Texas Bays and Estuaries Meeting

TBEM

Marine Science Institute
THE UNIVERSITY OF TEXAS AT AUSTIN

**Patton Center for Marine Science Education
Port Aransas, Texas
April 3-4, 2024**

Texas Bays and Estuaries Meeting

Patton Marine Science Education Center
The University of Texas at Austin
Marine Science Institute
Port Aransas, Texas

April 3 & 4 2024

This meeting would not be possible without the generous support of our sponsors

Table of Contents

Welcome!

The University of Texas Marine Science Institute is proud to host the 14th annual Texas Bays & Estuaries Meeting. We have a great program of talks and posters from all around the state! We are truly excited for the great turnout.

Please remember that all campus buildings, grounds, and outdoor spaces are nonsmoking.

Restrooms are located outside the auditorium in the new Patton Marine Science Education Center. Lunch will be provided on both days, and there will be catering for Wednesday night's poster session. Beer and wine will be available during the poster and Hors d'oeuvre session. You may wander freely with your drinks, but please do not leave the campus with them. Presenters will be next to their posters from 4:30 to 6:30 p.m. during the poster session on Wednesday evening (April 3rd) in the Lyceum.

Once again, thank you all for participating and we hope you enjoy the meeting. See you again next year!

Texas Bays and Estuaries Meeting Committee

Berit Batterton	Kyle Capistrant-Fossa	Victoria Congdon
Sharon Herzka	Joan Garland	Shelby Marincasiu
Adriana Reza	Mariana Rivera	Katie Swanson
Ingrid Vasconcellos	Tracy Weatherall	Tamara Rivera

Follow the meeting on social media with #TBEM2024
Wi-Fi Name: utguest
No Password

Sign up to receive UTMSI Emergency Alerts during the meeting:

https://r.i-info.com/UTMSI/Temp

Distinguished Speaker

Ms. Caimee Schoenbaechler, Manager, Coastal Science Department, Texas Water Development Board

Caimee Schoenbaechler leads a team of multidisciplinary scientists and engineers conducting data collection, modeling, and analysis of coastal water resources to support environmental flow management, planning for water supply and flood mitigation, and emergency oil spill response. She provides technical and administrative assistance to stakeholders, including the Texas Senate Bill 3 (2007) environmental flows adaptive management process, the Galveston Bay Council, and the Texas General Land Office's Coastal Management Program and Oil Spill Prevention and Response Program.

She began her career at The University of Texas Marine Science Institute as a Marine Research Assistant researching harmful algal blooms along the Texas Gulf Coast. Ms. Schoenbaechler has over 20 years of experience working in freshwater, coastal, marine, desert, and forest ecosystems. Her passion is bringing together ecological science for producing more effective management and policy of our natural resources.

She is a Certified Senior Ecologist, a graduate of the Texas Water Leaders Program, and holds a Master's degree in Environmental Management from Duke University and Bachelor degrees in Ecology, Evolution, and Conservation and Spanish from The University of Texas at Austin. She is a member of the Coastal and Estuarine Research Federation and The Ecological Society of America. Ms. Schoenbaechler is a 5th generation Texan who grew up on the Gulf Coast near Galveston, which inspired her to pursue a career in coastal resource management. In her spare time, you can find her adventuring in the great outdoors.

Invited Speaker

Dr. Krista L. Jankowski, Senior Scientist and Strategic Planner, Arcadis

Krista L. Jankowski specializes in the intersection of resilience planning, climate change adaptation, and project implementation. Before joining the Policy, Planning, and Funding team at Arcadis, Dr. Jankowski applied her expertise in a position with the Louisiana Coastal Protection and Restoration Authority. There, she led the development of the State's 2023 Coastal Master Plan, a $50 billion/50-year predictive modeling and project planning effort that guides investments in restoration and risk reduction projects in coastal Louisiana.

Dr. Jankowski earned her Ph.D. from Tulane University, where she delved into understanding the impact of environmental and climate change on coastal Louisiana wetlands. Her dedication to addressing the Louisiana coastal crisis through data-driven decision-making and extensive stakeholder involvement earned her the Tulane School of Science and Engineering's Outstanding Service Young Alumna Award in 2023. Through her work, Dr. Jankowski and her team illuminated how individuals and communities might experience future environmental changes, including sea level rise, enabling informed decision-making amidst climate uncertainty.

Beyond her academic achievements, Dr. Jankowski is a Licensed Professional Geoscientist in Louisiana and was honored with a National Academies of Science Gulf Research Program Science Policy Fellowship in 2017. She holds bachelor's degrees in Geology and Political Science from Macalester College (St. Paul, MN) and a master's in Climate & Society from Columbia University (New York, NY). Previously, she authored the National Park Service's Junior Paleontology Activity Book, which has engaged over 250,000 kids across the US and around the world. She also worked as a High School Biology Teacher in Memphis, TN, and as a Technical Advisor for the Red Cross Climate Centre where she worked to integrate climate change-related tools into disaster risk reduction practices in Southeast and Central Asia.

Wednesday, April 3, 2024

7:45 AM - **Registration,** Patton Center for Marine Science Education, The University of Texas Marine Science Institute, 855 East Cotter Avenue, Port Aransas, Texas

8:30 AM - **Welcome and Opening Remarks,** Dr. Ed Buskey, Director, The University of Texas Marine Science Institute

8:45 AM - **Distinguished Speaker: Advancing Coastal Science for Water and Flood Planning**
Caimee Schoenbaechler (Texas Water Development Board)

SEDIMENT PROCESSES AND HYDRODYNAMICS

*presenter

9:15 AM - **Flushing time in major coastal bays in the northern Gulf of Mexico from 20-year simulations**
Jiabi Du* (Texas A&M University at Galveston), Kyeong Park (Texas A&M University at Galveston), Kyle Wright (Texas Water Development Board), and Xinping Hu (Texas A&M University at Corpus Christi)

9:30 AM - **Remobilization, transport, and trapping of the Hurricane Harvey flood deposit in Galveston Bay 4 years after initial deposition**
Timothy M. Dellapenna* (Texas A&M University at Galveston), Nathalie Jung* (Texas A&M University at Galveston), Richard Schenk (Texas A&M University at Galveston), Scott Sudduth (Texas A&M University at Galveston), Peng Lin (Savannah River Ecological Laboratory, University of Georgia), and Jens Figlus (Texas A&M University)

9:45 AM - **The Lost Estuary, Land Cut, and Sand Sheet of Kenedy County, South Texas**
Randy Bissell* (Research Associate, Texas A&M University at Corpus Christi & Texas Master Naturalist™ South Texas Chapter)

10:00 AM - **BREAK**

RESTORATION

10:15 AM - **Origin of native soil amendments affects plant performance, diversity, and soil stability in coastal dune restoration plantings**
Kayla Zinsmeyer*, David Woods, and Kerri Crawford (University of Houston) (*student presentation*)

10:30 AM - **Blue Carbon and the Rio Grande Valley Artificial Reef**
Michelle King* and Dr. Richard Kline (University of Texas Rio Grande Valley) (*student presentation*)

10:45 AM - **Nueces Bay Rookery Islands: Habitat Restoration and Monitoring**
Rosario Martinez* (Coastal Bend Bays & Estuaries Program)

HABITATS AND ECOSYSTEMS

11:00 AM - **Impacts of regional climate change on South Texas marsh vegetation dynamics**
Berit E. Batterton* and Kenneth H. Dunton (University of Texas Marine Science Institute) (*student presentation*)

11:15 AM - **Habitat Suitability Index for Focused Flows: High Salinities Threaten Texas Estuaries**
Felipe Urrutia *, Paul Montagna Ph.D., and Daniel Coffey Ph.D. (Texas A&M University at Corpus Christi) (*student presentation*)

11:30 AM - **Microbes in polluted coastal dune soils**
Candice Y. Lumibao* and Yue Liu (Texas A&M University at Corpus Christi)

11:45 AM - **Six years later: what have we learned on Galveston Bay after natural disasters**
Hui Liu* (Texas A&M University at Galveston)

12:00 PM - **Lunch served in the Patton Center.** Participants are welcome to eat outside at tables under the science building or Patton Center.

1:00 PM - **A first look at seagrass populations in Baffin Bay, a semi-arid estuary in South Texas**
Sofia Armada Tapia* and Kenneth Dunton (University of Texas Marine Science Institute) (*student presentation*)

Wednesday, April 3, 2024

1:15 PM - **Measurements of Net Ecosystem Productivity in an Oxygen Saturated Seagrass Meadow**
Kyle A Capistrant-Fossa* (University of Texas Marine Science Institute), Megan Ballard (Applied Research Laboratories, The University of Texas at Austin), Kevin Lee (Applied Research Laboratories, The University of Texas at Austin), Andrew McNeese (Applied Research Laboratories, The University of Texas at Austin), Colby Cushing (Applied Research Laboratories, The University of Texas at Austin), Thomas Jerome (Applied Research Laboratories, The University of Texas at Austin), Preston Wilson (Walker Department of Mechanical Engineering and Applied Research Laboratories, The University of Texas at Austin), and Kenneth H Dunton (University of Texas Marine Science Institute) (*student presentation*)

1:30 PM - **Driving Factors of Mangrove Morphology is Dependent on Life Stage**
Jacob Doty* (Texas A&M University at Corpus Christi) (*student presentation*)

1:45 PM - **Mangrove mortality, recovery, and shifts in marsh-mangrove dominance along a catastrophic freeze gradient from the Rio Grande Valley to Port O'Connor**
Drs. C. Edward Proffitt* and Donna J. Devlin (Texas A&M University at Corpus Christi)

2:00 PM - **The effects of low inflow on a snook nursery community in the Rio Grande River, Texas**
Ethan Getz*, Perry Trial, and Catherine Eckert (Texas Parks & Wildlife Department)

INVERTEBRATE ECOLOGY

2:15 PM - **Reconstructed Environmental Stress Histories from Geochemical Records in Eastern Oyster Shells from Subtropical Estuarine Systems**
Jessica Randall* (Texas Parks & Wildlife Department) and Benjamin Walther (Texas A&M University at Corpus Christi)

2:30 PM - **BREAK**

2:45 PM - **Understanding biological impacts and recovery timelines for benthic invertebrates following nourishment on Texas beaches**
Melanie Ponce* (HRI), Kim Withers (Texas A&M University at Corpus Christi), Terry Palmer (HRI), Natasha Breaux (HRI), Erin Hill (HRI), and Jennifer Beseres Pollack (HRI) *(student presentation)*

3:00 PM - **Die-hard: Sudden, localized outbreak and thermal stress survivorship of the non-native worm *Ficopomatus enigmaticus* in Galveston Bay, Texas**
Vanessa Fernandez-Rodriguez* and Anja Schulze (Texas A&M University at Galveston) (*student presentation*)

POLICY, ECONOMICS AND COMMUNCIATION

3:15 PM - **Harmonizing Nature: A Complementary Approach to Science Communication**
Heidi Ballew* and Loretta Battaglia (Texas A&M University at Corpus Christi, Center for Coastal Studies)

3:30 PM - **The Social Science of Water Quality: Determining Beach Use to inform Texas Beach Watch Management**
Christine Hale* (Harte Research Institute), Diana Del Angel (Harte Research Institute), Coral Lozada (Harte Research Institute), Jason Pinchback (TX General Land Office), and Lucy Flores (TX General Land Office)

3:45 PM - **Up2U Litter Campaign: Cultivating Personal Responsibility for Litter Prevention in the Texas Coastal Bend**
Kathryn Tunnell* (Coastal Bend Bays & Estuaries Program)

4:00 PM - **Implementation of the Coastal Texas Project**
Tony Williams* (Texas General Land Office), Nicole Sunstrum (Gulf Coast Protection District), and LTC Ian O'Sullivan (US Army Corps of Engineers)

4:15 PM - **Social Conflict and the Industrialization of the Texas Coast during the 20th Century**
Blake Earle* (Texas A&M University at Galveston)

4:30 PM - **Poster Session / Hors d'oeuvres.** Located in the Marine Science Institute Lyceum, between the main lab and administrative buildings.

6:30 PM - **Social Event** located on the lawn by Patton Center

Poster Session Program

HABITATS AND ECOSYSTEMS

1 **Importance of biogenic serpulid reefs in Baffin Bay**
Natasha Breaux*, Terry Palmer, Jen Gilmore, Auria Avalos, and Jennifer Beseres Pollack (HRI, Texas A&M University at Corpus Christi)

2 **In Situ Habitat Data Collection with Concurrent Fisheries Independent Data along the Texas Coast**
Chelsea Crosby*, Story Lesher*, Jake Harris, Evan Pettis, and David Norris (TPWD Habitat Assessment Team)

3 **Determining the effects environmental pollution have on the colonization of arbuscular mycorrhizae fungi (AMF) in coastal dune grass species**
Breanna Garcia* and Dr. Candice Y. Lumibao (Texas A&M University Corpus Christi) (*student presentation*)

4 **Development of an Image Analysis Method to assess Potential impacts of Sediment Plumes on *Halodule wrightii* and its Epiphytes.**
Collin Kerr*, Kirk Cammarata, Austin Hamilton, Fabian Castro, Alex Bailey, Laura Ramirez, and Samantha Maupin (Texas A&M University at Corpus Christi) (*student presentation*)

5 **Intraspecific genotypic variation in *Schoenoplectus americanus* influences soil microbial diversity and functions under different Nitrogen conditions**
Yue Liu*, Mikaelia Robinson, Nathin Shiryaev, and Dr. Candice Lumibao (Texas A&M University Corpus Christi) (*student presentation*)

6 **Characterization of Contaminant Tolerant Soil Microbes Using Single and Mixed Species Culture on Mustang Island**
Dr. Candice Lumibao and Georgia Harris* (Texas A&M University at Corpus Christi) (*student presentation*)

7 **Freshwater Inflow to Texas Bays and Estuaries**
Paul Montagna* and Audrey Douglas (Texas A&M University at Corpus Christi)

8 **Updated maps of shallow and terrestrial coastal habitats in the Aransas Bay system**
David Norris*, Jake Harris, Evan Pettis, Story Lesher, Emma Clarkson, and Travis Sterne (Texas Parks & Wildlife Department)

9 **Development of Seagrass Epiphyte Image Analysis to Detect Changing Environmental Conditions**
Carissa Pinon*, Chi Huang, and Kirk Cammarata (Texas A&M University at Corpus Christi) (*student presentation*)

10 **Utilizing Earth Observations to Evaluate Texas Mangroves' Stress and Recovery in Response to Extreme Freeze in 2021**
Jennifer Ruiz* and Dr. Steven C Pennings (University of Houston) (*student presentation*)

11 **Region and species impact transferability of geospatial informatics tools in salt marsh vegetation modeling**
Kyle Runion* (University of Texas at Austin), Deepak Mishra (University of Georgia), Merryl Alber (University of Georgia), and Jessica O'Connell (Colorado State University) (*student presentation*)

12 **Piloting a Coastal Monitoring Community Science Project With Texas Fishing Guides**
Alexis M. Sabine* and Laura Picariello (Texas Sea Grant)

13 **Oysters, reef communities and carbon sequestration: environmental conditions driving shell growth**
Kelley Savage* (HRI), Keisha Bahr (Texas A&M University Corpus Christi), and Jennifer Beseres Pollack (HRI) (*student presentation*)

14 **The Influence of Aridity on Biomass Allocation in *Avicennia germinans* (Black Mangrove) Along a Latitudinal Gradient in the Texas Marsh-Mangrove Ecotone**
Maxwell D. Portmann* (Texas A&M University at Corpus Christi) (*student presentation*)

15 **Characterizing Cyanobacterial Mats on Wind-Tidal Flats at Padre Island National Seashore**
Zahra Hasan* (HRI), Isabel Nykamp (HRI), Kim Withers (TAMUCC Center for Coastal Studies), Stacy Trackenberg (HRI), Terry Palmer (HRI), Erin Hill (HRI), and Jennifer Beseres-Pollack (HRI) (*student presentation*)

16 **Developing Methods for Elevation Restoration on Wind-Tidal Flats in South Texas**
Isabel Nykamp* (Harte Research Institute), Dr. Jennifer Beseres Pollack (HRI), Dr. Kim Withers (Texas A&M University at Corpus Christi), Dr. Stacy Trackenberg (HRI), Dr. Terry Palmer (HRI), and Zahra Hasan (HRI) (*student presentation*)

17 **Comparative evaluation of oyster spat settlement and retention on shell, limestone and river rock cultch types used for restoration of Texas oyster reefs, *Crassostrea virginica***
Loren Horn* (Texas A&M University Galveston), Shambu Paudel, Carey Gelpi, and Joshua Leleux (Texas Parks & Wildlife) (*student presentation*)

18 **Spatial distribution of organic matter content of restored oyster reefs**
Kalie Tovar*, Kelley Savage, and Jennifer Beseres Pollack (HRI, Texas A&M University at Corpus Christi) (*student presentation*)

19 **The Importance of Stakeholder Engagement in Oyster Restoration Efforts**
Margaret Wheat-Walsh* and Lindsey Savage (Texas Parks & Wildlife Department-Restoration and Artificial Reefs Team)

20 **Effects of severe weather events on water quality in a TX estuary using a signal processing approach**
Mai S. Fung* (National Center for Ecological Analysis and Synthesis), Raymond Czaja Jr (National Center for Ecological Analysis and Synthesis), Xinping Hu (Texas A&M University Corpus Christi), Jennifer Pollack (Texas A&M University Corpus Christi), Paul Montagna (Texas A&M University Corpus Christi), Zachary Olsen (Texas Parks & Wildlife Department), Christine Jensen (Texas Parks & Wildlife Department), Zong-Liang Yang (The University of Texas at Austin), Zhanfei Liu (University of Texas Marine Science Institute), and Christopher Biggs (University of Texas Marine Science Institute)

WATER QUALITY AND CHEMISTRY

21 **Oxygen and hydrogen isotope composition of precipitation in Port Aransas, Texas**
Ryan Hladyniuk*, Patricia Garlough, and Alton Hensch (University of Texas Marine Science Institute)

VERTEBRATE SCIENCE

22 **Over-summering of migratory whooping cranes (*Gris americana*) on their wintering grounds**
Paityn Bower*, Matti Bradshaw, Carter Crouch, Arianna N. Barajas, Alicia M. Ward, Hillary L. Thompson, and Elizabeth H. Smith (International Crane Foundation)

FISH AND FISHERIES

23 **Spatial Patterns and Environmental Predictors of Trophy Spotted Seatrout in the Upper Laguna Madre, Texas**
Elliot Briell*, Ethan Getz, and Catherine Eckert (Texas Parks & Wildlife Department)

24 **Habitat use and Movement of Parrotfish on Coral Seascapes in the Flower Garden Banks National Marine Sanctuary**
Lelaina Clayburg* (University of Texas Rio Grande Valley), Marissa Nuttall (Texas A&M University Galveston), Jay Rooker (Texas A&M University Galveston), Robert Wells (Texas A&M University Galveston), Michael Dance (Louisiana State University), and Richard Kline (University of Texas Rio Grande Valley) (*student presentation*)

25 **Menhaden Mismatch: Population Trends in Texas Bays**
Charles Downey*, Ethan Getz, and Elizabeth Benson (Texas Parks & Wildlife Department)

26 **Regulating Acid-Base Balance in Larval Sheepshead Minnows Along a Salinity Gradient**
Lu Lin* and Andrew Esbaugh (University of Texas Marine Science Institute) (*student presentation*)

