Eighth Biennial State of the Bay

Poster Presentations

Anna R. Armitage

Texas A&M University at Galveston
Department of Marine Biology

Anna Armitage (Ph.D., 2003), is an assistant professor of Marine Biology at Texas A&M University at Galveston (TAMUG). Her research focuses on coastal and wetlands community ecology in salt marshes, tidal mudflats, and seagrass beds, with particular emphasis on changes in trophic structure following habitat restoration, nutrient enrichment, and other human disturbances. She has also investigated the population and community structure of restored and disturbed habitats, the physical and ecological effects of bioturbation, and the ecology of coastal wetlands, salt marshes, seagrass beds, invertebrates, and shorebirds.

Dr. Armitage completed her Ph.D. at University of California Los Angeles (Department of Biology) in 2003 under the guidance of Dr. Peggy Fong and Dr. Richard Vance. Her dissertation investigated community structure and trophic interactions in restored and natural estuarine mudflats. She then pursued postdoctoral studies in the lab of Dr. James Fourqurean at Florida International University in Miami. She investigated the effects of nitrogen and phosphorus enrichment on seagrass and epiphyte species composition and trophic structure. She was also extensively involved with a long-term seagrass monitoring program in the Florida Keys.

In July 2006, Dr. Armitage began her tenure at Texas A&M University at Galveston as an Assistant Professor in the Department of Marine Biology. Her research program will investigate the effects of habitat restoration, nutrient enrichment, and other anthropogenic disturbances on trophic interactions in coastal wetlands and subtidal seagrass beds. She will also teach an upper division course on Coastal Plant Ecology.

Dr. Armitage has over ten years of field experience in seagrass, reef, and marsh habitats and is proficient at marine vegetation monitoring, plant collection, and faunal sampling techniques. She has 14 years of experience with research scuba diving and is certified as a NAUI Diving Instructor. Dr. Armitage has ten peer-reviewed publications in the recent seagrass and wetland literature, covering topics that include trophic dynamics, marsh restoration, and the impacts of coastal nutrient enrichment.

Anna R. Armitage, Ph.D. • Assistant Professor

RESTORATION OF TIDAL WETLANDS IN SOUTHERN CALIFORNIA FOR SHOREBIRDS: LESSONS FOR GALVESTON BAY

Anna R. Armitage, Texas A&M University at Galveston, Galveston, Texas
Stacey M. Jensen, University of California Los Angeles, Los Angeles, California
Joy E. Yoon, University of California Los Angeles, Los Angeles, California
Richard F. Ambrose, University of California Los Angeles, Los Angeles, California

Habitat restoration can partially compensate for the extensive loss of coastal wetlands, but creation of functional habitat and assessment of restoration success remain challenging tasks. To evaluate wintering shorebird use of restored coastal wetlands, we quantified shorebird assemblages and behavior of selected focal species at five restored sites and paired reference sites in Mugu Lagoon, southern California. The Shannon-Wiener index of species diversity (for all birds in Order Charadriiformes) was higher in the restored than in the reference portion of three of the five sites, higher in the reference portion of a fourth, and similar between reference and restored areas of the fifth site.

Species diversity was lower in sites closer to man-made structures. The four most abundant species groups across the five sites were selected for detailed analysis of site use and behavior: Willets *Catoptrophorus semipalmatus*, Marbled Godwits *Limosa fedoa*, Dowitchers *Limnodromus* spp., and *Calidris* spp. Sandpipers (Western, Least, and Dunlin). Each focal species group exhibited distinct site preferences, and densities in restored sites were often as high or higher than in reference sites. Willets and Dowitchers preferred habitats with more extensive tidal flats, a characteristic of restored sites. Godwits and Sandpipers preferred heterogeneous habitats with a mix of water and tidal flats. Most birds were engaged in feeding activities during the ebb tides surveyed, and there were no apparent differences in behavior between reference and restored sites.

Though not all restored sites were used equally by all species, the creation of multiple restored sites with varied habitat characteristics attracted a diverse assemblage of shorebirds and may have contributed to the integrity of the regional wetland landscape by reducing the relative impact of anthropogenic disturbances. Wetland restoration should be planned on a landscape scale that incorporates a variety of habitat types. Habitat diversity and tidal flat habitat are important components of coastal wetland restoration programs that target shorebirds, and should be incorporated into wetland restoration work in Galveston Bay.

Andrea K. Catanzaro

U.S. Army Corps of Engineers
Galveston District

She received her Bachelor's of Science in Marine Biology, from Texas A&M University at Galveston in 1990, and her Master's of Science in Rangeland Ecology and Management, from Texas A&M University in 1998. For the last 13 years, she has worked as a Biologist for the U.S. Army Corps of Engineers, Galveston District, in the Planning, Environmental and Regulatory Division. She is currently an Environmental Lead in the Planning and Environmental Branch where she is responsible for project planning and National Environmental Policy Act evaluation and compliance for major Federal projects. She has been environmental lead on complex navigation, flood damage reduction and ecosystem restoration projects, including the Houston-Galveston Navigation Channels and Barge Lanes Projects, the Clear Creek Flood Damage Reduction Project, and the City of Brownsville, Texas, Resacas Restoration Project. In collaboration with Federal and state environmental resource agencies, she has developed and applied ecosystem/community level approaches for evaluating habitats to assess project impacts and mitigation, and determine suitable ecosystem restoration plans.

CLEAR CREEK WATERSHED FLOOD DAMAGE REDUCTION AND ECOSYSTEM RESTORATION STUDY

Andrea Catazano, U.S. Army Corps of Engineers, Galveston, Texas
Robert W. Heinly, U.S. Army Corps of Engineers, Galveston, Texas
Antisa C. Webb, U.S. Army Corps of Engineers, Galveston, Texas
Kelly A. Burkes-Copes, U.S. Army Corps of Engineers, Galveston, Texas

The Clear Creek watershed is approximately 47 miles long and extends from the Galveston Bay area inland to the southwest suburbs of Houston, Texas. The Galveston District is conducting a re-evaluation study for flood damage reduction while addressing ecosystem restoration opportunities on Clear Creek and six of its tributaries. Co-sponsors include Harris County Flood Control District, Galveston County, and Brazoria Drainage District No. 4. Due to environmental and public concerns, construction of the authorized project was halted. The current study is considering alternatives to large-scale channelization including localized flood conveyance, floodwater detention , and non-structural options such as raising or buying out frequently flooded structures.

The District is partnering with the U.S. Army Engineer Research and Development Center, Environmental Laboratory (ERDC), state and federal environmental resource agencies, and the local sponsors, to ensure all stakeholder issues are addressed. With ERDC's support, the District is developing three community-based Habitat Suitability Index models to evaluate changes to the aquatic and terrestrial system resulting from project implementation using the Habitat Evaluation Procedure (HEP). This presentation describes approaches and rationales for addressing multipurpose planning for flood damage reduction and ecosystem restoration, the benefits and challenges of inter-agency planning efforts, and the methods and models used to provide qualitative and quantitative information on project benefits. The project will serve as a case study for the community-based habitat assessment approach for a HEP application in an ecosystem context, demonstrating the effectiveness and power of these models in evaluating ecosystem restoration success.

William Dailey

William Dailey graduated summa cum laude with double degrees in Marine Biology and Marine Fisheries from Texas A & M at Galveston in December 1998. During his tenure as an undergraduate he had the good fortune to enroll in Bruce Collette's Biology of Fishes course at the Bermuda Biological Station, Karla McDermid's Atoll Ecosystems course at Midway Island and André Landry's Field Ichthyology course at Texas A & M at Galveston. This coursework continued to develop and nurture his interest in saltwater and freshwater fisheries ecology, and recreational fishing.

Dailey is currently working on his doctorate at Texas A & M at College Station. His dissertation is titled 'Early life history and stock structure of young-of-the-year tarpon, *Megalops atlanticus* Valenciennes, in the northwestern Gulf of Mexico. Tarpon, an invaluable sport fish throughout its range in the Gulf and Caribbean, have allowed him to immerse himself in their biology and ecology, and their recreational fishery. He has attended tarpon rodeos in Louisiana and Mexico, and worked with numerous silver king anglers and guides throughout the northwestern Gulf. Dailey has worked with the International Game Fish Association, Tarpon Tomorrow and Coastal Conservation Association members regarding tarpon management and conservation.

Among his other memorable experiences as a doctorate student was serving as crew chief and fish taxonomist of EPA's Environmental Monitoring and Assessment Program (EMAP) for wadeable streams in Nevada in 2004. The job assignment in Nevada created an opportunity for him to rekindle a passion for masters and open water swimming. He completed his first open water mile swim at Camp Longhorn in Burnet, TX at ten years old. Dailey entered and completed the 2004 Donner Lake Open Water Swim (2.7 miles) proximate to Reno, NV. He has since swam in two more Donner Lake Swims (2005 and 2006), two Alcatraz Sharkfest Swims (~ 1.5 miles; 2005 and 2006) and the Great Chesapeake Bay Swim (1 mile; 2006).

THE RECREATIONAL TARPON FISHERY IN LOUISIANA

William Dailey, Texas A&M University, Galveston, Texas
André M. Landry, Jr., Texas A&M University, Galveston, Texas

The recreational tarpon (*Megalops atlanticus*) fishery of the northwest Gulf of Mexico remains relatively robust in Louisiana. The golden era of tarpon fishing in Louisiana was the late 1960s with both spectacular angler participation and a tremendous number of silver king landings. Tarpon anglers at the Golden Meadow Tarpon Rodeo entered 45 silver kings in 1967, while the Abbeville Tarpon Rodeo had 110 tarpon landed at its Intracoastal City weigh station in 1966. The current fishery operates primarily from the Mississippi River delta west to Grand Isle where tarpon aggregate in the thousands during mid-summer through early fall. However, as recent as the 1970s, the fishery operated from April through early November across broader fishing grounds that included much of the state's nearshore waters west of Grand Isle.

Prior to 1987, anglers in Louisiana targeted tarpon primarily using large spoons trolled at six to seven knots yielding a catch ratio of three fish per 10 strikes, often referred to as 'jumps' or 'hook-ups.' Catch ratios doubled and the landing frequency of 90.7 kg (200-lb) tarpon increased substantially in 1987 with the introduction of the Coon-pop®, a heavy lead head jig with soft plastic body wired to a large circle hook. The International Grand Isle Tarpon Rodeo hosted its 84th annual event in July 2005 with a catch of nine tarpon ranging from 50.7 (111.6 lb) to 67 kg (147.4 lb). Historically, landings at the tournament peaked with 48 tarpon in 1966. The rodeo record tarpon of 93.4 kg (206 lb) was landed in 1973. In excess of 30 tarpon have been landed four times - 1962, 1965, 1966 and 1988. Rodeo tarpon anglers have ranged in number from greater than 500 in the 1960s and 1970s to approximately 100 today.

Debbie DeVore

US Fish and Wildlife

Debbie DeVore is a Fishery Biologist with the US Fish and Wildlife Service's Texas Coastal Program. She joined the Coastal Program in April 2002 after working as the Regional Habitat Restoration Specialist for the NOAA Community-Based Restoration Program. Prior to working for NOAA, Debbie was employed as an Environmental Biologist for a Houston-based engineering firm. Debbie completed her Bachelor of Science degree in Marine Biology as well as her Master of Science degree in Wildlife and Fisheries Sciences from Texas A&M University. Debbie enjoys most outdoor activities, including fishing, kayaking, and hunting.

WEST GALVESTON ISLAND COMPREHENSIVE HABITAT RESTORATION AND SHORELINE PROTECTION PLAN WITH BENEFICIAL USE OPPORTUNITIES FOR BAYSIDE SUBDIVISIONS

Debbie L. DeVore US Fish and Wildlife Service, Houston Texas

The purpose of the West Galveston Island Comprehensive Habitat Restoration and Shoreline Protection Plan (hereafter referred to as the West Galveston Island Plan) is to develop a long term plan that would maximize the beneficial use of suitable maintenance dredge material from residential canal subdivisions to restore and protect valuable estuarine habitats along west Galveston Island. To this end, a technical advisory committee has been formed, including representatives from the US Fish and Wildlife Service, National Marine Fisheries Service Habitat Conservation and Community Based Restoration Programs, Texas Parks & Wildlife Department, Texas General Land Office and the West Galveston Island Property Owner's Association.

A comprehensive plan and guide to partner residential subdivisions needing to maintenance dredge their canals and access channels with identified priority areas in need of restoration and/or protection will accomplish several objectives. A primary goal is to create and restore conditions conducive for the establishment of seagrasses, emergent marsh, sand and algal flats, and colonial waterbird nesting habitat. The West Galveston Island Plan will also educate waterfront homeowners concerning their options to beneficially utilize their maintenance dredge material and also maximize the involvement of local communities in bayside habitat protection, restoration, and environmental stewardship projects. Ultimately, the West Galveston Island Plan will lead to leveraged local funds to maximize state and federal dollars for the protection and restoration of fish and wildlife habitats.

