



forEverglades City

**Interdisciplinary design approach
for a resilient, adaptive and sustainable
(re)development of Everglades City**

**Jean Pierre Droge
Dr. Ir. Nico Tillie
Dr. Roberto Rocco**

Delft University of Technology
Faculty of Architecture and the Built Environment
master track: Landscape Architecture

**TU Delft**



Florida



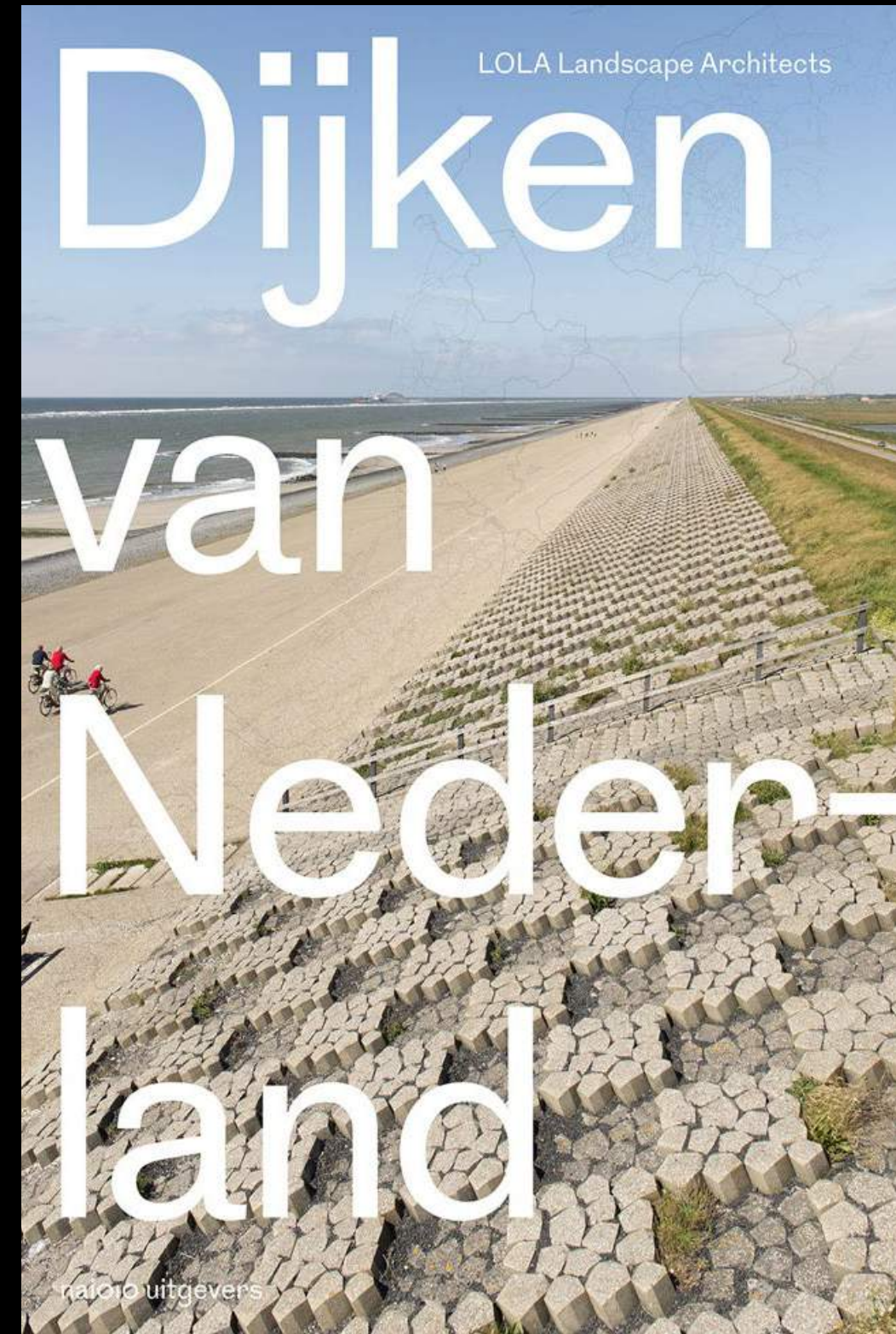
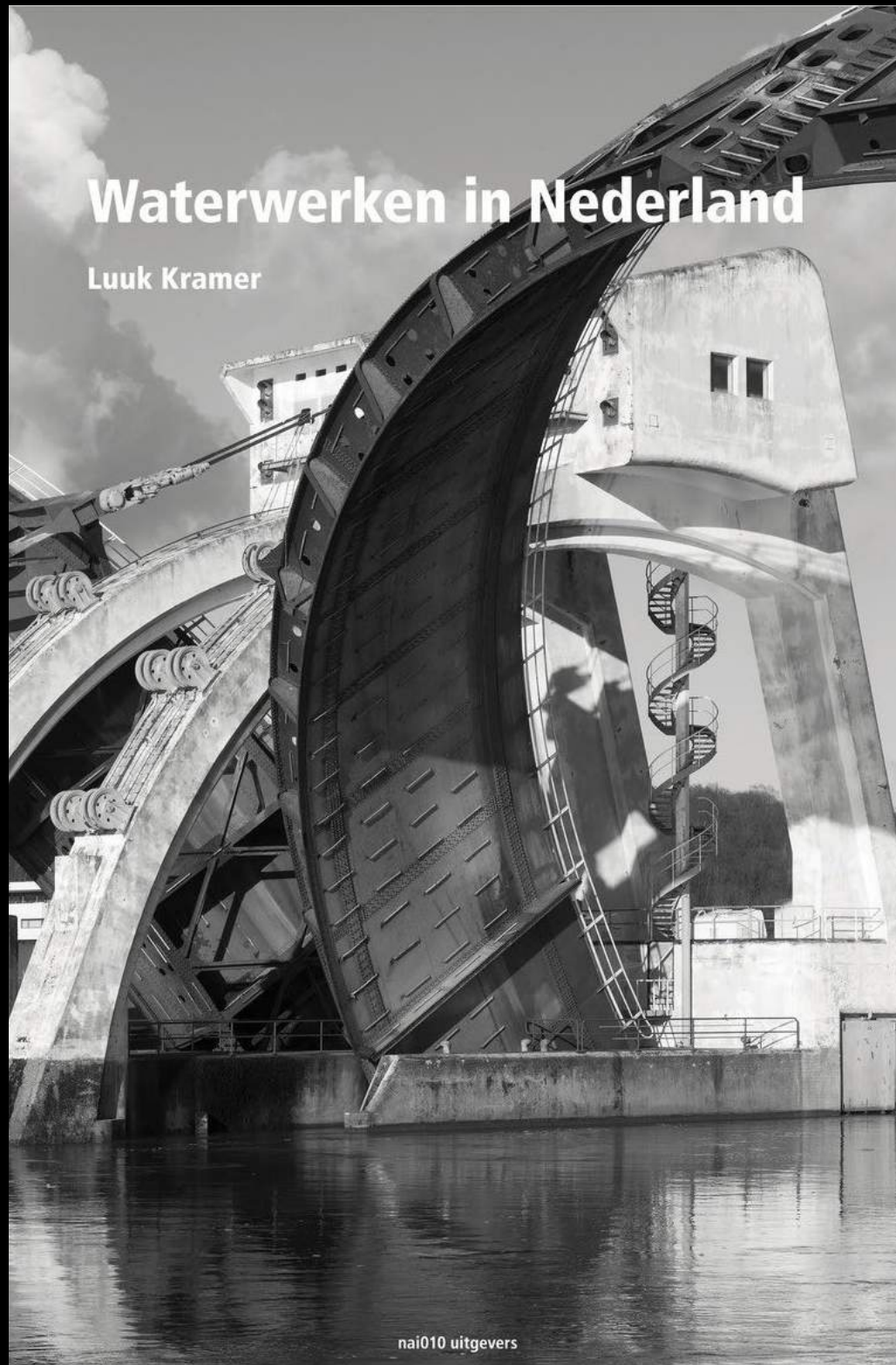
The Netherlands



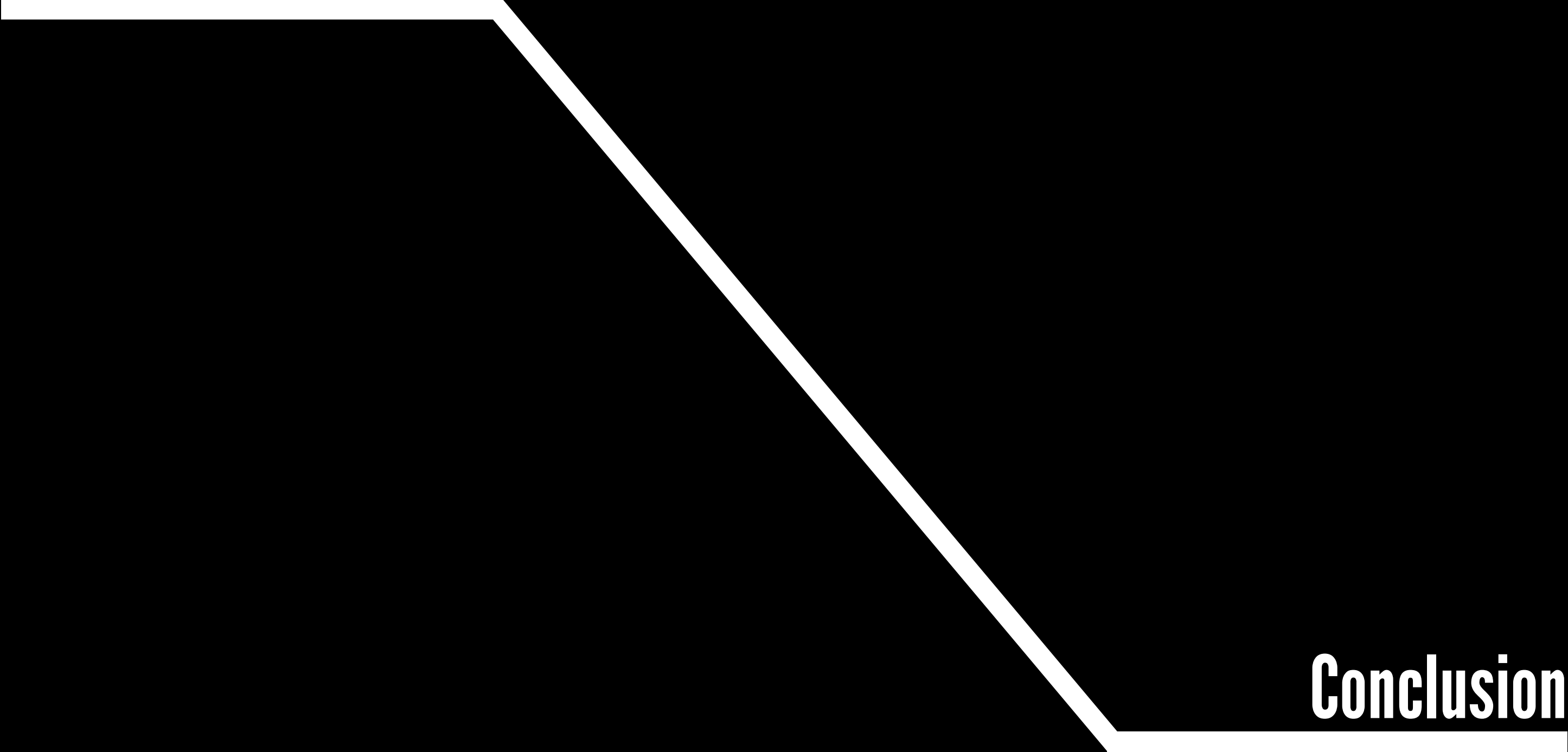
The edge of Miami - L-30 Canal, on the border between a Wildlife Management Area and Water Conservation Area (own picture)



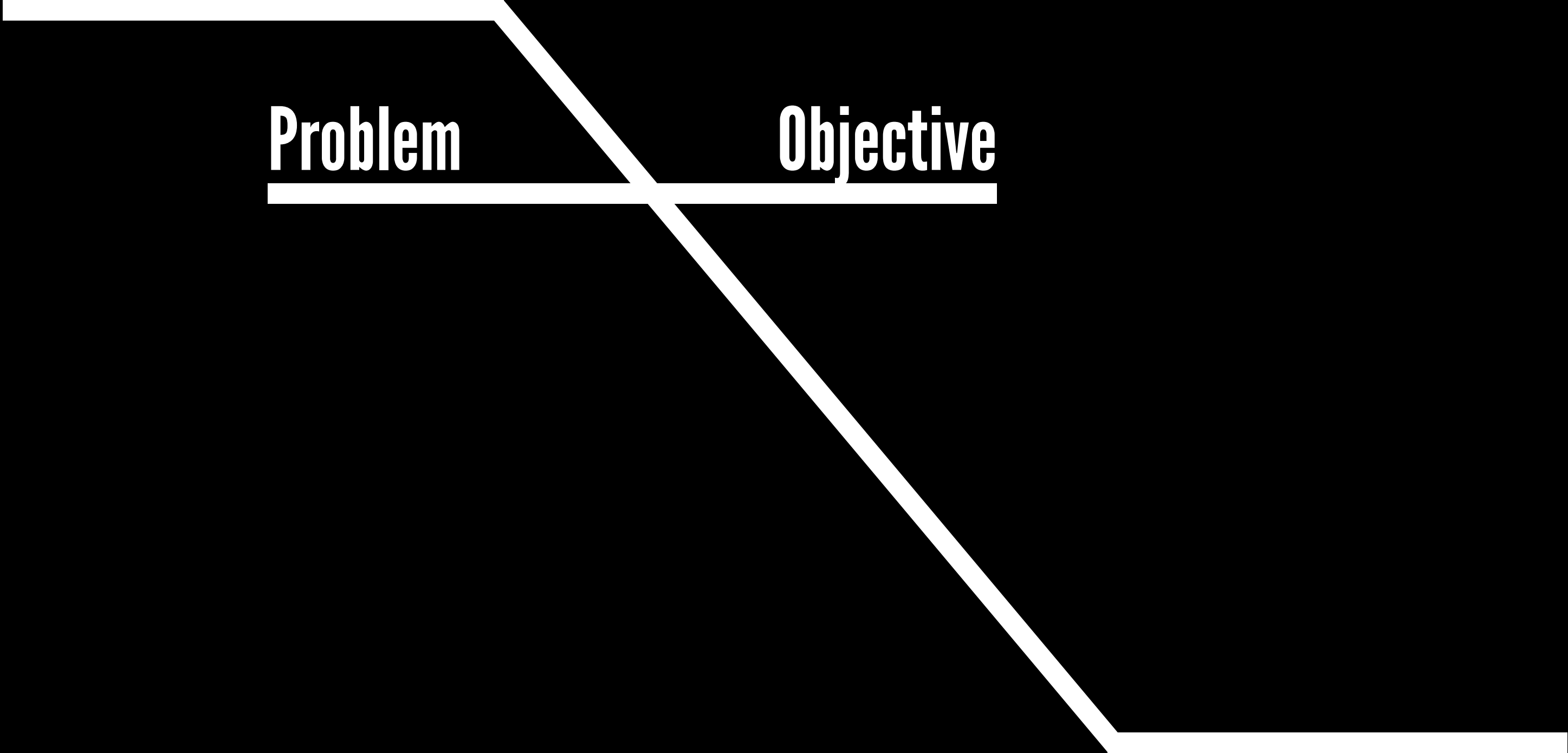
Start of Miami Canal - Herbert Hoover dike at Lake Okeechobee (picture by Cai Huang)



Context

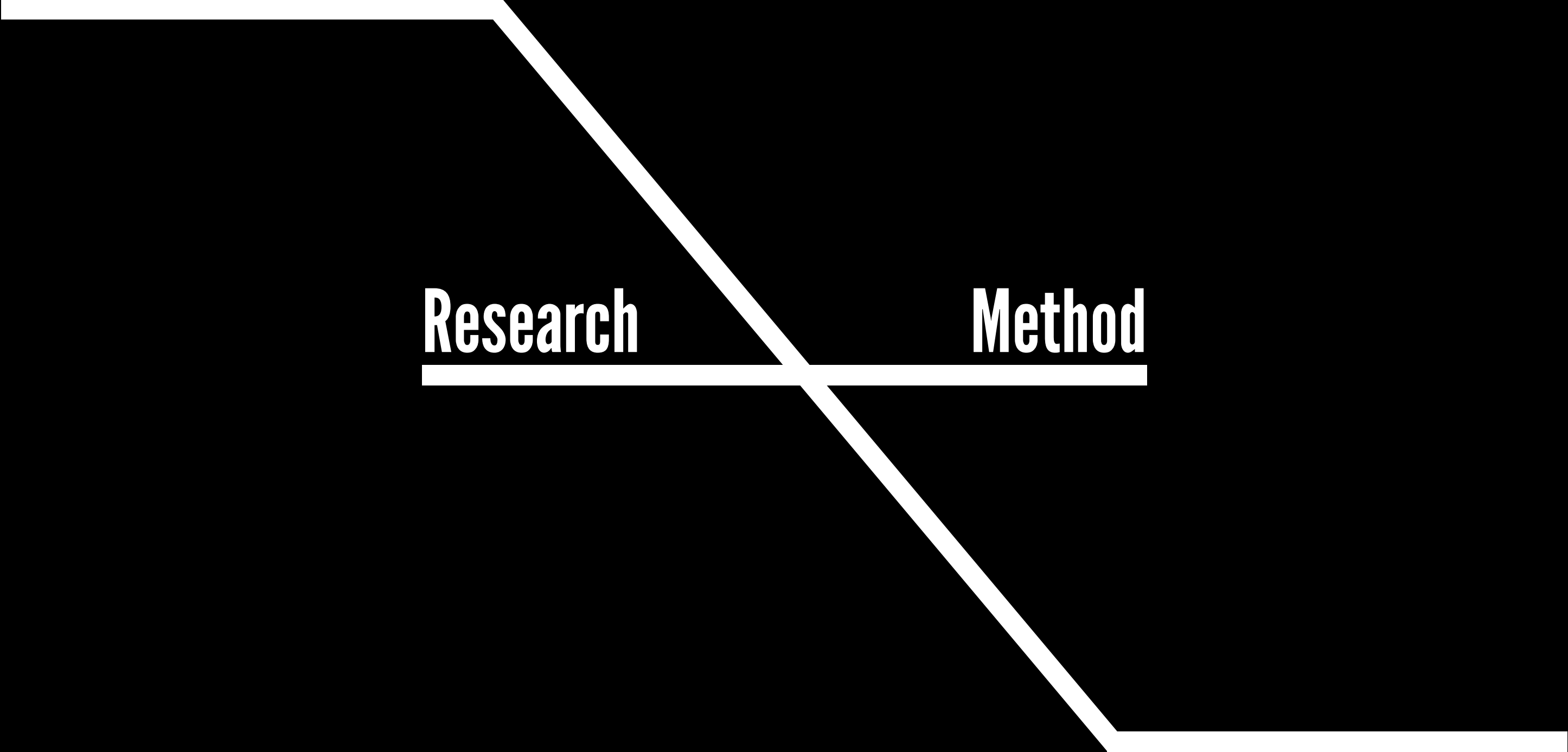
A thick white line on a black background. It starts as a horizontal line on the left, then slopes downward at a 45-degree angle towards the bottom right, and finally becomes horizontal again on the right side.

Conclusion



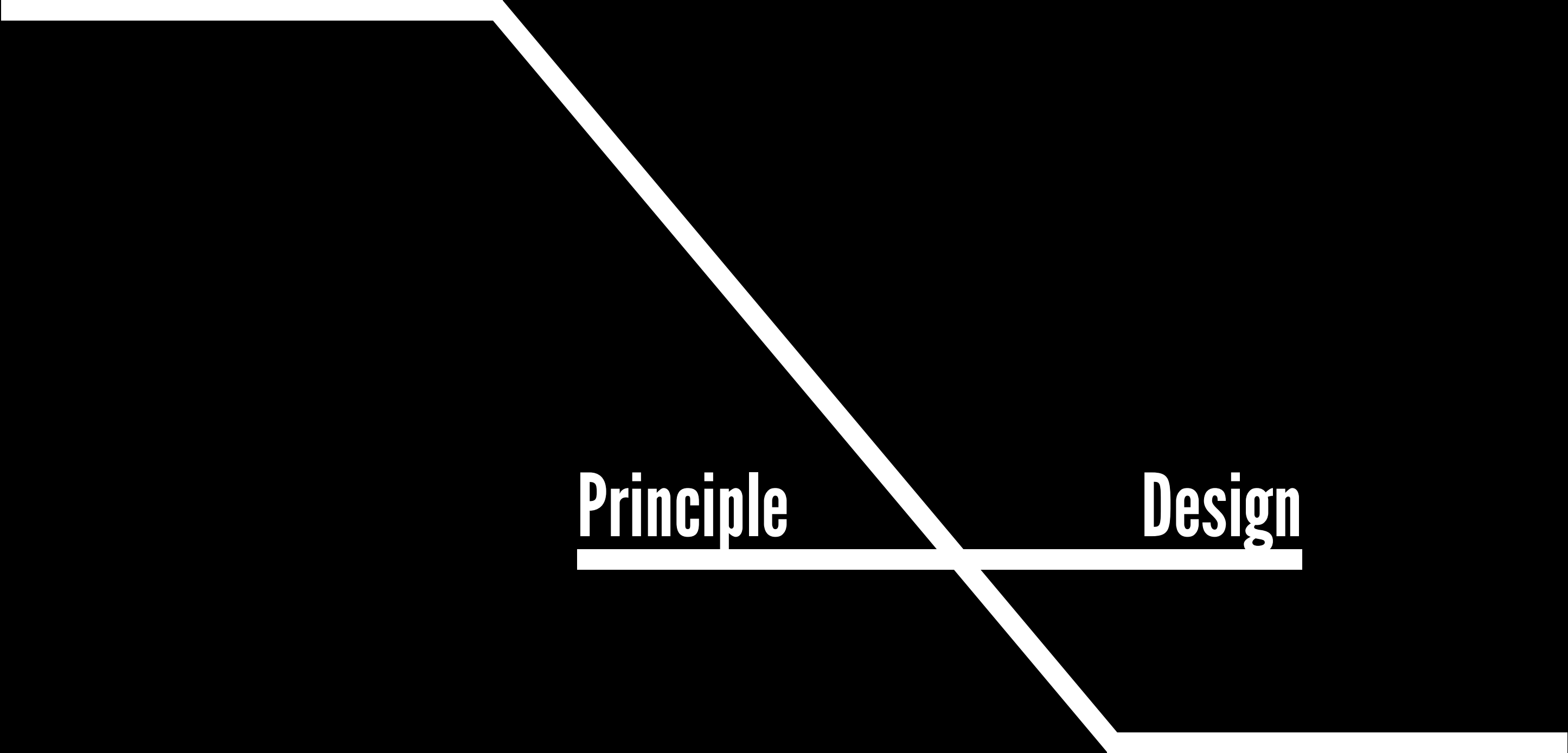
Problem

Objective



Research

Method



Principle

Design

Context

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graph LR; Context --- Problem; Problem --- Objective; Objective --- Research; Research --- Method; Method --- Principle; Principle --- Design; Design --- Conclusion
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Problem

Objective

Research

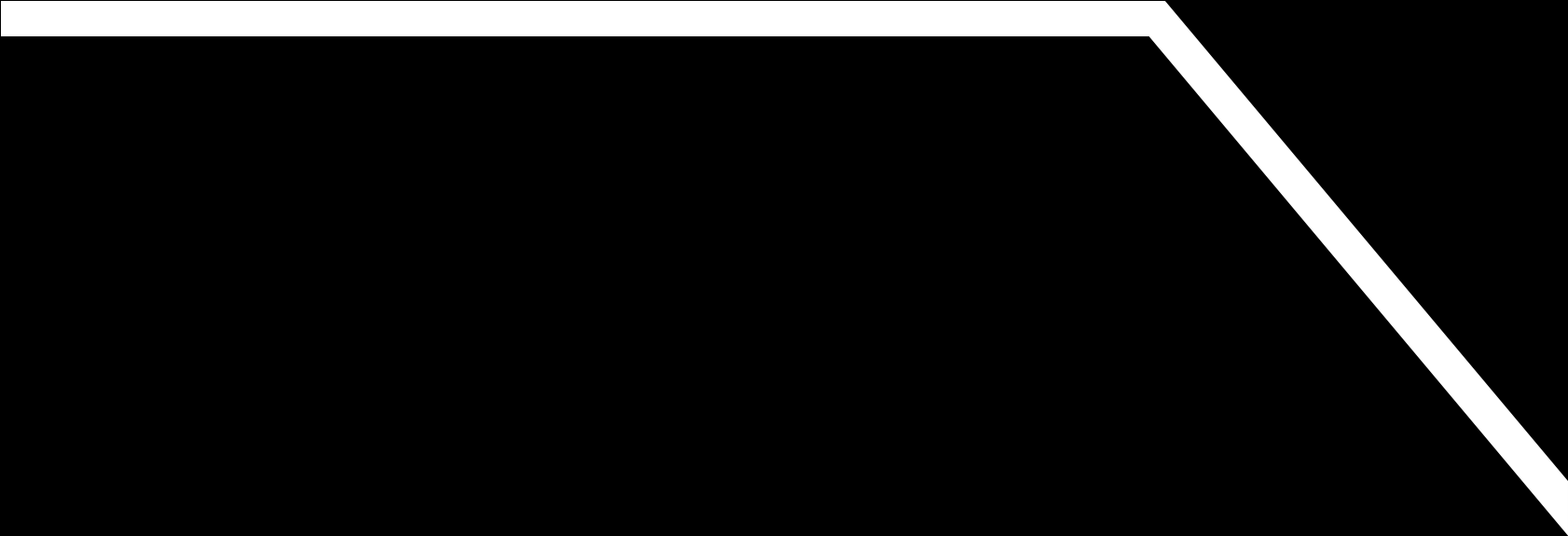
Method

Principle

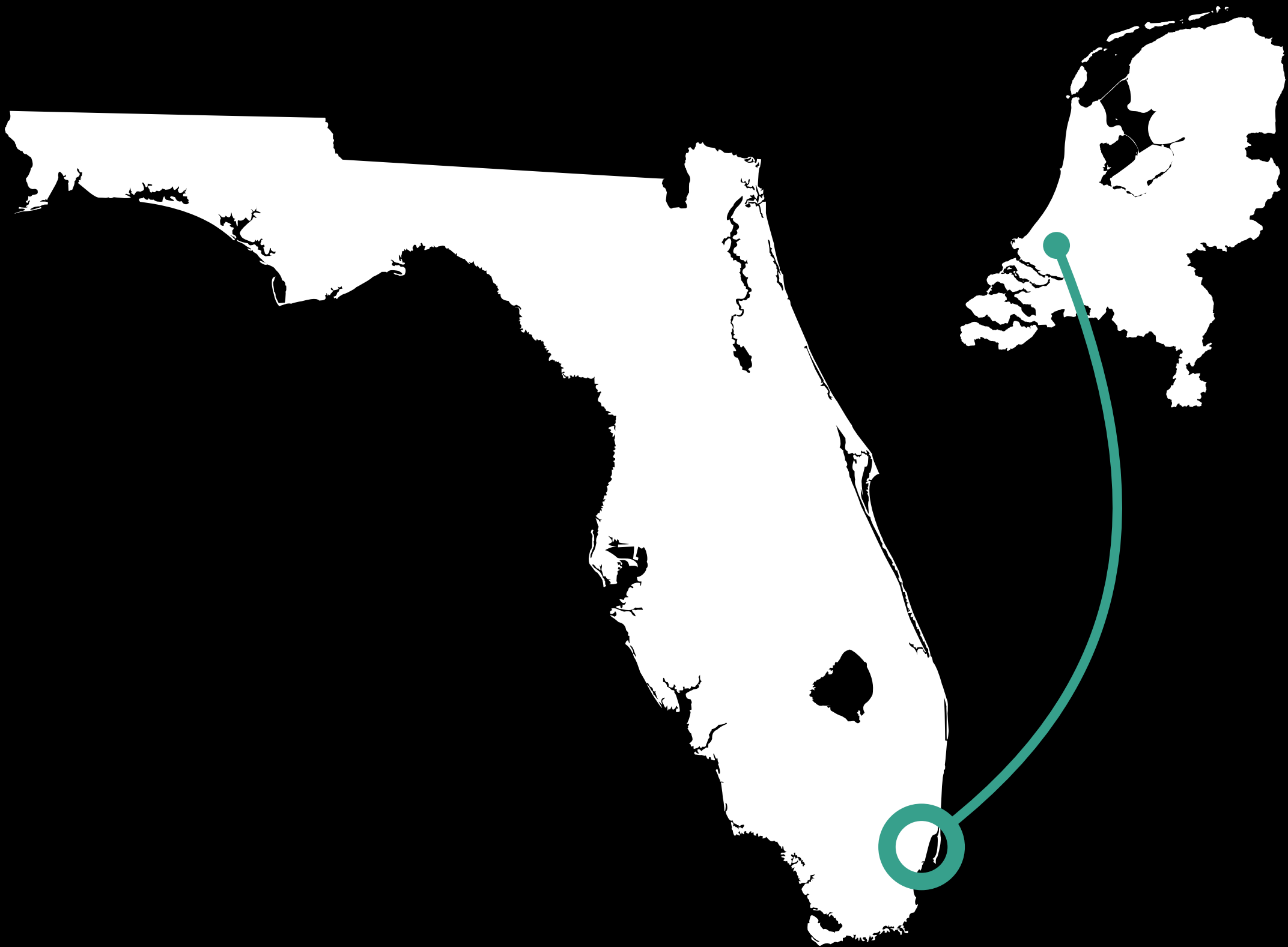
Design

Conclusion

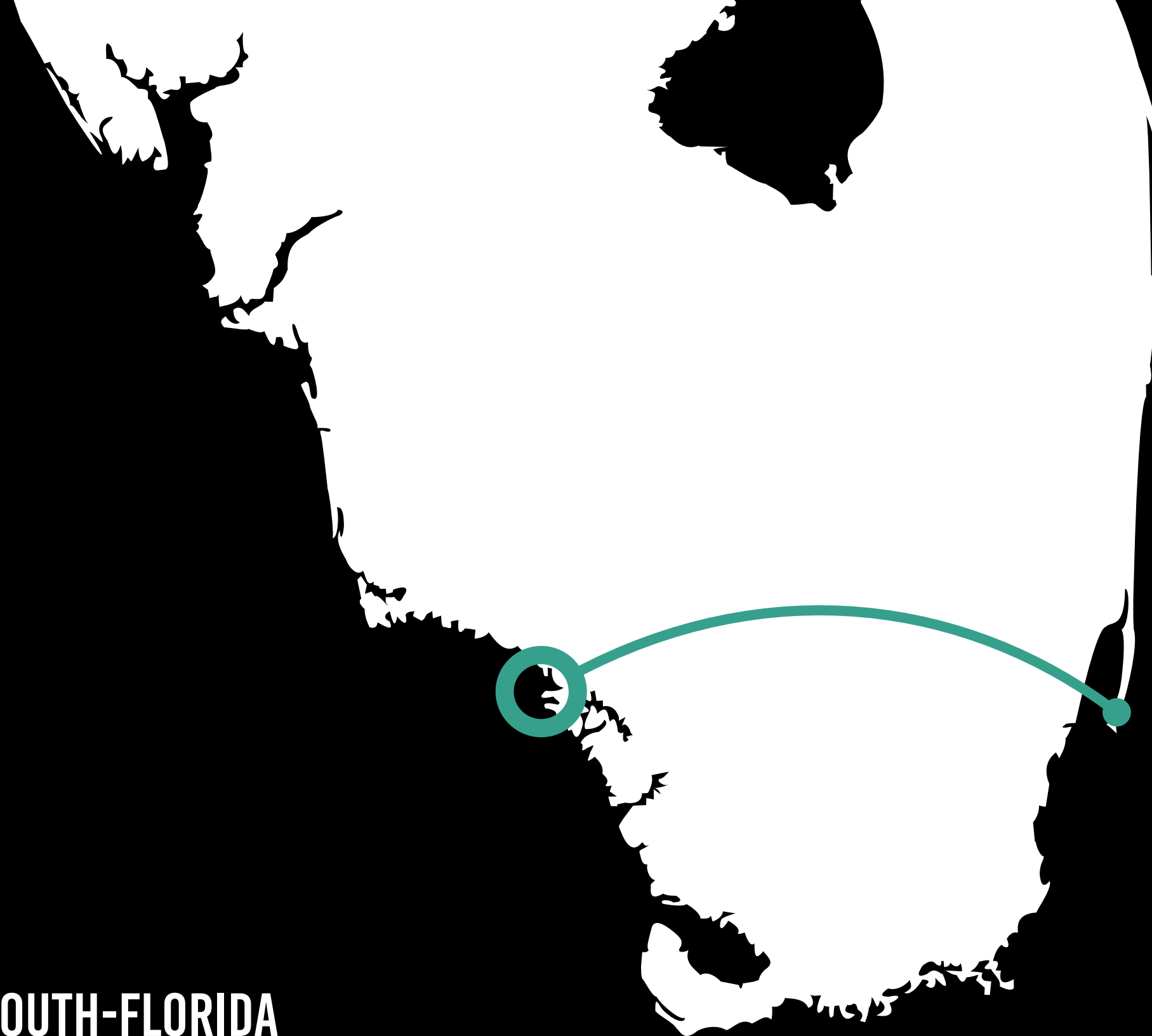
Context







SOUTH-FLORIDA





ATLANTIC OCEAN

MIAMI BEACH

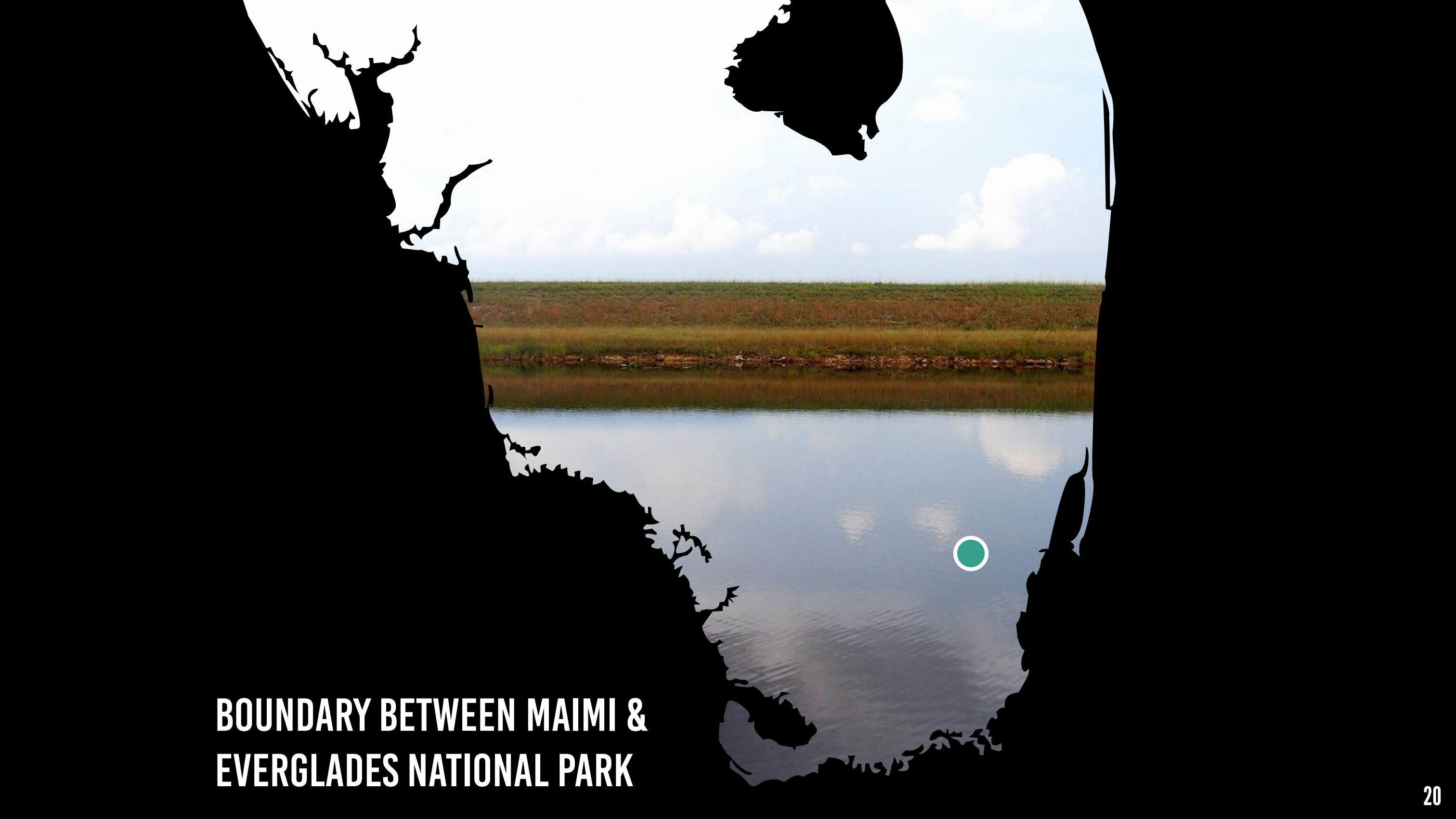
MIAMI BAY



MIAMI CANAL

An aerial photograph showing a long, straight canal filled with water, reflecting the sky. To the right of the canal is a multi-lane highway with several vehicles. The surrounding landscape is flat and green, likely a wetland or marsh area. The entire image is framed by a black silhouette of a tree branch on the left and a large, dark, irregular shape on the right, resembling a map outline. A small teal circle with a white border is located on the highway in the lower right quadrant.