27 **Assessing Relative Abundance and Broodstock-Recruitment Relationships of the Eastern Oyster (*Crassostrea virginica*) Across Four Texas Bays**
Jeremy McCulloch* and Zachary Olsen (Texas Parks & Wildlife Department-Coastal Fisheries Division)

28 **Revealing the hidden trophic roles of cryptobenthic blennies on the Texas Gulf Coast**
Hannah S. Rempel* (UTMSI), John Majoris (Texas A&M Corpus Christi), Juan Pablo Lozano Peña (UTMSI), C. Melman Neill (UTMSI), Mariana Rivera Higueras (UTMSI), Jordan Casey (UTMSI) (*student presentation*)

29 **Estimation of Fish Biomass on the RGV Reef Using Split Beam Sonar**
Allison White* and Richard Kline (University of Texas Rio Grande Valley) (*student presentation*)

30 **From Shore to Shells: Assessing Resilience of Genetically Different Eastern Oyster (*Crassostrea virginica*) Populations in Texas**
Alexandra M. Good*, Kate Gomez-Rangel, Joseph Matt, Christopher Hollenbeck, Keisha D. Bahr (Texas A&M University at Corpus Christi) (*student presentation*)

SEDIMENT PROCESSES AND HYDRODYNAMICS

31 **Spatial Gradient of Sediment Impacts on Seagrass Beds from Oil Tanker Docking and Shipping**
Kirk Cammarata* (TX A&M University-Corpus Christi), Collin Kerr (Texas A&M University-Corpus Christi), Austin Hamilton (Texas A&M University-Corpus Christi), Carissa Pinon (Texas A&M University-Corpus Christi), Patrick Nye (Ingleside On the Bay Coastal Watch Association), and Hua Zhang (Texas A&M University-Corpus Christi)

32 **Assessing Anthropocene History and Mercury Distribution in Sediments of Matagorda Bay, Texas, USA**
Yoonho Jung* (Texas A&M University), Timothy Dellapenna (Texas A&M University), Christina Belanger (Texas A&M University), Peng Lin (University of Georgia), and Wei Xing (University of Georgia) (*student presentation*)

32 **Understanding How Interactions Between Bathymetry and Current Velocities Affect Fish Assemblages of the RGV Reef**
Annie Zeiler* (University of Texas Rio Grande Valley), Richard Kline (University of Texas Rio Grande Valley) (*student presentation*)

Thursday, April 4, 2024

*presenter

8:30 AM - **Registration,** Patton Center for Marine Science Education, The University of Texas Marine Science Institute, 855 East Cotter Avenue, Port Aransas, Texas

FISH AND FISHERIES

9:15 AM - **Changes to behavior and metabolism with temperature acclimation in the sheepshead minnow (*Cyprinodon variegatus*)**
Madison Schumm*, Kerri Lynn Ackerly, and Andrew Esbaugh (University of Texas Marine Science Institute) (*student presentation*)

9:30 AM - **Fast or Slow? Evaluating Pace-of-Life Syndromes in Gulf Coast Blennies**
C. Melman Neill*, Madison Schumm, Mariana Rivera-Higueras, and Simon Brandl (University of Texas Marine Science Institute) (*student presentation*)

9:45 AM - **The use of eDNA in comparison to trawl and historical catch data for assessing marine finfish in Matagorda Bay, Texas**
Polly Hajovsky*, Damon Williford, Corey Waddell, Emily Miller, Caren Utley, Leslie Hartman, and Joel Anderson (Texas Parks & Wildlife)

10:00 AM - **Stability of bait fishes assemblage structure in South Bay, Texas**
Carlos E. Cintra Buenrostro* (University of Texas Rio Grande Valley), Jason Ferguson, and Andres Garcia (Lower Laguna Madre, Texas Parks & Wildlife Department Coastal Fisheries Division)

10:15 AM - **Southern Flounder in Texas Estuaries: An Examination of Size Specific Catch Rate Trends in the Context of Climate Related Population Impacts**
Donella Strom*, Zachary Olsen, and Joel Anderson (Texas Parks & Wildlife Department)

10:30 AM - **BREAK**

10:45 AM - **An Ancient Fish in a Current Estuary: Investigating Alligator Gar Movement and Habitat Use in Coastal Texas**
Jillian Swinford*, Joel Anderson, Carey Gelpi, Shambhu Paudel (Texas Parks & Wildlife Department, Coastal Fisheries Division), and Dan Daugherty (Texas Parks & Wildlife Department, Inland Fisheries Division)

Thursday, April 4, 2024

11:00 AM - **Assessing the distribution of acoustic fish backscatter associated with seafloor characteristics at two natural reefs within the Gulf of Mexico**
Marissa Lamb* and Dr. Richard Kline (University of Texas Rio Grande Valley) (*student presentation*)

11:15 AM - **Environmental and trophic drivers of key estuarine fishery species using nonlinear structural equation modeling**
Raymond Czaja Jr* (National Center for Ecological Analysis and Synthesis, University of California, Santa Barbara), Mai Fung (National Center for Ecological Analysis and Synthesis, University of California, Santa Barbara), Zachary Olsen (Texas Parks & Wildlife Department), Christine Jensen (Texas Parks &Wildlife Department), Jennifer Pollack (HRI, Texas A&M University at Corpus Christi), Paul Montagna (HRI, Texas A&M University at Corpus Christi), and Christopher Biggs (University of Texas Marine Science Institute)

11:30 AM - **Historic freshwater inflow silences an estuarine ecosystem**
Philip Souza, Jr.*, and Simon Brandl (University of Texas Marine Science Institute) (*student presentation*)

11:45 AM - **The Reef Road: Monitoring, Management, Research, and Restoration Along the Path of Oyster Sustainability in Texas**
Zachary Olsen* (Texas Parks & Wildlife Department)

12:00 PM - **Lunch served in the Patton Center.** Participants are welcome to eat outside at tables under the science building or Patton Center.

1:00 PM - **Invited Speaker: Gaining perspective on losing land: How data and methodology impact understanding of sea level rise in coastal Louisiana**
Krista L. Jankowski, Arcadis

WATER QUALITY AND CHEMISTRY

1:30 PM - **Quantifying the Background Levels of n-alkanes in Central and South Texas Bays and Estuaries**
Jack Lloyd*, Kaijun Lu, and Zhanfei Liu (University of Texas Marine Science Institute) (*student presentation*)

1:45 PM - **Evaluating the chemical levels of soil, groundwater, bay water, and bay sediment in Port Bay region**
Kaijun Lu* (UTMSI), Jack Lloyd (UTMSI), Jianhong Xue (UTMSI), Jace Tunnell (Texas A&M University at Corpus Christi), Kristin Nielsen (UTMSI), Zhanfei Liu (UTMSI)

Thursday, April 4, 2024

2:00 PM - **Assessment of Water Quality in a Model Coastal Bend Canal Community**
Nicole C. Powers (Texas A&M Corpus Christi), Nora J.C. Bleth* (Texas A&M Corpus Christi), Andrew Johnson (Texas A&M Corpus Christi), Jacqueline Nicolay (Texas A&M Corpus Christi), Ray Ayers (Citizen Scientist), and Jeffrey W. Turner (Texas A&M Corpus Christi) (*student presentation*)

2:15 PM - **Preservation of soil organic carbon at a mangrove–salt marsh ecotone following a lethal freeze event**
Kody Barone*, Kaijun Lu, and Zhanfei Liu (University of Texas Marine Science Institute) (*student presentation*)

2:30 PM - **River Discharge Effects on Chlorophyll Concentration Variability in the Northwestern Gulf of Mexico**
Wumi Andrew*, Xinping Hu, and Lei Jin (Texas A&M University at Corpus Christi) (*student presentation*)

2:45 PM - **BREAK**

VERTEBRATE SCIENCE

3:00 PM - **Responses to saltwater exposure vary across species, populations, and life-stages in anuran amphibians**
Molly Albecker* (University of Houston) and Michael McCoy (Florida Atlantic University)

3:15 PM - **The Effect of Island Traits on Colony Dynamics of Five Colonial Waterbird Species on the Texas Coast**
David Essian* (HRI), Jessica Magolan (HRI), Liam Wolff (HRI), David Newstead (CBBEP), Diana del Angel (HRI), Christine Hale (HRI), Matthew Streich (HRI), Bart Ballard (Caesar Kleberg Wildlife Research Institute), Jim Gibeaut (HRI), and Dale E. Gawlik (HRI)

3:30 PM - **CINDI: a co-production project to guide waterbird colony island rehabilitation on the Texas coast**
Dale E. Gawlik* (HRI), David A. Essian (HRI), Rostam Mirzadi (HRI), Jordan Giese (Caesar Kleberg Wildlife Research Institute), David J. Newstead (Coastal Bend Bays & Estuaries Program), Bart Ballard (Caesar Kleberg Wildlife Research Institute), Jessica Magolan (HRI), James Gibeaut (HRI), Matthew K. Streich (HRI), Liam G. Wolff (HRI), Christine Hale (HRI), and Diana del Angel (HRI)

3:45 PM - **Space Use and Movements of Inland Wintering Whooping Cranes in the Aransas-Wood Buffalo Population**
Carter G. Crouch, Andrew J. Caven, Matti R., Katrina M. Fernald* (International Crane Foundation), and Matthew J. Butler (US Fish and Wildlife Service)

4:00 PM - **Roost site use of wintering whooping cranes in the Aransas-Wood Buffalo Population**
Matti R. Bradshaw*, Carter G. Crouch, Katrina M. Fernald, Andrew J. Caven, Sundas Rehman, and Dorn M. Moore (International Crane Foundation)

4:15 PM - **Student Awards**

4:30 PM - **Closing**

Student Awards

Student presentations and posters are an important aspect of this meeting. Student awards for presentations and posters are just some ways to acknowledge excellence in research. The Coastal Bend Bays & Estuaries Program generously sponsors the best student presentation awards. Student oral presentations will be awarded with 1st ($200), 2nd ($150), and 3rd ($100) place prizes. Student posters will be awarded with 1st ($150), 2nd ($100), and 3rd ($50) place prizes.

Previous Oral Presentation Winners:

2014: **Philip Jose,** Texas A&M University-Corpus Christi, 1st Place
Rachel Arney, The University of Texas- Brownsville, 2nd Place
Quentin Hall, Texas A&M University-Corpus Christi, 3rd Place

2015: **Meredith Evans,** The University of Texas Marine Science Institute, 1st Place
Kathryn Mendenhall, Texas A&M University-Corpus Christi, 2nd Place
Juliet Lamb, Clemson University and Department of Forestry and Environmental Conservation, 3rd Place

2016: **Meredith Evans,** The University of Texas Marine Science Institute, 1st Place
Nick Reyna, The University of Texas Marine Science Institute, 2nd Place
Victoria Congdon, The University of Texas Marine Science Institute, 3rd Place

2017: **Austin Green,** The University of Texas Rio Grande Valley, 1st Place
Alex Tompkins, Texas A&M University-Corpus Christi, Harte Research Institute, 2nd Place
Erin Reed, The University of Texas Marine Science Institute, 3rd Place (tie)
Victoria Congdon, The University of Texas Marine Science Institute, 3rd Place (tie)

2022: **Jennifer Gilmore,** Harte Research Institute, Texas A&M University-Corpus Christi, 1st Place
Jacob Doty, Texas A&M University-Corpus Christi, 2nd Place
Kaiya Shealy, Texas A&M University-Corpus Christi, 3rd Place

Awards sponsored by Coastal Bend Bays & Estuaries Program

Previous Poster Winners:

2014:   **Melissa McCutcheon,** Texas A&M University-Corpus Christi, 1st Place
       Kevin DeSantiago, Texas A&M University-Corpus Christi, 2nd Place
       John Mohan, The University of Texas Marine Science Institute, 3rd Place

2015:   **Ashley Whitt,** Texas A&M University-Galveston, 1st Place
       Jason Jenkins, The University of Texas Marine Science Institute, 2nd Place
       Eric White, Texas A&M University-Corpus Christi, 3rd Place

2016:   **Natasha Breaux,** Texas A&M University-Corpus Christi, Harte Research Institute, 1st Place
       Rachel Edwards, Texas A&M University-Corpus Christi, Harte Research Institute, 2nd Place
       Jake Loveless, Texas A&M University-Corpus Christi, 3rd Place

2017:   **Hailey Boeck,** Texas A&M University-Corpus Christi, 1st Place
       Tyler Schact, Texas A&M University-Corpus Christi, 2nd Place
       Kesley Gibson, Texas A&M University-Corpus Christi, Harte Research Institute, 3rd Place

2022:   **Alyssa Outhwaite,** Harte Research Institute, Texas A&M University-Corpus Christi, 1st Place
       Felipe Urrutia, Harte Research Institute, Texas A&M University-Corpus Christi, 2nd Place
       Kathleen Roark, The University of Texas Marine Science Institute, 3rd Place.

       Awards sponsored by Coastal Bend Bays & Estuaries Program

Abstracts for Oral Presentations

SEDIMENT PROCESSES AND HYDRODYNAMICS

Flushing time in major coastal bays in the northern Gulf of Mexico from 20-year simulations

Jiabi Du* (Texas A&M University at Galveston), Kyeong Park (Texas A&M University at Galveston), Kyle Wright (Texas Water Development Board), and Xinping Hu (Texas A&M University at Corpus Christi)

Flushing time (or mean residence time) is a bulk transport timescale frequently used to measure the overall renewal capacity of a water body. When compared to the timescale of biogeochemical process, flushing time can be used to indicate the relative importance of physical transport processes relative to biogeochemical processes in determining the concentration and export rate of materials such as nutrients, sediment, petrochemical pollutants, fish larvae abundance, and phytoplankton biomass. Based on a well-validated numerical model, we for the first time estimated the flushing time over 20 years (2000-2019) for 13 major coastal bays in Texas, Louisiana, Alabama, and Florida panhandle along the northern Gulf coast. To resolve the uncertainty induced by how diffusion is parameterized in the particle-tracking model, we carried out tracer-based numerical experiments to correct the results from the particle-tracking model. The long-term mean, seasonality, and interannual variabilities of flushing time will be presented. By comparing with the estimates from the freshwater fraction method, we demonstrate that the freshwater fraction method greatly overestimates the flushing time in coastal bays with limited freshwater input. For these bay systems, shelf dynamics, together with subtidal exchange, play a more important role than the freshwater input in renewing the water.

Remobilization, transport, and trapping of the Hurricane Harvey flood deposit in Galveston Bay 4 years after initial deposition

Timothy M. Dellapenna*(Texas A&M University at Galveston), Nathalie Jung (Texas A&M University at Galveston), Richard Schenk (Texas A&M University at Galveston), Scott Sudduth (Texas A&M University at Galveston), Peng Lin (Savannah River Ecological Laboratory, University of Georgia), and Jens Figlus (Texas A&M University) (*presentation withdrawn*)

The floods associated with Harvey deposited 131.34x106 tons of sediment in Galveston, with an average thickness of 14 cm across all of Trinity and upper Galveston Bay. In the four years after Harvey, 27% of the deposit has eroded, increasing the bay's suspended sediment load by 9% annually. San Jacinto Bay (SJB), located in northwestern Galveston Bay (GB), has subsidence rates of 1.5-2.2 cm y^{-1} and has an average sedimentation rate of 2.6 cm y^{-1}, indicating that SJB is a net sediment sink. Additionally, the Bayport Flare/Channel, located with SJB, has experienced a 25% (6.25% annually) increase in siltation since Hurricane Harvey (2017). Sediment Trend Analysis (STA) was performed on a grid of sediment grab samples from the SJB area reveals sediment transport convergence from all sides of SJB, with the dominant pathways from the most exposed portions of Galveston Bay to the south and southeast. This study demonstrates that the Hurricane Harvey flood deposit is so large that it is now part of the permanent sediment record within

the bay and concludes that the elevated siltation within SJB and the Bayport Flare/Channel is likely sourced from the eroded sediments sourced from the Hurricane Harvey flood deposit within Galveston.

The Lost Estuary, Land Cut, and Sand Sheet of Kenedy County, South Texas
Randy Bissell* (Research Associate, Texas A&M University at Corpus Christi & Texas Master Naturalist™ South Texas Chapter)

Along the Texas Coast there are named estuaries projecting inland and interrupting the shoreline behind the barrier island chain. These bays include Matagorda, San Antonio, Copano, Corpus Christi, and Baffin Bay. Each of these is a drowned Pleistocene river valley formed through hundreds of thousands of years of oscillating sea level. Each connects to a modern river system. With closer inspection, we notice that each occurs at a regular interval of about 25 to 35 miles along the coast. But south of Baffin Bay, there is no bay! Instead, 25 miles south there is a bight on the Laguna Madre shoreline. This is where Holocene windblown sands and silts from Padre Island have filled the Laguna Madre. These same sands and silts filled a "Lost" unnamed estuarine bay. The prevailing and continuous winds have driven sand inland to form the South Texas Sand Sheet covering the coastal plain. Larger than the state of Delaware, the Sand Sheet crosses deep South Texas. Understanding the origins of the Lost Estuary and South Texas Sand Sheet are fundamental to the appreciation and conservation of this amazing landscape. Several species of plants occur only on the Sand Sheet, and it hosts species including the ocelot, bobwhite quail, and white-tailed deer between areas of inhospitable and prevalent desert-like conditions. This presentation will introduce the Lost Estuary by covering the geography, geology, and landforms of the Kenedy County coast. It will briefly describe prior studies and future research aims to improve the understanding of the evolution of this uniquely South Texas landscape.

RESTORATION

Origin of native soil amendments affects plant performance, diversity, and soil stability in coastal dune restoration plantings
Kayla Zinsmeyer*, David Woods, and Kerri Crawford (University of Houston) *(student presentation)*

Coastal dune restorations preserve important ecosystem services, such as storm surge protection; however, these efforts often fail to establish healthy dunes. Recent studies support using microbial soil amendments to bolster restoration outcomes. These could be especially helpful in degraded dunes or nourished beaches, which have low soil microbial abundance and diversity. This greenhouse experiment investigated the differential impacts of native soil amendments from 11 established dunes across the Texas Gulf Coast on communities of dune plants. All live amendments improved plant performance, diversity, and soil stability, though the extent of improvement varied by the soil amendment's location of origin. Moreover, plant species responded differentially by location. The best-performing soil amendments originated from dunes with high plant diversity and NO3 availability, with one location significantly outperforming the others. Our results suggest functional variation exists among the microbial communities of Texas coastal dunes, and that these differences are responsible for key indicators of restoration success. A likely contributor to the widespread

improvements observed is arbuscular mycorrhizal fungi, generalist plant mutualists that increase nutrient availability and soil stability. Overall, this research offers criteria for maximizing the functionality of soil microbial amendments for restoration and opens opportunities to understand the mechanisms underlying plant-soil mutualisms. Both outcomes contribute to improving dune management strategies through the introduction of a robust microbial community that assists plant community development, a goal that benefits ecosystem services such as storm surge protection, recreation activities, and cultural practices.

