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 23-24, 2025

Texas Bays & Estuaries Meeting

Patton Center for Marine Science Education

The University of Texas at Austin

Marine Science Institute

Port Aransas, Texas

April 23 & 24, 2025

MISSION ARANSAS NATIONAL ESTUARINE RESEARCH RESERVE

THE UNIVERSITY OF TEXAS MARINE SCIENCE INSTITUTE

COASTAL BEND BAYS & ESTUARIES PROGRAM

Sea Grant Texas AT TEXAS A&M UNIVERSITY

DIVERSE ANGLERS FLATS WORTHY MUTUAL RESPECT

Our Texas Our Future H-E-B

PORT ARANSAS the island life

Randy & Dawn through Coastal Bend Community Foundation

TEXAS A&M UNIVERSITY CORPUS CHRISTI | HARTE RESEARCH INSTITUTE

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

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Welcome!

The University of Texas Marine Science Institute is proud to host the 15th 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 4:00 to 6:00 p.m. during the poster session on Wednesday evening (April 23) 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

Joan Garland
Katie Swanson
Adriana Reza
Tracy Weatherall
Victoria Congdon
Shelby Marincasiu
Michelle McCumber
Eric Ehrlich
Tess Kelly
Kelley Savage
Kaitlyn Callagher
Amanda Jacoby
Alfonsina Romo

Follow the meeting on social media with #TBEM2025
Wi-Fi Name: utguest
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Sign up to receive UTMSI Emergency Alerts during the meeting:

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

Invited Speaker

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

Krista L. Jankowski, a Senior Scientist and Strategic Planner at Arcadis, 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.

Special Session

Texas Gulf Coast Research Center

Established by the 88th Texas Legislature and based at The University of Texas Marine Science Institute, the Texas Gulf Coast Research Center serves as a hub for advancing applied research that benefits coastal communities and ecosystems. In collaboration with UT scientists and local and state partners, the Center supports agile, impactful science that addresses current and emerging issues affecting the Texas coast.

With a mission to enhance innovation and resilience across the region, the Center has launched 25 diverse research projects to date. These span key topics such as marine and coastal ecosystems, plastic pollution, extreme weather resilience, wildlife and habitat studies, innovative solutions, and community engagement. From investigating blue crab recruitment and plastic degradation to exploring seaweed farming and supporting local grant-writing efforts, the Center is driving science-based solutions for the Gulf Coast's future.

The special session will highlight and explore several of these research areas, offering insights into the progress, challenges, and opportunities shaping the Texas Gulf Coast.

Wednesday, April 23, 2025

8:00 AM **Registration**, Patton Center for Marine Science Education, The University of Texas Marine Science Institute, 855 East Cotter Avenue, Port Aransas, Texas

8:45 AM **Welcome and Opening Remarks**, Dr. Ed Buskey, Director, The University of Texas Marine Science Institute

Concurrent Session: Patton Center

HABITATS AND ECOSYSTEMS
SESSION I

9:00 AM **Quantification of Blue Carbon within the Marine Animal Forest on the Rio Grande Valley Artificial Reef**

Michelle King* (The University of Texas Rio Grande Valley), Richard Kline (The University of Texas Rio Grande Valley), MD Rahman (The University of Texas Rio Grande Valley), and Abdullah Rahman (The University of Texas Rio Grande Valley)

9:15 AM **Scaling ecosystem assessment tools across diverse Texas Coastal Bend salt marshes**

Kyle Runion* (UT Marine Science Institute), Deepak Mishra (University of Georgia), Katie Swanson (Mission Aransas National Estuarine Research Reserve), Mark Lever (UT Marine Science Institute), Jessica O'Connell (Colorado State University)

9:30 AM **Interactive Effects of Hyposalinity and Nitrogen Loading on Halodule wrightii (Shoal Grass)**

Hudson DeYoe (University of Texas Rio Grande Valley)

9:45 AM **Plant mediated-responses of rhizosphere fungal communities to elevated N in coastal marshes**

Yue Liu* (Department of Life Sciences, Texas A&M University-Corpus Christi) and Candice Y. Lumibao (Department of Life Sciences, Texas A&M University-Corpus Christi)

10:00 AM **Refining Indices of Biotic Integrity for Assessing Texas Tidal Stream Communities**

Stacy N. Trackenberg* (Harte Research Institute, Texas A&M University- Corpus Christi), Terry A. Palmer (Harte Research Institute, Texas A&M University- Corpus Christi), Natasha J. Breaux (Harte Research Institute, Texas A&M University- Corpus Christi), Jennifer B. Pollack (Harte Research Institute, Texas A&M University- Corpus Christi)

Wednesday, April 23, 2025

HABITATS AND ECOSYSTEMS
SESSION I

10:15 AM **Advancing Coastal Habitat Mapping and Data Accessibility in Texas Bays and Estuaries**
Chelsea Crosby*, David Norris*, Evan Pettis (Texas Parks and Wildlife Department - Coastal Fisheries Division)

10:30 AM **Land use Change and Implications on Estuary Health using GIS Application**
Angelica Ovalle* (Harte Research Institute, Texas A&M University- Corpus Christi) and Paul Montagna (Harte Research Institute, Texas A&M University- Corpus Christi)

10:45 AM **Break**

SEDIMENT PROCESSES AND HYDRODYNAMICS

11:15 AM **In Search of the Historic Corpus Christi Pass and the US Civil War "Affair at Padre Island"**
Randy Bissell (Texas Master Naturalist and Texas A&M University-Corpus Christi)

11:30 AM **Packery Channel Nature Park Shoreline Enhancement**
Ian Fisher (Anchor QEA)

11:45 AM **Reef Resilience: Investigating the Biological, Chemical, and Physical Impacts of Sediment on Oyster Reefs**
Daphne White (Harte Research Institute, Texas A&M University- Corpus Christi), Keisha Bahr (Harte Research Institute, Texas A&M University- Corpus Christi)

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

SPECIAL SESSION
TEXAS GULF COAST RESEARCH CENTER

1:15 PM **Invited Speaker: Introduction to the Texas Gulf Coast Research Center**
Edward Buskey* (UT Marine Science Institute)

Wednesday, April 23, 2025

SPECIAL SESSION
TEXAS GULF COAST RESEARCH CENTER

1:30 PM **Favoring the Dark Side: Research to Reduce Malpigmentation and Improve Stock Enhancement of Southern Flounder in Texas**

Lee A. Fuiman* (UT Marine Science Institute), Cynthia K. Faulk (UT Marine Science Institute), Laura Sisk-Hackworth Laura Sisk-Hackworth, Ashley N. Fincannon (Texas Parks & Wildlife Department- Coastal Fisheries), and Christopher E. Mace (Texas Parks & Wildlife Department- Coastal Fisheries)

1:45 PM **Patterns in blue food consumption and the role of taxonomic identity for fatty-acid profiles of Gulf coast fisheries species**

Joyce Velos* (UT Marine Science Institute), Lauren Bell (UT Austin), Hannah Price (UT Austin), Natalie Poulos (UT Austin), Zachary Olsen (Texas Parks & Wildlife Department- Coastal Fisheries) and Simon Brandl (UT Marine Science Institute)

2:00 PM **Fine-scale transport of planktonic blue crab and early juvenile settlement to estuarine nursery habitat in Aransas Bay**

Sharon Z. Herzka* (UT Marine Science Institute, UTMSI), Alfonsina Romo-Curiel (UTMSI), Teresa Bennett (UTMSI), Mark Fisher (Texas Parks and Wildlife Department, TPWD), Zachary Olsen (TPWD)

2:15 PM **The impact of oscillating extremes at the base of the food-web.**

Alexander Barth* (UT Marine Science Institute; UT Statistics & Data Science), David Malcolm (UT Marine Science Institute); Edward Buskey (UT Marine Science Institute); Zachary Olsen (Texas Parks & Wildlife Department- Coastal Fisheries), Jordan Casey (UT Marine Science Institute)

2:30 PM **Break**

RESTORATION
SESSION I

2:45 PM **NASCC Living Shoreline: The Challenging Balance of Mission, Flora, and Fauna**

Aaron Horine*(Anchor QEA), Ian Fisher (Anchor QEA), Ryan Burke (Anchor QEA), Scott McGuire (NASCC/NAVFAC SE PWD Corpus Christi Environmental)

3:00 PM **Boggy Cut GIWW Stabilization Project**

Ryan Burke* (Anchor QEA), Aaron Horine (Anchor QEA), Ian Fisher (Anchor QEA)

Wednesday, April 23, 2025

RESTORATION
SESSION I

3:15 PM **Texas Wetland Action Mapping (WAM): Participatory Mapping of Tidal Wetlands and Their Migration Space**
Charlotte Nash (The Nature Conservancy)

3:30 PM **The Potential Role of Oyster Reefs in Carbon Storage: Habitat Context and Restoration Implications**
Kelley Savage* (Harte Research Institute, Texas A&M University-Corpus Christi), Xinping Hu (University of Texas Marine Science Institute), Benoit Lebreton (CNRS, University of La Rochelle, La Rochelle, FR), and Jennifer Beseres Pollack (Harte Research Institute, Texas A&M University-Corpus Christi)

3:45 PM **Developing Methods for Elevation Restoration on Wind-Tidal Flats**
Isabel Nykamp (Harte Research Institute, Texas A&M University - Corpus Christi)

4:00 PM **Poster Session / Hors d'oeuvres.**
Located in the Marine Science Institute Lyceum, between the main lab and administrative buildings.

6:00 PM **Social Event**
Located at the Sip Yard Port Aransas (123 W Cotter Ave, Port Aransas, TX 78373).

Wednesday, April 23, 2025

Concurrent Session: ERC Seminar Room

FISH AND FISHERIES
SESSION I

9:15 AM **Modeling Approaches for Identifying Key Drivers of Blue Crab Population Decline in Texas Estuaries**

Zhixuan Song* (Texas A&M University at Galveston), Joel Anderson (Texas Parks & Wildlife Division, Perry R. Bass Marine Fisheries Research Station), Zachary Olsen (Texas Parks & Wildlife Division, Corpus Christi Field Office), Hui Liu (Texas A&M University at Galveston)

9:30 AM **Metabolic Advantages Predict Interspecific Competitive Outcomes in a Sympatric Blenny Community**

C. Melman Neill* (The University of Texas at Austin Marine Science Institute, UTMSI), Madison Schumm (UTMSI), Mariana Rivera-Higueras (UTMSI), Simon J. Brandl (UTMSI)

9:45 AM **Characterization of Texas Sheepshead highlights increased fishing pressure on spawning aggregations**

Ethan Getz *(Texas Parks & Wildlife Department- Coastal Fisheries), Charles Downey (Texas Parks & Wildlife Department- Coastal Fisheries), and Catherine Eckert (Texas Parks & Wildlife Department- Coastal Fisheries)

10:00 AM **Using metabolic traits to evaluate southern flounder habitat suitability in the Gulf of Mexico**

Julie Nati*(UT Marine Science Institute) Lu Lin (UT Marine Science Institute) Jeb Armstrong (UT Marine Science Institute) Andrew Esbaugh (UT Marine Science Institute)

10:15 AM **Environmental influences on juvenile Atlantic Croaker (Micropogonias undulatus) growth in the Western Gulf of Mexico**

Isabelle Cummings* (Texas Parks & Wildlife Department- Coastal Fisheries) and Joel Anderson (Texas Parks & Wildlife Department- Coastal Fisheries)

Wednesday, April 23, 2025

FISH AND FISHERIES
SESSION I

10:30 AM **Otolith isotope chemistry as a tracer of restocked fishes: A case study with the White Seabass, a west coast Sciaenid**

Alfonsina Romo-Curiel* (UT Marine Science Institute), Sharon Z Herzka (UT Marine Science Institute), Ruairi MacNamara (Hubbs-SeaWorld Research Institute), Mike Shane (Hubbs-SeaWorld Research Institute), and Mark Drawbridge (Hubbs-SeaWorld Research Institute)

10:45 AM **Break**

11:15 AM **Developing a Method to Measure Current Flows around an Artificial Reef using a Sontek M9 ADCP**

Annie Zeiler *(University of Texas Rio Grande Valley), Richard Kline (University of Texas Rio Grande Valley))

11:30 AM **Estimation of Fish Carbon in an Artificial Reef Using Split Beam Sonar**

Allison K. White (University of Texas Rio Grande Valley), Richard J. Kline (University of Texas Rio Grande Valley)

VERTEBRATE SCIENCE

11:45 AM **Over-summering of Migratory Whooping Cranes on their Wintering Grounds**

Matti R. Bradshaw* (International Crane Foundation), Paityn C. Macko (International Crane Foundation), Stephanie M. Schmidt (International Crane Foundation), Carter G. Crouch (International Crane Foundation), Ariana N. Barajas (International Crane Foundation), Alicia M. Ward (International Crane Foundation), Hillary L. Thompson (International Crane Foundation), Elizabeth H. Smith (International Crane Foundation)

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

Wednesday, April 23, 2025

INVERTEBRATE ECOLOGY

2:45 PM **Characterizing Tolerance Thresholds of Genetically Divided Eastern Oyster (Crassostrea virginica) Populations to Guide Aquaculture and Ecosystem Risk Assessments in Texas**

Alexandra M. Good, M.Sc.* (Harte Research Institute, Texas A&M University-Corpus Christi), Kate Gomez-Rangel (Harte Research Institute, Texas A&M University-Corpus Christi), Joseph Matt, Ph.D. (Texas A&M University-Corpus Christi), Christopher Hollenbeck, Ph.D. (Texas A&M University-Corpus Christ), Keisha Bahr, Ph.D. (Harte Research Institute, Texas A&M University-Corpus Christi)

3:00 PM **Evaluating the Extent of Oyster Mortality After a Severe Flood Event in Galveston Bay**

Rileigh Hawk* (Texas Parks & Wildlife Department- Coastal Fisheries), Christine Jensen (Texas Parks & Wildlife Department- Coastal Fisheries)

3:15 PM **Assessing mesozooplankton dynamics in response to two different seasons in a Texas estuary**

Bailey Lin*, Jenelle Estrada, Christian Rines, Hui Liu

3:30 PM **Microplastic detection in the American oyster (Crassostrea virginica) and a depuration study collected from Southern Texas Coast**

Rebecca Muniz * (University of Texas Rio Grande Valley)

3:45 PM **Impact of antidepressant drug exposure on tissue architecture and biological conditions in the American oysters**

Md Faisal Amin* (University of Texas Rio Grande Valley)

4:00 PM **Poster Session / Hors d'oeuvres.**

Located in the Marine Science Institute Lyceum, between the main lab and administrative buildings.

6:00 PM **Social Event**

Located at the Sip Yard Port Aransas (123 W Cotter Ave, Port Aransas, TX 78373).

POSTER SESSION PROGRAM

FISH AND FISHERIES

1 **Oyster Reef-Associated Fish Habitat Partitioning and Connectivity**
Yamilla N. Samara Chacon* (TAMUCC), Daniel Coffey (TAMUCC), and Simon Brandl (UTMSI)

2 **An Ecological Characterization of Juvenile Tarpon and Snook Nursery Habitats in Texas**
Isabel Tiller* (Harte Research Institute, Texas A&M University- Corpus Christi), Dr. Matthew Streich (Harte Research Institute, Texas A&M University- Corpus Christi), Jason Williams (Harte Research Institute, Texas A&M University- Corpus Christi)

3 **Chronic lithium toxicity of red drum and sheepshead minnow across a salinity gradient**
Alton Hensch* (UT Marine Science Institute), Jacob Stone (UT Marine Science Institute), Andrew J. Esbaugh (UT Marine Science Institute)

4 **Quantifying juvenile fish associated with nursery habitats using ARIS sonar**
Kaitlyn Doyscher* (University of Texas Rio Grande Valley), Richard Kline (University of Texas Rio Grande Valley)

5 **Habitat use and Movement of Parrotfish on Coral Seascapes in the Flower Garden Banks**
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 (Louisianna State University), and Richard Kline (University of Texas Rio Grande Valley)

6 **eDNA Monitoring of Southern Flounder**
Jackson Piccirillo* (University of Texas Rio Grand Valley Graduate Student) Richard Kline (University of Texas Rio Grand Valley) MD Rahman (University of Texas Rio Grand Valley)

HABITATS AND ECOSYSTEMS

7 **Effects of Oyster Reef Health on Consumer Community Structure and Trophic Pathways**
Bailey Bonham* (UT Marine Science Institute) and Simon Brandl (UT Marine Science Institute)

Wednesday, April 23, 2025

HABITATS AND ECOSYSTEMS

8 **Mapping land cover on 1m resolution for Texas Coastal Bend with airborne lidar point clouds and satellite images**

Lihong Su* (Harte Research Institute, Texas A&M University- Corpus Christi)

9 **Assessing Climatic Impacts on Wetland Transformation and Resilience along the Texas Coast using Satellite Imagery**

John Malito* (UT Austin Bureau of Economic Geology), Katie Swanson (UT Marine Science Institute), and Wonhyun Lee (UT Austin Bureau of Economic Geology)

10 **Developing a physicochemical procedure for the trace metal quantification in Spartina spartinae at Mustang Island State Park**

Lalo Amador* (Department of Physical and Environmental Sciences, Texas A&M University- Corpus Christi), Wendy Rangel (Department of Physical and Environmental Sciences, Texas A&M University- Corpus Christi), Christina Montez (Department of Physical and Environmental Sciences, Texas A&M University- Corpus Christi) , Yue Liu (Department of Life Sciences, Texas A&M University- Corpus Christi), Candice Lumibao (Department of Life Sciences, Texas A&M University- Corpus Christi), and Ioana E. Pavel (Department of Physical and Environmental Sciences, Texas A&M University- Corpus Christi)

11 **A Time Series Study Of The Microbial Community Assemblage At A Coastal Ocean Site Within The Gulf Of Mexico**

Mahima Yogesh (Texas A&M University- Corpus Christi), Yajuan Lin (Texas A&M University-Corpus Christi), Shuai Gu (Texas A&M University-Corpus Christi)

12 **Development of Image Analysis Methods to Differentiate Epiphytes on Seagrasses**

Carissa Piñón* (Texas A&M University- Corpus Christi), Chi Huang (Texas A&M University- Corpus Christi), Kirk Cammarata (Texas A&M University- Corpus Christi)

13 **Assessing Wild Pig Diet and Damage to Wetland Plant Ecosystems Along a Riverine Floodplain**

Brenna Edwards* (Department of Physical and Environmental Science, Texas A&M University-Corpus Christi), John M. Tomeček (Department of Rangeland, Wildlife, and Fisheries Management, Texas A&M University), Loretta L. Battaglia (Department of Rangeland, Wildlife, and Fisheries Management, Texas A&M University)

Wednesday, April 23, 2025

HABITATS AND ECOSYSTEMS

14 **Development of a Rapid Method to Compare Algal Epiphyte Community Compositional Shifts in Thalassia testudinum**

Samantha Maupin*, Kirk Cammarata, and Candice Lumibao (Dept. of Life Sciences, Texas A&M University - Corpus Christi)

15 **Analyzing Carbon Sequestration in Coastal Texas Oyster Reefs**

Wyatt Prappas* (UTRGV School of Earth Environmental and Marine Science (SEEMS)), Richard Kline (UTRGV SEEMS), MD Rahman (UTRGV School of Integrative Biological and Chemical Sciences (SIBC)), Faiz Rahman (UTRGV SEEMS)

16 **Optimizing growth conditions for the cultivation of native macroalgae species, Gracilaria tikvahiae, in Texas**

Claire K. White*, Daniel Harden, Dr. Mark Lever

INVERTEBRATE ECOLOGY

17 **Variability and Environmental Drivers of Eastern Oyster Growth in Texas Coastal Bays (1990-2023)**

Jessica Randall* (Texas Parks & Wildlife Department- Coastal Fisheries) and Joel Anderson (Texas Parks & Wildlife Department- Coastal Fisheries)

18 **Springtails and Mites in Coastal Wetlands: Uncovering Patterns in Soil Microarthropod Distribution**

Peyton C. Calderon* (Center for Coastal Studies, Texas A&M University-Corpus Christi), Loretta L. Battaglia (Center for Coastal Studies, Texas A&M University-Corpus Christi)

19 **Applying environmental DNA to assess the prevalence of dermo disease across oyster reefs along the Texas Coastal Bend**

Marissa Kordal (UT Marine Science Institute)

20 **Drivers of Sessile Invertebrate Community Composition and Vulnerability to Invasion**

Olivia Hughes* (Center for Coastal Studies, Texas A&M University-Corpus Christi) and Loretta L. Battaglia (Center for Coastal Studies, Texas A&M University-Corpus Christi)

21 **Remote-Sensing-Based Mapping of Oyster Mariculture Suitability Along the Texas Coast**