Jim Dobberstine

The Galveston Bay Foundation

Jim Dobberstine received a B.A. in biology in 1993 from Concordia College in Portland, Oregon, and a M.S. degree in Environmental Management from the University of Houston Clear Lake (UHCL) in 2005. He is currently completing his thesis research on sediment toxicology toward a M.S. degree in Environmental Science-Biology, also at UHCL, anticipating graduation in 2007.

As Land Programs Manager at the Galveston Bay Foundation, he works as a biologist, project manager, and regulatory specialist, focusing on wetlands and other aquatic habitats. Formerly a biologist and aquatic habitat specialist in the zoo and aquarium field, he has also taught Environmental Science at Lee College in Baytown, Texas.

Jim is a member of the National Association of Environmental Professionals and the Society of Environmental Toxicology and Chemistry. He has served as the vice-chair of the Galveston Bay Estuary Program's Public Participation and Education Sub-committee since 2003, and Chair of the Clear Creek Watershed Partnership Water Quality Subcommittee since 2005.

Contact Info: (281) 332-3381 x215, jdobberstine@galvbay.org

IDENTIFYING SUITABLE REFERENCE SITES FOR IMPACTED SITES ALONG THE HOUSTON SHIP CHANNEL

Jim Dobberstine, The Galveston Bay Foundation, Houston, Texas
Jim Horne, PBS&J Environmental Toxicology Laboratory, Houston, Texas
Louis Brzuzy. Shell Oil Products USA, Houston, Texas
Cindy Howard, The University of Houston Clear Lake, Houston, Texas

Recent studies indicate that anthropogenic contaminants in the Galveston Bay estuary have resulted in numerous negative effects to water and sediment quality, species diversity, and biologic productivity. The Houston Ship Channel (HSC) is widely considered the location of maximal concentrations for heavy metals and many commonly measured organic compounds in runoff, inflows, and waste discharges to the estuary. Significant differences in environmental gradients, pollutant inputs, and removal processes can exist within local sub-areas of the estuary, making it difficult to compare sites across a large region. Determining an appropriate range of reference conditions for impacted tidal tributaries of the HSC has been a cause of concern regarding accurate assessment of their status.

This research applied the sediment quality triad (SQT) approach toward assessing potential reference sites within the Galveston Bay system. Over three seasons, five potentially unimpacted tidal tributary sites (bayous) were sampled within the Galveston Bay system. For each site, the benthic macroinvertebrate community, sediment heavy metal concentrations, and organic contaminants including PAHs, organochlorine and organophosphate pesticides were determined. Whole sediment toxicity was evaluated through bioassays using *Leptocheirus plumulosus* and *Mysidopsis bahia*. Benthic macroinvertebrate, sediment, and water quality parameters from the sites were compared to existing data from TMDL study sites within the HSC using the Engel and Summers Benthic Index and other statistical methods. Results indicate that determining a range of suitable reference conditions for a tidal tributary within the upper Galveston Bay system can be accomplished, but impacted estuarine sites must be matched to reference sites according to local variations in environmental qualities, including sediment consistency and salinity gradients. Based on the study parameters, one of the five sites investigated shows potential as a reference for impacted sites along the HSC. This study may help resolve a longstanding issue for impact assessments within the HSC.

SESSION NOTES

SURF'S UP-WAVE CHARACTERIZATION IN GALVESTON BAY

Keith Dupuis, Texas A&M University at Galveston, Galveston, Texas
Ayal Anis, Texas A&M University at Galveston, Galveston, Texas

Acoustic current meter data collected in the shallow (~3m depth) Galveston Bay, TX, estuary are used to characterize locally wind-generated surface wave heights, periods, and directions. Dynamic pressure time-histories were transformed to surface elevation spectra using Linear Wave Theory and were compared to the proposed shallow-water Texel, Marsen, and Arsloe (TMA) wave spectra. Our data was found to follow the TMA spectra after some modifications to the four empirical spectral shape parameters used in the TMA spectra.

Fetch-limited non-dimensional parameters for Galveston Bay wave data were found to follow the asymptotic limits proposed by Young and Verhagen (1996). These non-dimensional parameters model wave heights based on the knowledge of wind speed, fetch length, and water depth. Our observations provide an extension of the valid range for the non-dimensional parameters found by Young and Verhagen.

George Guillen, Ph.D.

Environmental Institute of Houston

Dr. George Guillen received his B.S. in Marine Biology from Texas A&M University (TAMUG) (Galveston, Texas) in 1979. He received his Masters Degree in Wildlife and Fisheries Sciences in 1983 from TAMU (College Station, TX). In 1996, Dr. Guillen received his Ph.D. in Environmental Science from the University of Texas - School of Public Health in Houston, TX.

From 1984 to 1988 Dr. Guillen worked for the Texas Parks and Wildlife Department in Houston, Texas as the Environmental Contaminants Biologist. His work focused on the investigation of pollutant impacts on fish and wildlife resources. During 1988 to 1998, Dr. Guillen served as a biologist and manager at the Houston regional office of the TWC and TNRCC (now the present Texas Commission on Environmental Quality -TCEQ). He was responsible for management of various environmental research, monitoring and enforcement programs. In 1998, Dr. Guillen took a position with the Minerals Management Service (MMS) in New Orleans, Louisiana. He was responsible for management of the Toxicology and Risk Assessment Unit which conducts research and analyses on the risks and impact of oil spills to marine resources. During 2000 through 2004, Dr. Guillen served as the Fisheries and Contaminants Program Leader for the USFWS in the Arcata, California field office. While there he directed fisheries, instream flow, and water quality studies along the northern California coast and Klamath River basin. He currently serves as the Executive Director of the Environmental Institute of Houston, part of the University of Houston system. He also serves as an Associate Professor in Biology and Environmental Science at the University of Houston Clear Lake. His current research interests include development of predictive models and methods to evaluate the influence of fisheries, water and sediment quality and habitat loss on aquatic resources.

University of Houston Clear Lake
2700 Bay Area Blvd
Houston, TX 77058
Phone: 281-283-3949
Fax: 281-283-3953
Guillen@cl.uh.edu

APPLICATION OF MULTIVIRATE STATISTICAL METHODS TO EVALUATE PATTERNS IN WATER QUALITY

George Guillen, University of Houston Clear Lake, Houston, Texas
Heather Biggs, University of Houston Clear Lake, Houston, Texas

The evaluation of water quality data has traditionally focused on single parameter analysis. Unfortunately, this approach cannot easily detect trends or patterns generated by multiple water quality variables. These observed patterns can provide insight into potential common factors affecting water quality within multiple basins. For example, common processes or factors (e.g. land-use, loading) associated with different watersheds may be responsible for overall water quality characteristics detected by multivariate statistical analyses. We provide an example of the use of these tools for evaluating water quality in Galveston Bay and how this could be used in future management.

Lynne Hamlin

Texas Parks and Wildlife Department
Coastal Fishery Division
Science and Policy Resources Branch
Coastal Studies Team

Lynne has been working for the past year with Dr. Wen Lee, an ocean ecologist with the Coastal Studies Team, to study fishery and habitat relationships through application of geographic information sciences (GIS) and statistical analyses. As an undergraduate specializing in transportation and water resources she worked at the Florida Everglades National Park research center; M.S. Geography, Texas State University B.S. Civil Engineering, Florida International University where she helped to collect and analyze field data for use in hydrologic models. After moving to Texas and working briefly as a transportation planner, she moved full time into the air quality field as an emissions specialist and then urban airshed modeler with the Texas Natural Resource Conservation Commission. At the TNRCC she applied GIS methods to model transportation-related emissions. Lynne lives near Austin with her husband Dave who is a pilot with Delta Air Lines.

Lynne Hamlin, Texas Parks and Wildlife Department, Austin, Texas Wen Lee, Texas Parks and Wildlife Department, Austin, Texas

Estuaries have been recognized for their role as nurseries for many species of fish and shellfish. Along the shoreline of the Galveston bay system, key estuarine habitats such as marsh, patchy marsh, submerged vegetation, unvegetated beaches, and oyster reefs provide this vital ecological role and an economic service. In this study we used a geographical information system (GIS) to match twenty seven years (1978-2004) of species catch rate data derived from the Texas Parks and Wildlife Department (TPWD) Resource Monitoring Program with habitat types in order to explore how habitats are spatially and temporally utilized by four common fishery species: juvenile Atlantic croaker, adult bay anchovy, juvenile brown shrimp, and juvenile white shrimp. Habitat types were based on the 1992 U.S. Fish and Wildlife's National Wetland Inventory, and an early 1990's GIS landcover dataset developed by the TPWD. We found that juvenile Atlantic croaker populations generally peaked from January through May, and statistically showed a positive relationship with marsh habitats, lower salinities, deeper water, sandy mud sediment texture, years with higher annual inflow, and warmer temperatures. Juvenile brown shrimp populations peaked from April through July, and statistically showed a positive relationship with salt marsh habitat, higher salinities, deeper water, sandy mud sediment texture, and warmer temperatures. Juvenile white shrimp populations peaked from July through November, and statistically showed a positive relationship with marsh habitat, submerged vegetation, and warmer temperatures. Adult bay anchovy peaked from August through October and did not exhibit differences in catch rates among the study habitat types.

HABITAT UTILIZATION BY SELECTED FISH AND SHELLFISH IN THE GALVESTON BAY SYSTEM

Lynne Hamlin, Texas Parks and Wildlife Department, Austin, Texas
Wen Lee, Texas Parks and Wildlife Department, Austin, Texas
David Buzan, Texas Parks and Wildlife Department, Texas

Estuaries have been recognized for their role as nurseries for many species of fish and shellfish. Along the shoreline of the Galveston bay system, key estuarine habitats such as marsh, patchy marsh, submerged vegetation, unvegetated beaches, oyster reefs, and uplands provide a much vital ecological and economic service. This study evaluates twenty seven years of bag seine data collected by the Texas Parks & Wildlife Resource Monitoring Program and explores how shoreline habitats in the bay are spatially and temporally utilized by four common species (Atlantic croaker, bay anchovy, brown shrimp, and white shrimp) in terms of species abundance. Statistical methods were applied for comparisons of catch rates among habitats, the evaluation of significant biotic and abiotic variables, and the development of a multivariate prediction model. Results from multivariate regression analyses indicate that marsh edge and submerged vegetation are the two most preferred habitats for both shrimp and the bay anchovy.

The poster presentation will have GIS-based maps showing the spatial distribution of the four species in the bay system during their months of peak abundance, a table summarizing the taxonomy of the species captured most frequently by bag seines over the twenty seven year period, and a summary of statistical analysis methods and results.

Kelli Haskett

Environmental Institute of Houston
University of Houston Clear Lake

Kelli Haskett is a full-time student at University of Houston Clear Lake working toward completion of his M.S. in Environmental Science with a focus in Biology. Kelli received a B.S. in Business Administration from Nicholls State University in Louisiana. He is currently a student employee of the Environmental Institute of Houston working in the Clean Rivers Program.

EFFECTS OF BASIN MORPHOLOGY AND URBAN NON-POINT SOURCE LOADING ON LAKE MADELINE WATER QUALITY

George Guillen, University of Houston Clear Lake, Houston, Texas
Susan Moore, University of Houston Clear Lake, Houston, Texas
Kelli Haskett, University of Houston Clear Lake, Houston, Texas
Heather Biggs, University of Houston Clear Lake, Houston, Texas

During June through October 2006 we conducted an intensive survey of the Lake Madeline watershed. Lake Madeline is a highly modified enclosed estuarine waterbody with limited hydrological exchange with Galveston Bay. The objectives of our study were to characterize dry and wet weather ambient water quality within Lake Madeline and attempt to identify potential sources of elevated indicator bacteria (e.g. *Enterococci* and fecal coliforms). Past data collected by various regulatory agencies suggests that Lake Madeline has occasionally exhibited elevated indicator bacteria levels. During our study we observed high concentrations of indicator bacteria during wet weather events. The various storm sewers discharging into Lake Madeline appear to be significant sources of *Enterococci* bacteria. These sewer lines contain elevated levels of *Enterococci* even during most dry weather events. These data along with other information provided, suggest that aging adjacent sanitary sewers may be the ultimate source of indicator bacteria within the watershed. The unique morphology of Lake Madeline and the associated reduced potential for tidal flushing further decreases the likelihood of significant mixing and dilution of pollutants. This often leads to summer lake stratification and anaerobic conditions. These factors probably increase the likelihood of finding elevated indicator bacteria levels, and low oxygen related fish kills. These findings have implications for communities planning similar canal subdivision developments along the Gulf coast of Texas.

