

Session VI-Room A1

COMMUNITY-CENTERED APPROACHES TO BOATER WASTE EDUCATION

Ted Driscoll, Outreach and Advocacy Team, Galveston Bay Foundation, Houston, Texas

Galveston Bay Foundation's Water Programs focus on educating and informing watershed residents of their impacts to our local water quality, and the actions they can take to reduce their individual and collective impact. By nature, behavior change campaigns such as these require outreach strategies targeted at specific communities using campaigns informed by feedback directly from the community itself. Galveston Bay Foundation's Boater Waste Education Campaign deploys this community-based model to engage the Bay's boating community in actions boaters can take to ensure a future where Galveston Bay has enough clean water to prosper and support the lifestyle many generations of families have come to enjoy. This presentation will review the strategies and methodologies behind the Galveston Bay Foundation's Boater Waste Education Campaign to effectively implement these strategies. It will place particular emphasis on the Community Based Social Marketing principals that inspired the recently expanded outreach and education efforts that have shown such success engaging citizens.

The Boater Waste Education Campaign has provided an opportunity to build individual capacity within the community by creating a more scientifically literate and environmentally aware boating community that strives to beneficially impact local water quality through reducing the prevalence of fecal bacteria contamination. The Boater Waste Education Campaign can lead to direct improvements in water quality by educating boaters, collecting and communicating environmental data to the public, building partnerships and increasing stakeholder interest in clean water, and collaborating with authorities to increase reporting and enforcement of illegal boater waste discharges.

To help inform the campaign, Galveston Bay Foundation interviewed several hundred recreational boaters over the course of three different summers to better understand the barriers and benefits to clean boating practices. Data from these surveys showed that, in large part, illegal boater waste discharge is the result of a lack of knowledge on pumpout facilities, lack of enforcement and understanding of potential environmental and public health impacts. Additionally, the actions of a few seem to impact many within the community. As a result, Galveston Bay Foundation utilized tools based on Community-Based Social Marketing recommendations to reduce these barriers to proper waste disposal and enhance its perceived benefits.

These tools were launched through the campaign's "Pump, Don't Dump" program. This program implores boaters to protect Galveston Bay by properly disposing of boat sewage produced while onboard their vessel. Although there are many origins of bacteria, Pump Don't Dump highlights actions boaters can take to directly improve our bay. These actions include pumping out marine heads at one of Galveston Bay's 29 pump-out facilities, and reporting boater waste discharges to the proper authorities through GBF's pollution-reporting tool, Galveston Bay Action Network (GBAN). This presentation will highlight the evolution of these tools based on boater survey findings, including the development of resources to create campaign "spokespersons" out of existing community influencers and leaders.

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OYSTER GARDENING – A PARTNERSHIP OF SCHOOLS, NON-PROFITS, AND COMMUNITY

Maureen Nolan-Wilde – Galveston Bay Area Chapter – TX Master Naturalist

This is a success story about a partnership between the Galveston Bay Area Chapter – Texas Master Naturalist (GBAC-TMN), Galveston Bay Foundation (GBF), Galveston's L. A. Morgan elementary school and members of the Tiki Island community.

This partnership kicked off with a presentation given by GBAC-TMN to second graders at Galveston's L.A. Morgan elementary school, an under-served school, on oyster gardening at Tiki Island. As a result, the students joined our 2019 efforts by writing over 200 messages of encouragement to future baby oysters (spat) on shell provided by GBF.

This community project was started by GBAC-TMN in 2017 with the help of GBF. We enlisted five Tiki families and put 25 oyster gardens into our waters. Word about the project spread quickly through articles featured in the local newspaper, a dedicated Facebook page, presentations to the community, and word of mouth. In 2019, 35 Tiki families are involved, fostering 180 oyster gardens under the guidance of GBAC-TMN and GBF.

At this year's garden-building event at the beginning of the season, we were able to utilize the oyster shell that included messages written by Morgan students. These shells were in high demand for new oyster gardens and prompted some Tiki residents to ask their grandchildren to write messages of their own to further encourage the recruitment and growth of spat.

Our oyster gardening community understands that the oysters we are growing are going to be used for restoration efforts and not for eating. However, we encourage participants to eat oysters at restaurants that choose to participate in GBF's innovative shell reclamation program.

