

# Case Studies in Design Innovation

## Rebuild by Design – Six Winning Projects

### New York

Manhattan, Lower East side

South Bronx, Hunts Point

Staten Island, Tottenville

Nassau County, Mill River

### New Jersey

Meadowlands – Little Ferry/Moonachie/Carlstadt

Hudson River – Hoboken/Weehawken/Jersey City

# Case Studies in Design Innovation

Using Rebuild by Design as a lens to demonstrate design innovation focuses primarily on addressing flood risk.

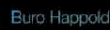
However, addressing other types of hazards such as wildfires, earthquakes, and tornadoes, can also be informed by the underlying principles and approaches employed here.



# THE BIG "U"

## REBUILD BY DESIGN

Promoting Resilience Post-Sandy Through Innovative Planning, Design, & Programming

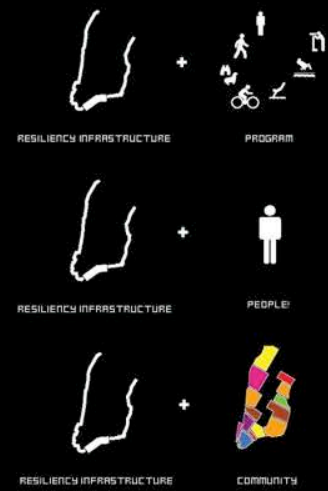


# THE BIG U - PRINCIPLES

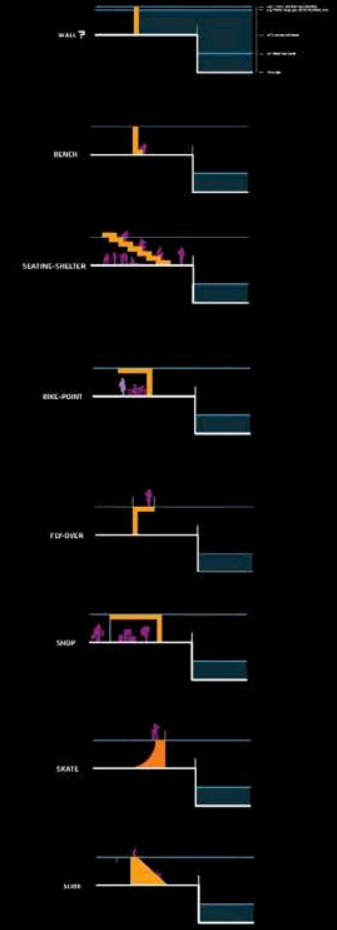


## TAILORED RESILIENCY

Design solutions for protection in the city become hybrid solutions, each custom tailored to their specific place, time and program. The artful combination of a classic engineered infrastructural element with desirable social functions of each community can produce an almost unnoticeable protection. There is something that is not so complex about protection. On the most basic level, the task is to make a barrier of a certain height. At the core of these design challenges is the requirement that it be done in a way that does not look like concrete barriers, but is an upgrade to the social and urban condition.



ROBERT MOSES      JANE JACOBS



## COMPARTMENT 1 (C1)

# EAST RIVER PARK



### INTRODUCTION

East River Park offers a chance to solve a simultaneous equation of surge protection, flood mitigation, and the long standing need for community access to the water, while investing in an underutilized strip of the park along the FDR. Building on the vision put forward in the 2013 East River Blueway Plan (page 63), the BIG U forwards a vision of a more accessible and ecologically sustainable waterfront that integrates vertical protection against East River flooding.

# LOWER EAST SIDE



## THE L.E.S. IS A RESERVOIR OF AFFORDABLE HOUSING.

The Lower East Side contains the largest concentration of public and affordable housing in Manhattan: nearly 14,000 of Manhattan's 53,890 NYCHA-run units are in CB3, and 39% of the 76,000 total housing units in the district are affordable (maintained through NYCHA, Mitchell-Lama, or other subsidies). The Lower East Side's affordable housing represents some of the last places where working-class and low-income residents can live in proximity to Manhattan's vast array of jobs and opportunities.

The oldest NYC public housing structures were built in the 1930s; the newest were built in the 1970s. Many of the buildings need repair; most were built according to a towers-in-the-park model that created cherished, if unimpressive, open space around the houses but also isolated them. That isolation has persisted; today, the majority of housing campuses include few (if any) retail or service establishments and are infrequently visited by nonresidents.



## THE L.E.S. LACKS SOCIAL INFRASTRUCTURE

Along the East River waterfront, where public housing structures cluster together, and transit stops are few and far between, the vibrant street life enjoyed by much of the Lower East Side dies out. Especially in the blocks dominated by NYCHA campuses, grocery stores, drugstores, medical offices, and community facilities (libraries, museums, etc.) are few and very far between. This forces the residents, who include many seniors and people with limited mobility, to travel further to meet their basic needs, despite limited transit access. Just as absence of transit access results in costly car dependency, spending more time procuring basic goods and necessary services (such as eviction counselling, interpretation services, etc.) leaves less time for work and childcare, and contributes to structural poverty.



# C1 PLAN

## 23RD STREET TO MONTGOMERY

### COMPONENTS:

**A**

**23RD STREET MEDIAN**  
.3 MILES

23rd Street acts as the northern boundary of the C1 compartment, connecting the vertical protection by the water's edge to higher elevations. Separating Hospital Row to the north from Peter Cooper Village to the south, this 90'+ wide roadway is reconfigured as a multi-modal green corridor that connects upland neighborhoods to the amenities and flood protections system along the waterfront. A generously sized median provides a safe, segregated bicycle lane and promenade. Built-in benches and planters enhance this as a social space and can support deployable flood gates during storm events.

**B**

**STUYVESANT COVE**  
.28 MILES

The existing park at the water's edge is extended beneath the elevated FDR, with pavilions housing food concessions and recreational programming. In preparation for storm events, deployable walls are inserted between the pavilions, creating a continuous line of vertical protection. Existing parking lots under the FDR are moved or stacked to free up land for rain gardens and public space.

