TENACITY  Tampa, Florida
Integrating Sea Level Rise and Urban Growth Prediction Modelling in Design Scenarios

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MLA 2020

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SCENARIO MAPPING
Pollutant Transfer & Bio-Effects

Biodiversity and Human Health at Stake

The site has TRI Facilities, Superfund Sites and almost 3.5 sqkm area is full of industries. These are point source pollutants contaminating the water resources. When there are storms events and floods the chemicals are washed off from these industries causing a threat to biodiversity and human health.

Coastal Wetlands
- Seagrass meadows
- Salt marshes
- Mangroves

Coastal Wetlands provide one of the most effective natural solutions for climate mitigation and long-term storage of CO2.

Some oysters from Tampa Bay were exposed to high paraquat burdens, periods of low water salinity, periods of starvation, as well as relatively high concentrations of toxicants.

West Indian (Florida) Manatee
Extremely vulnerable to habitat loss and overfishing

Seagrass Habitat
Extremely vulnerable to habitat loss and overfishing

33% Wetlands Lost
38% Low-salinity Marshes Lost
13% Mangrove Forests Lost
75% Seagrass Lost

FDA warns children, pregnant women and lactating moms to NOT eat any king mackerel due to their high mercury content.

3.5 sqkm Industry Area 4 Brownfield Sites 2 Landfill Sites 3 Superfund Sites 4 TRI (Toxic Release Inventories)
DESIGN SCHEMATICS
Land Transformation Modelling in GIS

Land Transformation Modelling

The LTM is a GIS-based tool used to predict land use examining relationship between structural drivers and land use changes. The LTM has a similar process to other regression-based prediction tools to observe relationships; however, it uses a machine learning approach to calculate complex patterns.

Scenarios

- Scenario 01: Business As Usual
- Scenario 02: Growth As Planned
- Scenario 03: Resilient Growth

Factors

Roads, Rivers and Lakes, Waterfront, Parks, Residences, Commercial, CBD, Existing Urban, Public School, Population Density, Population Increase, Slope, Employment, Poverty, Land value

Outputs

- Business As Usual: 1.70 sq km, 18.45%
- Growth As Planned: 1.39 sq km, 15.14%
- Resilient Growth: 0.72 sq km, 7.78%

Future Flood Risk

- Low: 90.5%
- High: 83.45%
- Extreme: 5%
PERFORMANCE
Impacts on Flooding

Scenarios:

1. Permeable Synthetic Turf
   - Berms to contain water and encourage groundwater penetration slowing down the runoff process.

2. Riparian Edge
   - Conserved and enhanced for acting as a buffer to contaminant transfer and also a natural sponge in flood scenarios.

3. Scenario 03
   - Various systems for infiltration and detention.