

QI<sup>TM</sup>



## Biochar for Hedge Fund Managers

**Albert Bates**

*Chief Permaculture Officer, eCO2*



download at: [thegreatchange.com/gcdownloads/](http://thegreatchange.com/gcdownloads/)

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# COP 21

Paris

December, 2015

*“this changes everything”*

TRILLIONIZATION

\$

eCO<sub>2</sub>

Cool. Design



# Climate Farming's Suite of Tools

Biochar

Keyline Design & Management

Soil Remineralization

Holistic Pasture Management (Mob Grazing)

Compost Tea

Aerobic Composting

Integrated Aquaponics and Waste Remediation

Animal Drawn Organic No-Till

EcoAgroforestry & Edible Landscaping

“Permafuels” for transportation, heating and cooling

Permaculture Design

# Permaculture

## A Biochar Cascade

2010-2015

Adding  
complexity to  
multiply yields

**Albert Bates**  
Global Village Institute  
for Appropriate Technology



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Water Treatment

Silage Conditioner

Digestive Supplement

Litter Amendment

Manure Conditioner

Soil Amendment

Carbon Sequestration

Cool  
Energy

Cool  
Feeds

Cool  
Fertilizer

Cool  
Food

Cool  
Planet

# Permaculture

## A Biochar Cascade

2016

Adding complexity to multiply yields



**Albert Bates**  
Global Village Institute  
for Appropriate Technology



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Nutrient-dense Organic N-fix Biomass Crop  
Baby Formula Aquaponics  
Gas Fractions Leaf Protein from Residue  
Electricity Gas & Fractions from Pyrolysis  
Heating & Cooling Biofertilizers & Nutraceuticals  
Organic Finance Potable and Mineral Water  
Ecological Restoration Runoff Conditioner  
Human & Animal Probiotics Silage Conditioner  
Green, Social, Fair Trade Funds Digestive Supplement  
eCO2OL Seal Products Litter Amendment  
eCO2OL Seal Real Estate Manure Conditioner  
Plasters, Insulation, Roof Media Geotextiles  
Soaps, Shampoos & Scrubs Wallboard  
Fuel Cell Cathodes Carbon Sequestration



# Permaculture

## A Biochar Cascade

2017

Adding  
complexity to  
multiply yield



**Albert Bates**  
Global Village Institute  
for Appropriate Techno.



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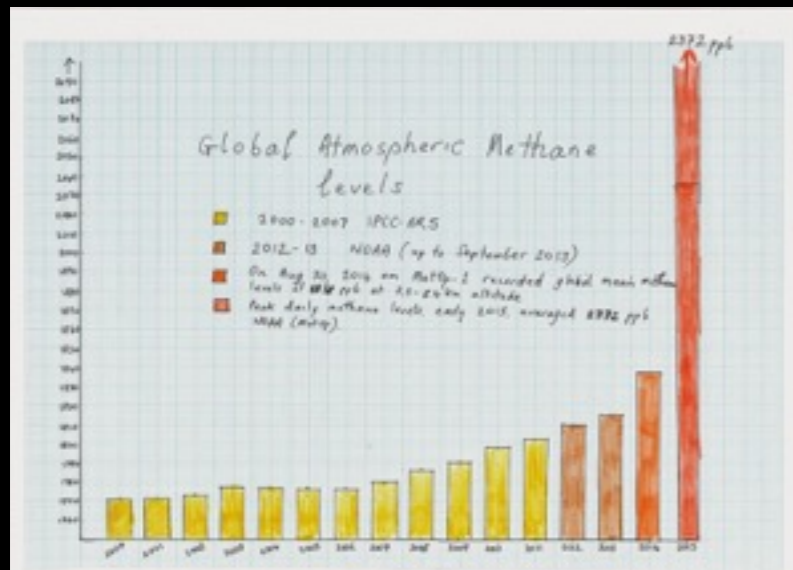


# Social Permaculture

- Personal relationships are capable of design
- The built environment has psychic effects
- We all have similar but different needs
- Good design fosters diversity and autonomy within a mutually supportive community

# Ecovillage Suite of Tools

Three Legged Stool  
Village Scale Design & Master Planning  
Social Permaculture  
Holistic Management  
Sociocracy  
Conflict Transformation  
Historical and Cultural Preservation  
Financial Permaculture  
Ecological Restoration and Regeneration



"Leverage points" are those points at which a relatively small amount of effort can bring about a large change in a system's functioning.

- ***The Law of the Few*** — some people spread disease (and ideas) better than others.
- ***The Stickiness Factor*** — the potency of viruses (or ideas and actions) can become universal. Ideas and actions to reverse climate change need to continue evolving and draw in people from around the world. The greater context of our climate dilemma suggests that if a favorable human tipping point is to occur, it needs to be able to cross cultures, genders, age groups, and races. It will need to be sticky across all those differences.
- ***The Power of Context*** — the conditions under which the change is considered tend to either reinforce the change or thwart its spread. *Commitment is not enough. The committed have to act, and share their commitment with others.*



Malcolm Gladwell



# COOLNESS

YOU MAY BE COOL... BUT YOU'LL NEVER BE SPOCK-LEANING-ON-A-  
RIVIERA-COOL

# Intended Markets

- Industrial Agriculture
- Waste Management
- Municipal Water Treatment
- Land & Water Remediation
- Forestry
- Electrical Utilities
- Industrial Process Heat
- Chemical Industry
- Pharmaceuticals
- Electronics

# Present Communities of Interest

- Permaculture Designers
- Landscape Architects
- Bioregionalists & Regional Planners
- Food/Water Security Activists
- Eco-Communities
- Ecological Restorationists
- Organic Farmers & Gardeners
- Transition Towns
- Natural Builders
- Yoga

**Cultural Creatives**

**Rolling Stone**

**SHAKIRA.**







# BONDS CAY

ZERO CONSERVATION CONCEPT

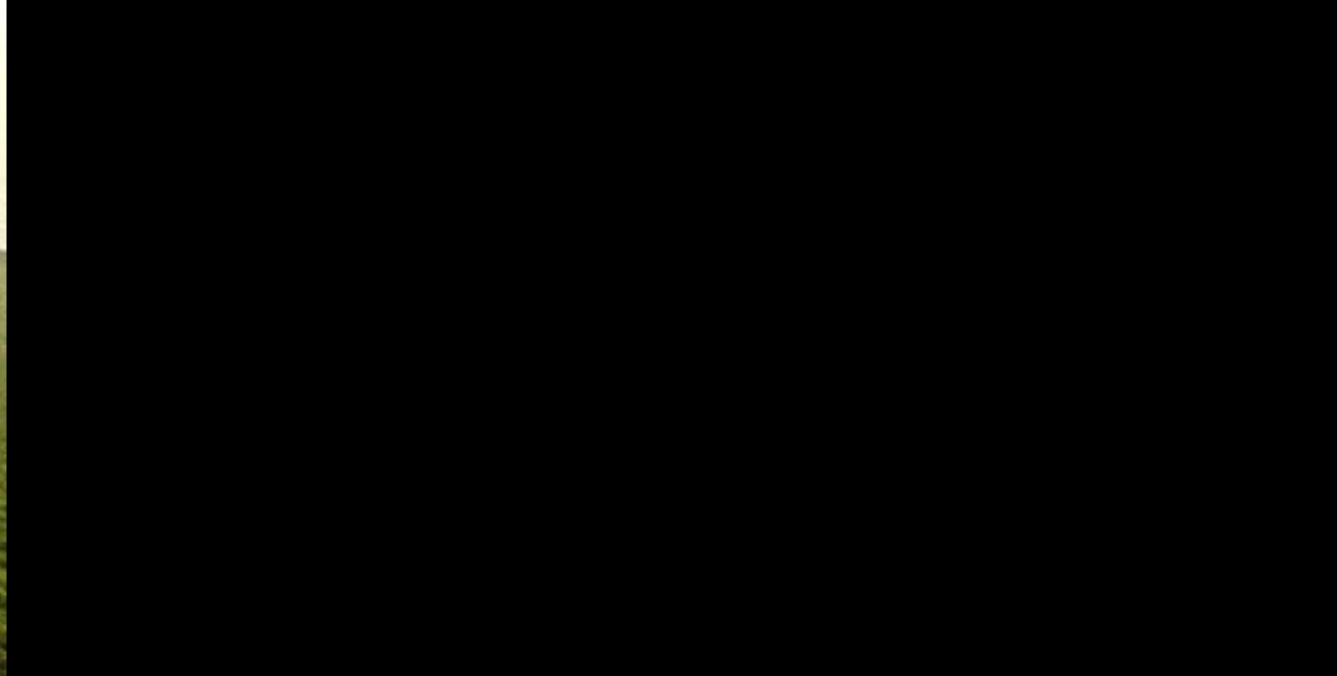


## BONDS CAY

CONSERVATION CONCEPT

**65 LOTS, MEDIUM DISTURBANCE**  
OFFSETS FOR AGRICULTURE, RECREATION AND WILDLIFE,  
CLUSTERED HOUSING AROUND MARINA AND SOUTH VILLAGE.





CLUSTERED HOUSING AROUND MARINA — 65 UNITS





# BONDS CAY

MACMANSION CONCEPT

Alejandro Sanz

Penelope Cruz

James  
Ridinger

Trevor  
Potheary

Kittredge Family

Todd Morley

J. Ball

Antonio & Shakira

Brad Pitt

Roger Waters

Javier Bardem

# INVESTMENT OPPORTUNITY AND EXPECTED PERFORMANCE RANGE

4 investors @ \$4.0mm each, entitles to each:

- *10% equity ownership;*
- *3 Premium lots*

Expected IRR: >45%

Present Value of \$4.0mm Investment @ 35% rate: \$5.7mm

ROI: 3x – 5x

Payback Period: Less than 2 years

# PERMACULTURE PRELIMINARY PROJECT EVALUATION FOR BONDS CAY

*"Earth turns to gold in the hands of the wise"*

— Rumi

**Global Village Institute**  
**for appropriate technology**  
The Farm, Summertown, Tennessee, USA  
Project Leader: Albert Bates

***Permaculture team***

Leader: Julio C. Gázquez  
Albert Bates  
Cliff Davis  
Maria Martinez Ros  
Anders Nyquist

***Appropriate technology team***

Leader: Jim Fournier  
Tom Zeller  
Jeff Clearwater  
Santiago Obarrio  
Frank Michael  
Jason Deptula

***Village design team***

Leader: Albert Bates  
Greg Ramsey  
Karin Nyquist  
Sybilla Sorondo  
Kevin M. O'Connor

***Home design team***

Leader: Aureliano delNegro  
Ruth Otgar  
Manuel Villanueva  
Carlos Higinio Esteban Crespo  
Bruce McDaniel

***Further assistance from:***

Richard Heinberg  
Gunter Pauli  
Rhamis Kent  
Vinay Gupta  
Kevin Guenther  
and many others