**C**

**CON-ED FLYOVER**  
.43 MILES

Building off of the work of The Blueway Plan, this integrated bridge and levee transforms the tightest public passage along the East River into a wide thoroughway with ample connection to the upland neighborhood.

**D**

**EAST RIVER PARK - THE BRIDGING BERM**  
1.4 MILES

A system of undulating berms between the FDR and the Park protect the neighborhood from storm surge and rising sea levels, while supporting a series of frequent, generous pedestrian bridges from the neighborhood into the park and maintaining existing sports fields. These bridges link enhanced corridors in the upland neighborhood to new program elements along the East River. The berms support diverse new plantings, provide enhanced prospects on the park, and create the passive social spaces that residents have asked for on their waterfront.





C3



### EAST RIVER PARK REDUX

The Bridging Berm provides robust vertical protection for the neighborhood from future storm surge and rising sea levels, while providing pleasant and accessible routes into the park from the Lower East Side. Berms and bridges offer plentiful unprogrammed spots for resting, socializing, and enjoying the prospect offered over the park and river. Both berms and bridges are planted with a diverse selection of salt-tolerant trees, shrubs and perennials, providing a resilient urban habitat. Facing the FDR, the berm hosts a series of terraced pockets planted with tough urban species, which filter car exhaust and enhance the view from the highway.



BIG TERM

10TH ST. BRIDGE

BERM NICHES  
ALONG EXISTING TREES

RAMPS

BIKEWAY ALONG  
NEW BERMSCAPE

EXISTING SPACE WITH  
NEWLY REQUIRED PROGRAMS

GREEN BRIDGE

PLAZA

EAST RIVER PARK  
THE BRIDGING BERM

HARBOR BATH

MAINTAINED EXISTING  
SPORTS FIELDS



**THE EAST RIVER PARK BIKEWAY**

The East River Bikeway and park service road undulate with the base of the berm, creating diverse biking and jogging experiences. Benches wrap around existing trees, creating intimate seating nooks and preserving the park's canopy.

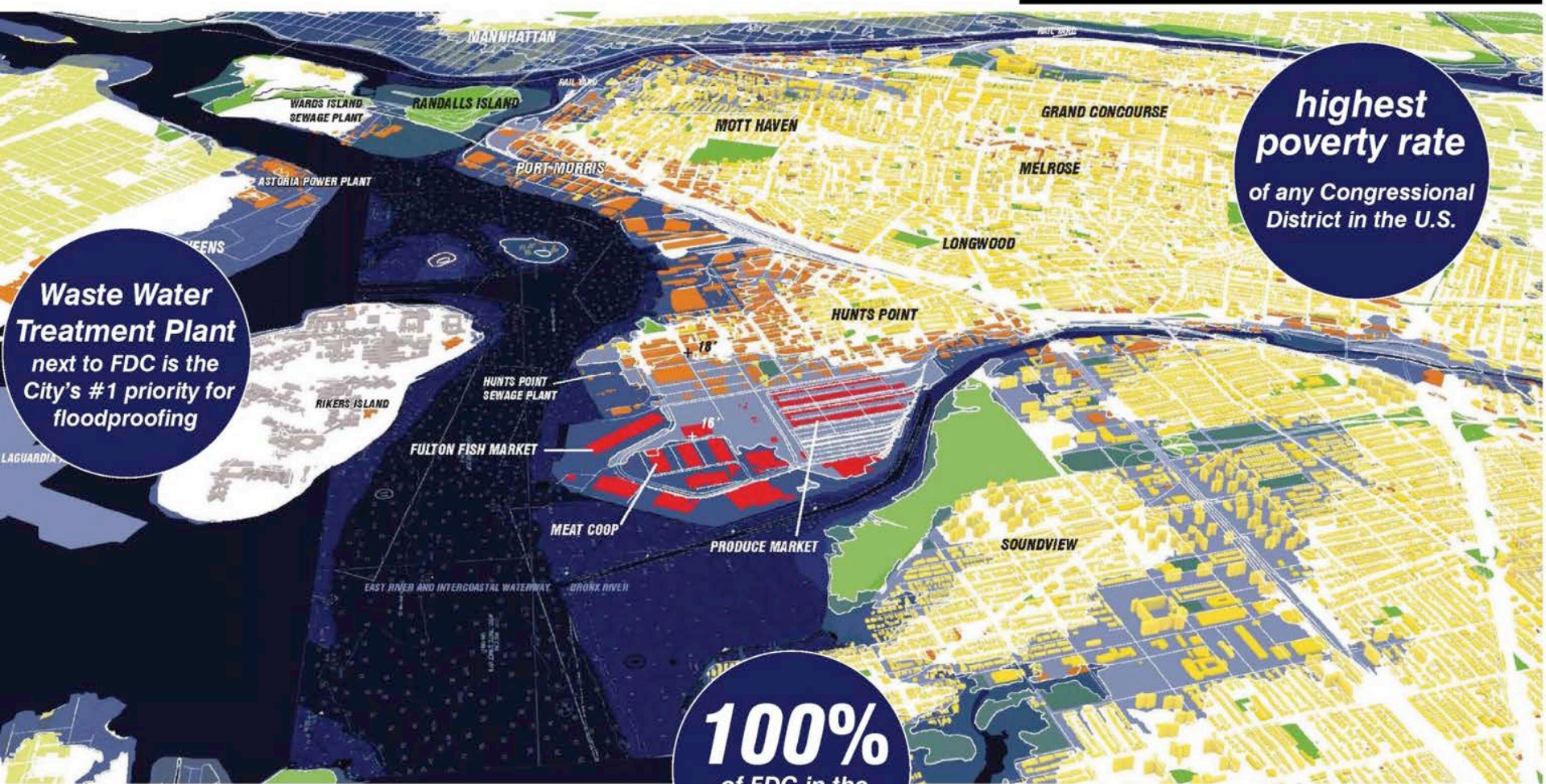




# LIFELINES

**PennDesign / OLIN**  
*HR&A Advisors*  
*eDesign Dynamics*  
*Level Infrastructure*  
*Barretto Bay Strategies*  
*McLaren Engineering Group*  
*Philip Habib & Associates*  
*Buro Happold*

# VULNERABILITY



Waste Water Treatment Plant next to FDC is the City's #1 priority for floodproofing

highest poverty rate of any Congressional District in the U.S.

