

Remnant Prairie Reclamation in an Urban Landscape, Houston, Texas

Society for Ecological Restoration

November 2nd, 2013

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Harris County Flood Control District
Stormwater Quality Department



Agenda

- **Harris County Flood Control District Overview**
- **Willow Waterhole Overview and History**
- **Adaptive Management**
- *Management and Monitoring*
 - *Methods and Results*
 - *Endangered Species – *Hymenoxys texana**
- *Challenges and Lessons Learned*
- *Future Plans*

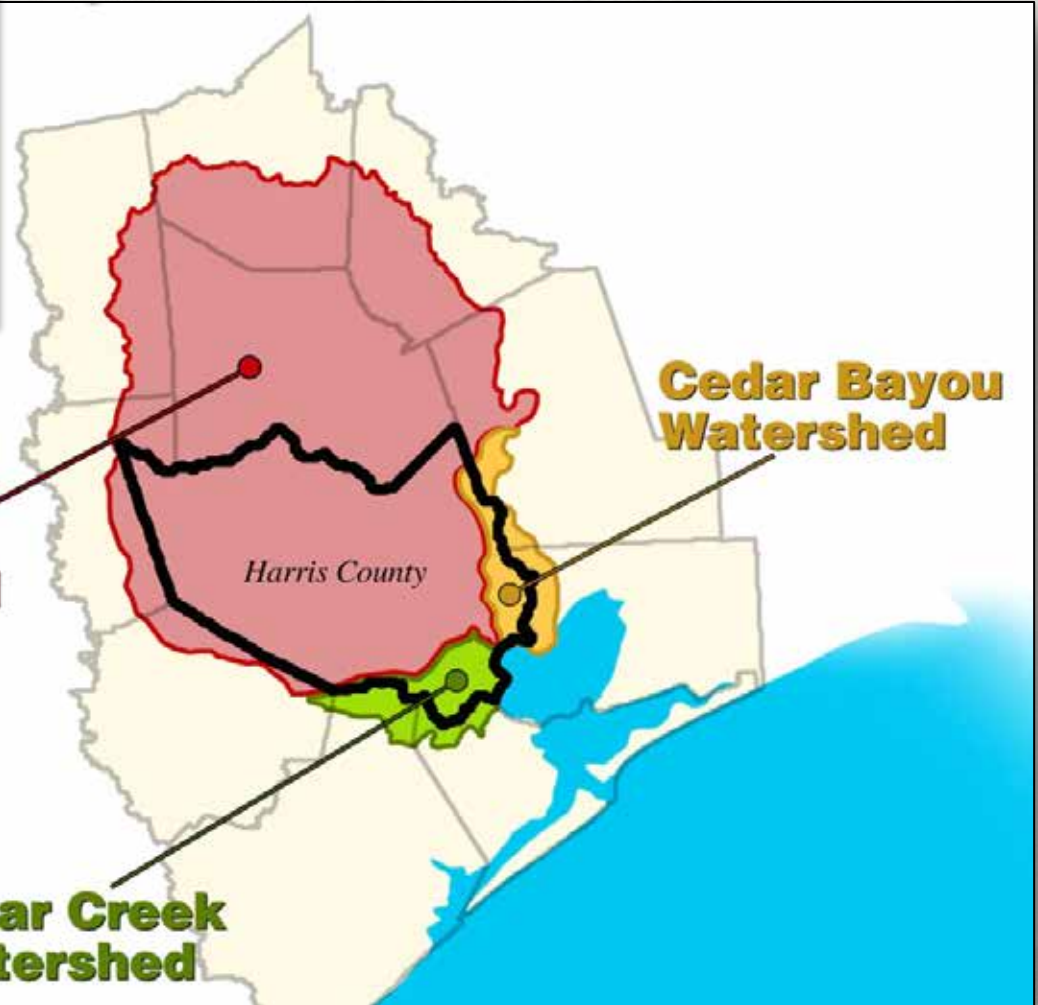
Harris County, Texas



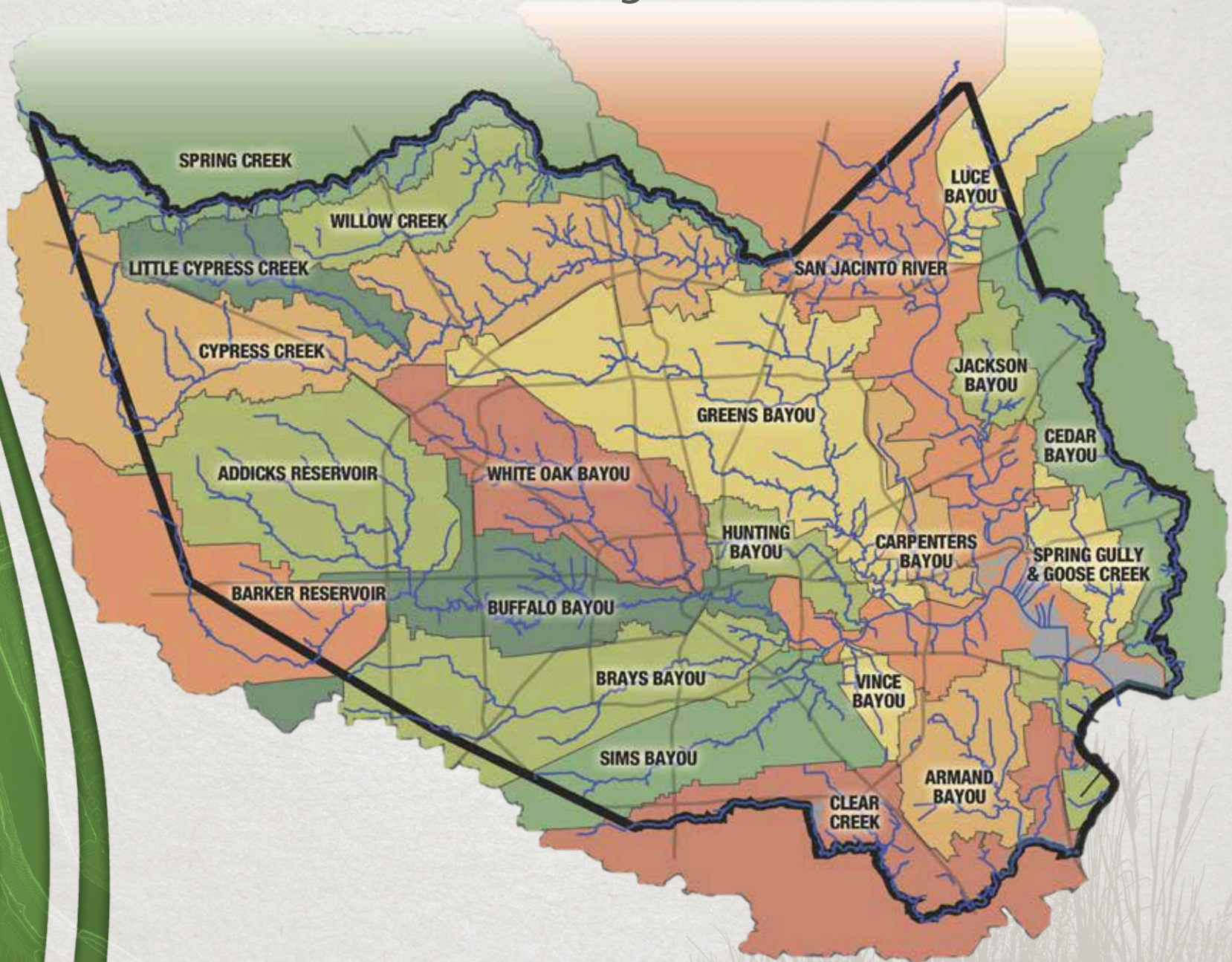
**San Jacinto
River Watershed**

**Cedar Bayou
Watershed**

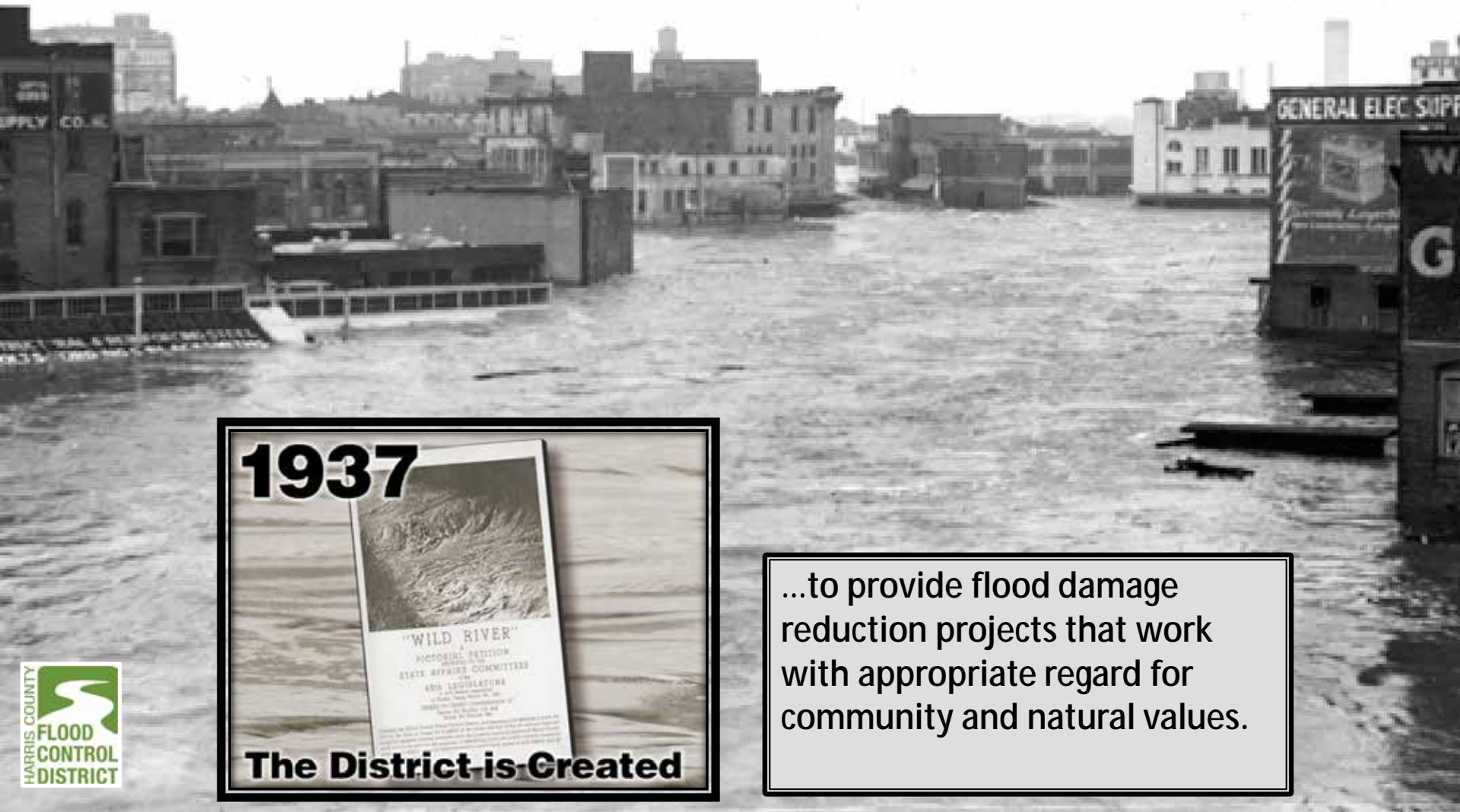
**Clear Creek
Watershed**



Harris County Watersheds



