Session II-Room A1

GALVESTON BAY WATERSHED TRASH ACTION PLAN: PARTNERS IN LITTER PREVENTION (Lightning Round session)

Session Moderators: Erin Kinney (HARC), 8801 Gosling Rd, The Woodlands, TX 77381, (281)364-6040
Stephanie Glenn (HARC)
Cynthia Clevenger (GBEP)
Lisa Marshall (GBEP)
Amanda Hackney (Black Cat GIS)

Partners in Litter Prevention (PLP) was formed in 2017 as the Trash Summit, a meeting of non-profits, researchers, city, county, state and federal agencies who study, remove, and educate the public about litter and marine debris. Out of the Trash Summits came the Galveston Bay Watershed Trash Action Plan: A regional partnership plan for addressing litter and marine debris, a non-regulatory guideance document for improved collaboration and coordination among stakeholders. The three goals: research, reduction, and removal, are addressed within the Action Plan and reflect the activities of the stakeholders. The Galveston Bay Watershed Trash Action Plan: Partners in Litter Prevention Lightning Round* session will highlight the formation of PLP, the purpose and goals of the Action Plan, and efforts of PLP stakeholders across the three goals of the Action Plan in the Lower Galveston Bay Watershed. Presentations will cover data collection and database efforts, pilot projects examining driving factors in bayou nonpoint source pollution and litter, awareness campaigns for various kinds of marine debris, developing monitoring programs for citizen scientists, cleanup efforts across the region, and targeted plastic reduction campaigns.
Presenters included in session (alphabetical order):
Sarah Bernhardt (Bayou Preservation Association), Cynthia Clevenger (GBEP), Stephanie Glenn (HARC), Sarah Gossett Robinson (Galveston Bay Foundation), Kendall Guidroz (Houston-Galveston Area Council), Amanda Hackney (Black Cat GIS), Erin Kinney (HARC), Karla Klay (Artist Boat), Lisa Marshall (GBEP), Stennie Meadours (Plastic Pollution Prevention Partnership), Taylor Rhoades (Houston Zoo)

*A Lightning Round is a time-limited and slide-limited presentation format. This fast-paced program is intended to focus on the heart of the issues and engage the audience. After a brief introduction of the session, each presenter will give a 5-minute presentation accompanied by 1-2 slides. There will be 15 minutes for Q&A at the end of the session.

~~~~~~~~~~~~~~~~~~~
Details of presentations, in no particular order (to avoid duplication):
Introduction: Partners in Litter Prevention and the The Galveston Bay Watershed Trash Action Plan
(Cynthia Clevenger, Lisa Marshall, Stephanie Glenn, Erin Kinney, Amanda Hackney)

Erin Kinney – Galveston Bay Watershed Regional Litter and Trash Database. HARC has begun developing a database of litter and marine debris reports and cleanups in the Galveston Bay region.

Amanda Hackney – Trash Tracker and Pledge on Donttrashagoodthing.org
The Trash Tracker is an online GIS driven tool to begin gathering data on local clean up efforts. Partners are encouraged to visit the donttrashagoodthing.org website and enter basic data on
~~~~~~~~~~~~~~~~~~~

clean up events: location, date, number of participants, counts of certain items, and an estimate of the total area cleaned. Currently there is no area wide site to collect this kind of information and many groups are using various metrics to catalog trash picked up. The trash tracker aims to provide standardized data to the Galveston Bay Report Card while minimizing extra work on the part of participants.

Sarah Bernhardt – Bayou Preservation Association is partnering with the City of Houston's Bureau of Pollution Control and Prevention, Houston Health Department on their Community Health Improvement Plan (CHIP) efforts to decrease nonpoint source pollution under their goal to improve water quality.

- Identified three most littered waterways using a specific matrix to focus on in a pilot project approach. Three very different water bodies, with potentially different sources, and different communities.
  - Little White Oak Bayou
  - Bering Ditch
  - Kuhlman Gulley
- Approach: Using lessons learned from community based social marketing, engaging local community groups in each targeted watershed to identify strategies that work for each community.
- Targeted outreach has the potential to make a difference if well documented, and could point to improvements. Concept of trash begets trash.
- Why is this work important? It could motivate others in other waterways, especially if we are able to show measured success.

