



EXISTING CONDITION

ENVISIONED FUTURE

EXISTING CONDITION
A coastal slum with sewage outflows, piling garbage, receding coastline, flooding hazards, political stigma, occupied by a segregate community

TRANSFORMATIVE APPROACH
Phasing is addressed, where interventions and the space surrounding them are evolving symbiotically with natural processes, morphing into a self-sustaining resilient landscape.

GABIONS
Placed at strategic angles, accumulate sediments through aeolian processes resulting in the formation of sand dunes

SAND DUNES
Protect the coast from erosive forces, host rare endemic species, & serve as pleasant recreational spaces

ENVIRONMENTAL JUSTICE
Attaining social resilience through ecological reclamation from the resulting spaces formed in the process.

SHORE-SPACE RECLAMATION
Increase of shore space through the symbiotic action between the breakwaters and the sand dunes

BREAKWATERS
dissipate wave velocity, reclaim the coastline through sedimentation dynamics, form habitats for juvenile fish & benthic flora and serve as an offshore platform for fishermen

HABITAT RESTORATION
Biodiversity revival restores the long lost ecological equilibrium

Country / City Lebanon / Beirut

University / School American University of Beirut

Academic year 2018 - 2019

Title of the project Ecological Synergies - The adaptive transformation of the Ouzai Coastal Slum

Authors Tara Kanj

TECHNICAL DOSSIER

Title of the project Ecological Synergies - The adaptive transformation of the Ouzai Coastal Slum
Authors Tara Kanj
Title of the course Landscape Capstone Project
Academic year 2018 - 2019
Teaching Staff Professor Maria Gabriella Trovato, Professor Balsam El Aris, Professor Mona Khechen
Department/Section/Program of belonging Department of Landscape Design and Ecosystem Management/ Bachelor of Landscape Architecture (BLA) and a Diploma of Ingenieur Agricole
University/School American University of Beirut



Written statement, short description of the project in English, no more than 250 words

In the South Western suburb of the Lebanese capital, the Ouzai coastal slum is composed of haphazardly built concrete homes, piling garbage, sewage leaks, and the absence of infrastructure and public services. The seashore area today is the only open/public space and a major component in the everyday lives of its inhabitants. However, this coastal strip is socially and environmentally vulnerable, deteriorating exponentially, and receding at an alarming pace as sea levels rise globally. This research-based design aims at envisioning a future, despite the complexities of political and legal barriers, resuscitating a shunned landscape previously conceived as a hopeless case. This proposal is an exploration of the critical relationship between sea-water, segregate communities in informal socio/spatial contexts, and ecological concerns. It aims at addressing the recurrent environmental risks proposing future scenarios of a healthier and sustainable future to this flood-prone area. Through a combination of conscientious engineering accuracy and thoughtful deliberation of the social component and use of space, the design envisions six composite structures. Methodically placed along the coastal strip, these structures react to the context depending on their varying functions. Limited-height flood protection shields the area against the recurrent winter floods, creating a safe, accessible, and in some instances, productive spaces for the inhabitants. They provide gathering areas and allow for future vegetated sand-dunes reconstruction. These structures and the surrounding space are evolving symbiotically with natural processes, morphing into a self-sustaining resilient landscape.