100% of FDC in the floodplain by 2050

FLOOD COMPOSITE: WORKING AND LIVING  
2014 100 YEAR FLOOD  
2050 100 YEAR FLOOD  
HUNTS POINT FOOD DISTRIBUTION CENTER  
INDUSTRIAL BUILDING  
RESIDENTIAL BUILDING/TOWN



# 1 Integrated Flood Protection

- FLOOD PROTECTION, GREENWAY, LEVEE LAB AND ECOLOGIES

# 2 Livelihoods

- JOBS, ENTREPRENEURSHIP AND CAREER PATHS

# 3 Cleanways

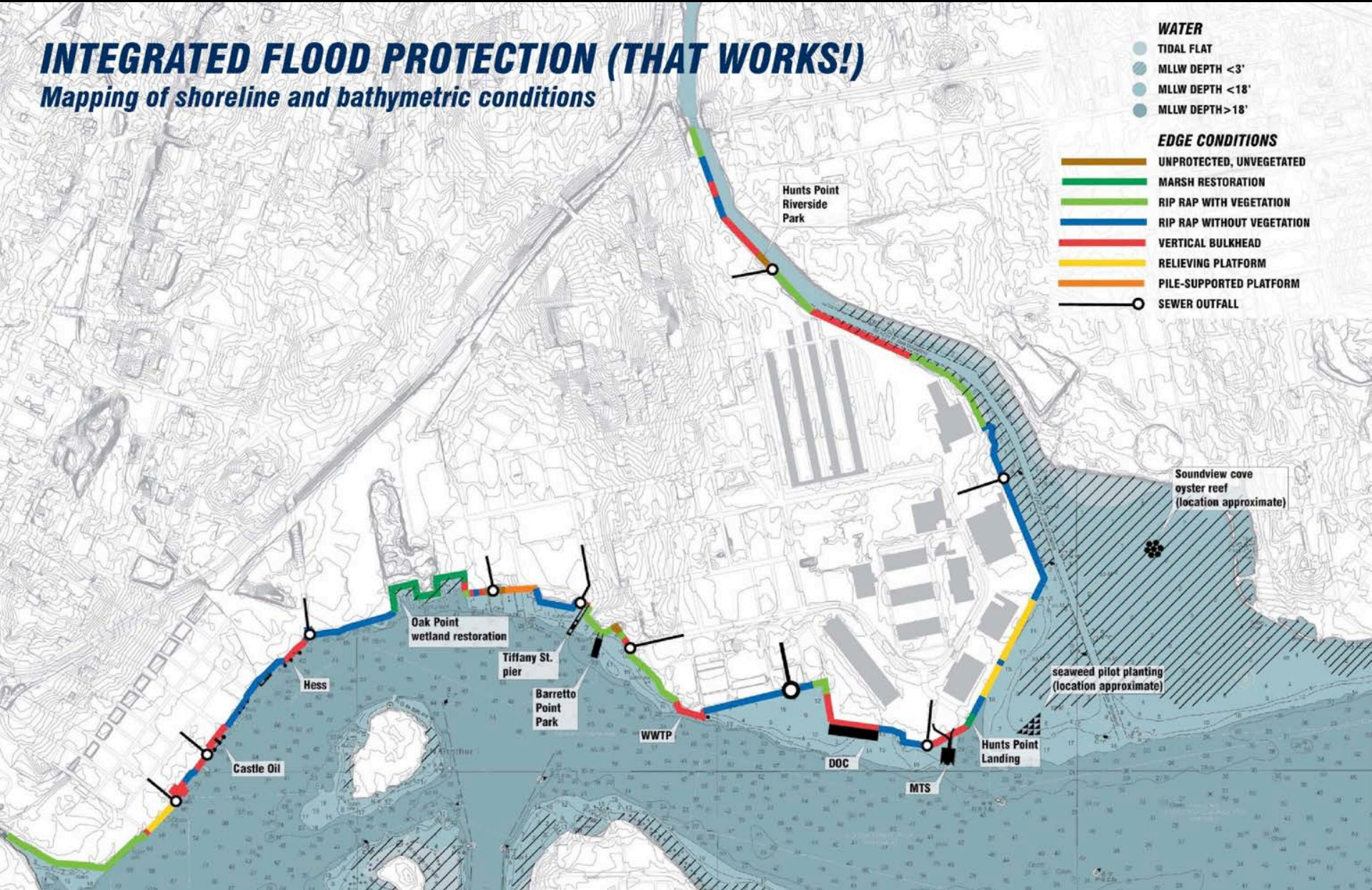
- ACCESS TO OPEN SPACE, CLEAN AIR AND FOOD
- MOBILITY AND SAFE PASSAGE THROUGH FREIGHT ROUTES
- POWER ISLAND WHEN CON ED IS DOWN
- LOW COST AND LOW CARBON REFRIGERATION FOR THE FOOD HUB

