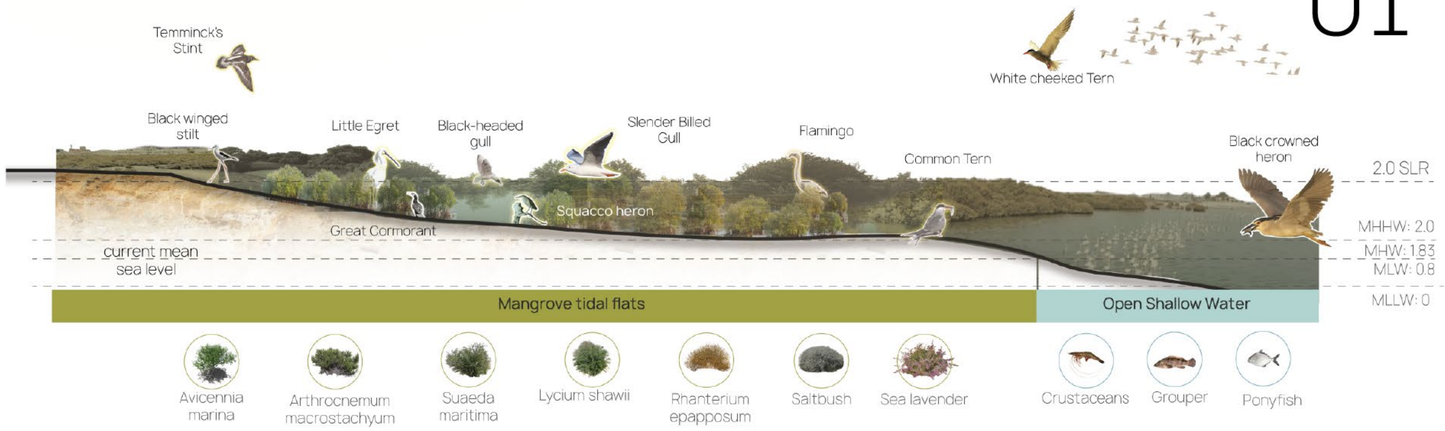
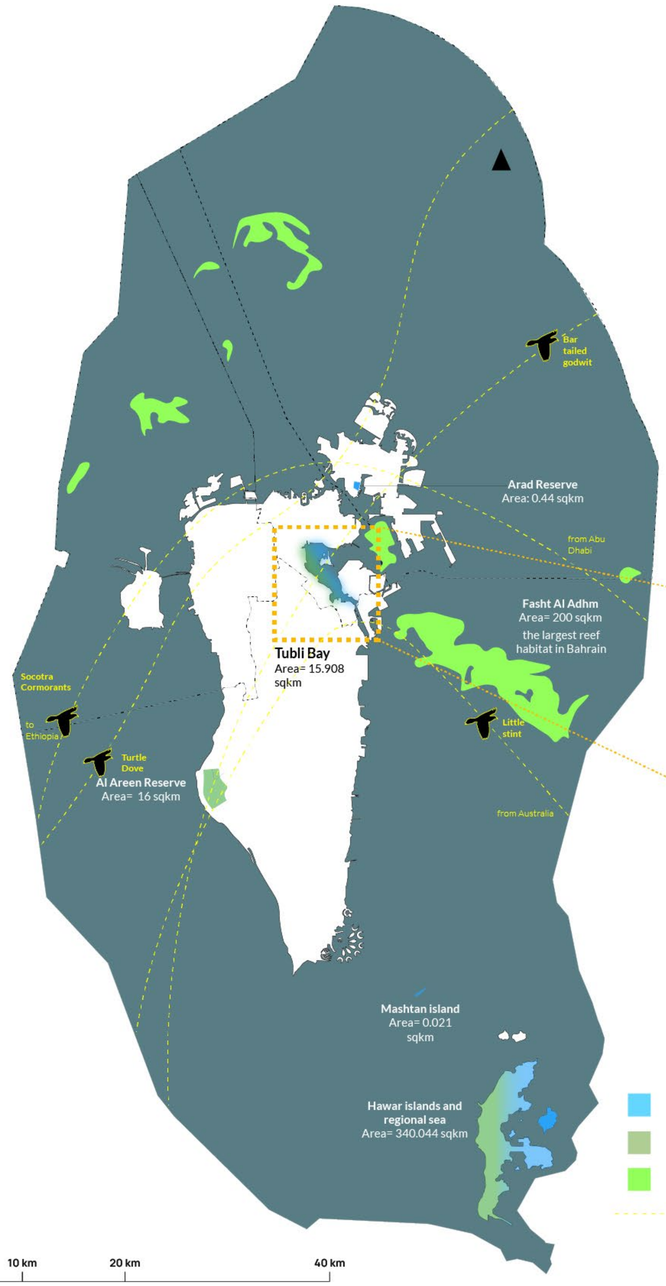
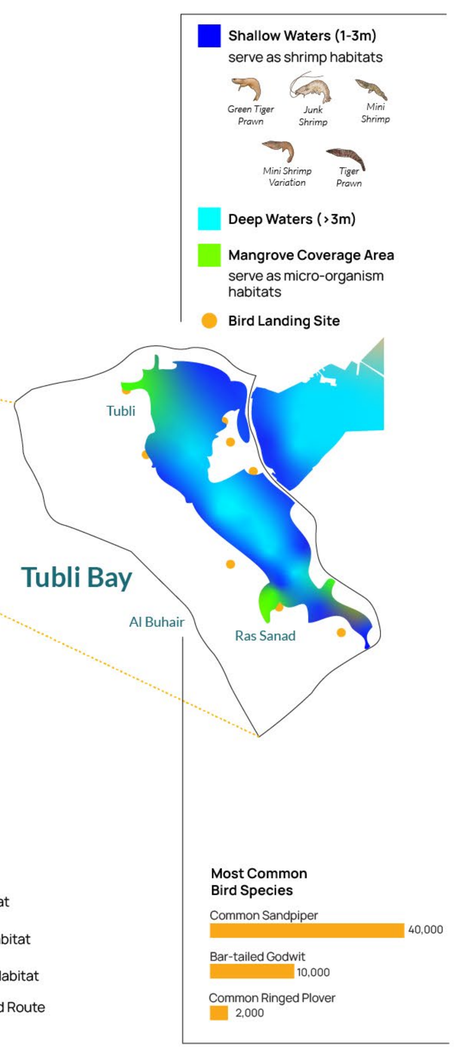
TUBLI BAY AS A WORLD ECOLOGICAL HOTSPOT

