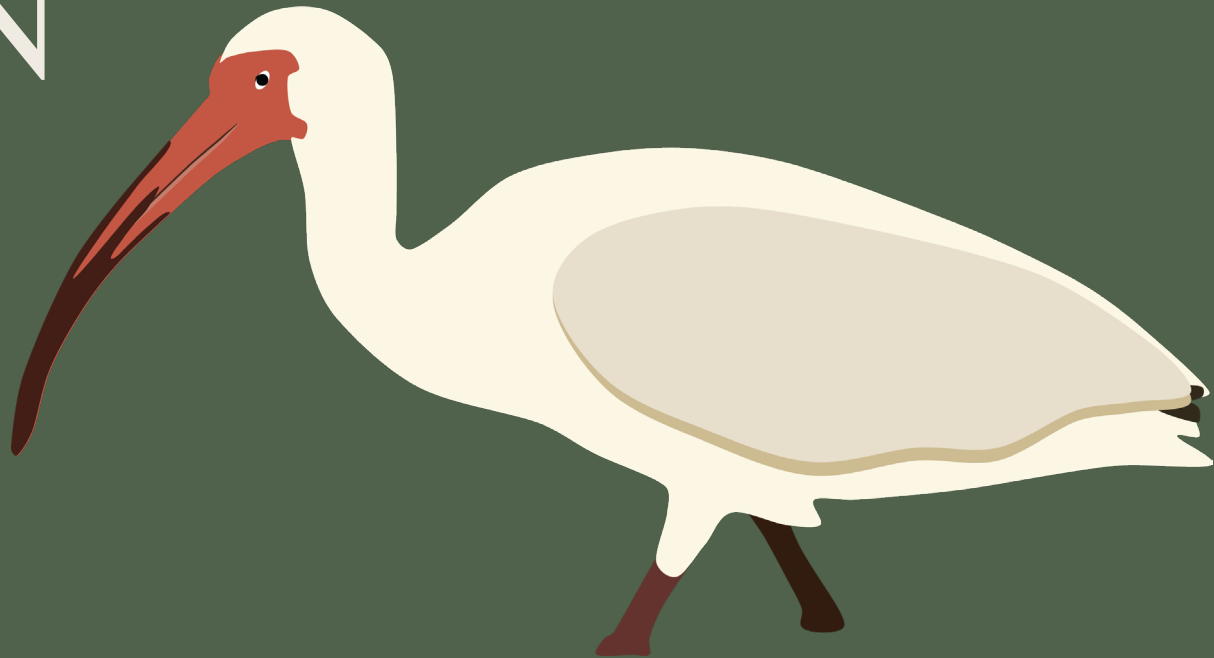


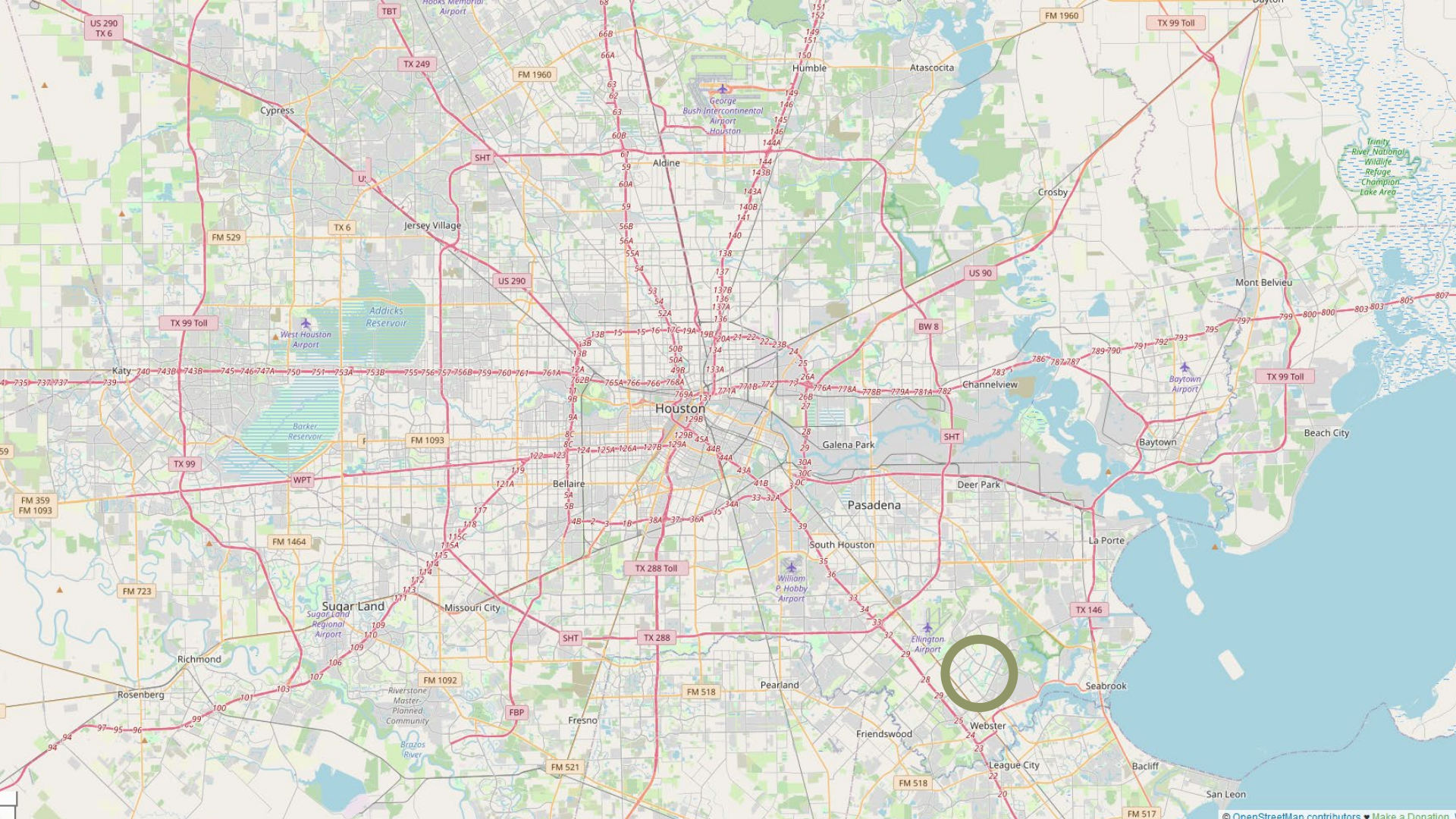
# EXPLORATION GREEN



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*A quick intro*  
*-Jennifer Morrow-*

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US 290  
TX 6

Cypress

TX 249

FM 1960

Humble

Atascocita

TX 99 Toll

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SHT

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TX 6

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West Houston Airport

Addicks Reservoir

US 290

US 90

Mont Belvieu

Trinity River National Wildlife Refuge  
Champion Lake Area

Katy 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Trinity River National Wildlife Refuge  
Champion Lake Area