WATER CONSERVATION AREA



**BOUNDARY BETWEEN MAIMI &
EVERGLADES NATIONAL PARK**

**EVERGLADES NATIONAL PARK
FRESHWATER MARSH**

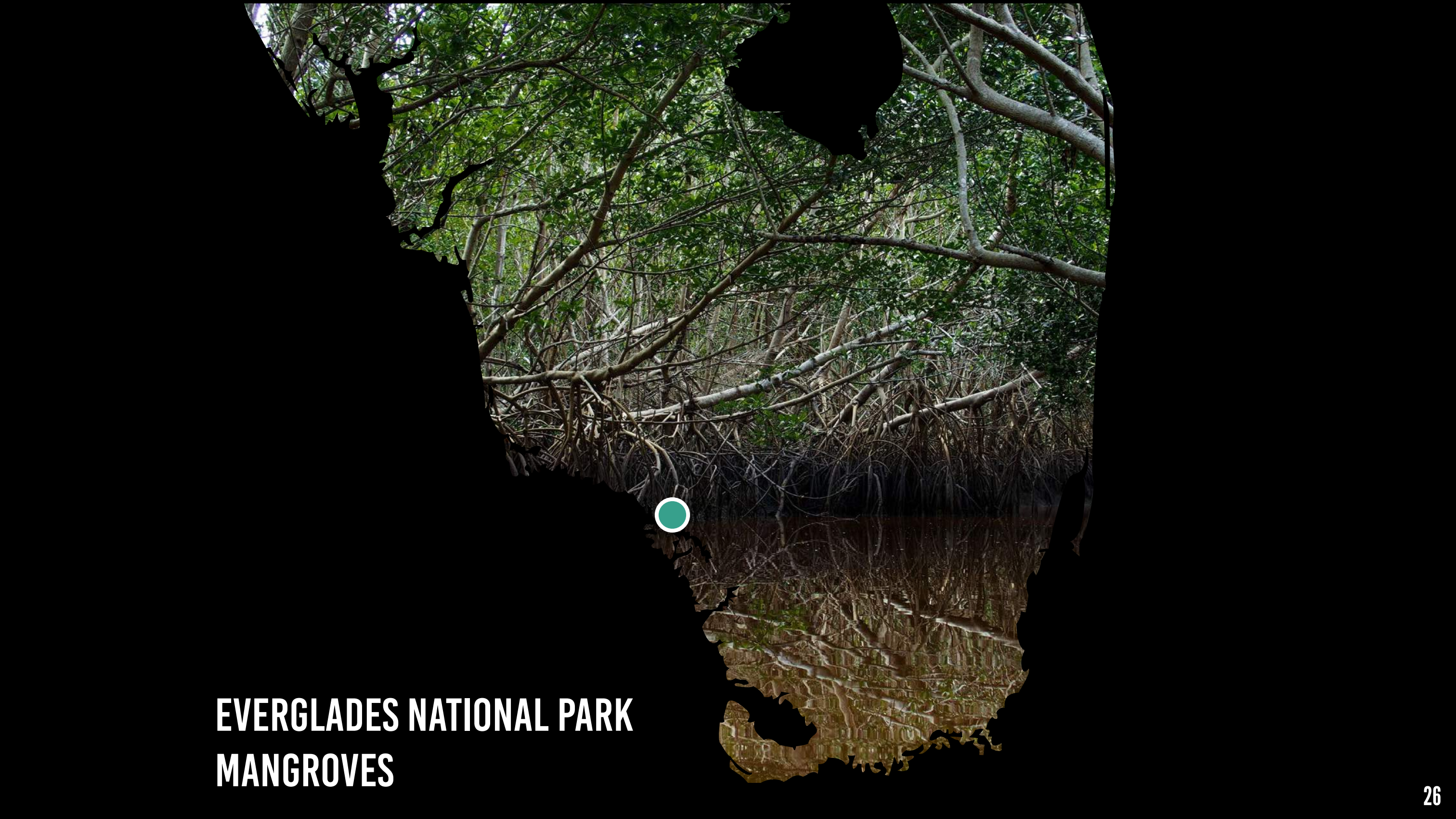
**EVERGLADES NATIONAL PARK
MARL PRAIRIE**



EVERGLADES NATIONAL PARK PINELANDS

**BIG CYPRESS
NATIONAL PRESERVE**

AMERICAN ALLIGATOR

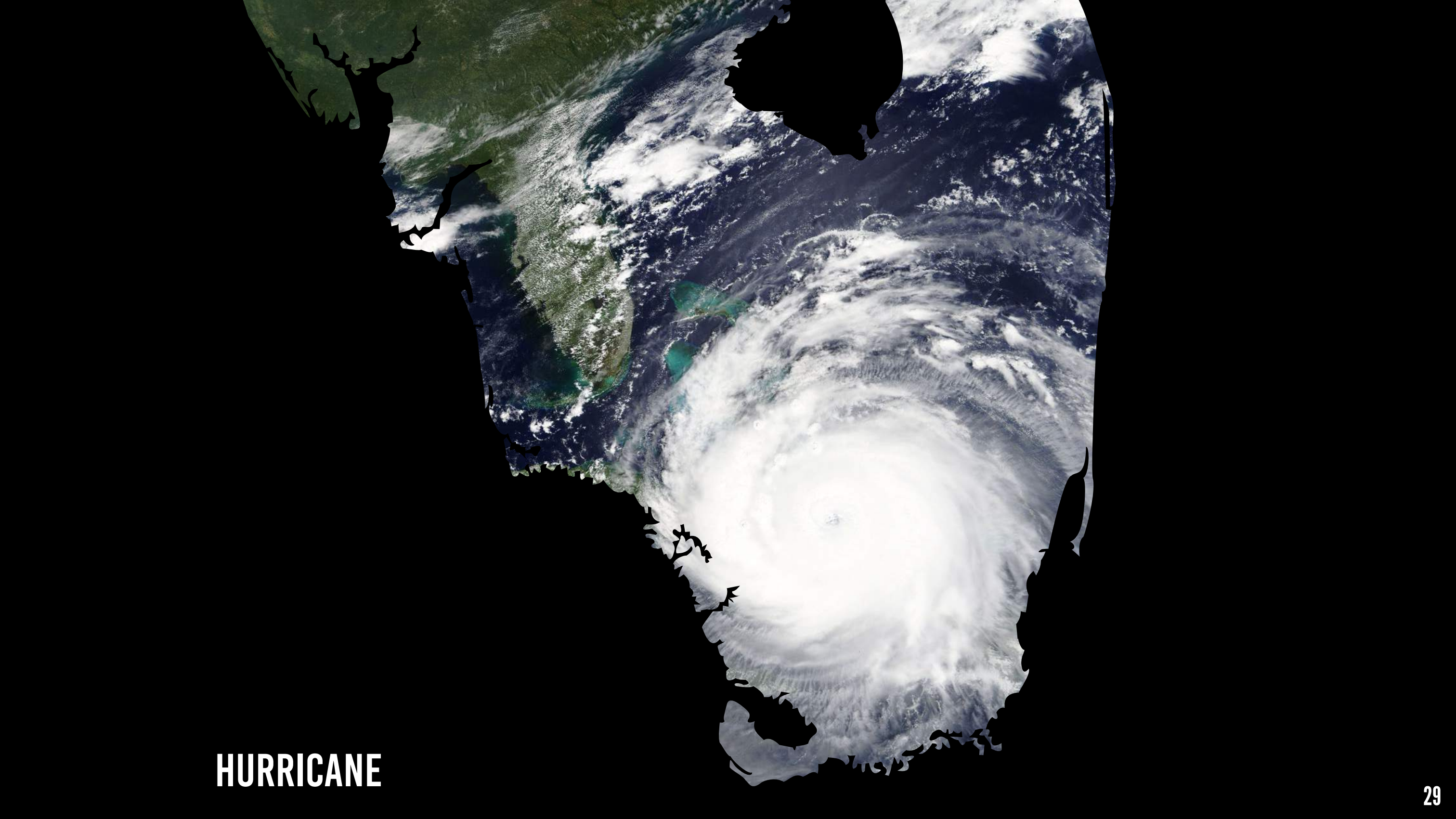


EVERGLADES NATIONAL PARK MANGROVES

**TEN THOUSAND ISLANDS
NATIONAL WILDLIFE REFUGE**



GULF OF MEXICO

A satellite image of a hurricane, showing a well-defined eye and spiral cloud bands, centered over the Atlantic Ocean. The image is framed by a black silhouette of the continents of North and South America. The hurricane's eye is a bright white circle in the center, surrounded by dense, swirling white clouds. The surrounding ocean is a deep blue, and some landmasses are visible in the upper left corner.

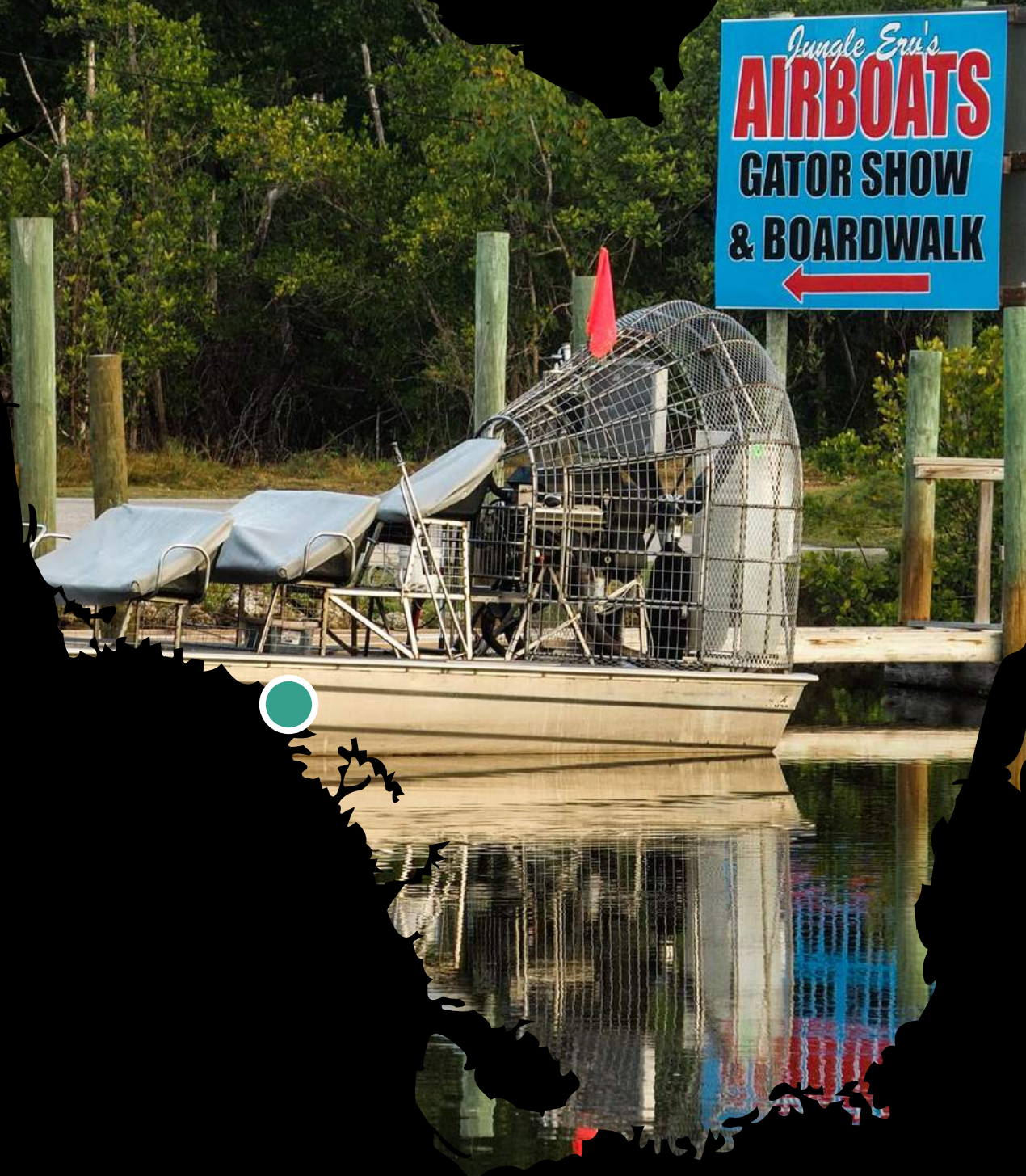
HURRICANE

EVERGLADES CITY



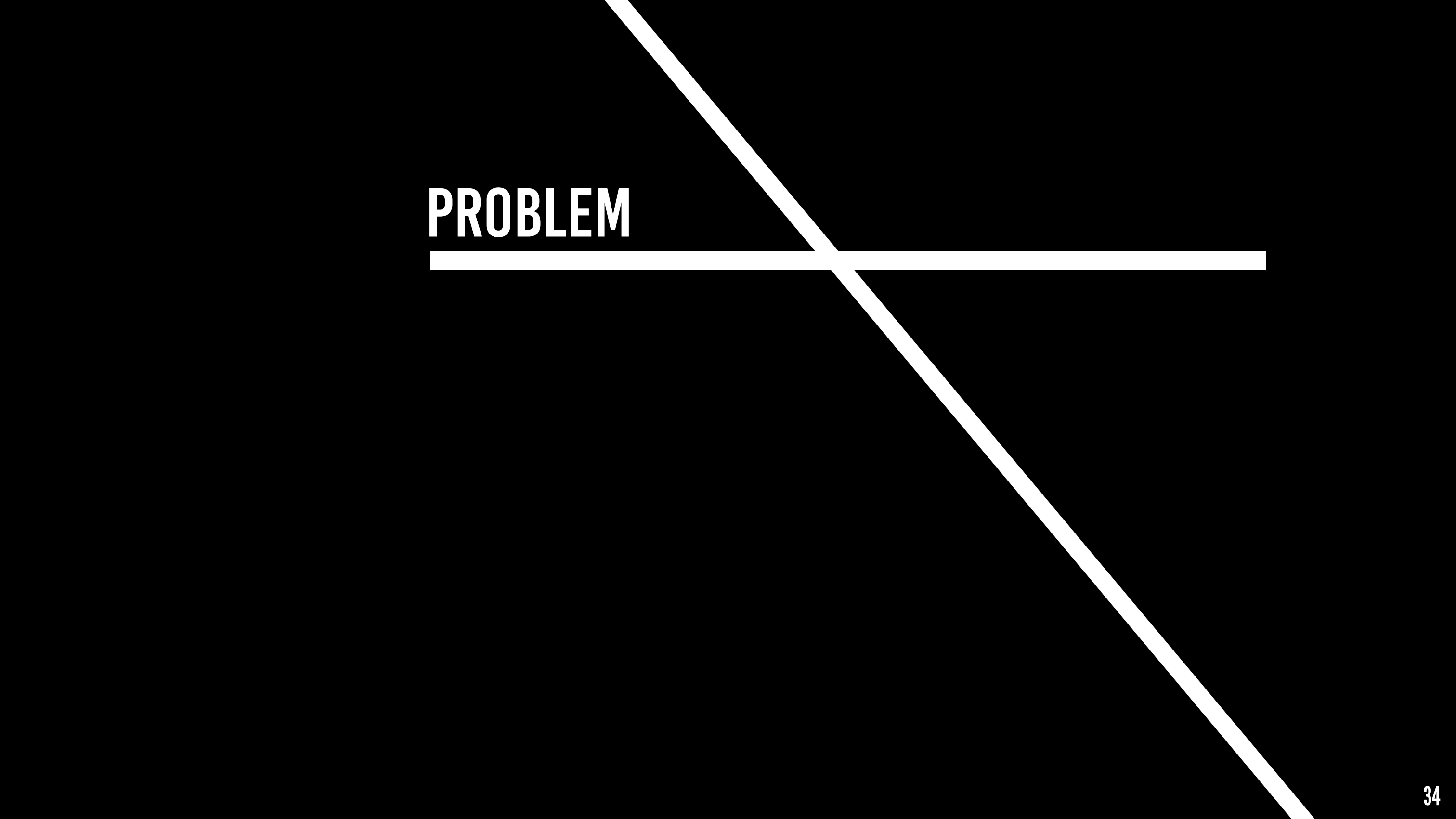
HOUSES ON STILTS

AIRBOATS



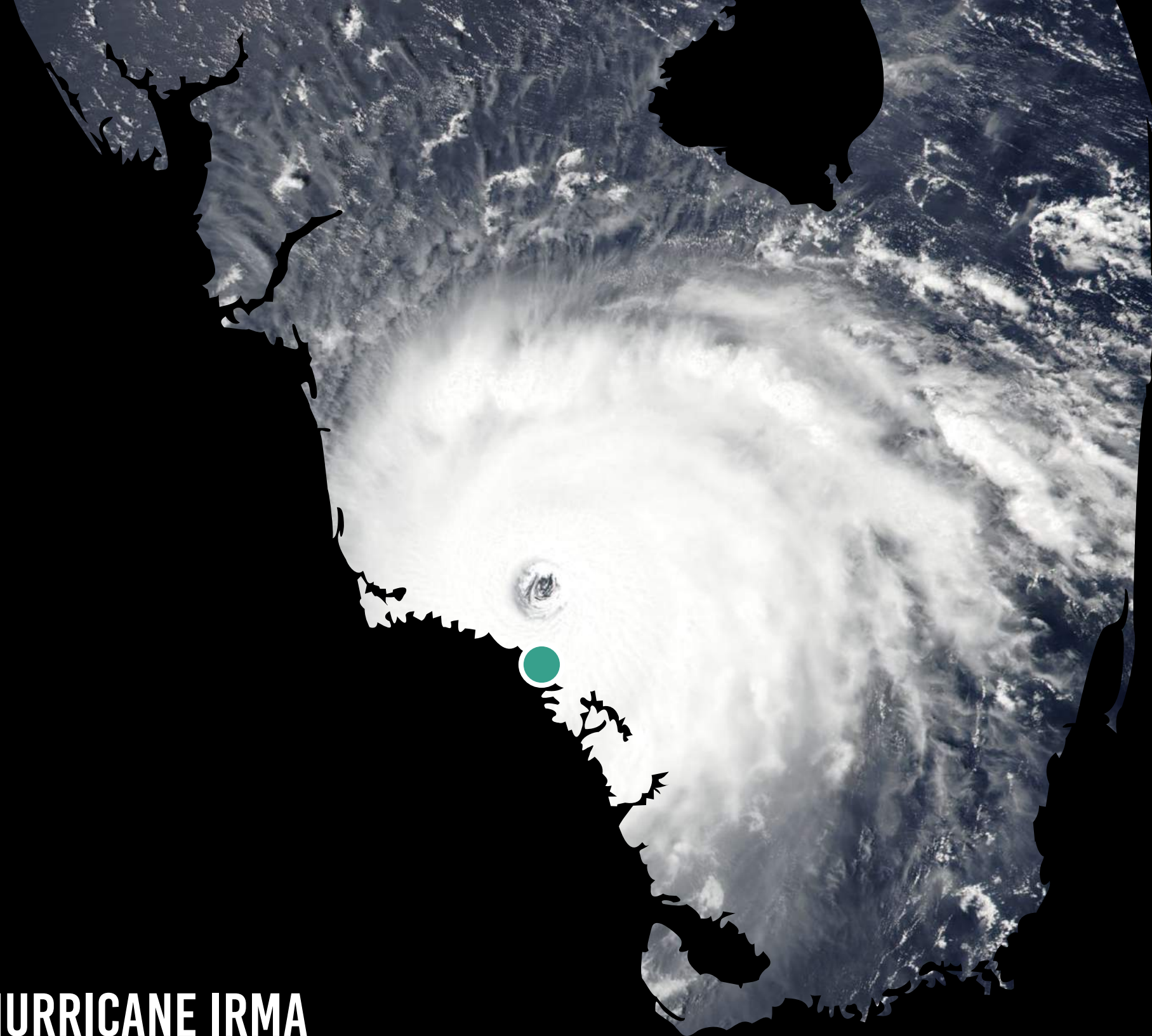


SEA-FOOD FESTIVAL



PROBLEM

HURRICANE IRMA



DESTRUCTION

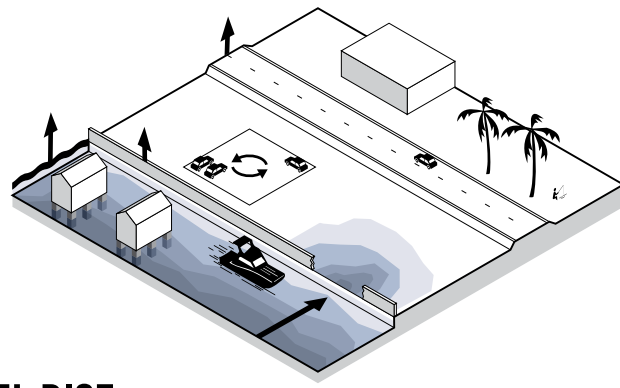
FLOODING

A photograph of a flooded residential street, likely in a coastal area. In the background, a white lighthouse with a dark top is visible, surrounded by other houses and palm trees. The water is calm, reflecting the buildings and the sky. The entire scene is framed by a large, black silhouette of a tree, which appears to be in the foreground, looking out over the flooded street. The sky is overcast and grey.

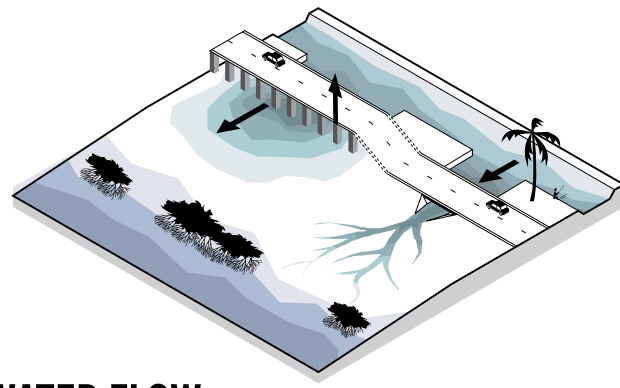
SEA-LEVEL RISE



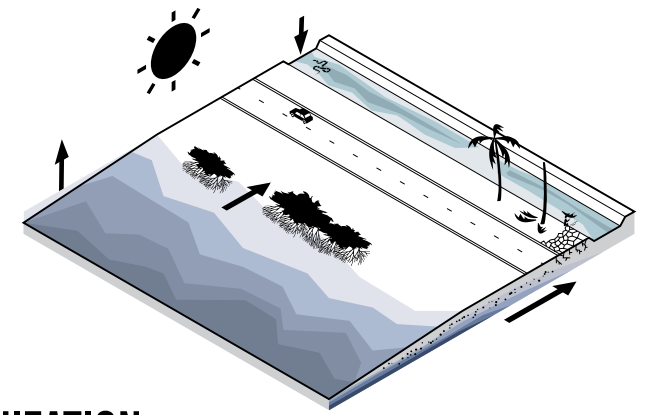
HURRICANE



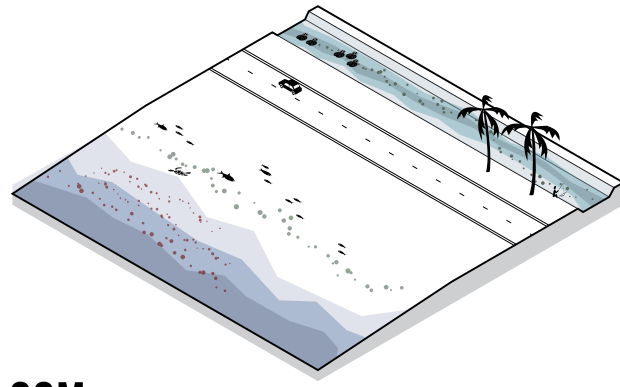
SEA-LEVEL RISE



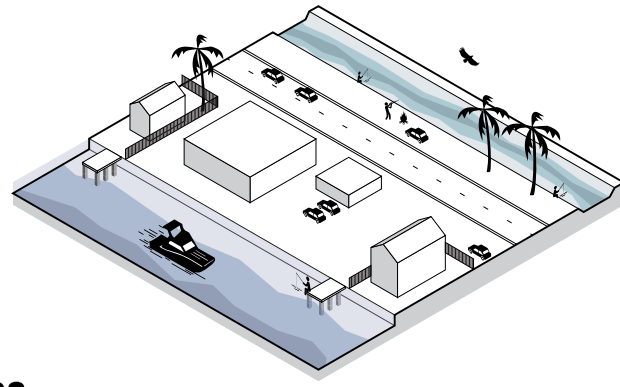
FRESHWATER FLOW



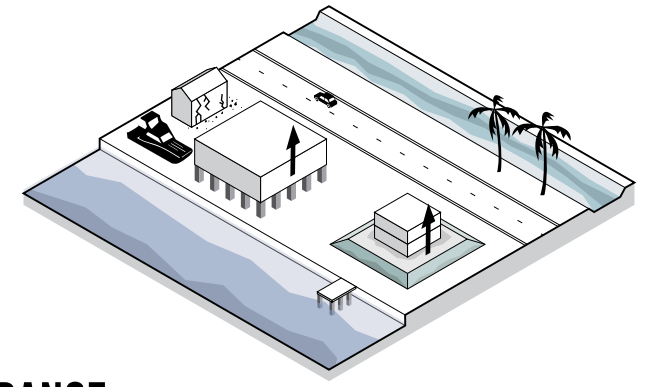
SALINIZATION



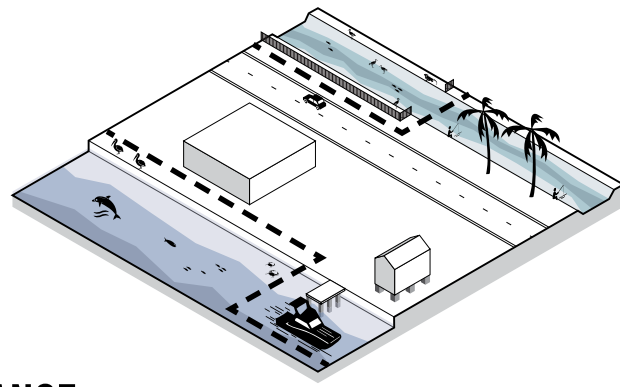
ALGAE BLOOM



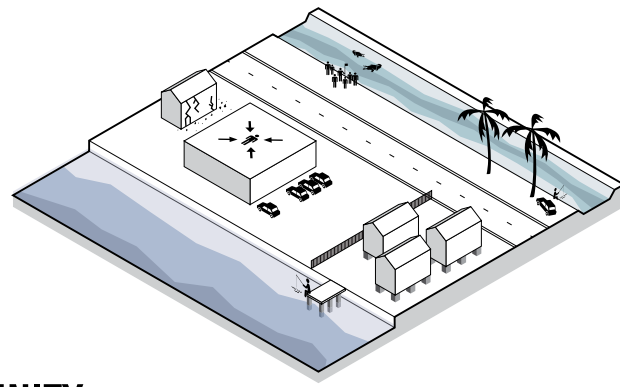
POLITICS



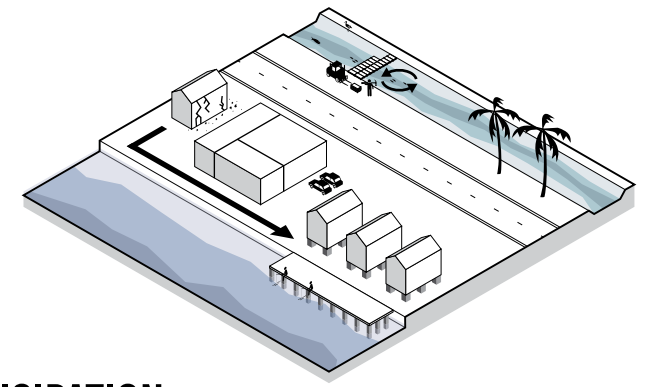
INSURANCE



GOVERNANCE



COMMUNITY



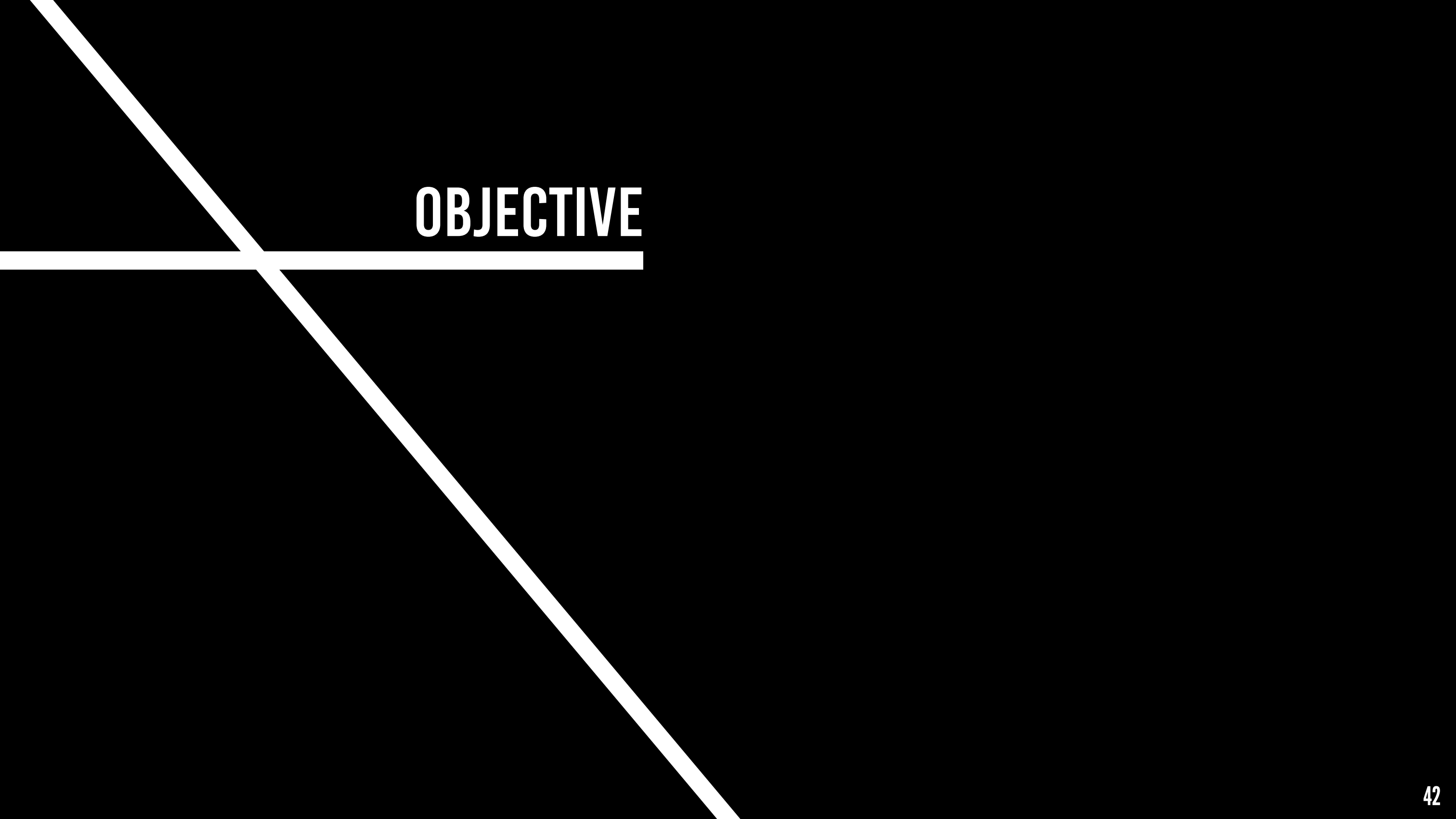
PARTICIPATION

EVERGLADES CITY

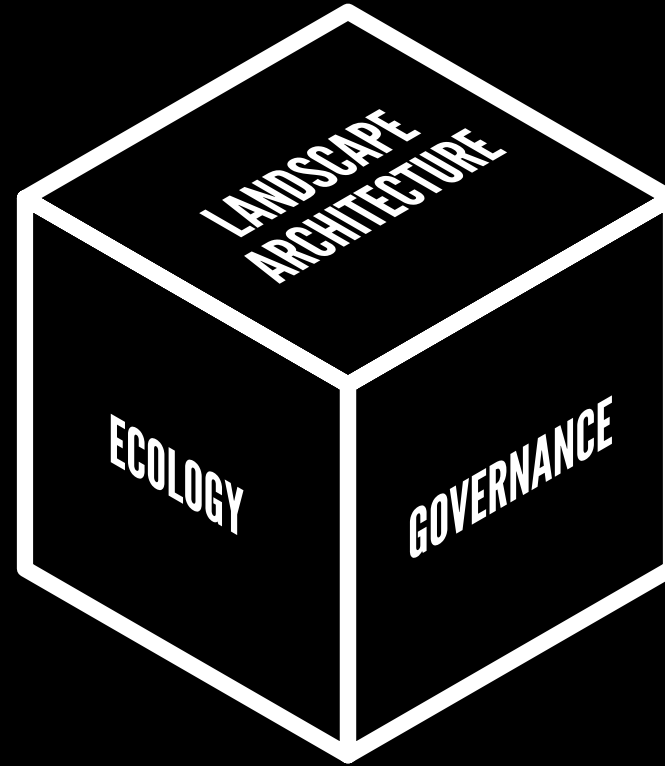
**IS NOT RESILIENT ENOUGH,
AS IT RECENTLY GOT DESTROYED BY HURRICANE IRMA.**