Harris County Flood Control District



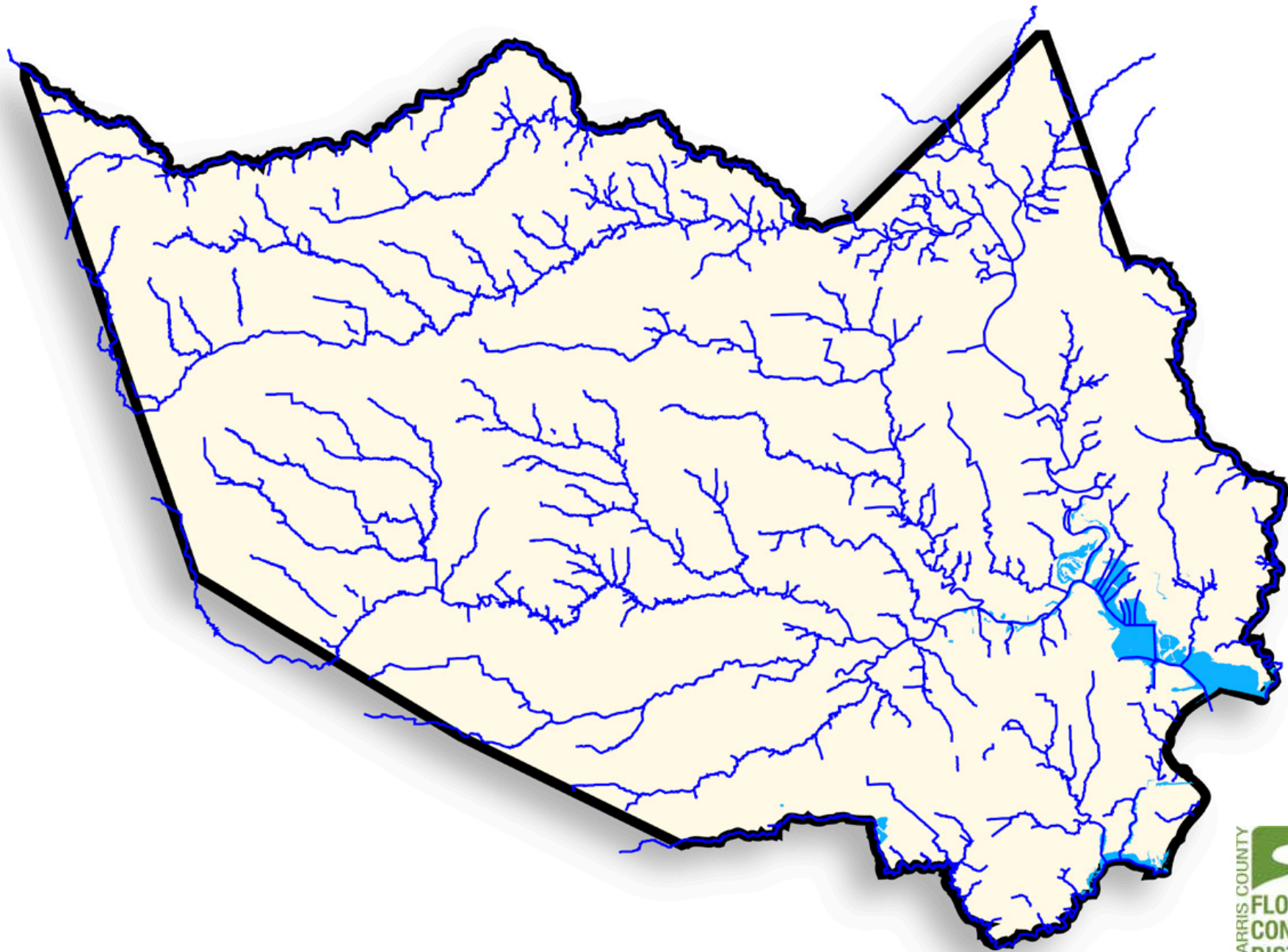
1937



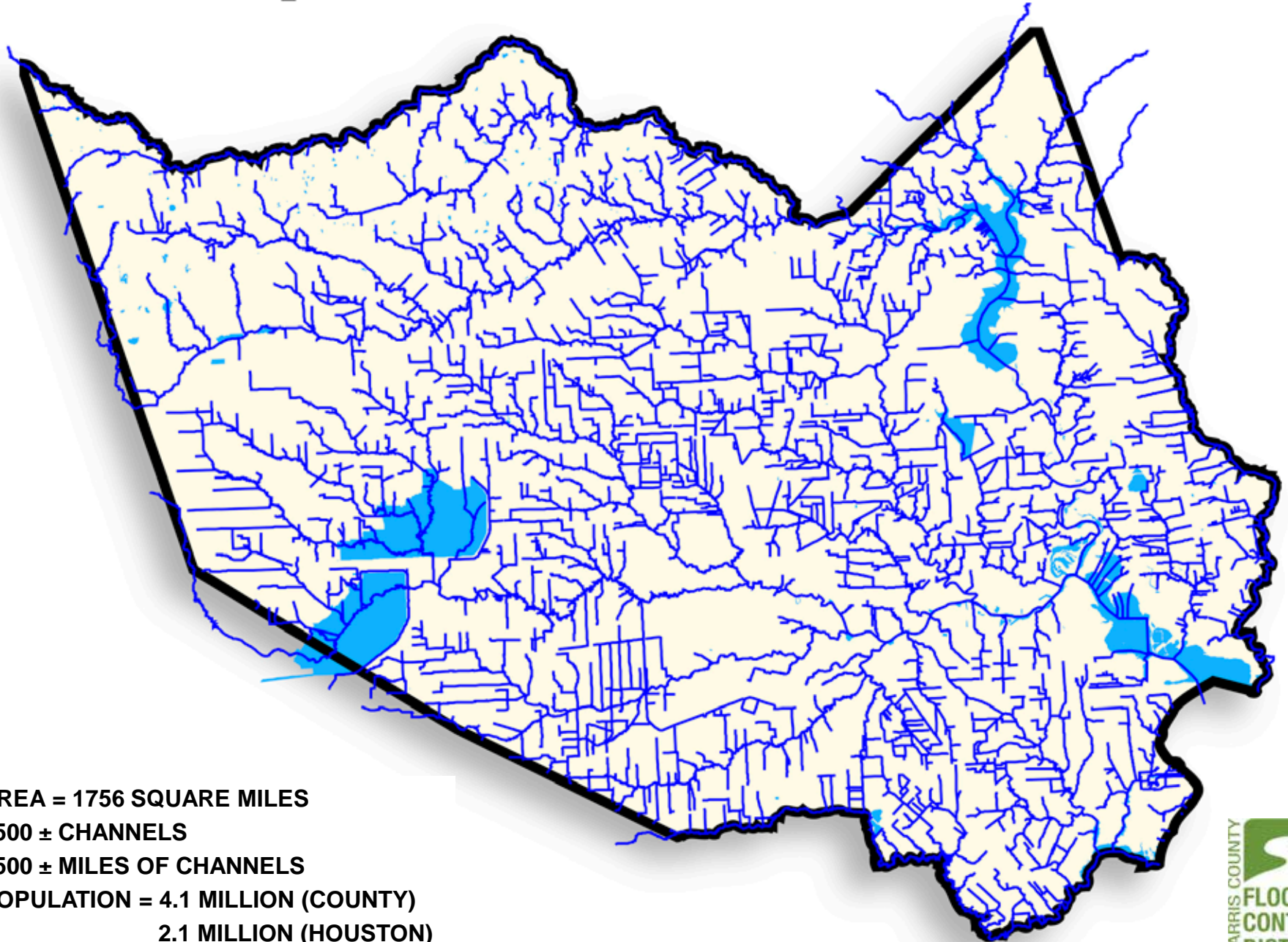
The District is Created

...to provide flood damage reduction projects that work with appropriate regard for community and natural values.