Karla Klay – Developing and implementing a marine debris action plan for Galveston, actions to raise awareness for beach goers and trash receptacles, and recycle centers in a zone with 7.5 million visitors (3.5 million day users from the Houston Region.)

Sarah Gossett Robinson- Galveston Bay Foundation is working with GBEP and GOMA (Gulf of Mexico Alliance) to develop a citizen science (macro) plastic/debris monitoring program and associated outreach. We'll be piloting the protocol with GBF's water monitoring volunteers but hope/plan to implement the protocol with volunteers and partner organizations throughout the watershed (you should actually be receiving an email from Cynthia about this soon as we'd like to pick your brain as we're finalizing the protocol). We plan to launch the protocol with our water monitors this October and begin associated community workshops (via T'Noya) in late fall (likely November). While the project will still be in the early-ish stages come January, we'd like to share the work we've done and the direction we hope to go.

Stennie Meadours - Plastic Pollution Prevention Partnership Update

The Plastic Pollution Prevention Partnership (P3P) was introduced at the 2016 Back the Bay Symposium as an incident command system for plastic pollution on the shorelines of the Galveston Bay Area. The P3P consists of: American Bird Conservancy, Audubon Texas, Galveston Bay Area Chapter - Texas Master Naturalist, Galveston Bay Foundation, Environmental Protection Agency, Gulf Coast Bird Observatory, Houston Audubon, Houston Zoo, Keep Bolivar Beautiful, Texas Commission on Environmental Quality, Galveston Bay Estuary Program, Texas Parks and Wildlife and Turtle Island Restoration Network. The mission statement of this partnership is ".....that initiates a coordinated and collaborative

cleanup/preventative response to plastic pollution and its impact to wildlife and water quality at accumulation spots along the shorelines of Galveston Bay."

Since January 2016 partner organizations have worked together to continue shoreline plastic cleanups and have expanded activities to include:
- Created the Galveston Bay Injured Bird Response Team
- Launched the human behavior change project "Fishing Line Recycling Campaign" currently underway.
- Hosted the 2nd Annual Plastic Pollution Prevention Symposium in October of 2019
- Sponsored three additional programs via Galveston Bay Area Chapter-Texas Master Naturalist, P3 Bayou Cleanup Crew, the Great Monofilament Bin Adventure and Nurdle Patrol.

Kendall Guidroz - Trash Bash

The mission of the Rivers, Lakes, Bays ‘N Bayous Trash Bash® (Trash Bash) is to promote environmental stewardship of our watershed through public education by utilizing hands-on educational tools and by developing partnerships between environmental, government and private organizations. This mission is closely aligned with several priorities identified in both the Galveston Bay Plan and the Galveston Bay Watershed Trash Action Plan, and in the more than twenty-five years since its inception, Trash Bash has expanded its impact far beyond a single-day cleanup event. The success of this event can be seen in the thousands of annual volunteers, the metrics of trash, tires, and recyclables collected, and the number of participants educated on other common water pollutants.

Taylor Rhoades - Houston Zoo/Plastic Free July
Started by the Plastic Free Foundation in Australia, Plastic Free July is a global movement that helps millions of people be part of the solution to plastic pollution, helping to save marine animals. Hundreds of businesses, local governments and community organizations participate in the Plastic Free July challenge each year, working to reduce single-use plastic in their communities. Since going single-use plastic bag, bottle, and straw free, the Houston Zoo has participated in this challenge for the past four years, encouraging staff members to make changes to their daily plastic consumption habits, both on an individual level, and within their respective departments. This talk will showcase how the Houston Zoo was inspired to take part in the Plastic Free July challenge, successes and challenges faced since becoming involved in workplace plastic reduction efforts, and goals looking ahead. This presentation will also include an invitation to all participating organizations at the State of the Bay Symposium to join together in the 2020 Plastic Free July Challenge, further showing how Texas is a leader in reducing plastic pollution to save wildlife.