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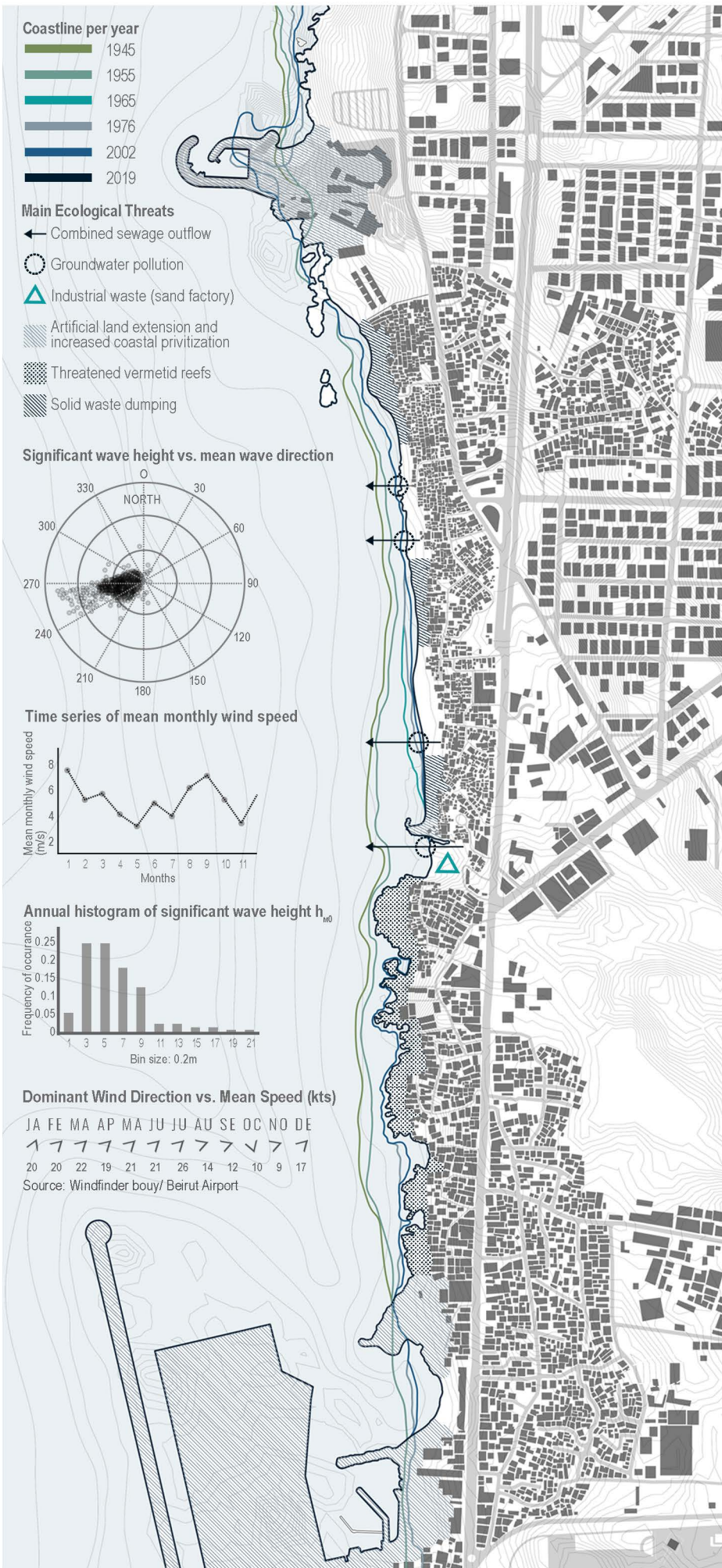


CLIMATE CHANGE AGAIN

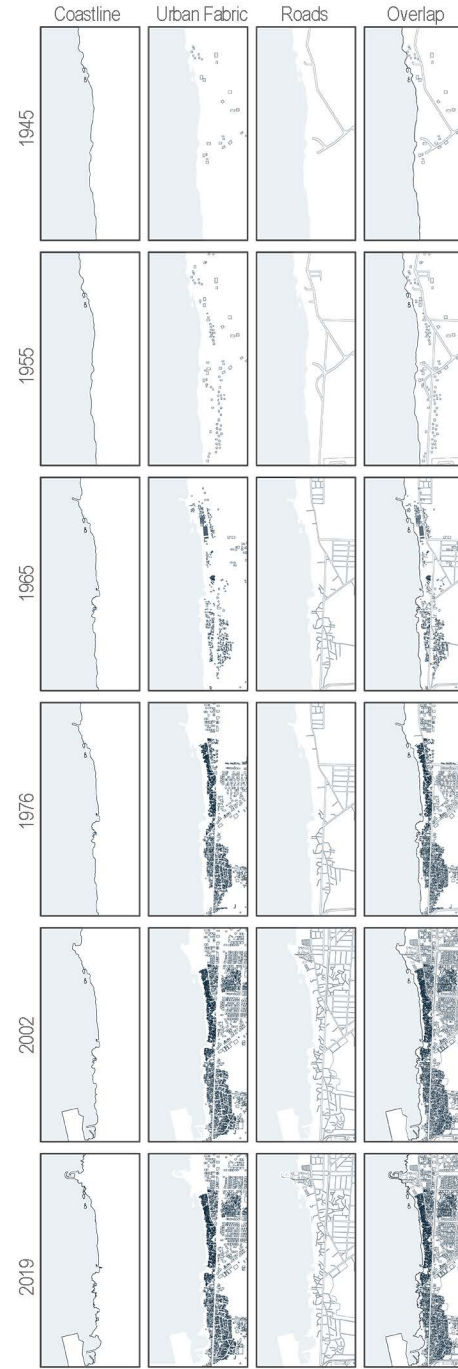
11th International Biennial Landscape Barcelona