Natural Channels



Open Channel Network



AREA = 1756 SQUARE MILES

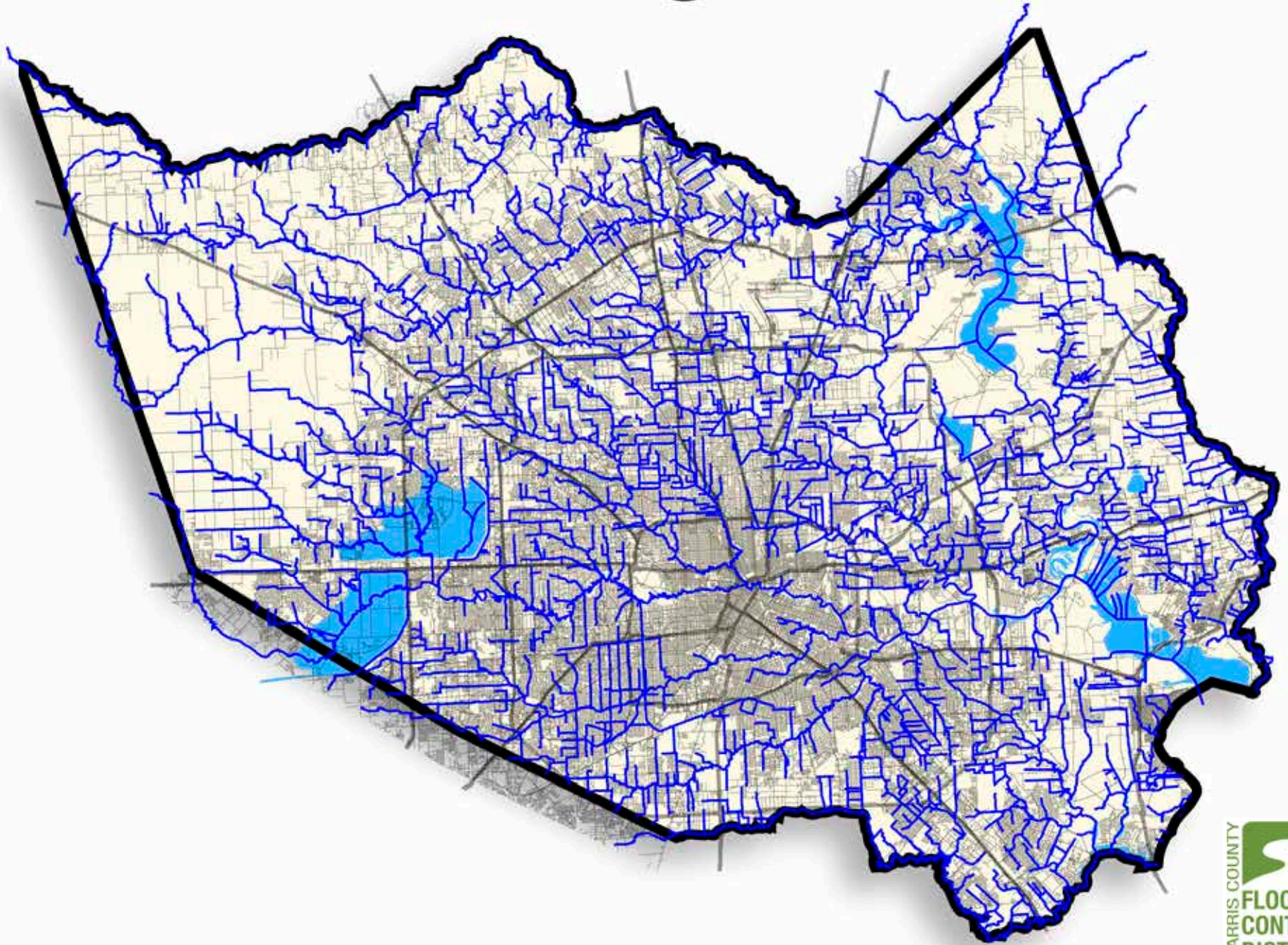
1500 ± CHANNELS

2500 ± MILES OF CHANNELS

POPULATION = 4.1 MILLION (COUNTY)

2.1 MILLION (HOUSTON)

Total Drainage Network



Harris County Flood Control Detention Basins

Montgomery County

Liberty County

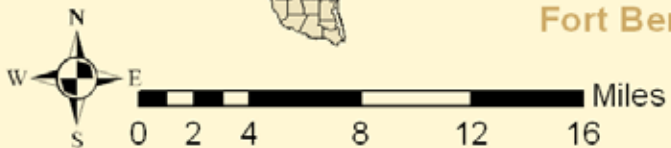
Waller County

Willow Waterhole

Fort Bend County

Brazoria County

Galveston County



Willow Waterhole



1956 – Coastal Prairie



Gulf Coastal Prairie Habitat

- The coastal prairie of Texas and Louisiana is one of the most imperiled ecosystems in the U.S.
- It once stretched from the western edge of the Atchafalaya basin to the King Ranch
- Farming, ranching, fire suppression, and urbanization have eliminated over 98% of its historic extent.

