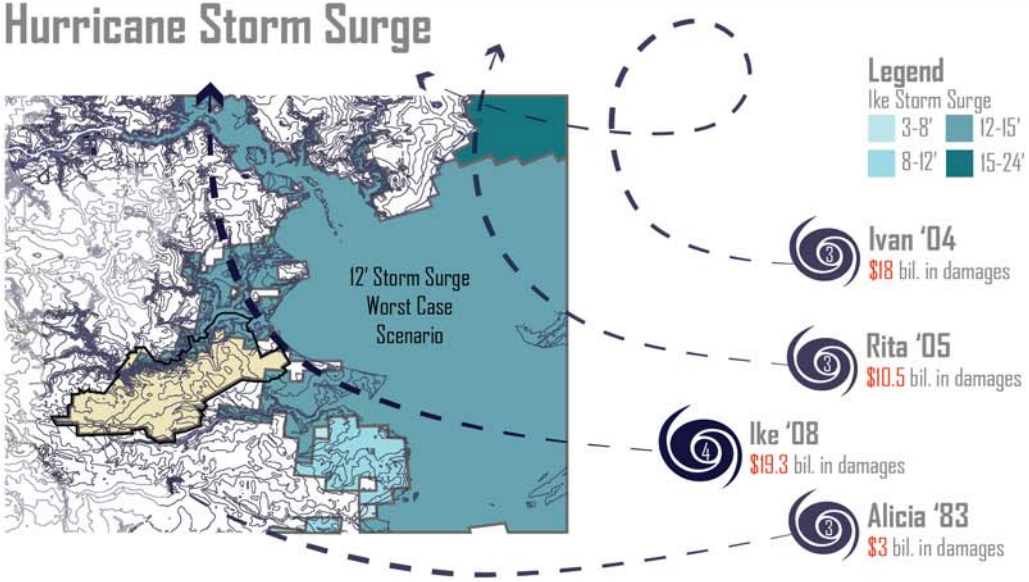
Alaina Parker
Claudia Pool
Maritza Sanchez
Molly Morkovsky
Phillip Hammond

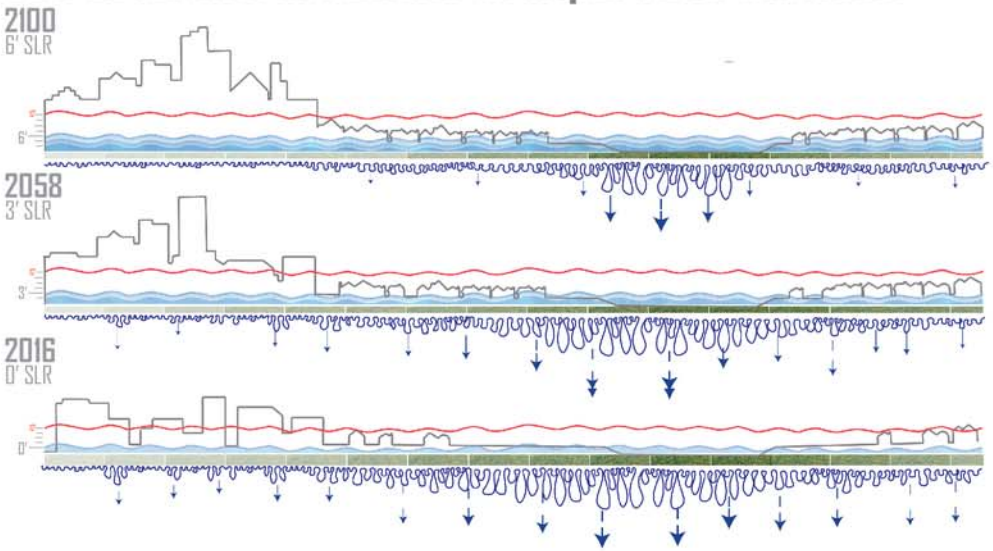
Location:

