THE
MISSION ★ ARANSAS OBSERVER
Newsletter of the Mission ★ Aransas National Estuarine Research Reserve
AUTUMN 2012

Bursting at the Seams

by Sally Morehead Palmer, Reserve Manager

The completion of our new Headquarters building couldn't have come at a better time! We've been rapidly filling every available office and laboratory space. Several new projects have been funded and we've brought on many new great researchers to help learn more about freshwater inflows, vulnerabilities to climate change, and the effects of the Deepwater Horizon Spill. These new projects are in addition to our continuing research on: water quality of our bay systems, harmful algal blooms, and annual changes in seagrass beds and marshes. If you'd like to delve into the details, go to our new website (www.missionaransas.org) for more information about these research projects.

While our researchers are busy sampling and learning more about the natural processes of local bays and estuaries, our educators have been helping school groups and communities learn about the importance of these systems and how to help solve the current "hot" issues. Our educators had a very busy spring and summer with end-of-the-year class field trips, family programs, and teacher workshops. We're also getting ready to hire an exhibit design firm to develop new displays at the University of Texas Marine Science Institute (UTMSI) Visitor Center. Stay tuned for hands-on interpretive displays in the new "Explorium" - a place where people will learn that estuaries are important transition zones that are critical to the survival of marine species. The Coastal Training Program and our Sea Grant partner have also made great strides in working with our local communities and helping them become more resilient to coastal storms. Flip the pages to meet some of our new staff and learn more about the cool projects going on at the Reserve.

You Can't Tell the Players Without a Scorecard

by Dr. Ed Buskey, Research Coordinator

The research team at the Reserve is growing by leaps and bounds! We've moved into the Estuarine Research Center with lots of new space, and we are already bursting at the seams! In addition to the all-star lineup of current scientists described below, this summer we had four undergraduate students participate in the Research Experiences for Undergraduates (REU) program: Shawn Bona (University of Wisconsin), Emily Bloom (University of California Davis), Melanie Peel (Whittier College), Zoe Wambaugh (Humboldt State University), and a visiting graduate student, Deepak Adhikari (University of Minnesota). Here's our current lineup:

Aubrey Lashaway received an MS from Penn State University in Wildlife and Fisheries Science. She will be completing a second MS in Marine Science at The University of Texas Marine Science Institute (UTMSI). While

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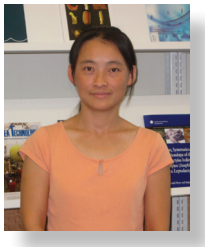
at UTMSI she has been the "Scientist in Residence" at Port Aransas ISD, the REU Student Coordinator, and currently is the Graduate Research Assistant for the Reserve. Her project focuses on how plankton respond to changing environmental parameters in the NERR.

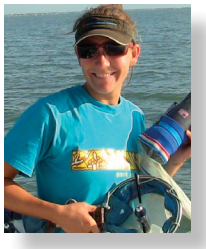
Catherine Buchalski is a Master's student at the University of New Hampshire in the Training for the Integration of Decision-Making and Ecosystem Science program. She will be an intern for six months focusing on all aspects of the collaborative research project, called "Balancing Freshwater Needs in a Changing Environment." Her role encompasses assisting with assessments of estuarine plants and animals, engaging with area stakeholders at workshops, and creating outreach pieces to communicate the freshwater inflows project to a wider public audience.

Cammie Hyatt received a BS from Corpus Christi State University. She has worked as a research technician for Dr. Ed Buskey for 20 years and helped implement the Reserve System Wide Monitoring Program (SWMP) in 2006. She is the Data Manager of the Reserve and also works on the zooplankton monitoring project and other aspects of SWMP, as needed.



Jianhong Xue received her Ph.D. in Marine and Atmospheric Sciences from Stony Brook University. While she was a post-doc at the Virginia Institute of Marine Science, she refined a biogeochemical model and evaluated the carbon budget on the U.S. East Continental Shelf. Jianhong joined UTMSI as a post-doc, looking at decadal-scale dissolved oxygen changes in the Gulf of Mexico. Her role at the Reserve is to look for climate change signals from the Reserve and partner datasets.