Once a thriving ecosystem of terrestrial and marine patches, Tubli Bay is one of the last remaining bio-diverse territories in the Kingdom of Bahrain. It is one of 8 main protected ecological sites within Bahraini territories. The Bay is located in the Eastern part of Bahrain, South of the capital "Manamah". Historically, Tubli Bay has been marginalized in governmental plans despite its ecological salience and strategic location near the capital, serving as a partially open ecological buffer to the Gulf waters. Economically, the bay has always supported the livelihood of surrounding communities through hosting a variety of ecological assets. In the past, many of the bay's residents have relied on fishery, pearl diving, and agriculture to generate income. Ecologically, the bay is widely known for its shallow waters that provide ideal nesting grounds for crustaceans and various shrimp species. The latter also thrive within mangrove patches spread along the bay's western edge, serving as major migratory bird landing sites. As such, Tubli Bay plays a significant ecological, social, and economic role within the Kingdom of Bahrain. However, its ecological assets and the traditional economies contingent upon them are endangered.



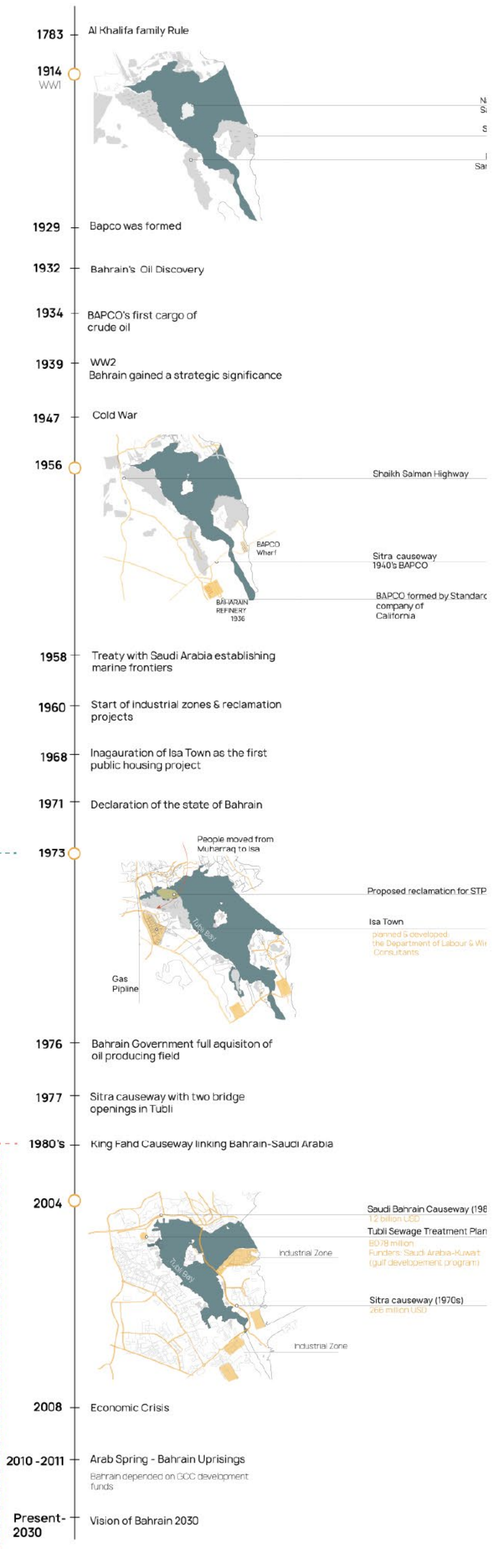
Tubli Bay



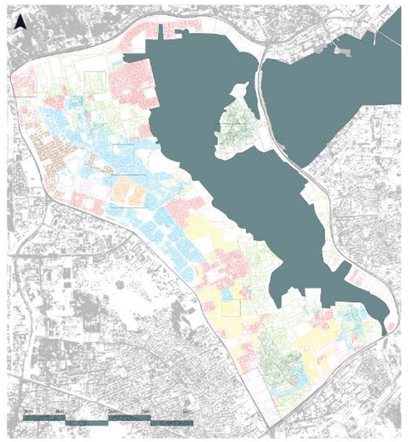


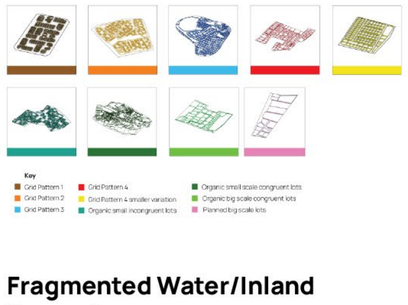
TUBLI BAY'S VULNERABILITY TO CLIMATE , URBANIZATION & EXTRACTIVE INDUSTRIES

Historical Evolution

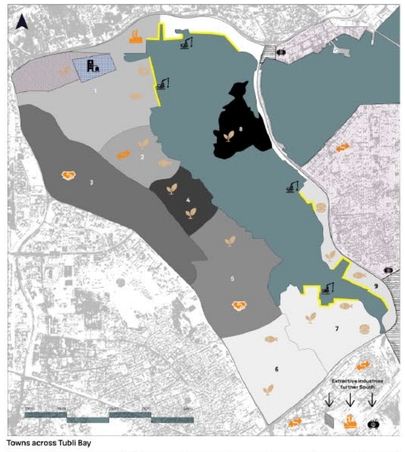


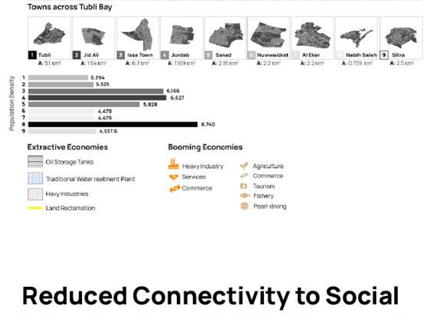
Fragmented Urban Form





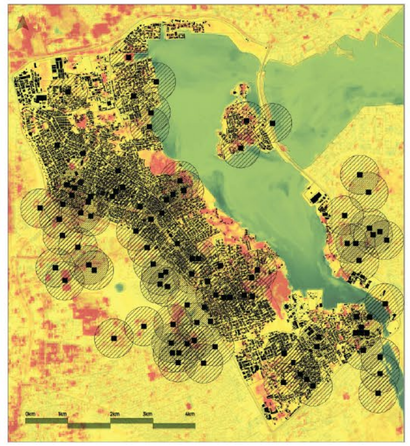
Extractive/Declining Economy



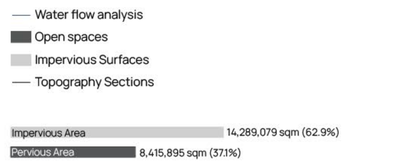


Climate Risks & Social Inequality

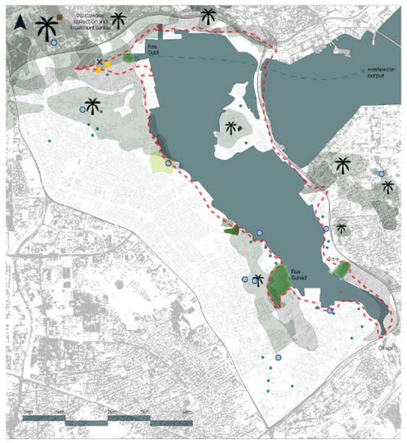
Heat-waves

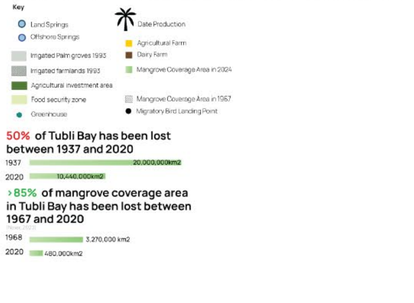


FLash-Floods

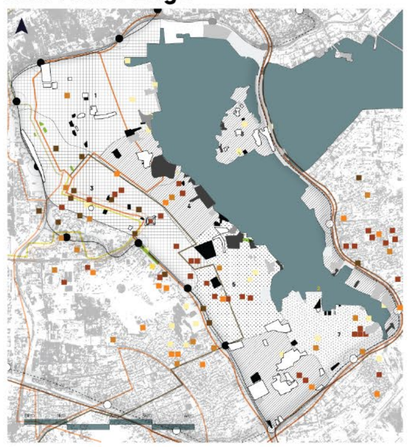


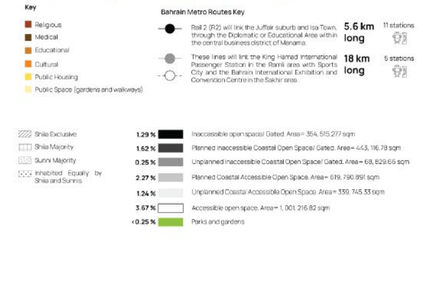
Fragmented Water/Inland Ecosystems



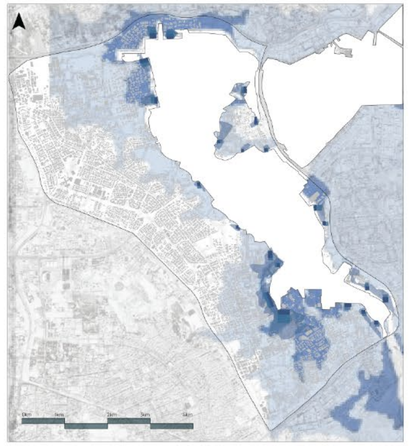


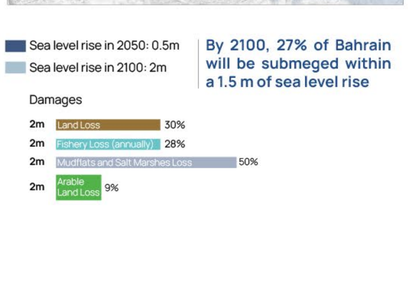
Reduced Connectivity to Social Infrastructure, Public Transport, and Water Edge



