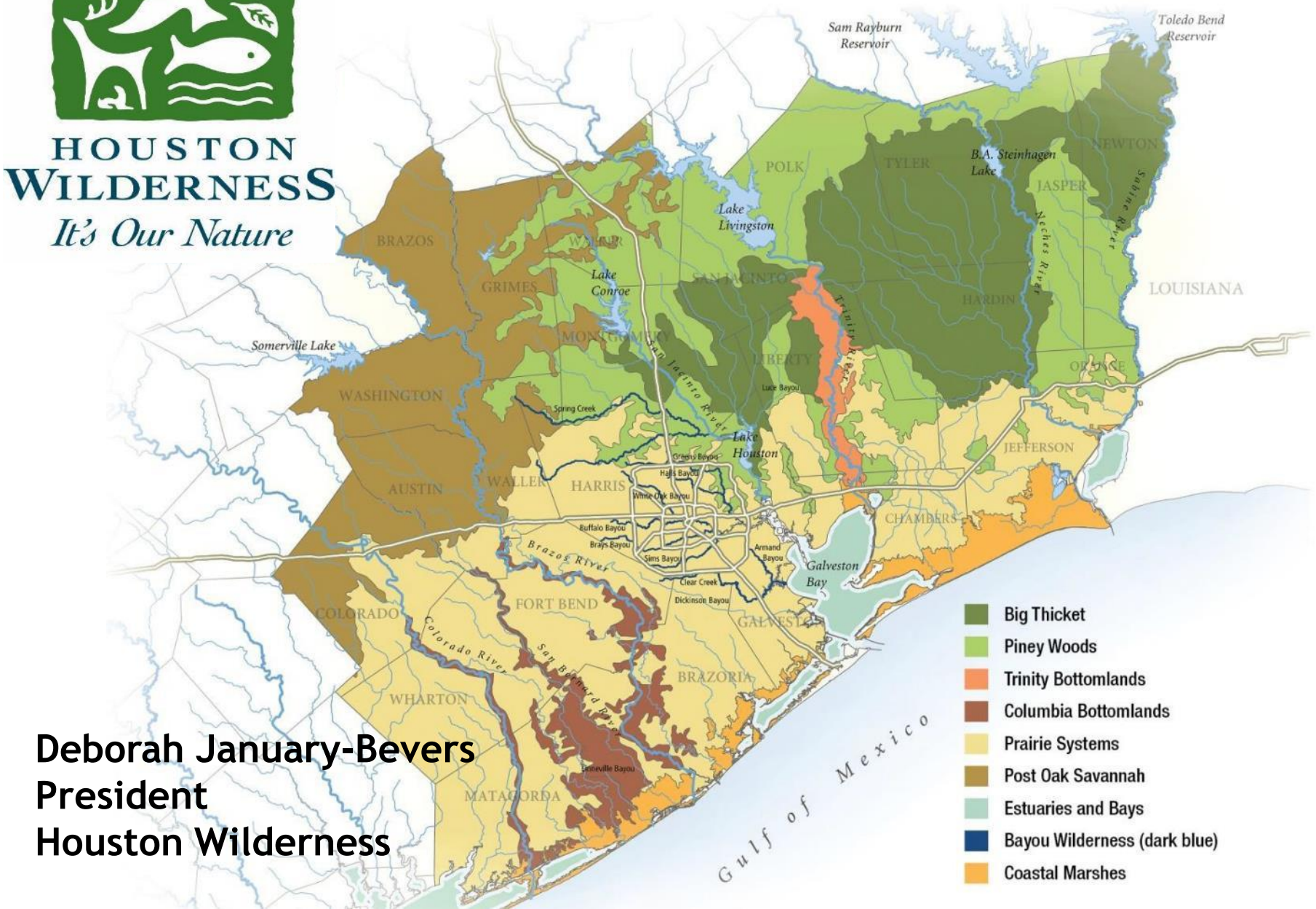
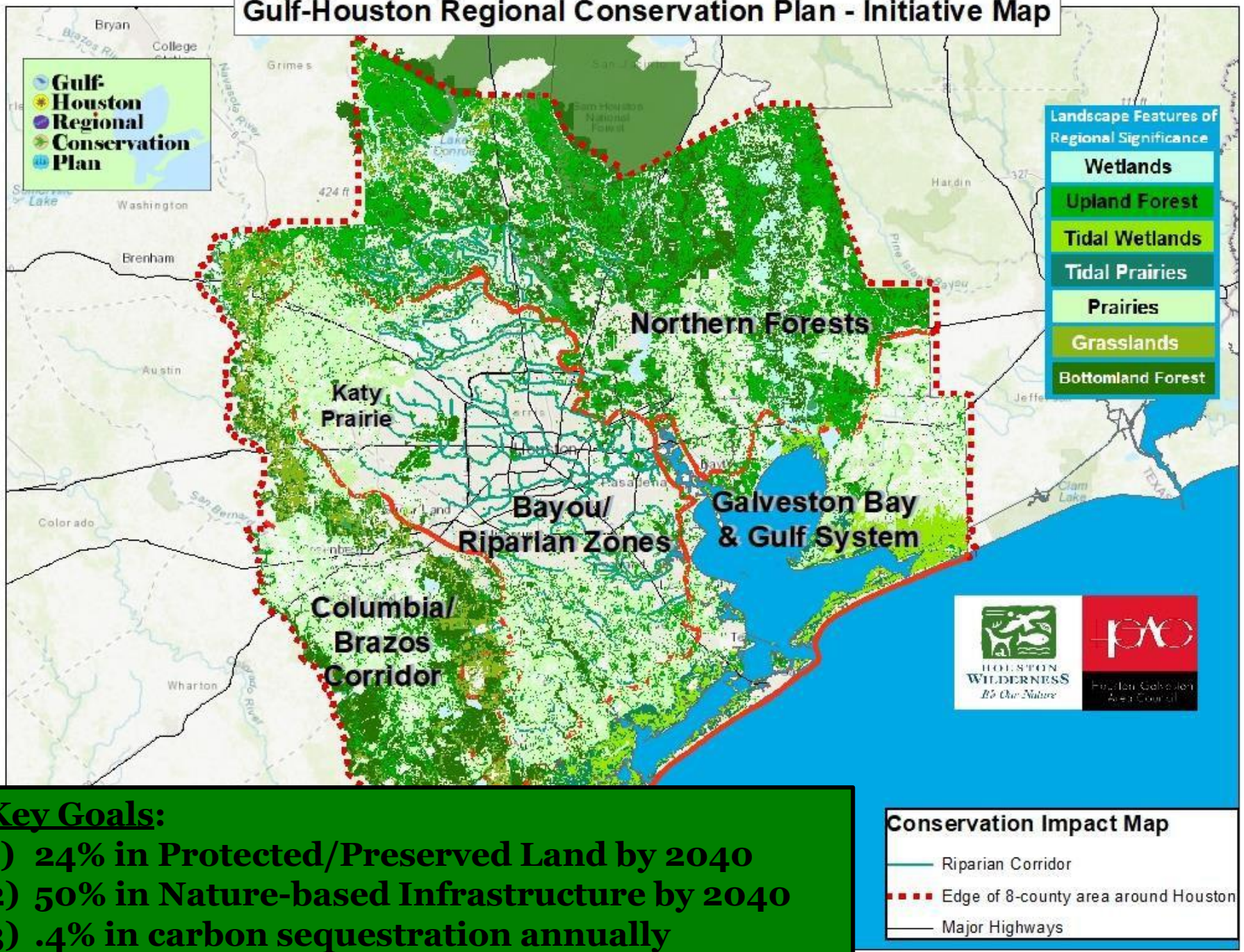
HOUSTON WILDERNESS

It's Our Nature



Deborah January-Bevers
President
Houston Wilderness



Key Goals:

1) 24% in Protected/Preserved Land by 2040
2) 50% in Nature-based Infrastructure by 2040
3) .4% in carbon sequestration annually

The Gulf-Houston Regional Conservation Plan

A long-term collaborative of environmental, business, and governmental entities working together to implement an ecosystem resilience plan for the 8-County Gulf-Houston region through 3 Key Goals:

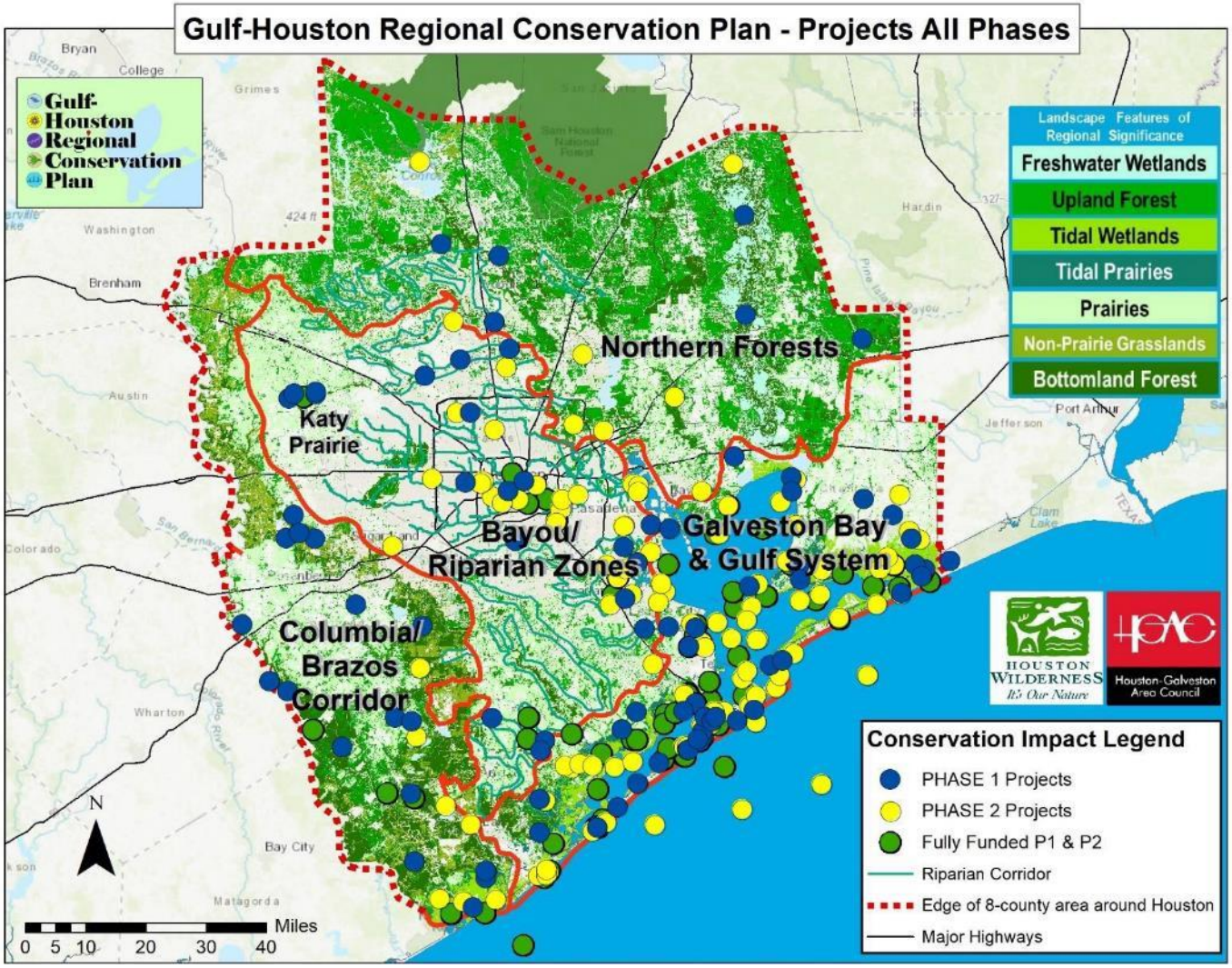
1st Goal - 24% by 2040 - Increase the current 14.7% in protected/preserved land in the region to 24% of land coverage by 2040

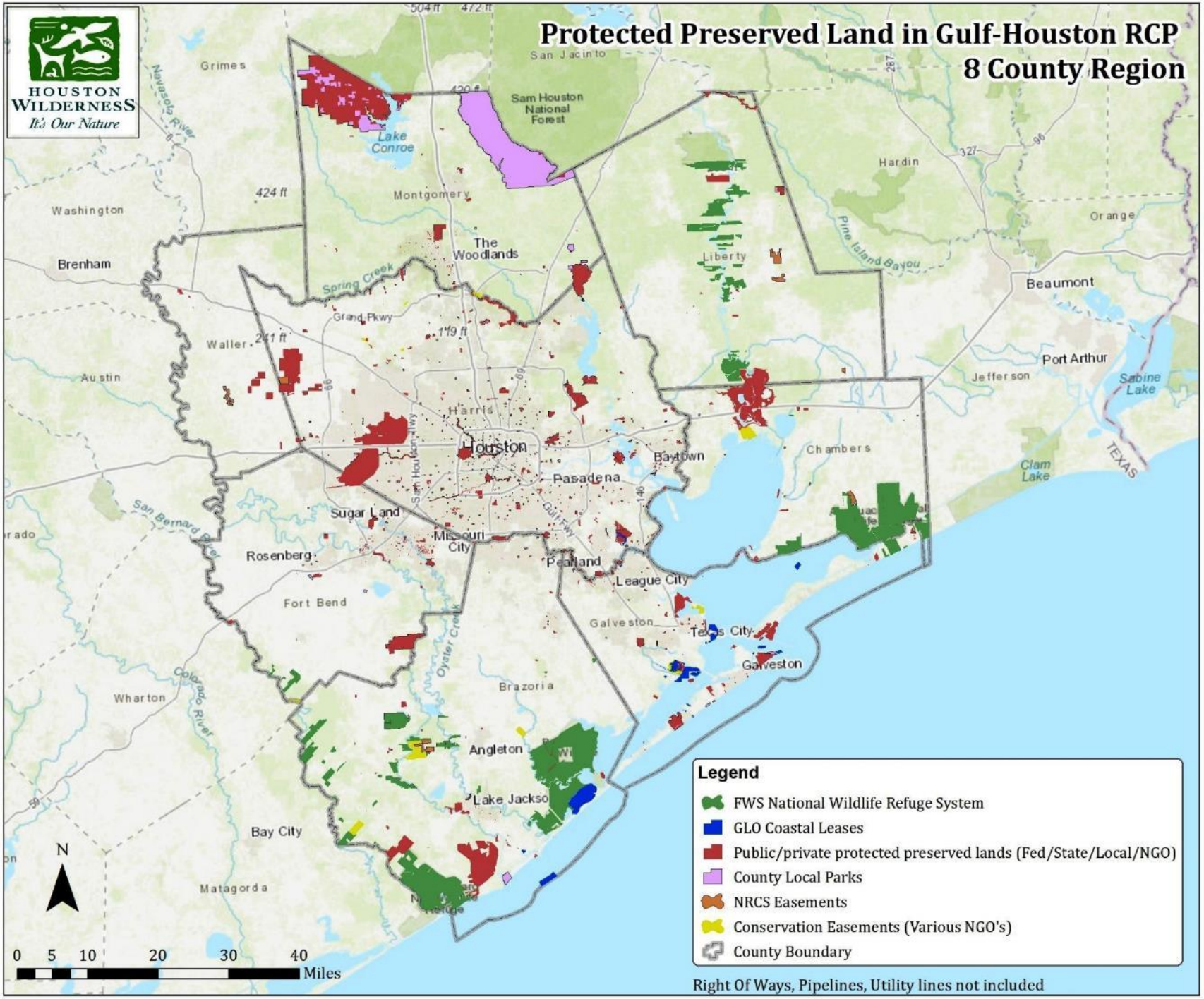
2nd Goal - 50% by 2040 - Increase and support the region-wide land management efforts to install nature-based stabilization techniques to 50% of land coverage by 2040

3rd Goal - 4% Annual Carbon Sequestration - Provide research and advocacy for an increase in air quality offsets through carbon absorption in native soils, plants, trees, and oyster reefs

RCP Working List of Projects and Already Funded Projects, to date

Over 75 Working List of Projects funded since 2014

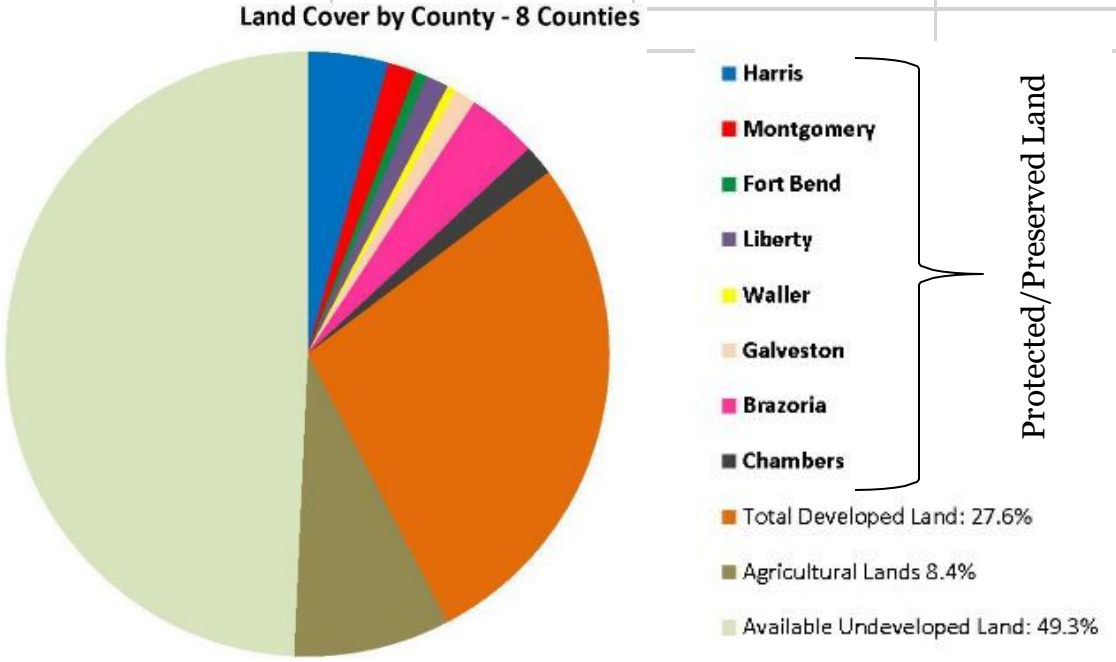



HOUSTON WILDERNESS
It's Our Nature
Protected Preserved Land in Gulf-Houston RCP
8 County Region
San Jacinto
Grimes
Sam Houston National Forest
Lake Conroe
Hardin
Montgomery
Washington
424 ft
The Woodlands
Brenham
Spring Creek
Liberty
Orange
Pine Island Bayou
Beaumont
Grand Pkwy
Waller
241 ft
119 ft
Port Arthur
Jefferson
Sabine Lake
Austin
Harris
Houston
Baytown
Chambers
Clam Lake
TEXAS
Pasadena
Sugar Land
Missouri City
Rosenberg
Pearland
League City
Fort Bend
Galveston
Texas City
Galveston
Brazoria
Wharton
Angleton
Lake Jackson
Bay City
Matagorda
N
0 5 10 20 30 40
Miles
Legend
FWS National Wildlife Refuge System
GLO Coastal Leases
Public/private protected preserved lands (Fed/State/Local/NGO)
County Local Parks
NRCS Easements
Conservation Easements (Various NGO's)
County Boundary
Right Of Ways, Pipelines, Utility lines not included