# 4 Maritime Supply Chain

- HIGH GROUND EMERGENCY FOOD AND RESOURCE PORT
- KEY LOGISTICS HUB IN FUTURE MARINE HIGHWAY SYSTEM

# INTEGRATED FLOOD PROTECTION (THAT WORKS!)

Mapping of shoreline and bathymetric conditions





# ***INTEGRATED FLOOD PROTECTION***

***New tidal inlets balance cut and fill; upland freshwater wetlands improve water quality***



# **INTEGRATED FLOOD PROTECTION**

***Thick section incorporates habitat and platforms for recreation on the water***



*Floating boathouse, lab and classroom for youth sailing and ecology program run by Rocking the Boat*

# INTEGRATED FLOOD PROTECTION

*Thin sections splice in the Greenway and manage operational conflicts*



*NYS Department of Environmental Conservation prefers cantilevered greenway over options requiring fill along water edge*

# LANDSCAPE INFRASTRUCTURE + LEVEE LAB + LIVELIHOODS

*Operations and maintenance design*



**LIVELIHOODS**  
Operations



**LIVELIHOODS**  
Construction



**LIVELIHOODS**  
Experimental Monitoring



**LIVELIHOODS**  
Business Growth & Diversification

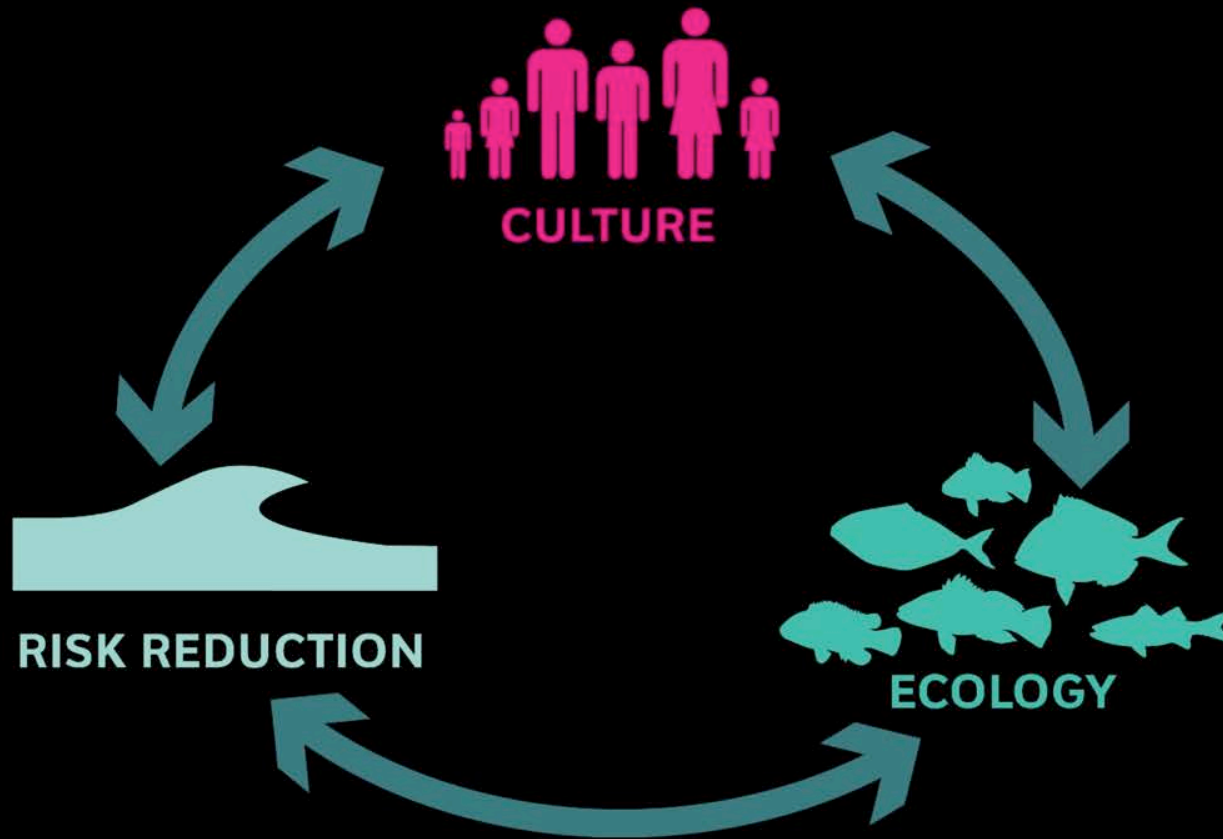


# LIVING BREAKWATERS

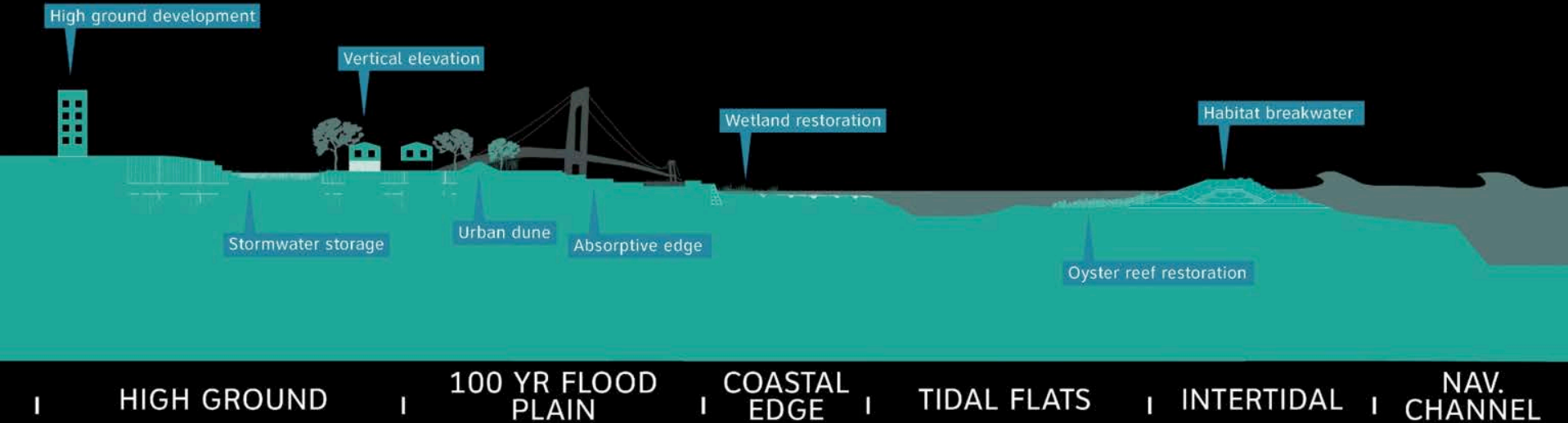
STATEN ISLAND + RARITAN BAY  
HUD REBUILD BY DESIGN