**IS NOT ADAPTIVE TO CLIMATE CHANGE,
WHERE IT IS NOW THREATENED BY SEA LEVEL RISE.**

**IS NOT SUSTAINABLE, AS ITS ECONOMY IS BASED ON TOURISM
WHICH DEPENDS ON THE THREATENED ECOSYSTEMS IN THE SURROUNDINGS.**



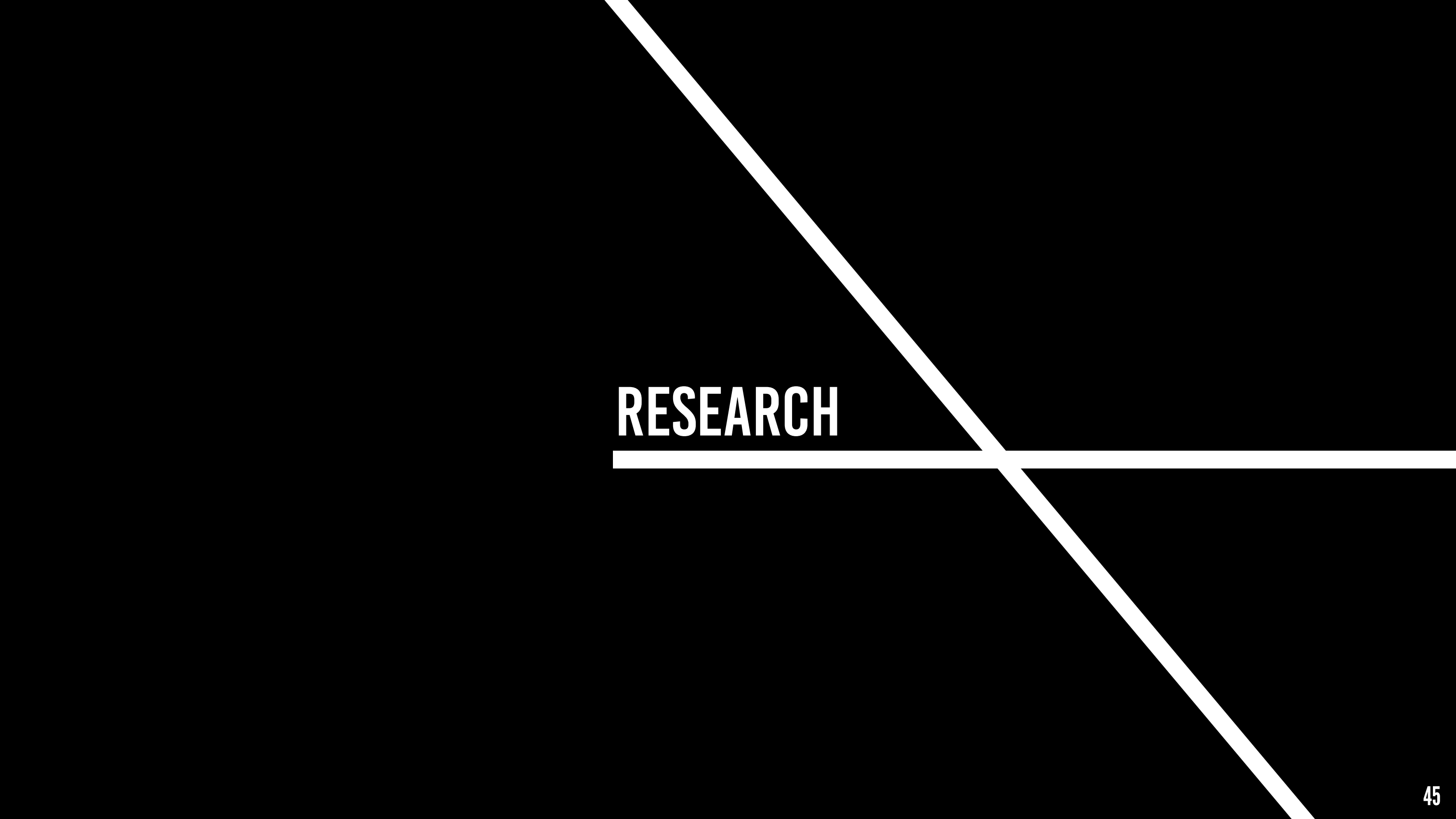
OBJECTIVE



INTERDISCIPLINARY DESIGN APPROACH

FOR A RESILIENT, ADAPTIVE AND SUSTAINABLE

(RE)DEVELOPMENT OF EVERGLADES CITY.



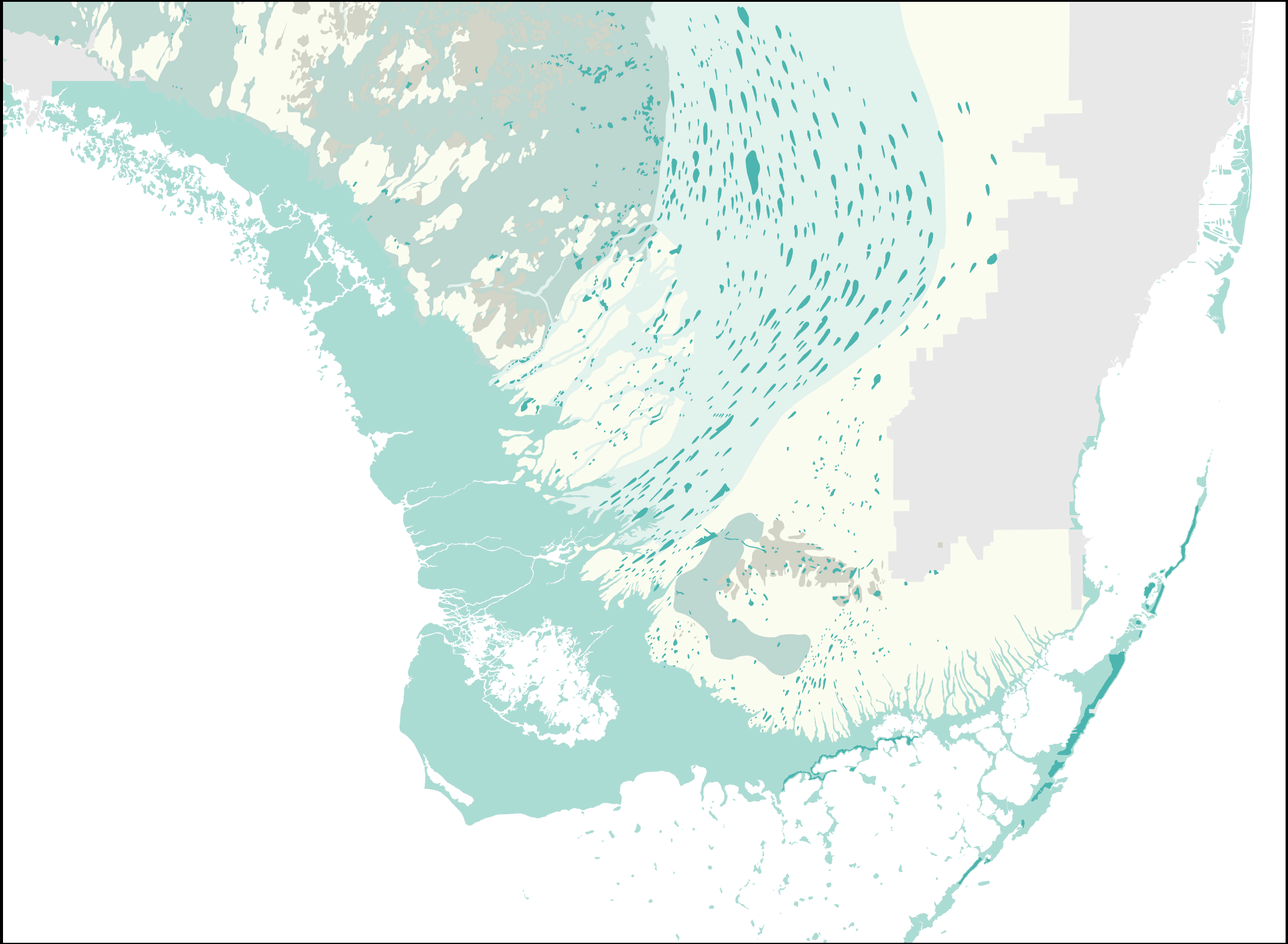
RESEARCH

RESEARCH QUESTION

1

**WHAT ARE THE ECOLOGICAL & HYDROLOGIC DYNAMICS
IN SOUTH-FLORIDA,
AND WHAT PRINCIPLES CAN BE APPLIED
IN EVERGLADES CITY?**





RESEARCH QUESTION

2

**WHICH PRINCIPLES FROM THE CERP
CAN BE APPLIED IN EVERGLADES CITY ?**



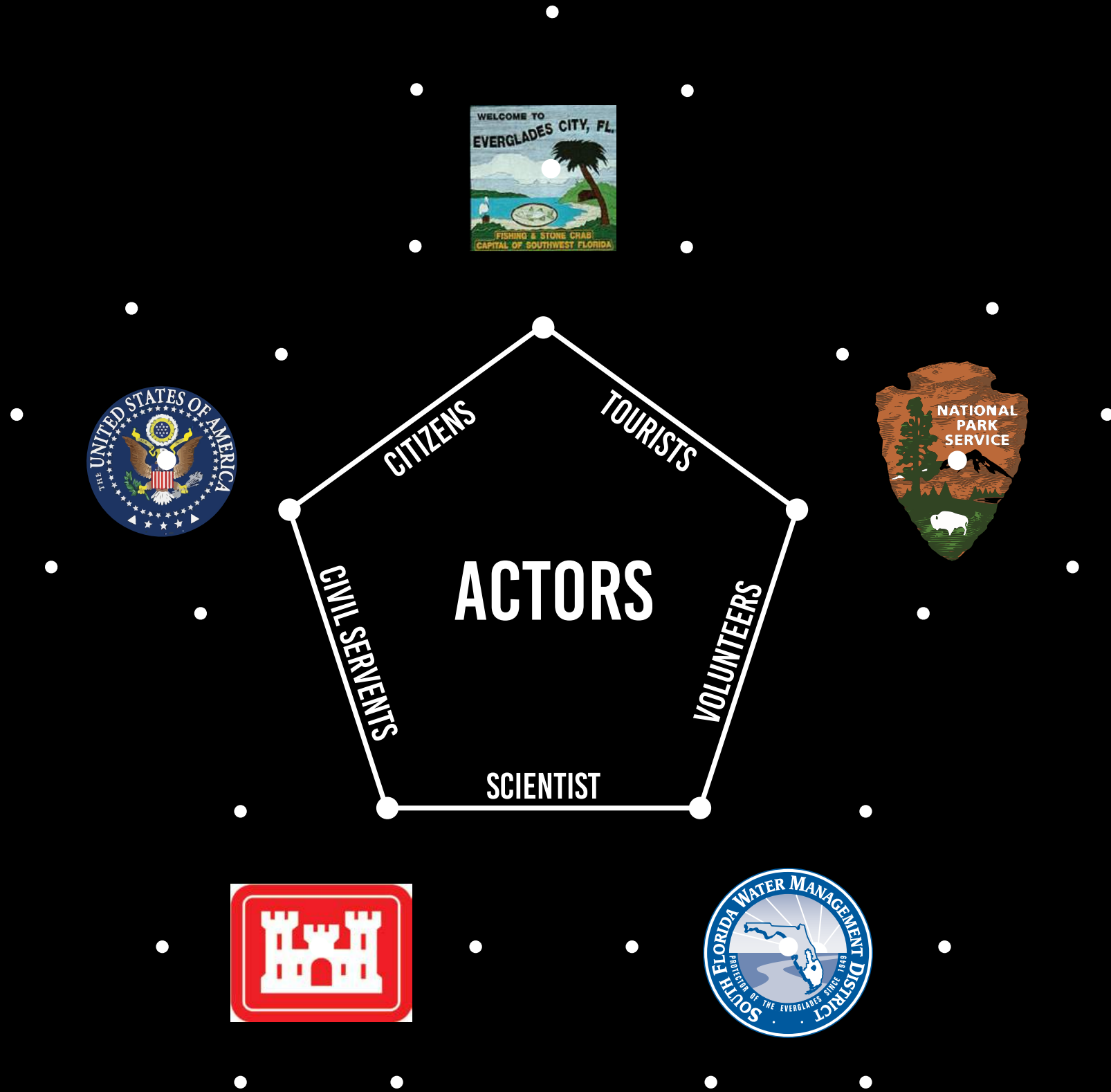
CERP

**COMPREHENSIVE EVERGLADES
RESTORATION PLAN**

RESEARCH QUESTION

3

**HOW TO IMPROVE INTERACTION
WITHIN LOCAL GOVERNANCE THROUGH THE
DESIGN STRATEGY?**

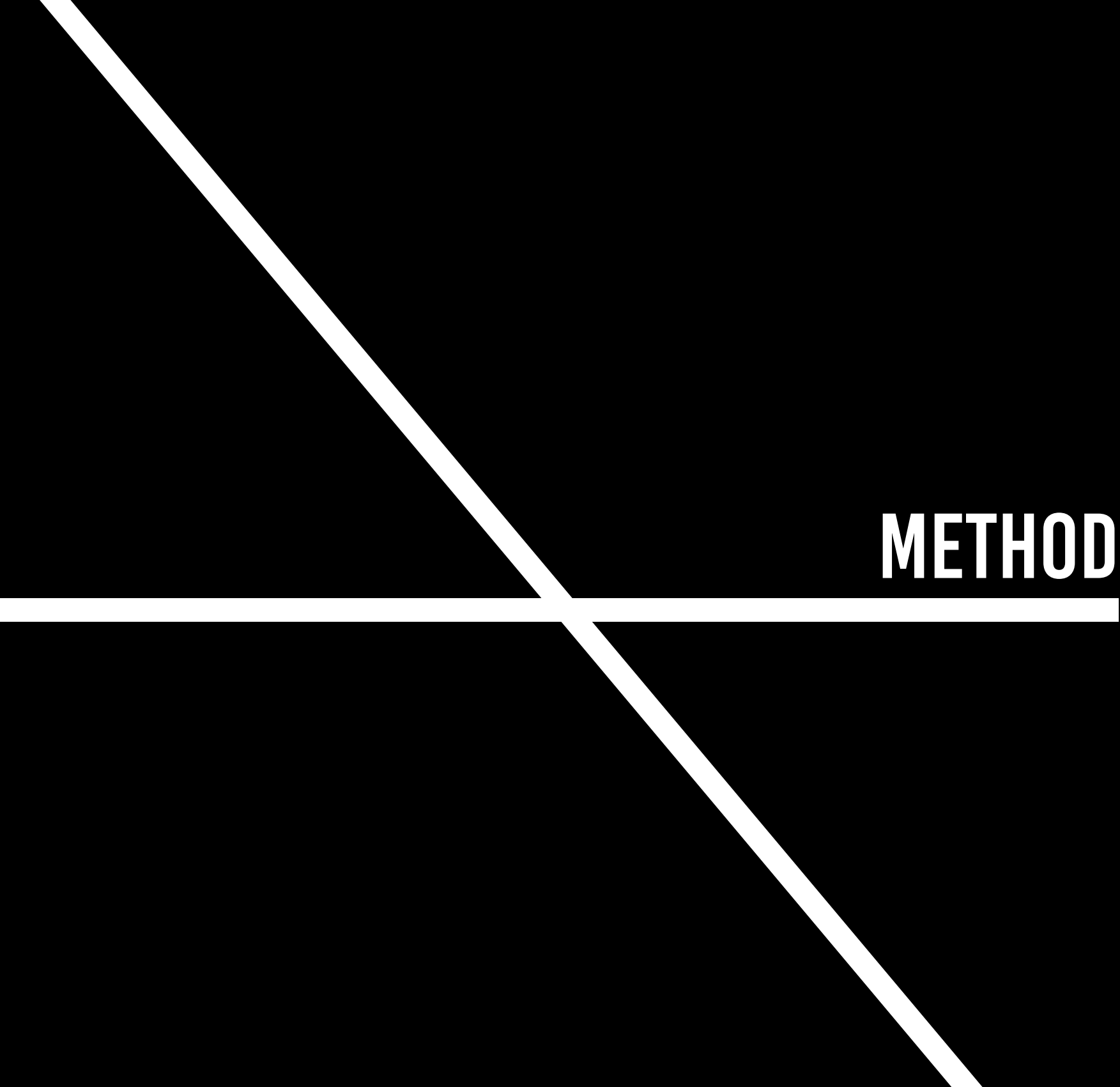


RESEARCH QUESTION

4

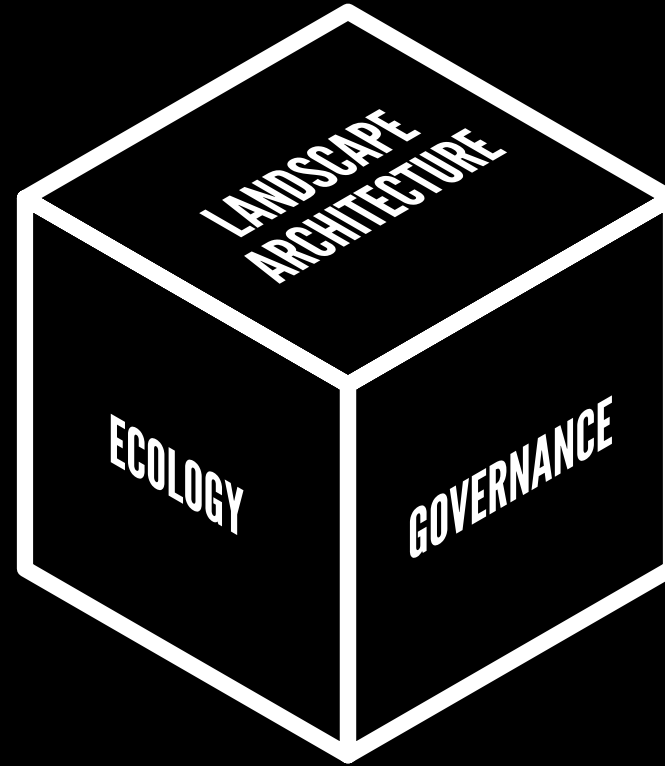
**WHAT IS THE POSITION OF THE PROJECT
IN A GLOBAL CONTEXT AND HOW DOES THE
DESIGN RELATE TO THIS SCALE?**