Barcelona September 2020
SCHOOL PRIZE

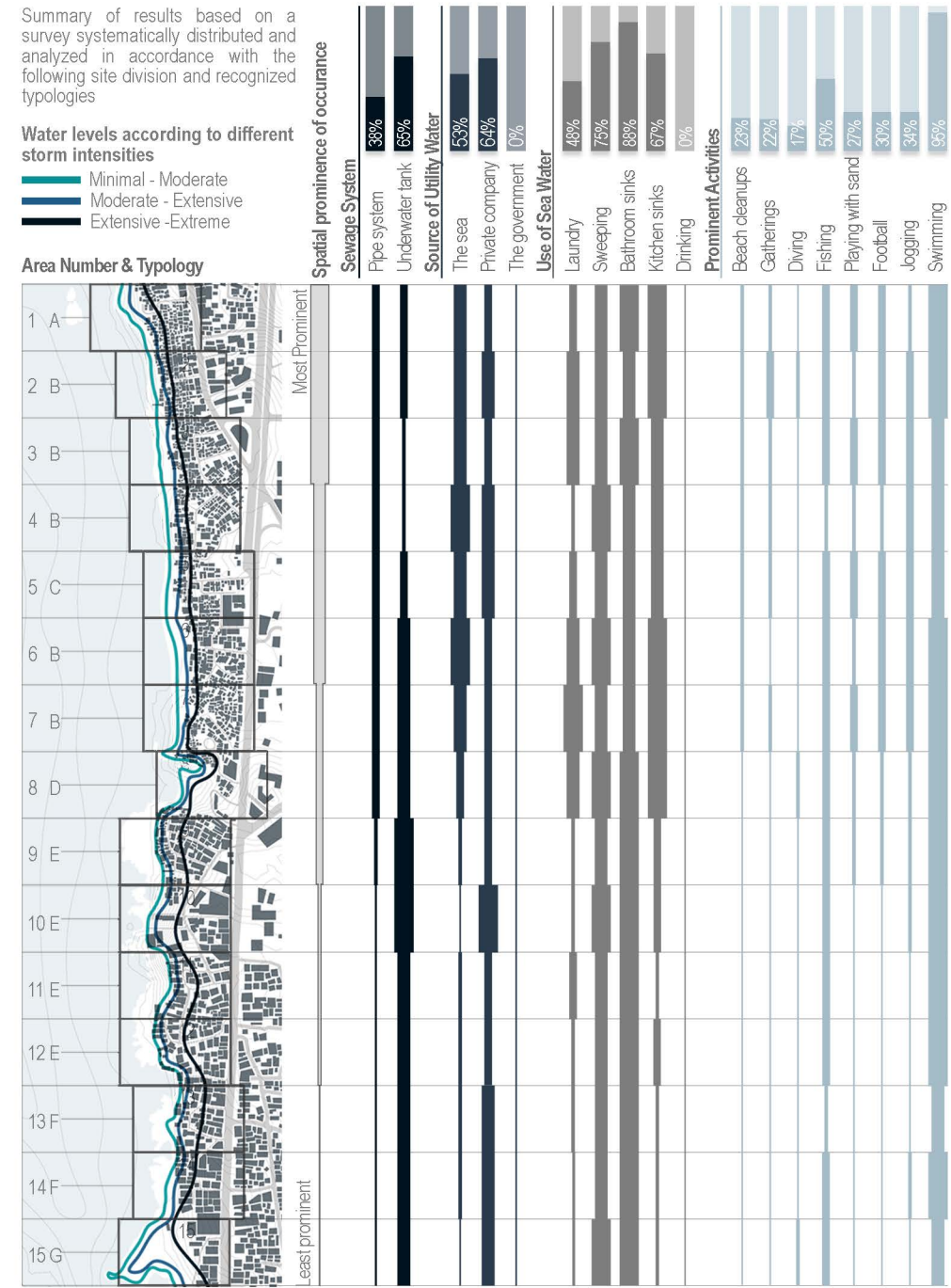
Historical Coastline Delineation & Ecological Analysis