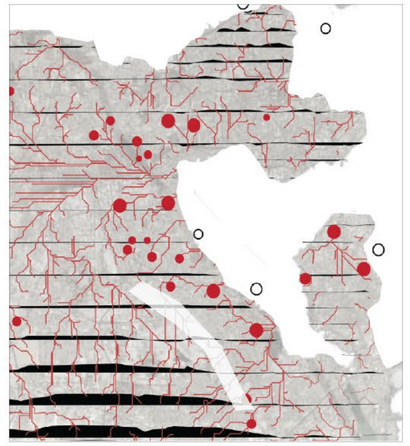


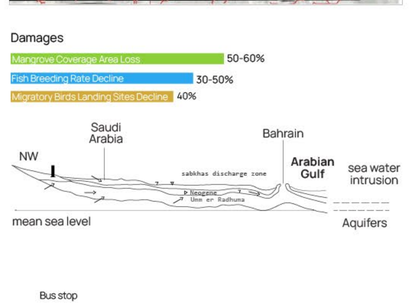
Sea-level Rise





Overexploitation of Water Springs and Aquifers





Bus stop

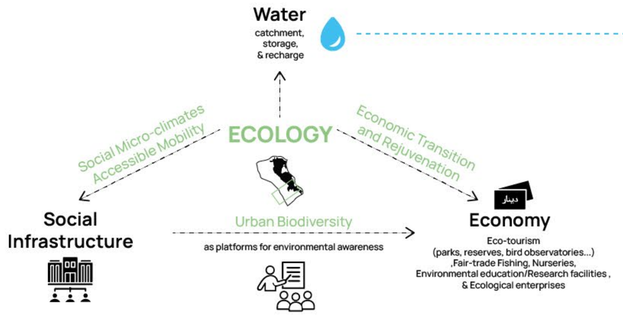
ECO-COMMONS: SEEDING URBAN BIODIVERSITY AS A FORCE FOR CLIMATE MITIGATION & SOCIO-ECONOMIC RESILIENCE

Eco-commons is envisioned as an ecological rehabilitation and green infrastructure project in Bahrain, designed to increase and connect marine and urban biodiversity in Tubli Bay through a continuous network of habitat spaces for migrating birds, and marine and terrestrial species.

Equally, this network aims to enhance existing social infrastructures and multi-modal mobility through urban microclimates and shade/cooling corridors in the area, and improved public access to the waterfront. The project proposes Eco-commons as a base to transition the area's current economy which comprises intensive aluminum extraction, heavy industries, and dwindling commercial activities to a clean economy that rests on eco-tourism, fair-trade fisheries, and clean energy production.

The project overlays water harvesting, storing, and treating structures with urban landscapes that alternate between habitat enhancement, recreation, and shade creation. Through its compounded performance of shade creation, water harvesting , and biodiversity/mangroves enhancement, the project aims to increase resiliency to climate threats that had been frequent in the area (increased heatwaves, droughts, flashfloods, and shoreline erosion) as well as grow a social resilience through communal stewardship of the eco-commons that translates into economic prosperity in line with climate action.

We envision Tubli Bay as a connected ecosystem of Social, Ecological, & Water Commons



Abundance of Water Resources

10
Freshwater springs

1
Aquifer
Al Buhair basin

Traditional Water Management

125,000 m3/day
Potential reuse of wastewater treatment

MACRO-SCALE

SOCIAL COMMONS
connecting new social micro-climatic spaces, waterfront boardwalks, and existing cultural hotspots through soft-mobility eco-corridors

ECOLOGICAL COMMONS
connecting marine, waterfront and inland ecosystems through biodiversity eco-corridors and transitional ecotones

WATER COMMONS
capturing storm-water and treating /reusing wastewater to nurture the proposed urban biodiversity network, support the growing eco-tourism economy and recharge the aquifers through key sites

MICRO-SCALE

MOBILITY & SOCIAL INFRASTRUCTURE

LANDSCAPE TYPOLOGIES

WATER SYSTEMS

ENGAGE & INTERACT
SEED URBAN BIODIVERSITY
CAPTURE, TREAT, RECHARGE WATER

RESTORE EXISTING ECOSYSTEMS

DECARBONIZE ENERGY

Al Buhair

Ras Sanad

Sitra

TUBLI BAY ECO-COMMONS

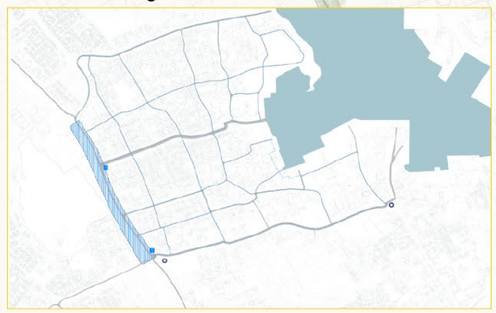
- Parking
- Educational facility
- Mosque
- Gym
- Biking Lane
- Walkway

1. Al Buhair Wildlife Reserve
2. Ras Sanad Mangorve Park
3. El Eker Waterfront
4. Ras Sanad Public Beach
5. Agricultural Communal Field
6. Agro-food Public Parket