Regional Impact

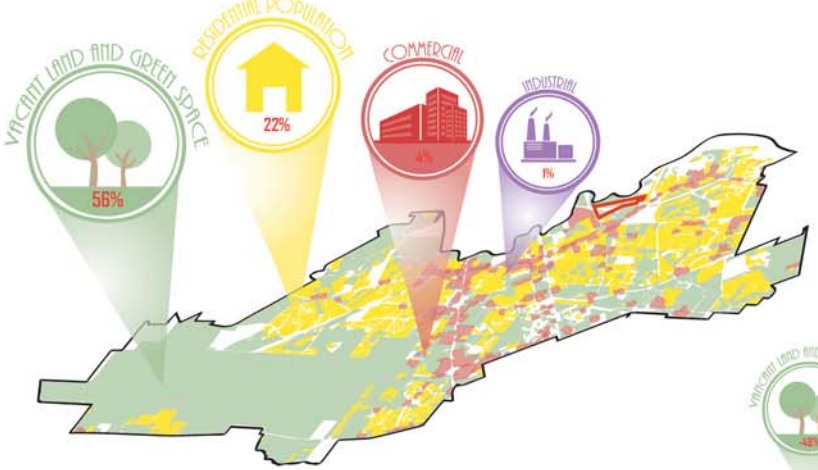
Hurricane Storm Surge



Sea-Level Rise in relation to Impervious Surfaces



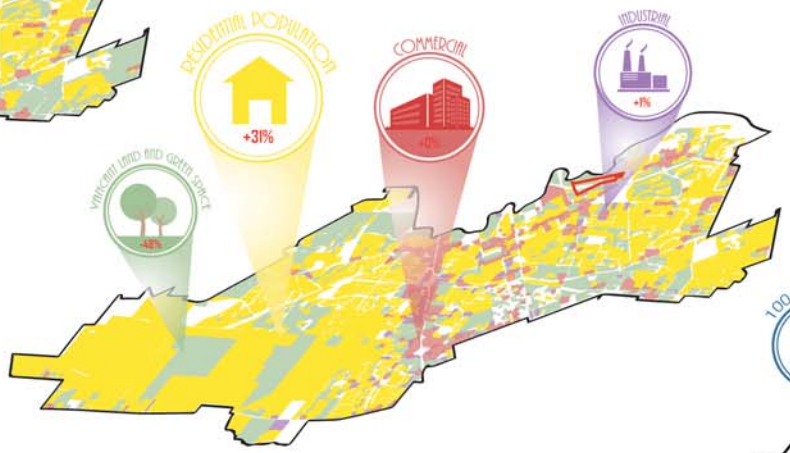
2016 Land Use Trends



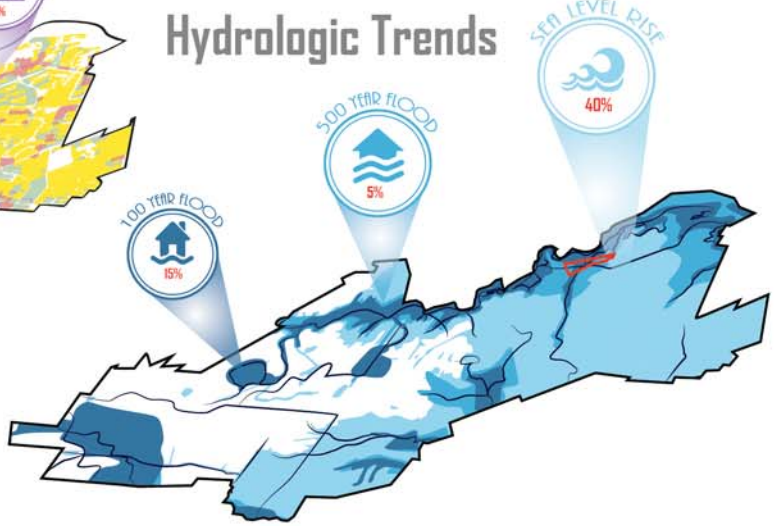
League city faces threats from climate change in the form of sea-level, increased storm surge, and threat of natural disaster. The **global frequency of hurricanes** is expected **to increase from 11% to 40% in 2100.** With **sea-levels projected to increase by 6' in 2100** League city will face not only **risk from larger storm surge** but also **increased risk of flooding as land cover becomes impervious** as the city continues to urbanize into the future.

By 2100 , sea-level rise will expand the flood plain to encompass over half of the city. If League City continues to develop at the current trend, it will be putting citizens in vulnerable living conditions.

