



# Bringing nature back *to campus*

**Cassidy Johnson, Ph.D.**

Biology Professor, Houston Community College  
Faculty Lecturer, Rice University  
President, Coastal Prairie Partnership





Grand Teton National Park, Wyoming



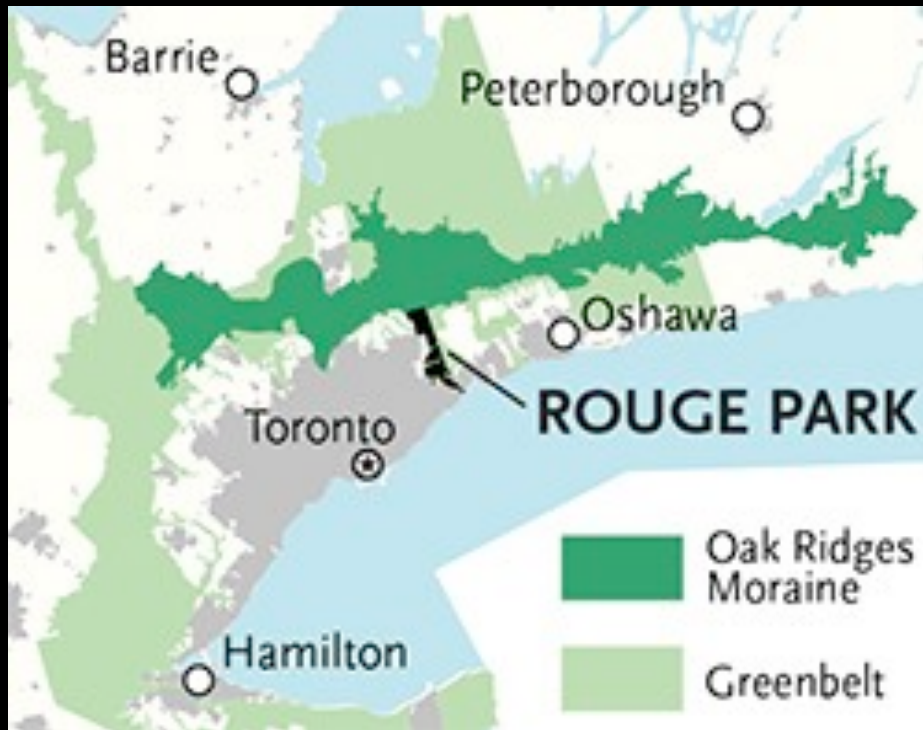
# Urban rewilding: Greater London National Park Initiative



All images from: Natural Capital,  
*Investing in a Green Infrastructure  
for a Future London, 2015*

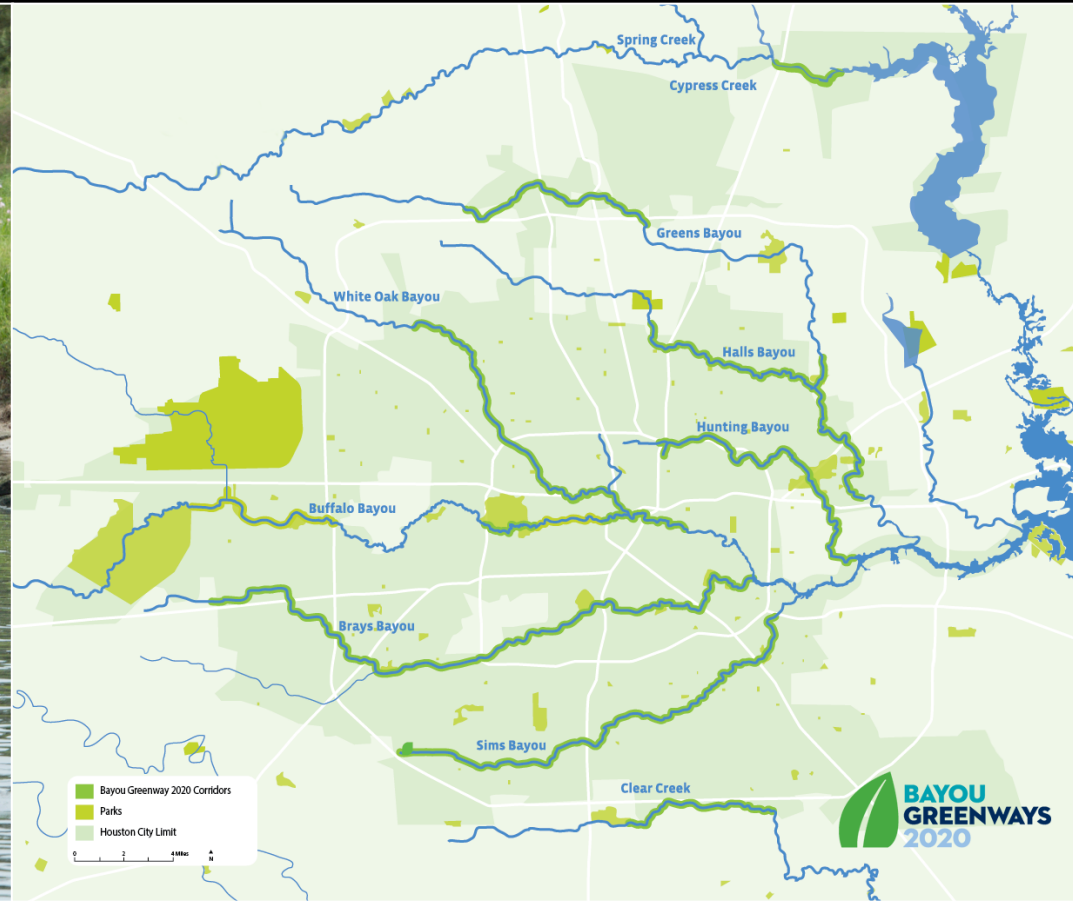


# Urban rewilding: Rouge National Urban Park, Canada





# Urban rewilding: Bayou Greenways 2020, Houston





# Urban pocket habitats

Willow  
Waterhole Park,  
Houston



Pollinator garden at University  
of Saint Thomas, Houston



# Colleges are essentially protected areas

- **Ithaca College**, NY: 560 acre reserve
- **University of California**, Santa Barbara CA: 250 acres of natural communities
- **University of West Alabama**, AL: 70 acres of blackland prairie
- **Georgia Southern University**, GA: 1 acre bioswales with native plants

