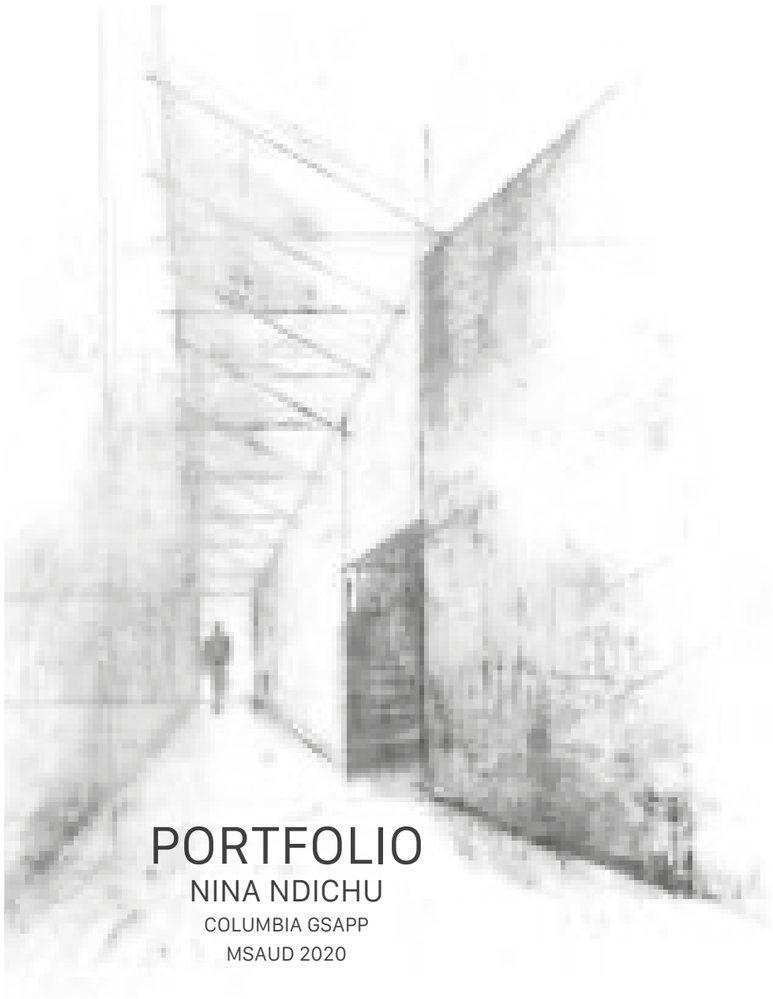
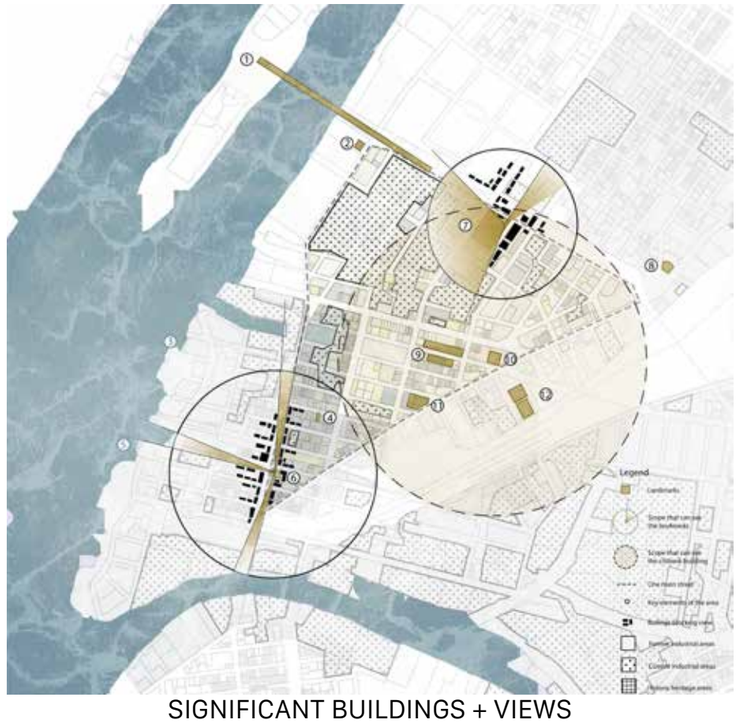


PORTFOLIO

NINA NDICHU
COLUMBIA GSAPP
MSAUD 2020

SUMMER

LAND USE



SIGNIFICANT BUILDINGS + VIEWS

CHANGING PERCEPTIONS

Long Island City is losing its identity from a heavily industrial city to a metropolitan city following in the steps of New York City.

The project envisions a revitalization of its most important landmarks (sites and buildings that have been in the area for a long time and when people visit Long Island City, they reminisce about the olden days. Low rise/ old structures are the most vulnerable and most likely to undergo redevelopment. The concentration of landmarks (heritage and perceived points of significance for the community)are used as a means to reprogram the streets and bring vitality to the once old neighborhood of LIC.

This part of LIC houses the major transit nodes – subway, ferry, road network (Vernon Boulevard, Jackson Avenue, Queens Plaza. Studies have shown that revitalization of "downtown" areas helps reactivate the rest of the city and mitigate effects of future development to certain extents.

Long Island City was once home to many factories and bakeries, some of which are finding new uses. The former Silvercup bakery is now home to Silvercup Studios.

Most of the significant buildings have their frontage on the major streets. We use these significant buildings as nodes to bring the community together. The community is made aware of their history, leading to greater appreciation of the place they live in. If the community obtains ownership of these places, it will increase their sense of belonging and promote community building, helping resist outside forces from transforming the neighborhood.

Significant buildings

Main streets

Number of pedestrian deaths

Walkability radius from subway stops

Queensboro Bridge

Terracotta Building

Hunter's Point Historic Building

Pepsi Cola Sign

FDNY Engine 258/Ladder 115

Long Island City Gantry

St. Mary's Catholic Church

Silvercup Studios

Clock Tower

Citibank

Supreme Court

MoMA PS1

THE BREAK SPACE

Sunnyside yards development is a new proposal over the Long Island Rail Tracks in the center of Long Island City. The proposed development is to be on a deck ranging from as low as 10 feet to as high as 100 feet.

Sunnyside Yards development is a threat to the existing neighborhoods if the development is not integrated well.

SKILLMAN AVENUE NODE

THOMPSON AVENUE NODE

QUEENS BOULEVARD NODE

FALL

FORESTS + CARBON SINKS SYSTEM

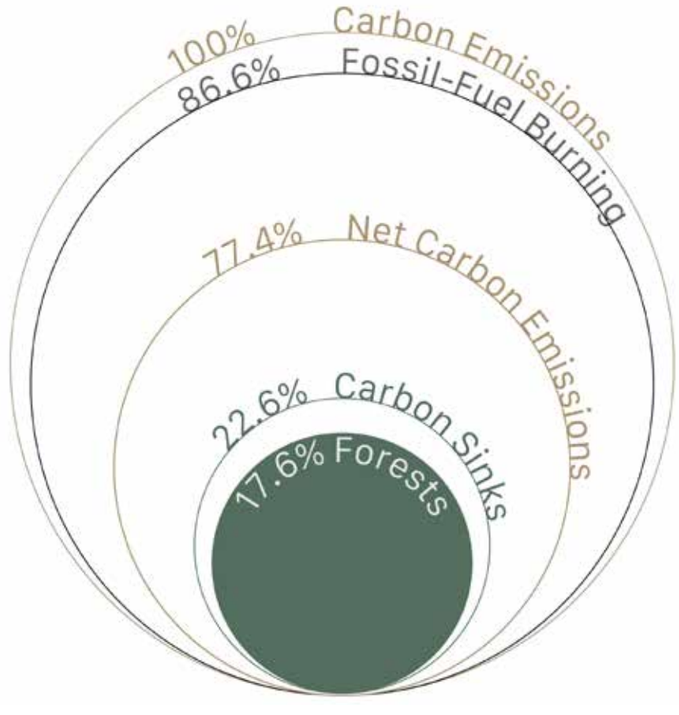
The Green New Deal's opening statement states how the main cause of climate change is human activity over the past century. Simple fact is we need our forests in order to have a healthy ecosystem. Forests and carbon sinks will turn over the climate crisis.

One only needs to plant one trees as a start. One thing that was clear is that the Hudson Valley region and New York state is doing quite well when it comes to reforestation from the heavy destruction that begun in the 1600s.

We also learn that forests need proper management in order for them to provide the healthy ecosystem that is the basis for clean air, clean water, clean environment as forests habitat and the other habitats that are in and around forests create a unique environment that is a symbiotic relationship for the human species to survive.

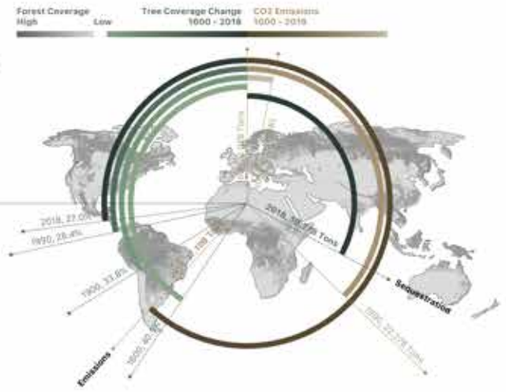
Forests are important, and we need to think of them as potentials to combat climate change. There are different benefits and threats to forests and this was investigated in Hudson valley as a system of forest management and tree cover being a potential carbon sink.

