Nature-Based Solutions to Building Resiliency

MIAMI WATERKEEPER®

Rachel Silverstein, Ph.D.

Executive Director and Waterkeeper

February 23, 2022

Nature and Nature-Based Solutions

Green Infrastructure Solutions

Working with nature to address societal problems

-Oxford University

Protecting, Restoring, Managing natural or semi-natural systems

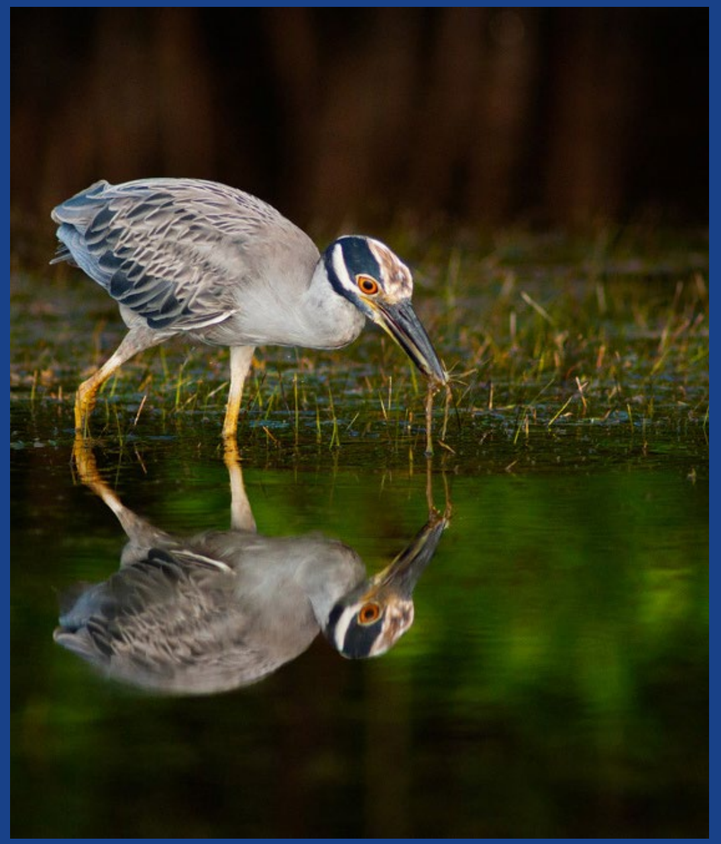
Benefitting Biodiveristy

Engaging community

Multiple Benefits

Examples of ecosystems with multiple benefits

Mangroves

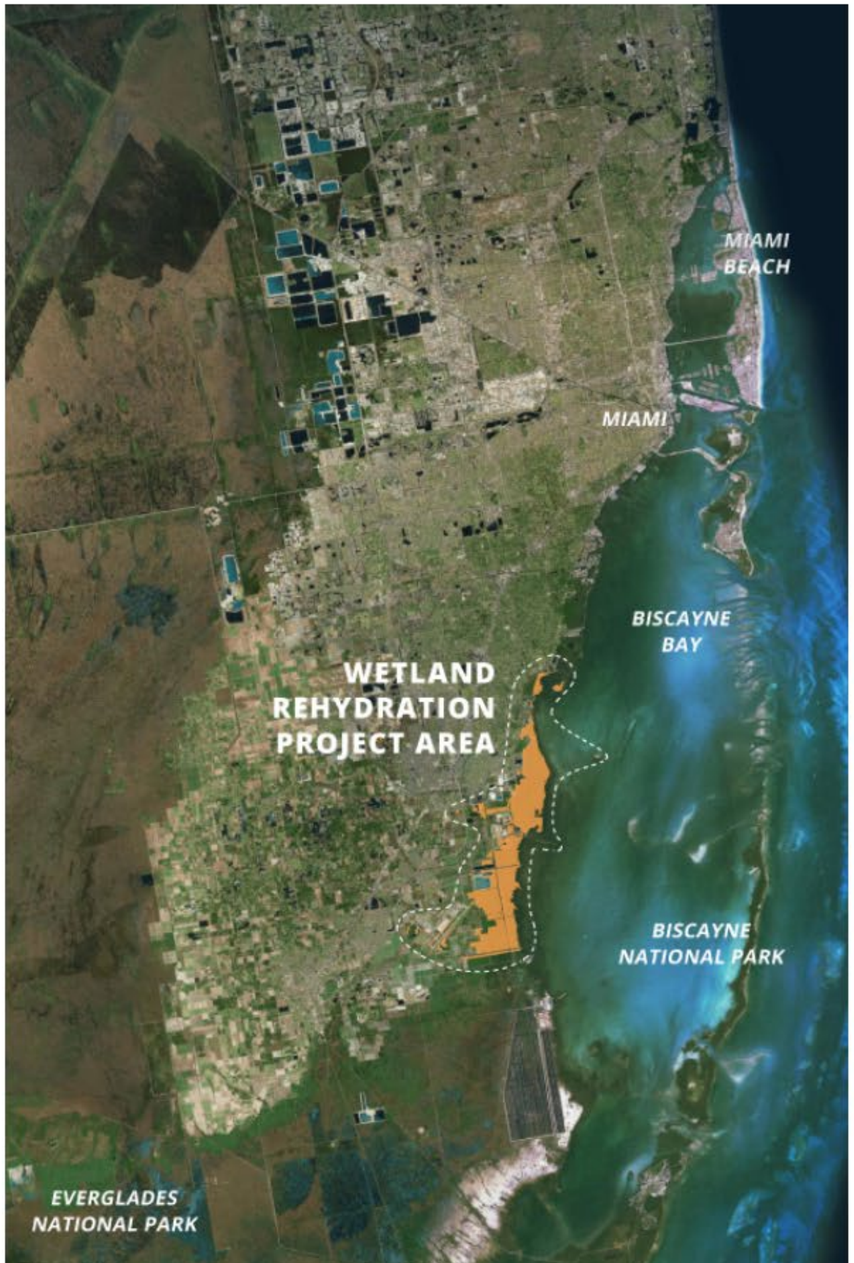


Marshes

Coral Reefs


But these benefits need to be quantified...
CONSTANCEMIERE

Valuation of Biscayne Bay with Earth Economics



HEALTHY **REHYDRATED WETLANDS ARE WORTH MORE THAN $3.3 BILLION** IN ECOSYSTEM GOODS AND SERVICES

LIVABLE COMMUNITIES **THRIVING ECOSYSTEMS**

Historically, rainfall an overland freshwater flows kept the waters of Biscayne Bay at low salinity levels, which enabled healthy ecosystems to thrive. Over the last 50-100 years, the Bay has become increasingly salty and has suffered lost productivity. Rehydrating Biscayne Bay's wetlands is a critical link in restoring its ecosystem health and function.

OPPORTUNITY FOR RESILIENCE

Resilience strengthens a community's ability to adapt and endure when faced with challenges of multiple scales - **threats to drinking water, major storms, aging infrastructure, coastal erosion, and rising oceans.**