Cypress Lake on University of Louisiana, Lafayette, LA campus



Image from: louisiana.edu



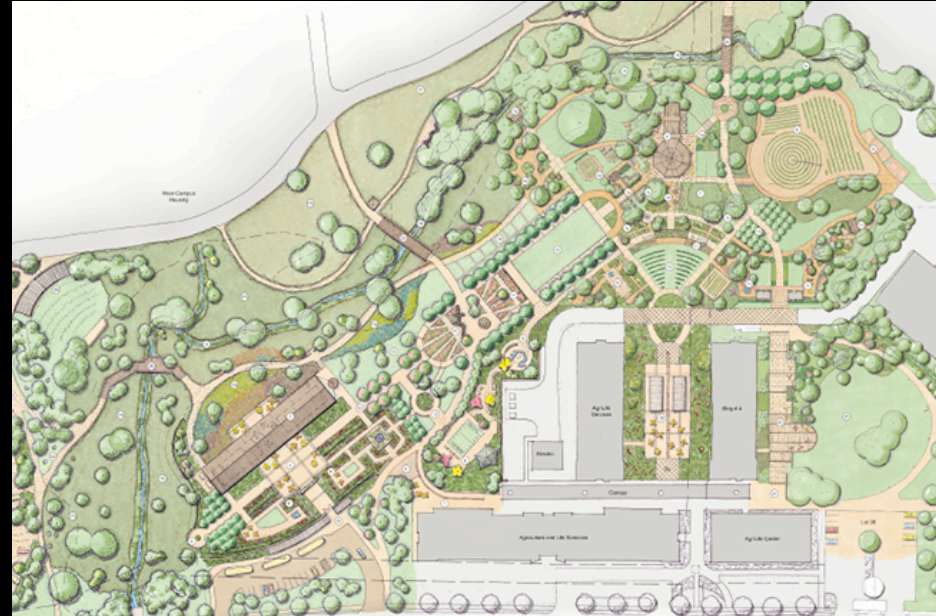
# Campus habitats are classrooms and laboratories