Isabel Johnson* (University of Texas Rio Grande Valley), Richard Kline (University of Texas Rio Grande Valley), MD Rahman (University of Texas Rio Grande Valley), Faiz Rahman (University of Texas Rio Grande Valley)

Wednesday, April 23, 2025

RESTORATION

22 **Plastic-free restored habitats: Reducing plastic pollution in community-based restoration of oyster reefs**

Mckenna Reinsch* (Harte Research Institute, Texas A&M University- Corpus Christi) Dr. Linda Walters (University of Central Florida), Dr. Lisa Chambers (University of Central Florida), Jace Tunnell (Harte Research Institute, Texas A&M University- Corpus Christi), Dr. Zhanfei Liu (University of Texas Marine Science Institute), Dr. Terry Palmer (Harte Research Institute, Texas A&M University- Corpus Christi), Natasha Breaux (Harte Research Institute, Texas A&M University- Corpus Christi), Erin Hill (Harte Research Institute, Texas A&M University- Corpus Christi), Dr. Jennifer Beseres Pollack (Harte Research Institute, Texas A&M University- Corpus Christi)

23 **Cost-benefit analyses of experimental oyster reef restoration strategies**

Kit Wheat-Walsh*, Evan L. Pettis

24 **El Nino/Southern Oscillation (ENSO) May Control Oyster Meta-population Connectivity for the Beezley Reef Sustainable Oyster Restoration Project**

William Rodney* (Texas Parks & Wildlife Department - Coastal Fisheries)

25 **Assessing Monitoring of Living Shoreline Projects**

Narita Ramirez* (Harte Research Institute, Texas A&M University-Corpus Christi)

26 **Ecological Restoration Project**

Harrison Taylor* (Texas A&M University Galveston Campus- Marine Biology/Marine Fisheries)

27 **Collaborative Restoration of a Network of Oyster Broodstock Spawning Reserves Across the Mission-Aransas Estuary**

Zachary Olsen* (Texas Parks and Wildlife Department), Lindsey Savage (Texas Parks and Wildlife Department), Evan Pettis (Texas Parks and Wildlife Department), Kit Wheat-Walsh (Texas Parks and Wildlife Department), Kathy Sweezey (The Nature Conservancy), Lauren Hutch Williams (The Nature Conservancy), Joan Garland (Mission-Aransas National Estuarine Research Reserve at The University of Texas Marine Science Institute), Katie Swanson (Mission-Aransas National Estuarine Research Reserve at The University of Texas Marine Science Institute), Jennifer Pollack (Harte Research Institute, Texas A&M University-Corpus Christi), Natasha Breaux (Harte Research Institute, Texas A&M University-Corpus Christi), Rosario Martinez (Coastal Bend Bays & Estuaries Program), Kiersten Stanzel (Coastal Bend Bays & Estuaries Program)

Wednesday, April 23, 2025

SEDIMENT PROCESSES & HYDRODYNAMICS

28 **Interpretation of the Sedimentology of an Oligocene Fluvial Core - A Texas River in Stone - 23 Million Years in the Making, Kenedy Co., Texas**

Andrew Waltrip*, Matthew Waltrip*, and Randy Bissell (all Texas A&M University - Corpus Christi)

29 **Assessing the Impacts of Beach Nourishment on Intertidal Infaunal Communities**

Lily Tubbs*, Danielle Downey, Terry Palmer, Kim Withers, Jennifer Beseres Pollack

30 **Comparison of Water Column and Sediment Porewater Conductivity in the Lower Laguna Madre, Texas**

Hudson DeYoe (University of Texas Rio Grande Valley)

31 **Stiffness of marine sediments measured on the scale of burrowers**

Jennifer Duncan* (Marine Science Institute, College of Natural Sciences, University of Texas at Austin), Semyra Reus (Dauphin Island Sea Lab, Stokes School of Marine and Environmental Science, University of South Alabama), and Kelly Dorgan (Marine Science Institute, College of Natural Sciences, University of Texas at Austin)

32 **Using pressure sensors to detect marine worm burrowing**

Austin R.Willson*, Kelly M. Dorgan, Jennifer L. Duncan, Alec P. Oveisi, Lillian Chin (Department of Marine Science, University of Texas at Austin)

TEXAS GULF COAST RESEARCH CENTER

33 **Human impact on lagoons shapes abundance and composition of shorebird prey**

Julia Berliner* (UT Austin Department of Integrative Biology), Simon Brandl (UT Marine Science Institute), Amanda Koltz (UT Austin Department of Integrative Biology), Matt Ashworth (UT Austin Department of Molecular Biosciences), Jordan Casey (UT Marine Science Institute), David Newstead (Coastal Bend Bays & Estuaries Program - Director of Coastal Bird Program), Rick Lanctot (U.S. Fish and Wildlife Services - Alaska Region Shorebird Coordinator), Mary Finch (UT Marine Science Institute), Elisabeth Frasch (UT Marine Science Institute)

34 **High-frequency shadowgraph imaging as an innovative approach to researching fine-scale dynamics of the ingress of blue crab megalopae into a turbid estuarine system**

Sharon Z. Herzka* (UT Marine Science Institute) and Charles Cousin (Bellamare)

Wednesday, April 23, 2025

TEXAS GULF COAST RESEARCH CENTER

35 **Exploring the Relationship between Local Fish Consumption, Diet Quality, Fishing Practices, and Food Security**

Eun Myung Kim* (UT Austin), Natalie Poulos, PhD (UT Austin), and Simon Brandl, PhD (UT Marine Science Institute)

WATER QUALITY

36 **Concentration of heavy metals in common bottlenose dolphins (Tursiops truncatus) from Galveston Bay**

Madison Hallmark* (Department of Life Science, Texas A&M University - Corpus Christi), Kyra Kaiser (Department of Physical and Environmental Science, Texas A&M University - Corpus Christi), Ioana E. Pavel (Department of Physical and Environmental Science, Texas A&M University - Corpus Christi), Dara Orbach (Department of Life Science, Texas A&M University - Corpus Christi)

37 **Evidence for a new indicator: the class 1 integron-integrase gene bridges the gap between fecal pollution and antibiotic resistance in Baffin Bay**

Kristen Waddell* (Del Mar College), Nora Bleth (Texas A&M University- Corpus Christi), Nicole Powers (Harte Research Institute), Jeffrey W. Turner (Laboratory for Microbial and Environmental Genomics, Texas A&M University- Corpus Christi)

38 **Microplastic Distribution and Composition in Bays and Estuaries of the Texas Coastal Bend**

Jessica Arisbeth Urias-Quiroz* (UT Marine Science Institute), Jordan Cisco (UT Marine Science Institute), Xiangtao Jiang (UT Marine Science Institute), Jianhong Xue (UT Marine Science Institute), Zhanfei Liu (UT Marine Science Institute)

39 **Evaluating Wild Pig Fecal Pollution in Coastal Recreational and Oyster-Harvesting Waters**

Lydia Cates* (Texas A&M University-Corpus Christi), Nora Bleth (Texas A&M University-Corpus Christi), John Tomecek (Department of Rangeland, Wildlife, and Fisheries Management, Texas A&M University), and Jeffrey Turner (Texas A&M University-Corpus Christi)

40 **Optimizing Surface Water Microplastic Collection: A Streamlined Protocol Applied to Corpus Christi Bay**

Jordan Cisco* (UT MSI), Jessica Arisbeth Urias-Quiroz (UT MSI), Xiangtao Jiang (UT MSI), Jianhong Xue (UT MSI), Zhanfei Liu (UT MSI)

Thursday, April 24, 2025

8:00 AM **Registration**, Patton Center for Marine Science Education, The University of Texas Marine Science Institute, 855 East Cotter Avenue, Port Aransas, Texas

Concurrent Session: Patton Center

WATER QUALITY

9:00 AM **Effects of Eutrophication and Hyposalinity on the Health of the Red Seaweed Gracilaria tikvahiae**

Donavuan Salazar* (School of Ocean Coastal and Earth Sciences, UT Rio Grande Valley)

9:15 AM **Building a better Baffin: Microbial source tracking examines nonpoint sources of fecal pollution**

Nora Bleth* (Texas A&M University- Corpus Christi), Nicole Powers (Harte Research Institute), Jacqueline Nicolay (Texas A&M University- Corpus Christi), Lydia Cates (Texas A&M University-Corpus Christi), Michael Wetz (Harte Research Institute), Jeffrey Turner (Texas A&M University-Corpus Christi)

9:30 AM **Multi-Drug-Resistant Marine Bacteria Carriers of Heavy Metals**

Wendy M. Rangel* (Texas A&M University-Corpus Christi), Kyra G. Kaiser (Texas A&M University-Corpus Christi), Ioana E. Pavel (Texas A&M University-Corpus Christi), Gregory W. Buck (Texas A&M University-Corpus Christi)

9:45 AM **The bioavailability of photo-bleached dissolved organic carbon from environmentally prevalent plastic nurdles in coastal waters**

Kadee Loyd*(UT Marine Science Institute), Xiangtao Jiang (UT Marine Science Institute), Kaijun Lu (UT Marine Science Institute), Kasia Dinkeloo (Department of Molecular Biosciences, UT-Austin), Kylee Hutchinson (Department of Biochemistry and Molecular Biology, Trinity University), Zhanfei Liu (UT Marine Science Institute)

10:00 AM **Break**

Thrusday, April 24, 2025

RESTORATION
SESSION II

10:30 AM **Developing Methods for Cyanobacterial Mat Restoration on Wind-Tidal Flats in South Texas**

Zahra Hasan* (Harte Research Institute, Texas A&M University - Corpus Christi), Dr. Jennifer Beseres-Pollack (Harte Research Institute, TAMUCC), Dr. Kim Withers (Center for Coastal Studies, TAMUCC), Dr. Stacy Trackenberg (Harte Research Institute, TAMUCC), Dr. Terry Palmer (Harte Research Institute, TAMUCC), Isabel Nykamp (Harte Research Institute, TAMUCC)

10:45 AM **Restoring Oyster Reefs through Unique Partnerships across the Texas Coast**

Kathy Sweezey* (The Nature Conservancy)

11:00 AM **Significant availability of native coastal grasses through a Regional Access to Native Grasses Growers Group under the 20-county Gulf-Houston Regional Conservation Plan**

Deborah January-Bevers* (Houston Wilderness), Dr. Sam Brody (Institute for Disaster Resilient Texas)

11:15 AM **Texas Coast Rookery Island Protection: Triangle Tree and Future Projects**

Matthew Sadowski* (HDR Engineering), Rosario Martinez (Coastal Bend Bays & Estuaries Program)

11:30 AM **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: Planning WITH Uncertainty**

Krista L. Jankowski, Arcadis

1:45 PM **Is a Court Bringing Sexy Back to NEPA?**

Kristina Alexander,* Endowed Chair for Marine Policy & Law (Harte Research Institute, Texas A&M University-Corpus Christi)

2:00 PM **Restoration for a Resilient Nueces River Delta**

Leigh Perry (CBBEP) and Aaron Baxter (CBBEP)

2:15 PM **Texas-sized planning effort for beneficial use of dredged material**

Rebecca Arnold* (Anchor QEA), and Ian Fisher* (Anchor QEA)

Thrusday, April 24, 2025

RESTORATION
SESSION II

2:30 PM **Update on the Texas Coastal Resiliency Master Plan**

Joshua Oyer

2:45 PM **Student Awards & Closing Remarks**

Thrusday, April 24, 2025

Concurrent Session II: ERC Seminar Room

HABITATS AND ECOSYSTEMS
SESSION II

9:15 AM **Fungi on the Edge: Ectomycorrhizal diversity in South Texas prairie dunes**
Jezreel Wilson*(Texas A&M University - Corpus Christi), Yue Liu (Texas A&M University - Corpus Christi), and Candice Lumibao (Texas A&M University - Corpus Christi)

9:30 AM **Water Use Regulation in Black Mangroves (Avicennia germinans) with Environmental Fluctuations Over the 2024 Summer Growing Season**
Cynthia Guo* (Department of Earth and Planetary Sciences, UT, Austin), Maria Ulatowski (Department of Earth and Planetary Sciences, UT, Austin), Berit Batterson (UT Marine Science Institute), Suvan Cabraal (Department of Earth and Planetary Sciences, UT, Austin), Chleo Chiu (Department of Earth and Planetary Sciences, UT, Austin), Ashley Matheny (Department of Earth and Planetary Sciences, UT, Austin)

FISH AND FISHERIES
SESSION II

9:45 AM **Morphological, physiological, and behavioral biomarkers for enhancing southern flounder larviculture (Paralicthys lethostigma)**
Daniel Kemp* (Texas A&M University at Galveston)

10:00 AM **Break**

HABITATS AND ECOSYSTEMS
SESSION II

10:30 AM **Blue Carbon Baseline Assessment at Port Bay, Texas. A study of stored organic carbon in the Texas Gulf Coast**
Alexandra Austin* (HRD Inc.)

10:45 AM **The Nueces River Tidal Segment: Challenges, Resource Management, and Water Quality**
Adrien Hilmy* (CBBEP), Aaron Baxter (CBBEP)

Thrusday, April 24, 2025

HABITATS AND ECOSYSTEMS
SESSION II

11:00 AM **Quantifying habitat loss at waterbird colony islands in Texas**

David A. Essian*, Jessica L. Magolan, Dale E. Gawlik, Jim Gibeaut1, Liam Wolff

11:15 AM **Travel Back to the Patton Center.**

11:30 AM **Lunch served in the Patton Center.** Participants are welcome to eat outside at tables under the science building or Patton Center.

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

2024:
Jacob Doty, Texas A&M University-Corpus Christi, 1st Place
Philip Souza, Jr., The University of Texas Marine Science Institute, 2rd Place
C. Melman Neill, The University of Texas Marine Science Institute, 3rd Place

Awards sponsored by Coastal Bend Bays & Estuaries Program

Student Awards

Previous Poster Presentation 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

2024: **Annie Zeiler,** The University of Texas Rio Grande Valley, 1st Place
Isabel Nykamp, Harte Research Institute, Texas A&M University-Corpus Christi, 2nd Place
Lu Lin, The University of Texas Marine Science Institute, 3rd Place

Awards sponsored by Coastal Bend Bays & Estuaries Program

Abstracts for Oral Presentations

HABITATS AND ECOSYSTEMS

SESSION I

Quantification of Blue Carbon within the Marine Animal Forest on the Rio Grande Valley Artificial Reef

Michelle King* (The University of Texas Rio Grande Valley), Richard Kline (The University of Texas Rio Grande Valley), MD Rahman (The University of Texas Rio Grande Valley), and Abdullah Rahman (The University of Texas Rio Grande Valley)

The protection and enhancement of coastal ecosystems ensures heightened biodiversity, increased fisheries, enhanced carbon capture, and numerous other benefits. The study of blue carbon ecosystems has expanded rapidly in the last two decades and the most well-known include plant-dominated ecosystems such as seagrass meadows, salt marshes, and mangrove forests. However, recent work on soft coral and sponges has shown the capacity for Marine Animal Forests (MAF) to capture blue carbon as well. The goal of the present study was to quantify the blue carbon in a nearshore artificial reef MAF and to establish the carbon content of common taxa. The MAF within the Rio Grande Valley Artificial Reef (RGV Reef) included 9 major groups of snowflake coral, sea whips, sea fans, stony coral, barnacles, sponges, bryozoans, sea urchins, and biofilms. Carbon analyses combined with surface area coverage estimates demonstrated the MAF within the RGV Reef holds 7.2 tons of blue carbon. The highest carbon concentrations were measured in soft corals and sponges at 10.41±1.10% and 5.46±1.60% by dry weight, respectively.

Scaling ecosystem assessment tools across diverse Texas Coastal Bend salt marshes

Kyle Runion* (UT Marine Science Institute), Deepak Mishra (University of Georgia), Katie Swanson (Mission Aransas National Estuarine Research Reserve), Mark Lever (UT Marine Science Institute), Jessica O'Connell (Colorado State University)

Productivity is important to quantify in salt marshes for broad carbon accounting and ecosystem health assessments. Salt marsh environments encompass diverse biotic and abiotic conditions, and this limits the scalability of models designed to estimate production. In this study, we present a framework to identify features universal to production of low marsh graminoids and apply these to develop the Coastal Universal Low Marsh (CULM) productivity model. We found that marsh grass total biomass (above- and belowground) varied across regions and species. Monoculture Spartina alterniflora marshes had nearly 50% greater biomass and over two times the root to shoot ratio in U.S. Georgia marshes than those in Texas. In Texas marshes, Distichlis spicata contained almost twice the biomass as S. alterniflora. Across comprehensive and region- or species-specific groupings, we identified six universal production metrics: flooding frequency, foliar chlorophyll, foliar nitrogen, solar radiation, vapor pressure, and temperature. A proxy-fit analysis identified the remote sensing index RDVI and Band 5 from Landsat as transferable proxies of foliar chlorophyll and foliar nitrogen, respectively. Each of these metrics varied consistently with biomass across diverse conditions. With these, we created and demonstrated the Coastal Universal Low Marsh (CULM) productivity model, which estimated total marsh biomass across diverse marshes with a root mean square error (RMSE) of 429 g m-2, normalized RMSE of 10%, and correlation with observed values of 0.74. CULM is a step forward for investigating total salt marsh biomass in a key plant functional type across diverse conditions.

SESSION I

Interactive Effects of Hyposalinity and Nitrogen Loading on Halodule wrightii (Shoal Grass)

Hudson DeYoe (University of Texas Rio Grande Valley)

The goal of this study was to examine the physiological effects of nitrogen pulses coupled with salinity decrease on Halodule wrightii in a controlled setting to mimic FWI events where salinity reduction and significant N loading occur simultaneously. Over the 22-day experiment, plants were subjected to three successive salinity drops (35→ 23, 23→15, 15→5) while simultaneously, nitrate-nitrogen was added at two levels (30 and 60 μM) besides a control. Halodule shoot production, photosynthesis, respiration, %N, carbon:nitrogen ratios and δ15N measurements revealed differing effects of low vs high N levels under 35 salinity versus hyposalinity.
Growth was unaffected by N additions at S35 but decreased when coupled with hyposalinity. The P:R ratio decreased over 6-fold, due to additively increased respiration from both hyposalinity and N addition. Leaf %N increased and C:N ratio decreased concomitantly with both stressors, but the greatest change was observed for the hyposalinity and high N combination. While the magnitude of the effect was related to the amount of added N at S35, there were disparate effects of low vs high N at S5. These measures are consistent with uptake of added N, increased respiration and depletion of carbon reserves. Surprisingly, δ15N indicated that added nitrate was not taken up by leaves at hyposalinity which implies internal translocation of amino acid N. Metabolic networks were presumably regulated differently at 30 vs 60 uM nitrate under conditions of hyposalinity. Stress due to the combination of hyposalinity and N-enrichment is energetically costly implying that FWI events may reduce seagrass resilience.

Plant mediated-responses of rhizosphere fungal communities to elevated N in coastal marshes

Yue Liu* (Department of Life Sciences, Texas A&M University-Corpus Christi) and Candice Y. Lumibao (Department of Life Sciences, Texas A&M University-Corpus Christi)

Coastal marshes provide essential ecological services, including nutrient cycling and shoreline stabilization, yet they are increasingly threatened by anthropogenic stressors such as nitrogen (N) enrichment. While soil fungi play key roles in nutrient dynamics and different plant species shape the soil fungi, little is known about how genetic differences within plant species influence fungal communities under environmental stress. In this study, we investigated how genotypic and heritable trait variation in Schoenoplectus americanus, a dominant Gulf Coast marsh sedge, shapes rhizosphere (soil surrounding roots) fungal communities in response to elevated N input. Leveraging a century-old marsh seed bank, we conducted a common-garden experiment using ancestral (ca. 100-year-old) and modern (>10-year-old) plant genotypes to assess how different genotypes and associated traits shape soil fungal community responses to low and high N conditions. We then characterized fungal community diversity and functional guilds via high throughput sequencing according to plant presence, plant genotypes, and traits. Our findings show that plant presence significantly increased soil fungal diversity and altered community composition, particularly under low N conditions. Fungal communities also varied across plant genotypes, with ancestral S. americanus genotypes supporting more distinct fungal assemblages. However, functional guild diversity was less sensitive to plant or nitrogen effects. Overall, these results suggest the importance of accounting for plant intraspecific variation in shaping soil fungal communities and in plant-soil-microbe feedback. By advancing our understanding of plant-microbe interactions under environmental change, this research also offers valuable insights into the potential resilience of coastal ecosystems facing nutrient stress.