Land Cover by County - 8 Counties

County	Total Land Cover (Acres)	Total Developed Land % (with Acres)	Land Currently Protected % (with Acres)	Agricultural lands % (with Acres)	Available Undeveloped Land % (with Acres)
Harris	1,103,836	62% (679,088)	19.5% (215,018)	2.4% (26,479)	16.6 % (183,251)
Montgomery	689,220	29% (199,167)	10.9% (74,814)	0.02% (145)	60.2% (415,094)
Fort Bend	558,738	26% (145,142)	5.6% (31,550)	13.4% (74,849)	55.0% (307,198)
Liberty	752,809	7% (53,100)	8.0% (60,595)	11.7% (88,086)	73.2% (551,027)
Waller	327,852	11% (37,116)	7.7% (25,098)	9.7% (31,905)	71.3% (233,733)
Galveston	247,594	36% (88,405)	22.8% (56,561)	0.4% (945)	41.1% (101,682)
Brazoria	893,083	15% (137,976)	21.0% (187,113)	8.4% (74,798)	55.2% (493,197)
Chambers	385,724	7% (28,183)	20.8% (80, 324)	30.8% (118,851)	41.1% (158,365)
Total RCP 8 counties	**4,958,857**	**27.6% (1,368,177)**	**14.7% (731,075)**	**8.4% (416058)**	**49.3% (2443548)**

Total Land Cover 8 counties (Acres)



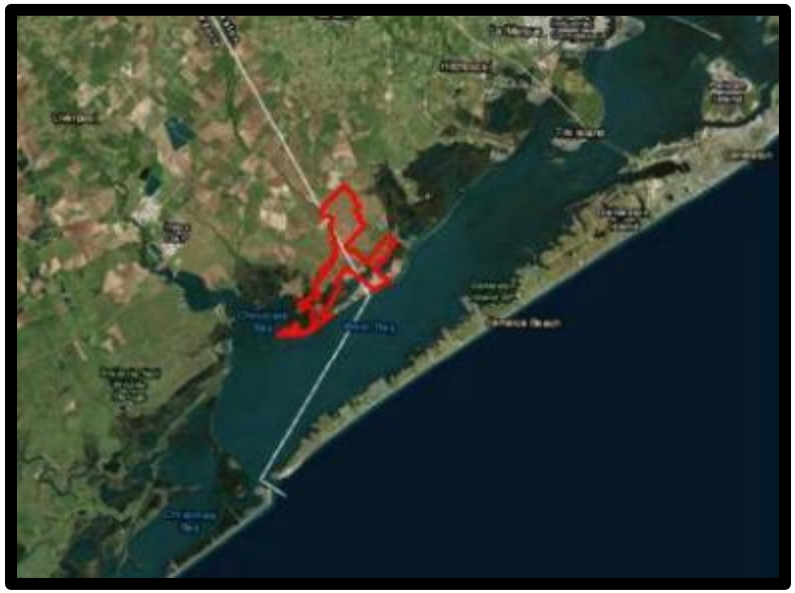
Examples of Protected/Preserved Lands

1)A 200 acre former golf course in Clear Lake, called Exploration Green, that is now protected/preserved land for flood detention, and recreation,

2) A 4,650 acre conservation easement along Chocolate Bay to help buffer against sea level rise and improve fisheries and wildlife habitat,

3) Over 10,000 acres of additional conserved prairie lands in Katy and

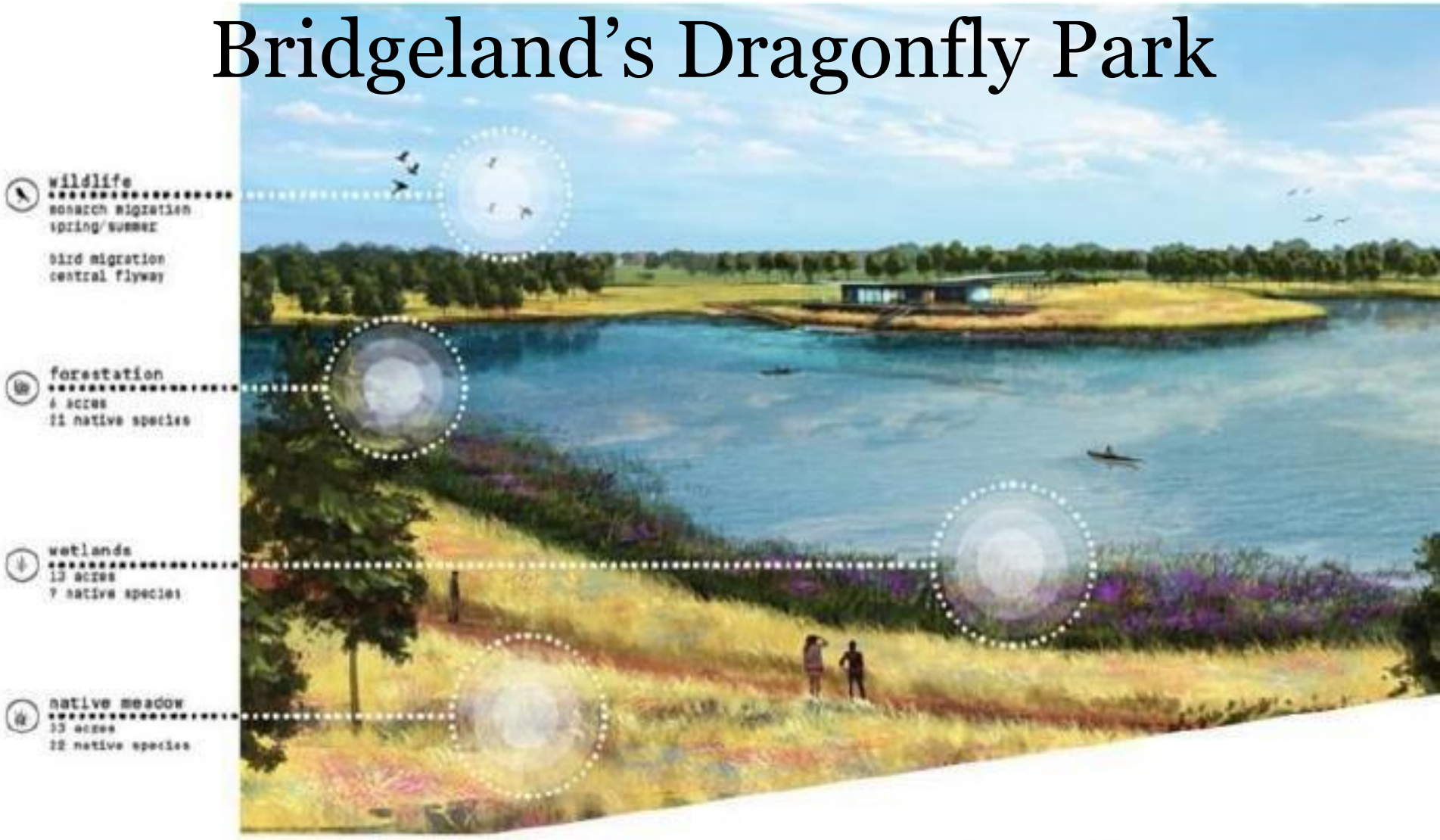
4)More than 70 large new detention basins along multiple waterways for added flood control and air/water quality improvements.



Chocolate Bayou Land

Exploration Green

Master Planned Community Example
Bridgeland's Dragonfly Park



https://www.bridgeland.com/things-to-do/activity-centers/dragonfly-park/

ecological systems

Cross Creek Ranch

Tools in the Resilience Toolbox

(1) Recreational Facilities Bonds for some Texas counties

(2) Green Bonds and related financing

(3) Texas Flood Infrastructure Fund

(4) Resilient Houston Plan Goal of 24% in conserved lands by 2040

(5) Governmental Buyout Programs, detention areas, and CIPs

(6) HCFCD Bond Projects and Buyouts Program

(7) Additional Park/Green Spaces through private/public partnerships - federal appropriations, grants and conservation easements, HGAC's new *Land Conservation Framework*

