SER TEXAS
SOCIETY FOR ECOLOGICAL RESTORATION

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Oral Presentation Abstracts

J. Ferrato
The Nature Conservancy of Texas

Black-capped vireo in adjacent arid and mesic communities: population and habitat change over 15 years

Black-capped vireo (BCVI) habitat in its mesic, northeastern range requires active management to maintain appropriate structure, less is known about long-term changes in BCVI habitat in arid, southwest. At The Nature Conservancy's Dolan Falls Preserve, Val Verde County, Texas, we sampled BCVI habitat in adjacent representatives of arid and mesic vegetation communities, 2002 and 2017; in addition to Breeding Bird Survey (BBS) point counts, 2001 and 2017. Randomly-located vegetation plots (n=20) were evenly divided between mesic alluvial and arid canyon. Vegetation height was consistently greater in alluvial than in canyon sites; neither site increased significantly between 2002 and 2017. Number of shrubs increased at both sites from 2002 to 2017, but area occupied by shrubs and vertical distribution of leaf cover remained similar. Shrub species diversity increased significantly only in alluvial sites. BCVI detections at BBS points (n=12) near vegetation plots decreased only at alluvial sites, whereas BBS data (n=50) from across the preserve showed increases in total number of BCVI detections, mean number of detections per point, and number of points occupied in 2017 compared to 2001. Changes in BCVI populations may reflect habitat changes.

D. Murray
Tarleton State University

Mesquite Savanna-Texas Wintergrass Complex: Best Management Practices for Conversion to Native Warm Season Grasses

In much of the Cross Timbers and Rolling Plains ecoregions of Texas, diverse native grassland plant communities have given way to degraded rangeland. These are dominated by invading mesquite (Prosopis glandulosa) and a cool season perennial grass, Texas wintergrass (Nassela leucotricha). These diversity-poor plant communities have been associated with the loss of native grassland bird populations. The primary goal of this research is to determine the best techniques or combinations of techniques from commonly recommended management practices, including grazing, prescribed burning, herbicide treatments, and reseeding, aimed at converting mesquite savanna-Texas wintergrass complex to native grasslands in a manner that would increase plant diversity and enhance grassland bird habitat. At two mesquite-invaded sites in north-central Texas dominated by Texas wintergrass, seeded and non-seeded plots were established in March 2015 following mesquite removal. These plots were subsequently divided into subplots to test herbicide, fire, and grazing singly or in combinations in March 2016 and March 2017. Treatment effects analyzed with generalized linear mixed model with repeated measures indicated all treatments that included herbicide reduced ($P = 0.05$) percent Texas wintergrass cover 50%, whether as single treatments, or in combination with burning and/or grazing as compared to controls and all other treatments. Burning or grazing did not add to reduction of Texas wintergrass by herbicide application, but did affect remaining litter cover, which may affect establishment of native warm season grasses and forbs.

C. Reemts
The Nature Conservancy of Texas

Hurricane-induced flooding has minimal effects on east Texas forests

Rainfall from Hurricane Harvey caused unprecedented flooding in parts of east Texas, including The Nature Conservancy's Sandyland Sanctuary (Hardin County). Areas of the preserve over 1 km away from Village Creek were flooded for multiple days. In spring 2018, we re-surveyed 72 bird survey points that had previously been surveyed in 2015-2017. In summer 2018, we re-sampled 66 vegetation plots (previously sampled in 2014-2017). The areas sampled included upland longleaf pine savanna, wet savanna, and baygalls. Preliminary analyses show that only 2% of canopy-sized trees had died after the flood. In areas where flood waters were deep, some longleaf pine seedlings and saplings had died; overall loss of regeneration was 15%. Overall bird species richness and community composition did not change. Three resident bird species (blue jay, brown-headed nuthatch, and northern mockingbird) decreased in abundance and frequency; one resident (northern bobwhite) and one migrant (yellow-throated vireo) increased in abundance and frequency. We expect that the long-term impact of the flood will be minimal but will continue monitoring to confirm our expectation.