SESSION I

Refining Indices of Biotic Integrity for Assessing Texas Tidal Stream Communities

Stacy N. Trackenberg* (Harte Research Institute, Texas A&M University- Corpus Christi), Terry A. Palmer (Harte Research Institute, Texas A&M University- Corpus Christi), Natasha J. Breaux (Harte Research Institute, Texas A&M University- Corpus Christi), Jennifer B. Pollack (Harte Research Institute, Texas A&M University- Corpus Christi)

Tidal streams are tidally influenced bodies of water containing faunal communities composed of freshwater, brackish, and saltwater species in the same location. Human activities have altered inputs to tidal streams, leading to degradation that affects both water quality and faunal communities. However, there is no established tool for assessing the health of faunal communities across large spatial scales (100s of km). In this study, we tested the applicability of using our previously developed indices of biotic integrity (IBIs) for Texas tidal stream communities using independently collected data. We refined these indices by accounting for different climatic and physiochemical qualities, such as salinity ranges. Our findings identify challenges in refining IBIs and outline future steps to inform bioassessment protocols for coastal environmental managers of Texas tidal streams.

Advancing Coastal Habitat Mapping and Data Accessibility in Texas Bays and Estuaries

Chelsea Crosby*, David Norris*, Evan Pettis (Texas Parks and Wildlife Department - Coastal Fisheries Division)

Estuarine habitats such as seagrass beds, oyster reefs, tidal flats, saltmarshes, and mangroves are vital to the ecological health of Texas bays and estuaries. They provide essential refuge and foraging opportunities for fish and wildlife, stabilize shorelines to reduce erosion, improve water quality, and support our recreational and commercial fisheries. Effective conservation of these vulnerable habitats, and the species that rely on them, usually starts with a better understanding of their distribution, extent, and condition.

Since 2016, the Texas Parks and Wildlife Department's (TPWD) Habitat Assessment Team (HAT) has been at the forefront of mapping these critical coastal habitats to support conservation and management efforts. Utilizing advanced remote sensing technologies and in situ monitoring techniques, HAT has been comprehensively surveying subtidal and intertidal systems across the Texas coast. These efforts have led to updated habitat maps of our bays and estuaries, many of which haven't been inventoried for several decades. Current mapping initiatives include (1) bay-wide acoustic surveys using scientific- and recreational-grade sonar systems, (2) satellite and aerial imagery analyses, and (3) field-based rapid habitat assessments paired with fisheries monitoring data.

In recent years, TPWD has made a concerted effort to ensure that this information can be utilized for internal and external conservation initiatives. HAT's spatial data products are now disseminated across multiple online data hubs and are accessible by resource managers, researchers, and the general public at no cost.

SESSION I

Land use Change and Implications on Estuary Health using GIS Application

Angelica Ovalle* (Harte Research Institute, Texas A&M University- Corpus Christi) and Paul Montagna (Harte Research Institute, Texas A&M University- Corpus Christi)

The health of estuarine ecosystems is increasingly at risk due to anthropogenic pressures as human populations along the coasts expand. Each estuary is surrounded by diverse anthropogenic land uses such as agricultural, industrial, and urban, each creating its own unique impacts on watersheds This study investigates the relationship between land-use changes within watersheds and their impact on estuarine health in Texas over a 20-year span, utilizing Geographic Information Systems (GIS). Five estuarine systems, ranging from the Matagorda Bay System in the north to the Laguna Madre Bay in the south, were selected for their distinct precipitation patterns and watershed characteristics. By analyzing land use patterns and their changes over time, correlations can be made with key estuarine water quality parameters, such as pH, dissolved oxygen, temperature, salinity, nutrients, and chlorophyll contents. Diversity and biomass of benthic organisms, bioindicators of estuarine health in estuaries, reflect changes in community composition and offer a deeper understanding of ecological responses to environmental stressors. This research aims to contribute to coastal stewardship strategies, such as environmental flow standards and non-point source pollution management, to foster sustainability in the Gulf of Mexico's coastal regions.

SESSION II

Fungi on the Edge: Ectomycorrhizal diversity in South Texas prairie dunes

Jezreel Wilson*(Texas A&M University - Corpus Christi), Yue Liu (Texas A&M University - Corpus Christi), and Candice Lumibao (Texas A&M University - Corpus Christi)

Fungi play an important role in the soil mycobiome as key decomposers and in mutualistic plant-fungi interactions. Among them, ectomycorrhizal (EcM) fungi form symbiotic associations with plants and influence ecosystem stability. Barrier islands such as those along the South Texas Gulf Coast, experience dynamic fluctuations in environmental pressures including salinity and soil nutrient availability. Their resilience might depend on the biotic communities in the coastal prairie dune ecosystems, including the EcM fungal communities. This study investigates the diversity of EcM in soils from four barrier islands (Padre Island, Mustang, Matagorda and Galveston) along a salinity gradient. We collected 5–20 soil cores from each island and profiled the mycobiomes using high-throughput sequencing of the internal transcribed spacer (ITS) region, employing EcM-specific primers. Soil properties, including total nitrogen, carbon, and salinity (ppt), were measured to assess their influence on EcM diversity and distribution patterns. Functional guilds were assigned using FUNGuild. Results showed distinct EcM communities among the barrier islands. There is also evidence of salinity and soil nutrients shaping the diversity patterns of these EcM communities depending on site, suggesting that site-specific soil conditions act to promote growth and increased abundance for certain fungal taxa. Insights gained from our research can inform solutions for restoration, promoting mycorrhizal-assisted growth of coastal plants. These findings highlight the need to understand how mycobiomes respond to environmental conditions, allowing us to better predict biodiversity loss under climate change.

SESSION II

Water Use Regulation in Black Mangroves (Avicennia germinans) with Environmental Fluctuations Over the 2024 Summer Growing Season

Cynthia Guo* (Department of Earth and Planetary Sciences, UT, Austin), Maria Ulatowski (Department of Earth and Planetary Sciences, UT, Austin), Berit Batterson (UT Marine Science Institute), Suvan Cabraal (Department of Earth and Planetary Sciences, UT, Austin), Chleo Chiu (Department of Earth and Planetary Sciences, UT, Austin), Ashley Matheny (Department of Earth and Planetary Sciences, UT, Austin)

Mangrove forests provide critical ecosystem services, including coastline stabilization, habitats for marine life, and carbon storage. However, climate change introduces temperature and precipitation shifts that may threaten their survival. The ability of mangroves to regulate water use efficiently through plasticity in leaf and root hydraulic traits will determine their resilience and capacity for range expansion. Over the past several decades, black mangroves (Avicennia germinans) have been migrating further north along the Texas Gulf Coast. We investigated the short-term physiological responses of Avicennia germinans to environmental fluctuations, near their northernmost range in Port Aransas Texas. From late spring to early fall, we measured leaf water potential, transpiration, carbon assimilation rate, and stomatal conductance in juvenile and sapling Avicennia germinans in response to changes in temperature, atmospheric vapor pressure deficit (VPD), photosynthetically active radiation (PAR), and salinity. We found that water use efficiency (WUE) – the exchange rate of carbon uptake for water loss -- for all ages was significantly correlated with environmental conditions. A. germinans increased WUE throughout the season as VPD increased. No significant differences in WUE were observed between single-stem saplings and multi-stem juveniles, suggesting consistent drought resilience across age classes.These findings indicate that A. germinans can maintain physiological stability under fluctuating environmental stress conditions, supporting its long-term survival in a warming climate. Its ability to recover after extreme events, such winter storm Uri in 2021, underscores its potential for continued range expansion and persistence in the Gulf of Mexico.

Blue Carbon Baseline Assessment at Port Bay, Texas. A study of stored organic carbon in the Texas Gulf Coast

Alexandra Austin* (HRD Inc.)

HDR assisted The Nature Conservancy's Texas Chapter with a pilot study to assess the stored soil carbon in wetland and upland ecosystems at the Port Bay Ranch in Aransas County, Texas to explore the possibility of using blue carbon credit opportunities to fund land protection projects. At a regeneratively managed site in Port Bay, Texas, this project aims to enhance carbon sequestration understanding through comprehensive habitat mapping, soil carbon sampling, and porewater analysis across 1,200 acres.

HDR performed initial site stratification using TPWD, USDA, USGS datasets, and satellite imagery, followed by field verification with 30 permanent sampling plots. Soil cores were collected and analyzed for dry bulk density and total organic carbon using Verra-approved methods, and porewater samples were collected and analyzed for salinity.

Outcomes included detailed habitat maps and precise soil carbon data, with the ultimate goal of providing baseline data on the carbon sequestration potential of the Port Bay site for future listing on the voluntary carbon market. Through the Nature Conservancy's collaboration with HDR, TerraCarbon, and Eurofins, the project advances scientific understanding and climate change mitigation and provides a replicable model with lessons learned for other restoration efforts.

The Nueces River Tidal Segment: Challenges, Resource Management, and Water Quality

Adrien Hilmy (CBBEP), Aaron Baxter (CBBEP)

Freshwater inflows are critical to maintaining a productive estuarine ecosystem. However, over past decades, ever growing anthropogenic demand on surface water resources, prolonged drought, and changing precipitation patterns have greatly reduced the volume of freshwater that reaches the bays and estuaries of the Texas Coastal Bend. This presentation will discuss the challenges and impacts of a reduced freshwater inflow regime to the Nueces Estuary system, management efforts to maximize the environmental benefit of available inflows, and ongoing efforts to address water quality concerns along the tidal segment of the Nueces River.

Quantifying habitat loss at waterbird colony islands in Texas

David A. Essian*, Jessica L. Magolan, Dale E. Gawlik, Jim Gibeaut1, Liam Wolff

Many of the >300 waterbird colony islands on the Texas coast are eroding rapidly, and colonial waterbird breeding habitat is decreasing statewide. Meanwhile, coastal resource managers are investing millions of dollars per year into habitat restoration. But without estimates of island-specific trends in habitat loss, resource managers will not be able to assess the consequences to regional bird populations or know how much time they have left to act. We used aerial images from four years during 1995–2018 to delineate nesting habitats for colonial waterbirds at 223 islands in three coastal bay systems in Texas. We quantified the rate of habitat loss for ground and tree nesting birds as a function of island traits, including size, fetch length, maximum elevation, and percent vegetation cover. Overall, 86% of islands lost unvegetated substrate at a rate of 3.0% ± 2.7% per year, and 77% of islands lost vegetated substrate at a rate of 1.9% ± 2.3% per year. Rates of habitat loss were faster at small islands with low percent cover. Loss was generally fastest at low-elevation islands, although some islands with high maximum elevation also had high rates of habitat loss. We also tested for changes in waterbird nest numbers from 1995–2018 and found that neither ground nor tree-nesting species declined, likely because birds dispersed to islands with habitat remaining.

In Search of the Historic Corpus Christi Pass and the US Civil War "Affair at Padre Island"

Randy Bissell (Texas Master Naturalist and Texas A&M University-Corpus Christi)

This presentation explores the geological and historical significance of Corpus Christi Pass, a lost tidal inlet connecting Corpus Christi Bay to the Gulf of Mexico. Shaped by dynamic coastal processes, the pass was also a critical Civil War supply route. On December 7, 1862, it became the stage for the "Affair at Padre Island," where Confederate forces under Captain Wilkes thwarted a Union attack.

Spanning six miles behind Mustang Island with depths of 3 to 10 feet, the pass posed navigational hazards due to strong currents and shifting sands. Hurricanes and longshore drift reshaped it over time, while modern projects like Packery Channel and Aransas Pass later altered the barrier islands, leaving only wetlands and faint traces today, discernible through maps and digital models.

Featuring historical paintings, maps, and geospatial analyses, the presentation tells two interwoven tales. It reconstructs the pass's geological history, illustrating how natural forces and human actions transformed the landscape. It also revisits the skirmish, where Confederates used Padre Island's dunes to outmaneuver Union troops. Cultural artifacts, like David Gambel's artwork and Adam Phewl's poetry, preserve the legacy.

The presentation reveals the deep ties between the region's geology and its human stories. By tracing the pass's remnants alongside its wartime role, it invites reflection on how landscapes and historical events shape each other, emphasizing the value of preserving Texas's barrier islands' dual heritage.

Packery Channel Nature Park Shoreline Enhancement

Ian Fisher (Anchor QEA)

Nueces County's Packery Channel Nature Park is one of the few places that provides improved recreational access to Packery Channel, which provides hydraulic connectivity between the gulf and the estuary complex of the upper Laguna Madre. It is heavily utilized for launching small craft, birding, and fishing, but its shoreline is exposed to the wave and wake action of Packery Channel. This has caused shoreline erosion, dramatic loss of the marsh habitat, and threatens the seagrass fronting the shoreline.

The coastal processes were evaluated using detailed 2D hydrodynamic modeling on a bay-wide and refined local scale, including wind driven waves, tidal currents, and sediment transport. Through this coastal engineering analysis, an understanding of the conditions which were most impactful to the site was developed. Utilizing this understanding, potential shoreline enhancement alternatives were developed to maximize the stabilization of the shoreline utilizing cost-effective techniques with safety in mind and enhance public access. The alternatives consisted of three breakwater systems with variations of the units used for each alternative.

An alternatives analysis was conducted to evaluate the shoreline enhancement schemes against a defined list of performance criteria that was developed in coordination with project stakeholders. The criteria included performance, habitat enhancement, unintended impacts, capital costs, permitting, and aesthetics. This analysis yielded a hybrid living shoreline, which was chosen as the preferred alternative that also supports regional engineering-with-nature initiatives. The design will help mitigate erosion, protect the existing seagrass, enhance marsh habitat along the shoreline, and provide anglers better access to deep water.

Reef Resilience: Investigating the Biological, Chemical, and Physical Impacts of Sediment on Oyster Reefs

Daphne White (Harte Research Institute, Texas A&M University- Corpus Christi), Keisha Bahr (Harte Research Institute, Texas A&M University- Corpus Christi)

Oysters are important marine organisms that provide essential habitats and management implements harvest-based closures to help with recovery, but there is little information on the impacts of environmental factors such as sediment influence on oyster growth and recruitment, therefore the goal of my research is to advance our knowledge of these impacts to help management inform oyster reef closures. Preliminary research from oyster heights and abundance across 44 reefs within 5 bays along the Texas coast show variation across sites and across bays. This is likely due to varying environmental factors influencing the reefs, particularly in the highly gradient hydrology of the Texas bays, which can be coupled with over harvesting. In addition to the unique salinity gradient along the study sites, the unknown sediment regimes across these bays can provide insight into what impacts oyster growth and recruitment. Therefore, this research aims to assess some of these factors to determine what can be contributing to degradation across open and closed reefs to report to the management of Texas oyster reefs.

Favoring the Dark Side: Research to Reduce Malpigmentation and Improve Stock Enhancement of Southern Flounder in Texas

Lee A. Fuiman*, Cynthia K. Faulk, Laura Sisk-Hackworth, Ashley N. Fincannon, and Christopher E. Mace

As a result of decades of declining populations of Southern Flounder (Paralichthys lethostigma), some fishery-management agencies have begun producing flounder for stock-enhancement. One problem is that normal pigmentation may not develop in hatchery fish, which makes them exceptionally vulnerable to predators. At the TPWD hatchery in Corpus Christi, 30% of production was malpigmented. We tested the effect of two larval diets on malpigmentation: non-enriched Artemia vs. enriched Artemia. Eggs from five spawns were divided equally between two rearing tanks, with one tank for each female assigned to each diet treatment. Larvae were reared to 55 days posthatching (dph), when the tank-wise malpigmentation rate was determined. Malpigmentation rate was also assessed for five tanks of flounder reared in the production hatchery.

Malpigmentation rates from the laboratory experiment were significantly lower for the enriched diet (18.4% vs. 4.4%). Hatchery-produced fish (unenriched diet) had a malpigmentation rate of 26.9%. The hatchery started using the enriched diet and mean malpigmentation rate decreased from 26.9% to 18.2%.

But, malpigmentation rates in the laboratory using the enriched diet (4.4%) were much lower than the rates observed in the hatchery on the same diet (18.2%), indicating that additional factors contribute to malpigmentation in the hatchery. Differences in light intensity were examined. The hatchery used higher light intensities (405 lux) than the laboratory (274 lux). Malpigmentation rates for the both diets (both locations included) showed a positive linear relationship with light intensity, suggesting that higher light intensities increase malpigmentation rates in Southern Flounder.

Patterns in blue food consumption and the role of taxonomic identity for fatty-acid profiles of Gulf coast fisheries species

Joyce Velos* (UT Marine Science Institute), Lauren Bell (UT Austin), Hannah Price (UT Austin), Natalie Poulos (UT Austin), Zachary Olsen (Texas Parks & Wildlife Department- Coastal Fisheries) and Simon Brandl (UT Marine Science Institute)

Coastal habitats (e.g., seagrass beds, marshes, oyster reefs) are among the world's most productive ecosystems but are subject to various local and global stressors. One important ecosystem service derived from these habitats is "blue foods": fishes, invertebrates and algae that can be harvested or cultured in the marine environment. These are often rich in essential macro- and micronutrients (e.g., protein, vitamins, omega-3s), and can be produced with less carbon footprint than terrestrial food sources, especially if harvested in artisanal ways. Yet, despite this potential, they have rarely been considered as a vital source of nutrients for coastal communities in high income countries like the United States. In this study, we investigate the nutritional profiles of targeted marine fishes found along the coast of the Gulf of Mexico using fatty acid (FA) analysis and examine blue food consumption in coastal Texas using food frequency questionnaires. We show that FA profiles vary predictably among species, with a clear separation based on nutritionally important omega-3s (ALA, DHA, and EPA). Regarding omega-3 concentrations, we demonstrate that less desirable species (e.g., Gafftopsail catfish) have comparatively higher nutritional benefits than more popular species (e.g., Black drum), yet are the least consumed by local populations. This is critical since the average respondent to our survey does not meet the recommended intake of essential omega-3s. Together, we reveal that species-specific habitat and carbon-source use may influence the nutritional profiles of fish species, which impacts the consumption of essential nutrients by human through biological, social and behavioral pathways.

Fine-scale transport of planktonic blue crab and early juvenile settlement to estuarine nursery habitat in Aransas Bay

Sharon Z. Herzka* (UT Marine Science Institute, UTMSI), Alfonsina Romo-Curiel (UTMSI), Teresa Bennett (UTMSI), Mark Fisher (Texas Parks and Wildlife Department, TPWD), Zachary Olsen (TPWD)

The blue crab, Callinectes sapidus, sustains fisheries throughout the Gulf of Mexico. Over the last decades, population declines in some regions, including Texas, have raised questions regarding the underlying causes. One possibility is that the decrease is linked to bottlenecks during early life. We examined the relationship between planktonic blue crabs in the Aransas Pass and the density of juveniles 2-20 mm carapace width (CW) collected in 5 seagrass (Halodule wrightii) nursery habitats in Lydia Ann Channel and Aransas Bay. Monthly (August to December 2024) sampling at the UTMSI Pier Laboratory with a plankton net and settlement collectors preceded early juvenile sampling. There was higher transport of planktonic crabs (individuals flood tide-1) during September and November; 5-40% of individuals had molted into early juveniles while in the plankton. There was no correlation between the abundance of megalopae collected with the plankton net and settlement collectors, possibly due to gear selectivity, patchiness, or other factors. Transport of planktonic blue crabs was positively correlated with early juvenile densities in seagrass habitat. Higher densities of the smallest juveniles < 10 mm CW) were found in Lydia Ann Channel, consistent with tidal transport. However, very early juveniles were observed as far as Mud Island, albeit in lower densities. Stable isotope analysis of megalopae caught at the UTMSI Pier and early juveniles collected in seagrass habitat indicates that these intrinsic chemical tracers can be used to trace the recent settlement of individuals to seagrass nurseries, which will support research into fine-scale transport dynamics and settlement.

The impact of oscillating extremes at the base of the food-web

Alexander Barth* (UT Marine Science Institute; UT Statistics & Data Science), David Malcolm (UT Marine Science Institute); Edward Buskey (UT Marine Science Institute); Zachary Olsen (Texas Parks & Wildlife Department-Coastal Fisheries), Jordan Casey (UT Marine Science Institute)

Bays along the Texas coast experience large variations in freshwater input. This includes a, strong north-south gradient of declining freshwater input and oscillations across interannual scales when Texas climate shifts between drought and wet states. Following changes in freshwater flows, the estuarine aquatic environment can drastically shift across space and time.

In the large and shallow Texas bays, phytoplankton fuel the open water food-web, feeding zooplankton and forage fishes. These organisms are tightly linked to changes in water quality, so it is critical to understand their potential response to changing conditions driven by freshwater flow variation.

Using two different sampling programs from the Mission-Aransas National Estuarine Research Reserve (MANERR) and the Texas Parks and Wildlife Department (TPWD) fisheries independent monitoring, we describe how organisms comprising the base of the food-web respond to salinity variation in Texas bays. With time-series of microplankton (20um - 200um size fraction) imaged throughout the Mission-Aransas estuary, we document a clear community shift from heterotrophic ciliates to autotrophic diatoms corresponding with oscillating wet and drought conditions. However, the relationship between forage fish and water quality is not as clear. While some fish, like Gulf menhaden, exhibit a strong link to salinity oscillations, there are other important factors influencing their population dynamics. Ultimately, this highlights the critical need to better understand linkages across trophic levels. Our on-going work through the Texas Gulf Coast Research Center is addressing this by identifying diet in plankton and forage fishes to understand bottom-up change.

