

# Mississippi Delta & The Jersey Shore


Innovative, Place-based Solutions:  
The Value of Interdisciplinary Perspectives



Jill Dixon, Sasaki Associates

Rob Nairn, Baird & Associates

Jason Hellendrung, Sasaki Associates



14th International Workshop on  
Wave Hindcasting and Forecasting &  
5th Coastal Hazard Symposium  
November 10, 2015



Outline:

**Part 1: Introduction**

**Part 2: Changing Course**

**Part 3: Rebuild by Design**

**Part 4: Conclusions**





Part 1:

# **Overview & Introduction**



Jill Dixon, Associate, Sasaki Associates



The need:  
Many critical  
coastal issues today are  
**broad, complicated, & messy**

CLIMATE CHANGE

RESILIENT COMMUNITIES

DISASTER RECOVERY

RISING SEAS

SOCIAL CHANGE

Two opportunities for innovative thinking:

**1. Design Competitions**

**2. Interdisciplinary Collaboration**

2 case studies:

**①. Changing Course**

**②. Rebuild by Design**

# Key Questions:

- Does interdisciplinary collaboration enrich ideas?  
What about the competition format?
- What is the value of combining science with design-thinking?
- What factors contributed to innovation?
- What do interdisciplinary, systems-based solutions look like?

## Defining “Interdisciplinary”

**Individuals representing two or more disciplines work as an integrated team, combining knowledge to solve a common problem**

MULTI-DISCIPLINARY

INTRADISCIPLINARY

TRANSDISCIPLINARY

INTEGRATED

TRANSEPISTEMIC

CROSS-DISCIPLINARY

# Interdisciplinary Benefits

- Creative breakthrough potential: Brings together ideas from many perspectives
- Questions practices that are accepted as state-of-the-art by a discipline
- Reframes the question

“Successful interdisciplinary outcomes...involve not only new answers, but also new questions. ...

All too often interdisciplinary teams are brought together ‘to fix the plumbing’ – only to tell the client, **‘We can fix the plumbing sir; the problem is you’re living the wrong house.’**

- Blackwell, et al. (2009). pg 82

# Interdisciplinary Challenges

- Different disciplinary languages
- Under-valuing of social science
- Team management / leadership
- Institutional structures and practices

# Best Practices for Interdisciplinary Collaboration

- Cultivate a collegial **atmosphere of trust and mutual respect**, which fosters constructive dialogue.
- Find the **leader** with the right personality and background to direct an interdisciplinary team and process.
- **Team Diversity:** Assemble a team with “the biggest box” possible, including expert, open-minded individuals

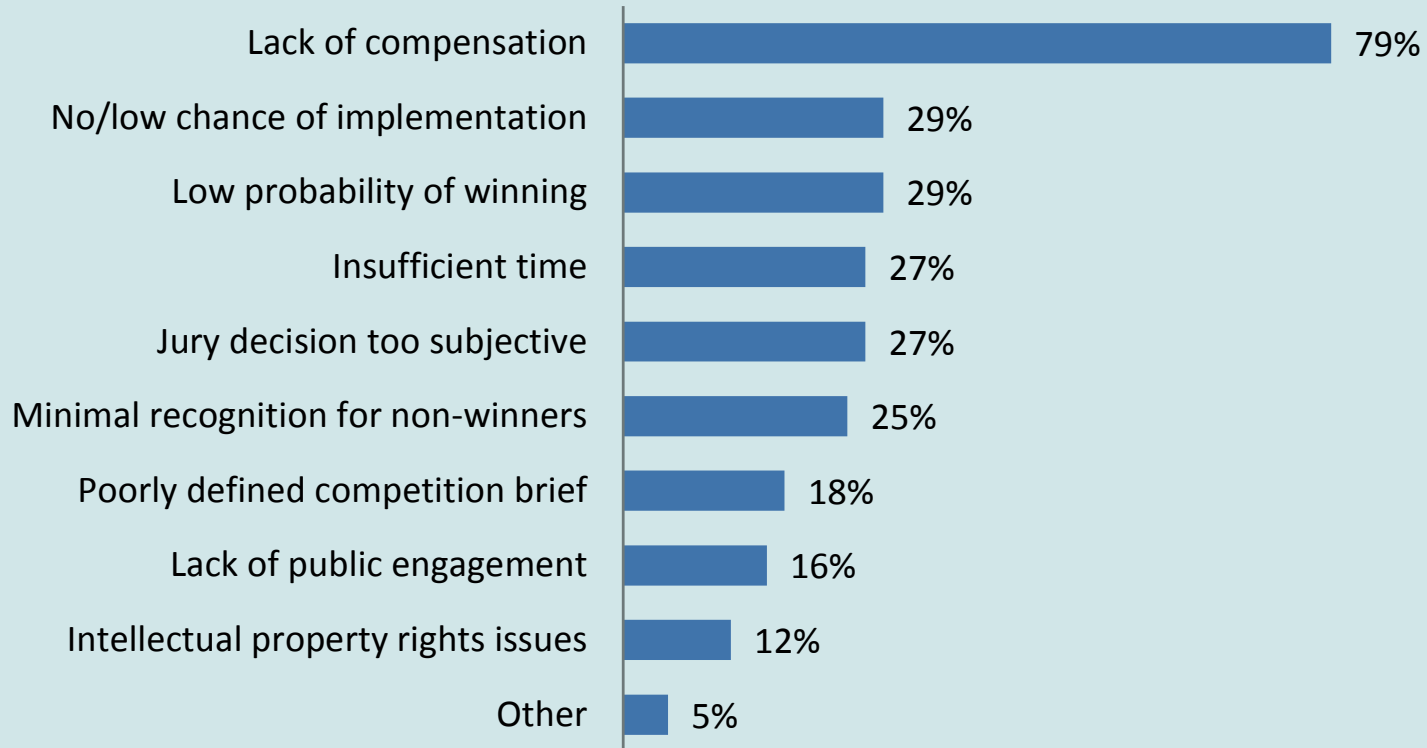


# Design Competitions 101

- Competitive process for generating ideas for buildings, products, public spaces, communities, or other topics
- Teams or individuals develop their ideas for a relatively short time-frame
- Usually, a jury selects the “best” idea

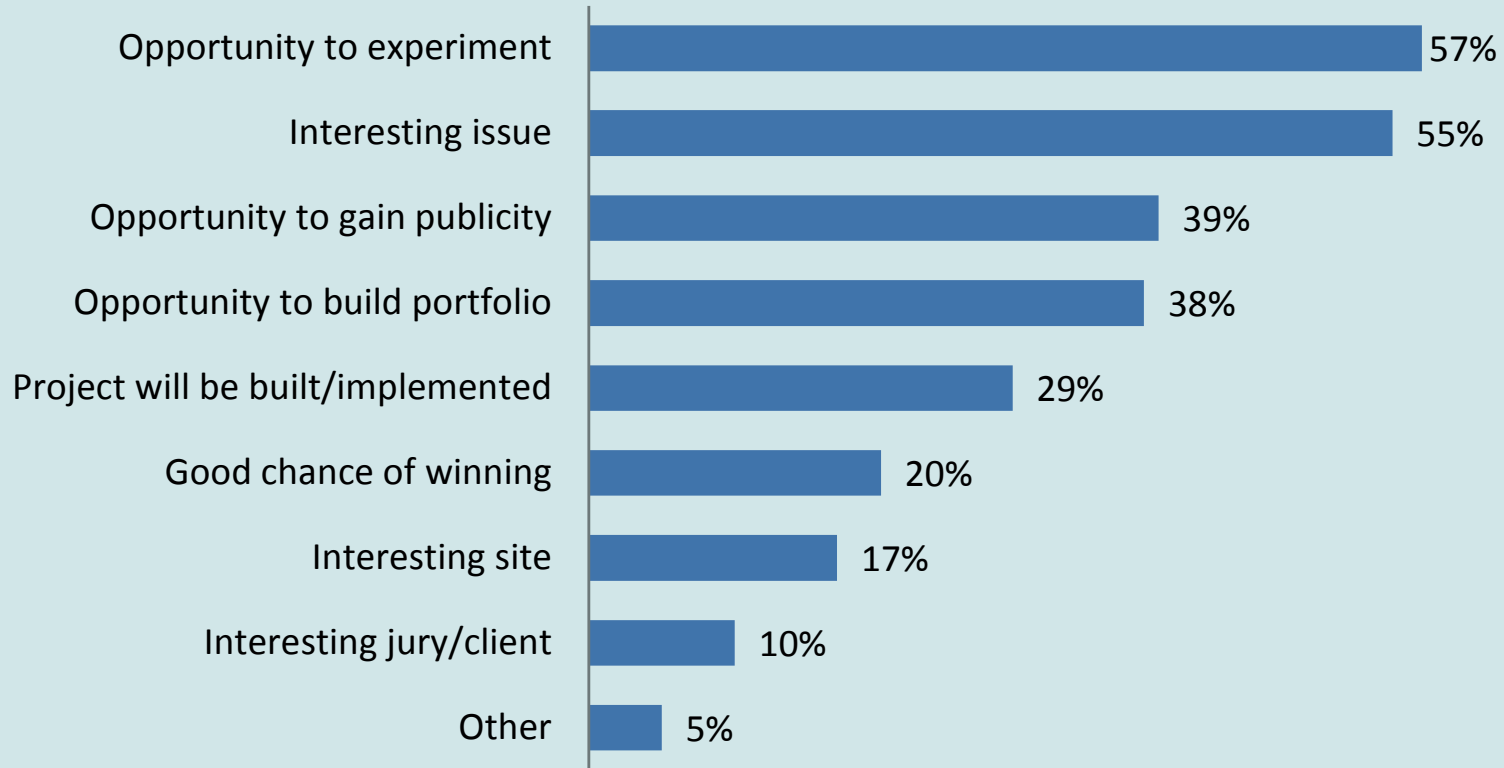


# Design Competitions: Challenges



Architectural Record /Van Alen Institute Design Competition Survey (2015).

# Design Competitions: Opportunities



Architectural Record /Van Alen Institute Design Competition Survey (2015).

# Design Competitions & Interdisciplinary Collaboration?

- **It's less common for competitions to include multiple disciplines**
- 46% respondents rarely or never work with other design disciplines
- 70% respondents rarely or never work with professionals outside of the design fields



# Introducing our Two Case Studies



# 1. Changing Course

- Challenge: “Coastal Crisis” in Louisiana
- The 2012 Coastal Master Plan found that realigning the river had the potential to be the most effective solution
- Environmental Defense Fund, Van Alen Institute, and other foundations and organizations
- 5 month competition
- 3 teams selected to participate



**changing course**

navigating the future  
of the Lower Mississippi  
River Delta

**REQUEST FOR  
QUALIFICATIONS**



New Orleans

**“Innovative but feasible redesigns of the lower River that facilitate the maximum use of the River’s water and sediment resources”**

## 2. Rebuild by Design

- Asked teams to envision solutions that increase resilience across the region affected by Hurricane Sandy in 2012
- An initiative of President Obama's Hurricane Sandy Rebuilding Task Force
- In partnership with the Municipal Art Society, NYU's Institute for Public Knowledge, Regional Plan Association, Van Alen Institute, and Rockefeller
- 10 teams selected from 148 proposals
- 2 stage, 7 month competition



# REBUILD BY DESIGN

An Initiative of the President's  
Hurricane Sandy Rebuilding Task Force

In Collaboration With  
NYU's Institute for Public Knowledge  
Municipal Art Society  
Regional Plan Association  
Van Alen Institute

Lead Supporter  
The Rockefeller Foundation

With Support From  
Deutsche Bank Americas Foundation  
Hearst Foundation  
Surdna Foundation  
The JPB Foundation  
The New Jersey Recovery Fund

## Design Opportunities

We invite you to share your thoughts on the ten teams' Design Opportunities. Explore each of these visionary ideas by location or Design Team, and let us know what you think at the bottom of each Design Opportunity page by posting a comment.



This is a critical moment for the Rebuild by Design project as we share the teams' thoughtful and unique visions to make our region more resilient. These proposals follow three months of in-depth analysis and public outreach, including both one-on-one conversations with people living in affected areas and robust guided conversations with Design Teams and citizens. This will lead up to a selection of projects each team

Part 2:  
**Changing Course**



Rob Nairn, Director, Baird & Associates



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# A DELTA FOR ALL

BAIRD TEAM

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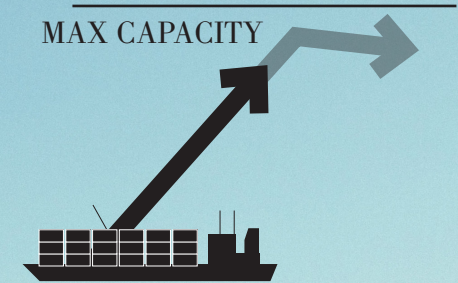




# MANY CHALLENGES TODAY

IT'S ABOUT MORE THAN LAND LOSS

-12,000 ACRES/YEAR



## WETLAND & LAND LOSS

Increasing sea level rise  
Continued subsidence  
Reduced sediment loads

## COMMUNITIES & BUSINESSES

Significant uncertainty, apprehension about the future  
Flood risk increasing  
Invisible suffering by coastal households

## FISHERIES

Significant to delta economy, but much uncertainty about future  
Tipping point looming?

## NAVIGATION & SHIPPING

Future growth limited by depth & capacity  
Dredging costs



# A DELTA FOR ALL

LAND & WETLAND BUILDING

BALANCE OF ESTUARINE & FRESHWATER

FLOOD RISK REDUCTION

INCREASED NAVIGATION CAPACITY

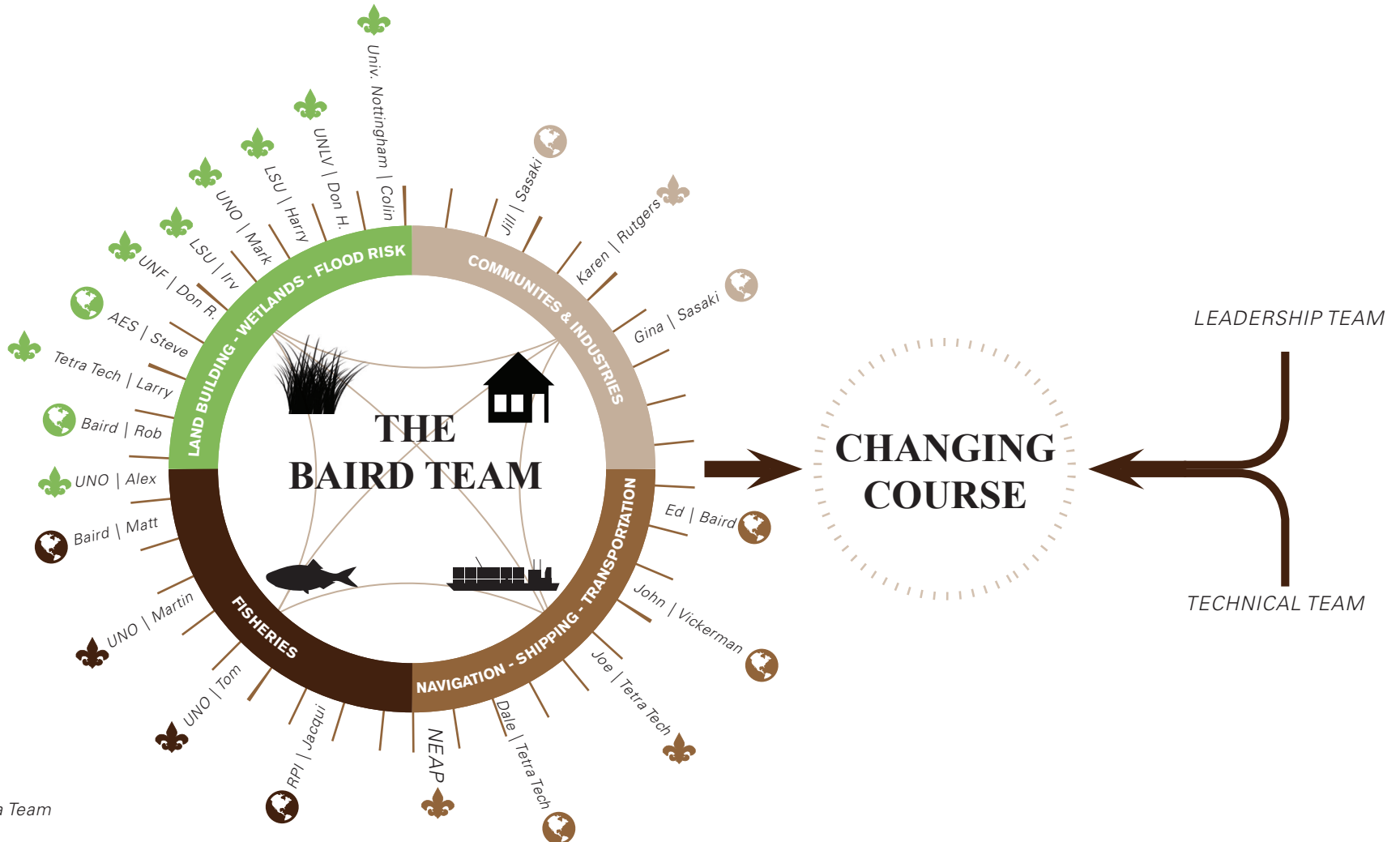
HELP TRANSITIONING & MORE CERTAINTY





# THE BAIRD TEAM

TEAMWORK + TRANSPARENCY + REALISM + INNOVATION



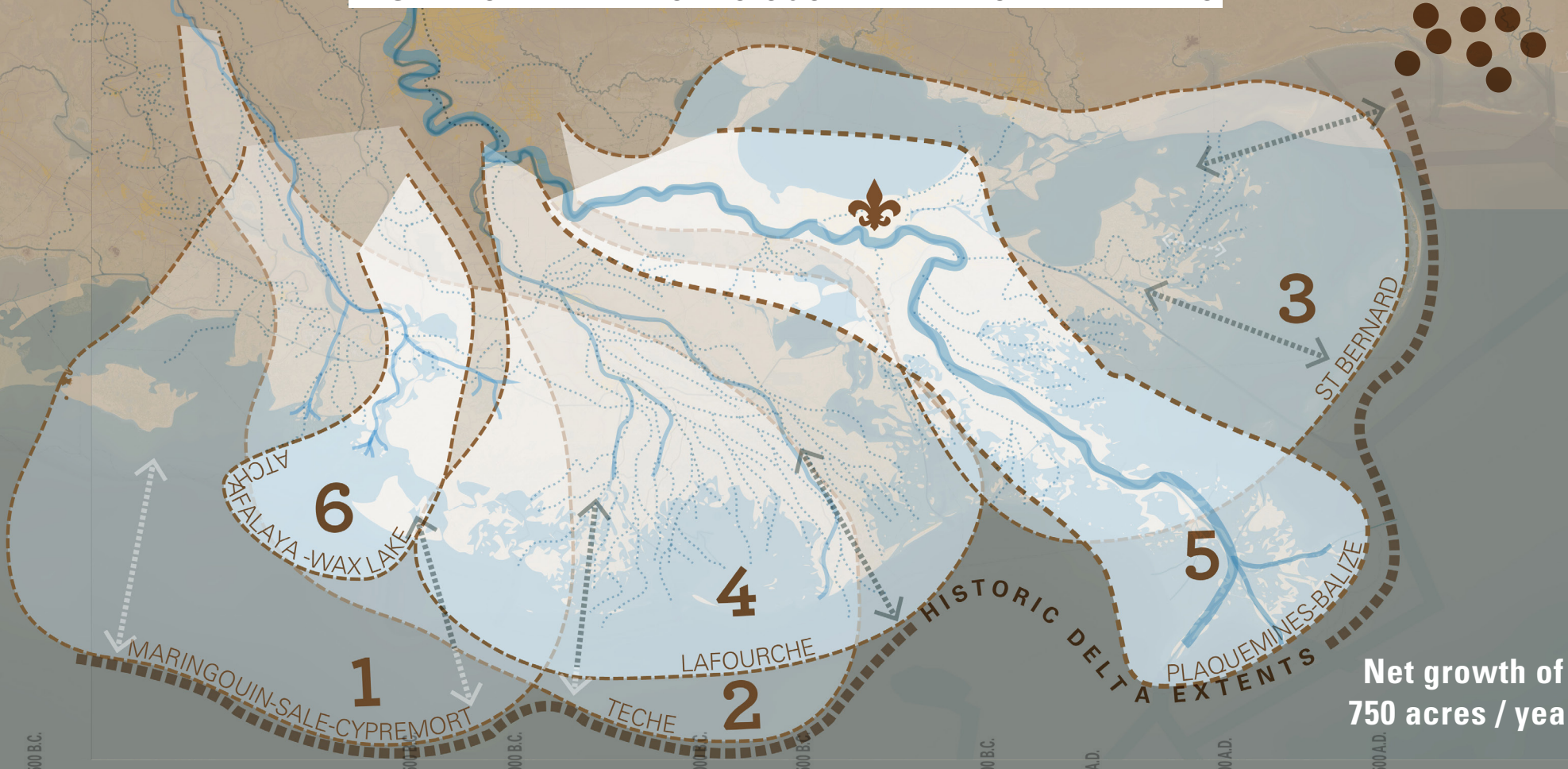
 Delta Team

 Fresh View Team

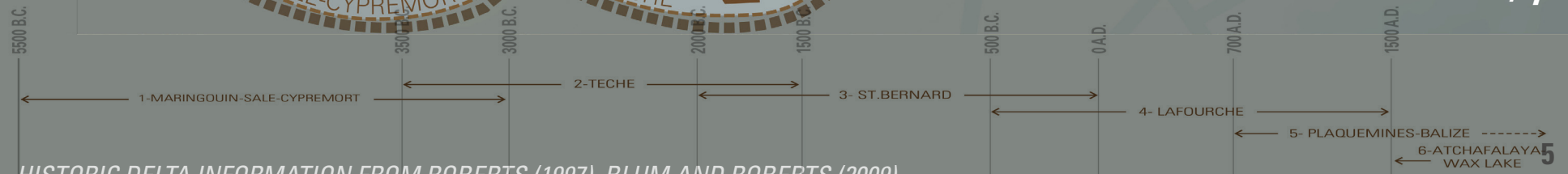
# HISTORIC DISTRIBUTARIES

HIGHER SEDIMENT LOADS SUSTAINED BROADER DELTAS

**400M**  
tons/year



**Net growth of  
750 acres / year**



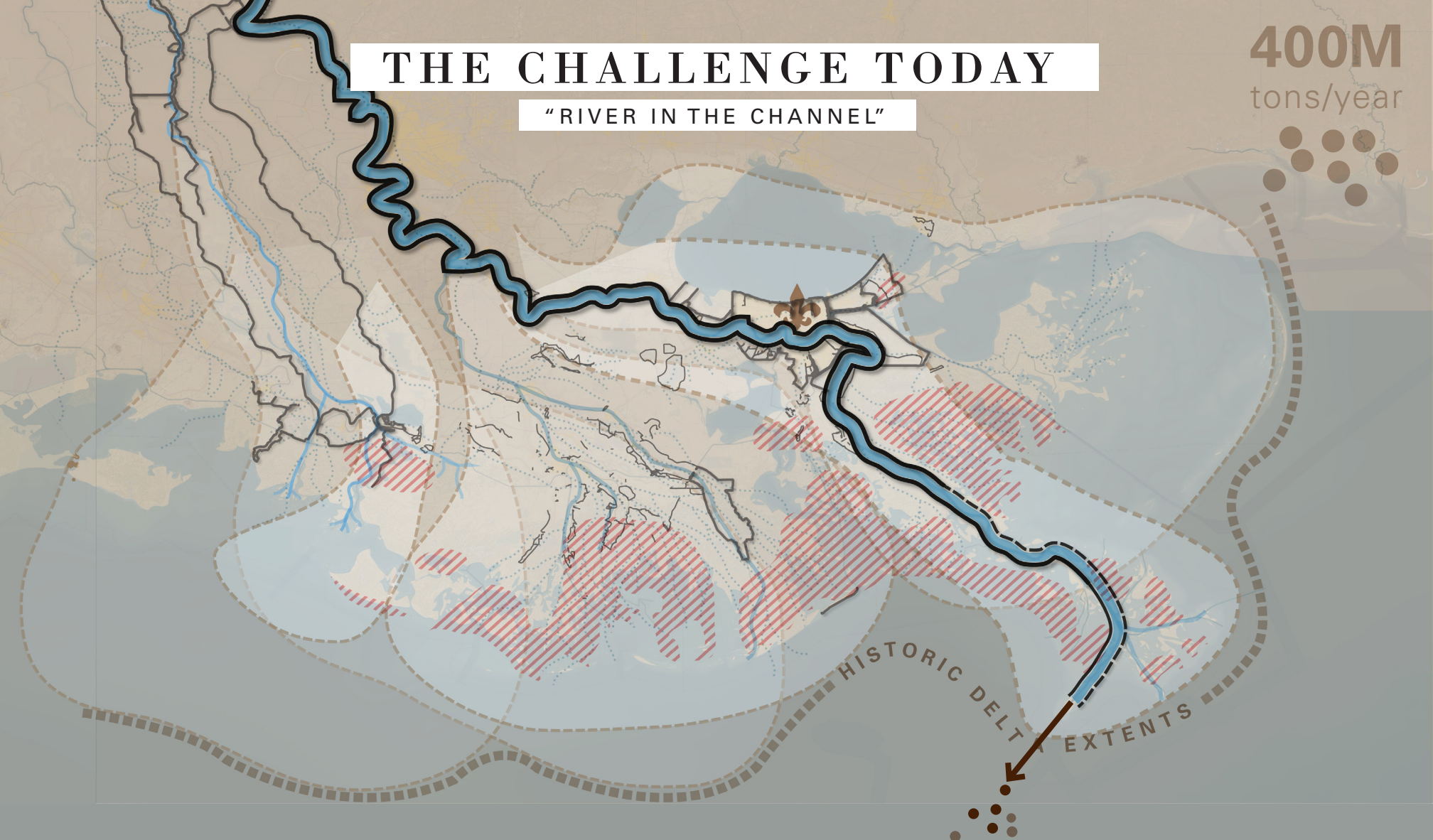
HISTORIC DELTA INFORMATION FROM ROBERTS (1997), BLUM AND ROBERTS (2009)