E. Vreugdenhil
Caesar Kleberg Wildlife Research Institute

Quail Habitat Restoration in Areas Dominated by Non-Native Grass

Non-native grasses, particularly buffelgrass (Pennisetum ciliare) and Old-World bluestems (Dichanthium and Bothriochloa spp.), have been planted in Texas since the 1930's for cattle forage and erosion control. These grasses have aggressively invaded native rangeland in southern Texas and Mexico and have become a leading cause of quail habitat loss and fragmentation. A pilot study showed that non-native grass stands could be greatly reduced and diversified via repeat discing and/or glyphosate application (to remove non-natives on cultivatable soil) and subsequent planting of ecotypic natives. In 2014 we began a large-scale (±121 ha) study to replicate this success. Our study is composed of 2 sites, a restoration treatment area and a non-treated control area. The restoration site was repeatedly disced and sprayed (5 events each) during 2014-2016 to remove non-native grasses and to deplete the soil seed bank. A diverse assemblage of native plants was sown in October 2016. We sampled herbaceous and woody cover along 80 transects during March, June, and October 2013-2018 using Daubenmire frames and the line-intercept method. Both the control site and the restoration site initially had >75% non-native vegetation cover. Since 2014, non-native cover has been reduced to <2%, where it has remained over the last 4 years. Native vegetation has gradually increased since the restoration efforts began but cover has varied with soil type and precipitation. If this restoration proves to be successful in the long-term and beneficial to quail, it represents an important step in learning how to effectively restore quail habitat on a large scale in South Texas.

C. Williams
BIO-WEST Inc

Restoration of Native Submersed Aquatic Macrophytes for an Endangered Fish Species: Results After Five Years

The Comal Springs and Comal River is a short urban river (5 km) located entirely within the city of New Braunfels, Texas, U.S.A. The Comal River is fed by the Comal Springs a karstic spring system that produces an historical average of 8.5 cms in flow. As many as seven rare and endemic spring or riverine species are found in the Comal system with six species listed as threatened or endangered by the United States Fish and Wildlife Service (USFWS). To help better protect these endangered species the USFWS approved a Habitat Conservation Plan to be implemented by the City of New Braunfels and other stakeholders which identifies several goals to improve and increase habitat for target species. One such target species is the fountain darter, Etheostoma fonticola. To improve habitat for this fish species several projects were implemented in the Comal River. These include removal of Hygrophila polysperma, a dominant nonnative submersed macrophyte, as well as propagation and reintroduction of native aquatic submersed macrophytes such as Ludwigia repens Cabomba caroliniana and Sagittaria platyphylla. Monitoring data collected over the previous ten years indicates that these native aquatic macrophytes are more suitable habitat for the fountain darter than Hygrophila polysperma. Location of restored area was prioritized based on historical observations of native macrophyte distribution, sediment and channel characteristics and water quality requirements for the fountain darter. Two dimensional hydraulic models were also utilized in the process to locate areas of river channel which would maintain sufficient flow during drought. In order to provide a reliable source of native aquatic plants several techniques were used including sprigging of stem fragments and in situ nursery propagation. Removal of Hygrophila polysperma and reintroduction of native vegetation in prioritized locations is expected to benefit the fountain darter by improving the quality of habitat, potentially resulting in higher fountain darter densities in these areas. Since 2013 an estimated 4,000 m² of Hygrophila polysperma have been removed and over 20,000 native aquatic macrophytes have been planted covering an estimated 3,100 m².

A. Fierro
University of Texas Rio Grande Valley

An invasive unglulate may restrain mangrove range expansion on the south Texas coast