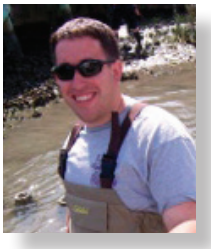
Kimberly Bittler is a master's student at UTMSI on the "Balancing Freshwater Needs in a Changing Environment" project. The purpose of the collaborative is to gather data that can be used to guide standards that may be critical for maintaining estuaries' productivity during droughts. Her research is focused on how freshwater inflows affect the focal species, blue crabs, especially during recruitment into estuaries.



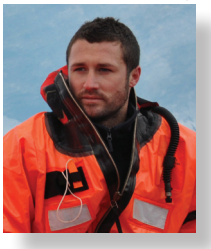
Rae Mooney received an MS from UTMSI. Since graduating she has worked as a research technician for the Reserve. Rae oversees the SWMP, which is the long-term monitoring program that looks at water quality parameters within the Reserve. She is also a collaborator in the Gulf of Mexico Alliance (GOMA) project, which strives to develop nutrient criteria for the Western Gulf of Mexico estuaries.

Kelly Darnell received an MS in Marine Science from the University of South Alabama. She then worked at the Duke University Marine Lab for two years before entering the Ph.D. program at UTMSI. Kelly's research is funded by a Reserve Graduate Research Fellowship and focuses on seagrass reproductive ecology along the Texas coast, specifically relating to factors that limit successful reproduction and seed recruitment.

Lindsay Scheef has her Ph.D. in Biological Oceanography from Florida State University. She studied zooplankton community dynamics as a post-doc at the National Center for Ecological Analysis and Synthesis. Currently Lindsay is a post-doc participating in the collaborative freshwater inflows project. Her research is focused on how changes in freshwater inputs to the Mission-Aransas Estuary could affect the transport of young blue crabs. To determine this she plans to chart the patterns of water flow within the estuary by deploying current meters that record the speed and direction of water movement.



Zack Darnell received a Ph.D. from Duke University and is now a post-doc and lecturer at UTMSI. His research focuses on physiological and behavioral responses to environmental stress and effects on life histories, distributions, and ecological relationships. Zack also uses physiological ecology and natural history to address fisheries management and conservation questions.



Rodrigo Almeda received his Ph.D. in Marine Sciences from the University of Barcelona (Spain). His doctoral research focused on the ecology and physiology of zooplankton, with particular emphasis on marine

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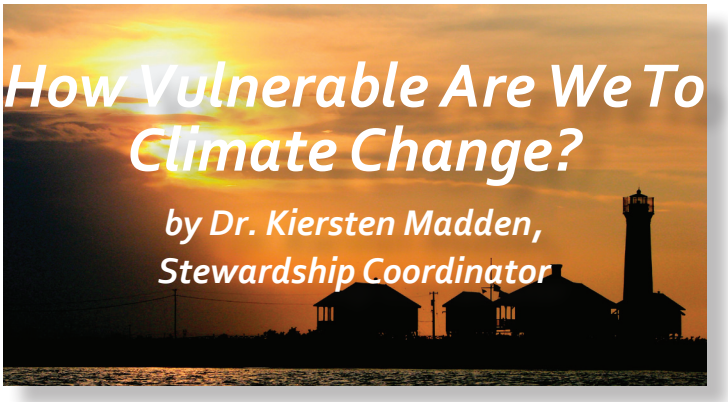


How Vulnerable Are We To Climate Change?