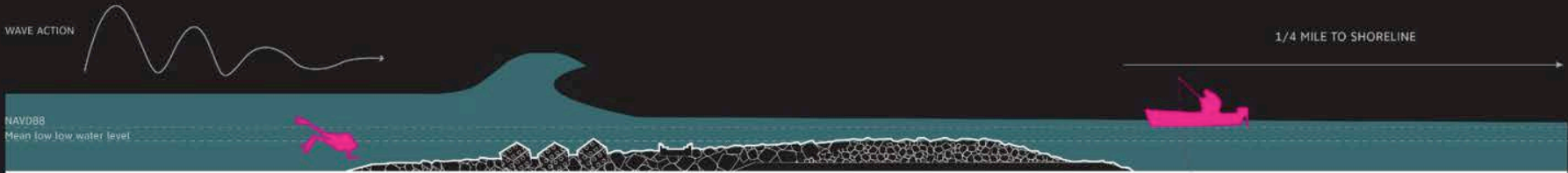
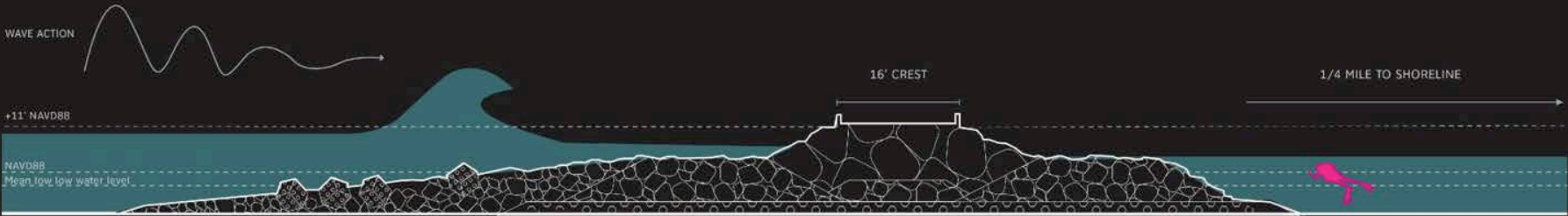