CARBON CONTRIBUTION



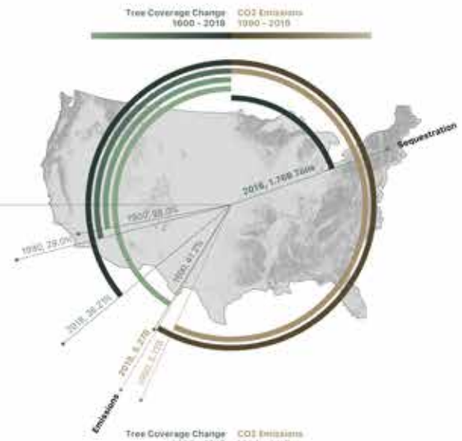
Global

Tree Coverage	27%
CO2 Absorbtion	19.77B
CO2 Emissions	37.10B
Net C Footprint	17.33B
Carbon Offset	x 3000



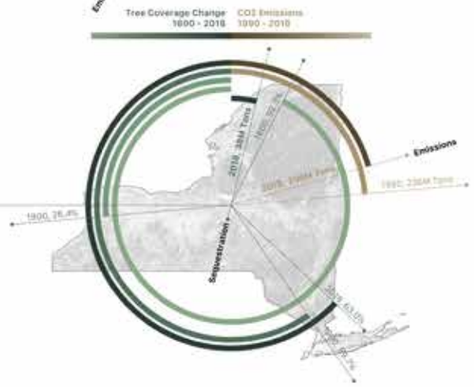
USA

Tree Coverage	36%
CO2 Absorbtion	1.76B
CO2 Emissions	5.27B
Net C Footprint	2.99B
Carbon Offset	x 500



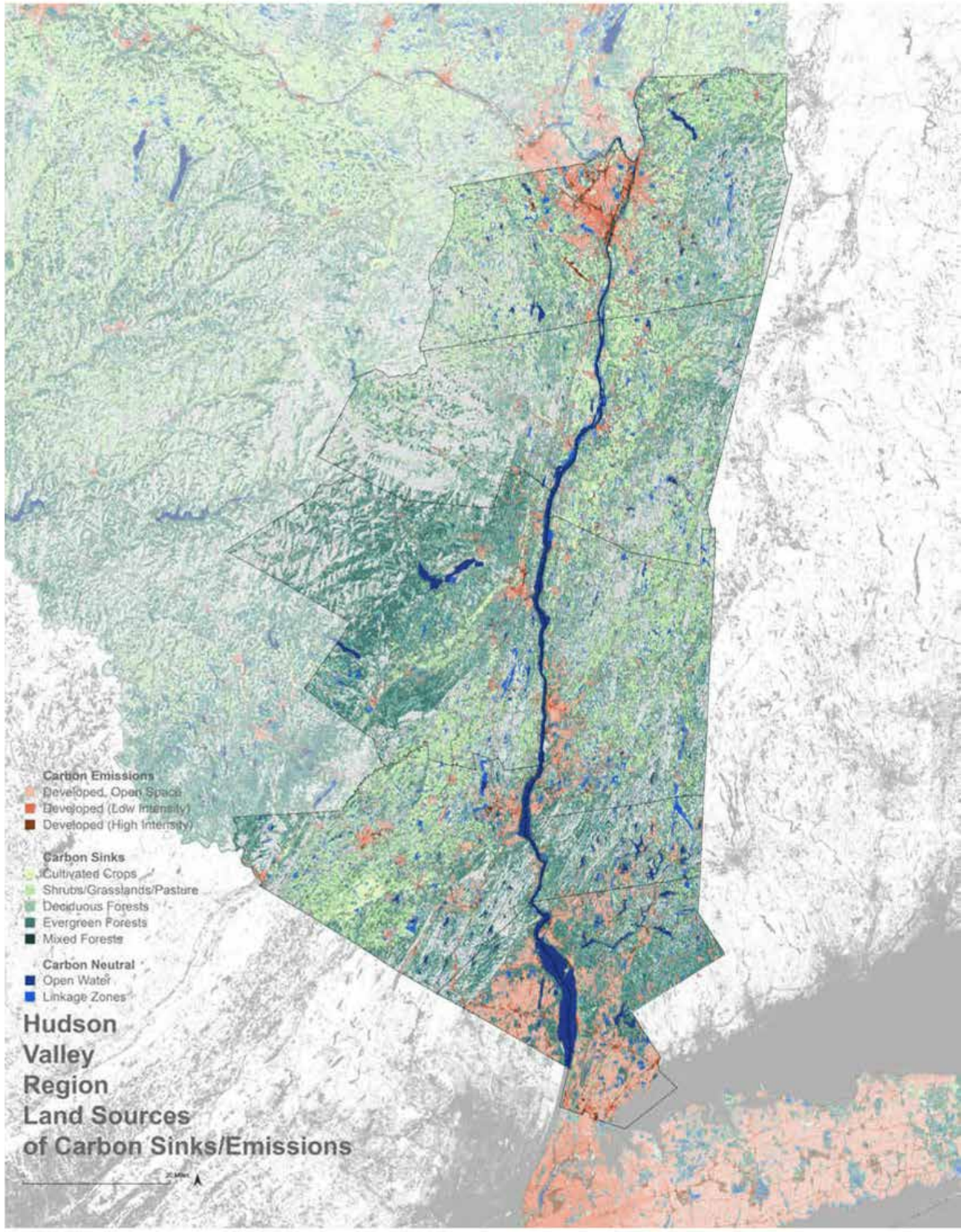
New York State

Tree Coverage	63%
CO2 Absorbtion	38M
CO2 Emissions	206M
Net C Footprint	168M
Carbon Offset	x 28



Hudson Valley Region

Tree Coverage	74%
CO2 Absorbtion	6M
CO2 Emissions	29.6M
Net C Footprint	23.6M
Carbon Offset	x 8



Forest Biodiversity

Threats

Climate Change

- Intensity Of Forest Disturbances
- Wildfires
- Invasive Species

Biodiversity

- Poor Functioning Ecosystem
- Vulnerability To Perturbations
- Less Able To Supply Humans

Invasive Species

- Harm Human Health
- Hinders Forest Growth
- Disrupts Biodiversity
- Negatively Impact Ecosystems
- Starves Filter Feeders

Human Activity

- Fragment The Forests
- Population Explosions
-high Development + Recreation Pressures
- Invasive Species

Benefits

Urban habitats

- Controlling Erosion
- Improving Air Quality
- Retaining Nutrients
- Protecting Water Quality + Quantity
- Educating Communities

Open Uplands + Barren

- Multiple-use Areas
- Water Flow Control
- Scenery

Stream habiats

- Flow Control
- Fish Habitat
- Water Absorption
- Nature's Sponges.
- Dilution
- Clean Water