by Dr. Kiersten Madden, Stewardship Coordinator

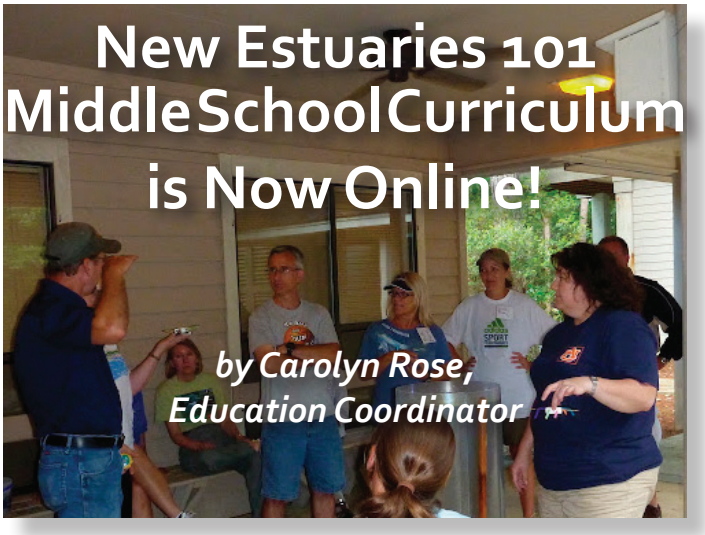
Climate change is already affecting our nation's estuaries. Changes in sea level, shifts in salinity and pH, changes in air and water temperature, and alterations in precipitation could result in the potential loss of habitats and associated species, as well as adverse impacts to local economies, development, and infrastructure. In order to improve the resiliency of these important ecosystems and the communities that rely on them, we must strengthen our understanding of climate variability and develop strategies that help us adapt to the major climate change threats. To develop sound adaptation strategies, decision-makers must understand which resources are most likely to be affected by climate change and what options are available for improving their resilience. Vulnerability assessments are a good tool for developing this understanding, and they help provide the necessary information for creating effective adaptation strategies.

The Mission-Aransas National Estuarine Research Reserve recently received funding through the Coastal and Oceans Climate Adaptation Program of the National Oceanic and Atmospheric Administration's Climate Program Office to conduct a vulnerability assessment in the Reserve and its surrounding communities. With this funding, Reserve staff will collaborate with Texas Sea Grant to better understand the potential impacts of the major climate change threats within the Mission-Aransas Estuary and its watershed. The Reserve is an ideal location to conduct this type of vulnerability analysis because it is situated in an area that is already exposed to episodic changes in climate and is forecasted to see increases in the frequency and duration of these episodic changes. The Reserve is also fortunate to have access to a variety of long-term datasets that will allow researchers to adequately assess vulnerability. The Mission-Aransas Reserve will partner with federal and state agencies, local governments, universities, and non-profits to gather data and conduct a thorough vulnerability assessment.

Vulnerability assessments will help resource managers make decisions about important species, such as the endangered Whooping Crane (photo courtesy of Dick Fischer).

Communities surrounding the Reserve are also at risk from climate change. They will be forced to deal with hazards, such as more frequent droughts, hurricane force winds, coastal flooding, and sea level rise.

The project has three primary goals: (1) synthesize and analyze long-term datasets from the Mission-Aransas Reserve and partner organizations to understand the sensitivity of Reserve habitats and species to climate variables, (2) assess the vulnerability of a subset of Reserve habitats and species to future climate change using relevant data, tools, and expert input, and (3) characterize the human communities of the Mission-Aransas Reserve watershed using the most recent census data and use the results to assess social vulnerability of local communities to potential climate change hazards. The results from this study will provide resource managers and local officials with the information they need to protect estuarine ecosystems, as well as humans. They will be able to choose appropriate management measures that promote estuarine resilience, incorporate climate change in management plans, and prioritize agency investments.



New Estuaries 101 Middle School Curriculum is Now Online!