SESSION I

NASCC Living Shoreline: The Challenging Balance of Mission, Flora, and Fauna

Aaron Horine*(Anchor QEA), Ian Fisher (Anchor QEA), Ryan Burke (Anchor QEA), Scott McGuire (NASCC/ NAVFAC SE PWD Corpus Christi Environmental)

An integral part of the Corpus Christi, Texas community and history, the Naval Air Station Corpus Christi (NASCC) has been home to naval pilot training since 1941. Today, The Navy, Marine Corps, Coast Guard, and foreign student pilots earn their wings at this famous training facility. Surrounded on three sides by water, the NASCC is under continuous threat of shoreline erosion, which continues to encroach on the main runway threatening the primary mission of the Navy and causing extensive habitat loss.

Local representatives at the base want to implement solutions based on Engineering With Nature (EWN) to restore the shoreline with a more resilient and sustainable protection. The challenge is to do so without interfering with aircraft fly zones, which includes minimizing structures which attract avian species and could increase the threat of bird strikes and elevate the danger to pilots and their aircraft.

Solutions will need to address the delicate balance of creating habitat through living shorelines, thriving with wildlife food sources by design, without increasing bird activity surrounding the base. It is anticipated that several solutions will need to be implemented, including green, gray, and hybrids of both.

To fully evaluate the proposed solutions for over 2 miles of shoreline, coastal processes will be evaluated using detailed hydrodynamic models. Through this coastal engineering analysis, potential shoreline enhancement alternatives, with an emphasis on Nature-Based Solutions for habitat restoration, will be developed to maximize the shoreline stabilization utilizing cost-effective techniques with the Navy mission and safety in mind.

Boggy Cut GIWW Stabilization Project

Ryan Burke* (Anchor QEA), Aaron Horine (Anchor QEA), Ian Fisher (Anchor QEA)

Located east of Matagorda, Placement Area (PA) 104 is an unutilized placement area south of Big Boggy National Wildlife Refuge and the Gulf Intracoastal Waterway (GIWW). The PA is located at the historical footprint of prior spoil islands, it currently exists as an open 3.6 mile stretch of water, which exposure leaves the GIWW and Big Boggy National Wildlife Refuge with limited protection from wave energy and coastal processes originating from East Matagorda Bay.The islands, remnants of the original Gulf Intracoastal Waterway (GIWW) construction, have almost entirely eroded due to vessel traffic, an unimpeded 4-mile fetch, and oyster harvest. Consequently, this section of the GIWW has rougher waters, causing interruptions in maritime commerce, frequent sediment shoals that necessitate maintenance dredging, and contribute to the erosion of the adjacent Big Boggy National Wildlife Refuge shoreline. With funding from a Texas General Land Office Coastal Erosion Planning and Response Act grant, and matching funds from the Port of Bay City Authority (POBCA), the Matagorda Bay Foundation (MBF) is leading a large scale, multifaceted habitat restoration project in EMB. The Boggy Cut GIWW Stabilization Project will re-establish the barrier island on the Project site, obstruct fetch generated waves from the south, and reduce sedimentation in the GIWW. The design will incorporate beneficial use of dredged material, providing placement capacity in addition to sheltering the GIWW and Big Boggy National Wildlife Refuge from daily wave climate and storm effects. The project will restore degraded wetland habitat, avian habitat, and increase oyster habitat.

SESSION I

Texas Wetland Action Mapping (WAM): Participatory Mapping of Tidal Wetlands and Their Migration Space

Charlotte Nash (The Nature Conservancy)

Tidal wetlands provide wildlife habitat, storm surge protection, improved water quality and carbon storage. Yet in the Gulf of Mexico, a combination of rapid rates of development, worsening storms, and sea-level rise at a rate higher than triple the global average is causing significant tidal wetland loss. To reduce and reverse the trend of tidal wetland loss in Texas, The Nature Conservancy has organized the Texas Wetland Action Mapping (WAM) working group made up of state and federal resource managers, environmental NGOs, academics, and landowners and managers. The WAM working group will identify consensus-based high-priority wetland restoration and protection areas across the state and produce a Texas Wetland Action Plan by fall 2025.

To inform planning, opportunity maps that identify where different conservation and restoration strategies for tidal wetlands and their migration space are likely suitable and needed were created. The Texas WAM working group will integrate these opportunity maps with existing partner and working group priorities, co-benefits data layers such as carbon storage, biodiversity, and flood mitigation potential, and other supporting data in a participatory mapping exercise. The working group will select and recommend high priority action areas, review draft action maps, and give final approval of the Texas Wetland Action Plan. Datasets created for this project will be integrated into a publicly available mapping tool on TNC's website to support other protection and restoration efforts of tidal wetlands and their migration space.

The Potential Role of Oyster Reefs in Carbon Storage: Habitat Context and Restoration Implications

Kelley Savage* (Harte Research Institute, Texas A&M University-Corpus Christi), Xinping Hu (University of Texas Marine Science Institute), Benoit Lebreton (CNRS, University of La Rochelle, La Rochelle, FR), and Jennifer Beseres Pollack (Harte Research Institute, Texas A&M University-Corpus Christi)

Carbon sequestration is increasingly recognized as an essential service provided by vulnerable vegetated coastal habitats, and emerging evidence suggests that oyster reefs, like vegetated habitats, may also play a vital role in capturing and storing carbon. However, there is high variability in carbon storage estimates across the relatively few studies conducted, and oyster reefs—like vegetated habitats—have sustained significant global losses. Increased awareness of oyster reef loss coupled with an emerging interest in oyster reefs as potential carbon sinks have necessitated a greater understanding of oyster reefs' role in the carbon cycle, the extent by which oyster reefs can store carbon, and how carbon dynamics may change depending on environmental conditions. Therefore, understanding where restored oyster reefs can best enhance carbon sequestration is critical to maximizing their potential ecosystem services. This study examines the carbon budget of oyster reefs in St. Charles Bay, Texas, focusing on how adjacent habitat, reef age, and depth influence carbon storage rates and long-term storage potential. Sampling involved vibracoring through oyster reefs to collect marine sediment and shell samples for carbon budget assessment. To evaluate the capacity of reefs for long-term carbon burial, the organic and inorganic carbon content in each core is scaled to the age of each reef on a per-square-meter basis. By understanding how reefs contribute to carbon capture and long-term storage, this research provides essential insights for optimizing restoration strategies to enhance carbon storage potential.

SESSION I

Developing Methods for Elevation Restoration on Wind-Tidal Flats in South Texas

Isabel Nykamp (Harte Research Institute, Texas A&M University - Corpus Christi)

Wind-tidal flats (WTF) are unique coastal wetland habitats characterized by extreme conditions, including high salinities and irregular, wind-driven tidal ranges. However, over 50% of the historical extent of WTF habitats along the Texas coastline have been lost, with the remaining flats further degraded by human impacts such as channelized tire tracks. Damage to WTF sediments (e.g. compaction, channelization) may persist for over 35 years, potentially disrupting wind-driven surface hydrology and degrading the cyanobacterial mats that thrive in these habitats. This research will address these disturbances to WTF through the development of effective and scalable techniques for their restoration. Simulated disturbances—mimicking vehicle tracks—were applied to WTF at Newport Pass and Padre Island National Seashore, Texas. Pilot elevation restoration treatments (sand, sand-filled burlap, and sand mixed with soil stabilizer) were applied in replicate to the disturbed plots and evaluated six-weeks after treatment then quarterly over a year. Treatment's effectiveness in restoring elevation and facilitating cyanobacterial mat recovery were compared to disturbance-only treatments and undisturbed plots. Project findings will be used to develop best-practices for restoration of ubiquitous tire track damages on WTF.

SESSION II

Developing Methods for Cyanobacterial Mat Restoration on Wind-Tidal Flats in South Texas

Zahra Hasan* (Harte Research Institute, Texas A&M University - Corpus Christi), Dr. Jennifer Beseres-Pollack (Harte Research Institute, TAMUCC), Dr. Kim Withers (Center for Coastal Studies, TAMUCC), Dr. Stacy Trackenberg (Harte Research Institute, TAMUCC), Dr. Terry Palmer (Harte Research Institute, TAMUCC), Isabel Nykamp (Harte Research Institute, TAMUCC)

Wind-tidal flats are coastal wetlands characterized by extreme environmental conditions (e.g., irregular inundation, hypersalinity, high irradiance), which foster the growth of cyanobacterial mats instead of typical saltmarsh vegetation. These mats support diverse benthic and epibenthic invertebrates that form the prey base for higher organisms, including crabs, fish, and thousands of migratory and wintering birds on the Texas Gulf Coast. However, over 50% of the historical extent of wind-tidal flats in Texas have been degraded by human activities, which inflict elevation damages that negatively impact surface hydrology and the cyanobacterial mats that thrive in these habitats. To address cyanobacterial mat degradation in Texas, we are conducting pilot restoration experiments to evaluate cyanobacterial community development within plots intentionally disturbed to mimic elevation damage. In June 2024, experimental plots at Newport Pass, TX were seeded with cultured cyanobacteria or treated with fertilizer. Treatment efficacy was assessed over six months using quarterly elevation measurements and microscopy observations to evaluate relative changes in cyanobacterial mat composition. Results are being compared to undisturbed and disturbance-only treatments. Project findings will provide recommendations on best practices for cyanobacterial mat restoration and inform future management efforts for wind-tidal flats.

Restoring Oyster Reefs through Unique Partnerships across the Texas Coast

Kathy Sweezey* (The Nature Conservancy)

Oyster reefs provide a wide variety of benefits to humans and to the marine ecosystem, and the most successful oyster reef restoration projects pursue multiple benefits by incorporating the feedback from diverse stakeholder groups. This presentation will review The Nature Conservancy's efforts to increase capacity for oyster reef restoration, expand the knowledge and support for restoration, and improve oyster populations across Texas – all made possible through the relationships fostered with diverse partners.

Multiple Texas-based projects will be examined in this presentation, including Beezley Reef, an innovative subtidal oyster reef design incorporating both sanctuary and harvestable areas into a single project, and Rett Reef, the first non-harvestable oyster reef restoration project led by a commercial oyster fisher in Texas.

The Nature Conservancy released a report in 2023 titled "Oyster Restoration in the Gulf of Mexico: Recommendations from The Nature Conservancy," which concludes that we are currently not on a trajectory to restore oyster populations to a sustainable level across the Gulf. Having both healthy oyster habitat and a prosperous oyster fishery is not an "either/or" scenario. Together, with the input and support from diverse stakeholders, we can implement integrated restoration plans that support the traditional use and cultural ties to oyster harvest and maintain oysters as a habitat important for their multiple ecosystem benefits.

SESSION II

Significant availability of native coastal grasses through a Regional Access to Native Grasses Growers Group under the 20-county Gulf-Houston Regional Conservation Plan

Deborah January-Bevers* (Houston Wilderness), Dr. Sam Brody (Institute for Disaster Resilient Texas)

The Gulf-Houston Regional Conservation Plan (RCP) is a decade-long collaborative in which Houston Wilderness facilitates a diverse Steering Committee of environmental, business and government stakeholders who work toward reaching the RCP's 3 key goals – 1) targeting additional protected/preserved green space in the 8-county Gulf-Houston region by increasing the current 16.3% in protected/preserved land to 24% of land coverage by 2040, 2) implementation of green and blue nature-based infrastructure (NBI) enhancements by increasing and supporting land management/construction efforts to install NBI on 50% of land coverage by 2040, and 3) substantial installation of native vegetation annually that provides carbon ecosystem increases in the 20-county Texas coastal region involving all seven coastal estuaries through research, education, facilitation of a Regional Access to Native Grasses (RANG) Growers Group, and multiple collaborative projects. In conjunction with the RCP Steering Committee, HW organized the RANG Growers Group, comprised of all interested native grass and coastal shrub growers/vendors/contractors in the 20-county Gulf-Houston region - along the entire Texas coast, to discuss significant expansion of native coastal grasses for our region. This abstract discusses the RCP work to assist in coordinating & expanding multiple coastal native grass nurseries/farms around the state to accommodate the large number of wetland and coastal NBI projects that will require very large numbers of targeted native plants - particularly seagrasses, marsh and dune grasses, bioswale grasses, other wetland grasses, and targeted coastal shrubs. Case examples will be provided.

Texas Coast Rookery Island Protection: Triangle Tree and Future Projects

Matthew Sadowski (HDR Engineering), Rosario Martinez (Coastal Bend Bays & Estuaries Program)

Rookery Islands throughout Texas bays play a crucial role in providing habitat for colonial water birds. These islands have been disappearing due to relative sea level rise and erosion and as result the bird populations are being threatened. Triangle Tree Rookery Island, located in the Upper Laguna Madre, is one such rookery island facing loss of habitat due erosion from wind driven waves and passing vessel wakes. This presentation will highlight the recently constructed shoreline protection at Triangle Tree Rookery Island, contracted by the Coastal Bend Bays and Estuaries Program (CBBEP) and designed by HDR engineering. To mitigate the erosion, HDR designed a 1,130-foot-long breakwater to protect the shoreline of this island. HDR engineering will present on the design process, construction and lessons learned during this project. In addition, the CBBEP will then present on upcoming rookery island protection projects happening throughout the Texas coast and the overall work they are doing to create resilience in these habitats and populations.

Is a Court Bringing Sexy Back to NEPA?

Kristina Alexander,* Endowed Chair for Marine Policy & Law (Harte Research Institute, Texas A&M University-Corpus Christi)

In November 2024 a federal court of appeals ruled that the National Environmental Policy Act (NEPA) regulations, applied by all federal agencies since 1978, were invalid. The Fourth Circuit nullified the regulations. In February 2025, the current administration withdrew the 1977 Executive Order which had directed issuance of the regulations, removing their underlying justification.

This presentation will discuss what happens now, using a 2025 Environmental Assessment for a living shorelines project to illustrate how agencies' individual NEPA regulations will dictate compliance with the law.

Restoration for a Resilient Nueces River Delta

Leigh Perry (CBBEP) and Aaron Baxter (CBBEP)

Numerous estuarine species utilize the coastal marsh habitat within the Nueces River Delta as foraging, breeding, nesting, and nursery grounds. The area harbors numerous state and federally listed endangered species, as well as several species-of-concern. However, studies show that the Nueces Delta shoreline is eroding at a rapid rate, and significant amounts of marsh habitat are being lost. This disappearing, fringing coastal marsh protects additional marsh habitat further inland, open-water channels and small lakes, and upland habitat that depends on the lower lying marsh for protection. As the size of these habitats decreases, so will the abundance and diversity of wildlife that breed, nest, forage, and shelter in the Nueces River Delta. CBBEP has long recognized the ecological value provided by the Nueces River Delta coastal marshes and has been working to protect this rapidly eroding shoreline for many years. And what started as a simple breakwater project along 1600 feet of Nueces delta shoreline has evolved, with the help of numerous partners, into a larger restoration effort for the greater Nueces River Delta.

Texas-Sized Planning Effort for Beneficial use of Dredged Material

Rebecca Arnold* (Anchor QEA), and Ian Fisher* (Anchor QEA)

Millions of cubic yards of sediment are dredged from federal channels each year along the coast of Texas and are "lost" from sediment-starved systems. A solution to this problem is beneficial use (BU) of dredged material, helps to retain material within the geomorphological system. Benefits from BU, include economic value in ecosystem function and commercial value in maritime, fishing, and wildlife revenue.

Ducks Unlimited (DU) has been leading an effort in Texas to identify, prioritize, and plan BU sites. The lynchpin of this effort is an ongoing RESTORE Act-funded Texas Master Plan for the Beneficial Use of Dredged Material (Master Plan) project. This involves coordinating efforts, identifying efficiencies, building consensus, prioritizing sites, and producing plans that will result in cost savings and streamline future BU projects.

The planning effort relies on input from key stakeholders through the Texas Beneficial Use Groups (TEXBUGs). Potential BU projects were solicited through the TEXBUMP website, as well as previous DU efforts. Nearly 400 projects were on the master list of potential BU projects which were reduced to 164 projects constituting the Initial Priorities List. Concurrently, a publicly available GIS-based Decision Support System (DSS) was developed to help evaluate site suitability for the Initial Priorities List projects, which were scored on a weighted characteristic matrix to ultimately rank the likelihood of success for the projects. Through the DSS, professional judgement, and input from the TEXBUGs, 28 projects have been selected for the Final Priorities List and advancement to the concept-level design phase.

Modeling Approaches for Identifying Key Drivers of Blue Crab Population Decline in Texas Estuaries

Zhixuan Song* (Texas A&M University at Galveston), Joel Anderson (Texas Parks & Wildlife Division, Perry R. Bass Marine Fisheries Research Station), Zachary Olsen (Texas Parks & Wildlife Division, Corpus Christi Field Office), Hui Liu (Texas A&M University at Galveston)

The Blue crab (Callinectes sapidus) is a key species of Texas estuary ecosystems, supporting both commercial and recreational fisheries. However, the population in Texas has experienced a long-term decline over the past 40 years. This declining trend emphasizes the urgent need to understand the effects of environmental variability and anthropogenic pressures on the blue crab fishery which may be used to craft meaningful management strategies and reasonable expectations for recovery of the blue crab population. The regional differences could indicate that ecological processes after settlement and human activities impact blue crab populations across various regions. However, the primary drivers remain unclear, hindering effective management. This project aims to determine the potential drivers of blue crab population decline across Texas estuaries. Using time-series CPUE data, we plan to employ a state-space model (SSM) to comprehensively understand the influence of multiple stressors on blue crab populations. Furthermore, Empirical Dynamic Modeling (EDM) will be applied to forecast potential population trends and evaluate the effects of environmental shifts. By incorporating multiple modeling approaches, this project will aid in the development of better assessment and management strategies for blue crab fisheries.

Metabolic Advantages Predict Interspecific Competitive Outcomes in a Sympatric Blenny Community

C. Melman Neill* (The University of Texas at Austin Marine Science Institute, UTMSI), Madison Schumm (UTMSI), Mariana Rivera-Higueras (UTMSI), Simon J. Brandl (UTMSI)

The pace-of-life syndrome hypothesis predicts the evolution of stable associations between metabolic and behavioral traits at 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. Blennies are small marine fishes that 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 pace-of-life syndromes within a sympatric blenny community, we used intermittent-flow respirometry and dyad assays to quantify metabolic rates and behavioral traits associated with competition for refugia in three blennies (Hypleurochilus cf. aequipinnis, Hypleurochilus multifilis, and Scartella cristata) collected from a set of pier pilings in the Port Aransas, TX ship channel. H. multifilis attained the highest maximum metabolic rates and largest aerobic scopes on average, while outperforming H. cf aequipinnis and S. cristata in both aggression and proportion of victories. At the individual level, aerobic scope differential strongly predicted competitive outcome after accounting for species identity. We interpret these results alongside community depth zonation trends obtained using visual surveys. Our results show support for the presence of pace-of-life syndromes in this community at the species and individual levels, which may underpin vertical niche partitioning.

FISH AND FISHERIES

SESSION I

Characterization of Texas Sheepshead highlights increased fishing pressure on spawning aggregations

Ethan Getz *(Texas Parks & Wildlife Department- Coastal Fisheries), Charles Downey (Texas Parks & Wildlife Department- Coastal Fisheries), and Catherine Eckert (Texas Parks & Wildlife Department- Coastal Fisheries)

Sheepshead have been characterized as one of the most vulnerable species to overfishing based on their spawning aggregation behavior. Here, we utilized fishery-independent and dependent data (1983-2023) collected by the Texas Parks and Wildlife Department to assess Sheepshead populations and describe the fishery in Texas. Gill net and bag seine data were used to describe Sheepshead abundance and distribution across different life stages, while creel surveys were conducted to determine spatial and temporal characteristics of the fishery and evaluate targeted fishing activity during the spawning season. Sheepshead encountered in gill nets and bag seines were especially common around Gulf passes along the mid and lower coast. Trends in Sheepshead abundance over time were not evident. However, increased harvest, catch rate and length indicated that Sheepshead experienced heightened fishing pressure during their spawning season (February-April) compared to the rest of the year. In addition, fishing pressure was highly concentrated spatially, with a disproportionate number of landings observed at two ramps near Aransas Pass. These results suggest that while populations in Texas are stable, fishing pressure is most intense when Sheepshead are highly vulnerable due to spawning behavior. Managers should be mindful of this tendency since restrictive changes to the regulations of other sportfish could have implications for the Sheepshead fishery.