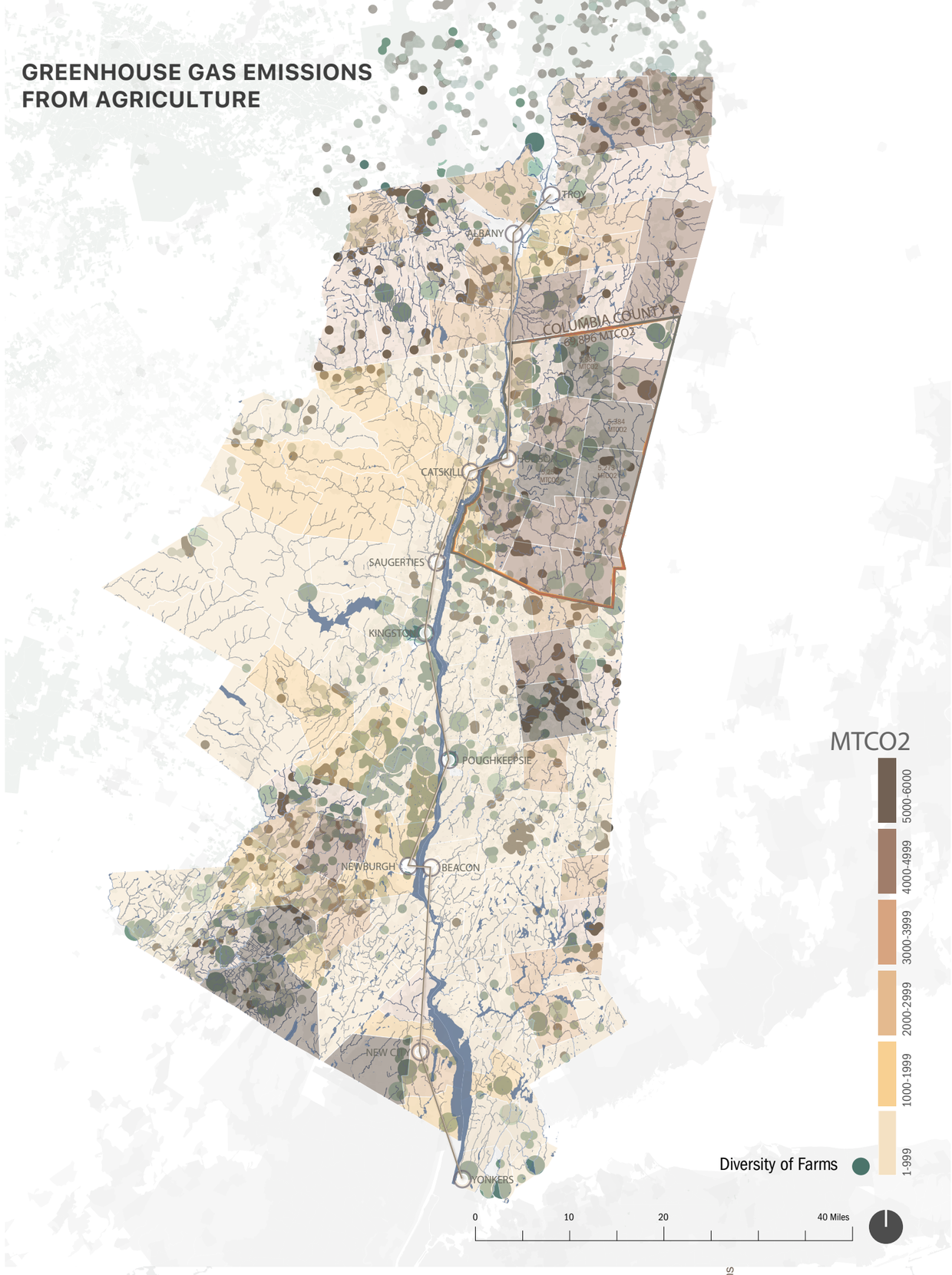
Coastal + Estuarine Habitats

- The River's Nursery
- Wastewater Treatment
- Water Absorption

Forest Habiat

- Clean Abundant Water
- Clean Air
- Climate Moderation
- Nature's Recycling Bin
- Economic Driver
- Scenery

GREENHOUSE GAS EMISSIONS FROM AGRICULTURE

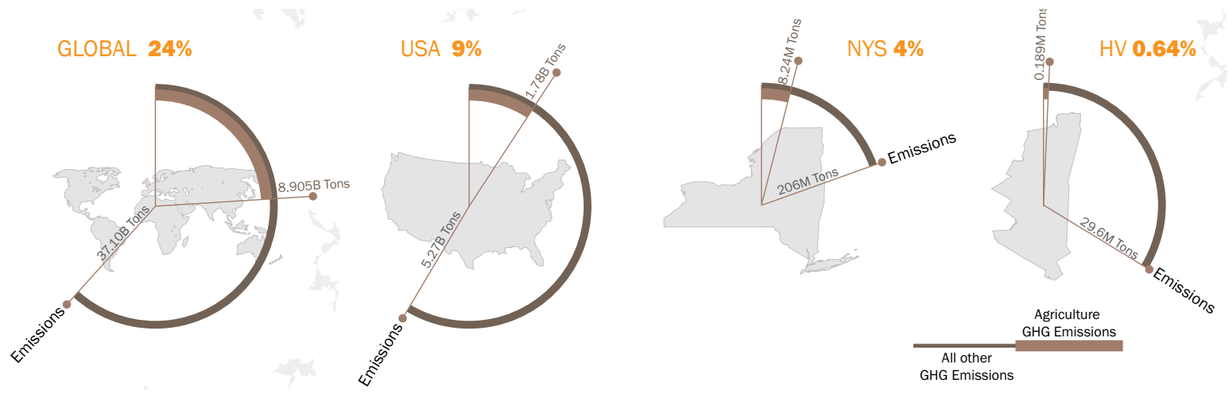


AGRICULTURE + CLIMATE CRISIS

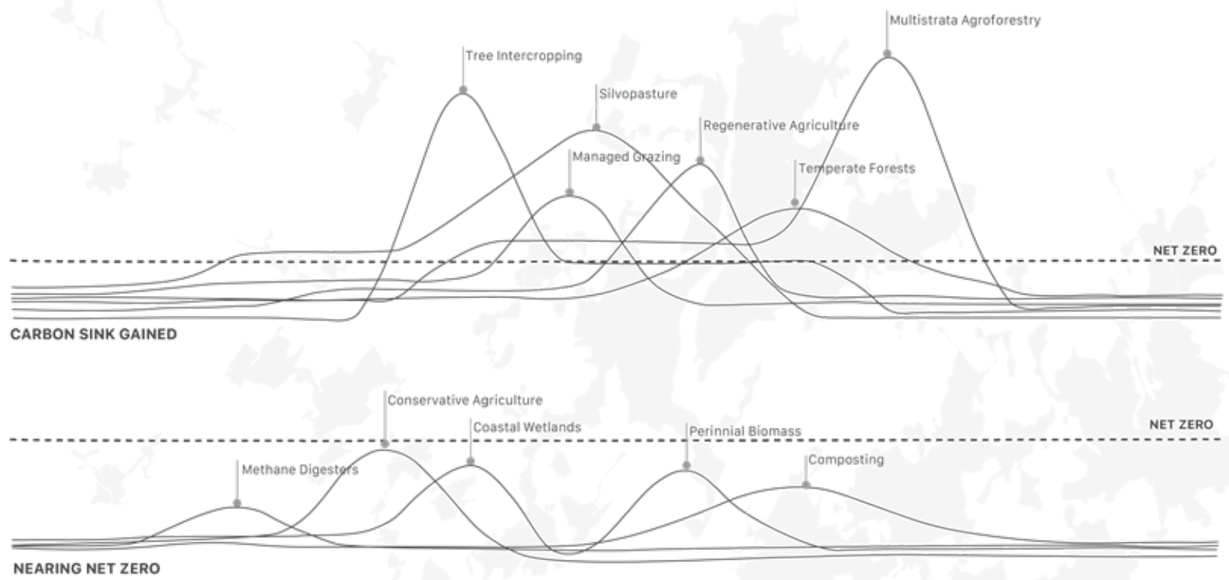
Agriculture makes up 9% of GHG emissions in the US and 0.64% in the Hudson Valley. Industrial Agriculture in the US today operates in a way that is out of sync with both the long term sustainability of the land and the well being of the people it is designed to feed.

Regenerative Agriculture does the opposite and works with nature. It's practices rebuild soil, which leads to increased carbon storage, less need for nitrogen and herbicides, a reduction in the likelihood of flooding, less erosion and healthier water systems, as well as healthier food.

This farming system depends on livestock, which are crucial in keeping the land sustainable and productive if appropriate rotational pasture management and diverse crop management is applied.