by Carolyn Rose, Education Coordinator

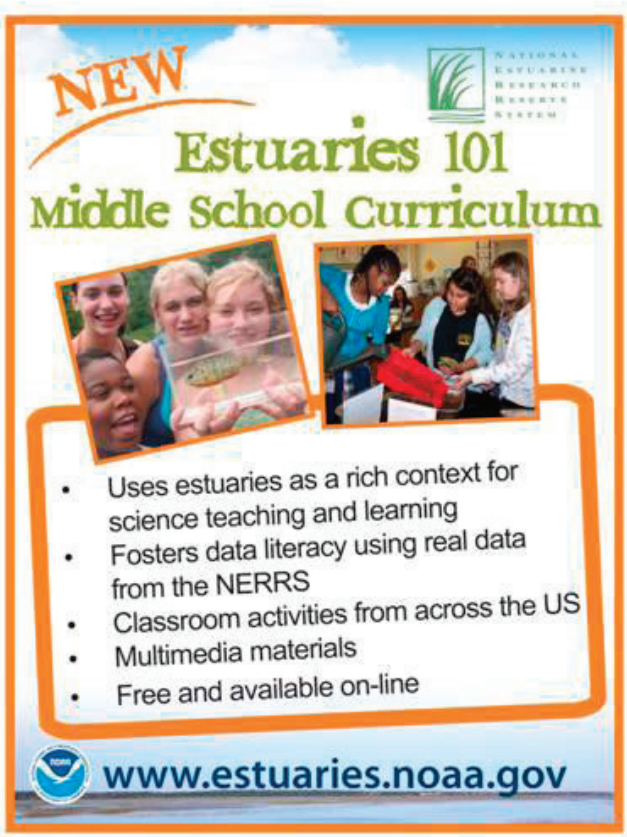
The Estuaries 101 Middle School Curriculum has launched! This online multi-media science curriculum was designed by the education coordinators of the National Estuarine Research Reserve System, to help fifth through eighth grade teachers access real scientific data and teach their students how to apply these data in scientific problem solving. Estuaries provide the focus for the 15 Estuaries 101 activities, which offer hands-on learning and field work opportunities in addition to real scientific data explorations. The goal of the curriculum is to help teachers and students increase their knowledge of coastal and estuarine science and achieve a greater appreciation of how estuaries affect their daily lives.

Two of the new Estuaries 101 activities focus on research conducted within the Mission-Aransas Reserve. One of the new activities, "The Great Oyster Mystery," is based on oyster research conducted in Copano and Aransas bays by Texas A&M University – Corpus Christi researchers. In this activity, students access NERRS System Wide Monitoring Program (SWMP) data to explore how changes in rainfall and salinity influence local oyster populations and their associated predators and parasites. Another of the Estuaries 101 activities, "Migrating Mangroves and Marshes," uses data collected within the Reserve to examine the effect of temperature on the expansion and contraction of black mangrove habitat. In this activity, students are asked to consider how changes in mangrove and marsh habitats might affect the animals that live in them.

Teachers testing a Bountiful Birds exercise from the Estuaries 101 Middle School Curriculum, at the Weeks Bay NERR

Other Estuaries 101 activities allow teachers and students to explore and compare estuaries all across the nation. NERRS education coordinators drew on the dynamic and diverse nature of estuarine ecosystems to create interdisciplinary activities that incorporate biology, chemistry, geography, history, geology, and marine science concepts. The activities are aligned with the national education standards in science and math for grades 5 through 8. To access the online Estuaries 101 Middle School Curriculum, please visit *http://estuaries.noaa.gov/Teachers/MiddleSchool.aspx*.

Funding for the development of the Estuaries 101 Middle School Curriculum was provided by NOAA and the Baldwin County, Alabama Board of Education.



Managing Resiliency through Disaster Response Planning

by Kristin Hicks, Coastal Training Program Coordinator

Environmentally sensitive coastal areas like those at the Mission-Aransas Reserve are exposed to many of the same hazards that threaten urban, suburban, and rural areas. The Reserve and its partners are responsible for the protection of commercial and recreational fishing habitat, emergent vegetation, and critical habitat that supports the wintering population of the highly endangered Whooping Crane. As a non-regulatory entity, the Reserve does not implement law enforcement, fire suppression, emergency medical, or other disaster response actions that are typical of cities, counties, and states. Therefore, the Reserve is largely dependent upon on the established disaster response plans of the environmental, public health, and safety agencies that are responsible for responding to a disaster within or nearby the Reserve. Developing a disaster response plan for the Reserve could reduce the impact of hazards to the reserve's habitats by enabling the Mission-Aransas Reserve to become better prepared for disasters and define appropriate actions for assisting with disaster response.