Session II-Room A2

MONITORING BOTTLENOSE DOLPHINS IN GALVESTON BAY, TEXAS

Kristi Fazioli – Environmental Institute of Houston, University of Houston-Clear Lake, Houston, TX

George Guillen - Environmental Institute of Houston, University of Houston-Clear Lake, Houston, TX

Vanessa Mintzer – The Galveston Bay Foundation, Webster, TX

Critical data gaps exist for all Texas bay, sound and estuary bottlenose dolphin (*Tursiops truncatus*) stocks and managers consider Galveston Bay a high priority for research. Through long-term photo-id monitoring, and remote biopsy darting, the Galveston Bay Dolphin Research and Conservation Program (GDRCP) program aims to tackle fundamental questions pertaining to the population's ecology, health and behavior. A variety of factors influence abundance and distribution patterns of coastal dolphins, including physical topography, water quality including salinity, turbidity and temperature, prey distribution and abundance, predator avoidance, social and behavioral patterns, and anthropogenic disturbance.

In Galveston Bay, elevated exposure to contaminants combined with anthropogenic and environmental stressors such as freshwater flooding, habitat loss, harmful algal blooms, noise pollution and human and fisheries interactions, create a high-risk environment, especially for resident dolphins that may spend their entire life dependent on the estuary and its resources. As a federally protected species under the Marine Mammal Protection Act, it is imperative for long-term monitoring and research on these dolphins to provide data that will inform future management decisions and assessment of impacts from natural and anthropogenic disturbances.

As of July 2019, the GDRCP has conducted 204 boat-based surveys, resulting in the observation of 7,847 dolphins in 804 groups. A total of 669 dolphins have been uniquely identified through photo-identification and over 50 dolphins have been remotely biopsy sampled for genetic, contaminant and stable isotope analyses. While some dolphins may be transient or temporary residents, data suggests high levels of site fidelity within the bay for many individuals. Seasonal trends suggest annual habitat shifts, with increased usage of upper bay during warm summer and fall months (water temperatures >20°C). Dolphins exposed to freshwater during flood events exhibit skin lesions consistent with degeneration and ulceration of the epidermis combined with secondary infection from opportunistic pathogens. This 'freshwater skin disease' is a topic of concern for estuarine dolphins throughout the Gulf of Mexico, and research in Galveston Bay is ongoing. A case study, conducted by the GDRCP after Hurricane Harvey has provided the first step toward understanding how flood events effect dolphins in Galveston Bay.

Session II-Room A2

STATUS OF GALVESTON BAY TERRAPIN POPULATIONS AND POTENTIAL THREATS TO THE SPECIES.

George Guillen, Environmental Institute of Houston (EIH), University of Houston-Clear Lake (UHCL), Houston, TX