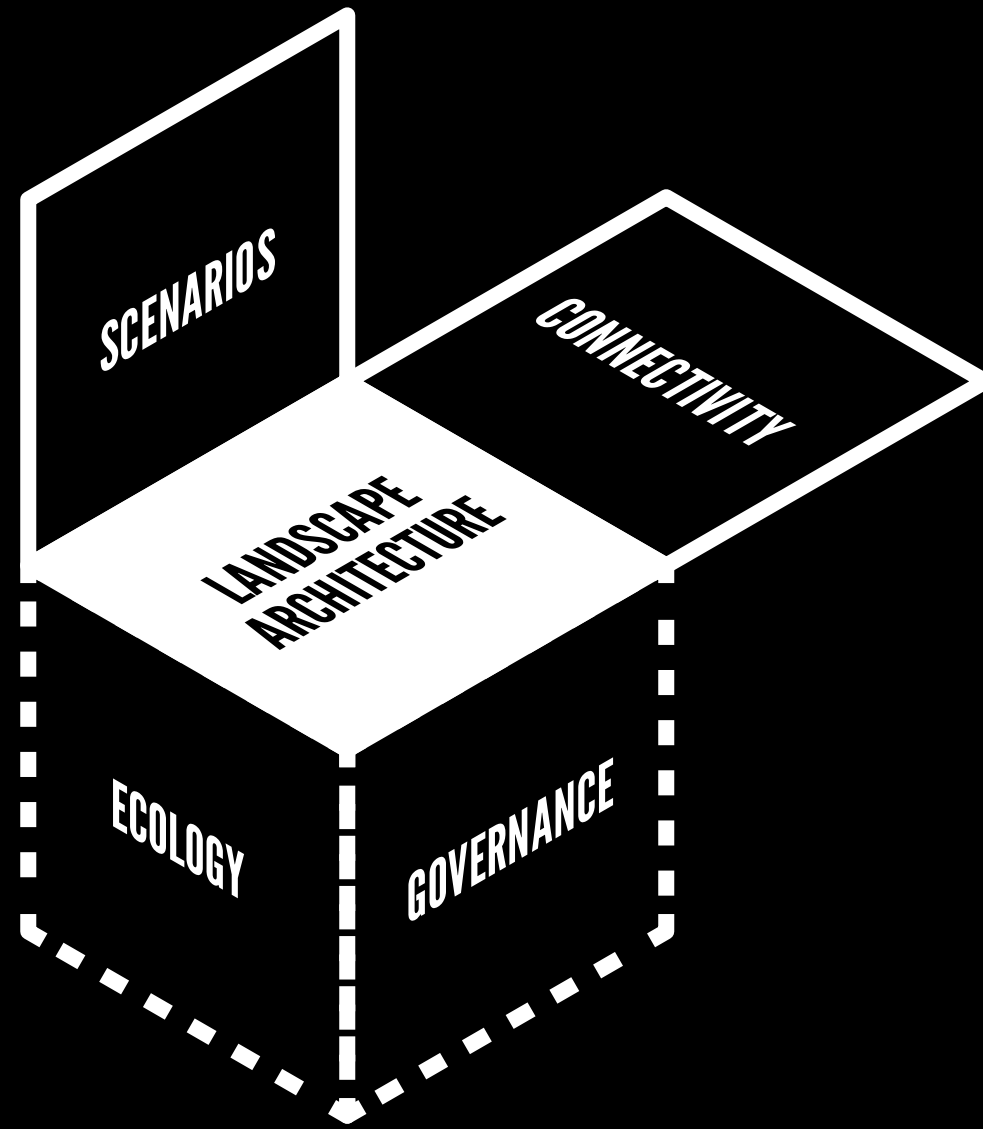


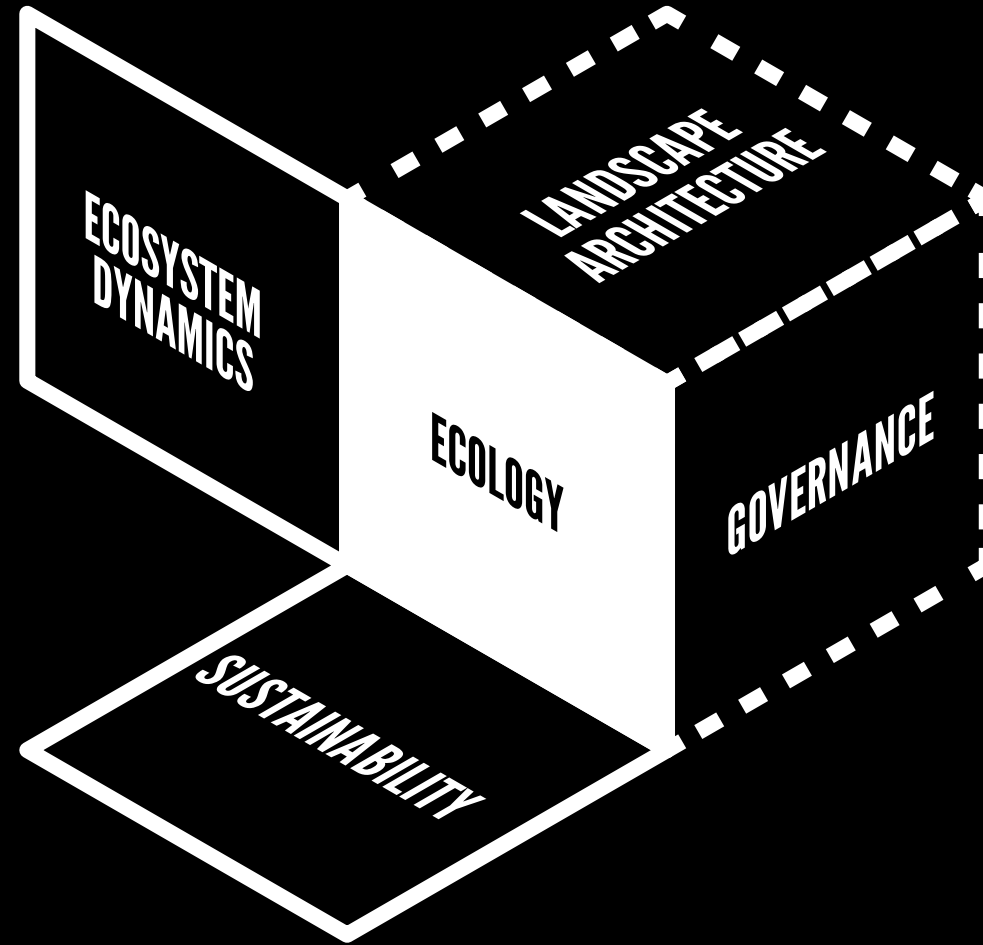


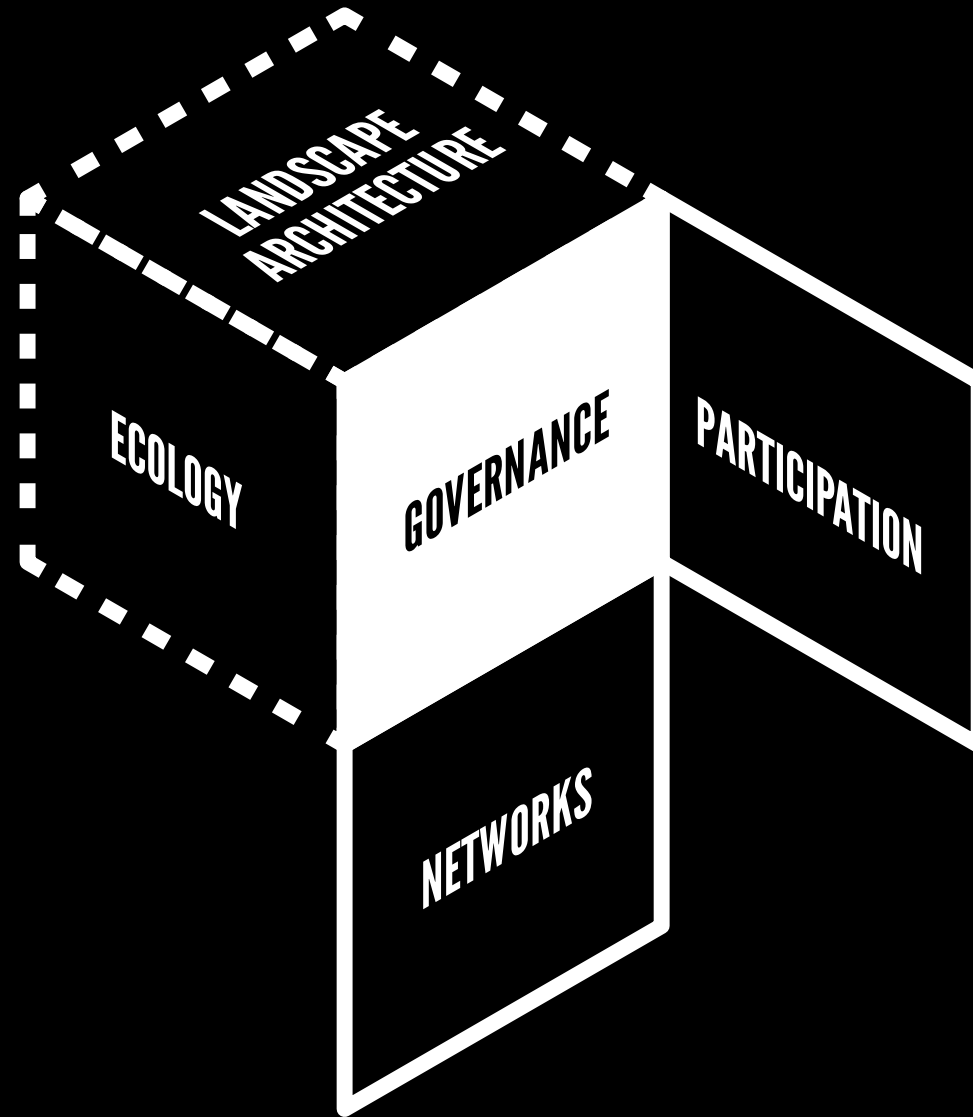
METHOD

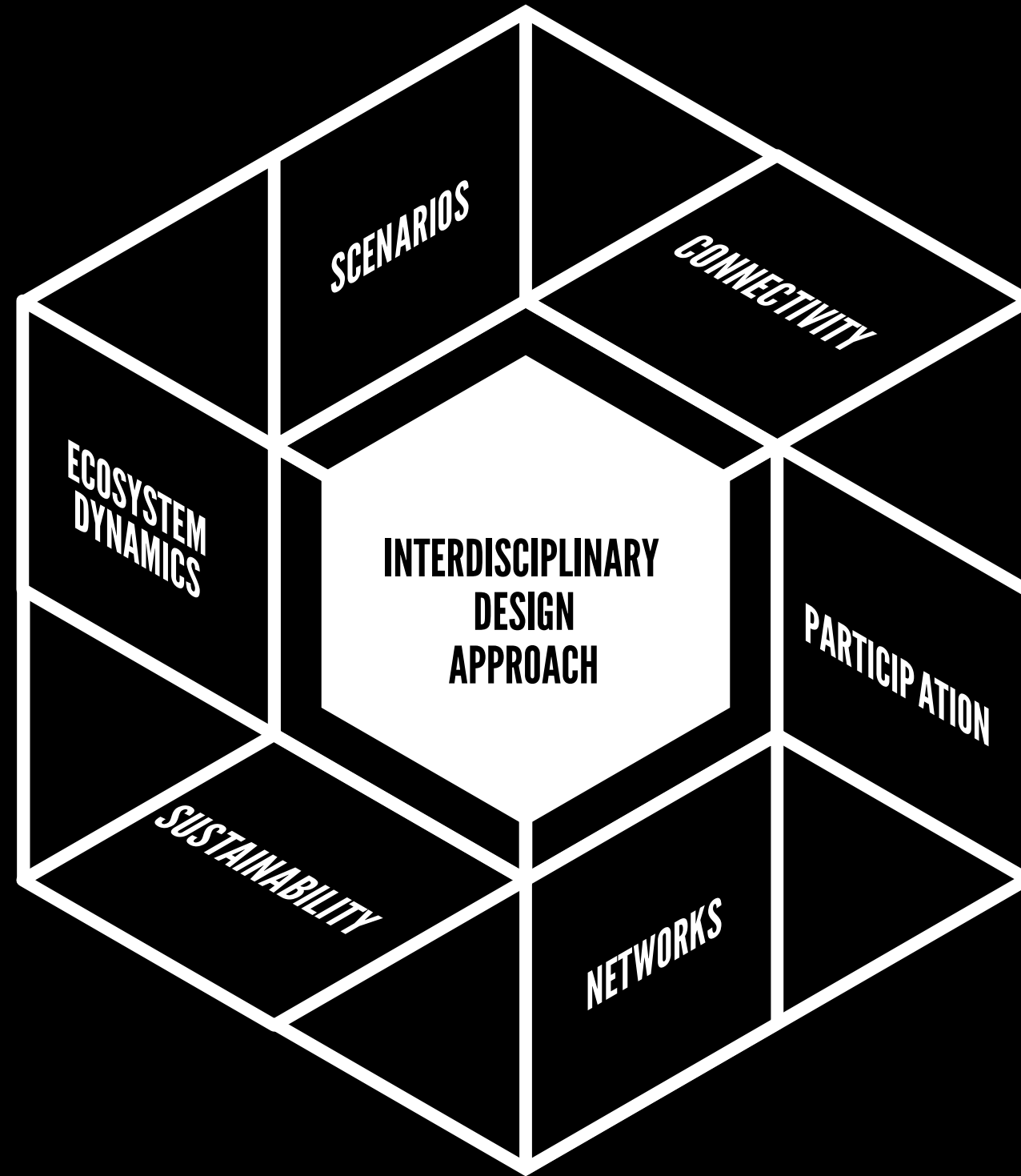
**INTERDISCIPLINARY
DESIGN
APPROACH**

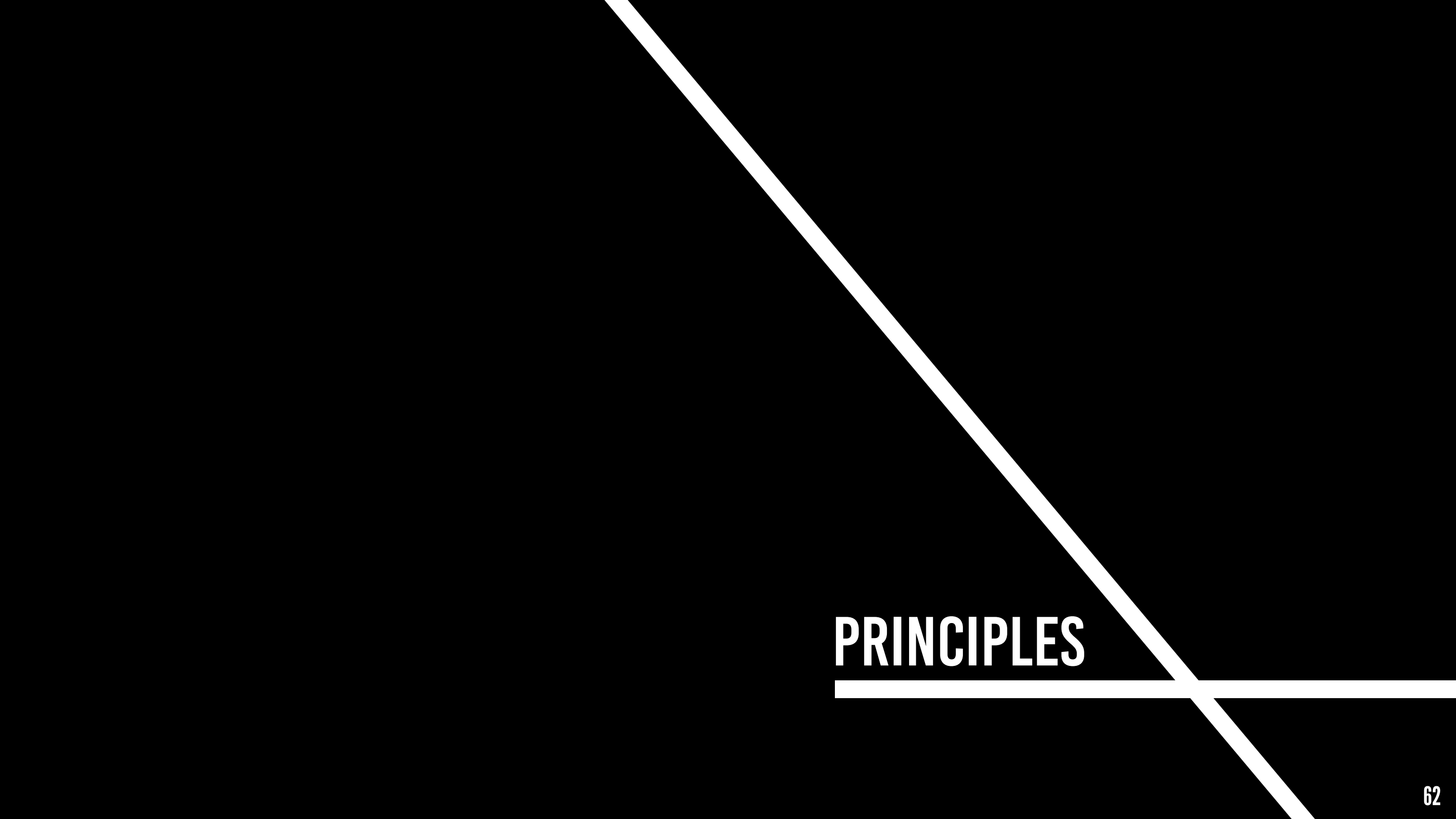










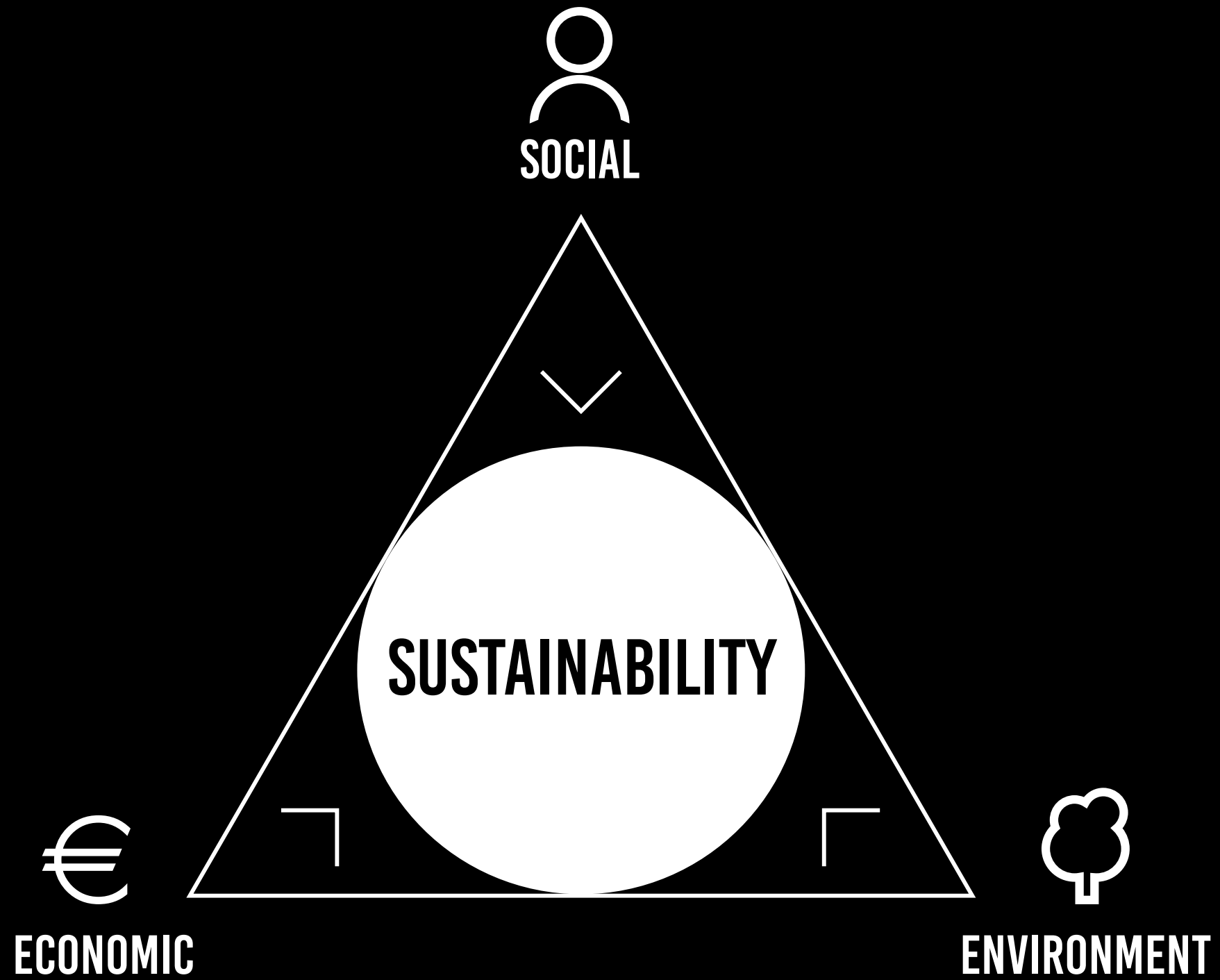
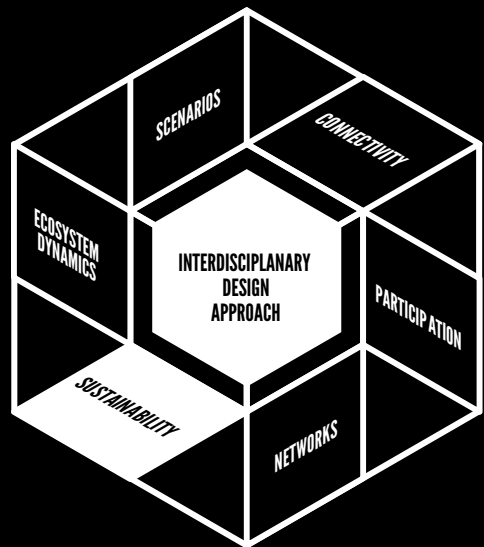


PRINCIPLES

1 CERP principle

2 Waterfront principle

3 Mangrove principle



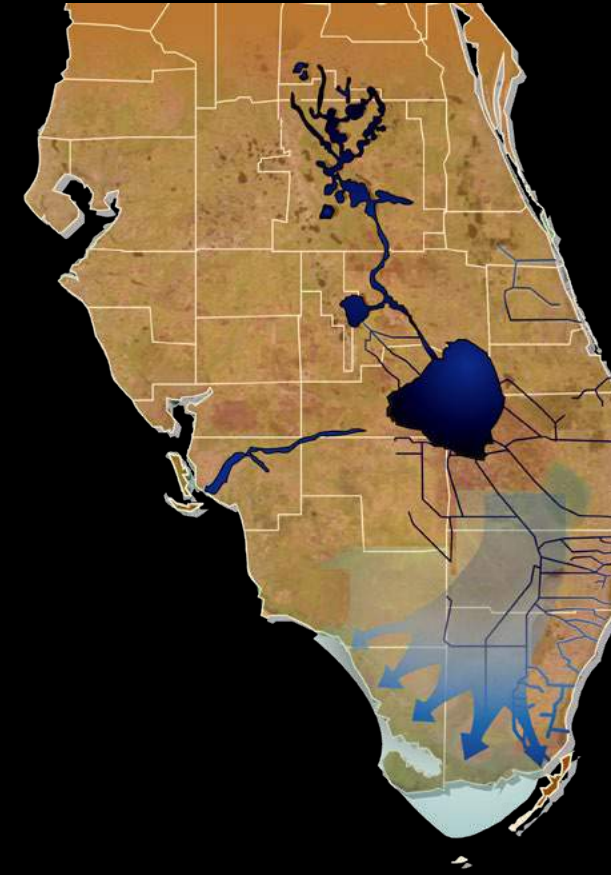
OLD



CURRENT



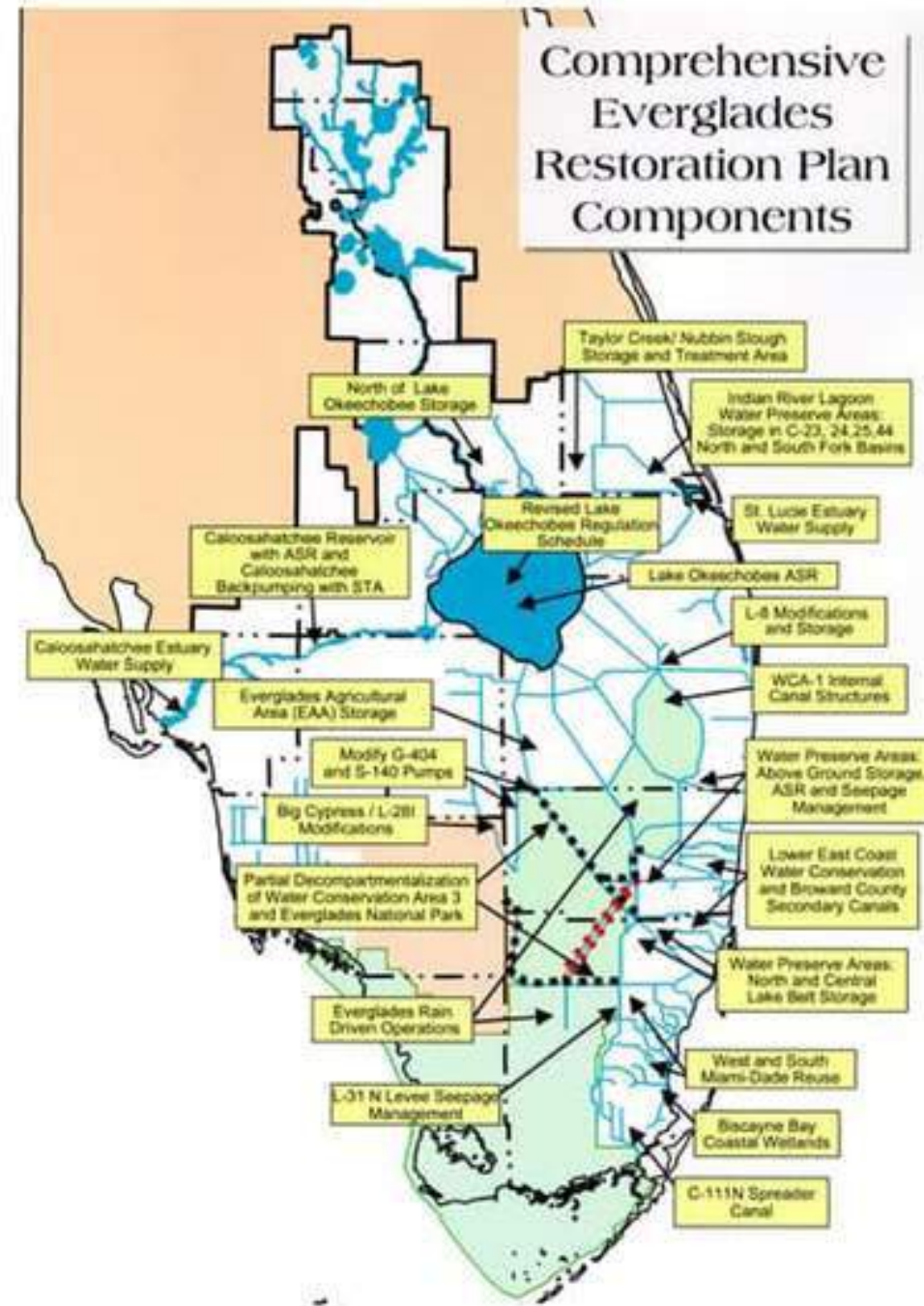
FUTURE

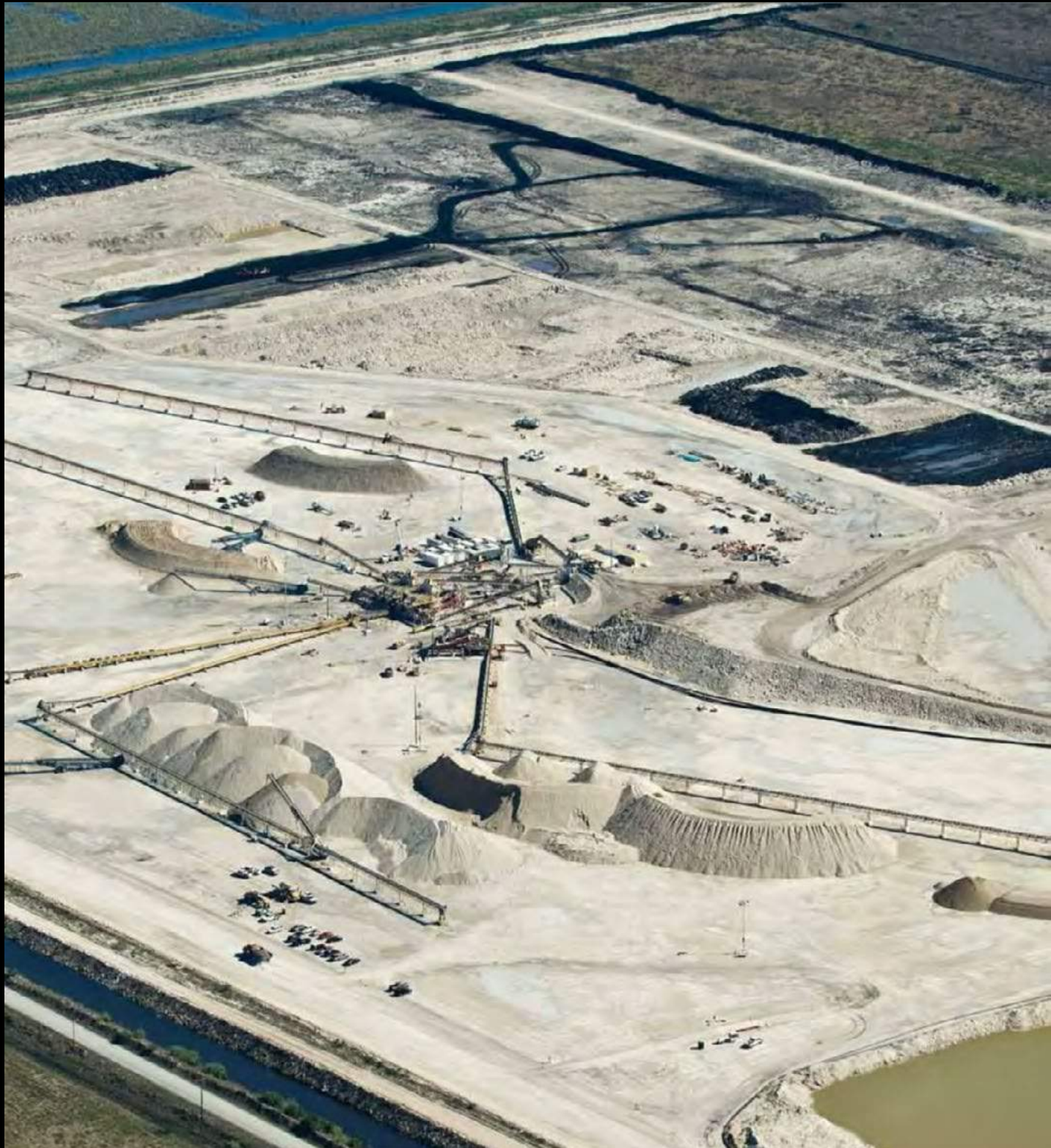


CERP

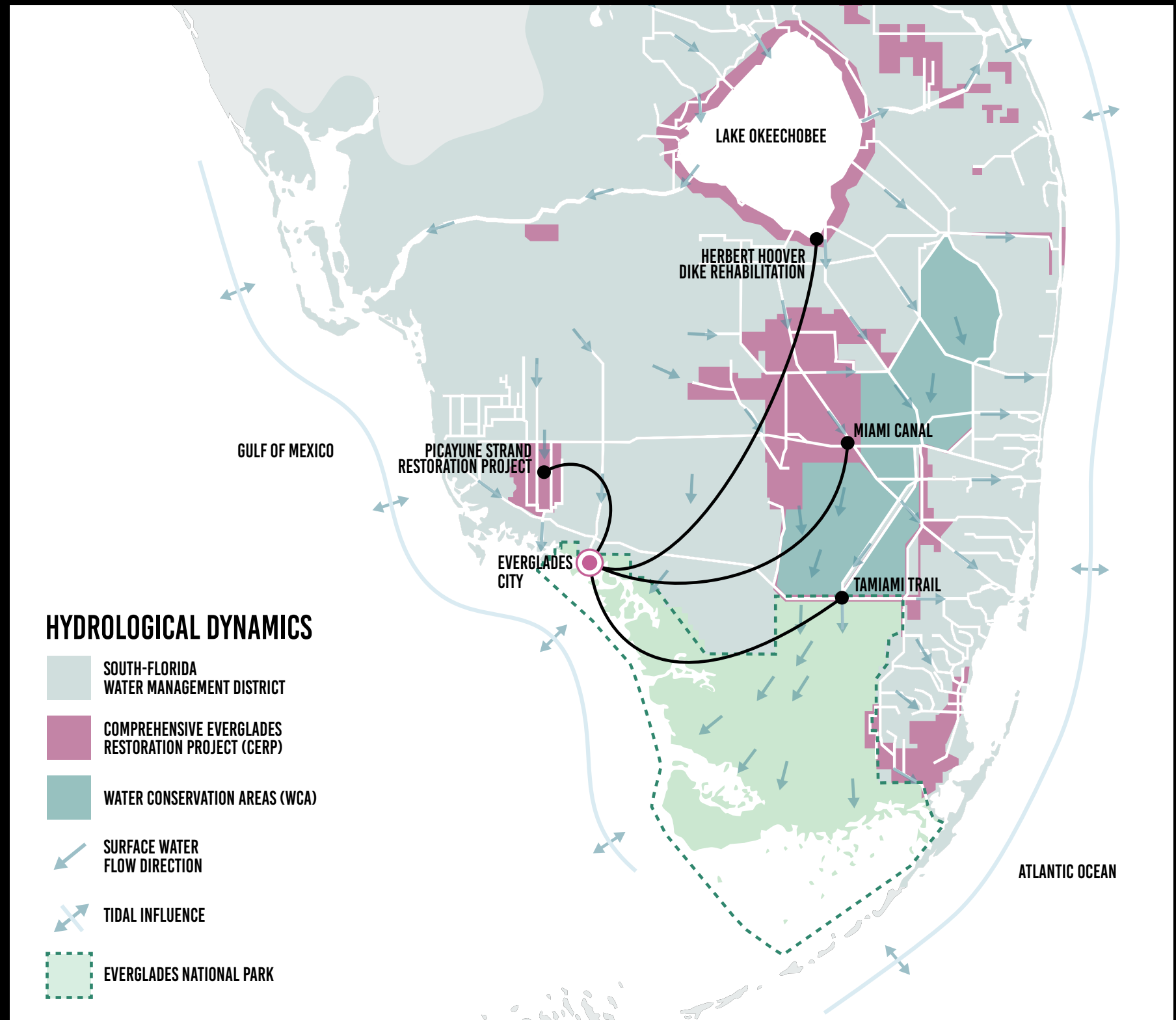
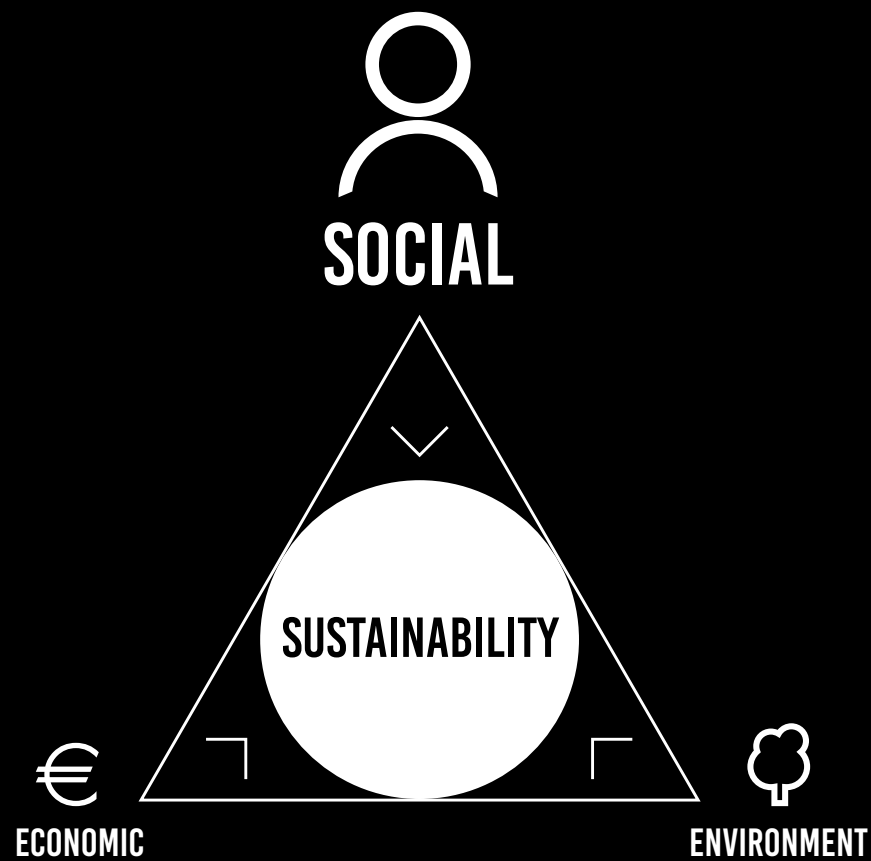
**COMPREHENSIVE EVERGLADES
RESTORATION PLAN**

Comprehensive Everglades Restoration Plan (CERP)



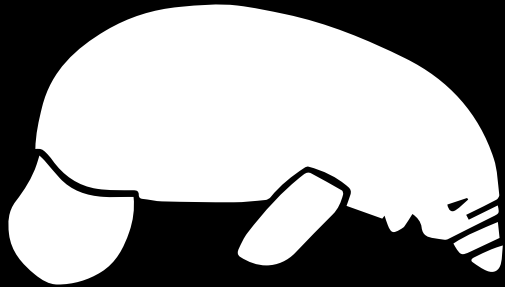


1 CERP principle

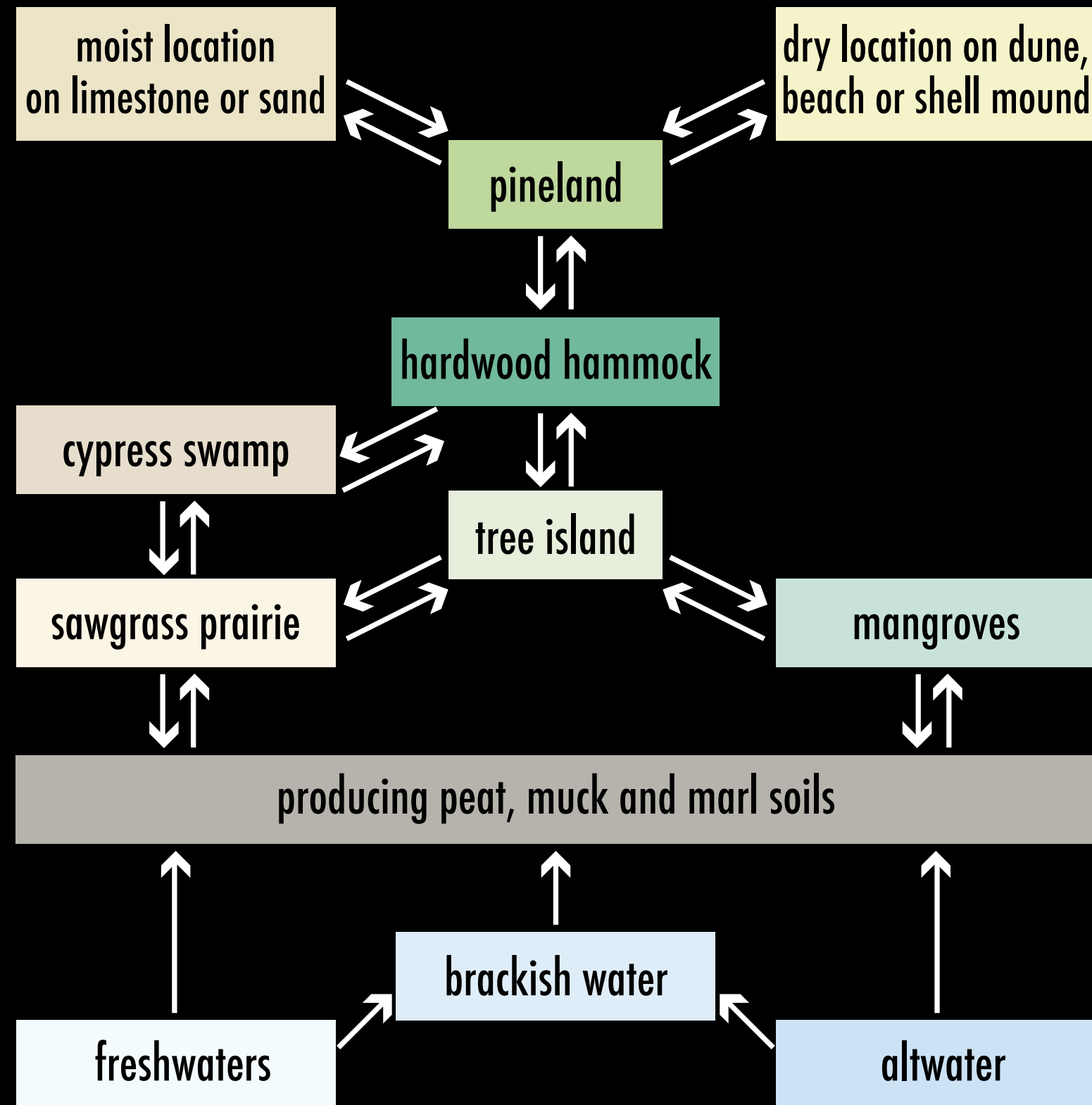
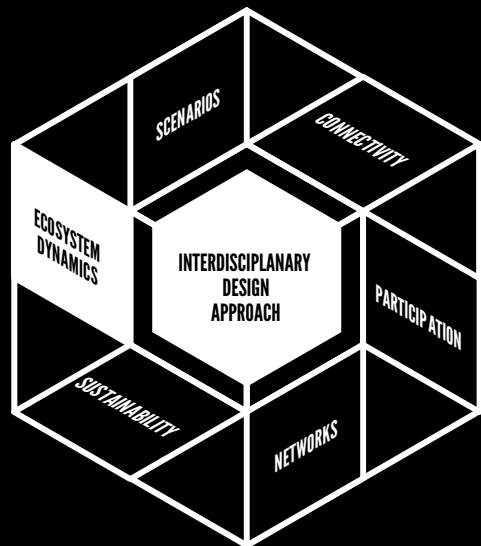