0m 200m 400m 600m

Inland Ecosystems

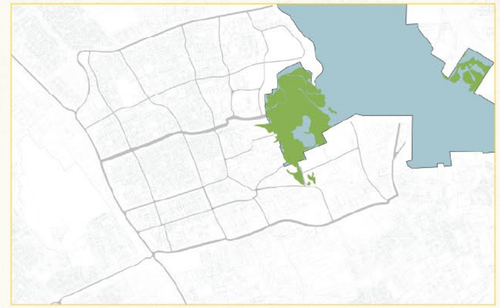
Water Harvesting Network



Eco-Corridors

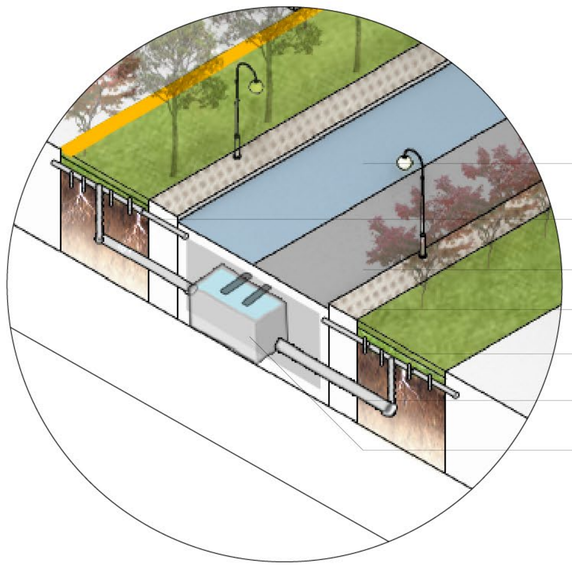
Biodiversity Hotspots

Coastal Ecosystems



ECO-CORRIDORS AS URBAN MICROCLIMATES, BIODIVERSITY HOTSPOTS, WATER & SOCIAL LIFELINES

Eco-Corridors Mass plan



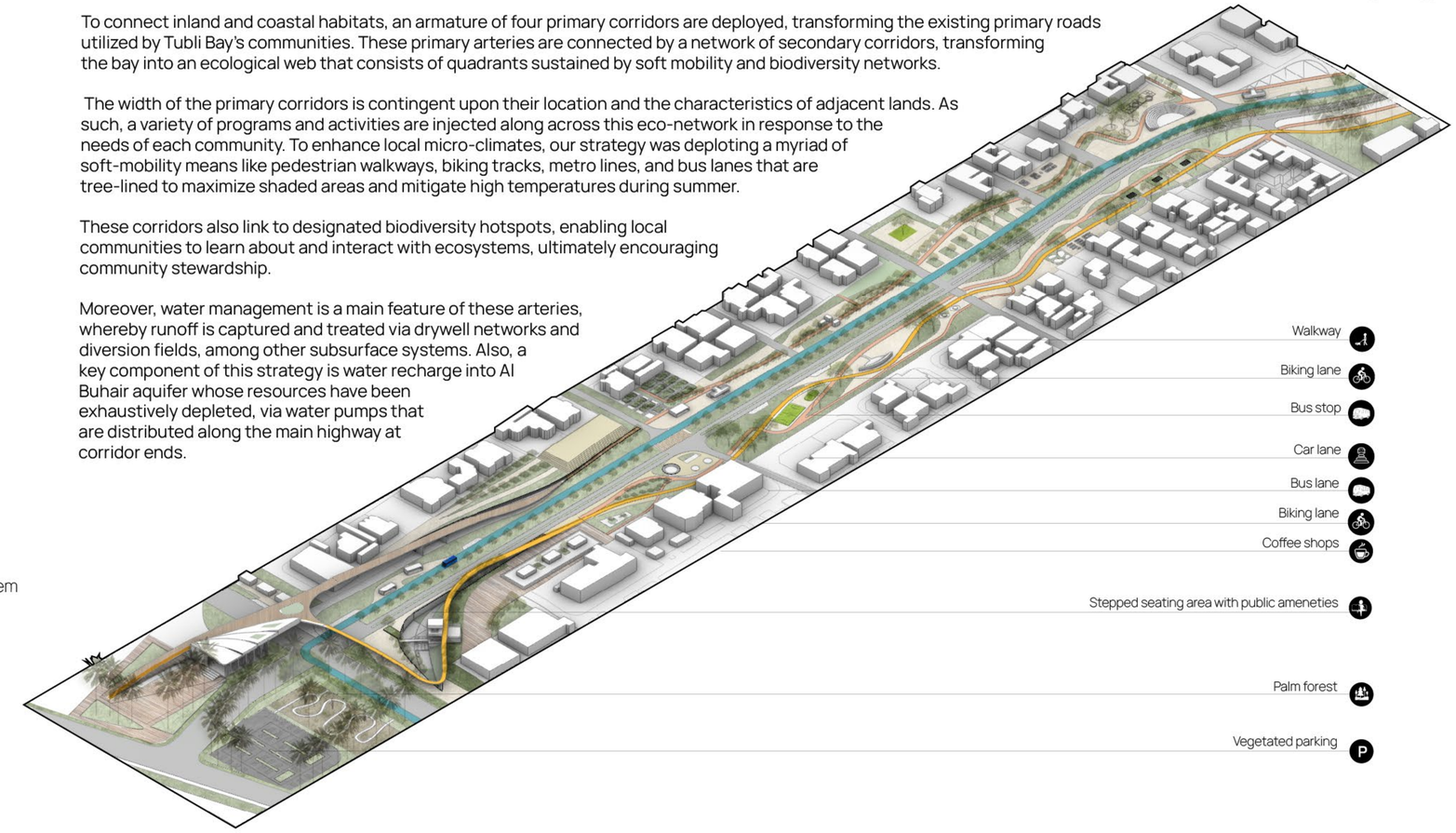
Subsurface Infiltration System in Secondary Corridors

To connect inland and coastal habitats, an armature of four primary corridors are deployed, transforming the existing primary roads utilized by Tubli Bay's communities. These primary arteries are connected by a network of secondary corridors, transforming the bay into an ecological web that consists of quadrants sustained by soft mobility and biodiversity networks.

The width of the primary corridors is contingent upon their location and the characteristics of adjacent lands. As such, a variety of programs and activities are injected along across this eco-network in response to the needs of each community. To enhance local micro-climates, our strategy was deploting a myriad of soft-mobility means like pedestrian walkways, biking tracks, metro lines, and bus lanes that are tree-lined to maximize shaded areas and mitigate high temperatures during summer.

These corridors also link to designated biodiversity hotspots, enabling local communities to learn about and interact with ecosystems, ultimately encouraging community stewardship.