Blue Carbon and the Rio Grande Valley Artificial Reef
Michelle King* and Dr. Richard Kline (University of Texas Rio Grande Valley) (s*tudent presentation)*

Blue carbon is the carbon captured within ocean ecosystems and contains over 1/3 of the world's excess carbon dioxide. Blue Carbon research is focused on plant-dominated habitats and reefs have long been overlooked for their roles in carbon sequestration. A comprehensive blue carbon study is currently taking place on the Rio Grande Valley Artificial Reef (RGV Reef). The RGV Reef is the largest artificial reef placement on the Texas coast and provides diverse habitats for settlement of encrusting invertebrate species. Encrusting species like *Leptogorgia* (Sea Whip Coral) have been documented to sequester carbon in their structures, laying the foundation for blue carbon studies of artificial reef structures hosting *Leptogorgia* and other encrusting invertebrates.
Blue Carbon on the RGV Reef will be calculated through analyses of individual carbon content and extrapolated into a reef wide calculation. Encrusting organism samples will be collected and assessed to determine carbon content per square meter of reef structure. Encrusting organism samples will be dried and processed through a carbon elemental analyzer to determine organic and inorganic carbon percentages. Additionally, videos taken at the time of sample collection will be reviewed to determine species abundance. Lastly, images will be reviewed in ImageJ software to calculate carbon per square meter on reef sites. The role of artificial reefs in the Blue Carbon budget is integral for understanding the added benefits of artificial reefs in struggling marine habitats worldwide.

Nueces Bay Rookery Islands: Habitat Restoration and Monitoring
Rosario Martinez (Coastal Bend Bays & Estuaries Program)

Since the 1960s, nesting islands in Nueces Bay, Texas have been lost to persistent erosion, hard shell dredging, and storm events. The Nueces Bay Rookery Islands are a group of 5 islands that serve as important rookies for colonial waterbirds such as black skimmers, herons, and egrets in Nueces Bay. These islands are important because there is limited amount of nesting (and loafing) habitat available to colonial waterbirds. In 2002, the islands were protected with geotubes, which was a great temporary solution; the geotubes began failing in 2015.   Protecting and restoring these islands would enhance bird populations in the entire Nueces Estuary by providing safe nesting and loafing habitat in west Nueces Bay, where nesting habitat has been rapidly declining.
Construction began in late November 2019 and completed in the summer of 2020 and included the placement of limestone rock around the perimeter of the five islands that were previously protected by geotubes. The area was filled with new material and provided over 3 acres of essential nesting habitat. This project was designed taking into consideration relative sea level rise, and current trends in high tides and storms. Annual colonial waterbird surveys have been conducted at the each of the islands (pre and post construction).

This presentation will discuss the obstacles faced during construction of the five rookery islands. The presentation will also discuss the monitoring efforts and adaptive management on the islands and reflect on the colonial waterbird nesting results.

HABITATS AND ECOSYSTEMS

Impacts of regional climate change on South Texas marsh vegetation dynamics
Berit E. Batterton* and Kenneth H. Dunton (University of Texas Marine Science Institute)
(student presentation)

Estuarine marshes are highly productive ecosystems, yet they can be sensitive to minor changes in climate that can drastically transform their emergent plant communities. This ecological instability can lead to cascading effects on critical marsh ecosystem functions and services, such as "blue carbon" sequestration, habitat provisioning, and shoreline protection. In Texas, air temperatures have increased 0.25-0.47°C per decade, and precipitation is becoming more variable, causing increased drought severity and estuarine hypersalinity. The Nueces Delta (Corpus Christi, TX) is a low-flow, heavily modified tidal wetland located at a precipitation and salinity-driven ecotonal boundary between wind-tidal microbial mat and either mangrove-dominant (southwards) or emergent marsh-dominant (northwards) vegetative assemblages. Therefore, Nueces Delta emergent plant communities are currently at risk of both long-term community composition shifts due to non-random species loss and overall vegetation loss with predicted increases in drought. Here, we seek to understand the environmental drivers of change in marsh vegetation composition in the Nueces Delta based on over two decades of continuous monitoring. We hypothesize that drought-related factors, such as vapor pressure deficit, soil water content, and pore water salinity, will significantly shift marsh community structure, particularly impacting species existing at their range limits (graminoid *Spartina alterniflora*). Using a Bayesian modeling approach, we quantified the impacts of various environmental factors on the proportions of wetland plant functional groups from 2001-2023.

Habitat Suitability Index for Focused Flows: High Salinities Threaten Texas Estuaries
Felipe Urrutia *, Paul Montagna Ph.D., and Daniel Coffey Ph.D. (Texas A&M University at Corpus Christi) *(student presentation)*

The Texas Coast harbors economically and ecologically important nekton species that rely on estuarine nurseries as essential habitats for successful juvenile recruitment. With further climate and anthropogenic pressures causing more drought, the resulting increase in salinities leads to loss of estuarine biodiversity. Therefore, this project aims to guide the strategic releasement of freshwater, or "focused flows," into estuarine environments by the Texas Water Development Board by assessing how historical changes in salinity impact Texas estuarine health and nekton recruitment. Juvenile nekton bag seine collections provided by the Texas Parks & Wildlife Department fishery-independent monitoring program from 1976 to 2022 were analyzed using a habitat suitability model framework to investigate the response of diversity metrics (species richness, diversity, and evenness) and the abundance of six indicator species (three invertebrate and three fish species) to environmental conditions across different freshwater inflow regimes (dry, average, and wet years). Diversity metrics and indicator species abundance displayed strong responses to season, estuarine type, distance to freshwater, and tidal inlet, among interspecific responses

to temperature, salinity, and dissolved oxygen. Implementing habitat suitability models using historical and predicted conditions under a focused flows strategy will identify strategic areas that require small volumes of freshwater, particularly during drought conditions, to maintain estuarine nekton diversity and abundance. This study provides a valuable decision-making tool to improve natural resource management stewardship of freshwater inflow and estuarine ecosystem health while promoting stability for coastal economies that rely on these ecosystems.

Microbes in polluted coastal dune soils
Candice Y. Lumibao* (Texas A&M University at Corpus Christi) and Yue Liu

Environmental pollution is a persistent ecological threat to coastal ecosystems through their adverse impacts on their biota. Long-term exposure of soil microbes, the critical players in many coastal biogeochemical processes, to these soil pollutants affects their growth and abundances, potentially leading to altered ecosystem functions. However, soil microbial communities might have the ability to bounce back or adapt, depending on the community composition i.e., microbial members and the individual capacity to tolerate contaminants. Here, we investigate how small-scale but chronic heavy metal pollution impact the functional and taxonomic diversity of soil bacterial communities, with the aim of gaining insights into potential contaminant tolerance of bacterial species. Using genomic approach, we analyzed 45 soil cores from two areas with a history of heavy metal contamination and oil pollution (former oil well pads) and from a nearby healthy area in the coastal prairie and marsh areas of Mustang Island. Comparisons of bacterial community compositions and isolation of potential contaminant-tolerant bacteria from the soils revealed a surprising maintenance of high bacterial diversity in contaminated areas, which might not impact the communities' overall functions. Preliminary analyses also reveal potential bacterial species capable of tolerating heavy metal in the soils. Our findings enriches our fundamental knowledge on microbial community dynamics and how contaminant exposure might disrupt these dynamics. These insights are important for predicting how microbe-mediated soil processes will change with environmental disturbances. Moreover, insights gained from our study can aid in coastal bioremediation and management.

SIX YEARS LATER WHAT HAVE LEARNED ON GALVESTON BAY AFTER NATURAL DISASTERS
Hui Liu* (Texas A&M University at Galveston)

Climate-driven events (e.g., hurricanes and droughts) along with man-made disasters (pollutants and oil spills) impose increasing threats to estuarine ecosystems. There is need for frequent and consistent monitoring activities to track the ecosystem status informing stakeholders for estuarine management decision making. While assessing these impacts is challenging, an integrated approach of monitoring estuarine ecosystems is promising through the development of time series data of relatively sensitive and broadly applicable ecosystem indicators. Our recent studies have shown that species of pelagic communities are sensitive to disturbances induced by hurricanes and human activities. Over three periods of 2008-2009, 2017-2018 and 2022-2023 we have collected/been collecting data in the bay including zooplankton, oyster larvae, water temperature, salinity, Chl-a, dissolved oxygen and pH etc. In this talk, I synthesize the data collected during the three periods on the past, recent and current status of the bay. Our goal is to provide science-based information in support of implementation and monitoring of Galveston Bay ecosystems fostering response and recovery of estuarine ecosystems in the wake of future disasters.

A first look at seagrass populations in Baffin Bay, a semi-arid estuary in South Texas
Sofia Armada Tapia* and Kenneth H Dunton (University of Texas Marine Science Institute)
(student presentation)

Seagrass meadows are valuable benthic habitats that provide important ecological functions and ecosystem services. However, their condition and distribution are dependent on favorable light environments. Environmental changes that affect water transparency can shift their distribution and abundance. Because of their rapid response to abiotic stressors and anthropogenic disturbances, seagrasses can be used as indicators of ecosystem health. Baffin Bay is a semi-arid estuary that is known for its economic importance for sport and commercial fisheries but is now facing problems related to eutrophication. To better document the sources of nutrient loadings and their effects on the seagrass meadows, we initiated a long-term monitoring program that detects changes in the ecosystem in response to environmental stressors. The main objective of this study was to determine the quantitative relationship between physical and biotic parameters that control the distribution and persistence of seagrass populations. We surveyed seagrass community composition at 110 stations in Baffin Bay following Tier-2 protocols developed by Neckles et al. (2012). Water quality was analyzed by measuring the hydrographic conditions at each station using a YSI data sonde and total suspended solids. Furthermore, we measured species composition and percent cover using a 0.25m2 quadrant and sampled seagrass leaf tissue to analyze for isotopic and stoichiometric signatures. We found Halodule wrightii was the most abundant species although its distribution was sparse throughout the bay. Our results provide insight into the environmental conditions in Baffin Bay. This data can help decision-makers develop management practices and regulatory policies to conserve these critical habitats.

Measurements of Net Ecosystem Productivity in an Oxygen Saturated Seagrass Meadow
Kyle A Capistrant-Fossa* (University of Texas Marine Science Institute), Megan Ballard (Applied Research Laboratories, The University of Texas at Austin), Kevin Lee (Applied Research Laboratories, The University of Texas at Austin), Andrew McNeese (Applied Research Laboratories, The University of Texas at Austin), Colby Cushing (Applied Research Laboratories, The University of Texas at Austin,), Thomas Jerome (Applied Research Laboratories, The University of Texas at Austin), Preston Wilson (Walker Department of Mechanical Engineering and Applied Research Laboratories, The University of Texas at Austin), and Kenneth H Dunton (University of Texas Marine Science Institute)
(student presentation)

Seagrasses are highly productive marine plants that provide numerous ecosystem services including "blue" carbon sequestration, sediment stabilization, animal food and refugia, and nutrient cycling. Measurement of net ecosystem productivity (NEP) provides a measure of ecosystem balance with respect to photosynthesis and respiration. In seagrass systems, measures of NEP reflect whether beds are net heterotrophic or autotrophic based on diel changes in dissolved oxygen. The ability of oxygen to dissolve in water is primarily a function of temperature, salinity, and pressure; gas supersaturation is common in warm, shallow, salty environments (i.e., Texas' seagrass meadows) and often results in ebullition (bubble formation). The presence of mixed-phase oxygen in supersaturated seawater creates difficulties for oxygen measurements because dissolved oxygen sensors only measure the dissolved phase. Therefore, to develop an accurate oxygen budget needed to characterize net ecosystem metabolism, dissolved oxygen measurements must be taken in conjunction

with separate ebullition measurements. Here, we seek to understand the drivers of NEP for a *Thalassia-testudinum*-dominated meadow in the western Gulf of Mexico. We hypothesize that oxygen ebullition will significantly increase NEP, particularly during the summer months because of photosynthetic dependence on temperature and solar irradiance. Seagrass meadows become saturated with oxygen from 08:00 – 22:00 with maximum occurring at 14:00. Seasonally, most ebullition occurs during July. Gross primary production is lowest in July due to high rates of respiration as well as high air-sea exchange (-300 mg O_2 m^{-2} d^{-1}), but production from oxygen ebullition causes the system to be net autotrophic (1500 mg O_2 m^{-2} d^{-1}).

Driving Factors of Mangrove Morphology is Dependent on Life Stage

Jacob Doty* (Texas A&M University at Corpus Christi) *(student presentation).*
Coastal wetlands are valuable resources both ecologically and economically. In Texas, anthropomorphic climate change is driving a shift in foundational wetland flora from predominantly herbaceous forbs/graminoids towards dominance by woody shrubs. Warming winter minimum temperatures have facilitated the poleward expansion of *Avicennia germinans* L.(L) (Black Mangrove) into coastal salt marshes along the Texas coast. However, current climate models predict increases in extreme low temperature disturbance events which may cause mass mortality of black mangrove stands. Understanding the response of black mangrove populations to extreme freeze disturbances will be paramount in understanding the future state of coastal Texas wetlands. The Feb. 2021 hard freeze brought temperatures so low that many mangroves in the region were killed and survivors resprouted from the base because destruction of living aboveground plant biomass was nearly 100%. The survival, growth rate, and time until reproductive viability of mangrove seedlings and resprouting adults will be critical in understanding the rate and extent of black mangrove recovery and continued population expansion. In coastal wetlands biogeochemical conditions are often dictated by elevation which tends to increase farther from the open water. Preliminary results found that there is a difference in driving factors of mangrove morphology between the adult and seedling life stages. For adults, morphological traits such as height (p=1.96e-10; R2=0.47), canopy area (p=3.105e-5; R2=0.23), and trunk diameter at 20 (p=0.003; R2=0.36) and 120 (p=0.012, R2=0.24) centimeters were all correlated with distance from open water (a proxy for elevation and flooding frequency). For seedlings, morphological traits such as height, canopy area, leaf number (p=2.5e-5; R2=0.11), branch number, and trunk diameter at 20 centimeters showed no relationship or low correlation with distance from open water indicating some other (possibly biotic) driving factor of black mangrove seedling morphology.

Mangrove mortality, recovery, and shifts in marsh-mangrove dominance along a catastrophic freeze gradient from the Rio Grande Valley to Port O'Connor

Drs. C. Edward Proffitt* and Donna J. Devlin (Texas A&M University at Corpus Christi)

We assessed the effects of the 2021 catastrophic freeze on marsh/mangrove (*Avicennia germinans*) vegetation at 7 sites across a latitudinal gradient (26°-28°N) in Texas. GAM analysis of mortality as a function of minimum temperature revealed a non-linear, sigmodial, pattern. Predicted mortalities were: 25% at -6.1°C, 50% at -6.5°C, 75% at -7.2°C, 80% at -7.4°C, 90% at -7.7°C, and >95% at -8°C. The tipping point for leaf damage fell between -4.9°C at the Lower Rio Grande Valley National Wildlife Refuge (NWR) and -5.7°C at Laguna Atascosa NWR (LA) where ~100% leaf loss occurred followed by re-foliation from surviving stems. The tipping point for complete mortality of above ground stems fell between -5.7°C and -6.4°C (Padre Island National Seashore [PI]), where all above ground biomass perished;

recovery occurred only from basal production of new stems. Mangrove shrub canopy area recovery at all sites from Corpus Christi Bay (CCB) north ranged 0-15% at 1 year. Recovery of shrub densities ranged 0-4% at both sites north of CCB, and 39-75% at sites from CCB south to PI. Our analyses indicate that reproductive output is tightly tied to size class; at a canopy diameter of 25cm, likelihood of a plant reproducing is 0.12, while at 40cm, the probability increases ~4X to 0.5. This reveals that in recovering populations where larger canopies are often in the minority, reproduction of smaller shrubs is critical. Dominance and diversity of marsh species was altered at some sites. Nutrients from leaf fall/decomposition may increase marsh plant colonization and growth.

The effects of low inflow on a snook nursery community in the Rio Grande River, Texas

Ethan Getz*, Perry Trial, and Catherine Eckert (Texas Parks & Wildlife Department)
Snook support important fisheries in the Gulf of Mexico and their populations are on the rise in Texas. However, the main snook nursery in Texas, the Rio Grande, remains one of the most imperiled rivers in North America. In 2001-2002, low flows led to the complete blockage of the Rio Grande, ceasing all exchange with coastal waters. Here, data collected by the Texas Parks and Wildlife Department was used to determine how the Rio Grande closure affected juvenile snook and the larger community. Bag seine and trawl samples were collected prior to the closure (1992-1997) and during the closure (2001-2002). Data were analyzed to assess snook size, seasonality and relative abundance. Species associations were also evaluated, and multivariate analyses were used to determine community shifts during the Rio Grande closure. Juvenile snook were present year-round, suggesting that the Rio Grande is functioning as an important nursery. Interestingly, snook were present before and after the closure, although decreased abundance after the closure was observed in trawl samples. Species associations were altered by the closure, with the complete disappearance of white shrimp in samples containing snook during the event. Community-level results highlighted a shift in assemblages with decreased species richness after the blockage. These results suggest that snook can withstand short-term disturbance events, but that community-wide impacts likely influence the entire system. As south Texas continues to become more arid, managers may need to consider the likelihood of similar events affecting important sportfish like snook in the future.

INVERTEBRATE ECOLOGY

Reconstructed Environmental Stress Histories from Geochemical Records in Eastern Oyster Shells from Subtropical Estuarine Systems.
Jessica Randall* (Texas Parks & Wildlife Department) and Benjamin Walther (Texas A&M University at Corpus Christi)

The geochemical records stored in biogenic carbonate oyster shells can be powerful tools to reconstruct environmental stress histories as variations in ambient water chemistry can result in discernible shifts in isotopic and elemental compositions within the accreted shell material. This study assessed the potential of $\delta^{13}C$ and Ba/Ca within eastern oyster (Crassostrea virginica) shells to discern past environmental variability in subtropical estuarine systems subject to major climactic events like droughts and floods. In low, fluctuating salinity environments that experienced hypersalinity during droughts and dramatic declines during flood events, $\delta^{13}C$ and Ba/Ca reflected distinct flood signals that aligned with local salinity

conditions. Conversely, high, stable salinity environments with minimal fluctuations reflected only typical seasonal variations, likely influenced by vital effects for $\delta^{13}C$ and by temperature and primary productivity for Ba/Ca. Observed $\delta^{13}C$ values closely matched predicted $\delta^{13}C$ values and monthly salinity estimates, emphasizing the efficacy of this chemical proxy utilized alone or in combination with Ba/Ca for similar investigations. Moreover, the transplanted shells demonstrated reproducibility among shells and highlighted their ability to display such changes promptly, as both $\delta_{13}C$ and Ba/Ca reflected the composition of their new environment within less than six months. This study confirms the capability of eastern oyster shells to capture fine-scale temporal changes in ambient environmental conditions, allowing them to serve as reliable bioindicators and recorders of their habitats.

Understanding biological impacts and recovery timelines for benthic invertebrates following nourishment on Texas beaches
Melanie Ponce* (HRI), Kim Withers (Texas A&M University at Corpus Christi), Terry Palmer (HRI), Natasha Breaux (HRI), Erin Hill (HRI), and Jennifer Beseres Pollack (HRI) *(student presentation)*

Beaches are ecologically and economically important coastal habitats. They provide nesting habitat for shorebirds and sea turtles, host diverse assemblages of benthic invertebrates, support recreation and tourism for coastal communities, and protect property and infrastructure from storms. However, beaches are dynamic, high-energy environments where sand can erode due to sea level rise, storms, and coastal flooding. One approach to combat beach erosion is "nourishment", where large quantities of sand are added onto an eroded beach, often at significant cost. Despite large investments in nourishment activities, a lack of standardized monitoring protocols has limited understanding of biological impacts and recovery timelines. To assist resource managers, the effects of sand nourishment on Texas beaches will be determined using a Before/After, Control/Impact (BACI) study design on two beaches—Jamaica Beach and Sargent Beach—slated for nourishment. Sampling will occur at three reference areas for each nourishment area, to more accurately determine whether differences in benthic communities between reference and nourished beaches can be attributed to nourishment or natural factors. Sampling will occur every 2 months for at least 10 months prior to a nourishment event. Sediment cores will be used to evaluate benthic invertebrate density, biomass, and diversity, and sediment grain size; discrete water quality measurements are collected with each sampling event. Univariate and multivariate statistics will be used to evaluate changes in sediments and benthic invertebrate community composition. Findings will be used to inform resource managers about benthic macroinvertebrate and sediment recovery timelines to establish consistent guidelines for future nourishment activities.