Participants often host Tiki Island Spat Happy Hours for their neighbors and grandchildren when gardens are taken out of the water, washed down with fresh water, and checked for spat and other creatures.

We post regular spat updates and share information about oysters on the Tiki Island Spat Lovers Facebook page as well as community and personal pages. Participants are asked to share what they are finding in their gardens along with the spat, including shrimp, crabs and various fish. The shell featuring messages from the second-graders feature prominently in these posts.

GBAC-TMN will be returning to Morgan in late fall after the oyster gardening season is finished. The 130 students who participated in the program will be hosted to a presentation on the success of the project and how they were able to help us, GBF, and the oyster population of Galveston Bay.

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THE GREAT MONOFILAMENT FISHING LINE RECYCLING ADVENTURE

Rick Becker – Galveston Bay Area Chapter – TX Master Naturalist

Susette Mahaffey – Galveston Bay Area Chapter – TX Master Naturalist

Keith Mahaffey – Galveston Bay Area Chapter – TX Master Naturalist

Stennie Meadors – Galveston Bay Area Chapter – TX Master Naturalist

Maureen Nolan-Wilde – Galveston Bay Area Chapter – TX Master Naturalist

Sandy Parker – Galveston Bay Area Chapter – TX Master Naturalist

Oral and/or Poster or Dedicated Presentation – Engage Communities

Fishing is a great outdoor activity for the entire family and monofilament line is an essential part of fishing tackle. Its flexibility, durability and hard-to-see nature make monofilament line attractive to anglers but make it a serious problem when it is improperly discarded into the environment.

- Monofilament line is not biodegradable and can last more than 600 years
- It cannot be recycled by normal plastic recycling centers
- Almost invisible, it entangles animals which leads to injury, drowning or starvation
- Swimmers can become entangled, leading to dangerous or fatal situations
- It can foul boat propellers and shafts resulting in expensive repairs
- Discarded in the trash, monofilament line can end up back in the environment when birds scavenge the landfills and use it as nest building material

In mid-2018, members of the Galveston Bay Area Chapter of Texas Master Naturalists were introduced to the Texas Monofilament Recovery & Recycling Program. Stewarded by Sea Grant Texas, the program encouraged people to construct and install fishing line tubes, register them, collect line from the tubes for recycling and report the amounts collected. Upon investigation it was discovered that only 14 tubes had been registered in Galveston County.

Galveston Bay Area Master Naturalists partnered with Sea Grant Texas to develop a managed, sustainable solution to remove monofilament line from the environment and recycle it. A project was initiated to locate all of the monofilament tubes in Galveston County. A search by Master Naturalist teams discovered over 90 tubes. While these tubes were installed with the best of intentions, many had been abandoned and were non-functional. Each tube was described and GPS mapped. A Google map was created and volunteers were recruited to monitor the tubes. Project plans, goals and data repositories were established to ensure long-term project sustainability. Outreach and communication teams created a Facebook site, offered Beach Heroes programs in local schools and set up booths at local fishing tournaments and nature events to encourage community engagement. Our project was featured in the August copy of the Galveston County Daily News Coastal Magazine

Now, anglers can deposit their used line in these tubes and volunteers will collect, clean and ship the line to Berkley Tackle Company in Spirit Lake, Iowa to be recycled. Berkley has the special equipment to recycle monofilament line, turning it into plastic feedstock to make fishing line spools and park benches.

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BENEFICIAL USE OF DREDGE MATERIAL FOR RESTORATION OF PIERCE MARSH, GALVESTON BAY, TEXAS

Philip Smith, Galveston Bay Foundation, Houston, TX

Pierce Marsh, located just north of West (Galveston) Bay and the Gulf Intercoastal Waterway (GIWW), has been a focal point of marsh restoration since the 1990s, when the Galveston Bay Foundation began its wetlands restoration work. Early projects were small in scale and mostly community-based, despite the logistical difficulties in accessing the site with volunteers. Methods used have ranged from simple marsh grass transplanting, to construction of earthen terraces or berms in various configurations, to the beneficial use (“BU”) of dredge materials. Most recently, a partnership between the Galveston Bay Foundation, U.S. Army Corps of Engineers, and the NRDA Trustees resulted in a marsh restoration project which beneficially utilized dredge materials from the GIWW. The project has seen great success in marsh restoration within Pierce Marsh and has opened the door for future BU opportunities.

