

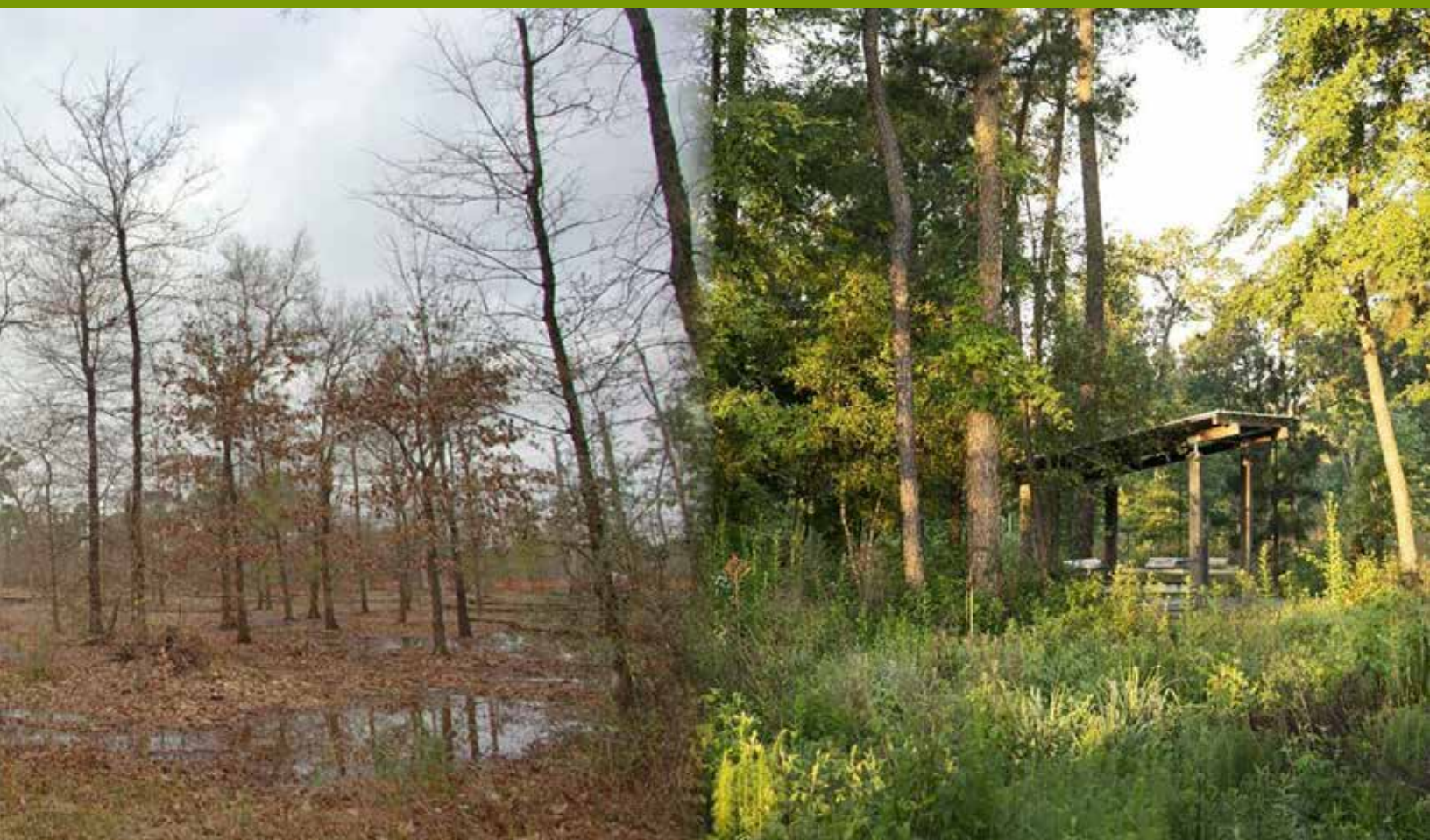
Field Notes

at the Houston Arboretum & Nature Center:

A symposium to share ecological knowledge in an urban setting

Thursday, September 14

Friday, September 15



2023
Houston, Texas

HOUSTON ARBORETUM & NATURE CENTER



Purpose of symposium

The Houston Arboretum & Nature Center hosted **Field Notes: A symposium to share ecological knowledge in an urban setting** on Thursday, September 14 and Friday, September 15, 2023.

This interactive and intimate environmental event connected Houston area practitioners, as well as select regional and national experts, to share on-the-ground knowledge and discuss larger conservation initiatives. It was open to the public for anyone interested in learning about conservation and restoration in an urban setting. The Master Plan and landscape restoration process of the Houston Arboretum & Nature Center was used as the framework and inspiration for the two days.

The goal of Field Notes was to foster meaningful dialogues across multi-disciplinary fields: practitioners, educators, designers, landscapers, planners, engineers, and contractors; regarding the methods, management, and messaging for ecological restoration in an urban setting. The goal was for participants to connect, compare notes, learn best practices, and become better educators and experts to support and strengthen urban ecological restoration practices, foster collaboration, and encourage innovation to benefit the Greater Houston Region.

Purpose of the document

This is a summary document of the two day symposium and serves as a way to share the discussions and main takeaways from the powerful time together at the Field Notes Symposium. The Houston Arboretum & Nature Center wants to share their experiences, as well as the experiences of others, for the benefit of current projects or other environmental organizations to inspire and improve the process of restoring and increasing ecologically based landscapes in urban settings.

This document highlights the main themes that emerged throughout the symposium as well as areas for further action and improvements.

How to use this document

The symposium documents are divided into five summary sections based on the agenda of the symposium: Overview and Resources, Why, How, Manage, and Message. Each of these documents provides an overview of the presentations, panel discussions, breakout sessions, walking tours, and resources relevant for that session. To integrate the entire symposium content all documents must be reviewed.



Agenda at a Glance

WHY SESSION – Thursday morning, Sept. 14

The need for the Arboretum's recent restoration and the region's larger green movement

Presenters:

Debbie Markey – Houston Arboretum & Nature Center
Jaime Gonzalez – The Nature Conservancy
Kelli Ondracek – Houston Parks and Recreation Dept.

Panel/Facilitated Discussion:

Jaime González – The Nature Conservancy
Kelli Ondracek – Houston Parks and Recreation Dept.
Todd Running – Houston-Galveston Area Council
Danielle Pieranunzi – SITES Green Business Certification Inc.
Sarah Newbery – Kinder Foundation

WHY Break-out session

HOW SESSION – Thursday afternoon, Sept. 14

How to design, construct, and integrate environmental restoration projects in an urban setting

Houston Arboretum Master Plan implemented by

Design Workshop: Conners Ladner

Presenters:

Emily Manderson – Blackland Collaborative
Susan Sherrod – Biohabitats

Panel/Facilitated Discussion:

Jason Burt – Forney Construction
Susan Sherrod – Biohabitats
Carolyn White – Harris County Public Health
Beth Clark – Clark Condon
Conners Ladner – Design Workshop

HOW Break-out session

1. Specifications and Field Observations
2. Soils: Testing, Amendments, Compost
3. Water and Plants
4. Planning and Analysis
5. Budget and Funding

Walking tours

1. Donor Retention Ponds & Savanna Design
2. Ravine Restoration – Design Vision, Storm Events, and Natural Channel Design
3. Woodland Restoration, 610 Entrance Design, and Wetland Transformation
4. Gardens and Native Landscaping
5. Display Walk, Event Lawn and Field Station Designs

MANAGE SESSION – Friday morning, Sept. 15

Managing and monitoring restored ecosystems to reach and maintain goals

Natural Channel Design – Ravine Restoration at the Arboretum: Brett Jordan

Presenters:

Stephen Benigno – Houston Arboretum & Nature Center
Lee Marlowe – San Antonio River Authority
Marissa Llosa – Houston Parks Board

Panel/Facilitated Discussion:

Lee Marlowe – San Antonio River Authority
Marissa Llosa – Houston Parks Board
Courtney Hall – Memorial Park Conservancy
Derek Sanford – Armand Bayou Nature Center
Gabriela Sosa – Buffalo Bayou Partnership

MANAGE Break-out session

1. Invasive Species Management
2. Fire and Grazing
3. Monitoring, Research, and GIS
4. Management in Urban Ecology Conditions
5. Sustaining Biodiversity

Walking tour: Savanna and meadow locations to discuss the effects of prescribed fire and goat grazing.

MESSAGE SESSION – Friday afternoon, Sept. 15

How to communicate, educate, and inspire

Presenters:

Tiffany Ritter – Houston Arboretum & Nature Center
Treaa Antony – Nature Heritage Society

Panel/Facilitated Discussion:

Treaa Antony – Nature Heritage Society
Anica Haymes – Houston Arboretum & Nature Center
Becky Martinez – Bayou Land Conservancy
Bethany Foshée – Coastal Prairie Conservancy
Dany Millikin – Houston Botanic Garden

MESSAGE Break-out session

1. Stepping up our social game
2. Classroom and Educational Messaging
3. Volunteers
4. Messaging sensitive topics
5. Flexible session

Jay Kleberg Messaging and Media
www.finandfurfilms.com/

Themes and Takeaways

The symposium was organized into four main themes and sessions: WHY, HOW, MANAGE, and MESSAGE. Below are the main takeaways from the symposium.

WHY

- Attendees were deeply moved to do ecological work to improve quality of life for both humans and nature within urban areas. Given recent extreme climatic events and urban expansion, there was a sense of urgency that has been unparalleled in our lifetimes.
- There was a strong consensus around the need to reconnect people to nature. It was advocated that through reconnection, people will be more willing and enthusiastic about preserving and restoring ecosystems.
- Ecological health is a social justice issue. Conservation has improved in terms of equity and inclusion but more can be done to improve incorporating sociological diversity when planning and implementing urban ecological restoration increases the odds of success. Disadvantaged communities are disproportionately affected by issues such as climate change. Functioning greenspaces should be evenly distributed throughout our cities to provide equitable access and healthier communities for everyone.
- **We can be our main obstacles. We must remember that we do have an impact, especially when we work together.**

HOW

- A holistic approach that includes unlikely partners improves the long-term success of the project. This includes working with groups such as health professionals, policy makers, economists, schools and educators, and developers, as well as ecologists.
- There is an urgent need to conserve land from development and elevate the value of natural landscapes to the same importance as buildings and infrastructure in the development practices.
- There is a need to push the development industry to normalize restoration practices in landscapes. This requires education at many levels and changes in maintenance practices.

- Community engagement should be emphasized and included in all phases of the project.
- Allocating an appropriate budget and financial planning for urban ecology projects is needed for the design, implementation, and long-term maintenance of restorative landscapes.

MANAGE

- Management is a challenging but critical component to restoring landscapes. Unique challenges in urban landscapes and climatic change create unknown variables when managing these systems.
- Management should be considered in all project phases, including budgeting, access, and techniques used to maintain the project in perpetuity.
- Having defined goals and a management plan that incorporates adaptive management is needed to help stay focused on priorities.
- Maintenance training for conservation professionals, park departments, and the general landscape maintenance industry is a massive need for restoration projects to be successful.

MESSAGE

- Communication was emphasized throughout the symposium and within all sessions. Communication was identified as an integral need for successful urban ecological projects. The ability to speak to different audiences and professionals is essential, and strong communication between professionals and the community is critical for successful projects. A multilingual approach is necessary to reach larger populations, especially in diverse urban areas.
- Education was highlighted many times as a path forward to increase the number of ecologically based projects in our cities and should be tailored to match the specific audience. It was asserted that people will not value what they do not understand.
- Effective communication, messaging, and gaining trust is a required skill and starting point in projects. One of the best ways to gain trust is to listen.

Resources

WHY

- **Douglas W. Tallamay.** *Nature's Best Hope.* 2020
Bringing Nature Home. 2007
- **Richard Louv.** *Last Child in the Woods.* 2008.
- **Robin Wall Kimmerer.** *Braiding Sweetgrass.* 2015
- **Charles C. Mann.** *1491: New Revelations of the Americas Before Columbus.* 2006
- **Dan Flores.** *Wild New World: The Epic Story of Animals and People in America.* 2022.

Green Rating Systems

- Homegrown National Park.
homegrownnationalpark.org/
- Sustainable Sites Initiative. sustainablesites.org/

HOW

Soil Mapping

- USDA-NRCS soil survey.
<https://websoilsurvey.nrcs.usda.gov/app/>

Soil Testing

- Texas Agrilife Extension – basic soil testing.
soiltesting.tamu.edu/
- Earthfort – biological testing. earthfort.com/

Soil interpretation

- Jim Urban. *Up By Roots.* 2009.

Amendment suppliers

Compost

- Nature's Way Resources – Quality static aged compost. www.natureswayresources.com/

Tools

- Penetrometer.
- Double ring infiltrometer.
- Soil testing supplies – most labs will give you instructions for taking samples.
Available at:
 - Forestry Suppliers Inc.
www.forestry-suppliers.com/
 - Gemplers. www.gemplers.com

Water and Plants Resources

Plant Sources for Gulf Coast area

- Morning Star Prairie Plants, Damon, TX.
morningstarprairieplants.com/
- Buchanan's Native Plants, Houston, TX.
buchanansplants.com/
- Tree Search Farms, Houston, TX.
<https://treesearchfarms.biz/home-page>
- Joss Growers, Georgetown, TX.
jossgrowers.com/
- Native Texas Nursery, Austin, TX. nativetx.com/

Seed Sources for Gulf Coast area

- Regional seed collecting hosted by the Coastal Prairie Conservancy.
www.coastalprairieconservancy.org/seed-collecting
- Native american seed, Junction, TX.
seedsources.com/
- Wildseed farms, Fredericksburg, TX.
www.wildseedfarms.com/
- Douglas w. King seed, San Antonio, TX.
www.dkseeds.com/
- Bamert seed company, Muleshoe, TX.
bamertseed.com/
- NRCS plant materials program/seed releases.