Texas A&M University, College Station



<http://cbe.tamu.edu>

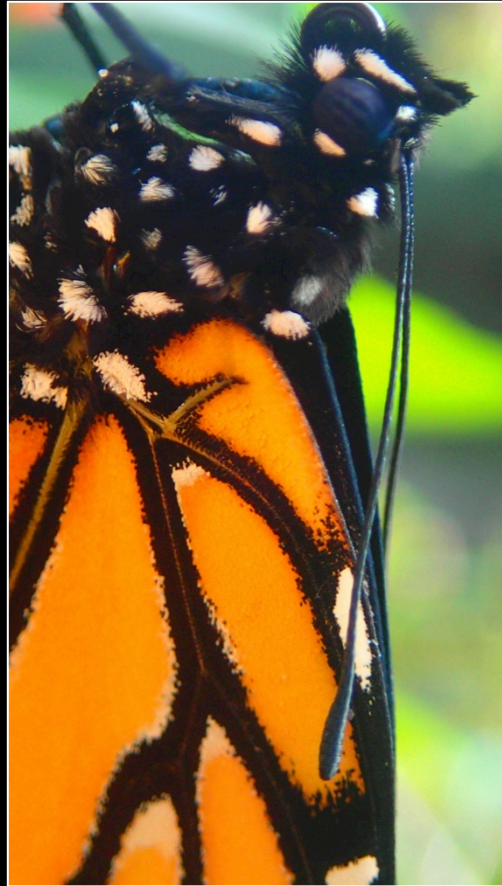
7 acre outdoor classroom



Drawing by Texas A&M AgriLife



# Can these urban habitats help protect biodiversity?





# Texas was a “prairie state”

## Original Grasslands: Vast and Diverse

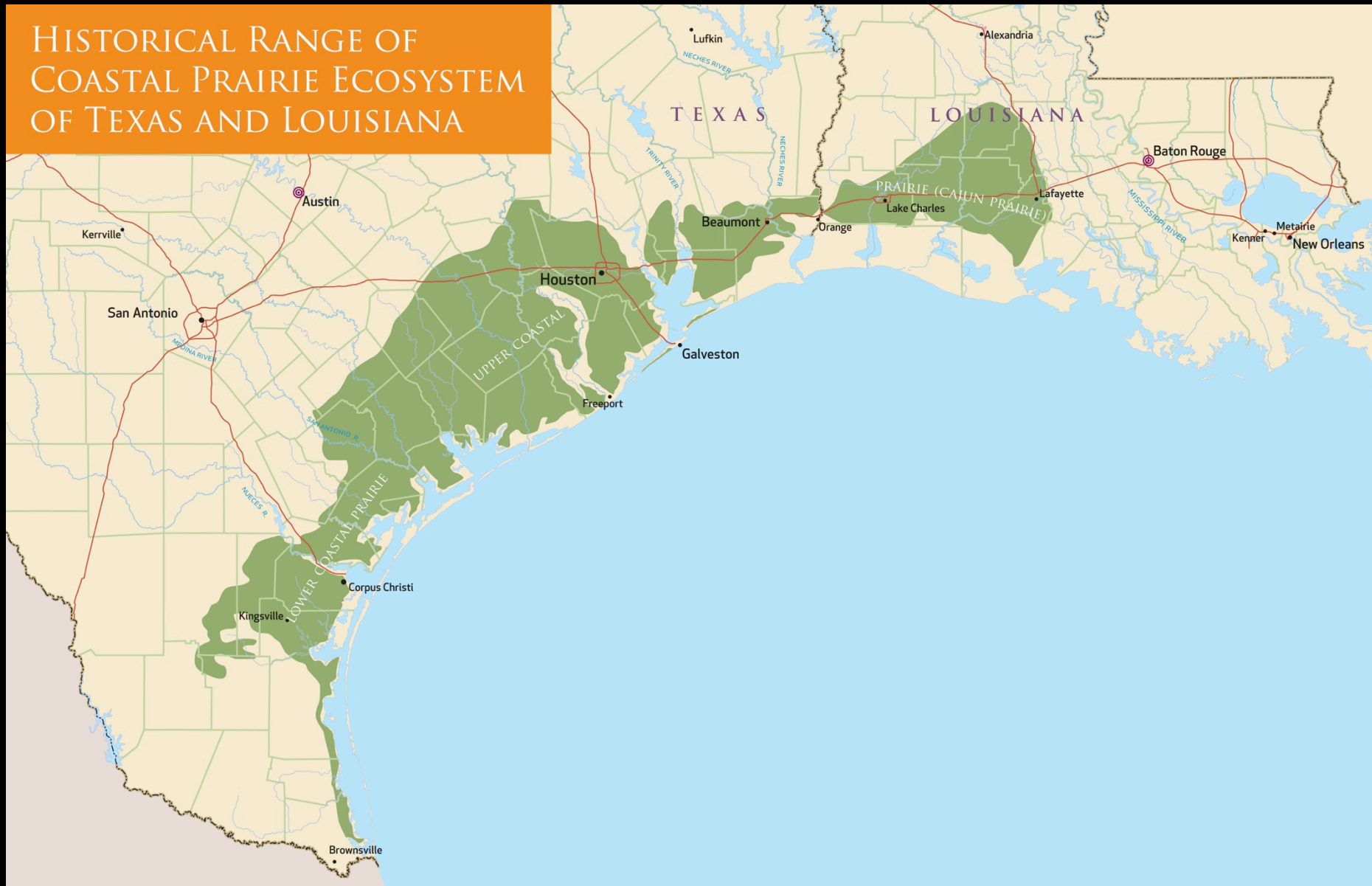


Map courtesy of The Texas Landscape Project, Todd and Ogren 2016



# The Coastal Prairie

HISTORICAL RANGE OF  
COASTAL PRAIRIE ECOSYSTEM  