Judith Haydel

IAP World Services, Inc.
USGS National Wetlands Research Center

Judith Haydel holds masters degrees in English (1981, University of New Orleans), Public Administration (1982, University of New Orleans), and Library and Information Science (Louisiana State University, 2002), and a Ph.D. in Political Science (1987, University of New Orleans). She taught English at Xavier University from 1981 to 1985, and Political Science at the University of Southwestern Louisiana from 1985 to 1987 and at McNeese State University from 1987 to 2003. She was a reference librarian at the University of Louisiana at Lafayette from 2003 to 2005 and is a librarian at the USGS National Wetlands Research Center (NWRC).

She works on the National Biological Information Infrastructure (NBII) project's Central Southwest/Gulf Coast Information Node (CSWGCIN). She finds, vets, and catalogs resources to the node and engages in education and outreach activities, including participation in professional meetings and conferences. She also locates resources, information, and references for the NWRC Cost Center Director and the Information Branch Chief, and writes and edits information as directed by the Information Branch Chief.

Her professional experience includes publications in political science, legal, and history journals, and contributions to four specialized encyclopedias on legal and constitutional topics. She has extensive experience researching government information.

GULF OF MEXICO COASTAL AND ESTUARINE RESOURCES FROM THE U.S. GEOLOGICAL SURVEY'S NATIONAL BIOLOGICAL INFORMATION INFRASTRUCTURE

Judith Haydel ,U.S. Geological Survey's National Wetlands Research Center, Lafayette, LA

The National Biological Information Infrastructure (NBII) is a federal digital library coordinated by the U.S. Geological Survey. NBII's Central/Southwest Gulf Coast Information Node (CSWGCIN) is an effort of the Houston Advanced Research Center and the U.S. Geological Survey's National Wetlands Research Center. CSWGCIN provides access to a wealth of biological information and resources relating to the Northern Gulf of Mexico for researchers, educators, and the public.

Alexander Y. Karatayev

Stephen F. Austin State University

Education:

M. Sc., Biology, Belarussian State University, Minsk, 1976
Ph.D., Aquatic biology, Institute of Zoology Belarussian Academy of Science, 1983
Doctor of Sciences, Hydrobiology, Institute of Zoology Belarussian Academy of Science, 1992

Research Interests & Areas of Expertise:
Ecology, biology, parasitology and spread of aquatic invasive species and their role in aquatic ecosystems; biodiversity, conservation and management of freshwater ecosystems; taxonomy, biology, ecology and productivity of benthic and periphyton communities; ecology of cooling water reservoirs.

Professional Publications and Presentations:
Peer-review publications: 71. Publications in proceedings: 31. Presentations at scientific meetings and invited talks: 81.

Professor, Biology Department, Stephen F. Austin State University, Nacogdoches, Texas, 2001 - Present
Research Ecologist, University of the State of New York Museum Field Research Lab, 2000-2001
Chair, General Ecology Department; Chief, Aquatic Ecology Department, Scientist, Belarussian State University, 1977-2000

Contact Information
Phone - (936) 468-5195
Fax - (936) 468-2056
e-mail: akaratayev@sfasu.edu

POTENTIAL EFFECT OF INTRODUCTION OF EXOTIC BIVALVE *LIMNOPERNA FORTUNEI* ON COASTAL ECOSYSTEMS

A.Y. KARATAYEV A. Y., Department of Biology,
Stephen F. Austin State University, Nacogdoches
L. E. BURLAKOVA, Department of Biology,
Stephen F. Austin State University, Nacogdoches
D. BOLTOVSKOY, Ecología, Genética y Evolución,
Universidad de Buenos Aires, Argentina
D. K. PADILLA, Department of Ecology and Evolution, Stony Brook University

Invasive bivalve *Limnoperna fortunei* (the golden mussel), native to mainland China, is extremely aggressive invader in Asia and South America, and is likely to invade North America in the near future. The fresh and brackish waters of Gulf Coast region may be a perfect environment for the golden mussel, which has high upper temperature (35°C) and salinity (15 ppt.) limits, low pH (5.5), calcium (3 mg L^{-1}), and oxygen (0.5 mg L^{-1}) limits, and is very tolerant to organic pollution.

We predict that in the near future the golden mussel may spread across all southern states of US, form high densities, and, being a very powerful suspension feeder, will have large effects on the biodiversity, structure and functioning of all aquatic communities. These changes will include (but not limited to) increase in water clarity, macrophyte overgrowth, abundance of benthivorous fish, and decreases in the densities of phytoplankton and zooplankton, total phosphorous, and suspended matter. The most pronounced negative effect on the biodiversity is expected on native unionids that already are considered the most endangered freshwater group in Texas.

Paula Moreno

Texas A&M University at Galveston, Behavioral Ecology Laboratory

2006/Present – Fisheries Biologist, IAP/NOAA Fisheries Project.

2005/06 – Postdoctoral Scholar, Texas A&M University at Galveston, Behavioral Ecology Laboratory, Texas.

2005 – Ph.D. in Wildlife and Fisheries Sciences, Texas A&M University, College Station, Texas. Dissertation: *Environmental Predictors of Bottlenose Dolphin Distribution and Core Feeding Densities in Galveston Bay, Texas*.

Research interests include: improving our understanding of vertebrates' habitat use patterns and underlying processes (bottom-up and top-down) to enhance conservation and ecosystem-based management; predicting animal distribution and behavior, in particular of marine top-predators, using multivariate statistics and GIS tools; evaluating biological and physical stressors—natural and anthropogenic—on vulnerable animal populations such as cetaceans.

Contact: Paula Moreno, Ph.D., IAP/NOAA Fisheries Project, 705 Convent Ave., Pascagoula, MS 39567. Phone: (228) 762-4591 (ext. 325). Email: Paula.Moreno@noaa.gov

HABITAT PREFERENCE OF BOTTLENOSE DOLPHINS: A PREDICTIVE MODEL FOR GALVESTON BAY

Paula Moreno, Ph.D., postdoctoral researcher., Texas A&M University, Wildlife & Fisheries Sciences *and* Texas A&M University at Galveston, Department of Marine Biology, Marine Mammal Research Program, 5007 Avenue U, Galveston, Texas
Michael Mathews, Ph.D., student, Texas A&M University, Department of Mathematics
Bernd Würsig, Prof., Texas A&M University, Wildlife & Fisheries Sciences *and* Texas A&M University at Galveston, Department of Marine Biology, Marine Mammal Research Program

The Galveston Bay estuary is a complex ecosystem that serves as a nursery for many species, including the bottlenose dolphin. Dolphins are top-level consumers, and as the only marine mammals in the bay, may serve as a unique indicator of its health and integrity. This is the first study to model occurrence of dolphins in the Lower Galveston Bay (LGB) taking into account the influence of natural and anthropogenic factors. We used a generalized additive model (GAM), a modern non-parametric non-linear multiple regression technique, to predict the distribution of bottlenose dolphins in the LGB. To count groups of dolphins and measure environmental parameters, we conducted a total of 367 boat surveys from January to December of 2001. This amounted to 3,815 km of search effort, yielding a total of 1,802 dolphins in 211 groups. Measured environmental variables included surface water temperature, salinity, turbidity, number of shrimp boats, total number of boats, and number of seabirds (used as a proxy for prey distribution). Using geospatial tools, these environmental variables—along with location, distance to the Gulf of Mexico and water depth–were analyzed on a 500-m resolution grid. Temporal factors at daily and seasonal scales were also examined. We found that all variables except seasons and turbidity were useful to predict dolphin distribution in the LGB.

Occurrence of dolphins was linearly and positively correlated with number of seabirds and shrimp vessels and non-linearly correlated with all other variables. Distance to the Gulf of Mexico was the most influential non-linear predictor of occurrence, with a peak at about 8 km that corresponds to a zone of high turbulence, where channels meet. We identified bay areas where bottlenose dolphins tended to congregate, mostly for feeding; the majority of the groups (86.2%) were found in only 21.5% of the total surveyed area. By identifying bay habitat important for dolphins and also, possibly, for the fish species they prey upon, we hope to contribute to the conservation and sustainable management of the bay. The bottlenose dolphin is a marine protected species, and those occurring in the Galveston Bay are considered a distinct management stock. This heightens the importance of continued monitoring of this stock and of considering their habitat needs when assessing the potential impacts of human activities on the bay ecosystem. Our study may also provide a better understanding of habitat requirements for coastal delphinids.

Clifton C. Nunnally

Texas A&M University at Galveston
Department of Oceanography

Clifton C. Nunnally is a doctoral student in the Department of Oceanography at Texas A&M University at Galveston. Research experience includes behavioral monitoring of sperm whale interactions with longline fishermen in the Gulf of Alaska. He also was participant in the Mineral Management Services sponsored survey of the deep Gulf of Mexico (DGoMB) as a researcher and field worker during all 4 summers of the project. He has also participated in the NURP funded Shelf and Slope Experimental Taphonomy Initiative (SSETI) involving the Johnson-Sea Link. His thesis research involved the structure of the macrobenthic community at cold hydrocarbon seeps and their relation to the function of the total sediment community (e.g. comparing total sediment oxygen demand in relation to macrofauna community structure. His doctoral research will focus on a complete energetic and stoichiometric trophodynamic model of a benthic ecosystem in the hypoxia zone of the northern Gulf of Mexico and from Lake Madeline/Offatts Bayou, a anoxic basin in Galveston Bay. Growing up in northern New Mexico and West Texas he found his way to Abilene Christian University where he completed a bachelor's of science in biology in 1998 and from there to Texas A&M where he completed a masters of science in oceanography in 2003. During his time at sea both in Alaska and the Gulf of Mexico he has logged almost 300 sea days, more than 140 of those on Texas A&M's R/V Gyre. During his masters work he worked as a research assistant under Dr. Gilbert T. Rowe during the DGoMB project. Since moving to Galveston to pursue his doctorate he has worked a teaching assistant, teaching labs for mariculture, conservation biology, marine botany, biology of marine invertebrates and biostatistics. Recent field work in Simpson Bay, Prince William Sound Alaska is focusing on the benthic abundance of prey items for the resident sea otter populations. In 2007, planned research trips will include monthly sampling of the Lake Madeline and Offatts Bayou System, the Gulf of Mexico Dead Zone and also an ROV exploration of Green's Canyon at the bottom of the continental slope.

Texas A&M University at Galveston, Ft. Crockett #356, nunnallc@tamug.edu, (409) 741-7123;
Laboratory for Deep-Sea Biology: http://www.marinebiology.edu/Rowe/Home.htm

AN URBAN BENTHIC OBSERVATORY IN A SHALLOW HYPOXIC MARINE BASIN

C. C. Nunnally, Texas A&M University at Galveston
R. L. Brinkmeyer, Texas A&M University at Galveston
A. S. Quigg, Texas A&M University at Galveston
G. J. Gillen, University of Houston, Clearlake
L. Roehrborn, Texas A&M at Galveston
G. T. Rowe, Texas A&M University at Galveston

Benthic ecosystems in urban environments are stressed by hypoxia, fish kills and harmful algal blooms. Measuring responses to such events is being conducted to account for the environmental processes that contribute to such phenomena. We at Texas A&M Galveston monitor environmental interactions that occur within Lake Madeline and Offats Bayou (LMOB), a semi-enclosed basin that exhibits a spectrum of responses to eutrophication. Our benthic observatory monitors sediment fluxes, sulfur reducing bacterial mats, biogeochemical processes, algal blooms and contamination from the effluent of a sewage treatment facility. Loading from a variety of sources, including storm water runoff, has contributed to increased levels of indicator bacteria (e.g. fecal coliforms, *Enterococci* spp) within Lake Madeline.

This is most apparent during high rainfall events. The risk from exposure to waterborne pathogens is therefore highly elevated during these periods. The long term, high frequency sampling will help us learn how nutrients and stratification control hypoxic/anoxic events. The urban benthic observatory (UBO) will contribute to establishing observatories on the continental shelf.

Dr. Sandeep Patil

Biological and Agricultural Engineering,
Texas A & M University,
College Station, Texas 77843. USA.

I obtained Bachelors degree in Civil Engineering from University of Pune, India and Master of Engineering in Hydraulic Structures from M. S. University, India. I was a Lecturer in MGM College of Engineering, Bombay, India. My Ph. D. is in Environmental Hydraulics from Indian Institute of Technology, Bombay, India. I worked as a Research Associate in The Hong Kong Polytechnic University, Hong Kong.

I joined Texas A & M University in July 2006 as a Post-doctorate Research Associate in Biological and Agricultural Engineering, Texas A & M University.