Using metabolic traits to evaluate southern flounder habitat suitability in the Gulf of Mexico

Julie Nati*(UT Marine Science Institute) Lu Lin (UT Marine Science Institute) Jeb Armstrong (UT Marine Science Institute) Andrew Esbaugh (UT Marine Science Institute)

Southern flounder (Paralichthys lethostigma) are a commercially and recreationally important species with a relatively narrow distribution in the western Atlantic ocean, extending from Virginia (USA) to the midpoint of the Gulf of Mexico. Despite consistent efforts on the part of fisheries managers, the southern flounder population has been in precipitous decline over the past 40 years. Here, we sought to inform on this dire situation by modelling theoretical habitat availability of southern flounder on the basis of the thermal and oxygen sensitivity of metabolic traits, while also comparing outputs to those of overlapping species with more robust populations (e.g. red drum and sheepshead minnow). To parameterize habitat availability models, we measured the thermal sensitivity of standard metabolic rate (SMR), maximum metabolic rate (MMR) and the critical oxygen threshold (Pcrit) at four different temperatures (18,22,26 and 30°C). All metabolic traits were collected using standard intermittent flow respirometry protocols. The available data suggest that southern flounder exhibit a hypoxia vulnerability (i.e. Pcrit) that is particularly thermally sensitive as compared to sheepshead minnow and red drum. More specifically, the thermal sensitivity of southern flounder is double that of red drum, while sheepshead minnow Pcrit is remarkably thermally insensitive. All species show relatively similar thermal sensitivities on SMR. These data will be discussed in the context of metabolic habitat availability along the Texas coast on the basis of seasonal water temperature and oxygen level data of relevant coastal and offshore habitats.

SESSION I

Environmental influences on juvenile Atlantic Croaker (Micropogonias undulatus) growth in the Western Gulf of Mexico

Isabelle Cummings* (Texas Parks & Wildlife Department- Coastal Fisheries) and Joel Anderson (Texas Parks & Wildlife Department- Coastal Fisheries)

Spatial and environmental variation in finfish growth can have important implications for fisheries management. Atlantic Croaker (Micropogonias undulatus) is a valuable sportfish and baitfish throughout the Gulf of Mexico and U.S. western Atlantic coast; however, growth throughout the juvenile stage, when most growth occurs, is largely understudied in the Western Gulf of Mexico. Therefore, this study aimed to model Atlantic Croaker young-of-the-year growth, determine spatial variation in growth along the Texas coast, and evaluate environmental influences on growth rate. Length frequency data for juvenile Atlantic Croaker was taken from major Texas bays using Texas Parks and Wildlife Department fishery-independent sampling data from 1990-2023. A multi-model approach was used to establish juvenile growth curves and compare growth among regions, and generalized additive models assessed the influence of salinity, temperature, turbidity, and dissolved oxygen on growth. Richard's model provided the best fit for juvenile growth and described clear spatial differences in growth among bays. Growth rate increased substantially from north to south, following trends of increasing salinity and temperature and decreasing turbidity and dissolved oxygen. Salinity and dissolved oxygen were significant for predicting growth in the generalized additive model, with higher salinity promoting growth in larger juveniles (approximately ≥ 70 mm). These findings suggest salinity plays an important role in juvenile growth and likely contributes to spatial variation in growth along the Texas coast. As anthropogenic effects continue to alter estuarine conditions in the Gulf of Mexico, understanding juvenile growth dynamics will be essential for effective management and assessing future population trends.

Otolith isotope chemistry as a tracer of restocked fishes: A case study with the White Seabass, a west coast Sciaenid

Alfonsina Romo-Curiel* (UT Marine Science Institute), Sharon Z Herzka (UT Marine Science Institute), Ruairi MacNamara (Hubbs-SeaWorld Research Institute), Mike Shane (Hubbs-SeaWorld Research Institute), and Mark Drawbridge (Hubbs-SeaWorld Research Institute)

The stable isotope composition of otolith carbonate can be a tracer of the environmental conditions to which fish are exposed during early life. Specifically, δ18O values reflect the carbonate precipitation's temperature and the δ18Owater (correlated with salinity). On the other hand, δ13C values reflect the isotopic composition of the dissolved inorganic carbon pool, metabolism, and food sources. The Ocean Resources Enhancement and Hatchery Program is one of the longest-running marine stock enhancement programs in the US. White Seabass (WSB), Atractoscion nobilis, are spawned under controlled conditions, and embryos, larvae, and early juveniles are reared in a hatchery at known temperatures and salinities. Restocking into California waters occurs at an average size of 20 cm total length (< 1 year old). There is a pressing need to estimate the contribution of the stocking program to the fishery, which requires accurate identification of restocked individuals. We examined whether stable isotope analysis of the otolith cores (larval stage) serve as a tracer to identify hatchery-reared WSB released into Southern California Bight. Comparison of the isotope ratios of the cores of restocked (i.e., origin confirmed from coded wire tags) and wild sub-adult/adult individuals, and early juveniles from the hatchery rearing tanks, indicated no significant differences in δ18O values. However, clear discrimination was achieved with δ13C values: restocked individuals overlapped those of hatchery early juveniles but differed from wild individuals. Hence, this approach can successfully discriminate hatchery-reared WSB from natural populations, and ongoing research seeks to estimate the hatchery's contribution to the fishery.

Developing a Method to Measure Current Flows around an Artificial Reef using a Sontek M9 ADCP

Annie Zeiler *(University of Texas Rio Grande Valley), Richard Kline (University of Texas Rio Grande Valley))

Artificial reefs are used commonly to increase hard substrate, providing habitat to a variety of reef-associated species. The Rio Grande Valley Artificial Reef (RGV reef) is the largest nearshore artificial reef off the Texas Coast, covering 1,650 acres in the Gulf of Mexico. The reef consists of diverse structural types including replicated railroad tie piles, concrete pyramids, and low-profile modules. While the benefits of these structures as habitat are clear, there is little information about the altered current flows caused by placing these substrates on the seafloor. In this study, we aim to determine how different reef structures alter the currents and affect abundance of associated fish and longevity of the reef structures. A 3-D reef map created from swath bathymetry was used to provide water depth, surface area, roughness, and vertical relief from the sea floor. A Sontek Hydrosurveyor M9 acoustic doppler current profiler (ADCP) was used to measure changes in current velocities over different sized structures on the reef. While ADCPs are commonly used in protected waters to measure stream flows and volumes, we used the ADCP to compare artificial reef habitats in terms of water velocity and direction. In combination with ADCP data, side scan sonar imagery was used to measure fish abundance and location surrounding reef structures. These findings will better inform future artificial reef design and deployment by determining which types and configurations of structures best benefits reef species, promoting fishery stocks at these sites.

Estimation of Fish Carbon in an Artificial Reef Using Split Beam Sonar

Allison K. White (University of Texas Rio Grande Valley), Richard J. Kline (University of Texas Rio Grande Valley)

As global fisheries stocks have decreased due to overfishing and climate change, artificial reefs have gained significant attention. In addition to providing or restoring habitat, artificial reefs may serve as carbon capture sinks and potential climate mitigation strategies. The Rio Grande Valley Reef is an artificial reef located in the northern Gulf of Mexico off the coast of South Padre Island, Texas. The RGV Reef area spans 1,650 acres and is comprised of hundreds of patches of recycled and pre-formed materials ranging from low relief (1-2ft) to high relief (8-30ft) reef structures. This reef provides a variety of novel habitat stepping-stones for multiple fish species during different life stages and supports local fisheries. Since the first deployment of structures in 2016, there has been drastic increases in fish abundance, particularly commercially harvested red snapper (Lutjanus campechanus). However, quantification of fish biomass is necessary to evaluate the effectiveness of different structure types in increasing fish biomass. For this study, a Simrad EK80 split beam sonar was used to estimate fish biomass associated with the reef patches. Biomass was calculated using fish echo returns and fish carbon content was calculated from lab-derived carbon measurements for common species. Approximately 2.8 tons of organic carbon were held within 24.2 tons of fish within the RGV reef. The results of this study provide important information on the amount of carbon held within fish biomass associated with a previously overlooked blue carbon ecosystem.

Morphological, physiological, and behavioral biomarkers for enhancing southern flounder larviculture (Paralicthys lethostigma)

Daniel Kemp* (Texas A&M University at Galveston)

Declining Texas southern flounder (Paralicthys lethostigma) populations have necessitated stock enhancement efforts by Texas Parks and Wildlife Department (TPWD) hatcheries. Here, we report and compare the predictive power of physiological biomarkers on larval growth and health across two hatcheries. Larvae were sampled from 1-40 days post hatch (dph) at TWPD's Sea Center Texas (LJ) and CCA/CPL Marine Development Center (CC). Morphological, physiological, and swimming performance parameters were assessed at each life-stage.

Absolute metabolic rate (AMR) increased as the larvae grew at both sites, though CC larvae had greater absolute AMR across all pre-metamorphosis time points (1-35 dph). Corroborating this, the CC larvae were consistently larger than LJ larvae prior to 40 dph. Mass-specific MR varied with metabolic demands in development (i.e. gill development and metamorphosis). Cardiological data indicate that southern flounder cardiac performance is volume-controlled past early developmental stages, as recorded in other flounders. Trends and peaks in movement were correlated with milestones in larval development that support more active pelagic feeding in both hatcheries. Conversely, decreases in movement from 35-40dph indicate early fish settlement at these life-stages in both hatcheries. Our data suggest that the physiological endpoints correlate well with early morphological development through metamorphosis across both hatcheries. These morphological and physiological parameters are robust and reliable biomarkers when comparing and benchmarking larviculture protocols for southern flounder.

Over-Summering of Migratory Whooping Cranes on Their Wintering Grounds

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Over-summering of migratory bird populations on wintering grounds may occur when individuals forgo migration and remain in non-breeding or wintering habitats. We compiled and summarized all reported published and unpublished instances of migratory whooping cranes (Grus americana) over-summering on the wintering grounds during 1891-2023. We report 4 occurrences of over-summering from the Eastern Migratory Population (EMP), 4 reports from Texas during 1891-1941, and 28 individuals over-summering across 19 summers from the Aransas-Wood Buffalo Population (AWBP) post 1941. Although there were many instances of over-summering without proximate causes in the AWBP, some potential documented causes or contributing factors across both populations include injury, disease, death of a mate, injury of a mate, unfamiliarity with the migration route, or unfamiliarity with the breeding grounds. We also report on instances of 4 remigial and 3 body molts on over-summering AWBP cranes. The remigial molt is of primary interest as Whooping Cranes go flightless during this period, and they may be under increased risk of depredation while flightless. We documented over-summering AWBP cranes using saltmarsh habitats as well as freshwater wetlands, and EMP cranes using wetlands and flooded agricultural fields, which are habitats known to be used by wintering individuals. As these endangered populations are still quite small, individuals missing breeding seasons or experiencing additional threats while over-summering is a potential concern for population recovery.

Characterizing Tolerance Thresholds of Genetically Divided Eastern Oyster (Crassostrea virginica) Populations to Guide Aquaculture and Ecosystem Risk Assessments in Texas

Alexandra M. Good, M.Sc.* (Harte Research Institute, Texas A&M University-Corpus Christi), Kate Gomez-Rangel (Harte Research Institute, Texas A&M University-Corpus Christi), Joseph Matt, Ph.D. (Texas A&M University-Corpus Christi), Christopher Hollenbeck, Ph.D. (Texas A&M University-Corpus Christ), Keisha Bahr, Ph.D. (Harte Research Institute, Texas A&M University-Corpus Christi)

The Eastern Oyster (Crassostrea virginica) is a vital coastal resource in Texas, supporting fisheries, stabilizing shorelines, and improving water quality. In 2019, Texas legalized oyster aquaculture, creating economic opportunities while enhancing ecological resilience. However, oyster populations face increasing threats from coastal development, pollution, and climate change, including rising temperatures and fluctuating salinities. Understanding their adaptive capacity is essential for sustaining both the fishery and ecosystem health. This study examines the physiological tolerance thresholds of genetically distinct Northern and Southern oyster populations in Texas, divided by a transition zone in Corpus Christi Bay. Using an intermittent-flow respirometry system, we assessed metabolic responses, including oxygen consumption (MO_2) and calcification rates, under varying salinity and high-temperature conditions. Results indicate that salinity was the primary driver of MO_2, with extreme salinity levels suppressing metabolism, likely as an energy conservation strategy. Temperature effects were secondary, slightly reducing MO_2 across salinity treatments. Calcification rates remained stable, with genetic background influencing responses more than population-level differences. These findings provide insights into population-specific stress tolerances and how Texas oyster populations may respond to environmental stressors. This research contributes to a risk assessment framework to guide fisheries management, aquaculture practices, and coastal restoration efforts, ultimately supporting the resilience of Texas' oyster reef ecosystems in a changing climate.

Evaluating the Extent of Oyster Mortality After a Severe Flood Event in Galveston Bay

Rileigh Hawk* (Texas Parks & Wildlife Department- Coastal Fisheries), Christine Jensen (Texas Parks & Wildlife Department- Coastal Fisheries)

Estimating natural mortality of Eastern Oysters (Crassostrea virginica) is essential for managing the oyster fishery to balance the economic and ecological benefits of healthy oyster reef. A common method for estimating oyster mortality is the "Box Count Method", wherein the proportion of recently dead oysters with shells still articulated, or "boxes", to live oysters is calculated. Two months after a severe flood event in the Spring of 2024, specialized oyster mortality sampling was conducted in Galveston Bay, Texas in which counts of live oysters and boxes were collected. Resulting mortality estimates were combined with Texas Parks and Wildlife (TPWD) monthly routine oyster data to gain a full understanding of the severity and extent of the event. Elevated levels of oyster mortality were observed throughout Galveston Bay with the average percent mortality reaching a peak in mid-June at 64%. Certain areas of Galveston Bay were affected more than others, Trinity Bay experienced 100% oyster mortality whereas East Bay averaged only 19% mortality. Following this event, abundances of market size oysters (greater than 3 inches) were below the TPWD threshold for opening before the oyster fishery season. However, the low salinity environment and abundance of settlement material allowed spat to settle in the highest numbers since 2018 in Galveston Bay. The continual monitoring of our oyster reefs and the flexibility to collect additional information allows TPWD to properly characterize the health of Galveston Bay's oyster reefs and make informed management decisions that benefit the longevity of the resource.

Assessing mesozooplankton dynamics in response to two different seasons in a Texas estuary

Bailey Lin*, Jenelle Estrada, Christian Rines, Hui Liu

Over the past few decades, Galveston Bay, Texas, has experienced both man-made disasters and major hurricanes. The frequency of these events will only continue to increase with the advent of climate change. Quantifying the impacts of these disturbances can be difficult; however, the implementation of long-term monitoring for ecosystem indicators that integrates both environmental and biological components has proven to be an effective tool for deepening our understanding of the impacts and consequences. Since September 2022, monthly zooplankton sampling has been ongoing along a salinity gradient in the bay alongside the concurrent collection of environmental parameter data. Data analyses indicate distinct spatial patterns in copepod diversity and abundance around the salinity gradient, as well as a relationship between diversity and temperature. Coincidentally, the bay experienced two different summers in 2023 and 2024, drought in summer 2023 and above average rainfall in summer 2024, which allowed us to explore the effects of two diametrically opposed seasons on zooplankton community dynamics in Galveston Bay. The results of this research will contribute to the further understanding of estuarine zooplankton dynamics in terms of the prudent management of estuarine ecosystems that are frequently impacted by climate related perturbations for effective and sustainable long-term ecosystem-based management of impacted systems.

Microplastic detection in the American oyster (Crassostrea virginica) and a depuration study collected from Southern Texas Coast

Rebecca Muniz * (University of Texas Rio Grande Valley)

Microplastics have invaded the aquatic environment and its inhabitants, causing significant disturbances. Bivalves are among the main organisms impacted by microplastics due to their filter feeding technique. Their important ecological roles make them key species for research. In this study, we used a Nile Red staining technique to quantify microplastics in American oyster (Crassostrea virginica). We compared field samples (sampled immediately after collection) with lab samples (after depuration) to identify differences in the quantity, shape, and size of microplastics. Approximately 15 oysters were collected from two sites along the Gulf of Mexico Coast. Depuration lasted two weeks under controlled laboratory conditions. The field results showed a significant number of microplastics, with an abundance of microfibers and varying sizes, while the lab results showed a significant decrease in both the quantity and size of microplastics. Our findings suggest that microplastics are disrupting and altering the tissue, and therefore the physiology, of American oysters.

INVERTEBRATE ECOLOGY

Impact of antidepressant drug exposure on tissue architecture and biological conditions in the American oysters

Md Faisal Amin* (University of Texas Rio Grande Valley)

The rapid growth of pharmaceutical usage over the past few decades has brought significant benefits to human health. Studies have shown that a wide array of pharmaceutical compounds such as antibiotics and antidepressant drugs are commonly detected in surface waters, groundwater, and even drinking water. Pharmaceuticals in aquatic environments pose a serious threat to a diverse range of aquatic organisms. Marine bivalves are an important and wide source of seafood for people worldwide. In this study, we determined the effect of short-term exposure to fluoxetine, an antidepressant drug used for depression (low dose: 0.5 µg/L and high dose: 5 µg/L for one week) on American oyster (Crassostrea virginica, an important shellfish and seafood species) under controlled laboratory conditions. Histological analysis showed atrophy in the gills and digestive glands of oysters exposed to fluoxetine. The pH levels of extrapallial fluid significantly increased in the high-dose treatment groups. However, antidepressant treatments significantly decreased the amount of mucous in the gills and digestive glands. Our results suggest that oysters can experience impaired physiological functions through morphological changes in tissues and alterations in body fluid conditions due to antidepressant drug exposure.

WATER QUALITY

Effects of Eutrophication and Hyposalinity on the Health of the Red Seaweed Gracilaria tikvahiae

Donavuan Salazar* (School of Ocean Coastal and Earth Sciences, UT Rio Grande Valley)

The goal of this study was to examine the physiological effects of nitrogen pulses in conjunction with decreased salinity on the red seaweed Gracilaria tikvavhiae in an experimental setting mimicking freshwater inflow (FWI) event that simultaneously reduces salinity and load N. Over a 9-day experiment, seaweed was subjected to four successive salinity drops (35-25, 25-15, 15-5, 5-0 (ppt)) while nitrate N (120umol/L) was simultaneously added periodically over the course of the experiment. Additionally, seaweed was subjected to high N and low salinity separately along with a control group. Gracilaria % growth, net primary production rate (NPP), respiration rate (RR), and nutrient absorption rate were measured throughout the experiment to quantify seaweed health across the four different treatments.

Seaweed % growth was significantly lower in all three treatment groups than the control group. Seaweed experiencing hyposalinity saw a decrease in NPP and RR over the course of the experiment. The separate high N group saw no significant difference in NPP or RR compared to the control group. The combination of the hyposalinity and nitrate addition decreased the NPP and RR over the course of the experiment. There was no significant difference between the NPP and RR of the NH treatment and the hyposalinity treatment.

The NPP and RR decline of the treatments experiencing salinity decrease, and the lack of statistical difference between the control and high nitrate group imply that it is the low salinity that is the main stressor for Gracilaria tikvahiae in the environment after a FWI event.

Building a better Baffin: Microbial source tracking examines nonpoint sources of fecal pollution

Nora Bleth* (Texas A&M University- Corpus Christi), Nicole Powers (Harte Research Institute), Jacqueline Nicolay (Texas A&M University- Corpus Christi), Lydia Cates (Texas A&M University- Corpus Christi), Michael Wetz (Harte Research Institute), Jeffrey Turner (Texas A&M University- Corpus Christi)

Baffin Bay, the jewel of the Texas Coast, is renowned for its wildlife, providing Texans with recreational spaces for birding, boating, fishing, hunting, and hiking. Baffin Bay is shallow, hypersaline, and enclosed by Padre Island, leading to long residence times and minimal tidal flushing. These conditions make the bay vulnerable to fecal pollution, one of the leading causes of declining water quality along the Texas coast. Three of the bay's tributaries, Los Olmos, Petronila, and San Fernando Creeks, have been classified as impaired due to high concentrations of fecal indicator bacteria (FIB). A comprehensive water quality study examined the drivers of fecal pollution within the watershed. Eighteen monthly sampling events (12 sites, N=216 samples) revealed FIB regularly exceeded the USEPA's recommended thresholds. Microbial source tracking (MST) using host-associated molecular markers quantified nonpoint sources of fecal pollution. Human, gull, pig, and cow markers were detected in 32%, 70%, 34%, and 73% of samples, respectively. All four markers were pervasive throughout the watershed and concentrations (gene copies/100mL) were reported for human (mean=205.7, max=111,850), gull (mean=571.5, max=14,400), pig (mean=576.5, max=41,200), and cow markers (mean=1,381, max=71,800). The gull marker was highest in the bay, whereas the pig, human, and cow markers were highest within San Fernando Creek, a hotspot for fecal pollution. Non-point source fecal pollution within Baffin Bay, though largely driven by gulls and cattle, is complex and requires data-driven management strategies incorporating MST data.