Along the Lower Laguna Madre, historically expanding black mangrove (Avicennia germinans) stands were recently observed being browsed intensively by invasive nilgai antelope (Boselaphus tragocamelus). This novel interaction appears to alter mangrove plant architecture, metabolism and reproductive output. The antelope were introduced to south Texas via the King Ranch in the 1930's and have since significantly increased in population and distribution. Generally thought to be grazers, B. tragocamelus have been recurrently recorded on camera browsing on A. germinans. Preliminary stable isotope analysis suggest that B. tragocamelus is now preferring mangrove and other C3 woody species over the abundant, higher protein content C4 grasses. To assess the effects of heavy browsing by B. tragocamelus, selected structural and functional characteristics of A. germinans were compared between browsed and non-browsed trees. As expected, browsed trees have a reduced canopy Leaf Area Index, but also have lower resorption ratios of nitrogen and phosphorus. Leaf chlorophyll content in browsed trees was lower, possibly pointing at more stressed plants. Browsing negatively affected the amount of inflorescences and produced smaller propagules. Heavy vertebrate herbivory on A. germinans in south Texas is a novel interaction, and may well constitute a negative feedback to the range expansion of this estuarine foundation species.

J. Navarro
University of Texas Rio Grande Valley

Facilitative interaction between Batis maritima and Avicennia germinans seedlings: a look at microenvironmental parameters and implications for mangrove restoration

Observations of promoted recruitment, survival and growth of black mangrove (Avicennia germinans) seedlings in patches of the herbaceous halophyte Batis maritima are frequently observed where the species coexist. An in situ experiment is being conducted in an A. germinans stand in the Lower Laguna Madre aiming to explore what it is hypothesized to be a multifaceted facilitative interaction. For this purpose, A. germinans seedlings were planted in plots established on existing B. maritima patches, bare mud, and within the mangrove stand, the later as reference for some variables. Continuously recording devices (Hobo loggers, eButtons) were installed in every plot to measure soil temperature, air temperature at seedling height, and light intensity/sun exposure. In addition, soil electrical conductivity, redox, pH, N and P were and will continue to be measured. Seedling responses (survival, growth, leaf chlorophyll) are being recorded. Microenvironmental variables and plant responses (mangrove seedlings) will be compared to assess the influence of B. maritima, and the implications for mangrove restoration and mangrove range expansion will be discussed.

M. Partain
Texas A&M University - Corpus Christi

Evaluations of tea bag index (TBI) in predicting decomposition rates in black mangrove (Avicennia germinans) sediment

Ecosystem carbon emissions, which may contribute to climate change, are fundamentally driven by the balance between primary production (carbon dioxide use/oxygen production) and respiration (oxygen use/carbon dioxide production) within habitats. Most of the carbon dioxide produced by ecosystems is derived from the decomposition of plant litter. A fundamental problem in comparing decomposition rates among ecosystems is that different kinds of plants produce different kinds of litter (e.g., leaves vs. wood) and each litter type for each species decomposes at a different rate, depending on temperature, moisture, and soil type. The Tea Bag Index (TBI), a method that has been standardized with known reference values for green tea and rooibos, provides the data necessary to calculate decomposition rates, which allow for comparisons across ecosystems worldwide. However, the use of non-native materials to monitor decomposition rates has its detractors, who often dismiss TBI as an unrealistic representation of decomposition and preferring to use native material that, in turn, results in decomposition rates that cannot be compared "apple to apple" The overall goal of this study is to compare decomposition rates in black mangrove habitats in South Texas derived from TBI with the decomposition of native litter to assess the efficacy of TBI.. Sediment is one of the last things that is restored in an ecosystem, so the TBI could be done to test the function of the sediment pre and post-restoration. This method could further be used in long-term ecosystem management, as it does not require substantial
funding or large crews.

J. Avila Sanchez
Caesar Kleberg Wildlife Research Institute

Comparison of Seasonal Prescribed Burning effects on Forage Production and Composition of Gulf Cordgrass Communities

Gulf Cordgrass (Spartina spartinae [Trin.] Merr. ex Hitchc.) is a perennial bunchgrass found along the coast of the Gulf of Mexico, it is used as a reserve when other available forage is scarce. As it matures, its leaves become coarse and low in nutritive value and palatability, therefore, solid stands are avoided by livestock and other foraging wildlife. Removal of old growth by burning or shredding promotes palatable green forage. In this study our objective is to demonstrate that fire in grasslands can increase forage production, improve herbaceous composition by increasing species richness, and removal of excessive fuel and mulch. We are studying the effects of seasonal prescribed burning in summer and winter and comparing 8 burned pastures with presence of gulf cordgrass and 2 control (not burned) pastures. For this, eight 1 squared meter quads (10.764 square feet) are randomly placed along transects that are permanently inside the pasture to be clipped for biomass/forage production, record plant composition, recruitment and mortality. Preliminary results show that summer burning results in higher plant mortality (29%) than other winter and control treatments (9%). Rainfall and soil moisture before and after burning appears to be more important than the season that we burn (Summer or Winter). Where soil moisture was collected, plots with 35% moisture had significantly faster and steadier forage regrowth, compared to plots with 15% moisture. Since drought is a common phenomenon in South Texas, it is important to consider soil moisture before planning to conduct a prescribed burn.