OF TEXAS AND LOUISIANA



Map courtesy of the Katy Prairie Conservancy



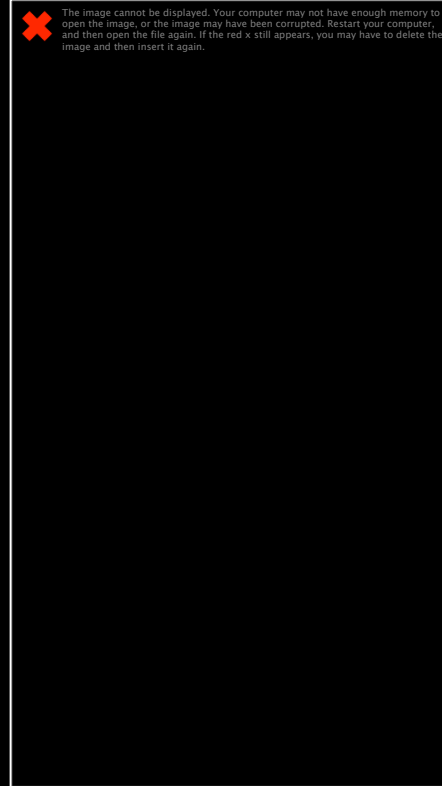
# Endless oceans of grass



Sideoats gramma



Little bluestem



Big bluestem



Yellow Indiangrass

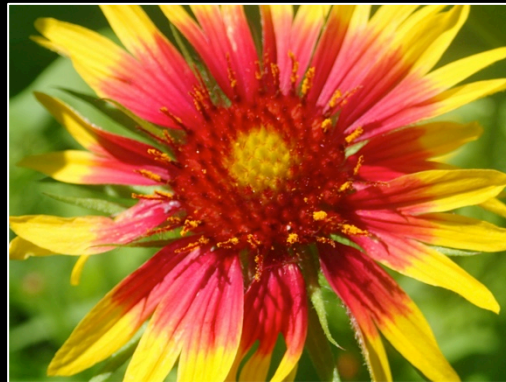


# The bulk of the prairie is underground





# Coastal prairies support incredible biodiversity





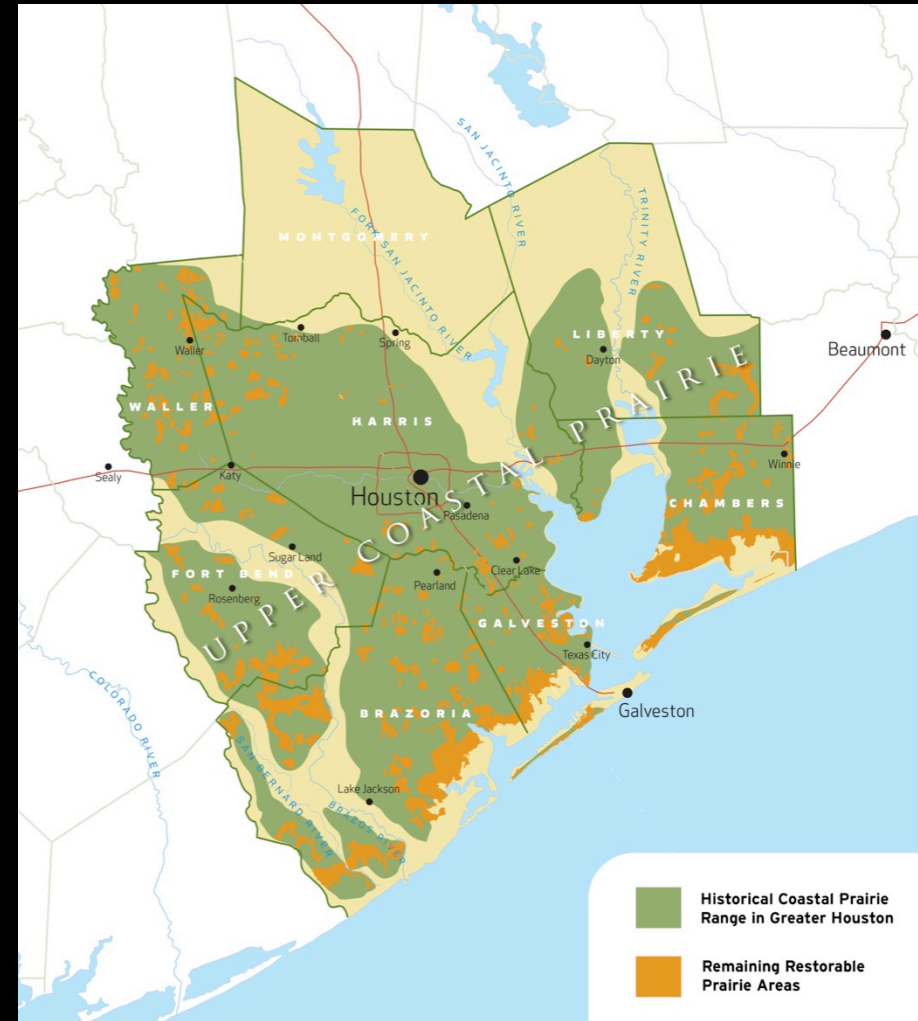
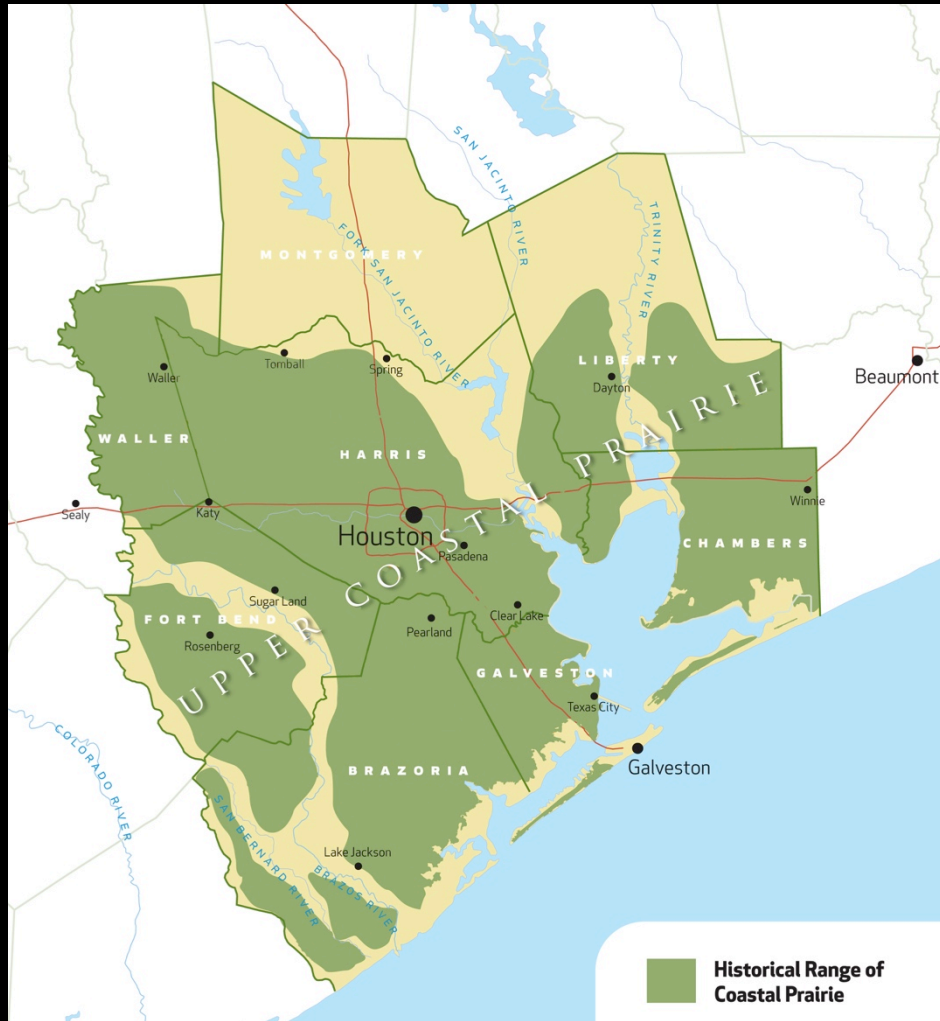
# The prairie shaped our legacy as Texans