Information

- Nine Natives Program – native plant gardening.
- Houston Audubon – bird friendly habitats.
- Native plant finder, The National Wildlife Federation.
- USDA-NRCS Soil Survey.
- Biota of North America Program.
- Native Plant Society of Texas.
- Houston Arboretum & Nature Center.
- Douglas W. Tallamay
Nature's Best Hope. 2020
Bringing Nature Home. 2007

Planning and Analysis

- SER recovery wheel.
www.ser.org/page/SERNews3113
- SITES.
sustainablesites.org/certification-guide



Resources continued

- NRCS rangeland assessments.
www.nrcs.usda.gov/sites/default/files/2022-10/RangelandReport2018_0.pdf
- Ecological Site Descriptions.
edit.jornada.nmsu.edu/
- Soil survey.
websoilsurvey.nrcs.usda.gov/app/
- TPWD Ecological Mapping Systems.
tpwd.texas.gov/landwater/land/programs/landscape-ecology/ems/
- USFW – IPaC: Project planning tool that streamlines the USFWS environmental review process.
ipac.ecosphere.fws.gov/
- USGS Gap Analysis Project. Multiple products: Species, Land Cover, and Protected Areas.
 - Database of the United States.
www.usgs.gov/programs/gap-analysis-project
 - Houston/Galveston area Council of Governments: Data and GIS hub.
www.h-gac.com/Home
- TPWD GIS data and Interactive web maps
tpwd.texas.gov/gis/
 - Landscape Ecology Program.
tpwd.texas.gov/landwater/land/programs/landscape-ecology/
- AgriLife and extension services
 - Soil testing: soiltesting.tamu.edu/
 - Environment and Natural Resources.
agrilifeextension.tamu.edu/
- Corp of Engineers – precipitation model – streamflow model
 - Streamflow model: www.erdc.usace.army.mil/Media/Images/igphoto/2002498120/
- State geologic resources
 - Texas State Geological Survey: www.beg.utexas.edu/outreach/state-geological-survey
- SEINET Regional Network of North American Herbaria. symbiota.org/seinet/
- Biota of North America Program (BONAP). Distributions of North American Vascular Flora, County level. www.bonap.org/
- Flora of North America Editorial Committee, eds. 1993+. Flora of North America North of Mexico. 22+ vols. New York and Oxford.
http://floranorthamerica.org/Main_Page
- Inaturalist: Online social network of people sharing biodiversity information to help each other learn about nature. Identification aid and tool creating data for scientists. www.inaturalist.org/

- Randell, Bob. 1999. Year round vegetables, fruits and flowers for Metro Houston: A Natural Organic Approach Using Ecology, 12 Edition. Houston, TX: Year Round Gardening Press. 323 p. ISBN: 0-9705207-0-0
- US forest service fire effects info systems.
www.fs.usda.gov/research/rmrs/products/dataandtools/tools/fire-effects-information-system-feis
- Noss, Reed. 2018. Fire Ecology of Florida and the Southern Coastal Plain. University Press of Florida. 358 p. ISBN 13:9780813056715
upf.com/book.asp?id=9780813056715#

MANAGE

Invasive species resources

- The Nature Conservancy Weed Control Methods handbook. This is an older resource, but very detailed. www.invasive.org/gist/products/handbook/methods-handbook.pdf
- TexasInvasives.org.
- Invasive.org. www.invasive.org/
- Bugwood Center for Invasive Species and Ecosystem Health, University of Georgia.
www.bugwood.org/index.cfm
- Invasive Plant Atlas of the United States.
www.invasiveplantatlas.org/
- TAMU Brush busters.
texnat.tamu.edu/about/brush-busters/
- USDA Forest Service Invasive Species Program.
www.fs.usda.gov/managing-land/invasive-species
- Ladybird Johnson Wildflower Center (for replacement natives). www.wildflower.org/
- USDA Plants Database. plants.usda.gov/
- Integrated Pest Management Principles
www.epa.gov/safepestcontrol/integrated-pest-management-ipm-principles.

Fire and Grazing

- Local burn associations.
- NRCS has programs for per acre burnings.
- Texas Forest Service.
- National Wildfire Coordinating Group.
www.nwccg.gov
- Texas A&M Agrilife Extension Prescribed Fire: A Tool for Landowners Large and Small.

Monitoring, Research, GIS

- NEON – National Ecological Observatory Network.
www.neonscience.org/about
Protocols are all online.

Resources continued

- H-GAC Houston-Galveston Area Council.
www.h-gac.com/Home

GIS software programs

- Field Maps.
 - Polygons.
 - ID areas.
 - Notes sections.
 - Back in the office reference.
 - Great for overall estimate of area covered/ what's actually on the ground
- Survey 123.
 - Decreases paperwork.
 - Who collected data.
 - What day it was collected.
 - Similar to google forms – can develop to your needs.
 - Can take photographs, coordinates, start/end dates.
 - Can set up own templates/parameters.
 - Survey questions should be relevant, but not excessive.
- StoryMaps.
 - A way to tell a story using GIS data.
 - Your own data.
 - Photographs of sites' change over time
 - Great tool if you are the messenger for your project.
 - Student pricing.
 - Nonprofit members get 85% reduction in annual fees.

MESSAGING

Social media resources

Always ask about nonprofit pricing/discounts! Set up a few of the tools.

- Canva – graphic design tool for making videos, graphics, presentations, etc.
- *Free pro version for nonprofits.*
- Hootsuite – social media management.
- Later – social media management, some plans allow you to pull and use user generated content. They also have a great blog with ideas and trends. *Offers a 50% discount to nonprofits.*
- Linktree – customizable link in bio.
Free Linktree Pro account for nonprofits.

Organizations/people doing social media well

- Native habitat project (Kyle Lybarger) – prairies, restoration.
www.instagram.com/nativehabitatproject/

- Crime pays but botany doesn't (J. Santore).
www.youtube.com/channel/UC3CBOPt2-NRvoc2ecFMDCsA
www.instagram.com/crime_pays_but_botany_doesnt/?hl=en
- National parks.
www.instagram.com/bigbendnps/?hl=en
- Black forager.
www.instagram.com/blackforager/?hl=en
- Misanthropic botanist.
www.instagram.com/misanthropicbotanist/?hl=en
- Nature is metal.
www.instagram.com/natureismetal/

Tools that are best to use

- Gimble – helps stabilize videos and makes them look so much more professional; newer iPhones have stabilization feature.
- Editing
 - DaVinci Resolve – free computer software.
 - iMovie.
 - Final Cut Pro.
 - Canva – basic video editing; will do it in the size you need; have a free pro trial for nonprofits.
 - Remote Mics – helpful for outdoor videos vs. built in mics.

Classroom and educational messaging resources

- NAAEE – overall environmental education information.
- TAEI – overall environmental education information.
- NAI – interpretation resources.
- Canva.com – for multimedia (they offer some translation).
- Lady Bird Johnson www.wildflowercenter.org for examples of plants and information.
- Texas AgriLife Extension – experts and resources for landscaping.

Volunteer resources

- Volunteer Houston – volunteer resources and professional classes related to volunteer management.
- HAVA Houston Association of Volunteer Administrators – upcoming; memberships open in the spring.
- Better Impact – Volunteer Software (option)
- CCVA – Professional Certification in Volunteer Management.

02 Why Session

Thursday morning, September 14

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2023
Houston, Texas

HOUSTON ARBORETUM & NATURE CENTER

Agenda at a Glance



Day 1: Thursday, September 14th

WHY SESSION

The need for the Arboretum's recent restoration and the region's larger green movement

Presenters:

Debbie Markey – Houston Arboretum & Nature Center

Jaime González – The Nature Conservancy

Kelli Ondracek – Houston Parks and Recreation Department

Panel Discussion:

Jaime González – The Nature Conservancy

Kelli Ondracek – Houston Parks and Recreation Department

Todd Running – Houston-Galveston Area Council

Danielle Pieranunzi – SITES Green Business Certification Inc.

Sarah Newbery – Kinder Foundation

WHY Break-out session

The attendees were asked the same questions as the panelists to identify trends, commonalities, and differences.



Why Session Presentations

Debbie Markey

Executive Director, Houston Arboretum & Nature Center



During her 18 years at the organization, Debbie has effectively managed business operations, significantly boosted income, and expanded community outreach. She refined the mission and vision, set achievable goals, and expanded program offerings, especially for underprivileged children and families in Houston. In 2021, a \$26M master plan tripled visitation and transformed the Arboretum.

PRESENTATION:

Hurricane Ike and Drought:

- In 2008, Hurricane Ike hit, leading to a three-year drought with minimal rainfall.
- The drought followed the hurricane, causing significant water shortages.

Impact of Hurricane Ike:

- Hurricane Ike caused extensive damage, including loss of trees and vegetation in the Arboretum.
- The subsequent drought resulted in significant tree mortality.

Master Plan and Transformation:

- In 2013, a 10-year master plan for the Arboretum was initiated in response to Hurricane Ike's impact.
- The plan led to significant improvements, the creation of new entrances and parking, building and infrastructure updates, and the restoration of key ecosystems.

Restoration and Improvements:

- The restoration efforts included restoration of savanna, woodland, and wetland habitats with improved trails and boardwalks, and the revitalization of the ravine.
- Notable improvements also occurred in the Discovery Room, providing visitors with engaging and educational experiences.

Condensed Phased Funding:

- The master plan was implemented in phases to secure funding for different aspects of the project.
- It was essential to manage both direct construction costs and soft costs related to the project's various phases.

Master Plan Transformations



2003



2013

Old Parking Lot now Courtyard & Lawn



Discovery Room Before and After



Event Lawn near Woodway



Why Session Presentations



Jaime González

Community & Equitable Conservation Director, The Nature Conservancy in Texas

Jaime González is a conservationist, environmental educator, and communicator. He collaborates with communities to create healthier, climate-resilient, and wildlife-rich spaces through One Health approaches. He's the vice chair of NAAEE, setting national environmental education standards, and has received awards for his work, including the Elizabeth Hull Abernathy Award from the Garden Club of America. Jaime is also a proud Houston Arboretum & Nature Center alumnus, where he served as an interpretive naturalist and conservation lead from 1998-2005.



PRESENTATION:

Acknowledgment of Indigenous Land:

- Importance of recognizing the ancestral lands of Indigenous peoples.

Urban Growth and Environmental Challenges:

- Rapid urban growth has led to wetland loss and extensive concrete development.
- Urbanization is causing issues like urban heat islands.

Biodiversity and Environmental Justice:

- The region faces threats to biodiversity, exacerbated by events like Hurricane Harvey.
- Environmental injustice affects low-income communities and communities of color with poor air, soil, and water quality.

Conservation Efforts:

- Organizations are creating trails and restoring natural areas like prairies.
- Initiatives measure biodiversity and engage the community.

Youth Engagement:

- Encouraging to see young people advocating for climate action and biodiversity conservation.

Building a Broader Earth Care Movement:

- Need for collaboration beyond traditional conservation to address environmental justice and equity.

Community-Centered Approach:

- Focus on transforming neighborhoods and parks for biodiversity and equity.
- Economic factors influence what people experience in local green spaces.

Education and Communication:

- Highlights the importance of education and communication campaigns promoting nature's values.

Collaborative Learning:

- Invites everyone to contribute to a more sustainable and inclusive community.
- Advocates for learning from diverse communities and perspectives.

Why Session Presentations

Kelli Ondracek

Natural Resources Manager, Houston Parks and Recreation Department

Kelli has over 17 years of experience in habitat restoration, wildlife research, and habitat management. She is responsible for managing and restoring natural resources and nature-based infrastructure within the City of Houston's parks.



PRESENTATION:

- The City of Houston Parks and Recreation Department's (HPARD) Natural Resources Division supports land preservation, habitat management, and habitat restoration goals for the city.
- The city passed a Nature Preserve Ordinance in 2022 to preserve and protect 7,423 acres in 26 parks as natural areas that are restricted from development. City of Houston, Texas, Code of Ordinances, Chapter 32- Parks and Recreation, Article V. – Nature Preserves.
- HPARD's Riparian Restoration Initiative is targeting the creation and enhancement of forested habitat in all parks adjacent to waterways, with a total of 70 parks scheduled for restoration by 2030.
- HPARD's prairie restoration efforts have restored over 130 acres of habitat in 5 parks utilizing plantings from seed locally collected from remnant and restored prairies around the Houston area.
- HPARD is actively managing habitat throughout the city's 17,000 acres of natural areas by conducting habitat assessments, developing management plans, and implementing practices such as grazing and prescribed fire.



Why Panel Discussion



Discussion Panel::

Jaime González – The Nature Conservancy
 Kelli Ondracek – Houston Parks and Recreation Department
 Todd Running – Houston-Galveston Area Council
 Danielle Pieranunzi – SITES Green Business Certification Inc.
 Sarah Newbery – Kinder Foundation

What is your why?

Kelli Ondracek's “why” is rooted in a deep commitment to environmental preservation and enhancing the quality of life for residents in the Houston area. Working with the relatively new Natural Resources Division within the Houston Parks and Recreation Department, her primary motivation is to protect and enhance the city’s natural landscapes. Kelli and her team focus on infusing nature into every park, safeguarding existing natural areas, and elevating the quality of life for local residents.

Todd Running's “why” is to enhance the quality of life for residents in the region.

Danielle Pieranunzi's “why” is to elevate landscapes in development practices by working on the promotion of the Sustainable Sites Initiative, a green rating program for landscapes. SITES advocates for

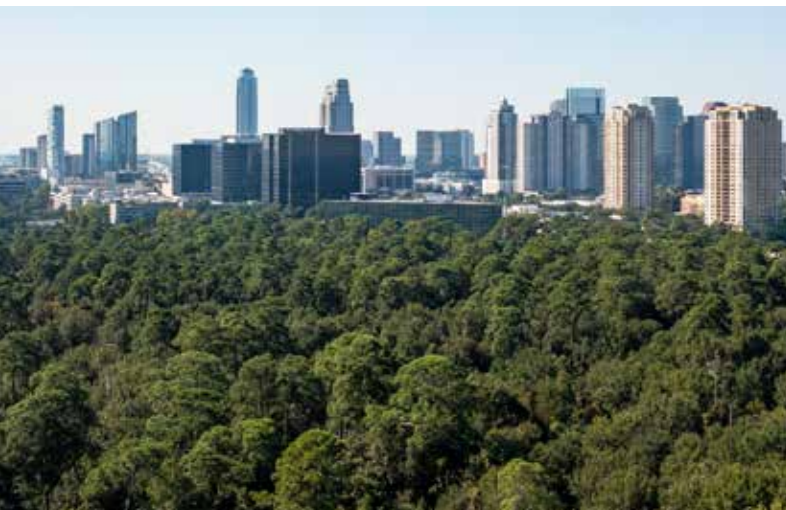
eco-conscious development decisions prioritizing vital ecosystem services.

Jaime González's “why” is driven by a deep love for people and nature, and a desire to ensure their survival in the 21st century.

Sarah Newberry's “why” as part of the Kinder Foundation is to support transformational parks and green spaces projects that improve quality of life for all Houstonians. Her goal is to create inclusive spaces that reconnect people with nature and promote the idea that we are an integral part of it. As an architect and landscape architect, she strives to reshape our built environment to reflect this philosophy.

Who is the beneficiary of habitat restoration & increased ecosystem function?