Case Study: Miami's Back Bay Study

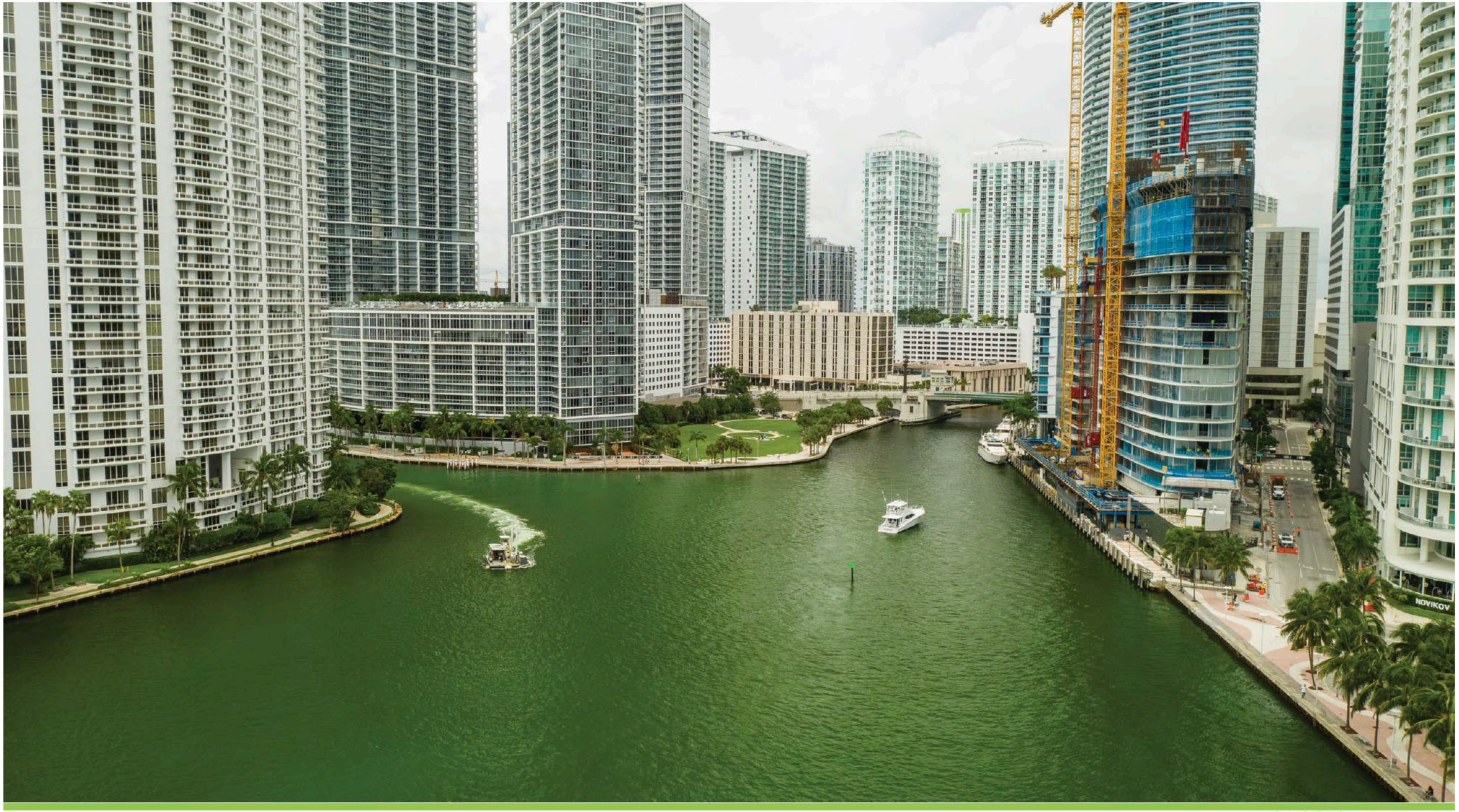
Directive by Congress for the Army Corps to study projects to address storm surge