C. Sutton
Texas A&M University - Commerce

The use of prescribed fire, herbicide application, and native plants to restore bottomland Blackland Prairie in constructed wetlands

The Blackland Prairie of Texas, once covering approximately 4.2 million ha, now exists mainly in fragments <10 ha encompassing less than 1% of its original total area. Increasing awareness of the importance of the Blackland Prairie region and the ecosystem services provided therein has promoted restoration of prairie remnants and establishment of prairie plant assemblages in constructed systems. We use a randomized block design to measure levels of short-term phenological success and biomass gain of eastern gamagrass (Tripsacum dactyloides) and lowland switchgrass (Panicum virgatum) in constructed wetlands containing encroaching woody and invasive competitor species. We establish three treatments: (1) herbicide, (2) prescribed burn and (3) herbicide and prescribed burn. Each treatment will contain plots with species 1, plots with species 2, and plots with both species 1 and 2 to compare isolated and co-occurrence growth success. Here we compare the existing species composition, diversity, and abiotic factors at two constructed prairie wetlands with mixed land use and management histories. We hypothesize that a combination method of herbicide/prescribed burn will have the greatest negative effect on invasive re-emergence and the greatest positive effect on native plant growth. Results from this study will provide baseline data for native plant success and future management strategies in constructed prairie wetlands, and may be integrated into future bottomland prairie restoration designs.

J. Baez
University of Texas Rio Grande Valley

Exploring allelopathy of native woody species as potential approach for thorn forest restoration: a test on inhibition of germination and emergence

A frequent impediment of restoration efforts are introduced species that become invasive. A promising approach to hinder aggressive exotic plants during restoration of terrestrial habitats involves allelopathic effects of few native species. Our observations in tamaulipan thorn scrub have pointed at several species with apparently strong allelopathic effects. Here we assessed potential chemical inhibition of germination and seedling emergence by Acacia shaffneri, and compared it to a close but apparently non allelopathic species, Acacia farnesiana. Live leaves and fine roots of both species were collected and dried to constant weight at 40°C, and then grinded to powder. Aqueous extracts were prepared with grinded dry plant material in five dilutions that were tested in a completely randomized design with five replications for a total of 100 experimental units. The experimental unit was a petri dish with 100 seeds of Sorghum bicolor over a layer of absorbent paper. The dishes were kept at room temperature and the paper moist with its corresponding extract dilution until the germination process was considered complete. Parameters describing the germination process (germinability, mean germination time, mean germination rate and synchrony of germination) will be compared between species, tissues and extract dilutions. On a parallel experiment, pots filled with soil were seeded with sorghum and covered with a thin layer of mulch made from these and other native woody species. Seedling emergence and initial growth will be assessed. Implications for the control of invasive African grasses in the context of thorn forest restoration will be discussed.

D. Davidson
Landowner Scientist

The art and science of King Ranch bluestem restoration

In 2007, research began to find a way to restore grasslands dominated by King Ranch (KR) bluestem (Bothriochloa ischaemum). A lecture by Barron Rector (TA&M extension service) formed the basis for this effort that focused on soil restoration. A control burn in 2009, and solarization thereafter, provided a large number of plots where KR plants and roots were killed and soil restoration, followed by reseeding, has resulted in a mosaic of areas (20) now restored to native grasses and forbs. Analysis by PLFA confirms soil restoration and molecular analysis (DNA) shows that pathogenic fungi associated with KR was also killed by the restoration methods developed. No differences in mycorrhiza or bacterial genera was found between KR and restored areas.