The development of a plan specifically tailored to the Reserve's disaster response needs required input from stakeholders in the emergency management and response community. A stakeholder consultation workshop was held on June 18, 2012, and was attended by representatives from federal agencies, state agencies, and local governments. The purpose of this workshop was to gather input on 1) existing disaster response plans, 2) agency and government roles and responsibilities, and 3) the role that the Reserve would play in the event of a disaster. The workshop also provided stakeholders with the opportunity to become familiar with the capabilities of the Reserve to assist during a disaster, including access to physical assets such as boats, personnel, and volunteers, sampling and testing capabilities, as well as detailed knowledge of the Reserve and its natural resources. The information gathered from this workshop will be used to develop a disaster response plan that is specific to the Mission-Aransas Reserve.

More Coastal Training Programs for 2013

The Coastal Training Program has several events coming up at the beginning of 2013. These events will include a symposium on mangrove research in Texas, a Community Rating System conference, and a 2-day workshop on coastal access issues in the Coastal Bend. Keep an eye on the Mission-Aransas website for more information on these and other Coastal Training Program events. http://www.missionaransas.org/education_training.html

If you have any questions about this article or the Coastal Training Program, please contact Kristin Hicks at kristin.hicks@austin.utexas.edu or 361.749.3048

Workshop participants discussed the specifics of the Reserve's role in response to a large oil spill.

Green Tip: Did you know?

In the United States, an estimated 12 million barrels of oil are used annually to make plastic bags. The U.S. International Trade Commission reported that 102 billion plastic bags were used in the U.S. in 2009. Even when properly disposed, bags are easily windblown and often wind up in waterways or on the landscape, becoming eyesores and degrading soil and water quality as they break down. Their manufacture, transportation, and disposal also require large amounts of non-renewable resources and release equally large amounts of global-warming gases.

You can take steps to reduce plastic bag consumption:

1. Bring your own reusable shopping bags to the store.
2. Bring your own produce bags in addition to reusable shopping bags.
3. Shop at stores that offer credit for bringing your own bags.
4. Tell your friends and family about the downfalls of plastic bags.
5. Spread the word by politely refusing to accept plastic bags from cashiers and store owners.
6. If you have plastic bags at home, reuse them or make sure they are properly recycled.

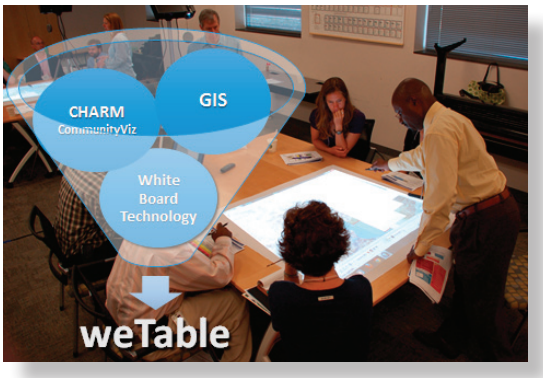
Protecting the Charm of Aransas County and Rockport-Fulton

by Heather Wade, Coastal Planning Specialist

Texas Coastal Community Health and Resource Management (CHARM) is a program created by Texas Sea Grant urban planners that helps communities and local officials better understand the implications of population growth, land development, and coastal risks. This is done through public engagement, education, and computer mapping tools. The program seeks to build partnerships between coastal communities and university researchers to find ways to reduce risks from coastal hazards, protect life and property, and foster safe, vibrant communities. Texas Sea Grant received a $100,000 grant from NOAA to bring this program to the communities of Aransas County.

A major strength of the program is that it works through partnerships. Texas A&M University, Texas Sea Grant, and multiple research agencies will provide resources and tools, while partner communities will bring their planning priorities and knowledge of local conditions. Some of the partners involved in the CHARM project for Aransas County include, but are not limited to, Aransas County, the City of Rockport, the Town of Fulton, the Aransas County Independent School District, the Aransas County Appraisal District, Aransas County Navigation District, Texas A&M AgriLife, and the Mission-Aransas Reserve. Additional input will be drawn from the public to help make this program responsive to local priorities.