# THE CHALLENGE TODAY

"RIVER IN THE CHANNEL"

400M  
tons/year



Current trends: 12,000 acres lost each year + navigation challenges + increasing flood risk

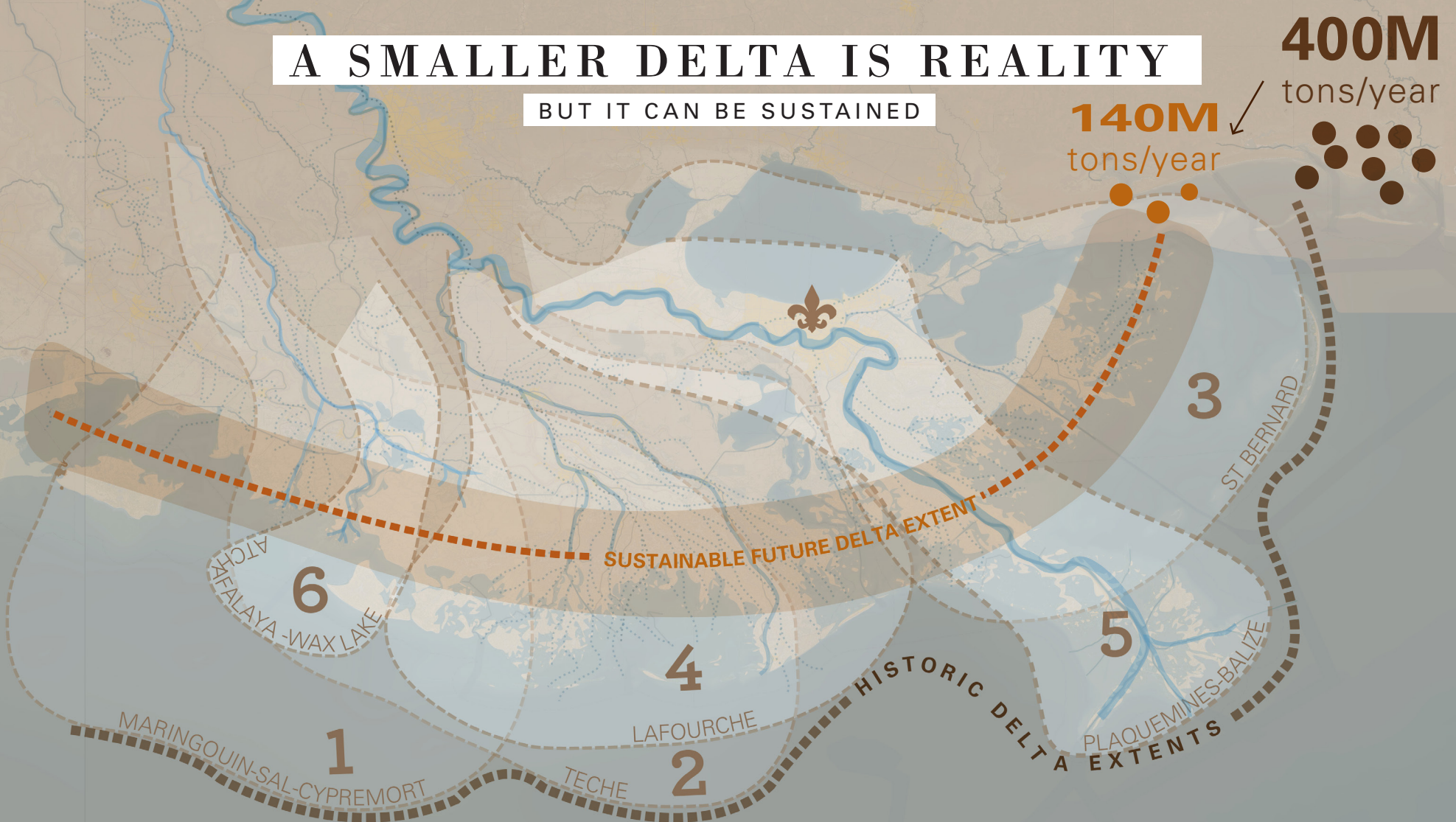


# A SMALLER DELTA IS REALITY

BUT IT CAN BE SUSTAINED

400M  
tons/year

140M  
tons/year



To sustain a delta of this size, we must create ~ 12,000 acres each year

# SUSTAINABLE DELTA

HOW DO WE GET THERE?

**The river as  
land-builder.**

VS.

**Dredging as  
the answer.**



**\$ 5-10M/km<sup>2</sup>**

land building with  
distributaries



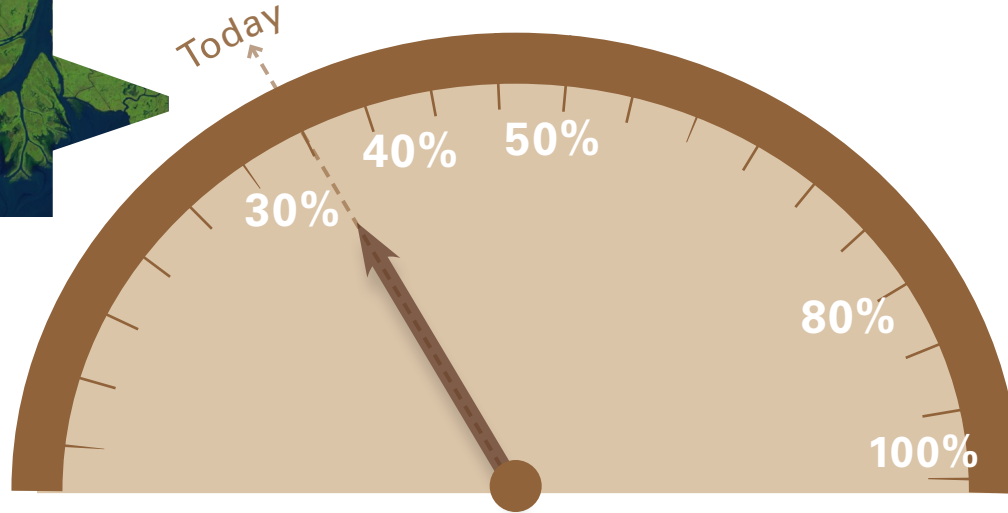
**\$ 25-70M/km<sup>2</sup>**

**= \$1.3-3.5B each year to maintain  
the sustainable delta footprint**

And we must strive to  
capture every grain.

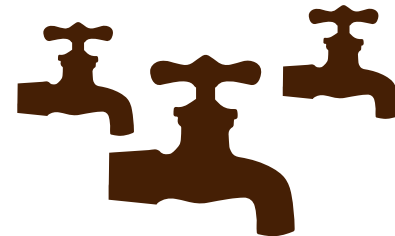
# SUSTAINABLE DELTA

HOW DO WE GET THERE?



**Decaf**

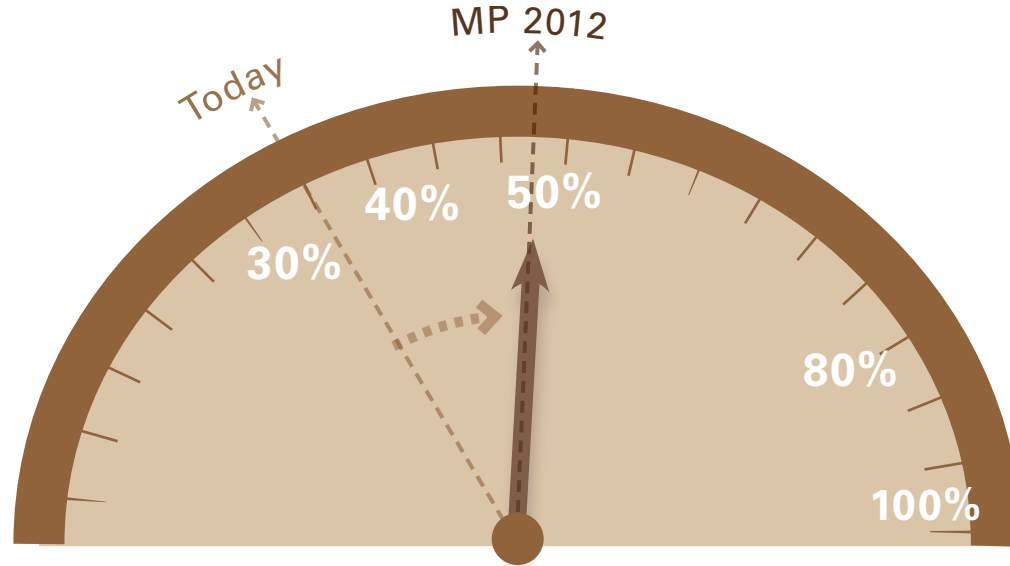
% of river harnessed  
for land building



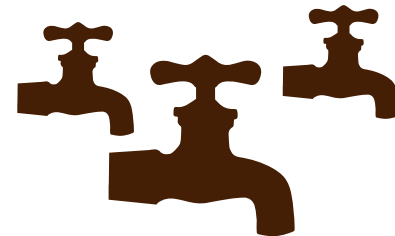
**Extra  
Bold**

# SUSTAINABLE DELTA

HOW DO WE GET THERE?



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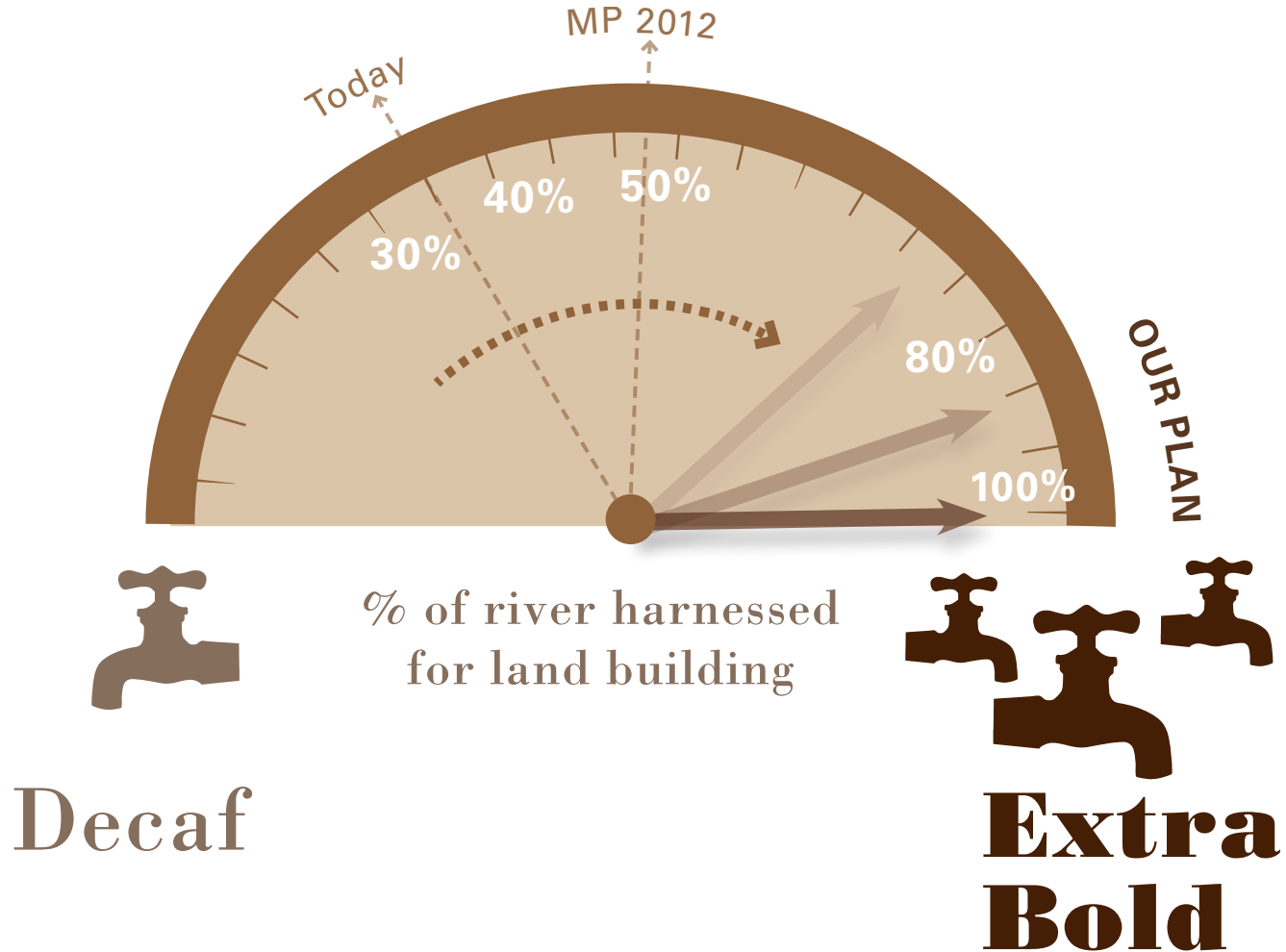


**Decaf**

**Extra  
Bold**

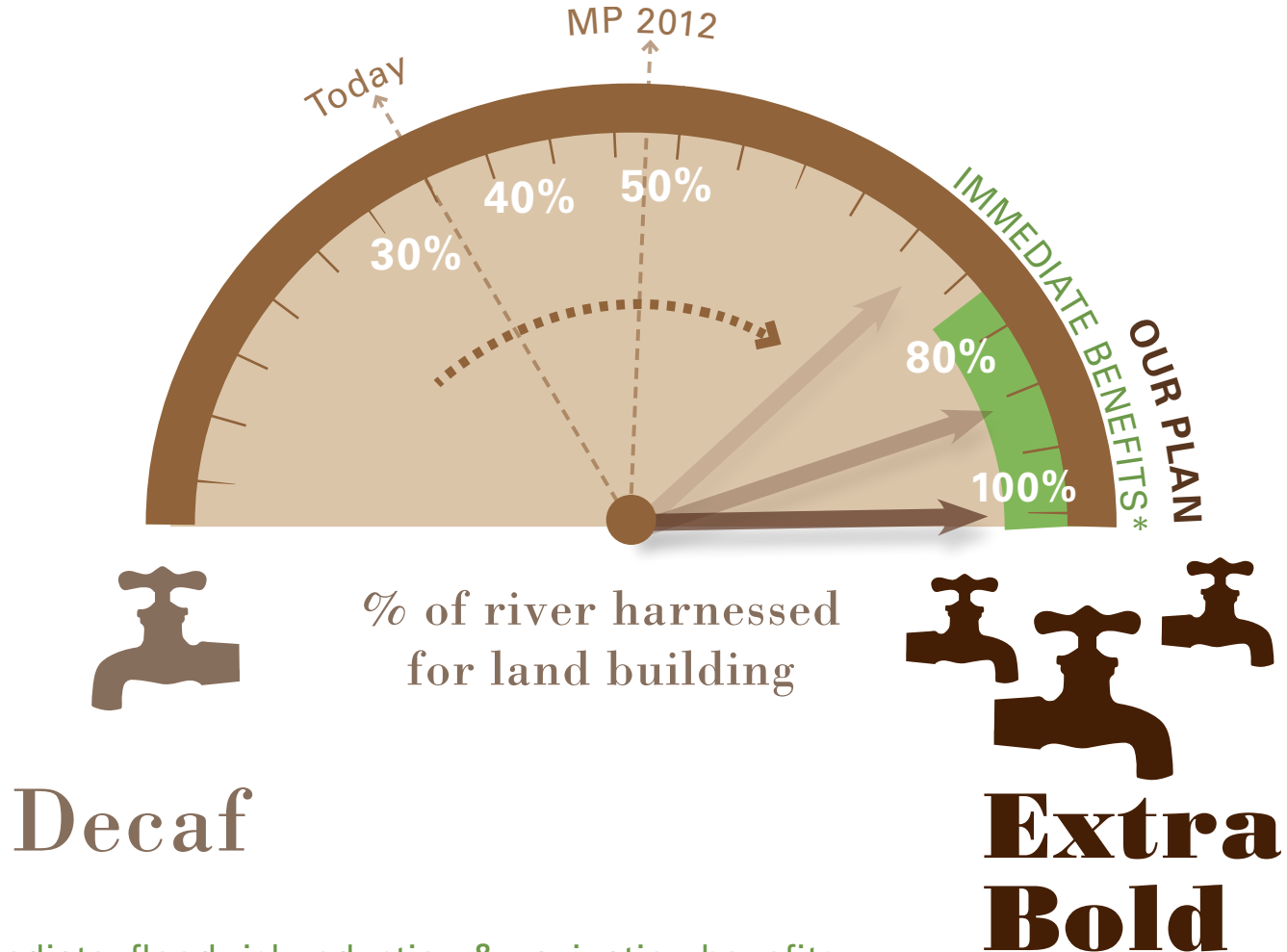
# SUSTAINABLE DELTA

HOW DO WE GET THERE?



# SUSTAINABLE DELTA

HOW DO WE GET THERE?



\*Significant & Immediate: flood risk reduction & navigation benefits





# MANAGED DISTRIBUTARIES

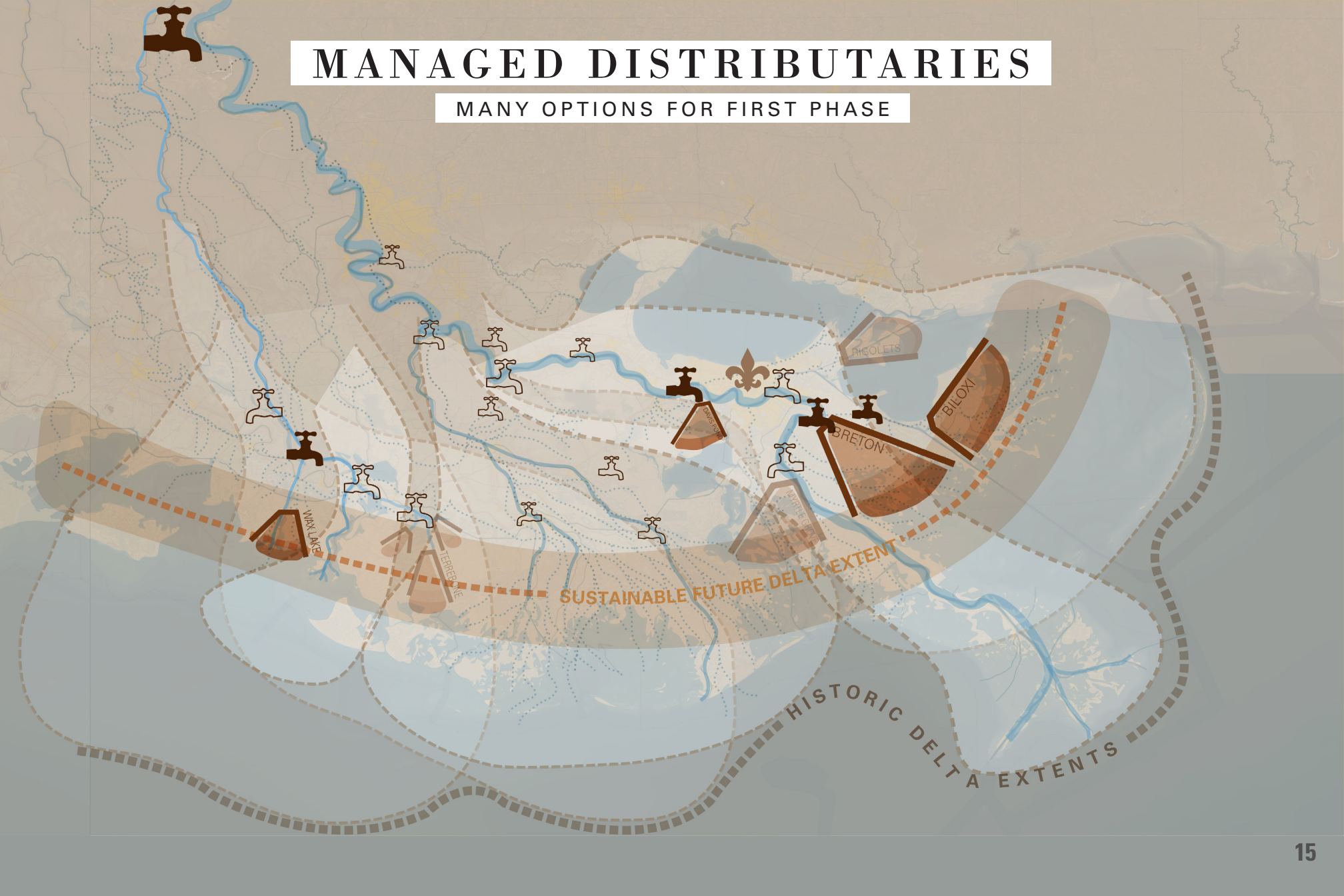
A LAND-BUILDING APPROACH THAT HARNESSSES THE  
MISSISSIPPI RIVER'S FULL POTENTIAL