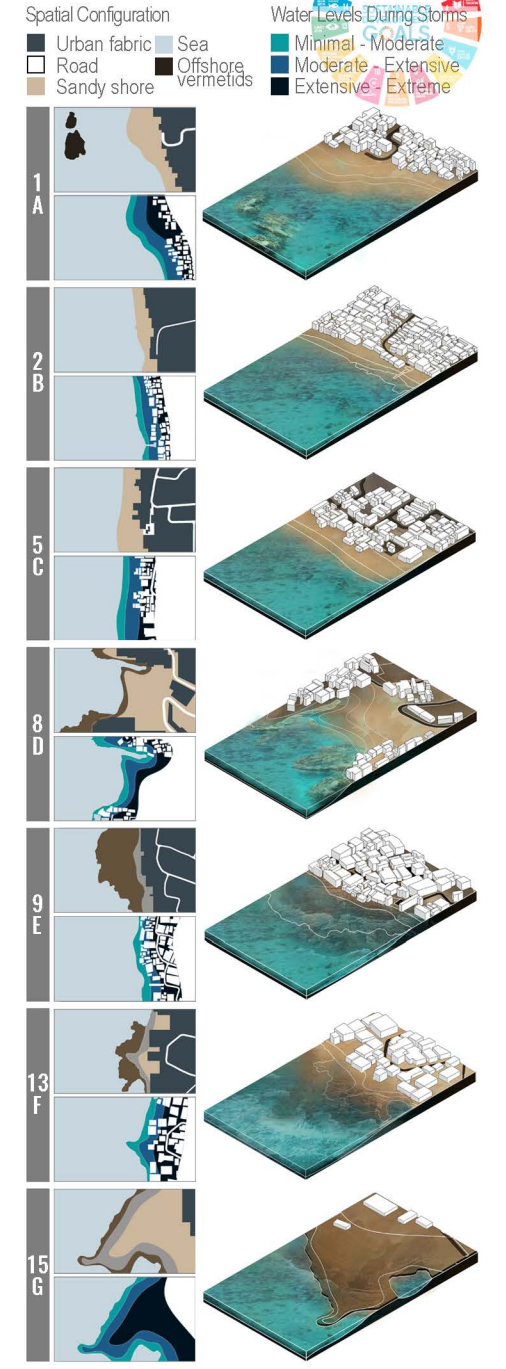
Historical Evolution



Site Division & Spatial Transcription of Survey Results



Spatial Typologies



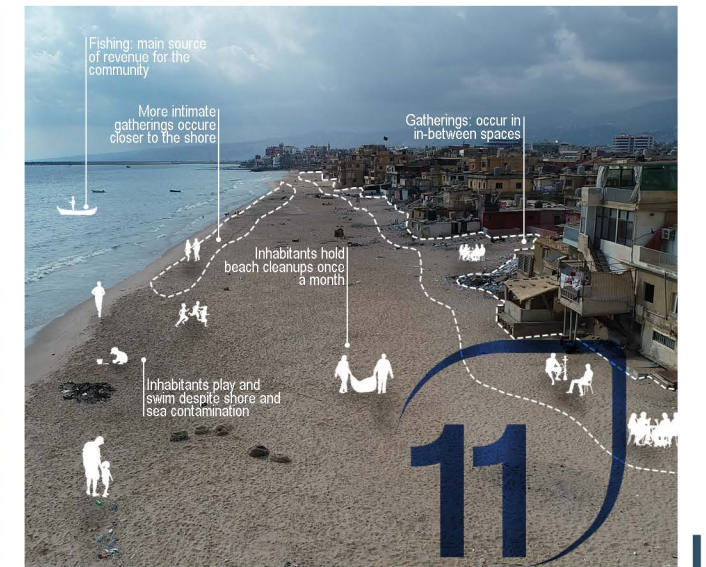
Area of Intervention



Ecological Threats



Activities



Hybrid Structures

HARD

Revetment
 Seaward Boulevard
 Artificial Reefs
 Breakwater
 Groynes
 Fish Farms

SOFT

Oyster Reef
 Bioretention Basin
 Seagrass Beds
 Beach Dunes
 Marsh
 Sediment Pond