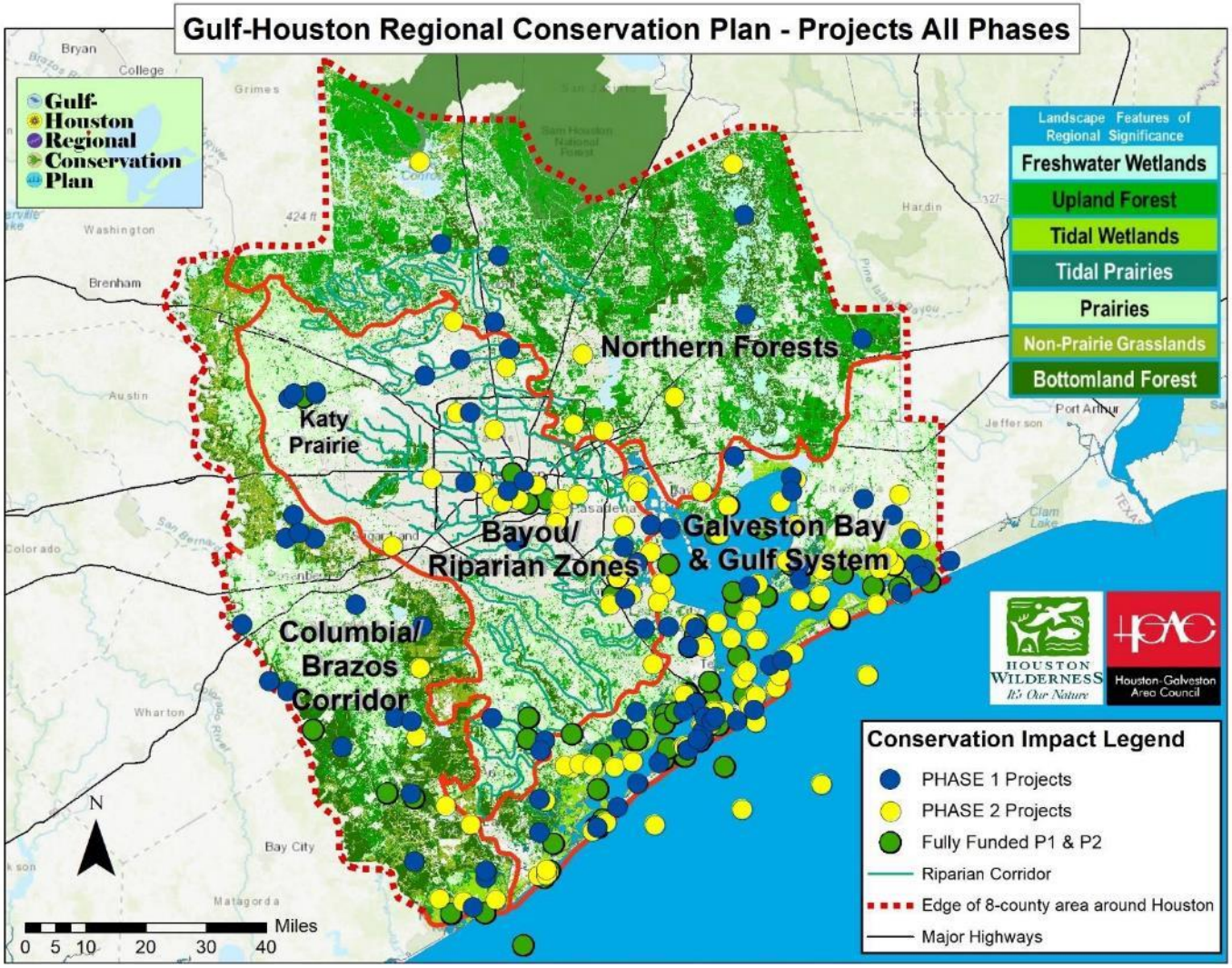
(8) Gulf-Houston RCP Working List of Projects (Phase 1)

(9) Floodplain Regulations

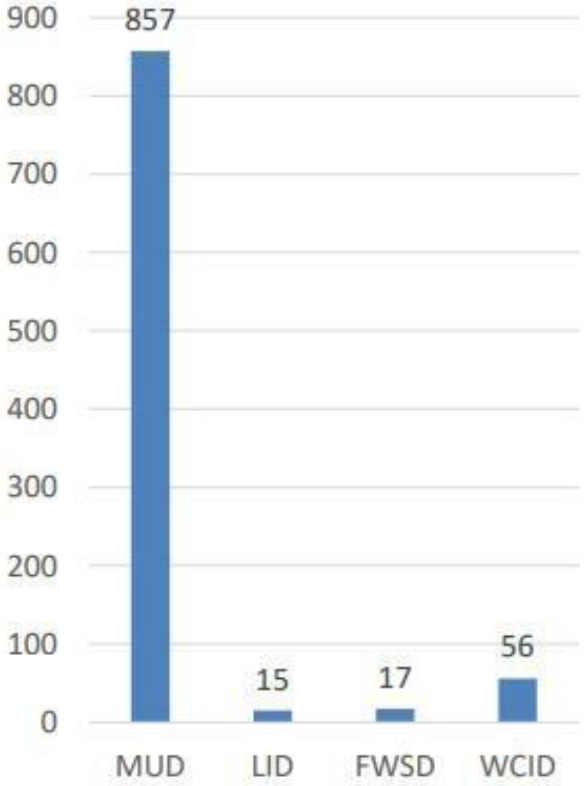
(10) Setbacks/Buffers

RCP Working List of Projects and Already Funded Projects, to date

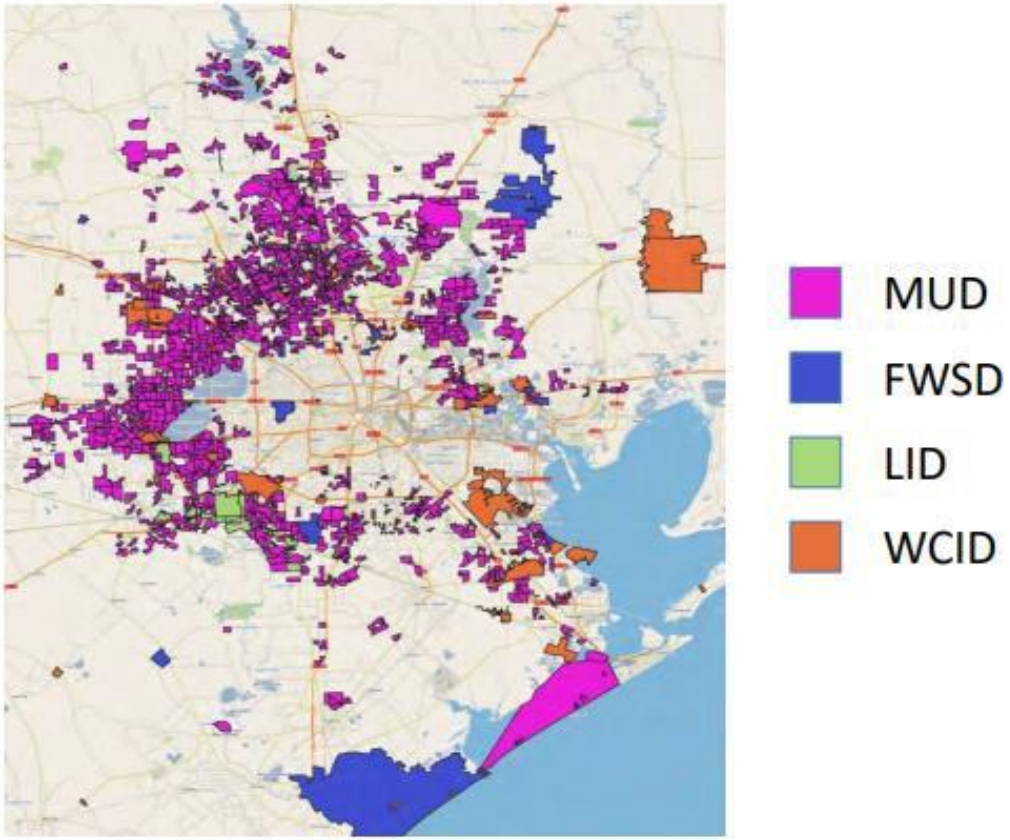
Over 75 Working List of Projects funded since 2014



Within the Houston MSA, there are 945 such districts, including 857 municipal utility districts (MUDs), 15 levee improvement districts (LIDs), 17 fresh water supply districts (FWSDs), and 56 water control and improvement districts (WCIDs). This report sometimes will refer to all of these types of districts collectively as "MUDs."



Source; TCEQ



How can MUDs build Recreational Facilities?

MUDs may acquire recreational facilities and obtain funds to develop and maintain them in the same manner as authorized for the acquisition, development, and maintenance of other district facilities.

Allowing recreational bonds has been very successful and has allowed for hundreds of acres of critical green space!

Bridgeland – Recreational Facilities

Texas Water Code (TWC) Sec. 49.464. ACQUISITION OF AND PAYMENT FOR RECREATIONAL FACILITIES.

Restrictions on the bonds that MUDs can issue for Recreational Facilities

A MUD's outstanding bonds supported by ad valorem taxes for recreational facilities **may not exceed 1%** of the taxable value of property in the district at the time of issuance of the debt. This limitation does not apply to the financing of other MUD facilities; only paying for recreational facilities is limited.

A higher % = substantially more protected/preserved land

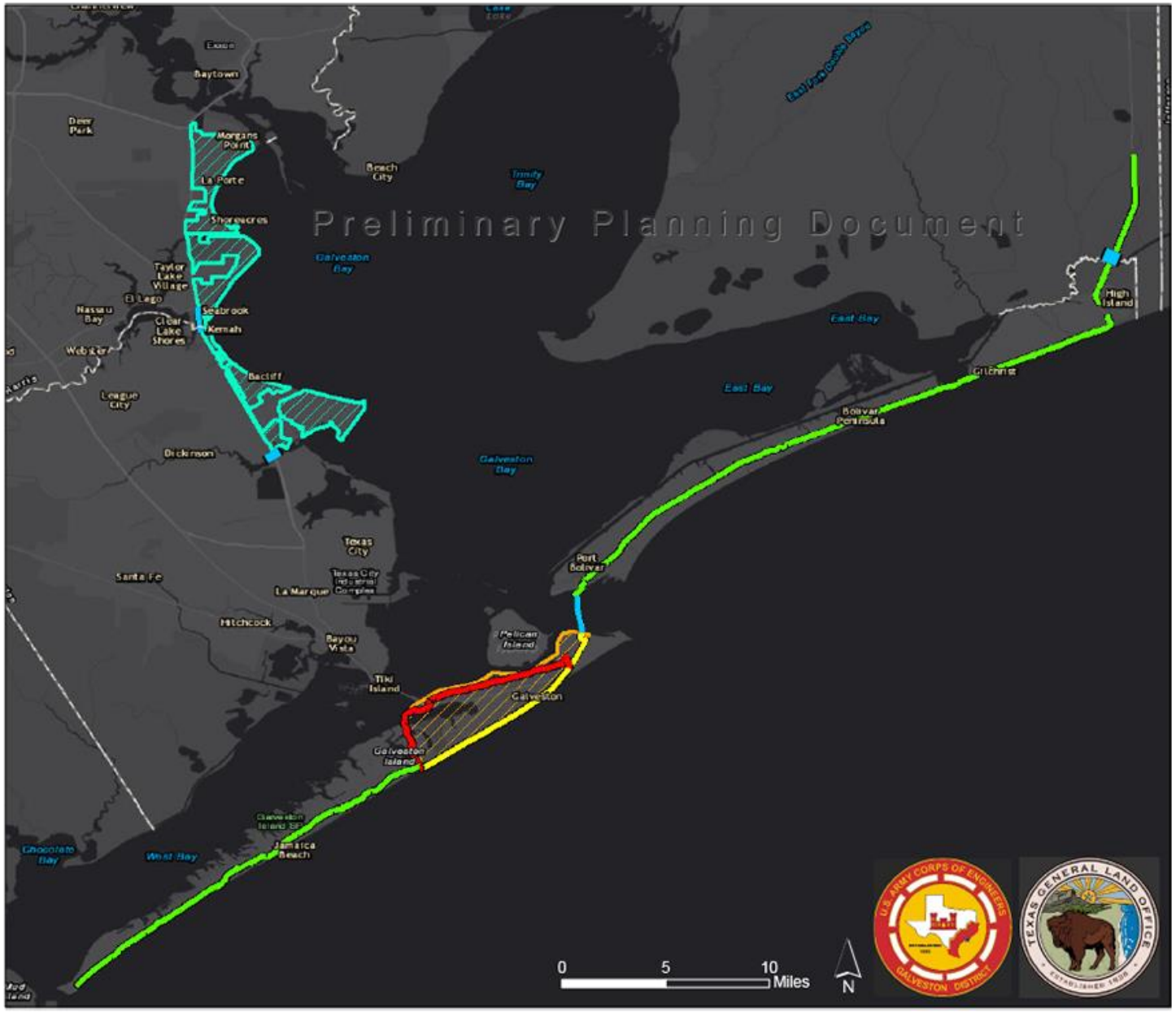
Texas Administrative Code, Title 30, Part 1
TCEQ, Chapter 293.41., Subchapter E