# THE LAYERED APPROACH





# BREAKWATERS REDUCE WAVE ACTION



# HABITAT BREAKWATERS

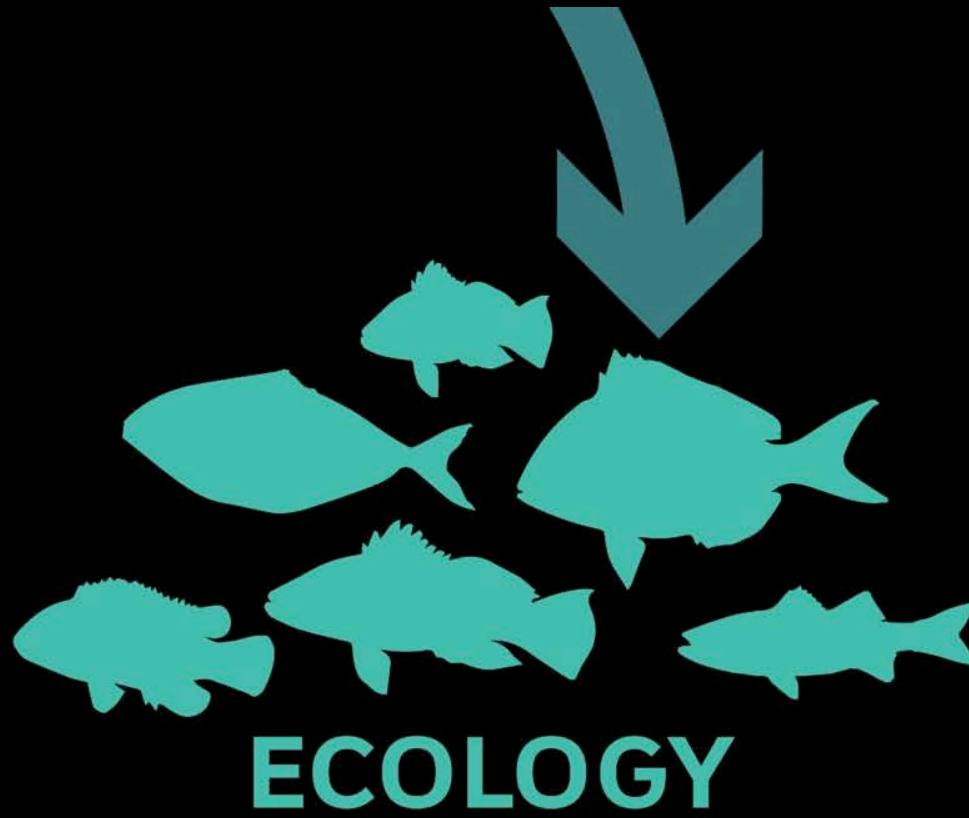


## DO:

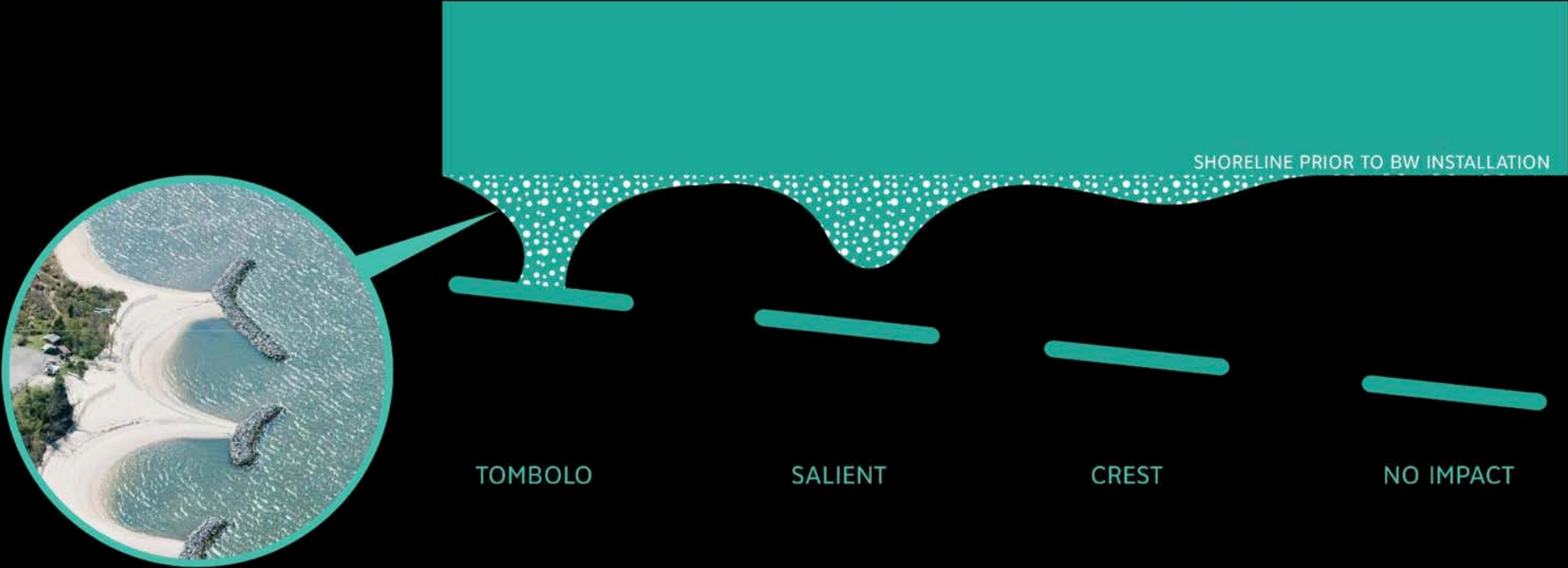
- REDUCE EROSION
- LESSEN WAVE IMPACTS
- PROVIDE HABITAT
- ENCOURAGE RECREATIONAL FISHERIES
- BUILD BEACHES

