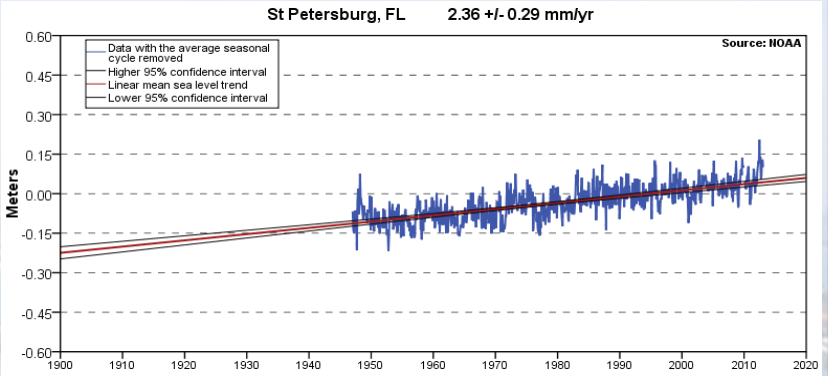
Tampa Bay's Vulnerability to Sea Level Rise

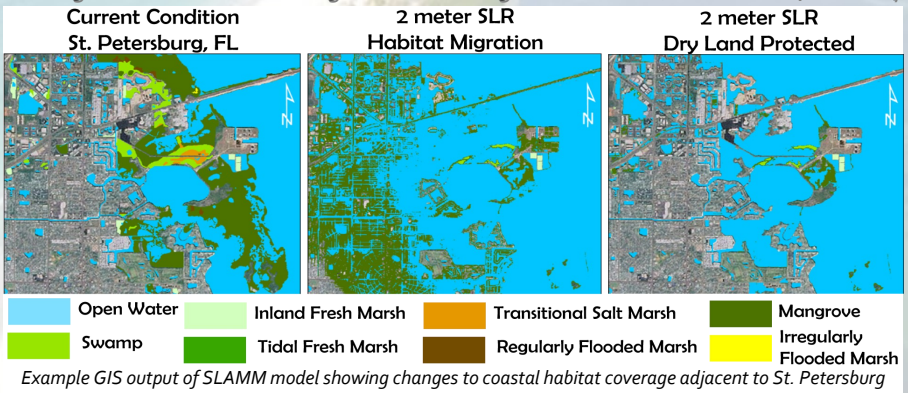
Background: The Tampa Bay Estuary Program has developed restoration and protection goals for critical coastal habitats (e.g., seagrass, mangroves, salt marsh, and salt barrens) found within the estuary. The goals are based on "Restoring the Balance" of these habitats to the proportions observed during a 1950 benchmark period. Climate change and rising sea levels have the potential to impact the persistence and restoration of these habitats in the future and therefore delay or prevent the achievement of these goals, particularly for salt marsh and salt barrens.



Current trend in sea level rise at the St. Petersburg tide gauge station (Source: NOAA).

Sea level has already been rising in Tampa Bay at a rate of about an inch per decade (see upper right figure). Accelerated sea level rise (SLR) and a warming climate have the potential to impact the ability of certain coastal habitats to maintain their current coverage within Tampa Bay.

Anticipated Changes: Coastal habitat coverage changes were simulated using the Sea Levels Affecting Marshes Model (SLAMM v. 6.01) under two future land management scenarios (protecting currently developed lands into the future vs. allowing coastal habitats to migrate with changes in sea level). In addition, a variety of sea level rise scenarios were simulated ranging from 40cm — 2.0m.



Example GIS output of SLAMM model showing changes to coastal habitat coverage adjacent to St. Petersburg and Weedon Island given a 2.0m sea level rise by 2100 & two different land management strategies.

Based on this modeling work, Tampa Bay is projected to become a more mangrove-dominated estuary in the future. Depending upon the future land management strategy implemented within the region, decreases in the total coverage of coastal habitats are also expected. The largest coverage losses are expected for coastal freshwater wetlands, salt marshes, and salt barrens.

Managing Our Future: The suite of estuarine habitats within Tampa Bay is a highly valued resource that provides ecological, aesthetic, socioeconomic and intrinsic benefits and vitality to the region. Local and regional efforts to sustain, restore and provide adaptation strategies for the continued benefit and enhancement of these coastal habitat resources is paramount for the Tampa Bay region. Future management is recommended, as follows:

Utilize Planning Tools

The TBEP and TBRPC developed a SLR Visualization Tool that allows managers to visualize different rates of SLR on coastal habitats and parcels within the Tampa Bay watershed. The hope is that land use managers and restoration practitioners will use the tool to plan for the future. The tool can be found here:

tampabay.wateratlas.usf.edu/TB_SLRViewer/

Restore Habitat Mosaics

Future restoration efforts should apply the lessons learned from large-scale ecosystem restoration efforts that have incorporated a mix of habitats into their designs. This type of restoration provides more functional benefit to the estuary and proactively offers coastal habitat resiliency towards any future SLR impacts – especially when coastal upland features are integrated into the design and allow for the future migration of tidal emergent wetlands into higher elevations.

Create Habitat Refugia

New restoration and land acquisition sites will need to be identified upslope of Tampa Bay's coast given SLR projections and anticipated coastal habitat and shoreline changes. For critical coastal habitats with specific niche elevation requirements (e.g. salt barrens that are only seasonally inundated by tide), it may be necessary to identify low-lying inland areas that could become available as salt barren habitat in the future and set these areas aside as future habitat refugia sites.

Background Image: Dorian Aerial Photographics, Inc.