Katy 740-743B-743B-745-746-747A-750-751-753A-753B-755-756-757-756B-759-760-761-761A-12A-12B-12C-12D-12E-12F-12G-12H-12I-12J-12K-12L-12M-12N-12O-12P-12Q-12R-12S-12T-12U-12V-12W-12X-12Y-12Z-13A-13B-13C-13D-13E-13F-13G-13H-13I-13J-13K-13L-13M-13N-13O-13P-13Q-13R-13S-13T-13U-13V-13W-13X-13Y-13Z-14A-14B-14C-14D-14E-14F-14G-14H-14I-14J-14K-14L-14M-14N-14O-14P-14Q-14R-14S-14T-14U-14V-14W-14X-14Y-14Z-15A-15B-15C-15D-15E-15F-15G-15H-15I-15J-15K-15L-15M-15N-15O-15P-15Q-15R-15S-15T-15U-15V-15W-15X-15Y-15Z-16A-16B-16C-16D-16E-16F-16G-16H-16I-16J-16K-16L-16M-16N-16O-16P-16Q-16R-16S-16T-16U-16V-16W-16X-16Y-16Z-17A-17B-17C-17D-17E-17F-17G-17H-17I-17J-17K-17L-17M-17N-17O-17P-17Q-17R-17S-17T-17U-17V-17W-17X-17Y-17Z-18A-18B-18C-18D-18E-18F-18G-18H-18I-18J-18K-18L-18M-18N-18O-18P-18Q-18R-18S-18T-18U-18V-18W-18X-18Y-18Z-19A-19B-19C-19D-19E-19F-19G-19H-19I-19J-19K-19L-19M-19N-19O-19P-19Q-19R-19S-19T-19U-19V-19W-19X-19Y-19Z-20A-20B-20C-20D-20E-20F-20G-20H-20I-20J-20K-20L-20M-20N-20O-20P-20Q-20R-20S-20T-20U-20V-20W-20X-20Y-20Z-21A-21B-21C-21D-21E-21F-21G-21H-21I-21J-21K-21L-21M-21N-21O-21P-21Q-21R-21S-21T-21U-21V-21W-21X-21Y-21Z-22A-22B-22C-22D-22E-22F-22G-22H-22I-22J-22K-22L-22M-22N-22O-22P-22Q-22R-22S-22T-22U-22V-22W-22X-22Y-22Z-23A-23B-23C-23D-23E-23F-23G-23H-23I-23J-23K-23L-23M-23N-23O-23P-23Q-23R-23S-23T-23U-23V-23W-23X-23Y-23Z-24A-24B-24C-24D-24E-24F-24G-24H-24I-24J-24K-24L-24M-24N-24O-24P-24Q-24R-24S-24T-24U-24V-24W-24X-24Y-24Z-25A-25B-25C-25D-25E-25F-25G-25H-25I-25J-25K-25L-25M-25N-25O-25P-25Q-25R-25S-25T-25U-25V-25W-25X-25Y-25Z-26A-26B-26C-26D-26E-26F-26G-26H-26I-26J-26K-26L-26M-26N-26O-26P-26Q-26R-26S-26T-26U-26V-26W-26X-26Y-26Z-27A-27B-27C-27D-27E-27F-27G-27H-27I-27J-27K-27L-27M-27N-27O-27P-27Q-27R-27S-27T-27U-27V-27W-27X-27Y-27Z-28A-28B-28C-28D-28E-28F-28G-28H-2



**Total Acreage = 200**

**Ponds = 38 acres**

**Wetlands = 39 acres**

**Paved Trails = 6 miles**

**Over 4,000 Native Trees**

**150,000 Wetland Plants**

**Water Storage Capacity**

**500,000,000 gallons**



Built for resilience, embraced by the community.  
Protecting homes and connecting people.



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# *The History*

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Bay Area Blvd. at Space Center Blvd.

# FLOODING IN CLEAR LAKE



# TIMELINE

2005

Two hydrology studies are commissioned, and it confirms current flooding issues and proved more extreme events would cause significant damage in the Clear Lake area..

2005

The nearly 200 -acre Clear Lake Golf Course is defunct, and developers are interested in acquiring the property. Adding this much concrete without responsible detention would have been detrimental to the area.

2011

After much wrangling in a court case, the Clear Lake City Water Authority purchased the property for storm water detainment for about \$6.2M.

2012

Community engaged in determining future of the project through a series of townhall meetings.



# Former Clear Lake Golf Course



# TIMELINE

continued

2013

The master plan for a multi-use stormwater detention and nature park is presented to the public; the Conservancy is formed from volunteers interested from townhall meetings.

2014

A Conservation Easement is signed with the Galveston Bay Foundation to protect the property from development in perpetuity.

2015

Digging begins on Phase 1A;

A nursery is built to nurture tree saplings for later planting.

# TIMELINE

continued

2017

Hurricane Harvey hits. Phase 1 was about 80% complete when it was put to the test. It held up like a champ and performed as designed.

2017-  
2024

From 2017 to 2024, after phases were completed, 4 of the 5 phases have been Tropical Storm or Hurricane tested and have proven their value.

2023

The project is complete!

# CHALLENGES AND LOGISTICS



Original Build Plan: 20 years

Board of Directors Request: 5 years

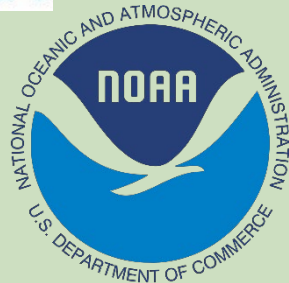
Completion Time: 8 years.

Since we had never done this before, the Phase 1 project was divided into three smaller sections, allowing us to learn and improve on the construction process before taking on a larger full section.