The BU project completed in 2016, restored approximately 80 acres of intertidal marsh complex by beneficially utilizing just over 179,000 cubic yards of dredge material from an adjacent navigation dredge project conducted by the U.S. Army Corps of Engineers (USACE). By beneficially utilizing the material, the project saved capacity in existing disposal areas as well as restored vital fisheries habitat in Galveston Bay. The site was seeded with locally harvested smooth cordgrass seeds over a two-year period. Seeding efforts were extremely successful, and as of Spring 2019, the restored marsh was flourishing.

Adding to the success of the project are the economic savings that BU projects can take advantage of. By partnering with USACE, project partners were only responsible for paying the incremental costs associated with placing the dredge material at the restoration site rather than the typically used USACE dredge material placement areas. In this scenario, the restoration project did not have to pay a contractor for initial dredging costs or mobilization and demobilization costs, which can significantly impact project costs overall and raise the “per-acre restored” cost.

The project also set the example in Texas that a partnership between NGOs, state agencies, and federal agencies, including USACE, can work within the tight constraints of USACE contracting requirements to utilize dredge material to benefit the environment and fisheries instead of placing the material into a disposal area. All these benefits were attainable at no cost to the initial federal dredging project through the NRDA Trustees and Galveston Bay Foundation working to secure funds for incremental project costs.

Because the project worked so well, both from the operational end and in the successful restoration of 80 acres of intertidal marsh, project partners have seized on the opportunity to do more under the same model. Since the project was completed, additional funding has been secured to engineer and design more BU opportunities with Pierce Marsh as well as other sites along the Texas coast. Future funding has also been secured to complete an additional 150 acres

of marsh restoration in Pierce Marsh through a continued partnership between the Galveston Bay Foundation, the NRDA Trustees, and USACE.

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Making the Watershed Connection for Healthy Stream Corridors

Sarah P. Bernhardt, Ph.D., President & CEO, Bayou Preservation Association, Houston, TX

Linda R. Shead, P.E., Vice Chair, Bayou Preservation Association, Houston, TX

In addressing the health of watersheds and stream corridors, it can be helpful to consider profile, cross-section, and plan views of the watershed. The plan view helps with a holistic perspective of the entire Lower Galveston Bay Watershed, illuminating the interconnectedness of area streams and Galveston Bay, and taking it beyond just a bayfront perspective. The profile view helps with seeing upstream influences on the downstream. The cross-section view helps make clearer the connection between what happens in the uplands of the watershed and what results in the stream channel – it's all connected by rainfall and runoff.

For purposes of this presentation, we will focus on the cross-sectional view, that is, from uplands down to the floodplain – which is comprised of riparian areas, the stream bank and the stream channel – and then back “up” the other side of the watershed. What happens on those uplands and in those riparian areas has direct and indirect impacts on the stream itself and ultimately Galveston Bay, whether through water quantity, water quality, channel stability, vegetation health, and/or wildlife diversity.

Healthily functioning watersheds have natural hydrological functions – capturing, storing, and releasing water – and natural ecological functions – providing diverse sites for biogeochemical reactions and providing habitat for plants and animals. Within those watersheds, healthily functioning riparian areas – the transitional band of vegetation between streams and their uplands – have even more specific natural functions: dissipate energy from high-flow events; protect channel banks from excessive erosion; stabilize channels; trap sediment; build floodplains; store water; recharge shallow aquifers; and sustain base flow. These functions are dependent on the presence of specific vegetation types and on their appropriate management.

For the Lower Galveston Bay Watershed, its heavily urbanized areas and diverse human-based and natural communities make restoration of all the natural functions of watersheds and riparian areas impossible. Furthermore, there is no one magic bullet, whatever the targeted function being addressed. Yet, wherever feasible, restoration efforts incrementally improve the functions and associated values of watersheds and riparian areas, which, in turn, improve the streams, the Bay, and the quality of life for all, including reducing flood damages from storm events.