SOCIAL

Fishing
 Shore Activities
 Gatherings
 Swimming
 Participatory Activities
 Commercial Activities

Hybrid Breakwater

Harbor
Accessible Platform
Oyster Reefs

Wave action
Cross-shore transport
Long-shore transport

Hybrid Gabions

Halts wind velocity
Sediment accumulation
Shoreline increase

Gabions transform into sand dunes

Hybrid Groyne & Living Shoreline

Shoreline reclamation
Land stabilization
Groyne Hybrid

Wetland Hybrid
Phytoremediation
Developed oyster reef

Hybrid Path

Vermetid proliferation
Resilient flood defense

Perforated walkway allows for safe access without harming the reef

Hybrid Biogenic Oyster Reefs

Accessible platform
Oyster habitat providers
Reef formation

Vortex formed by perforations serve as submerged breakwaters

Hybrid Fish Farms

Controlled quadrats
Species repopulation
Creek calm waters

Paddleboard access
Significant source of local revenue

Masterplan

HYBRID PLACEMENT

- 1 Breakwaters
- 2 Gabions
- 3 Groyne
- 4 Path
- 5 Biogenic Reef
- 6 Fish Farms

ZOOM-IN PLANS

- A Breakwaters & sand dunes zoomin
- B Vermetids & biogenic oyster reefs zoom-in

Zoom-ins A & B: Year Zero

GABIONS

Decomposable steel mesh lining armor stone aggregates.

BREAKWATERS

Meticulous placement of breakwaters to manipulate new shore shape.

SEDIMENTATION DYNAMICS

Placement configuration of gabions results in land stabilization and sediment accumulation.

BIOGENIC OYSTER REEFS

20cm perforations protects juvenile species and amplifies oyster reef proliferation.

SOCIAL SPACES

Creation of safe social spaces through presence of informal seating and vegetation in a dynamic setting.

FLOODING HAZARD

Area highly prone to disastrous flooding due to proximity to the sea.

THREATENED VERMETID REEFS

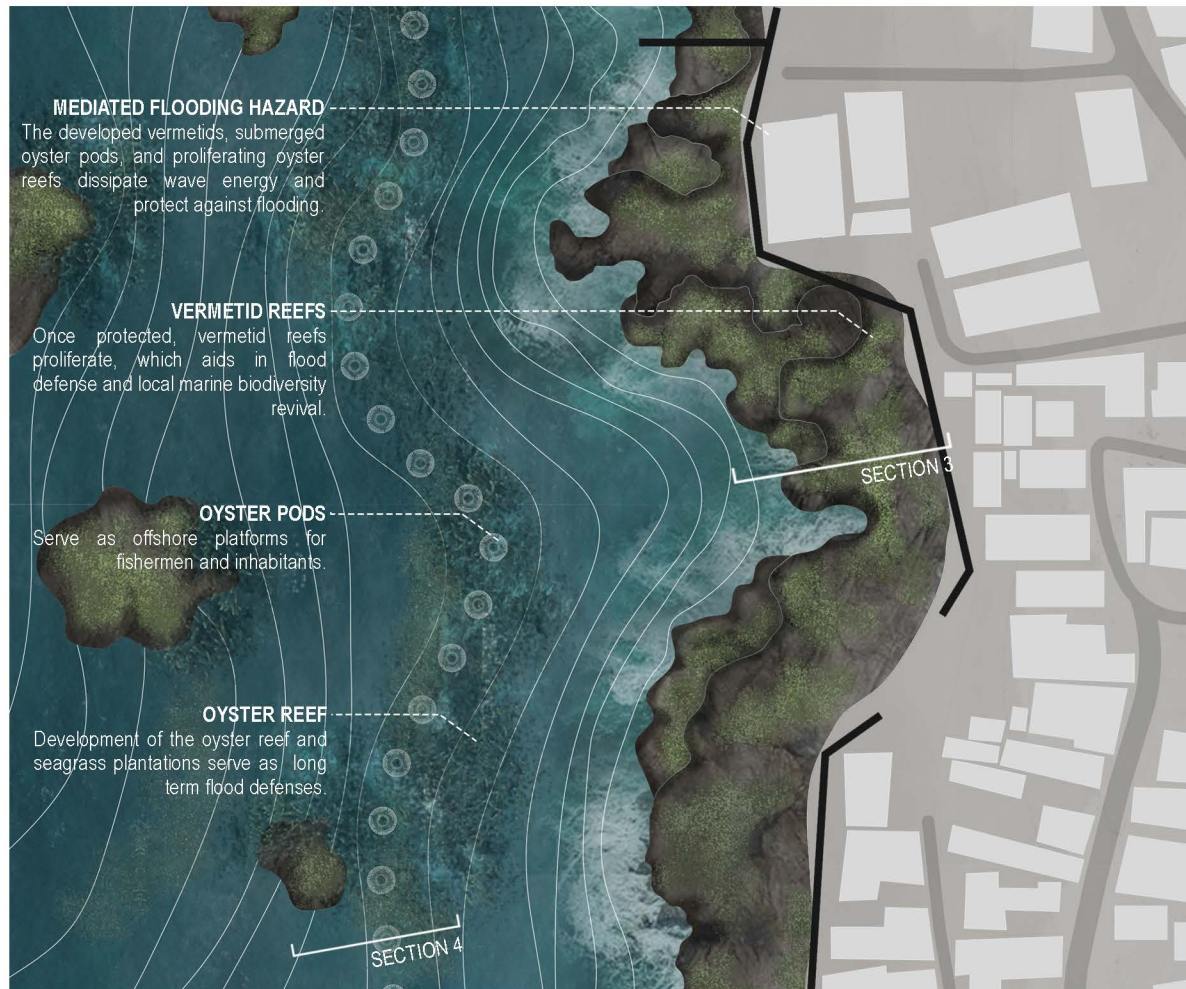
Threatened reefs due to trampling and settlement encroachment.