BENEFITS OF RESILIENT FARMING PRACTICES

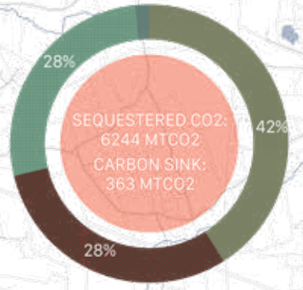


Recreation Opportunity

Fruit Processing Facility

Specialty Dairy Processing Facility

FARM ACRES IN LOOP: 3,202



Primary and Middle School

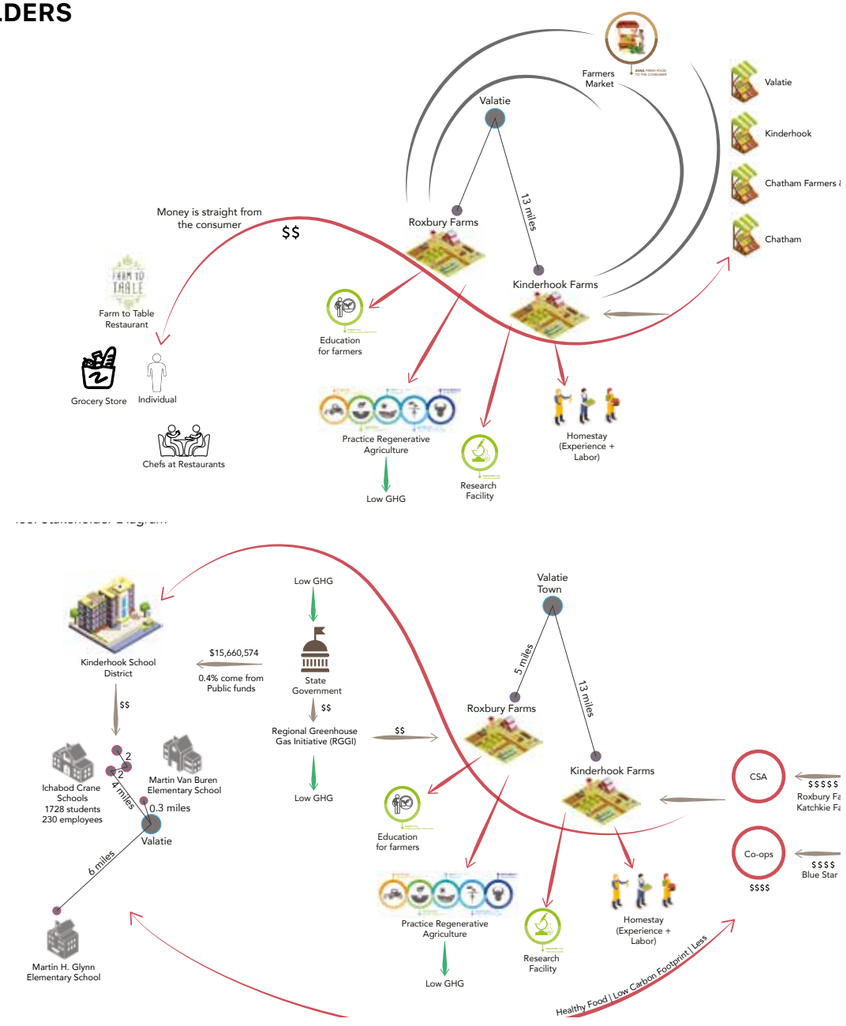
Education Opportunity

Fruit Processing Facility

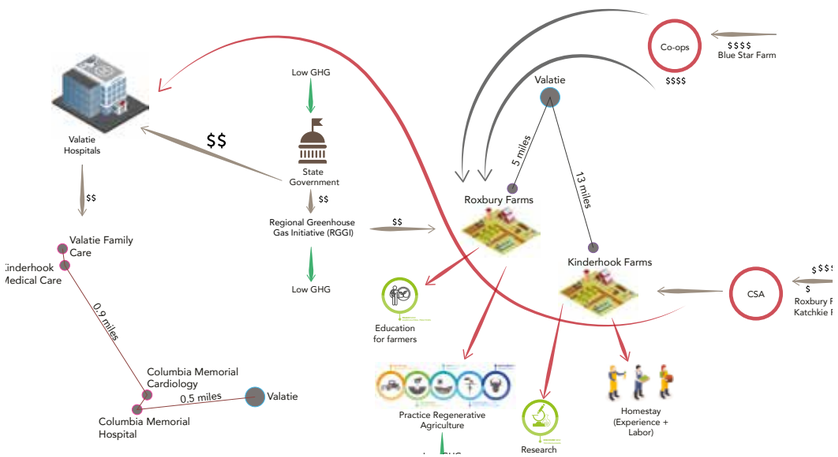
Agricultural Vacant Land
Field Crops
Livestock and Products
Specialty Farms
Orchard Crops
Nursery and Greenhouse
Truck Crops
Research Farms

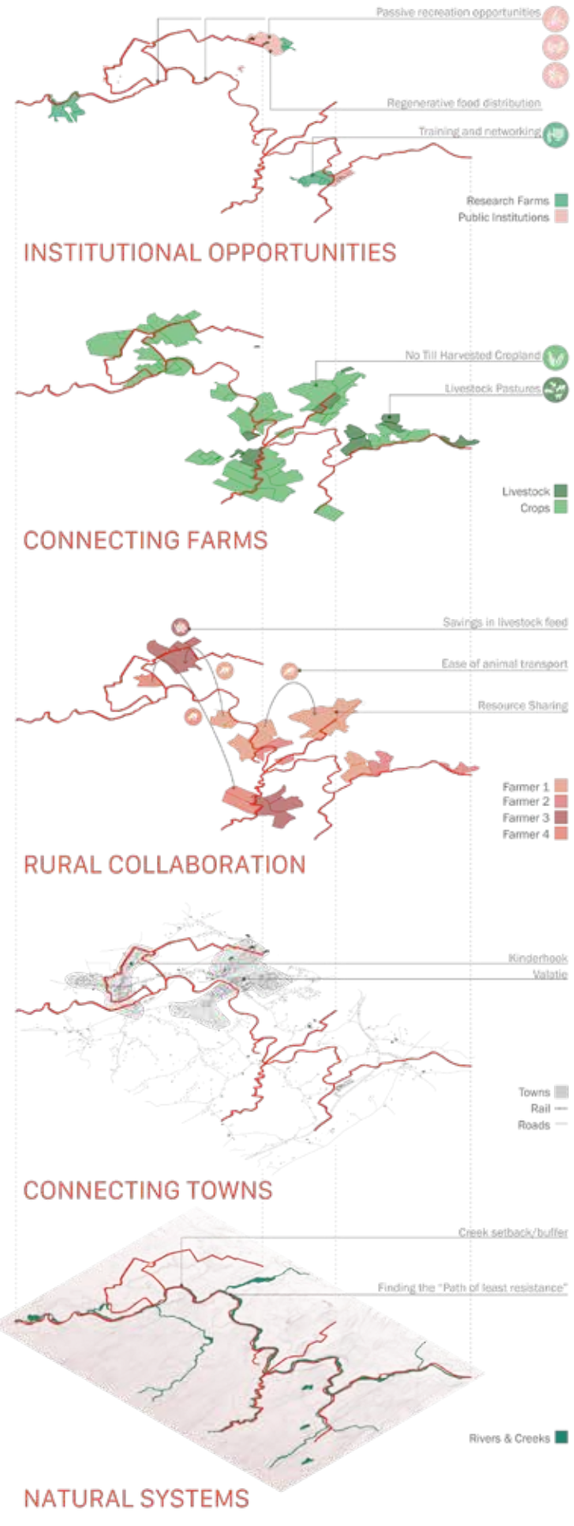
0 0.75 1.5 3 Miles

STAKEHOLDERS



ospital Stakeholder Diagram





Industrial Agriculture in the US today operates in a way that is out of sync with both the long term sustainability of the land and the well being of the people it is designed to feed.

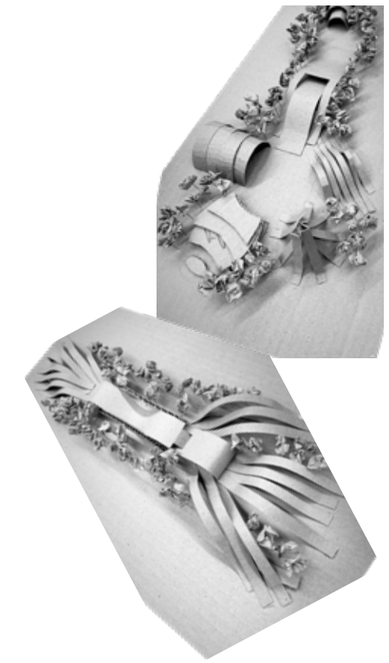
A NEW FARMING SYSTEM

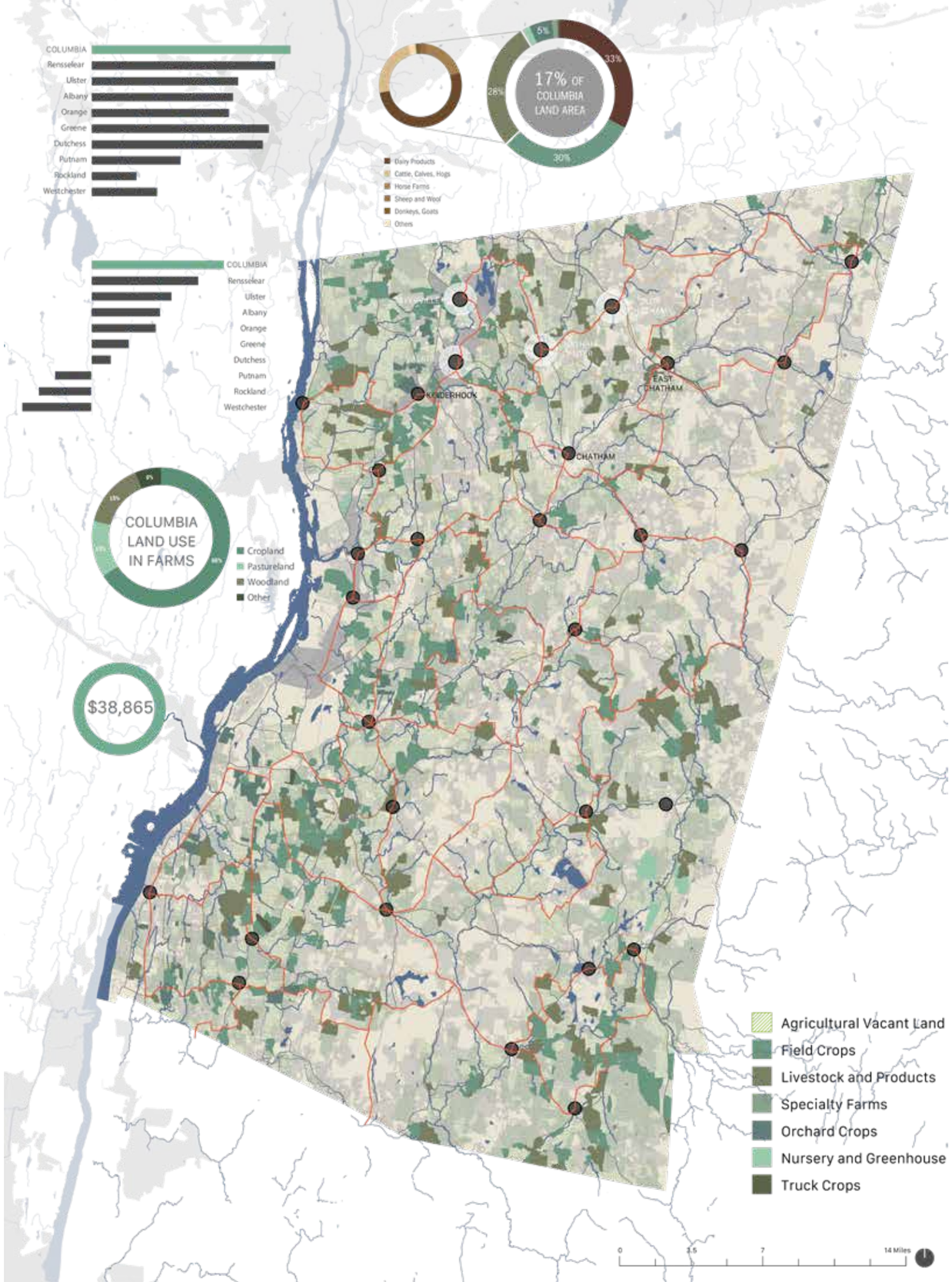
A unique spatial system has been created in the form of an arterial route that will be connected with adjacent paddocks and harvested cropland through easements, where farmers will be able to share each others land and develop social networks. Livestock will be moved and rotated through the trail and connected paddocks, to regenerate the land and sequester carbon.