Multi-Drug-Resistant Marine Bacteria Carriers of Heavy Metals

Wendy M. Rangel* (Texas A&M University-Corpus Christi), Kyra G. Kaiser (Texas A&M University-Corpus Christi), Ioana E. Pavel (Texas A&M University-Corpus Christi), Gregory W. Buck (Texas A&M University-Corpus Christi)

Inorganic contaminants, such as heavy metals, contribute to environmental pollution resulting in adverse human health. The U.S. Environmental Protection Agency (EPA) has set National Primary Drinking Water regulations on high priority inorganic chemical pollutants (e.g. As, Ba, Cd, Cu, Sb, Se, Cr, Hg, Be, Pb, and Tl) that are introduced to drinking water from erosion of natural deposits and discharge of industrial sources. These pollutants have potential health effects resulting from both short and long-term exposure. Another route of exposure is infection by bacterial strains that have the capability of absorbing heavy metals. Correlations between increased heavy metal concentration and antimicrobial resistance have been observed in previous studies demonstrating relationships between multi-drug-resistance and bacterial ability to concentrate toxic heavy metals. Two marine bacteria, Vibrio (V.) vulnificus and V. alginolyticus, may cause life-threatening infections within 48-96 hours and their resistance to common antibiotic treatments is a major health concern. This study hypothesized that the bioaccumulation of heavy metals into the local bacterial cells correlates with increased antimicrobial resistance. To test this hypothesis, V. vulnificus and V. alginolyticus isolated from Texas Coastal Bend estuarine and marine waters were measured using Inductively Coupled Plasma-Optical Emission Spectroscopy (ICP-OES), an analytical chemistry technique used to quantify metal contaminants down to the low and sub-ppb concentration range. Results showed that there was a correlation in internal levels of some heavy metals with bacterial resistance to common antibiotics. The knowledge gained from this study can be used in the treatment of antibiotic-resistant Vibrio strains.

The bioavailability of photo-bleached dissolved organic carbon from environmentally prevalent plastic nurdles in coastal waters

Kadee Loyd*(UT Marine Science Institute), Xiangtao Jiang (UT Marine Science Institute), Kaijun Lu (UT Marine Science Institute), Kasia Dinkeloo (Department of Molecular Biosciences, UT-Austin), Kylee Hutchinson (Department of Biochemistry and Molecular Biology, Trinity University), Zhanfei Liu (UT Marine Science Institute)

Microplastics pose a significant threat to marine ecosystems, but due to their small size, resistance to degradation, and vast dispersal, it is challenging to evaluate their environmental weathering and lifespan simply based on field samples. Through laboratory experiments, this study assessed the photodegradation of microplastics and the bioavailability of their weathering products in seawater. Nurdles of four polymer types – HDPE, PP, PET & PS – were exposed to four and eight weeks of simulated irradiation, equating to 0.75 and 1.5 years, respectively, of natural noon summer sun in south Texas. Irradiated nurdles were analyzed for oxidation and leachate production as dissolved organic carbon (DOC). FT-IR and SEM provided evidence of weathering for all four polymers, with HDPE exhibiting the most significant increases in its oxidative indices. PP nurdles produced the highest concentration of DOC, and this production, for all polymers, appeared to accelerate over time. The DOC collected after eight weeks of irradiation was then inoculated with microbial consortium from the Gulf of Mexico coast for a 35-day period to observe biodegradation. While DOC degradation was high (75-95% for all polymers), bacterial cell growth was low, leading to growth efficiency values much lower than previous studies with natural DOM. This suggests that a small fraction of the microorganisms may have been responsible for plastic-DOC respiration; sequencing is ongoing and will be presented. Overall, this work provides insight into the longevity and fate of microplastics and plastic-derived substances in the ocean.

Abstracts for Poster Presentations

FISH AND FISHERIES

Oyster Reef-Associated Fish Habitat Partitioning and Connectivity

Yamilla N. Samara Chacon* (TAMUCC), Daniel Coffey (TAMUCC), and Simon Brandl (UTMSI)

In the Gulf of Mexico (America), eastern oyster (Crassostrea virginica) reefs are considered important habitats for ecologically and economically important gamefishes such as red drum (Sciaenops ocellatus), spotted seatrout (Cynoscion nebulosus), and sheepshead (Archosargus probatocephalus). These reefs enhance foraging opportunities for gamefish, but their active harvesting for human consumption may reduce habitat health and impact habitat use by mobile predators. To mitigate these impacts, the Texas Parks and Wildlife Department (TPWD) has implemented short and long-term harvest closures to conserve depleted oyster reefs. However, limited data exist on how these static management strategies influence mobile fish communities that rely on these habitats. Therefore, the proposed study will assess gamefish habitat use and connectivity across oyster reefs in five Texas bays (Aransas, Copano, Mesquite, San Antonio, and Matagorda) using acoustic telemetry. Acoustic receivers will be deployed at 44 oyster reefs with varying harvesting statuses (open vs. closed) to monitor gamefish movements. Additionally, ten individuals per species per bay (150 total individuals) will be internally tagged with an acoustic transmitter to track their movements. Findings from this study will provide critical insights into the ecological role of oyster reef management in shaping fish movement patterns and habitat dependence. Ultimately, this research aims to inform conservation and fisheries management strategies by enhancing our understanding of how gamefish interact with and rely on oyster reef habitats.

An Ecological Characterization of Juvenile Tarpon and Snook Nursery Habitats in Texas

Isabel Tiller* (Harte Research Institute, Texas A&M University- Corpus Christi), Dr. Matthew Streich (Harte Research Institute, Texas A&M University- Corpus Christi), Jason Williams (Harte Research Institute, Texas A&M University- Corpus Christi)

Atlantic Tarpon (Megalops atlanticus) and the snook species complex (Centropomus sp.; primarily fat snook and common snook) are highly revered sportfish in Texas' coastal waters and designated as "Species of Greatest Conservation Need" under the Texas Conservation Action Plan. Tarpon and snook once supported productive recreational and commercial fisheries until populations collapsed in the mid-1900s due to overfishing and reduced recruitment. While fishing mortality of adult fish has been reduced by a transition to a primarily catch and release recreational fishery, poor juvenile recruitment could be hindering recovery of these populations. Unfortunately, there is limited knowledge on the early life history of tarpon and snook in Texas. The purpose of this study is to identify nursery habitats, describe the physical, biological, and environmental characteristics of these habitats, and provide novel information on the occurrence, abundance, and seasonal residency of juvenile tarpon and snook within identified nurseries using a combination of bimonthly field sampling, tag-recapture methods, acoustic telemetry, and citizen science. Since April 2024, juvenile tarpon occurrence was verified at three of five sampling sites while juvenile snook occurrence was verified at four sites. Sixty-two juvenile tarpon were captured, ranging from 160–490 mm SL, and 54 juvenile snook were captured, ranging from 25–186 mm SL. Juvenile tarpon and snook were observed from April-December. Nineteen tarpon were acoustically tagged across two sites to monitor movement and seasonal residency within the nurseries. The results of this study will fill knowledge gaps and inform management strategies in Texas.

Chronic lithium toxicity of red drum and sheepshead minnow across a salinity gradient

Alton Hensch* (UT Marine Science Institute), Jacob Stone (UT Marine Science Institute), Andrew J. Esbaugh (UT Marine Science Institute)

Lithium is an emerging toxicant in aquatic systems owing to its prevalent use in modern technologies and pharmaceuticals. Yet, the effects of lithium on aquatic environments, particularly marine and estuarine systems, remains understudied. The existing research has focused primarily on freshwater systems where lithium has been found to be acutely toxic at the parts per million level. Additionally, environmental sodium has been shown to be a protective against lithium toxicity in freshwater habitats, likely owing to the fact that lithium is thought to compete with sodium for biotic ligands. Such findings would suggest that lithium is likely of negligible environmental impact to coastal oceans owing to the relatively high sodium concentrations; however, it is important to acknowledge that differences in osmoregulatory strategy between freshwater and marine fishes may manifest in differing patterns of lithium toxicity. The aim of this study was to assess the effects of lithium across a salinity gradient using species common to the Gulf of Mexico (Cyprinodon variegatus; sheepshead minnow and Sciaenops ocellatus; red drum). Toxicity was assessed using a classic chronic toxicity developmental and teratogenicity test, which resulted in effective concentration (EC) 20 and 50 estimates across a range of salinities. For both study species, significantly higher toxicity was observed than what has been described in the literature for freshwater fish. Interestingly, the freshwater EC50 values were significantly higher than 15, 30, and 45 ppt values for sheepshead minnow. Overall, these data suggest lithium is not, as yet, a contaminant of environmental concern for coastal fish species.

Quantifying juvenile fish associated with nursery habitats using ARIS sonar

Kaitlyn Doyscher* (University of Texas Rio Grande Valley), Richard Kline (University of Texas Rio Grande Valley)

Artificial reefs are implemented globally to enhance marine habitat and provide structure for marine fish. Additionally, artificial reefs are economically important for increasing tourism and commercial fishing. Adaptive resolution imaging sonar (ARIS) is a non-invasive surveying method that uses high frequencies that range from 1.1 MHz to 1.8 MHz to provide high resolution video-like images. The objectives of our study are to determine the abundance and size of juvenile fish associated with natural and artificial nursery habitats using the ARIS. The study will sample sites along Texas's coast including small natural reefs and artificial nursery patches of varying densities and material. We will slowly tow the ARIS in a specialized winged frame to assist with stabilization and orientation. Images will be processed using ARISFish to detect and quantify fish residing over nursery habitat. Juvenile fish density and body sizes will be compared between natural and artificial reefs as well as vertical relief and surface area. These findings will fill knowledge gaps regarding reef complexity and key factors of nursery habitats that influence juvenile fish abundance and distribution on reef habitat.

Habitat use and Movement of Parrotfish on Coral Seascapes in the Flower Garden Banks

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 (Louisianna State University), and Richard Kline (University of Texas Rio Grande Valley)

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 commercially important fish and endangered corals. Monitoring of these reefs has been conducted for 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 used 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 a bank within the FGBNMS (East Flower Garden Bank). Several tagging trips were completed over one and a half years. Twenty Parrotfish from two species, Stoplight Parrotfish (Sparisoma viride) and Queen Parrotfish (Scarus vetula), were tagged on East Flower Garden Bank with acoustic transmitters to evaluate their daily movements, activity spaces (e.g. home range), and potential impacts they may have on coral conditions.

FISH AND FISHERIES

eDNA Monitoring of Southern Flounder

Jackson Piccirillo* (University of Texas Rio Grand Valley Graduate Student) Richard Kline (University of Texas Rio Grand Valley) MD Rahman (University of Texas Rio Grand Valley)

The southern flounder (Paralichthys lethostigma) is a species of flatfish that ranges from the east coast of the United States to the northern Gulf of Mexico. Southern flounder spend the beginning of their development in estuaries and coastal waters. They then migrate offshore to reproduce. Southern flounder fill an important niche in estuary and coastal ecosystems due to their role as benthic predators. They are also valuable commercial fish due to their accessibility by individual anglers as well as by fisheries. As southern flounder are sexually dimorphic, the larger females are disproportionately harvested. This, paired with the southern flounder's environmental sex determination being driven by rising coastal temperatures, has caused concerns over the southern flounder population. The goal of this study is to develop an eDNA monitoring protocol for southern flounder. Water samples were collected weekly at five locations in the Lower Laguna Madre around the spawning migration. Samples were collected using a pole and bottle apparatus near the seafloor. Water samples were vacuum filtered and preserved in DNAzol. Extracted samples were amplified with PCR using a species-specific first and nested primer sets to verify the presence of southern flounder. Preliminary tests using known quantities of flounder DNA have shown that DNA presence can be detected at 400X dilutions. If successful, eDNA will be a non-contact method to determine the timing for offshore spawning in southern flounder.

HABITATS AND ECOSYSTEMS

Effects of Oyster Reef Health on Consumer Community Structure and Trophic Pathways

Bailey Bonham* (UT Marine Science Institute) and Simon Brandl (UT Marine Science Institute)

Oyster reefs support diverse benthic communities and provide essential ecosystem services to coastal communities but currently face harvesting pressures that may alter habitat availability, community composition, and ecosystem functioning. We examine how community structure and trophic pathways differ in response to reef health. Using oyster sampling units (OSUs), we quantify abundance, biomass, and size distributions of small fishes and invertebrates in five bay systems across the Texas coast. Fish biomass and abundance trends opposed those of invertebrates in relation to oyster density, indicating complex community dynamics. Furthermore, we used bulk stable isotope analysis to compare nutrient pathways across reefs, hypothesizing that trophic structure and resource use reflect changes in filtering processes and food web dynamics due to reduced oyster densities. Our findings help us understand how reef degradation impacts critical processes on oyster reefs to inform future management.

Mapping land cover on 1m resolution for Texas Coastal Bend with airborne lidar point clouds and satellite images

Lihong Su* (Harte Research Institute, Texas A&M University- Corpus Christi)

Accurately mapping coastal land cover is required for estimating effects of relative sea level rising. The working site of our NOAA ESLR project is covered by 6167 lidar 1500m square tiles, 4 Sentinel-2 pre-defined 109.8 km square tiles, and 325 WorldView-2 images. However, currently lidar data has lots of misclassification on coastal wetland such as widespread confusion with bare-soil and marshes. One of the primary objectives is to re-classify lidar point categories produced by lidar data suppliers by our Bayesian approach with WorldView-2 and Sentinel-2 multispectral imagery, and USGS 30m DEM and NOAA C-CAP 30m landcover datasets. It is not operationally feasible for us to produce a sufficient training set deep neural networks from the hundreds WV2 images and lidar tiles and to reclassify lidar point clouds under limited time and resources. Our classification approach combines machine learning and human expertise together on lidar point clouds and satellite images with a Bayesian approach.

To accurately separate regularly flooded and irregularly flooded regions, another of the primary objectives is to use time-series Sentinel 10m imagery and lidar bare-earth 1m DEM to obtain high-water line, mean sea level, and low-water line. We use the outcomes to identify low marsh for the classification.

We applied this method for our NOAA ESLR project that covers the six-county Coastal Bend of Texas. The results are trustworthy to support accurate estimating effects of relative sea level rising.

Assessing Climatic Impacts on Wetland Transformation and Resilience along the Texas Coast using Satellite Imagery

John Malito* (UT Austin Bureau of Economic Geology), Katie Swanson (UT Marine Science Institute), and Wonhyun Lee (UT Austin Bureau of Economic Geology)

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Developing a physicochemical procedure for the trace metal quantification in Spartina spartinae at Mustang Island State Park

Lalo Amador* (Department of Physical and Environmental Sciences, Texas A&M University- Corpus Christi), Wendy Rangel (Department of Physical and Environmental Sciences, Texas A&M University- Corpus Christi), Christina Montez (Department of Physical and Environmental Sciences, Texas A&M University- Corpus Christi) , Yue Liu (Department of Life Sciences, Texas A&M University- Corpus Christi), Candice Lumibao (Department of Life Sciences, Texas A&M University- Corpus Christi), and Ioana E. Pavel (Department of Physical and Environmental Sciences, Texas A&M University- Corpus Christi)

In 2013, Mustang Island State Park, a small barrier island in South Texas along the Gulf Coast, experienced significant contamination from previous oil and gas operations containing hazardous metal components (Texas Park and Wildlife (TPWD) Report 2016). Phase #1 of the project: In 2024, Spartina spartinae root samples were collected with a TPWD permit from a 1.89-acre study site comprising of contaminated (n = 15 specimens) and non-contaminated (n = 15) sites for trace metal analysis by inductively coupled plasma-optical emission spectroscopy (ICP-OES) down to low or sub-parts per billion (ppb). This gulf cordgrass was selected as a long-term environmental indicator due to its ecological benefits as well as its relation to endophytic microbes that colonize and live inside plant root tissues. Phase #2: A physicochemical method was developed and finetuned to prepare root samples for metal analysis by ICP-OES by breaking them down into a colorless, transparent solution. The physical processes consisted of handwashing, ultrasonication, dehydration, and cryo-maceration. This was followed by chemical processes of chemical digestion in a microwave reactor, vacuum filtration, chemical bleaching, and acidification by reconstitution. It was determined that chemical bleaching in a microwave reactor was the most efficient and successful method in reaching the desired results. Phase #3: Eight hazardous metals (As, Ba, Cd, Cr, Hg, Pb, Se, and Ag) will be quantified according to the EPA Method 200.7 and the Resource Conservation & Recovery Act for addressing environmental problems associated with hazardous waste. The magnitude and strength of the effects of these environmental pollutants on plants and microbes will also be determined (community evolution of contaminant-degrading microbes). The overarching hypothesis is that long-term accumulation of pollutants in Spartina spartinae can serve as a remediation tool for contaminated soils and help protect wildlife which may feed on it.

A Time Series Study Of The Microbial Community Assemblage At A Coastal Ocean Site Within The Gulf Of Mexico

Mahima Yogesh (Texas A&M University- Corpus Christi), Yajuan Lin (Texas A&M University-Corpus Christi), Shuai Gu (Texas A&M University-Corpus Christi)

Through maintaining the ocean's fertility, cycling nutrients, forming the base of the food chain, and helping bolster the ocean's productivity, marine microorganisms play a critical role in the oceans. However, despite their importance, there are very few time series studies focused on creating a baseline for microbial community assemblages within the Gulf of Mexico (GoM). This knowledge gap is significant, because it impedes the understanding of the impacts of anthropogenic activities and climate change on the GoM from the bottom-up. Therefore, the purpose of this study was to conduct a year-long time series at two sampling sites adjacent to the GoM focused on assessing the water column microbial community's abundance, diversity, and structural changes utilizing next-generation sequencing and bioinformatics. The results of this study describe the abundances of various taxa (family and genus-level) across the entire sampling period and between the two sampling sites, enabling the examination of the influences of temporal and spatial variances on the distribution of bacterial taxa. Furthermore, the addition of alpha and beta diversity metrics enables the further analysis of the bacterial communities at various time points, elucidating microbial community composition within this understudied region.

Development of Image Analysis Methods to Differentiate Epiphytes on Seagrasses

Carissa Piñón* (Texas A&M University- Corpus Christi), Chi Huang (Texas A&M University- Corpus Christi), Kirk Cammarata (Texas A&M University- Corpus Christi)

Seagrass epiphytes block light, impede gas exchange, compete for nutrients and increase physical drag leading to blade tearing. The relationships between seagrass, epiphytes, and environmental conditions may provide insight into mechanisms of seagrass decline. The goal of this study is to provide a framework and workflow to differentiate and quantify epiphyte communities that may be indicative of seagrass health. Seagrass blades were scanned and image-analysis and microscopy were used determine morphological composition of epiphytes and their colonization patterns. Epiphytes were examined microscopically and categorized by color perception, structure, and the frequency at which they were encountered. The epiphyte groups were scanned in color and similar pixel groups were selected to capture variation within and between epiphyte categories. Cluster analysis was used to determine the accuracy of categories of epiphytes defined by microscopy and the libraries of pixels associated with categories defined via image analysis. Various methods of separability and differentiability of pixel groups are examined to confirm the accuracy of the defined groups. If morphological epiphyte groups can be used to monitor shifts in biofilm communities through image analysis, then this can methodology could provide a way to monitor these community changes affordably and with less effort than other methods.

Assessing Wild Pig Diet and Damage to Wetland Plant Ecosystems Along a Riverine Floodplain

Brenna Edwards* (Department of Physical and Environmental Science, Texas A&M University-Corpus Christi), John M. Tomeček (Department of Rangeland, Wildlife, and Fisheries Management, Texas A&M University), Loretta L. Battaglia (Department of Rangeland, Wildlife, and Fisheries Management, Texas A&M University)

Wetland ecosystems are among the most productive systems globally and provide critical support for biodiversity. Wetlands can also serve as ideal hotspots for establishment and proliferation of non-native and invasive species. Invasive ungulates can be particularly destructive to wetland ecosystems and trophic structure, especially when introducing novel disturbances. Wild pigs (Sus scrofa), a highly invasive omnivore, often favor soft bottomland systems, resulting in continuous disturbance and possible long-term degradation of community structure and function. The goal of this research is to examine impacts on wetland vegetation along the Aransas River floodplain where a pig reduction project will commence in the spring of 2025. We hypothesize that wild pig disturbances will cause significant changes in vegetation composition and that recovery rates will be inversely related to frequency of wild pig disturbance patterns. Secondly, we predict that diet composition will differ depending on season and resource availability. Plant surveys will be used to quantify community composition, trampling and rooting damage to vegetation, and community recovery trajectories following wild pig reduction. Changes in vegetation will be tested pre- and post-removal using NMDS and PERMANOVA. Remote-triggered cameras will be strategically placed across sample sites for monthly monitoring of pig activity, and to differentiate their effects from those of co-occurring wild and domestic ungulates. The stomach of each pig will be harvested, and vegetation contents will be taxonomically classified using DNA metabarcoding. Collectively, these data will provide a comprehensive assessment of wetland vulnerability to this highly invasive omnivore.