Moreover, water management is a main feature of these arteries, whereby runoff is captured and treated via drywell networks and diversion fields, among other subsurface systems. Also, a key component of this strategy is water recharge into Al Buhair aquifer whose resources have been exhaustively depleted, via water pumps that are distributed along the main highway at corridor ends.



RESURFACING INLAND ECOSYSTEMS

Al Buhair Wetalnds Location

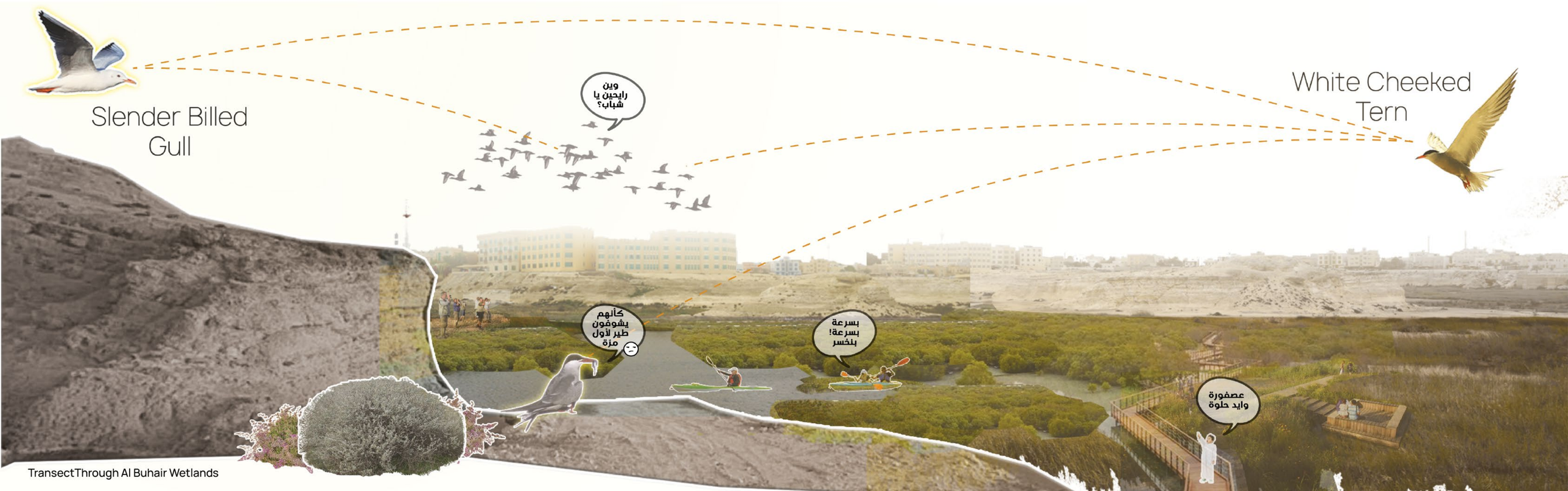
Positioned along the National Charter Highway, Al Buhair wetlands are a vital wetland ecosystem that are disconnected from the rest of the bay. Historically, the site has been marginalized and is currently rundown, threatening the continuity of its ecosystems. As such, our strategy is centered around the rejuvenation of Al Buhair by connecting it to the existing coastal habitats.

Connecting these ecosystems requires the creation of a rhizomatic armature of primary and secondary eco-corridors. The main eco-corridor which connects Al Buhair wetlands and Ras Sanad mangroves, is the widest as it sustains more subsurface water-flow. The corridor links to Al Buhair via a multi-functional structure that serves as a soft-mobility interface, and deploys a water pump recharging Al Buhair aquifer.

As such, Al Buhair becomes a major component of this ecological network and its rejuvenation serves as a catalyst to resurface and revive biodiversity flows in the bay.

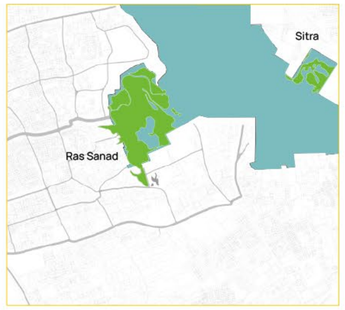
Eco-Corridor Intersection with Al Buhair

Al Buhair Wetlands Mass Plan



TransectThrough Al Buhair Wetlands

REPLENISHING COASTAL ECOSYSTEMS



1.Mangrove Typology

Ras Sanad is one of the last remaining mangrove habitats in the bay. It is home to "Avicennia marina" species that attract a variety of migratory birds and micro-organisms and contribute to reducing pollution through carbon sequestration.

Our strategy is to transform the habitat into a reserve park by creating a public space interface along adjacent communities. It also entails expanding the mangroves to the North-east direction, enabling visitors to navigate the reserve through a continuous boardwalk. Across the latter, stepped terraces and birdwatching towers are deployed.