The panel acknowledged every habitat restoration project needs to consider who the beneficiaries are as conservation decisions are equity decisions. In urban areas like Memorial Park, benefits and resources are widespread, while local parks mainly serve nearby communities and often have less resources. Having distributed parks within a 10 minutes walk is important to spread the benefits. Shifting from the “people vs. nature” mindset is essential for holistic urban planning, recognizing both people and nature as stakeholders. Wildlife should be considered too. Benefit distribution depends on resource allocation to align climate resilience, biodiversity, and human health. Ultimately, the beneficiaries depend on funding and utilization strategies.



Why Panel Discussion Continued

What is the most urgent need in urban conservation right now?

Kelli emphasized the urgent need for land preservation in Houston due to the irreversible nature of land loss. She appreciated the efforts of the Houston Parks Board, the Bayou Land Conservancy, and her department with the City of Houston in looking for land acquisition opportunities. While restoration is possible, once land is developed, it is lost forever. Given predictions of increased development and population growth, she stressed the importance of conserving as much land as possible for future generations.

Jaime also added that climate adaptation in communities, along thoroughfares in particular, to allow for people to have safe transit with heat and other disturbances, are also important as well as saving land.

What are the biggest impediments in urban restoration?

The panel acknowledged several challenges related to land conservation. They highlighted the limited availability and high cost of land, which poses difficulties in land acquisition. They also discussed the importance of partnerships with foundations and nonprofits to address these funding challenges. Funding constraints were noted as a significant obstacle. Moreover, the panel emphasized the need for education, particularly for rural landowners, to make landowners aware of the many resources and opportunities to preserve their land. This is seen as essential in preventing the sale of family farms for development and ensuring the conservation of valuable land.

If there could be one breakthrough action that could open lots of avenues, what would that be?

Todd highlighted the need to place conservation projects within a regional framework to enhance their effectiveness and visibility. Emphasis is placed on the inclusion of these projects in watershed-based plans and regional conservation initiatives, as well as on various platforms, to widen their reach and increase funding opportunities.

Danielle also recommended moving beyond disciplinary boundaries and to focus on site design



from an early stage by employing integrated design teams and an integrated design process.

Jaime felt that limited funding is more of a symptom. The main challenge is to effectively communicate to the public the essential role of nature and nature-based solutions in human health and environmental conservation. Forming alliances with environmental justice and public health organizations is suggested as a strategy to achieve more impactful results. He advocated that there is a need to create an inclusive movement beyond conservation to have a more effective and influential coalition.

What assets are working best?

Danielle noted a growing global attention to the value of landscapes and nature-based solutions. There is more attention to biodiversity and nature restoration and clearly linking those things to climate change, pollution, and land degradation. These issues are at the global stage being addressed at regional and local levels within a variety of communities and with different strategies. She mentioned the development of new tools, such as the free Pathfinder app, which helps projects achieve carbon neutrality and address climate change, pollution, and land degradation. These tools are seen as crucial in inspiring and supporting projects that have positive impacts on both the environment and communities. Danielle highlighted the significance of rating systems, specifically favoring the SITES rating system, as a means to go beyond regulatory requirements and protect natural areas as well as help tell the project story and increase awareness. Overall, she emphasized the importance of the people involved in creating and implementing these tools and their

Why Panel Discussion continued

experiences that can help protect landscapes and address environmental challenges.

How do you best facilitate collaboration?

Sara stressed the significance of trust as the foundation of successful collaboration, emphasizing that building trust requires clear communication and creating space for meaningful conversations within teams. Sara also underscored the necessity of a clear, shared goal for all stakeholders, as misaligned interests can hinder progress. She noted that the common goal should be more important than the specific method of achieving it, and that compromises may be necessary. Having a strong leader is also needed to be able to facilitate team collaboration. Respect and active listening within design teams are seen as essential, as they contribute to creating a psychologically safe space for collaboration. Additionally, Sara suggested considering the motivations of other collaborators to find common ground and create mutually beneficial partnerships. She acknowledged the tendency to focus on one's own area of expertise and stresses the importance of recognizing the potential for collaboration beyond one's immediate discipline.

Who are we not working with?

The panel highlighted the need for developers to be part of the solution especially in an unplanned, non-zoned environment. They suggested that change should be driven by market demand or policies, or ideally, a combination of both.



The panel stressed the importance of reimagining development and identifying large landowners such as school districts which are equitably distributed. They highlighted the potential of rewilding and improving school campuses to benefit both the environment and students. Additionally, they stressed the need to recognize community members as experts and tap into various areas of expertise, such as public health and the healthcare industry, to bridge gaps and create impactful collaborations. Overall, they suggested that working with developers, schools, and the health industry could lead to transformative results.

The panel suggested looking for unlikely partners, such as economists, to assess and emphasize the value of landscapes and nature-based solutions, including clean air, clean water, and erosion control. They advocated for working with economists to highlight the economic benefits and interdependence of these services.

Additionally, the panel stressed the importance of engaging with economically disadvantaged communities who often bear the brunt of conservation and health issues. To reach these groups effectively, they proposed building trust through channels like faith-based organizations or programs like Meals on Wheels, school groups or other organizations which could serve as trusted intermediaries for disseminating information and gathering input for people who don't have access to social media, cell phones, or the internet.

The panel emphasized that people are actively reaching out to the City of Houston, and the city



Why Panel Discussion *continued*

is open to working with various groups as a public entity to actively involve the community through churches, school groups, and other organizations. Different community groups often help with the city's restoration efforts. This is a positive example of community input.

What are some alternative ways of reaching out to communities?

The panel expressed an interest in delving deeper into this subject, suggesting a desire to explore the diversity of contacts they engage with and perhaps identify potential gaps or unexplored partnerships.

Jaime emphasized the importance of building trust when working with communities, especially those that have experienced disinvestment and distrust towards larger institutions. He suggested partnering with consultants and community members who have established connections and credibility within these communities to facilitate trust. Jaime shared an example of a nature plan called Greener Gulfton, highlighting the importance of language justice and ensuring meetings are conducted in multiple languages to reach a diverse community effectively. He also stressed the value of Spanish language news channels, which have significant viewership, and recommends tapping into this resource to connect with a broader population that holds a deep respect for nature.

Panelist Biographies

Todd Running

Water Resources Manager, Houston-Galveston Area Council

Todd Running has been with the Houston-Galveston Area Council (H-GAC) for 31 years. He manages water quality assessments for a river and three coastal basins in the area. He has led numerous special studies on water quality in the region. Under his leadership, H-GAC's Clean Rivers Program has produced innovative reports using technology. Mr. Running oversees TMDL Implementation Plans, Watershed Protection Plans, and the annual Regional Water Quality Management Plan update at H-GAC.

Danielle Pieranunzi

SITES Director, Green Business Certification Inc./ U.S. Green Building Council

Danielle has a strong passion for bridging the gap between science and practical applications to promote sustainability and positive societal change. She has been involved with



the SITES program since 2006, collaborating with a diverse group to enhance nature's role in the built environment and develop comprehensive guidelines. In her role, Danielle oversees SITES' market development, certification services, and technical advancements.

Sarah Newbery

Director of Parks and Greenspace, Kinder Foundation

Sarah coordinates partnerships and leads initiatives related to the foundation's park projects. Most recently, she served as a senior advisor partnering with Memorial Park Conservancy and Uptown Houston to deliver the Memorial Park Land Bridge and Prairie project. Prior to joining the foundation, she served for four years as Project Director for Memorial Park at Uptown Houston where she managed the planning process for the 2015 Memorial Park Master Plan in partnership with Memorial Park Conservancy and Houston Parks and Recreation Department.

Why Breakout Session Summary

What is your why?

In general, people attended the conference to network, build community, and learn about ecology. Many attendees had a passion for the environment and want to keep hope alive for future generations. Many people were motivated to build more sustainability because they see that a healthy environment has a significant impact on people's quality of life, health, and general joy.

What is the most urgent need?

It was felt that the area of most urgent need is education. People don't value what they don't understand. As well, it was felt that it is critical to address land conservation, economic funding, and accessibility and inclusion.

Major impediments to building ecologically based landscapes?

Some of the major impediments identified were 1) that restorative landscapes were cost prohibitive, 2) there are cultural associations and norms in regards to aesthetics and nature that work against native landscapes, 3) university and development policies do not support sustainable landscapes, and 4) people do not feel that they can have an impact as an individual.

Assets we currently have:

A significant inspiration and asset was the work of Doug Tallamy and his Homegrown National Park program, as well as other green rating programs that can provide guides for project success.

Who are we NOT reaching out to in our communities that could have an impact?

People felt that more connection and education needed to be happening at a cultural level such as in schools, churches, community centers, and HOA's. More education is also needed at the physical level such as with developers, home owners, and agriculture and lastly, at the professional level with engineers, landscape professionals, policy makers, and the nursery industry.

Main take-aways:

- Education
- Individual impact

One of the main take-aways in all of the breakout sessions was that people can still make a difference at

a personal level even with "small" contacts. Repeated contacts with chosen partners makes a big impact. When reaching out to others, it was recommended to consider the:

- Social reach: Who can reach the most PEOPLE to spread education / enthusiasm?
- Physical reach: Who has the LAND where conservation can take place?
- Procedural reach: Who has the tools, expertise, and manpower to create and MAINTAIN projects?

Resources

Douglas W. Tallamy.

Nature's Best Hope. 2020

Bringing Nature Home. 2007

Richard Louv. *Last Child in the Woods*. 2008

Robin Wall Kimmerer. *Braiding Sweetgrass* 2015

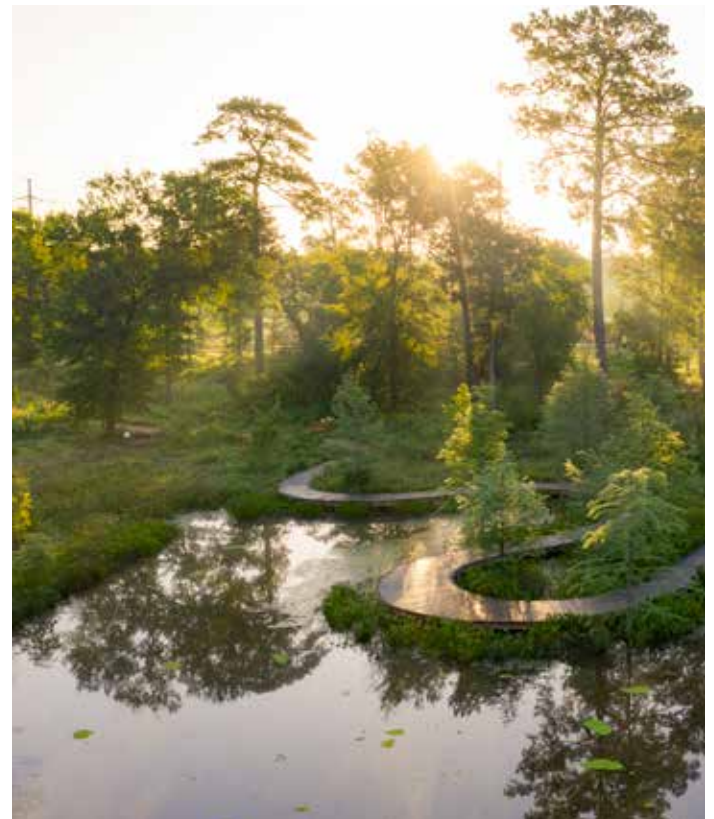
Charles Mann. *1491: New Revelations of the Americas Before Columbus*. 2006

Dan Flores. *Wild New World*. 2022

Green Rating Systems

Homegrown National Park <https://homegrownnationalpark.org/>

Sustainable Sites Initiative <https://sustainablesites.org/>



03 How Session

Thursday afternoon, September 14

Field Notes

at the Houston Arboretum & Nature Center:

A symposium to share ecological knowledge in an urban setting



2023
Houston, Texas

HOUSTON ARBORETUM & NATURE CENTER

Agenda at a Glance



Day 1: Thursday, September 14th

HOW SESSION

How to design, construct, and integrate environmental restoration projects in an urban setting

Houston Arboretum Master Plan implemented by Design Workshop: Conners Ladner

Presenters:

Emily Manderson – Blackland Collaborative
Susan Sherrod – Biohabitats

Panel/Facilitated Discussion:

Jason Burt – Forney Construction
Susan Sherrod – Biohabitats
Carolyn White – Harris County Public Health
Beth Clark – Clark Condon
Conners Ladner – Design Workshop

HOW Break-out session

1. Specifications and Field Observations
 2. Soils: Testing, Amendments, Compost
 3. Water and Plants
 4. Planning and Analysis
 5. Budget and Funding
-

Walking tours

1. Donor Retention Ponds & Savanna Design
2. Ravine Restoration – Design Vision, Storm Events, and Natural Channel Design
3. Woodland Restoration, 610 Entrance Design, and Wetland Transformation
4. Gardens and Native Landscaping
5. Display Walk, Event Lawn and Field Station Designs

How Session Presentations

Conners Ladner

Principal, Design Workshop, Austin

With over 15 years in landscape architecture, urban design, and open space planning, Conners specializes in innovative, sustainable designs that integrate natural beauty into urban spaces. Driven by creative passion and a commitment to beauty, he employs thorough research, comprehensive analysis, and iterative design to create inspiring and functional public spaces.

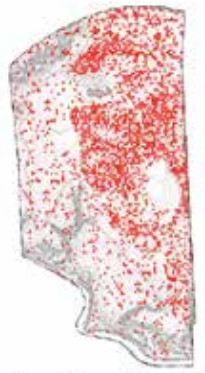


PRESENTATION:

- The presentation provided an overview of the need for a Master Plan at the Houston Arboretum as well as the design and implementation process led by the landscape architecture firm, Design Workshop.
- Urbanization in Houston has had a monumental impact on environmental systems. Development is displacing massive amounts of natural habitat.
- Houston historically was a coastal prairie. The coastal prairie ecosystem plays a vital role in regional flood control by absorbing and holding floodwaters.
- Hurricane Ike and the drought of 2011 took a significant toll on the landscape. The design team and the Arboretum saw within the devastation, an opportunity to enhance both the conservation and experiential aspects of the Arboretum.
- Through extensive mapping analysis it was found that the majority of the tree mortality occurred in historic prairie soil locations.
- The analytic process led the design team to a more resilient and diverse landscape concept.
- The Master Plan included elements such as the design and construction of restored savanna, constructed wetlands that captured stormwater and provided water for irrigation, parking loops immersed in the landscape, increased trail capacity and walkability, enhanced woodland, event lawns for large gatherings, and a restored ravine.
- The implementation of the Master Plan has significantly increased visitorship and the Arboretum's presence in Houston by providing improved ecosystems and exciting experiences.