Ecological principle

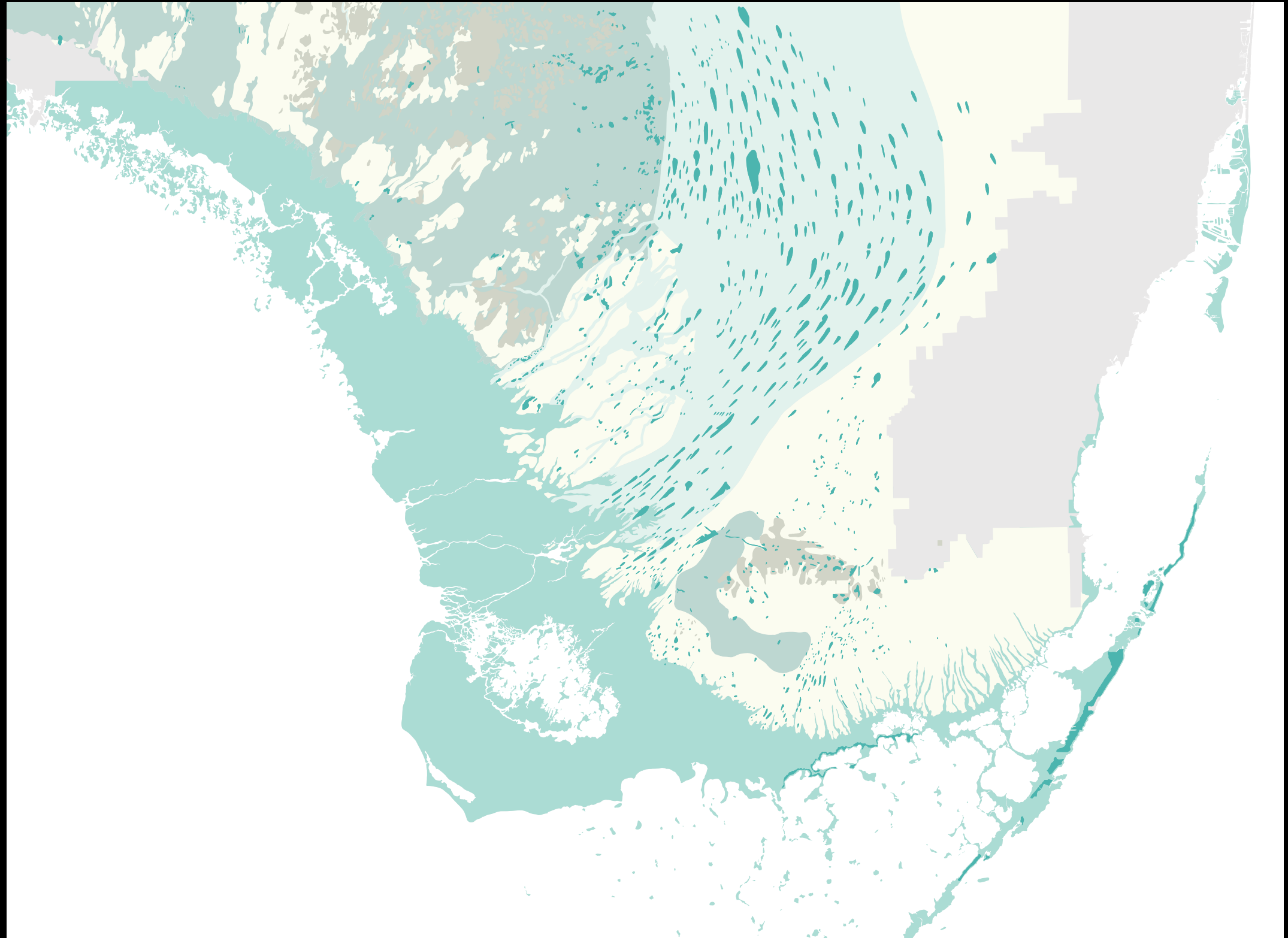
Manatee mitigation



Ecosystem dynamics



Ecosystem map





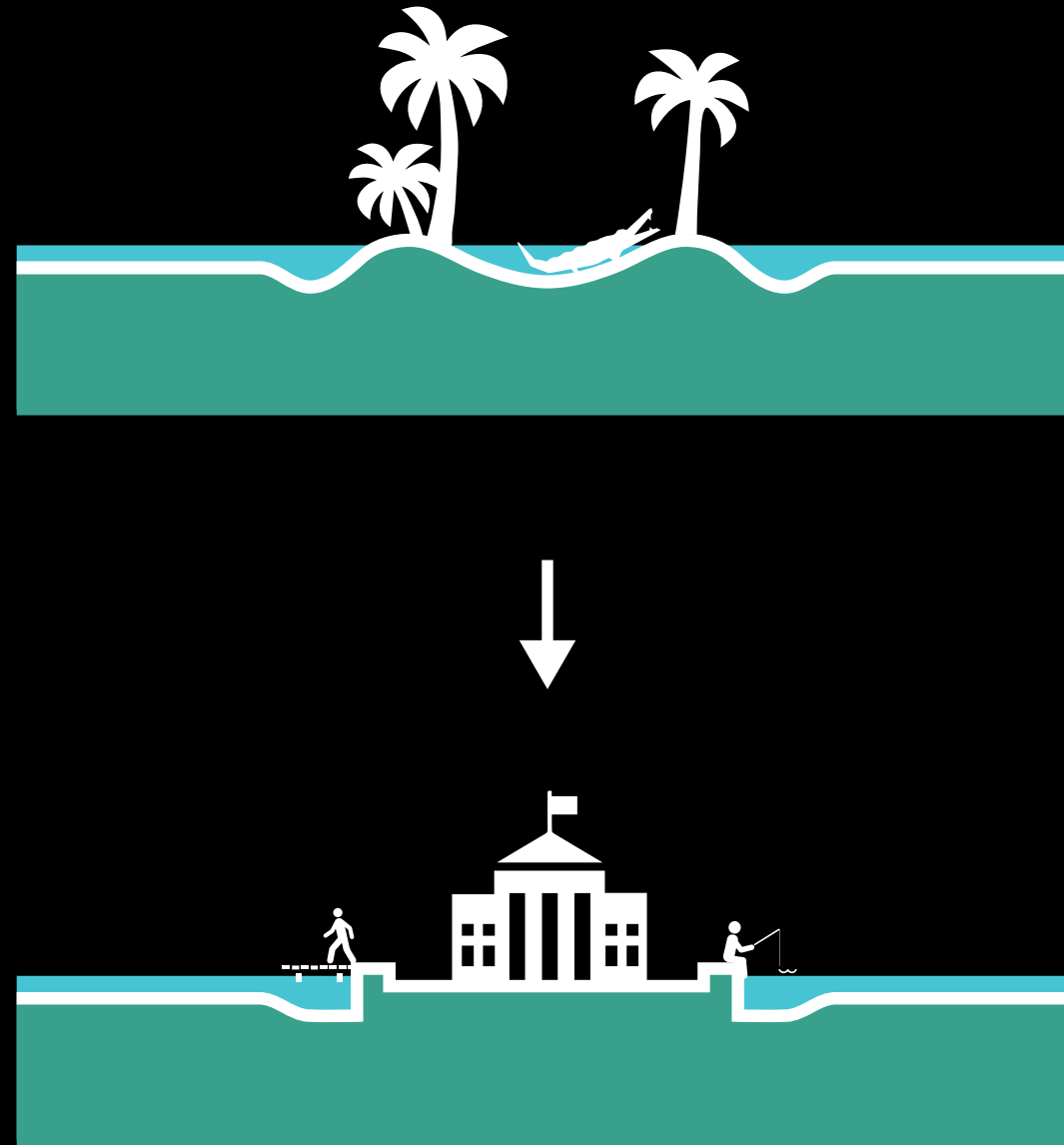




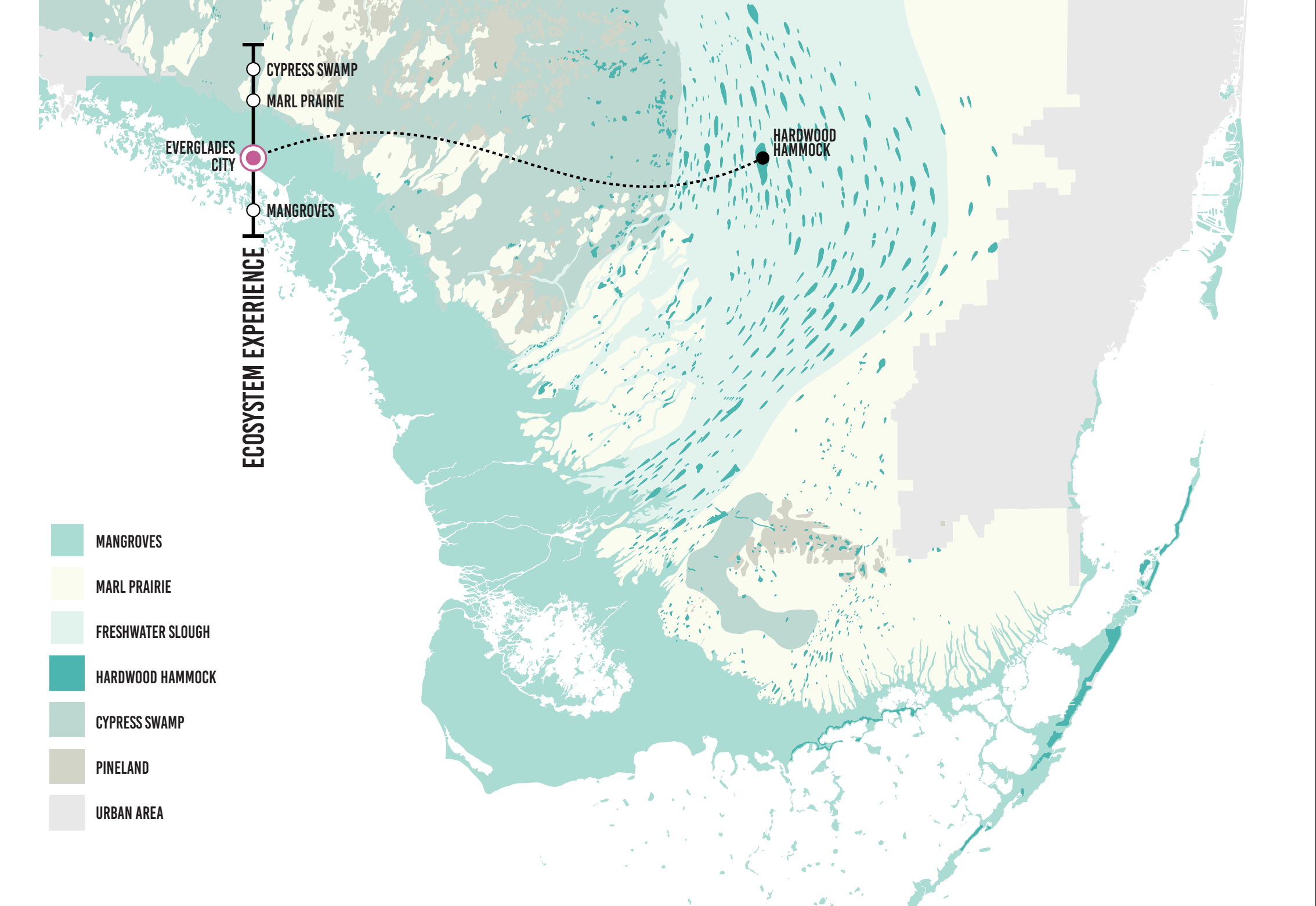
Tropical Hardwood Hammock - section



2 Waterfont principle



Ecosystem experience

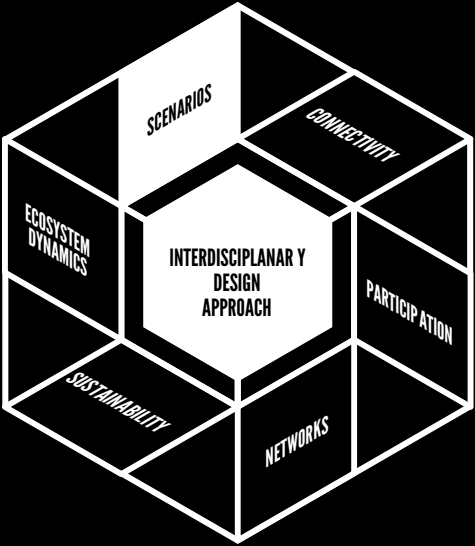
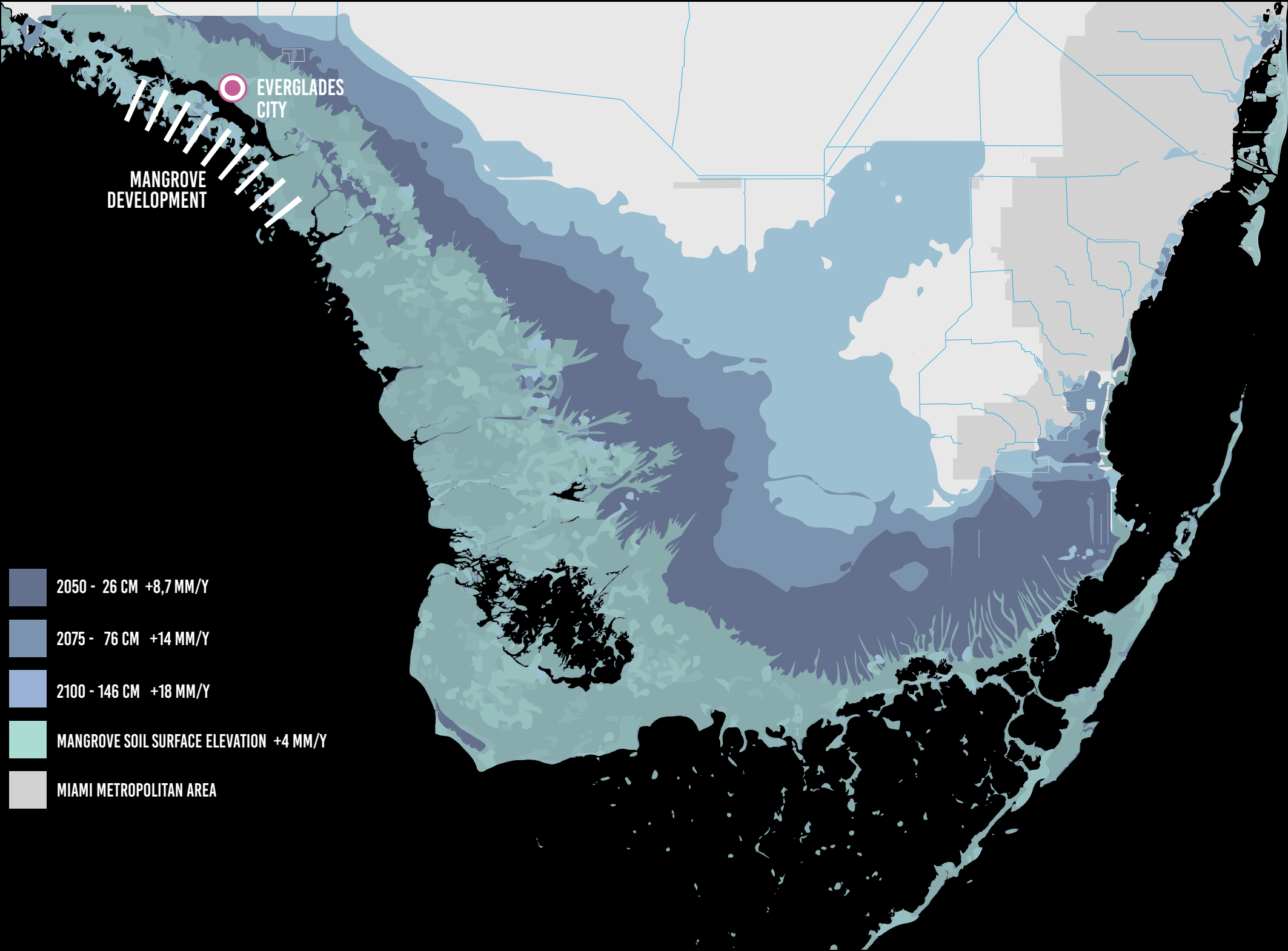




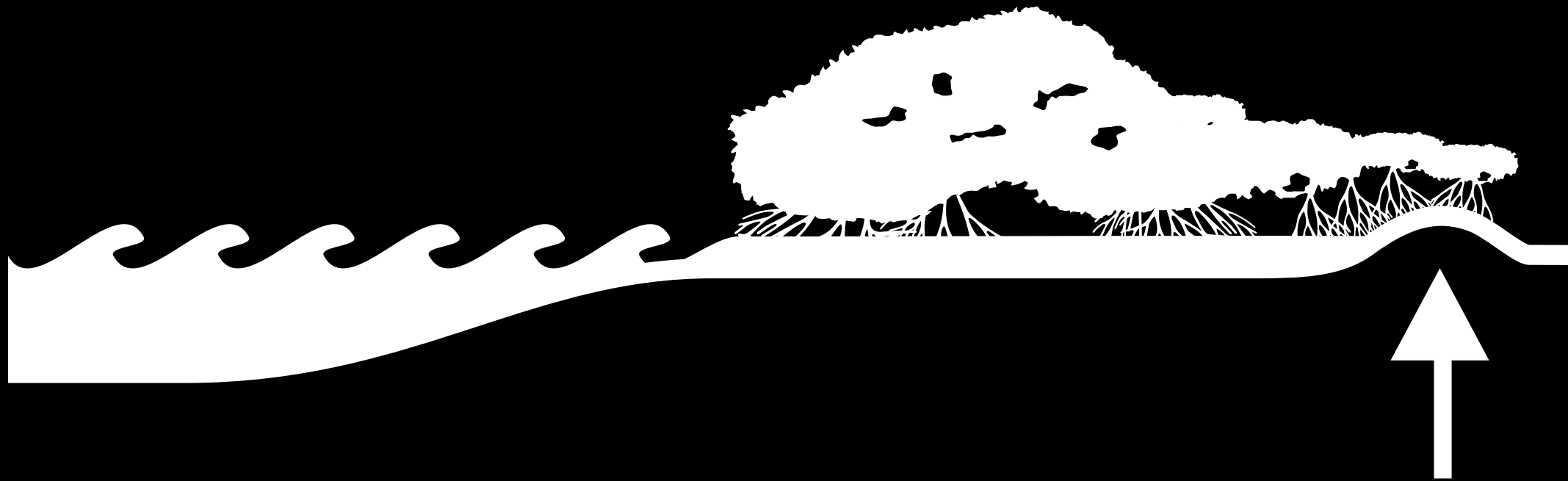




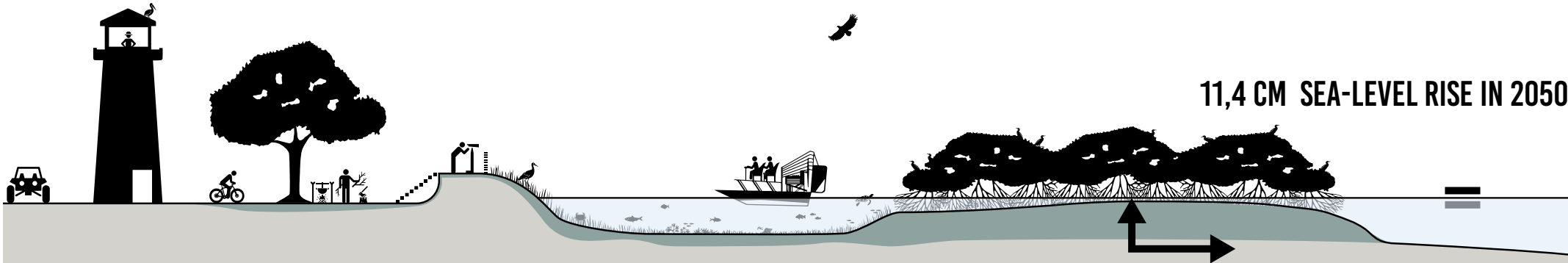
Sea-level rise



3 Mangrove principle

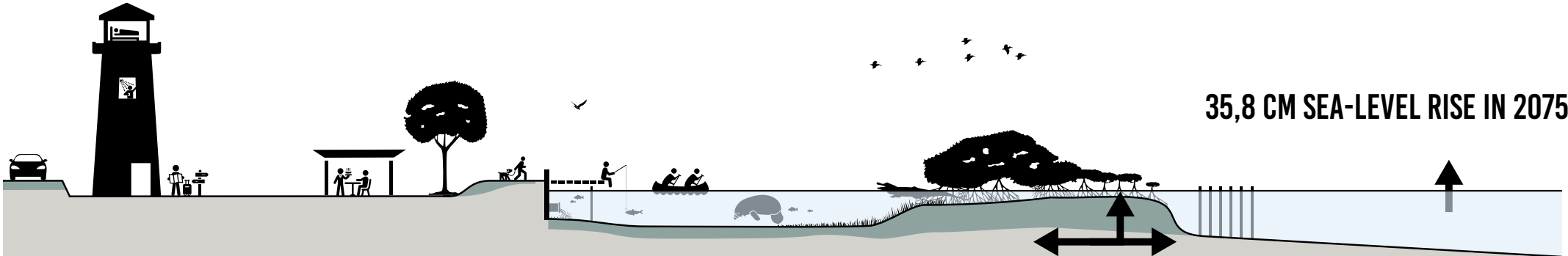


Scenario



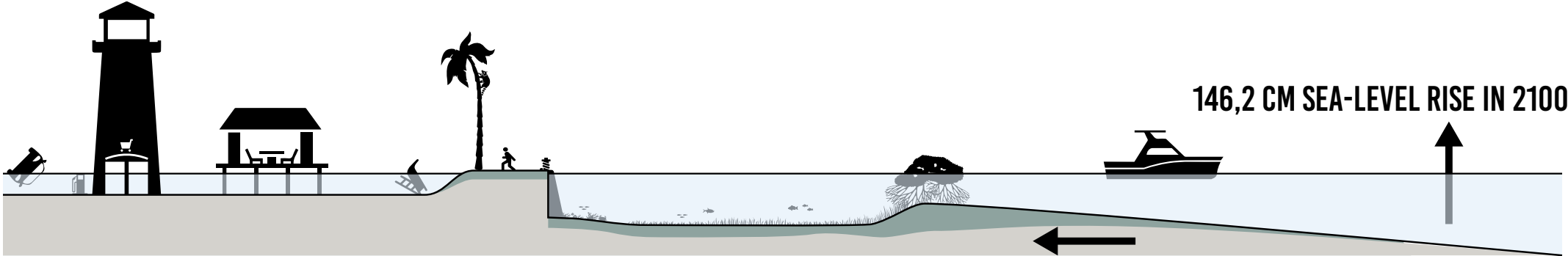
BEST-CASE SCENARIO

11,4 CM SEA-LEVEL RISE IN 2050
3,8 MM/Y SLR < 4 MM/Y MANGROVE SOIL ELEVATION



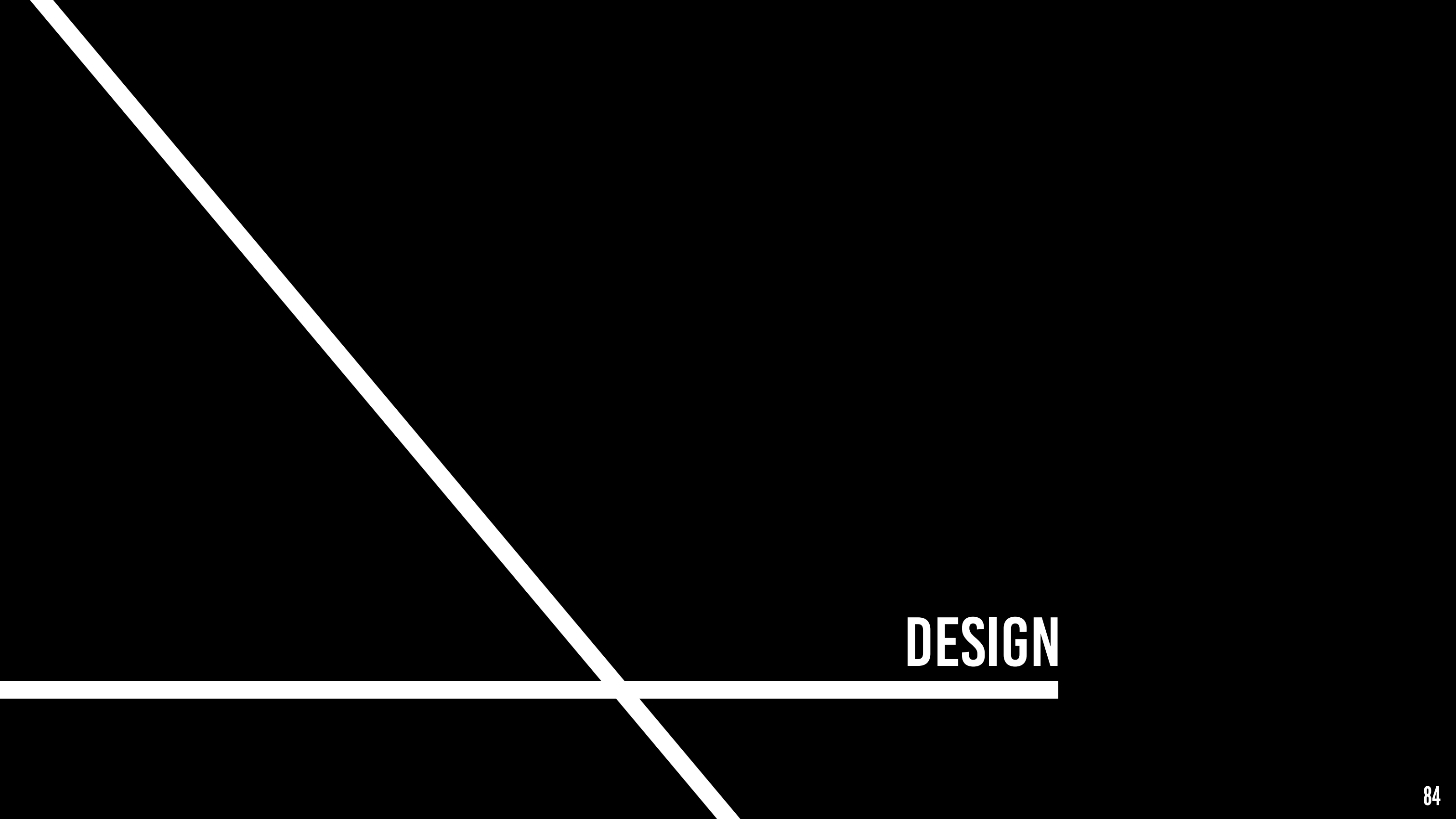
PROBABLE SCENARIO

35,8 CM SEA-LEVEL RISE IN 2075
6,5 MM/Y SLR > 4 MM/Y MANGROVE SOIL ELEVATION



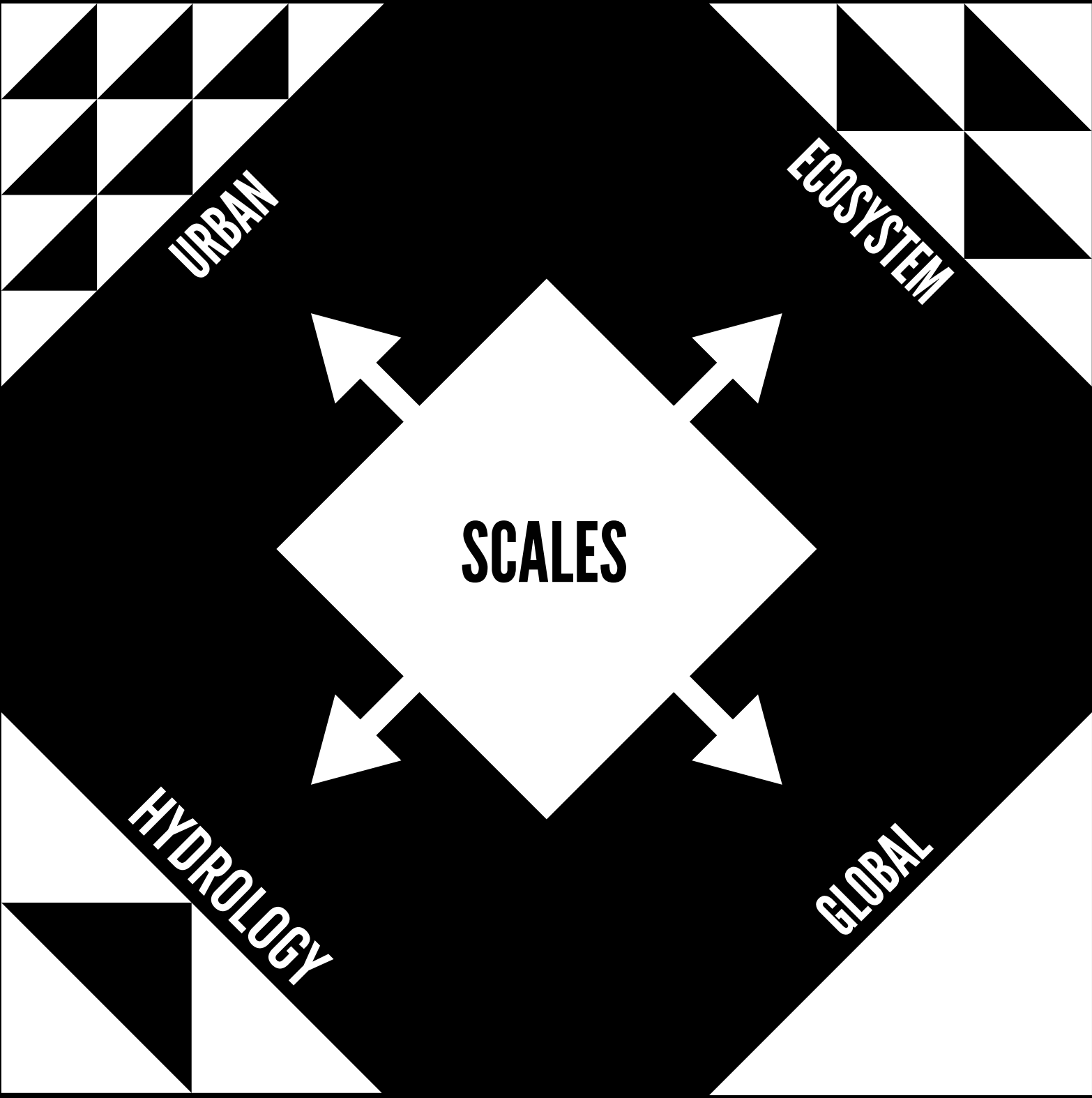
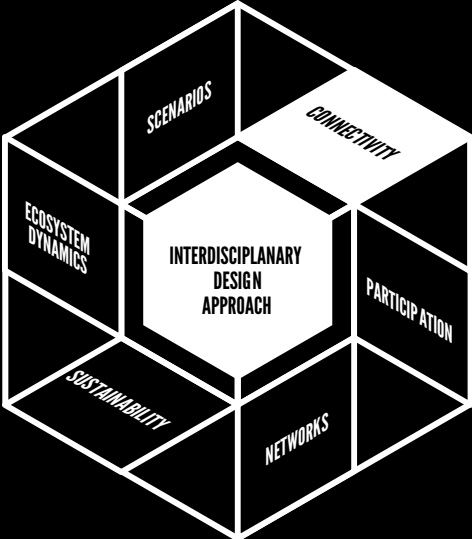
WORST-CASE SCENARIO

146,2 CM SEA-LEVEL RISE IN 2100
18 MM/Y SLR >> 4MM/Y MANGROVE SOIL ELEVATION

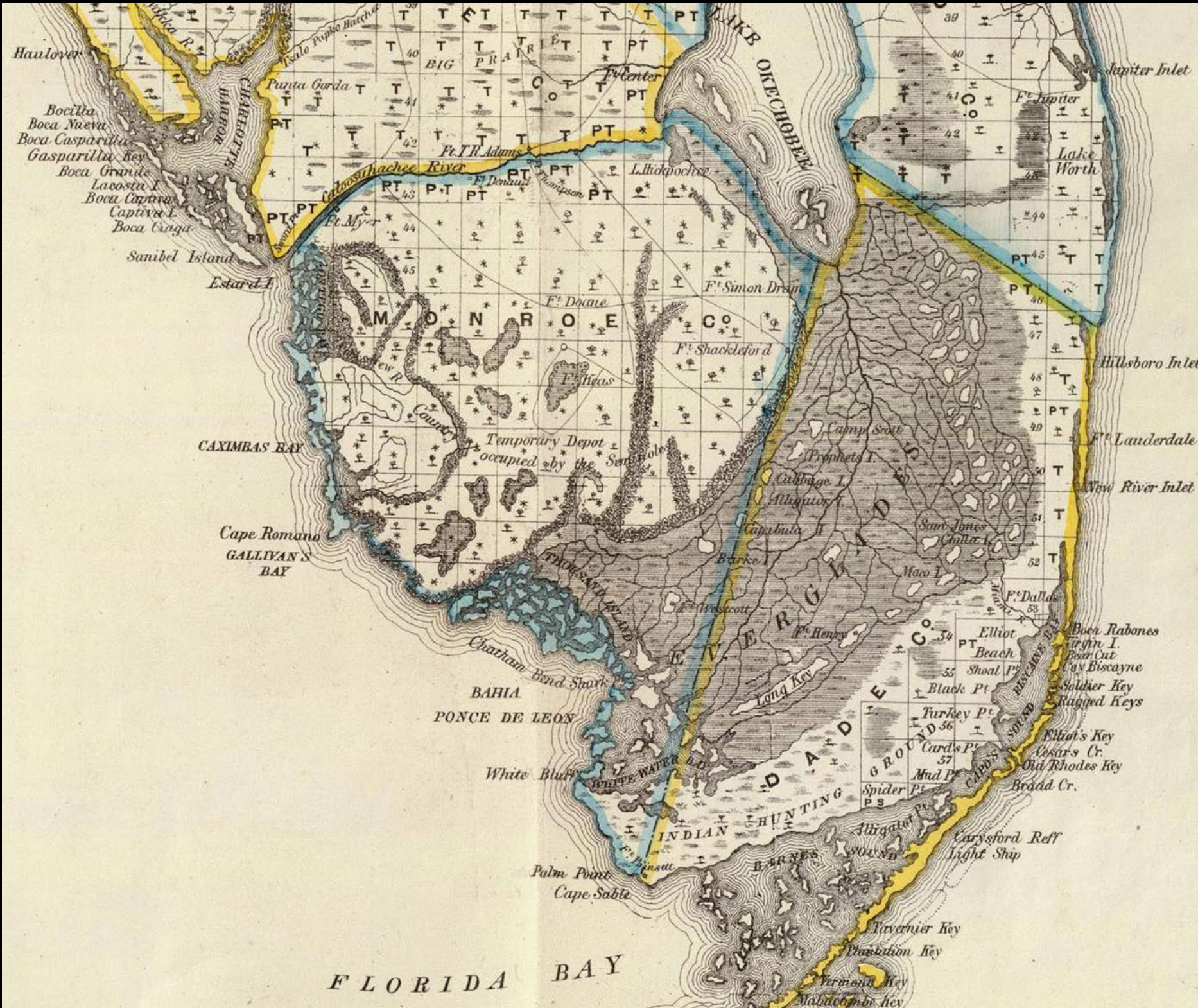


DESIGN

Connectivity



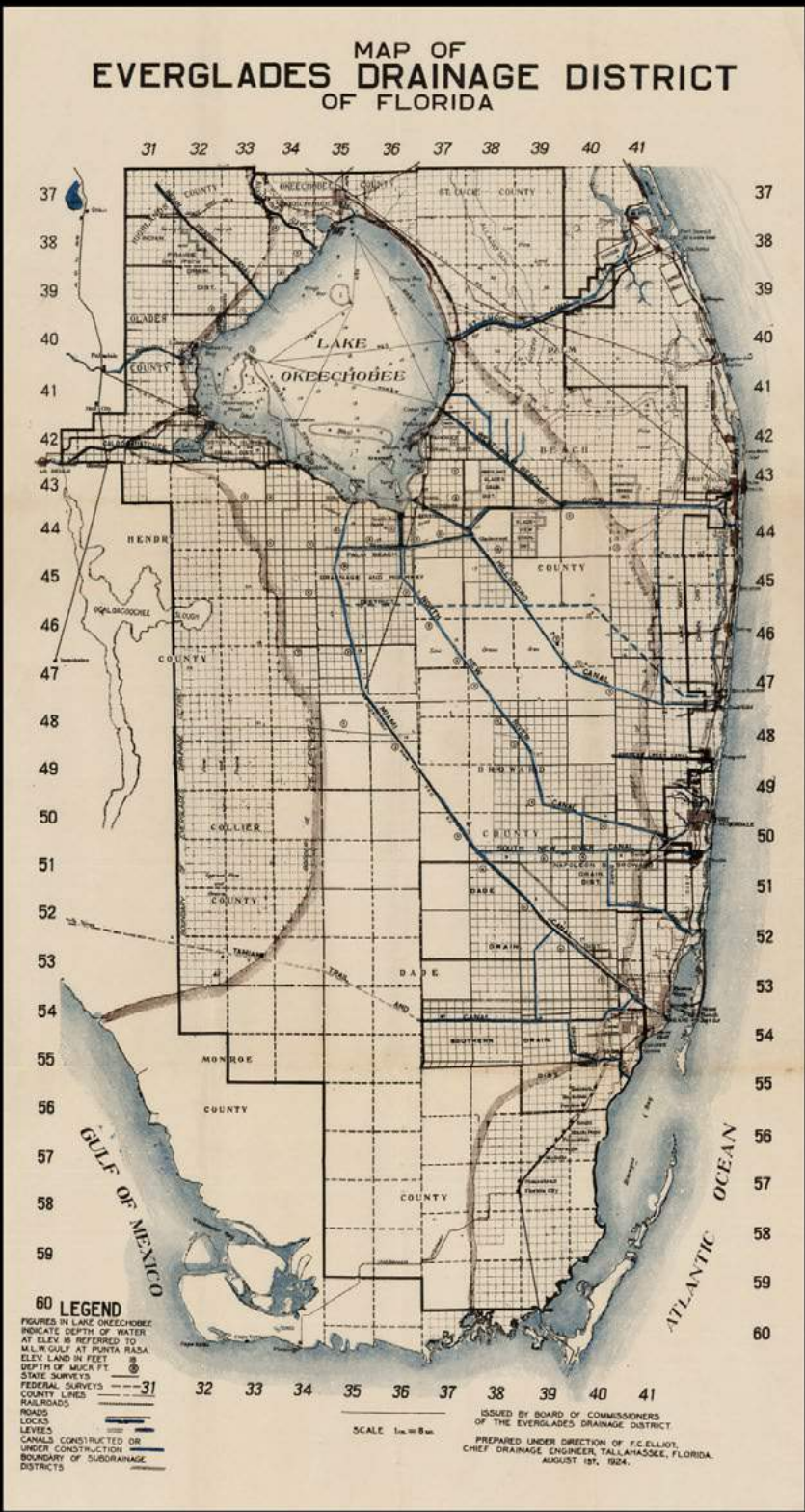




1914

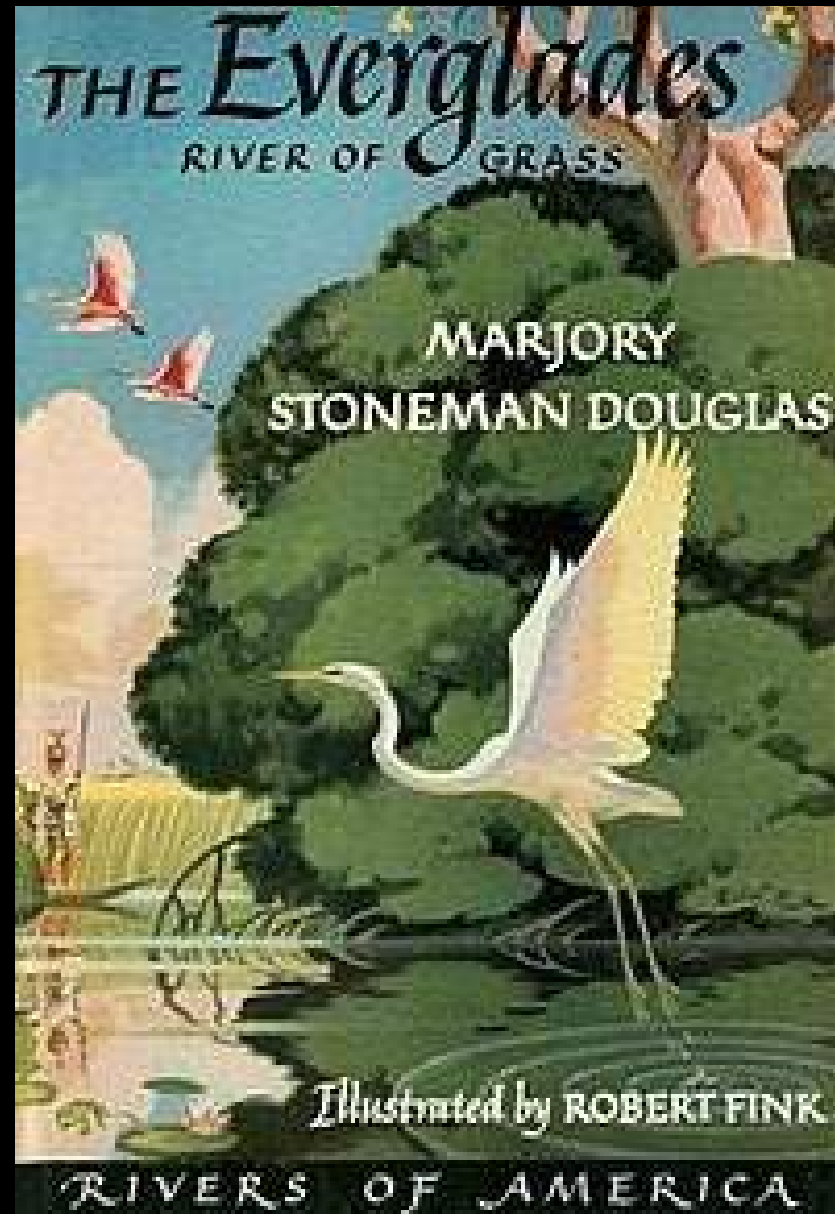


1924



Map of Everglades Drainage District of Florida - 1914 (retrieved from: <https://www.floridamemory.com/>)