MIami Herald

Curtis and
Rogers

Curtis and
Rogers

EXISTING CONDITIONS at Miami River



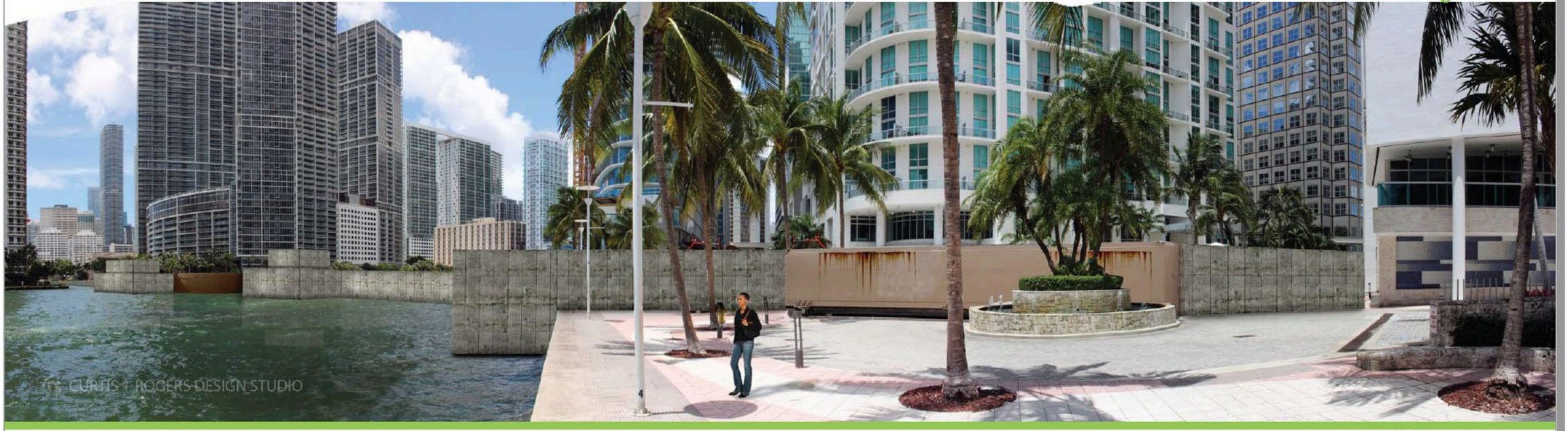
USACE BACKBAY TSP PROPOSED at Miami River

Rendering 5

EXISTING CONDITION at Miami River

USACE BACKBAY TSP PROPOSED at Miami River

Rendering 7



Sciences ENGINEERING ENVIRONMENTAL ECOLOGICAL

CUMMINS | CEDERBERG
Coastal & Marine Engineering

CURTIS+ ROGERS DESIGN STUDIO INC.

Fundamental challenges must be fixed.

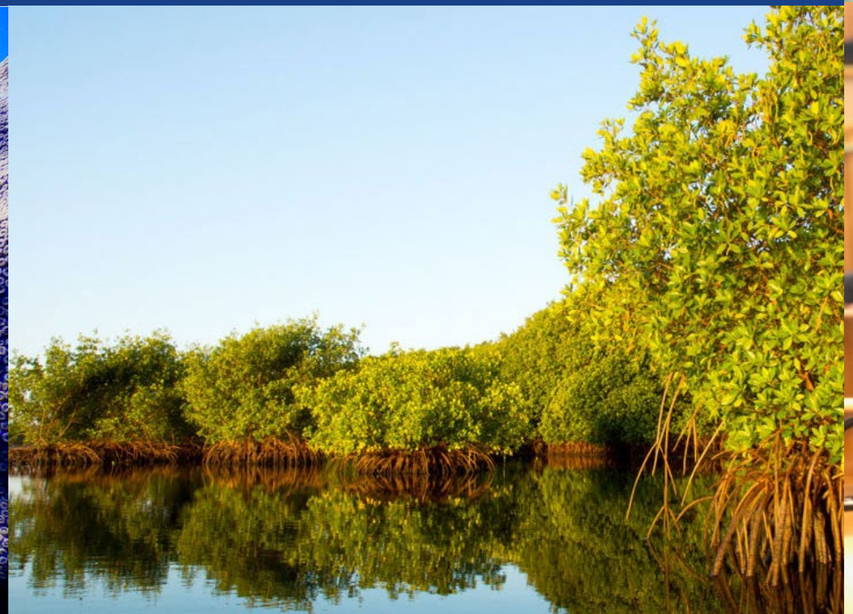
Change the cost-benefit analysis.