Mandi Gordon, EIH, UHCL, Houston, TX

Jenny Oakley, EIH, UHCL, Houston, TX

The Texas Diamond-backed terrapin, *Malaclemys terrapin littoralis*, is found in Texas estuaries from Sabine Lake to Nueces Bay. Diamond-backed terrapin possess limited osmoregulatory ability and preferentially utilize mesohaline saltmarsh and associated habitats for foraging and nesting. The primary objective of this ongoing study was to determine temporal and spatial trends in the relative density of terrapin within Galveston Bay and identify factors affecting their abundance and distribution. We examined historical data and collected new data including interviews with bay user groups and field population studies. Large numbers of terrapin were first reported in 1841 in Galveston Bay near oyster reefs and adjacent islands. Declines in terrapin reported from 1841 to 1975 where likely due to initial over harvesting by a targeted fishing industry, followed by the shell dredging industry and oyster fishery which removed large amounts of oyster shell and eliminated numerous islands, intertidal reef, and shell beaches where terrapin nest and forage. Today terrapin have been observed frequently foraging and infrequently nesting in South Deer Island and the Moses Lake area where remaining small isolated shell hash islands and beaches exist. During a period of 10 years (2008 to 2019) DTWG in the vicinity of South and North Deer Islands, Sportsman Road, Galveston Island, and Greens Lake were monitored using a mark-recapture methods using carapace notching and PIT tags with infrequent supplementary radio and acoustic telemetry. Abundance estimates have fluctuated considerably between years suggesting a fairly open population that likely moves between adjacent islands and the mainland. Based on examination of data collected by TPWD blue crab bycatch program and collection of injured terrapin it appears that today the major sources of anthropogenic mortality in island populations of DTWG appear to be bycatch associated with the blue crab fishery and vessel collisions. Due to a small home range, projected sea level rise, historical and projected losses of nesting habitat, DTWG will face an increased risk of local extirpation. Expanded routine monitoring within Galveston Bay is needed to improve population estimates and trends to assess impacts associated with future changes in the estuary. Potential future impacts on terrapin associated with planned coastal barrier projects are discussed in light of the local population dynamics and habitat associations.

Session II-Room A2

MOVEMENT PATTERNS AND HABITAT USE OF SEA TURTLES ON THE UPPER TEXAS COAST: PROTECTING AND SUSTAINING LIVING RESOURCES

Christopher D. Marshall, Department of Marine Biology and
Gulf Center for Sea Turtle Research, Texas A&M University at Galveston, Galveston, TX

Sea turtles are now in every estuarine and coastal system in Texas. However, the majority of the in-water sea turtle monitoring work has occurred in south Texas. There has been little-to-no long-term, in-water monitoring of sea turtles on the upper Texas coast. A mark-recapture study for sea turtles on the upper Texas coast was re-initiated by Texas A&M University at Galveston Campus in 2018. The focus of in-water work on the upper Texas coast and the Galveston Bay Estuary System (GBES) is to address gaps in our understanding of Kemp's ridley (*Lepidochelys kempii*), green (*Chelonia mydas*) and loggerhead (*Caretta caretta*) sea turtle natural history in this region.

This mark-recapture program allows us to identify what species are using the region and to attain population demographics such as: population size, density and age/size structure and longitudinal information regarding occurrence, relative abundance and growth. This program also focuses on understanding the movement patterns, habitat needs and health of these three sea turtle species in the GBES. As part the health assessment, the prevalence of cutaneous fibropapilloma tumors (FP) is being documented, blood is being collected to comprise a blood plasma baseline and overall health is being assessed by calculating a Body Condition index.

The on-going goals of the study are to capture sea turtles of any size and species. Once captured we, 1) apply flipper, PIT, acoustic and satellite tags, 2) collect mass and morphometric data, 3) conduct a health assessment, and 4) collect biopsies for stable isotope analyses. These species are currently listed as species of greatest conservation need by the Texas Conservation Action Plan (TPWD, 2012). Kemp's ridley sea turtles are the most critically endangered sea turtles in the world (LE, TPWD, 2012). Green sea turtles are threatened (LT) and loggerheads are endangered (LE). Data regarding habitat use, and movement patterns of these ESA-listed and threatened species are needed to better evaluate stock structure and implement spatially explicit management strategies in the western Gulf of Mexico.

During the past 18 months, both juvenile green and loggerhead turtles have been captured in the GBES. Numerous green turtles presented with FP tumors. Acoustic tags are providing fine-scale movement data of sea turtles moving in and out of estuaries through major passes (e.g., Galveston and San Luis Passes), while satellite tags provide broad-scale movement data through habitats and allow us to track the movement of turtles to and from coastal habitats. Acoustic tagging of sea turtles benefits from an established network of acoustic tag receivers in both Galveston Pass and San Luis Pass, and throughout the GBES, by colleagues in the Department of Marine Biology at Texas A&M University at Galveston (TAMUG). Current evidence from recaptures suggest that green sea turtles show great site fidelity, have a small home range and do not leave Christmas Bay even during risks of cold-stunning. The abundant seagrass habitat is a rich resource that is contributing to rapid growth and size while minimizing energetic costs of movement.