**Restricted use: No circulation of  
this report without express  
permission of GVI**

# RENEWABLE ENERGY SOURCES



**Solar** – Abundant, Reliable, Distributed, Easily Harvested  
340 d/yr, 1400 kWh/yr-kW, Mature Tech, Prices Dropped

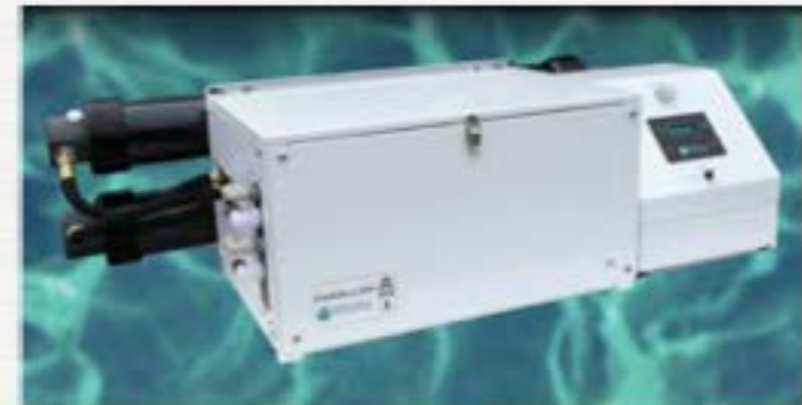
**Wind** – Abundant, Distributed, Winter Peak, 5.7 m/s ave.  
2400 kWh/yr-kW. Issues – Seasonal – High Maintenance,  
Noise, Siting/Distance – Hurricane Protection – Insurance

**Ocean** – OC not practical at Bond's scale, Wave – NREFT

**Biomass** – Sustainable carbon-neutral options on Bond's will  
require long term permaculture solutions. Bamboo, Biochar

# R/O WATER

- Spectra 2800F R/O unit powered by Solar PV
- Desalinization by Reverse Osmosis
- Max 10 cu meters/day = 1m gal/yr
- Daytime: 3 cu m/day = 1,000 cu m/yr
- Solar with no battery cycle: 1,000 gal/day = 365,000 gal/yr
- Capital cost is less than for Rainwater Storage in Poly Tanks
- Costs 10 to 100 times less than Air-to-Water technology
- Ocean-water well for source — deep well for salt discharge





# SPINE ROAD - porous compacted stone



## Select proposed technologies:

### Power Generation

- Solar panels
- Windmills

### Power storage

- Hydrogen
- Flying wheels

### Water Heating

- Geo-exchange technologies

### Water

- Individual reverse osmosis units powered by solar panels
- Air dehumidification

### Waste

- Chromoglass

# BOND'S CAY

island retreat research

LOCATION OPTION 'A'  
south island

- most beautiful site on the island
- construction established for future seaplane jetty for hotel
- access to diverse ecology

SEA PLANE JETTY

COMMUNAL FACILITIES

TENT ACCOMODATIONS

LOOP PATH

FUTURE MANGROVE RESTORATION



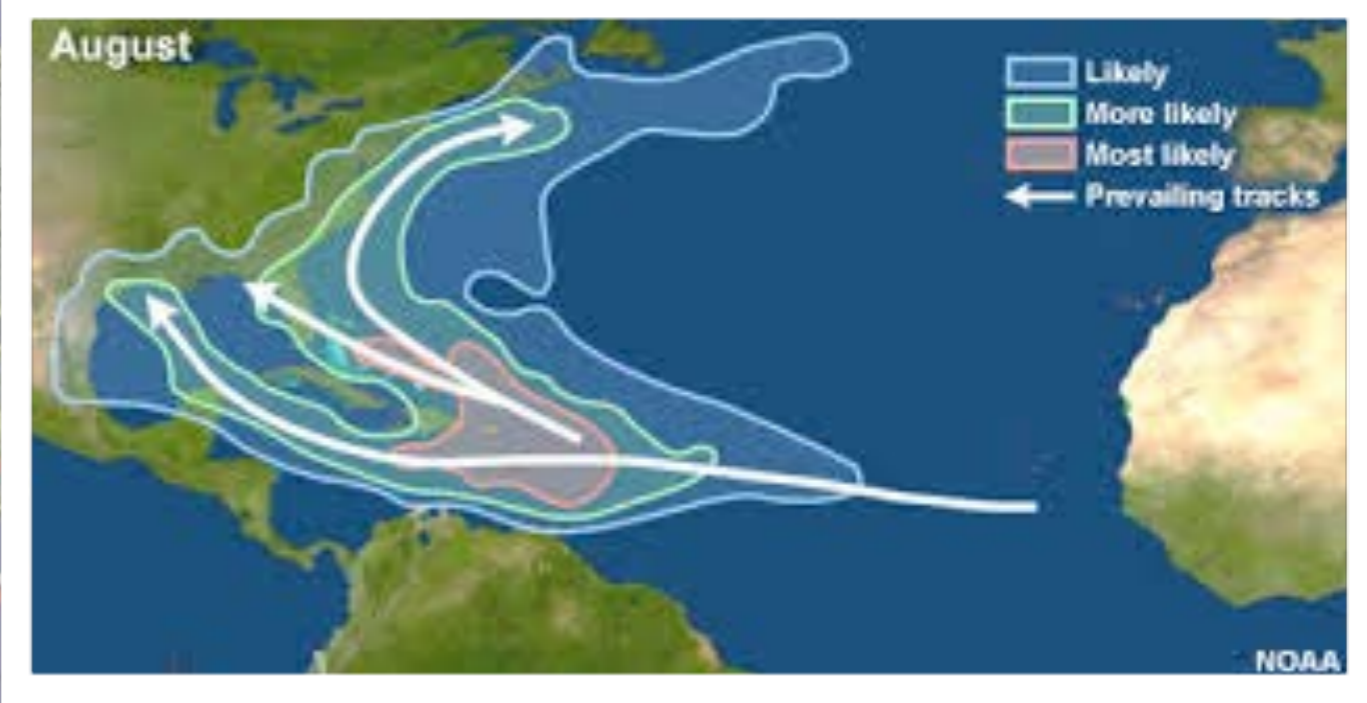
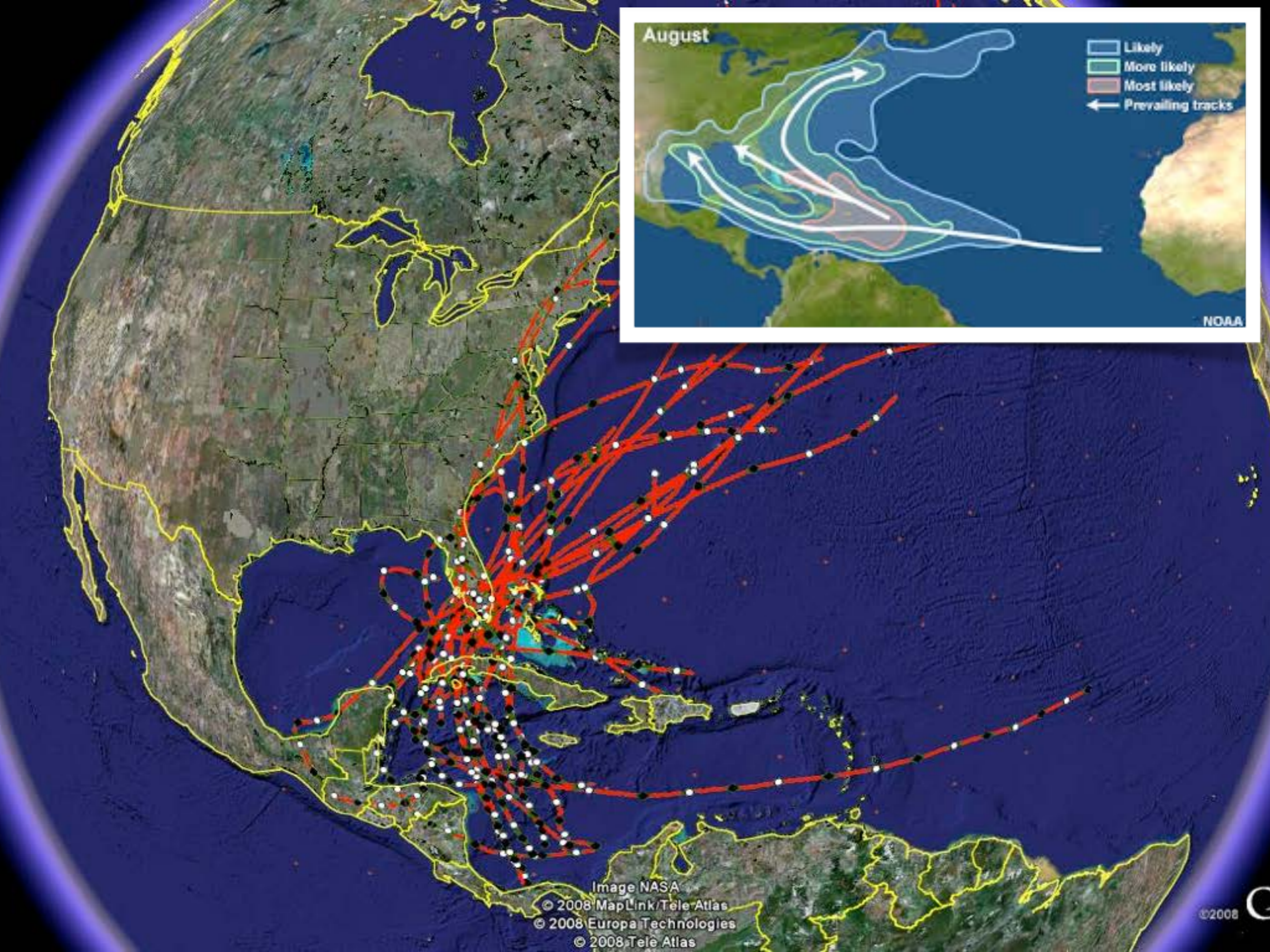
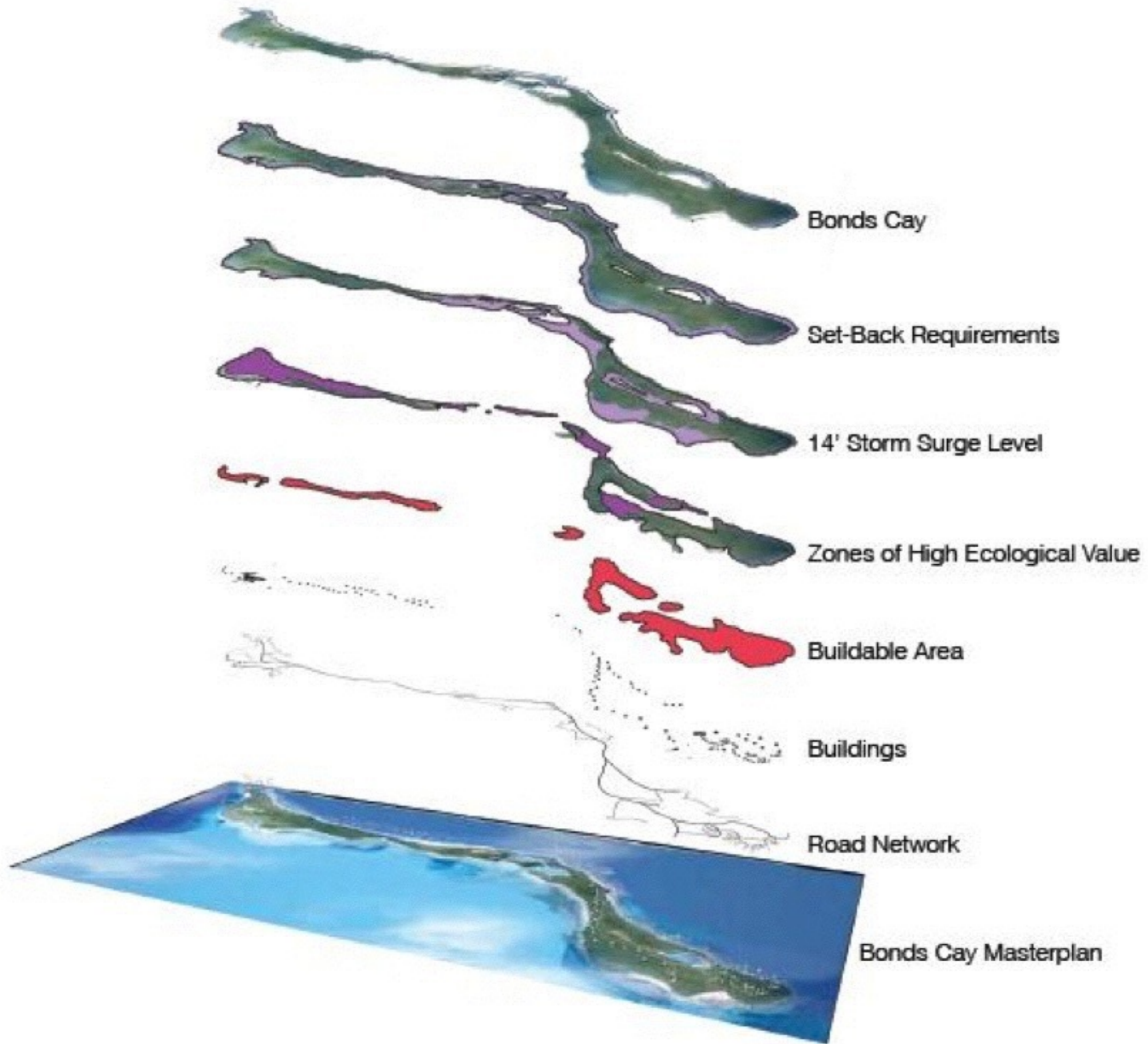
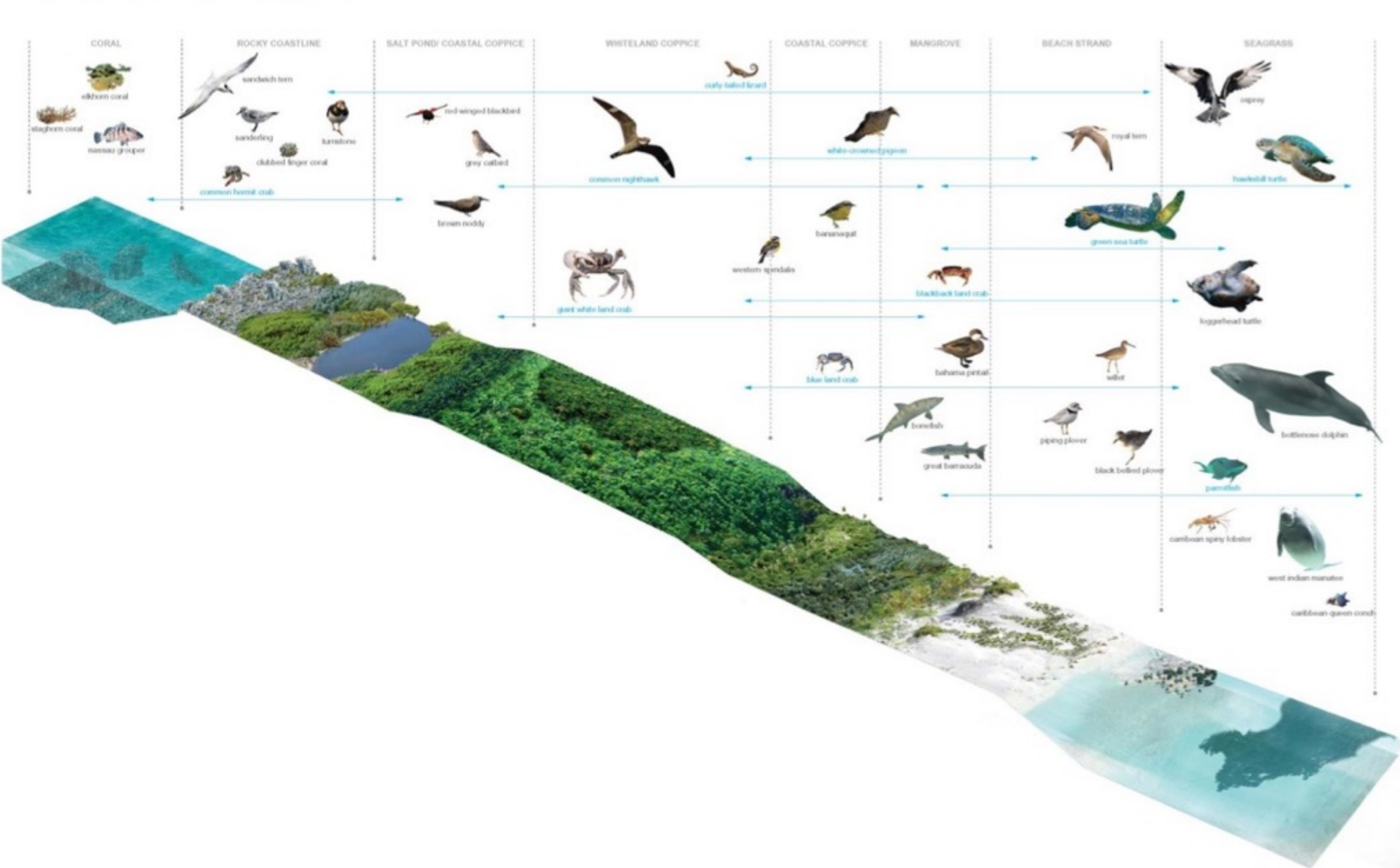