C. deLeon
St. Edward's University

Mycorestoration of a Ligustrum japonicum-invaded urban park in Austin, TX

By spreading beyond its ornamental use, the invasive tree Ligustrum japonicum can reduce native biodiversity in Central Texas. Ligustrum control typically involves cutting trees and spraying stumps with herbicide, but that can be expensive and may have non-target negative effects. This study analyzed impacts of the removal of Ligustrum japonicum (by cutting) followed by treatments using woodchips inoculated with native mycorrhizal fungi on Ligustrum regrowth, success of native grass and wildflower plantings, and soil conditions at Blunn Creek Preserve in Austin, TX. Treatments included inoculation of woodchips with oyster mushrooms, woodchips alone, and herbicide application to the stump. Preliminary results have shown that the addition of native mycorrhizal fungi and organic plant matter served to increase the survival rates and growth of native grasses plantings, increase decomposition rates, lower soil temperatures, and increase soil moisture. Thus, with this research we concluded that the fungi have assisted in the remediation of soils in areas inoculated, giving the potential option to move away from chemical pesticides. Findings of this research should be of broad interest to invasive species managers in Central Texas and beyond.

L. Marlowe
San Antonio River Authority
Giant Ragweed is the Answer.

It may not be the answer to all of the questions, but Giant Ragweed (Ambrosia trifida) is an important native plant that doesn't deserve to be indiscriminately targeted for removal. In fact, it provides multiple benefits that can be used by restoration practitioners to assist in the restoration process. Why spend limited resources of time and labor on removal efforts of this plant if it is supporting your project restoration goals? Giant Ragweed is currently one of the most important native plants found in the Mission Reach Ecosystem Restoration project along the San Antonio River for a variety of reasons. This presentation will highlight the observed ecological benefits as well as the adaptive management approaches being used for this much-despised native plant.

O. Roybal
Trinity University

Variation in Growth of KR (Bothriochloa ischaemum) and Little (Schizachyrium scoparium) Bluestem in the Presence and Absence of Field-Collected Fungal Endophytes

Above and below ground microbes play critical roles as determinants of plant fitness. Understanding the influence of fungal endophytes (residing in plant tissues) on the dynamics of grass species invasion could reveal novel approaches for invasive species control and remediation efforts following invasive species removal. Nonetheless, few studies have isolated and directly tested fungal endophytes as determinants of growth in invasive and native grasses. In this study, we focused on the native little bluestem (Schizachyrium scoparium, hereafter referred to as LBS) and the invasive, non-indigenous King Ranch bluestem (Bothriochloa ischaemum var. songarica, hereafter referred to as KR). We hypothesized that 1. root fungal endophytes will differ between KR and LBS root tissues, 2. Their species composition will be determined by the grass species that dominate a community, and 3. endophyte species will differentially affect the growth of KR and LBS. In particular, we were interested in root fungal endophytes present in LBS in KR-dominated patches under the assumption that these endophyte species may facilitate LBS under these conditions. To test hypotheses 1 and 2, we isolated root fungal endophytes from KR and LBS growing naturally in KR- and LBS-dominated patches across three sites and two soil types. These isolates were then categorized as "morphotypes" based on visual assessment. To test hypothesis 3 for endophytes isolated from LBS in KR-dominated patches, we grew LBS in the presence and absence of the two most common endophyte morphotypes. For each treatment group (2 endophyte morphotypes + a control), LBS was planted from seed in 180 cone-tainers® (3.8 cm in diameter, 18.4 cm deep) filled with sterilized UC system soil mix with additional CaCO 3 to mimic local calcareous soils. Once germinated, each individual was inoculated by placing a small amount of fungal endophyte plus agar on the soil surface. Plants were maintained in a randomly assigned spatial matrix under greenhouse conditions at approximately 25°C and watered as needed to keep soils moist but not saturated. Each week, for four weeks, we randomly harvested 20 individuals per treatment and measured above ground and below ground biomass. We also collected root samples that were stored for colonization assessment. Results of the study will be presented.