DESIGN PROPOSAL

This trail will become part of the public realm and also cater for human movement and passive recreation. The trail will also venture into urban areas, connecting with key town nodes and in doing so it will increase opportunities in the distribution of healthy food and the awareness regenerative agriculture practices.

CONCEPTUAL MODELS





SOCIAL CONNECTIONS + IMPROVED HEALTH

The design and transition also enables improved social connections for isolated farmers and the capacity for them to build social capital in their localities which will hopefully once again make the lure of being a farmer a lucrative one. In essence if the Green New Deal comes in effect, it will also help support family farms who have felt the effects of the current degraded agriculture system and help feed the mouths of America.

Pedestrian walkway near Creek

Livestock crossing over Creek

Livestock Crossing over Main Street

Livestock + Pedestrian Path

MIGROCULTURE

CO-OPERATIVE NETWORK

"More than a mere alternative strategy, regenerative agriculture represents a fundamental shift in our culture's relationship to nature."

- MIKE **CATRONE -**

"Carbon aside, the advantages of silvopasture are considerable, with financial benefits for farmers and ranchers."

- MATT **SHEPHARD -**

""We know carbon farming practices work, we just need to make them happen by creating infrastructure and diverting resources to farmers.""

- MARTINA **SKJELLERUDSVEEN -**

GHG
emissions
189,000
MTCO2

NET ZERO

18% of FARMLANDS
required to reach net zero in the Agricultural industry in the Hudson Valley

"At that point in time, as a farmer myself, it was clear that there's a lot of things that the farming community and farmers can do to help reverse the detrimental impacts of climate change."

- GAIL **TAYLOR -**

"A lot of farmers are being educated about the capacity of soil to sequester carbon. It gets them excited to think that they can contribute to a reversal of climate change."

- MATT **SHEFFER-**

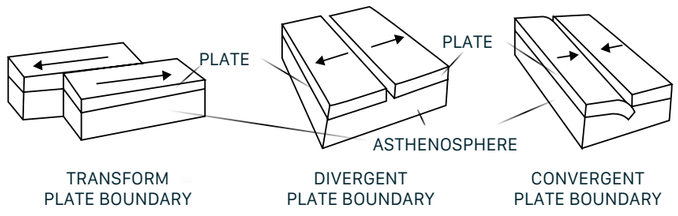
SPRING

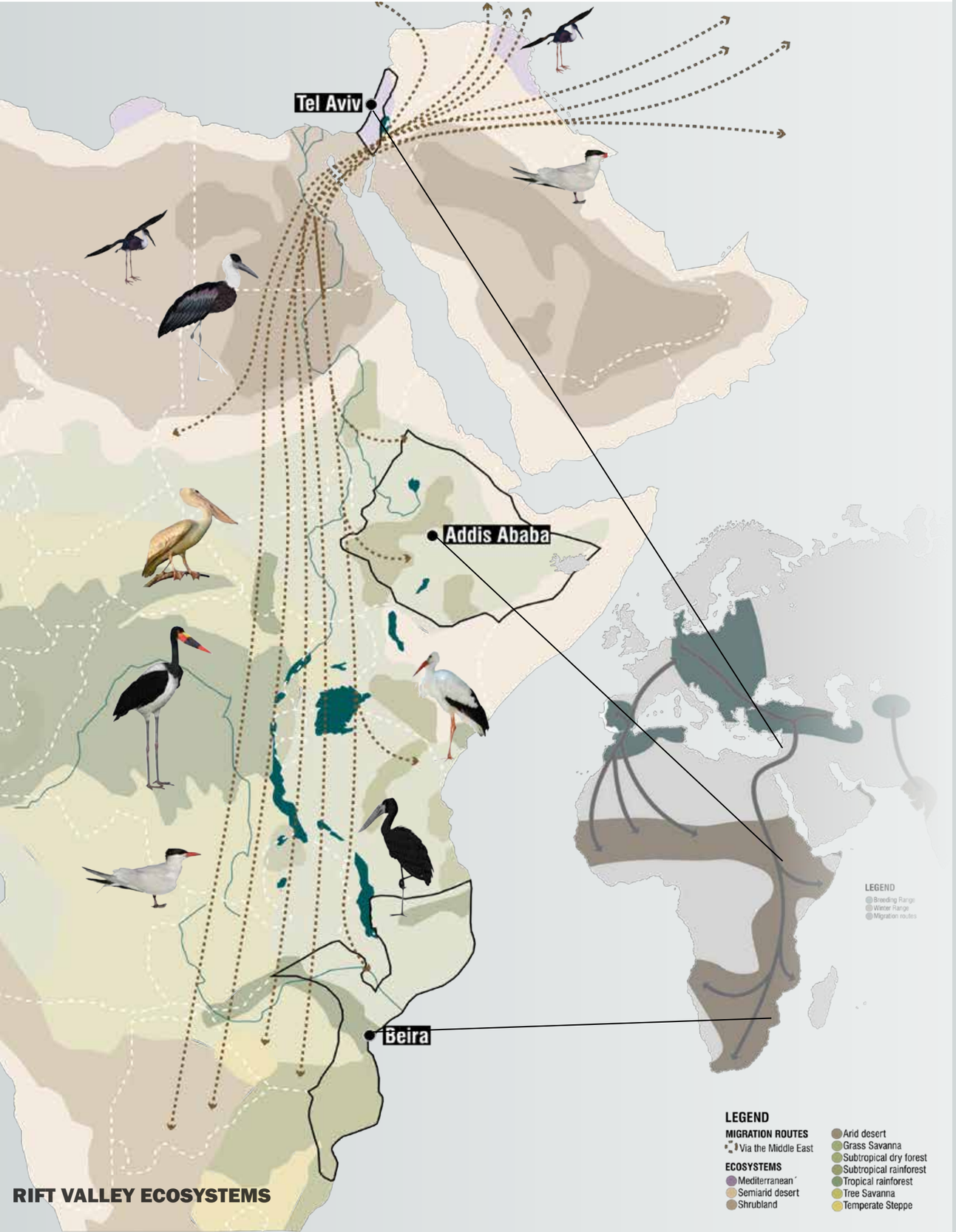
THE GREAT RIFT VALLEY

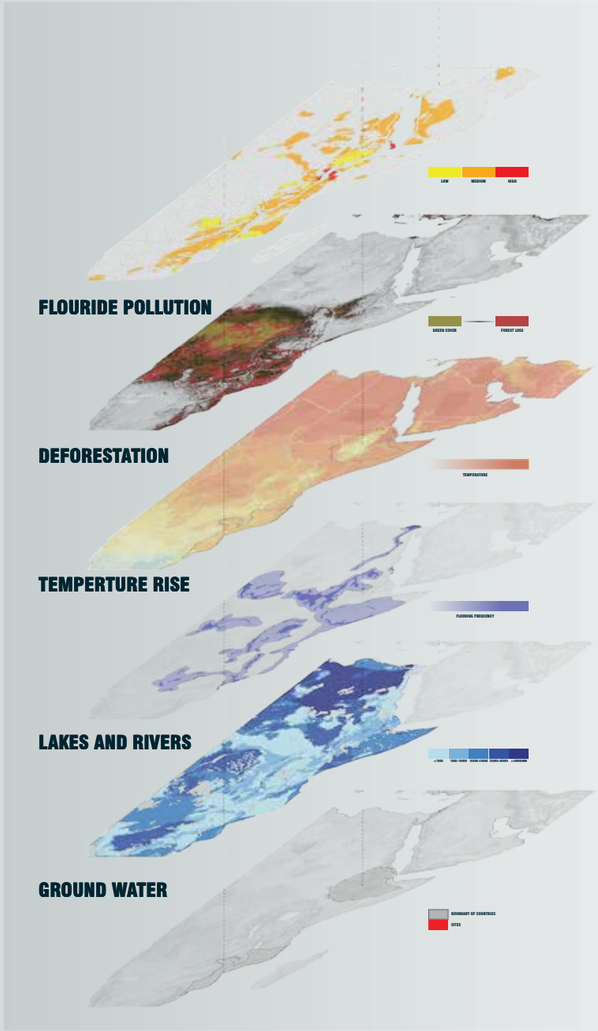
The rift valley formed about 25 million years ago establishing some of the most critical ecosystems in two continents. WE investigate urbanization and climate challenges in three cities along a global transect that is marked with fossil evidence of the beginning of human civilization, the Great Rift Valley.