Image NASA  
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© 2008 Europa Technologies  
© 2008 Tele Atlas

©2008



# Ecosystems



# ethics of production

feedstocks from wastes  
waste heat recapture  
carbon sequestration  
ecologically beneficial  
social equity



# Sarvodaya

*Sri Lanka*

## 10 BASIC HUMAN NEEDS

- a clean and beautiful environment
- a clean and adequate supply of water
- basic clothing
- a balanced diet
- a simple house to live in
- basic health care
- simple communications facilities
- basic energy requirements
- well-rounded education, and
- cultural and spiritual sustenance



**El Valle**



# Carbon Negative Bioeconomy

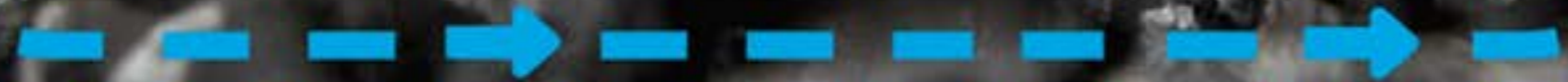
# BIOECO<sub>2</sub>NOMY

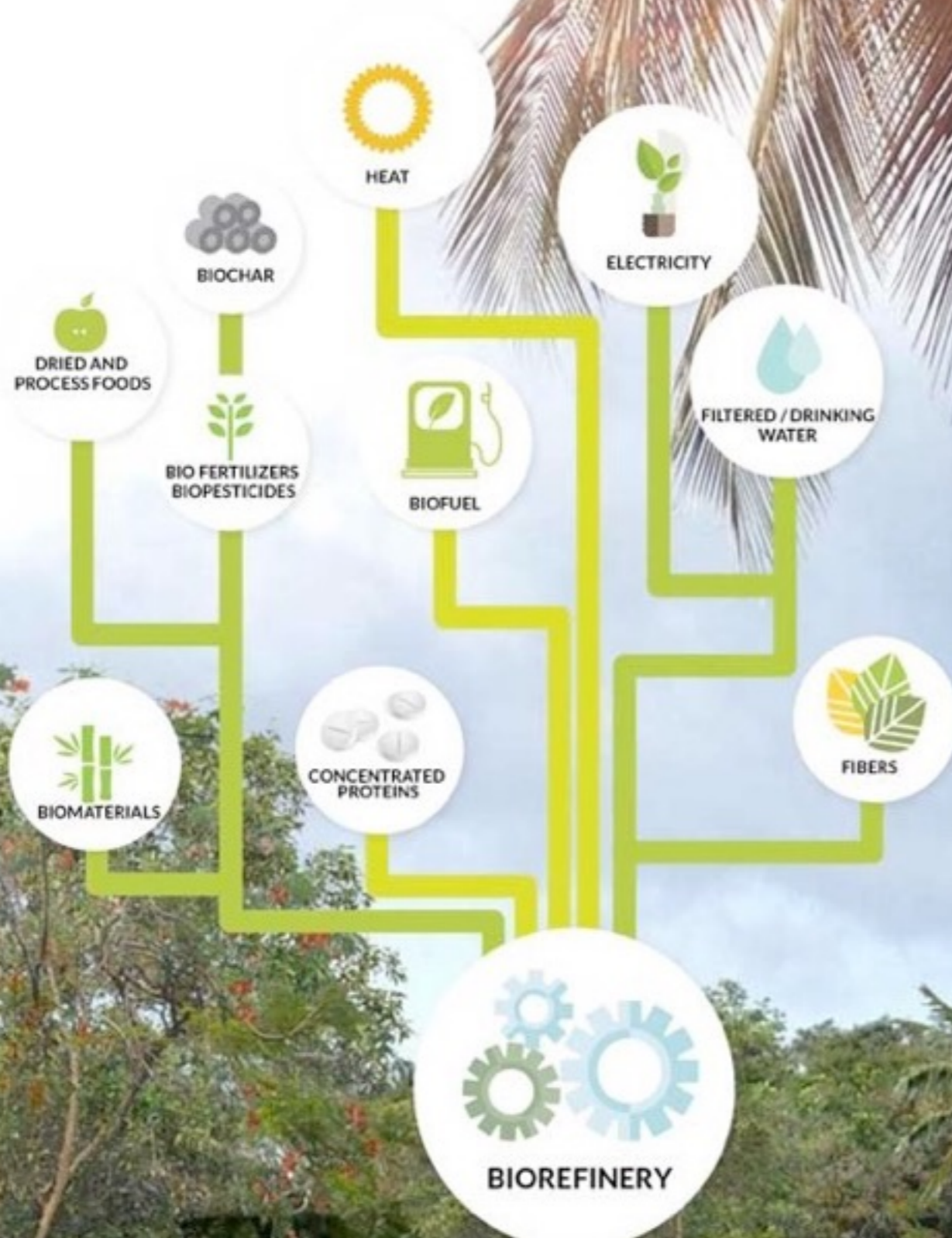
↑ \$ ↓ CO<sub>2</sub>



Biodiversified Crops

Composted Biochar





CO<sub>2</sub>OL Communities are regenerative by design. Unlike many short-sighted development models used around the world, we work with nature to provide off-grid, sustainable solutions to food, drinking water, waste treatment and energy needs.