J. R. Valdez Barillas

Texas A&M University - San Antonio

Soil microbe composition can facilitate Sideoats Grama (Bouteloua curtipendula) establishment when growing in competition with Bermuda grass (Cynodon dactylon)

The establishment of native plants in areas dominated by invasive is influenced by soil ecological processes. For instance, differences in soil microbe composition can promote the growth of a species native to the community and inhibit an invading species. We studied the effects of soil microbe composition by measuring changes in biomass of Sideoats and Bermuda in response to native and invasive soil treatments. The native soil came from areas where Sideoats is well-established. The invasive soil came from areas dominated by Bermuda. Each species was grown individually and combined in plastic cones filled with commercial top soil. Our design included a native soil treatment, an invasive soil treatment, and untreated cones as controls. Bacterial effects were assessed by adding an antifungal (Fungin) to one set of cones and an antibacterial (ampicillin) to a second set of cones within each treatment. We conducted a metagenomic analysis using the V4 region of 16sRNA sequence to assess microbial composition and differences based on microbial community metabolism were assessed using Biolog's carbon source utilization analysis. The metagenomic and metabolic analysis shows that native soil bacteria are more diverse than the invasive soils. The biomass results suggest that Sideoats grows better in competition with Bermuda when treated with its native soil. Bermuda grows better alone with invasive soil, but performs poorly with native soil. We conclude that Sideoats can potentially shift the microbial community as it becomes established in areas dominated by Bermuda and replace Bermuda through soil microbial inhibition.

C. Whiting
University of Texas at Austin

King Ranch bluestem and fire: impacts and control of an invasive grass

Invasive grasses can reduce native biodiversity and threaten endangered species. Controlling invasive grasses is a challenge because they frequently survive fires and regrow rapidly afterwards. They also make fires hotter and more frequent. Previous studies have found that fire sometimes reduced the cover of the invasive grass Bothriochloa ischaemum (King Ranch bluestem); however, it is not clear whether native species were equally harmed. In one study, we burned in four different seasons, plus an unburned control, to determine (1) whether the season of fire would determine B. ischaemum response, and (2) whether native species would replace B. ischaemum after fire. Twenty to twenty-eight months after the prescribed fire, the plots burned in August or September had significantly less B. ischaemum cover and more native herbaceous perennial plant cover than plots burned in February or April or left unburned. In a second study, we investigated the effects of B. ischaemum on grassland and savanna fire. We hypothesized that B. ischaemum was creating large amounts of fine fuels, which increased fire durations and temperatures. We recorded fire temperatures and collected biomass samples before 25 prescribed fires on sites with and without B. ischaemum. Biomass was higher and fires lasted longer in sites with B. ischaemum than in sites without B. ischaemum. These two studies suggest that B. ischaemum changes fire regimes but, nevertheless, fires at the right season can shift a community from B. ischaemum dominance.

T. Arsuffi
Texas Tech University @ Junction Llano River Field Station

Healthy Watershed Approach To Managing Streams in a Dynamic World for Resistance, Resiliency and Restoration: Role of Science, Stakeholders, Education and Partnerships

Resistance and resilience are 2 critical components of ecosystem stability associated with disturbance. Watershed is a productive scale to evaluate streams to perturbations (e.g. invasive species, land fragmentation and management practices, loss of riparian habitat). Such disturbances affect stream flow and water quality and threaten the health of the watershed. The Llano River, a clear spring-fed perennial river, supports a unique ecosystem and provides constant critical flows downstream to the Colorado River and Highland Lakes/Austin. To manage, maintain or restore ecological integrity of the Upper Llano watershed, and using a partnership approach, the TTU Llano River Field Station, Texas A&M WRI, TPWD are working with the NGOs and others to develop and implement a Healthy Watershed Protection Plan (WPP) through a federal Clean Water Act 319(h) grant from the TSSWCB and the U.S. EPA. Our scientific approach characterizes the complexity of the watershed to understand structural and functional attributes of the watershed to gain insight to resistant and resilience characteristics important to restoration. We do this through an integrated assessment of the landscape and biotic condition, chemical/physical parameters, critical watershed functional attributes and benefits from implementation of best management practices (BMP). The WPP uses a stakeholder process for decision-making on plan elements, wildlife concerns; economics of BMPs. Watershed education components include public workshops (well owner, stewardship, hogs, invasives etc.) and curriculum for K-12 students. Agency partnerships, stakeholder/landowner involvement and education should be considered anthropogenic resistance and resilience components of watersheds that promote stability by increasing capacity to absorb disturbances and enhance recovery.