## DO NOT:

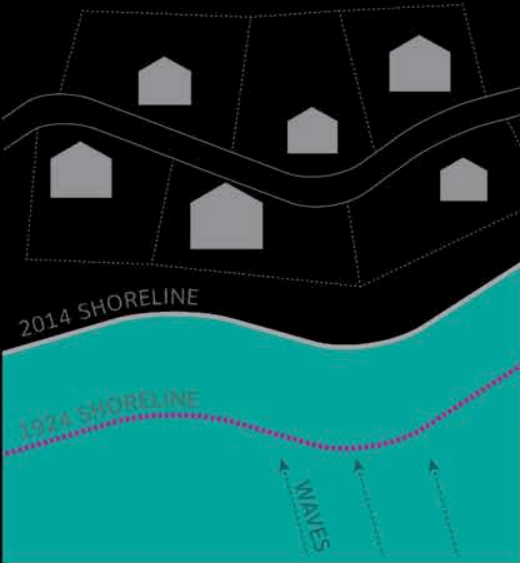
- KEEP OUT FLOOD WATER



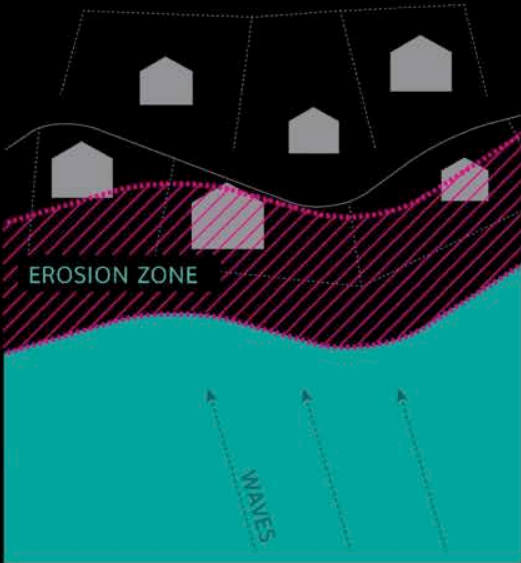
# BREAKWATERS BUILD BEACHES



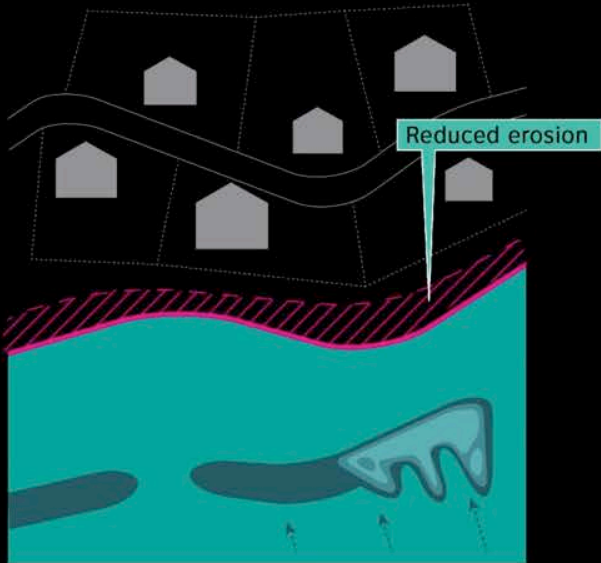
# RISK REDUCTION : SHORELINE LOSS



HISTORIC SHORELINE LOSS

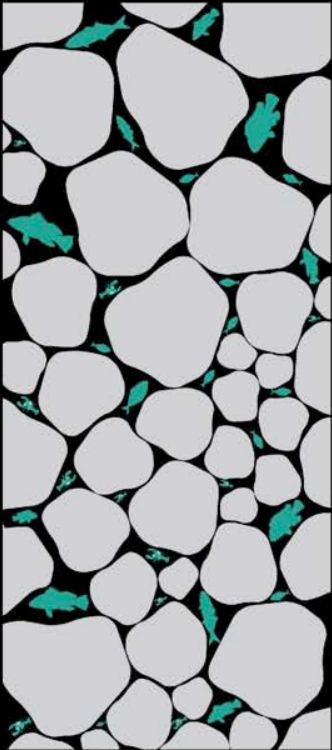
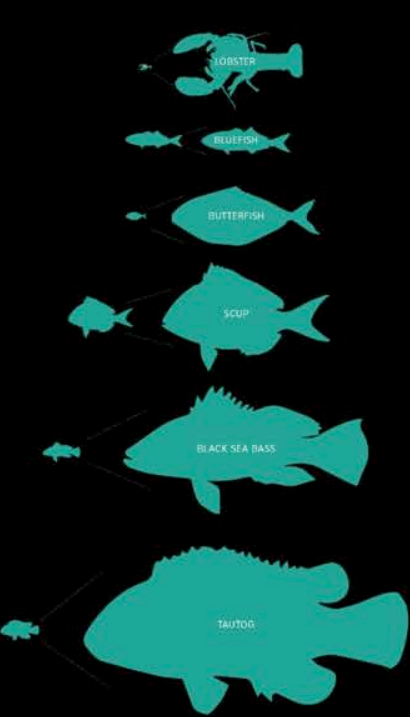


PROJECTED SHORELINE LOSS WITH NO INTERVENTION



SHORELINE STABILIZATION WITH INTERVENTION

# CREATE NICHES



# BUILDING ECOLOGICAL RESILIENCY



**ECONCRETE IN S**  
 A concrete structure designed to absorb and filter pollutants from the water.

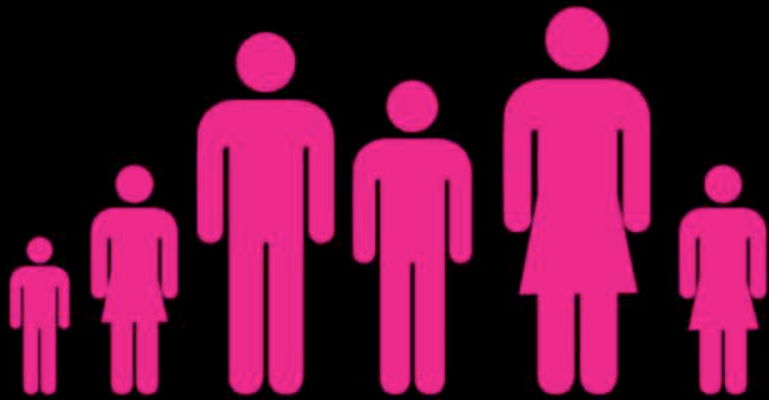
**FINE SPICES # 1**  
 A natural material that provides a habitat for small marine organisms.

**RETRACTILE SAND STREETS**  
 A natural material that provides a habitat for small marine organisms.

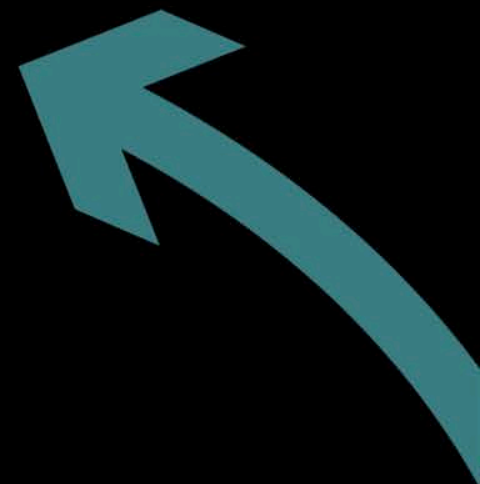
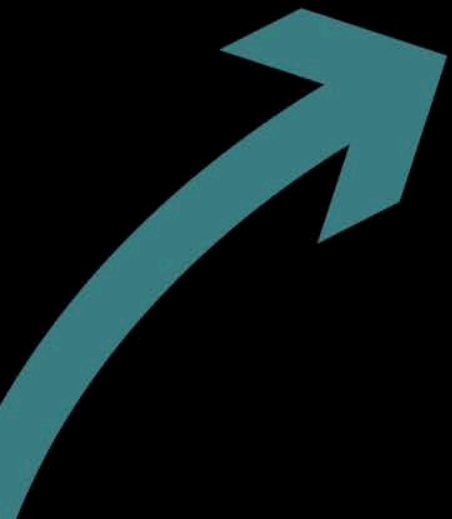
**SPRING BELLS**  
 A natural material that provides a habitat for small marine organisms.