What then are the pieces of restoration that can be accomplished, and where does it make sense to do so? How do we make and foster an understanding of the interconnectedness of area streams and Galveston Bay for the residents, workers, organizations, government entities, and businesses within the lower watershed? The connection can, in turn, lead to a shared collective view of the roles we all play in maintaining / restoring healthy stream corridors, with all their attendant benefits for the Bay environment and our quality of life.

Bayou Preservation is taking a multi-pronged approach to these issues, from outreach and education programs for area citizens to on-the-ground vegetation management projects to advocacy for policies and projects that support improved watershed management. All of these efforts incorporate Bayou Preservation's core values of science-based policies and actions,

collaboration, and community. This presentation will summarize these approaches, their benefits, applicability, reported or perceived successes, and lessons learned.

Session VI-Room A3

TREES FOR WATER: INTEGRATING FORESTRY PRACTICES IN WATERSHED PLANNING

Justin Bower, Community and Environmental Planning, Houston-Galveston Area Council,
Houston, Texas

Water quality and quantity issues are among the most pressing challenges for the Houston-Galveston region. Polluted waterways, flooding, and drought have affected millions in the Galveston Bay watershed and are exacerbated by the area's rapid development. At the same time, the integrity of our forest systems and the ecosystems services they provide are equally impacted by land use changes. The strong link between the health of our forests, including our urban forests, and our water challenges has increasingly been at the forefront of state and local efforts to bridge the gap between their respective planning processes. Forestry best practices can have pronounced beneficial impacts on our water resources and integrating forestry in water issues raises the awareness and potential resources for forestry. In addition to consideration in flood mitigation planning, watershed protection planning efforts represent an ideal nexus between the two adjacent spheres of water and forestry projects.

This presentation will focus on local and regional efforts to identify and capitalize on opportunities to link forestry and water efforts. The presenter will discuss tangible benefits of forestry practices for water quality and quantity planning. Additionally, the presenter will highlight benefits of integration for forestry efforts. Specific focus will be given to how forestry practices, especially in urban forests, can be coordinated with Clean Water Act Section 319(h) watershed protection plans and Total Maximum Daily Load Implementation Plans. Case studies will highlight local projects (e.g., the West Fork San Jacinto River and Lake Creek Watershed Protection Plan) and regional partnerships that have benefitted the Galveston Bay Watershed.

Attendees should leave the presentation with increased understanding of the potential shared values of these practice areas and ideas for integrating them.

What is the goal of the session?

Session VI-Room A3

UTILIZING A BASIN-WIDE APPROACH TO ADDRESS WATER QUALITY IMPAIRMENTS

Steven Johnston, Community and Environmental Planning, Houston-Galveston Area Council,
Houston, Texas

Impairments to water body use standards affect human and aquatic life throughout the Houston-Galveston Area Council's 13-county region. The largest single use impairment is contact recreation due to elevated levels of fecal bacteria. Fecal bacteria present a public health concern, and investments to remove the impairment can be substantial. Watershed-based planning is the first step to address impairments, ranging from studies to determine pollutant loads and source reduction requirements to engaging with watershed stakeholders to identify practical voluntary practices to reduce pollutant loads and development of a reduction plan leading to implementation.

A major challenge to watershed-based planning efforts is sustaining the engagement process that includes stakeholders with a myriad of interests; proving difficult to maintain the stakeholder base from the watershed planning stage and into and through implementation. This is especially true when the impairments cover numerous watersheds, effect entire basins, span multiple counties and cross political subdivisions - how do you prevent stakeholder fatigue, conserve limited resources and deliver a pollutant reduction plan that can be successfully implemented? The presenter will explore this challenge while presenting the state of Texas' and U.S. EPA's basin approach to watershed-based planning.

Attendees should walk away from the presentation knowing more about the region's water quality impairments, watershed-based planning process, stakeholder engagement and challenges and opportunities that present when seeking to improve water quality.