J. Childers
Tetra Tech

Lessons learned from a Section 203 feasibility study.

Section 203 of the Water Resources Development Act (WRDA) of 1986, as amended, allows a nonfederal agency to complete a feasibility study for a water resource project and submit it for review by the Assistant Secretary of the Army for Civil Works (ASACW) to determine if the project is feasible, meets federal law and regulations, and is recommended for authorization by Congress for construction and federal cost sharing. This talk will describe lessons learned from a Section 203 study completed by a nonfederal interest, reviewed by ASACW for policy compliance, and submitted to Congress for authorization in a pending WRDA. The lessons learned provide insight to agencies interested in taking this approach to complete a feasibility study for congressional authorization and implementation with federal cost sharing. To reduce damaging discharges to estuaries Florida passed Senate Bill 10 (SB10) directing the South Florida Water Management District (SFWMD) to complete a study evaluating construction of a reservoir to capture and treat excess water from Lake Okeechobee and redirect flows to the Greater Everglades. SB10 required the State to work with USACE to deliver the study to ASACW by March 30 for Congressional approval October 1, 2018, 18 months from the law being signed. The tight deadlines forced SFWMD, a State agency, to conduct the study in accordance with Section 203 of WRDA 1986, as amended. Despite time constraints, other factors including available technical expertise, tools, aggressive public involvement, effective engagement with elected officials, and timing enabled successfully completion.

S. Benigno
Harris County Flood Control District

Establishing a Native Prairie Vegetation Bioswale to Assess Runoff Reduction

The Harris County Flood Control District is assessing and comparing the runoff reduction under two separate conditions 1) native coastal prairie vegetation and 2) traditional turf grasses in backslope swales at two separate locations in Harris County. In early 2018, native coastal prairie was established in plots through seeding and transplanting following the removal of turf grasses. This presentation will discuss the steps taken to establish the native vegetation and the upcoming hydrologic monitoring that will assess the runoff reduction potential of native coastal prairie vegetation.

D. Grobert
Austin Water

Savannah Plant Community Dynamics of the Eastern Edwards Plateau

Preliminary analysis of vegetation transect surveys documenting plant community response to 40 prescribed burns and 20 mechanical treatments conducted over a twelve-year period on the City of Austin's Water Quality Protection Lands. This preliminary investigation of how species and trait-defined functional groups respond to ecological interventions reveals a few specific patterns and a broad depiction of ecological resilience. This is a great talk to attend if you, like the author, are or have ever been urgently curious about, for example, how Carolina jointail (Coelorachis cylindrica) or doveweed (Croton monanthogynus) respond to prescribed fires (spoiler: they grow back). This is the highly anticipated continuation of last year's riveting lecture on woody plant dynamics by the same author.

I. Karklins
Environmental Survey Consuting

What's wrong with novel ecosystems really?

Novel ecosystems or no-analog systems occur in urban and rural environments and largely the result of human influences. The concept arose as early as 1935 when Tansley wrote of "anthropogenic ecosystems [that] differ from those developed independently of man" in his Ecology article "The use and abuse of vegetational concepts and terms." In recent years, the novel ecosystem concept has been a subject of debate, sometimes heated, in the ecological restoration community. This presentation will explore the history and theory of novel ecosystems and consider the potential benefits provided by novel ecosystems. Various strategies for managing novel ecosystems and the practicality of reversing their impact will also be considered.