# Bio<sub>2</sub>regional Impact



Create a top-quality primary medical care clinic

Build a world-class health spa and fine arts retreat center

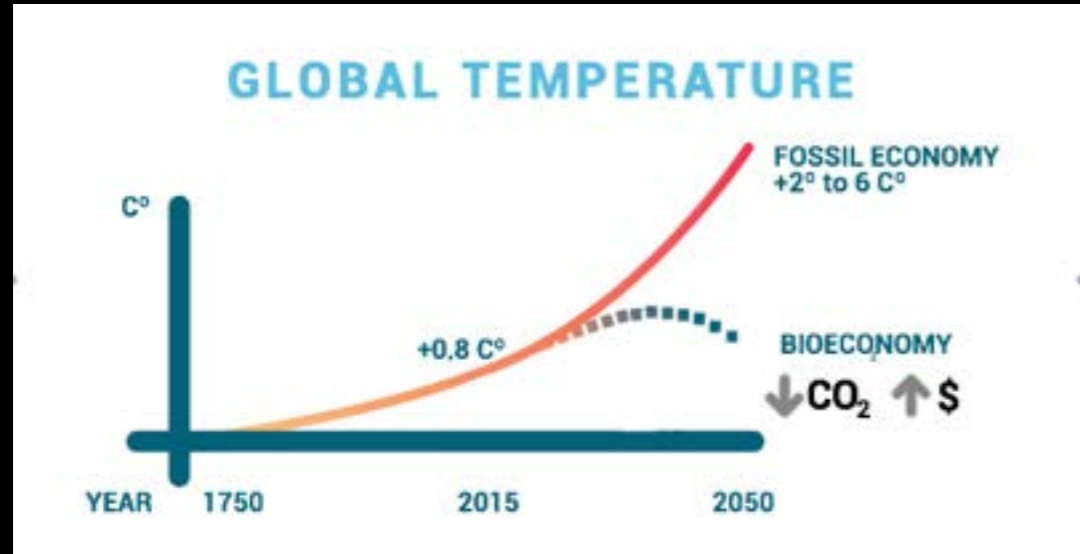
Stimulate local enterprise to full employment using a vocational training school and regenerative business incubator

Revolutionize local education systems to train future stewards and generate creative sparks for the nascent bio-economy

Grow the local economy while continuously reducing costs to residents.