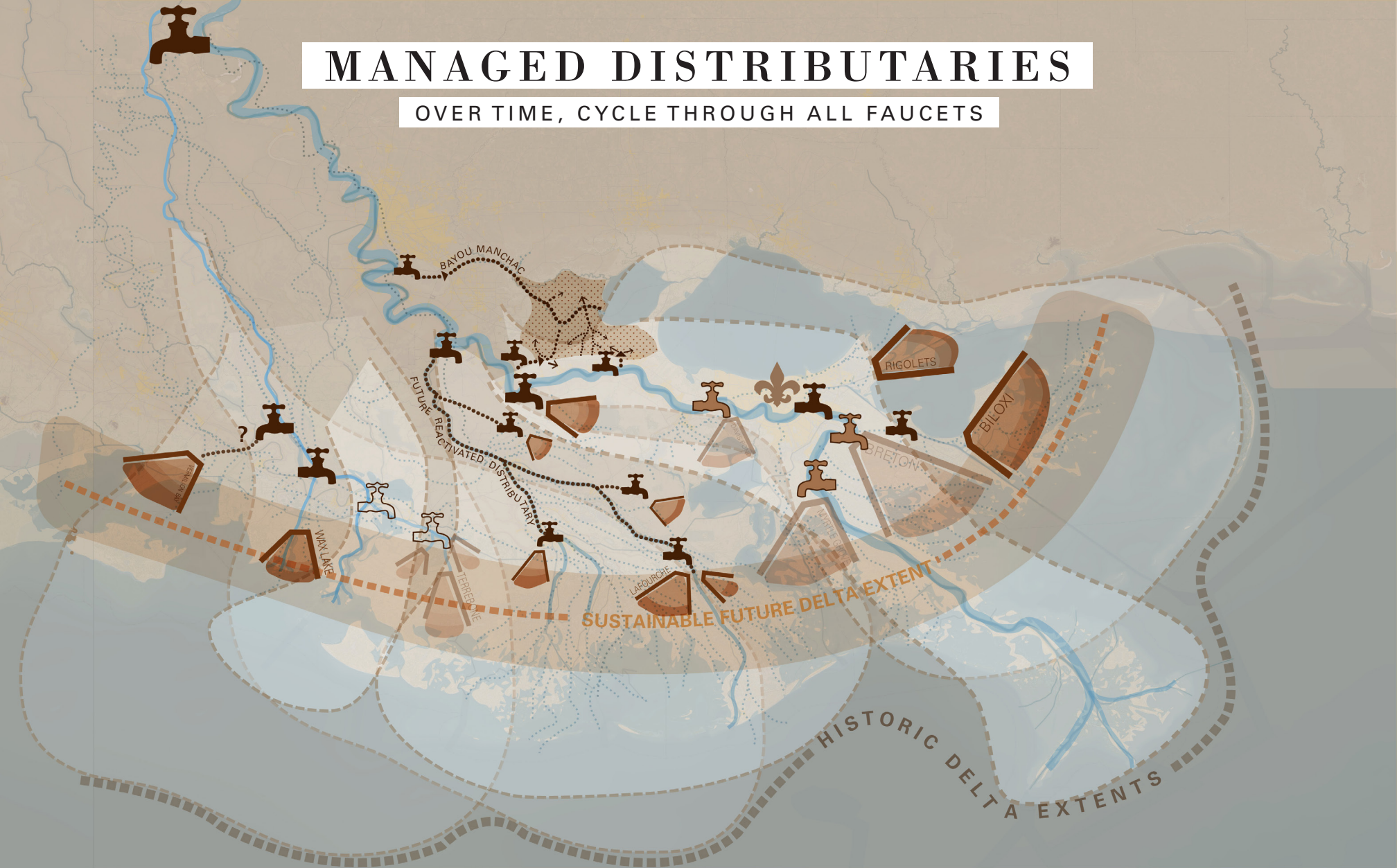
# MANAGED DISTRIBUTARIES

MANY OPTIONS FOR FIRST PHASE



# MANAGED DISTRIBUTARIES

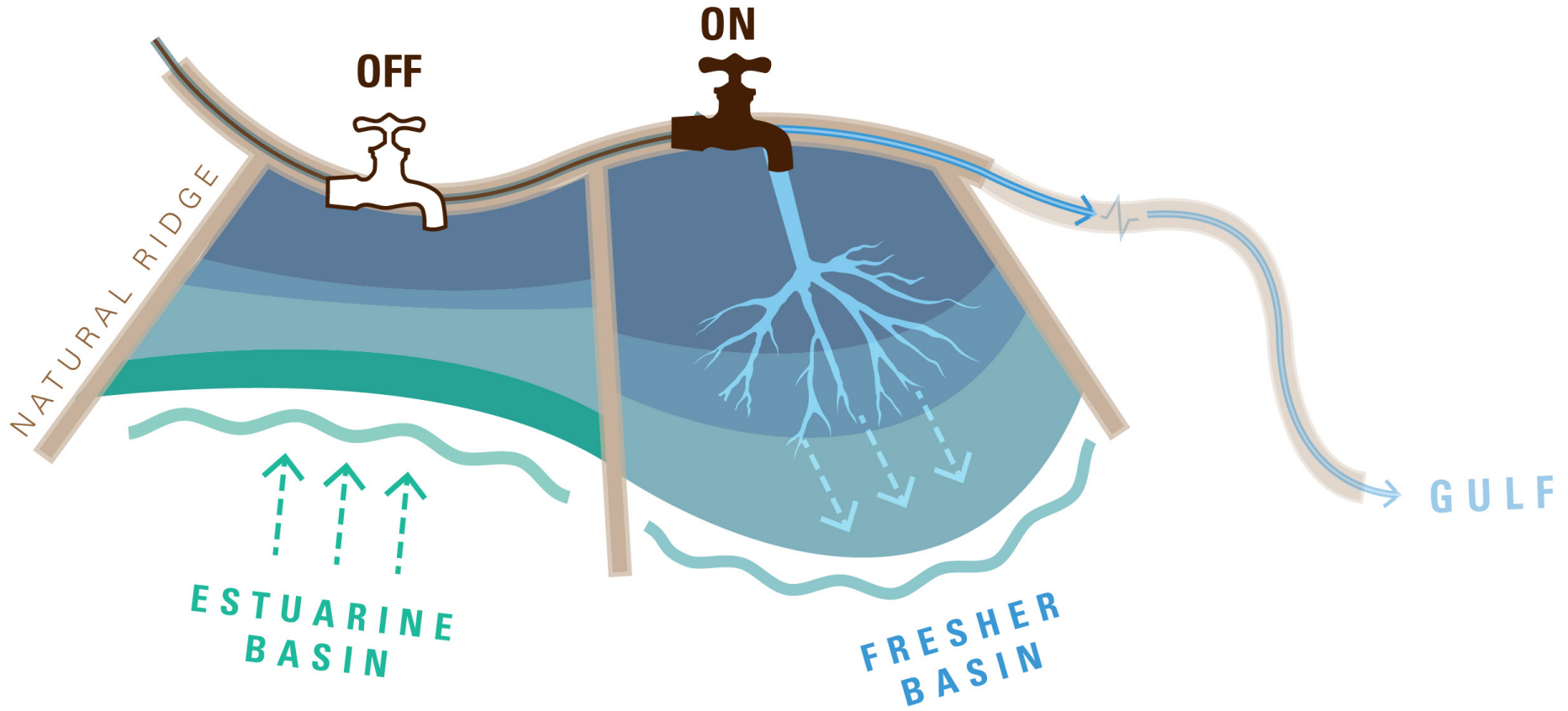
OVER TIME, CYCLE THROUGH ALL FAUCETS





# MANAGED TO PRESERVE A BALANCE

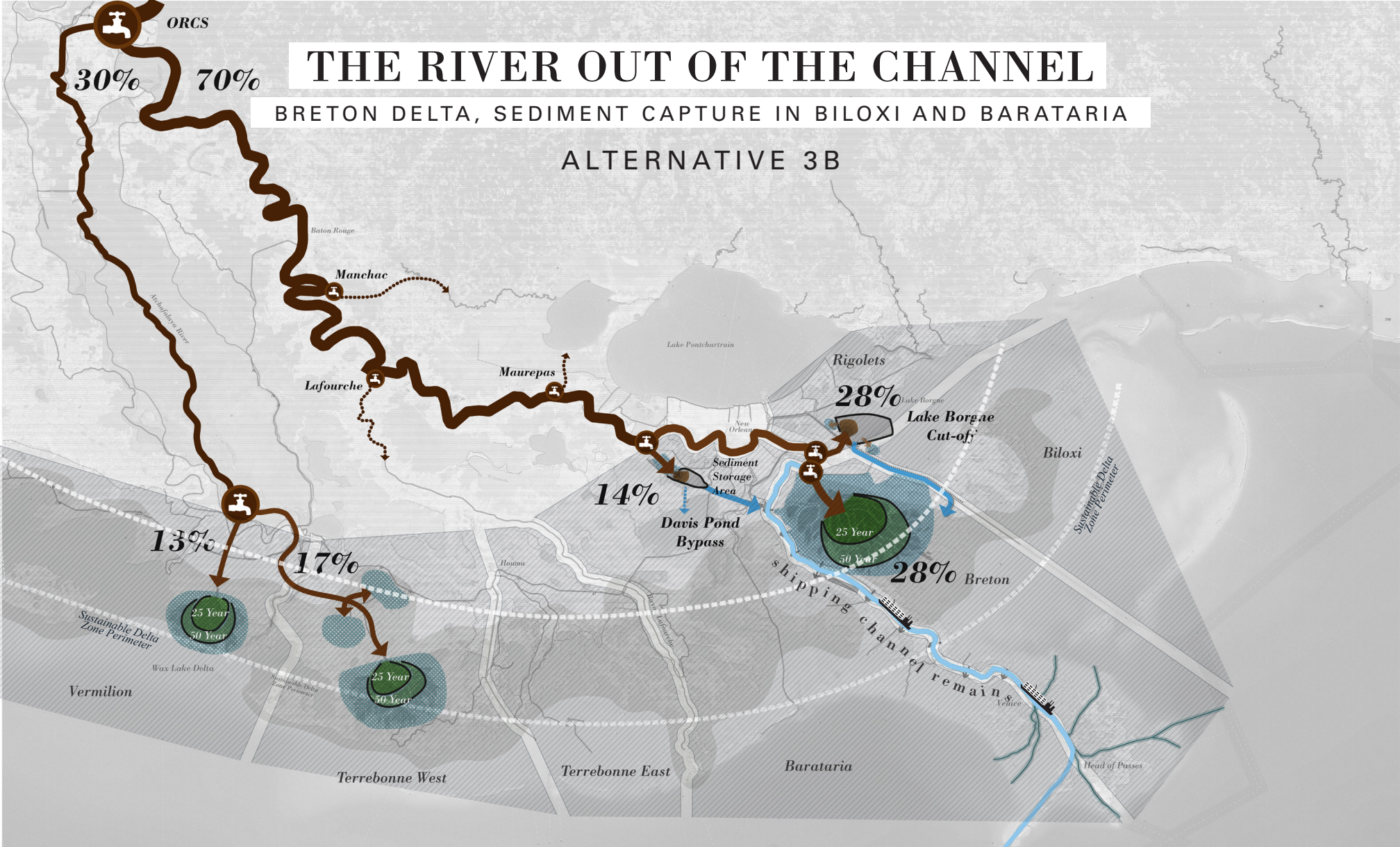
ECOLOGY + HYDROLOGY + FISHERIES



# THE RIVER OUT OF THE CHANNEL

BRETON DELTA, SEDIMENT CAPTURE IN BILOXI AND BARATARIA

ALTERNATIVE 3B



This map shows one of many possible options for the first phase (~ 50 years). Additional analysis and outreach is needed before selecting any starting point



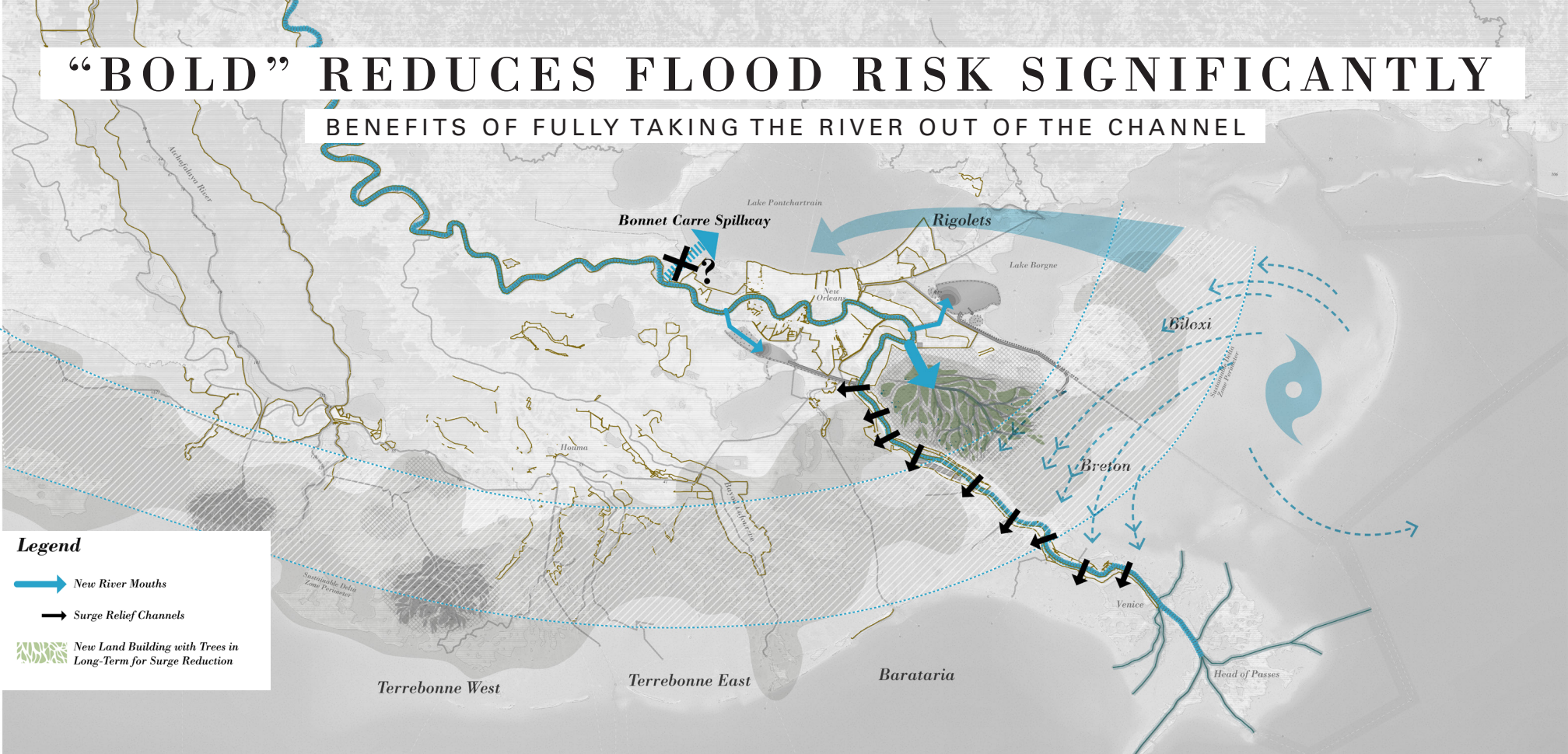
Going “bold” & fully taking the river out of the channel yields immediate, significant benefits for flood protection & navigation





# “BOLD” REDUCES FLOOD RISK SIGNIFICANTLY

## BENEFITS OF FULLY TAKING THE RIVER OUT OF THE CHANNEL



### IMMEDIATE: REDUCED RIVER FLOOD RISK

reduces peak river flood levels by 10 to 15 feet

### IMMEDIATE: REDUCED STORM SURGE

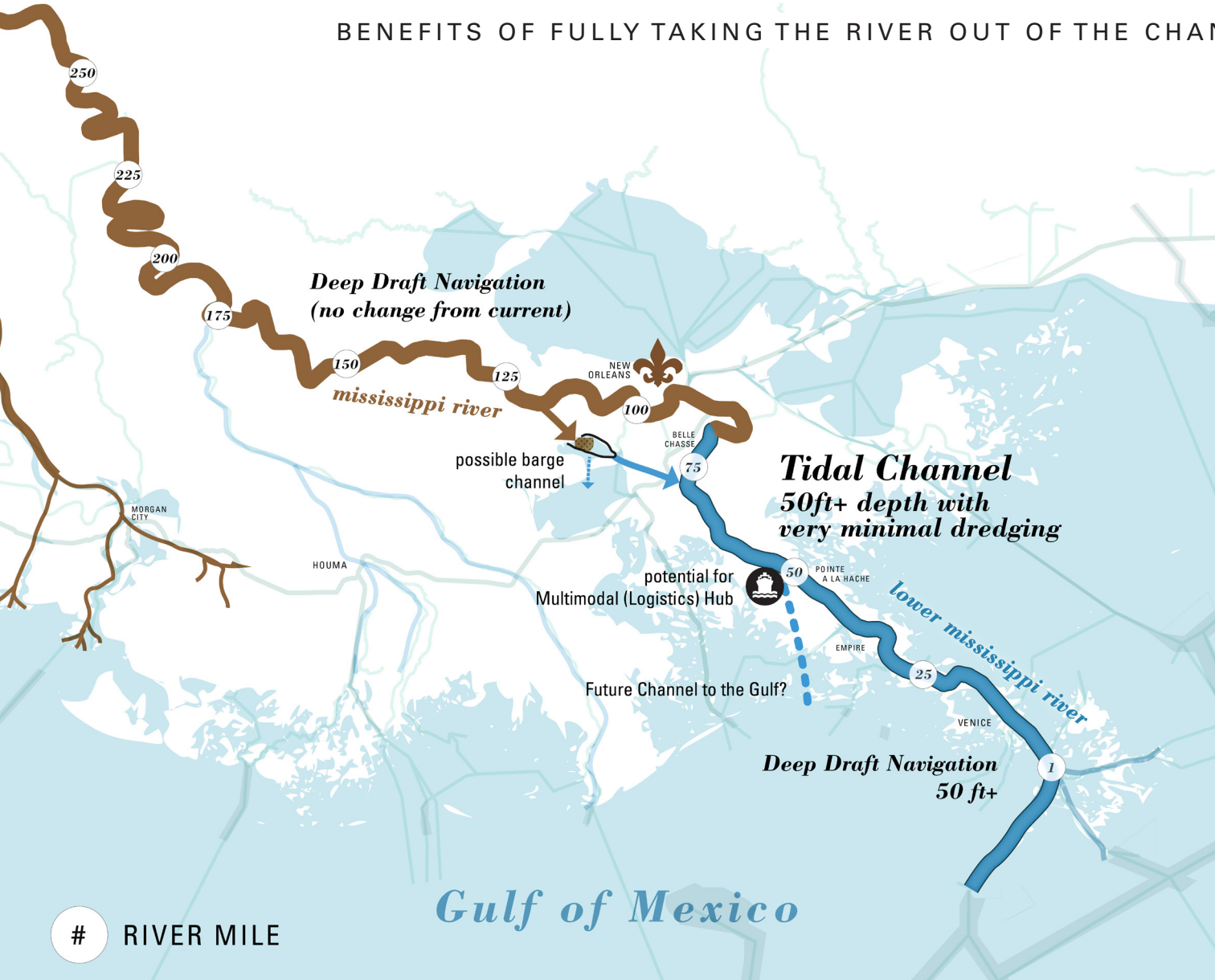
storm surge channels reduce hurricane surge levels by at least 5 feet during Katrina-like events

### OVER TIME (10-20 YRS) ADDITIONAL SURGE REDUCTION

as trees grow on newly built land

# “BOLD” BENEFITS NAVIGATION

BENEFITS OF FULLY TAKING THE RIVER OUT OF THE CHANNEL



- Substantially reduce or eliminate dredging in lower Mississippi for the existing and future 50' deep channel
- Increased safety
- Allows for widening of the river for more anchorage, ports, & transshipment areas
- Eliminates the need for the IHNC, Harvey, and Algiers locks



# “BOLD” BENEFITS ECOLOGY

BENEFITS OF TAKING THE RIVER OUT OF THE CHANNEL



- Significant reduction in hypoxia / Gulf Dead Zone
- Restores critical habitat for migratory birds (and increases birding tourism)
- Preserves and enhances diversity of ecosystems within delta
- Stability for fisheries (vs. approaching tipping point)



# “BOLD” BENEFITS THE ECONOMY

## BENEFITS OF TAKING THE RIVER OUT OF THE CHANNEL



- Results in new economic development & expanded tax bases
- New Delta will become “A New Wonder of the World” – ecotourism & delta management sectors skyrocket
- A more accessible Delta - for tourists & residents
- Delta Discovery Center
  - Ecotourism hub
  - Research center
  - “Blue Jobs” training



# A ROADMAP TO HELP TRANSITION

REDUCING FUTURE UNCERTAINTY AND EXPANDING CHOICE



1  
TRANSITION TO  
SUSTAINABLE FOOTPRINT/  
TWO HOME PROGRAM



2

*Defining the sustainable delta extent provides greater certainty about where it is safe to live and work in the future*

## 2 Home Program

- A voluntary, assisted relocation program for groups
- Provide lots to groups (could use surplus Louisiana Land Trust (LLT)/Road Home Program lots)
- Residents could retain current coastal home, too
- Allows two homes for an easier transition







Part 3:

# **Rebuild by Design**



Jason Hellendrung, Principal, Sasaki Associates



**JERSEY SHORE**  
*Deeper Than The Beach*

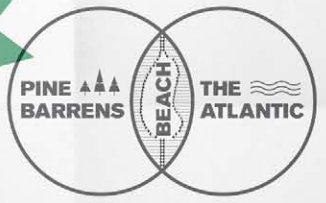
**SASAKI  
RUTGERS  
ARUP**



FIELD GUIDE  
NEW JERSEY SHORE



Deeper Than  
NJ SHORE  
The Beach



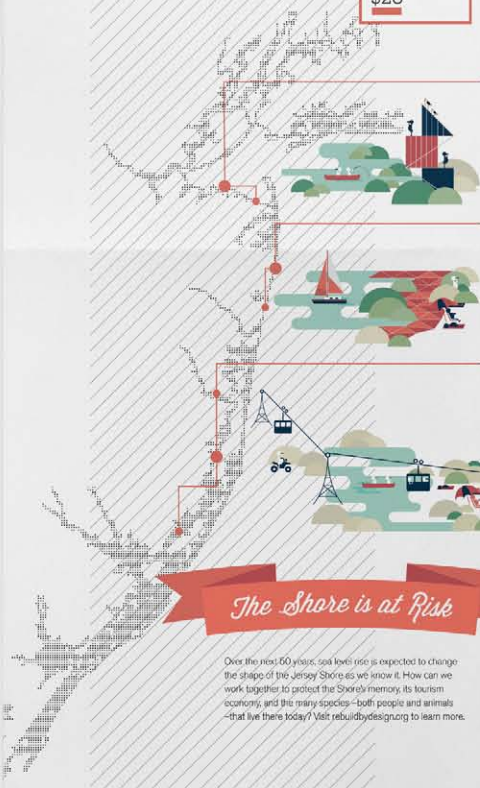
THE NEW JERSEY SHORE is deeper than the beach – it extends far beyond the narrow sandy strip where we spend summers basking in the sun and cooling off in the ocean. The Shore reaches to the Pine Barrens – the state's forested refuge for animals, trees, and other Jersey Deeds. It includes 92 coastal bays and creeks, rivers and creeks that connect the Atlantic Ocean inland miles from the coast. The Shore goes beyond the Garden State Parkway that transports visitors north or south to favorite Jersey destinations. The truth is there is far more to the story of the Jersey Shore than we usually remember.

- Thank You to Our Partners!
- Governor's Office of Recovery and Rebuilding
  - State of New Jersey
  - Asbury Park
  - Barnegat Bay Partnership
  - Beckley Township
  - Clean Ocean Action
  - Deal Lake Commission
  - Environmental and Shade Tree Commission, AP
  - Jersey Shore Partnership
  - Keansburg
  - Littoral Society
  - Monmouth County
  - NJ Future
  - Ocean County
  - Showroom Theatre, AP
  - Surfside Foundation
  - Jersey Shore Chapter
  - Together North Jersey
  - Toms River Township
  - Union Beach
  - Urban Coast Institute
  - Monmouth University

New Jersey's Cultural Heart

THE SHORE IS NEW JERSEY'S cultural and economic heart. It brings billions of dollars into the state's economy and sustains countless jobs. The Jersey Shore is home to beloved landmarks that dot the coast and extend into the mainland. Memories of local shops and beach activities linger year after year and are passed down between generations. Do you return to the same strip of beach or vacation house every summer? Do you live on the Shore year round and experience the changing seasons and summer swell? Are you ever at the beach in the winter?

BILLIONS OF DOLLARS generated by NEW JERSEY TOURISM \$28



New Jersey's "National Park"

THE PINE BARRENS, a forested area of pine, oak, and cedar trees rooted in sandy soils, rival the nation's great national parks in size. Covering nearly 22% of NJ's land, the Pine Barrens are almost equal in size to Grand Canyon National Park. Forty three endangered or threatened species know the value of this unusual landscape and make their home there. The largely undisturbed land supports a wide range of plant and animal life, in addition to wonderful activities for us all. You might even find the Jersey Deed there!