Canopy mortality (2012)



Assessed Canopy Mortality 2013

70%+ Mortality
50-70% Mortality
20-50% Mortality
< 20% Mortality



How Session Presentations



Emily Manderson

*Principal and Senior Environmental Designer,
Blackland Collaborative*



Emily works to provide ecological expertise to a variety of project types such as developing Best Management Practices for the Houston Parks Board to working on Master Plans, facilitating visioning sessions, and providing construction oversight. From 2014-2020, Emily was the Conservation Director at the Houston Arboretum & Nature Center.

PRESENTATION:

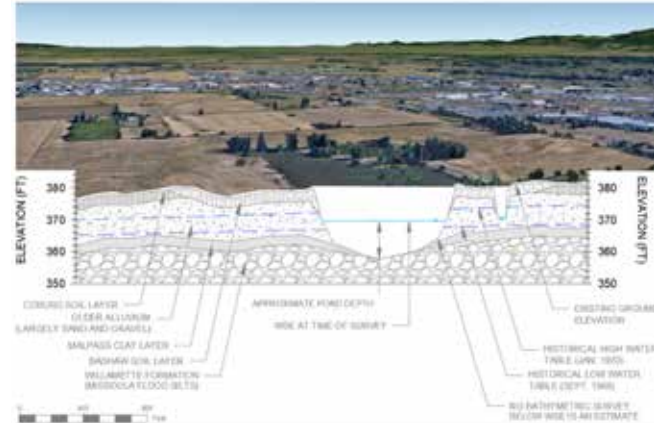
- Emily reviewed the construction of the restoration portions of the Houston Arboretum's Master Plan.
- The conservation team played an important part in moving from design to construction.
- Not every project has a conservation team and there are areas where the design and construction process needs to be strengthened to better incorporate ecological practices.
- For ecologically based projects, it is critical to have an integrated design team and an ecologist on the team. The ecologist will use the lens of ecological function and will help look for opportunities at all phases of the project.
- Before construction the conservation team did some very critical steps that are not often included in landscape design and construction practices.
 - The conservation team gathered baseline data before construction began as part of their long term performance monitoring.
 - Initiated a pilot project to test methods before large scale construction
 - Performed site preparation of primarily removing invasive species for a year before construction
 - Worked with the City of Houston to be the first project in Houston to receive approval on the tree mitigation ordinance and finally get credit for restoring the savanna ecosystem.
- Be on the ground during construction and don't be afraid to speak up.
- Restoration requires many in the field adjustments because they are projects that are site specific. We need to learn how to be more efficient with the process and not slow things down and add cost.
- Availability of native plant material was a challenge due to the amount of plants needed and the timing was hard to determine due to the shifting construction schedule.
- Have persistence and patience. These are new practices for the development field and with communication, education, and perseverance the restoration process will become more normalized.

How Session Presentations continued

Susan Sherrod

Senior Ecologist, Biohabitats

Susan is a Professional Wetland Scientist, Certified Ecological Restoration Practitioner serving as part of a multidisciplinary team of conservation planners, restoration practitioners, and ecosystem designers. In addition to her role at Biohabitats Susan is on the Scientific Advisory Committee for Wildlands Restoration Volunteers and a university instructor in global change ecology, biodiversity and conservation, ecosystems, urban ecology and sustainability, and applications to landscape architecture.



PRESENTATION:

- Incorporating ecology into site assessment and design requires considerations of scale, multiple changing systems (historic to future), constraints, ecosystem function, and diverse stakeholders.
- This talk is a quick tour of Biohabitats' methods to evaluate the multiple dimensions of a site's ecological function, with the intention of developing a nuanced understanding of the natural and cultural heritage of a Place.
- Suitability analyses are a valuable GIS-based planning tool to rank areas of varying conservation priority within a site. Primary factors influencing conservation suitability may be species habitat, water and floodplain, soils, viewsheds, or other metrics.



Regional Imperiled Species

Bell and Coryell Counties (yellow outline) are developing a Regional Habitat Conservation Plan for

- Golden-cheeked warbler (Endangered, ESA),
- Monarch butterfly (Endangered, IUCN),
- Salado salamander (Threatened, ESA),
- Karst invertebrates (Endangered, ESA),
- Freshwater mussels (candidates, ESA), and
- Other species to be determined.

Anticipated to be finished in 2024, of these wildlife and their habitat needs. With its position on the western side of Bell County and broad expanse of to be a significant support for this conservation effort.



How Panel Discussion



Discussion Panel::

Jason Burt – Forney Construction

Susan Sherrod – Biohabitats

Carolyn White – Harris County Public Health

Beth Clark – Clark Condon

Conners Ladner – Design Workshop

How do you incorporate ecology into project design, and what is often missed?

Carolyn White expressed that ecological restoration work is typically done with community engagement as a separate effort, and often late in the process or to notify neighbors about construction. She advocated that when we work on ecology-based projects we must remember that we are also doing work that is based in community health and well-being. Providing equitable access to healthy environments can further advance the ecological outcomes. It is important to look at projects holistically – with a One Health lens – so that wildlife/biodiversity health, environmental health, and human health are equally

considered. Providing equitable access to nature and natural environments for communities that have historically been disinvested can go a long way to boost regional environmental health and improve biodiversity. As restoration practitioners, we need to fully understand the context of our projects and investigate opportunities to uplift communities who have experienced inequities. Carolyn mentioned that there are several groups working locally on a One Health Index, including Harris County Public Health, The Nature Conservancy, Houston Advanced Research Center, and Asakura Robinson. This analysis complements commonly used indices, such as Social Vulnerability Index or Environmental Justice Screening Tool. This One Health Index can help identify places where ecological restoration is needed the most.

Jason Burt recommended getting the contractor involved early in the process and having meetings with the design team to review the design and discuss the logistics plan to reduce in the field changes.

What elements are most important to understand before the design starts?

Susan Sherrod stressed that there is not a single most important thing, but in addition to the items covered in her presentation, such as scale and suitability analysis; soils and hydrology need to be understood, and cultural importance, whether indigenous or contemporary. Projects don't succeed without local support.



How Panel Discussion continued

How has native plant sourcing impacted the design or implementation of restoration projects, and what are your favorite methods for acquiring plants?

Beth Clark noted that native seed and plant sources are getting better year by year, but the demand for native species still far outweighs the supply. This shortage requires advanced planning for both seeds and plants.

Local genotypes for seed are mostly limited to hand collections from local prairies. The Coastal Prairie Conservancy manages collecting on local prairies throughout most of the year. Many restoration projects, especially the larger projects, utilize seeds from commercial seed sources like Native American Seed, Bamert Seed, and Douglass King. These seeds are collected from their own fields, some of which are NRCS releases. Many of these species are native throughout much of Texas and into the coastal areas. (barring the more extreme climates of West and far North Texas). While commercially grown seeds may not be all coastal genotypes, most species are fairly persistent once established. Work is ongoing to collect and bring local genotypes into production.

Local organizations like the Houston Garden Club and the Houston Arboretum are growing plants for native plant sales, for specific restoration projects, and for their own use.

She mentioned that other growers like Morningstar Prairie Plants are also specializing in local genotypes, but production is not to the level needed for large restoration projects. For larger parks and developer projects, contract growing with commercial nurseries can be an option, assuming the seeds are available. This requires early planning as well as advance funding.

What are the biggest challenges or opportunities at the design, construction, or implementation phases?

Jason advocated understanding lead time issues on your long lead items has a big impact on the construction process. This is critical now more than ever with supply chain issues. He stated that it would be a bad situation if you rush out of the gate to start a project then hit a stopping point because you are waiting on materials of long lead items to arrive.



He also mentioned that many times the initial land survey on projects are out of date. This happens when it takes many years for funding to be in place on projects for them to start. Getting a contractor on board early allows for some pre-construction services as well as onsite reconnaissance to take place. In regards to projects like the Houston Arboretum and other Houston projects, the site endured many named storms and droughts in prior years so the tree survey wasn't current to onsite conditions when the project started. However, the design and plans were implemented on the survey given years prior. Having the contractor on board early can identify where new opportunities to route utilities may be a better fit as a tree is no longer there that may have been designed around initially, as an example. Jason said that he personally likes to visit a job prior to construction when it is raining, see how the water moves, how it drains, or if there are any flooding areas we need to be mindful of.

Can you speak to your experience of working with the community in both design and implementation phases?

Carolyn expressed that engaging the community early in the project design is essential to fully understand needs and discover opportunities that may not be considered by a typical team of ecologist, biologist, and other experts. She stated that making all ecological restoration projects responsive to local community member needs advances our response to big, looming problems like climate change, extinctions, population density/overcrowding, and sprawl. Engaging community and embracing project

How Panel Discussion continued

co-creation can exponentially increase capacity for long-term management and co-ownership. This makes projects more cost effective and can alleviate gentrification and displacement often associated with restoration projects. Carolyn mentioned that at Harris County Public Health, they have been working on a One Health Toolkit for planners, designers, policy makers, etc. to put these principles into practice and realize the synergies that are possible when environment, wildlife/biodiversity, and humans are brought to the table with an equitable voice.

Speak about the importance of seeing the site during the design and implementation process.

Susan Sherrod felt that seeing the site helps you see what is unexpected, what doesn't show up on a map. You see patterns, potential habitat for noteworthy species, a sense of place (including sounds), and off site connections are all important to identify and understand in the design process.



Panelist Biographies

Jason Burt

Director of Site Development, Forney Construction

Throughout his 26 years of construction and site work experience, Jason has amassed an expansive portfolio of projects, including an impressive collection of renowned golf courses around the world. Jason is a reliable team player who confidently and calmly manages people, plans and complex projects.

Carolyn White

Urban Environmental Planner, Harris County Public Health (HCPH) Built Environment Unit

Carolyn White is also the Public Health representative to the County's Infrastructure Resilience Team, a multi-departmental, collaborative group developing a Flood Resilience Plan. Her work focuses on uplifting under-resourced communities and natural infrastructure to bring equitable climate adaptation to Harris County, focusing on One Health principles. Prior to joining HCPH she was the Conservation Director at Memorial Park Conservancy and an Environmental Services Program Manager with the Harris County Flood Control District.

Beth Clark

Retired Principal, Clark Condon

Beth is a registered landscape architect with a special interest in native plants, native plant gardens, and prairie restoration. With over 30 years of experience and as a co-founder of Clark Condon, Landscape Architects in Houston, she has been a project designer for large scale green-sector projects and numerous commercial and public sector projects.

Beth retired in 2020 and now concentrates her time with non-profits including projects at Armand Bayou Nature Preserve, Houston Arboretum, and the Houston Botanic Garden. She has been an officer of the Houston Native Prairies Association for over 10 years and serves on the board of Urban Harvest, a non-profit for food access, community gardening, and gardening education.

How Breakout Session Summary



Specification and Field Observations

The transition from design to construction can be complicated and things don't always go as planned. Jason Burt of Forney Construction and Emily Manderson of Blackland Collaborative led a discussion regarding the role of specifications and guidelines in construction as well as the importance of being in the field as things are being built.

Key Takeaways

- Specifications should be very detailed, but continuous communication between design team, and contractor is critical
- Communication checklist, or pathway is important for contractor to navigate field changes to ensure design intent is retained
- Engaging the contractor earlier in the process is beneficial for construction efficiencies.
- Have a meeting with the contractor before construction begins with the design team and client to review drawings and discuss process and unique items surrounding the project.
- The plans and specifications should be aligned and specifications should be unique to the project rather than standard text that is used on many projects.
- Being in the field during construction helps to build trust and transparency in the project and keeps the contractor and subcontractors accountable.
- Being in the field also helps the designer understand the challenges of construction and will inform design and specifications in the future.

Soils testing, Amendments, Compost

Soils are a significant component of restoration. Getting the soils right will influence the success of a restoration by impacting establishment, invasive species, and long-term management. John Hart Asher of Blackland Collaborative and Stephen Benigno of the Houston Arboretum & Nature Center led a discussion of soil analysis, amendments, and compost.

Key Takeaways

- Pre-design assessment of soil is important to identify healthy and unhealthy soils.
- Map expected soil using the USDA soil survey, then sample each soil type, and ideally each broad community type, for testing.
- Several labs exist for testing:
 - Texas Agrilife Extension will perform basic soil analysis for nutrients, texture, and organic matter.
 - Testing for soil life requires a specialized lab.
- Design to the soils as is, rather than attempting big changes to soil. Ideally use onsite topsoil, stockpile if possible from areas to be built on, and use it for restoration or new planting areas.
- Protect healthy soil during construction and have a plan for restoration of areas that must be damaged, or is already damaged.
- Microtopography helps diversify the landscape, improves water infiltration and retention, and detritus builds up in low points. Creating temporary microtopography by placing obstructions across the slope (rocks, logs etc) and encouraging uneven terrain helps slow water flow and increase the amount entering the ground. Often germination occurs on the upslope side of obstructions.
- Native plants often require low nutrient conditions, be careful with fertilizer and make small changes.
- Compost
 - Young compost is less expensive, but frequently high in nutrients and large carbon sources.
 - Slow aged, static piled, compost is preferable but more expensive and can be difficult to obtain.
 - Nature's Way Resources makes quality, static piled, compost.
 - Dillow Dirt is higher in heavy metals and often nutrient.

How Breakout Session Summary continued



- Other Amendments
 - Let testing and goal plant community guide you. Low nutrients are generally fine, if something is missing entirely consider addition.
 - Organic, slow release fertilizer is preferable. Microlife fertilizers are an example.
 - Biochar helps with water retention, can mix with compost.
 - Fulvic and humic acid can help rebuild the O layer.
 - Compost tea – mixed understanding and efficacy. Some have had great success, others less.
 - Liquid amendments can be created using ideal habitat soil – mixed effectiveness.
 - Tilling
 - Undamaged soil, with intact native communities shouldn't be tilled. However, damaged soil, situations in which the vegetative community needs to be replaced, tilling may be needed. Will need to encourage good seed soil contact. Deep tilling can be a problem, bringing up weed seed from deeper in the soil column and damaging the soil structure.
 - Try to bring in compost and incorporate it when tilling.
 - Compaction
 - Penetrometer to test compaction on site – readings change with soil moisture. Very useful during and post construction in the field.
 - Bulk density can be taken to assess compaction regardless of soil moisture, but it takes longer and requires drying soil in a core of known volume.
 - Planting timing – this should be adapted to the species you are planting.
 - Forbs and cool season grasses in the fall.
 - Warm season grasses in the spring.
 - Fall is often the optimal planting time, though March and April are fine as well.
 - Winter grass seeding can also be successful in wildland type plantings, with expected spring germination.
- Resources**
- Soil Mapping**
- USDA-NRCS soil survey.
websoilsurvey.nrcs.usda.gov/app/
- Soil Testing**
- Texas Agrilife Extension – basic soil testing
soiltesting.tamu.edu/
 - Earthfort – biological testing
earthfort.com/.
- Soil interpretation**
- Jim Urban. Up By Roots. 2009
- Amendment suppliers**
- * Compost – Nature's Way Resources - Quality static aged compost.
www.natureswayresources.com/
- Tools**
- Penetrometer.
 - Double ring infiltrometer.
 - Soil testing supplies – most labs will give you instructions for taking samples. Available at: Forestry Suppliers Inc.
www.forestry-suppliers.com/
 - Gemplers. www.gemplers.com
- Water and Plants**
- Beth Clark of Clark Condon and Carolyn White of Harris County Public Health led a discussion on site water issues such as managing stormwater and providing irrigation. Issues regarding native plant material and availability were additionally discussed.
- Key Takeaways**
- The EPA's green stormwater infrastructure resources provides guidance on stormwater management.
 - One Water concept for health equity involves taking into account hydrology, hydraulics, geomorphology, water quality, environment, one health, and equity.
 - Irrigation – Given anthropological changes, careful consideration must be made when determining irrigation needs, and what may be required to emulate an “average” amount of rainfall.