Session VI-Room A3

HEADWATERS TO BAYWATERS (H2B)

Mary Anne Piacentini, Katy Prairie Conservancy and H2B Partners, Houston, Texas

Headwaters to Baywaters (H2B) is an initiative to increase riparian conservation within the Houston Galveston region. That is, its goal is to increase land and habitat protection of the unique ecosystems that interface between area waterways (such as creeks, bayous, and rivers) and the uplands of their watersheds. Riparian corridors in this region include the natural landscapes of wetlands, bottomland forests, and rolling prairies – all important and integral to our regional biodiversity and identity. The initiative was launched by five partner organizations: Bayou Land Conservancy (BLC), Buffalo Bayou Partnership (BBP), Galveston Bay Foundation (GBF), Houston Audubon Society (HAS), and Katy Prairie Conservancy (KPC).

H2B operates within a multi-county area that is initially encompassing the overlapping areas of focus of each partner organization, and specifically in the lower subwatersheds of Galveston Bay (upstream to Lake Livingston). The fundamental connectivity of water resources within the Galveston Bay subwatersheds is inherently the streams and stream channels themselves. Riparian areas along these waterways are the next level of connectivity, wherever the natural systems still exist or can be restored.

A network of conserved and healthy riparian corridors contributes to the health of the waterways, and ultimately Galveston Bay, through the functions that healthy riparian areas provide to their streams: dissipating energy from high-flow events, protecting against excessive bank erosion, stabilizing channels, trapping sediment, storing water, building floodplains, recharging shallow aquifers, and sustaining base flow.

Furthermore, accomplishing the H2B goal of riparian corridor land protection contributes to the broader nature-based infrastructure in the region. Nature-based infrastructure has been described as a network of green/natural areas that deliver ecosystem services, without charge. Ecosystem services are those derived from the complex natural processes that occur through the interactions between a community of organisms and its physical environment. Ecosystem services provided by healthy riparian corridors, and by extension the H2B initiative, include: flood resilience, water quality, wildlife habitat, recreation potential, and economic value.

Among other advantages of nature-based infrastructure, as opposed to gray infrastructure, is that it generally yields multiple benefits from a single project. These multiple benefits often contribute to the triple bottom line of ecological, economic, and social benefits – helping clean our air and water, providing opportunities for economic development, and dissipating and reducing flooding. Integrating nature-based infrastructure with traditional stormwater practices may additionally support and enhance resilience in the Houston-Galveston region. Moreover, conserving or restoring the natural landscapes of riparian corridors, especially on a large scale, ensures that the benefits provided will be available for future generations.

Examples of riparian corridor land protection along targeted stream corridors that feed Galveston Bay will be presented, along with the benefits this protection offers to the Bay and to the community at large. The presentation will also discuss how this effort can help the rewilding and restoring of these corridors, and ensure that these protected and reclaimed spaces are not only available for regional and migratory wildlife, but also make economic sense. Opportunities for additional conservation and restoration and other collaborative efforts will also be explored.

Session VI-Room A3

ADAPTIVE CHANGE MANAGEMENT IN ENVIRONMENTAL PLANNING

Todd Running, Community and Environmental Planning, Houston-Galveston Area Council,
Houston, Texas

As environmental planners and managers we have all come up with great project ideas and grant proposals that we know are going to make a difference. Local jurisdictions like the idea, the grantor agency likes the project and the proposal gets funded. The time from the project being conceived to the time that the contract is signed can be well over a year. Lots of things can change during that time, not to mention changes that might happen during the contract period. Mother Nature can throw a lot at us – hurricanes, flooding and drought. Economies can change, local jurisdiction priorities can change. All these things are completely out of our control. As managers of these projects, we need to adapt and make course corrections on the fly that will get us to a good outcome for the project, despite the changes thrown at us.

As managers of multiple 319(h) grants for Watershed Protection Plans, TMDL I-Plans and Public Outreach engagement, H-GAC has been in the change management business on many different occasions. Measures taken to mitigate change have ranged from small tweaks to the scope of work to having to pull the plug on the project and move those resources to another endeavor. In this presentation the author will share his experience with change management over the last 27 years and will focus on the challenges presented and changes that have been made to the Coastal Communities Project currently in progress that are making it a great success.

Attendees should walk away from the presentation knowing that the projects they develop and submit for funding may need to change due to factors outside their control and adjusting the project to account for that change is something that they don't need to be afraid of.