THE SHORE IS INLAND BAY  
Situated west of Sandy Hook, around the Raritan Bay, and commonly known as the Bayshore region.

THE SHORE IS THE HEADLANDS  
Located in the central shore, with beach-side communities that connect into each other and open onto the ocean.

THE SHORE IS BARRIER ISLANDS  
Found both at Sandy Hook and Barnegat Bay, as well as Little Egg Harbor, and everything to the south.

Have you seen me lately?

THE SHORE IS DIVERSE—there is far more within it than meets the eye. In addition to summer escapes and treasured communities, it is also home to 43 threatened or endangered species. Which of these iconic New Jersey residents have you seen? Check them off your list and take them in!

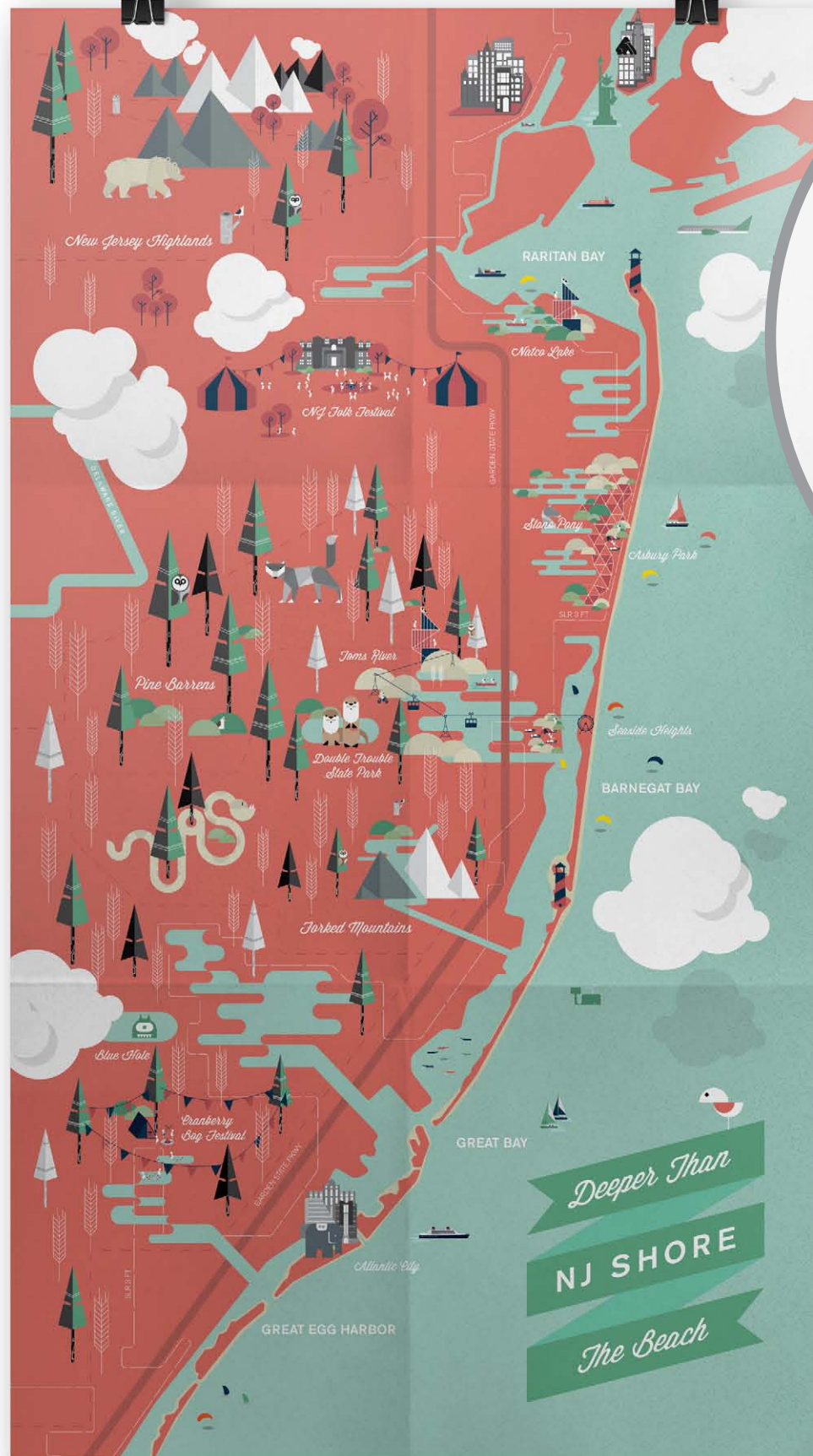
- Barred Owl (*Strix varia*)
- Black Bear (*Ursus americanus*)
- River Otter (*Lutra canadensis*)
- Red Fox (*Vulpes vulpes*)
- Piping Plover (*Charadrius melinotos*)
- Northern Pine Snake (*Pituophis melanoleucus melanoleucus*)

The Shore is at Risk

Over the next 60 years, sea level rise is expected to change the shape of the Jersey Shore as we know it. How can we work together to protect the Shore's memory, its tourism economy, and the many species – both people and animals – that live there today? Visit rebuildbydesign.org to learn more.







Deeper Than  
**NJ SHORE**  
 The Beach

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 Asbury Park  
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 Littoral Society  
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**PINE BARRENS**  
 1,094 SQ MILES

**GRAND CANYON**  
 1,902 SQ MILES

**YOSEMITE**  
 1,169 SQ MILES

**GREAT SMOKIES**  
 815 SQ MILES

**SEQUOIA**  
 632 SQ MILES

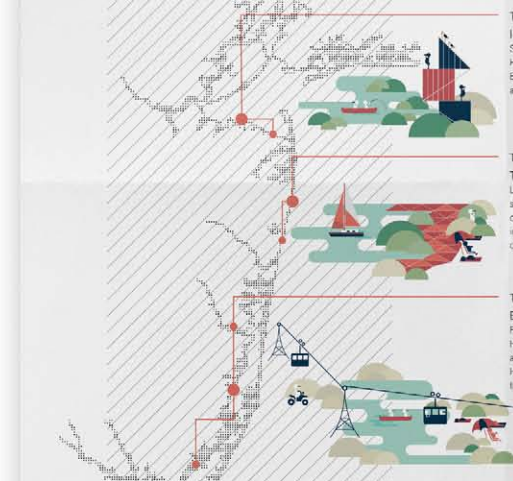
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*Strix varia*
- Black Bear  
*Ursus americanus*
- River Otter  
*Lutra canadensis*
- Red Fox  
*Vulpes vulpes*
- Piping Plover  
*Charadrius melanocephalus*
- Northern Pine Snake  
*Pituophis melanoleucus melanoleucus*

Beloved memories of local shops and beach activities linger year after year and are passed down between generations. Do you return to the same strip of beach or vacation house every summer? Do you live on the Shore year round and experience the changing seasons and summer swell? Are you ever at the beach in the winter?

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**\$28**



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**ECOLOGY**



A black and white photograph of a forest. In the background, a long, low building with a covered walkway is visible. The foreground is a sandy clearing with several picnic tables and a wooden fence. The word "ECOLOGGY" is overlaid in the center in a bold, red, sans-serif font.

# ECOLOGGY



# BEACH BADGES

In Loving Memory  
Of  
GERTRUDE CREMEN

Welcome to  
DUMPTON  
DAILY BADGES  
**\$ 7.00**  
BADGES MUST BE WORN BY PERSONS  
16 YEARS OF AGE OR OLDER  
**SEASON BADGES**  
**\$ 60.00**  
AVAILABLE AT TAYLOR PAVILION  
5th AND OCEAN AVENUES

# ECONOMY







**ECONOMY**





CULTURE



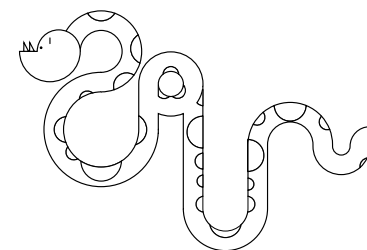
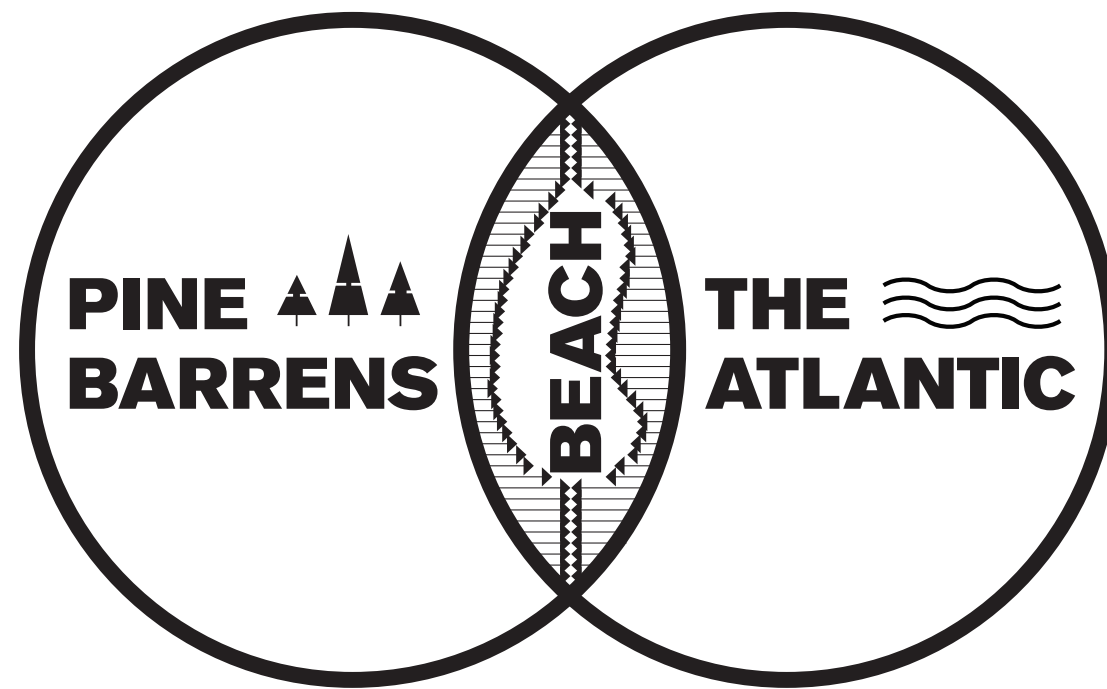


# CULTURE

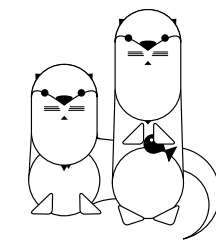
# DIVERSE ECOLOGIES

THE ECOLOGY OF THE SHORE EXTENDS BEYOND THE SLIVER OF SAND KNOWN AS THE BEACH

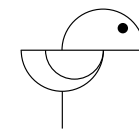
## Deeper Than The Beach



 Northern Pine Snake  
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## New Jersey's "National Park"

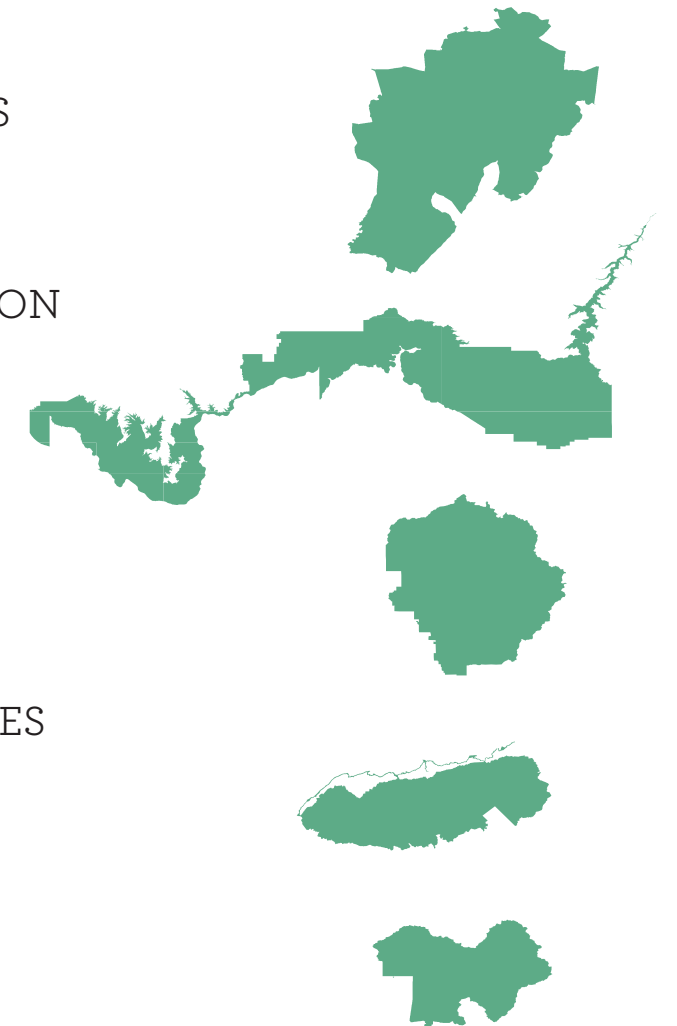
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1,902 SQ MILES

YOSEMITE  
1,169 SQ MILES

GREAT SMOKIES  
815 SQ MILES

SEQUOIA  
632 SQ MILES



# VULNERABLE ECONOMIES

THE SHORE'S TOURISM ECONOMY IS DRIVEN BY THE UNDERLYING COASTAL ECOLOGY

BILLIONS  
OF DOLLARS

*generated by*

NEW JERSEY  
TOURISM

\$28

## Summer Swell



PERCENT OF TOTAL NEW JERSEY LODGING  
SALES GENERATED IN THE STUDY AREA

74%

AVG. INCOME OF  
A SHORE TOURIST

**\$99,000**

AVG. INCOME OF  
A SHORE RESIDENT

**\$39,000**

## Car Culture



PERCENT OF VISITORS THAT TRAVEL TO THE  
JERSEY SHORE VIA PRIVATE CAR

89%

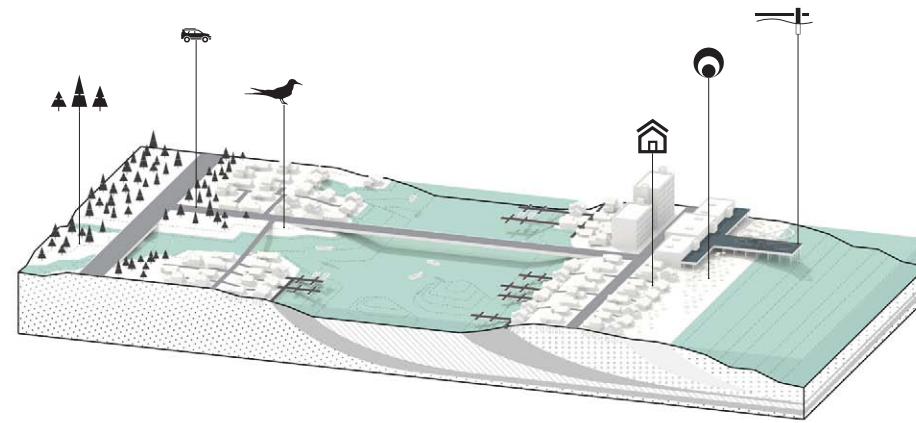
PERCENT OF ALL MAJOR TRAFFIC  
INTERSECTIONS IN THE STUDY AREA  
THAT ARE CONGESTED

SIXTY PERCENT



# THREE COASTAL TYPOLOGIES

BARRIER ISLAND



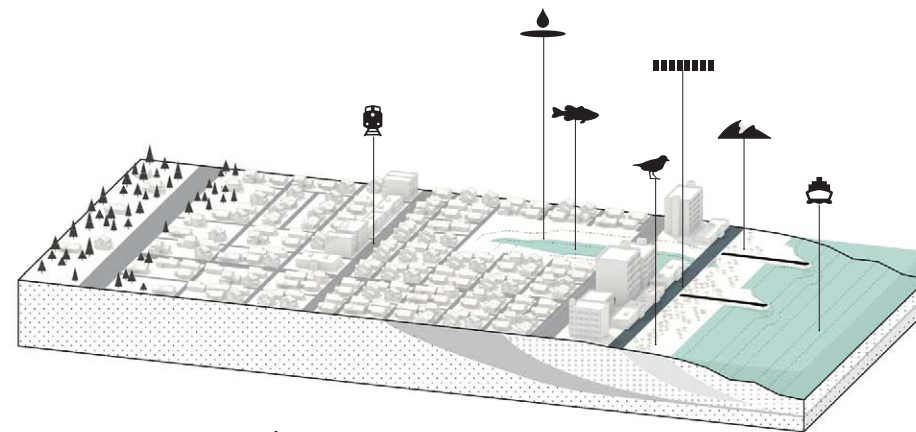
PIER



PINE BARRENS



HEADLANDS



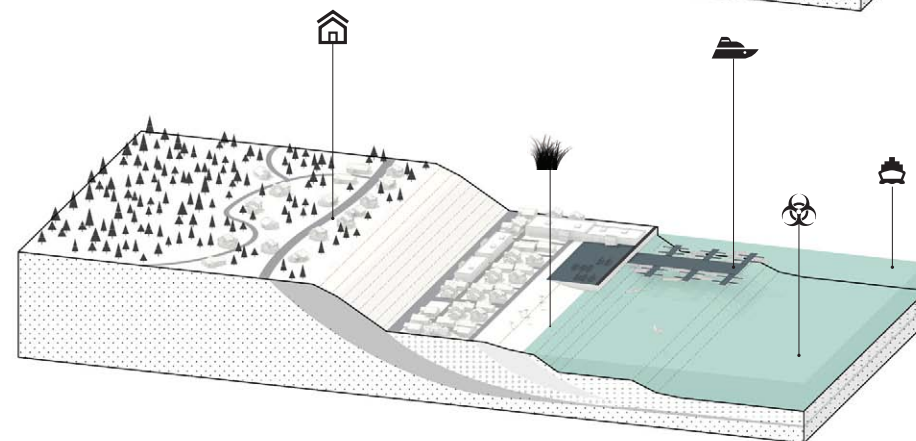
BOARDWALK



SAND DUNE



INLAND BAY



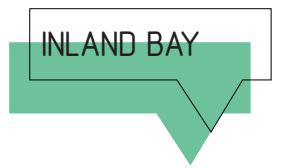
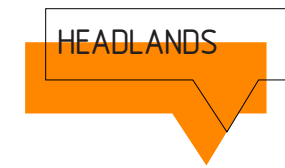
MARINA



MARSH



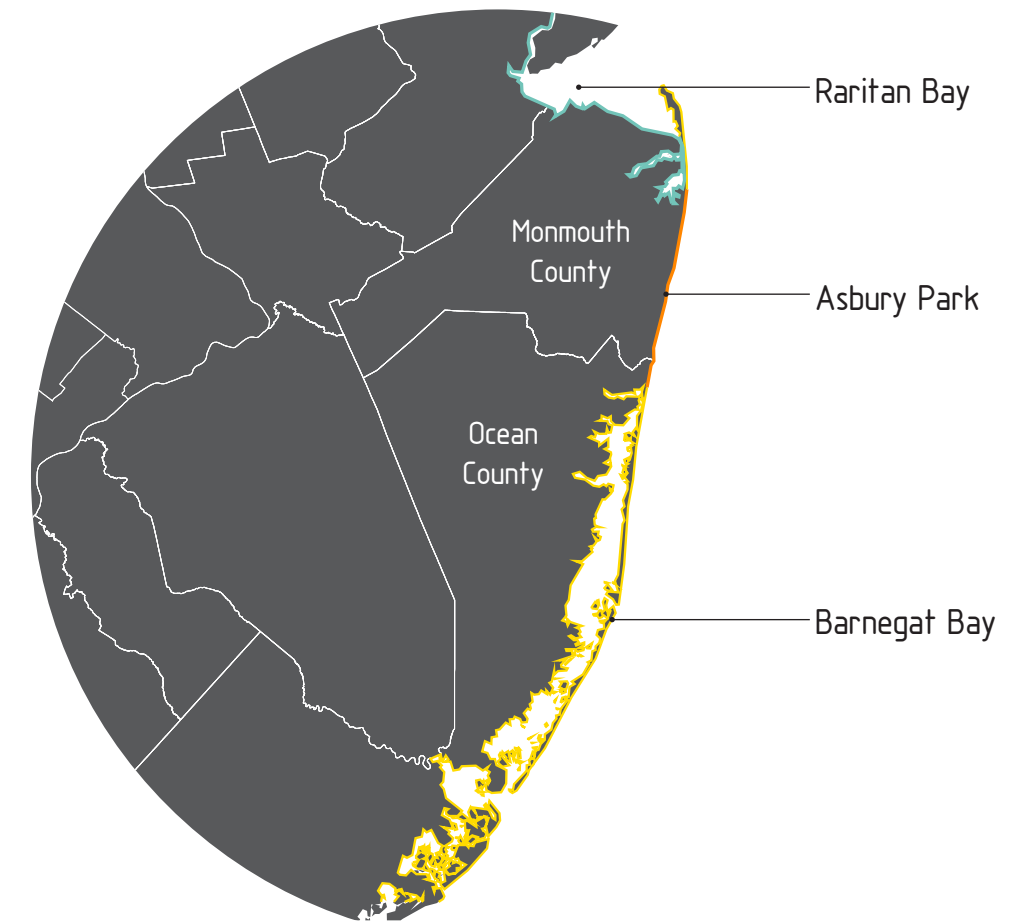
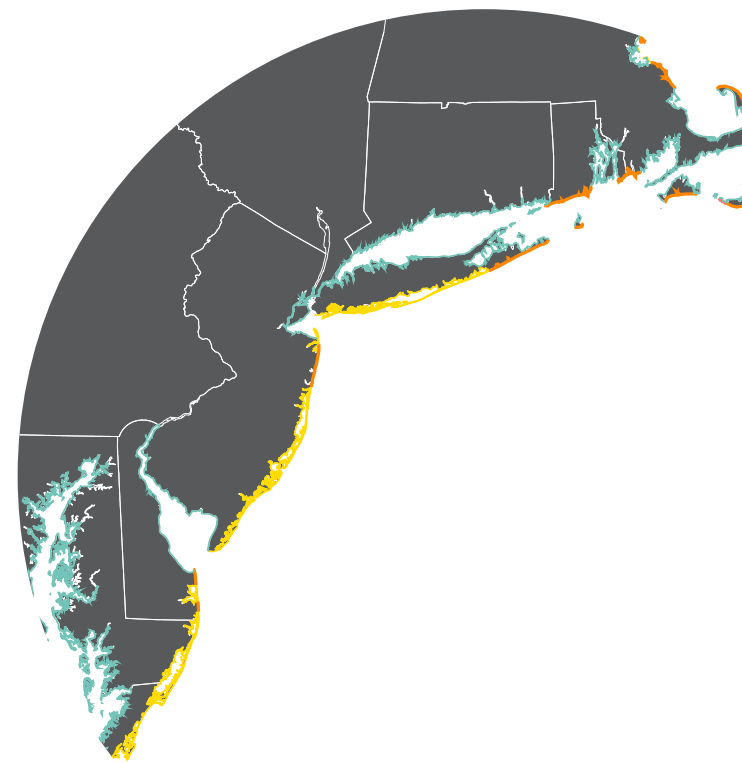
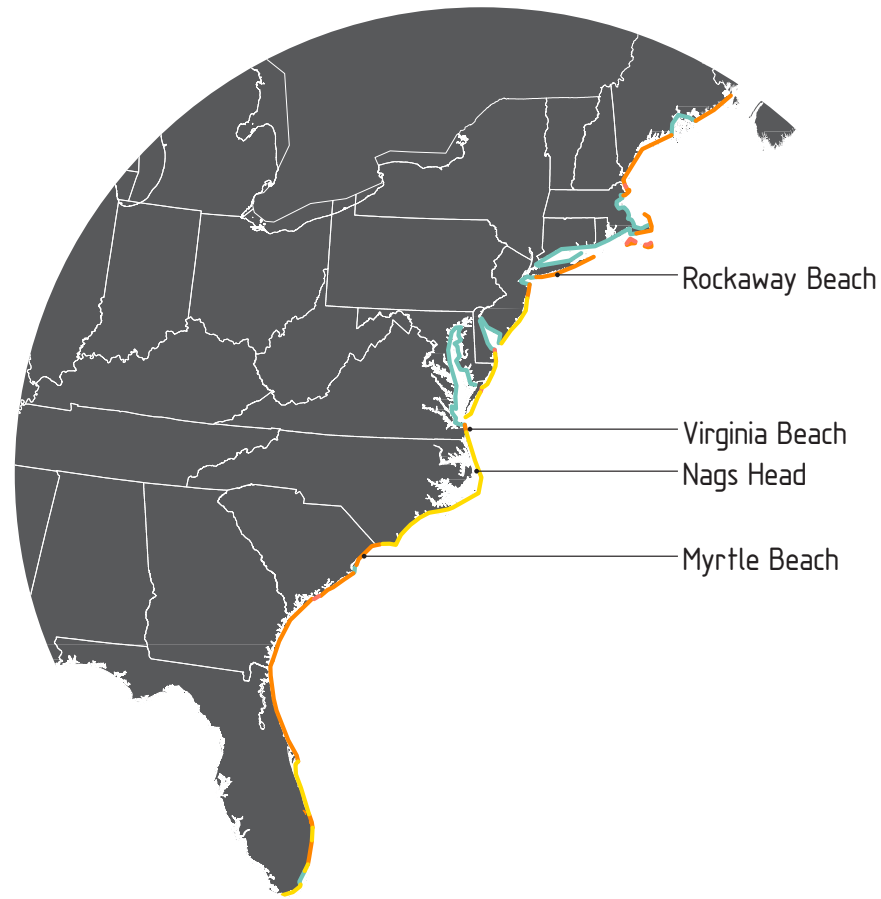
# REGIONALLY RELEVANT