2.Intertidal Waterfront Typology

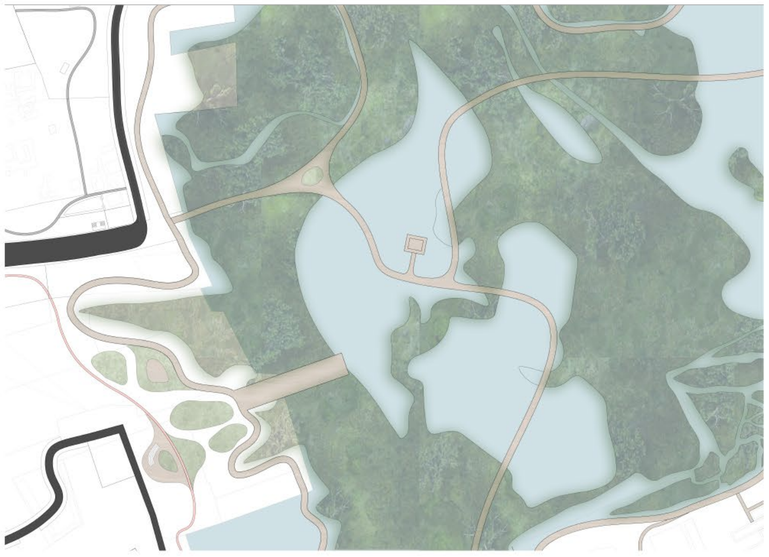
El Eker edge is a key intertidal zone that serves as a migratory bird habitat, specifically for flamingos. During winter, the area suffers from flash floods whose frequency is expected to augment with sea-level rise in the future.

Thus, our strategy transforms the reclaimed edge into a recreational waterfront that features green buffers, tidal pools, and a living breakwater to mitigate sea-level rise. Also, the waterfront links to a continuous boardwalk with bird-watching terraces, and connects with the adjacent and facing mangrove habitats.

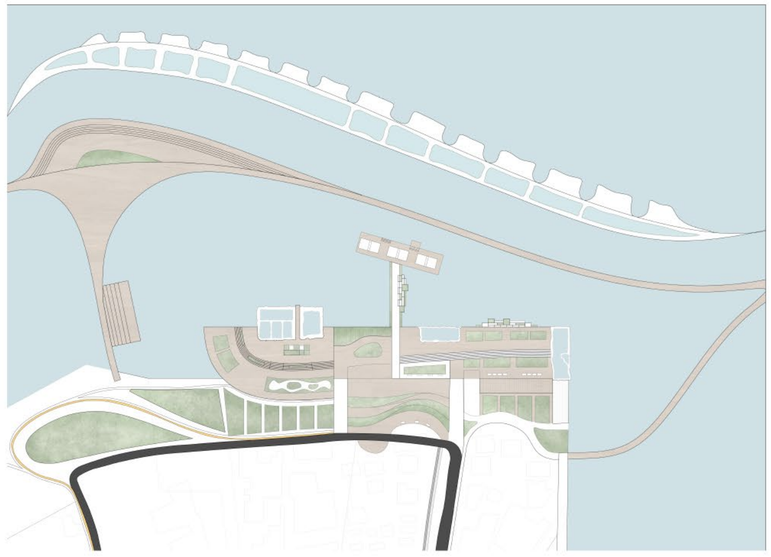
3.Beach Typology

Ras Sanad public beach is a vital ecological zone that is threatened by land reclamation and pollution, rendering it a detrimental environment for existing species like birds, fish, and other marine organisms.

Considering it is one of the very few public spaces accessible by adjacent communities and fishermen, our strategy is to expand the beach via shoreface nourishment and revitalize it by deploying several public amenities. Some of the latter would be playgrounds for children, festive areas, tidal pools, a fish market, and a jetty that connects with Nabi Saleh island via a ferry line.

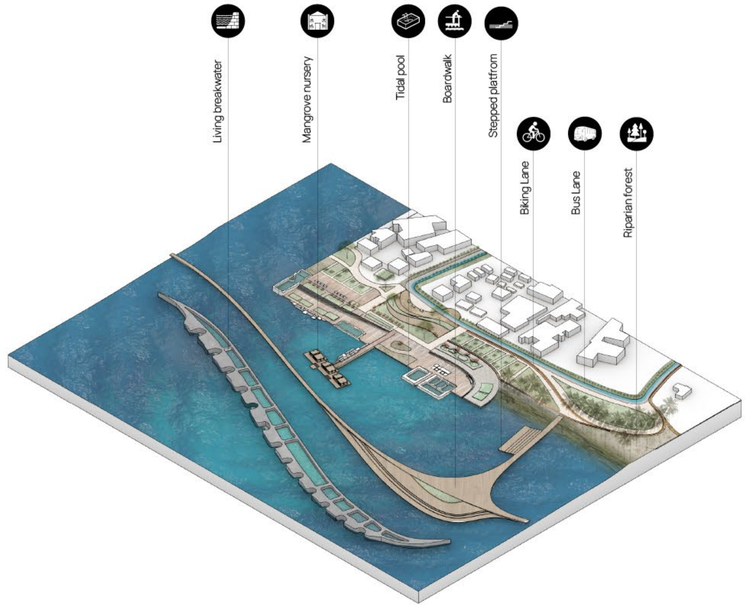


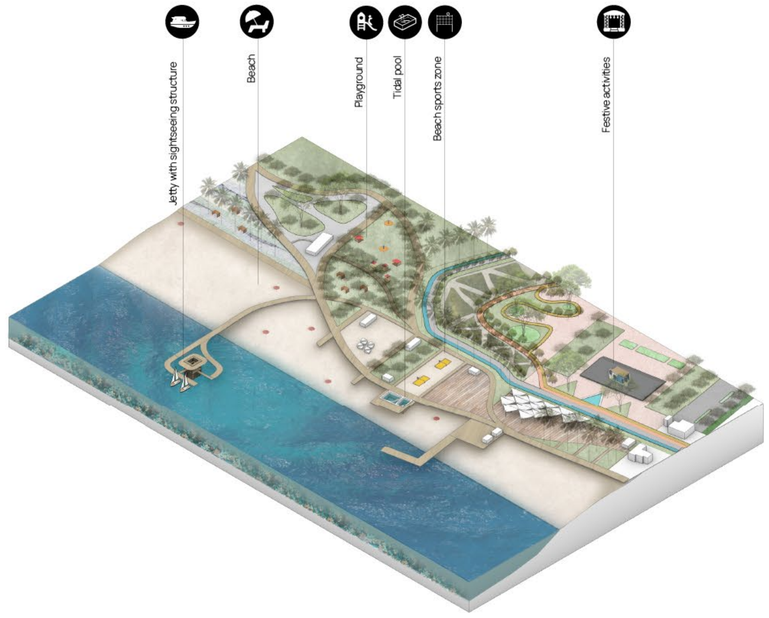
2. Mangroves reserve edge with a boardwalk and birdwatching towers