Coastal Texas Protection and Restoration Feasibility Study

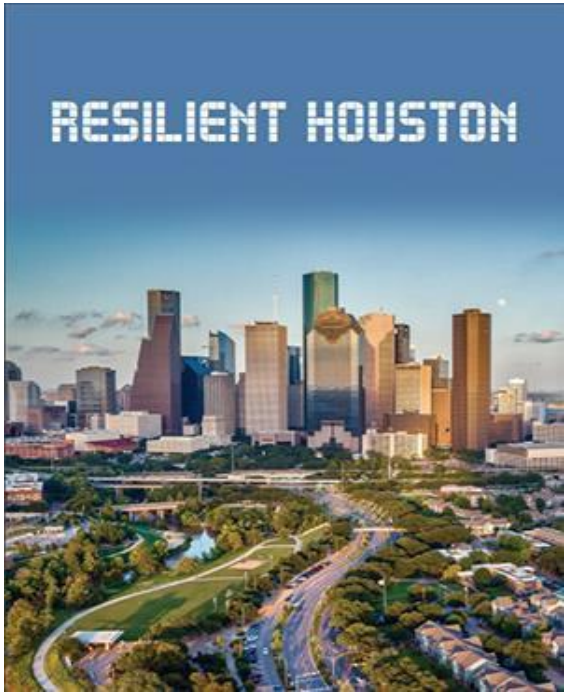
Alternative A

- Navigation and Environmental Gates
- Levee/Floodwall
- Galveston Ring Levee*
- Galveston Seawall Improvements
- Galveston Island Nonstructural Improvements*
- Nonstructural Improvements

* One or both of these features may be selected.



Houston Wilderness is facilitating the Gulf-Houston RCP in conjunction with overlapping goals in the City of Houston's *Resilient Houston Plan*



Chapter 2: Safe & Equitable Neighborhoods – **Goal 6:** Plant 4.6 million new native trees by 2030.

Chapter 4: Accessible & Adaptive City – Goal 11: 100 new green stormwater infrastructure projects by 2025

Chapter 5: Innovative & Integrated Region – Goal 16: Conserve 24% of undeveloped regional lands as natural spaces by 2040

For more information on the Resilient Houston Plan:
https://www.houstontx.gov/mayor/chief-resilience-officer.html

2nd Key Goal

50% by 2040 - Increase and support the region-wide land management efforts to install nature-based stabilization techniques to 50% of land coverage by 2040

Types of Nature-based Stabilization Techniques:

- Bioswale
- Cistern
- Stormwater Wetlands
- Green Roof
- Permeable Pavement
- Rain Barrel
- Rain Garden
- Stormwater Planter Box
- Underground Storage
- Vegetated Filter Strip
- Vegetated Swale

- **Low Impact Development**
- **Large-Scale Native Tree Plantings**

Local Example of Green Infrastructure

Project Brays

- Provide retention area for heavy rain events
- Develop natural marshlands and green spaces along Brays Bayou
- Improve water quality and reduce the need for treatment
- Provide recreation and tourism opportunities for the community

Infrastructure need: Water Quality, Water Supply, Water Detention/Retention and Flood Control

Solution(s):

•Filtration and absorption of pollutants using wetland and prairie grasses

•Community recreational park

•Green spaces that allow for water retention in heavy rain events

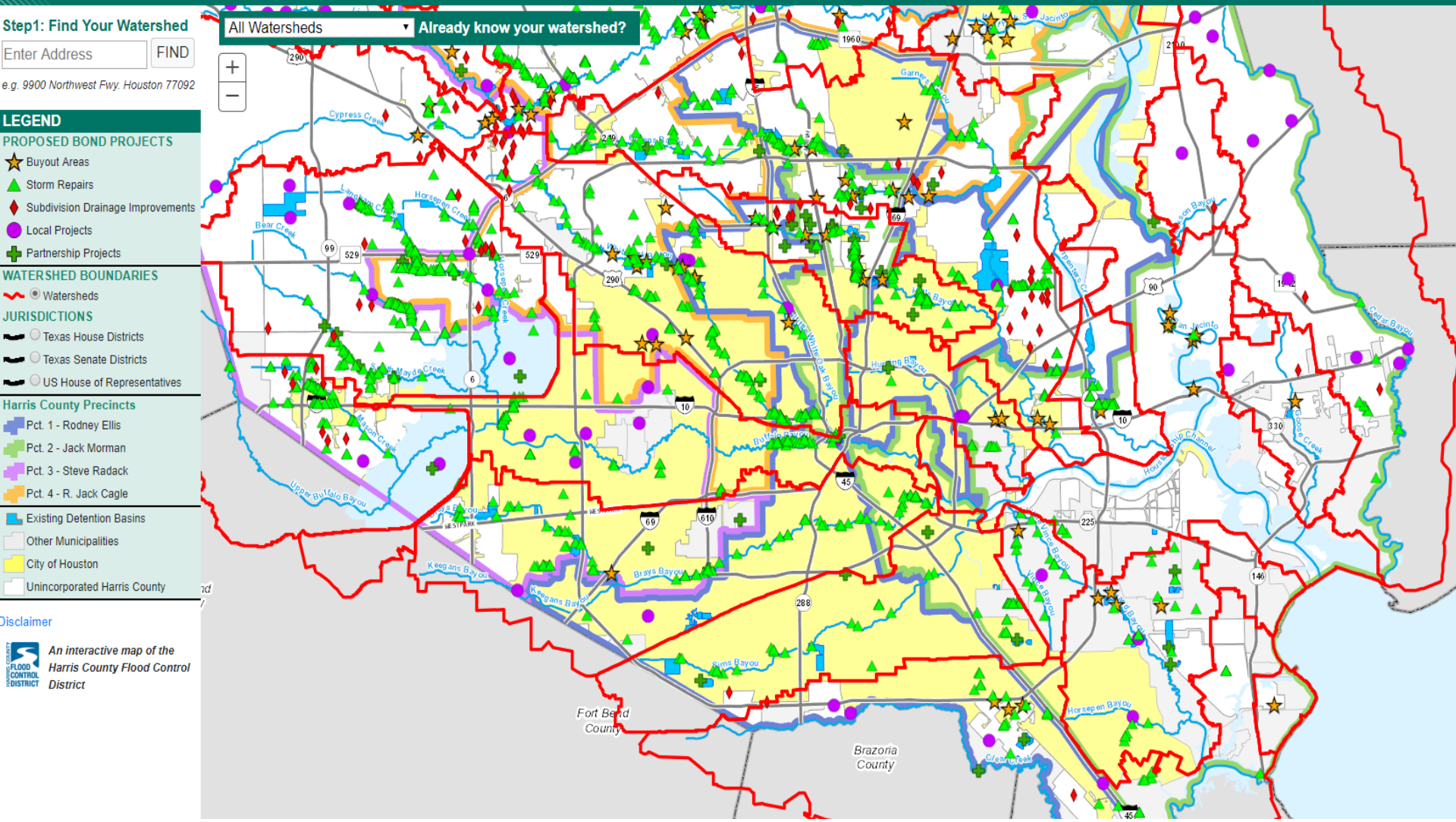
•**Cost to Construct:**

$3.2 Million

In 2006, the Brays Bayou Marsh at Mason Park, near the mouth of the bayou was completed.

http://www.projectbrays.org/about.html

BOND PROGRAM
INFORMATION & COMMUNITY ENGAGEMENT



Tools in the Resilience Toolbox

(1) Public & Private Ecological Restoration Projects

- Coastal Texas Study ER Projects
- **NGO, Developer, Municipal, County Projects (Working List – Phase 2)**
- Wetland Mitigation Banks
- Corporate campuses