My research area consists of

1) Hydrodynamics and transport of pollutants through vegetation.
2) Plant vibration, Instability analysis in submerged vegetation.
3) Wave-current interaction, dispersion and diffusion processes.

sandeeppatil@neo.tamu.edu
cesandeeppatil@yahoo.com
Phone: 979-862-3751

MONAMI WAVE IN SUBMERGED VEGETATION

Sandeep Patil
V. P. Singh
Biological & Agricultural Engineering, Texas A & M University, Texas.

Flow through submerged vegetation can be conveniently divided into two parts, the flow through vegetation and the overflow (Nepf and Vivoni, 2000). In between, there is an important transition of strong shear around interface due to the abrupt decrease in velocity by stem drag in the upper part of canopy. As a result, velocities in the two parts are different in magnitude and can be made a continuous function of flow depth by connecting through the strong shear velocity (Carollo et al. 2002, 2005; Wilson et al., 2003). This continuous shear combined with change in the density from vegetation to overflow forms the problem of KH instability at the interface (Kundu and Cohen, 2002).

The direct visible effect of the instability is the wave motion of the upper part of dowels (Fig. 1) called *monami* (Ackerman and Okubo, 1993; Grizzle et. al., 1996) that affects the vertical momentum transfer (Ikeda and Kanazawa, 1996), particulate sediment transport (Gambi et. al. 1990) and biological transport like larvae (Eckman, 1987), pollen dispersion (Ackerman, 2002) and plant morphology (Sand-Jensen, 2003; Asaeda et. al, 2005). Studies have been conducted to examine the hydrodynamics of monami waving in circular meadows (Ikeda and Ohta, 1993) and in eelgrass blades (Ghisalberti and Nepf, 2002, 2006) and dependency on stem density (Poggi et al., 2004). However, the key features of monami wave i.e. wave amplitude and period, are not yet modeled and is the objective of this paper.

In this paper, the geometry of the bending stem is derived to calculate the amplitude of monami wave. It is further extended with linear continuity and momentum equations to find the brunt-vaisala frequency for monami. Reciprocal of this frequency is the wave period and combine with the wave amplitude, the interfacial monami wave can be described. Both the wave amplitude and period are derived in terms of easily measurable vegetation parameters and can be calculated using scientific calculator. This information is important in its application to various current studies on hydrodynamics in wetlands such as scalar transport (White & Nepf, 2003), pollen dispersion (Ackerman, 2002) and vegetation removal (Duan et. al, 2006).

Dianna L. Ramirez

University of Houston, Clear Lake

Dianna L. Ramirez grew up in Columbia Station, Ohio. After graduating high school in 1994, she attended Texas A&M University at Galveston. She graduated with a double major in Marine Biology and Marine Fisheries in 1998. Dianna married her husband a few years after graduating college. She and her husband have a son who will be two in March. She has been working full time at Seaborne ChalleNGe Corps, teaching science to at risk youth for the past seven years. She also is pursuing a Master's Degree in Environmental Science at the University of Houston, Clear Lake. Dianna plans to graduate in the summer of 2007.

409-933-0839
diannalramirez@hotmail.com

DISTRIBUTION AND POTENTIAL IMPACTS OF INVASIVE FISH SPECIES IN THE CLEAR LAKE WATERSHED

George Guillen, University of Houston Clear Lake, Houston, Texas
Dianna Ramirez, University of Houston Clear Lake, Houston, Texas

During September 2004 through October 2006 we conducted surveys in selected first and second order tributaries of the Clear Lake watershed in Galveston Bay, Texas. Fish community data were collected using backpack electroshocking gear and seines. In addition, limited trawling and gillnetting was conducted in one of the larger bayous. Results of these surveys and comparisons with past data suggest that native "exotics" such as the Rio Grande Cichlid, *Cichlasoma cyanoguttatum*, have invaded and extended their range within the watershed,and have become dominant in some waterbodies. Native sunfish and overall diversity have declined in many waterbodies invaded by Rio Grande Cichlids. Other exotic species including, tilapia *Oreochromis niloticus* and suckermouth catfish *Pterygoplichthys* spp. were collected. Possible sources include ongoing introductions by tropical fish hobbyists and downstream invasion through low salinity bay systems. The probability is high for widespread invasion of these species into other portions of southeastern Texas and Louisiana coastal streams, due to their tolerance to low salinity water.

Will Roach

University of Houston – Clear Lake – Houston

Will Roach was born and raised in Texas. He received bachelor's and master's degrees in Wildlife and Fisheries Science from Texas A&M University and conducted his master's research on game bird populations at the King Ranch. He began a 16-year career with the U.S. Fish and Wildlife Service at the Gulf Coast Research Station studying colonial waterbird populations, then transferred to the Clear Lake Field Office, where he worked as an Environmental Contaminants Specialist and later as the Texas Coastal Program Coordinator. Will's work on the toxicology of produced water outfalls in Galveston Bay during the early 1990's led to the cessation of brine discharge practices. Will currently is an environmental consultant specializing in coastal habitat restoration and wetlands. He also teaches a field ornithology class as an adjunct instructor at UHCL.

BENTHIC MACRINVERTEBRAE COMMUNITY RECOVERY AFTER CESSATION OF PRODUCED WATER DISCHARGE TO TWO SITES IN THE GALVESTON BAY SYSTEM

Will Roach, University of Houston-Clear Lake, Houston, Texas
Fred McGrew, University of Houston-Clear Lake, Houston, Texas
Daniel Escobar, University of Houston-Clear Lake, Houston, Texas
Cindy Howard, University of Houston-Clear Lake, Houston, Texas

Produced water, or oilfield brine, is a by-product of oil and gas recovery operations. Produced waters typically contain elevated levels of dissolved salts, petroleum hydrocarbons, heavy metals and Ra-226. Prior to about 1994, a common method of brine disposal along the Texas coast was discharge to surface waters, either directly or by overland flow. Historically, brines discharged into freshwater or intermittent streams caused such obvious water quality problems that this disposal method was restricted to tidally influenced water bodies. Texas Railroad Commission (TRC) 1991 data indicated that the Galveston Bay system and its tributaries were permitted to receive ≤15.2 million gallons of produced waters per day from 93 permitted sources, although the actual volumes discharged to the bay varied widely.

1991 we conducted a study of two sites in the Galveston Bay system that were at the time receiving discharge volumes of produced water: Cow Bayou (on Clear Creek) and Tabbs Bay. Using a Sediment Quality Triad (SQT) approach, that study showed significant alterations in sediment chemistry and related adverse impacts on the benthic macroinvertebrate communities in these two brine disposal areas. The discharges of produced water to Tabbs Bay and Cow Bayou were discontinued around 1994; however, no environmental monitoring was conducted at either Tabbs Bay or Cow Bayou in the ensuing years.

The present study is a retrospective analysis of the changes in sediment chemistry and the benthic macroinvertebrate community of Cow Bayou occurring in the 10+ years since cessation of brine disposal activities. Samples were collected in 2004 and 2005 from the same stations in Cow Bayou and Robinson Bayou (reference) that were studied in 1991. Following an SQT design, benthic macroinvertebrate abundance, diversity and species composition were determined, as were concentrations of Sr, Ba, other selected heavy metals and selected organics. Sediment toxicity tests were selected that replicated species studied in 1991.

Our results suggest that the hypothesized recovery of the former disposal sites is occurring. For example, in 1991 benthic taxa diversity (H') in Cow Bayou ranged from zero at CB01 (closest to

Linda R. Roehborn

Texas A&M University

Linda Roehrborn was born and raised in Marshfield, Wisconsin in 1972 and grew up on her family's strawberry farm. In 1991, she graduated from Marshfield Senior High School in 1991. In January of 1994, Linda joined the active duty Air Force and was assigned to the 607th Air Control Squadron (ACS), Luke Air Force Base, AZ where she deployed to Camp Doha, Kuwait in 1995-1996 in support of "Operation Desert Storm".

While in Arizona, Linda studied phytoplankton growth in extreme environments and graduated with her Bachelor's of Science degree in Biology (Magna Cum Laude) at Arizona State University.

Linda transferred to the Texas Air National Guard threee years ago where she is the current acting Non Commissioned Officer In Charge of the Radar shop and a member of the unit's honor guard. Her volunteer activities include a 30-day activation to aid in the relief of those affected by Hurricanes Katrina and Rita and assisting with the 2006 food drive in conjunction with the Houston Food Bank. Last year, she was honored as the 272nd EIS 2005 Outstanding NCO of the Year and a 2005 Outstanding EI Community NCO nominee.

In December, Linda graduated with her Master's of Science in Biological Oceanography at Texas A&M University under the guidance of Dr. Antonietta Quigg. Several of the results from her study are presented at the Eighth Biennal State of the Bay Symposium.

In her spare time, Linda enjoys spending time with her family in Wisconsin, running with her dog, flying, playing rugby and volunteering as a scuba diver at Moody Gardens Aquarium in Galveston, TX.

She hopes to start her PhD at the University of Washington within the next year studying deep sea extreme environments, eventually applying to the Astronaut Program at NASA and becoming an officer in the United States Air Force

lroehrborn@yahoo.com

SEASONAL ANALYSIS OF ABIOTIC AND BIOTIC FACTORS IN THE WATER COLUMN AND THEIR IMPACTS ON PHYTOPLANKTON COMMUNITY COMPOSITION IN OFFATT'S BAYOU-LAKE MADELINE, GALVESTON

Linda R. Roehrborn, Graduate Student, Texas A&M University at Galveston
Winston Denton, Dickinson Marine Laboratory, Texas Parks and Wildlife, Dickinson
Dr. Antonietta S. Quigg, Assistant Professor, Texas A&M University at Galveston

A year long study (Nov 2004- Oct 2005) in Offatt's Bayou, Galveston was conducted to examine spatiotemporal patterns of water column abiotic and biotic characteristics on natural shifts in the distributions and abundances of phytoplankton. To accomplish this, hydrological and meteorological parameters were collected and phytoplankton biomass, community composition and chlorophyll *a* data were examined for significant relationships. Seasonal variations in water temperature, salinity, dissolved oxygen and pH levels, as well as wind effects and hydrodynamic restriction were considered as the key controlling factors in phytoplankton dynamics in Offatt's Bayou. Spatial patterns of phytoplankton abundance generally reflected the circulation patterns (or lack thereof) in Offatt's Bayou with higher abundances observed in the restricted areas and lower abundances in the well mixed regions.

Temporally, diatom blooms were prominent during winter, spring and autumn, which were characterized by cooler temperatures, less light availability, increased dissolved oxygen concentrations and reduced salinities than those observed in the summer. The most dominant diatoms were *Guinardia delicatula, Ditylum brightwelli, Rhizosolenia setigera, Dactyliosolen fragillissimus* and numerous *Chaetoceros species.* During summer, the waters of Offatt's Bayou were warmer and more saline, the haptophyte, *Corymbellus aureus,* was the dominant taxa, with highest standing crops in the circulation restricted Lake Madeline.

The decay of the bloom caused by *C. aureus* is thought responsible for a fish kill that occurred during late August 2005 in Lake Madeline. Long term monitoring of Offatt's Bayou is important for assessing human impacts on abiotic and biotic components of the system, as well as impacts to higher trophic levels such as fish. We are using the Offatt's Bayou-Lake Madeline (LMOB) complex as a small scale observatory to understand the large scale changes occurring in Galveston Bay and other estuaries in Texas.

David J. Rosen, Ph.D.

U. S. Fish and Wildlife Service

David Rosen is a broadly trained plant scientist and has worked as a botanist for the U. S. Fish & Wildlife Service since 2002. David also serves as a research associate at the S. M. Tracy Herbarium at Texas A&M University, and adjunct faculty member of the Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University. David's research interests include systematics and ecology of sedges; floristics and plant community structure of southeastern coastal plain ecosystems; and exotic invasive species management. David's professional duties focus on the role of botany in natural resource conservation and management. David participates in numerous collaborative research projects dealing with landscape genetics of coastal prairie plants, prairie restoration techniques, and management of exotic invasive species. David received his doctoral degree in Rangeland Ecology and Management from Texas A&M University where his research focused on biosystematics. David is a member of the American Society of Plant Taxonomists and the Texas Academy of Science, and is an author of numerous refereed publications in the fields of botany and plant ecology.

THE VASCULAR FLORA OF NASH PRAIRIE: A COASTAL PRAIRIE REMNANT IN BRAZORIA COUNTY, TEXAS

David J. Rosen, Ph.D., U. S. Fish and Wildlife Service, Houston

An intensive survey of the vascular flora of Nash Prairie, a ca. 120 ha Coastal Prairie remnant in Brazoria County, Texas, resulted in a checklist of 309 species of vascular plants representing 63 families and 196 genera. The six families containing the most species are Poaceae (70), Cyperaceae (36), Asteraceae (46), Fabaceae (17), Euphorbiaceae (9), and Scrophulariaceae (7). Rich native genera include Carex (10 spp.), Cyperus (9 spp.), Juncus (7 spp.), Panicum (7 spp.), and Paspalum (7 spp.). Non-native species accounted for 7% of the total; 50% (11) of which were grasses. The native flora comprises 287 species distributed in 63 families. The native grass flora includes 59 species in five subfamilies, and comprises 71% C_4 species, most of which belong to the Panicoideae (35). The flora of Nash Prairie includes numerous globally and regionally rare species and species with temperate amphitropical distributions.