The program will develop a community mapping tool that highlights existing areas of risk from coastal hazards, like storm surge and wind damage. This is made possible through ArcGIS and CommunityViz software and helps us to create our CHARM model. CHARM can also quantify potential damages and losses to public and private property from a range of hurricane, climate, and growth scenarios. Participants who use CHARM can decide which scenarios to test.



The combination ofGIS, the CHARM model, and Whiteboard Technology creates our weTable - a tool for participatory community planning.

So why does this matter? Coasts are attractive places to live and future growth on our coasts is a certainty. As of 2010, approximately 39% of the population in the State of Texas lived in a coastal community. It is projected that the coastal regions in the Gulf of Mexico will see a 15% increase in population by the year 2020, with the State of Texas coastal region reaching approximately 10 million people. The CHARM tool allows people to ask 'what if' questions about the future by selecting map areas for additional development and growth. Answers to the following questions can help local officials work with limited public resources to mitigate hazards.

The CHARM model allows us to look at different implications of development, different scenarios for growth, and a plethora of other aspects of community planning.

- How big will the risks facing our communities be in 10, 15, or even 25 years?
- How will resources like public schools, critical facilities, and drinking water be impacted?
- Can today's roads handle future storm evacuations?
- Which risks increase as the population grows?
- What steps could be taken to reduce those risks?

The CHARM tool can help answer these questions, but not without first getting input and guidance from local officials and stakeholders. The Texas Coastal CHARM program will last about a year and a half. During this time, the CHARM team will develop this tool, work with local officials, define future growth scenarios, and educate the public about hazard mitigation practices. The greatest outcome of the project will include the development of three preferred growth scenarios identified by participants at two workshops. These workshops will put the power of the CHARM model and weTable into the hands of Aransas County community members. The tools and final report will be delivered to the participating communities.

For more information contact: Heather Wade at 361-749-3049 or hbwade@tamu.edu.

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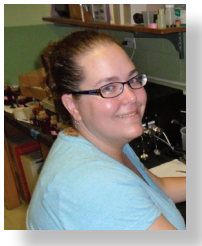
invertebrate planktonic larvae. Rodrigo joined UTMSI as a post-doc in March 2012. He is currently working with the Dispersion Research on Oil: Physics and Plankton Studies project (DROPPS), investigating the interactions between suspended crude oil and zooplankton organisms.



Jena Campbell earned her Ph.D. from UTMSI. She was a Reserve Graduate Research Fellow studying the dynamics of harmful algal blooms and the tiny animals that may feed on them. She was also in charge of the Imaging Flow Cytobot, an instrument used to monitor for harmful algae. Jena is now a Research Scientist Associate and assists with Reserve and SWMP projects while working on publishing manuscripts.

Candace Peyton received an MS from UTMSI. She taught aquatic science at Gregory Portland High School. Since returning to UTMSI she has organized projects both with the Reserve and the newly funded DROPPS project. DROPPS is a consortium funded by the Gulf of Mexico Research Initiative with a goal of providing data sets and predictive models to assess the dispersal and fate of oil spills in the Gulf of Mexico.

This is a really strong team headed up by coach and Research Coordinator (RC) Ed Buskey. He received his Ph.D. from the Graduate School of Oceanography at the University of Rhode Island, his MSc from the University of British Columbia, and his BA from Brown University. In addition to being the RC, he is a professor in the Department of Marine Science, Interim Department Chair, and director of the Gulf of Mexico Research Initiative DROPPS consortium, which includes scientists from seven institutions studying the effects of oil on the marine environment.

Road Scholars Feature Programs

- Exploring the Gulf Coast 12/3/12 & 1/14/13
- Cruising the Texas Gulf Coast Delta 1/28/13
- Birding in America's "Birdiest Small Coastal City" 2/4/13
- Birding the Texas Tropics 2/10/13
- Endangered Whooping Cranes 2/19/13
- Spring Coastal Migration 3/10/13
- The Texas Hill Country 4/14/13

For program information contact Linda Fuiman at 361-749-6806 or linda.fuiman@utexas.edu.