Photo of San Antonio trail drive by Jimmy Zintgraff, 1955



# Less than 1% of the coastal prairie remains



Maps courtesy of the Katy Prairie Conservancy

# Loss of the prairie has unintended consequences



Photo of I45 during Tax Day flood, 2016 by Cody Duty/Houston Chronicle



# Bringing the prairie back: Urban pocket prairies



**Katy  
Prairie**  
Conservancy

**Prairie Builder Schools  
Program**

Images courtesy of the Katy Prairie Conservancy





Whistlestop Prairie, Hermann Park



MD Anderson Prairie, Medical Center



Shasta's Prairie, University of Houston



Clinton Park Prairie, Houston



# Can colleges help protect Texas's most imperiled ecosystem?



Attwater's Prairie Chicken Refuge, Colorado County, TX



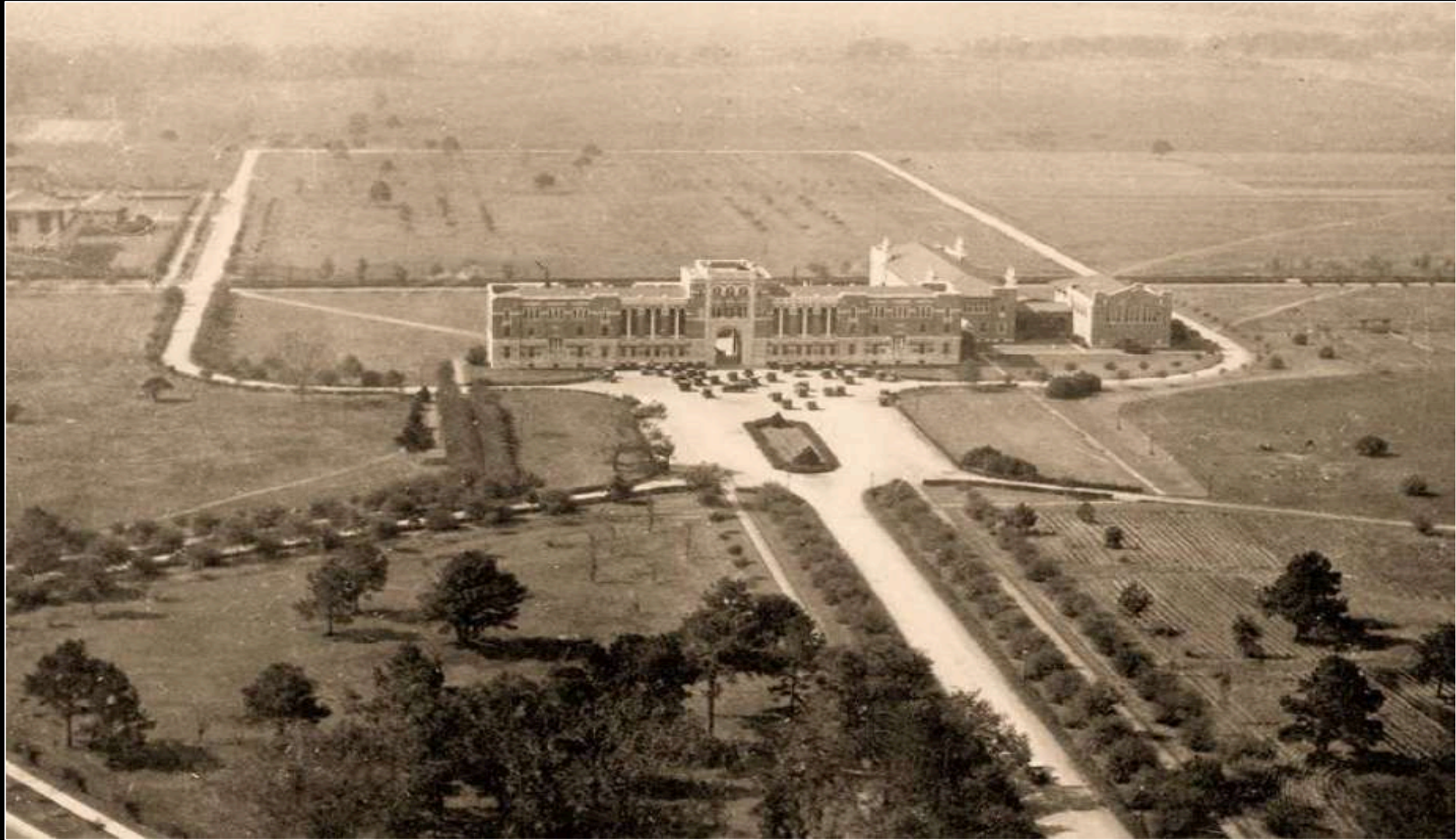
# Rice has a part to play in urban conservation