1947



River of Grass

Marjory Stoneman Douglas (1890-1998)

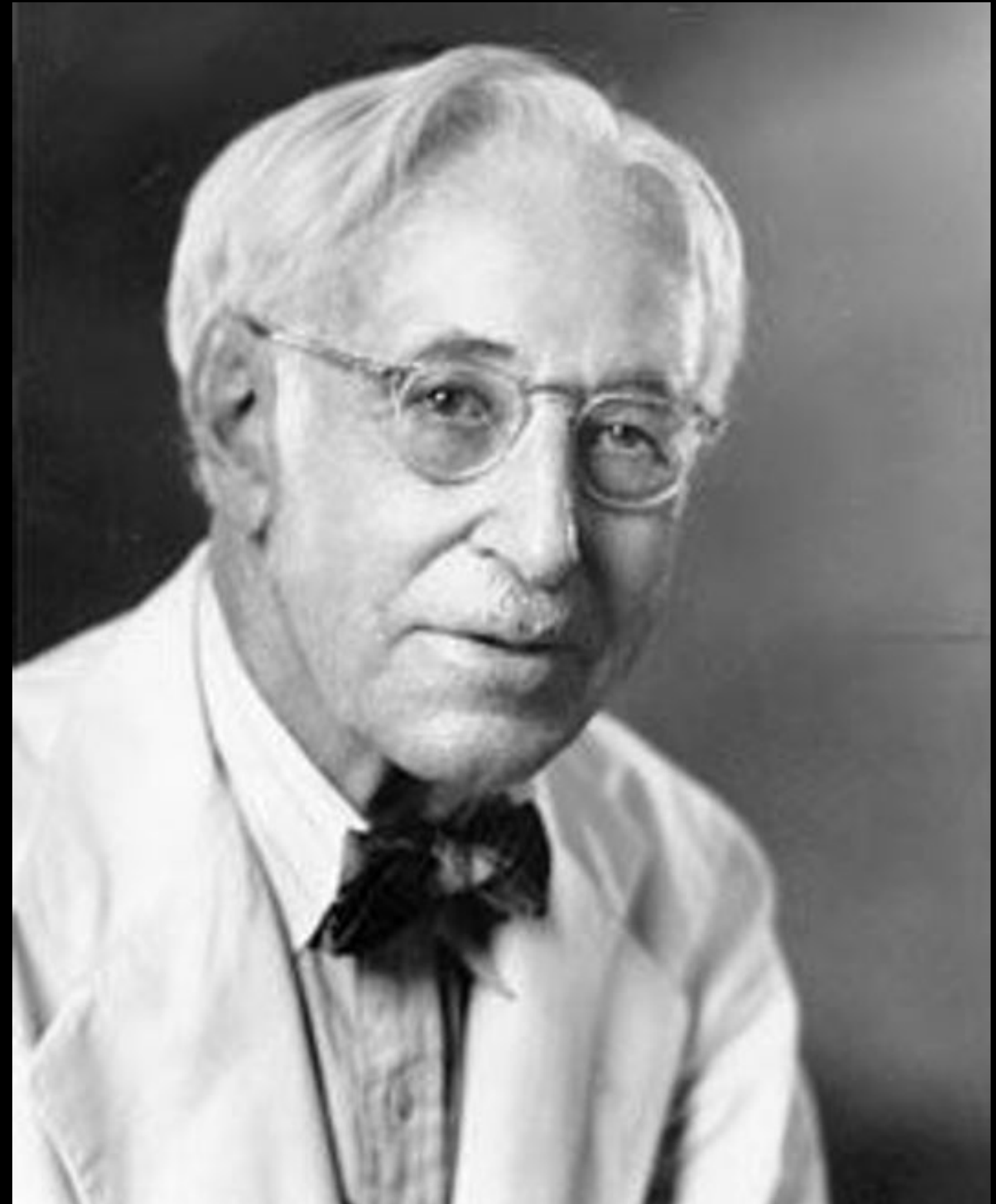
Environmentalist

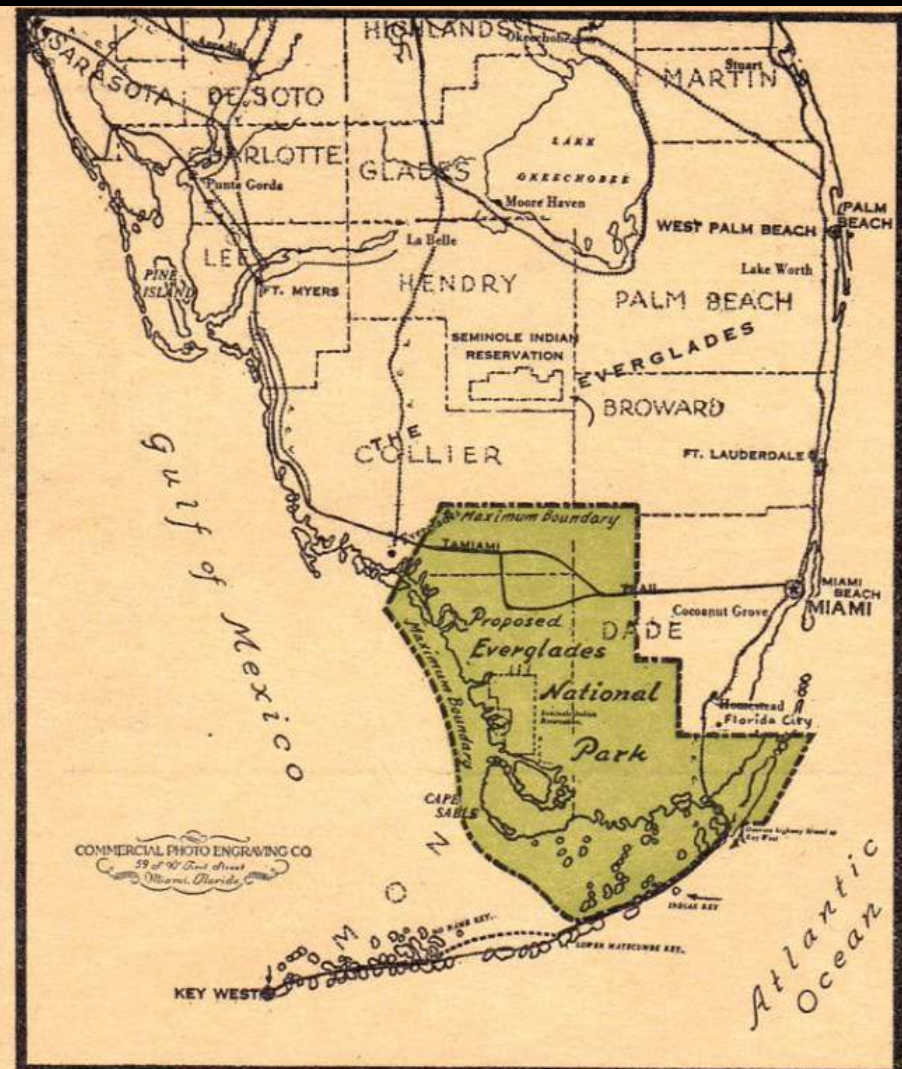


1947



Everglades National Park
Ernest F. Coe (1866-1951)
Landscape Architect





GOVERNOR'S OFFICE
ALBANY, N. Y.

September 25, 1930

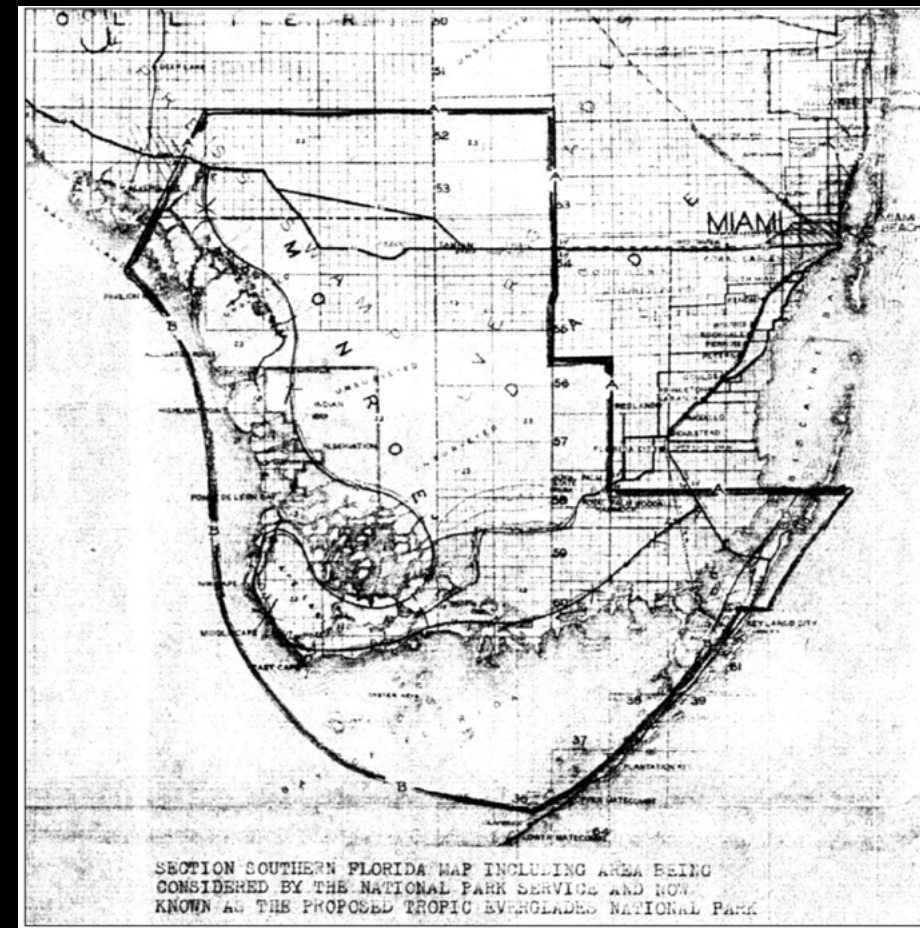
Dear Mr. Coe:

"I am glad that the Everglades National Park project is getting on so well. I can tell you that, knowing this country at first hand, I am very hopeful that it can be preserved for the nation for all time."

Very sincerely yours,

FRANKLIN D. ROOSEVELT

Issued by
The Everglades National
Park Association, Miami, Fla.
and Washington, D. C.



SECTION SOUTHERN FLORIDA MAP INCLUDING AREA BEING
CONSIDERED BY THE NATIONAL PARK SERVICE AND NOW
KNOWN AS THE PROPOSED TROPIC EVERGLADES NATIONAL PARK

Letters and numbers to left on following list
correspond to letters and numbers on above map.

A Proposed land boundary lines	B Proposed shore lines and islands
A.C.L. Railroad station site	14 Boat stations along (10-11)
P.E.C. Railroad station site	15 Waterway to Royal Palm Hammock passing through jungles
East Coast State Highway	16 Gulf entrance to Ingraham Lake
West Coast State Highway	17 Ingraham Lake back of Cape Sable
Miami harbor	18-19 Cape Sables. Poak objectives and turning point for park travel
Everglades harbor	18 Logical housing area site
East Cape Sable	19 Camp colony opportunities
West park-highway entrance and boat landing	20 Inland passage from (18) and (19)
East park-highway entrance	21 Tamiami Trail
Trunk park-highway	22 Gator Lake and rookeries
One way highway exit via Royal Palm Hammock and tropic jungles	23 Great primeval nature areas
Turner River. West water entrance for boats going to Cape Sable, etc.	24 Highways adjoining park
General inside water route	25 Bumpus Bend

March 1, 1930
LFC/R

submitted by:
The Tropic Everglades Park Association





Regional scale



Timeline



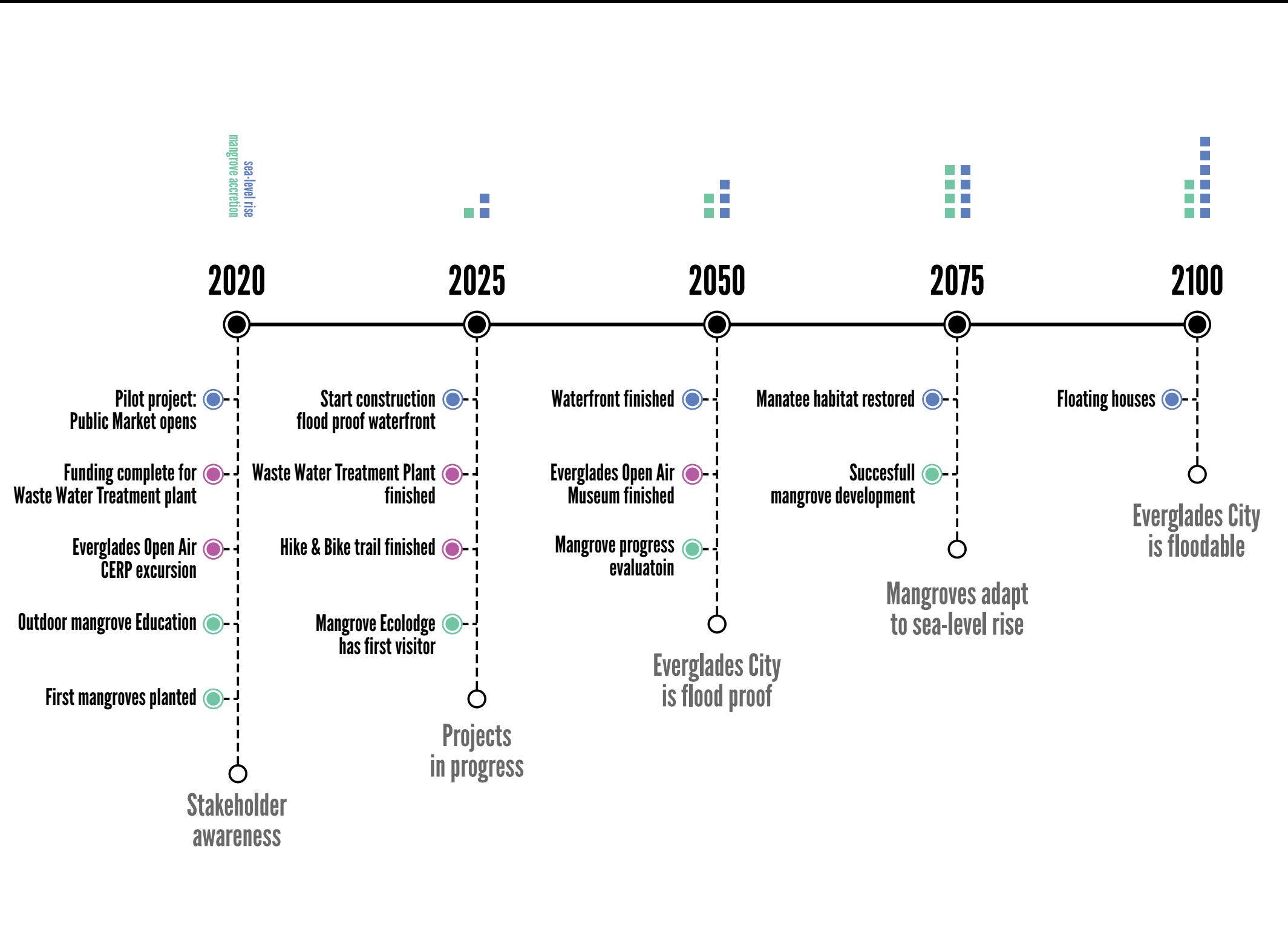
floodproof waterfront



everglades open air

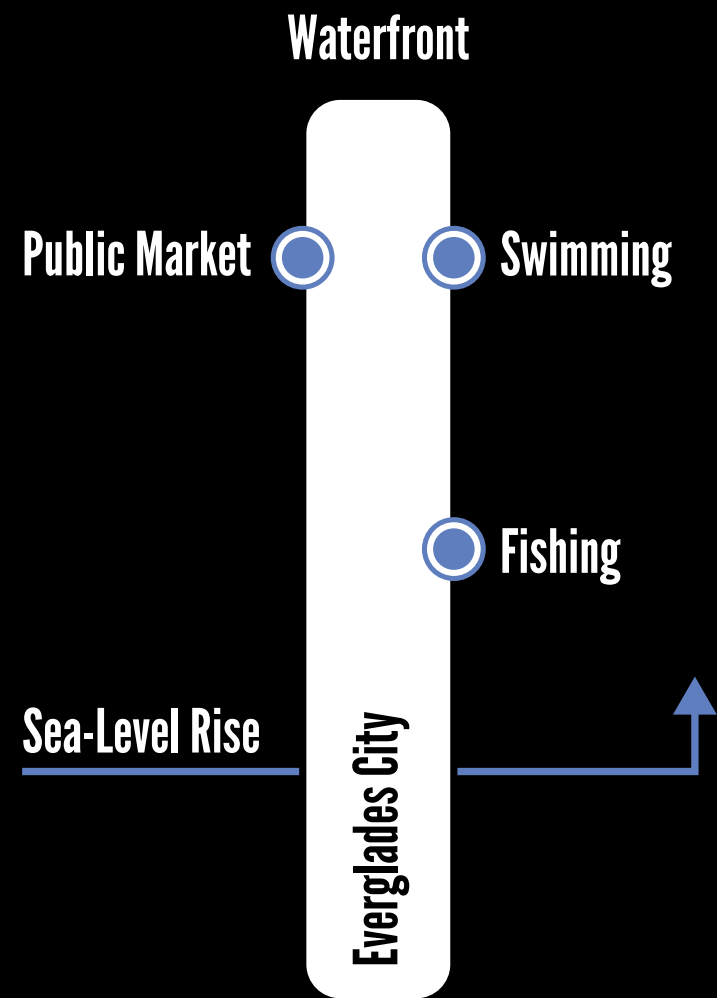


mangrove development project



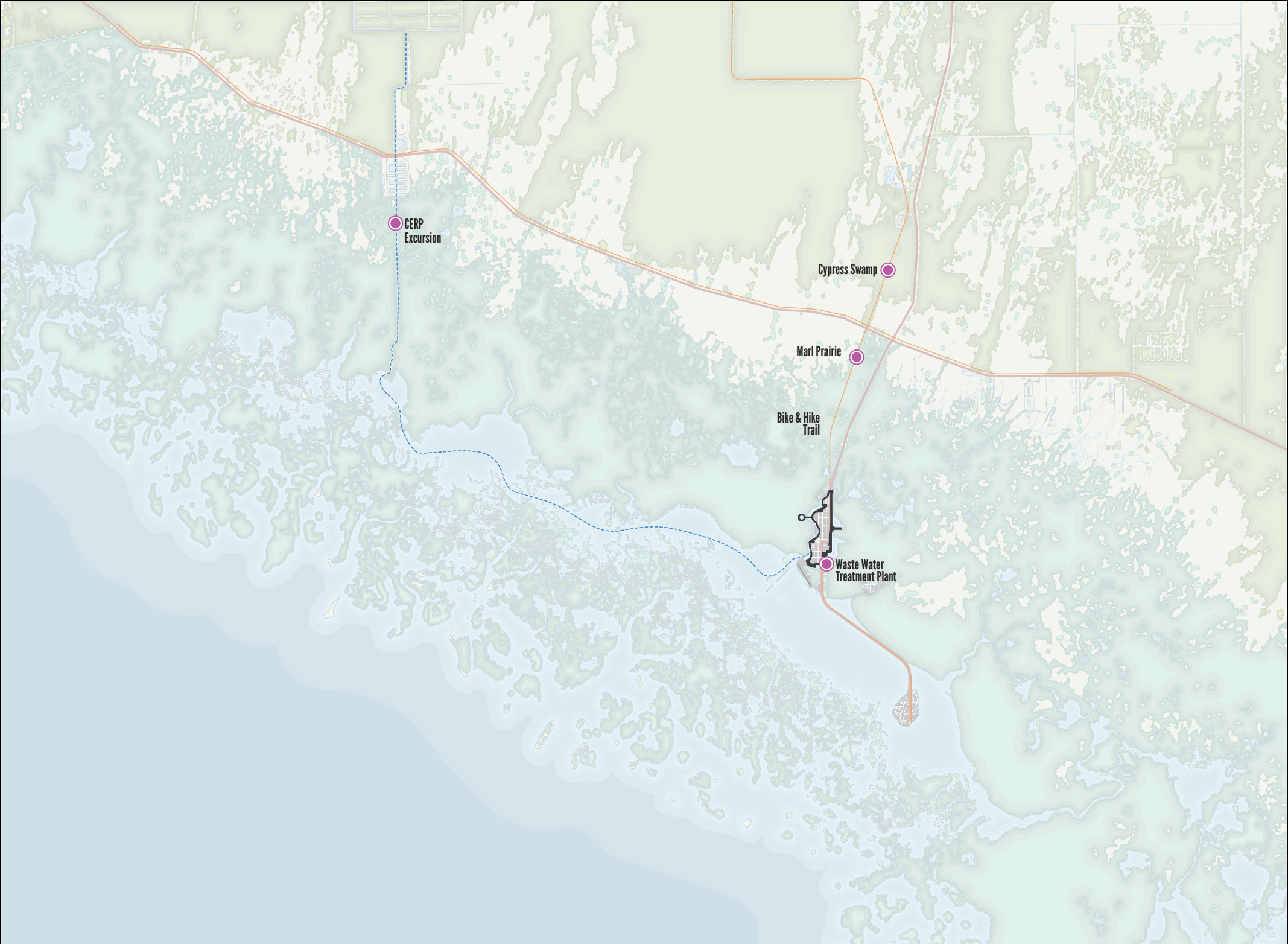
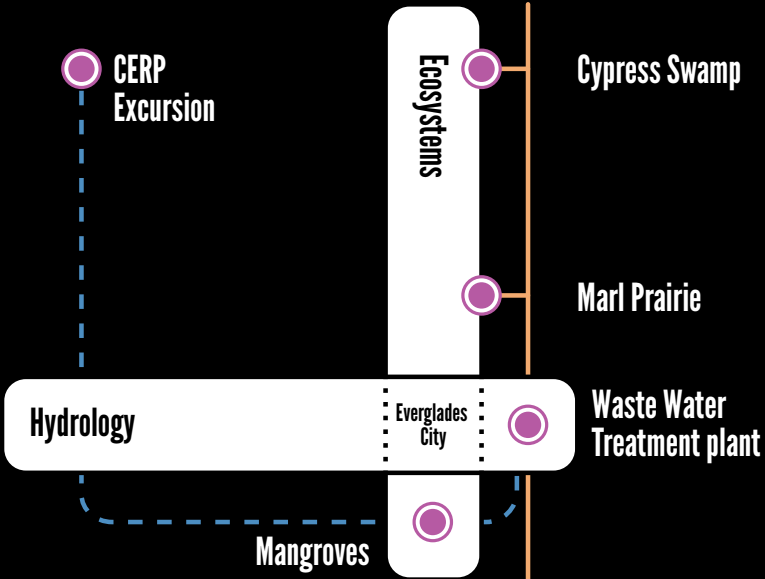
Regional plan

flood-proof waterfront



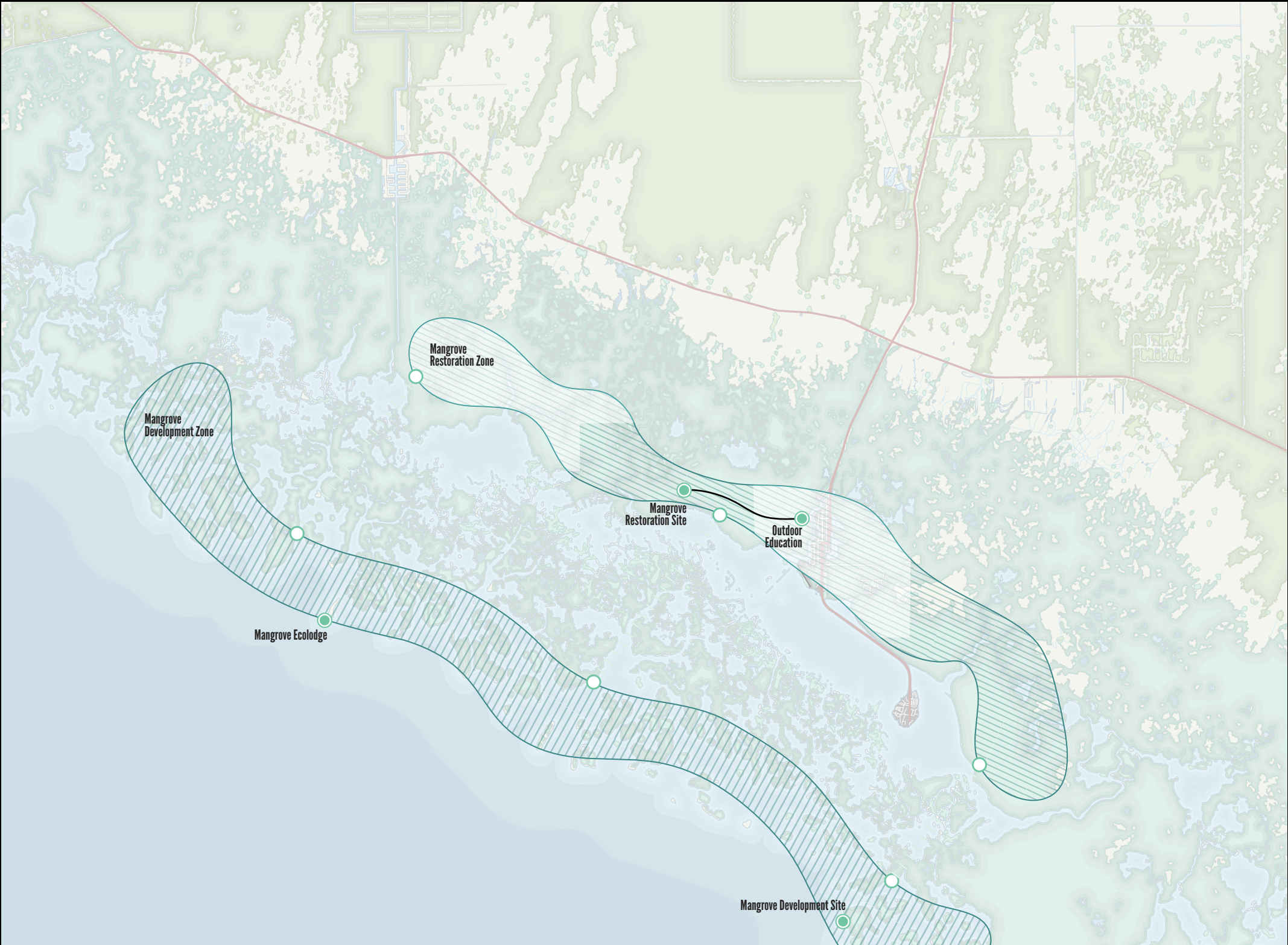
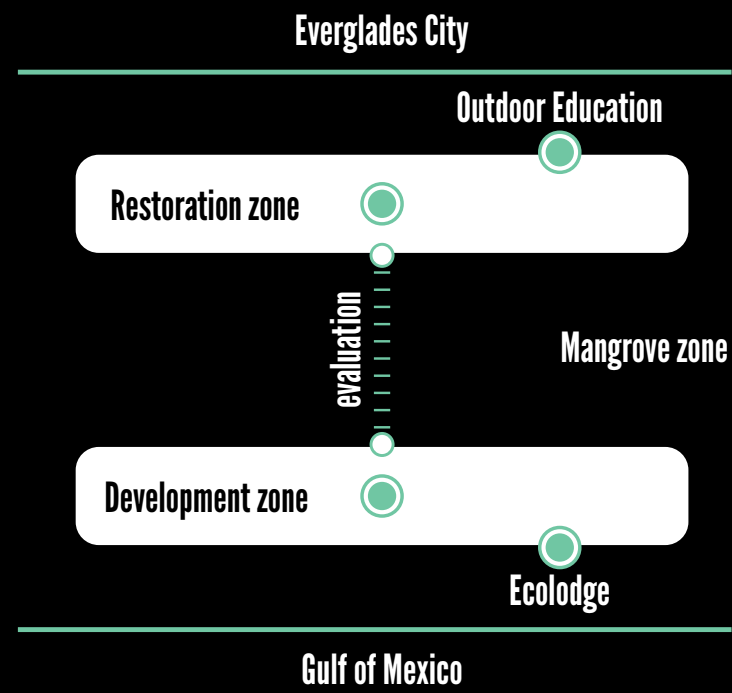
Regional plan