TECTONIC PLATE MOVEMENT

Even as geologic forces were forming the earth's surfaces around the globe, other geologic forces were also pulling this surface apart, creating rifts. One of the locations of those forces is the Great Rift Valley, a tectonic line that is shearing, tearing, erupting, and collapsing, but also creating.







RIFT VALLEY ECOSYSTEMS

Climate change continues to threaten the Green-Blue Network with temperature rise, flooding, cyclonic weather, drought, and ecosystem loss are some of the outcomes observed across the Rift. We investigate this green-blue network through the analysis of the migratory path of the white stork along The Rift Valley. This lens helps us analyze the habitat loss and human-induced evolution and the direct impacts of climate change and how they vary from across the Rift.

The migratory birds' species inform the health of the ecosystems and are observable indicators to measure climate change. If the continued destruction of these habitats occur, many of these species will cease to exist and inadvertently amplify the negative impacts of human activity on these systems. To mitigate these challenges, we further zoom into the different sites showcasing the habitats and ecosystems of the green-blue network and the threats to these systems, concluding with adaptive scenarios.

DAMS ALONG THE NILE

COASTAL EROSION

KEY

GEOLOGY

- Kurkar Sandstone formations
- Coast Reduction 1987-2014
- Cliff Formation
- River Channels

INFRASTRUCTURE

- Marine Reserves
- Desalination Restricted Area
- Anchorages
- Petroleum Gas Wells
- Proposed Communication Pipeline
- Existing Gas Pipeline
- Roads

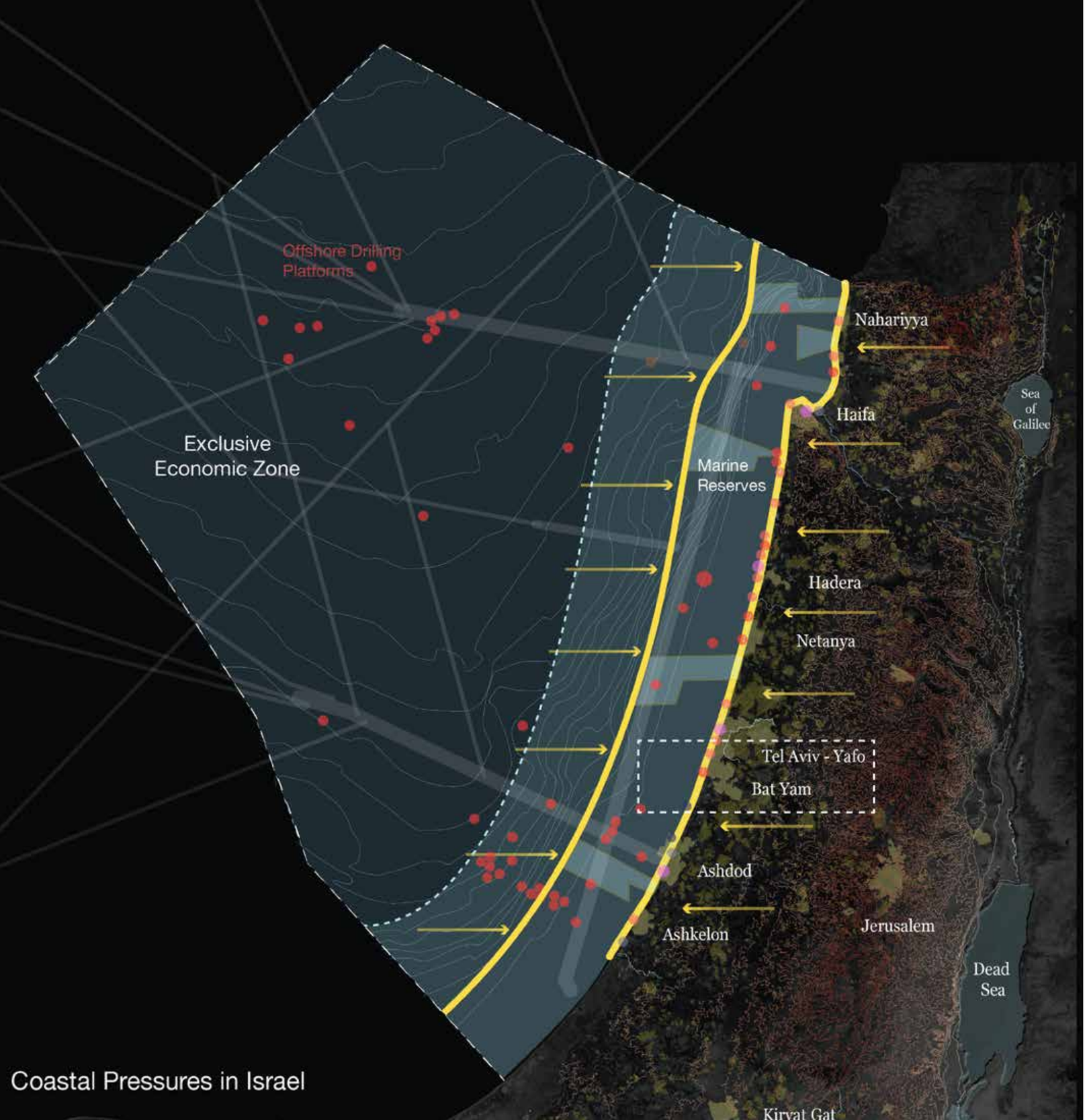
SOCIAL

- Public Beaches
- Public Parks

Tel Aviv

Jaffa

Bat Yam



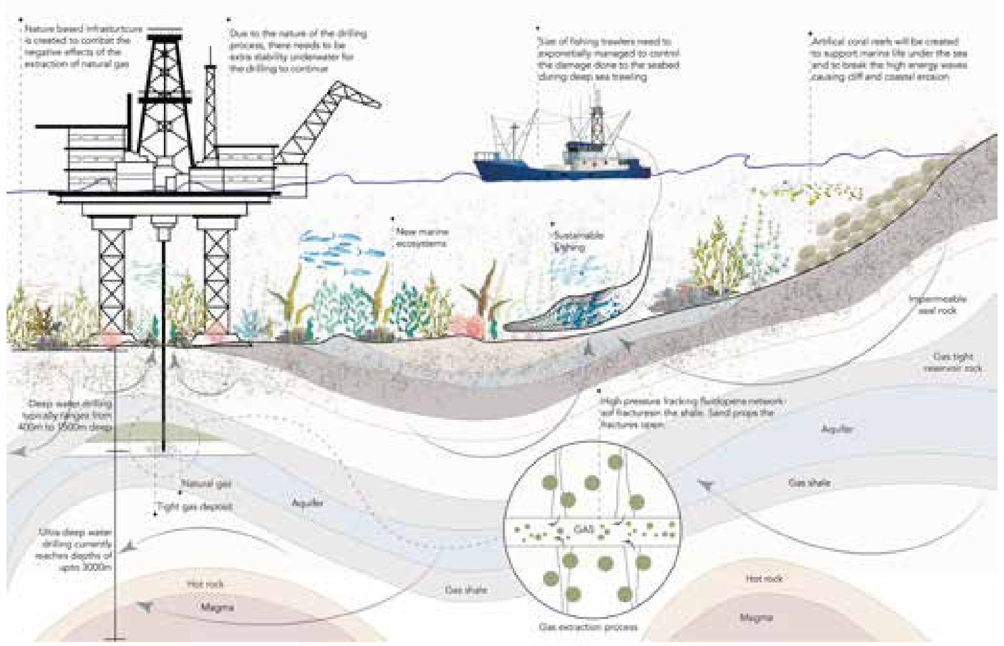
ISRAEL'S PRESSURES + THE COAST

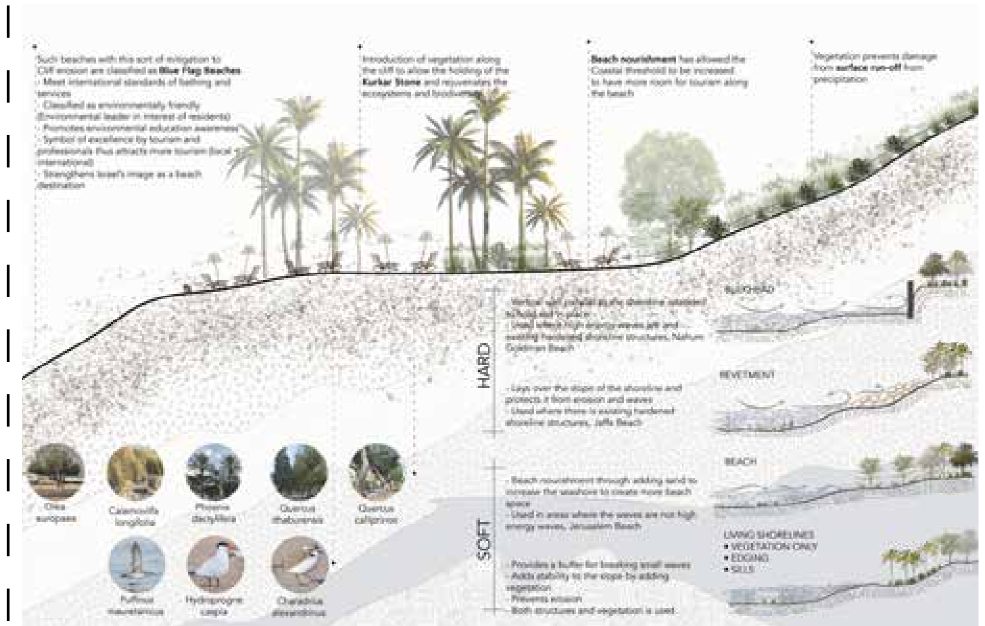
The continual damming of the Nile for hydroelectric power and water reservoirs, have led to the obstruction of sediment and nutrients toward the Mediterranean in the north, increasing erosion along the coastal front of Israel and Lebanon.