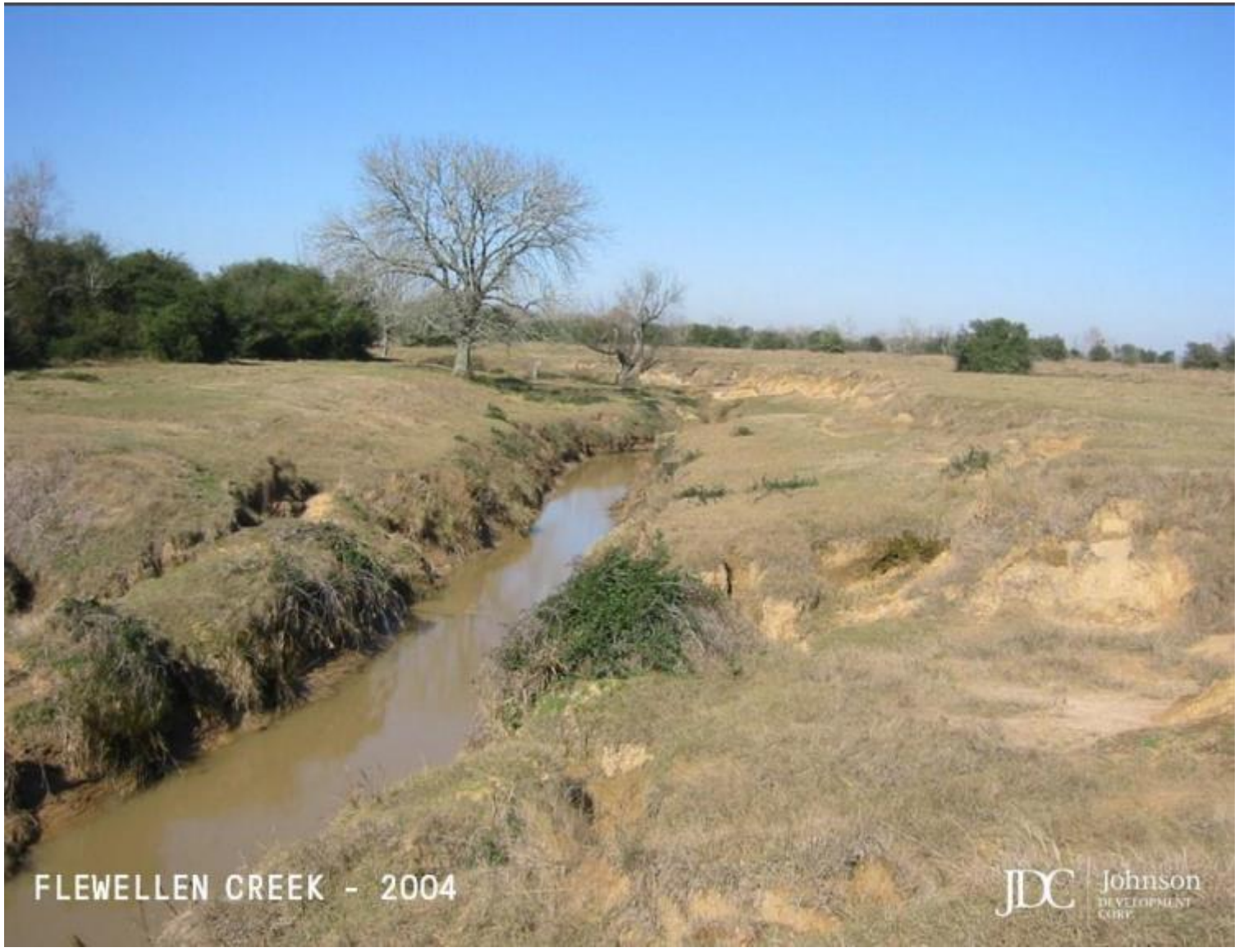
(2) Private & Public Nature-based Stabilization Projects

(3) City of Houston's Incentives for Green Development (approved Dec. 2020)

(4) Identifying desired green infrastructure strategies with

NOAA's Green Infrastructure Options to Reduce Flooding

Cross Creek Ranch



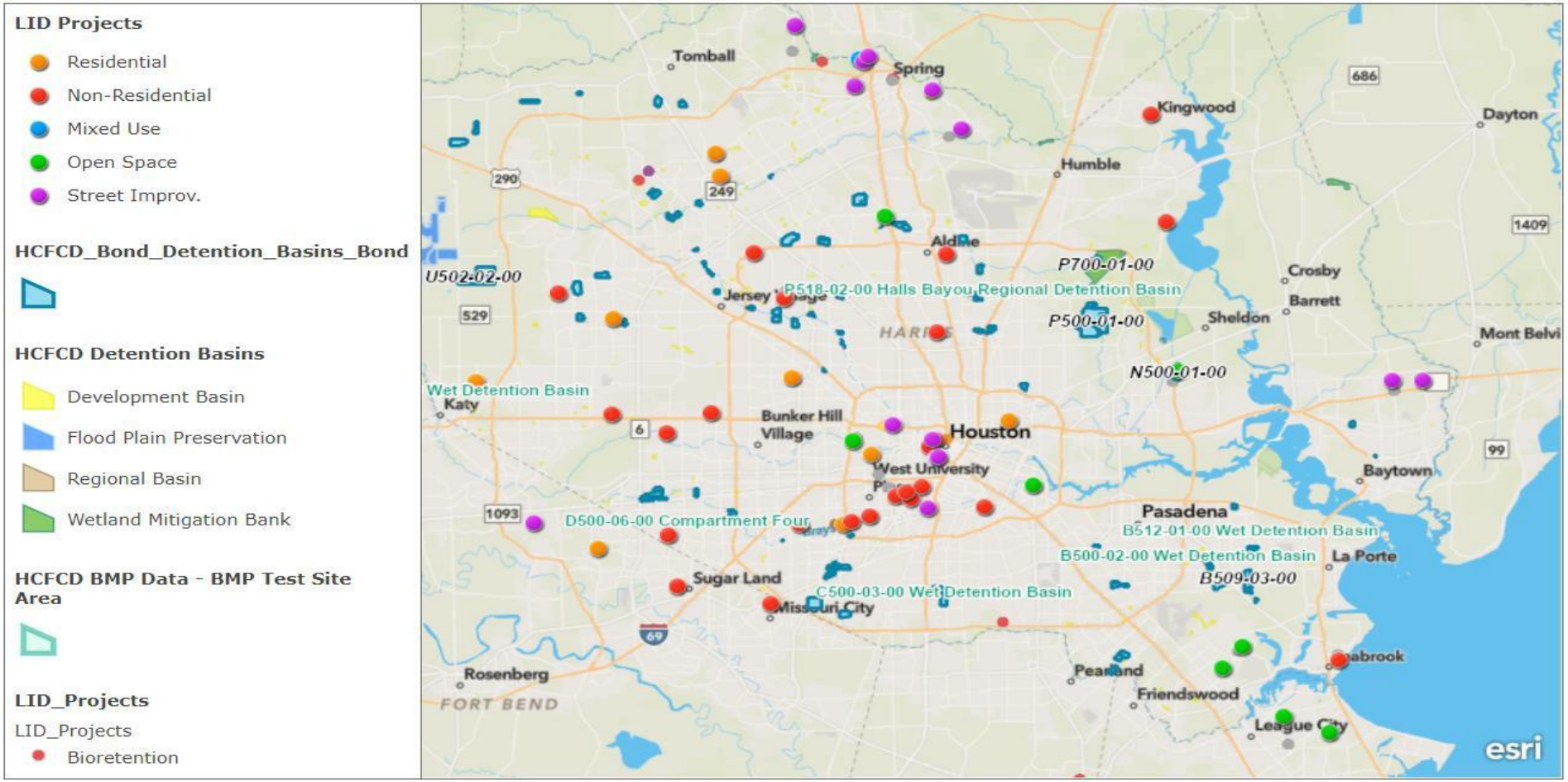
Cross Creek Ranch

Harris County MUD No. 230
Mandolin Gardens Park

Memorial Park's Eastern Glades

Nature-based Stabilization Techniques
Low Impact Development Projects

LID DATA



3rd Key Goal

Provide research and advocacy for a 4% annual increase in air quality offsets through carbon sequestration in native soils, plants, trees, and oyster reefs