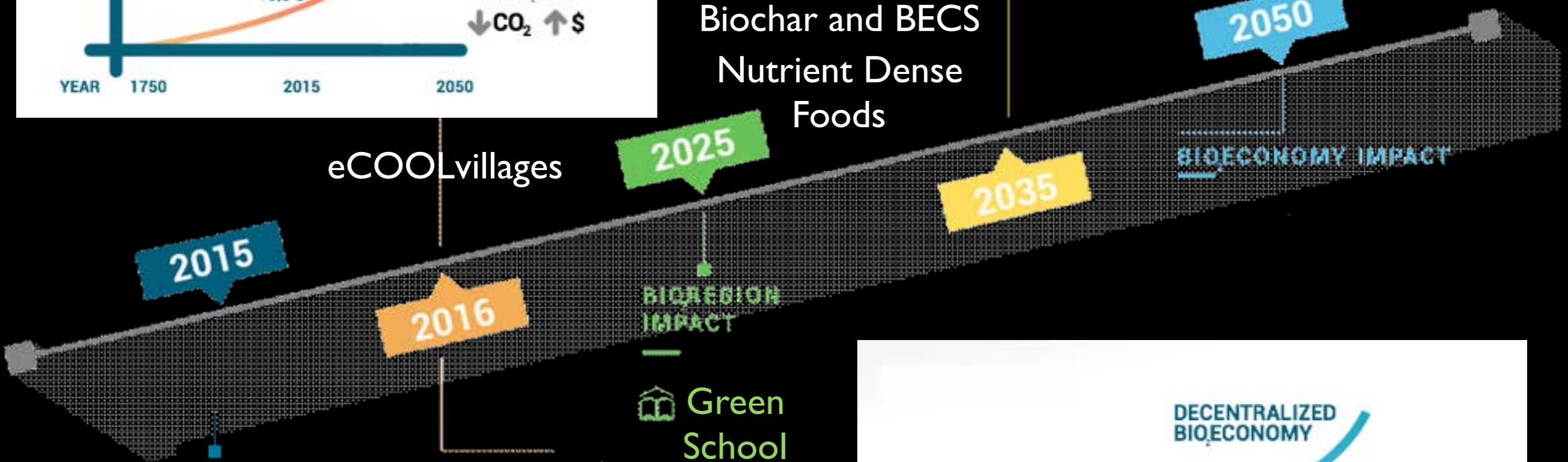
# eCO<sub>2</sub> VISION

## Going to Scale

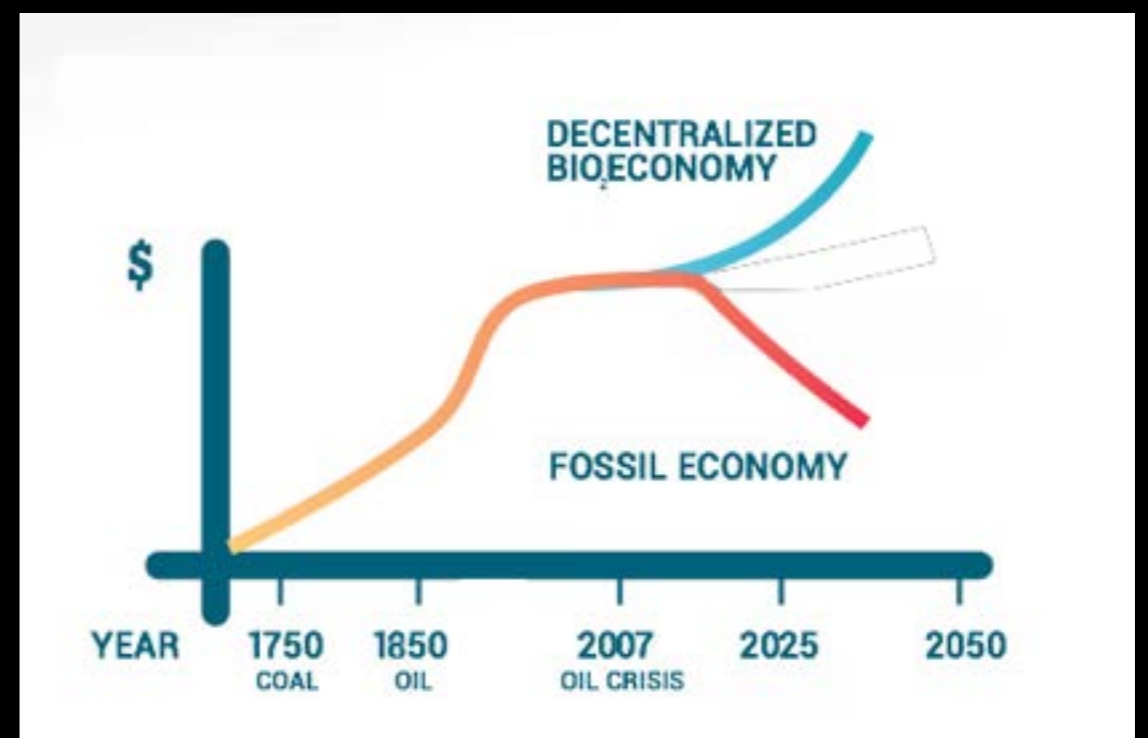


Biochar and BECS  
Nutrient Dense  
Foods

HARD WOOD  
REFORESTATION



ECO2 jobs



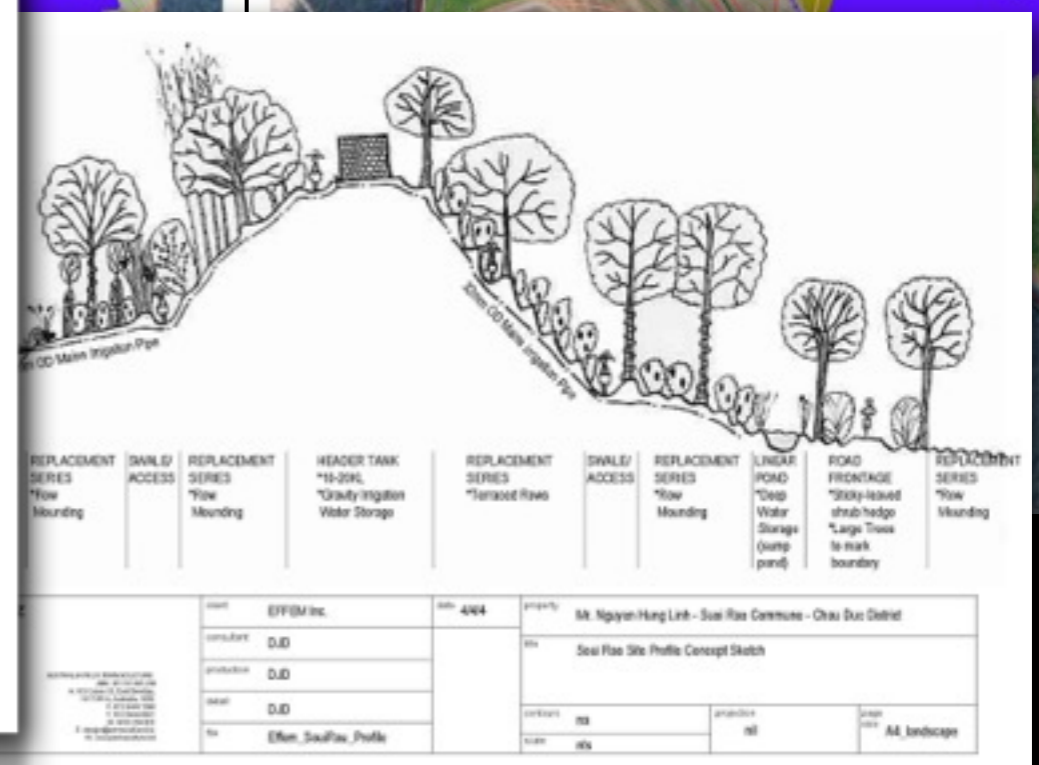
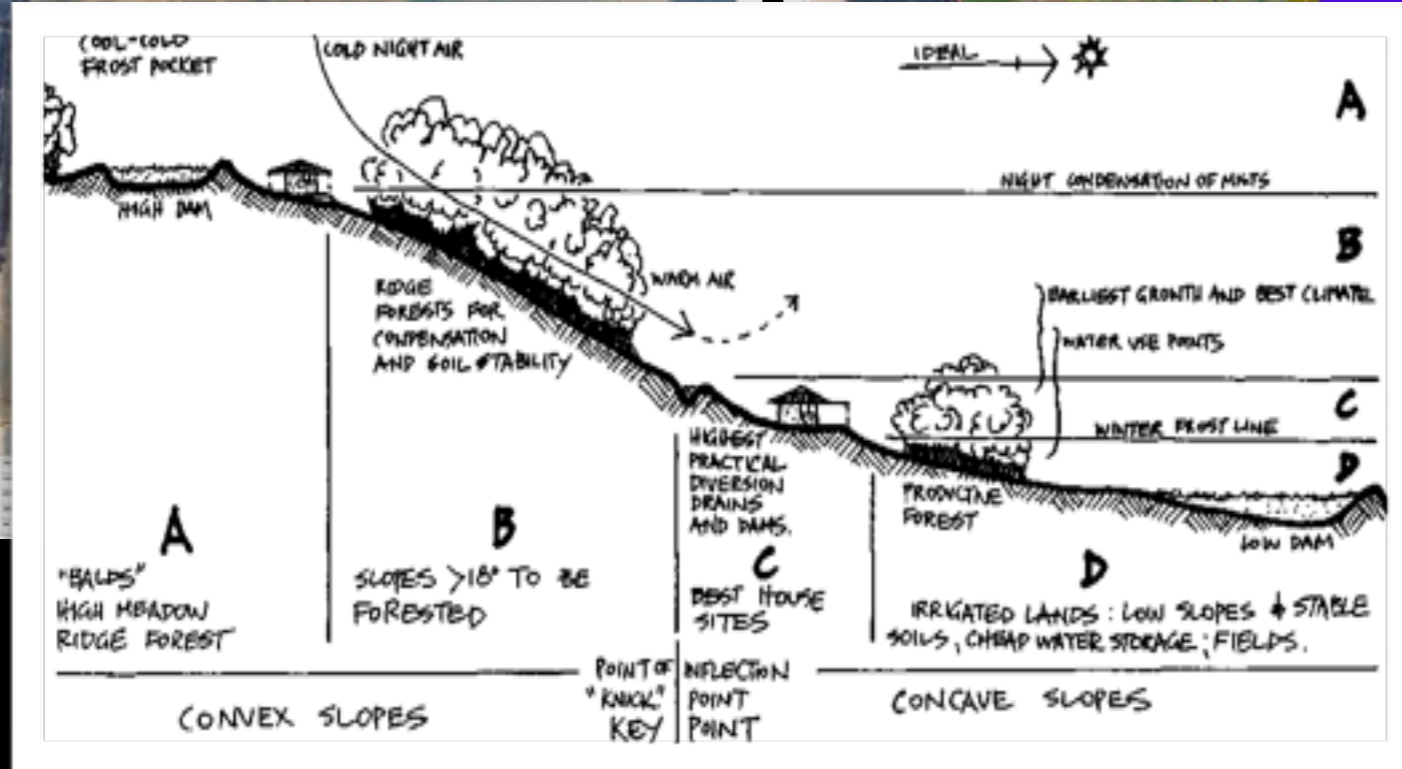
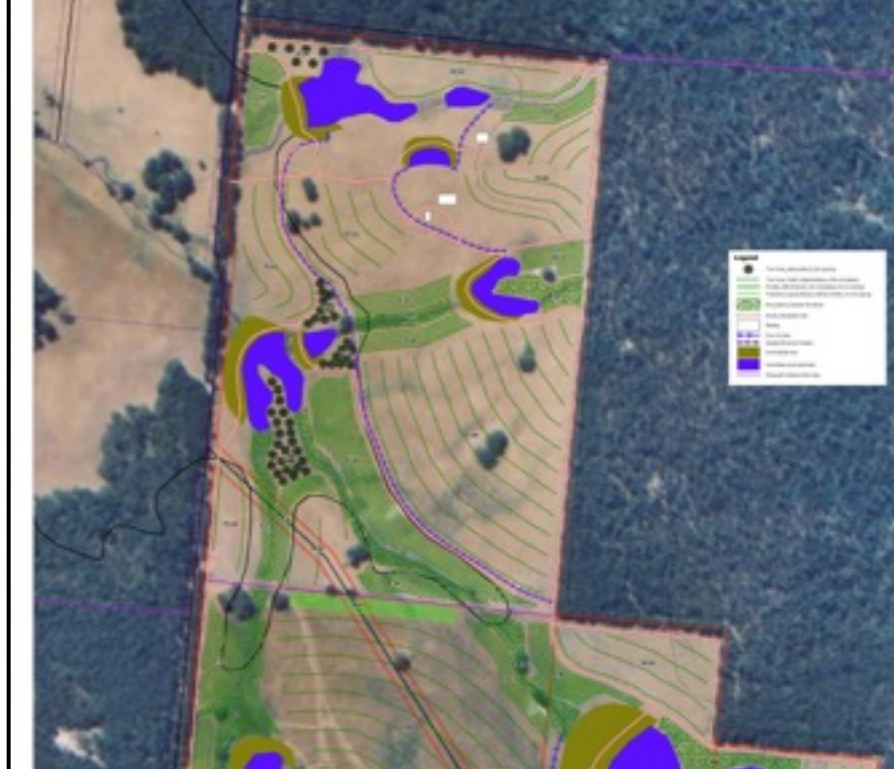
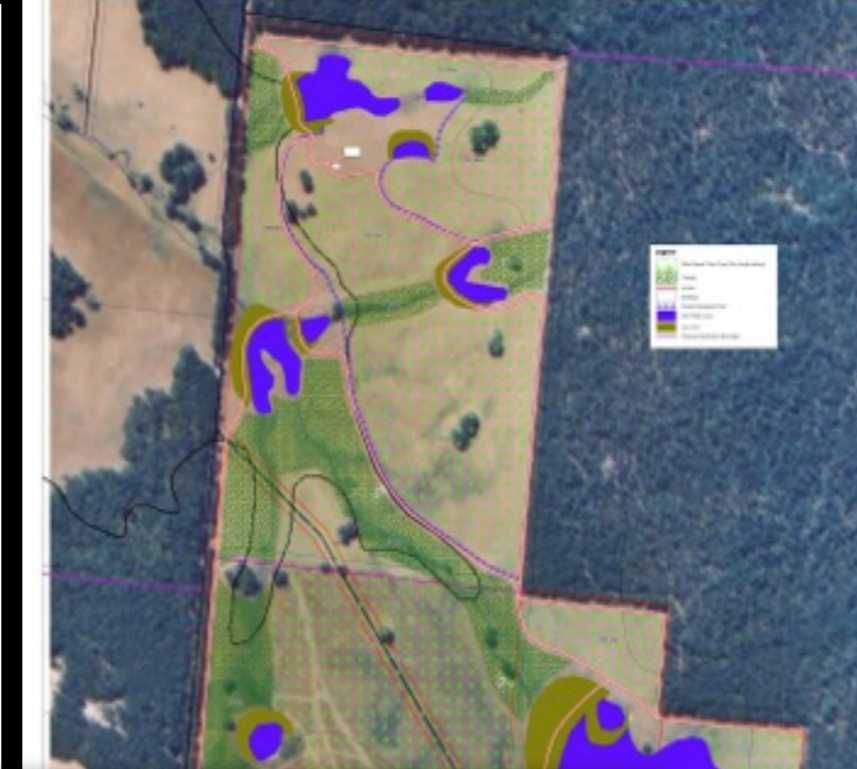
# Base Mapping