1. Hard edge with tidal pools and stepped terraces

3. Ras Sanad public beach with a fish market



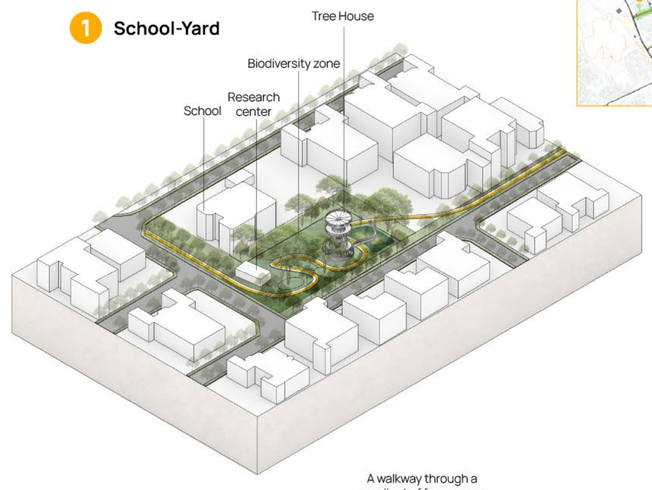


NURTURING URBAN BIODIVERSITY HOTSPOTS THROUGH COMMUNAL ENGAGEMENT

1. Education Infrastructure to raise awareness among the youth

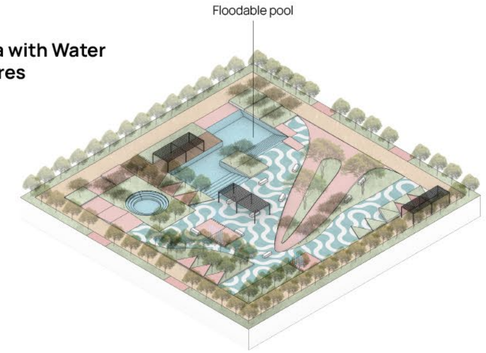
2. Water treatment plant overlayed with public amenities

1 School-Yard



2 Community Garden

3 Piazza with Water Features



4 Urban forest

Deployed Species


Orchard


Palm trees


Papaya


Neem


Almond


Tamarind


Bambar


Ghaf trees

White-eared bulbul Bird

White Cheeked Tern

Birds Habitat Patches

Vacant lands will be transformed into bird habitat patches & public participation & education

Ghaf Tree

Birds Get Fresh Fruits

People get notified when it is bird migration season

Public Participtation

Tubli bay is the landing site for 26,404 migratory birds of 45 different species

PHASED TRANSFORMATION TOWARDS CLIMATE & SOCIAL RESILIENCE

Phase I 0-5yr

Installing the network

Phase II 5-15yr

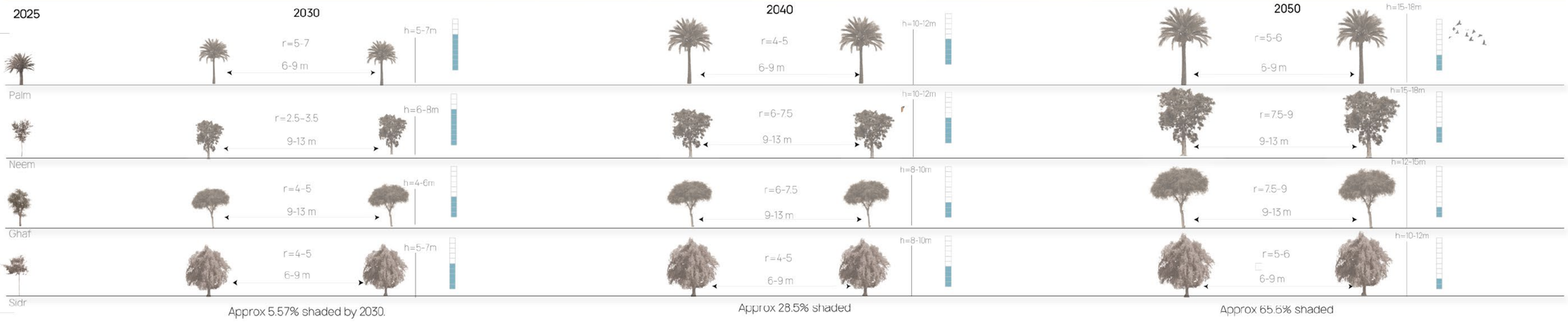
Expanding and connecting biodiversity pockets

Phase III 15-25yr

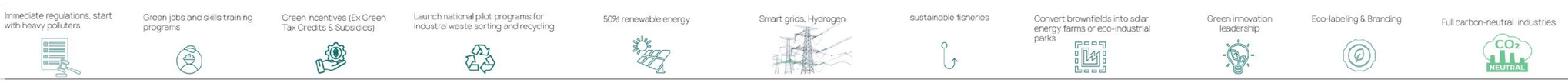
Ecological consolidation and system maturity

WATER	Capture	Treat	Recharge
ECOLOGY	Seed >>>	Nurture >>>	Grow
HUMAN	Educate	Engage	Prosper

Tree Coverage



Green Industries



Eco Tourism

Mudflats

Mangroves

Fauna