## ATLANTIC SEABOARD

## SANDY AFFECTED AREAS

## NEW JERSEY SHORE



Linear Miles

Population

# of 2nd Homes

Linear Miles

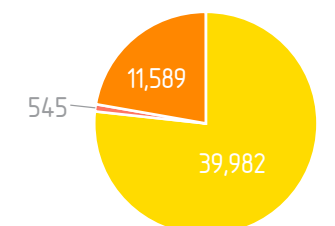
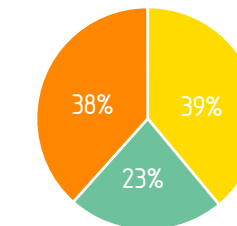
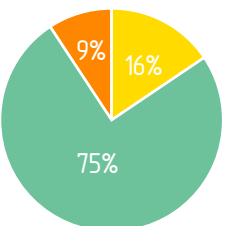
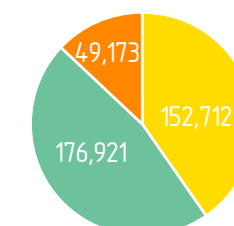
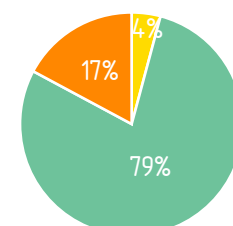
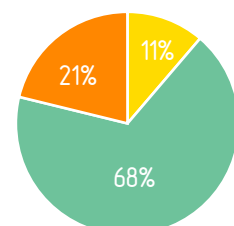
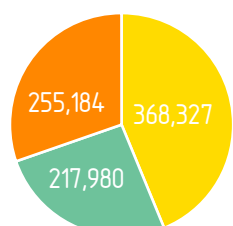
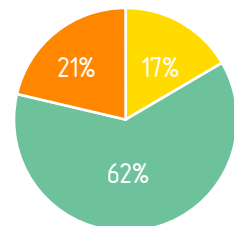
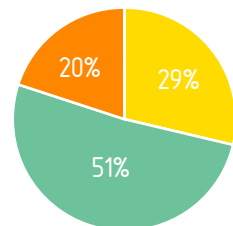
Population

# of 2nd Homes

Linear Miles

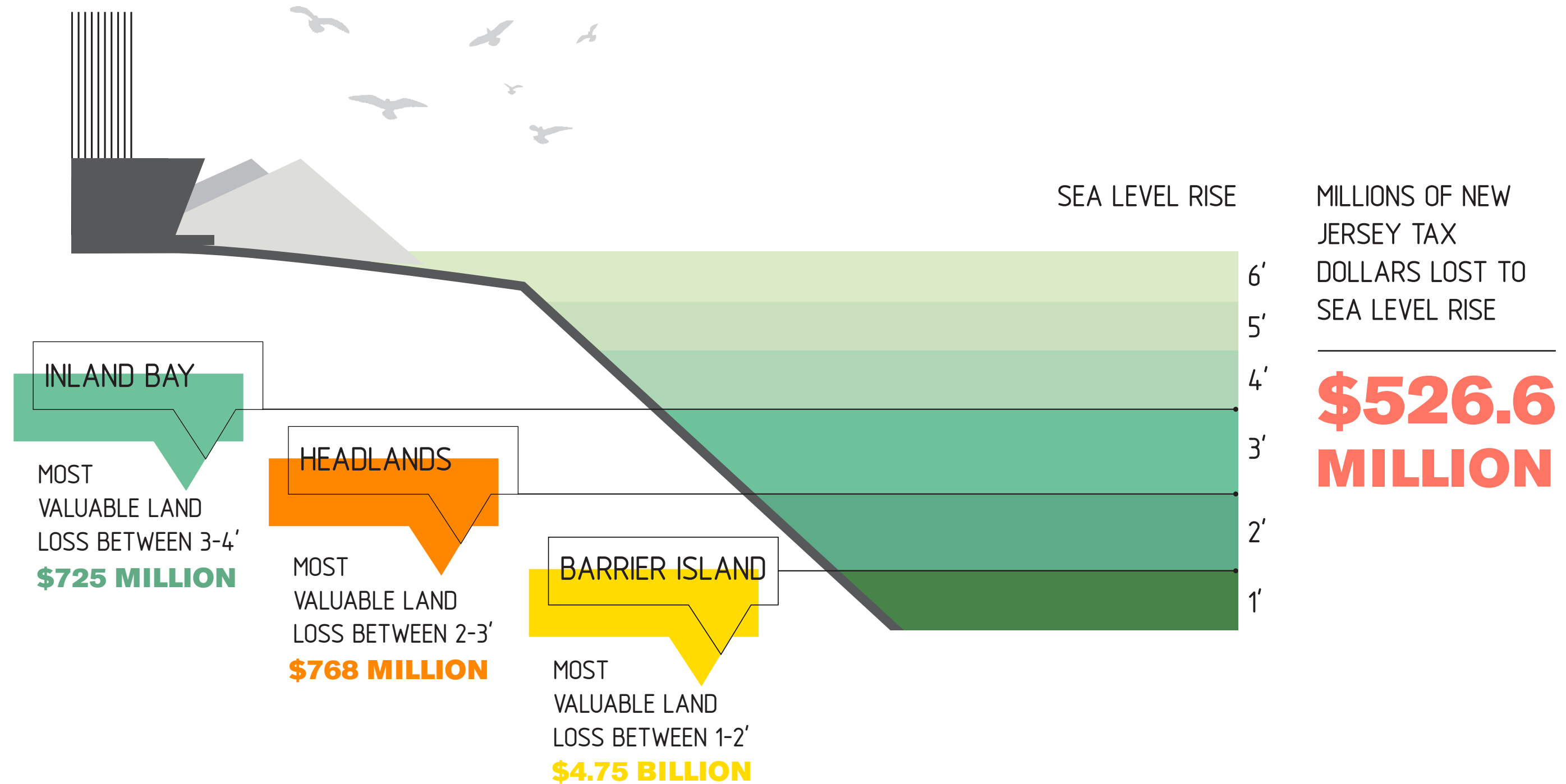
Population

# of 2nd Homes



# SHORE IS AT RISK

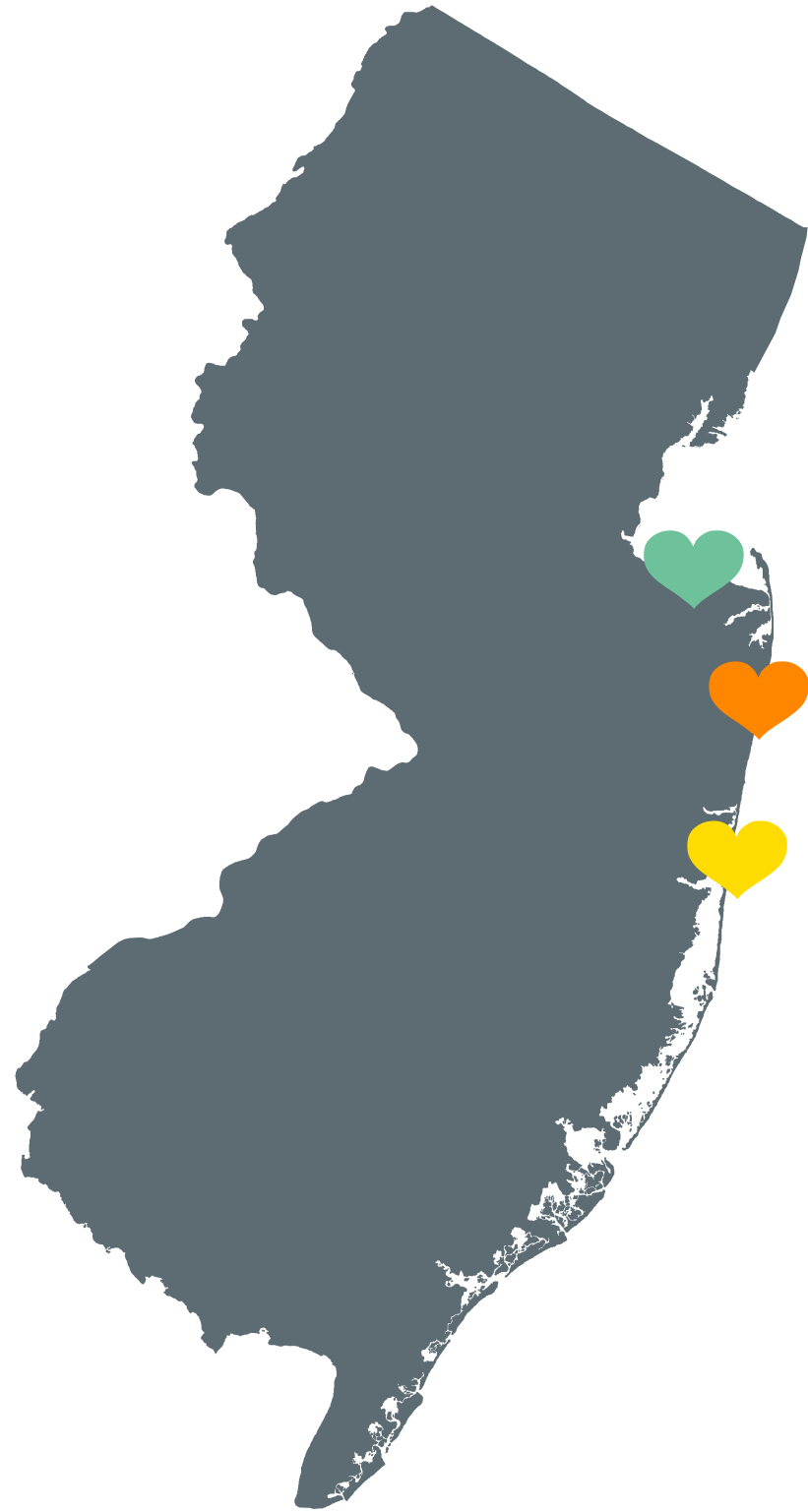
VARIED DYNAMICS OF SEA LEVEL RISE AND LAND VALUE