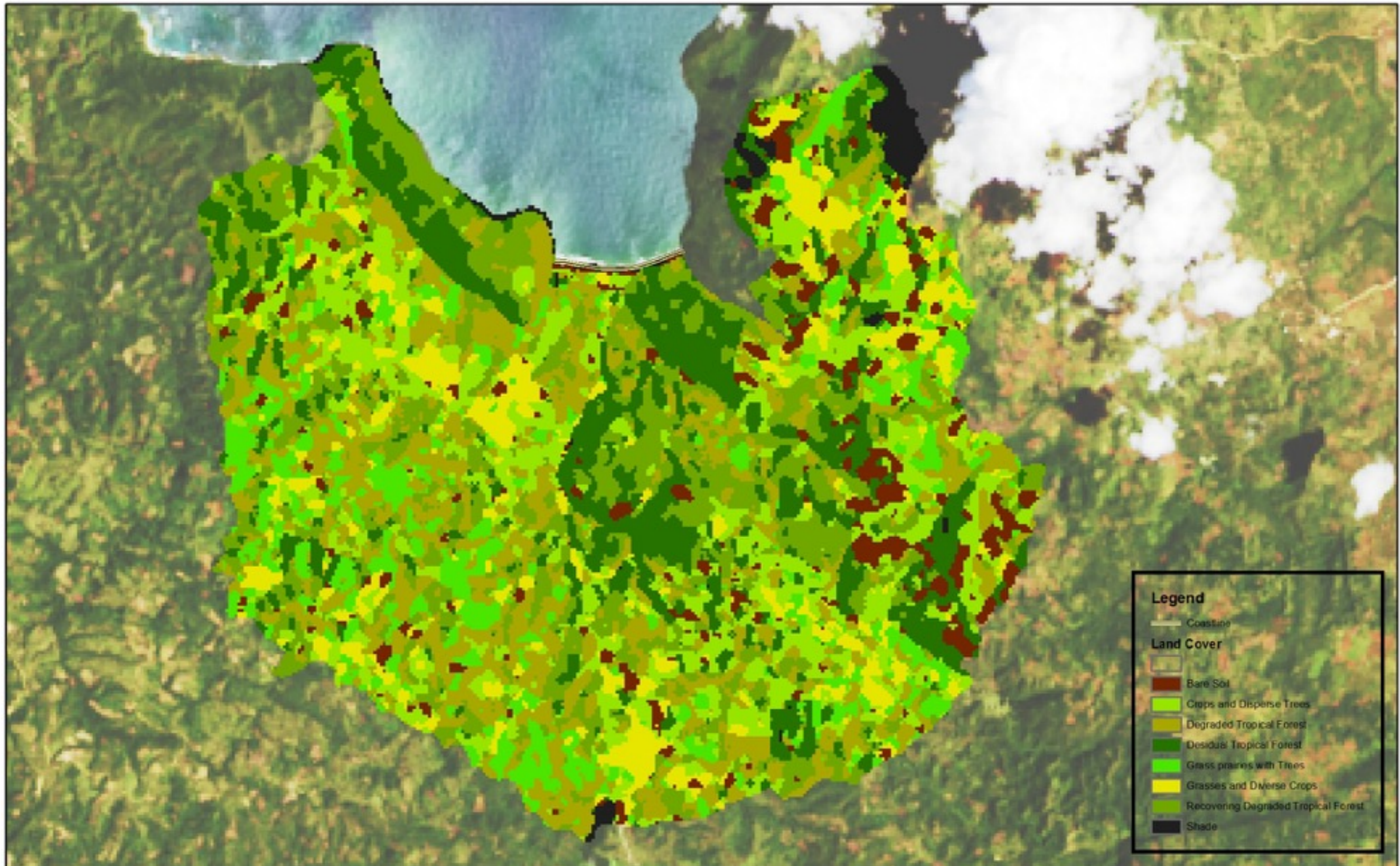
# Site Analysis



# Site Assessment & Analysis (SAA)

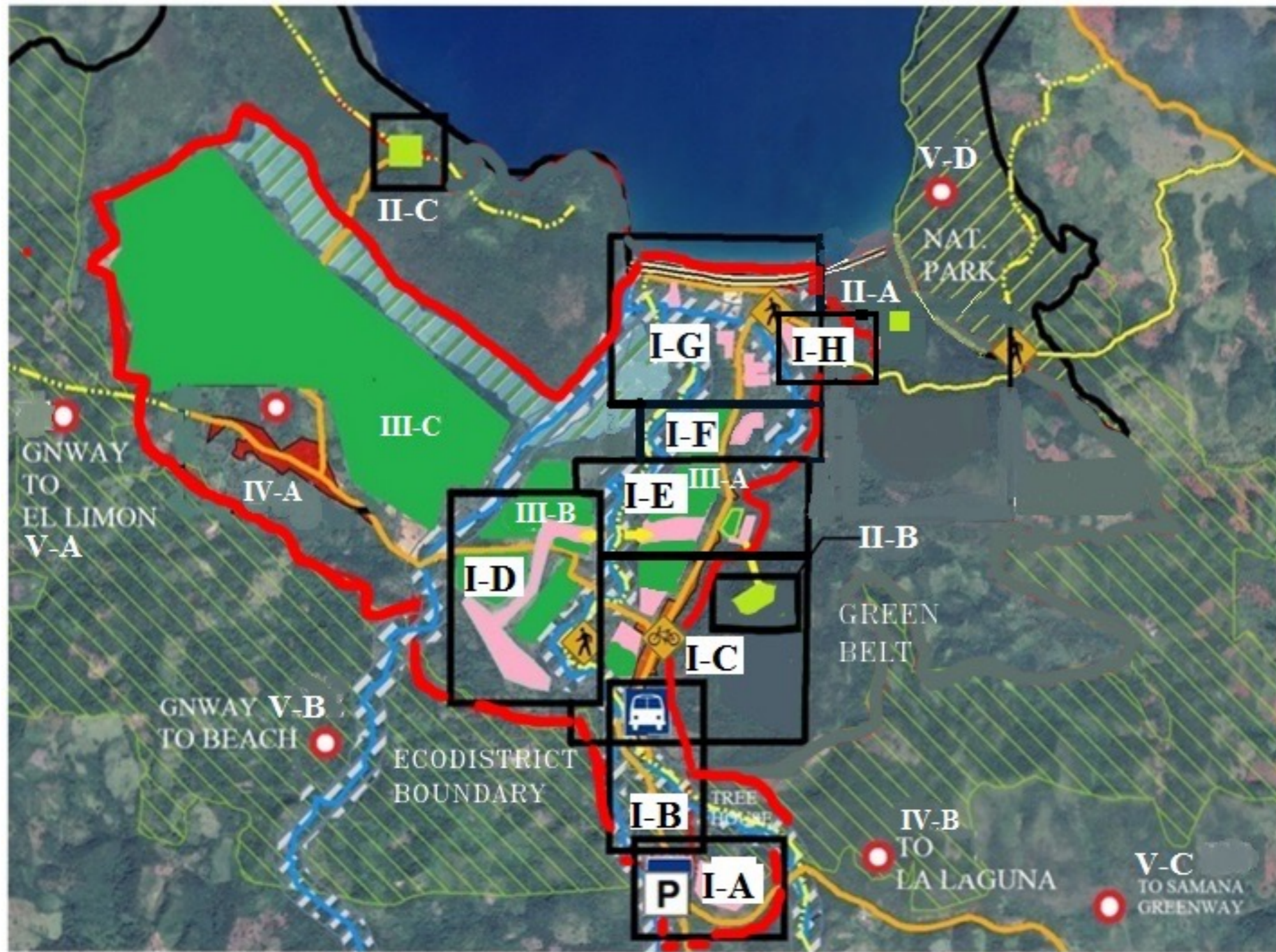



# Proyecto Samana: El Valle Land Cover










 REGIONAL ECOTOURISM AREA

Regional Ecotourism Area Connecting Catano National Park to El Limon National Park Designed to Protect the Ecological & Cultural Resources. See Regional Ecotourism Map

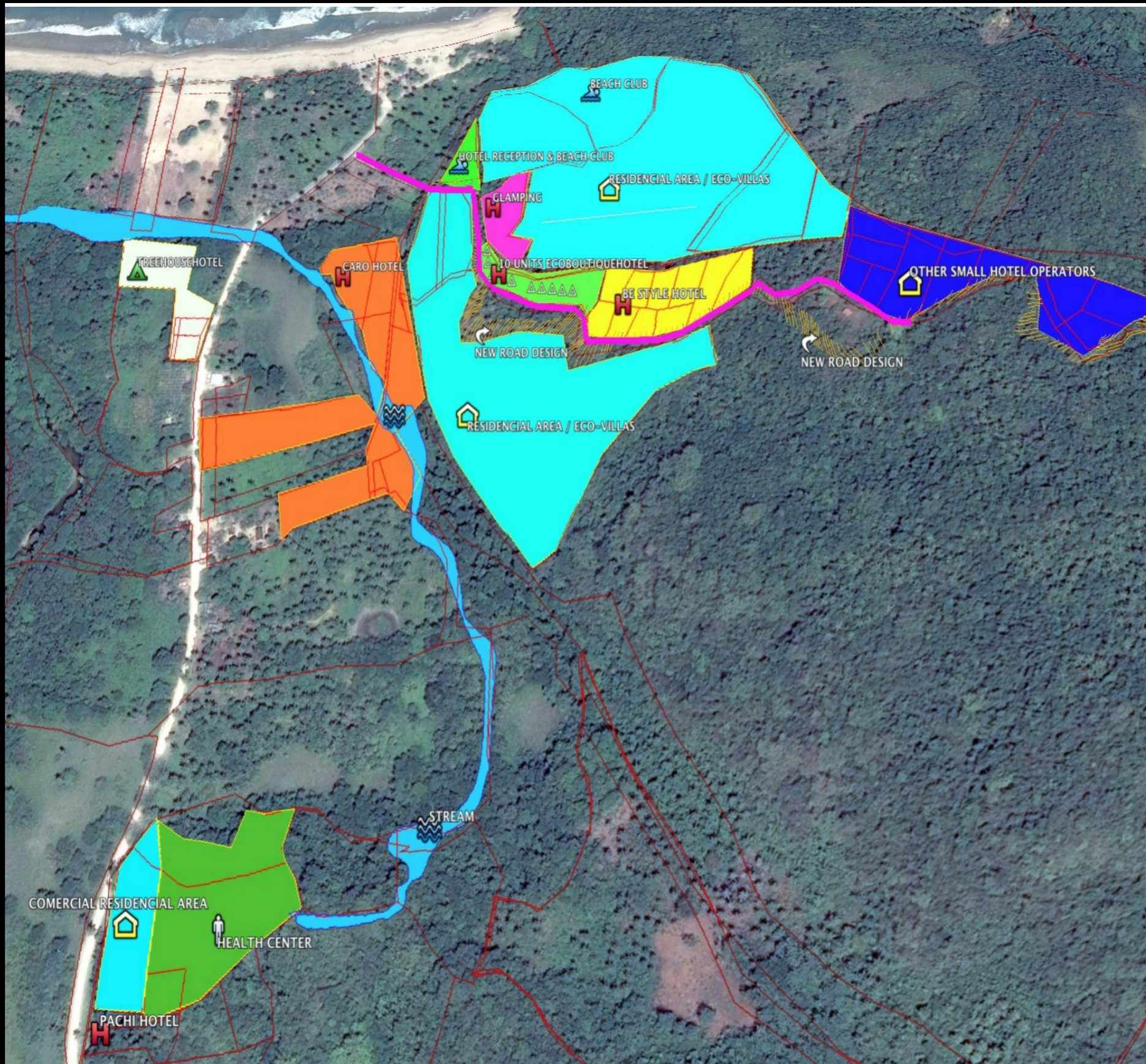
 ECODISTRICT BOUNDARY

Walkable/Bikable Valley Land for Preservation & Supporting Agriculture (90%) & Primary Ecotourism Development (10%) Located Adjacent to Existing Infrastructures

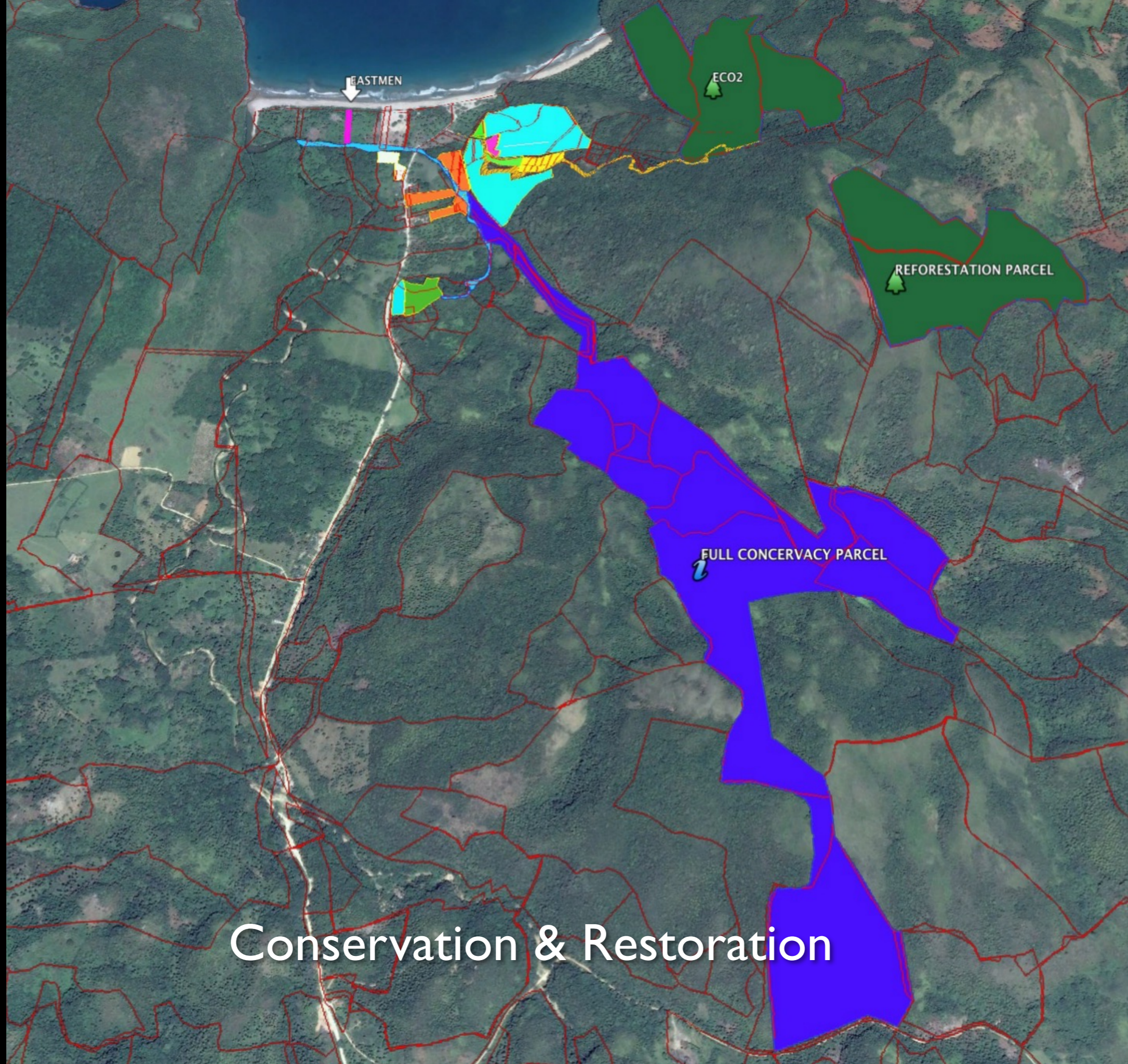
### LEGEND

#### ECODISTRICT AREA

- I (A-H) - El Valle Ecotourism Development Areas
- II (A-C) - Upper Ecotodge Developments/Re-forestation Areas
- III(A-C) - Valley Ag Areas
- IV(A-B) - Existing Towns Expansion & Cultural Tourism
- V(A-D) - Natural Connections & Features