2040 Land Use Trends



Hydrologic Trends

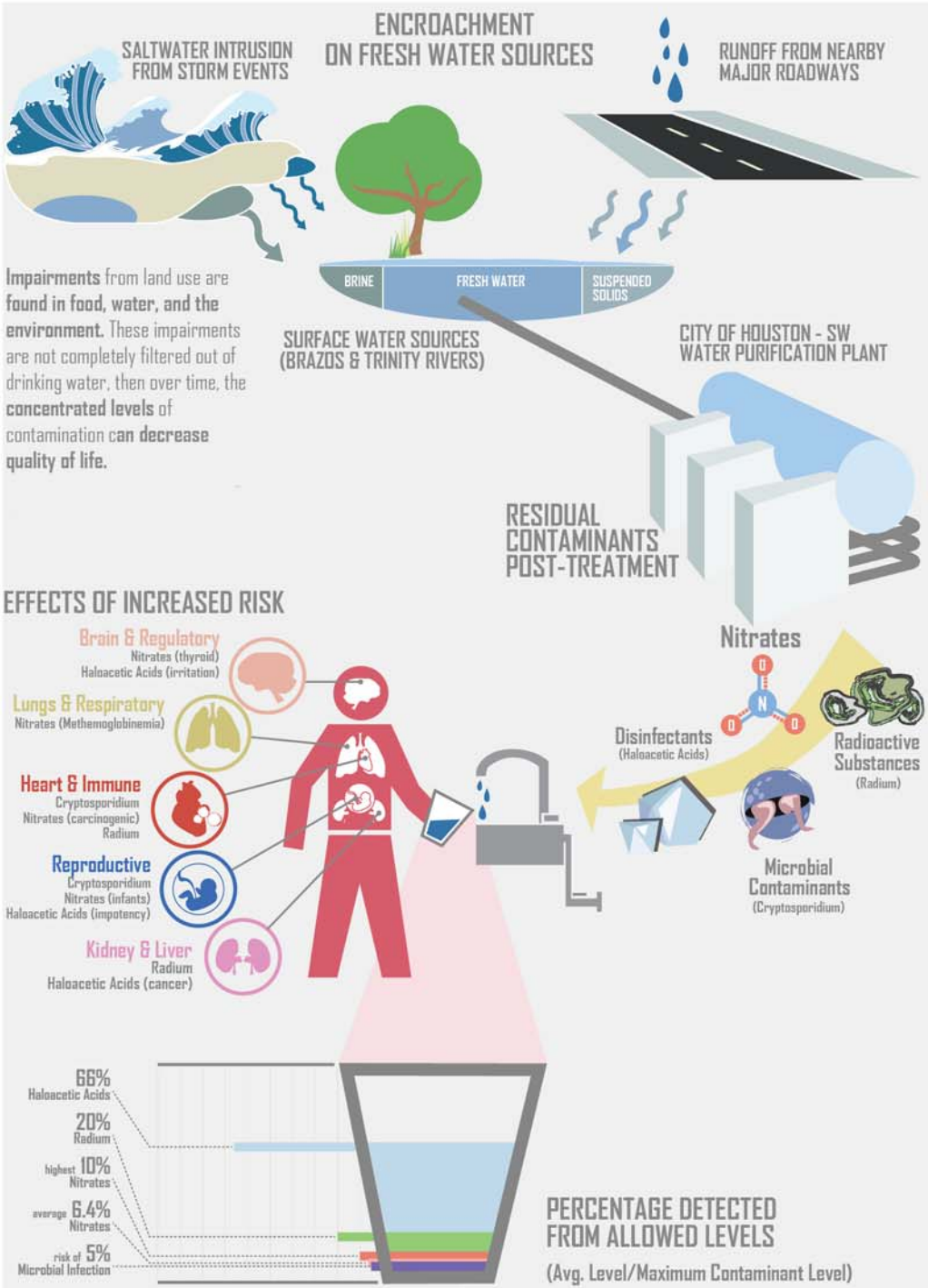


The **current population of League city is 91,000**, it is characterized as having mostly residential and vacant land. League city is characterized as a **bedroom community** where the majority of the **population lives in the city but commutes outside to work, shop, and recreate.**

By 2040 the population is forecasted to triple from 91,000 to over 275,000. If League City is to continue developing based on it's current land use trends, it is projected to develop over 50% land as residential with virtually no projected commercial or industrial growth.

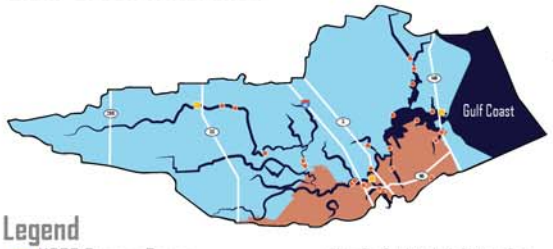
Regional Impact

Hazards to Public Health



Impaired Waterways

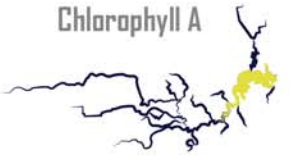
Clear Creek Watershed



Legend
- USGS Stream Gauge
- Monitoring Station
- League City

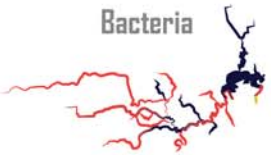
(Note: The Southern half of League City is located in the Dickinson Watershed)