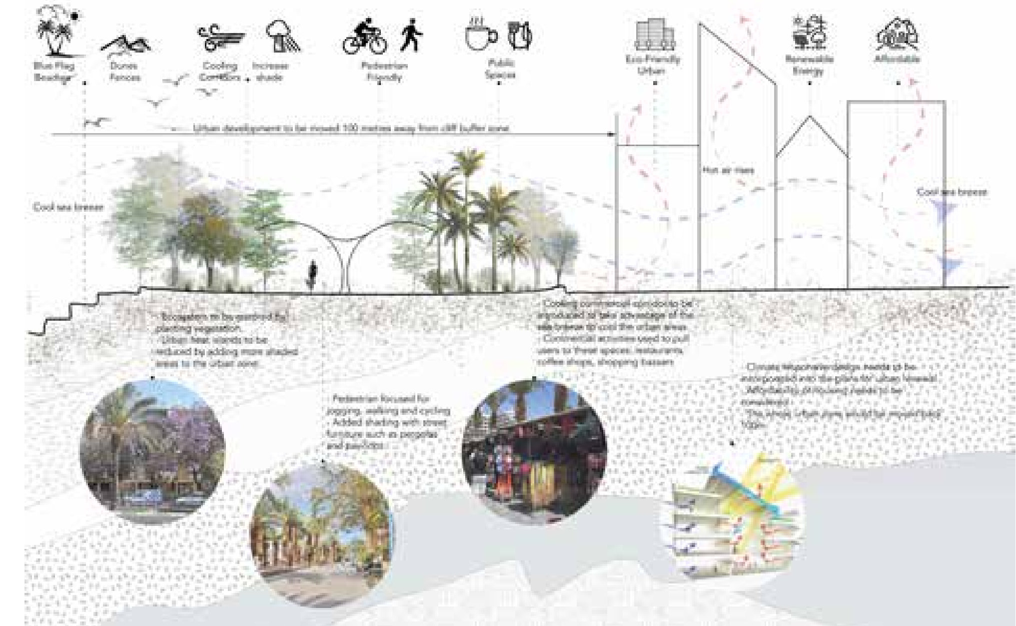
The recent discovery of one of the world's largest offshore natural gas reserve sin the Exclusive Economic Zone of Israel has led to a huge dependency on fossil fuels and the country is no longer looking to invest in renewable energy sources. While this would be enough to provide the country with energy for the next 40 years, the impacts of the offshore drilling platforms are felt in the sea as well as the coastal threshold that is already damaged.

The shoreline as already receded back enormously over the past years and the Kurkar stone found along the coast, is soft and brittle adding the risk of the cliffs collapsing due to man-made interventions.

The rapid urbanization and increased population of Israel has allowed for several construction of permanent structures that add pressure to this zone. Additionally, the inappropriately designed buildings for this particular climate, fail to take advantage of the several hot months to generate energy.





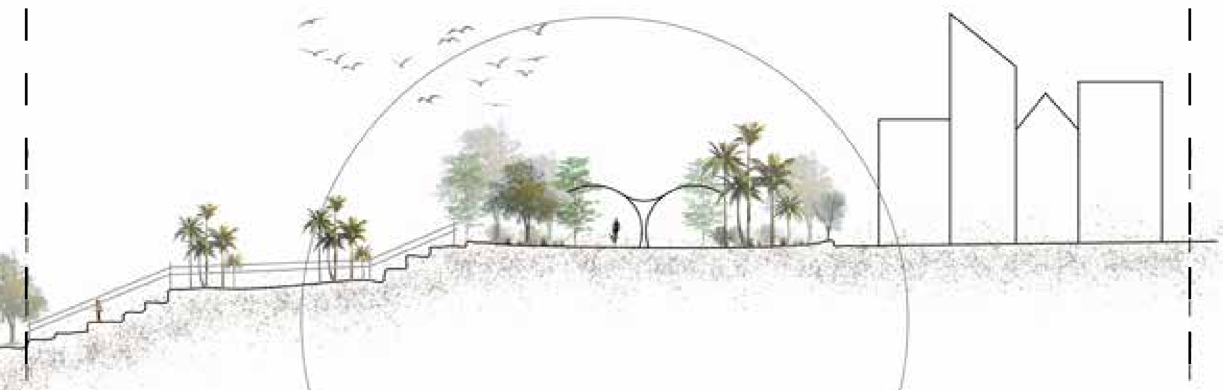


MARINE RESTORATION

- ~ Different marine life in different depths of the sea
- ~ Protect marine life through new ecosystems
- ~ Creation of new ecosystems using nature based infrastructure
- ~ Regulate drilling times
- ~ Reduce noise pollution
- ~ Creation of new energy using tidal energy

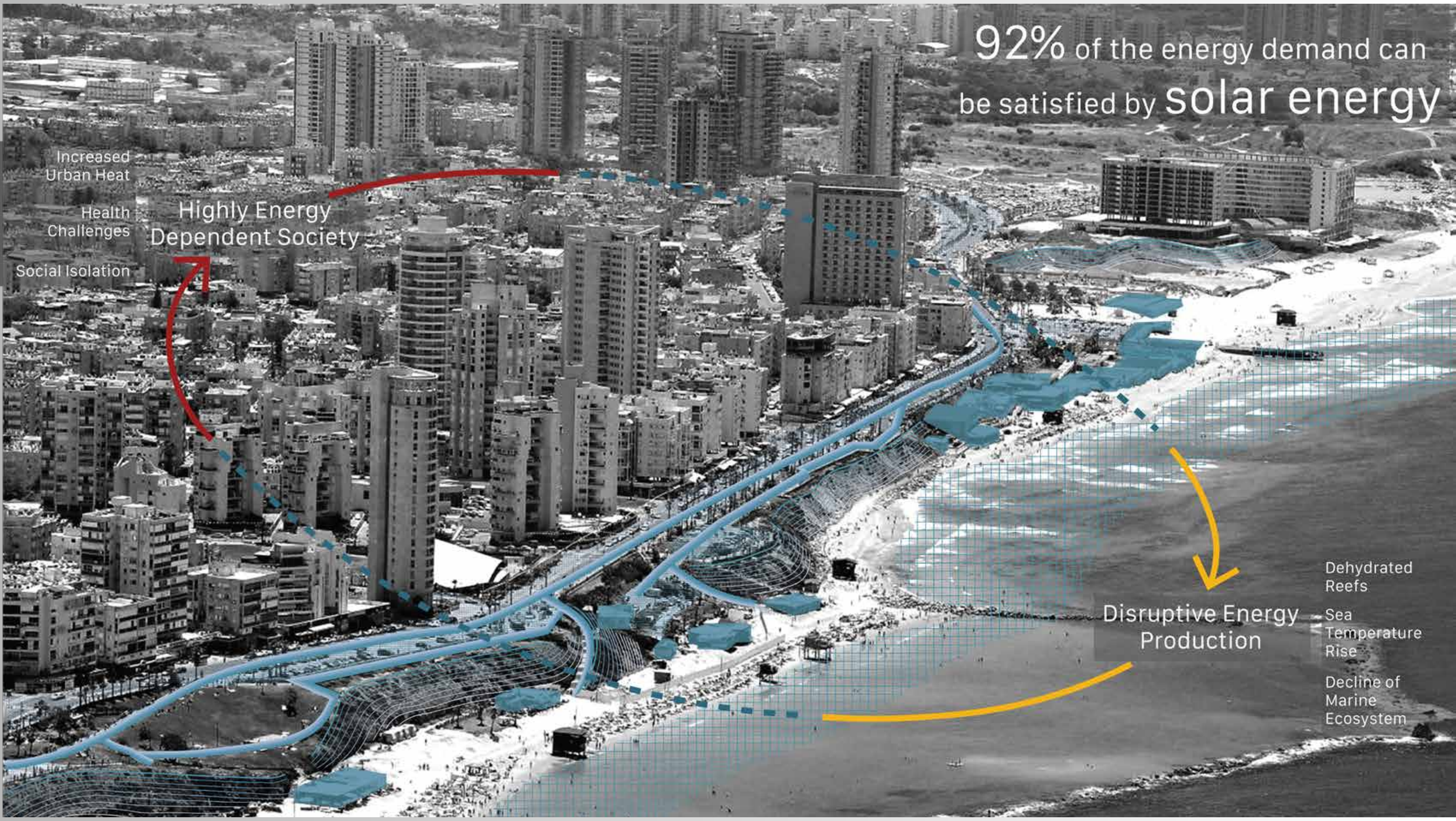
COASTAL THRESHOLD RESTORATION

- ~ Beach nourishment to create larger beaches
- ~ Protection of the coastal threshold
- ~ Protection from cliff erosion
- ~ Improve infrastructure that prcmotes cliff restoration
- ~ Soft + green typologies used for restoration and protection
- ~ Improve biodiversity
- ~ Grow more vegetation