This research suggests previous estimates of species richness for climax Coastal Prairie in Texas are low, and that historic and potential losses of botanical diversity are greater than previously thought.

Natalie A. Rund

U.S. Army Corps of Engineers
Galveston District

Natalie received her B.A. from Texas A&M University at Galveston in Maritime Studies, 2001. For the last 5 years, she has worked as an Environmental Specialist for the U.S. Army Corps of Engineers (USACE), and has focused on National Environmental Policy Act coordination and compliance of Civil Works projects. Her duties include participation on interdisciplinary teams through applying concepts and knowledge of the biological sciences and the USACE planning process to formulate project alternatives and to evaluate the environmental effects of Civil Works projects. In addition to serving as an Environmental Lead on federal projects; Natalie is also an active participant with the Beneficial Use Group (BUG), which a subset of the Interagency Coordination Team for the Houston-Galveston Navigation Channel project. The BUG's role is to find the most beneficial use of dredge material by creating beneficial use sites in Galveston Bay.

HOUSTON-GALVESTON AVIGATION CHANNEL (H-GNC) BENEFICIAL USE (BU) SITES

Natalie A. Rund, U.S. Army Corps of Engineers, Galveston District

The Port of Houston Authority and the U.S. Army Corps of Engineers, with the guidance from the Beneficial Uses Group (BUG), developed a plan for the beneficial use of dredged material from the widening and deepening and maintenance dredging of the Houston Ship Channel under the Houston-Galveston Navigation Channels Project.

The plan, The Recommended Beneficial Use Plan for Placement of Dredged Material (BUG Plan) included construction of 4,250 acres of marsh at three beneficial (BU) sites - Bolivar Marsh, Atkinson Island, and Mid-Bay Marsh. At the Bolivar Marsh BU site, three marsh cells totaling 840 acres have been constructed, filled with dredged material and planted with smooth cordgrass, Spartina alterniflora. Construction of tidal circulation channels for two of these cells will be completed in 2007. At the Atkinson Island BU site, construction and filling of four marsh cells totaling 775 acres with dredged material will be completed in 2007; two of these cells will be planted with S. alterniflora.

Construction of a fifth 325-acre cell will begin in 2007. The current Mid-Bay Marsh BU site consists of approximately 600 acres. At this site, approximately 40 acres of coastal prairie habitat has been constructed from dredged material and planted. In 2007, approximately 60 acres of marsh will be constructed from dredged material and planted with smooth cordgrass, Spartina alterniflora. Construction of tidal circulation channels for two cells will also be completed in 2007. The remaining acres in the BU site will be filled with dredged material in the future.

COOPERATIVE CONSERVATION

Dr. Benjamin Tuggle, U.S. Fish and Wildlife Service, Albuquerque, New Mexico

Cooperative Conservation describes the efforts of landowners, communities, conservation groups, industry, and governmental agencies who join together to conserve our environment. Through cooperative conservation, citizens from every walk of life enhance, restore, and protect lands, waters, air, and wildlife resources on public and private lands. Citizens play a central and substantive role in the stewardship and governance of the environments in which they live, work, and play. Cooperative conservation's principles are simple. It is voluntary and incentive-based: people associate together voluntarily to pursue common conservation goals.

Solutions are found and priorities are implemented, challenges are addressed by people working together. Cooperative conservation is rooted in local action and reliant on local knowledge and is based on sound science. It is the practical option to litigation and polarization that otherwise divide Americans. Finally, it is entrepreneurial: innovation and creativity by citizens is the engine that drives cooperative conservation problem solving.

The Fish and Wildlife Service plays an important role to turn cooperative conservation into on-the-ground results. The Service does this through several programs of which the Coastal Program is specifically focused on coastal resources. This Program is designed to develop partnerships, work with local communities and provide financial and technical assistance to implement habitat conservation projects. Coastal areas provide many important resources and it is important to conserve them. They provide important fish and wildlife habitats, sustain coastal communities, are economically important and promote human health and safety. These benefits provided by the Texas Coast have been recognized as nationally significant. The partnerships on the Texas coast are some of the strongest and most diverse in the nation, and have produced nationally significant results. The Service and its Texas Coastal Program are grateful to be part of these partnerships and are proud of the award winning projects these partnerships have developed.

BELLY-UP IN THE BAYOU, WHO'S THE CULPRIT? PHISICAL, CHEMICAL AND BIOLOGICAL PARAMETERS OF OFFATTS BAYOU, GALVESTON

Allison C. Skinner, Texas A&M University at Galveston, Galveston, Texas
Dr. Antonietta S. Quigg , Texas A&M University at Galveston, Galveston, Texas

Offatts Bayou was created by the City of Galveston as a borrow pit for landfill during the first part of this century. The bayou is approximately 4.8km long with a maximum width of 1km, with an average depth of approximately 5m. Offatts Bayou is an important nursery and habitat for many finfish and shellfish. It also serves as an important recreational area for nearby residents and visitors. The low mixing environment of Offatts Bayou (due to its relatively deep basin and small mouth), makes it a good study area for understanding the causes and effects of hypoxia and phytoplankton blooms, both of which may be significant factors in the cause of the near annual fish kills. Physical, chemical and biological parameters were measured twice weekly over the course of two summers. A fish kill occurred in the summer of 2005, however none transpired during the summer of 2006. This allows for interesting comparisons between the two summers; possibly pointing to the cause of the observed fish kill in 2005.

SESSION NOTES

DETERMINING THE EFFECTS OF 2, 3, 7, 8-TETRACHLORODIBENZO-p-dioxin (TCDD) AND LOW DISSOLVED OXYGEN ON RED DRUM (SCIAENOPS OCELLATUS) MORTALITY

Amanda M. Thronson, Graduate Student, Texas A&M University at Galveston

Dr. Antonietta S. Quigg, Assistant Professor, Texas A&M University at Galveston

Depletion of dissolved oxygen in aquatic habitats is a growing concern. Over half of the major estuaries in the United States suffer from oxygen depletion at some point during the year, resulting in many fish species becoming ill and/or dying as a result of hypoxic waters.

Habitats with decreased dissolved oxygen may also contain pollutants, particularly in places such as the Houston Ship Channel (HSC). Prolonged low dissolved oxygen may alter the potency of pollutants such as dioxins (eg. TCDD). By altering redox conditions, particularly at the sediment water interface, pollutants may become more bioavailable to fish. If that is the case, the ability of fish to respond to hypoxic conditions or environmental pollutants might produce mortality under conditions where either stress alone would not be lethal.

The purpose of this study is to determine whether there is an interaction between hypoxia and TCDD in red drum mortality in the HSC. Red drum is an important species in the Texas recreational fishery industry, and elevated concentrations of pollutants (particularly dioxins) in fish tissues raise concerns for human health.

Charlotte Wells, M.S.

Texans for Alternatives to Pesticides (TAP)

Charlotte Wells is a native Houstonian who grew up in North Texas and moved back to the Gulf Coast. Her early years were spent fishing and crabbing on Double Bayou. Today she finds sanctuary sailing on upper Galveston Bay with her husband and friends. She has introduced Galveston Bay to visitors from all over the world and has thus realized that this bay cannot be taken for granted. Galveston Bay needs to be protected for future generations.

Education and advocacy are the heart of her academic and professional life. After attending Austin College Ms. Wells embarked upon an elementary school teaching career and earned an M.S. from the University of Houston Clear Lake. Teaching third-grade at Bayshore Elementary in LaPorte allowed her to impart to students some of her knowledge about and passion for protecting the environment. She instilled respect for all things living, and an understanding of how all things are interconnected.

From 1994 to 2001, Ms. Wells operated Baytime Books for Children, a resource and learning center in the Seabrook/Kemah area. There she taught basic skills along with specialized high interest workshops to encourage children to go beyond the basics, connecting reading and math to critical thinking skills and lifelong learning. When the Port of Houston Authority announced plans for the Bayport Container and Cruise Terminal. Ms. Wells joined Galveston Bay Conservation and Preservation Association (GBCPA) and committed herself to the organized opposition to this giant project so damaging to green space and air and water quality on upper Galveston Bay. Following her work with children at Baytime Books, she chose a new path of education and advocacy, working with GBCPA to save wetlands on the upper bay.

Texans for Alternatives to Pesticides (TAP) hired Charlotte in 2003 to direct the organization in its mission to reduce pesticide use in schools, homes and public places. Knowing the negative impact of chemicals upon waterways, she sought to address consumer's understanding of the many risks of pesticide use. When the people understand that pesticides are poisons, they are much more willing to use alternatives to safeguard children, pets, surroundings and their own well-being. While TAP is teaching people in schools and childcare centers about the dangers of using pesticides around children, the environment will always be a focus of the organization. Ms. Wells is working with homeowners and public officials to promote pesticide-free lawns so as to reduce non-point-source pollution entering Galveston Bay, and this is the subject of our poster presentation at the State of the Bay Symposium. Let's save the planet one yard at a time!

Texans for Alternatives to Pesticides (713-523-2827) charlotte@nopesticides.org
www.nopesticides.org

NOT IN MY BACKYARD! PREVENTING POLLUTION BY MAINTAINGING A PESTICIDE-FREE LAWN

Charlotte Wells, Executive Director, Texans for Alternatives to Pesticides, Houston, TX.

Public concern over the potential hazards associated with chemical lawn care products and services has been on a steady rise. And with good reason. Over 100 million pounds of pesticides are used by homeowners in homes and gardens each year, even more when commercial companies are added in. Suburban lawns and gardens are known to receive far heavier pesticide applications per acre than most other land areas in the U.S., including agricultural areas. The Galveston Bay Plan identifies runoff pollution as the biggest water quality problem facing the bay and its tributaries.

Of 30 commonly used lawn pesticides, 13 are probable or possible carcinogens, 14 are linked with birth defects, 18 with reproductive effects, 20 with liver or kidney damage, 18 with neurotoxicity, and 28 are sensitizers and/or irritants. Of those same 30 lawn pesticides, 17 are detected in groundwater, 23 have the ability to leach into drinking water sources, 24 are toxic to fish and other aquatic organisms vital to our ecosystem, 11 are toxic to bees, and 16 are toxic to birds. With numbers like this, the only logical question becomes: is this really necessary and what can we do to stop or prevent this kind of contamination?

Texans for Alternatives to Pesticides (TAP) is a member of the National Coalition for Pesticide-Free Lawns and is working to halt senseless exposure to lawn pesticides and to educate the public, landscapers, and policy makers on the use of non-toxic and least-toxic lawn care practices and products. Change begins and ends at local level. The public plays an extremely important role in lawn pesticide reform – not only in the way it perceives the use of toxic pesticides in homes and communities but also in the way it demands safe alternatives from retailers, organic services from lawn care providers, and better protection from pesticide exposure from local policy makers.

This poster presentation will help educate neighbors, communities – including landscapers and policy makers about the unacceptable hazards of using lawn chemicals and the use of alternatives to improve water quality in Galveston Bay.

Leslie Williams

Texas Parks and Wildlife

Leslie received her Bachelors in Zoology from The Ohio State University and her Masters in Biology from the University of Houston. Her research thesis was titled "A Comparison Between Natural and Restored Wetlands at the San Jacinto Battleground State Historical Park".
After receiving her masters, she worked with the Galveston Bay Foundation as a Restoration Specialist for over two years. She then went on to work with Texas Parks and Wildlife as a Natural Resource Specialist and has been there for the past three years.

Phone 281-534-0106
Leslie.williams@tpwd.state.tx.us

SEAGRASS INVENTORY FOR CHRISTMAS BAY

Leslie Williams - Texas Parks and Wildlife, Dickinson, TX

Seagrass in the Galveston Bay system had almost entirely disappeared by the late 1970s due to dredge-and fill activities, boat traffic, subsidence, erosion, storms, and wastewater discharges. In 1989 it was estimated that there were 700 acres of submerged aquatic vegetation remaining in the Galveston Bay complex, with approximately 386 acres in Christmas Bay and the remainder along Trinity Bay. This reflected a loss of more than 70% of the seagrass habitat historically present in this bay system in the 1950s. Seagrass meadows are very productive habitats which provide food and shelter for juvenile fishery species, crabs, and shrimp, so the loss of these habitats created significant concern among several resource agencies.