Chlorophyll A



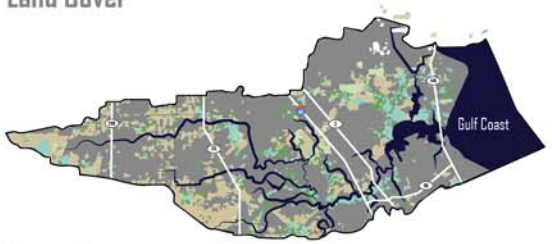
No Concern
Concern
Impairment

Bacteria



Low Dissolved O_2

Land Cover

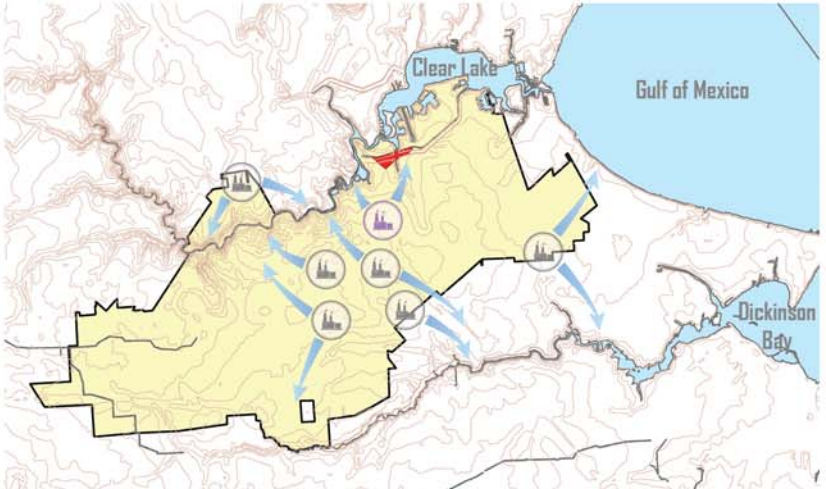


Legend
- Developed Land
- Agriculture
- Forest
- Grassland
- Wetland

Nutrient Loading

PCB/Dioxin

Direction of Polluted Runoff



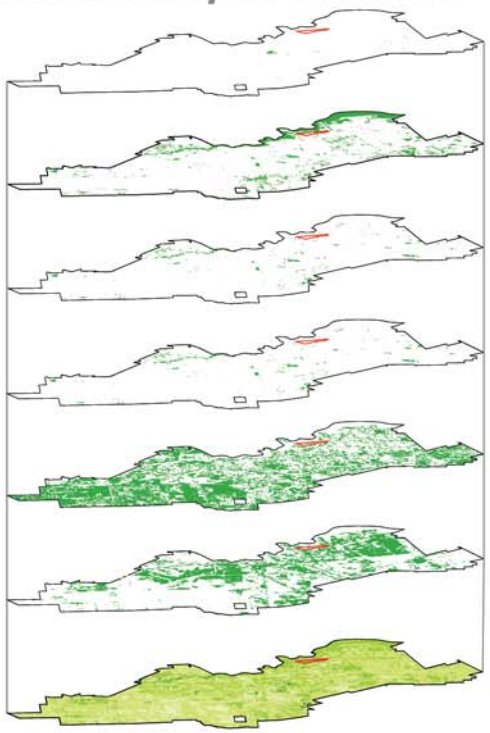
Industrial Area
Water Runoff

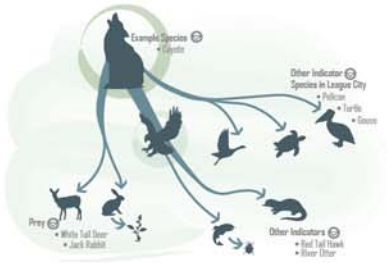
The **stormwater runoff from industrial areas** of League City **contains pollutants and chemicals** that **reduces the quality of drinking water.**

The site is influenced by Industrial Packaging Systems which produces plastic drums, steel drums, and plastic boxes.

Analysis of Natural Influences

Habitat Analysis & Context



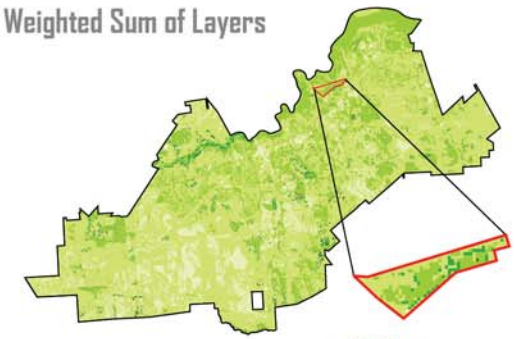


Indicator Species

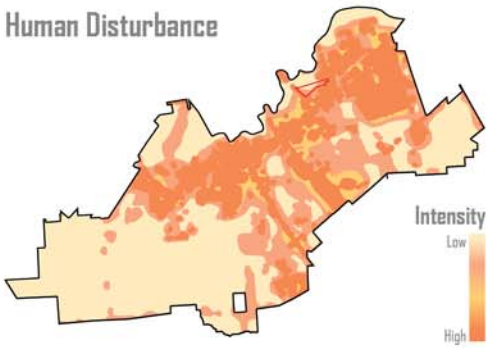
An **indicator species** signifies when a regional habitat possesses **qualities suitable** for other ecological or environmental conditions. This indication then can be used as a **predictor** for **biological capacity** and the presence of other commonly-associated species in the given area.

For League City's **habitat suitability**, a weighted sum of indicator species was created by taking USGS Gap Data for a wide array of species to **verify biodiversity** in the analysis. The sum indicates locations where a **healthy variety** of endangered wildlife, predators, prey, and pollinators can be found in concentration.

Weighted Sum of Layers

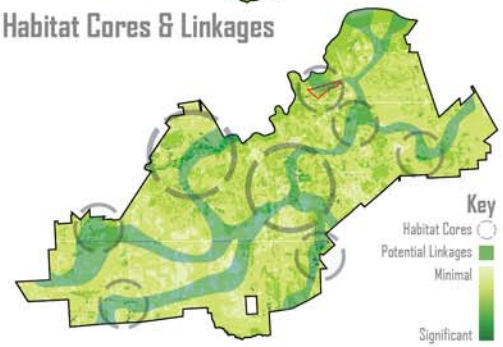


Human Disturbance



When the habitat concentrations are aligned next to the **disruptions from urban activities,** isolation of the habitat cores show apparent.

Habitat Cores & Linkages

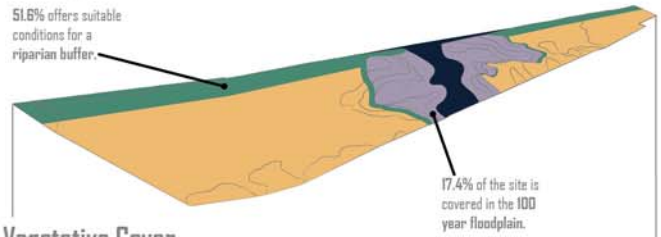


Relevance to the Site

Through identifying a **path of least disturbance** linking habitat cores, including the site, a map of **suggested linkages** or "eco-corridors" for League City can be inferred as shown.