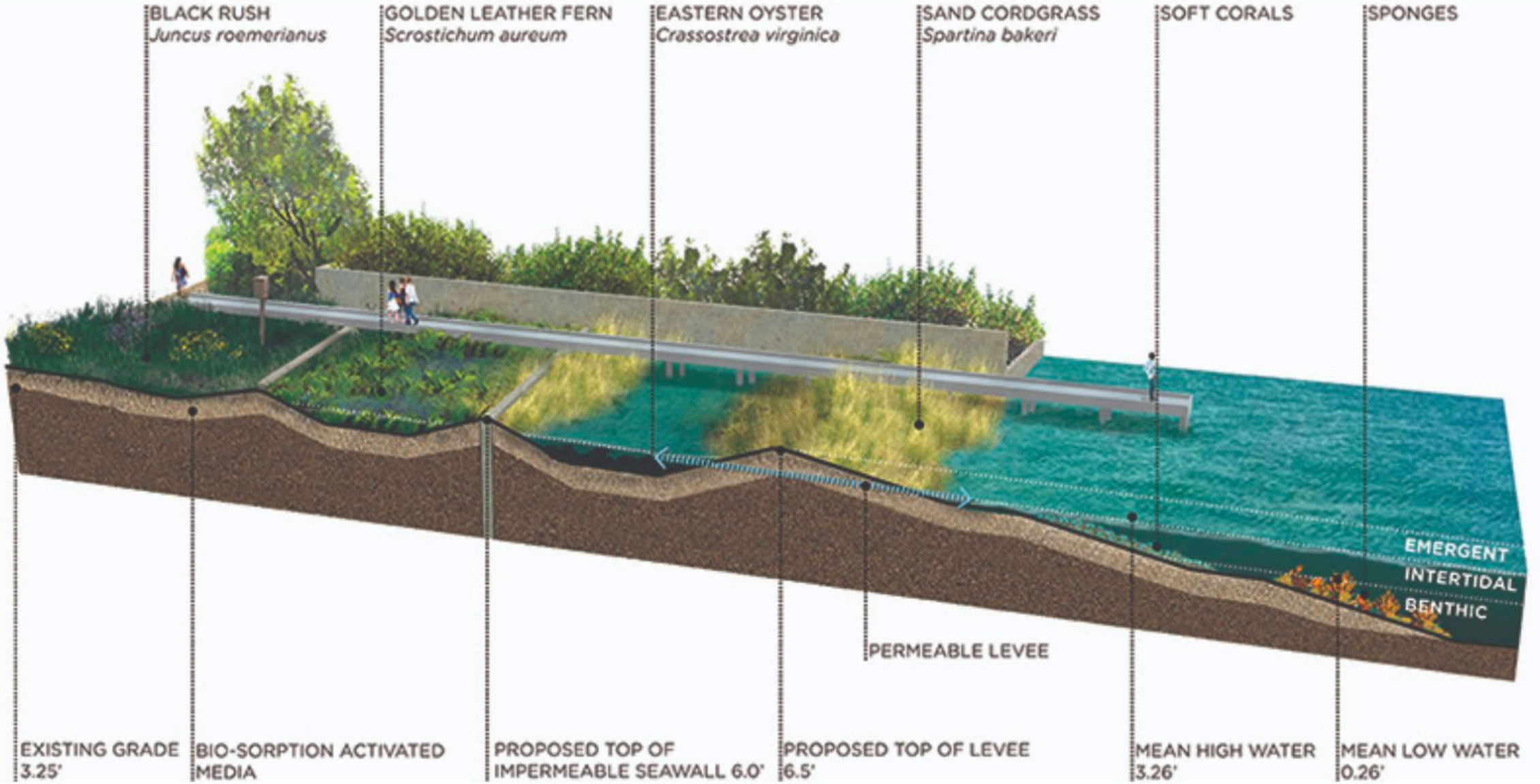
Include sea level rise.

Go beyond agency comfort zone.

What *do* we want?

A locally-preferred plan.