HYBRID BIOGENIC OYSTER PODS

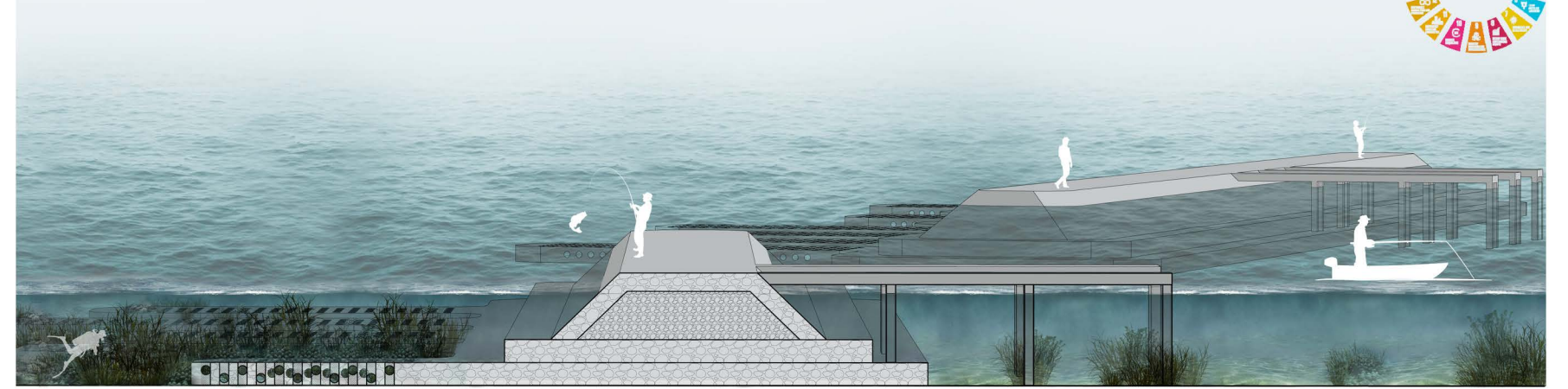
Serve as submerged breakwaters, dissipating wave energy without damaging the adjacent vermetid reefs.

HYBRID PATH

Facilitates accessibility to the sea while protecting the reefs and allowing sunlight to percolate through resulting in reef proliferation.



Section 1: Hybrid Breakwaters



Section 2: Hybrid Gabions Transformed to Sand Dunes



Section 3: Hybrid Path



Section 4: Biogenic Oyster Reefs