How Breakout Session Summary continued

- USDA-NRCS Web soil survey is useful in identifying climax plant communities and ecosystem descriptions.
- Soil food web – discusses levels of fungi, nematodes and protozoa etc in soil. Soil life analysis can be conducted at some labs.
- The Nine Natives Program from the Coastal Prairie Conservancy is very useful when beginning the journey of gardening with native plants.

Resources

Plant Sources for Gulf Coast area

- Morning Star Prairie Plants – Damon, TX. morningstarprairieplants.com/
- Buchanan's Native Plants – Houston, TX. buchanansplants.com/
- Tree Search Farms – Houston, TX. treesearchfarms.biz/home-page
- Joss Growers – Georgetown, TX. jossgrowers.com/
- Native Texas Nursery. Austin, TX. nativetx.com/

Seed Sources for Gulf Coast area

- Regional seed collecting hosted by the Coastal Prairie Conservancy. www.coastalprairieconservancy.org/seed-collecting
- Native American Seed – Junction, TX. seedsources.com/
- Wildseed Farms – Fredericksburg, TX. www.wildseedfarms.com/
- Douglas W. King Seed – San Antonio, TX. www.dkseeds.com/
- Bamert Seed Company – Muleshoe, TX. bamertseed.com/
- NRCS plant materials program/seed releases

Information

- Nine Natives Program – native plant gardening.
- Houston Audubon – bird friendly habitats.
- Native Plant Finder, The National Wildlife Federation.
- USDA-NRCS Soil Survey.
- Doug Tallamy books.
- Biota of North American Project.
- Native Plant Society of Texas.
- Houston Arboretum & Nature Center.

Planning and Analysis

This session explored site assessment, analysis, and integrating both into design. Susan Sherrod of BioHabitats and Michelle Bertelsen of Blackland Collaborative led a discussion of pre-design analysis and how it impacts design.

Key Takeaways

- Communication is important before, during, and after site assessment
 - Ecological site assessment is generally not part of design projects. Convincing project managers it holds value, and then ensuring assessment results are incorporated into design are important.
 - Communicating results should take several forms.
 - A report for detailed information is useful, but quickly communicating the key findings and the ecological implications to people without ecological experience is just as important.
 - A slide show composed primarily of images, both site photo and infographics, is an important tool. Deliver the assessment in bite-sized pieces.
 - Repeated communication of findings and implications is needed.
- Psychology of a site assessment.
 - Know the goal for the assessment as well as the larger project goals – they will direct the focus and type of assessment to use. The organization or client should be setting these goals.
 - The overarching questions:
 - What are my assets and liabilities?
 - What is healthy, and what is not?
 - Are permits needed?
 - Is a specialist needed? (NEPA, Wetlands, etc.)
 - Develop your own social network of plant nerds.
- Analyze context remotely, but on-site assessment is important for discovering the details of a site.

Resources

- SER recovery wheel. www.ser.org/page/SERNews3113
- SITES. sustainablesites.org/certification-guide
- NRCS rangeland assessments. www.nrcs.usda.gov/sites/default/files/2022-10/RangelandReport2018_0.pdf
- Ecological Site Descriptions. edit.jornada.nmsu.edu/
- Soil survey. websoilsurvey.nrcs.usda.gov/app/

How Breakout Session Summary continued



- TPWD Ecological Mapping Systems.
tpwd.texas.gov/landwater/land/programs/landscape-ecology/ems/
- USFW – IPaC: Project planning tool that streamlines the USFWS environmental review process. ipac.ecosphere.fws.gov/
- USGS Gap Analysis Project. Multiple products: Species, Land Cover, and Protected Areas Database of the United States.
www.usgs.gov/programs/gap-analysis-project.
- Houston/Galveston area Council of Governments: Data and GIS hub. www.h-gac.com/Home
- TPWD GIS data and Interactive web maps.
tpwd.texas.gov/gis/
- Landscape Ecology Program.
tpwd.texas.gov/landwater/land/programs/landscape-ecology/
- AgriLife and extension services.
Soil testing: soiltesting.tamu.edu/
Environment and Natural Resources: agrilifeextension.tamu.edu/
- Corp of Engineers.
Streamflow model: www.erdc.usace.army.mil/Media/Images/igphoto/2002498120/
- State geologic resources.
Texas State Geological Survey: www.beg.utexas.edu/outreach/state-geological-survey
- SEINET Regional Network of North American Herbaria. symbiota.org/seinet/
- Biota of North America Project (BONAP).
Distributions of North American Vascular Flora, County level. www.bonap.org/
- Flora of North America Editorial Committee, eds. 1993+. *Flora of North America North of Mexico*. 22+ vols. New York and Oxford.
floranorthamerica.org/Main_Page
- iNaturalist: Online social network of people sharing biodiversity information to help each other learn about nature. Identification aid and tool creating data for scientists.
www.inaturalist.org/
- Randell, Bob. 1999. *Year round vegetables, fruits and flowers for Metro Houston: A Natural Organic Approach Using Ecology*, 12 Edition. Houston, TX: Year Round Gardening Press. 323 p. ISBN: 0-9705207-0-0
- US forest service fire effects info systems.
www.fs.usda.gov/research/rmrs/products/dataandtools/tools/fire-effects-information-system-feis
- Noss, Reed. 2018. *Fire Ecology of Florida and the Southern Coastal Plain*. University Press of Florida. 358 p. ISBN 13:9780813056715
upf.com/book.asp?id=9780813056715#

Budget, Funding and Phasing

Raising the funds, determining a budget, and funding the implementation of a restoration project is multifaceted and requires a variety of skills and professional input to make happen. Conners Ladner of Design Workshop and Debbie Markey of the Houston Arboretum & Nature Center shared experiences and lessons learned related to funding conservation projects.

Key Takeaways

- Effective communication regarding the project to a variety of funders is critical.
- Budgeting for maintenance and having the capacity for the right maintenance team and facilities is imperative to develop a financial plan.
- Planning for the upfront cost of restoration with an anticipation for a long term payoff.
- Be prepared for inflation and price changes during the implementation and phasing of a project.
- Maintenance fund- plan to put away 5-10% of all unrestricted gifts into a maintenance fund for future needs.
- Look for Economic Development Grants from your City or State.
- Budget for replanting cost in successive years.
- Look for creative funding sources – speak to others that have gone through the process to gain insights into areas of funding.

Walking Tour Day 1



**Donor Retention Pond/Savanna Boardwalk/
Savanna Field Station/Savanna Restoration**
Jason Burt of Forney Construction, and Trevor Rubenstahl and Kelsey Low of the Houston Arboretum & Nature Center led the savanna loop walk. Topics included the creation of the stormwater ponds, parking loops, and boardwalks as well as the restoration of the savanna and wildlife impacts due to the restoration.

Ravine – Design Vision, Storm Events, and Natural Channel Design

Stephen Benigno and Patti Bonnin of the Houston Arboretum & Nature Center, and Carolyn White of Harris County Public Health, and led a walk of the Arboretum’s ravine, which is a tributary to Buffalo Bayou. Topics covered included the design vision of the ravine, storm events that informed and caused the team to modify the design, how Natural Channel Design was integrated, and the performance since installation.

610 Woodland Restoration/610 Entrance/Wetland Field Station

Emily Manderson of Blackland Collaborative, and Tiffany Ritter and Jim Crabb of the Houston Arboretum & Nature Center led a walk through the woodland restoration area inside the 610 loop. Topics included the design intent, construction and implementation process. The walk ended with the Wetland Field station in the swamp and covered the educational opportunities the master plan enhanced.

Gardens – Pollinator, Sensory Gardens, Display Walk

Beth Condon of Clark Condon, and Jane Reiersen, Nova Morales, and Quinn Fanning of the Houston Arboretum & Nature Center led a walk around the courtyard gardens surrounding the administrative and educational building as well as the display walk. The talk covered the design intents of the gardens and the construction and implementation process. Garden maintenance was also discussed.

Display Walk/Event Lawn/Ravine Field Station

Connors Ladner of Design Workshop, and Debbie Markey and Carol Nicholiasen of the Houston Arboretum & Nature Center led a walk along the display walk, event lawn, and ravine field station. Topics covered included the issues surrounding event lawn construction and the many roles the area plays for conservation and programing.



04 Manage Session

Friday morning, September 15

Field Notes

at the Houston Arboretum & Nature Center:

A symposium to share ecological knowledge in an urban setting



2023
Houston, Texas

HOUSTON ARBORETUM & NATURE CENTER

Agenda at a Glance



Day 1: Friday, September 15th

Natural Channel Design – Ravine Restoration at the Arboretum:
Brett Jordan

MANAGE SESSION

Managing and monitoring restored ecosystems to reach and maintain goals

Presenters:

Stephen Benigno – Houston Arboretum & Nature Center

Lee Marlowe – San Antonio River Authority

Marissa Llosa – Houston Parks Board

Panel/Facilitated Discussion:

Lee Marlowe – San Antonio River Authority

Marissa Llosa – Houston Parks Board

Courtney Hall – Memorial Park Conservancy

Derek Sanford – Armand Bayou Nature Center

Gabriela Sosa – Buffalo Bayou Partnership

MANAGE Break-out session

1. Invasive Species Management
2. Fire and Grazing
3. Monitoring, Research, and GIS
4. Management in Urban Ecology Conditions
5. Sustaining Biodiversity

Walking tour: This walking tour took five groups on walks to the savanna and meadow locations to discuss the effects of prescribed fire and goat grazing.



Intro Presentation

Brett Jordan, Ph.D.

Owner, Hydro Geo Designs

Brett Jordan, with 19 years of expertise in hydrology, fluvial geomorphology, and related fields, has significantly contributed to over 60 river systems across various U.S. regions. His work encompasses watershed-scale sediment and nutrient transport analysis, stream and coastal marshland restoration, and hydraulic structure design. He has developed over 35 miles of stream rehabilitation and assessed over 500 miles of streams.



PRESENTATION:

Brett Jordan provided an overview of the design and construction process of restoring the Arboretum ravine in 2018. The design build project focused on removing obstructions and restoring a natural channel process in an area with significant water flow from a large drainage area. This entailed energy dissipation measures right at the start due to the forceful flow of water through a box culvert.

Key steps in the project included:

1. **Removal of obstructions:** Two culverted crossings causing erosion and flow backup were removed.
2. **Installation of bridges:** Ensuring safe abutments and checking for hydraulic impacts like scouring.
3. **Stormwater management:** Addressing outfall from a stormwater pond and controlling erosive flows.
4. **Natural channel restoration:** Allowing for self-regeneration and accepting some natural erosion.
5. **Use of repurposed materials:** Logs from the parking lot construction and savanna restoration were used to create energy-dissipating structures like log ripples and log veins.
6. **Hydraulic analysis:** Ensuring structures could withstand velocities and shear stress, particularly in response to significant rainfall events.
7. **Construction management:** Emphasizing the importance of preparing the site for unexpected weather events to prevent equipment loss or project delays.
8. **Results:** Brett was particularly proud of the successful revegetation and natural look achieved, showing before-and-after pictures of the project site. They highlight the importance of minimizing impact, preserving tree roots for bank stability, and the use of boulders and other materials to support the ecosystem and infrastructure, like a bridge crossing. The results after several years show a well-integrated environment where even the constructed elements have taken on a natural, organic feel, contributing to habitat complexity.



Manage Session Presentations



Stephen Benigno, PhD, CERP

Conservation Director, Houston Arboretum & Nature Center



Stephen heads the Arboretum's team overseeing natural landscape conservation, focusing on ecosystem restoration, resource management, and environmental research. Before this, he worked at Harris County Flood Control District, handling habitat restoration, environmental engineering, endangered species protection, and streambank biostabilization. His work also involved researching the integration of natural ecosystems in urban areas. He is a Certified Ecological Restoration Practitioner.



PRESENTATION:

Urban Ecosystem Management

- Ecosystem Management is required to maintain project goals in perpetuity.
- All projects are different, and management actions depend on site-specific conditions.
- Some form of monitoring should be integrated into the overall plan to allow for adaptive management.
- A hybrid or novel ecosystem may be the outcome, as invasive species may always be present in urban systems.
- A reasonable approach with clear and achievable goals are necessary to create a successful project.



Ecological restoration focuses on recovering impaired ecosystems towards sustainability. However, in dynamic, disrupted urban environments, true restoration might not be fully achievable. Ecosystem Management compensates for human impacts, hindering sustainability. This management, tailored to each site's unique goals and factors, must be integrated into all project phases, considering realistic implementation of strategies and resources like personnel and equipment.

Continuous monitoring is essential in management, allowing for strategy adjustments based on data and success criteria. A simple, replicable monitoring plan ensures consistent data collection. This may involve baseline data, reference ecosystems, or historical reports. Finding an appropriate reference ecosystem can be challenging, leading to managing towards novel or hybrid ecosystems. Dealing with invasive species depends on available resources.



Ecosystem management is a perpetual process, requiring a unique approach for each site, clear, adaptable goals, effective communication of results, and acceptance of uncontrollable natural factors.

Manage Session Presentations continued

Lee Marlowe

Sustainable Landscape Ecologist, San Antonio River Authority

Lee is a seasoned restoration ecologist with 20+ years in ecological restoration and natural resource management. She specializes in using native plants for wildlife habitat, water quality, stabilization, and aesthetics in various landscapes. Currently, she contributes her expertise to the Ecological Engineering Department, supporting diverse projects.