Image courtesy of Rice University



# The prairie is a part of Rice's history



Rice University 1910; Courtesy of the Woodson Library





Harris Gully Natural Area, Rice University



# Conservation in action: EBIO 324



EBIO 324 Fall 2015



EBIO 324 Fall 2016





Rice University

Hermann Park

Texas Medical Center

© 2016 Google



# Whistlestop Prairie at Hermann Park



Image courtesy of the Katy Prairie Conservancy





# MD Anderson Prairie at Texas Medical Center

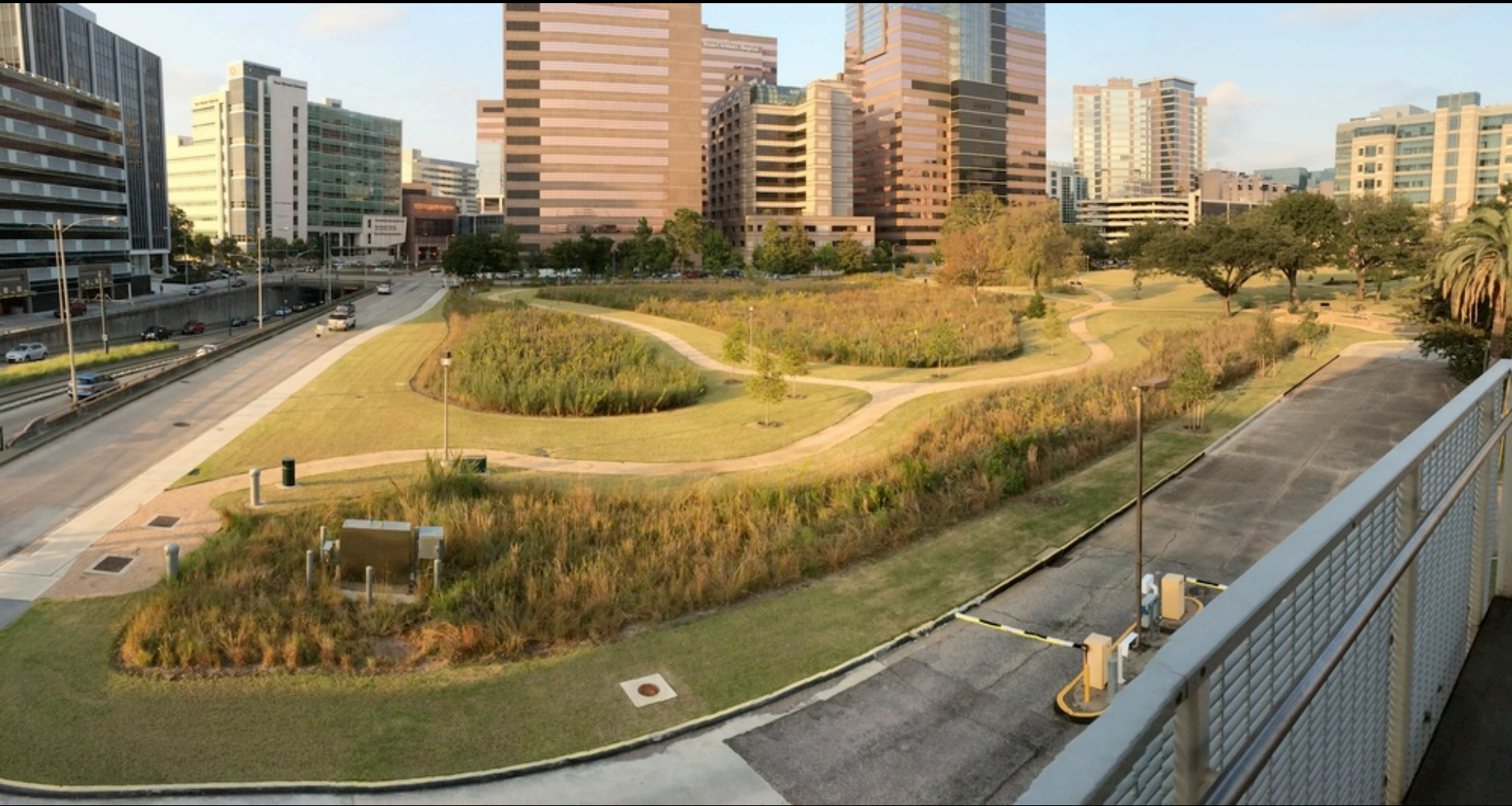


Image courtesy of the Katy Prairie Conservancy

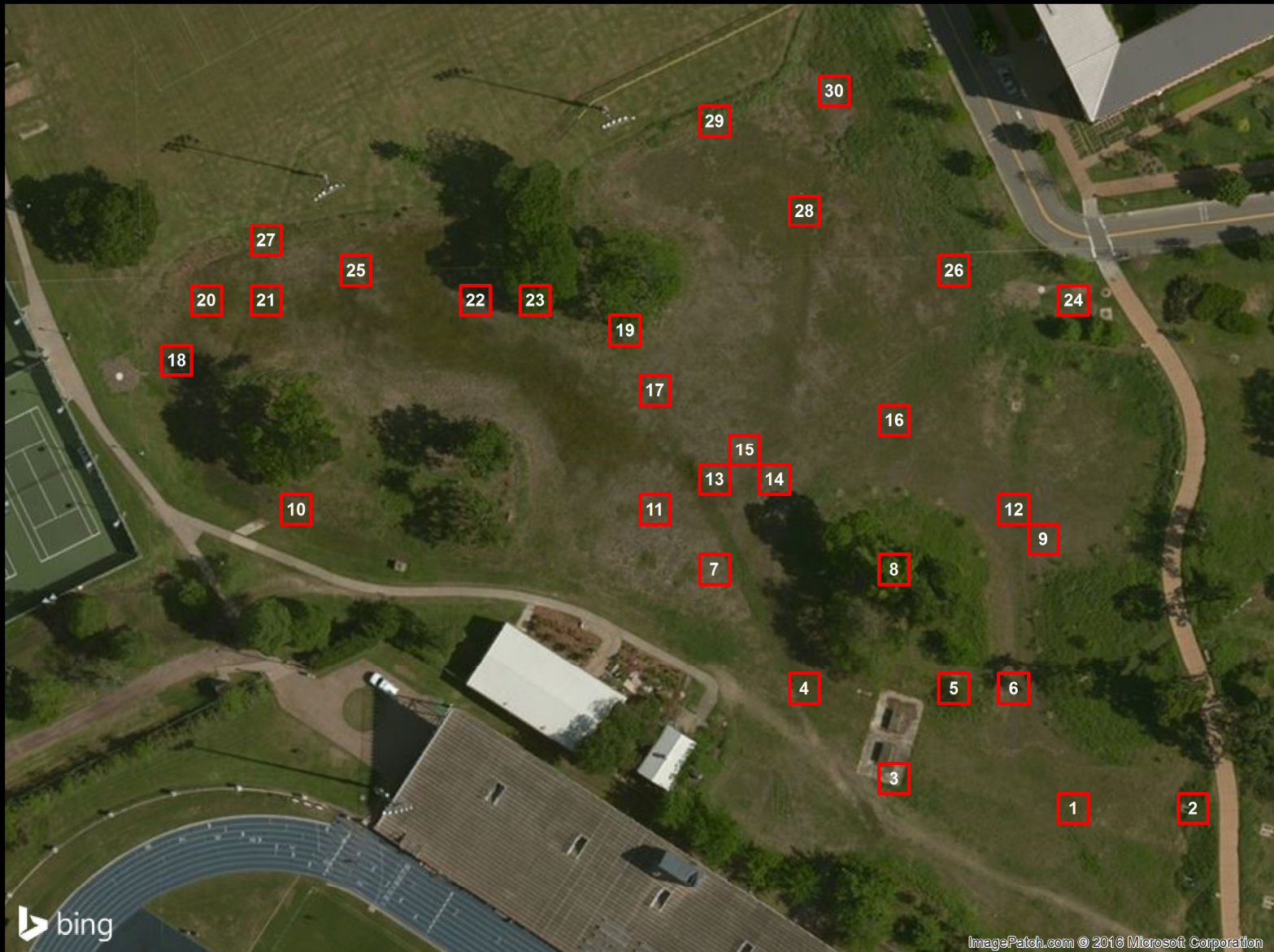




Fall 2016 EBIO 324 students organizing their survey of the Harris Gully Natural Area