everglades open air



Regional plan

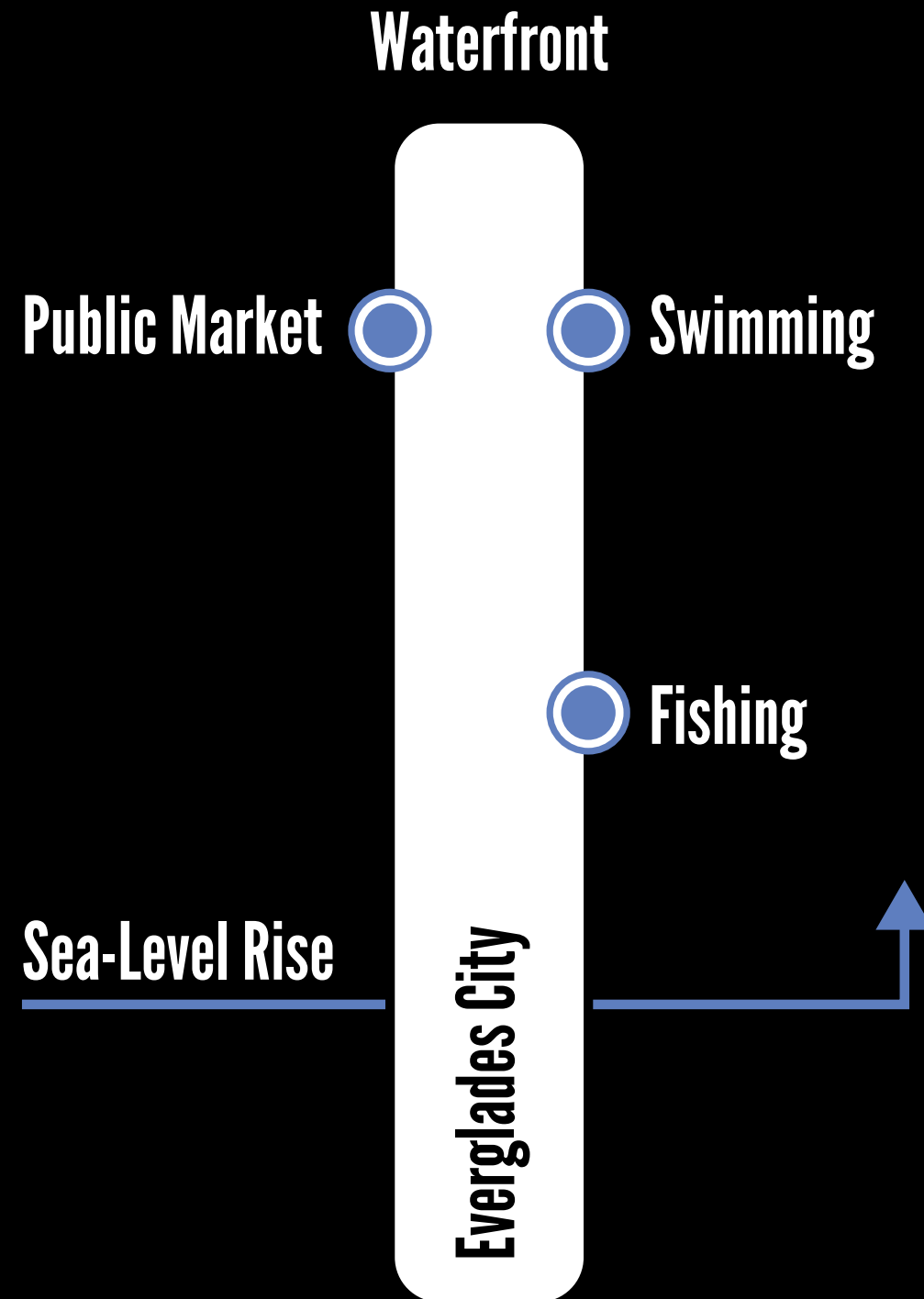
mangrove development project



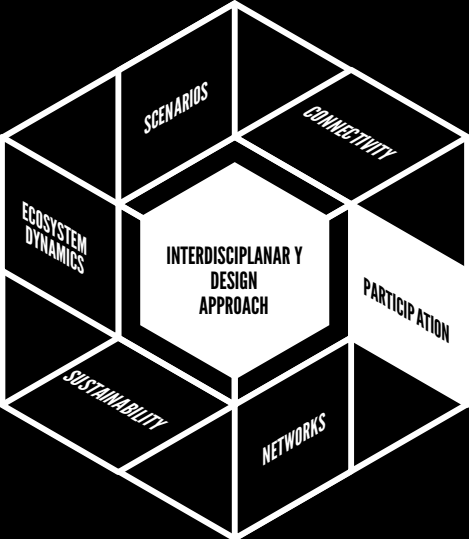
Regional plan



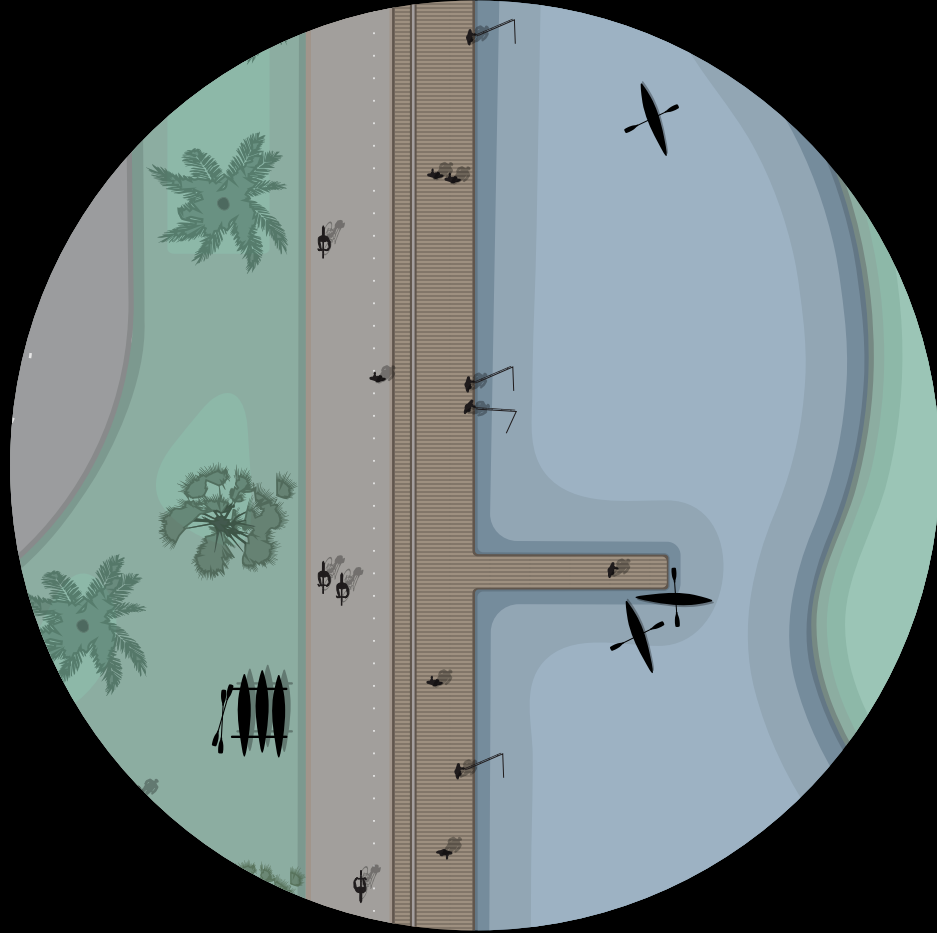
Flood-proof Waterfront



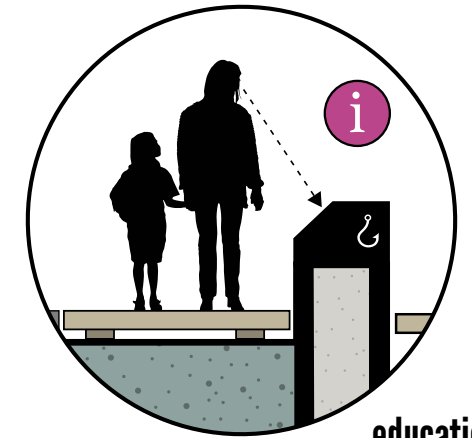
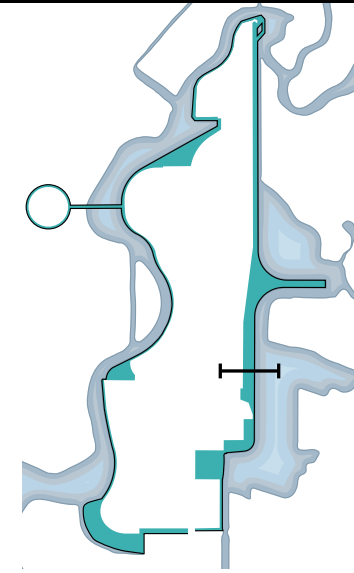
Participation