Development of a Rapid Method to Compare Algal Epiphyte Community Compositional Shifts in Thalassia testudinum

Samantha Maupin*, Kirk Cammarata, and Candice Lumibao (Dept. of Life Sciences, Texas A&M University - Corpus Christi)

Seagrass beds are vital coastal ecosystems. As seagrasses grow, they host increasing accumulations of algal epiphytes. Epiphytes respond quickly to environmental change. In cases of excessive nutrient input, overgrowth of epiphytes can precede declines in seagrass populations. As these declines have become more common, interest has developed in new methods of monitoring the health of seagrass beds. This project develops a rapid method of comparing algal epiphytic community composition and change to monitor at-risk ecosystems. Pigment fluorescence of algal epiphytes was used along with morphometric data to seasonally compare two sites with differing pore-water nutrient contents. Fluorescence assays provide a broad view of epiphyte community changes by assessing relative amounts of chlorophyll- and phycoerythrin- fluorescence. Morphometric results showed seasonal differences in length of seagrass blades, but no site-based differences. Epiphyte to seagrass biomass ratios varied seasonally with greater relative accumulations in the cool water-temperature seasons. Significant differences between the two sites were seen in summer and winter. Fluorescence results indicate that both sites are dominated by primarily red fluorescence producing species, but there were some site-based differences. Fluorescence ratios (Phyco/Chl) varied seasonally with greater relative accumulations of red algae in the warm seasons, and significant differences between the two sites were seen in spring and fall. Methods of fluorescence analysis were able to successfully detect relative changes in algal epiphyte community composition, and both seasonal and site-based differences. In the future, this data will be combined with methods of pigment analysis to further test the conclusions found here.

Analyzing Carbon Sequestration in Coastal Texas Oyster Reefs

Wyatt Prappas* (UTRGV School of Earth Environmental and Marine Science (SEEMS)), Richard Kline (UTRGV SEEMS), MD Rahman (UTRGV School of Integrative Biological and Chemical Sciences (SIBC)), Faiz Rahman (UTRGV SEEMS)

With the threat of rising carbon dioxide levels worldwide, the global search for carbon sinks is increasing. The ocean is the world's largest carbon sink, with carbon sequestered within marine structures and ecosystems referred to as 'blue carbon'. Studies have shown that the coastal mangroves, seagrasses and saltmarshes actively sequester large quantities of blue carbon. Shallow water coral reefs also sequester carbon, but rather passively. Oyster reefs are an understudied coastal shallow water ecosystem that has the potential to passively sequester carbon despite lacking vegetative components.

In the present study, carbon measurements spanning the Texas coast are currently being performed to examine the carbon sequestration potential of oyster reefs. Sediment core samples will be taken from transects around selected oyster reef sites. Samples will be processed according to the IUCN blue carbon manual and run through an elemental analyzer to determine the organic carbon percentage. Carbon data will be used to determine if there is a higher blue carbon accumulation on oyster reefs as compared to control sites. Evidence that oyster reefs function as blue carbon ecosystems could benefit Texas's growing oyster mariculture industry and encourage the conservation of existing oyster reefs.

Optimizing growth conditions for the cultivation of native macroalgae species, Gracilaria tikvahiae, in Texas

Claire K. White*, Daniel Harden, Dr. Mark Lever (Department of Marine Science, College of Natural Sciences, The University of Texas, Marine Science Institute)

With the threat of rising carbon dioxide levels worldwide, the global search for carbon sinks is increasing. The ocean is the world's largest carbon sink, with carbon sequestered within marine structures and ecosystems referred to as 'blue carbon'. Studies have shown that the coastal mangroves, seagrasses and saltmarshes actively sequester large quantities of blue carbon. Shallow water coral reefs also sequester carbon, but rather passively. Oyster reefs are an understudied coastal shallow water ecosystem that has the potential to passively sequester carbon despite lacking vegetative components.

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Variability and Environmental Drivers of Eastern Oyster Growth in Texas Coastal Bays (1990-2023)

Jessica Randall* (Texas Parks & Wildlife Department- Coastal Fisheries) and Joel Anderson (Texas Parks & Wildlife Department- Coastal Fisheries)

The growth dynamics of eastern oysters (Crassostrea virginica) and the factors influencing them were analyzed across four major Texas bay systems - Galveston, Matagorda, San Antonio, and Aransas Bay – using Texas Parks and Wildlife (TPWD) oyster dredge data collected from 1990-2023. To model bay-specific oyster growth, mean total length estimates of assigned age-0.5 and age-1.5 oysters were generated using each winter season as a repeated measure of growth. These size-at-age estimates were then used to fit von Bertalanffy growth functions (VBGF), generating mean growth curves over all years for each bay system. To identify potential drivers of growth variation among bays, a boosted regression tree (BRT) model was applied to evaluate the influence of multiple environmental variables on age-0.5 and 1.5-year-old oysters. These analyses can reveal influential drivers of growth in oysters within Texas bay systems, providing crucial information to guide restoration efforts and the development of adaptive management strategies that support sustainable harvesting and monitoring practices to ensure the resilience of these ecologically and economically significant reef systems.

Springtails and Mites in Coastal Wetlands: Uncovering Patterns in Soil Microarthropod Distribution

Peyton C. Calderon* (Center for Coastal Studies, Texas A&M University-Corpus Christi), Loretta L. Battaglia (Center for Coastal Studies, Texas A&M University-Corpus Christi)

Coastal wetlands are among the most productive ecosystems on Earth but face severe threats from sea level rise and global warming. Microarthropods play a vital role in wetland carbon cycling by grazing on microbes, stimulating microbial activity, enhancing nutrient turnover, and supporting plant growth. Despite their ecological importance, wetland microarthropods remain understudied. Collembolans and oribatids, two key microarthropod groups, are globally distributed detritivores and microbivores. While collembolans have been documented in European and Asian coastal habitats and oribatids in European salt marshes and Canadian peatlands, their distribution in Southeastern U.S. wetlands is largely unknown. Microarthropods are sensitive to environmental changes and alter their composition accordingly, making them good indicators of ecosystem shifts. This knowledge gap limits predictions of coastal wetland responses to climate change.

To address this gap, soil communities were sampled in the dominant vegetation zones of three South Texas estuaries (Oso Bay, Nueces Bay, and Redfish Bay) in February and March 2025. Soil cores (7cm diameter, 9cm depth) and pitfall traps were collected, and microarthropods were extracted using Berlese funnels. Soil moisture, leaf litter, pH, conductivity, texture, soil organic matter (SOM), and C:N ratios will be analyzed. As microbivores and detritivores, microarthropod distribution is expected to correlate with SOM, which represents food availability. Salinity is predicted to negatively impact microarthropods by inducing desiccation, while nitrogen may have a positive effect by promoting microbial growth. Preliminary results show high collembola abundance in the eutrophic, euhaline estuary (Oso Bay) and high oribatida abundance in the mesotrophic, polyhaline estuary (Redfish Bay).

Applying environmental DNA to assess the prevalence of dermo disease across oyster reefs along the Texas Coastal Bend

Marissa Kordal (UT Marine Science Institute)

The eastern oyster (Crassostrea virginica) is an ecosystem engineer in estuaries across the eastern United States and Gulf of Mexico. Oyster reefs provide habitat and refuge for many estuarine species and remove excess nitrogen from the water column. Dermo disease, caused by the protist Perkinsus marinus, results in the mortality of oysters and is present across Texas bays and estuaries. Traditional assays to monitor P. marinus in oyster populations require sacrificing oysters, are time intensive, and lack specificity and infection intensity. Here, we aim to map the distribution of P. marinus infections across oyster reefs along the Texas Coastal Bend using environmental DNA. We compare P. marinus detection from oyster tissue versus environmental DNA from the water column around oyster reefs, then we use quantitative PCR to quantify the infection intensity in oysters. Finally, we examine how dermo disease prevalence may be related to fishing pressure, oyster reef condition, and oscillating environmental factors, such as temperature and salinity.

Drivers of Sessile Invertebrate Community Composition and Vulnerability to Invasion

Olivia Hughes* (Center for Coastal Studies, Texas A&M University-Corpus Christi) and Loretta L. Battaglia (Center for Coastal Studies, Texas A&M University-Corpus Christi)

Coastal wetlands are among the most productive ecosystems on Earth but face severe threats from sea level rise and global warming. Microarthropods play a vital role in wetland carbon cycling by grazing on microbes, stimulating microbial activity, enhancing nutrient turnover, and supporting plant growth. Despite their ecological importance, wetland microarthropods remain understudied. Collembolans and oribatids, two key microarthropod groups, are globally distributed detritivores and microbivores. While collembolans have been documented in European and Asian coastal habitats and oribatids in European salt marshes and Canadian peatlands, their distribution in Southeastern U.S. wetlands is largely unknown. Microarthropods are sensitive to environmental changes and alter their composition accordingly, making them good indicators of ecosystem shifts. This knowledge gap limits predictions of coastal wetland responses to climate change.

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Remote-Sensing-Based Mapping of Oyster Mariculture Suitability Along the Texas Coast

Isabel Johnson* (University of Texas Rio Grande Valley), Richard Kline (University of Texas Rio Grande Valley), MD Rahman (University of Texas Rio Grande Valley), Faiz Rahman (University of Texas Rio Grande Valley)

TPWD has issued permits for oyster mariculture in the Texas bays since 2021. However, selecting oyster mariculture sites is currently based on proximity to existing sites or manual survey. This can be inefficient because it does not consider the conditions needed for optimal oyster growth, like turbidity, temperature, and nutritional conditions. It is important for commercial oyster producers to be able to select sites where oysters will grow fast and become marketable in the shortest amount of time. Therefore, developing a remote-sensing-based Oyster Suitability Index (OSI) map of the Texas coast would be a significant resource to permitting agencies and producers in the state. Our project seeks to develop an OSI map of the Laguna Madre and a spatially distributed seagrass map at 30 m pixel scale, as seagrass exclusion is required in oyster mariculture site selection. NASA Landsat reflectance data will be used to estimate the level of Chlorophyl-a and water column turbidity of the coastal waters. Satellite-based thermal data will be used to derive the sea surface temperatures. Satellite data will be validated with in-situ measurements. Data from the Chlorophyl-a content, water column turbidity, and sea surface temperature will be combined to develop the OSI map. This map will aid in the planning of future oyster mariculture sites.

Plastic-free restored habitats: Reducing plastic pollution in community-based restoration of oyster reefs

Mckenna Reinsch* (Harte Research Institute, Texas A&M University- Corpus Christi) Dr. Linda Walters (University of Central Florida), Dr. Lisa Chambers (University of Central Florida), Jace Tunnell (Harte Research Institute, Texas A&M University- Corpus Christi), Dr. Zhanfei Liu (University of Texas Marine Science Institute), Dr. Terry Palmer (Harte Research Institute, Texas A&M University- Corpus Christi), Natasha Breaux (Harte Research Institute, Texas A&M University- Corpus Christi), Erin Hill (Harte Research Institute, Texas A&M University- Corpus Christi), Dr. Jennifer Beseres Pollack (Harte Research Institute, Texas A&M University- Corpus Christi)

Unsustainable harvest practices and environmental changes have reduced oyster reef distribution globally. In response, habitat restoration plays a key role in rebuilding degraded reefs, often by deploying substrate into coastal waters to facilitate larval recruitment of oysters. In small-scale and community-based oyster reef restoration, recycled oyster shells are commonly placed into polyethylene (PE) plastic mesh bags to create stable, three-dimensional structures and minimize shell loss from currents and wave action. Although PE plastic mesh offers affordability, versatility, and durability, this practice introduces large volumes of plastic into coastal waters and may have unintended consequences. Although there is a strong desire to eliminate plastics in habitat restoration, plastic-free materials present new issues with installation, durability, availability, and cost.

This project aims to evaluate the usability, performance, longevity, volunteer-friendliness, and cost of plastic-free restoration materials while assessing how traditionally used plastic materials degrade into micro- and nano-plastics in coastal environments. Newly developed plastic-free materials—including cement-infused jute rings, basalt bags, and biopolymer mesh—will be evaluated over two years in the field and laboratory for oyster recruitment, fauna biodiversity, material longevity, and resilience, volunteer compatibility, cost-effectiveness, and unintended consequences from material breakdown. Project findings will help identify effective plastic-free materials, which will be shared with resource managers and restoration practitioners to support broader adoption in habitat restoration.

Cost-benefit analyses of experimental oyster reef restoration strategies

Kit Wheat-Walsh*, Evan L. Pettis

The Texas Parks and Wildlife Department (TPWD) typically conducts oyster reef restorations by placing "cultch" (shell or rock material) on degraded reef, thereby providing increased surface area for juvenile oyster settlement. However, in recent years, the cost of cultch material and placement has been increasing exponentially. In response, TPWD constructed several "experimental" sites to identify the most economically and ecologically effective approaches to oyster restoration. Restoration designs tested include using different (1) placement configurations—i.e. 'mounds' with significant vertical relief vs continuous, uniform 'flats' layers, (2) depths of cultch material in both 'mounds' and 'flats' configurations, and (3) spatial intervals using the 'mounds' configuration. The experimental treatments were monitored bi-annually using hydraulic oyster patent tongs to monitor oyster recruitment, growth, and survival.

All designs tested resulted in increased oyster abundances, comparable or exceeding those of nearby natural reefs. Costs for each restoration strategy varied as a function of total volume of cultch required to cover the same spatial footprint. Here, we present the preliminary results of cost-benefit analyses to investigate the average output (in terms of production of juvenile, subadult, and adult oysters) per dollar spent for each respective approach. Our assessments suggest that layers placed using a smaller volume of cultch per unit area may result in more cost-effective production of oysters over the short-term, although they may not produce higher total abundances. Additional monitoring and analyses are needed to assess long-term restoration success as it relates to resiliency and 'spill-over' impacts to adjacent, unrestored reefs.

El Nino/Southern Oscillation (ENSO) May Control Oyster Meta-population Connectivity for the Beezley Reef Sustainable Oyster Restoration Project

William Rodney* (Texas Parks & Wildlife Department - Coastal Fisheries)

The Beezley Reef Sustainable Oyster Restoration Project is a partnership between The Nature Conservancy (TNC), Texas Parks and Wildlife Department (TPWD) and The Galveston Bay Foundation (GBF). Project funding comes from the National Fish and Wildlife Federation's (NFWF) Gulf Environmental Benefit Fund (GEBF). The project restored 40 acres of oyster reef on 3 reefs in Upper Galveston Bay in the mouth of the Trinity Bay sub-estuary. Two reefs totally 25 acres were designed to be open for commercial harvest while another 15-acre reef was designed to function as a sanctuary reef. The design concept was that dense populations of large spawner oysters on the sanctuary reef would produce high-density larvae clouds that would wash over the adjacent harvestable reefs via prevailing tidal currents. To investigate potential connectivity between the restored reefs and adjacent reefs, ceramic spat settlement tiles were deployed at a series of stations both parallel and perpendicular to the predominant tidal current vectors. Tiles were allowed to soak for several weeks before being retrieved and examined for spat. Preliminary results indicate that when conditions were favorable for oyster spawning and recruitment, spat density of tiles was influenced by proximity to restored oyster reefs. Favorable water quality conditions were strongly influenced by the El Niño/Southern Oscillation cycle. El Niño conditions were unfavorable for oyster reproduction and recruitment and La Niña conditions were favorable.

Assessing Monitoring of Living Shoreline Projects

Narita Ramirez* (Harte Research Institute, Texas A&M University-Corpus Christi)

Natural and nature-based infrastructure, known as "living shorelines," can improve the ability of coastal ecosystems to recover and provide protection. Living shorelines offer many benefits, such as reducing shoreline erosion, deflecting wave energy, improving water quality, stabilizing shoreline habitats for terrestrial and aquatic species, and maintaining the natural land-water connection. This study will focus on completed living shoreline projects along the Texas Gulf Coast to determine how the contracts for those projects address post-construction monitoring. Post-construction monitoring and maintenance are not well-documented, as there is limited data on the long-term effectiveness of living shoreline projects. Methodologies proposed for this study include a structured survey, site visits, and document analysis of existing monitoring proposals and permit applications, and project documentation. The survey will assess the adequacy of monitoring based on several factors. Including the type of shoreline, the installation year, the designated monitoring time-frame, and the available budget. Additionally, the survey will seek to identify any other issues or flaws related to the monitoring of these projects within the scope of their designated contracts. Analysis will identify common patterns, themes, and insights amongst coastal monitoring from completed surveys. The findings will help inform best practices for post-construction monitoring terms, ensuring that completed living shoreline projects continue to function effectively as sea levels rise.

Ecological Restoration Project

Harrison Taylor* (Texas A&M University Galveston Campus- Marine Biology/Marine Fisheries)

Galveston's coastal ecosystem, in particular on Pelican Island, is threatened by invasive flora species, disrupting the natural ecology. The Ecological Restoration Project (ERP) aims to implement Biota Nodes to support native flora and fauna. (Tindall, 2019) A collaborative student initiative aims to begin this restoration by November through a three-phase plan.

Phase one of the ERP involves assessing the target marshlands around the A&M Galveston campus, documenting invasive species, and collaborating with local entities to source native plants. Team members will independently gather supplies and determine suitable planting locations before transitioning to phase two. Phase two involves removing invasive flora, donating remains for compost, and tilling the soil to prepare for replanting native species. Native flora will be planted based on phase one data, followed by the installation of plant guards as protection. The result is a completed Biota Node ready for growth.

Phase three involves maintenance of the Biota Nodes, including monitoring growth, logging fauna, and protecting plants. After six months, the plant guards are removed, and the node becomes self-sustaining. This phase ends with the team beginning phase one again to establish new Biota Nodes in other areas.
The ERP Biota Nodes will expand over time, with students at TAMUG establishing new nodes that will connect to restore the ecosystem damaged by invasive species. (Tindall, 2019) While local, the project aims to have a lasting environmental impact, contributing to the protection of Galveston's ecosystem and biodiversity.

Collaborative Restoration of a Network of Oyster Broodstock Spawning Reserves Across the Mission-Aransas Estuary

Zachary Olsen* (Texas Parks and Wildlife Department), Lindsey Savage (Texas Parks and Wildlife Department), Evan Pettis (Texas Parks and Wildlife Department), Kit Wheat-Walsh (Texas Parks and Wildlife Department), Kathy Sweezey (The Nature Conservancy), Lauren Hutch Williams (The Nature Conservancy), Joan Garland (Mission-Aransas National Estuarine Research Reserve at The University of Texas Marine Science Institute), Katie Swanson (Mission-Aransas National Estuarine Research Reserve at The University of Texas Marine Science Institute), Jennifer Pollack (Harte Research Institute, Texas A&M University-Corpus Christi), Natasha Breaux (Harte Research Institute, Texas A&M University-Corpus Christi), Rosario Martinez (Coastal Bend Bays & Estuaries Program), Kiersten Stanzel (Coastal Bend Bays & Estuaries Program)

Oyster habitats serve important ecological and economic roles by supporting water quality, erosion protection, habitat provision, and oyster fisheries. Oyster reefs are threatened by several stressors including water quality degradation, coastal development, storm impacts, and overharvest. In Texas estuaries, oyster restoration is typically conducted by replacing cultch materials and allowing for natural oyster settlement and growth. Another effective approach, used successfully elsewhere, is establishing no-harvest sanctuaries that protect oyster populations and promote larval dispersal to surrounding areas. This project aims to restore a network of oyster broodstock reserves throughout the Mission-Aransas Estuary. With input from local anglers and oyster fishers, along with site-specific data collection, we will identify five restoration sites in Copano, Aransas and Mesquite Bays and enhance an existing restoration site in St. Charles Bay. These reserves will range from 3-10 acres each, with a goal of restoring 20 to 50 acres of oyster habitat throughout the estuary. Before and during the restoration, the project team will conduct extensive outreach to involve the local community in various aspects of the restoration process including site selection, participation in restoration construction (e.g., shell recycling and project bidding), and restoration monitoring. Combining oyster restoration and community involvement will result in a better understanding of the restoration process and a sense of ownership in project outcomes. This project will serve as a model for broodstock-focused oyster restoration, generating valuable insights to refine and improve restoration strategies in the future.