# PARTNERSHIPS



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*A quick intro*  
*-Matt Forster-*

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*Development &  
Maintenance*

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# GROWING THE GREEN SPACE

## **The Conservation Easement**

Trees

Pollinator gardens, prairie areas

Bird houses (blue bird, chimney swifts, purple martins), bat houses, bee boxes

Native grass cultivation



# GREEN SPACE MAINTENANCE

**The Reuse Line** – for irrigation and pond leveling

**Outflow maintenance:** clear debris, monitor dumping, manage spills, etc.

**Strategic mowing schedule**

**Invasive plant removal:** Chinese tallow, crepe myrtle, Brazilian vervain, plantain; Johnsongrass, Angleton bluestem, King Ranch bluestem

**Animal control:** Alligators and nutria, injured birds, unclaimed pets



# PREPARING FOR PEOPLE

**Hike-and-bike path:** dog sanitation, benches, port-a-johns, trash cans

**Parking lots:** lights, security, trash cans

**Public relations:** Signs, educating community



# MAINTAINING VISITOR EXPERIENCE

**General maintenance:** litter, trash pick-up, replace doggy bags

**Enforcing rules:** no fishing, dogs must be on leash, no overnight parking, no unauthorized vehicles

**Working with neighbors:** address illegal mowing and dumping

# LAND STEWARD TEAM



# STAFFING

## Clear Lake City Water Authority

- 1 Land Steward – 1
- 2 Full-time assistant – 1
- 3 Part-time assistant – 3
- Grass Crew – 4-6

### Responsibilities:

- Property Owner
- Maintenance
- Mowing
- Repairs
- Storm water quality (wetlands)
- Nuisance wildlife removal (aggressive alligators and invasive nutria)

Annual Operating Budget ~\$150,000

## Exploration Green Conservancy

- Executive board – 5
- Advisor board – 5
- Volunteers – community

### Responsibilities:

- Amenities upkeep (trails, benches, trees)
- Planting events
- Community events
- Organize volunteers
- Obtain grant and donations to continue funding amenities support

Annual Operating Budget ~\$50,000

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A quick intro  
- Abby Stanhouse -

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# The Design

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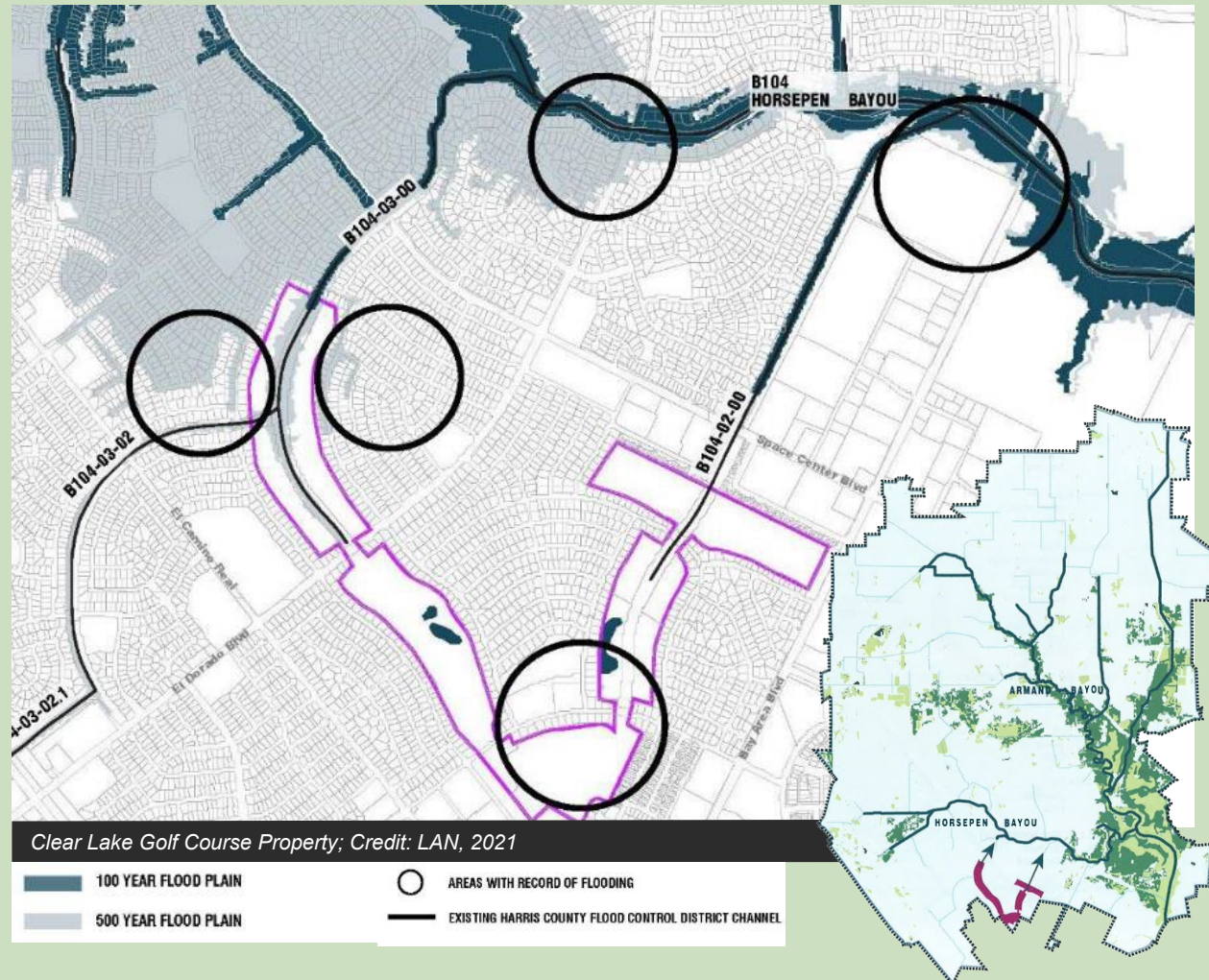
*Bay Area Blvd and Space Center Blvd, April 2009  
Credit: Exploration Green Conservancy*