Session VI-Room A4

Local Community Planning for Resiliency and Mitigation with Texas Citizen Planner

Celina Gauthier Lowry, Texas A&M AgriLife Extension Service

Every day, local governments are confronted with planning decisions—large and small—that will shape how their communities grow for years to come. Texas Citizen Planner (TCP) is a planning education program for locally elected and appointed officials, created by Texas Community Watershed Partners (TCWP), a program of the Texas A&M AgriLife Extension Service, located in Houston-Clear Lake.

Over the past few years, TCWP has conducted multiple workshops attended by over 120 local decision-makers and officials in communities up and down the Texas Coast, instructing them about the legal foundations and powers of land use planning, mitigating risks associated with natural hazards, green infrastructure, and flooding issues. The curriculum is based on Texas practices, laws, and requirements for local planning, development, mitigation, and environmental stewardship. Training sessions include a multi-speaker agenda with presentations delivered by experts and leaders from various fields, sharing unique experiences through case study examples. Presenters have included faculty of Texas universities, speakers from private consulting practice, and state/local governments.

As the population of Texas increases and local leadership constantly changes, the need to instruct and educate Texans in local leadership about long-term planning continues. For some communities, the first step is an open dialog among municipal colleagues about planning efforts and opportunities to integrate processes. Where leadership is willing, Citizen Planners can use Texas case study examples and best practices to reduce their vulnerability to hazards and increase the community's resiliency. Trained Citizen Planners strengthen local planning capacity and build an awareness of how they can guide community outcomes through ordinance and planning tools to avoid flood and surge zones, build to code or better, etc, that benefits human safety and natural resources.

Session VI-Room A4

GREEN INFRASTRUCTURE FOR TEXAS: MANAGING STORMWATER ACROSS THE LANDSCAPE SPECTRUM

Charriss York, Texas A&M AgriLife Extension Service, Houston, TX

John Jacob, PhD, Texas A&M AgriLife Extension Service, Houston, TX

Green infrastructure (GI) is nature-based solution to stormwater management. These solutions can be implemented across the landscape spectrum, from individual sites, to neighborhood or community-scale, all the up to large landscape level projects. Project benefit vary with each scale. A rain garden that treats runoff from a parking lot can provide water quality improvement, small-scale water detention, and habitat for small wildlife species, where a 500-acre wetland preservation and restoration project can provide ecosystem level services, large-scale flood mitigation, and habitat for many species of wildlife. An effective approach to planning green infrastructure projects for a community or watershed should take into consideration this variability of scale and benefit. Individual practices should be considered for each scale, with an overarching view of the landscape spectrum.

Session VI-Room A4

STORMWATER TREATMENT WETLAND SUCCESS STORIES AND WHERE WE GO FROM HERE

Christie Taylor, TCWP, Texas A&M AgriLife Extension Service, Houston Texas

Stormwater treatment wetlands provide multiple benefits to the community improving water quality, providing habitat and green spaces, and alleviating water quantity issues such as flooding. This best management practice is proving to be the most valuable method to treat stormwater at the community or neighborhood scale. The past several years TCWP has worked with partners to install stormwater treatment wetlands in a number of watersheds around Galveston Bay. This presentation will highlight successes, lessons learned and where we want to go from here.

Starting in the Brays Bayou watershed Mason Park and MD Anderson stormwater wetland projects both showcase the combination park setting and while balancing the need for detention in an urban area. Then we move south into the Clear Creek watershed with Exploration Green and the many successes and awards for this project that went from a 15 year master plan to a 5 year master plan largely due to community support. We see educational benefits as well as the natural benefits other Clear Creek watershed wetlands with our partners at CCISD and the City of Pearland Nature Center. These projects led to our newest collaboration with the Houston Botanic Garden to create a stormwater treatment wetland at the entrance to the new Botanic Garden in the Sims Bayou watershed in the spring of 2020.

Where we go from here depends on communities' partnerships and a shared vision for water quality, habitat improvement, and increased ecological services. Our goal is to assist in creating demonstration stormwater wetlands in each of the sub watershed of Galveston Bay, and working with communities across Texas and the U.S. to incorporate stormwater treatment wetland features as part of their drainage infrastructure.