Existing Site Conditions

Developable Land Bank

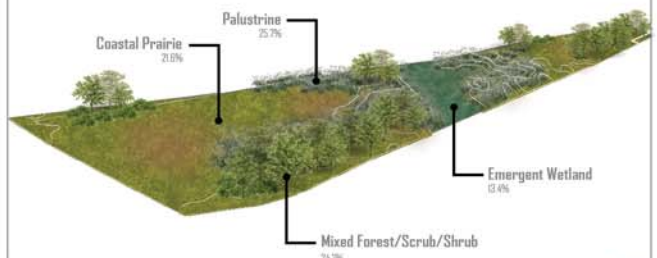


Flood Absorption
15 ft. to 100 ft. suitable

Eco-Corridors
100 ft. to 1650 ft. suitable

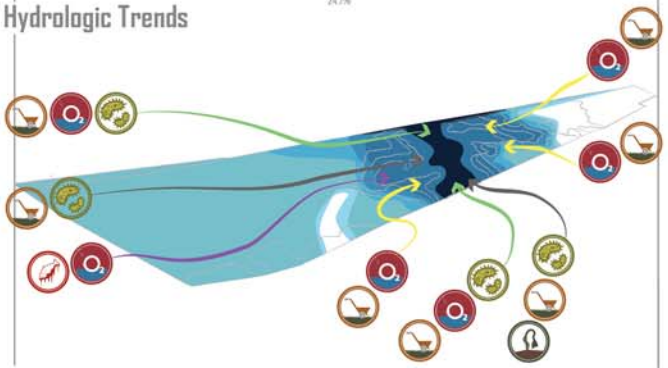
Legend
- Ideal Riparian
- Critical Absorption
- Undevelopable
- Developable
- Hydrography

Vegetative Cover



The site contains a **biodiverse mix of ecologies** that transition from wetlands to scrub forest. A greater emergence of cover can be found at **lower elevations**, **correlating** well with areas of **critical absorption** to be **remediated**.

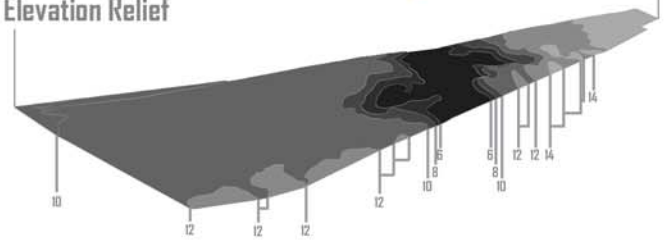
Hydrologic Trends



Legend
- Existing Water
- 100 Year Floodplain
- 2025 Sea Level Rise
- PCB/Dioxin
- Increased Chlorophyll A
- Low Dissolved Oxygen
- Increased Bacteria
- Nutrient Loading
- 2050 Sea Level Rise
- 2075 Sea Level Rise
- 2100 Seal Level Rise
- Agricultural Source
- Industrial Source
- Residential Source
- Impervious Source

As a **lowland site**, several types of **contaminants from runoff** reach the basin at its center. **Mitigation** by natural processes is pivotal to filtering out harmful substances prior to **returning to the hydrology**.

Elevation Relief



Legend
Elevations
0 ft.
+14 ft.

The Problem?

Flooding from **stormwater** and **hazard events** has **adverse effects** on the **ecology** of **natural and human processes** in **developed areas.** **Climate change** will **intensify** these **impacts.**

The Solution...

Intercept the **adverse effects** at the **source** to **ensure the health, safety, and welfare of** both **natural and human environments.**

REMEDIATION THROUGH SOURCE INTERVENTION

- TREATMENT OF ENVIRONMENTAL HAZARDS
- OMISSION OF POINT AND NON-POINT SOURCE POLLUTION
- REMEDIATION OF NATIVE ECOLOGIES
- ENHANCEMENT OF SUITABILITY AND INTERACTION

Re.S.T.O.R.E. Implementation

Design Framework

COMMERCIAL
1. RESTAURANT/RETAIL CENTER
2. THE GROVE MIXED-USE
3. EGRET FOOD MARKET
4. RECREATIONAL SHOPS
5. HEALTH CENTER

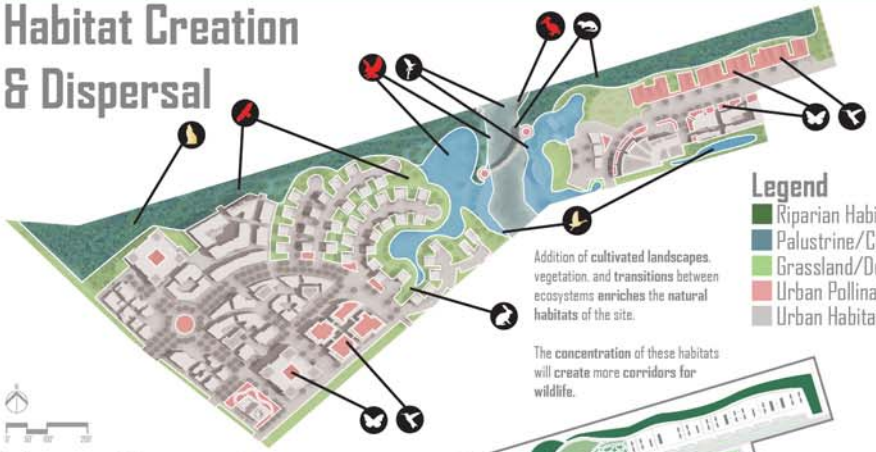
RESIDENTIAL
6. THE MARTIN HOUSE APARTMENTS
7. THE WEDGE TOWNHOMES
8. THE SLICE EFFICIENCY HOUSING