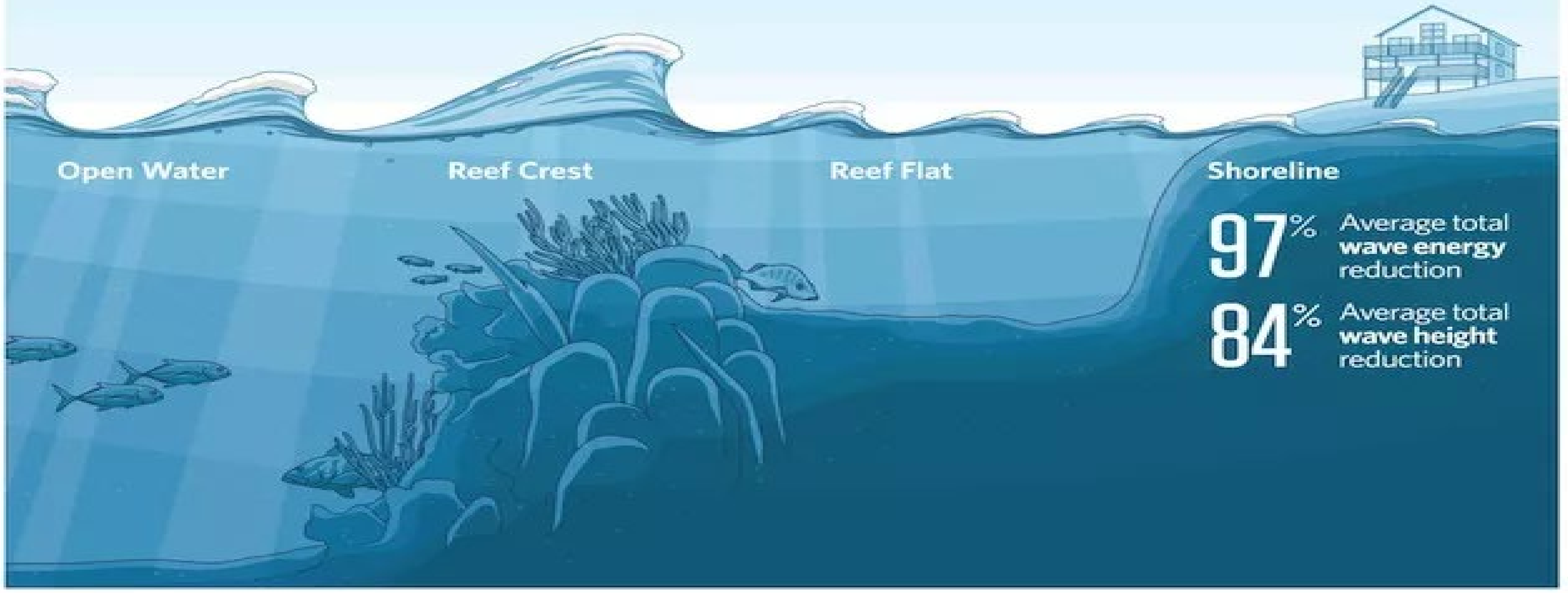


Local Office Landscape

Rescue a reef

Coral Reefs Reduce Wave Energy and Height

Coral reefs reduce wave energy by an average of 97 percent across all studies globally. The reef crest, or shallowest part of the reef where the waves break first, dissipates 86 percent of wave energy on its own. The whole reef reduces wave height by 84 percent.



Study Citation: Ferrario, F., M.W. Beck, C.D. Storlazzi, F. Micheli, C.C. Shepard, L. Airoldi. 2014. The Effectiveness of Coral Reefs for Coastal Hazard Risk Reduction and Adaptation. *Nature Communications*. Doi:10.1038/ncomms4794

A Locally-Preferred Plan: TBD, but should prioritize:

Sea level rise considerations.

Nature and Nature-based features

Community input, benefits, and equity.

Environmental and societal benefit.

Any questions?

www.miamiwaterkeeper.org
Instagram:
@miamiwaterkeeper
Twitter: @miamiwaterkpr
Facebook: @miamiwaterkeeper