# Lodging and Residential



EASTMEN

ECO2

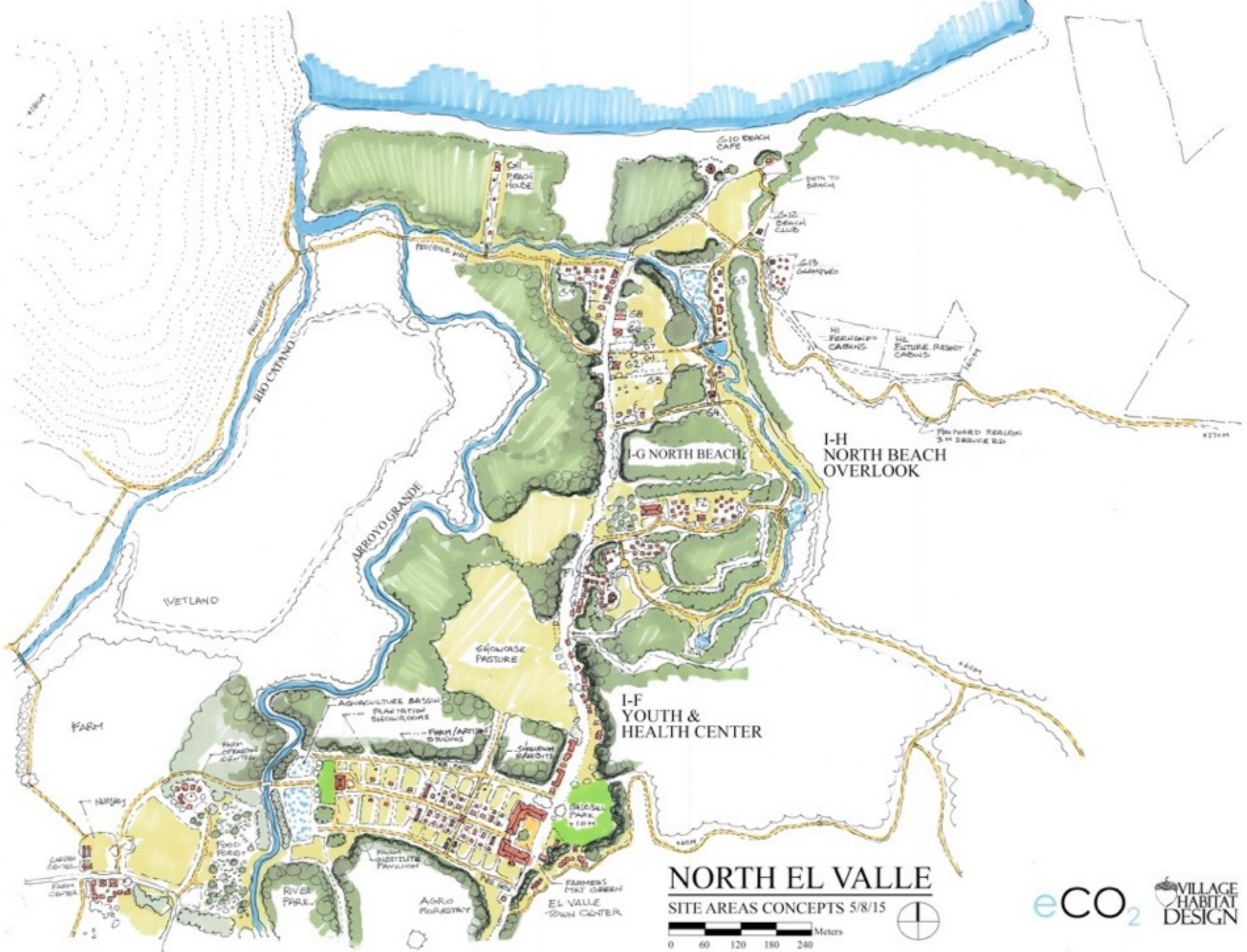
REFORESTATION PARCEL

FULL CONCERVACY PARCEL

Conservation & Restoration

# Natural and Historic Preserve Offsets

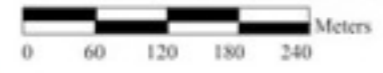






# SOUTH EL VALLE

SITE AREAS CONCEPT 5/8/15



	Eco district	Greenbelt Districts	Remote Rural Districts
<b>Overall development density</b>	Maximum of 1 unit per hectare	Maximum of 1 unit per 4 hectares (excluding steep slopes)	Maximum of 1 unit per 4 – 20 hectares - depending on degree of remoteness (excluding steep slopes)
<b>Preservation/Development Areas</b>	90% preserved 10% developed	95% - 98 % preserved 2 - 5% developed (2% in gnbelt - 3% exported to ecodistrict)	95 - 98 % preserved 2 – 5% developed depending on degree of remoteness
<b>Village/Hamlet project development density (project area)</b>	Minimum of 10 units per hectare	Minimum of 10 units per hectare	Minimum of 10 units per hectare
<b>Village/Hamlet housing density (housing area)</b>	Minimum of 15 units per hectare	Minimum of 15 units per hectare	Minimum of 15 units per hectare



### TOWN INFILL DEVELOPMENT

The expansion of key areas in existing towns, primarily along existing roads and paths as infill designed around food and energy self sufficiency and a thriving local bio-economy.

#### Transportation

Pedestrian Priority

- Shuttle
- Cart
- Bicycle
- Lease on demand vehicles

#### Lots Types

200 – 600 Sq m  
Maximum 1000 Sq m

#### Building Types

To reflect historic massing & setbacks.  
Primary types: Live/work, courtyard home, cottage home and duplex homes.







Green School





YO SOY DE  
*Corazón* DEL  
VALLE

Food

Fuel

Fiber

Electricity

Soil Carbon

Heat

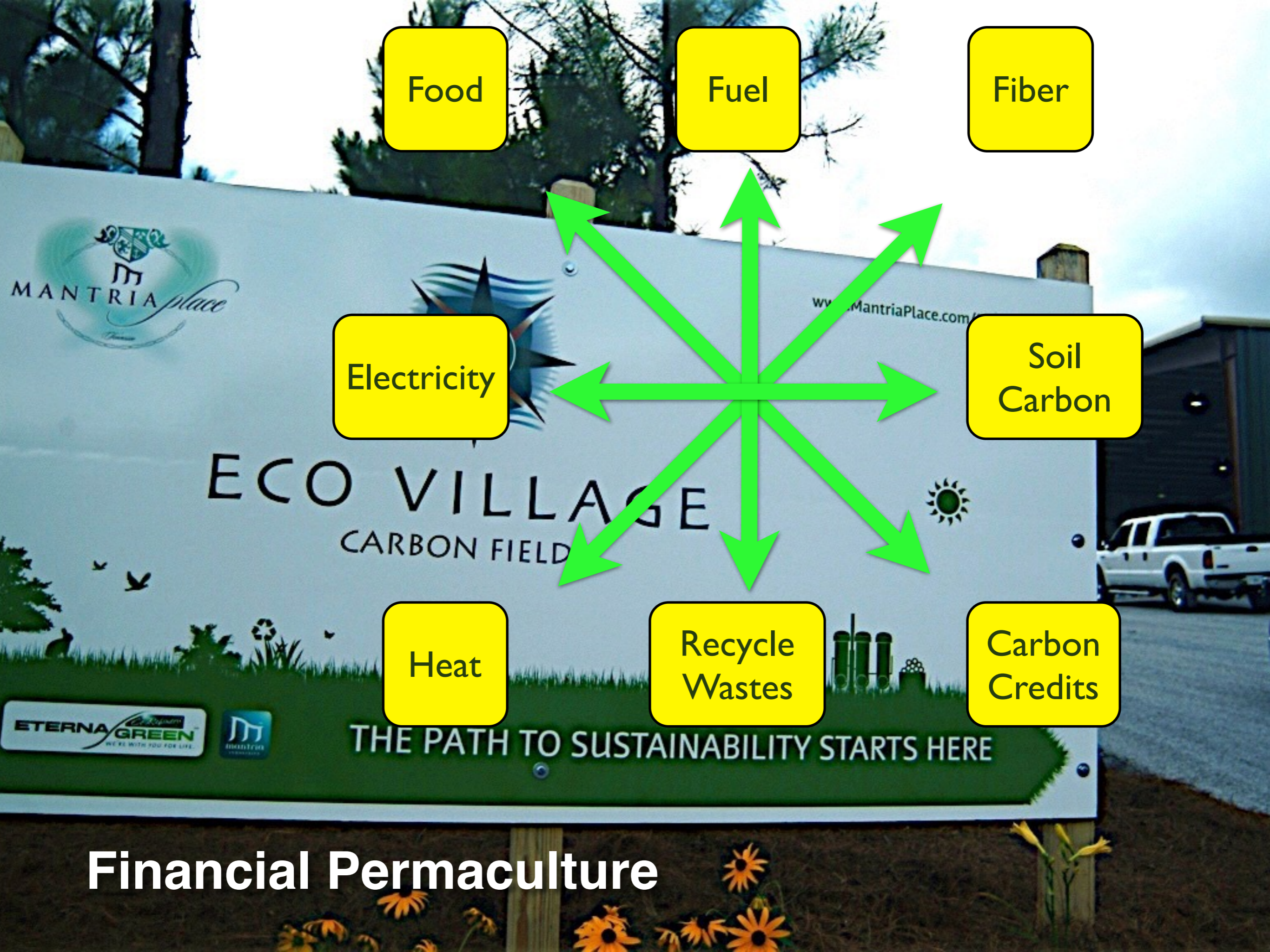
Recycle Wastes

Carbon Credits

ECO VILLAGE  
CARBON FIELD

THE PATH TO SUSTAINABILITY STARTS HERE

# Financial Permaculture



# Nursery shop and Training center



# Nursery shop and Training center



# Processed product partnership







# Organic food supply



# Tropical products partnership



# Local raw materials



# Eco-village, training and eco-tourism



# Local raw materials





Museum



Columbus interacting with Native woman on hammock. Theodor Galle, circa 1630



# Cool Management Company

## Logistic and services

### OFFGRID

Installation  
Regular supervision  
O&M  
Existing Staff

### Biochar & biofert

Permaculture  
Stakeholders  
Land restoration  
CO2 capture

### Content Curator

Blogging / videos  
Photos  
Corp image

## Agronomists, foresters & Gardeners

### Growing & gardening

Landscape execution  
Nursery propagation  
Plant shop sales  
Veggies

### Waste management

Cleaning  
organic material  
Trash / recycling

### Water & Energy

Eco solutions supply

## Communication and administration skills

### Housing service

Timesharing staff  
Accommodation  
Rentals / purchase  
laundry

### Training

Bioeconomy courses  
Students reception  
Fresh Young people

### Facilitate

New business  
Artisans and studios  
Artists

### Administration

Accountant  
Secretary  
Payments  
Reporting

### Eco-tourism

Visitors reception  
Showroom enhance  
Derive to existing  
activities (e.g.  
Zipline, horses, etc)

### Processing

Bio products supply  
Produce / deliver

Coming soon from February 2016!!!