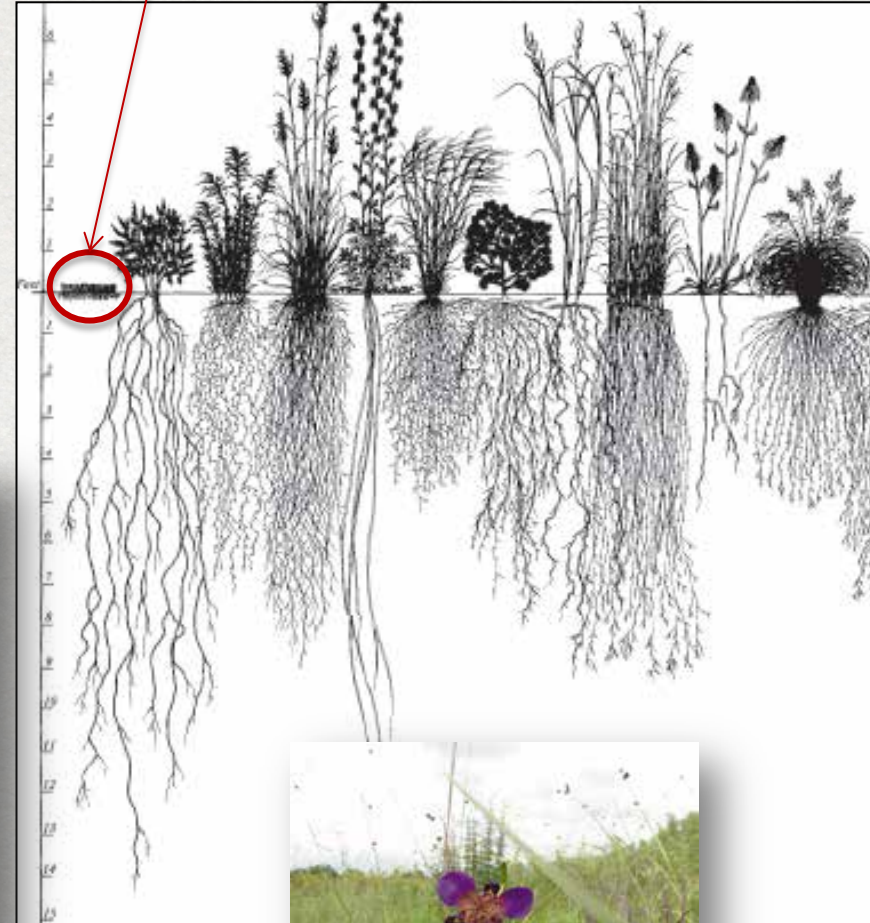


Gulf Coastal Prairie Habitat



Bermuda Grass

Native Grasses



Gulf Coastal Prairie Habitat

- Sustainable habitat.
- Supports infiltration, transpiration, evaporation.
- Reduces runoff – stormwater quantity
- Improves stormwater quality
- Requires less mowing, but still requires some level of maintenance.
- Increases plant and animal species diversity.
- Keeps undesirable species in check.
- Provides aesthetic appeal of seasonally changing wildflowers.
- Provides educational opportunities for local schools and the general public.
- Enhances community and natural values.



NEPA and Biological Assessment Compliance

- *Hymenoxys texana* and coastal prairie remnants discovered during NEPA study.
- HCFCD obligated to conserve 15 acres of coastal prairie and prairie dawn colonies.
- Coastal Prairie Management Plan prepared with USFWS cooperation to address continued success of the Texas prairie dawn flower colonies.
- Revegetation of adjacent detention basin will include native prairie buffer.
- Annual monitoring and reporting to USFWS and USACE.



Adaptive Management

- Map coastal prairie remnants, fence Texas Prairie Dawn
- Phase I clearing with hydro-ax over about 7 acres - 2010
- Clear additional undesirable trees and rake mulch
- Set management units, mow, transplant, survey, monitor, etc.
- Phase II clearing with hydro-ax over about 7 additional acres - 2013