Due to the extensive seagrass habitat present, Christmas Bay had been a priority conservation site for state resource management programs. In 1988 Texas Parks and Wildlife and The General Land Office designated Christmas Bay an official State Coastal Preserve and State Scientific Area. Christmas Bay is one of the most productive and least disturbed bays within the Galveston Bay complex. In 1996 a management plan was drafted to address major goals for the management of Christmas Bay as a coastal preserve, which included the protection of seagrass habitat as the principal concern for vegetation management.

In 1998 Dr. Warren Pulich conducted a mapping project to determine the status of seagrass in Christmas Bay. Dr. Pulich had aerial photographs taken for Christmas Bay and Drum Bay and these photographs were then photointerpreted in ArcView. The 1998 aerial photographs were compared to maps from 1975 and aerial photographs from 1987. Pulich determined that seagrass in Christmas and Drum Bay covered approximately 424 acres and consisted primarily of mixed shoalgrass *(Halodule wrightii)* and clovergrass *(Halophila engelmanni)* beds, with widgeongrass becoming abundant in the spring and fall. Interspersed within the seagrass beds were also patches of turtle grass *(Thalassia testudinum)* totaling 1.6 acres. A comparison with the older maps and aerial photographs showed there had been an increase in seagrass acreage since 1987. Dr. Pulich also compared seagrass distributions to physical changes in the environment and concluded that the seagrass trends appeared consistent with the relative protection of Christmas Bay from major dredging and waterfront development.

The current project will continue the seagrass inventory of Christmas Bay and determine the status and trends of seagrass habitat within Christmas Bay over the last 6 years. Aerial photography has been obtained and will be photointerpreted in Arc View. The aerial photographs will be groundtruthed using approximately 75 GPS stations and water quality parameters will be measured at each station. The current aerial photographs and GIS maps will be compared to Dr. Pulich's photographs and maps from 1998. This will determine seagrass trends in Christmas Bay over the past six years; including changes in acreage, patchiness, and whether a shift in distribution and species composition has occurred.

SESSION NOTES

Texas Commission on Environmental Quality

Eighth Biennial
State of the Bay Symposium

Participant List

Hilton Galvestion Island Resort
& Galveston Island Convention Center
Galveston, Texas

January 23 - 25, 2007

Eighth Biennial State of the Bay Symposium-Participants

COMPANY	NAME	ADDRESS					PHONE
TCEQ R-12 Houston	Rodney E Adams	5425 Polk Ave	Ste H	Houston	TX	77023	713 767-3684
Humble HS	Karina Adrain	600 Studemont St	#1216	Houston	TX	77007	713 817-7660
Coastal Bend Bays & Estuaries	Ray Allen	1305 N Shoreline Blvd	Ste 205	Corpus Christi	TX	78401	361 885-6202
HARC	Will Alvis	4800 Research Forest Dr		The Woodlands	TX	77381	281 364-6085
Galveston Cty Health District	Erin Anderson	PO Box 939		LaMarque	TX	77568	409 938-2459
Rice University	John B Anderson PhD	Dept of Earth Sciences		Houston	TX	77251	713 348-8448
U S Army Corps of Engineers	Fred L Anthamatten	PO Box 1229		Galveston	TX	77550	409 766-3930
TAMUG	Anna Armitage PhD	5007 Ave U		Galveston	TX	77551	409 740-4842
Port of Houston Authority	Scott Aspelin	111 E Loop North		Houston	TX	77029	713 670-2589
Texas Water Development Board	Barney Austin PhD	PO Box 13231		Austin	TX	78711	512 463-8856
Pasadena ISD	Linda Bachle	11,111 Beamer Rd		Houston	TX	77089	713 740-0303
Texas Tech University	Blake N Beall	6912 Hope Ave		Lubbock	TX	79424	806 778-0163
Berg Oliver Associates	Kimberly Beasley	14701 St Mary's Ln	Ste 400	Houston	TX	77079	281 589-0898
U S Geological Survey	Kent Becher	2775 Altamesa Blvd		Fort Worth	TX	76133	817 263-9545
Seabrook Wetlands Board	Gary Bell	1700 First St		Seabrook	TX	77586	281 291-5600
US Fish & Wildlife	Moni Belton	17629 El Camino Real	#211	Houston	TX	77058	281 286-8282
Texas Parks & Wildlife	David Bennett	1502 FM 517 E		Dickinson	TX	77539	281 534-0129
GBAC-TMN	Dick Benoit	708 E Wilkins		League City	TX	77573	281 554-9017
NOAA Restoration Ctr / IMSG	Kristopher G Benson	4700 Ave U		Galveston	TX	77551	409 766-3699
ExxonMobil Biomedical Sciences	Gregory R Biddinger	800 Bell St	Rm 4155F	Houston	TX	77002	713 656-4978
University of Houston Clear Lake	Heather Biggs	2700 Bay Area Blvd	Ste 540	Houston	TX	77058	281 283-3947
U S EPA	Gerald O Binninger	Mail Code:EPA/GMPO		Stennis Space Ctr	MS	39529	228 688-3017
U S Army Corps of Engineers	Janet Thomas Botello	PO Box 1229		Galveston	TX	77550	409 766-3931
EPA / GMPO	John F Bowie	Bldg 1100		Stennis Space Ctr	MS	39529	228 688-3888
Texas Parks & Wildlife	Brenda Bowling	1502 FM 517 E		Dickinson	TX	77539	281 534-0129
Coastal Bend Bays & Estuaries	Jim Bowman	1305 N Shoreline Blvd	Ste 205	Corpus Christi	TX	78401	361 885-6202
Crenshaw School / GISD	Renee Brawner	PO Box 660		Galveston	TX	77553	409 684-8526
TCEQ R-12 Houston	Linda Broach	5425 Polk Ave	Ste H	Houston	TX	77023	713 767-3579
Trinity River Authority	Richard Browning	PO Box 60		Arlington	TX	76004	817 493-5176
Houston Audubon Society	Winifred Burkett	440 Wilchester		Houston	TX	77079	713 932-1639
Stephen F Austin State University	Lyubov Burlakova Ph.D	Box 13003-SFA	Biology	Nacogdoches	TX	75962	936 468-2322
Agilet Benefits Communication Group	Linda Burton	PO Box 5403		Jamaica Beach	TX	77554	713 582-4688
CenterPoint Energy	Gwen Wagner CEcD PCED	PO Box 1700		Houston	TX	77251	713 207-3433
Ekistics Corporation	Glenda L Callaway	PO Box 980158		Houston	TX	77098	713 520-9031
Texas General Land Office	Tom Calnan	PO Box 12873		Austin	TX	78711	512 463-5100

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COMPANY	NAME	ADDRESS					PHONE
Galena Park ISD	Sophia Cantu	6722 Uvalde Rd		Houston	TX	77049	281 459-5300
U S Army Corps of Engineers	Andrea Catanzaro	2000 Fort Point Rd		Galveston	TX	77553	409 766-6346
H-GAC	Om Chawla	3555 Timmons Ln	Ste 120	Houston	TX	77027	713 993-4586
University of Texas Health Science Ctr	Ann O Cheek Ph.D	1200 Pressler St	RAS W610	Houston	TX	77030	713 500-9231
Texas Parks & Wildlife	Kyle Chernosky	1502 FM 517 E		Dickinson	TX	77539	281 534-0129
Houston ISD	Jennifer Chriestmon	4829 Winnetka St		Houston	TX	77021	281 216-1783
TAMUG	Stephanie Corley	1001 Texas Clipper Rd		Galveston	TX	77554	409 740-4748
Houston Parks & Recreation Dept	Luci Correa	2999 S Wayside Dr		Houston	TX	77023	713 845-1264
TCB	Sharon Crabb	5757 Woodway St	101W	Houston	TX	77057	713 267-3187
City of League City Engineering	Brian Craig	1535 Dickinson Ave		League City	TX	77573	281 554-1440
Coastal Bend Bays & Estuaries	Dustin Cravey	1305 N Shoreline Blvd	Ste 205	Corpus Christi	TX	78401	361 885-6202
Gulf Coast Institute	Jay Blazek Crossley	3015 Richmond	Ste 201	Houston	TX	77098	713 523-5757
Texas Parks & Wildlife	Jan Culbertson	1502 FM 517 E		Dickinson	TX	77539	281 534-0111
Houston Parks & Recreation Dept	Karen Cullar	2999 S Wayside Dr		Houston	TX	77023	713 845-1022
Texas Parks & Wildlife	Kevin Cunningham	1502 FM 517 E		Dickinson	TX	77539	281 534-0129
TCEQ Galveston Bay Estuary	Jeff DallaRosa	17041 El Camino Real	Ste 210	Houston	TX	77058	281 486-1242
Coastal Bend Bays & Estuaries	Monika De la Garza	1305 N Shoreline Blvd	Ste 205	Corpus Christi	TX	78401	361 885-6202
U S Fish & Wildlife	Debbie L DeVore	17629 El Camino Real		Houston	TX	77058	281 286-8282
Texas Parks & Wildlife	Winston Denton	1502 FM 517 E		Dickinson	TX	77539	281 534-0138
U S Army Corps of Engineers	Felicity Dodson	PO Box 1229		Galveston	TX	77550	409 766-3105
Gulf of Mexico Foundation	Quenton R Dokken	5403 Everhart Rd	PMB 51	Corpus Christi	TX	78411	361 882-3939
Armand Bayou Nature Center	Candy Donahue	PO Box 58828		Houston	TX	77258	281 474-2551
TCEQ Galveston Bay Estuary	Helen Drummond	17041 El Camino Real	Ste 210	Houston	TX	77058	281 486-1240
The Nature Conservancy	Mark Dumesnil	205 N Carrizo St		Corpus Christi	TX	78401	361 882-3584
TCEQ R-12 Houston	Bryan Eastham	5425 Polk Ave	Ste H	Houston	TX	77023	713 767-3596
Berg Oliver Associates	Aron Edwards	14701 St Mary's Ln	Ste 400	Houston	TX	77079	281 589-0898
City of Houston	Carol A Ellinger	611 Walker	18th FL	Houston	TX	77002	713 837-7658
City of Friendswood	Laura Ewing	910 S Friendswood Dr		Friendswood	TX	77546	281 996-3270
URS Corporation	Susi Ferguson	PO Box 201088		Austin	TX	78729	512 419-5455
TCEQ R-12 Houston	Kirk Fleener	5425 Polk Ave	Ste H	Houston	TX	77023	713 767-3652
TCEQ R-12 Houston	Kirk Fleener	5425 Polk Ave	Ste H	Houston	TX	77023	713 767-3652
East Chambers ISD	Sarah Fontenot	1955 St Hwy 124		Winnie	TX	77665	409 296-4183
U S Army Corps of Engineers	Ryan Fordyce	PO Box 1229		Galveston	TX	77550	409 766-3114
TCEQ Austin	Frank Fuller	PO Box 13087		Austin	TX	78711	512 239-5796
Texas General Land Office	Daniel Gao	PO Box 12873		Austin	TX	78711	512 475-1967