Die-hard: Sudden, localized outbreak and thermal stress survivorship of the non-native worm *Ficopomatus enigmaticus* in Galveston Bay, Texas
Vanessa Fernandez-Rodriguez* and Anja Schulze (Texas A&M University at Galveston) *(student presentation)*

The serpulid annelid *Ficopomatus enigmaticus* is a global invader of estuarine habitats, with first reports in Texas in 1950 in Port Aransas and Corpus Christi. Currently, it is regularly detected on colonization plates within Galveston Bay (GB). In the spring and early summer of 2023, we reported massive reef-like aggregations (up to 1m width) in a private shipyard marina in GB on various substrates (e.g., floating docks, boat hulls, propellers, and rudders). The environmental conditions that triggered the sudden localized proliferation are still under

analysis. Over the subsequent summer months, the population almost completely vanished. To understand the response of F. *enigmaticus* to different temperature regimes, we are conducting thermal stress experiments on early larval stages, evaluating the survival rate and the presence of competent larvae. A competent larva is defined as having three segments with three pairs of parapodia, chaetae, and a pair of posterior hooks, indicating readiness to settle. Three thermal treatments (4.4, 20, and 30 °C) were applied under insulated conditions. Larvae exposed to 4.4 °C exhibited higher survival rates and the lowest presence of competent larvae, while those exposed to the 30 °C treatment experienced the highest mortality, with almost all survivors being competent. Larvae exposed to 20 °C demonstrated the highest presence of competence. We are continuously monitoring for renewed proliferation and developing molecular markers to assess thermal stress on larvae.

POLICY, ECONOMICS AND COMMUNICATION

Harmonizing Nature: A Complementary Approach to Science Communication
Heidi Ballew* (Texas A&M University-Corpus Christi, Center for Coastal Studies) and Loretta Battaglia (Texas A&M University-Corpus Christi, Center for Coastal Studies)

Informing citizens and stakeholders of locally relevant scientific findings can result in increased interest in local resources and their conservation. However, scientific data and findings can be difficult to interpret, making non-traditional approaches to scientific outreach appealing. We will test two hypotheses on the effectiveness of using music to better understand environmental data through an interactive seminar at TBEM 2024 (hereafter Seminar Study). To prepare the data for demonstration, we first conducted an ARIMA time series analysis on temperature, dissolved oxygen, and salinity data for the Upper Laguna Madre, Texas ecosystem from January 1978 to December 2023 collected as part of TPWD's Coastal Fisheries Independent Sampling Monitoring program. Second, we sonified raw environmental data using Python Data Mapper to allow for auditory interpretation of findings. We mapped data to two octaves of musical notes on the C Lydian scale for less musical dissonance. Each environmental factor was assigned a musical instrument in TwoTone software. Lastly, we performed an AI-assisted thematic analysis of the environmental audio with Cyanite software. Temperature showed a subtle increase, dissolved oxygen had fewer peaks across recent decades, and salinity showed a slight decreasing trend over the past decade (p-value < 0.05). During this seminar, we will present the data conventionally and then supplement it with audio to evaluate the audience's experience, the effectiveness of the data type, and participants' understanding of the data presented. Results will be used to improve the efficacy of this outreach initiative.

The Social Science of Water Quality: Determining Beach Use to inform Texas Beach Watch Management
Christine Hale*(HRI), Diana Del Angel (HRI), Coral Lozada (HRI), Jason Pinchback (TX General Land Office), and Lucy Flores (TX General Land Office)

The Texas Beach Watch program is administered and managed by the Texas General Land Office (GLO) and funded by the Environmental Protection Agency and the State of Texas. Texas Beach Watch provides information to the public about water quality at selected beaches along the Texas coast. The program regularly monitors select Texas beaches for Enterococcus bacteria in the water, and when levels exceed the acceptable standards for

safe recreation, the GLO and local government partners publish public advisories about affected waters. To identify which beaches should be monitored for bacteria, the GLO uses a tier system to rank levels of potential human exposure to water at each location. The GLO must periodically review their list of monitoring locations to decide if updates or changes are necessary. If so, the GLO initiates a public process to review and if necessary, add or remove monitoring locations. To inform this process and decision, the Community Resilience Group at Harte Research Institute determined which beaches are more heavily used, how beaches are being used, and what environmental knowledge people have regarding beaches they use. A socio-ecological methodology synthesizing subject matter expert interviews, surveys, and geospatial analysis was developed to help inform Texas Beach Watch managers as they work to update program operations. Preliminary results will be shared, including a conceptual model, and initial Texas beach population estimates based on cell phone data validated by qualitative input from surveys and interviews. This project is an example of socio-ecological science informing natural resource management and policy.

Up2U Litter Campaign: Cultivating Personal Responsibility for Litter Prevention in the Texas Coastal Bend
Kathryn Tunnell* (Coastal Bend Bays & Estuaries Program)

Up2U is the battle cry of an innovative litter prevention campaign that began in the headwaters of the Nueces basin in 2004 and was brought down to the six coastal counties and ten watersheds of the Texas Coastal Bend in 2020. The campaign was developed around market research that an empowering message was more impactful than a "don't" message, and that people "did not want to be told what to do." Instead, they would respond positively to a challenge, especially if that challenge was logical and fact-based - it's Up2U. The cornerstone of the Up2U Litter Prevention campaign is a yellow mesh litter bag emblazoned with the empowering Up2U message. The litter bags are a tool for trash removal, trash prevention, and outreach. They are distributed for free at thirty established distribution locations at public access sites, as well as cleanups and other community events. The program is in its 4th year and has been widely accepted by the community. By the end of the 5-year project, we expect strong partners to have emerged to sustain the message and the program into the future.

Implementation of the Coastal Texas Project
Tony Williams* (Texas General Land Office), Nicole Sunstrum (Gulf Coast Protection District), and LTC Ian O'Sullivan (US Army Corps of Engineers)

The Coastal Texas Project consists of multi-lines of defense with both Coastal Storm Risk Management (CSRM) and Ecosystem Restoration (ER) measures. The US Army Corps of Engineers (USACE), Gulf Coast Protection District (GCPD) and Texas General Land Office (GLO) are working together to advance both ER and CSRM measures. The Coastal Texas Study identified CSRM measures for the Galveston Bay System and on South Padre Island, including beach and dune restoration and enhancement on a scale not seen in Texas. There are also eight large scale ER measures along the Texas coast that are critical to long-term resilience. The GLO has multiple erosion response projects and studies that could advance both ER and CSRM measures, and is working with the USACE and GCPD to maximize the benefit to Coastal Texas. Projects that are currently moving forward are beach and dune restoration on Galveston, Bolivar and South Padre Island, shoreline habitat restoration and protection along Powder Horn Lake in Matagorda Bay, breakwaters along the GIWW in

Galveston and Brazoria Counties, as well as sediment source identification and other studies that could improve the proposed measures.

Social Conflict and the Industrialization of the Texas Coast during the 20th Century
Blake Earle* (Texas A&M University at Galveston)

Over the course of the 20th century the bays and estuaries of the Texas coast underwent a dramatic transformation driven by industrialization. The twin forces of the state's petrochemical industry as well as commercial fishing played a central role in developing the physical infrastructure of the coast while also integrating regions of the state previously isolated from national and international markets. Industrialization also transformed the bays and estuaries themselves as increases in maritime traffic, pollution, and overfishing altered the ecology of these waterways to the detriment of shellfish populations. The industrialization of the Texas coast, then, set the stage for conflict among fishermen who, over the second half of the century, competed for a dwindling resource. With a focus on Matagorda and San Antonio Bays, this paper explores how this environmental degradation exacerbated conflict between white and Vietnamese fishermen in the aftermath of the arrival of thousands of Vietnamese refugees during the late 1970s and early 1980s. Through a study of official reports, historical newspapers, and oral histories this paper shows how the conflict that beset the state's fishing industry was directly tied to environmental change and the perception of that change among fisherfolk. Though firmly rooted in the past, this study offers relevant insights into the social ramifications of environmental degradations while offering an example of the successful integration of a minority group into the social and cultural mainstream of the Texas coast.

FISH AND FISHERIES

Changes to behavior and metabolism with temperature acclimation in the sheepshead minnow (*Cyprinodon variegatus*)
Madison Schumm*, Kerri Lynn Ackerly, and Andrew Esbaugh (University of Texas Marine Science Institute) *(student presentation)*

Marine fish tolerate environmental stress through modifications to their physiology and behaviour. In particular, thermal stress is of concern for fish because increased temperatures lead to elevated baseline metabolic demand. Increases in metabolism must be supported by concurrent increases in resource supply, and thus are expected to relate to changes in behavioural traits that contribute to resource acquisition. Energy demand may further increase risk-taking and reduce behaviours that diminish predation risk in fish (e.g., shoaling and scototaxis). On this background, our aim was to evaluate changes to metabolic rate, behavioural traits, and the relationship between behaviour and metabolism across two temperatures in a locally abundant estuarine model teleost, the sheepshead minnow (*Cyprinodon variegatus*). Fish were acclimated to 22C or 32C for 14-days and standard and routine metabolic rates (SMR and RMR, respectively) were measured. Fish were then subjected to a suite of behavioural assays for measures of activity, exploration, sociability, and anxiety. As expected, warmer temperatures increased in SMR, but surprisingly RMR was not impacted by warming. Interestingly, the warm acclimation significantly increased measures of activity and anxiety; however, there was no correlation between behaviours and metabolic traits in individuals acclimated to either temperature. Our data indicate that while both metabolism and behaviour show flexibility with warming, there is no apparent link

between the two. These data have important implications for understanding how ecologically significant behaviors and metabolism interact in fishes, and how these interactions may be altered with ocean warming in our local estuaries.

Fast or Slow? Evaluating Pace-of-Life Syndromes in Gulf Coast Blennies
C. Melman Neill*, Madison Schumm, Mariana Rivera-Higueras, and Simon Brandl
(University of Texas Marine Science Institute) *(student presentation)*

The pace-of-life syndrome hypothesis predicts the evolution of stable associations between metabolic, behavioral, and life history traits at both the species and individual levels, but empirical studies of these phenomena often fail to assess in situ dynamics. Niche partitioning between "fast" individuals, characterized by high metabolic rates and proactive behavioral traits, and "slow" individuals, displaying the opposing suite of traits, may only manifest under a limited set of ecological conditions. It is important to determine whether dynamics predicted from laboratory-based physiological and behavioral data occur under standing ecological conditions. Cryptobenthic fishes are small (<5 cm) and experience rapid turnover, traits which may promote fine-scale niche partitioning as well as enable physiological and behavioral measurements. Further, these species are often highly site-associated, allowing quantitative in-situ assessment of spatial niche partitioning. To detect the presence of stable pace-of-life syndromes within a sympatric cryptobenthic fish community, we are using intermittent-flow respirometry and dyad assays to quantify metabolic rates and behavioral traits associated with competition in three blennies (*Hypleurochilus cf. aequipinnis*, *Hypleurochilus multifilis*, and *Scartella cristata*) collected from a set of pier pilings in the Port Aransas ship channel. We are also using an enclosed field sampling technique to characterize the vertical distribution of each species, revealing community depth zonation trends. By combining laboratory measurements of physiological and behavioral traits with quantitative spatial data, we aim to determine whether these species have evolved distinct "paces of life," and how well in-situ spatial niche partitioning reflects the dynamics predicted by these laboratory measurements.

The use of eDNA in comparison to trawl and historical catch data for assessing marine finfish in Matagorda Bay, Texas
Polly Hajovsky*, Damon Williford, Corey Waddell, Emily Miller, Caren Utley, Leslie Hartman, and Joel Anderson (Texas Parks & Wildlife Department)

Environmental DNA (eDNA) has emerged as a versatile tool to assess aquatic communities, including the presence of cryptic taxa and species that are not easily detected with traditional sampling gears. The focus of this study was to compare the finfish community of Matagorda Bay as inferred by eDNA metabarcoding with a 47-year dataset of fishery-independent sampling conducted by Texas Parks and Wildlife Department (TPWD) in Matagorda Bay. We collected water samples from March-June during 2023 in conjunction with trawl sampling conducted by TPWD. Universal and elasmobranch-specific primers were used to amplify the mitochondrial 12S ribosomal gene, and PCR products were sequenced using the Illumina sequencing platform. A total of 62 families have been detected between 1976-2022 via historical sampling, of which 49 (79%) were detected via eDNA in one season of one year. The most commonly detected species in the historical and trawl catch (Gulf menhaden, Atlantic croaker, spot, and bay anchovy) were present in the top commonly detected species for eDNA. Atlantic croaker and bay anchovy are highly detectable by both methods, whereas other species (e.g., pinfish and spot) were detected better by either trawls or eDNA. Species richness differed significantly between eDNA, 2023 trawls, and historical data. In conclusion,

eDNA did an exceptional job detecting finfish. Differences among detection methods could be due to gear bias, for example, size-selected bias of most fishing gears. Then there's the ubiquitous presence of eDNA in the water column, potentially making it a more unbiased sampling method.

Stability of bait fishes assemblage structure in South Bay, Texas
Carlos E. Cintra Buenrostro* (University of Texas Rio Grande Valley), Jason Ferguson, and Andres Garcia (Lower Laguna Madre, Texas Parks & Wildlife Department Coastal Fisheries Division)

A variety of organisms make their living in and around the dominant seagrass vegetation in the hypersaline Lower Laguna Madre of Texas estuarine ecosystems, which serve as nursery habitat for many commercially and recreationally important fishes. Because in marine food webs forage fishes integrate energy among trophic levels and several bait fishes are prey for larger fishes of fisheries relevance (including several finfishes young of the year), this study explores the dynamics and bait fishes recruitment in South Bay by assessing biodiversity (a structural indicator of ecosystem health). Fishery-independent data (ca. 20 yrs., 2000-2020) were collected with bag seines by the Texas Parks and Wildlife Department. Overall catch yielded 8,354 fishes in 55 species and a ~20 yrs. sum of fishes caught of ~278,467/ha (i.e., catch per unit effort = CPUE). Bait fishes richness, diversity and CPUE were not significantly different among years ($F_{0.05(20,144)}$ = 0.91, p = 0.57; $F_{0.05(20,144)}$ = 0.81, p = 0.70; $F_{0.05(20,144)}$ = 1.56, p = 0.07, respectively), while evenness and similarities were ($F_{0.05(20,129)}$ = 1.91, p = 0.02; R = 0.17, p = 0.001, respectively), suggesting a stable fishes assemblage structure over time. Although variations among metrics were observed among years, it seems South Bay bait fishes return to a consistent assemblage structure.

Southern Flounder in Texas Estuaries: An Examination of Size Specific Catch Rate Trends in the Context of Climate Related Population Impacts
Donella Strom*, Zachary Olsen, and Joel Anderson (Texas Parks & Wildlife Department)

Southern flounder (*Paralichthys lethostigma*) are a commercially and recreationally important marine flatfish found throughout the Gulf of Mexico and along the United States' southeastern Atlantic coast that are experiencing range-wide declines. Recent research has focused on concerns of climate-change related factors including the possibility of temperature-dependent masculinization and resulting shifts in size structure of the population. In the context of these recent studies, we examined Texas Parks and Wildlife Department (TPWD) gill net sampling data from 1983-2023 to assess long-term changes in size-specific catch rates for each bay system along the Texas coast. Although sex data was not collected with this long-term monitoring data, we made use of available size frequency and sex ratio data from a separate nested study to infer a coarse understanding of sex specific trends across binned size classes (≤300mm, 301-400mm, >400mm) representative of changing percentages of males. While specific catch rate patterns varied by bay system and size class, and the data showed substantial interannual variation for much of the timeseries, we generally observed a decrease in fishery independent catch rate compared to historic highs in most bay systems. Catch rate trends by size class didn't suggest shifts in sex ratio across the timeseries, though we recognize sex ratio is only estimated with our current analysis. This data synthesis helps to identify limitations of currently collected flounder monitoring data and highlight needs for further research.

An Ancient Fish in a Current Estuary: Investigating Alligator Gar Movement and Habitat Use in Coastal Texas

Jillian Swinford*, Joel Anderson, Carey Gelpi, Shambhu Paudel (Texas Parks & Wildlife Department, Coastal Fisheries Division), and Dan Daugherty (Texas Parks & Wildlife Department, Inland Fisheries Division)

While alligator gar (*Atractosteus spatula*) are widely regarded as freshwater fish, they are also one of the dominant predators in estuarine bays throughout Texas and are often more prevalent than other marine predators. Abundance of alligator gar has been well documented in Texas estuaries, indicating their role as apex predators within these ecosystems, but seasonal movements and habitat use of gar in these regions requires further research. Cedar Lakes, a small coastal region between Matagorda Bay and Galveston Bay, saw record alligator gar gill net CPUE following Hurricane Harvey in 2017, a trend which has continued in the subsequent years. This study tracked forty-three tagged fish through the Cedar Lakes Acoustic Telemetry Array from March 2023 through March 2024. Initial telemetry data from spring of 2023 shows a majority (44.2%) of the fish tagged have stayed near the Cedar Lakes marsh lagoons, likely utilizing abundant food resources found there. Another group of individuals made large scale movements into the bordering bay systems (Matagorda and Galveston Bay) and rivers (Brazos and San Bernard Rivers) in the spring (May-July), followed by a lack of emigration over the summer (August-September). Data indicates that both environmental conditions alongside fish size may be driving these different movement behaviors between fish. This presentation describes the preliminary analysis of the first twelve months of movement of Alligator gar in this unique estuarine region with the goal of better understanding the Alligator gar's role within coastal ecosystems.

Assessing the distribution of acoustic fish backscatter associated with seafloor characteristics at two natural reefs within the Gulf of Mexico

Marissa Lamb* and Dr. Richard Kline (University of Texas Rio Grande Valley) (*student presentation*)

Sonar mapping and imagery are commonly utilized in marine environments where environmental factors such as depth, water conditions, size, and visibility are limiting. Biomass estimates and seafloor characteristics are also frequently determined using acoustic surveying methods in these restrictive conditions. One such setting with limiting conditions is a natural reef formation called East Bank Ridge located 18 nautical miles off the coast of South Padre Island, spanning an area of over 80 km^2 at 40-45m depth. There is no scientific record of the structural composition or fish community present at the site, but it is a well-known fishing site in the local community. In this study, we aim to identify high-relief structures, determine the seafloor characteristics, and quantify fish biomass estimates present at East Bank Ridge. A 2D topographic map of the formation was created using multibeam sonar that was then used to identify suitable habitats for reef fish species. Split beam sonar was used to determine fish biomass estimates and quantify bottom characteristics including relief, roughness, and slope. Big Seabree Reef, the natural reef system in closest proximity to East Bank Ridge, will be used as a comparison site to assess differences in structural composition and fish community abundance. Comparisons across the two sites and within sites based on bottom characteristics were conducted. This will help inform how differences in high relief structure and location may impact fish abundance between two local natural reef formations that are popular fishing sites.