# Harris Gully Natural area sampling points



Plot generated by Mashal Awais, EBIO 324 student Fall 2016



# iNaturalist is an online database for identification







**iNaturalist.org** Observations ▾ Species ▾ Projects ▾ Places Guides People 0 0 cassidyjohnson

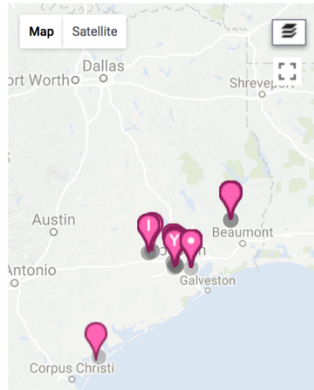
### Your observations

[Home](#) [Observations](#) [Calendar](#) [Favorites](#) [Lists](#) [Journal](#) [IDs](#) [Projects](#) [Profile](#)

[Add observations](#) [Batch edit](#) [Search](#)

Photos / Sounds	Species / Taxon Name	Date observed	Place	Date added	
	<b>Gulf Fritillary</b> <i>Agraulis vanillae</i>	October 22, 2016 10:40 AM CDT	8501 Spencer Hwy, Deer Park, TX, US (Google, OSM)	October 31, 2016 06:45 PM CDT	2 IDs Research Grade <a href="#">Edit</a>   <a href="#">View »</a>
	<b>Obedient Plant</b> <i>Physostegia virginiana</i>	October 22, 2016 10:38 AM CDT	8501 Spencer Hwy, Deer Park, TX, US (Google, OSM)	October 31, 2016 06:44 PM CDT	Needs ID <a href="#">Edit</a>   <a href="#">View »</a>
	<b>Torpedo grass</b> <i>Panicum repens</i>	October 22, 2016 10:13 AM CDT	8501 Spencer Hwy, Deer Park, TX, US (Google, OSM)	October 22, 2016 04:08 PM CDT	1 ID Research Grade <a href="#">Edit</a>   <a href="#">View »</a>
	<b>American Bullfrog</b> <i>Lithobates catesbeianus</i>	October 1, 2016 05:41 AM CDT	Waller County, TX, USA	October 08, 2016 06:24 PM CDT	1 ID Research Grade

[Map](#) [Satellite](#)





# Students generated species lists and calculated biodiversity

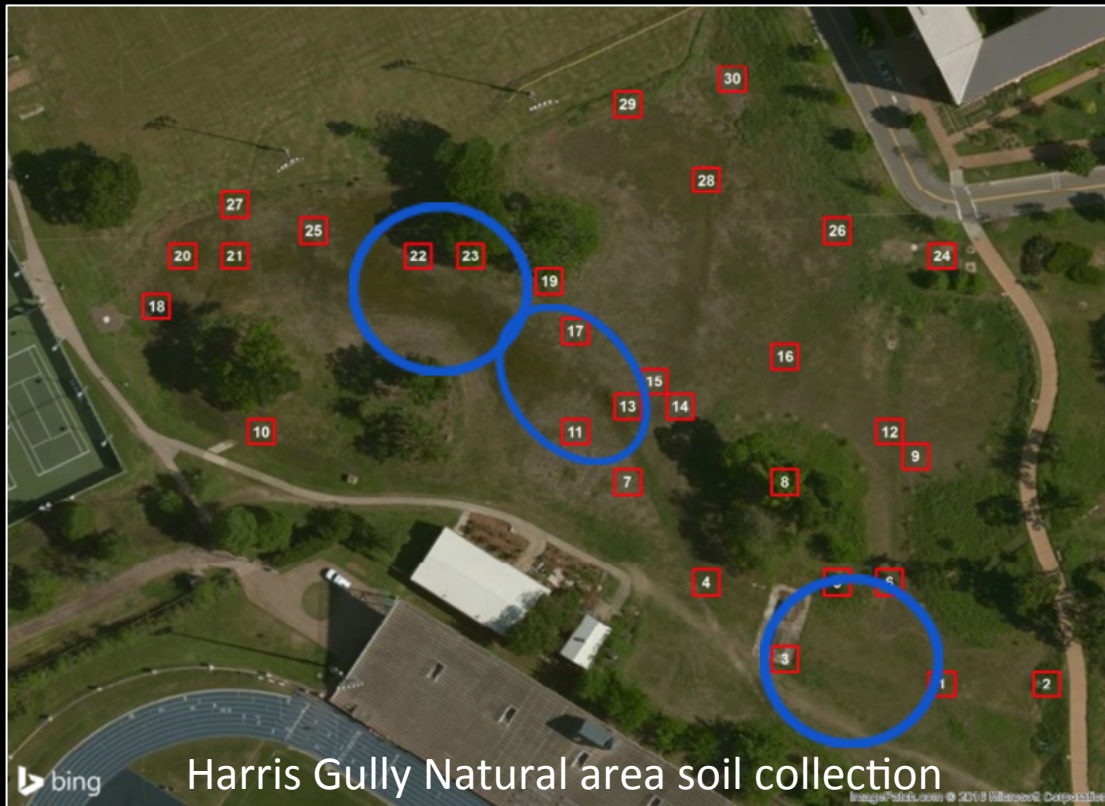
<i>Insects/Pollinators</i>	<i>Native Grasses</i>	<i>Native Forbs</i>
Asian Lady Beetle Monarch Butterflies Common Green Darner Wandering Glider Dragonfly Ceraunus Blue Butterfly Gulf Fritillary Butterfly Common Buckeye Butterfly Pearl Crescent Butterfly Moth species Skippers Southern Broken-Dash Little Yellow Butterfly Sulphur Butterfly (Pieridae) Carpenter Bees Honey Bees Grasshoppers Wasps Sesbania Clown Weevils Long-legged flies Lovebug Hanging-thieves	Indiangrass Paspalum Bristly Foxtail Marsh Bristlegrass	Woolly Croton Virginia Three-seed Mercury Pinkladies Yellow-flowered Waterhyssop Yellow Woodsorrel Ivy-leaf Morning Glories Prairie Sunflower Prairie False Foxglove Upright Prairie Coneflower Bladderpod Sumpweed Carolina Ponyfoot Canada Goldenrod Woodsorrels Round-leaved Frogfruit Plains Coreopsis Golden Hedge Hyssop Flatsedges Illinois Bundleflower Spotted Spurge Toadflax species Pyramid Flower Indian Blanketflower
<i>Total Species Found:</i> 21 Insects	4 Native Grasses	23 Native Forbs