Large-scale Native Tree Plantings

Ecosystem Services Provided by a Forest

1. Cleaner water through root systems and recharges aquifers

2. Provides storm water retention

3. Provides habitat for wildlife and birds that people & ecotourism

4. Improved quality of life for residents

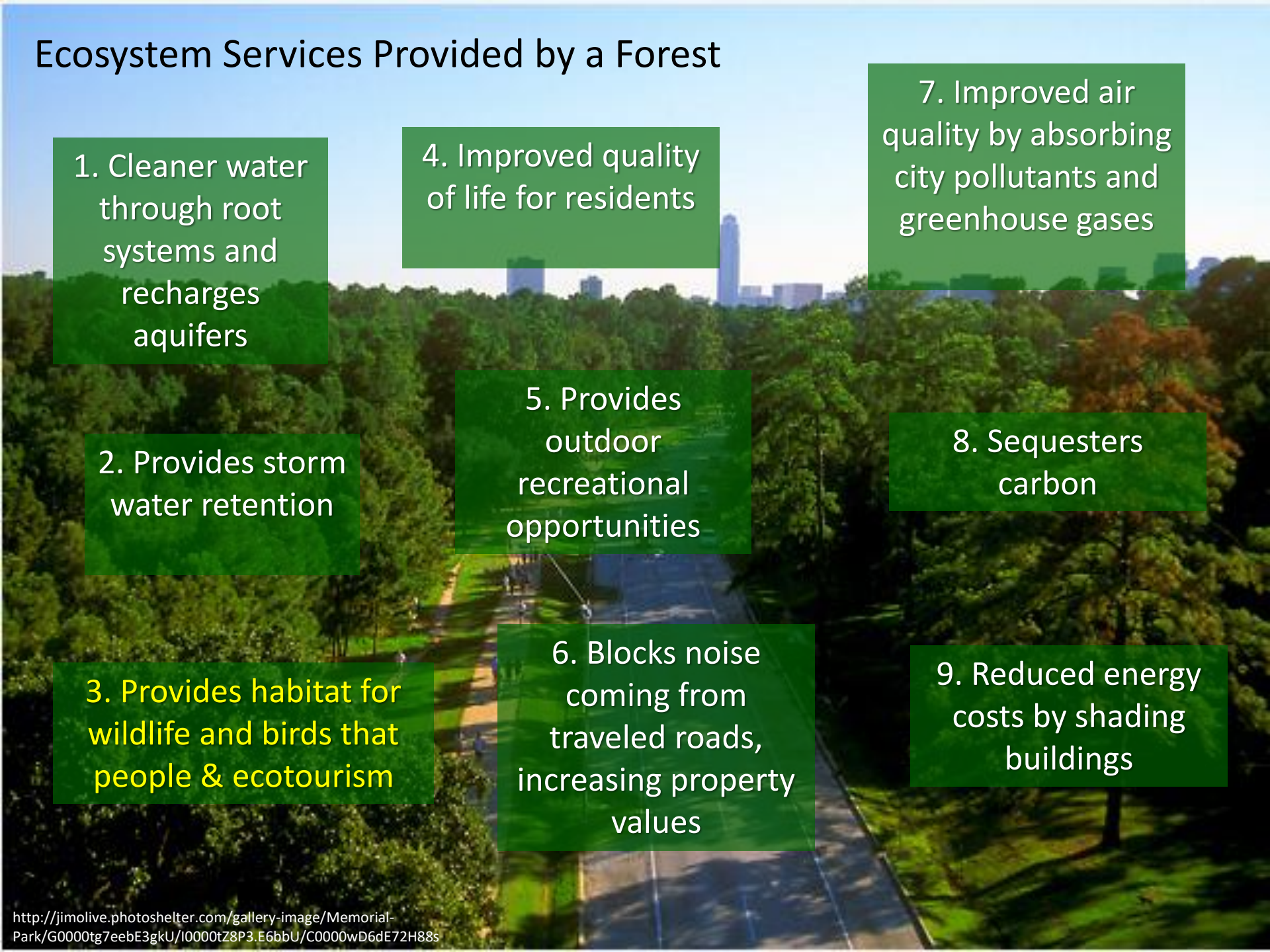
5. Provides outdoor recreational opportunities

6. Blocks noise coming from traveled roads, increasing property values

7. Improved air quality by absorbing city pollutants and greenhouse gases

8. Sequesters carbon

9. Reduced energy costs by shading buildings



http://jimolive.photoshelter.com/gallery-image/Memorial-Park/G0000tg7eebE3gkU/I0000tZ8P3.E6bbU/C0000wD6dE72H88s

Regional Native Tree Species – Targeted Ecosystem Services Rankings

Tree species	Total CO_2 Stored (lbs.) DBH + 10 years	Tree species	CO_2 sequestrated (lbs./tree/year) DBH + 10 years	Tree species	Water absorption (gal./year) DBH + 10 years	Tree Species	Total air pollutant w PM2.5 (lbs./year) DBH + 10 years	Tree species	Total VOC Emission Potential (µg of C/g of leaf dry weight/hr)
Live Oak	1019	Live Oak	388	Tulip Tree	2006	American Sycamore	1.8	Southern Crabapple	0.0
Black Cherry	971	River Birch	315	Water Oak	1879	Live Oak	1.8	American Basswood	0.0
River Birch	935	Green Ash	300	American Sycamore	1747	Tulip Tree	1.8	Slippery Elm	0.2
Boxelder	896	Slippery Elm	197	Live Oak	1658	Black Walnut	1.8	American Elm	0.2
Laurel Oak	875	Laurel Oak	194	River Birch	1648	Red Maple	1.6	Black Cherry	0.2
Water Oak	869	Winged Elm	179	Red Maple	1591	Slippery Elm	1.5	Green Ash	0.2
Red Maple	859	Eastern Cottonwood	176	Black Walnut	1518	Sweetgum	1.5	White Ash	0.2
Willow Oak	739	Water Oak	173	Laurel Oak	1518	Water Oak	1.4	Elm	0.2
Sweetgum	739	Black Willow	169	Sweetgum	1395	American Elm	1.4	Plum	0.2
Slippery Elm	689	Boxelder	159	American Elm	1364	Laurel Oak	1.3	Winged Elm	0.2
American Elm	667	Elm	153	Willow Oak	1316	Boxelder	1.3	Common Persimmon	0.2
Tulip Tree	659	Sweetgum	150	Slippery Elm	1299	River Birch	1.3	Washington Hawthorn	0.2
American Sycamore	651	Baldcypress	148	Black Cherry	1095	Green Ash	1.3	Carolina cherry Laurel	0.2
Green Ash	634	Willow Oak	140	Boxelder	1081	White Ash	1.3	Eastern Redbud	0.2
Eastern Cottonwood	593	Red Maple	139	Green Ash	1977	Southern Magnolia	1.2	Tulip Tree	0.3
Black Willow	590	Plum	139	Hickory	1907	Black Tupelo	1.2	River Birch	0.3
Loblolly Pine	479	Southern red Oak	131	Red Mulberry	1878	Black Cherry	1.1	Red Mulberry	0.3
Washington Hawthorn	448	White Ash	118	Black Tupelo	1858	Willow Oak	1.1	Sugarberry/Hackberry	0.3
White Ash	447	American Elm	114	Southern red Oak	1858	Eastern Cottonwood	1.1	Holly	0.3
Southern Crabapple	445	Swamp chestnut Oak	114	White Ash	1833	Loblolly Pine	1.1	Savannah Holly	0.3
Plum	445	American Sycamore	111	Eastern Cottonwood	1791	Red Mulberry	1.0	American Holly	0.3
Baldcypress	442	Loblolly Pine	108	Oak	1740	Hickory	1.0	Redbay	0.7
Longleaf Pine	425	Black Cherry	101	Swamp chestnut Oak	1729	Redbay	1.0	Red Maple	1.7
Southern red Oak	418	Oak	94	Flowering Dogwood	1639	Flowering Dogwood	0.9	Boxelder	1.7
Shumard Oak	413	Shortleaf Pine	91	Plum	1493	Black Willow	0.9	Flowering Dogwood	1.7
Swamp chestnut Oak	413	Shumard Oak	90	Shumard Oak	1492	Sugarberry/Hackberry	0.9	American Hornbeam	1.7
Oak	407	Longleaf Pine	85	Loblolly Pine	1480	Shumard Oak	0.9	Hickory	1.7
Black Walnut	388	Tulip Tree	81	Black Willow	1466	Elm	0.9	Sugar Maple	1.7
Shortleaf Pine	374	Willow	79	Southern Magnolia	1458	Southern red Oak	0.9	Bitternut Hickory	1.7
Hickory	355	Black Walnut	76	Redbay	1368	Oak	0.9	Mockernut Hickory	1.7
Black Tupelo	354	American Basswood	76	Southern Crabapple	1359	Shortleaf Pine	0.9	Pecan	1.7
Flowering Dogwood	338	Hickory	75	Shortleaf Pine	1322	Carolina cherry Laurel	0.9	Eastern red Cedar	1.7
Holly	337	Sugar Maple	71	Elm	1319	Southern Crabapple	0.8	Black Walnut	2.1
Winged Elm	337	Washington Hawthorn	68	Carolina cherry Laurel	1311	Swamp chestnut Oak	0.8	Southern Magnolia	2.1
Elm	336	Redbay	64	Pecan	1283	Plum	0.8	Longleaf Pine	2.1
Southern Magnolia	332	Savannah Holly	63	Winged Elm	1267	American Basswood	0.8	Shortleaf Pine	2.1
Redbay	332	Holly	59	Eastern Redbud	1238	Eastern Redbud	0.8	Loblolly Pine	2.1
Willow	281	Sugarberry/Hackberry	58	American Basswood	1199	Winged Elm	0.7	Baldcypress	2.1
American Basswood	261	Southern Magnolia	55	Sugarberry/Hackberry	1157	Sugar Maple	0.7	American Sycamore	70.1
Carolina cherry Laurel	232	Post Oak	55	Mockernut Hickory	1145	Mockernut Hickory	0.7	Black Willow	70.1
Red Mulberry	219	Bitternut Hickory	54	Willow	1134	Longleaf Pine	0.7	Eastern Cottonwood	70.1
Savannah Holly	190	White Oak	54	Bitternut Hickory	1098	American Hornbeam	0.6	Willow	70.1
Sugar Maple	181	Flowering Dogwood	46	Longleaf Pine	1094	Common Persimmon	0.6	Water Oak	70.1
Common Persimmon	164	Black Tupelo	46	Common Persimmon	1092	Willow	0.6	Live Oak	70.1
Mockernut Hickory	140	Red Mulberry	44	Baldcypress	1078	Baldcypress	0.6	Laurel Oak	70.1
Post Oak	139	Mockernut Hickory	44	American Hornbeam	1027	Holly	0.6	Willow Oak	70.1
Bitternut Hickory	136	Pecan	44	White Oak	907	Savannah Holly	0.6	Shumard Oak	70.1
White Oak	136	Common Persimmon	38	Sugar Maple	891	Bitternut Hickory	0.5	Swamp chestnut Oak	70.1
Pecan	135	American Holly	33	Washington Hawthorn	790	Pecan	0.5	Southern red Oak	70.1
American Hornbeam	133	American Hornbeam	31	Post Oak	691	White Oak	0.5	Oak	70.1
American Holly	127	Southern Crabapple	27	Holly	665	American Holly	0.3	White Oak	70.1
Sugarberry/Hackberry	111	Eastern Redbud	19	Savannah Holly	639	Post Oak	0.3	Post Oak	70.1
Eastern Redbud	72	Eastern red Cedar	17	American Holly	525	Washington Hawthorn	0.3	Black Tupelo	70.1
Eastern red Cedar	45	Carolina cherry Laurel	3	Eastern red Cedar	324	Eastern red Cedar	0.2	Sweetgum	70.1