**SUBTERRANEAN ROCKY BENTHOS**  
 A natural material that provides a habitat for small marine organisms.

**ROCK LATS**  
 A natural material that provides a habitat for small marine organisms.



**CULTURE**

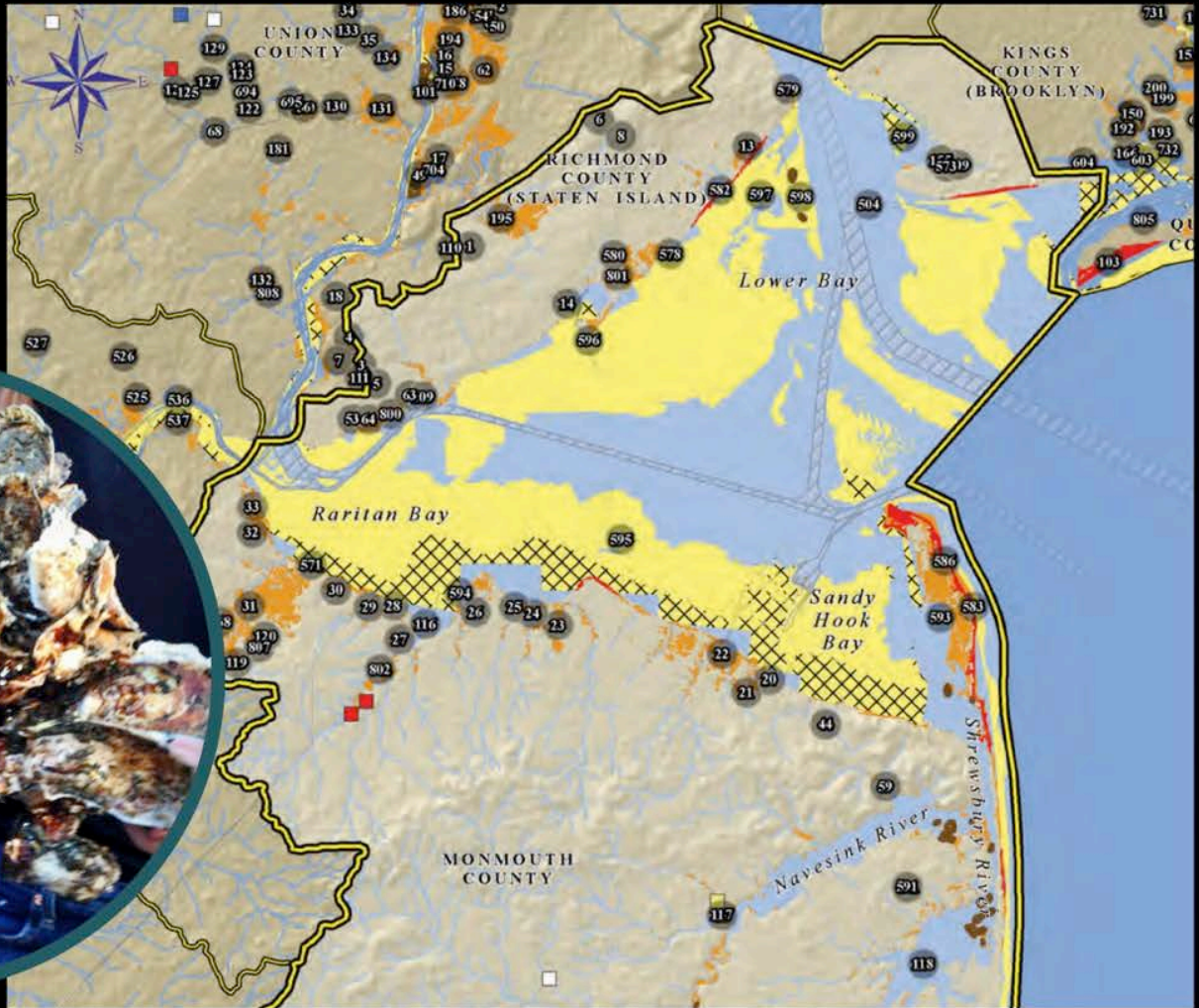








COMPREHENSIVE RESTORATION PLAN  
OYSTER RESTORATION SUITABILITY MAP

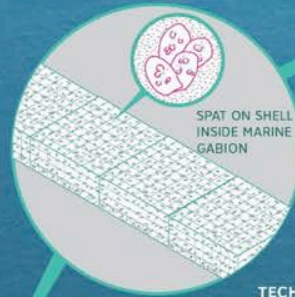


# OYSTER CULTURE

LIVING SHORELINE

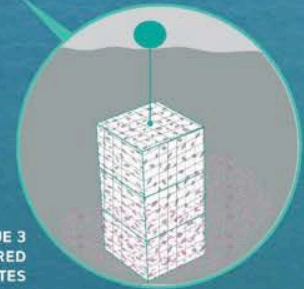
MARINE PIERS

LIVING SHORELINE

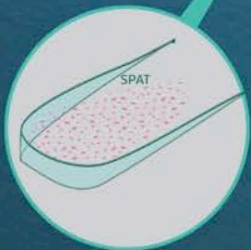


SPAT ON SHELL  
INSIDE MARINE  
GABION

TECHNIQUE 2:  
OYSTER GABION  
SUBTIDAL UNITS ONLY

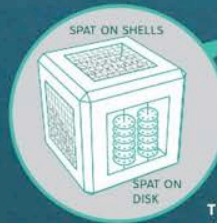


TECHNIQUE 3  
SPAT SANCTUARY WITH FLOATS MOORED  
TO MARINE PIERS AT MONITORED SITES



SPAT

TECHNIQUE 4:  
TANK-LESS SETTING



SPAT ON SHELLS

SPAT ON  
DISK

TECHNIQUE 1  
ECONCRETE OYSTER DISK  
ATTACHED TO SUBTIDAL UNITS ONLY



OYSTER CAM



NAVIGATIONAL GUIDE AND  
MONITORING CAMERA TO  
PREVENT POACHING

# SCHOOLS AT THE WATERFRONT



# WATER HUBS