Session II-Room A2

IMPACT OF SALINIZATION EVENTS ON AMERICAN ALLIGATORS

Patricia C.Faulkner[1]
David Hala[1]
Lene H. Petersen[1]

[1]Department of Marine Biology, Texas A&M University, Galveston, Texas, USA

American alligators (*Alligator mississippiensis*) are native to the southeastern United States. They are mainly found in freshwater but can forage in brackish waters and have also been reported in near-shore environments. However, alligators cannot tolerate saline environments for prolonged periods of time without access to freshwater. Many alligator habitats are prone to frequent saltwater intrusions from storm surges that can push seawater into in-shore freshwater areas. These intrusions can be both persistent (lasting ~1 year) and severe (~24 ‰ or 24 parts per thousand salt concentration), and can have significant negative effects on freshwater organisms. Rivers, lakes and freshwater wetlands are also frequently exposed to salinization due to anthropogenic perturbations causing changes in freshwater or underground water flow. Furthermore, gradually rising sea levels can introduce saline water into inland groundwater fed wetlands resulting in salinization of inland areas. Finally, predicted impacts of salinization are higher for freshwater than saltwater marshes in Gulf of Mexico coastal areas.

The inability of alligators to tolerate saline environments may impact alligator populations in vulnerable areas. As alligators are a keystone species and apex predators, a decline in their numbers can negatively impact ecosystems. Alligators further provide significant revenue for Gulf of Mexico states from hunting, ecotourism and alligator farming. To this end, we set out to determine the tolerance of juvenile American alligators exposed to even low levels of salinity (12 ‰) for short or prolonged periods of time. We studied changes in the Renin–Angiotensin II–Aldosterone System (RAAS), which is an endocrine system responsible for regulating salt/water balance in vertebrates. Both short- (7 days) and long-term (5 weeks) salinity stress caused significantly elevated electrolyte levels in juvenile alligators, while there was significant reductions in the RAAS hormone angiotensin II. Surprisingly, there were no changes in aldosterone levels, which is a hormone known to exert direct effects on kidney ion absorption/excretion. Dehydration was evident in both studies (significant after 5 weeks 12 ‰ exposure), demonstrating a low tolerance of alligators to saline environments.

Juvenile alligators, although sexually immature, produce steroid hormones that are needed to support gonad growth and reproductive maturity. We therefore also assessed changes in reproductive hormones following short- and long-term exposure to 12 ‰ saltwater. Interestingly, short- and long-term 12 ‰ saltwater exposure differently affected androgen, progestogen and estrogen steroid hormone levels, demonstrating time-dependent saltwater effects on gonadal steroidogenesis. Collectively, plasma steroid hormone analysis along with observed changes in gonad histology from male and female alligators showed marked changes between treatment groups. The implications of these changes suggest potential long-term reproductive effects under salinity exposure.

Understanding alligator physiological responses to salinity stress is important for informing management or conservation decisions to protect wild alligator populations. A decline in alligator populations could have negative effects on the local ecology and economy, and it is therefore imperative to assess the impacts of salinization on this indigenous and under-studied reptile.

Session II-Room A3

NRCS Coastal Zone Soil Survey in Texas

Jon Weidenfeld
Soil Scientist
Rosenberg, Texas

Coastal Zone Soil Survey provides valuable information for planning and managing areas that have high urban and significant ecological values while exposed to high hazard potentials. When coastal areas are healthy and intact, they provide valuable services — and we rely on coastal areas as places to live, work, swim, boat, fish, and transport goods. Through the Coastal Zone Soil Survey, the Natural Resources Conservation Service (NRCS) is gathering valuable information to assist in predicting and explaining soil distributions and functions that can help identify healthy ecosystems, determine where to focus restoration efforts, and detect early warning signs of degradation. This vital work will assist all of us in making wise decisions concerning our coastal natural resources.