PRESENTATION:

Tips for managing and monitoring restored ecosystems in urban settings

Apply adaptive management by using the latest site information and best management practices to meet your goals. If native vegetation coverage is a goal:

- Identify primary target species for management – these are the species with the greatest potential to disrupt the restored ecosystem – prioritize management of these species with your limited resources.
- Monitor and document beneficial contributions to the restored ecosystem from volunteer native species (those plants that were not intentionally installed) and manage the site accordingly (e.g., Giant Ragweed as a beneficial species for year-round habitat versus automatic removal).

Use simple tools for management and monitoring:

- Simple tools can add value for science and outreach.
- Simple flow charts can serve as guidelines for site vegetation management and can easily convey priority tasks to field staff, the public, partners, and others (e.g., highest priority task is to take action on primary target species with viable seed present versus a low priority task to take action on volunteer native species providing ecosystem benefits).
- Simple black & white project maps showing enough site features for viewers to understand locations can be useful for communicating tasks to site management staff as well as documenting work through map markups and conveying that information to others – these markups can be digitized if resources allow.
- Don't overcomplicate site data collection, use rapid assessment protocols and simple field forms if they provide you with the information you need to make decisions and meet goals.



Manage Session Presentations Continued



Marissa Llosa, CSE

Conservation Manager, Houston Parks Board

Marissa specializes in conserving natural resources in Houston's Bayou Greenway and other areas maintained by the Houston Parks Board, encompassing about 2,800 acres. Her experience includes 19 years as a field biologist for Texas A&M AgriLife Extension Service, focusing on wetland restoration in Galveston Bay. She founded the Wetland Restoration Team, leveraging Master Naturalist volunteers for projects at Sheldon Lake State Park and several bayous.



PRESENTATION:

- Adaptive management of your conservation areas also means you need to be adaptive to change within your program, as change will happen.
- Listen to your team, support them and learn how to harness their power while also giving good guidance.
- Have a plan to guide your growth.

The mission and challenges faced by the Houston Parks Board:

Since 1976, the Houston Parks Board has aimed to create, improve, protect, and advocate for parks accessible to everyone. The Bayou Greenways project is a significant ongoing initiative, involving 150 miles of trails along Houston's bayous and adding 3,000 acres of green space across nine waterways, funded partly by a \$100 million city bond and a \$120 million match by the Parks Board.

Challenges and Strategies:

Conservation and Planning: Initially, there was a lack of management plans, which are crucial for setting goals and directions for ecological restoration.

Invasive Species: A significant portion of the habitats were dominated by invasive species, which required a strategy to manage and reduce them.

Initiatives and Best Practices: The team developed four major initiatives and worked with experts to establish best management practices tailored to Houston's diverse environments.

Time Management: The team faced time constraints, exemplified by a project that required quick action following an unplanned burn on a bayou.

Adaptive Management: They adopted adaptive management to cope with dynamic environmental changes, like flooding and droughts, which impact restoration efforts.

Community Relations: The perception of the community and stakeholders can be a challenge.

Maintenance and Monitoring: The expansive area of the Parks Board's jurisdiction necessitates efficient use of electronic tools for monitoring and automating maintenance processes.

Staff Training and Adaptability: Training staff to recognize various plant species and remain adaptable to change, such as staff turnover, is essential.

Manage Panel Discussion



Discussion Panel::

Lee Marlowe – San Antonio River Authority

Marissa Llosa – Houston Parks Board

Courtney Hall – Memorial Park Conservancy

Derek Sanford – Armand Bayou Nature Center

Gabriela Sosa – Buffalo Bayou Partnership

Tell us the one thing that you feel is most challenging in managing your site.

Derek Sanford's main challenge is feeling confident on integrated management decisions. The more he learned, the more he realized there's so much more to learn and a big part of that is novel invasive species management.

Lee Marlowe's main challenge on the Mission Reach ecosystem restoration project in San Antonio is stormwater and its impacts such as pollutants particularly, floatables and trash.



Marissa Llosa's main challenge is not having a centralized location for her team to work out of. It affects whether or not they can effectively do management and maintenance.

Gabriela Sosa's biggest challenge is dealing with invasive species management.

Courtney Hall's main challenge is staying focused while keeping her eye on the different priorities and being ready to shift as needed. This involves tempering the desire to put out many spot fires versus working on one main issue.

Are your management actions guided by pre-developed goals and quantifiable metrics? If so, what are they? If not, would having goals and metrics help or hinder your efforts?

Gabriela said that sometimes she gets feedback 'data' that the landscape looks 'ugly'. She sees it as a prompt to delve deeper. Why do people think this looks ugly and where is this feedback coming from? And more importantly, she must examine how it aligns with her ecological goals such as biodiversity. Having set goals that frequently get revisited helps inform management decisions especially in high visibility parks.

Lee shared that in the Mission Reach Ecosystem Restoration Project, they have an operations and maintenance plan that was developed by a very integrated team with clear performance goals for the ecosystem. The use of goals and quantifiable metrics

Manage Panel Discussion Continued

plays a pivotal role in management of the ecosystems. Lee communicated that the main vegetational goal is achieving 70% aerial coverage by native species. This is a high and challenging goal for an urban waterway and they are currently at 50% native coverage. Lee is proud of this high goal and they are striving towards reaching 70% while also proving the needed conveyance.

Does your organization have a defined management plan and is this management plan still useful in your day-to-day?

Derek explained that their management plan is a detailed written document that is crucial for the stewardship department to establish clear objectives and quantifiable deliverables to justify budget and actions. It's essential for all team members to familiarize themselves with the management plan and they are currently working on adapting the document to address current issues.

Marissa shared they have sites that have very specific plans, and then they have our Best Management Practices (BMPs) for all the different habitat types we manage. They are also working on an Integrated Pest Management Plan (IPM). There is the need for digital transformation to make these plans more accessible. Converting the plans into an interactive digital format, like a mobile survey app, makes for easy access in the field. This approach allows for regular updates and keeps the plans relevant. The goal is to improve staff engagement and improve performance metrics.

Gabriela's team is working on an adaptive management plan with Bio Habitats. It's been helpful to seek an external perspective to assist in seeing the bigger picture since we are so busy with the day to day functioning of the program. As the first conservation manager at Buffalo Bayou Partnership, She faced the challenge of establishing a baseline for monitoring without much guidance. Gabriela realized that the architects who designed the park were allies, having gathered essential data needed for goal development. By locating documents on species planted a decade prior and their selection rationale, she could perform meaningful comparisons. Dedication and passion is important in conservation work, as it involves extensive research because there is the risk of fixating on singular issues instead of the broader conservation goals.



Lee shared that their operations and maintenance plan for the Mission Reach project was crafted for simplicity to aid our community coordination. It includes essential goals and straightforward guidelines, making it accessible for all project members. The plan features useful appendices like maps and task summaries for easy reference. Though it's not necessary to constantly use these resources, familiarity with the plan is encouraged. Its simplicity was key to gaining approval from the San Antonio City Council and Bexar County, aligning with broader local planning efforts and enhanced visuals for better engagement.

Derek explained that by acknowledging that many innovative ideas might have already been explored in the past documentation, can help avoid redundancy and inefficiency.

What should be set up at the beginning of a project to help manage your sites?

Courtney discussed the importance of establishing a clear understanding of both long-term and short-term goals from the beginning, internally and externally with stakeholders. She advocated for employing concept renderings and using other reference sites to help visualize potential outcomes. This approach aids in communication and setting realistic expectations. Understanding and planning for ecological processes and succession, and using this knowledge as an educational tool. She also recommended recognizing important elements like the source of your seed bank and high-value areas that might need special consideration is also important to consider before

Manage Panel Discussion continued

starting the project. Emphasizing the value of on-site walks with the team, designers, and contractors for better planning and decision-making. Lastly, she suggested understanding how the project aligns with other operations like lawn care and litter management, and considering the end users' needs and perspectives.

Additional considerations discussed:

Keeping the End-User in Mind: Always focus on the 'why' behind the project, keeping the end user's experience and needs at the forefront of planning and execution.

Multilingual Communication: Emphasizing the need for information to be accessible in multiple languages, especially in areas where the primary language is not English. This is vital for engaging with local communities and workers, ensuring they understand important information about conservation efforts.

Community Engagement: The importance of involving the community in conservation efforts was discussed, with a focus on understanding why certain communities might not be participating and finding ways to encourage their engagement.

Adaptive Management in Conservation: The panel touched on the concept of adaptive management in conservation projects, which involves making adjustments based on changing conditions and new information. This approach is especially relevant in dealing with challenges like drought, extreme weather, and invasive species.

Staff Training and Retention: The challenges of hiring, training, and retaining staff in physically demanding and outdoor conservation work were highlighted. Emphasis was placed on the need for adequate training, knowledge transfer, and the importance of recognizing and valuing the contributions of staff members.

Challenges in Conservation Work: The panelists discussed the various challenges faced in conservation work, including dealing with unexpected events like fires or floods, managing financial resources, and effectively communicating the value of conservation efforts to a wider audience.

Panelist Biographies

Courtney Hall

Conservation Manager, Memorial Park Conservancy

Courtney Hall specializes in wetland and coastal restoration. She plays a key role in maintaining and restoring native habitats in the Park and collaborates with designers and construction teams on the Memorial Park Master Plan.

Derek Sanford

Stewardship Program Coordinator, Armand Bayou Nature Center

Derek Sanford has a background in Texas coastal ecosystems, he focuses on habitat maintenance, restoration, and educational outreach. His experience includes extensive work in coastal restoration across Texas.

Gabriela Sosa, Ph.D.

Conservation Manager, Buffalo Bayou Partnership

Dr. Gabriela Sosa is an expert in urban ecosystem recovery. With international experience in environmental monitoring, she has also been involved in U.S. environmental policy. Dr. Sosa actively contributes to the H-GAC Natural Resources Advisory Committee and the Texas Society for Ecological Restoration.



Manage Breakout Session Summary



Invasive Species Management

Unfortunately, invasive species are a dependable presence in urban landscapes. Dealing with these aggressive offenders requires a combination of planning, prevention and constant diligence. Michelle Bertelsen of Blackland Collaborative and Trevor Rubenstahl of the Houston Arboretum & Nature Center led a session focused on identifying and managing some of the most prevalent and persistent invasive species that plague urban restoration projects in the Greater Houston Region.

Key Takeaways

- Creating an Integrated Pest Management (IPM.) protocol is critical for safe and effective invasive species removal and management. This should be updated on a regular basis to reflect changes in the science and lessons learned through field applications.
- Invasive species will always be present in urban environments therefore it is important to define your priority species and thresholds for percent coverage for each species.
- Preparing the site and taking the time (ideally one year) to remove invasive species before implementation will have a significant impact on long term maintenance of invasive species.

Resources

- The Nature Conservancy Weed Control Methods handbook. This is an older resource, but very detailed. <https://www.invasive.org/gist/products/handbook/methods-handbook.pdf>
- Texas Invasives. www.texasinvasives.org

- Invasive.org. www.invasive.org/
- Bugwood Center for Invasive Species and Ecosystem Health, University of Georgia. <https://www.bugwood.org/index.cfm>
- Invasive Plant Atlas of the United States. <https://www.invasiveplantatlas.org/>
- TAMU Brush busters. <https://texnat.tamu.edu/about/brush-busters/>
- USDA Forest Service Invasive Species Program. <https://www.fs.usda.gov/managing-land/invasive-species>
- Ladybird Johnson Wildflower Center (for replacement natives. <https://www.wildflower.org/>)
- USDA Plants Database. <https://plants.usda.gov/>
- Integrated Pest Management Principles. www.epa.gov/safepestcontrol/integrated-pest-management-ipm-principles

Fire and Grazing

Urban landscapes have been disconnected from the natural processes that have sustained them for millennia. Although it may seem counterintuitive, frequent disturbances such as fire and grazing are necessary to maintain healthy, diverse and sustainable ecosystems in this region. The Arboretum has recently had the opportunity to implement a form of both fire and grazing, and John Hart Asher of Blackland Collaborative and Stephen Benigno of the Houston Arboretum and Nature Center and Justin Huddleston of the Houston Fire Department Wildlands Burn Unit will be sharing their experiences with these not-so-new management techniques.

Key Takeaways

Disturbance is a driver

- Grasslands developed in direct response to drought. Fire and grazing maintained them.



Manage Breakout Session Summary continued

- Pine forests in the South East had similar disturbance regimes.
- Understanding historic disturbance regimes is important to managing in the present, as well as understanding changes to the site and how that influences disturbance intervals and vegetation response.
- Woody encroachment is one of biggest threats to grasslands.
- Wildfires now are not healthy fires because fuel has built up, and they tend to be very intense.
 - Sterilizes soils.
 - Threatens the upper canopies.
- Fire regimes have been resources to move ungulates in native societies.

Site prep

- For target driven fire you may need to prep the site – creating access pathways, fire breaks, and possibly protecting structures or key natural features. Create access pathways around the entire site, and internally as necessary. Fuel breaks between fuel types are useful.
- ALWAYS test fire to understand specific conditions.
 - Monitoring weather conditions to stay in prescription up to and through the course of the fire is import.

Wildlife protections

- Most wildlife moves out of the way of the fire.
- Fires are patchy, and unburned areas act as refuge.
- During and following the fire, many species are attracted to the area for food.

Urban Wildland interface problems

- Prescription parameters are tighter to manage risk.
- People component must be considered. It is better to over-inform than have anyone be surprised.
- Cultural fear is on the decline and should be a goal.
- Time of Year.
 - Dormant vs Growing season burn.
 - To address woody species, burn in growing season according to plan.
 - Moving burn into summer means hotter temperature of fire.
 - Can knock back some species such as King Ranch bluestem, but encourage other species. It's important to understand your site.
 - Completely different community responses in different seasons.
 - Many prescriptions are written for winter to enhance forage production.

- Historically, natural fires came through when things were dry and prone to burn.
- Managing perceptions around fire.
 - Barriers to implementing prescribed fire.
 - Public perception.
 - Communicate with immediate neighbors and take their fears seriously.
 - Provide information on the benefits, not only to the natural community, but the protections that frequent, low intensity fires provide through fuel reductions.
 - Provide information on how prescribed fires are managed and how risk to the human community is mitigated.
 - Lack of knowledge & resources.
 - Smoke Management.
 - Air quality impacts are of a large concern in urban prescribed fires. Take care to follow the burn plan to minimize smoke impacting the public.
 - Burn Plans.
 - Develop a burn plan in tandem with your burn boss. Previously used burn plans can be minimally revised to fit new areas.
- First step to get started.
 - Education and training.
 - Prescribed burn alliances.
 - Private consultancy implementation.

Resources

- Local burn associations.
- NRCS has programs for per acre burnings.
- Texas Forest Service.
- National Wildfire Coordinating Group. <https://www.nwccg.gov>
- Texas A&M Agrilife Extension Prescribed Fire: A Tool for Landowners Large and Small.