# FLOODING IN CLEAR LAKE



*Reseda and Diana Lane, October 2013  
Credit: Exploration Green Conservancy*

# DRAINAGE PATTERNS



# Community Identified Goals

Ideas Collected through townhall meetings, surveys and volunteer citizen committee

- Green space
- Recreational and healthy lifestyle opportunities
- Ecological Benefits
- Educational benefits
- Use of nature to solve man-made issues
- Focal point for community gathering
- Means to encourage community engagements



# Planning and Design

- SWA Group prepared master plan
- Preliminary designs shared for feedback
  - › Upper Bank
  - › Trees
  - › Buffer Distance
- Coordination with Harris County Flood Control District
- Conservation easement established with the Galveston Bay Foundation



Exploration Green Masterplan, Credit: SWA Group, 2013

# Nature Based Solutions

Working with natural systems to provide more than flood mitigation

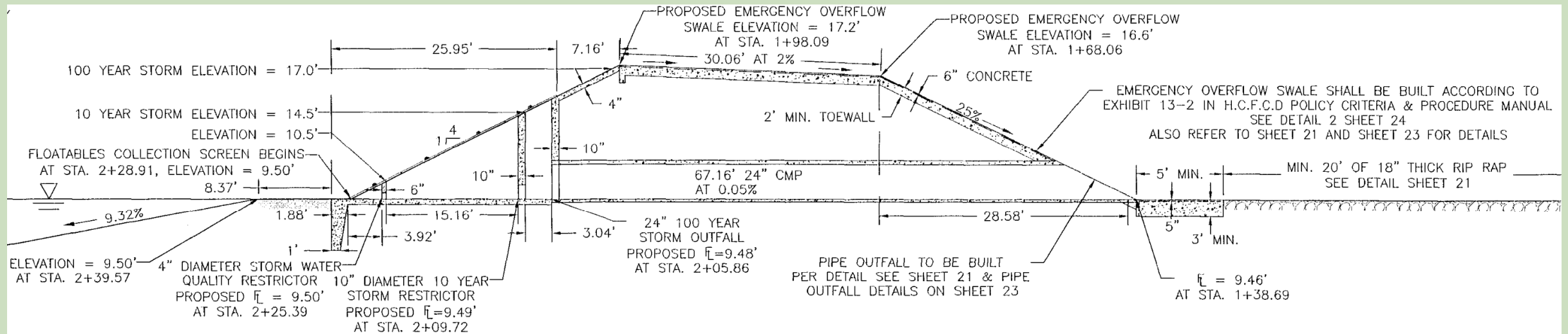
- Partnerships
- Water Quality Benefits
  - › Longer conveyance time
  - › Deep Pools
  - › Wetlands
- Natural Habitat
- Native Grasses



# Outfall Structure



Outfall Structure, Credit: LAN, 2018



Outfall Structure Detail – Section View, Credit: Lockwood, Andrews and Newnam (LAN), 2021