CALENDAR OF EVENTS

November

10 Texas Coastal Bend Nature Challenge Closing Ceremonies, 3 p.m. - 5 p.m.

17 Goose Island State Park Habitat Hike, 10 a.m., RSVP to Carolyn Rose

December

6 Green Team Feature Film: "Bag It," 7 p.m.

7 Winter Walking Tour, Nature Preserve at Charlie's Pasture, 9 a.m.

13 Green Team Feature Film: "Sun Comes Up," 7 p.m.

January

11 Winter Walking Tour, Nature Preserve at Charlie's Pasture, 9 a.m.

11,18,25 Bay Talks, Bay Education Center, 12 p.m.-1 p.m.

10 Green Team Feature Film: "Switch," 7 p.m.

17, 24,31 UTMSI Public Lecture Series, 7 p.m.

February

1,8,15 & 22 Bay Talks, Bay Education Center, 12 p.m. - 1 p.m.

8 Winter Walking Tour, Nature Preserve at Charlie's Pasture, 9 a.m.

7, 21 & 28 UTMSI Public Lecture Series, 7 p.m.

21-24 Whooping Crane Festival

March

1 & 8 Bay Talks Bay Education Center, 12 p.m. - 1 p.m.

7 & 14 UTMSI Public Lecture Series, 7 p.m.

8 Winter Walking Tour, Nature Preserve at Charlie's Pasture, 9 a.m.

Tours of the Wetlands Education Center
Every Tue, Thurs, & Sat, 10 a.m., UTMSI in Port Aransas

Afternoon Movie
Every Mon - Thurs, the UTMSI Visitor Center

Science on a Sphere
Every Tues - Sat, 2 p.m. and 3 p.m., Bay Education Center in Rockport

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RESEARCH RESERVE
University of Texas
Marine Science Institute
750 Channel View Drive
Port Aransas, Texas 78373
www.missionaransas.org

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Staff

Administrative
Reserve Manager: *Sally Morehead Palmer*
Administrative Associate: *Candace Peyton*

Coastal Training Program
Coastal Training Program Coordinator: *Kristin Hicks*
Sea Grant Coastal Planning Specialist: *Heather Wade*

Research
Research Coordinator: *Dr. Ed Buskey*
Research Assistants: *Cammie Hyatt & Rae Mooney*
Cooperating Scientist: *Dr. Tracy Villareal*
Graduate Research Fellows: *Kelly Darnell & Aubrey Lashaway*
Postdoctoral Fellows: *Dr. Jianhong Xue, Dr. Zack Darnell & Dr. Lindsay Scheef*
Environmental Cooperative Science Center Coordinator: *Shanna Madsen*

Education
Education Coordinator: *Carolyn Rose*
Marine Education Services Director: *Sara Pelleteri*
Education Specialists: *Suzy Citek & Dana Sjostrom*
Outreach & Volunteer Coordinator: *Colleen McCue*
Road Scholar Coordinator: *Linda Fuiman*
Scientist-in-Residence: *Catalina Cuellar*

Stewardship
Stewardship Coordinator: *Dr. Kiersten Madden*
Cooperating Scientist: *Dr. Ken Dunton*
Animal Rehabilitation: *Amanda Terry & Guy Davis*
Research Assistant: *Anne Evans*

The Mission-Aransas National Estuarine Research Reserve includes 185,708 acres of federal, state, and private land, on the south Texas Coast. A great diversity of habitats are contained within the Reserve, including tidal marsh, riverine, marine, prairie, mangrove and woodland. Protecting these habitats, encouraging resource conservation and providing opportunities for research and education are among the major goals of the Reserve. The Reserve is administered by the University of Texas Marine Science Institute and the National Oceanic and Atmospheric Administration, in partnership with governmental agencies and private organizations. Mission-Aransas NERR partners include the United States Fish and Wildlife Service, Texas General Land Office, Texas Parks and Wildlife Department, Texas Department of Transportation, Coastal Bend Bays & Estuaries Program, Coastal Bend Land Trust, Nature Conservancy, Fennessey Ranch, and Aransas County / City of Rockport.