Tools in the Resilience Toolbox

(1)Targeting Native Tree Species based on Ecosystem Services abilities

(2)Resilient Houston Plan Goal of 4.6 Million Native Trees Planted by 2030

(3)Research on large-scale use of native grasses

(4)Major soil enhancements – compost and mulch

(5) Carbon Trading (public and private)

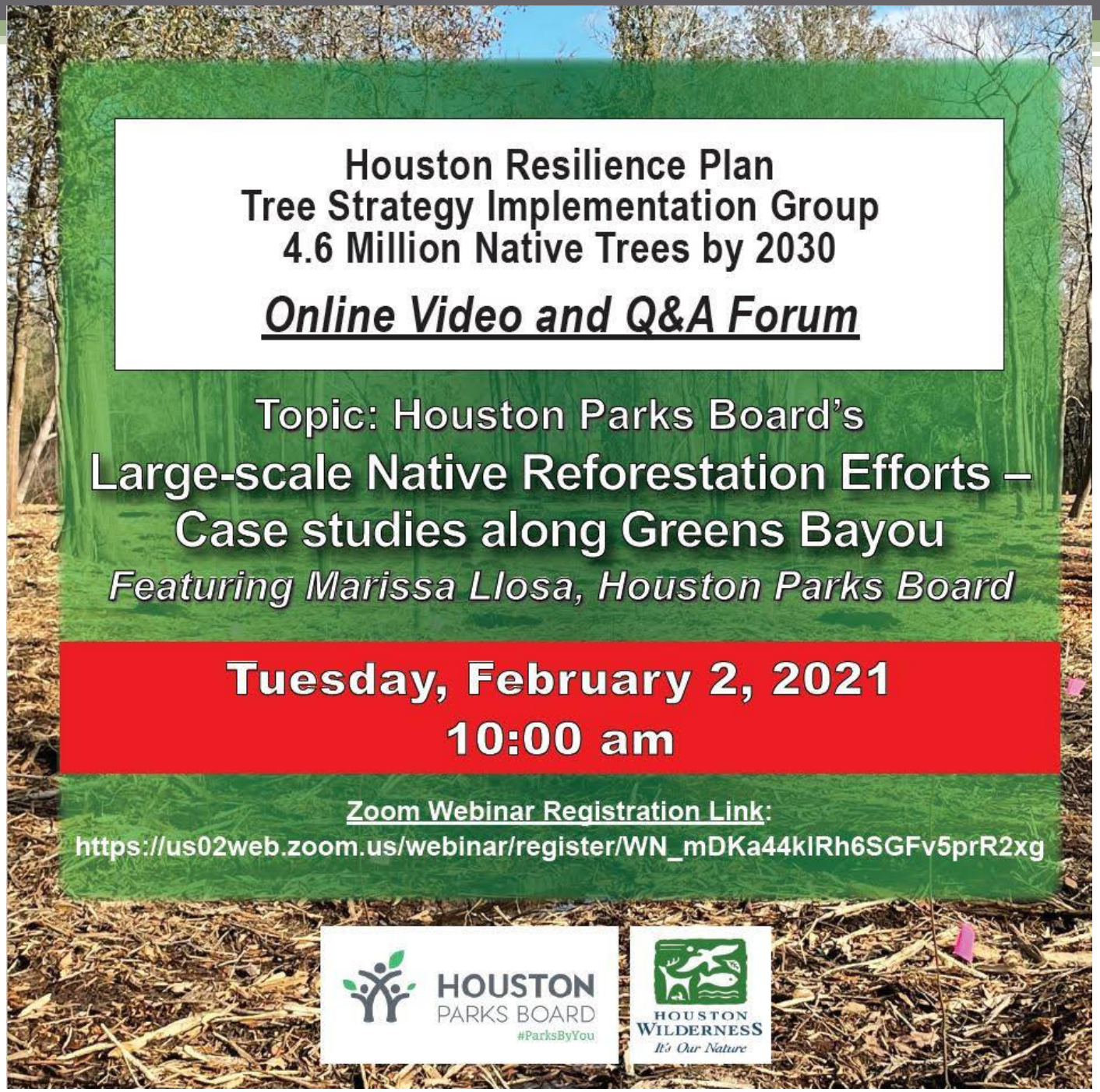
Major forestation initiatives are taking place in the 8-county RCP area, including a 4.6 million native tree planting goal by 2030 and a Port of Houston TREES Program to plant 1 million trees along the 25 miles of the Houston Ship Channel.

Bayport Terminal area

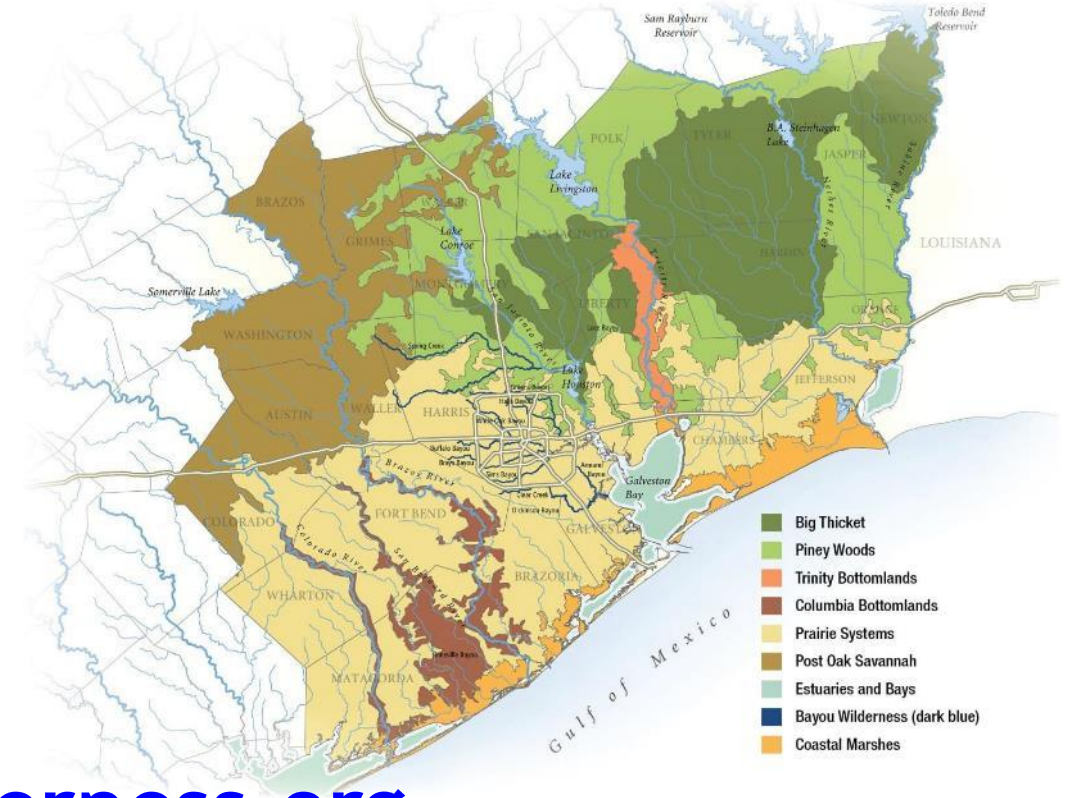
Examples of Tree Planting Scenarios to Meet 3rd Key Annual Goal: [3]

Species of Tree	Number of Trees Planted (in 1 year)	Amount of Carbon Sequestered per Tree (lbs./year) [3]	Total Carbon Sequestered After Planting (lbs./year)
Live Oak	150,000	268	40,200,000
River Birch	50,000	215	10,750,000
Green Ash	10,000	200	2,000,000
Slippery Elm	25,000	197	4,925,000
Laurel Oak	75,000	194	14,550,000
Water Oak	20,000	173	3,460,000
Boxelder	20,000	159	3,180,000
Sweetgum	30,000	150	4,500,000
Red Maple	50,000	139	6,950,000
White Ash	10,000	118	1,180,000
American Elm	25,000	114	2,850,000
American Sycamore	20,000	111	2,220,000
Loblolly Pine	50,000	106	5,300,000
Total	**485,000**		96,765,000
Total in tons (trees only)			**50,000 tons** [6]
Additional Carbon Added to Soil (mulch) [4]			200,000
Additional Carbon Added to Soil (composting) [5]			200,000
Native grasses & oyster reefs			150,000
Existing forestation in region	90 million		**+**
Total in tons			**600,000**

Sweetwater Lake shoreline has eroded at a rate of 1-2 feet per year. In order to protect the shoreline from further erosion, Galveston Bay Fndn enhanced native oyster populations, and restored salt marsh, working with volunteers to construct up to 1,900 linear feet of living shoreline.


Houston Resilience Plan
Tree Strategy Implementation Group
4.6 Million Native Trees by 2030
Online Video and Q&A Forum
Topic: Houston Parks Board's
Large-scale Native Reforestation Efforts –
Case studies along Greens Bayou
Featuring Marissa Llosa, Houston Parks Board
Tuesday, February 2, 2021
10:00 am
Zoom Webinar Registration Link:
https://us02web.zoom.us/webinar/register/WN_mDKa44klRh6SGFv5prR2xg
HOUSTON
PARKS BOARD
#ParksByYou
HOUSTON
WILDERNESS
It's Our Nature

HOUSTON WILDERNESS
It's Our Nature



Websites

www.HoustonWilderness.org

www.GulfHoustonRCP.org