PUBLIC
9. ReSTORE VISITOR CENTER
10. 'THINKERY' CHILDREN'S MUSEUM
11. PARKING GARAGE
12. GOOD EATS COMMUNITY GARDEN

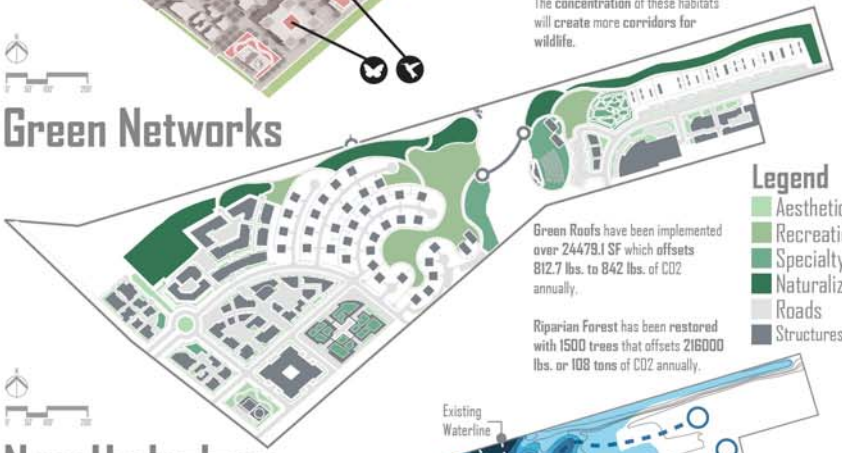
RECREATION
13. BIRD'S NEST AVIARY
14. BIRD WALK PEDESTRIAN BRIDGE
15. GREEN SIEVES WATER TREATMENT PONDS
16. PECKING GROUNDS FOOD TRUCK PARK
17. THE EMBANKMENT AMPHITHEATER