# A RESILIENT JERSEY SHORE

THREE CATALYSTS TO DRIVE INNOVATION IN RESILIENCY



INLAND BAY



HEADLANDS



BARRIER ISLAND







**HEAD**

---

**LANDS**





# EXISTING CONDITIONS

**13 SMALL COMMUNITIES**

7 TRANSIT STOPS

**22 DAMAGED COASTAL LAKES**

TOTAL POPULATION OF  
HEADLANDS COMMUNITY

LINEAR FEET OF  
HEADLANDS BOARDWALK

**104,457**

**50,803<sup>ft</sup>**



# RISK

## LOWER RISK FROM SLR



## UPLAND RUNOFF

% OF ASBURY'S IMPERVIOUS SURFACES

**45%**

% OF WATERSHED THAT DRAINS TO DEAL LAKE

**98%**

## DIVIDED CULTURE

ASBURY'S RACE RIOTS

**1970**

# STRATEGY

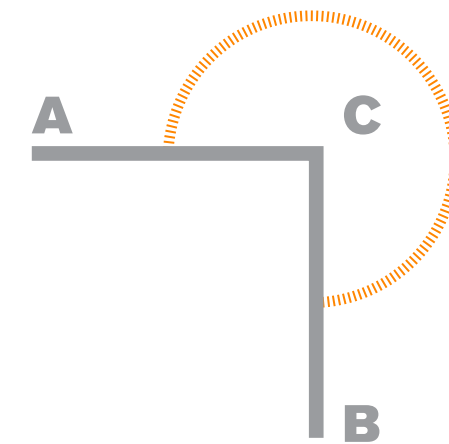
## INCREASE SLR PROTECTION

  
**BOARDWALK**



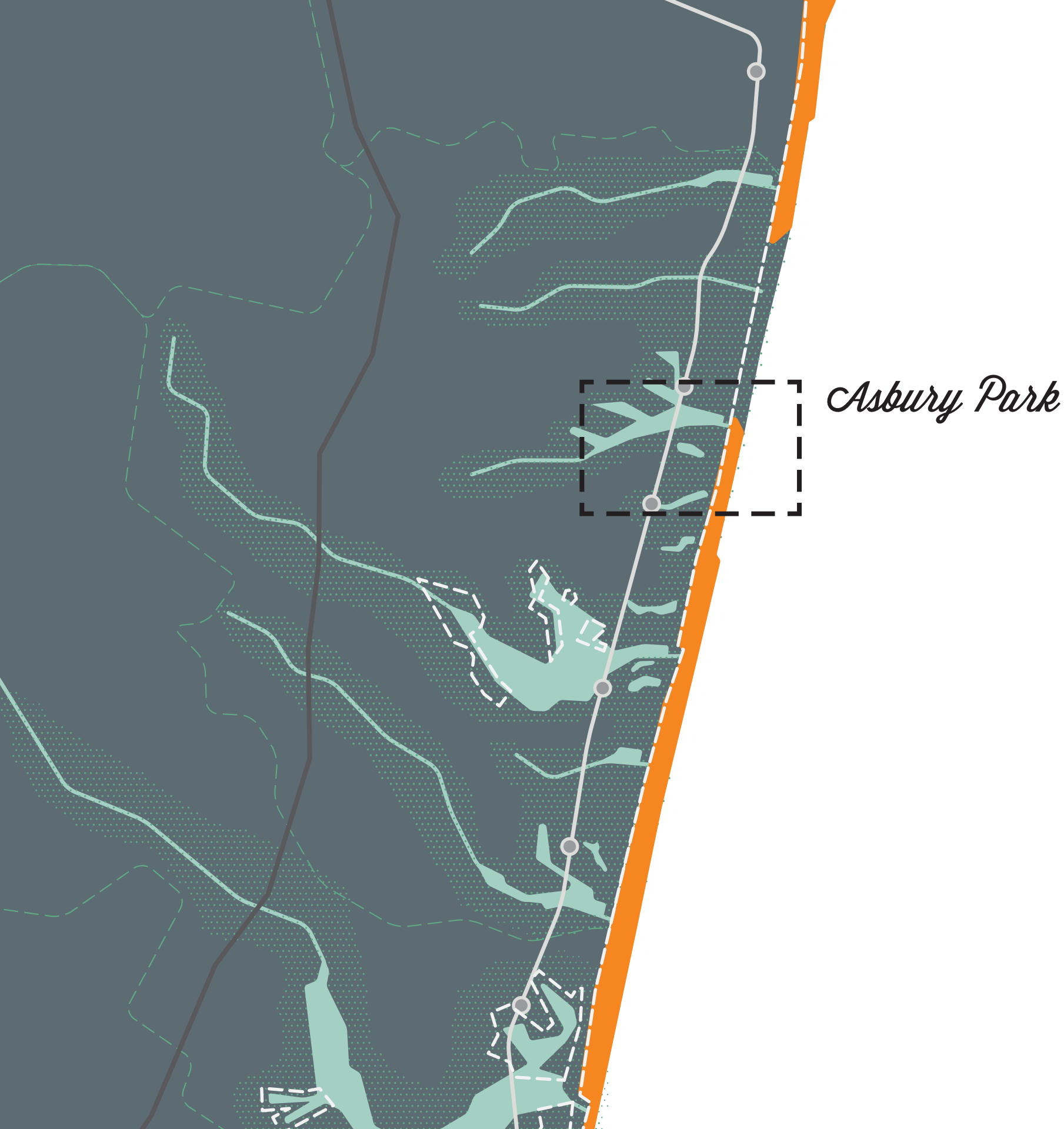
  
**SAND DUNE**

## RETHINK INFRASTRUCTURE



**A+B=C**

## CONNECT A DIVIDED COMMUNITY







**DIVIDED COMMUNITY  
AND GREY STREETS**

---

**VULNERABLE BOARDWALK  
BUSINESSES AND  
SERVICES**

---

**DEGRADED LAKES  
AND LAKE SHORES**

---

# **ASBURY PARK, NJ TODAY**



*Greetings from Asbury Park!*

CONNECTED WEST/EAST  
GREEN STREETS

PROTECTIVE BOARDWALK  
PRESERVES & REINVENTS  
BEACH ECOLOGY

ECOLOGICALLY HEALTHY  
LAKES CONNECTING  
TO BOARDWALK & BEACH

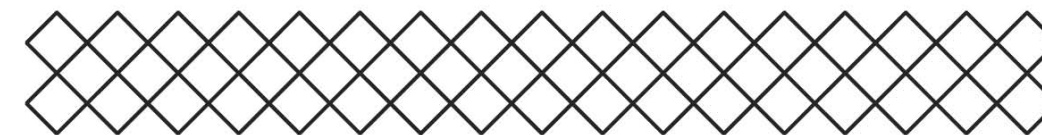
# RESILIENT ASBURY PARK





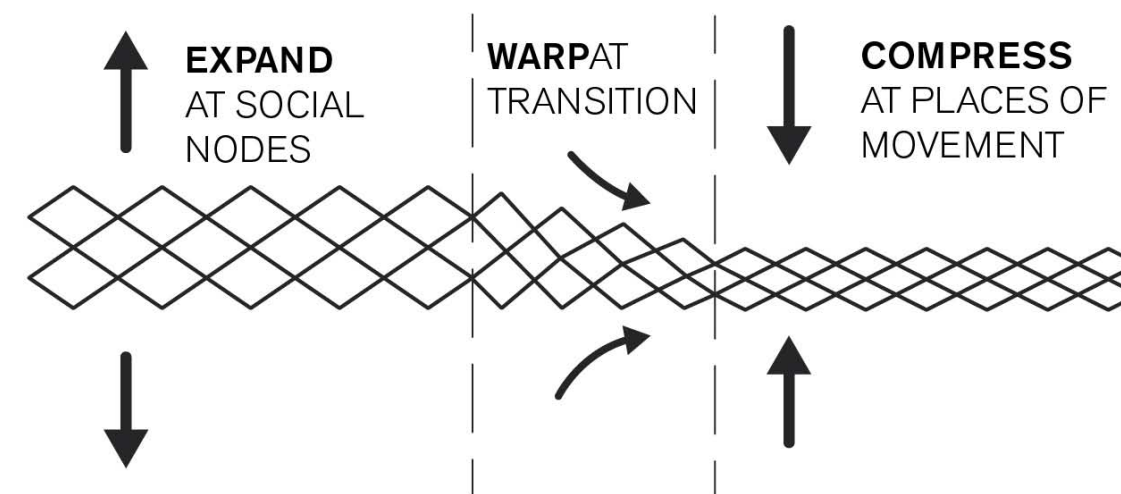
# 1

## DUNE FENCE GRID



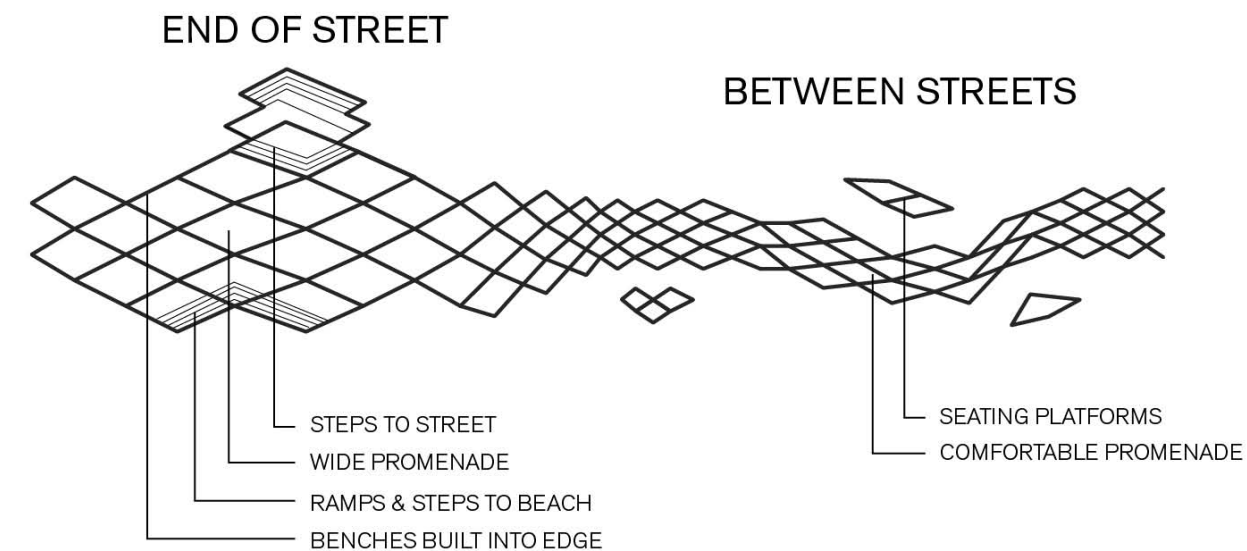
# 2

## CUSTOMIZE THE GRID



# 3

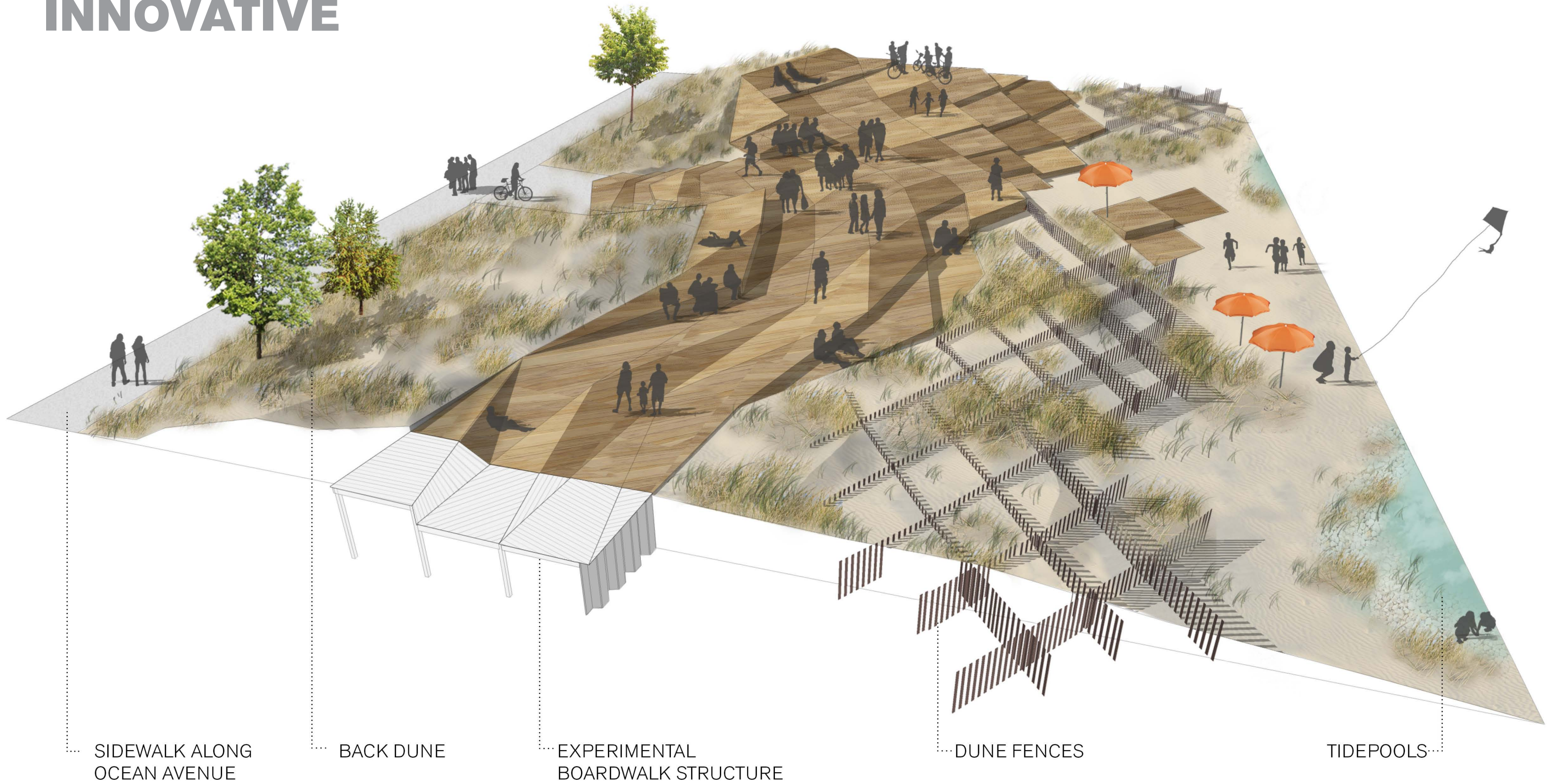
## BUILD A BOARDWALK



**INNOVATIVE**



# INNOVATIVE



SIDEWALK ALONG  
OCEAN AVENUE

BACK DUNE

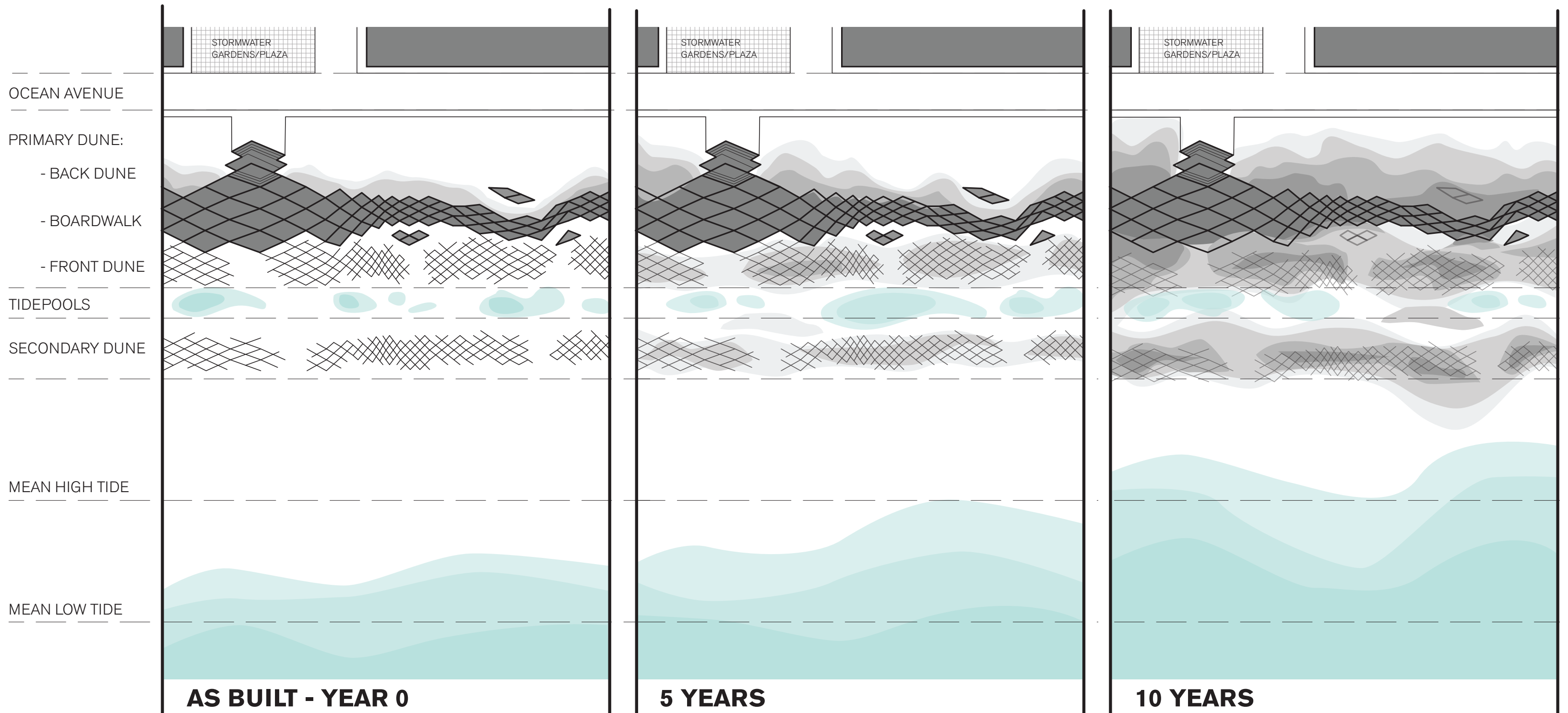
EXPERIMENTAL  
BOARDWALK STRUCTURE

DUNE FENCES

TIDEPOOLS



# EVOLUTION: DUNE-BUILDING BOARDWALK OVER TIME















*Eat at Franks!*

Dunes Park  
NJ SHORE  
The Coast





**INLAND**

---

**BAY**

# EXISTING CONDITIONS

**11** SMALL COMMUNITIES

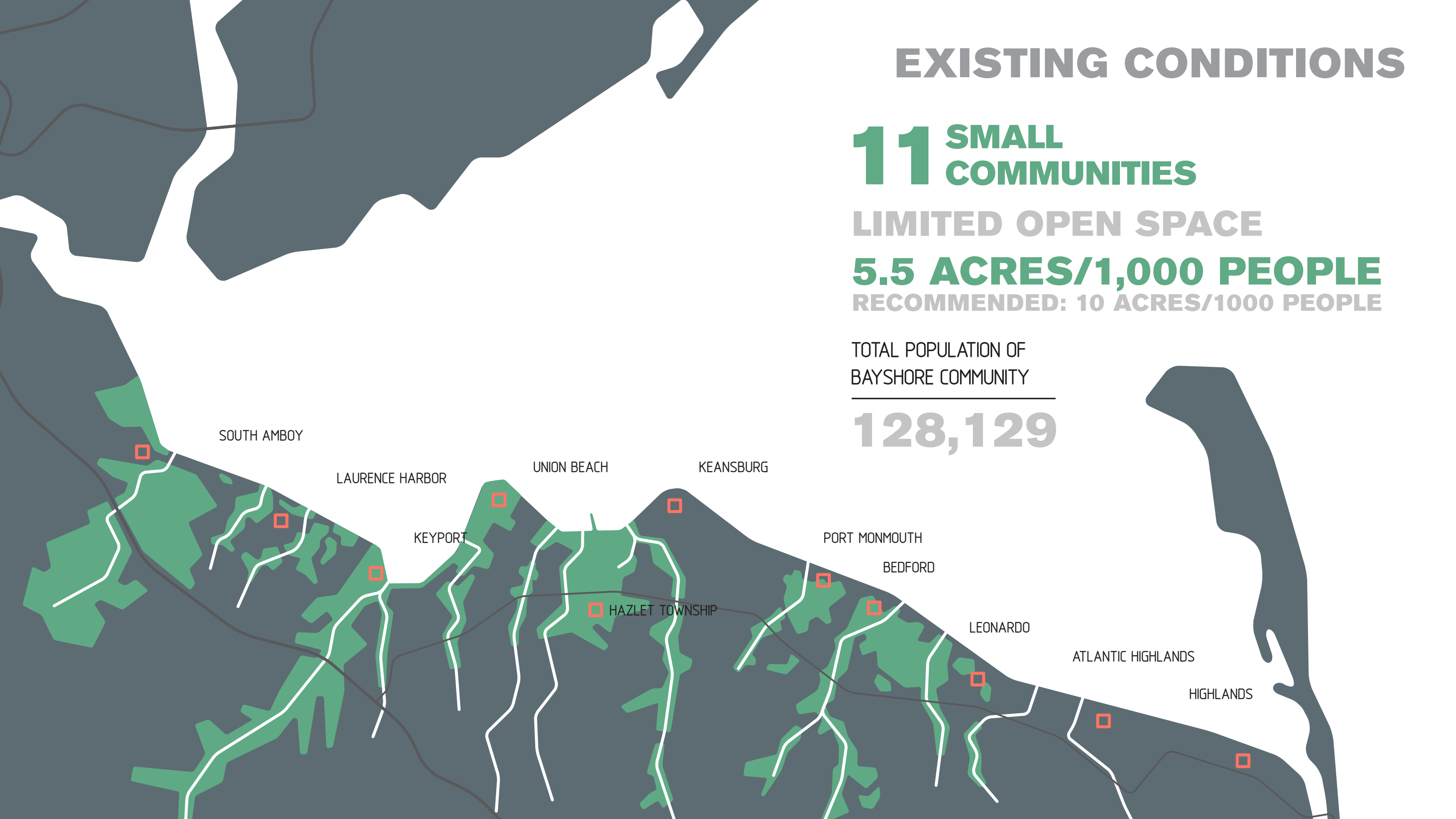
LIMITED OPEN SPACE

**5.5 ACRES/1,000 PEOPLE**

RECOMMENDED: 10 ACRES/1000 PEOPLE

TOTAL POPULATION OF BAYSHORE COMMUNITY

**128,129**





# RISK

## SURGE & UPLAND FLOODING

**53%** LOW INCOME POP. IMPACTED  
BY A 100 YEAR FLOOD EVENT

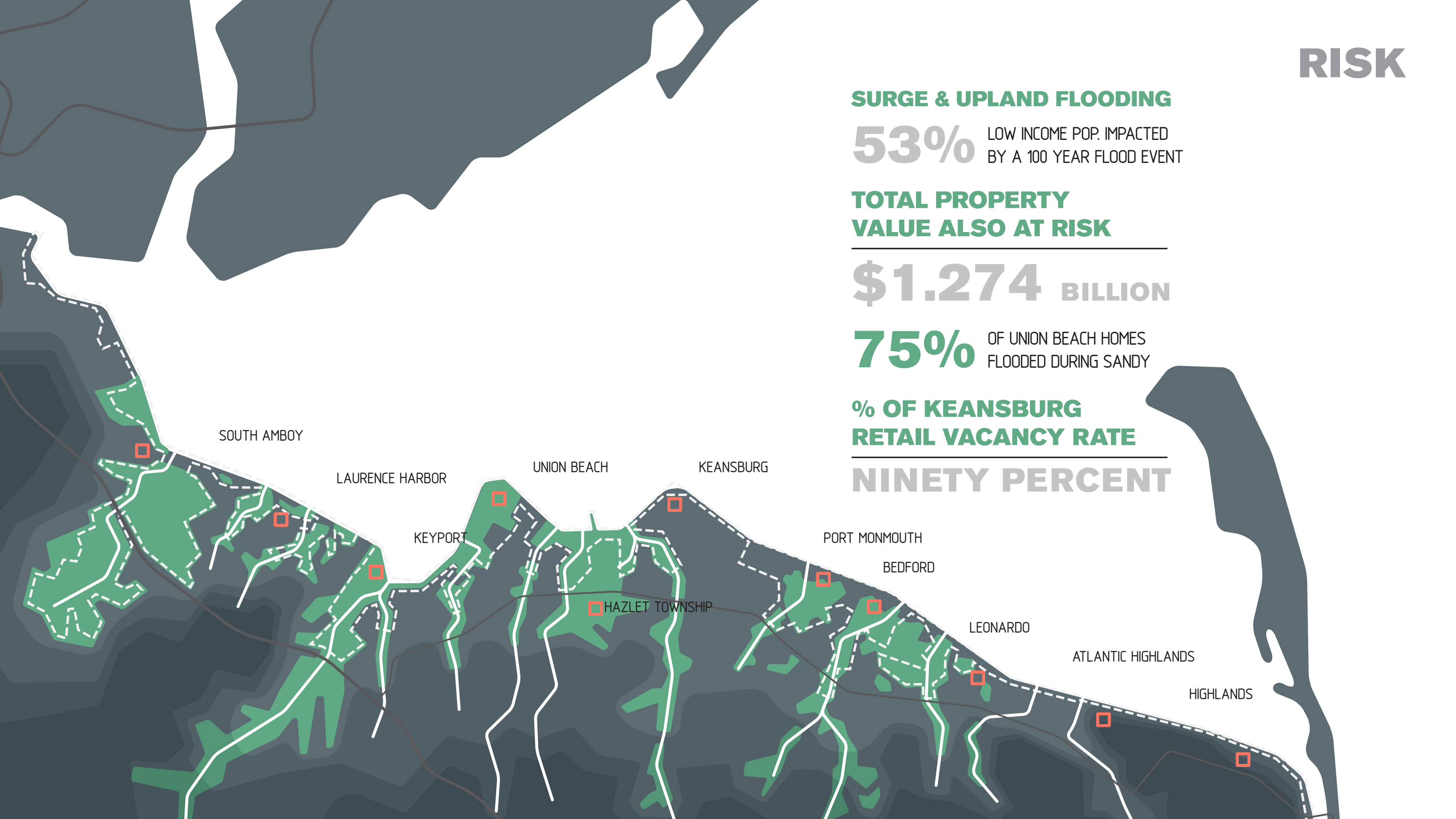
## TOTAL PROPERTY VALUE ALSO AT RISK

**\$1.274** BILLION

**75%** OF UNION BEACH HOMES  
FLOODED DURING SANDY

## % OF KEANSBURG RETAIL VACANCY RATE

**NINETY PERCENT**



# STRATEGY

## MAKING ROOM FOR WATER



**MARINA**



**MARSH**

ADDED OPEN SPACE  
VIA NATCO LAKE ACCESS

**432 ACRES**  
(331 PUBLICLY OWNED)

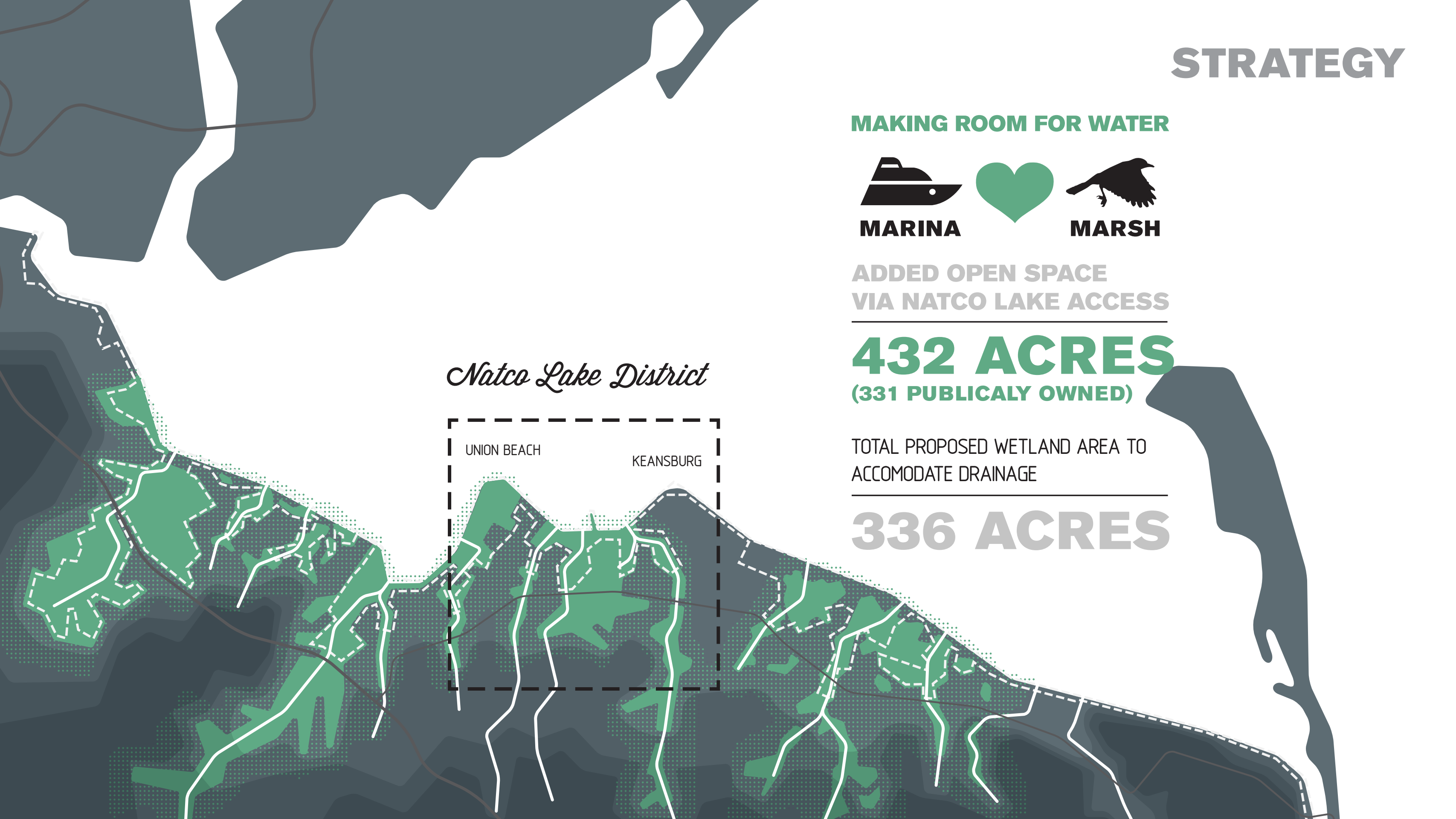
TOTAL PROPOSED WETLAND AREA TO  
ACCOMMODATE DRAINAGE

**336 ACRES**

### *Natco Lake District*

UNION BEACH

KEANSBURG







**VIEWS TO MANHATTAN**

**“WHEN IT RAINS,  
IT FLOODS...”**

**STORM SURGE**

**STORM SURGE**

**ONE PROPERTY  
OWNER, IFF**

**“WE NEED TO  
MAKE ROOM  
FOR WATER...”**

**NATCO LAKE**

**“NATCO LAKE?  
WHAT NATCO LAKE?”**



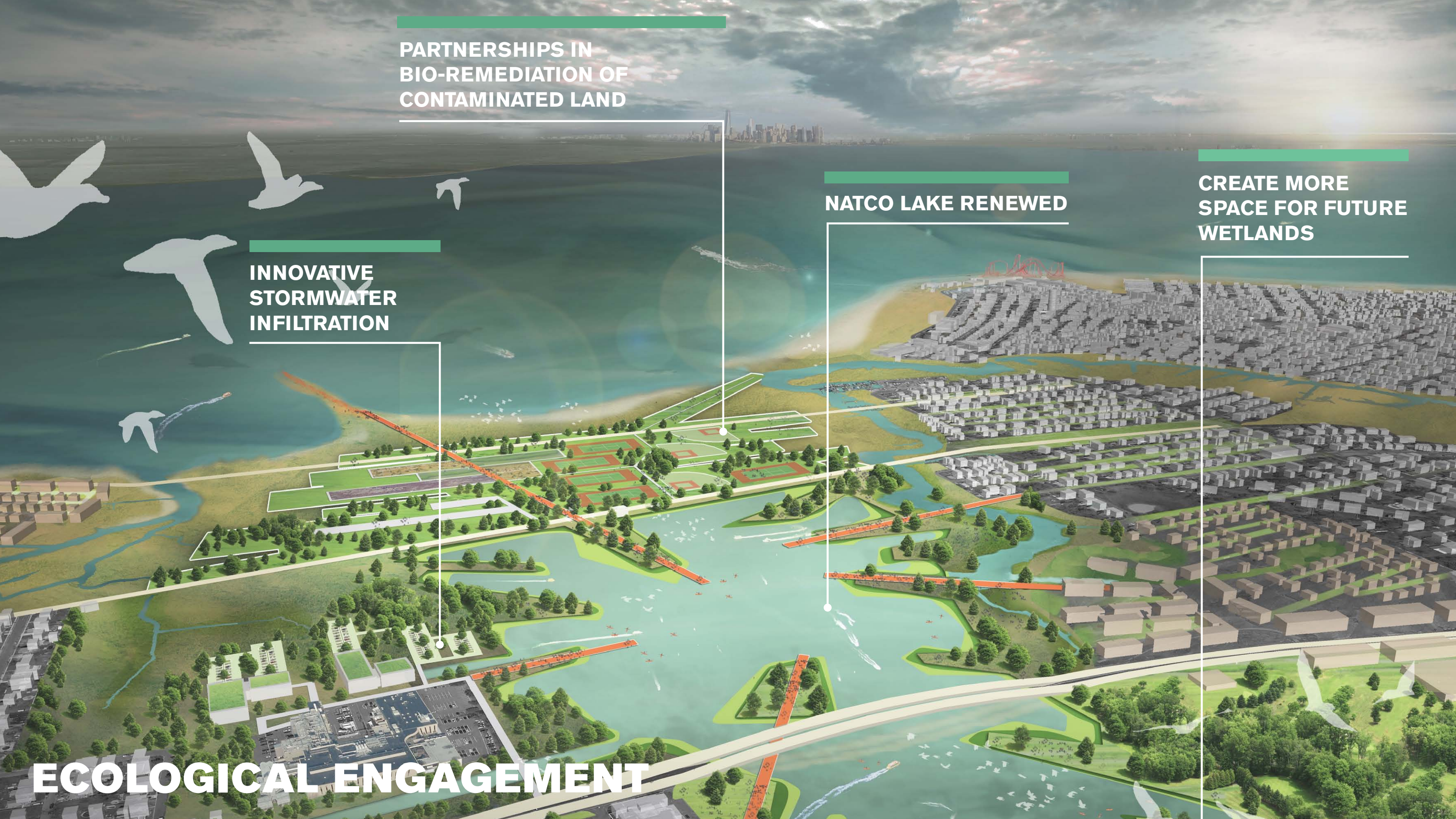
**PARTNERSHIPS IN  
BIO-REMEDIATION OF  
CONTAMINATED LAND**