Environmental and trophic drivers of key estuarine fishery species using nonlinear structural equation modeling

Raymond Czaja Jr* (National Center for Ecological Analysis and Synthesis, University of California, Santa Barbara), Mai Fung (National Center for Ecological Analysis and Synthesis, University of California, Santa Barbara), Zachary Olsen (Texas Parks & Wildlife Department), Christine Jensen (Texas Parks & Wildlife Department), Jennifer Pollack (HRI, Texas A&M University at Corpus Christi), Paul Montagna (HRI, Texas A&M University at Corpus Christi), and Christopher Biggs (University of Texas Marine Science Institute)

The strong influence of abiotic factors on production of key fishery species in Texas estuaries is well established. Less established is the degree to which prey and predators affect abundances of fishery species through direct and indirect effects. For example, salinity may impact Red drum directly (e.g., via physiological mechanisms) and/or indirectly by impacting Blue crabs, a prey species that is widely consumed by Red drum. We leverage Texas Parks and Wildlife monitoring data and use nonlinear structural equation modeling (SEM) to investigate such direct and indirect impacts on the abundance of six key fishery species: Red drum, Spotted seatrout, Atlantic Croaker, Spot, Blue crabs and Eastern oysters. We compare the strength and directionality of such impacts between species and between two systems, Aransas and Galveston Bay, while considering four abiotic factors: temperature, salinity, dissolved oxygen and turbidity. Effects differed between bays with salinity having greater influence in Aransas Bay and trophic impacts (e.g., bottom up controls of fish abundance) being more prevalent in Galveston Bay. Surprisingly, the abundance of Blue crabs was more linked to that of Atlantic croaker and Spot than of Red drum and Spotted seatrout. Models frequently produced quadratic relationships (e.g., for salinity and temperature effects) highlighting the importance of accounting for nonlinear relationships in SEMs in complex, dynamics systems such as Aransas and Galveston Bay. These SEMs represent a snapshot of ongoing working group efforts to model fisheries production in Texas estuaries in response to environmental, climate and severe weather variability.

Historic freshwater inflow silences an estuarine ecosystem

Philip Souza, Jr.*, and Simon Brandl (University of Texas Marine Science Institute) *(student presentation)*

Acute natural disturbances can have dramatic, often negative, effects on the structure and functioning of biological communities in affected ecosystems. Freshwater inflow is important to the functioning of estuaries but can have deleterious effects when large pulses reduce salinity below optimal levels for aquatic residents. Many acute disturbances, including freshwater inflows, are expected to become more frequent and severe due to climate change and continued anthropogenic forcing, necessitating studies on the impacts of severe acute disturbances. Here, we use passive acoustics to capture a near-continuous, system-wide community response to a series of acute freshwater inflows into the Mission-Aransas Estuary (MAE). Our findings show decreased sonic activity across marine mammals, fishes, and invertebrates following the disturbance, effectively silencing the bay closest to the river mouths. Sound production is critical for locating and capturing prey, courtship, and spawning for many of the observed species, suggesting that the suspension of sonic activity represents a significant interruption to ecosystem functioning in the studied estuary, with potential long-lasting consequences for ecosystem services to local stakeholders. Estuaries in semi-arid regions, including the MAE, are expected to experience longer droughts broken up by more frequent severe flooding events in the coming decades. The ecological effects of these natural disturbances will be compounded by management decisions related to the extraction

of freshwater resources for human consumption and increased human activity in estuaries, challenging managers to balance the needs of tightly intertwined ecological communities and coastal societies.

The Reef Road: Monitoring, Management, Research, and Restoration Along the Path of Oyster Sustainability in Texas
Zachary Olsen* (Texas Parks & Wildlife Department)

Throughout their range, Eastern Oysters are a challenge for resource managers given the multiple services (ecological and economic) and multiple stressors (environmental and anthropogenic) that impact demand and availability. The objectives of this presentation are to (1) provide an overview of the recent history of oyster fishing in the Mission-Aransas Estuary, (2) review TPWD oyster monitoring and restoration efforts, and (3) discuss current strategies and future direction for oyster management. In recent years, increased oyster fishing effort has been observed in the Mission-Aransas Estuary given decreased market oyster abundance in upper coast estuaries due to a mixture of environmental events (i.e., hurricanes, flooding) and heavy harvest. This has resulted in a concentration of oyster boats in some areas, most recently during the winter of 2024. TPWD conducts both fishery independent "routine" oyster dredge sampling to assess broad scale, bay wide trends, and "targeted" oyster dredge sampling to assess area and fishery specific status. Oyster restoration is ongoing in several Texas estuaries and is conducted in partnership with several conservation and fishery partners and with a variety of harvest, sanctuary, and research objectives. Current strategies for oyster fishery management are fishing effort reduction (e.g., license buyback) and developing alternative oyster harvest opportunities (i.e., off-bottom and on-bottom culture) while continuing to monitor and close harvest on public reefs as oyster sampling thresholds are breached. Several ongoing and planned research projects aim to improve our understanding of oyster populations and the impacts of oyster management on the abundance and services that oysters provide.

WATER QUALITY AND CHEMISTRY

Quantifying the Background Levels of n-alkanes in Central and South Texas Bays and Estuaries
Jack Lloyd*, Kaijun Lu, and Zhanfei Liu (University of Texas Marine Science Institute)
(student presentation)

n-Alkanes can be sourced from biogenic and anthropogenic activities, yet n-alkanes from direct oil contamination can provide distinct molecular signatures which can be used to evaluate the degree of direct oil contamination in aquatic ecosystems. Petrochemical industries are abundant in areas near several south and central Texas estuaries, including Corpus Christi, Matagorda, and San Antonio bays, as well as the Mission-Aransas National Estuarine Research Reserve (NERR), and represent a risk to estuarine ecosystems and public health. These areas comprise 675,000 acres of wetland, terrestrial, and marine environments, and the presence of n-alkanes can indicate the impact of petroleum-related industries in these regions, as well as baseline data critical for developing effective responses to future potential disasters. In this study, we sought to understand the geochemical factors controlling the n-alkane abundance and distribution in south and central Texas estuaries by measuring sediment characteristics and n-alkane concentrations in

sediment and water samples from the NERR, Corpus Christi, Matagorda, and San Antonio bays from 2022 to 2023. Carbon preference indices, terrestrial-aquatic ratios, and molecular weights were used as source indicators. Additionally, organic carbon, carbon isotope (δ13C), and grain size were determined for each sediment sample. Although analysis is still ongoing, primary results indicate that terrestrial inputs and higher plants are the major sources of n-alkanes, and that direct oil contamination is not observed. Overall, these environments continue to be affected by natural and anthropogenic factors, highlighting the need for continued monitoring and research.

Evaluating the chemical levels of soil, groundwater, bay water, and bay sediment in Port Bay region

Kaijun Lu* (UTMSI), Jack Lloyd (UTMSI), Jianhong Xue (UTMSI), Jace Tunnell (Texas A&M at Corpus Christi), Kristin Nielsen (UTMSI), and Zhanfei Liu (UTMSI)

To systematically evaluate the contamination status of Port Bay, we measured the various chemical constituents, including nutrients (NH_4^+, NO_2^-+NO_3^-, and PO_4^{3-}), pigments, total suspended solids, mercury (Hg), uranium (U), radium-226 (Ra-226), and polyaromatic hydrocarbons (PAHs), in soil samples collected from locations proximal to the Port Bay tailings ponds and in water and sediment samples within the Port Bay. Our findings reveal that levels of contaminants such as Hg, U, Ra-226, arsenic (As), chromium (Cr), and PAHs in soils, groundwater, bay water, bay sediments, and oyster tissues generally fall below established critical thresholds, indicative of an environmentally acceptable quality. However, certain sampling sites adjacent to the tailings ponds and/or the TX-188 highway exhibit elevated contamination levels relative to other locations, implying a potential localized impact. Furthermore, analysis of the Port Bay water column indicates notably higher concentrations of various chemicals, indicating distinct characteristics of this shallow ecosystem compared to adjacent larger bays. Specifically, the resuspension of bay sediments appears to significantly influence levels of nutrient, pigment, and PAH in the water column. The PAHs demonstrate a propensity for remobilization from sediment to water during wind-driven resuspension events, likely owing to their preferential association with fine clay minerals. Therefore, while overall contamination levels may not raise immediate concerns, the transient relocation or elevation of contaminants via resuspension processes may introduce complexities and unforeseen effects on this shallow ecosystem. These findings underscore the necessity for further investigations and ongoing monitoring to comprehensively understand and mitigate potential environmental impacts.

Assessment of Water Quality in a Model Coastal Bend Canal Community

Nicole C. Powers (Texas A&M Corpus Christi), Nora J.C. Bleth* (Texas A&M Corpus Christi), Andrew Johnson (Texas A&M Corpus Christi), Jacqueline Nicolay (Texas A&M Corpus Christi), and Ray Ayers (Citizen Scientist), and Jeffrey W. Turner (Texas A&M Corpus Christi) *(student presentation)*

Coastal residential canal communities are an important yet overlooked component of the global human-natural coupled environment. Coastal fauna depend on these environments for critical nursery and foraging habitat. Yet these coupled environments are acutely vulnerable to urbanization as well as point and nonpoint source pollution. This study monitored water quality in a model residential canal community in the northwestern Gulf of Mexico. The comprehensive approach included multiple water quality metrics (enterococci, microbial source-tracking, nutrients) quantified semi-monthly at nine stations for eight months. Enterococci were detected in 50.6% of samples and the human-associated HF183 fecal

marker was detected in 43.6% of samples. Enterococci were significantly higher after wet-loading events, whereas HF183 was significantly lower after wet-loading events. Gull and canine fecal markers were not correlated with wet- or dry-loading. The highest enterococci, canine marker, and nitrate levels were observed at sampling stations receiving stormwater runoff from an adjacent highway. An inverse correlation was observed between enterococci and HF183, demonstrating the need for monitoring and management approaches in marine systems that include multiple water quality indicators. These results also highlight an urgent need for stormwater retrofitting to reduce runoff and remove potentially harmful microorganisms from the environment.

Preservation of soil organic carbon at a mangrove–salt marsh ecotone following a lethal freeze event
Kody Barone*, Kaijun Lu, and Zhanfei Liu (University of Texas Marine Science Institute) *(student presentation)*

Mangrove and salt marsh ecosystems play an important role in the cycling of carbon in the estuarine environment and are particularly critical for carbon sequestration. Along the Texas Gulf Coast, competition between dwarf black mangrove and smooth cordgrass (henceforth *Spartina*) has been well documented in salt marshes since the 1930s. Mangroves have been outcompeting *Spartina* and expanding their range as winter temperatures warm over time. However, winter freezing events can cause severe mangrove die-back, potentially allowing *Spartina* to reestablish. Due to the infrequent nature of winter freezes in Texas little is known about how wetland biogeochemical cycling is impacted by freeze-induced mangrove die-back and Spartina reestablishment. In February of 2021, winter storm Uri hit Texas with temperatures reaching approximately -7°C, killing the majority of mangroves along the Texas Coastal Bend. *Spartina* has since been observed recolonizing previously mangrove-dominated wetlands. To understand how such a major mangrove die-back event impacted local marsh soil biogeochemical carbon cycling, we quantified and characterized the concentrations and degradation of organic carbon in a Texas marsh-mangrove wetland impacted by winter storm Uri. Cores (30 cm) were taken from patches of *Spartina*, live/dead mangroves, and a mixture of dead mangroves and *Spartina*. Preliminary results suggest that the soil organic carbon in mangrove patches is higher than *Spartina*, and carbon in dead mangrove patches consists of more recalcitrant material than patches of living mangroves.

River Discharge Effects on Chlorophyll Concentration Variability in the Northwestern Gulf of Mexico
Wumi Andrew*, Xinping Hu, and Lei Jin (Texas A&M University at Corpus Christi) *(student presentation)*

Climate change is a contributor in altering productivity in aquatic ecosystems, mostly through changes in hydrological and associated nutrient cycles. These changes have the potential to significantly affect the chlorophyll concentration in the surface coastal ocean, a proxy for phytoplankton abundance. This study investigates the relationship between climate-induced river discharge variability and chlorophyll concentration. Statistical analyses utilizing regression modeling and time-series analysis were conducted over a 16-year period using discharge data from multiple rivers and surface chlorophyll concentration data obtained from remote sensing at several outer shelf sites within Flower Garden Banks National Marine Sanctuary in the northwestern Gulf of Mexico. We anticipate delayed parallel correlation in chlorophyll concentrations with fluctuations in river discharge. It is expected that these

otherwise oligotrophic locations exhibit distinct seasonality and interannual variations, reflecting the cyclical nature of climate patterns and hydrological systems.

VERTEBRATE SCIENCE

Responses to saltwater exposure vary across species, populations, and life-stages in anuran amphibians

Molly Albecker* (University of Houston) and Michael McCoy (Florida Atlantic University)

To predict the impacts of environmental change on species, we must first understand the factors that limit the present-day ranges of species. Most anuran amphibians cannot survive at elevated salinities, which may drive their distribution in coastal locations. Previous research showed that coastal *Hyla cinerea* are locally adapted to brackish habitats in North Carolina, USA. Although *Hyla squirella* and *Hyla chrysoscelis* both inhabit coastal wetlands nearby, they have not been observed in saline habitats. We take advantage of naturally occurring microgeographic variation in coastal wetland occupancy exhibited by these congeneric tree frog species to explore how salt exposure affects oviposition site choice, hatching success, early tadpole survival, plasma osmolality and tadpole body condition across coastal and inland locations. We observed higher survival among coastal H. cinerea tadpoles than inland H. cinerea, which corroborates previous findings. But contrary to expectations, coastal H. cinerea had lower survival than *H. squirella* and *H. chrysoscelis*, indicating that all three species may be able to persist in saline wetlands. We also observed differences in tadpole plasma osmolality across species, locations and salinities, but these differences were not associated with survival rates in salt water. Instead, coastal occupancy may be affected by stage-specific processes like higher probability of total clutch loss as shown by inland H. *chrysoscelis* or maladaptive egg deposition patterns as shown by inland *H. squirella*. Although we expected salt water to be the primary filter driving species distributions along a coastal salinity gradient, it is likely that the factors dictating anuran ranges along the coast involve stage-, species- and location-specific processes that are mediated by ecological processes and life history traits.

The Effect of Island Traits on Colony Dynamics of Five Colonial Waterbird Species on the Texas Coast

David Essian* (HRI), Jessica Magolan (HRI), Liam Wolff (HRI), David Newstead (CBBEP), Diana Del Angel (HRI), Christine Hale (HRI), Matthew Streich (HRI), Bart Ballard (Caesar Kleberg Wildlife Research Institute, Jim Gibeaut (HRI), and Dale E. Gawlik (HRI)

Rookery islands on the coast of the Gulf of Mexico are eroding. In response, coastal resource managers from multiple agencies have completed several island rehabilitation projects, and many more have been proposed. Rehabilitating islands is expensive, and resources for such projects are limited, creating a demand for certainty when deciding which islands to direct resources toward. However, the potential contribution of any particular island to sustain waterbird populations remains highly uncertain, primarily due to data deficiencies. Here we used existing bird survey data (2003-2021) to develop occupancy models that assess the influence of island traits on interannual colony persistence and colonization patterns. Across species, larger islands had the lowest colonization rates, but the effects of island size were nonlinear and had wide credible intervals. It is possible that larger colonies had lower colonization rates because they are more prone to human and mammalian predator disturbance. Smaller colonies may attract potential breeders, but their size only permits a

small number of nesting pairs, resulting in fewer individuals to recolonize the island in consecutive years. Additionally, many smaller islands became submerged within our study period, and thus could not persist as rookeries. The effects of other covariates varied across species, suggesting that island prioritization will depend on species-specific objectives. These results will be used as evaluation criteria within a multi-criteria decision-making framework to help managers site and design island rehabilitation projects.

CINDI: a co-production project to guide waterbird colony island rehabilitation on the Texas coast
Dale E. Gawlik* (HRI), David A. Essian (HRI), Rostam Mirzadi (HRI), Jordan Giese (Caesar Kleberg Wildlife Research Institute), David J. Newstead (Coastal Bend Bays & Estuaries Program), Bart Ballard (Caesar Kleberg Wildlife Research Institute), Jessica Magolan (HRI), James Gibeaut (HRI), Matthew K. Streich (HRI), Liam G. Wolff (HRI), Christine Hale (HRI), and Diana del Angel (HRI)

Coastal managers are rehabilitating waterbird colony islands on the Gulf of Mexico coast because this important habitat is eroding from storms and sea level rise. However, with almost 300 colony islands on just the Texas coast, agencies will not have the funds to rehabilitate them all. Nor do all islands have the same potential to increase waterbird populations. Therefore, in 2022, we initiated the Colony Island Network Design and Implementation (CINDI) project, which uses a co-production process to develop a prioritization tool for rehabilitating islands to help conserve colonial waterbird populations on the Texas coast. Survey respondents identified availability of nesting substrate, amount of human disturbance, presence of predators, and amount of foraging habitat as the greatest constraints on colony size. An analysis of changes in area of nesting substrate from 1995 to 2018 showed a 57% decrease in area of bare substrate with little change in vegetated substrate, despite a 24% decrease in total island area. Mean distance from colonies to foraging areas ranged from 5.2 km for the Great Egret to 14.7 km for Reddish Egret. A set of spatial occupancy models based on data in the Texas Colonial Waterbird Survey (2003-2021) indicated that colony persistence was lower for the Caspian Tern (0.51) and Black Skimmer (0.57) than the herons. The final prioritization tool will incorporate all interim data products to assess the relative conservation and socioeconomic value that an island adds to a region given the cost of rehabilitating it.

Space Use and Movements of Inland Wintering Whooping Cranes in the Aransas-Wood Buffalo Population
Carter G. Crouch, Andrew J. Caven, Matti R. Bradshaw, Katrina M. Fernald* (International Crane Foundation), and Matthew J. Butler (US Fish and Wildlife Service)

Aransas-Wood Buffalo Population (AWBP) Whooping Cranes are increasingly utilizing inland areas for a portion of the winter. We compiled information on cranes utilizing inland areas from various sources. We summarized data from Whooping Cranes with active transmitters from 2009–2022, and we compared 95% auto-correlated kernel density estimates (AKDE) and daily distance movements for coastal wintering cranes and those that spent a portion of their winter inland. There have been individuals near Granger Lake during 5 of the last 13 winters and 11 of the last 13 winters in Colorado and Wharton counties, Texas, USA. Seven marked cranes across 11 crane winters from spent between 3.1–100% of their winter at inland areas. Inland wintering birds demonstrated AKDE home ranges more than twice as large as coastal wintering birds controlling for age, and the top Generalized Linear Mixed Model predicted that utilizing inland areas for parts of the winter

equated to a 92.0±4.3% increase in daily movement during the winter. We found that several other factors influenced movement patterns, which warrant consideration when comparing between the groups. Continued use of these inland areas has implications for what we consider Whooping Crane wintering habitat and how we manage for this species.