C. Shackelford
Caesar Kleberg Wildlife Research Institute

Evaluation and Development of Native Seed Sources for West Texas

West Texas Native Seeds was organized under the Texas Native Seeds Project of the Caesar Kleberg Wildlife Research Institute at Texas A&M Kingsville in 2010 as a partnership with the Borderlands Research Institute at Sul Ross State University. Our mission is to develop native ecotypic seed sources for restoration activities in the Trans Pecos, western Edwards Plateau, and adjacent ecoregions. Previously, only one high quality, locally-adapted native seed source appropriate for use in these regions was commercially available. Our goal over the next decade is to develop 15+ regionally-adapted ecotypic seed sources for restoration work in West Texas. Over 1,200 collections have been made from a target list of 38 grasses and 52 forbs across 37 counties in West Texas. These collections are the foundation for the evaluation and selection of ecotypic native plant materials for commercial scale production. Presently, one species is planted under initial evaluation. Nine species are now in seed increase with commercial release expected in 2019 and 2020. Two species are currently available commercially. Four new evaluations are planned for 2019. Evaluation plantings are located at two sites representative of the variable climate and soil environments of the Trans Pecos, western Edwards Plateau, southern Rolling Plains, and southern High Plains ecoregions of West Texas: the Sierra la Rana Plant Research Facility, south of Alpine, TX; and the Railway Ranch Plant Research Facility, south of Odessa, TX.

S.T. Tsim
Trinity University

Conservation of Private Lands with High Ecological Values for Butterfly Diversity in Hong Kong, China

Hong Kong locates at the southeastern coast of the mainland China, with a total land area of 1,111 km 2 inhabiting of 7.45 million populations. From the land utilization analysis, urban and built-up land have covered 24.4% of land, and the rest of land are remaining either natural or covering by vegetation. Although a significant portion of land (43.4%) which is mostly hills and mountains has been protected by variety of statutory tools, some non-protected areas in particular privately-owned agricultural lands and inland fishponds in lowland areas have established exceptionally high biodiversity after decades of operation abandoned. Many of these privately- owned lands are under threatened by habitat destruction, invasive species, urban development, uncontrolled fires, non-environmental-friendly agricultural practices, soil contamination, and unregulated human activities etc. This urged the Hong Kong Special Administrative Region Government to develop "Management Agreement" (MA) and "Private-Public Partnership" – the new nature conservation policy. This paper review the experience of Fung Yuen Butterfly Reserve (FYBR) which is the first batch of ecological importance site implementing MA in Hong Kong since 2005. Under the MA scheme, non-governmental organizations in cooperative with the landowners could apply for funding from Government, so as to maintain or enhance the ecological values of the managed site. After 13 years of implementation, the operation mode of FYBR could be served as a model of private-land conservation. The comprehensive conservation measures including habitat restoration and management, species conservation action, site safeguard, environmental education, community involvement, research and ecological monitoring will be reviewed.

D. Walton
Memorial Park Conservancy

Ecological Restoration in an Urban Park Context: Bringing Habitat to Memorial Park

Centrally-located in Houston Texas, Memorial Park is a 1,500-acre urban wilderness with a history of ecological neglect. The resultant landscape is dominated by invasive and undesirable species that provide little opportunity for sustainability or resiliency and are successional stagnate. Post-drought of 2011-2012, the Memorial Park Conservancy initiated a Master Plan for that park that is based in ecological restoration. Houston and the Memorial Park tract are located at the confluence of three ecoregions: Gulf coast prairie, pineywoods, and post oak savanna. Additionally, the southern border of the park is an approximate 4-mile reach of Buffalo Bayou, a major river with miles of associated tributaries and riparian habitat that drain the heart of the park. A holistic approach to ecological restoration for the park incorporates these four habitat icons. Methods to assess the resiliency of ecosystems and to restore sustainable habitats able to progress through successional stages are presented. From a watershed planning perspective, the emergence of ecotones within an urban setting are responsive to not only natural factors such as hydric conditions, but also public features such as trails, roads, and view corridors. Choosing plants well suited for environmental goals is just one factor in successful ecological restoration. Setting the stage with soil biology and natural stable landform, while incorporating the stress of hydrology, can go a long way to ensure plant success. Ecological restoration initiatives for riparian, native grassland, and upland forest habitats that incorporate these overarching principles are presented within the context of the Houston area urban setting.