Hydro-Ax Clearing

Pre-Forested Condition



Pre-Management



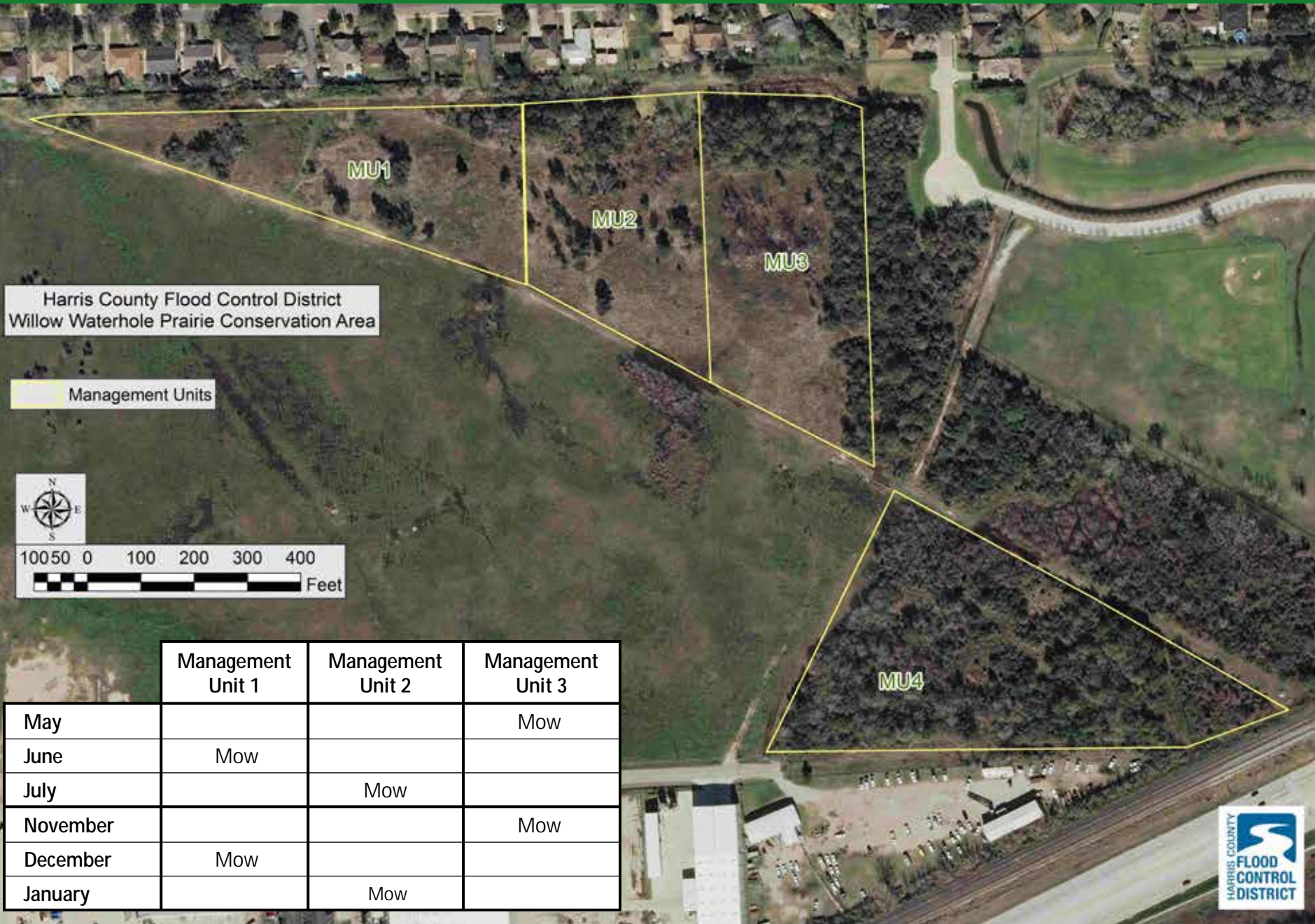
Post-Phase I



Agenda

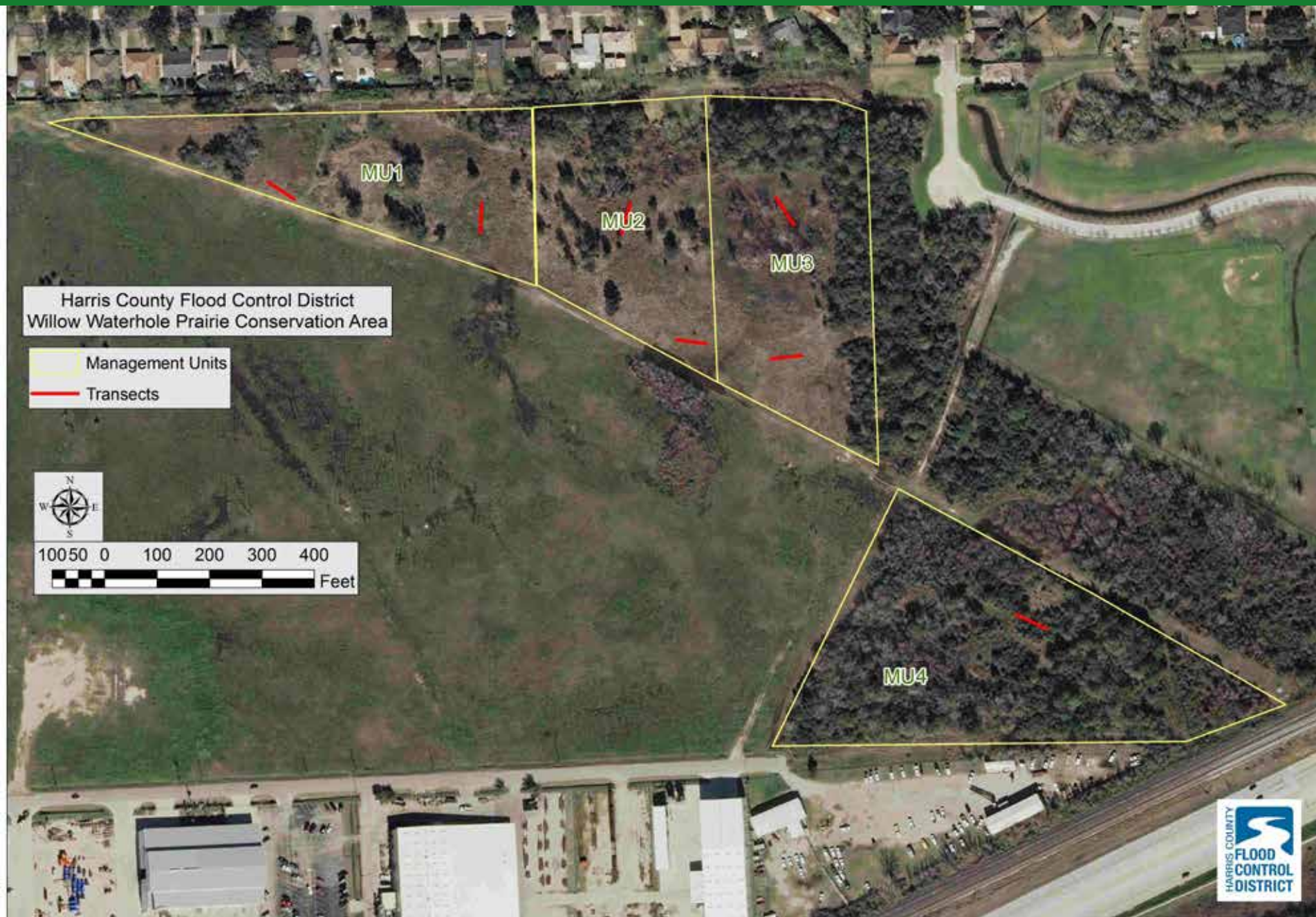
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- **Challenges and Lessons Learned**
- **Future Plans**