# Construction

## Phase 1, 2 and 4 Tested

- Harvey, Imelda and Beta
- Harvey Phase 1 80% complete
- Result Fast Track Project



*Normal Water Surface, July 2017*



*Hurricane Harvey, August 2017*



# Construction

## Phased

- Each five ponds separate
- Phase 1, 3 sub phases
- Reduce community impacts

Coordinate for Tree and Wetland Plantings and Reuse Irrigation System Install





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A quick intro  
- Rich Sommer -

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# Exploration Green Conservancy

*Nurturing Exploration Green as a natural space where wildlife and people thrive*



# PLANTINGS



## Trees

- Over 30,000 volunteer hours
- Planted more than 4000 native trees
- Over 50 species

## Wetlands

- 6100 volunteer hours
- 44,000 native plants
- 44 species
- 23 high school interns



# Trees



American Beautyberry  
American Elm  
American Fringe  
American Hornbeam  
American Sweetgum  
American Sycamore  
Bald Cypress  
Black Cherry  
Black Tupelo  
Bur Oak  
Buttonbush  
Cedar Elm  
Chickasaw Plum  
Chinkapin Oak  
Common Persimmon  
Compton Oak  
Eastern Cottonwood

Eastern Red Cedar  
Eastern Redbud  
Green Ash  
Laurel Oak  
Live Oak  
Loblolly Pine  
Mayhaw  
Mexican Plum  
Montezuma Cypress  
Nuttall Oak  
Overcup Oak  
Parsley Hawthorne  
Pecan  
Possumhaw Holly  
Red Maple  
Red Oak  
River Birch

Roughleaf Dogwood  
Rusty Blackhaw  
Senna  
Shumard Oak  
Southern Crabapple  
Southern Magnolia  
Strawberry Bush  
Sugarberry  
Swamp Chestnut Oak  
Turk's Cap  
Viburnum  
Water Oak  
Water Tupelo  
Waxmyrtle  
White Oak  
Winged Elm  
Yaupon Holly

# Wetlands



Opposite spot flower  
Valley redstem  
Aquatic milkweed  
Lemon bacopa  
Water hyssop  
Water canna  
Thin scale sedge  
Louisiana sedge  
Buttonbush  
Inland sea oats  
Swamp lily  
Jointed flatsedge  
Creeping burhead  
Upright burhead  
Mixed spikerush  
species  
Square-stem spikerush  
Mountain spikerush  
Blue mud plantain  
Woolly rose mallow  
Spider lily

Blue waterleaf  
S. blue flag / Dixie iris  
Soft rush  
Juncus spp.  
Round-headed rush  
Floating seedbox  
Spatterdock  
Yellow water lily  
White water lily  
Maidencane  
Pickerelweed  
Whitetop sedge  
Beaksedge  
Bulltongue  
Arrowhead  
Delta duck potato  
Lizard tail  
Three square  
Chairmaker sedge  
Bullrush  
Marsh hay