CLIFF BUFFER ZONE/ URBAN

- ~ Push all infrastructure away from the 100m riparian reserve
- ~ Grow more vegetation to stabilize the soil
- ~ Improve diversity for species, migratory birds
- ~ Prioritizing the pedestrian
- ~ Increase of open spaces - coastline considered open space
- ~ Reduce surface run off that is the major cause of cliff erosion
- ~ Promote local tourism to increase local economy
- ~ Push tourism not only to the coast but toward the metropolitan areas
- ~ Regulate population living along the coastal threshold
- ~ Proper drainage to reduce pollution


92% of the energy demand can be satisfied by solar energy
Increased Urban Heat
Health Challenges
Social Isolation
Highly Energy Dependent Society
Disruptive Energy Production
Dehydrated Reefs
Sea Temperature Rise
Decline of Marine Ecosystem

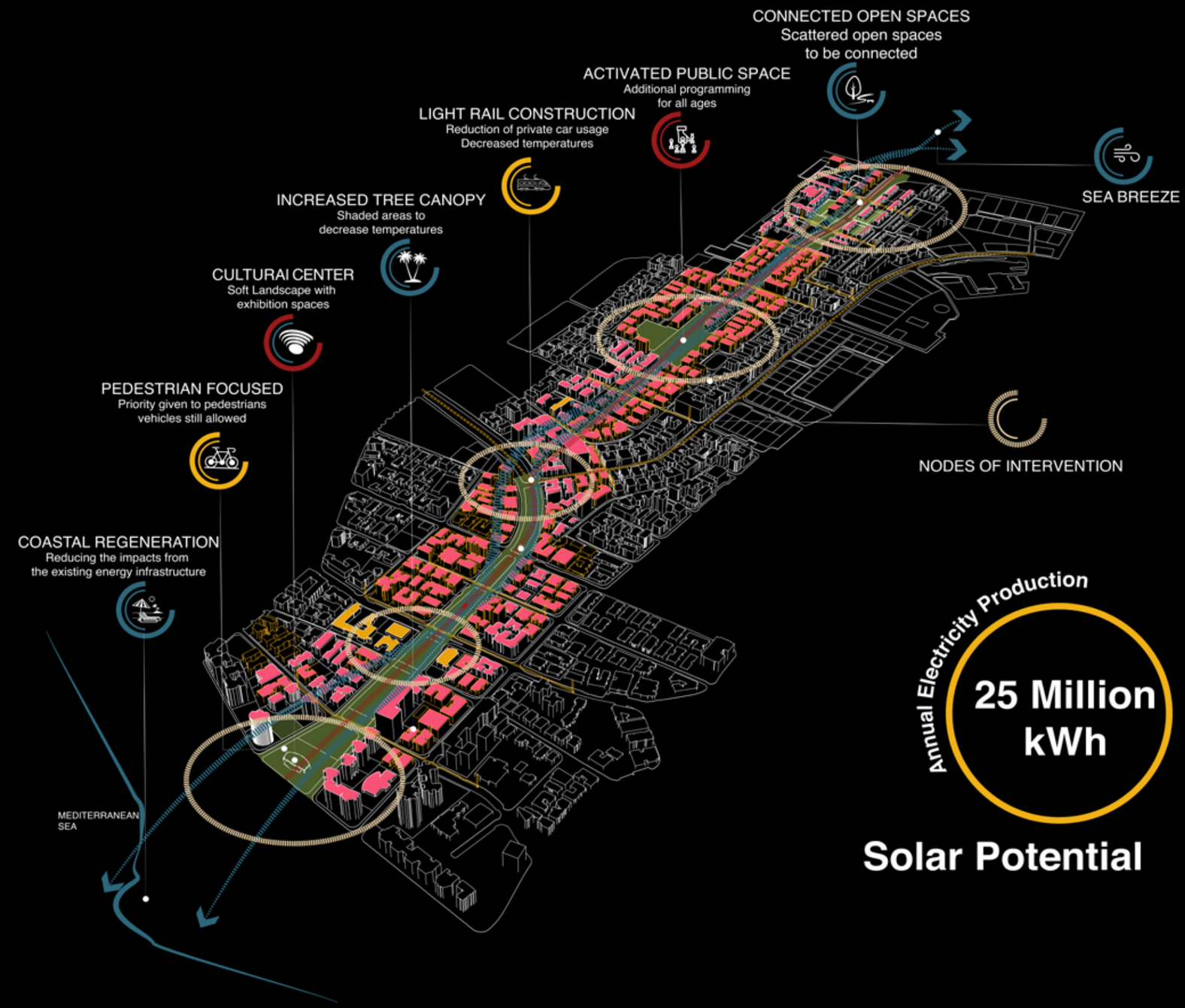
MICROGRID
Public space - Local energy generation and storage network

PUBLIC PROGRAMMING
Energy generation

SOCIAL INFRASTRUCTURE
Placemaking
Raising awareness

GREEN + ENERGY EFFICIENT NEIGHBORHOOD
Sustainable retrofitting

CLIMATE RESPONSIVE DESIGN
Retrofiting existing structures to use solar energy



Annual Electricity Production

25 Million kWh

Solar Potential

LEGEND

- Energy
- Social
- Landscap

DAMAGED SHORES ALONG ISRAEL COAST

REACTIVATION OF BAT YAM BEACH

COASTAL PROTECTION + TIDAL ENERGY

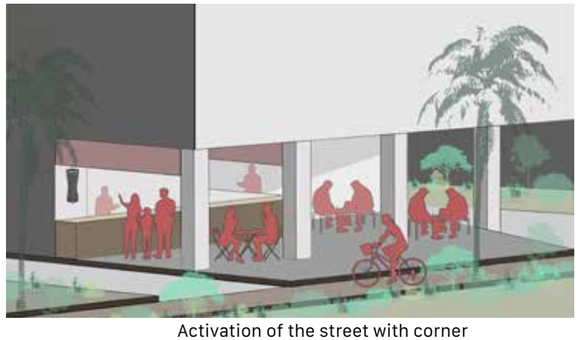
The proposed boardwalk extensions into the water are built on nature based infrastructure reefs that are designed by altering the existing breakwaters. This is an opportunity to demonstrate new technology of energy generation using tidal momentum. The purpose of this is to generate energy while slowing down the speed of the waves hitting the coast.

The cliff will be de-concertized and vegetated, creating a softer gradient from the city to the Mediterranean Sea. Lighter boardwalk structures are proposed on the beach to reactivate the coast using a different approach from what is there now. The displaced commercial programming will be incorporated in a way that has little to no impact on the environment. We promote this sustainable way.

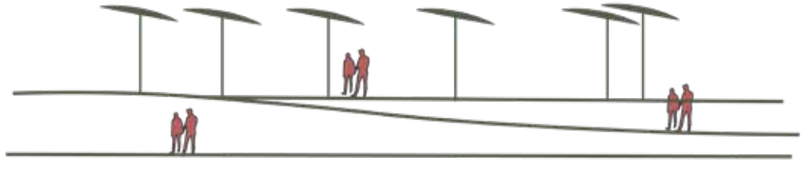
Taking into consideration the daily and seasonal variations in the tide, we have pocket beaches that include temporary programming.

BOARD-WALK SECTION

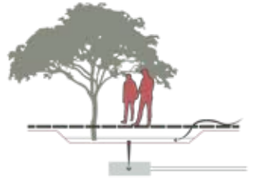
Independence Boulevard
Ecology + Social + Energy



Activation of the street with corner
green grocers and gaming points



Cultural center elements



Bioswale detail

PHOTOVOLTAIC ROOF GARDEN

COOLING COMMERCIAL CORRIDOR

CLIMATE RESPONSIVE ARCHITECTURE + BATTERY MODULE

MARICULTURE, TIDAL ENERGY GENERATION +
NATURE BASED INFRASTRUCTURE

BAT YAM BIENNIAL AT THE CULTURAL CENTER

COASTAL THRESHOLD REGENERATION +
SUSTAINABLE PROGRAMMING

NEW INDEPENDENCE BOULEVARD NIGHT
MARKET

IMPLEMENTATION PLAN

This phasing and stakeholders diagram builds off the timeline of Bat Yam municipality's urban renewal plan and the urgency of climate change. We collaborate with Bat Yam municipality to develop policies to protect the marine ecosystem and start transitioning towards solar energy.

In the next 5-10 years, these policies will spearhead our project into the implementation stage with the Israeli Electric Corporation which deals with energy infrastructure in Israel and Bat Yam Municipality who can aid in the activation of public spaces.

In 50 years, once the energy landscape is established, we engage building science professionals and initiate public private partnerships for the operations and maintenance of the project to ensure continued sustainability.

Come 100 years, we foresee this pilot project's growth in Israel.