Design Schematics

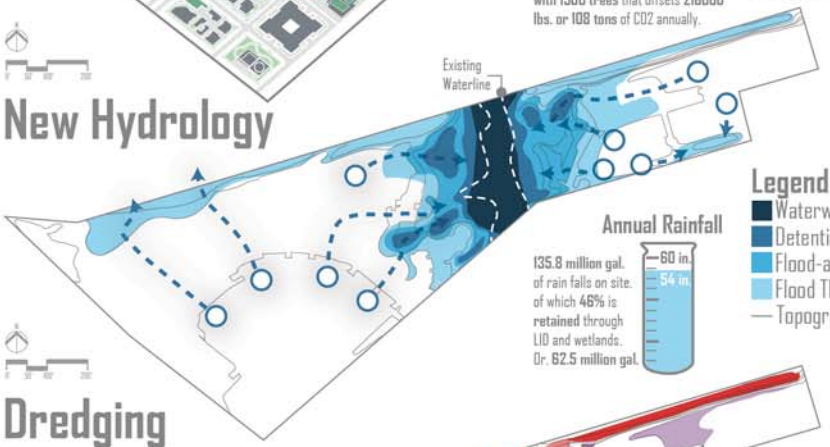
Habitat Creation & Dispersal



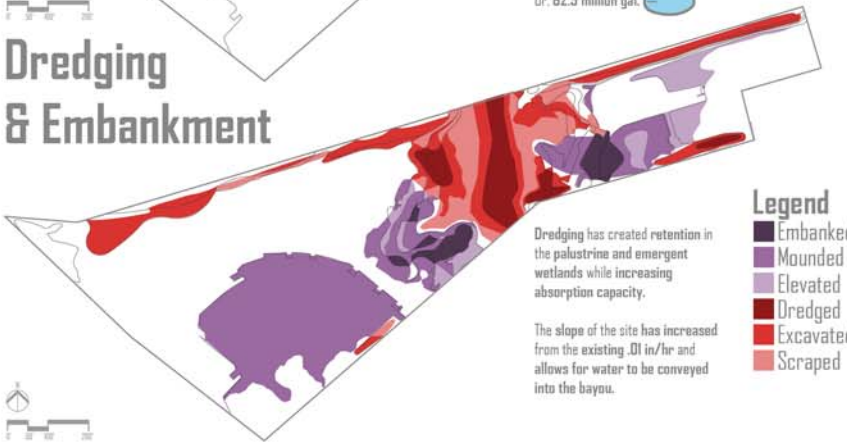
Green Networks



New Hydrology

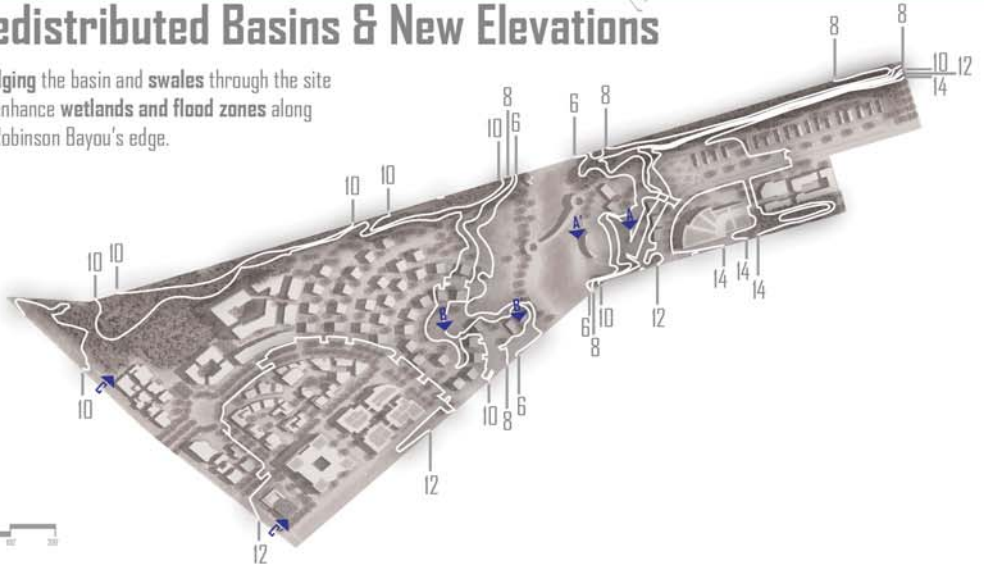


Dredging & Embankment

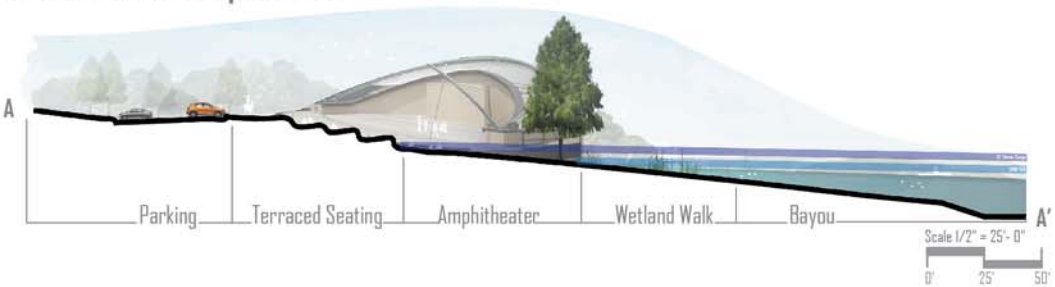


Redistributed Basins & New Elevations

Dredging the basin and **swales** through the site will enhance **wetlands and flood zones** along the Robinson Bayou's edge.



The Embankment Amphitheater

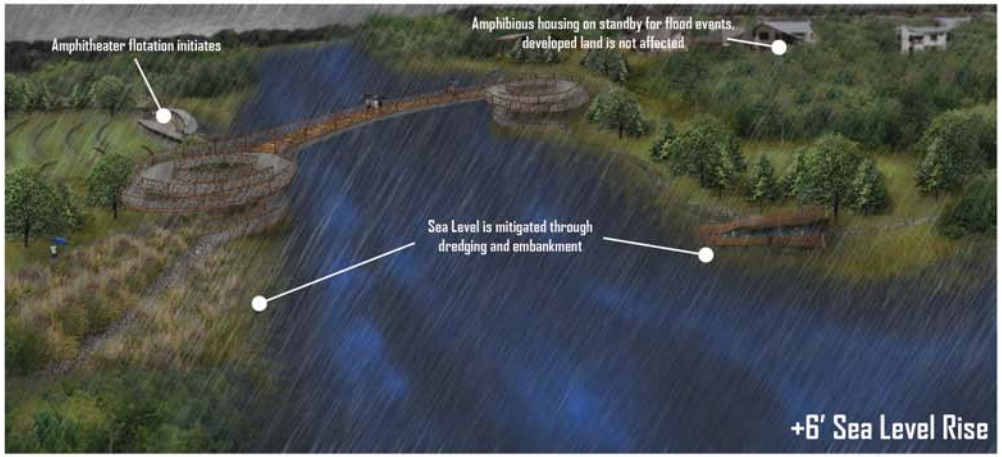


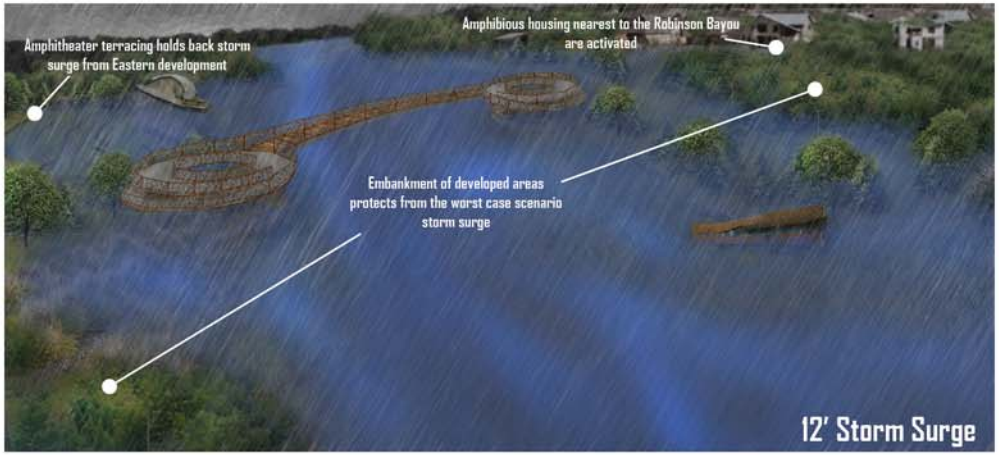
The Wedge Community

Commercial District

Flood Control Mechanisms & L.I.D.