Roost site use of wintering whooping cranes in the Aransas-Wood Buffalo population
Matti R. Bradshaw*, Carter G. Crouch, Katrina M. Fernald, Andrew J. Caven, Sundas Rehman, and Dorn M. Moore (International Crane Foundation)
Nocturnal roost site use of the Aransas-Wood Buffalo Population of Whooping Cranes (*Grus Americana*) wintering in Texas is not well known. Understanding roost site use patterns are important for habitat managers to understand space use, depredation risk, and habitat needs. We identified roost sites used by Whooping Cranes wintering in Texas using data from cranes tracked with Platform Transmitting Terminals. We analyzed 88 bird winters across 42 individuals that had at least 1 location exceeding accuracy thresholds for 90% of the winter nights and at least 90 nights of data in a winter season. A hierarchical clustering approach was used to group roost locations that were within 100 meters of each other and identify unique roost sites by individual (n = 2,677). We found that on average, Whooping Cranes used 30.4 (range 8–69; SE = 1.71) roost sites per winter and spent an average of 4.4 nights (range 1–110; SE = 0.18) total at each site throughout the winter. In addition, roost sites were used on average 2.8 (range 1–33; SE = 0.07) different times throughout the winter, indicating revisitation of sites during the season. Roost sites overlapped with 23.5 % (range 0–64.7%; SE = 0.03) of the area visited in a previous year. These results indicate that Whooping Cranes rely on a network of roost sites during the winter and return to some of the sites both within and between winters.

Abstracts for Poster Presentations

HABITATS AND ECOSYSTEMS

Importance of biogenic serpulid reefs in Baffin Bay
Natasha Breaux*, Terry Palmer, Jen Gilmore, Auria Avalos, and Jennifer Beseres Pollack (Harte Research Institute for Gulf of Mexico Studies at Texas A&M University- Corpus Christi)

Baffin Bay is a predominantly hypersaline estuary characterized by evaporation rates that exceed freshwater delivery, long hydrologic residence times, and the occurrence of unique structures or 'reefs' created by Serpulid worms. The area is known for exceptionally productive commercial and recreational fisheries that are thought to be supported by benthic macrofauna inhabiting these reefs. Baffin Bay's Serpulid reefs support a unique benthic macrofaunal community with 191 times greater abundance, 97 times greater biomass, and twice the number of species than in nearby soft sediments. Abundant macrofauna inhabiting these structures likely serve as an important food source for sport fish and other higher trophic-level fauna, particularly in hypersaline periods when soft-sediment macrobenthic food resources are scarce. However, Baffin Bay's Serpulid reefs are thought to be in decline. We are investigating the functioning of these reefs and potential for future restoration success by conducting ongoing monitoring of the reef and soft sediment communities, examining timing and location of Serpulid settlement via recruitment tiles, and exploring substrate options for potential restoration efforts.

In Situ Habitat Data Collection with Concurrent Fisheries Independent Data along the Texas Coast
Chelsea Crosby*, Story Lesher*, Jake Harris, Evan Pettis, and David Norris (TPWD Habitat Assessment Team)

The Texas Parks and Wildlife Department (TPWD) Coastal Fisheries Division has been collecting fisheries data since the 1970s. It is known that estuarine habitat influences marine fish and invertebrate growth, recruitment, and survival. However, habitat data have seldom been collected concurrently with fisheries independent data coastwide. In 2016, the TPWD Habitat Assessment Team initiated a pilot study to pair in situ habitat data collection with the nekton community data collected by TPWD's Fisheries Management Team's bag seine monitoring program. The in situ data include information on aquatic habitat and sediment type, emergent and intertidal shoreline habitat, intertidal habitat slope and heterogeneity, and presence of other habitats and anthropogenic structures. Following refinement of the habitat assessment methodologies utilized in the pilot study, the TPWD management teams on Texas's Lower Coast (Aransas Bay, Corpus Christi Bay, Upper Laguna Madre, and Lower Laguna Madre) have collected this paired habitat data since 2018 and the program is being extended to the Upper Coast (Sabine Lake, Galveston Bay, Matagorda Bay, and San Antonio Bay) in 2024. This data can provide insight on how habitat affects nekton community diversity, region-specific habitat preferences for important coastal fish species, and potential target areas for habitat restoration. The data collected through this program have a broad range of applications for fisheries and habitat management/research and are publicly available upon request.

Determining the effects environmental pollution have on the colonization of arbuscular mycorrhizae fungi (AMF) in coastal dune grass species.
Breanna Garcia* and Candice Y. Lumibao (Texas A&M University at Corpus Christi) *(student presentation)*

Almost all plants form a symbiotic association with mycorrhiza, which is a special type of fungi that can colonize the root cells of plants. Mycorrhiza provides benefits for the host plants by aiding in nutrient acquisition while plants provide carbon sources to the fungi. Environmental disturbances, like metal contaminations, have the potential to alter these plant-mycorrhizal symbioses. Leveraging on a site with long history of heavy metal and oil pollution in the coastal prairie dune ecosystems in Mustang Island, we assessed how long-term exposure to contaminants impact the rate of AMF (arbuscular mycorrhizal fungi) colonization into the plant roots. We collected roots from twenty *Spartina spartinae* (Gulf cordgrass) plants, a dominant gulf dune grass in Mustang Island, from an area with known previous oil and metal contaminations and a nearby uncontaminated or healthy area. We quantified AMF colonization by staining the roots with tryphan blue solution and employing the grid-line intersection method. Comparisons were made between plants growing in contaminated versus uncontaminated soils. Analyses revealed that there is more AMF presence in contaminated plants, including more numbers of hyphae, vacuoles, arbuscules and even DSE (dark septate endophytes) compared to plants in the uncontaminated site. These findings suggest that plant-mycorrhizal symbiotic associations are strengthen under long-term exposure to environmental disturbance, potentially due to reciprocal benefits they provide to each other. Our results provide new insights into how environmental pollutions can alter plant-mycorrhizal symbioses, and the potential to harness plant-AMF symbioses for coastal restoration. For example, fungal symbionts that can aid in plant recovery and establishment can be used to inform and guide efforts to protect and restore coastal ecosystems under shifting environmental conditions or as a bioremediation tool.

Development of an Image Analysis Method to assess Potential impacts of Sediment Plumes on *Halodule Wrightii* and its Epiphytes.
Collin Kerr*, Kirk Cammarata, Austin Hamilton, Fabian Castro, Alex Bailey, Laura Ramirez, and Samantha Maupin (Texas A&M University at Corpus Christi) *(student presentation)*

Seagrass ecosystems have experienced alarming declines globally. Understanding the interactions between seagrass leaves and their biofilms is critical. These "epiphytes" comprise diverse organisms such as algae, bacteria, and invertebrates. They influence nutrient cycling, light availability, gas exchange, particle entrainment, leaf breakage and overall habitat complexity. This research aimed to: 1) develop an image analysis method to characterize epiphyte biofilm accumulation on *Halodule wrightii* leaves, ideally including quantity, morphology and composition; and 2) to apply the method in the context of artificial sediment plumes to determine if suspended sediments and light attenuation alter the abundance and characteristics of epiphyte biofilms. The image analysis method, an adaptation of Huang et al. (2023), utilizes ENVI spatial image processing software (NV5 Geospatial) to remove background surrounding scanned leaf images (RGB), create color band ratios and thresholds to distinguish epiphytes from seagrass leaves, and to quantify the distinguished image classes (pixel counting). Comparisons of imaging-derived 'Leaf Coverage" (% of leaf area covered by epiphytes) to the normalized biomass-based metric ("epiphyte to seagrass biomass ratio") revealed statistically significant and similar seasonal variation declining from July to November. In contrast, when quantitative results were analyzed in the context of three different experimental sediment plume exposure intensities (Control, Low, High), neither metric revealed significant differences, nor were there any

between different locations or depths. In conclusion, epiphyte image analysis produced results similar to those from epiphyte biomass in this study, but the suspended sediment disturbances did not appear to impact the epiphyte community under these conditions.

Intraspecific genotypic variation in *Schoenoplectus americanus* influences soil microbial diversity and functions under different nitrogen conditions.
Yue Liu*, Mikaelia Robinson, Nathin Shiryaev, and Candice Lumibao (Texas A&M University at Corpus Christi) *(student presentation)*

Coastal marshes, one of the most productive ecosystems across the globe, are facing significant threats from increasing anthropogenic-driven environmental changes. These ecosystems play a crucial role in biodiversity conservation, storm mitigation, and pollutant filtration. Understanding the intricate interactions between plant genotypes and soil microbial communities within these marshes is critical for predicting and managing their resilience to environmental stressors, such as high nutrient load (eutrophication). Here, we explored how the genotypic variability of *Schoenoplectus americanus*, a dominant marsh sedge impacts soil microbial communities under varying Nitrogen (N) conditions. In a common garden experiment, we assessed the responses of bacterial communities to intraspecific variation within S. americanus across ancestral (germinated from 100-year-old seeds) and modern genotypes. Significant interaction effects were observed between nitrogen input levels and the presence of plants, demonstrating that plant presence modulates soil microbial diversity and potential functions depending on nitrogen availability. Ancestral and modern genotypes of S. americanus exhibited distinct influences on bacterial diversity and function, with notable differences under N conditions. These outcomes highlight the importance of genetic diversity within plant populations in shaping soil microbial communities and their functional capacities. Our study provides novel insights into the mechanisms driving plant-microbe interactions in coastal marshes and underscores the potential for genetic variability within key marsh species to influence ecosystem resilience to environmental change.

Characterization of Contaminant Tolerant Soil Microbes Using Single and Mixed Species Culture on Mustang Island
Dr. Candice Lumibao and Georgia Harris* (Texas A&M University at Corpus Christi) *(student presentation)*

Coastal pollution by oil and heavy metals is a major persistent threat to coastal ecosystems, causing loss of ~ 80,000 acres of coastal wetlands annually (U.S. Fish and Wildlife, 2009). It can potentially affect the composition in situ soil microbial communities by promoting growth of certain bacterial taxa that can tolerate contaminants. However, basic understanding of the ecology of contaminant-tolerant microbes and how interspecific interactions can influence each other's ability to tolerate or degrade contaminants are still lacking. In this study, we investigated whether we could isolate bacterial taxa from contaminated soils in coastal prairie dunes in Mustang Island and how interactions between bacterial species can impact their ability to degrade contaminants. Using culture and genetic approach, we isolated bacterial species from contaminated soils. We then conducted Minimum Inhibition Concentration (MIC) test by selecting two bacterial species and grew them either as single-species or mixed-culture in media with varying concentrations of zinc (0.05, 0.10, 15 mg/mL) and crude oil (1%). Our results indicate we were able to isolate twelve putative bacterial species (showing different morphology), pending genetic identification. Preliminary analyses indicate differential rate of degradation and growth between bacterial species, which can impact mixed-culture degradation capabilities. Comparison between mixed-species and

single-species culture approaches provides valuable insights on the effect of competition or cooperation between species on their respective ability to degrade contaminants. The findings of this project have potentially significant implications for the rehabilitation of contaminated coastal dunes, as soil microbes play a vital role in contaminant degradation (Xie, 2009).

Freshwater Inflow to Texas Bays and Estuaries
Paul Montagna* and Audrey Douglas (Texas A&M University at Corpus Christi)

Freshwater inflow is an environmental flow from a river to a bay, estuary, or coastal receiving water. The first compendium on "Freshwater Inflows to Texas Bays and Estuaries" was published in 1994 and described the State of Texas methodology to develop estuary inflow needs in response to 1985 House Bill 2. The 2007 Senate Bill 3 provided four key changes: 1) from a single inflow number to the concept of an inflow regime, 2) a focus from protecting sport and commercial fisheries to an ecosystem-based management approach, 3) establishing environmental flow standards for every river, creek, and bay system in Texas, and 4) establishing an adaptive management program to review or revise standards after 10 years. Since 1994, there has been enormous growth in data and scientific methods to identify inflow effects and needs. The new book summarizes state-wide data and focuses on ecological processes to compare differences and responses across all Texas estuaries. The comparative approach is necessary because the combination of physical attributes (such as, climate, inflow, adjacent watersheds, geomorphology, and tidal exchange) vary and drive different biological and ecological responses across the state. The new book has 17 chapters and provides five major recommendations: 1) State-wide monitoring of connections between physical characteristics and biological responses. 2) 3-D circulation models and salinity measurements. 3) Mechanistic studies that link the biological response to physical dynamics. 4) Focused approach to protect key nursery habitats during droughts. 5) Simpler standards linked to biological outcomes.

Updated maps of shallow and terrestrial coastal habitats in the Aransas Bay system
David Norris*, Jake Harris, Evan Pettis, Story Lesher, Emma Clarkson, and Travis Sterne (Texas Parks & Wildlife Department)

The Texas Parks and Wildlife Department's Habitat Assessment Team has recently completed the generation of updated habitat maps for the Aransas Bay system using existing publicly available high-resolution aerial imagery. An extensive bay-wide habitat survey had not been completed since 2004. Free historical imagery from the Texas Orthoimagery Program (TOP), San Antonio River Authority (SARA), and National Agriculture Imagery Program (NAIP) underwent supervised classification using Trimble's eCognition software. Shallow and terrestrial coastal habitat extents (i.e. seagrass, mangroves, oyster reefs, salt marsh, tidal flats, and beaches) were identified through classification algorithms and manual editing, and verified through subsequent ground truthing efforts. The resulting, publicly available geospatial data products can be used to quantify changes in habitat extent over time and aid in assessments to inform natural resource management decisions.

Development of Seagrass Epiphyte Image Analysis to Detect Changing Environmental Conditions
Carissa Pinon*, Chi Huang, and Kirk Cammarata (Texas A&M University at Corpus Christi)
(student presentation)

Seagrasses and their biofilms of epiphytic algae and associated organisms interact in complex ways that are impacted by environmental conditions (Huang et al 2023). These biofilms can block light, impede gas exchange, compete for nutrients and increase physical drag leading to blade tearing. The relationships between seagrass, epiphytes, and environment may provide insight into mechanisms of seagrass decline. This study uses image-analysis of color scans to compare changes in epiphyte community morphological composition and colonization patterns resulting from environmental conditions. Seagrass beds with two visibly different epiphyte communities in Redfish Bay, Texas were sampled over a one-year period. Additional sampling and manual epiphyte dissection created an unidentified but visually distinct collection of the most abundant algal epiphytes that were individually scanned to build RGB color spectral libraries representative of red- and green-colored algae and uncolonized leaf areas. This image analysis uses ENVI software spectral profiles with Spectral Angle Mapper (SAM) algorithms to classify seagrass image pixels into distinct groups of epiphytes, seagrass, invertebrates or unidentified. The two samples sample sites compared had largely similar epiphytes present, but they appeared in varying quantities. We hypothesize that more detailed analyses of specific epiphyte groups (e.g., red or green algae) will reveal unique differences between the two sites for epiphyte composition or colonization patterns. Image analysis may further improve and expand the seagrass monitoring toolset by creating an archive of images that can be re-analyzed in future comparisons and can be done so affordably and semi-automatically.

Utilizing Earth Observations to Evaluate Texas Mangroves' Stress and Recovery in Response to Extreme Freeze in 2021
Jennifer Ruiz* and Dr. Steven C Pennings (University of Houston) *(student presentation)*

In February of 2021 Winter Storm Uri impacted the state of Texas, bringing severe winter weather with below-freezing temperatures for an extended period of time. These uncharacteristic conditions resulted in catastrophic mangrove mortality along the Texas Gulf Coast, as observed in the wetland community of Harbor Island in Aransas Pass, Texas. This community is the area of focus for this study as well as a field site of long-term monitoring work the Pennings lab has conducted since 2012. The goal of this study was to assess the effectiveness of moderate resolution satellite imagery in observing the impact of severe cold weather on Mangrove health, resultant die-off, and subsequent recovery. Multispectral satellite imagery from Landsat 8 Operational Land Imager (OLI) and Landsat 9 (OLI-2) was collected from USGS EarthExplorer for the study period of January 2021 through August 2023. The imagery was analyzed using ArcGIS Pro to process Normalized Difference Vegetation Index (NDVI) values and ENVI to derive spectral signatures. Preliminary results showed that the 30 meter resolution Landsat imagery clearly depicted mangrove stress and die-off as a result of the freeze as well their recovery. The next step in this study is to formally compare the remotely sensed data with the ongoing plot-based observations to determine if the changes observed at plot-level accurately match observations of the greater landscape. This combination will enable larger-scale conclusions to be drawn with improved ability for generalization. Additional considerations include assessing landscape level elevation changes post-freeze and their effects on subsequent mangrove recolonization.

Region and species impact transferability of geospatial informatics tools in salt marsh vegetation modeling
Kyle Runion* (University of Texas at Austin), Deepak Mishra (University of Georgia), Merryl Alber (University of Georgia), Jessica O'Connell (Colorado State University) *(student presentation)*

Salt marsh geospatial informatics tools are important to aid coastal management in vulnerable regions, such as the Texas Coastal Bend (TCB). However, existing tools are restrained to areas with characteristics similar to their calibration data, and salt marshes differ regionally. For example, differences in climate and tidal range can drive distinct plant growth patterns. The Belowground Ecosystem Resiliency Model (BERM) is a recently developed geospatial informatics tool to characterize salt marsh productivity from remotely sensed and geospatial data. But, BERM calibration data is limited to South Atlantic U.S. *Spartina alterniflora* marshes. The goals of this study were to investigate the impact of a new region and species on BERM performance. We carried this out by collecting calibration data for two common TCB marsh species, *S. alterniflora* and *Distichlis spicata*, and testing model performance in TCB marshes of belowground biomass predictions. Model prediction error in TCB marshes increased compared to native BERM calibration marshes. In BERM calibration marshes, prediction mean bias error (MBE) was -5.2 gm-2 (normalized MBE: 0.001%). Among the same species, *S. alterniflora*, but in a new region, TCB, MBE increased in magnitude to -133.7 gm-2 (nMBE: 45.6%). And in TCB marshes of a different species, D. spicata, the MBE was -197.7 gm-2 (nMBE: 23.5%). Here we show that region- and species-invariant models were less accurate in predicting marsh biophysical properties, and calibration among these gradients is an important model-building step. Ultimately, we aim to develop salt marsh geospatial informatics tools in the TCB to assess landscape resilience.

Piloting a Coastal Monitoring Community Science Project With Texas Fishing Guides
Alexis M. Sabine* and Laura Picariello (Texas Sea Grant)

Fishing guides have a unique ability to recognize changes occurring in the environment due to the extensive experience they have accumulated while working in coastal waters. They are often the first witnesses of the impacts of long-term and acute events on coastal habitats and ecosystems. However, their expertise is not always sought out in data gathering missions. Recognizing the importance of amplifying the voices of local experts, Texas Sea Grant aimed to gain a better understanding of environmental changes occurring in Texas bay ecosystems through a collaboration with the recreational fishing industry that documented local ecological knowledge. A coalition was assembled for a community science pilot project to monitor the Texas coast, consisting of twelve fishing guides, each with 15 to 35 years of experience fishing the coast. These local stewards reported their observations of processes affecting bays from Galveston to the Lower Laguna Madre, including changes to habitats, shorelines, fisheries and wildlife, water quality, water depth, and more.
The fishing guides shared their insights on the erosion of shorelines and bay islands throughout Texas; rising sea level, particularly in Rockport and Galveston; more frequent extreme weather events; increasing human activity and use of coastal resources since the start of the COVID-19 pandemic; and impacts of Winter Storm Uri on black mangroves and fish populations. The coalition identified the need for widespread outreach and education for anglers, boaters, and coastal residents and identified potential solutions and recommendations for future management and research initiatives.