Monitoring, Research, and GIS

Although sometimes intimidating, monitoring is a cornerstone of a successful restoration project, and can define baseline conditions, shape future trajectories and determine success criteria. This session explored how monitoring and research can help improve projects and how GIS technology can be implemented to assist and simplify this effort. Led by Gabriela Sosa of Buffalo Bayou Partnership and Lee Marlowe of the San Antonio River Authority.

Manage Breakout Session Summary continued

Key Takeaways

GIS

- Used to measure vegetation, birds, wildlife.
- The value is that all the data is instantaneous.
- Very helpful in large landscapes and with big teams.
- Can reveal landscape scale patterns and connections that are not obvious while physically in the field.
- Very important to keep track of what's out there.
 - Historical accuracy.
 - Reference for future projects.
 - Informs adaptive management.
 - Baseline data.
- Accuracy has improved over time & tools exist to increase accuracy further.
- Can be expensive and complex, but becomes more accessible with time. GIS work can be contracted out.

How will the data be collected and used?

- Manage expectations for what people are asking you to do with GIS. Often people do not know when they are asking for something that takes a lot of time.
- Rely on other organizations and existing datasets. Some work has already been done, and using existing data can focus your time in the field. Much easier to confirm or disprove that the site fits a predefined pattern, then start from scratch.
- May not need to know name of every species.
- Need to know just the most important species for management.
 - What are problem plants, what is needed to manage them, how urgent is the need? Example: Reproduction cycles — Chinaberry takes 5 years vs Vitex which reproduces very quickly.

How to be most effective in the field?

- Species that cannot be identified in the field can be collected for identification in the laboratory.
- Long checklists can be cumbersome. Species can be grouped by type (Old World Bluestems instead of individual species) or set up species list to autocomplete.
- With any digital tool, check for errors. Paper copies can be a great backup.

After you collect data, what do you do with all the information?

- Separate responsibilities e.g. one person/team may be the owner of the data for questions about the data analysis, but another person/team may be the experts in the GIS specifics, the type of organism, etc.

Resources

NEON – National Ecological Observatory Network

<https://www.neonscience.org/about>

- Protocols are all online.
- H-GAC Houston-Galveston Area Council. www.h-gac.com/Home

GIS software programs

- Field Maps.
 - Polygons.
 - ID areas.
 - Notes sections.
 - Back in the office reference.
 - Great for overall estimate of area covered/ what's actually on the ground
- Survey 123.
 - Decreases paperwork.
 - Who collected data.
 - What day it was collected.
 - Similar to google forms – can develop to your needs.
 - Can take photographs, coordinates, start/end dates
 - Can set up own templates/parameters.
 - Survey questions should be relevant, but not excessive.
- StoryMaps.
 - A way to tell a story using GIS data.
 - Your own data.
 - Photographs of sites' change over time.
- Great tool if you are the messenger for your project.
- Student pricing.
- Nonprofit members get 85% reduction in annual fees.

Management in Urban Ecology Conditions

Urban ecosystems present unique challenges that require adaptive solutions. In addition to more extreme climate swings and invasive species, outside partnerships and people management can also be resource-intensive tasks. Thoughtful planning and a broad skill set are necessary to jump the hurdles to accomplish project goals. Courtney Hall of Memorial

Manage Breakout Session Summary continued

Park Conservancy and Marissa Llosa of Houston Parks Board led a discussion on navigating these challenges.

Key takeaways

- Beneficial environmental changes may contradict the public's idea of a healthy natural space.
- Messaging is important to keep the public on board with why changes are being made. It is important to communicate the items below:
 - Different types of ecosystem exist, each with its own needs.
 - What healthy ecosystems are, why the existing system is not as healthy as it could be, and how we are working to improve health.
 - What will the changes look like, how will the ecosystem be healthier/more biodiverse/sustainable after?
 - Urban environments are unique.
 - Systems are dynamic.

Sims Bayou.

- A lot of time was spent putting in native plants and turf. Homeowners along bayou greenway couldn't see it another way.
 - It is important to plant trees in the right places with the right conditions otherwise they will die and need replacement or removal.

Sustaining Biodiversity

Change is constant in any ecosystem, and especially so in an urban landscape. Sustaining biodiversity in an ever-changing setting is not only necessary for conserving a healthy and diverse ecosystem, but ensuring that an appropriate level of aesthetic is provided for guests, stakeholders and donors. Derek Sanford of Armand Bayou Nature Center, Emily Manderson of Blackland Collaborative and Theo

Ostler of the Houston Arboretum & Nature Center led a discussion of methods for maintaining a diverse urban wildscape.

Key takeaways

- At Armand Bayou, managing diversity has been both easy and challenging. They have a good representation of the upper Texas Coast and are trying to buy more land which is proving to be challenging. Some of the activities have included implementing different kinds of flow controls in an intertidal marshland and tributary, establishing habitat for birds, simplifying restoration for the savannas and other ecosystems on site, and documenting species diversity before you lose it.
- At the Houston Arboretum native plant nursery, grasses are the fastest growing plants.
- Some of the easiest species to grow for diversity are: Little bluestem (*Schizachyrium scoparium*), Side oats grama (*Bouteloua curtipendula*), Sugarcane plumegrass (*Saccharum giganteum*).
- Bushy bluestem (*Andropogon glomeratus*) was successful in the beginning of establishment but but was an aggressive seeder. It then needed to be controlled to improve diversity.
- Most valuable experience has been through working in the field and managing the ecosystem.
- Some general challenges are:
 - Controlling woodies in a grassland ecosystem that is surrounded by woods.
 - Implementing lessons that were learned into the management plan.
 - Nature can be nudged in the direction we want it to go, but it won't always turn out that way.
 - Biodiversity needs to be sustained over time. Reseeding and replanning needs to be a regular event, especially in urban ecosystems.



Walking Tour Day 2



Since the implementation of the Master Plan, goat grazing and prescribed fire have been used as management tools throughout the Arboretum in addition to more traditional methods. The walking tours on Day 2 explored the implementation and impacts of prescribed fire and goat grazing.

HFD, HANC, TPWD, Texas A&M Forest Service and others performed a prescribed fire in the recently restored 8ac savanna habitat on March 25th, 2021. It was the first prescribed fire within the 610 Loop since 1999 (when the Arboretum burned the Meadow). This came after much planning and communication with agencies and the general public, and was a major milestone in the Arboretum's ecosystem management. Prescribed fires were again used in March 2022 and February 2023 in the 3ac Meadow.

High density low frequency goat grazing conducted by Rent-a-Ruminant occurred five times between 2020 and 2023 in separate locations and various habitats within the Arboretum.



The Arboretum performed quantitative vegetation monitoring to gather data on the effectiveness of these management techniques. Prescribed fire was shown to enhance habitat quality within the Meadow. Goats were most impactful in clearing areas with woody brush, given goats are more browsers than grazers. Long-term results are not yet available, and current detailed information can be found on the Arboretum's website. These techniques will most likely require repeated or follow-up management to maintain a desired result, but the use of prescribed fire and grazing indicated positive impacts and provided additional tools to effectively manage ecosystems in urban environments.



05 Message Session

Friday afternoon, September 15

Field Notes

at the Houston Arboretum & Nature Center:

A symposium to share ecological knowledge in an urban setting



2023
Houston, Texas

HOUSTON ARBORETUM & NATURE CENTER

Agenda at a Glance



Day 2: Friday, September 15th

MESSAGE SESSION

How to communicate, educate, and inspire

Presenters:

Tiffany Ritter – Houston Arboretum & Nature Center

Treasa Antony – Nature Heritage Society

Panel/Facilitated Discussion:

Treasa Antony – Nature Heritage Society

Anica Haymes – Houston Arboretum & Nature Center

Becky Martinez – Bayou Land Conservancy

Bethany Foshée – Coastal Prairie Conservancy

Dany Millikin – Houston Botanic Garden

MESSAGE Break-out session

1. Stepping up our social game
 2. Classroom and educational messaging
 3. Volunteers
 4. Messaging sensitive topics
 5. Flexible session
-

Messaging and Media

Jay Kleberg, *Gulf of Mexico Trust*

www.finanfurfilms.com



Message Session Presentations

Tiffany Ritter, *Education Director, Houston Arboretum & Nature Center*

Tiffany Ritter has been with the Houston Arboretum and Nature Center since 2010, starting as a volunteer before transitioning to an educator. She is passionate about environmental education.

Tiffany has over 20 years experience in education and leadership and is an active community volunteer for Texas Parks & Wildlife, Galveston Bay Foundation, PAIR Houston, Texas Association of Environmental Education, and the Texas Children in Nature Network.



PRESENTATION:

Communication Importance: Emphasizes the various forms of communication - verbal, nonverbal, written, and visual - in conveying environmental messages.

Role of Education: Stresses education as a key part of their mission for land conservation and restoration.

Everyone as Educators: Advocates that everyone, regardless of their role, is a teacher in some capacity.

Target Groups for Education:

- Children, as part of the Arboretum's foundational mission since 1967.
- Civic leaders and decision-makers, for advocacy and awareness.
- Non-English speakers, to broaden outreach.
- Landowners, for sustainable land management practices.
- Medical centers, promoting health benefits of nature.
- Homeowner associations, for environmentally friendly practices.
- Continuous Learning: Highlights the need for ongoing learning and professional development in environmental fields.
 - Inspiration in Education: Encourages inspiring future generations by engaging with children and making learning fun and interactive.

Balance in Communication: Suggests mixing seriousness with humor to make environmental education more engaging and relatable.

Invitation for Involvement: Encourages participation as docents or volunteers at the Houston Arboretum and offers assistance in environmental education efforts.



Message Session Presentations continued



Treasa Antony, Executive Director of Nature Heritage Society

Finding her bliss helping families find joy in the outdoors, Treasa Antony left a 20-year corporate career to dedicate more time to family and NHS as Executive Director. She is also the Director of Community Relations at the woman owned startup, Community Lattice, which is a social impact organization that helps communities understand and optimize land revitalization programs as a pathway to environmental and climate justice.



Inspiration from the Founder: Inspired by Nature Heritage Society founder Glen Miller, a former educator from Texas who grew up close to nature, Miller noticed a lack of nature access for black and brown children and sought to change this.

- **Formation of Nature Care Society:** Initially started as Nature Care Society in the '90s, it later evolved into Nature Heritage Society.
- **Engagement with Schools:** The society began by taking public school children camping and fishing, offering them new outdoor experiences.
- **Access to Unconventional Spaces:** They focused on bringing children to places like Sugar Land and a pump track for mountain biking, which are usually inaccessible to their community.
- **Funding and Activities:** Activities are grant-funded, and in the absence of grants, they conduct local hikes and visits to state parks.
- **Sea Center Texas Visit:** Children get tactile experiences with marine life at the Sea Center in Texas.
- **Bird Watching Initiatives:** Incorporation of bird watching, including partnership with African American birders, to provide relatable role models.
- **Houston Wilderness Park Experience:** Visits to Houston Wilderness Park and Raptor Center, emphasizing outdoor learning and interaction with nature.
- **Camping and Nature Interaction:** Camping trips where children encounter wildlife and learn about environmental stewardship.
- **Therapeutic Aspect of Nature:** Acknowledgment of nature's role in reducing stress and providing a healing environment for children from challenging backgrounds.
- **Educational Philosophy:** Emphasizes learning from nature about collaboration, coexistence, and taking care of the environment.
- **Conclusion:** Treasa is inspired by the children they serve and the lessons of nature, driving the Nature Heritage Society's mission.

Treasa Antony's speech highlights the importance of connecting children, especially from underserved areas, with nature to foster appreciation, environmental stewardship, and personal well-being.

Message Panel Discussion



Discussion Panel::

Treasa Antony – Nature Heritage Society
 Anica Haymes – Houston Arboretum & Nature Center
 Becky Martinez – Bayou Land Conservancy
 Bethany Foshée – Coastal Prairie Conservancy
 Dany Millikin – Houston Botanic Garden

What are the most important or common messages you communicate?

Becky Martinez found that she is most frequently reminding people that conservation is possible everywhere and it is possible to appreciate natural beauty in urban environments such as Houston, a place that seems so developed. Green spaces and diverse ecosystems exist even in developed cities, offering opportunities for nature experiences.

Anica Haymes emphasized the importance of expressing gratitude and appreciation for volunteers who dedicate their time to conservation efforts and environmental education. This approach underlined the significance of community involvement and mutual respect in fostering a culture of conservation and environmental awareness.

What concepts are hard for people to understand?

Bethany Foshée emphasized the challenge of connecting people, especially those in urban areas, with environmental concepts like ecosystem services. She highlighted the growing gap between humans and the natural world, partly due to technology, and the importance of reconnecting people with nature for mental health and wellbeing. It helped to simplify complex topics like carbon storage and the tragedy of the commons to make them more relatable to urban dwellers and start with basic, comprehensible points before delving into detailed explanations. Conveying too much information at once can be overwhelming and counterproductive. Beginning conversations

with simple, engaging elements such as specific native plants, gradually builds understanding and interest in environmental issues. The goal is to make environmental concerns personally relevant and understandable to the public.

Dany Millikin suggested that perhaps we are trying to communicate too much at once and we can potentially lose our audience and message in doing so. Dany argued that we can communicate, for example, the value of a prairie and why it shouldn't be developed, into a story that is comprehensible without trying to explain everything at once. Perhaps starting with grasses or sunflowers and then adding more detail to the story after trust has been established.

How to adapt messaging to different audiences?

Anica reflected on her experience as the volunteer coordinator at the Arboretum working with a diverse group of volunteers in terms of age, professions,



Message Panel Discussion Continued

and demographics. She initially believed she was well-equipped to communicate effectively, but realized the importance of listening to understand the diverse needs and perspectives of her audience. Post-pandemic, she rebuilt the volunteer program by sending out surveys and engaging in conversations to tailor her approach.

Dany felt engaging adults, rather than children, in environmental education is especially important because he feels the issues need to be addressed immediately. He found that by using creative incentives like offering ‘chef made’ food and drinks to attract participants he will get more people engaged and participating. There is also a need for diversity in conservation and making botanic gardens more inclusive. The historical barriers faced by black and brown communities must be acknowledged. Conservation has come a long way with diversity and it still has a long way to go.

How to make the initial connection to audiences that are missing?

Though challenging, **Treasa Antony** tries to find similar faces in different disciplines so that missing audiences can feel included. She collaborated with the Audubon Society to introduce familiar faces, making participants feel at ease and inspired, and to convey the message that these are attainable pursuits. Her goal is to engage people, particularly those from inner-city areas, and provide them with even a basic level of exposure to experiences that are often more accessible to others. In this endeavor, she must acknowledge that she is starting from a more fundamental level compared to others’ experiences.