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COMPANY	NAME	ADDRESS					PHONE
U S Geological Survey	Martha N Garcia	301 National Center		Reston	VA	20192	703 648-6960
US Fish & Wildlife	Phil Glass	17629 El Camino Real	#211	Houston	TX	77058	281 286-8282
HARC	Stephanie Glenn	4800 Research Forest Dr		The Woodlands	TX	77381	281 364-6042
HARC	Lisa Gonzalez	4800 Research Forest Dr		The Woodlands	TX	77381	281 364-6044
TCEQ R-12 Houston	Clarence Gray	5425 Polk Ave	Ste H	Houston	TX	77023	713 767-3582
Texas Parks & Wildlife	Brad Grimmett	1502 FM 517 E		Dickinson	TX	77539	281 534-0129
University of Houston Clear Lake	George Guillen Ph.D	2700 Bay Area Blvd	Ste 540	Houston	TX	77058	281 283-3950
Texas Water Development Board	Carla Guthrie	PO Box 13231		Austin	TX	78711	512 463-4179
Harris County Storm Water Quality	Dimetra Hamilton	9800 NW Frwy	Ste 305	Houston	TX	77092	713 290-3074
Texas Parks & Wildlife	Lynne Hamlin	3000 IH-35 S	Ste 320	Austin	TX	78704	512 912-7090
TPWD	Manseung Han	3000 S IH-35	Ste 320	Austin	TX	78704	512 912-7107
Houston Audubon Society	Flo Hannah	440 Wilchester Blvd		Houston	TX	77079	713 932-1639
NOAA Fisheries	Rick A Hart PhD	4700 Avenue U		Galveston	TX	77551	409 766-3404
University of Houston Clear Lake	Kelli Haskett	126 Whitson St		Alvin	TX	77511	281 704-9432
IAP World Services	Judith Haydel	700 Cajundome Blvd		Lafayette	LA	70506	337 266-8615
Texas Seaport Museum/GHF	Christine Hayes	Pier 21	#8	Galveston	TX	77550	409 763-1877
HDR/Shiner Moseley & Associates	Daniel J Heilman	555 N Carancahua	Ste 1650	Corpus Christi	TX	78478	361 696-3344
TAMUG	Clarissa Heiner	1001 Texas Clipper Rd		Galveston	TX	77554	409 740-4748
TCEQ R-12 Houston	Harry Heinlein	5425 Polk Ave	Ste H	Houston	TX	77023	713 767-3615
Texas Parks & Wildlife	Rebecca Hensley	1502 FM 517 E		Dickinson	TX	77539	281 534-0129
Carr Environmental Group Inc	David Hollas	12707 I-45 N	Ste 585	Houston	TX	77060	281 872-9300
University of Houston Clear Lake	Cindy Howard Ph.D	2700 Bay Area Blvd		Houston	TX	77058	281 283-3745
U S Army Corps of Engineers	Jayson Hudson	PO Box 1229		Galveston	TX	77550	409 766-3108
U S Fish & Wildlife	John A Huffman	17629 El Camino Real		Houston	TX	77058	281 286-8282
Texas Cooperative Extension	Diane Humes	17000 El Camino Real	Ste 301	Houston	TX	77058	281 218-0721
Houston Zoo Inc	Scott Humphreys	1513 N MacGregor		Houston	TX	77030	713 533-6643
Texas A&M University	Jennifer L Irish Ph.D	3136 TAMU		College Station	TX	77843	979 845-4586
TAMUG	Tanveer Islam	1001 Texas Clipper Rd		Galveston	TX	77554	409 740-4748
Houston Arboretum	James Thomas Ivy	8007 Stroud Dr		Houston	TX	77036	713 774-0529
Texas Master Naturalist Galveston	Terry Lynne Jackson	5528 Avenue S		Galveston	TX	77551	409 740-0847
Texas Sea Grant	John Jacob Ph.D	17000 El Camino Real	Ste 301	Houston	TX	77058	281 218-0565
U S EPA	Douglas Jacobson	1445 Ross Ave	Ste 1200	Dallas	TX	75202	214 665-6692
Galena Park ISD	Erikka Jammer	6722 Uvalde Rd		Houston	TX	77049	281 459-5300
Texas Water Development Board	Zhenwen Jia	PO Box 13231		Austin	TX	78711	512 936-0884
H-GAC	Ayodele Jibowu	3555 Timmons Ln	Ste 120	Houston	TX	77027	713 993-2418

COMPANY	NAME	ADDRESS					PHONE
TCEQ Austin TMDL	Casey Johnson	PO Box 13087		Austin	TX	78711	512 239-1505
Galveston Cty Health District	Barbara Johnston	PO Box 939		LaMarque	TX	77568	409 938-2459
TCEQ/GBEP	Steven Johnston	17041 El Camino Real	Ste 210	Houston	TX	77058	281 486-1244
	Judith L Jones	3506 Cove View	#104	Galveston	TX	77554	409 740-4247
Galveston Bay Estuary Program	Scott A Jones	17041 El Camino Real	Ste 210	Houston	TX	77058	281 486-1245
Gulf Coast Bird Observatory	Carol A Jones	103 W Hwy 332		Lake Jackson	TX	77566	979 480-0999
The Nature Conservancy	Jared Judy	4702 Hwy 146 N		Texas City	TX	77590	409 941-9114
	Jim Kachtick	9035 Hendon Ln		Houston	TX	77036	713 772-2598
Harris County PHES	Badruddin Karachiwala	2223 W Loop	Ste 529	Houston	TX	77027	713 439-6262
Stephen F Austin State University	Alexander Karatayev Ph.D	Box 13003-SFA	Biology	Nacogdoches	TX	75962	936 468-5195
TCEQ R-12 Houston	Marty Kelly	5425 Polk Ave	Ste H	Houston	TX	77023	713 767-3562
Texas State University	James Kimmel	110 Norcrest Dr		San Marcos	TX	78666	512 396-8404
Texas State University	Jerry Kimmel	110 Norcrest Dr		San Marcos	TX	78666	512 396-8404
Gahagan & Bryant	Robert Kite	10631 S Sam Houston Prkwy W		Houston	TX	77071	713 545-8015
Texas A&M University Galveston	Jae-Young Ko Ph.D	5007 Ave U		Galveston	TX	77551	409 740-4919
TSSWCB	Brian Koch	1120 Hodges Ln		Wharton	TX	77488	979 532-9496
TCEQ Austin	Christine Kolbe	PO Box 13087		Austin	TX	78711	512 239-5831
Harris County Storm Water Quality	Jon-Paul Komar	9800 NW Frwy	Ste 305	Houston	TX	77092	713 290-3091
Armand Bayou Nature Center	Mark Kramer	PO Box 58828		Houston	TX	77258	281 474-2551
TCB Inc	Kelly Krenz Doe	5757 Woodway		Houston	TX	77057	713 267-2849
US Army Corps of Engineers Galveston	Dalton Krueger	2000 Fort Point Rd		Galveston	TX	77550	409 766-3026
Texas Cooperative Extension	Chris LaChance	17000 El Camino Real	Ste 301	Houston	TX	77058	281 218-0721
East Chambers ISD	Brandi Larson	1955 St Hwy 124		Winnie	TX	77665	409 296-4183
H-GAC Texas Watch	Gib Larson	15522 Banff Dr		Houston	TX	77062	281 488-0423
Berg Oliver	Nick Laskowski	14701 St Mary's Ln	Ste 400	Houston	TX	77079	281 589-0898
Texas Parks & Wildlife	Wen Yuh Lee	3000 IH-35 S	Ste 320	Austin	TX	78704	512 912-7017
HARC	Jim Lester Ph.D	4800 Research Forest Dr		The Woodlands	TX	77381	281 364-6041
East Chambers ISD	Kristy Little	1955 St Hwy 124		Winnie	TX	77665	409 296-4183
Moffatt & Nichol	Mandy Loeffler	11011 Richmond Ave	Ste 200	Houston	TX	77042	713 977-7372
Aldine ISD	Deena Logan	13300 Chrisman Rd		Houston	TX	77039	281 985-6590
GBF/TCB	Timothy D Love	5757 Woodway	Ste 101 W	Houston	TX	77057	713 267-2788
H-GAC Texas Watch	Teri MacArthur	234 Baywood Court		Spring	TX	77386	281 381-3281
PBS&J	Jason Maldonado	1250 Wood Branch Park Dr		Houston	TX	77079	281 529-4198
Trinity River Authority	Webster Mangham	5300 S Collins		Arlington	TX	76018	817 493-5139
Trinity River Authority	Webster Mangham	5300 S Collins		Arlington	TX	76018	817 493-5139

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Texas Parks & Wildlife	Karen Marks	4200 Smith School Rd		Austin	TX	78744	512 389-8833
Harris County Storm Water Quality	R Trent Martin	9800 NW Frwy	Ste 305	Houston	TX	77092	713 290-3092
Scenic Galveston Inc	Lalise Whorton Mason	2201 Macarthur St		Houston	TX	77030	713 664-1870
Texas A&M Sea Grant College	Julie Massey	5115 Hwy 3		Dickinson	TX	77539	281 534-3413
H-GAC	Carl E Masterson	PO Box 22777		Houston	TX	77227	713 993-4561
Armand Bayou Nature Center	Christine Mattox	PO Box 58828		Houston	TX	77258	281 474-2551
Trice Educational Consulting	Sherrie Matula	15918 Cavendish Dr		Houston	TX	77059	281 486-0224
McFarlane & Associates	Robert W McFarlane	2604 Mason St		Houston	TX	77006	713 524-2927
Texas Tech University	Rachel McNew	5415 A Lehigh		Lubbock	TX	79416	806 885-4567
City of Friendswood	Melvin Measeles	1203 Timberlane		Friendswood	TX	77546	281 236-7345
TAMUG	Bill Merrell Ph.D	1001 Texas Clipper Rd		Galveston	TX	77554	409 740-4748
TCEQ R-12 Houston	Lythia Metzmeier	5425 Polk Ave	Ste H	Houston	TX	77023	713 422-8944
Galveston Bay Foundation	Courtney Miller	17324-A Hwy 3		Webster	TX	77598	281 332-3153
Texas Tech University	Lou Mills Ph.D	3419A 22nd St		Lubbock	TX	79410	806 742-2858
Galveston Bay Foundation	Vanessa Mintzer	17324-A Hwy # 3		Webster	TX	77598	281 332-3381
Texas State Soil & Water Conservation	Carter Miska	1120 Hodges Ln		Wharton	TX	77488	979 532-9496
TCEQ R-12 Houston	Courtney Mize	5425 Polk Ave	Ste H	Houston	TX	77023	713 422-8921
W Galveston Island Property Owners	Jerry Mohn	4210 Silver Reef-PBW #1		Galveston	TX	77554	409 737-5768
W Galveston Island Property Owners	Winkie Mohn	4210 Silver Reef-PBW #1		Galveston	TX	77554	409 737-5768
Texas A&M University Galveston	Paula Moreno Ph.D	705 Convent Ave		Pascagoula	MS	39567	228-762-4591
Texas General Land Office	Juan Moya	PO Box 12873		Austin	TX	78711	512 475-3735
Pasadena ISD	Catherine Munoz	6630 Wildwood Way		Houston	TX	77023	713 926-7594
U S Army Corps of Engineers	Carolyn Murphy	2000 Fort Point Rd		Galveston	TX	77553	409 766-3044
North Harris Cty Reg Water Author	Paul R Nelson	3648 FM 1960 West	#110	Houston	TX	77068	281 440-3924
J Simmons Group Inc	Tammy A Noyes	7129 N Loop E		Houston	TX	77028	713 675-5100
Texas Parks & Wildlife	Cherie O'Brien	1502 FM 517 E		Dickinson	TX	77539	281 534-0132
TAMUG	Nicci Obert	1001 Texas Clipper Rd		Galveston	TX	77554	409 740-4748
TCEQ R-12 Houston	Nwachukwu Sam Okonkwo	5425 Polk Ave	Ste H	Houston	TX	77023	713 767-3692
Texas Parks & Wildlife	Jennifer Olson	1502 FM 517 E		Dickinson	TX	77539	281 534-0129
League of Women Voters	Nancy Parra	1529 Maryland St		Houston	TX	77006	713 528-2678
US Fish & Wildlife	Steve Parris	17629 El Camino Real	#211	Houston	TX	77058	281 286-8282
Crenshaw School / GISD	Cathy Denise Parsons	PO Box 660		Galveston	TX	77553	409 684-8526
Gulf Coast Waste Disposal Authority	Gordon Pederson	910 Bay Area Blvd		Houston	TX	77058	281 488-4115
TCEQ R-12 Houston	Stacy Pentecost	5425 Polk Ave	Ste H	Houston	TX	77023	713 767-3667
TCEQ Event Manager	Sue Phillips, CMP	PO Box 13087		Austin	TX	78711	512 239-6327