Oysters, reef communities and carbon sequestration: environmental conditions driving shell growth
Kelley Savage* (HRI), Keisha Bahr (Texas A&M University-Corpus Christi), and Jennifer Beseres Pollack (HRI) *(student presentation)*
Determining the potential role of oyster reefs in carbon sequestration requires accurately predicting the effects of oyster reef calcification on the carbonate system of estuaries. Oyster reef physiological rates, i.e., calcification and respiration, are often more sensitive indicators of environmental conditions and would provide a greater understanding of how oyster

individuals and reef communities might respond to the impacts of environmental stressors and how those stressors might affect carbon cycling. However, most research has focused on linear growth rates of oyster shells, and very few studies have focused on calcification rates and stress tolerances of oysters. Therefore, a semi-quantitative synthesis was performed to determine if the existing oyster growth literature can facilitate the prediction of directional responses and thresholds of the eastern oyster, *Crassostrea virginica*, to changing environmental conditions and their implications for oyster reef carbon cycling. Variability in ecological, spatial, and temporal scales across studies and the disparity in the number of responses documented in laboratory and field settings make direct comparisons difficult. To improve our understanding of oyster reefs' role in the carbon cycle, there needs to be a comprehensive strategy that considers oyster individuals and reef communities in novel approaches that allow measurements of the same responses in laboratory and field settings. This approach will allow for more accurate predictions of future changes in oyster reef health and function, especially regarding carbon cycling dynamics.

The Influence of Aridity on Biomass Allocation in *Avicennia germinans* (Black Mangrove) Along a Latitudinal Gradient in the Texas Marsh-Mangrove Ecotone
Maxwell D. Portmann* (Texas A&M University at Corpus Christi) (s*tudent presentation*)

In a rapidly changing climate, aridity is projected to intensify as evapotranspiration (ET) and salinity increase and annual precipitation and humidity decrease along the South-Central Texas Gulf Coast. On a local scale, the effects of aridity may lead to an intensifying gradient of dryness (i.e., low soil moisture, increasing salinity and ET) that correlates with intertidal elevation and distance from open water. Aridity and dryness will almost certainly have a massive impact on important foundational vegetation, such as *Avicennia germinans* and salt marsh species that support the structure and function of the coast. An increase in aridity and dryness has the potential to modify facilitative and competitive effects between marsh and mangrove species. In a preliminary field experiment, I will measure survival and growth patterns of *Avicennia* propagules planted in paired plots (presence/absence of salt marsh vegetation) along an intertidal elevation and dryness gradient. The questions addressed are: 1) Does increased dryness associated with higher elevation affect *Avicennia* survival and allocation of above and below ground biomass; 2) Do marsh plants enhance or reduce the effects of increasing dryness? After 4-months, seedlings will be excavated to compare mass fractions. We expect to find: 1) an increase in allocation of biomass to roots with increasing intertidal elevation due to an increase in dryness 2) a decrease in root biomass allocation in salt marsh presence plots because of facilitative effects of salt marsh plants that may potentially ameliorate physiochemical conditions in the soil and reduce inundation frequency.

Characterizing Cyanobacterial Mats on Wind-Tidal Flats at Padre Island National Seashore
Zahra Hasan* (HRI), Isabel Nykamp (HRI), Kim Withers (TAMUCC Center for Coastal Studies), Stacy Trackenberg (HRI), Terry Palmer (HRI), Erin Hill (HRI), and Jennifer Beseres-Pollack (HRI) (s*tudent presentation*)

Wind-tidal flats are unique coastal habitats often associated with the presence of laminated cyanobacterial mats that perform key ecological functions, such as sediment stabilization and provision of highly productive foraging grounds for shorebirds. At Padre Island National Seashore (PINS), extensive wind-tidal flats provide significant overwintering habitat for thousands of wintering and migratory birds, including threatened species such as Piping Plover and Snowy Plover. However, energy exploration and other human activities at PINS

have damaged over 1214 hectares of this specialized habitat, and comprehensive ecological assessments are needed to understand the ecological condition of cyanobacterial mats across the intermittently damaged landscape. To address this need, cyanobacterial mats were extensively sampled at PINS in January 2024 using hand cores across 200 km2 of damaged and undamaged wind tidal flats. Cyanobacterial mat samples are being evaluated using High-Performance Liquid Chromatography (HPLC) and microscopy to understand differences in community composition between damaged and undamaged areas as well as across the spatial extent of the wind-tidal flats. Preliminary results from HPLC analysis indicate that the pigment profiles of cyanobacterial mats vary between damaged and non-damaged areas. A second sampling is planned for July 2024 to evaluate how cyanobacterial mat communities vary between wet and dry seasons. Project findings will provide practical information to help future conservation, restoration, and management of wind-tidal flats.

RESTORATION

Developing Methods for Elevation Restoration on Wind-Tidal Flats in South Texas
Isabel Nykamp* (HRI), Dr. Jennifer Beseres Pollack (HRI), Dr. Kim Withers (Texas A&M at Corpus Christi), Dr. Stacy Trackenberg (HRI), Dr. Terry Palmer (HRI), and Zahra Hasan (HRI) (*student presentation*)

Wind-tidal flats, characterized by extreme conditions including high salinities and irregular, wind-driven tidal-ranges, are unique coastal wetland habitats. However, more than 50% of the historical extent of these unique habitats has been lost along the Texas coastline, primarily due to human-induced degradation, often in the form of channelized tire-tracks. Damages to wind-tidal flat sediments can persist for extended periods of time (>35 years), negatively impacting both wind-driven surface hydrology and the cyanobacterial mats that thrive in these habitats. To address elevation damages on Texas wind-tidal flats, we are working to develop effective and scalable techniques for their restoration. Simulated disturbances—mimicking vehicle tracks—were applied to wind-tidal flats in Newport Pass, TX. Pilot elevation restoration treatments (loose wet sand, sand-filled burlap, loose wet sand mixed with soil stabilizer) were applied in replicate to the disturbed plots in October 2023. The treatment's effectiveness in restoring elevation and facilitating cyanobacterial mat recovery was assessed six weeks post-treatment and will continue to be evaluated quarterly over the next year. Results are being compared to disturbance-only treatments as well as undisturbed. Project findings will be used to develop best-practices for restoration of ubiquitous tire track damages on wind-tidal flats and inform future restoration efforts.

Comparative evaluation of oyster spat settlement and retention on shell, limestone and river rock cultch types used for restoration of Texas oyster reefs, *Crassostrea virginica*
Loren Horn* (Texas A&M University Galveston), Shambu Paudel, Carey Gelpi, and Joshua Leleux (Texas Parks & Wildlife) *(student presentation)*

During the summer of 2023 post-restoration recruitment success of four different cultch types (river rock, limestone, and live and dead oyster shell) was evaluated within a well-established oyster reef restoration site in Sabine Lake, TX. The Sabine Lake oyster reef has existed for over 100 years and has no current or historical record of commercial oyster harvest. Restoration via cultch placement was done within a 50-acre permitted site using river rock in

2015 and was subsequently enhanced with the placement of limestone in 2020. Replicate samples were taken every two weeks from both limestone and river rock placement areas over the 3 month summer period. Spat were enumerated from all river rock, limestone, live and dead oyster shell cultch pieces taken. A Zero-Inflated Negative Binomial Poisson model was developed to test the null hypothesis that spat number between cultch types are the same. The model predicts that 1) spat settlement is higher on limestone than river rock, and both dead and live shell; 2) dead shell associated with both river rock and limestone areas contributes to a zero-spat count; 3) spat number is higher on live shell than dead shell regardless of area type (i.e. river rock or limestone). Our results indicate that there is preferential settlement of spat on limestone compared to other cultch types tested.

Spatial distribution of organic matter content of restored oyster reefs
Kalie Tovar* (HRI), Kelley Savage (HRI), and Jennifer Beseres Pollack (HRI) *(student presentation)*

Oyster reefs provide numerous ecosystem services, including water filtration, shoreline protection, and habitat provisions for a variety of species. Another ecosystem service oysters may provide is carbon sequestration. Oysters are known to act as both a carbon sink and source. Oysters can act as a carbon sink by filter feeding and trapping suspended organic matter throughout the intricate reef structure. In contrast, oysters can act as a carbon source through the formation of calcium carbonate shells, which produce carbon dioxide (CO_2) that escapes into the atmosphere. However, the role of oyster reefs in the carbon cycle is understudied. Only eleven studies have quantified and reported carbon storage rates for oysters, and of those studies, the complex mechanisms affecting oyster reef carbon cycling are not always considered. Therefore, to account for these complexities, this research will evaluate sediment organic matter content adjacent to and within a restored subtidal oyster reef in St. Charles Bay, TX. Understanding the sediment organic matter adjacent to and within an oyster reef will help determine the spatial distribution to which carbon accumulates and if subtidal oyster reefs in St. Charles Bay, TX can impact the carbon found within the system. Sediment organic matter content results will be compared to elemental compositions of organic carbon to provide complementary information on carbon burial and potentially act as a proxy for carbon sequestration of a restored subtidal oyster reef.

The Importance of Stakeholder Engagement in Oyster Restoration Efforts
Margaret Wheat-Walsh* and Lindsey Savage (Texas Parks & Wildlife Department-Restoration and Artificial Reefs Team)

Texas Parks and Wildlife relies heavily on partnerships with external entities to conduct oyster restoration projects. To increase engagement with these partners, TPWD has two main workgroups, the Oyster Restoration Workgroup and the Oyster Regulatory Workgroup, that allow stakeholders to collaborate on restoration activities along the Texas coast. As habitat restoration projects are both ecologically and economically important, these workgroups are comprised of members from the commercial oyster industry, academia, and non-governmental organizations which helps to promote open communication across all entities. In addition to these workgroups, TPWD involves industry in other site selection processes for projects funded by grants and by Federal relief bills, such as the 2023 CARES Act and the Hurricane Harvey Disaster Relief Fund. We have been inviting industry members aboard our boats to participate in pre-restoration ground truthing (including tonging and polling sites to identify appropriate substrate for oyster restoration). This allows industry members to provide input on restoration locations and understand the restoration criteria

identified by TPWD. Another form of stakeholder engagement occurred in 2023 when TPWD hosted several workshops along the coast aiming at engaging industry in future oyster restoration siting, specifically for House Bill 51 sites. The commercial industry and ecological community have the same goal of increasing oyster populations, therefore increasing opportunities for both sides to have input on future projects is helpful and necessary.

WATER QUALITY AND CHEMISTRY

Effects of severe weather events on water quality in a TX estuary using a signal processing approach
Mai S. Fung* (National Center for Ecological Analysis and Synthesis), Raymond Czaja Jr (National Center for Ecological Analysis and Synthesis), Xinping Hu (Texas A&M University at Corpus Christi), Jennifer Pollack (Texas A&M University at Corpus Christi), Paul Montagna (Texas A&M University at Corpus Christi), Zachary Olsen (Texas Parks & Wildlife Department), Christine Jensen (Texas Parks & Wildlife Department), Zong-Liang Yang (The University of Texas at Austin), Zhanfei Liu (University of Texas Marine Science Institute), and Christopher Biggs (University of Texas Marine Science Institute)

Understanding effects of severe weather on estuarine water quality is a complex task that requires the quantification and separation of the impacts of natural climate variability from the impacts of weather events. Impacts of severe weather on estuaries in the Gulf of Mexico are of special concern, given that these estuaries are fisheries and biodiversity hubs located in areas that commonly experience intense weather events. In this work, the impact of severe weather on water quality in the Mission-Aransas National Estuarine Research Reserve (NERR) was investigated with a signal processing approach. Using partial wavelet coherence analysis, climate oscillations such as the El Niño Southern Oscillation (ENSO), the Pacific Decadal Oscillation (PDO), and the Atlantic Multidecadal Oscillation (AMO) were designated as control signals to differentiate between the impact of natural climate variability and weather events such as storms, droughts, and heat waves. Weather events were represented by heat wave, precipitation, and storm indices. The control signals and weather event signals were compared to a shorter time series (~20 years) of water quality parameters including salinity, dissolved oxygen, pH, turbidity, chlorophyll-a, and nutrients (nitrate, ammonium, phosphate) to quantify the relationships between severe weather and water quality in the Mission-Aransas NERR.

Oxygen and hydrogen isotope composition of precipitation in Port Aransas, Texas
Ryan Hladyniuk*, Patricia Garlough, and Alton Hensch (University of Texas Marine Science Institute)

We examined the oxygen and hydrogen isotopic composition of precipitation in Port Aransas, Texas to understand the hydrological contribution to the local estuary. Since 2021, the average oxygen and hydrogen isotopic composition, reported relative to VSMOW was -2.6‰ (n=22) and -10.3‰ (n=20). The isotope composition of precipitation is controlled by the amount of rain and temperature, however, in mid-latitude regions there has been evidence that the isotope composition of precipitation is controlled by the type of rain (convective versus stratiform) (Aggarwal et al., 2016). When comparing the isotope composition of water to the amount and temperature, only weak correlations were found ($r2=0.1$ and 0.3, respectively). We used the convective precipitation dataset, from the NADAS (Xia et al.,

2009), and observed even weaker correlations between the isotope composition of precipitation and the type of rainfall, as a whole and seasonally (r2<0.1). The data hints to an alternative control on local precipitation, perhaps the mesoscale convective systems from moisture arising from southern airmasses. When comparing the isotope composition to the long-term oxygen and hydrogen isotopic composition record of the local estuary, abrupt, large-scale events, such as Hurricane Harvey can force near meteoric conditions in the estuary, specifically in Aransas, Mesquite and Copano Bays ($\delta^{18}O$ values of -6‰). Also noteworthy, the $\delta^{18}O$ values of water at Copano Bay shifts toward lower values, -8.0‰ and -4.5‰, during September 2018 and August 2021, respectively, indicating influxes of meteoric water. Future studies will focus on meteoric water (precipitation and groundwater) contributions to Copano Bay.

VERTEBRATE SCIENCE

Over-summering of migratory whooping cranes (*Grus americana*) on their wintering grounds
Paityn Bower*, Matti Bradshaw, Carter Crouch, Arianna N. Barajas, Alicia M. Ward, Hillary L. Thompson, and Elizabeth H. Smith (International Crane Foundation)

Over-summering of migratory bird populations on wintering grounds may occur when individuals forgo migration and remain in non-breeding or wintering habitats. Pre-migratory physiological conditions of individuals are thought to be a contributing factor in migratory behavior change. We summarize past reports of Whooping Cranes over-summering on the wintering grounds, and the potential contributing factors. Additionally, we report three new documented instances of over-summering on the wintering grounds in the Eastern Migratory Population (EMP) and four instances in the Aransas-Wood Buffalo Population (AWBP). We also report habitat use and two summers of molting information on the Texas coast for AWBP cranes. Whooping Cranes over-summering on the wintering grounds has management implications for National Wildlife Refuges who typically are not managing for this species during the summer. Additionally, as these endangered populations are still quite small, individuals missing breeding seasons is a potential concern for population recovery.

FISH AND FISHERIES

Spatial Patterns and Environmental Predictors of Trophy Spotted Seatrout in the Upper Laguna Madre, Texas
Elliot Briell*, Ethan Getz, and Catherine Eckert (Texas Parks & Wildlife Department)

Spotted Seatrout (trout) are one of the most heavily targeted sportfish along the Texas coast. With recent regulation changes intended to reduce harvest mortality of trophy-sized trout, understanding differences in spatial patterns and environmental drivers of distribution between trophy and smaller adult trout has become especially relevant for fisheries managers. Here, we leveraged a long-term (1983-2023) gill net dataset collected by the Texas Parks and Wildlife Department to model trout abundance and distribution for both the trophy (>28") and remaining adult populations. Space-time pattern mining geoprocessing tools were used to evaluate spatio-temporal trends in distribution. Boosted regression trees

(BRTs) were used to determine predictors of trout abundance. Kernel density distribution estimates and hot spot analyses showed that trophy trout exhibit a greater degree of spatial clustering, with abundance peaks concentrated along specific shorelines compared to smaller adults. Neither trophy nor smaller adult trout exhibited significant changes in distribution over time, suggesting that differences in distributional characteristics have remained consistent. Salinity and bay were strong predictors for both size groups. However, dissolved oxygen concentration and temperature were much more important in predicting the abundance of trophy trout, while depth, turbidity, and season played a larger role in determining the abundance of smaller adult trout. These results indicate that trophy trout display unique spatial use patterns, and that their abundance may be driven by a unique set of hydrological factors.

Habitat use and Movement of Parrotfish on Coral Seascapes in the Flower Garden Banks National Marine Sanctuary
Lelaina Clayburg* (University of Texas Rio Grande Valley), Marissa Nuttall (Texas A&M University Galveston), Jay Rooker (Texas A&M University Galveston), Robert Wells (Texas A&M University Galveston), Michael Dance (Louisiana State University), and Richard Kline (University of Texas Rio Grande Valley) *(student presentation)*

Coral reefs are vital ecosystems for various reasons. Not only do they provide critical habitat and cycle nutrients, but they also contribute to the economy via tourism and medical research. The Flower Garden Banks National Marine Sanctuary (FGBNMS) is a collection of natural banks in the Gulf of Mexico that comprise the United States' northernmost coral reefs. These reefs are home to many commercially important fish and endangered corals. Monitoring of these reefs has been conducted for many decades and includes corals as well as fishes and other reef-associated flora and fauna. Some of the most conspicuous fish on the FGBNMS are the parrotfishes (family Scaridae) a group of mainly herbivorous fishes that include some corallivorous species. Parrotfish contribute to bioerosion on reefs as well as reef-building and sediment production due to their feeding strategies. There is also concern that the feeding habits of parrotfish may contribute to the spread of coral diseases on reefs. In this study, we are using a high-density array of acoustic receivers that allows for acoustic positioning (Innovasea, Vemco Positioning System, VPS) to track the fine-scale movements of the parrotfish at two banks within the FGBNMS (East Flower Garden Bank and Stetson Bank). Parrotfish will be tagged with acoustic transmitters to evaluate their daily movements, activity spaces (e.g., home range) and potential impacts they may have on coral condition.

Menhaden Mismatch: Population Trends in Texas Bays
Charles Downey*, Ethan Getz, and Elizabeth Benson (Texas Parks & Wildlife Department)

Menhaden are a commercially and ecologically important genus of fish that are present throughout Texas coastal waters, including the Gulf of Mexico. They support a large commercial fishery and are crucial to the diets of many other commercially and recreationally important fishes. A long-term fisheries-independent dataset collected by the Texas Parks and Wildlife Department was used to assess population trends for menhaden species along the Texas coast. Menhaden were collected using bag seines, bay trawls, gulf trawls, and gill nets from 1983-2023. Samples were analyzed to determine trends in abundance and distribution coastwide as well as any patterns in specific bay systems. Juvenile and sub-adult menhaden captured in bag seines and bay trawls did not show clear trends in coastwide abundance while adults captured in gills nets showed a significant decrease over the past two decades. When investigated by bay system, Sabine Lake and Galveston Bay had the highest

abundance of menhaden as well as the largest declines, where other bay systems tended to have smaller and more stable populations. Additionally, the Texas Parks and Wildlife Department has quantified fish kills throughout Texas and determined that menhaden are present in a majority of kills, which could account for the decline in adult populations. Reduced menhaden populations could have negative effects on the ecosystem, so further investigations into potential drivers for declines such as DO, salinity, and water temperature, as well as bay specific effects, are needed to identify management concerns.