**INNOVATIVE  
STORMWATER  
INFILTRATION**

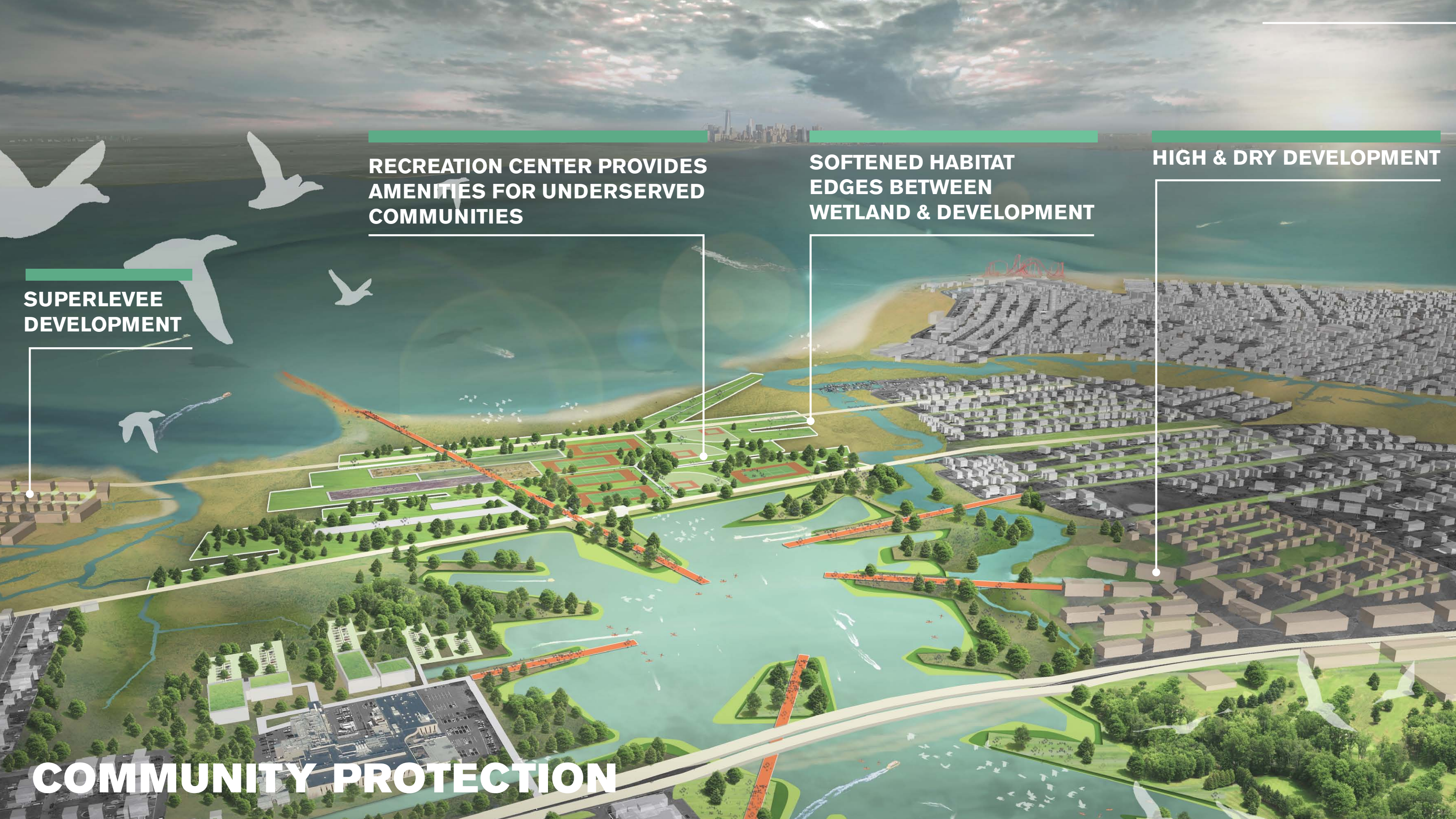
**NATCO LAKE RENEWED**

**CREATE MORE  
SPACE FOR FUTURE  
WETLANDS**

**ECOLOGICAL ENGAGEMENT**







**RECREATION CENTER PROVIDES AMENITIES FOR UNDERSERVED COMMUNITIES**

**SOFTENED HABITAT EDGES BETWEEN WETLAND & DEVELOPMENT**

**HIGH & DRY DEVELOPMENT**

**SUPERLEVEE DEVELOPMENT**

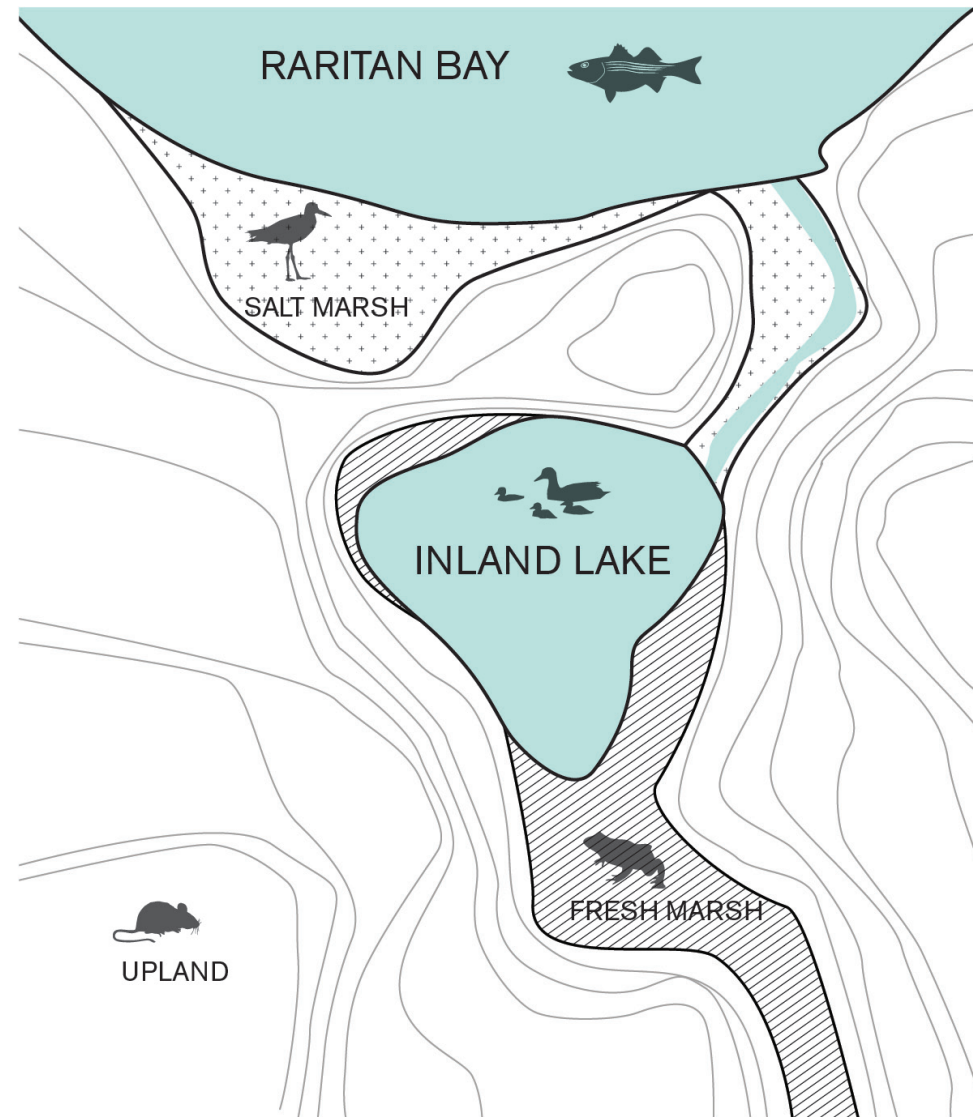
**COMMUNITY PROTECTION**



# EVOLUTION: HABITAT ENGINE

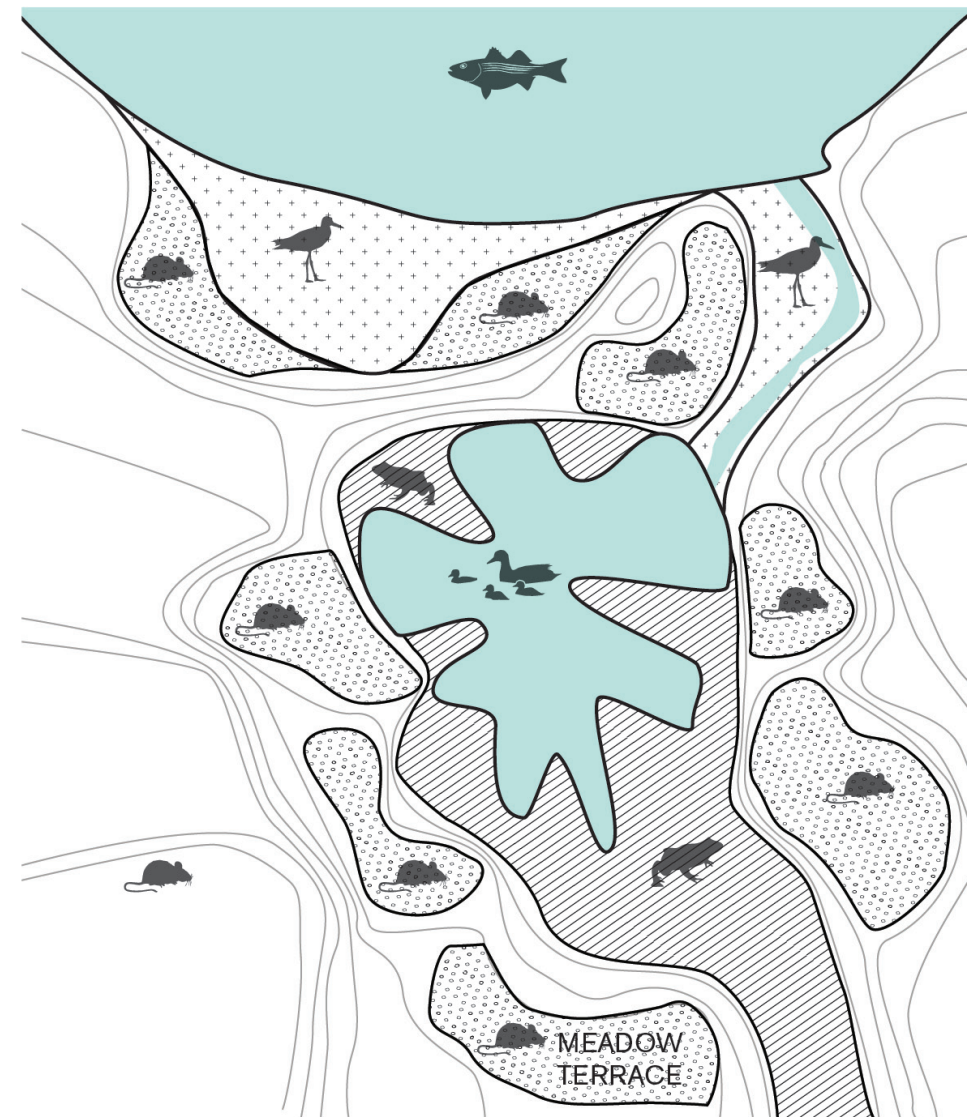
## EXISTING CONDITIONS - LIMITED HABITAT

Limited palette of habitats, no space for habitat migration in the case of sea level rise.



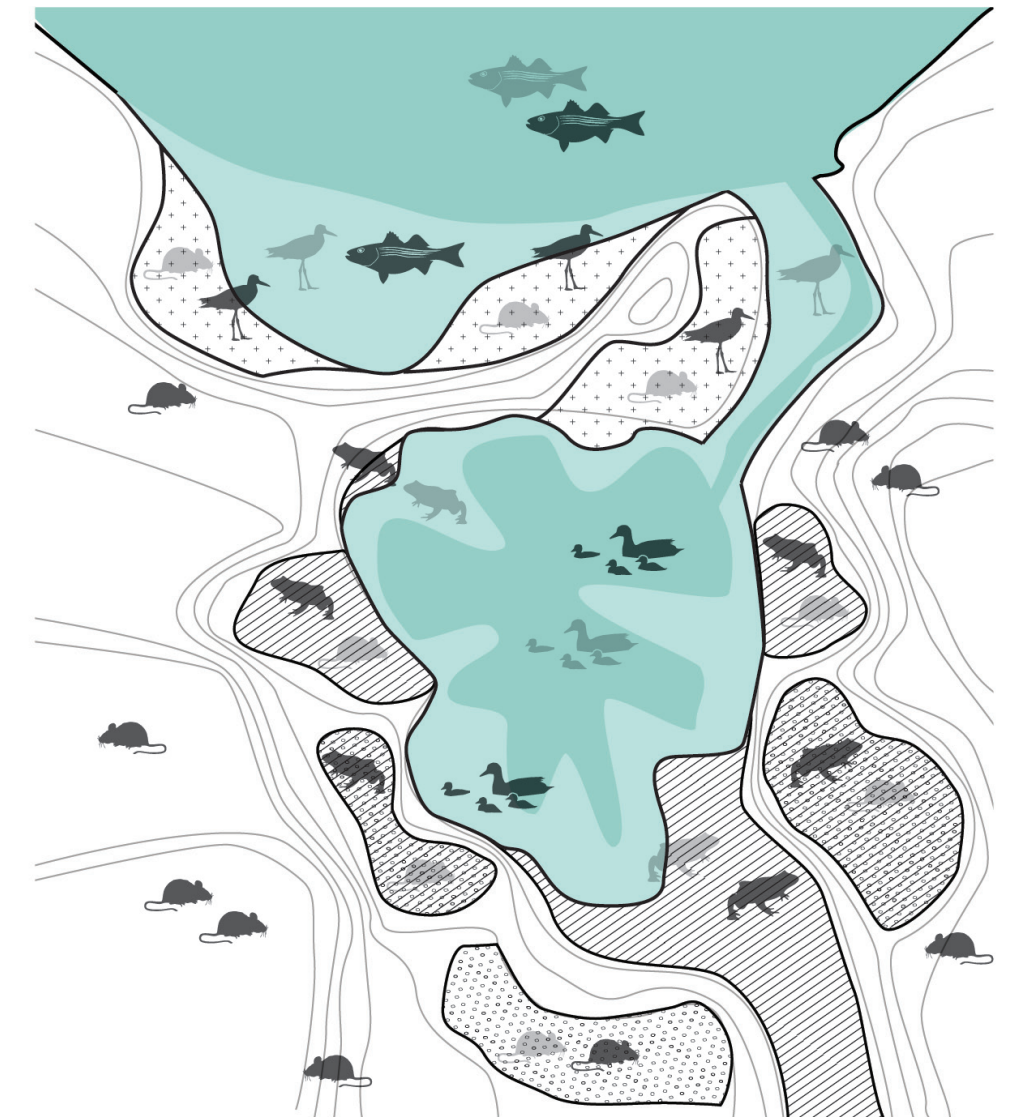
## 20 YEARS - CREATE ADDITIONAL HABITAT

Carve habitat terraces adjacent to existing habitat, creating space for water to take over salt marsh/wetland & salt marsh/wetland to take over meadows as sea level rises.



## 50 YEARS - SEA LEVEL RISES, HABITATS MIGRATE

Sea level rises, flooding salt marshes and some freshwater wetland. Terraces provide new salt marsh and wetland habitat for species to move into.