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COMPANY	NAME	ADDRESS					PHONE
Texas Parks & Wildlife	Manny Pineiro	1502 FM 517 E		Dickinson	TX	77539	281 534-0129
Seabrook Wetlands Board	David Popken	1700 First St		Seabrook	TX	77586	281 291-5600
City of Baytown	Tracey Prothro	1724 Market		Baytown	TX	77520	281 420-7128
Texas A&M Galveston	Daisy Puccetti	PO Box 1675		Galveston	TX	77553	409 740-4525
River Systems Institute	Warren Pulich Jr Ph.D	Texas State University		San Marcos	TX	78666	512 245-3930
University of Houston Clear Lake	Dianna L Ramirez	1506 Goliad Ave		LaMarque	TX	77568	409 933-0839
H-GAC	Kathleen Ramsey Ph.D	PO Box 22777		Houston	TX	77227	713 499-6653
Texas A&M University	Thomas M Ravens	PO Box 1675		Galveston	TX	77553	409 740-4465
University of Houston Clear Lake	Lynne Ray	2833 Cytherea Cr		Alvin	TX	77511	281 331-8880
Texas A&M Galveston	Sammy Ray Ph.D	PO Box 1675		Galveston	TX	77553	409 740-4526
Texas Sea Grant	Ralph Rayburn	2700 Earl Rudder Frwy S	#1800	College Station	TX	77845	979 845-7526
Armand Bayou Nature Center	George Regmund	PO Box 58828		Houston	TX	77258	281 474-2551
H-GAC	Bruce Ridpath	3555 Timmons Ln	Ste 120	Houston	TX	77027	832 681-2537
Houston Advanced Research Ctr	Stephanie Ritter	4800 Research Forest Dr		The Woodlands	TX	77381	281 367-1348
University of Houston Clear Lake	Will Roach	225 Narcissus		Clear Lake Shores	TX	77565	281 910-3156
Texas General Land Office	Colleen Robertson	11811 North D St		LaPorte	TX	77571	281 471-0391
Texas Parks & Wildlife	Lance Robinson	1502 FM 517 E		Dickinson	TX	77539	281 534-0129
US Fish & Wildlife	David Rosen Ph.D	17629 El Camino Real	#211	Houston	TX	77058	281 286-8282
TCEQ R-12 Houston	Michelle Ruckstuhl	5425 Polk Ave	Ste H	Houston	TX	77023	713 767-3666
U S Army Corps of Engineers	Natalie Rund	2000 Fort Point Rd		Galveston	TX	77553	409 766-6384
H-GAC	Todd Running	3555 Timmons Ln	Ste 120	Houston	TX	77027	713 993-4549
Galveston Bay Chapter, Tx Master	Frances Ryan	7700 Seawall	#1204	Galveston	TX	77551	409 741-8547
NRG Texas	Breck Sacra	1301 McKinney		Houston	TX	77010	713 553-6433
US Fish & Wildlife	Shaun Sanchez	PO Box 278		Anahuac	TX	77514	409 267-3337
Conservation Capital LLC	Ron Sandberg	1124 Danbury Rd		Houston	TX	77055	713 956-0633
University of Houston Clear Lake	Julie Sandefur	4321 Lawrence Rd		Baytown	TX	77520	281 435-4454
TCEQ Chief Engineer	David C Schanbacher PE	PO Box 13087		Austin	TX	78711	512 239-1228
Texas Parks & Wildlife	William "Jamie" Schubert	1502 FM 517 E		Dickinson	TX	77539	281 534-0135
Texas A&M Galveston	Nancy Schultz	PO Box 1675		Galveston	TX	77553	409 740-4525
TCEQ R-12 Houston	Elizabeth Sears	5425 Polk Ave	Ste H	Houston	TX	77023	713 767-3674
LaPorte ISD	Kelly Sebelius	1510 Crescent Shores Ln		Seabrook	TX	77586	281 604-6824
USDA NRCS	Eddie Seidensticker	7705 West Bay Rd		Baytown	TX	77514	281 383-4285
TAMUG	Bill Seitz	1001 Texas Clipper Rd		Galveston	TX	77554	409 740-4748
HISD HP Carter Career	DeAnza Sharpe	1700 Gregg		Houston	TX	77020	713 226-2651
The Trust for Public Land	Linda Shead	1113 Vine St		Houston	TX	77002	713 226-7200

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COMPANY	NAME	ADDRESS					PHONE
Galveston Bay Information Center	Elizabeth A Shelton	200 Seawolf Prkwy		Galveston	TX	77554	409 740-4703
Berg Oliver Associates	David Sherrill	14701 St Mary's Ln	Ste 400	Houston	TX	77079	281 589-0898
Texas Parks & Wildlife	Kristina Shipman	3000 IH-35 S	Ste 320	Austin	TX	78704	512 912-7037
Galveston Cty Health District	Kristin Shivers	PO Box 939		LaMarque	TX	77568	409 938-2459
Kingwood College	Brian R Shmaefsky Ph.D	20000 Kingwood Dr		Kingwood	TX	77339	281 312-1609
J Simmons Group Inc	James Simmons Jr	7129 N Loop E		Houston	TX	77028	713 675-5100
Texas Cooperative Extension	Marissa Sipocz	17000 El Camino Real	Ste 301	Houston	TX	77058	281 218-6253
Texas Parks & Wildlife	Andrew Sipocz	105 San Jacinto St		LaPorte	TX	77571	281 471-3200
Galveston Bay Foundation	Philip Smith	17324-A Hwy 3		Webster	TX	77598	281 332-3381
Texas Water Development Board	Ruben Solis	PO Box 13231		Austin	TX	78711	512 936-0820
Texas Cooperative Extension	Bud Solmonsson	17000 El Camino Real	Ste 301	Houston	TX	77058	281 218-6340
Crockett Elementary Houston ISD	Lawrence Spence	2112 Crockett St		Houston	TX	77007	281 684-0288
GBWAP	Brent Stafford	17324-A Hwy 3		Webster	TX	77598	281 332-3381
Texas Seaport Museum/GHF	Sidney Steffans	Pier 21	#8	Galveston	TX	77550	409 765-6951
TCEQ Austin TMDL	Ron Stein	PO Box 13087		Austin	TX	78711	512 239-4507
Tegeler Career Center	Mrs. Karen Stocco	4949 Burke Rd		Pasadena	TX	77504	713 740-0410
Galveston Bay Foundation	Bob Stokes	17324-A Hwy # 3		Webster	TX	77598	281 332-3381
Texas Parks & Wildlife	Glen Sutton	1502 FM 517 E		Dickinson	TX	77539	281 534-0129
USDOC/NOAA/NMFS	Rusty Swafford	4700 Ave U		Galveston	TX	77551	409 766-3699
The Trust for Public Land	Holli Swick	1113 Vine St	Ste 115	Houston	TX	77002	713 226-7200
Harris County Flood Control District	Michael D Talbott	9900 Northwest Frwy		Houston	TX	77092	713 684-4000
HDR/Shiner Moseley & Assoc	Robert C Thomas	555 N Carancahua	Ste 1650	Corpus Christi	TX	78478	361 857-2211
Texas Parks & Wildlife	Andy Tirpak	1502 FM 517 E		Dickinson	TX	77539	281 534-0137
Texas Parks & Wildlife	Shannon Torrence	1502 FM 517 E		Dickinson	TX	77539	281 534-0136
Coastal Bend Bays & Estuaries	Leo Trevino	1305 N Shoreline Blvd	Ste 205	Corpus Christi	TX	78401	361 885-6202
Eddie Gray Wetlands Education Ctr	Mary Alice Trumble	1724 Market		Baytown	TX	77520	281 420-7128
Houston Zoo Inc	Tara Tucker	1513 N MacGregor		Houston	TX	77030	713 533-6543
Coastal Bend Bays & Estuaries	Jace Tunnell	1305 N Shoreline Blvd	Ste 205	Corpus Christi	TX	78401	361 885-6202
U S Geological Survey	Michael J Turco	19241 David Memorial Dr	#180	Conroe	TX	77385	936 271-5300
ISTPP	Arnold Vedlitz	TAMU 4350		College Station	TX	77843	979 862-1521
Galveston Bay Estuary Program	Mary Villareal	17041 El Camino Real	Ste 210	Houston	TX	77598	281 486-1241
Galveston Island Nature Tourism	Morton D Voller	PO Box 1468		Galveston	TX	77553	409 392-0841
Texas A&M University/GERG	Terry L Wade Ph.D	833 Graham Rd		College Station	TX	77845	979 862-2323
Texas Parks & Wildlife	Tom Wagner	1502 FM 517 E		Dickinson	TX	77539	281 534-0129
Cabeza de Vaca Group	John M Wallace	6 N Cedar Lawn Dr		Galveston	TX	77551	

COMPANY	NAME	ADDRESS					PHONE
Coastal Conservation Assoc	Jayo Washington	202 Forest Ave		Shoreacres	TX	77571	281 427-7345
PBS&J	Marisa Weber	1250 Wood Branch Pk Dr	Ste 300	Houston	TX	77079	281 493-5100
TCEQ Austin	Thomas Weber	PO Box 13087		Austin	TX	78711	512 239-6928
U S Army Corps of Engineers	Glenn Weitknecht	PO Box 1229		Galveston	TX	77550	409 766-3198
East Chambers ISD	Sarah Welch	1955 St Hwy 124		Winnie	TX	77665	409 296-4183
URS	Frederick T Werner	4303 Mountain Flower Court		Houston	TX	77059	281 480-9595
Reliant Energy	Kerry Whelan	1000 Main St	16th FL	Houston	TX	77002	713 488-8080
US Fish & Wildlife	Matthew Whitbeck	PO Box 278		Anahuac	TX	77514	409 252-4311
Harris County Flood Control District	Carolyn White	9900 Northwest Frwy		Houston	TX	77092	713 684-4000
Mayde Creek Junior High School	Erica Whitney	21101 Kingsland Blvd	#526	Katy	TX	77450	281 237-4968
Scenic Galveston Inc	Evangeline L Whorton	20 Colony Park Cr		Galveston	TX	77551	409 744-7431
Texas Parks & Wildlife	Leslie Williams	1502 FM 517 E		Dickinson	TX	77539	281 534-0129
U S Fish & Wildlife	Darrell S Williams	17629 El Camino Real		Houston	TX	77058	281 286-8282
Houston Audubon Society	Jim Winn	525 Dana Ln		Houston	TX	77024	
Moffatt & Nichol	Larry Wise	11011 Richmond Ave	Ste 200	Houston	TX	77042	713 977-7372
Texas Parks & Wildlife	Brian Witt	1502 FM 517 E		Dickinson	TX	77539	281 534-0129
Texas Parks & Wildlife	Jarrett Woodrow	1502 FM 517 E		Dickinson	TX	77539	281 534-0131
H-GAC	Jean Wright	3555 Timmons Ln	Ste 120	Houston	TX	77027	713 499-6660
US Fish & Wildlife	Catherine Yeargan	17629 El Camino Real	#211	Houston	TX	77058	281 286-8282
Texas Cooperative Extension	Charriss York	17000 El Camino Real	Ste 301	Houston	TX	77058	281 218-6253
TCEQ Registration	Barbara Young	PO Box 13087		Austin	TX	78711	512 239-1940
USDOC/NOAA/NMFS	Heather Young	4700 Ave U		Galveston	TX	77551	409 766-3699
Blinn College	Robert D Young, Jr	25945 Kickapoo Rd		Hockley	TX	77447	281 960-1196
NOAA Fisheries	Roger Zimmerman	4700 Ave U		Galveston	TX	77551	409 766-3500

Texas Commission on Environmental Quality

Eighth Biennial
State of the Bay Symposium

Exhibitor List

Hilton Galvestion Island Resort
& Galveston Island Convention Center
Galveston, Texas

January 23 - 25, 2007

State of the Bay Symposium
Exhibitor List

Fermata Inc	Robin Leonard	PO Box 5485		Austin	TX	78763	832 859-9659
GHF Harbor Tours	Elise Stephens	PO Box 2010		Galveston	TX	77553	409 765-1700
GHF Harbor Tours	Sid Steffens	PO Box 2010		Galveston	TX	77553	409 765-1700
GHF Harbor Tours	Mary Castano	PO Box 2010		Galveston	TX	77553	409 765-1700
Galveston Bay Foundation	Courtney Miller	17324-A Hwy 3		Webster	TX	77598	281 332-3381
Galveston Bay Foundation	Philip Smith	17324-A Hwy 3		Webster	TX	77598	281 332-3381
Galveston Bay Foundation	Vanessa Mintzer	17324-A Hwy 3		Webster	TX	77598	281 332-3381
Galveston Bay Foundation	Bob Stokes	17324-A Hwy 3		Webster	TX	77598	281 332-3381
Gulf of Mexico Foundation	Bobbi Reed	5403 Everhart Rd	PMB 51	Corpus Christi	TX	78411	361 882-3939
Gulf of Mexico Foundation	Quenton Dokken	5403 Everhart Rd	PMB 51	Corpus Christi	TX	78411	361 882-3939
Gulf of Mexico Foundation	Richard Gonzales	5403 Everhart Rd	PMB 51	Corpus Christi	TX	78411	361 882-3939
Gulf of Mexico Foundation	Kathryn Tunnell	5403 Everhart Rd	PMB 51	Corpus Christi	TX	78411	361 882-3939
H-GAC	Todd Running	3555 Timmons Ln		Houston	TX	77027	713 993-4549
PBS&J	Marisa Weber	1250 Wood Branch Pk		Houston	TX	77079	281 493-5100
Scenic Galveston Inc	Evangeline Whorton	20 Colony Park Cr		Galveston	TX	77551	713 664-1870
Scenic Galveston Inc	Lalise Mason	20 Colony Park Cr		Galveston	TX	77551	713 664-1870
Texas A&M University Galveston	Fred Schlemmer PhD	1001 Texas Clipper Rd		Galveston	TX	77554	409 740-4937
Texas A&M University Galveston	David Wentling PhD	1001 Texas Clipper Rd		Galveston	TX	77554	409 740-4937
URS Corporation	Susan S Ferguson	PO Box 201088		Austin	TX	78729	512 419-5455
US Army Corps of Engineers Galveston	Marilyn Uhrich	PO Box 1229		Galveston	TX	77553	409 766-3994
University of Houston Clear Lake	Heather Biggs	2700 Bay Area Blvd	#540	Houston	TX	77058	281 283-3950
University of Houston Clear Lake	George Guillen	2700 Bay Area Blvd	#540	Houston	TX	77058	281 283-3950