Regulating Acid-Base Balance in Larval Sheepshead Minnows Along a Salinity Gradient
Lu Lin* and Andrew Esbaugh (University of Texas Marine Science Institute) *(student presentation)*

Estuarine systems are highly dynamic with daily and seasonal fluctuations in salinity, pH, and oxygen that can impose significant physiological stress on larvae during recruitment. Sheepshead minnow (*Cyprinodon variegatus*) is an estuarine teleost model organism that has great tolerances for pH and salinity gradients at the early life stage. However, the mechanism of acid-base regulation physiology under different osmotic environments remains unclear. Sodium-proton exchanger (NHE) is believed to contribute to acid excretion and sodium uptake primarily, which can be thermodynamically unfavorable in freshwater and energetically costly in hyperosmotic conditions. V-type proton ATPase (VHA) might contribute alternatively to acid excretion under such conditions. Our goal is to understand how larvae cope with the coupling effects of salinity and pH stressors and the interactions between osmoregulation and acid-base regulation physiology. Embryos at 1 dpf were acclimated to different salinity conditions at 0 ppt, 25 ppt, and 60 ppt for 7 days until hatch and sampled for gene expression. Scanning ion-selective electrode (SIET) was employed to assess the proton flux and the contributions of various enzymes including NHEs, carbonic anhydrase, and VHA. Survivorship was not affected by salinity treatments. Expressions of CA14, and subunit V0D1 of VHA were not affected. At 0 ppt, NHE3 was upregulated while NHE2c was downregulated. NHE2a and NHE2c were upregulated in 60 ppt.

Assessing Relative Abundance and Broodstock-Recruitment Relationships of the Eastern Oyster (*Crassostrea virginica)* Across Four Texas Bays
Jeremy McCulloch* and Zachary Olsen (Texas Parks & Wildlife Department-Coastal Fisheries Division)

Eastern Oysters (*Crassostrea virginica*) constitute a valuable fishery in Texas, with ex-vessel values approaching $30 million for some years. They also provide valuable ecosystem services such as structural habitat for lower trophic level finfish and invertebrates, reinforcement of shorelines to combat erosion, and water filtration. As a part of Texas Parks and Wildlife Department's (TPWD) fisheries-independent monitoring program, TPWD has collected routine oyster dredge survey data for over 30 years, providing relative abundance and length data for spat, sub-market, and market sized oysters. The objectives of this analysis were twofold: first, assess trends in spat, sub-market, and market oyster abundance in 4 bay systems of the Texas coast; second, examine broodstock-recruitment relationships across these 4 bay systems based on other similar analyses conducted using long-term oyster dredge monitoring data. Here we found varying trends in relative abundance among bay systems in Texas, such as decreased spat, sub-market, and market abundance throughout the time series in Galveston Bay and, in contrast, cyclical trends in abundance in Matagorda Bay, San Antonio Bay, and Aransas Bay. The broodstock-recruitment relationship

generally fit a Ricker model which suggests decreased recruitment at very high levels of spawning stock biomass. However, the specifics and fit of these models differed by bay system. While Ricker models are certainly an oversimplification of the broodstock-recruitment relationship (i.e., not accounting for factors such as salinity and cultch availability), they do suggest some necessity for fisheries managers to incorporate broodstock abundance into management decision making.

Revealing the hidden trophic roles of cryptobenthic blennies on the Texas Gulf Coast
Hannah S. Rempel* (University of Texas Marine Science Institute, UTMSI), John Majoris (Texas A&M Corpus Christi), Juan Pablo Lozano Peña (UTMSI), C. Melman Neill (UTMSI), Mariana Rivera Higueras (UTMSI), and Jordan Casey (UTMSI) *(student presentation)*

Cryptobenthic fishes (<5 cm) can account for about half of the biodiversity of both tropical and subtropical nearshore marine ecosystems, but they are rarely included in fish community surveys, including in Texas bays and estuaries. Despite their small size, they have high turnover rates and may provide key food web links between the microbiota they consume and larger predators that consume them, helping to support a high diversity and biomass of higher trophic level fishes. While cryptobenthic fishes like blennies and gobies are found across oyster reefs, jetties, and estuarine mudflats in coastal Texas, little is known about their population dynamics and ecology. As Texas faces increasing coastal disturbances such as freeze events, nutrient blooms, hurricanes, and coastal development, there is an urgent need to obtain baseline data on the diets and ecosystem roles of these species and develop techniques to rapidly assess species responses following disturbances. The characterize the trophic roles of several common blennies (*Hypleurochilus cf. aequipinnis, Hypleurochilus multifilus, and Scartella cristata*) in jetties in the Corpus Christi Bay, we are using a combination of bulk δ^{13}C and δ^{15}N stable isotope analysis and DNA metabarcoding of fish gut contents. By combining traditional techniques like bulk stable isotope analysis to study fish nutritional needs with novel approaches like DNA metabarcoding that can reveal previously underappreciated food web connections, we aim to shed light on the underappreciated ecosystem roles of this cryptic, yet important group of fishes in Texas bays and estuaries.

Estimation of Fish Biomass on the RGV Reef Using Split Beam Sonar
Allison White* and Richard Kline (University of Texas Rio Grande Valley) *(student presentation)*

The Rio Grande Valley Reef is an artificial reef located 13 nautical miles off the coast of South Padre Island. The RGV Reef area spans 1,650 acres and is comprised of hundreds of patches of material ranging from low relief (1-2ft) to high relief (8-30ft) reef structure. This reef provides crucial habitat for multiple fish species during different life stages and supports local fisheries. Since the deployment of structures in 2016, there has been a noticeable increase in fish abundance and recruitment, particularly commercially harvested snapper (Lutjanus sp.), however quantification of fish biomass is necessary to evaluate the effectiveness of different structure types in recruitment of fish. For this project, a Simrad EK80 split beam sonar will be used to estimate fish biomass associated with the reef patches. Analysis of the sonar data will be done through Echoview by application of filters to eliminate background noise and to remove the   echo returns from plankton and other non-fish marine life from the fish measurements. Biomass estimation will be calculated using nautical area scattering coefficient (NASC) value from fish echo returns and weight curves created from rod caught fish. Additionally, carbon content contained within the fish populations associated at the RGV reef will be estimated from the biomass of fish school and

individual fish tracks. This will provide important quantitative information on the success of the reef in recruitment of fish and carbon capture within the fish associated with the RGV reef.

From Shore to Shells: Assessing Resilience of Genetically Different Eastern Oyster (*Crassostrea virginica*) Populations in Texas
Alexandra M. Good*, Kate Gomez-Rangel, Joseph Matt, Christopher Hollenbeck, and Keisha D. Bahr (Texas A&M University at Corpus Christi) (*student presentation*)

The eastern oyster, *Crassostrea virginica*, is a valuable foundational species providing critical ecosystem services and an economically valuable fishery and aquaculture industry for Texas. However, population growth, coastal development, pollution, and flooding will threaten Texas' top commercial fishery. In addition, these local threats will interact with global environmental changes, so it is vital to understand the species' specific stress tolerances and adaptive capacities. This Texas oyster population is divided into two genetically different sub-species found in the Northern and Southern regions of the state, with Corpus Christi Bay acting as the transition zone between the divergent populations. However, few scientific conclusions have been made regarding why there is such vast genetic variation between the two populations of oysters in Texas. Therefore, using an intermittent flow respirometry technique, this project will characterize the individual tolerance thresholds of the genetically different sub-populations to a range of salinities under high temperatures. The results of this work aim to help predict future risk and resilience of the South Texas oyster population dynamics, aquaculture production, and restoration of ecosystem services. The risk assessment created will contribute to the resiliency of Texas' coastal oyster reef habitats to climate change by filling the knowledge gap surrounding stress tolerances to dramatic salinity fluctuations and evaluating how the genetically different oyster populations will respond to interacting local and global stressors.

SEDIMENT PROCESSES AND HYDRODYNAMICS

Spatial Gradient of Sediment Impacts on Seagrass Beds from Oil Tanker Docking and Shipping
Kirk Cammarata* (Texas A&M University-Corpus Christi), Collin Kerr (Texas A&M University-Corpus Christi), Austin Hamilton (Texas A&M University-Corpus Christi), Carissa Pinon (Texas A&M University-Corpus Christi), Patrick Nye (Ingleside On the Bay Coastal Watch Association), and Hua Zhang (Texas A&M University-Corpus Christi)

A TCEQ- and USACE-approved expansion of an oil export terminal prompted study of adjacent *Thalassia testudinum*-dominated mixed seagrass beds to evaluate "operational impacts" of tanker docking activities, pre-expansion. UAS and NAIP aerial imagery suggested decreasing seagrass presence where tugboat prop wash directed sediment plumes onto seagrass beds. Impacts were hypothesized to exhibit a spatial gradient. Sediment plumes from tanker docking events were captured by light loggers and sediment traps which, respectively, recorded light levels near zero at seagrass canopy height for almost 3 hrs, and >712 g/m^2d dry sediment settled at 200 m from the terminal. Light attenuation traveled over 800 m to a waterfront community. Salinity, TSS and inorganic content increased in the sediment plumes. Seagrass indicators (species composition, biomass, leaf area) exhibited gradients with distance from the terminal to 500 m. However,

impacts from boat wakes and prop scarring then increased at 2 sites flanking a marina access channel. Erosional scouring was observed near the terminal in summer, but nearby dredging in winter may have buried seagrasses at the same site. Monitoring efforts were challenged by the rapidly changing anthropogenic disturbances. *Thalassia* presence decreased from June to August (2021) at 233 m from the terminal, but by August 2023 we were unable to locate *Thalassia* within 300 m of the terminal. Construction of new docking berths for Suezmax and VLCC ships will place similar, but possibly larger, unmitigated docking impacts adjacent to the highest quality seagrass beds and within 500 m of homeowner waterfront properties.

Assessing Anthropocene History and Mercury Distribution in Sediments of Matagorda Bay, Texas, USA
Yoonho Jung* (Texas A&M University), Timothy Dellapenna (Texas A&M University), Christina Belanger (Texas A&M University), Peng Lin (University of Georgia), and Wei Xing (University of Georgia) *(student presentation)*

Matagorda Bay, one of the biggest estuaries in the U.S., has experienced a significant increase in anthropogenic activities due to population and industrial growth. In particular, mercury is known for its detrimental effects as it bioaccumulates as methyl mercury. The introduction of mercury into the marine environment by both natural and anthropogenic sources. Anthropogenic mercury sources include coal combustion, fossil fuel, metal production, municipal incineration, chloroalkali plant, cement production plant and local waste combustion which are predominant in Matagorda Bay as one-third US petroleum refining capacity is located along the shores of Galveston Bay. A total of 28 cores were collected to analyze the anthropogenic mercury input into Matagorda Bay and its historical distribution through geochronology. Our results show that the highest total mercury concentration was located in Cox Bay, where a chloroalkali plant operated during the 1970s, followed by a polyvinyl chloride plant since 1980s. The point source of total mercury seems to have peaked in the 1990s, decreasing due to environmental regulation. While the total mercury concentration generally decreased with increasing distance, cores from the dredging channel connecting Cox Bay and Matagorda ship Channel showed a high total mercury inventory. This is likely a result of the dredging near Cox Bay, causing the resuspension and redistribution of the contaminated sediments. Despite the function of a bay to prevent the transport of contaminated sediments to open ocean, mercury in Matagorda Bay is likely carried out via non-point sources.

Understanding How Interactions Between Bathymetry and Current Velocities Affect Fish Assemblages of the RGV Reef
Annie Zeiler* (University of Texas Rio Grande Valley), Richard Kline (University of Texas Rio Grande Valley) *(student presentation)*

The Rio Grande Valley Artificial Reef (RGV reef) is the largest artificial reef in the Gulf of Mexico. The reef is located 13 miles offshore of South Padre Island and covers 1650 acres of Texas State waters. These varied reef structures provide structure, food, and protection for all life stages of numerous reef fish species. There are several types of structures in this reef area such as piles of railroad ties, concrete pyramids, and low-profile modules placed in a grid to provide replication. Currently, there is no bathymetric map to characterize and compare reef structures with currents and other oceanographic features. In this study, we are creating a map of the RGV reef and will measure current velocities and disturbances on different sized patches on the reef. We aim to determine how the reef structures change the currents and make them more attractive for fish. The map is being created using swath

bathymetry, providing information on water depth, roughness, and vertical relief from the sea floor. A Sontek Hydrosurveyor M9 acoustic doppler current profiler (ADCP) will be used to measure current velocity and changes over different sized patches on the reef. This study will provide important information on the bathymetry and changes to water currents affected by structures within the RGV reef to further examine oceanographic characteristics associated with the reef and fish assemblages. Information about how the reef affects current flow and fish populations will be useful for improving future artificial reef design and deployment.

Campus Map
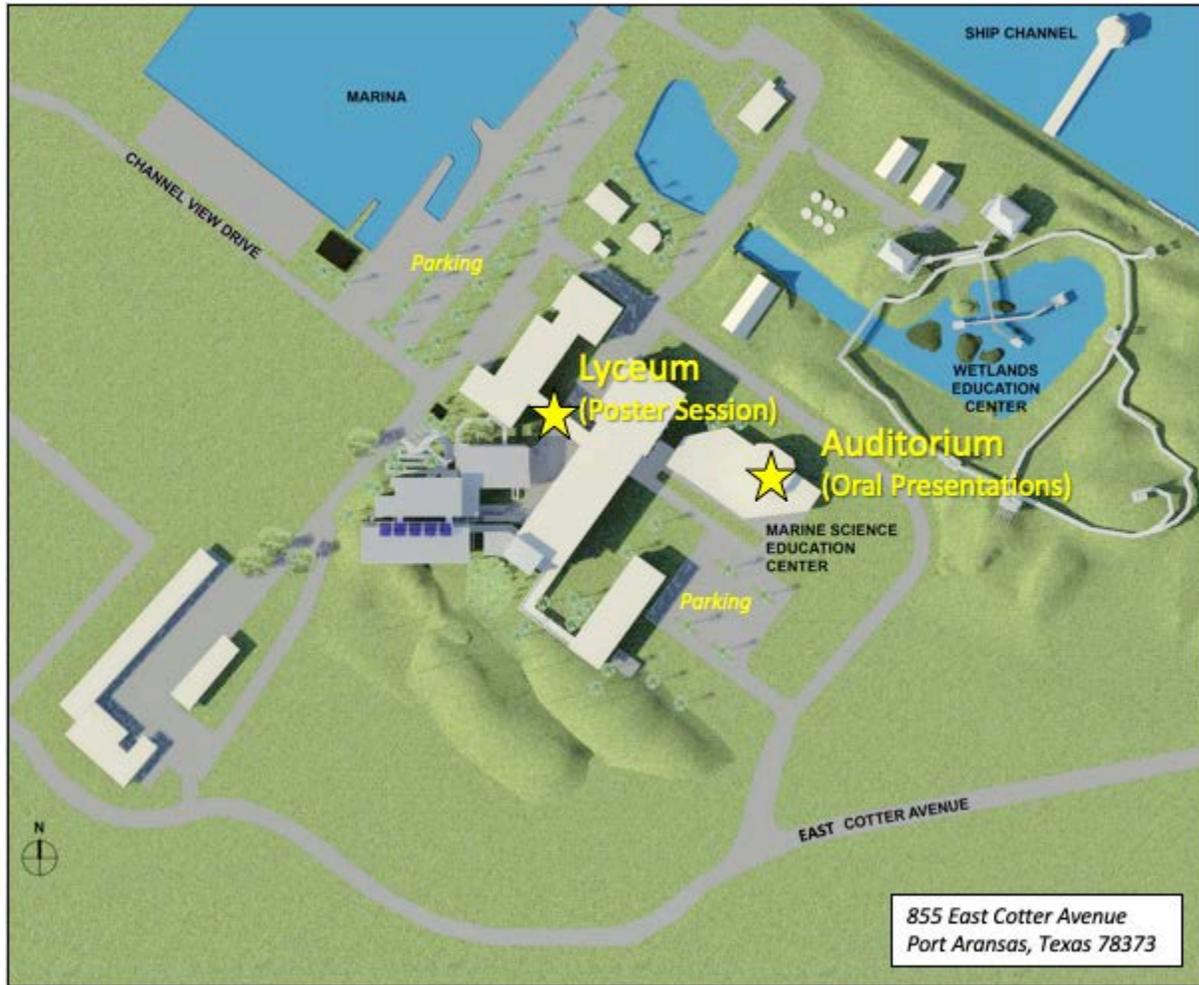
Main campus of The University of Texas Marine Science Institute

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

Greening the TBEM 2024

Bringing people together for a large meeting like Texas Bays and Estuaries can create significant environmental impacts. As professionals in our field, it is important for the Mission-Aransas Reserve and the University of Texas Marine Science Institute to lead by example. The following list highlights the steps we've taken to reduce the impact of TBEM 2024:

- Providing paper coffee mugs (please keep and reuse throughout day if possible)
- Convincing vendors to use Styrofoam alternatives
- Reusable bags for meeting materials
- Reusable nametags
- Using materials with as much recycled content as possible
- Providing electronic copies of meeting materials to registered participants
- Limited paper use through duplex printing where possible
- Email communication with registered participants
- Contracting with local, environmentally responsible vendors whenever possible.

Upcoming Events and Meetings

Welcome to 52nd Annual Benthic Ecology Meeting

When: April 10 - 14, 2024

Where: Charleston, South Carolina (USA)

Venue: Charleston Marriott

https://bem.disl.edu/

2024 COASTAL & ESTUARINE SUMMIT

HOSTED BY RESTORE AMERICA'S ESTUARIES

October 6-10, 2024   Washington, D.C. Region

HTTPS://ESTUARIES.ORG/2024-RAE-SUMMIT/

https://sws2024.org/site/page.aspx?pid=901&sid=1554&lang=en

Texas ASBPA Coastal Symposium - 2024
2024 Texas Coastal Symposium, "Preserving and Protecting Texas Shores and Beaches"

About this Event

ASBPA Texas Chapter announces the 2024 Texas Coastal Symposium, which will be held on Thurs, April 11th, 2024 at the HARTE Research Institute in Corpus Christi, Texas.
Technical and policy-oriented abstracts are invited for a broad range of coastal issues related to changes in disaster recovery, coastal ecology, science, engineering, economics, and policy.
Topics should be related to aims and goals of ASBPA and related to Texas beaches shorelines. Please submit abstracts as PDF or Word documents to:
Cris.Weber@aptim.com or Jace.Tunnell@tamucc.edu

https://texasasbpa.org/

https://www.southcentralsetac.org/

April 16, 2024 Texas General Land Office Coastal Management Program Funding Opportunities
Location: Patton Center, UTMSI
Website: https://texas-coastal-management-program.ticketleap.com/port-aransas-workshop/

April 15-May 15, 2024 28th Annual Birding Classic
Website: https://tpwd.texas.gov/events/great-texas-birding-classic

November 14-16, 2024, Science Teachers Association of Texas
Location: San Antonio
Website: https://www.statweb.org/

HOSTED BY THE TEXAS WATER DEVELOPMENT BOARD

January 27-29, 2025 Water for Texas Conference
Location: Austin
Website: https://waterfortexas.twdb.texas.gov/2025/

Opportunity for Public Comments
Texas Beneficial Use Master Plan Call for Input - Ducks Unlimited & TCEQ
Stakeholders interested in participating should contact Todd Merendino at Ducks
Unlimited (tmerendino@ducks.org) and Stephanie Taylor at Anchor QEA
(staylor@anchorqea.com)

Public Meeting on the City of Corpus Christi's Proposed New TPDES Permit No.
WQ0005289000
TCEQ's Office of the Chief Clerk will facilitate a public meeting on the City of Corpus Christi's
proposed TPDES Permit No. WQ0005289000, which authorizes the discharge of water
treatment waste from a proposed Inner Harbor Desalination Plant
Website: https://www.tceq.texas.gov/agency/decisions/hearings/events/public-meeting-on-the-city-of-corpus-christis-proposed-new-tpdes-permit-no-wq0005289000
Website: https://www.desal.cctexas.com/