As a member of the National Cooperative Soil Survey, NRCS is the lead Federal agency for mapping and interpreting our nation's soil resources, including in our coastal zone areas. NRCS supports rigorous scientific content from field data gathering and research; diverse and uniquely effective partnerships; and modern techniques to produce spatial and tabular seamless soil surveys as well as timely distribution of the data to all users.

NRCS Activities with Coastal Conservation and Aquaculture

Robert Ziehr Natural resources Manager
Temple, Texas

Natural Resources Conservation Service (NRCS) provides leadership in a partnership with landowners, operators, and producers in conserving, maintaining, and improving our natural resources. The NRCS provides farmers and ranchers with financial and technical assistance to voluntarily put conservation on the ground. All programs are voluntary and offer science-based solutions that benefit both the landowner and the environment.

Traditionally the NRCS has worked from the shoreline inland with traditional operations. Emerging issues such as climate change, need for coastal resiliency, estuary restoration, and Texas starting an aquaculture program illustrated the need for a new and different set of conservation standards and practices.

Session II-Room A3

NRCS Soil Health Activities Along the Coast

Alan Stahnke State Soil Scientist
Temple, Texas

NRCS has been promoting soil health building practices for several years now. Managing for soil health (improved soil function) is mostly a matter of maintaining suitable habitat for the myriad of creatures that comprise the soil food web. This can be accomplished by disturbing the soil as little as possible, growing as many different species of plants as practical, keeping living plants in the soil as often as possible, and keeping the soil covered all the time.

The soil health principles that the NRCS manages for provide many ecosystems services both on the farm and surrounding communities to include our bays and estuaries. We can look at previously installed Soil Health Management Practices and calculate ecosystem services such as carbon sequestration, increased water holding capacity, and reduction in erosion.

Session II-Room A3

Building Healthy Soils in a Backyard

Brian Koch
Regional Watershed Coordinator
Texas State Soil & Water Conservation Board

Soil Health has been an increasingly popular buzzword for basically following more natural principles to produce food and fiber, by increasing soil organic matter. There are 5 basic principles one can follow in their operation to build healthier soil, minimizing disturbance, keeping the ground covered, maintaining continuous living roots, increasing plant biodiversity, and introducing livestock. In my presentation, I will describe how I follow these 5 principles to grow healthy and fresh food for my family, while at the same time making my water use more efficient, decreasing fertilizer inputs and creating better habitat for birds and pollinator insects.

Session II-Room A4

Large Scale Coastal Restoration Concepts for the Texas Upper Coast Barrier Islands and the Present Availability of Sediment Sources: How Much Sediment is Needed?

Carla Kartman[(1)] and Juan Moya[(2)]

(1) Carla Kartman, Texas General Land Office, Coastal Planning Program, Austin, Texas.
(2) Juan Moya, Freese and Nichols, Inc., Coastal Program, Austin, Texas.

In November of 2015, the Texas General Land Office (GLO) and the U.S. Army Corps of Engineers (USACE) started a study on the actions that could be taken to ensure the Texas coast remains resilient for future generations. The main goal has been a study that: Protects lives, Property, jobs and the environment; Replenishes eroding sand dunes and beaches; Helps restore coastal wildlife habitats; And does so with minimal disruption of what makes the Galveston Bay area community so unique. The Project was called the Coastal Texas Protection and Restoration Feasibility Study, also known as the Coastal Texas Study. Under this study, USACE and GLO initiated an Environmental Impact Statement for the Texas Coastal Study. One of the main objectives of this study is to develop risk reduction (protection) measures to the Texas coastal barrier islands (TBIs) and the infrastructure, communities and habitats that live on them.

The TBIs are considered the first line of defense during storms and hurricanes protecting bays and Gulf shorelines and watersheds. Geomorphologically speaking, TBIs include barrier shorelines, islands, and headlands; inlets, beaches, dunes, wetlands and marshes among others. From the ecological point of view, these geomorphological features are the substrate of bird rookery islands, oyster reefs, marshes and seagrass beds. In conclusion: TBIs provide important, essential and critical substrate habitats for a wide variety of terrestrial and aquatic species on the Gulf and bays sides for marine and the fresher estuarine ecosystems.