Gulf cordgrass  
Powdery thalia  
Eastern gamagrass

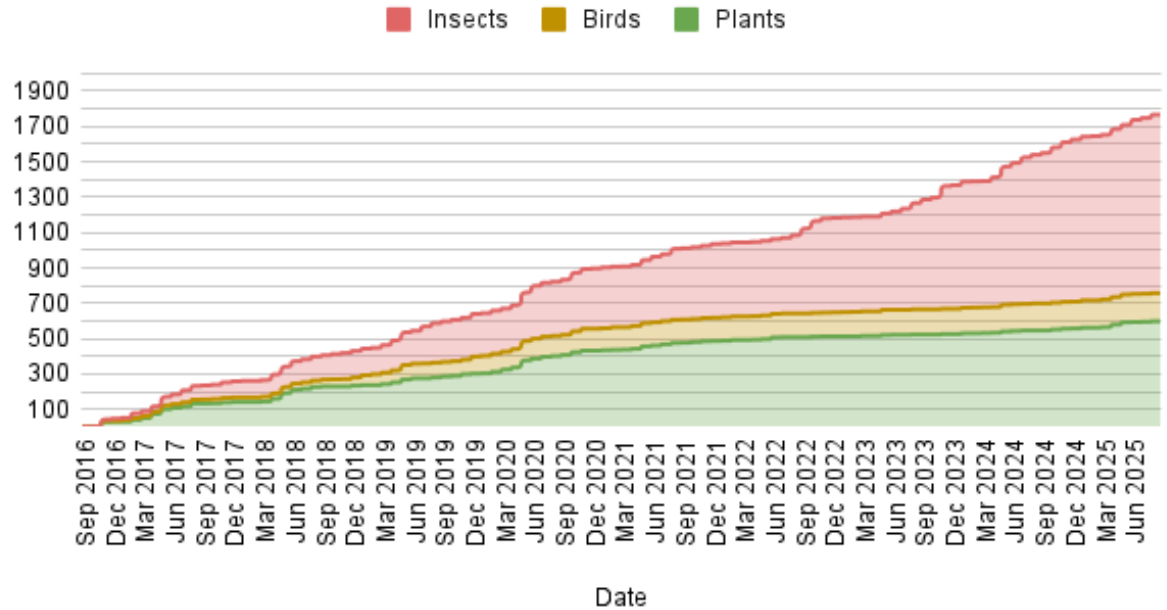


# Ecosystem Biodiversity

- **Benefits**
  - Ecosystem resilience and health
  - Provides wildlife habitat and host plants
- **1000+ species of insects**
- **13 species of fish observed**
  - Ponds not stocked
- **245 bird species (ebird data)**
  - More than 5x increase vs pre-2016 start of construction
- **4 habitat islands**
  - 1 rookery with 100's of nesting cormorants, herons, & egrets

# Ecosystem Biodiversity

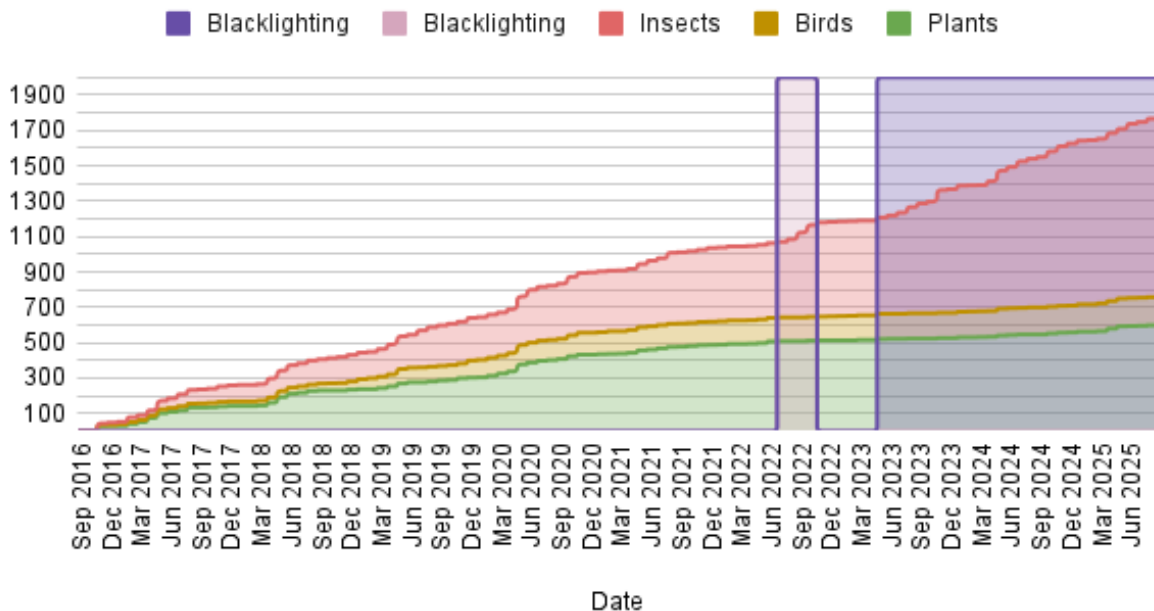
## Species Counts for Plants, Birds and Insects