# NATCO LAKE COASTAL PARK

Deeper Than  
NJ SHORE  
The Beach



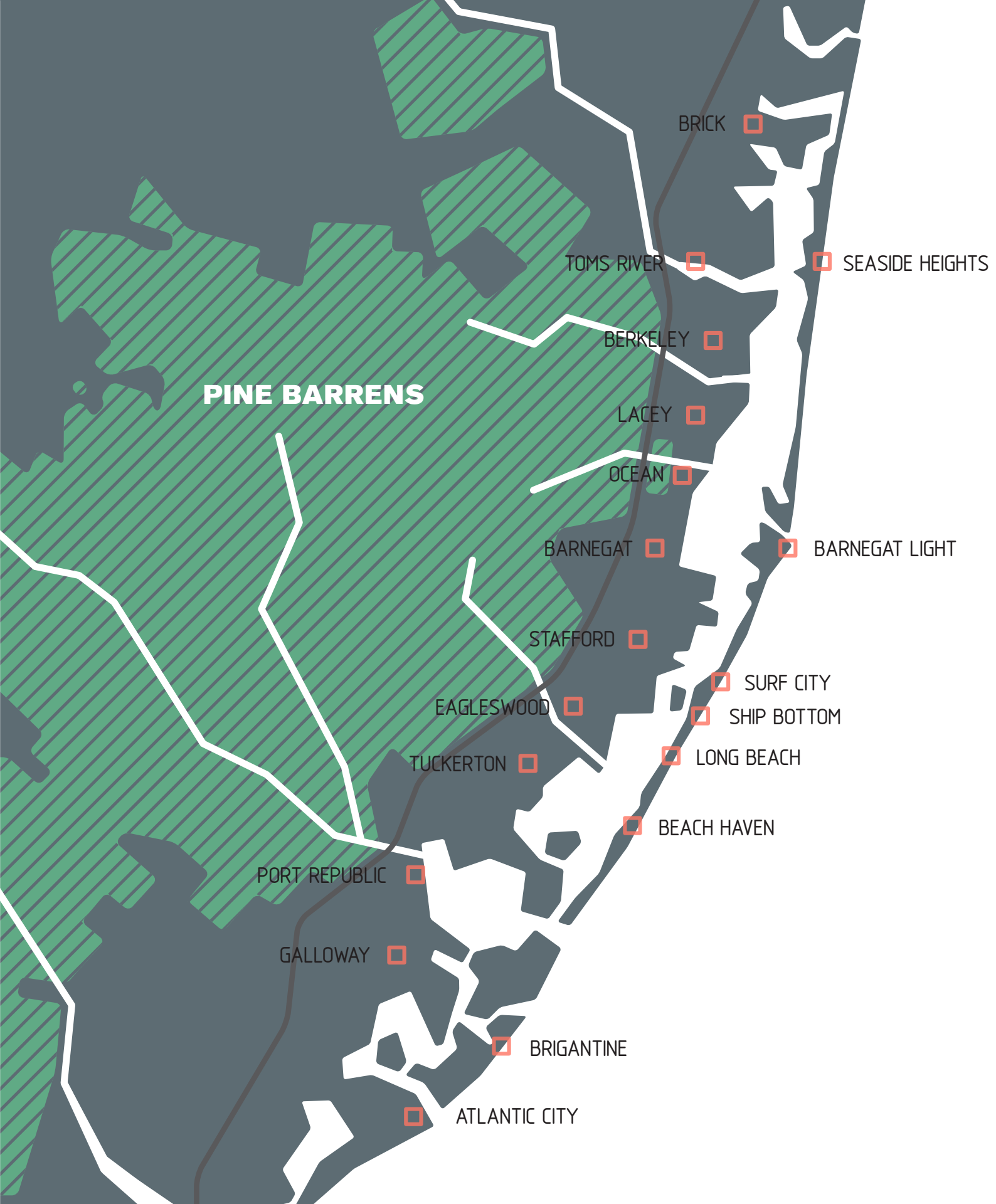


**BARRIER**

---

**ISLAND**





# EXISTING CONDITIONS

**11 INLAND COMMUNITIES**

**EIGHT BI COMMUNITIES**

NUMBER OF PASSENGER RAIL STOPS

**ZERO**

TOTAL POPULATION OF THE BARRIER ISLANDS

**310,800**

## SUMMER SWELL

% OF VISITORS THAT TRAVEL TO THE SHORE VIA A PRIVATE CAR

**89%**

% OF ALL MAJOR INTERSECTIONS THAT ARE CONGESTED

**60%**



# RISK



## HIGH VULNERABILITY



**97%** OF SECOND HOMES ARE AT RISK

VOLUME OF SECOND HOMES AT RISK

**32,501**

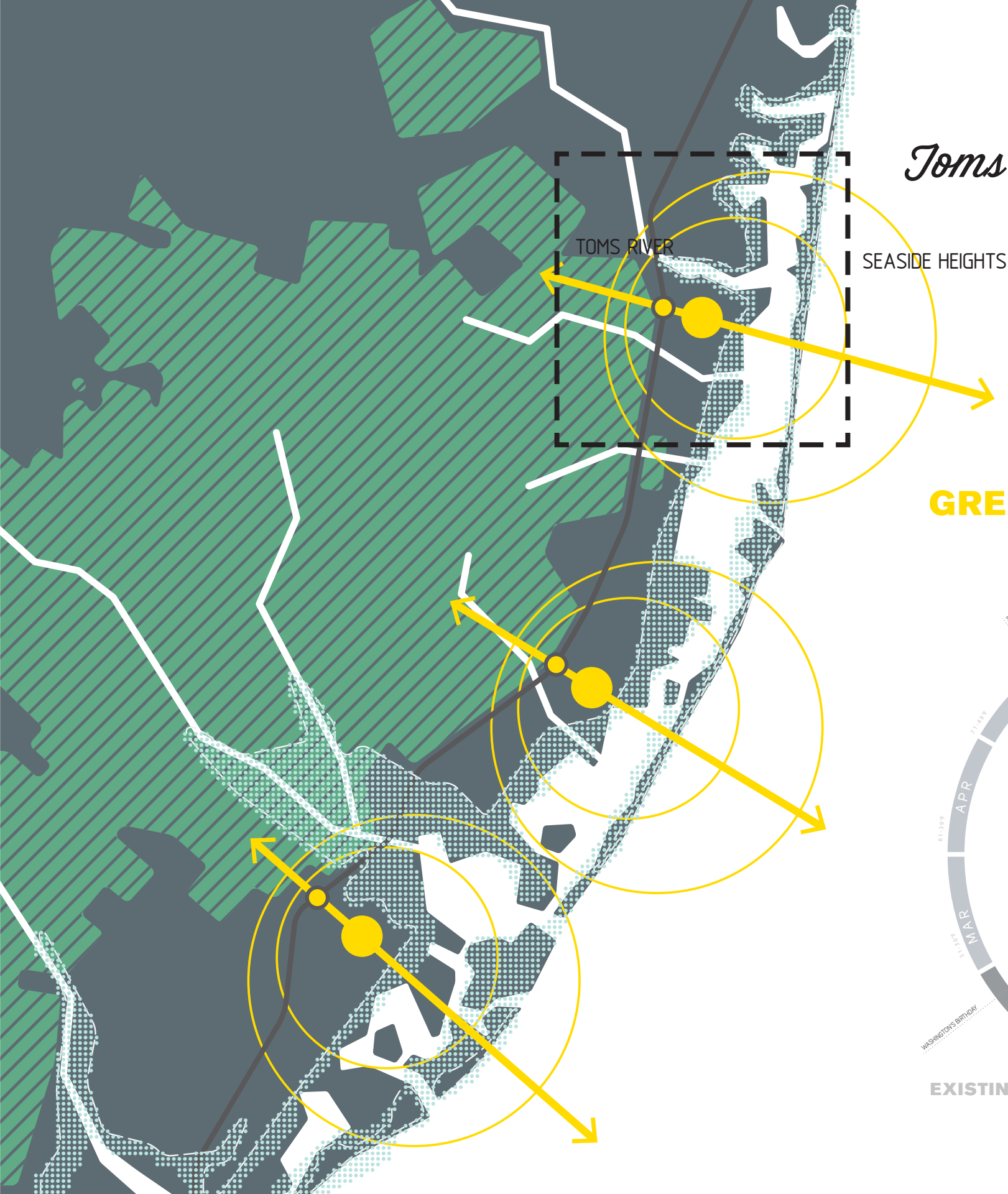
ACRES LOST UNDER JUST 1 FOOT OF SLR

**43,823**



# STRATEGY

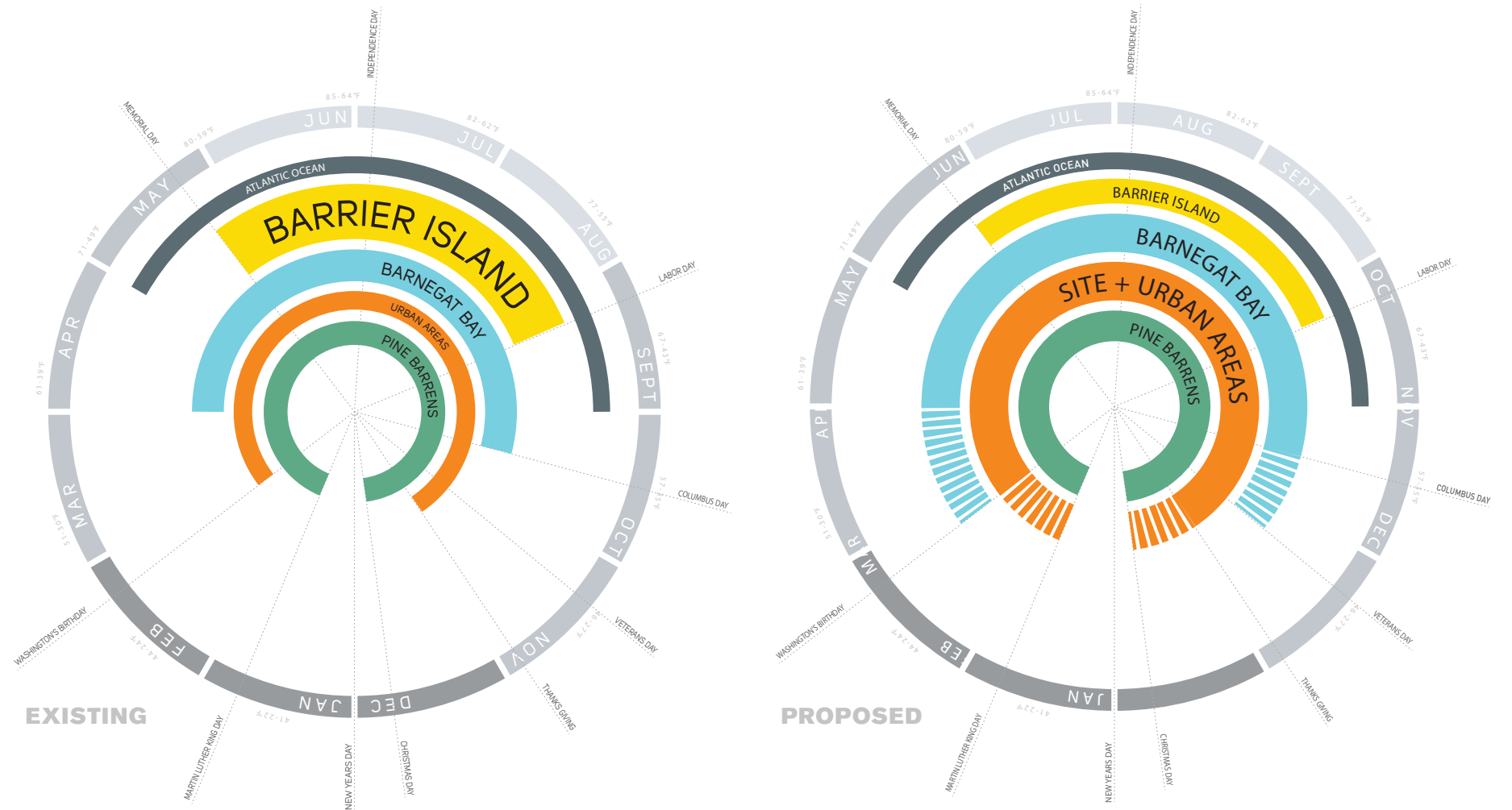
## Toms River District



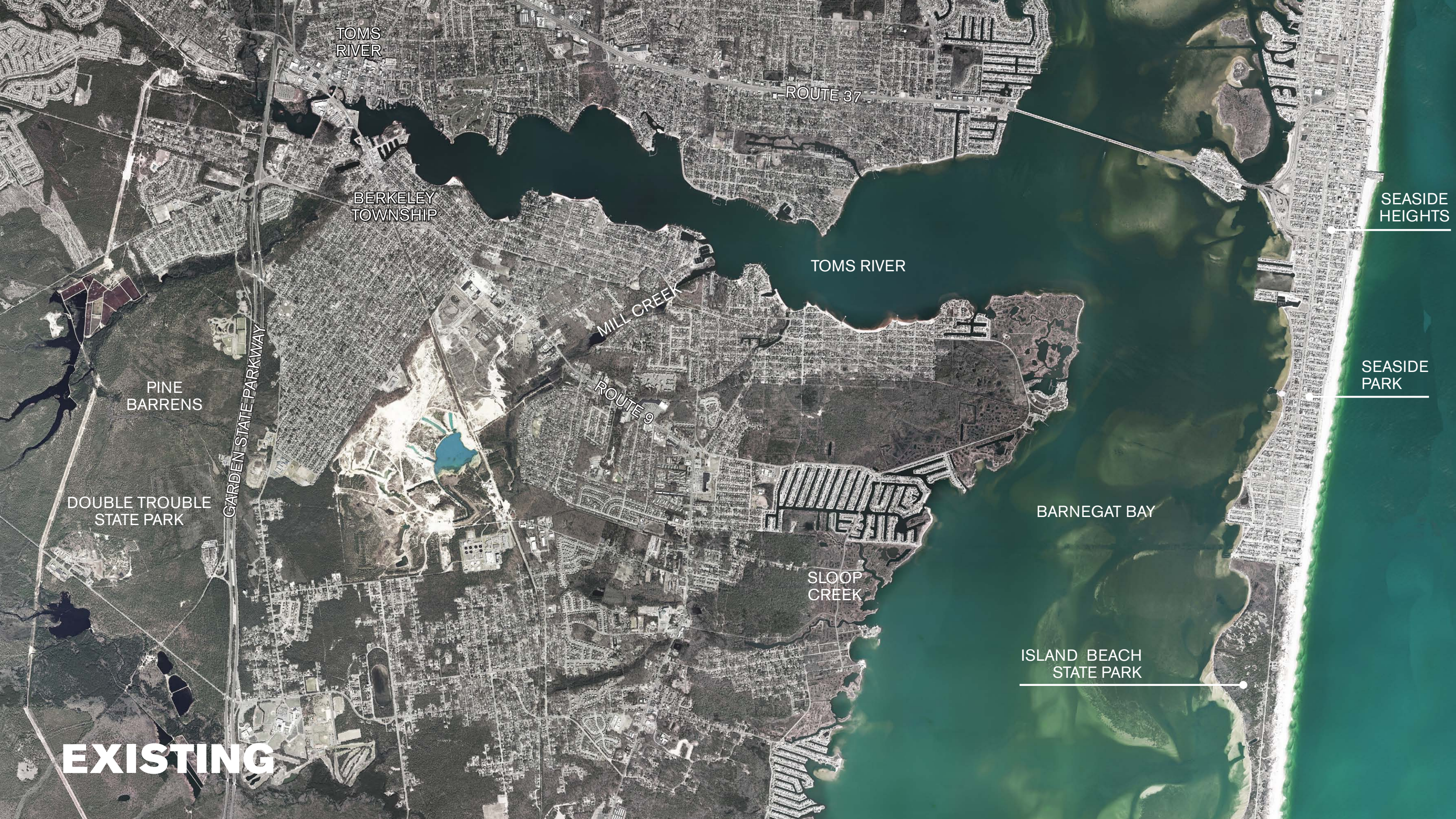
## PIER AS NEW TRANSECT



## GREATER YEAR ROUND TOURISM OPPORTUNITIES







TOMS RIVER

ROUTE 37

BERKELEY TOWNSHIP

SEASIDE HEIGHTS

TOMS RIVER

MILL CREEK

SEASIDE PARK

PINE BARRENS

ROUTE 9

DOUBLE TROUBLE STATE PARK

BARNEGAT BAY

GARDEN STATE PARKWAY

SLOOP CREEK

ISLAND BEACH STATE PARK

**EXISTING**





TOMS RIVER

ROUTE 37

BERKELEY TOWNSHIP

16,200 ACRES

SEASIDE HEIGHTS

SURROUNDING PUBLIC LANDS

TOMS RIVER

SEASIDE PARK

MILL CREEK

ROUTE 9

PINE BARRENS

BARNEGAT BAY

DOUBLE TROUBLE STATE PARK

GARDEN STATE PARKWAY

SLOOP CREEK

NJ PULVERIZING SITE

707 ACRES

ISLAND BEACH STATE PARK

PUBLICLY OWNED LANDS + SAND MINE





TOMS RIVER

ROUTE 37

BERKELEY TOWNSHIP

EXISTING SHORELINE

3' SEA LEVEL RISE

TOMS RIVER

MILL CREEK

ROUTE 9

PINE BARRENS

DOUBLE TROUBLE STATE PARK

GARDEN STATE PARKWAY

BARNEGAT BAY

100% BEACH ATTRACTIONS

37% HOUSING UNITS

24% POPULATION

IN FLOOD ZONE

2050 SEA LEVEL RISE (31")





TOMS RIVER

ROUTE 37

↑ TO CATTUS ISLAND COUNTY PARK

ACCESS TO BARRIER ISLAND

NEW ECO-TOURISM HUB

TOMS RIVER

PINE BARRENS

MOBILITY CONNECTIONS

DOUBLE TROUBLE STATE PARK

BARNEGAT BAY

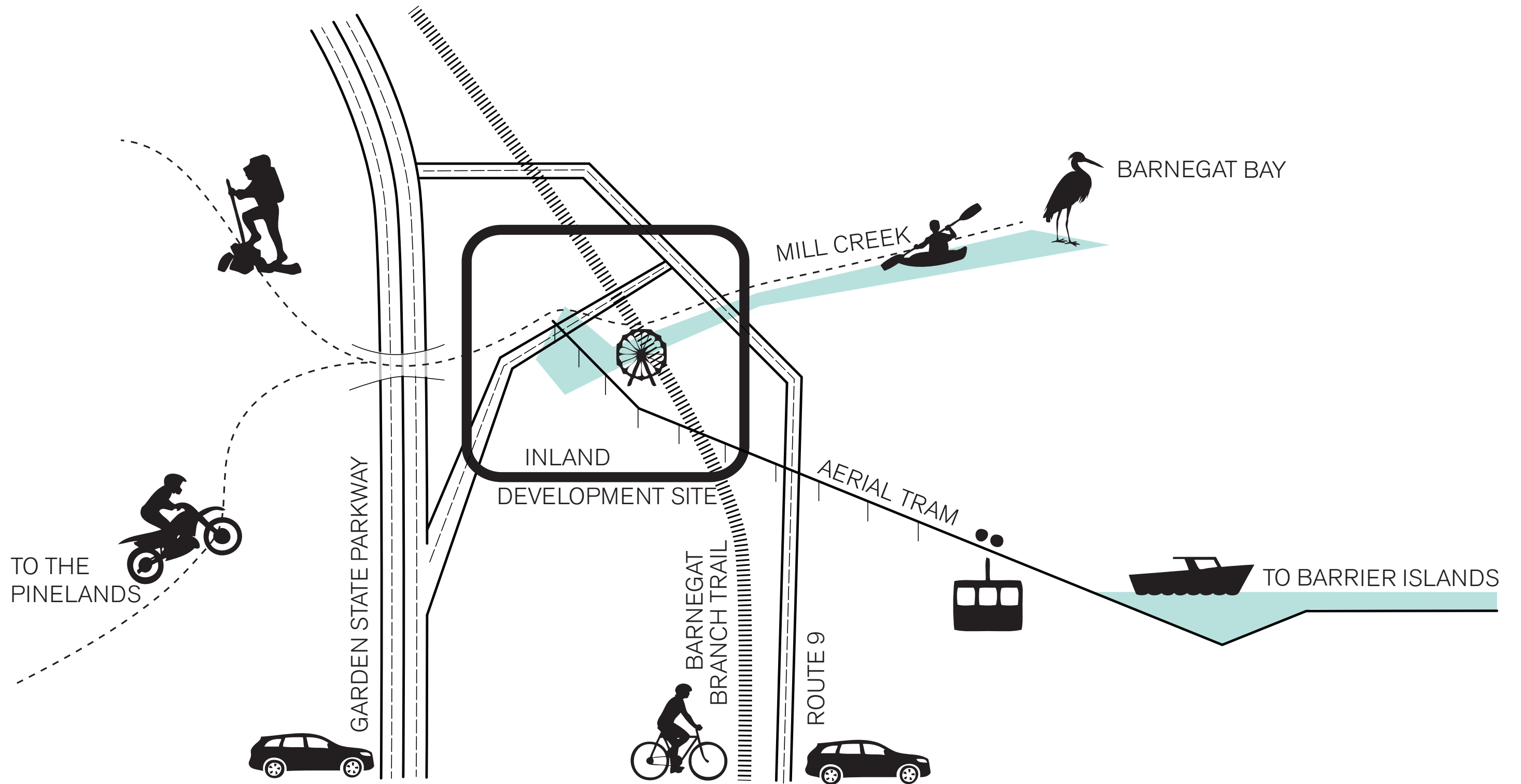
ECOLOGICAL CONNECTIONS

PLANNED ECOTOURISM SITE

TO BARNEGAT LIGHTHOUSE STATE PARK ↓



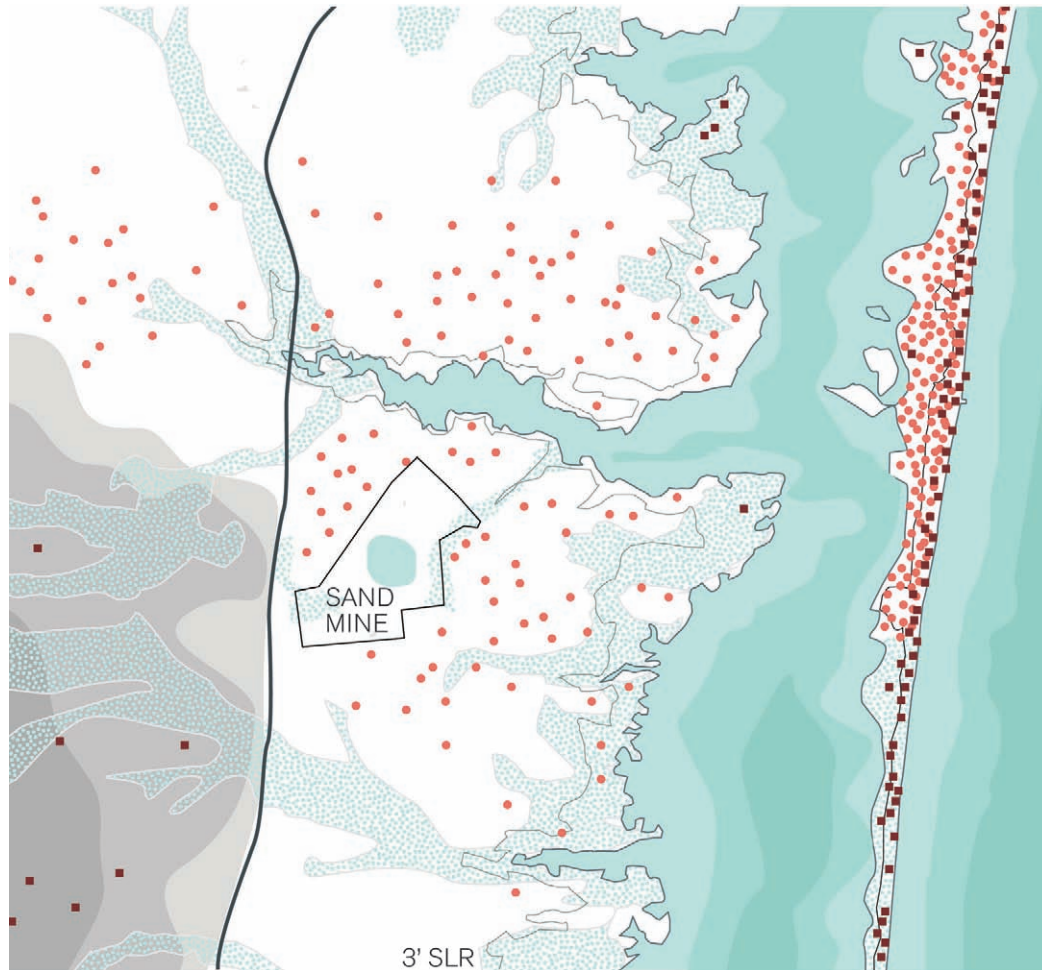
# GETTING THERE & GETTING AROUND



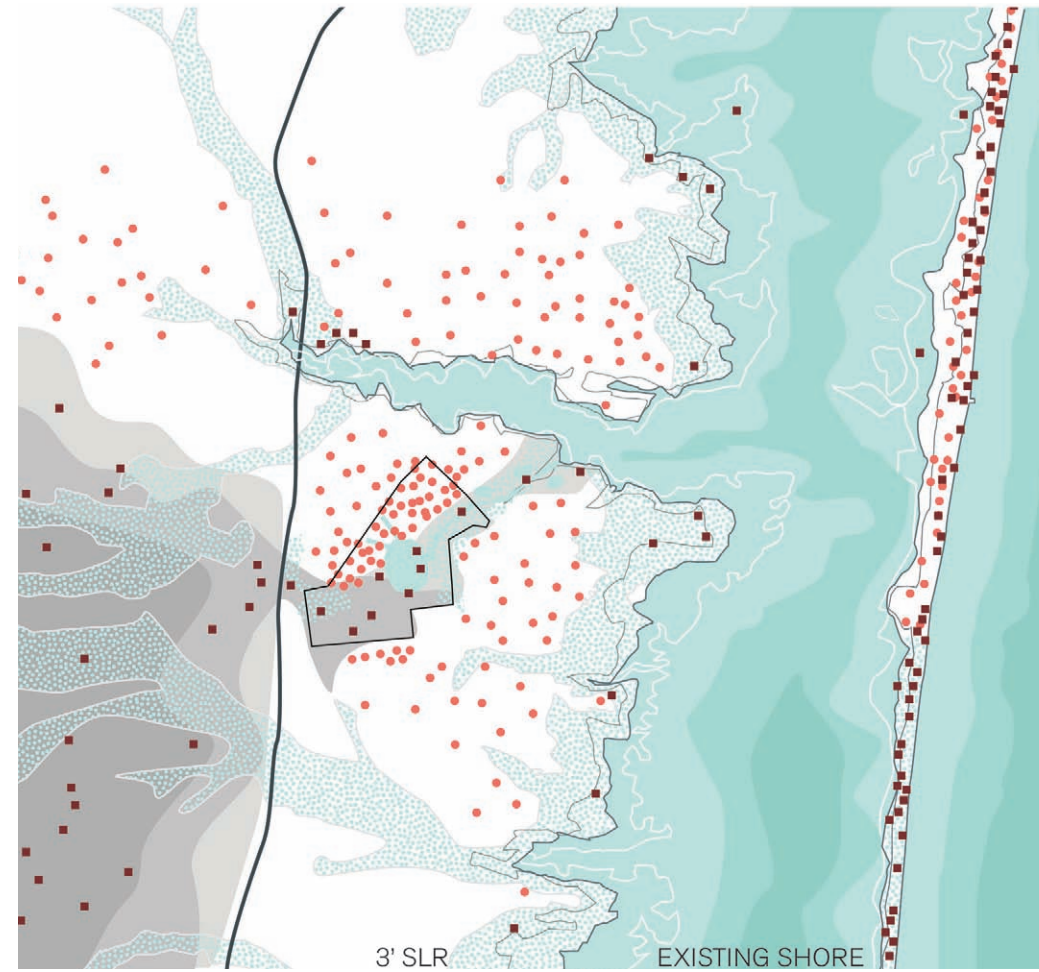


# EVOLUTION: DIVERSIFICATION

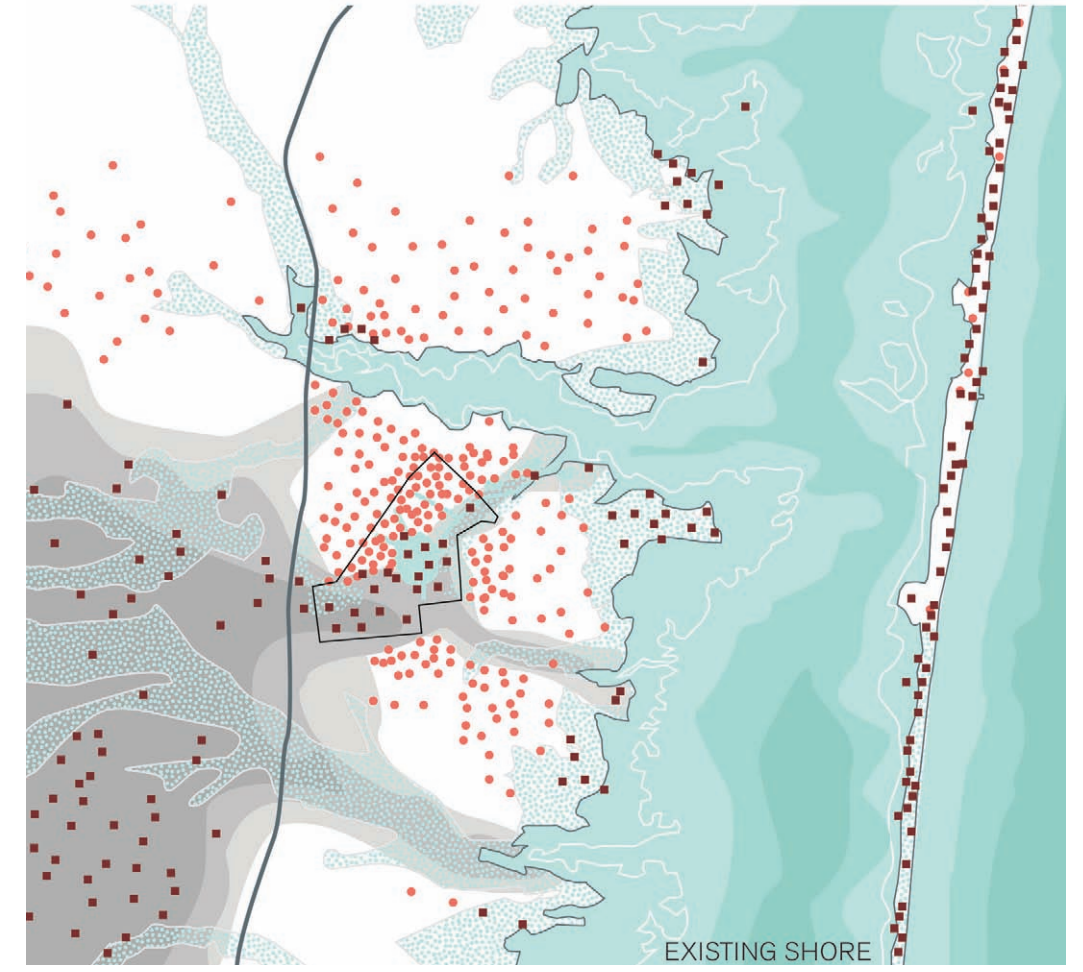
PRESENT DAY



2 GENERATIONS



4 GENERATIONS

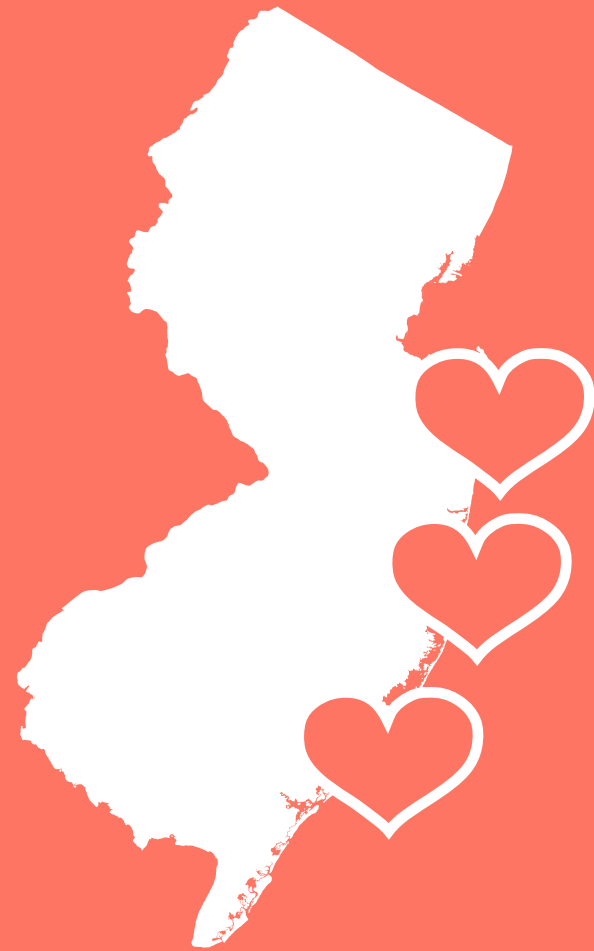


- DESTINATION VISITS
- PERMANENT RESIDENCES









**RESILIENT JERSEY**

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**SHORE**



Part 4:  
**Conclusions**



Jill Dixon, Associate, Sasaki Associates



# Value of Interdisciplinary Collaboration Confirmed!

- Much more innovative, broad ideas than would have been possible with only one discipline
- More systematic, comprehensive approaches
- Solutions at the scale of the challenge



# Lessons Learned

- The power of effective storytelling
- Benefits of structured brainstorming
- Need for designers, engineers, scientists, and social scientists
- Build team with expert, collaborative, and curious core team members
- What seems simple to one discipline is ground-breaking for another; different disciplines operate at different scales
- **Don't underestimate the power of an interdisciplinary team (especially your own!), the outcomes might surprise you**