Interpretation of the Sedimentology of an Oligocene Fluvial Core - A Texas River in Stone - 23 Million Years in the Making, Kenedy Co., Texas

Andrew Waltrip*, Matthew Waltrip*, and Randy Bissell (all Texas A&M University - Corpus Christi)

This project focuses on interpreting a 20-foot core from the Oligocene-aged "5-I-W" sandstone reservoir, part of the Upper Frio Formation in the Rita Field, Texas. The well-preserved whole core, obtained in 1988 from 5000 ft., provides insight into a high-energy depositional environment within a braided stream system on the ancient Texas coast. The reservoir sand is primarily composed of medium-grained quartz and rock fragments, with minor amounts of mica and feldspar, all extensively cemented by calcite.

The late Oligocene sands of the Rita Field, located in central Kenedy County, belong to the Rio Grande-Ancestral Nueces Delta Complex. This system was influenced by volcanic activity and sediment influx from the upper Rio Grande Valley, with periodic pulses of volcanic-derived sediment. Additionally, eustatic sea-level changes played a significant role in shaping the depositional environment. Modern braided stream systems along the Texas Gulf Coast—characterized by high sediment loads, dynamic channels, and steep gradients with fast-flowing waters—serve as valuable analogs for interpreting this ancient depositional setting.

The core analysis provides critical insights into the reservoir's architecture, essential for predicting well performance. These findings inform water production, injection, and CO_2 sequestration strategies within this stratigraphic unit (in the planning stages).

By relating core facies to present-day sedimentary environments along the Texas Gulf Coast, we can draw parallels to similar high-energy fluvial-deltaic systems and braided stream environments. These systems, much like those of the Oligocene period, continue to be influenced by episodic sediment influx and eustatic sea-level fluctuations, shaping the region's coastal and marginal marine facies.

Assessing the Impacts of Beach Nourishment on Intertidal Infaunal Communities

Lily Tubbs*, Danielle Downey, Terry Palmer, Kim Withers, Jennifer Beseres Pollack

Beaches are dynamic ecosystems that provide critical habitat for benthic invertebrates, which play key roles in nutrient cycling, shorebird foraging, and broader food web interactions. However, shoreline erosion threatens these habitats, prompting restoration efforts such as beach nourishment. In November 2024, South Padre Island beach, Texas, underwent nourishment to address sediment loss and maintain ecosystem functions. This study evaluates recovery dynamics of the intertidal macrobenthic community post-nourishment using a Before-After-Control-Impact (BACI) design. Sampling began in February 2024 and continues bi-monthly, measuring metrics such as density, biomass, and diversity. Preliminary pre-nourishment results reveal temporal shifts in community composition, with dominant taxa including Donax spp., Emerita spp., and Scolelepis sp. showing varying responses. Changes in diversity and abundance indicate that seasonality and sediment characteristics influence recovery rates. The findings will inform future nourishment projects by identifying key factors for minimizing ecological disruption and enhancing resilience in benthic communities.

Comparison of Water Column and Sediment Porewater Conductivity in the Lower Laguna Madre, Texas

Hudson DeYoe (University of Texas Rio Grande Valley)

Coastal sediment porewater salinity has received little attention in Texas despite it having the potential to affect multiple aspects of coastal biota and ecology. No protocol or instrumentation has been developed for continuous measurement sediment porewater conductivity. We evaluated instrumentation and created a housing for porewater conductivity monitoring then developed a field protocol and are in the process of collecting field data. Field data from 5 LLM sites for January-March 2025 indicate that sediment porewater conductivity is typically lower than water column conductivity. Porewater conductivity does not always parallel water column conductivity.

Stiffness of marine sediments measured on the scale of burrowers

Jennifer Duncan* (Marine Science Institute, College of Natural Sciences, University of Texas at Austin), Semyra Reus (Dauphin Island Sea Lab, Stokes School of Marine and Environmental Science, University of South Alabama), and Kelly Dorgan (Marine Science Institute, College of Natural Sciences, University of Texas at Austin)

Marine infauna extend burrows through sediment by fracture, a process that is strongly affected by the geotechnical properties of sediment, specifically fracture toughness and stiffness. Measuring stiffness that infauna experience can be challenging since they are small and burrow below the surface. A new device was developed to measure stiffness on scales experienced by infauna. A custom-built stiffness probe was created using a force sensor and probe with a 6mm-diameter, spherical tip. This probe aligns with a sediment core with pre-drilled holes for measurements. The probe is slowly inserted into and retracted from the sediment at a rate comparable to pharynx eversion by burrowing worms. From the measured force-displacement curves, stiffness and hysteresis can be calculated. Stiffness is measured over the depth of the core to compare depths where infauna are found versus where they are not present. Fracture toughness will be measured at the same depth and orientations as stiffness, so they be directly compared to one another to understand where infauna are distributed in the sediment. Finally, high frequency acoustical attenuation and sound speed measurements can be taken at the same locations in the core to examine how infaunal activity affect acoustical measurements. These measurements can be compared to fracture toughness and stiffness. Examining all these variables and relating them to infauna community, abundance, and activity can give better insight into the types of environments that infauna prefer to inhabit. With this instrument, we can determine how much stiffness varies on small scales within sediment that are comparable to infaunal size.

Using pressure sensors to detect marine worm burrowing

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The physical and biogeochemical properties of sediment are modified by the burrowing of animals that inhabit marine sediments, such as annelid worms. Determining the impact and scale of burrowing is important in understanding the key ecosystem functions these animals provide such as the modification of particle composition, assisting in drainage, and in mixing nutrients within sediments . The extent to which annelids mix sediment is not fully understood, however, as worms inhabit an opaque environment in which they cannot be directly observed. A fundamental question in linking animal activity to sediment mixing is how much and in what patterns animals move through sediments. In this research, movements of annelid worms will be detected through pressure signals. Pressure sensors will connect to 3-D-printed custom-built devices made of flexible silicone resin that will form one wall of an aquarium filled with natural muddy sediments. These pressure sensors will be used to understand the scale of their mixing capabilities and to determine the X and Y positions of the polychaete worms burrowing in 2-D antfarm tanks. This study aims to demonstrate the utility of 3-D-printed pressure sensors as a method of detecting the movement of infauna and to better understand how worms impact sediment properties.

Human impact on lagoons shapes abundance and composition of shorebird prey

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Shorebird populations across North America have plummeted over recent decades. Given their energetically costly migrations, shorebirds are especially sensitive to habitat quality and resource availability in their overwintering grounds. The Texas Gulf Coast provides such wintering grounds and stopover sites for 98 percent of long-distance migratory bird species of North America, including endangered piping plovers and red knots. Migratory birds are also a major facet of the ecotourism economy on the Texas Gulf Coast. However, land use change due to development, tourism, and recreation have altered the overwintering habitats of shorebirds in recent years. In this study, we investigate how areas with low and high human impact were associated with the abundance and estimated biomass of potential shorebird prey (biofilms, meiofauna, and mobile invertebrates). We also use isotope analyses to build food webs for common shorebird prey items, many of whose natural history is poorly characterized. Two sites, Port Aransas Nature Preserve and Packery Flats, were chosen to represent lagoon habitats that shorebirds frequent in the winter. We sampled shorebird prey in high and low human impacted areas within these lagoons across three transects, each with three replicates, along the low- and the high tide lines. Preliminary results indicate the composition of the mobile invertebrate community varies between sites and with human impact, suggesting that site management could influence shorebird prey quality. Future work includes macronutrient analyses to understand how human impacts on overwintering habitats may influence nutritional quality of shorebird prey.

High-frequency shadowgraph imaging as an innovative approach to researching fine-scale dynamics of the ingress of blue crab megalopae into a turbid estuarine system

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Comprehending the physical and biological processes underlying the dispersive larval stage of marine organisms is one of the central challenges in marine ecology. Ingress of the larvae of estuarine-dependent species, such as the blue crab (Callinectes sapidus), is typically studied by in situ sampling with plankton nets and settlement collectors. Continuously recording optical systems provides a much higher temporal resolution and continuous observation of marine communities while minimizing behavioral changes and gear selectivity biases. In addition, high-frequency time series can be generated to examine species-specific abundance relative to tidal stage, environmental gradients, circulation, and interspecific ecological interactions. Shadowgraph imaging systems have proven particularly suitable for imaging the relatively large water volumes necessary to detect planktonic organisms in relatively low densities, such as blue crab megalopae. The In Situ Imager (ISIIS-DPI, manufactured by Bellamare) is a high-resolution system with an LED-based collimated light source to minimize scattering and a shadowgraph line-scan camera. It allows for continuous monitoring of zooplankton over a relatively large field of view and broad depth of field. Its telecentric lens system yields in-focus particles throughout the depth of field, allowing for precise two-dimensional observation and measurements of individuals. Other video systems that use standard videography have been unsuccessful in turbid estuaries due to the high concentration of organisms and particulates in the water column that causes high light scattering. We will describe the ISIIS-DPI system deployed at the UTMSI Pier Laboratory and present the progress toward detecting and researching the estuarine ingress of blue crab megalopae.

Exploring the Relationship between Local Fish Consumption, Diet Quality, Fishing Practices, and Food Security

Eun Myung Kim* (UT Austin), Natalie Poulos, PhD (UT Austin), and Simon Brandl, PhD (UT Marine Science Institute)

In 2022, the food insecurity rate in Texas' Coastal Bend (CB) was 19.4%, higher than the food insecurity rate in Texas (16.4%) and the U.S. (12.8%). CB is a community where fish consumption is common due to its proximity to the ocean. While food insecurity is associated with poor diet quality, fish consumption could be associated with improved diet quality. Therefore, the study aimed to 1) assess correlations between food security (FS), fishing practice (FP), local fish consumption (LFC), and diet quality (DQ) and 2) identify the relationships between LFC and DQ.

An online survey and Dietary History Questionnaire III (DHQIII) were distributed in the CB region. The survey measured FS, FP, and LFC. The DHQIII was used to calculate Healthy Eating Index (HEI) scores to measure DQ. Pairwise correlations were used to assess correlations, and linear regression was used to examine the association between DQ and LFC. Significant correlations were found between FS and HEI scores ($r=-0.28, p<0.01$), FS and FP ($r=-0.20, p<0.05$), and LFC and FP ($r=0.59, p<0.01$). Significant association was found between very low food security and DQ ($r=-7.00, p<0.05$).

Although no direct relationship between LFC and DQ was identified, results suggest there may be an underlying relationship between FS and FP. Furthermore, due to the CB's high food insecurity prevalence, local fish should be considered a high-quality source of food that is accessible and affordable to this community. Research should continue to explore the relationship between FS and LFC given its potential to improve the DQ of food insecure communities.

Concentration of heavy metals in common bottlenose dolphins (Tursiops truncatus) from Galveston Bay

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Common bottlenose dolphins (Tursiops truncatus) are sentinel species in assessing pollution in the aquatic ecosystem. Contamination via prey sources and water absorb and accumulate in the skin tissues of dolphins. In this project, we explore the concentration of heavy metals in the skin of 101 post-mortem common bottlenose dolphins off Galveston, Texas. Galveston is an industrialized area susceptible to metal run-off due to high industrial activity. Heavy metals are introduced into the water systems via agricultural runoff, industrial effluent, and the burning of fossil fuels. High concentrations of inorganic chemicals in water systems cause a concern for the health of marine organisms and humans in contact with polluted sources. We hypothesize that quantifiable concentrations of heavy metals will be present in the skin tissues of dolphins that exceed the U.S. Environmental Protection Agency's (EPA) recommended concentrations. Inductively Couples Plasma-Optical Emissions Spectroscopy (ICP-OES) will be used to determine the concentration of 11 hazardous heavy metals (As, Ba, Be, Cd, Cr, Cu, Hg, Pb, Sb, Se, and Tl) following EPA Method 200.7. Biopsy skin samples ranging from 0.5 to 1.5 grams were dehydrated and chemically digested before ICP-OES analysis. Results will be compared to the EPA's maximum contamination level (MCL) of drinking water, as outlined in the National Primary Drinking Water Regulation (NPDWR). Data will provide perception of the health of marine organisms and water quality in Galveston Bay.

Evidence for a new indicator: the class 1 integron-integrase gene bridges the gap between fecal pollution and antibiotic resistance in Baffin Bay

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Baffin Bay is a shallow, hypersaline bay in South Texas that provides critical habitat for wildlife and ideal locations for fishing, hiking, hunting, birding, and boating. This mixed-use watershed is vulnerable to fecal pollution; three of its tributaries (San Fernando, Petronila, and Los Olmos Creeks) have been classified as impaired due to high concentrations of fecal indicator bacteria (FIB). An ongoing microbial source tracking project within the watershed has identified humans, cows, pigs, and gulls as significant contributors of nonpoint fecal pollution. This project builds on the ongoing microbial source tracking project by quantifying the class 1 integron-integrase gene, intI1, a mobile genetic element associated with antimicrobial resistance, as an additional marker for anthropogenic pollution. The intI1 gene was quantified in water samples (N = 142) from Baffin Bay and Petronila, San Fernando, and Los Olmos Creeks using a droplet digital PCR assay. The gene (gene copies/100mL) was detected at all sites and in 85% of samples (mean = 316,869.8, median = 3,250, min = < 187.5, max = 6,732,000), showings ignificant spatial variation in abundance. San Fernando Creek had the highest quantities of intI1, followed by Los Olmos, Petronila, and Baffin Bay sites respectively. Within the bay, the site closest to San Fernando Creek had the highest concentration of intI1. The intI1 gene concentration was also significantly positively correlated ($p<0.05$) with human (tau = 0.309), cow (tau = 0.460), and pig (tau= 0.235) fecal markers, as well as enterococci (tau= 0.160), indicating that intI1 has broad utility for estimating anthropogenic pollution.

Microplastic Distribution and Composition in Bays and Estuaries of the Texas Coastal Bend

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Microplastics (MP), defined as plastic particles with a diameter < 5 mm, pose a growing environmental threat due to their widespread distribution, from terrestrial to oceanic environments. It is estimated that 80% of marine pollution comes from plastic waste. In the Gulf of Mexico (GoM), particularly along the Texas coast, plastic waste concentrations are 30 times higher than in other regions worldwide, due to the abundant petrochemical manufacturing facilities and dense populations. To fully understand the threat MP pose to the GoM, we collected water samples from four different bays (Corpus Christi Bay, Mission Aransas Bay, Baffin Bay, and Upper Laguna Madre) and quantified the plastic concentrations using pyrolysis gas chromatography mass spectroscopy. Preliminary results show that Corpus Christi Bay contains up to 1.6 μg/L of MP, where polyethylene (PE), polypropylene (PP), and polyethylene terephthalate (PET) were the dominant polymer types. The same analysis will be performed on the remaining bays to assess the regional variation in MP concentrations and identify the dominant plastic types. We expect varying MP concentrations across sites because different factors such as population density, ocean currents, and tidal patterns, influence MP contamination differently. However, similar dominant plastic types are expected across sites because PE, PP, and PET are the most commonly used plastics for manufacturing.

Evaluating Wild Pig Fecal Pollution in Coastal Recreational and Oyster-Harvesting Waters

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Copano Bay and the Aransas River comprise an estuary that provides south Texas with recreational space and enterprising oyster mariculture. However, surrounding counties contain invasive wild pigs that are prevalent across Texas. Fecal pollution originating from wild pigs can harbor pathogens that contribute to the overall health risk for recreators and oyster mariculture. Although detrimental ecological impacts of wild pigs are well documented in terrestrial environments and some marine organisms such as sea turtles and dolphins, marine waters used for recreation and mariculture remain unassessed. An ongoing 12-month water quality assessment before and during wild pig removal (January 2025-December 2025) examines nutrients, environmental conditions, and fecal indicator bacteria concentrations. Microbial source tracking (MST) will use the Pig2Bac host-associated molecular marker to quantify the presence and abundance of fecal pollution from wild pigs in water and oyster tissues. We hypothesize that the removal of feral hogs will lead to an overall increase in water quality and a reduction in oyster fecal bacteria loading. Preliminary results indicate that E. coli in the river (median=41MPN) and bay (median=20MPN) as well as enterococci in the river (median=20MPN) and bay(median=20MPN) fall well below the USEPA's statistical threshold value, meeting FIB criteria.

Optimizing Surface Water Microplastic Collection: A Streamlined Protocol Applied to Corpus Christi Bay

Jordan Cisco* (UT MSI), Jessica Arisbeth Urias-Quiroz (UT MSI), Xiangtao Jiang (UT MSI), Jianhong Xue (UT MSI), Zhanfei Liu (UT MSI)

Understanding the distribution of microplastics in marine environments requires not only accurate analytical tools but also robust and reproducible sampling and analytical techniques. We first refined a scalable methodology for surface water microplastic collection using a modified plankton tow approach, which features a 150 µm mesh plankton net with an innovative jellyfish excluder to ensure consistent sampling across varying biological conditions. Our protocol enables the processing of approximately 30,000 liters of seawater per tow, maximizing sample representativeness in spatially heterogeneous environments. We then digest the collected materials using nitric acid and sodium persulfate and followed by cryomilling for homogenization. The sample is finally analyzed by pyrolysis coupled with gas chromatography mass spectrometry (Py-GC/MS). This holistic methodological framework was applied successfully in Corpus Christi Bay, where microplastic concentrations ranged up to 1.6 µg/L and were dominated by polyethylene (PE), polypropylene (PP), and polyethylene terephthalate (PET). This case study demonstrates the efficacy of our protocol in high-biomass estuarine systems and supports its use for standardized, high-throughput monitoring of microplastic pollution in surface waters.

CAMPUS MAP

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 2025

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 2025.

- 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
- Contracting with local, environmentally responsible vendors whenever possible.

UPCOMING EVENTS & MEETINGS

https://tpwd.texas.gov/events/great-texas-birding-classic
The Great Texas Birding Classic
April 15 – May 15, 2025

https://gulfofamericaalliance.org/wp-content/uploads/2024/07/2025-GOMA-All-Hands-Schedule-at-a-Glance.pdf
2025 All Hands Meeting GOMA
May 5 - 8, 2025
Biloxi, MS, USA

ASITA

The University of Texas at Austin
Marine Science Institute

Port Aransas, Texas
2025

Advances in Stable Isotope Techniques and Applications (ASITA) Conference
May 18th to 21st, 2025
Port Aransas, TX

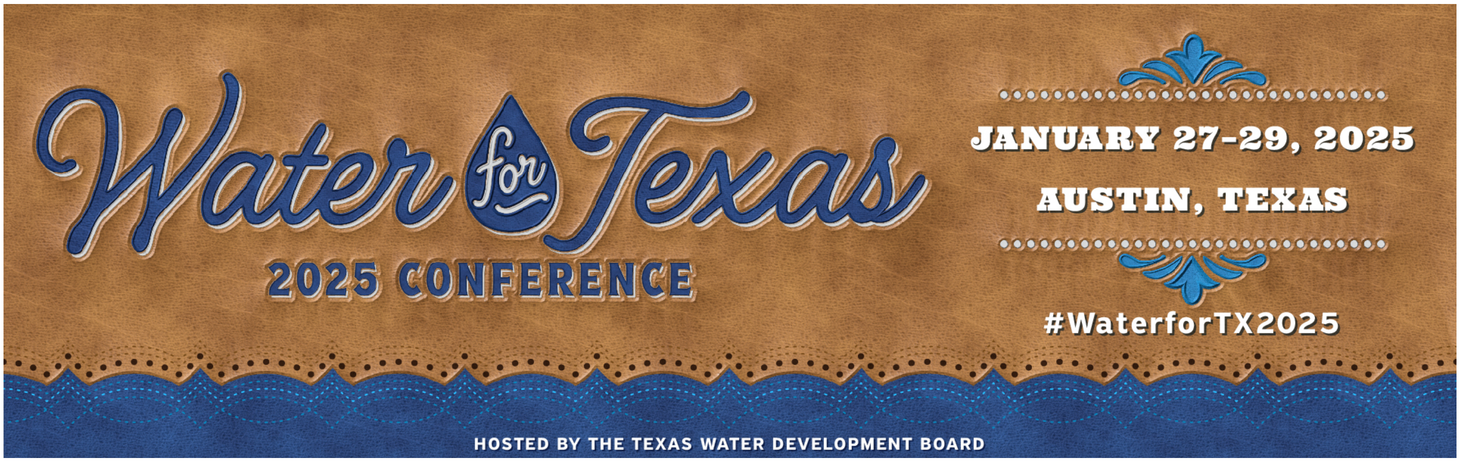
https://asita2025utmsi.com/

https://utmsi.utexas.edu/learning-opportunities/summer-science/port-aransas-texas/
UT Summer Science
May 27-June 27
Port Aransas, TX

http://swsannualmeeting.com/
The Society of Wetland Scientists 2025
July 15-18, 2025
Providence, RI

https://afsannualmeeting.fisheries.org/
The American Fisheries Society's Annual Meeting
August 10-14, 2025
San Antonio, TX

https://afsannualmeeting.fisheries.org/
Coastal & Estuarine Research Federation 2025 Conference
November 09 - 13, 2025
Richmond, VA



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