Management and Monitoring: Cyclical Mowing Schedule





Management and Monitoring: Transects



Management and Monitoring: Transects



Transect Monitoring Results

Data shows a rapid recovery of coastal prairie habitat

Transect 4, for example:

Date	Bare Ground (% cover)
10-Dec	62.75
11-Mar	48.25
11-Oct	56.50
12-Mar	12.35
13-Oct	<10.00

- Consistent Shannon-Wiener Diversity Index: 3.8 – 4.1 over three years
- Evenness values of +0.87

Pioneer and other prairie plant species emerging

- 244 native grasses and forbs
- Notable species
 - Sharp, Prairie, and Bracted blazing star, Rattlesnake Master, Houston Camphor daisy, Texas Prairie Dawn, Texas Coneflower, Indian Plantain, Giant Blue Sage, Green Antelopehorn
 - Little, Big, and Bushy Bluestem, Indian grass, Eastern Gamagrass, Gulf Cordgrass, Gulf Muhly



Management and Monitoring: Endangered Species – *Hymenoxys texana*



Hymenoxys texana

- Common name is Texas Prairiedawn
- Federally listed as endangered in 1986
- First discovered in 1890s and then thought to be extinct until rediscovery in 1981
 - Exists from February - May
 - Found in small open areas of sandy, saline soils
 - Often located on lower sloping portions of mimma mounds
 - Mounds of sandier soils form micro-topography that support a unique and diverse plant assemblage



Hymenoxys texana

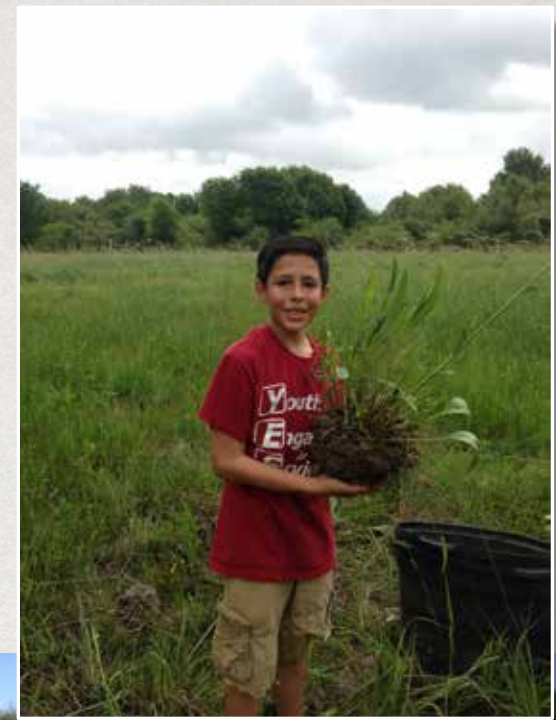
1. Fence the two known colonies
2. Control invasive species encroachment
3. Annual quantitative monitoring
 - First year (2013) – 100 individuals
82 seed heads
4. Soil analysis
 - Higher salinity than neighboring prairie soils (1.0-1.7 mmho/cm)
 - Highly sodic soils (ESP>25%)
5. Increase colony size and vigor
 - Teamed with Mercer Arboretum to explore seeding introduction
 - Seedling germination trial
 - In-situ vs ex-situ
 - Amend the soil to facilitate growing conditions
 - Increase soil salinity
 - Expand bare spaces for reintroduction



Selective Clearing and Transplanting

Volunteers from local public schools and organizations

- YES Prep public school
- Post Oak Middle School
- Houston Audubon Society
- Texas Gulf Coast Master Naturalists



Challenges

Proximity to an urban area

- Unauthorized public access
 - Nearby residents
 - Public infrastructure
- Higher incidence of invasive species



Future Plans

Prairie Expansion

- Continue to Mow
- Continue to Monitor
- Burn Plots?
- Increase *H. texana* populations
- Transplant and seeding

Basin Construction

- Test methods to establish native plants on slopes
- Install boundary to prevent unrestricted site access
- Design access plan for public education, recreation, trails, etc.

Lessons Learned



- Diverse and viable seed bank is crucial
- Minimize soil disturbance
- Consistent and thorough documentation
- Consistent volunteer coordination
- Adaptive Management Plan
- Outreach
 - Public
 - Internal

Questions?

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