Plant list for HGNA, EBIO 324/524 Fall 2015



# Students collected soil data for analysis



	Nitrate (ppm)	Organic Matter (%)
Hermann Park	3	5
MD Anderson	1	4.97
Harris Gully #1	0	3.32
Harris Gully #2	1	2.15
Harris Gully #3	1	4.08





# Planting recommendations were developed for the HGNA



## WET:

Blazing star  
Swamp sunflower  
Split beard bluegrass  
Little bluestem  
Giant coneflower

## DRY:

Indian blanket  
Rattlesnake master  
Big bluestem  
Indiangrass  
Wildrye  
Brownseed paspalum  
Purple prairie clover  
Muhly grass



# Cost estimate and timeline for restoration



Planting budget:  
1,500 plugs (3 acres): \$7,500  
Additional seeding: \$1,200



# Rice community engagement

## Signage

### Benefits of Prairies

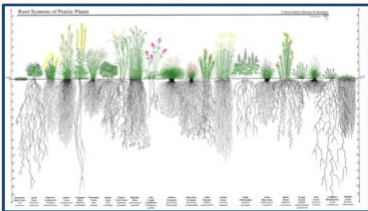
*Habitat Restoration of the Harris Gully Natural Area*

- The Coastal Prairie provides shelter, food, and water for a wide variety of wildlife.
- Wildflowers bloom year-round, providing nectar and pollen for vulnerable pollinator populations, such as the Monarch butterfly, whose migratory pathway runs through the Houston area. A fully restored coastal prairie can host over 300 plant species.

- Urban prairies such as this absorb large quantities of rainwater due to their expansive root system. As water travels through the roots, it is purified by natural biological processes.
- The root system of the Coastal Prairie helps reduce flooding in the Houston Area.

- The Coastal Prairie is also home to the burrowing owl. Unlike other species of owl, the burrowing owl is active during the day and feeds on mainly small vertebrates and insects.
- While this species is protected under the Migratory Bird Treaty Act, their numbers have been on the decline partly due loss of habitat. Restoration of the Harris Gully Natural Site could provide a home for this species and bring owls back to Rice's campus!

#### Root Systems of Prairie Plants Run Deep



#### Pollinators Call the Prairie Home



Mexican Free-tailed Bat



Bumble Bee



Monarch Butterfly



Ruby-throated Hummingbird

#### Can You Spot the Flower?



Lemon Monardella



Gay Feather



Butterfly Weed



Scarlet Sage



Pink Evening Primrose



Swamp Sunflower



Swamp Milkweed



## Collaboration

Wiring runs underground inside a PVC pipe.

1. Pressure Transducer runs up and into the well screen, and sits at the very bottom of the well (2.5')
2. Bubbler tube and Water Detection Sensor are attached to the inside of the pipe, pointing downstream.



Photo: Stephen Benigno, Harris County Flood Control



**RICE | OEDK**  
Oshman Engineering Design Kitchen



# Final synthesis and project pitch



Student presentation at Southern Plains & Prairie Conference November 2015



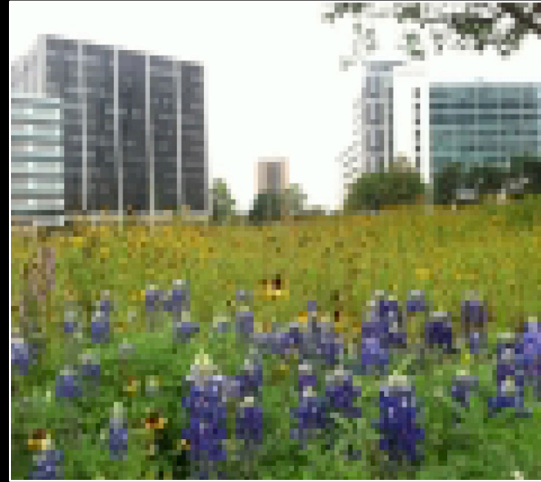
Title slide for student presentation to Rice Arboretum Committee and community members, November 2016



# Can these urban habitats help protect biodiversity?



Whistlestop prairie  
(~6 years)  
Highest diversity



MD Anderson prairie  
(~4 years)  
Good diversity



Harris Gully  
(no restoration)  
Lowest diversity



# *Next phase: Harris Gully Natural area build out!!*



University of Saint Thomas students  
working on Whistlestop Prairie



University of Houston students working  
on Shasta's Prairie at UH campus



# The sun has not set on Texas's iconic landscape...



Rice and University of Houston students working on Shasta's Prairie at UH campus



Rice EBIO 324 students collecting seeds at prairie remnant, Deer Park Prairie



# Thank you!