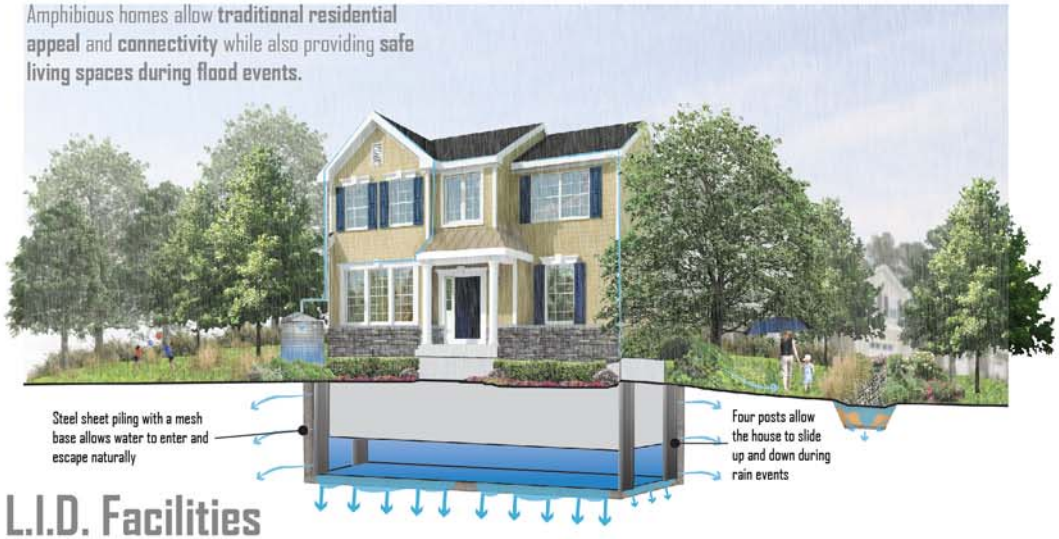
Non-Structural Dredging & Embankment





Structural Amphibious Housing

Amphibious homes allow **traditional residential appeal** and **connectivity** while also providing **safe living spaces during flood events.**



L.I.D. Facilities

The combination of **vegetated walls**, **pervious paving**, and **bioswales creates the eco-boulevard.** The boulevard **intercepts** and **conveys** storm-water to nearby detention ponds.

Riparian buffer reduces the potential for **erosion** and **pollutants** to **contaminate water sources.**

Pervious paving reduces and **distributes** storm-water volume, as well as encouraging **groundwater infiltration.**

Re.S.T.O.R.E. Legacy

Phase 1: Excavate & Establish

Phase 1 focuses on **establishment** of vital wetland habitats and constructing anchor developments to draw in community interest.

Additional **excavation** of land by dredging and embanking soils prepare the site for future development while **increasing treatment** and **retention capacity**.

Treatment

Site Absorption Capacity

8% Evaporation — 50% Runoff

41% Retained and Treated

Omission

Site Saturation Point

0" — 1" — 2" — 3"

Runoff Begins at **1.42 in.** rainfall

Revitalization

Site L.I.D. Proportion to Impervious Surfaces

5% Swales

75% Detention Basins

90% Pervious — 10% Impervious

Enhancement

Site Development

3% Public — 90% Green Space

2% Infrastructure

5% Commercial

Phase 2: Access & Inhabit

Increased **accessibility** comes with Phase 2 by adding parking, residential housing, and mixed-use development to the site.

Sensitive wetland ecologies have been planned around to allow for wildlife to **inhabit** the site, and also, help **reduce flood risk** from new urban developments by **increasing runoff absorption.**

Treatment

Site Absorption Capacity

16% Evaporation — 50% Runoff

34% Retained and Treated

Omission

Site Saturation Point

0" — 1" — 2" — 3"

Runoff Begins at **1.99 in.** rainfall

Revitalization

Site L.I.D. Proportion to Impervious Surfaces

30% Swales — 10% Green Roof and Gardens

15% Detention Basins — 45% Porous Pavers

62% Pervious — 38% Impervious

Enhancement

Site Development

4% Public — 15% Residential — 62% Green Space

6% Infrastructure

13% Commercial

Phase 3: Invest & Enhance

By **investing** all principles of resilient design, Phase 3 finishes development with **reduced runoff** and **improved saturation,** enhancing quality of life for humans and natural ecologies.

Through **enhanced** and **low-impact development**, the site creates a community for **all life** to live, work, and call home.

Treatment

Site Absorption Capacity

19% Evaporation — 47% Runoff

34% Retained and Treated

Omission

Site Saturation Point

0" — 1" — 2" — 3"

Runoff Begins at **2.40 in.** rainfall

Revitalization

Site L.I.D. Proportion to Impervious Surfaces

30% Swales — 10% Green Roof and Gardens

15% Detention Basins — 45% Porous Pavers

45% Pervious — 55% Impervious

Enhancement

Site Development

4% Public — 30% Residential — 45% Green Space

6% Infrastructure

15% Commercial