EWN Engineering With Nature®

Idealized Green-Grey Infrastructure Optimzation

Problem

Selecting and designing infrastructure configurations to mitigate storm impacts while balancing the objectives of multiple stakeholders is a challenging open problem. Recent USACE directives encourage the use of natural infrastructure to achieve risk reduction alongside broadened social benefits, but current natural infrastructure knowledge is limited to site-specific locations and the consideration of natural infrastructure is often a complex and expensive task requiring detailed data gathering and numerical simulation.

A Partial Solution: EWN + iCOW

Ceres, et al. developed the island City on a Wedge (iCOW) tool to optimize the combination of traditional infrastructure measures by considering multiple "levers", e.g., building withdrawal, seawall construction, etc. This project will extend iCOW to include natural infrastructure such as reefs, wetlands, and living shorelines, permitting stakeholders to design near-optimal infrastructure configurations which can be further validated with certified simulations.

Value

This project will enable USACE and other planners to more reliably and easily assess complex cost-benefit tradeoffs when configuring flood mitigation plans by providing a transparent, easily modified, open-source, and statistically robust tool. It will equip stakeholders and municipalities to widen the aperture when considering flood mitigation plans in order to achieve risk reduction alongside additional community benefits.