In order to restore these TBIs and their geomorphic features, USACE and GLO need to identify at least 170,000,000 cubic yards of sediment to restore and develop sustainable alternatives to protect the TBIs. This presentation shows the steps GLO is taking to identify the geological units that have availability of sediment sources for coastal restoration on the areas recommended by the Texas Coastal Study. As the result of this effort, the Texas coastal geology is being reclassified with a non-traditional approach on the availability of sand by reclassifying the Beaumont Formation and the Holocene deposits on the coast for the sediments needed for coastal restoration. The results are being compared with the analysis of the TBIs considering their sustainability. Some key geomorphic features were compared to understand the trends of the TBIs and determine which specific features and sub-features have the potential for fast changes or potential disappearance though breaching or any other similar process. The comparison factors included: Age, geologic migration rates, shoreline migration rates, dune and ridge elevation, washover dynamics, geologic thickness, probability of rollback, navigation influence, engineering structural influence, magnitude of aeolian processes, availability of sediments for restoration, relative subsidence, flood potential and the probability of breaching. The main question is: how much sediment will be needed to sustain these features? This presentation plays with different variables of physical conditions of the TBIs vs the sediments needed and the sediments available in the geological formations of the region. It finally presents several scenarios on the future steps that must be taken to complete these needed restoration projects.

Session II-Room A4

COASTAL TEXAS PROTECTION AND RESTORATION FEASIBILITY STUDY: LARGE SCALE ECOSYSTEM RESTORATION ALONG THE TEXAS COAST

Dianna Ramirez, Texas General Land Office, La Porte,Texas

The U.S. Army Corps of Engineers (USACE) and the Texas General Land Office (GLO) are partners in the Coastal Texas Protection & Restoration Feasibility Study (Coastal Texas Study), a $19.8 million study to design potential protection and restoration solutions that would promote long-term resilience for the entire coast of Texas. The GLO and USACE have developed a draft comprehensive plan that includes storm surge risk reduction measures and large-scale ecosystem restoration project. The Tentatively Selected Plan (TSP) identified ecosystem restoration measures along the Texas coast. The projects were selected to restore and maintain thousands of acres of habitat, and to maintain crucial geomorphological feature. The Coastal Texas Study was developed to work in concert with the GLO Texas Coastal Resiliency Master plan, that identifies 123 projects selected by coastal experts as best for enhancing coastal resiliency.

Session II-Room A4

OVERVIEW OF THE 2019 TEXAS COASTAL RESILIENCY MASTER PLAN

Tony Williams, Coastal Resources, Texas General Land Office, Austin, TX

With the 2019 Texas Coastal Resiliency Master Plan, the Texas General Land Office provides a framework to protect coastal communities, wildlife habitats, and infrastructure from coastal hazards such as flooding, storm surge damage, erosion, habitat loss, and adverse impacts to water quality. The 2019 Resiliency Plan builds on the framework and momentum of the 2017 iteration of the Resiliency Plan to communicate the value and vulnerability of the coastal region and ultimately recommends resiliency actions, strategies, and projects for funding and implementation. Projects proposed within the 2019 Resiliency Plan were vetted and prioritized through a locally-driven planning process established from input from regional Technical Advisory Committees. Coastal modeling efforts were also undertaken during the 2019 planning process to estimate future landscape changes, storm surge inundation areas, and potential losses to infrastructure. This presentation will deliver an overview of the planning process, summarize the modeling results, and provide information on some of the various projects proposed within the Resiliency Plan that offer nature-based as well as structural and non-structural solutions to our state's coastal issues of concern. Project types proposed in the Resiliency Plan include aspects of marsh creation/restoration, shoreline stabilization, beneficial use of dredge material, land conservation, beach nourishment, dune restoration, hydrologic connectivity, and nonpoint source pollution reduction. The Resiliency Plan aims to provide adaptive management, stakeholder engagement opportunities, and long-term coastal planning for the State of Texas.