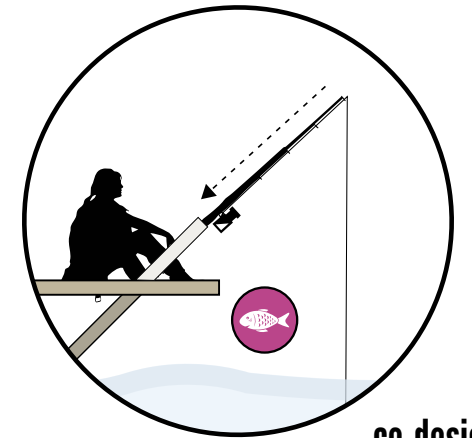
Fishing



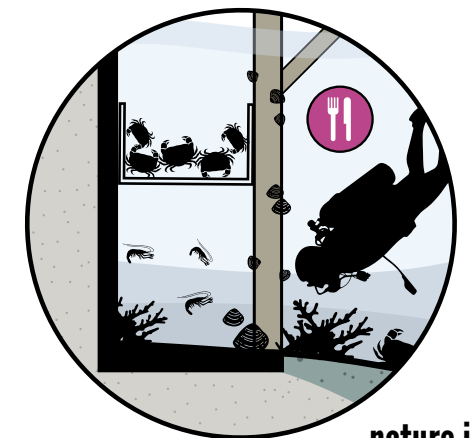
Fishing spot



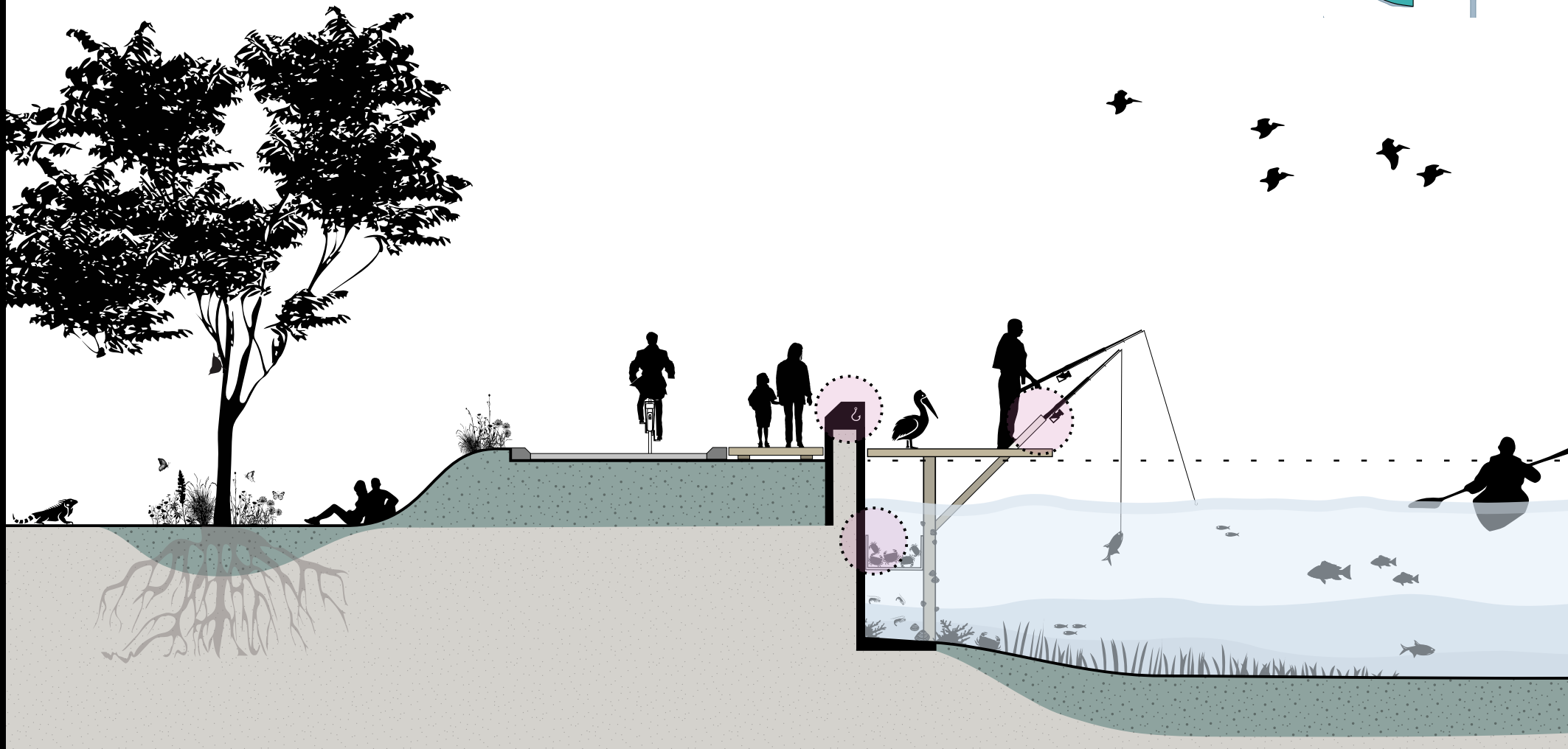
education



co-design



nature inclusive



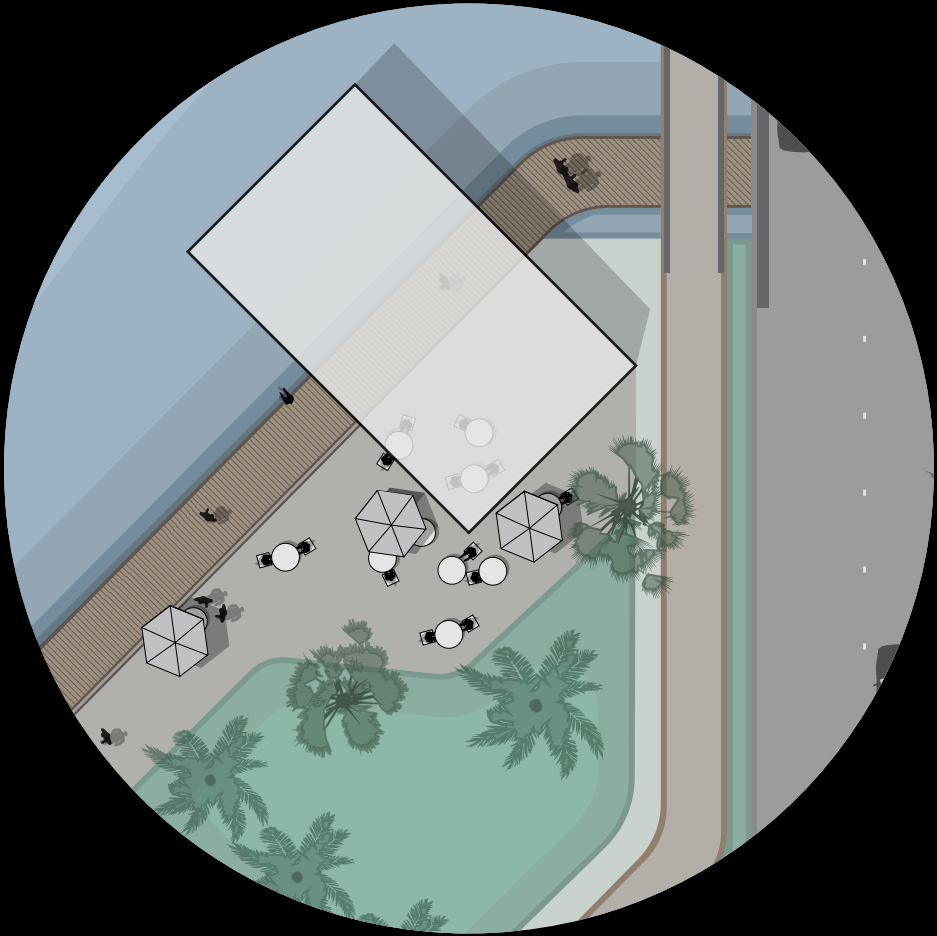








Public Market

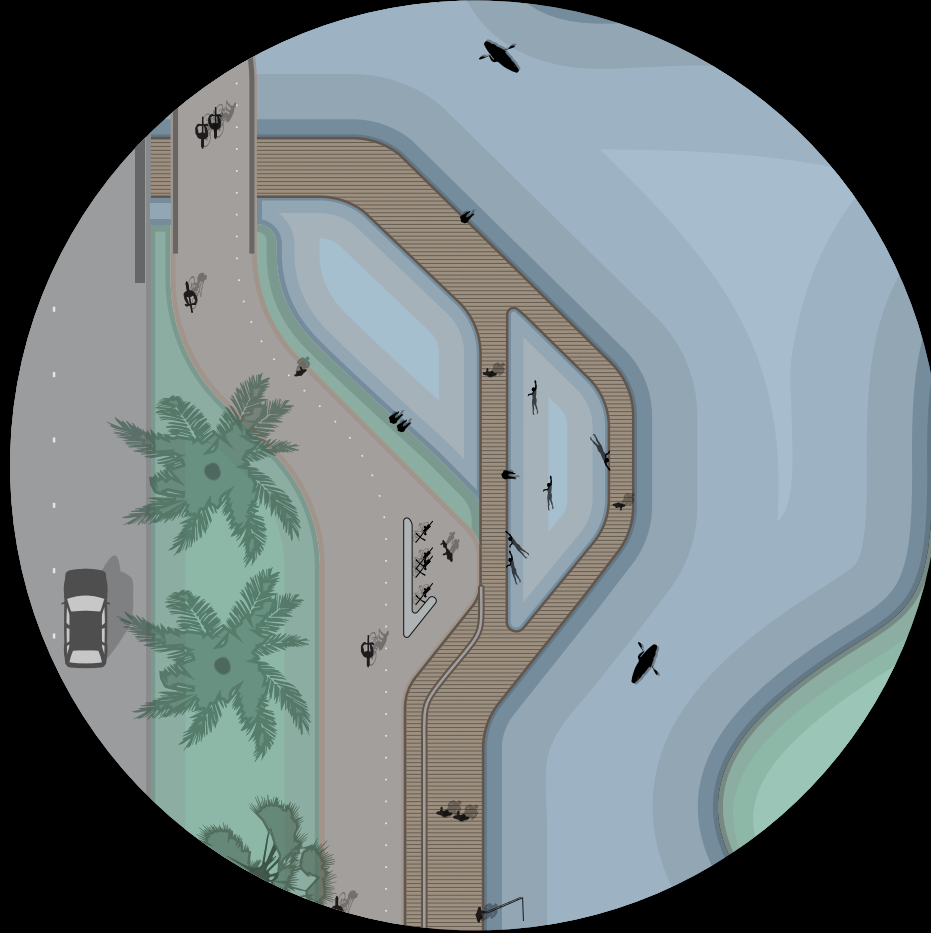








Swimming pool







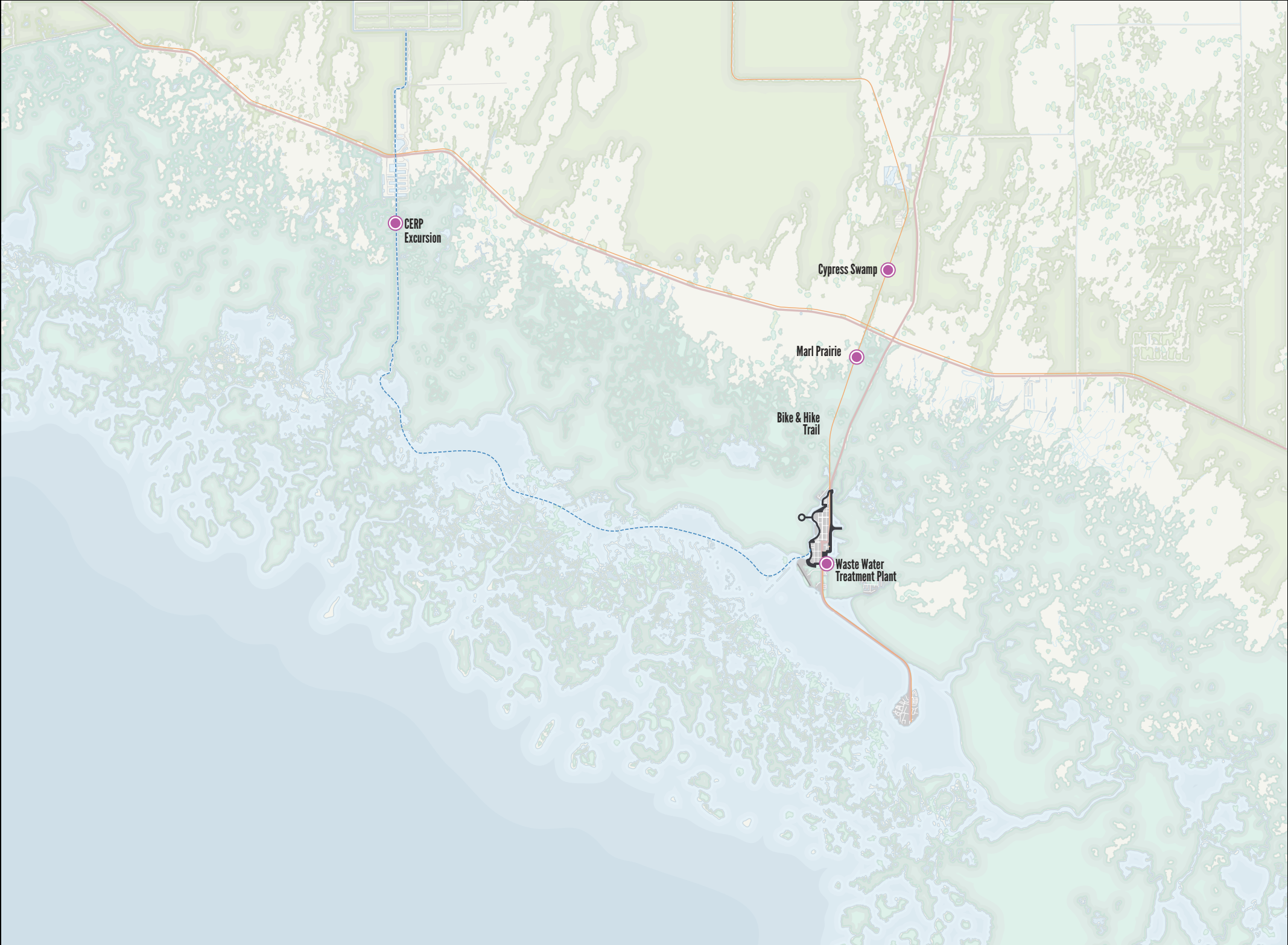


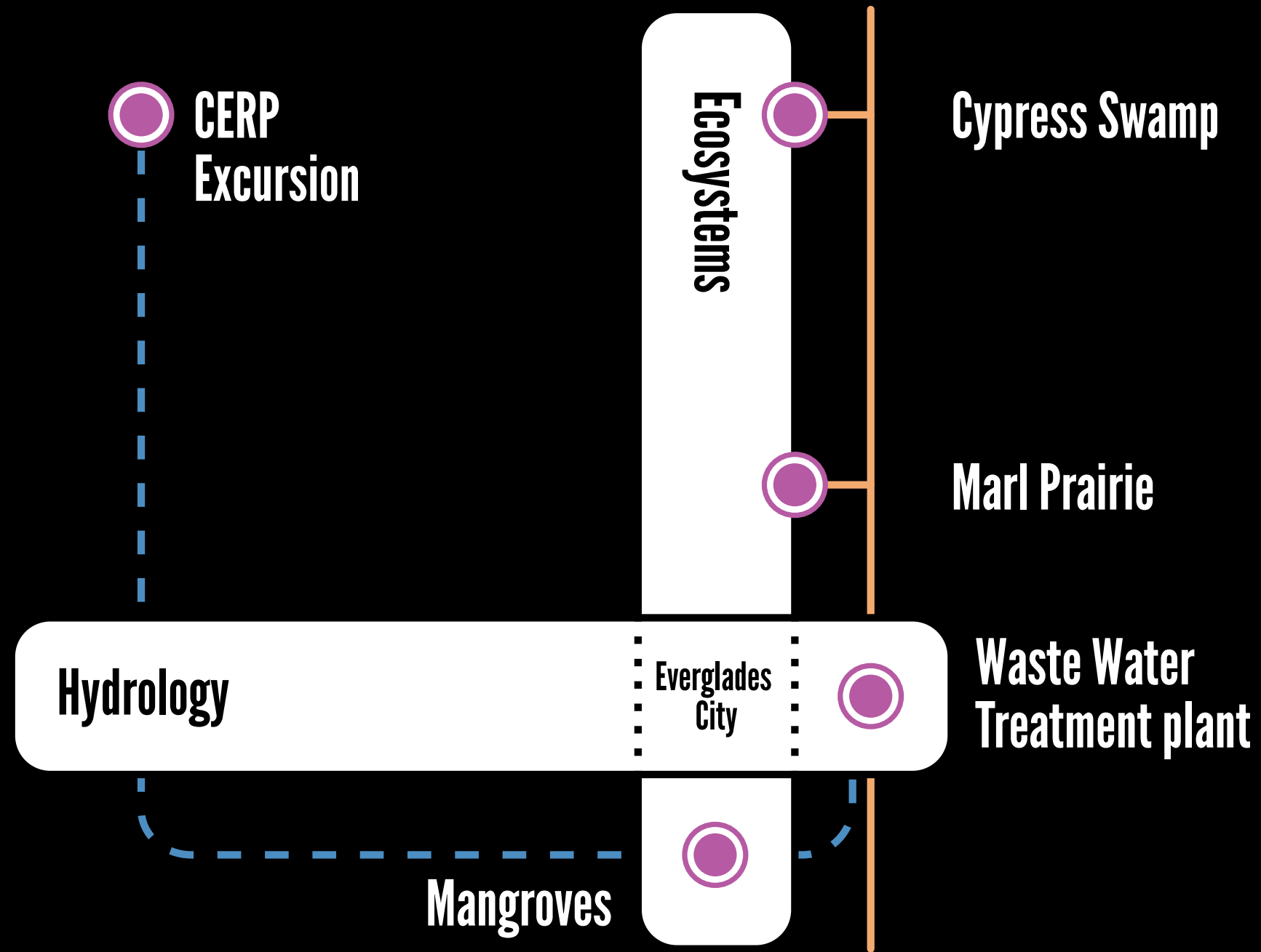




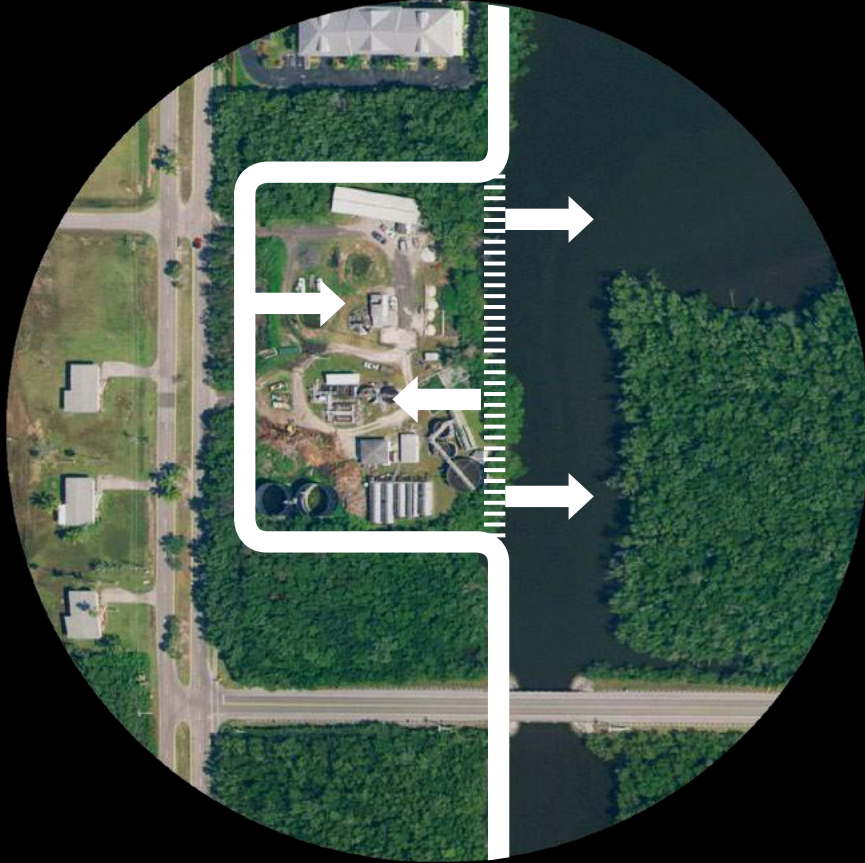


Everglades Open Air





Wastewater treatment plant















Bike & Hike trail

Cypress Swamp







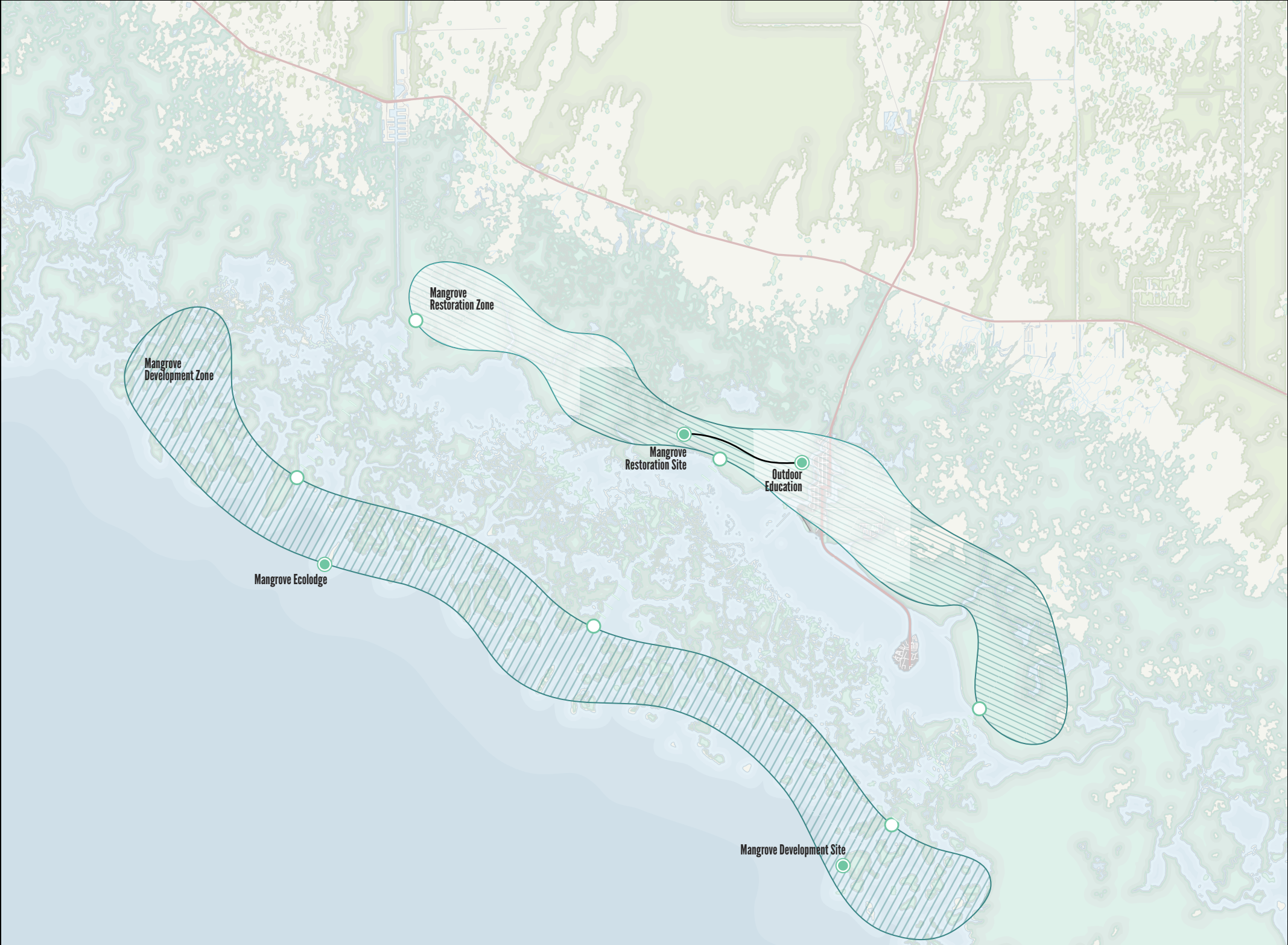
Bike & Hike trail

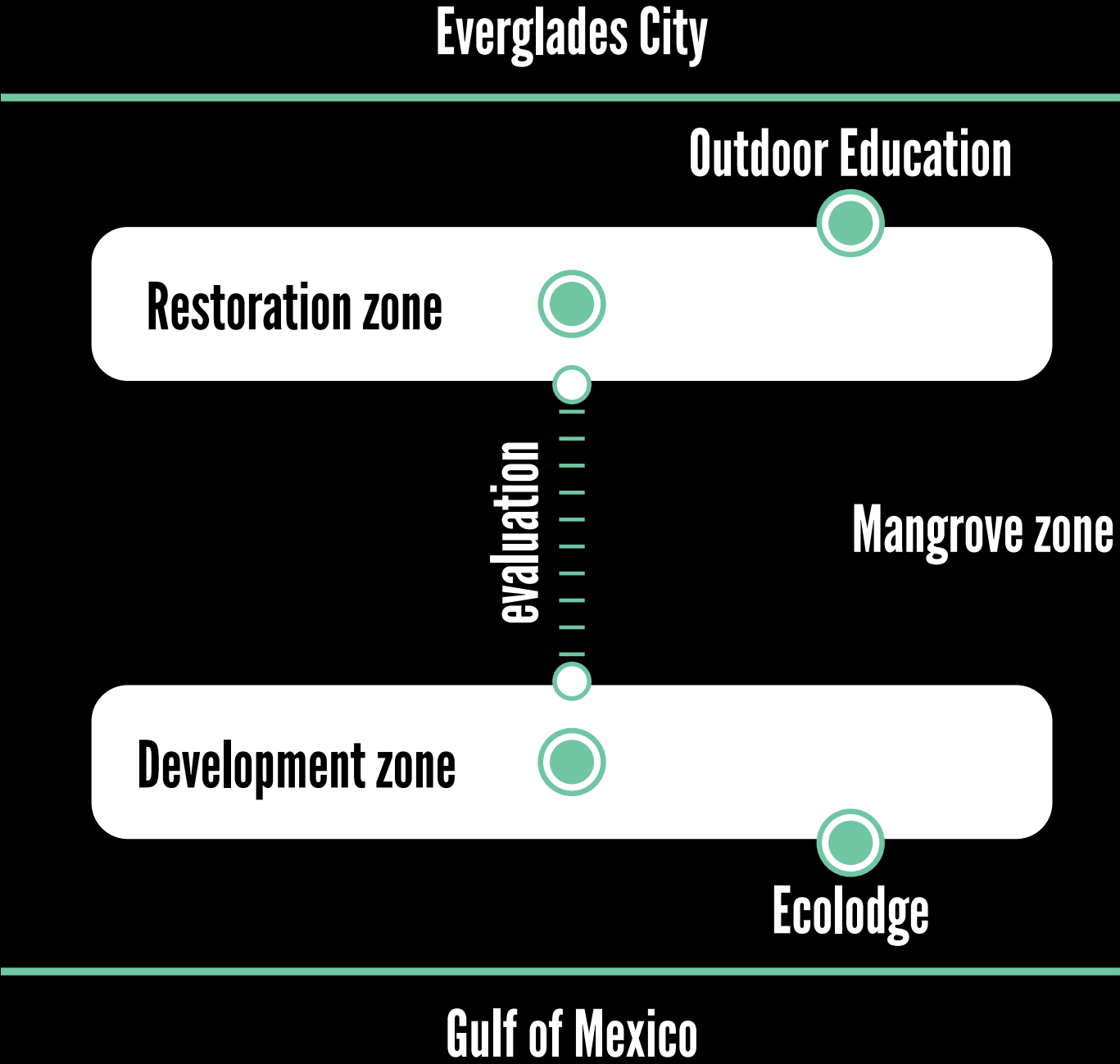
Marl Prairie

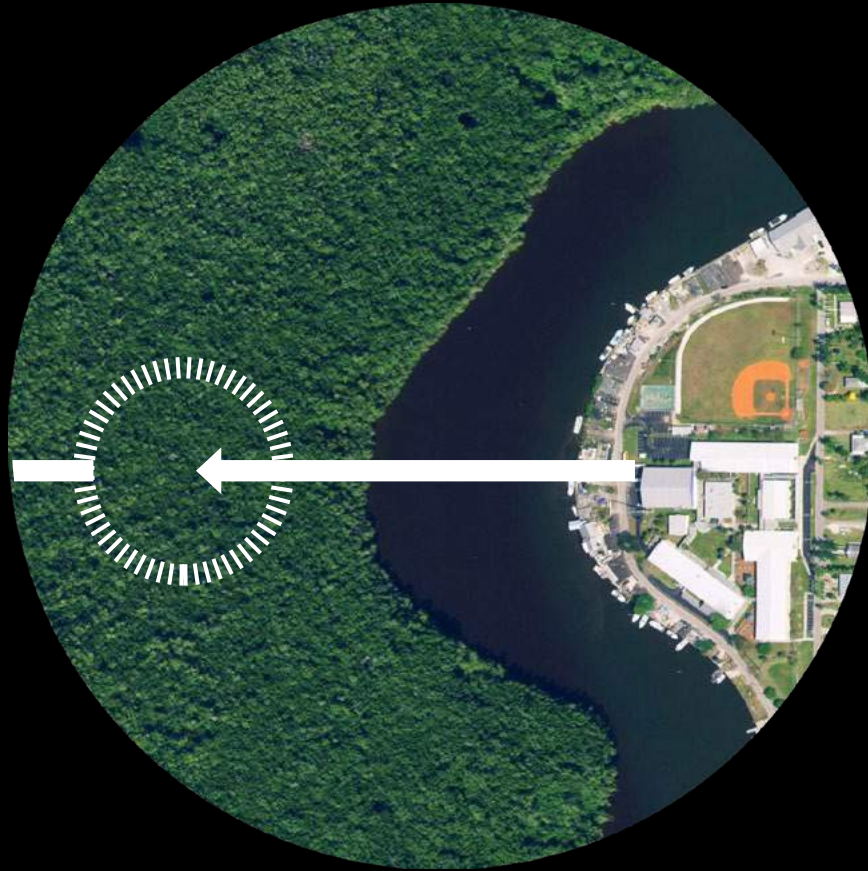




Mangrove Development Project

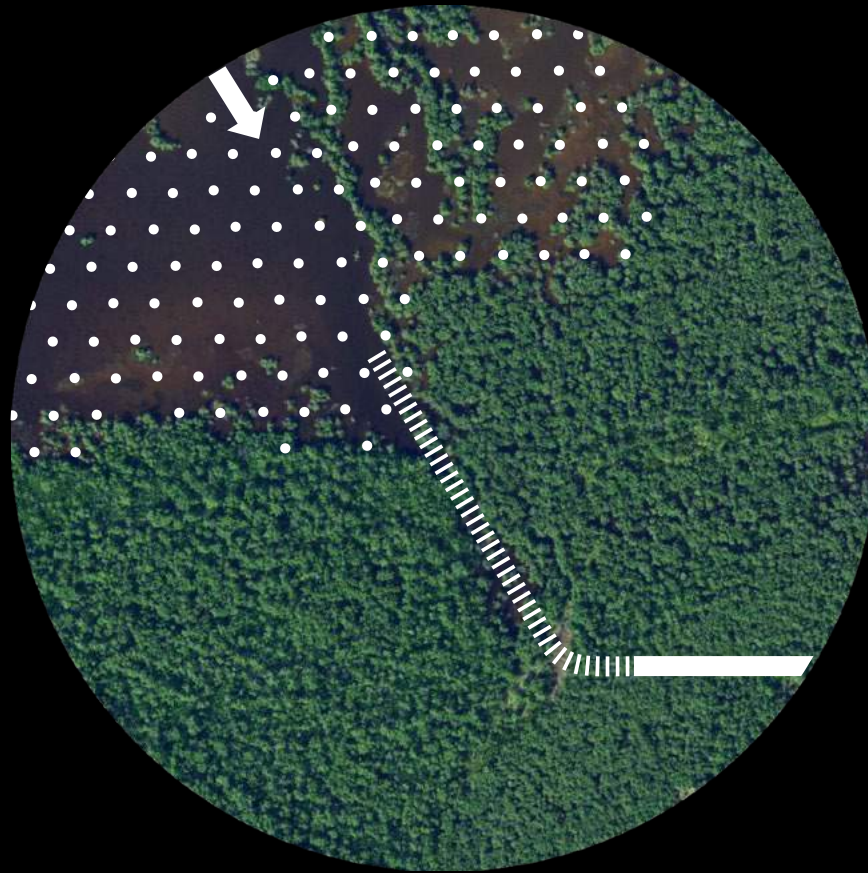






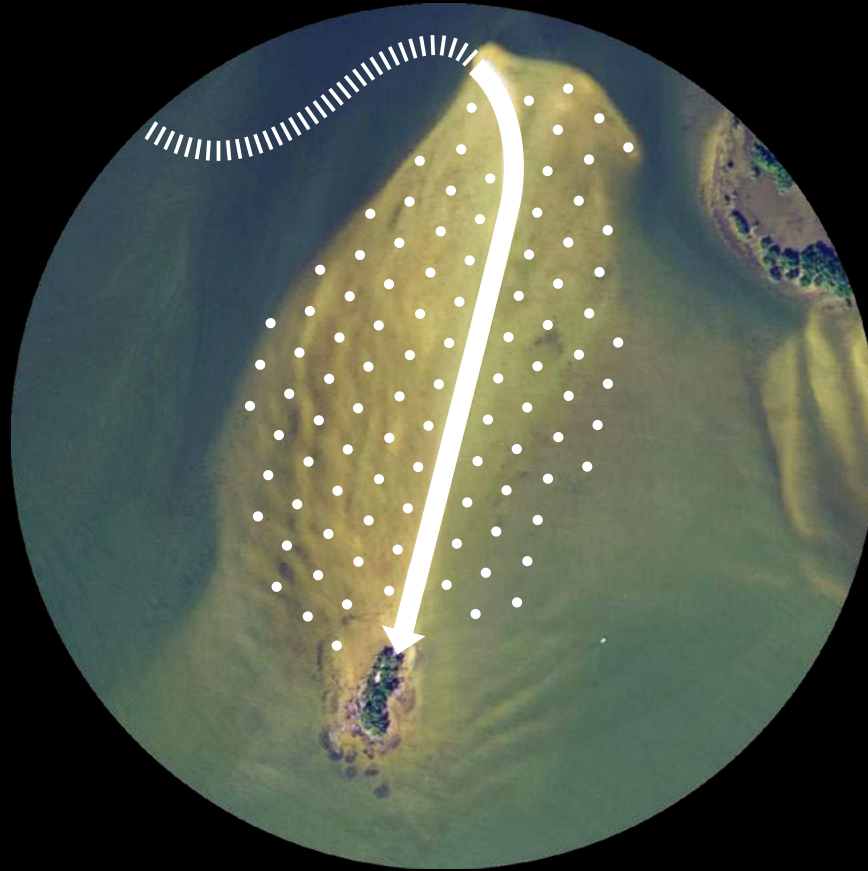


Mangrove Restoration





Mangrove Ecolodge

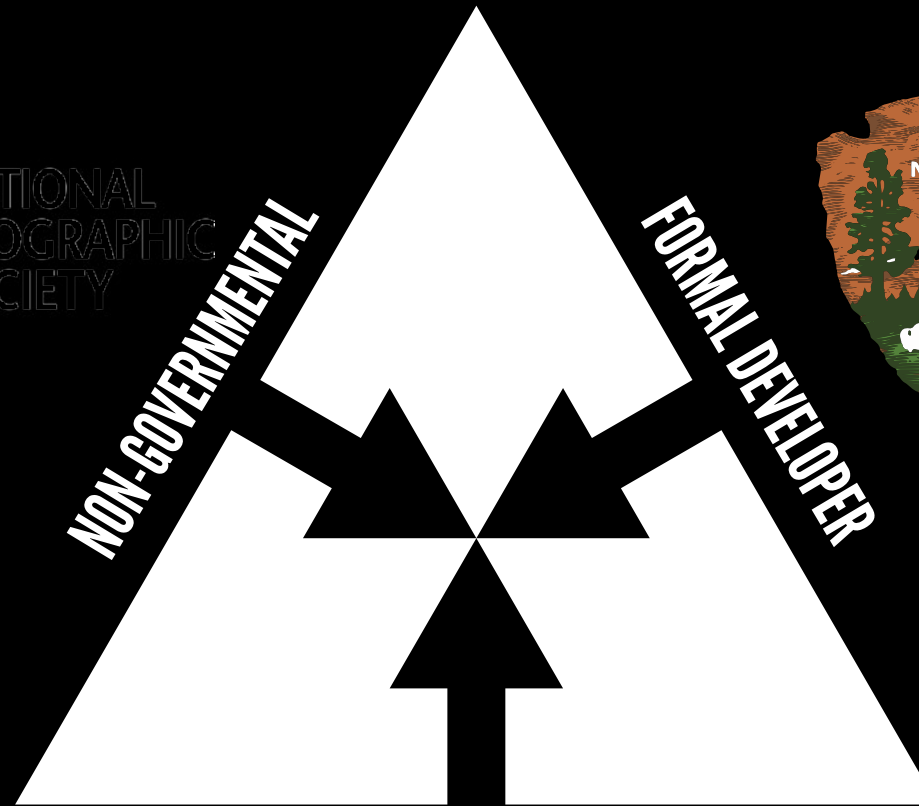




NATIONAL
GEOGRAPHIC
SOCIETY

NON-GOVERNMENTAL

FORMAL DEVELOPER



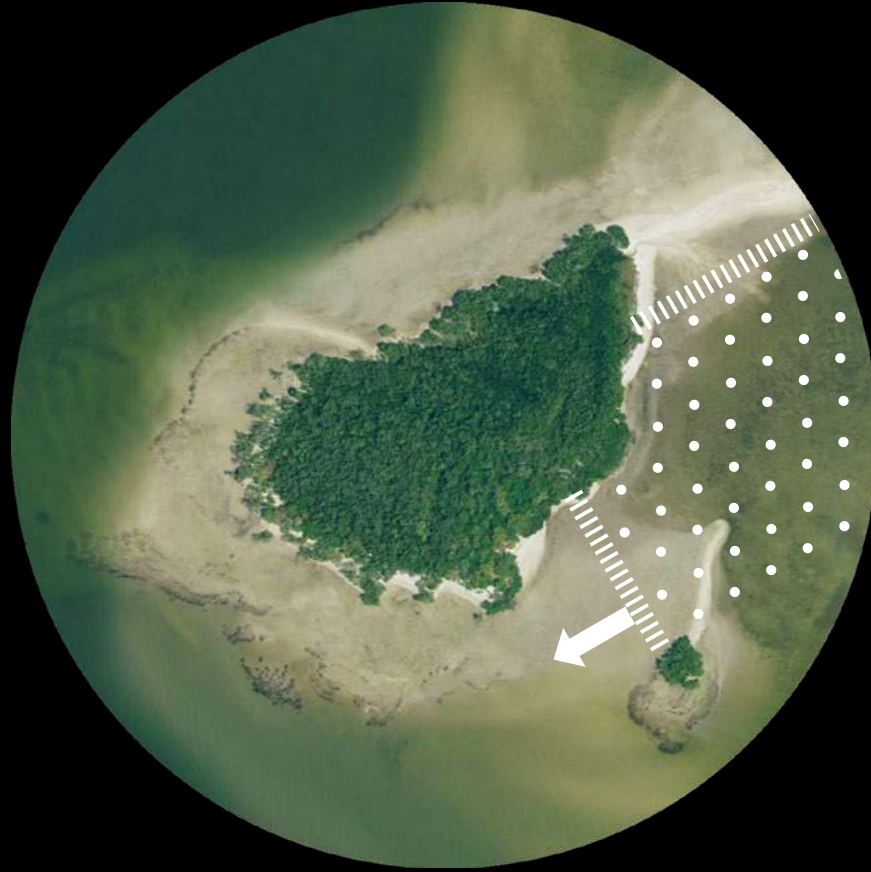
INFORMAL INSTITUTION





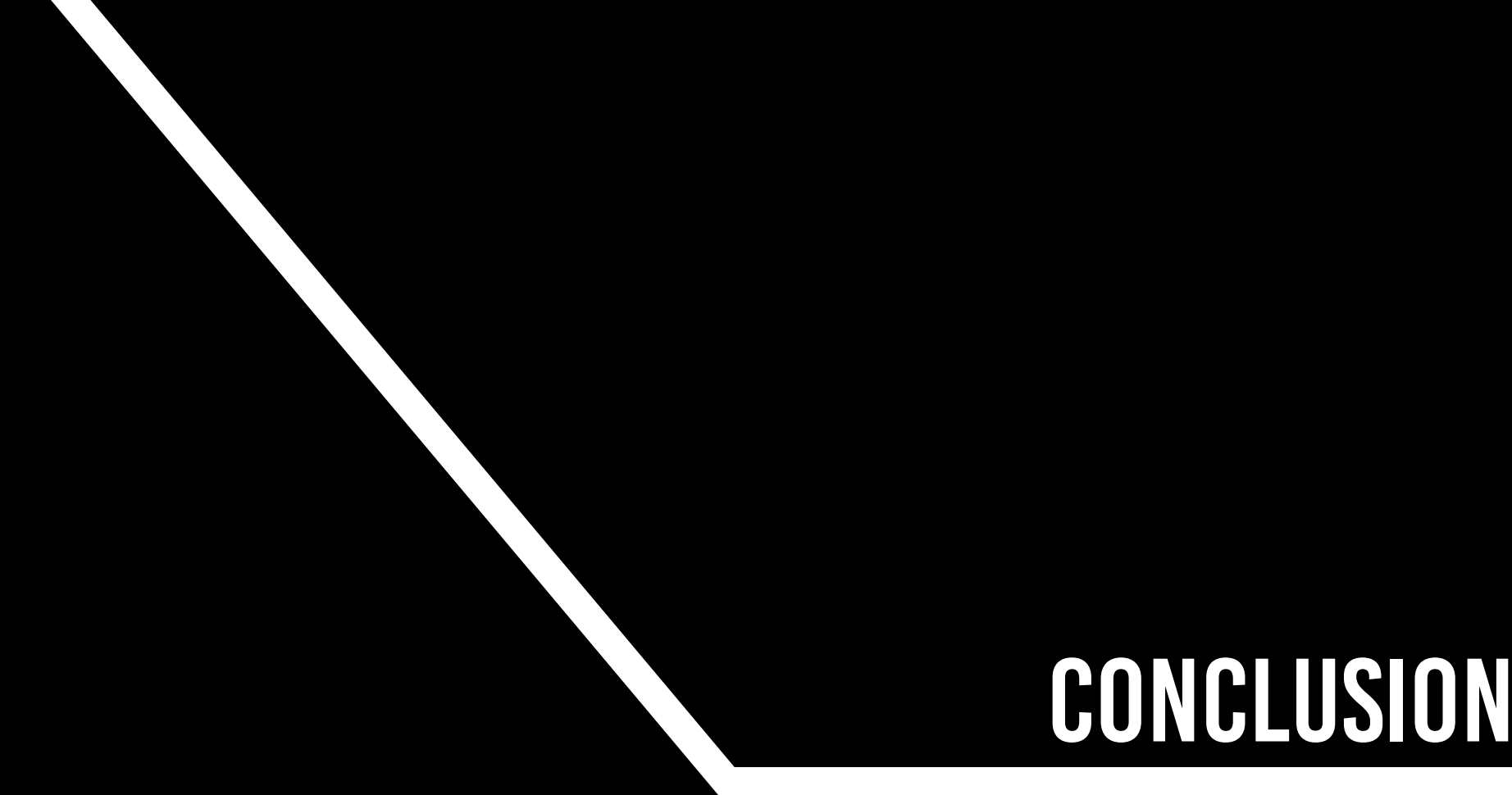


Mangrove Development







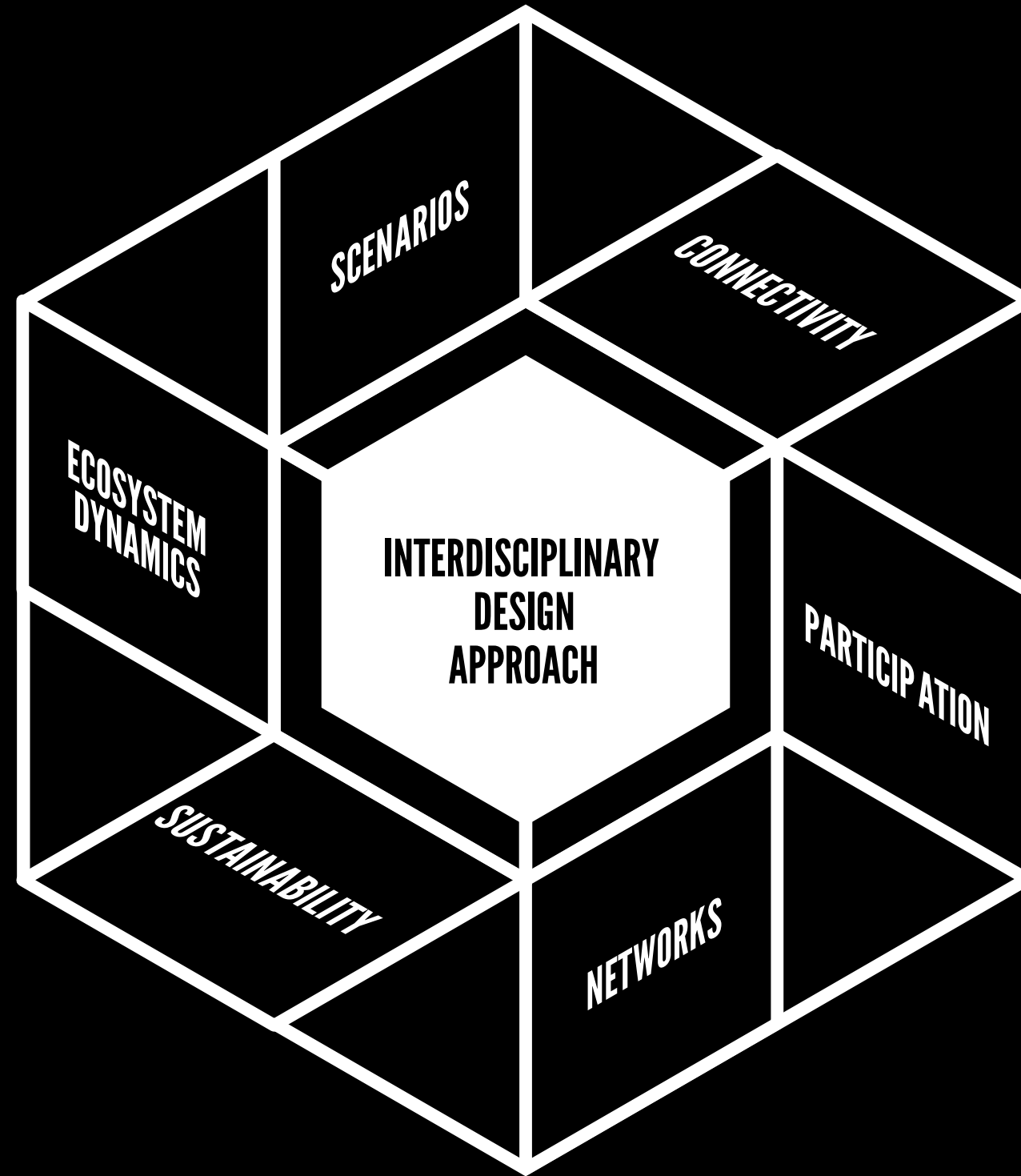


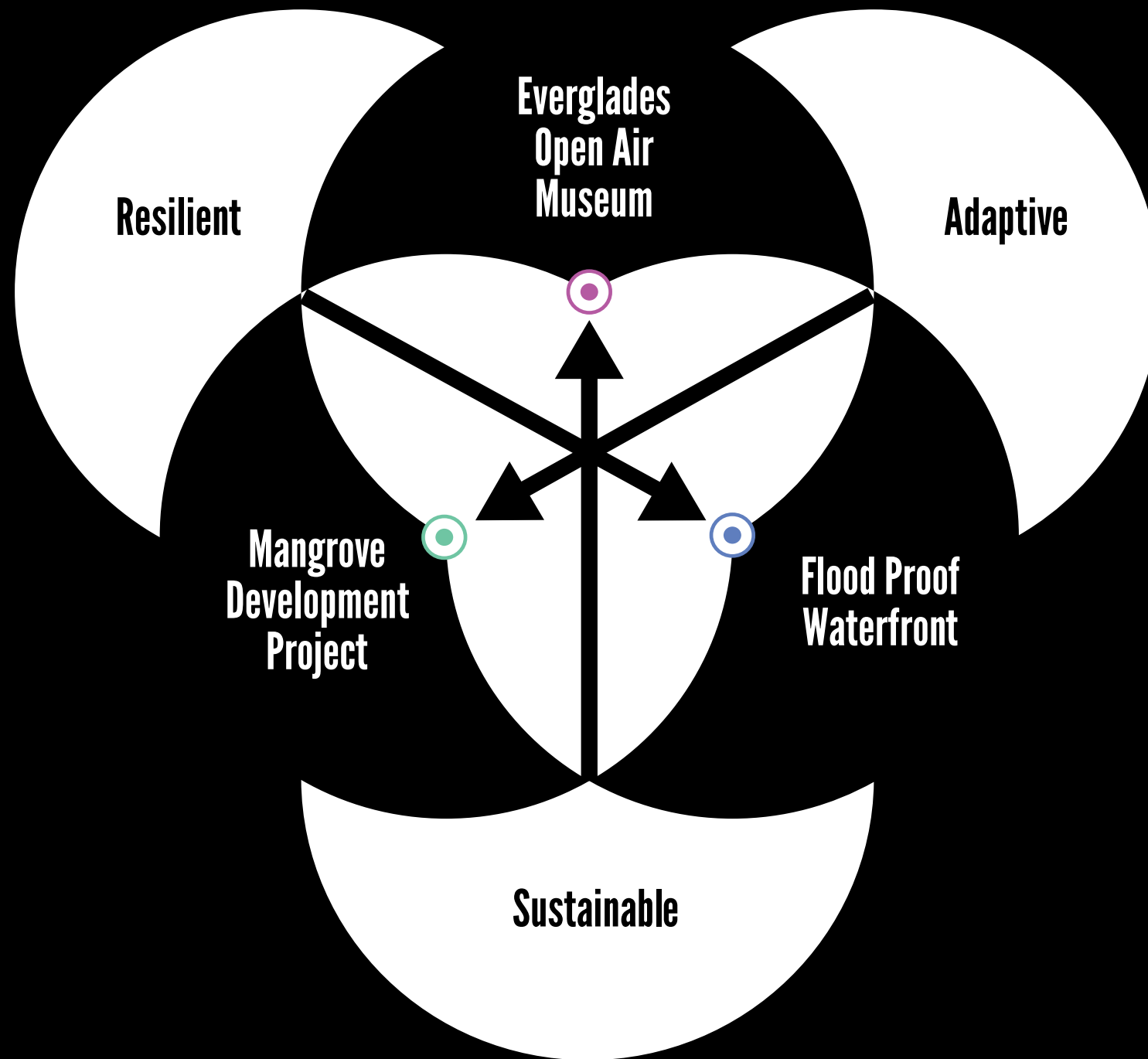
CONCLUSION

INTERDISCIPLINARY DESIGN APPROACH

FOR A RESILIENT, ADAPTIVE AND SUSTAINABLE

(RE)DEVELOPMENT OF EVERGLADES CITY.



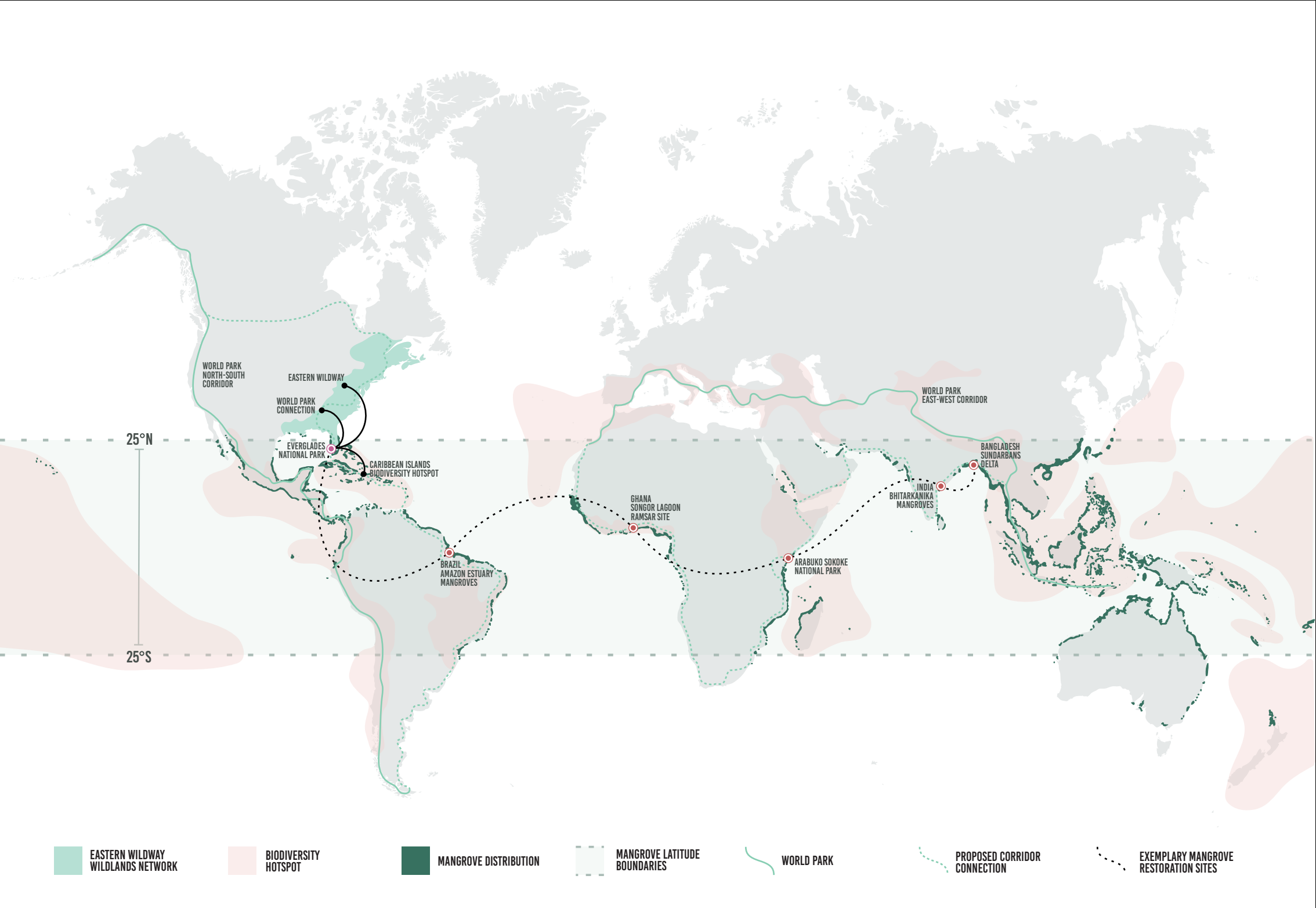


RESEARCH QUESTION

4

**WHAT IS THE POSITION OF THE PROJECT
IN A GLOBAL CONTEXT AND HOW DOES THE
DESIGN RELATE TO THIS SCALE?**

Global connectivity



Ecocity World Summit 2019 Vancouver



forEverglades City

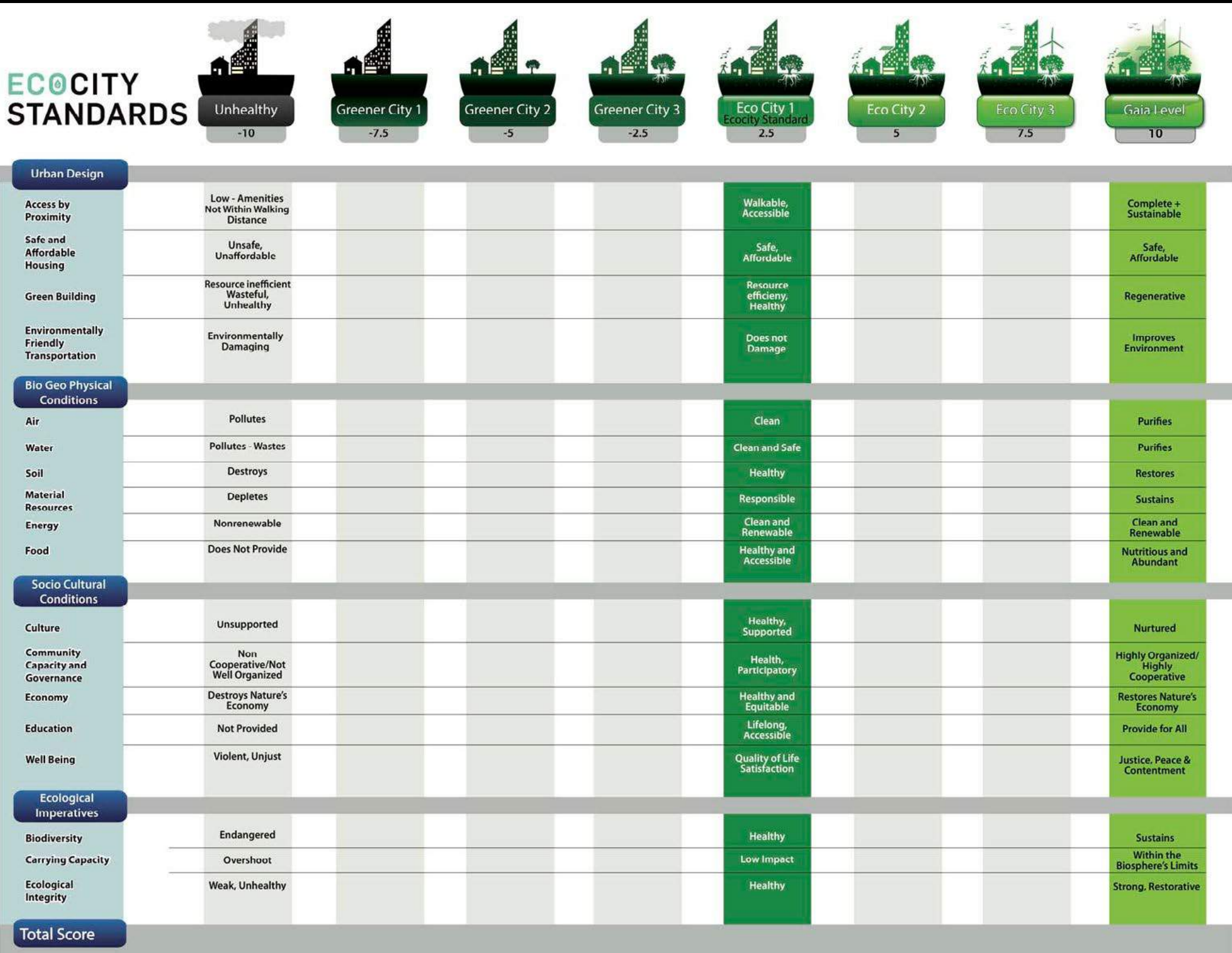
Interdisciplinary design approach
for a resilient, adaptive and sustainable
(re)development of Everglades City

Jean Pierre Droge
Dr. Ir. Nico Tillie

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master track: Landscape Architecture **TU Delft**

Ecocity Standards



Ecocity World Summit 2021 Rotterdam



forEVERGLADES CITY
by Jean Pierre Droge



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master track: Landscape Architecture