Anica also faced challenges in reaching out to missing audiences because the process to become a volunteer can be challenging to those who are not able to pay a fee, have access to a computer and specific software, or time for long orientation. It can feel overwhelming, or not as accessible as they thought it was going to be, leading to a loss of potential volunteers. Additionally, she found it particularly difficult to create volunteer opportunities for young children; as there are few resources or established methods for engaging five or six-year-olds in conservation. Despite frequent interest from parents and scout leaders, Anica is still seeking effective ways to involve children in these activities.

How do we make restoration more of a mainstream and common practice?

Becky believes that successful environmental restoration awareness begins with small-scale, personal actions, like encouraging the planting of native plants in personal spaces, even if it’s just an apartment. She also emphasized the importance of large-scale projects, like those at the Arboretum and Memorial Park Conservancy, which are highly public and allow community feedback. By showcasing restoration efforts of various sizes, people can understand its impact on both community and personal levels. The more exposure people have to these types of landscapes the more comfortable people will be with the changes.

Bethany often uses the term ‘stewardship’ instead of ‘restoration’ as she feels it has a more positive connotation. She stressed the importance of people feeling a connection with nature and feeling the power of nature taking care of them, which is a crucial first step before discussing stewardship. This involves creating safe and welcoming natural spaces for children and adults, particularly those from urban environments. She also reflected on the history of colonization and the need to speak to the changes that have happened to the landscape and remember that it was once a wilder and less controlled landscape.

Dany supported using marketing strategies, like repetition of messages and cross-promotion on social media, to reinforce the importance of conservation efforts. It is important to share each other’s stories to amplify the message and for environmental enthusiasts to openly share their passion.



Message Panel Discussion Continued

How to approach sensitive or really high stakes topics?

Treasa said she addresses sensitive topics directly. There is a delicate balance between being diplomatic and the need to confront issues that affect marginalized populations, particularly how the comfort of one group can threaten the existence of another; a conflict sometimes reflected in tragic news stories. Communication is important, striving to be direct yet non-threatening in both verbal and non-verbal interactions. Despite efforts to soften the delivery, some people may still react negatively or shut down in response to the message. The best approach was to be as direct, honest, and humane as possible in these interactions.

What are the methods for getting the message out? How do you communicate with social media and what other tools do you use?

Becky said the most successful approach for spreading their message is through the volunteers themselves rather than the staff. Becky mentioned a 14-mile trail managed by the organization where new members and volunteers often join after interacting with current volunteers who are actively working and sharing their passion for conservation. This word-of-mouth recruitment is likened to having “informed apostles” who spread their enthusiasm to others.

A master naturalist from the audience mentions that a mentoring program has been introduced, enhancing member recruitment and retention. This program includes mentors meeting new trainees for coffee and providing support, which has led to considerable expansion and success in keeping knowledgeable volunteers engaged, likening it to keeping one’s chicks close.

Anica responded that while there is no traditional mentorship program in place at the Arboretum, Anica has concentrated on providing educational opportunities and appreciation events to bring volunteers together. They have introduced volunteer-specific training throughout the year, covering a variety of topics such as being a docent and caring for animals in a discovery room. Additionally, content classes have been added to address topics of interest expressed by the volunteers. Naturalists volunteer to assist with these efforts, offering specialized classes

like bird sound identification and entomology, with activities like setting up moth traps. It is also an opportunity for volunteers to bring friends and family members as well as get to know the other volunteers.

Panelist Biographies

Anica Haymes

Volunteer Manager, Houston Arboretum & Nature Center

As the Volunteer Manager at the Houston Arboretum, Anica organizes both conservation and education-based volunteer opportunities, maintains the Volunteer database, oversees recruitment, training, and onboarding processes for general volunteers, schedules corporate, private, and school group volunteer experiences, and develops and implements successful teen volunteer programs.

Becky Martinez

Conservation Director, Bayou Land Conservancy

Becky oversees land project management and strategic planning for land conservation at BLC. Her previous experience was focused on environmental regulatory compliance, wetlands permitting and mitigation banking. Becky works to increase and maintain BLC’s preserved lands and reconnect people to the area’s natural beauty.

Bethany G. Foshée

Stewardship & Outreach Director, Coastal Prairie Conservancy

Bethany has extensive experience managing conservation programs for Houston’s environmental nonprofits. Her core mission over the past two decades has been to foster a true land ethic among the region’s diverse citizenry by delivering meaningful conservation and outdoor recreation opportunities, reminding people of the joy found only in connecting to nature.

Dany Millikin

Director of Education, Houston Botanic Garden

Before joining the Houston Botanic Garden, Dany served as Executive Director of the Organic Horticulture Benefit Alliance — a Houston non-profit dedicated to the education of organic and sustainable lawn and garden practices, and operated an organic, edible-focused landscaping company.

Dany has launched an exciting speaker series, horticulture training in Spanish, and an organic certification at OHBA, led corporate/volunteer events at Memorial Park, and partnered with local chefs to present fun programs on plants and the culinary arts.

Message Breakout Session Summary

Stepping Up our Social Game

Reaching a diverse audience means embracing social media. The session explored the benefits and challenges of social media with Christine Mansfield of the Houston Arboretum and Nature Center, Bethany Foshée of the Coastal Prairie Conservancy, John Hart Asher and Michelle Bertelsen of Blackland Collaborative.

Key Takeaways

- It is important to know what is your voice on social media and how is it different on different platforms
- Identify your goal and what you are trying to accomplish.
- Many posts are going towards video because it is more engaging.
- It is helpful to invest in good quality equipment and software.
- It is helpful to communicate within the organization and know when things are happening to capture raw material.
- You will get better as you go.
- Using humor to helps demystify science and plant jargon works well for folks who aren't as knowledgeable.
- Narrative is important in helping to disarm people.
- Using humor that's relatable; contagious enthusiasm.
- In social media these days 100% authenticity translates well.
- Humanizing – videos with people in them, hearing voice overs vs. text; audience wants to engage with the person behind the video.
 - Can utilize user generated content to avoid having to be one person; sharing stories of visitors, experts, etc.
- Finding balance of being authentic and not taking self too seriously within the bounds of the organizational mission, etc. – sometimes easier for individual creators vs. organizations.
 - Important to frequently have this conversation internally so folks understand.
- Bridging age gaps based on how audiences interact and what they respond to – multiple page report vs. social media post; recognizing how younger generations are inclined to learn, e.g. through videos.
 - Helpful to have multiple connection points e.g. long youtube video + short Reels.
 - Also helpful to have various ways to communicate info based on preferences and disabilities (e.g. captioned videos, alt text, capitalizing each word in a hashtag).
- Tooting your own horn – showcasing the work that you're already doing.
 - Leadership at the top recommending all staff to take photos of everything you're doing so it can be used to share your story.
 - Utilizing teammates who are already doing the work to help build and showcase content.
- Using scientific names to help engage audiences who want to know more; building bridges and being real about not always knowing.
- Sharing work of similar groups and collaborating on content – helps make connections; using influencers to help reach audiences you're not typically hitting.
- Organization needs to invest a budget for marketing, but also in the communications and marketing team; critical for the success of the organization.

Resources

Always ask about nonprofit pricing/discounts! Set up a few of the tools:

- Canva – graphic design tool for making videos, graphics, presentations, etc.
Free pro version for nonprofits



Message Breakout Session Summary *continued*

- Hootsuite – social media management.
- Later – social media management, some plans allow you to pull and use user generated content. They also have a great blog with ideas and trends. *Offers a 50% discount to nonprofits*

- Linktree – customizable link in bio
Free Linktree Pro account for nonprofits

Organizations/people doing this well

- Native habitat project (Kyle Lybarger) – prairies, restoration.
www.instagram.com/nativehabitatproject/
- Crime pays but botany doesn't (J. Santore).
www.youtube.com/channel/UC3CBOpT2-NRvoc2ecFMDCsA
www.instagram.com/crime_pays_but_botany_doesnt/?hl=en
- National parks.
www.instagram.com/bigbendnps/?hl=en
- Black forager.
www.instagram.com/blackforager/?hl=en
- Misanthropic botanist. www.instagram.com/misanthropicbotanist/?hl=en
- Nature is metal.
www.instagram.com/natureismetal/

Tools that are best to use

- Gimble – helps stabilize videos and makes them look so much more professional; newer iPhones have stabilization feature
- Editing
 - DaVinci Resolve – free computer software.
 - iMovie.
 - Final Cut Pro.
 - Canva – basic video editing; will do it in the size you need; have a free pro trial for nonprofits.
 - Remote Mics – helpful for outdoor videos vs. built in mics.

Classroom and Educational messaging

Teaching conservation and restoration in the classroom to a younger audience and the general public can normalize restoration and provide a literacy in ecological principles. Kelsey Low and Patti Bonnin of the Houston Arboretum & Nature Center and Emily Manderson of Blackland Collaborative led a discussion of educational messaging tips and other lessons learned through their years of teaching experience.

Main Takeaways

- The session identified the level of experience with teaching and reviewing that has worked well and what hasn't.
- People are often trying to reach out to clients, other people in their jobs and profession, as well as students.
- The hands-on approach of planting trees and visiting gardens has been successful. Use what outdoor space you have, try hands-on activities, and direct experiences.
- Offer materials and instructions in the language most appropriate to your audience. This may include bilingual materials and teaching, or offering an interpreter.
- Some of the challenges to educating in the field are motivation, time, money, and lack of interest from clients.
- If you can't bring people to the nature, bring nature to them. This may be bringing plants to their office to experience, carpooling, offering alternative transportation, or using multimedia.

Resources

Websites for information about messaging:

- NAAEE – overall environmental education information.
- TAAEE – overall environmental education information.
- NAI – interpretation resources.
- Canva.com – for multimedia (they offer some translation).



Message Breakout Session Summary *continued*

- Lady Bird Johnson www.wildflowercenter.org for examples of plants and information.
- Texas AgriLife Extension – experts and resources for landscaping.

Volunteers

Engaging volunteers is an important component of ecological restoration as volunteers often play a critical role in making management possible and are the best spokespeople for your program. Becky Martinez of the Bayou Land Conservancy, and Anica Haymes of the Houston Arboretum & Nature Center led a discussion of Messaging and working with Volunteers.

Main Takeaways

- The people leading the session shared their experiences with volunteers.
- At the Bayou Land Conservancy, highly trained volunteers perform baseline assessments for new land. They provide training on how to recognize issues with the land and how to gather data. These volunteers are relied on for data and information.
- At the Houston Arboretum, the volunteer manager trains volunteers in basic training and offers opportunities that other staff members create. The volunteer manager also trains the staff on possible volunteer opportunities.
- Some organizations have a volunteer manager as an afterthought and attach it to another job and don't understand the time and effort that the position requires to develop a successful program.
- An organization has to advocate for themselves with corporate volunteer groups.
- Offerings and volunteer standards may change over time as the organization changes and evolves.

Being able to communicate those changes to volunteers is important.

- It is time consuming to build authentic relationships with certain communities.
- When trying to build diversity in volunteer groups it works well if you can find connections between groups once you have established genuine connections.

Messaging Sensitive Topics to Different Audiences

Speaking to the public and specific audiences regarding restoration and urban ecology is not always easy. This session will discuss messaging sensitive topics to different audiences. Dany Millikin from the Houston Botanic Garden, Treasa Antony with the Nature Heritage Society, and Tiffany Ritter from the Houston Arboretum & Nature Center led a discussion exploring this topic.

Main Takeaways

- People consider sensitive topics to include herbicide use, private-public partnerships in conservation, climate injustice, zoning issues, politics, urgency of climate crisis, and gentrification.
- Adaptive messaging should be used to make messaging towards communities better suited for that community. Instead of telling lower income communities not to do something, provide them with a way to do those things and word it in a different way for people to better understand the message.
- Successful conversations with opponents to climate change or environmental justice look like starting from a common point, building rapport, pinpointing the part of environmental justice that is a block for opponents.
- People of color should address sensitive topics by standing firm in your beliefs, sharing struggles in friendly spaces in order to grow understanding among those who can advocate, disrupting the narrative that black and brown people are other in these spaces. The more we talk about it, the less of a stigma and less defensive it becomes.
- A good strategy for fostering collaboration with others is meeting people “where they are,” i.e. understanding there are pre-existing stressors that inform others actions. It is also possible to change the message or find a representative from the community to convey the message so it will be better received.



Closing Presentation: Messaging and Media

Jay Kleberg

Executive Director, Gulf of Mexico Trust

The Gulf of Mexico Trust applies Texas-based, science-backed solutions to the Gulf's most pressing challenges. Jay has served as Associate Director for Texas Parks and Wildlife Foundation, co-founded the travel company, Explore Ranches, and was a producer of the film *Deep in the Heart*. He and his wife are producing *Chasing the Tide*, a film about their 370-mile walk across Texas' seven barrier islands.



www.finandfurfilms.com

Jay Kleberg provided an excellent end to the symposium by emphasizing the need for strong storytelling to help amplify conservation and urban ecology. Jay reviewed clips of nature-based films he has been a part of, to exemplify different approaches and the effectiveness of storytelling. Films reviewed were: *Deep in the Heart of Texas*, *American Ocelot*, *The River and The Wall*, and his newest project- *Chasing the Tide*. Below are the main takeaways from his presentation:

- Storytelling matters. Storytelling can not only amplify voices but it can spur change. Good storytelling is imperative to connecting with others-clients, new audiences, each other. It's not a new phenomenon, there is just a greater emphasis on the visual medium.
- Use all forms of communication: movies, film, photography, social media to engage with your audience.
- The film *Deep in the Heart* influenced science, social studies and history based curriculum for 300,000 students with Texas examples.
- The film *The River and The Wall* had congressional screenings and renewed efforts to conserve land and generate tourism opportunities on both sides of the border.
- *Chasing the Tide* is a film that is being created about one couple's 370-mile trek across the barrier island of Texas.
- One fourth of Texas' population and economy is on the coast. While creating more man made reservoirs than any other state, these features have choked our bays and estuaries of freshwater and nutrients. The Intracoastal waterway disrupted the natural saltwater-freshwater exchange in our bay systems, our diverse coastal habitats are shadows of their former selves, and yet they are still resilient.

The people, communities and coastal environment bear the brunt of a changing climate. We want Texans to think about Texas as a coastal state and not simply a state with a coast. With a journey, a film, book and curriculum, and partners; we'll see if we can change their minds and not just adapt to change but enhance our environment.

- We tell these stories to connect with people, because while telling stories is important, it's ultimately people who make a difference.
- We can't stop telling these important stories. For example, we have to keep reminding Texans that the largest congregation of mammals on the planet, 20 million bats, lives within commuting distance of roughly 5 million people.
- In an urbanized world, it's our collective responsibility to connect people to the natural world.



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