iNaturalist data compiled by Brian Schrock

# Ecosystem Biodiversity

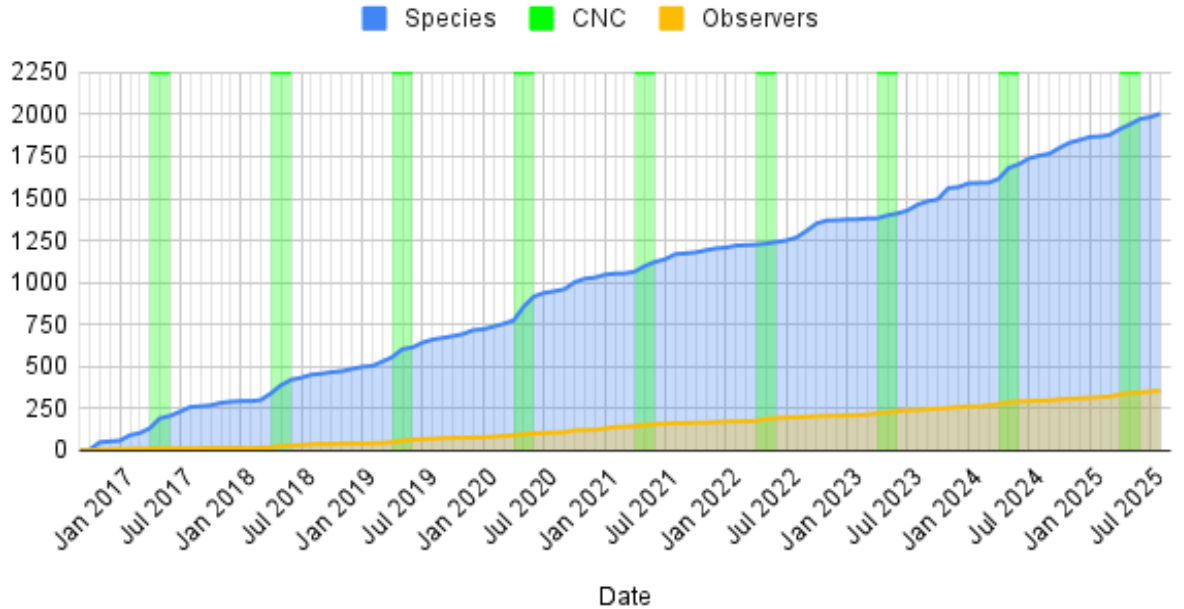
## Species Counts for Plants, Birds and Insects



iNaturalist data compiled by Brian Schrock

# Ecosystem Biodiversity

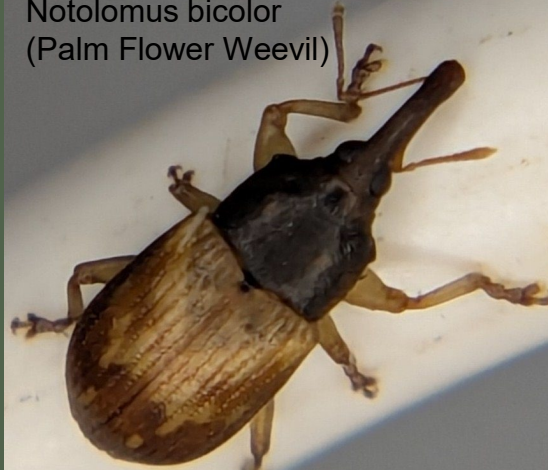
## Species and City Nature Challenge Events



iNaturalist data compiled by Brian Schrock

# A few obscure observations

*Notolomus bicolor*  
(Palm Flower Weevil)



Brian Schrock

*Euwallacea similis*  
(Bark Beetle)



Rich Sommer

*Amercaenis ridens*  
(Mayfly)



Mary Spolyar





# Frequent Residents

- Western Cattle Egret
- Anhinga
- Larger populations of White Ibis, Black-bellied Whistling-Duck and Neotropic Cormorants
- Summer breeding Swallow-tailed Kites, Purple Gallinule, & Limpkin

# Limpkin eating an Apple Snail



Rich Sommer



# Next Steps

- K-12 Education
  - Many nearby public and private schools
- Other Education and Outreach
- Healthy Community
  - 100's of people  
walk/run/bike through EG each day





# Next Steps

## K-12 Education

- Ponds
- Wetlands
- Riparian Trees
- Pollinator Gardens





# Next Steps

## Other Education and Outreach

### Current Programs

- Bird Walks
- Moth Nights
- Scout Merit Badge Days
- City Nature Challenge
- Wetland Walkabout (May)
- Squawk Walk (September)

### In Planning

- Nature hikes
- Insect hunts
- Bioblitz



## Contact Us

<https://www.explorationgreen.org>

[info@explorationgreen.org](mailto:info@explorationgreen.org)

Join our Newsletter



## Chronolog Stations

### Beautyberry Pond

<https://www.chronolog.io/site/EGC101>

### Bumblebee Pond

<https://www.chronolog.io/site/EGC102>