A vibrant, stylized Buddhist painting. The central figure is a golden Buddha seated in a meditative posture, holding a blue vase with both hands. The Buddha has a serene expression and is surrounded by a large, ornate, multi-layered halo in shades of blue, gold, and red. The background is a lush landscape with green hills, pink lotus flowers, and a blue sky with soft clouds. The overall style is reminiscent of traditional Tibetan or Himalayan Buddhist art.

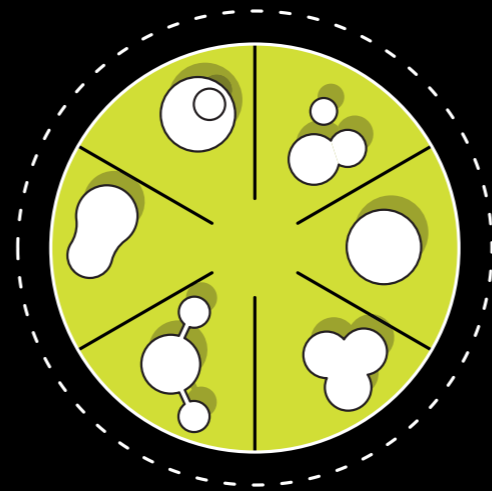
**Fundraising**



World Showroom



**Tulum**



# **PUERTAS COMMUNITY MASTERPLAN**

2016.07.08

**CONTEXT**

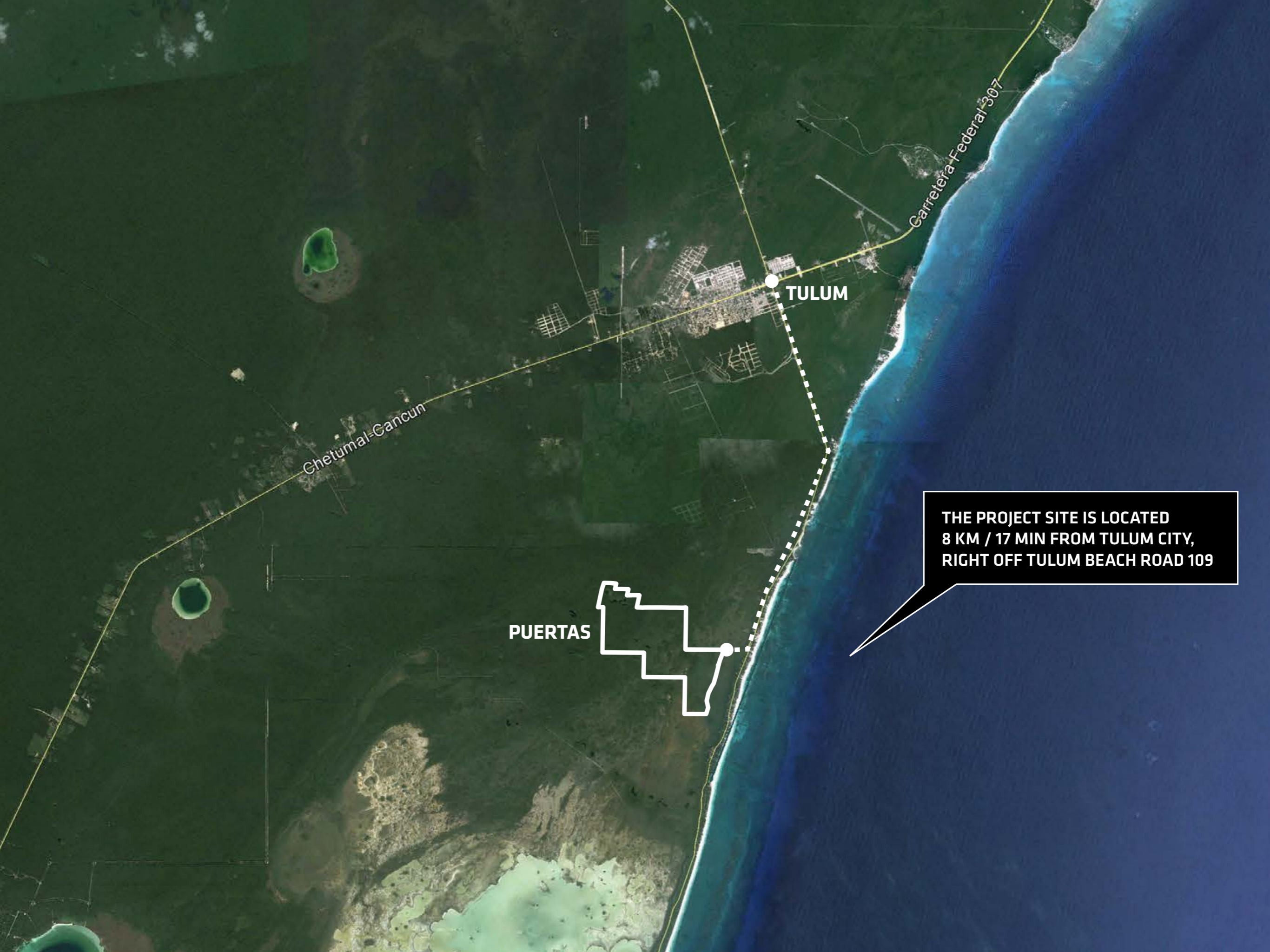
**Isla Holbox**  
My winter home for the past 12 years

**CANCUN AIRPORT**

**PUERTAS**

**THE PROJECT SITE IS LOCATED  
123 KM / 1H 40MIN FROM  
CANCUN AIRPORT**





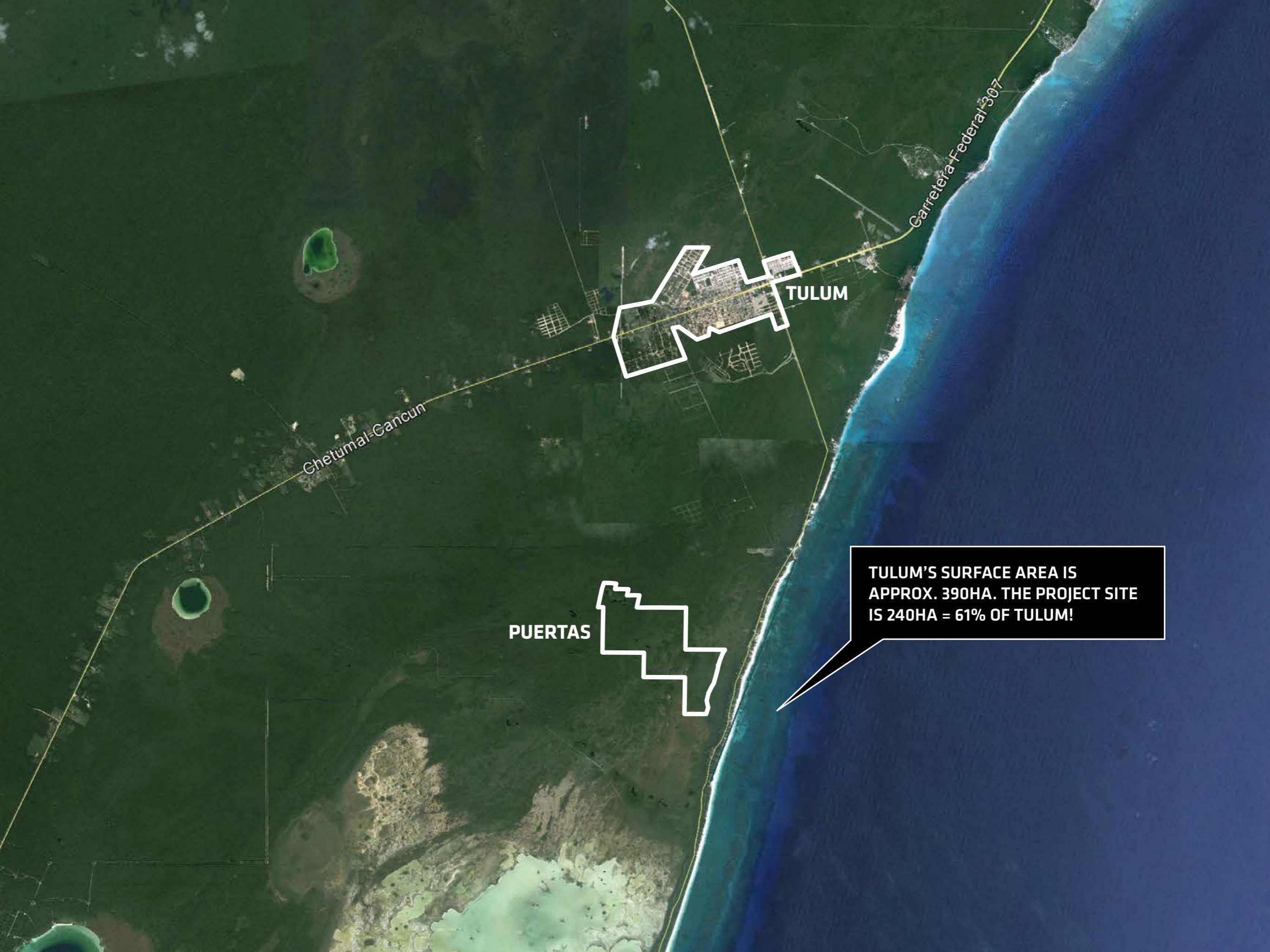
Chetumal-Cancun

Garretera Federal 307

TULUM

PUERTAS

THE PROJECT SITE IS LOCATED  
8 KM / 17 MIN FROM TULUM CITY,  
RIGHT OFF TULUM BEACH ROAD 109



Chetumal-Cancun

Garretera Federal 307

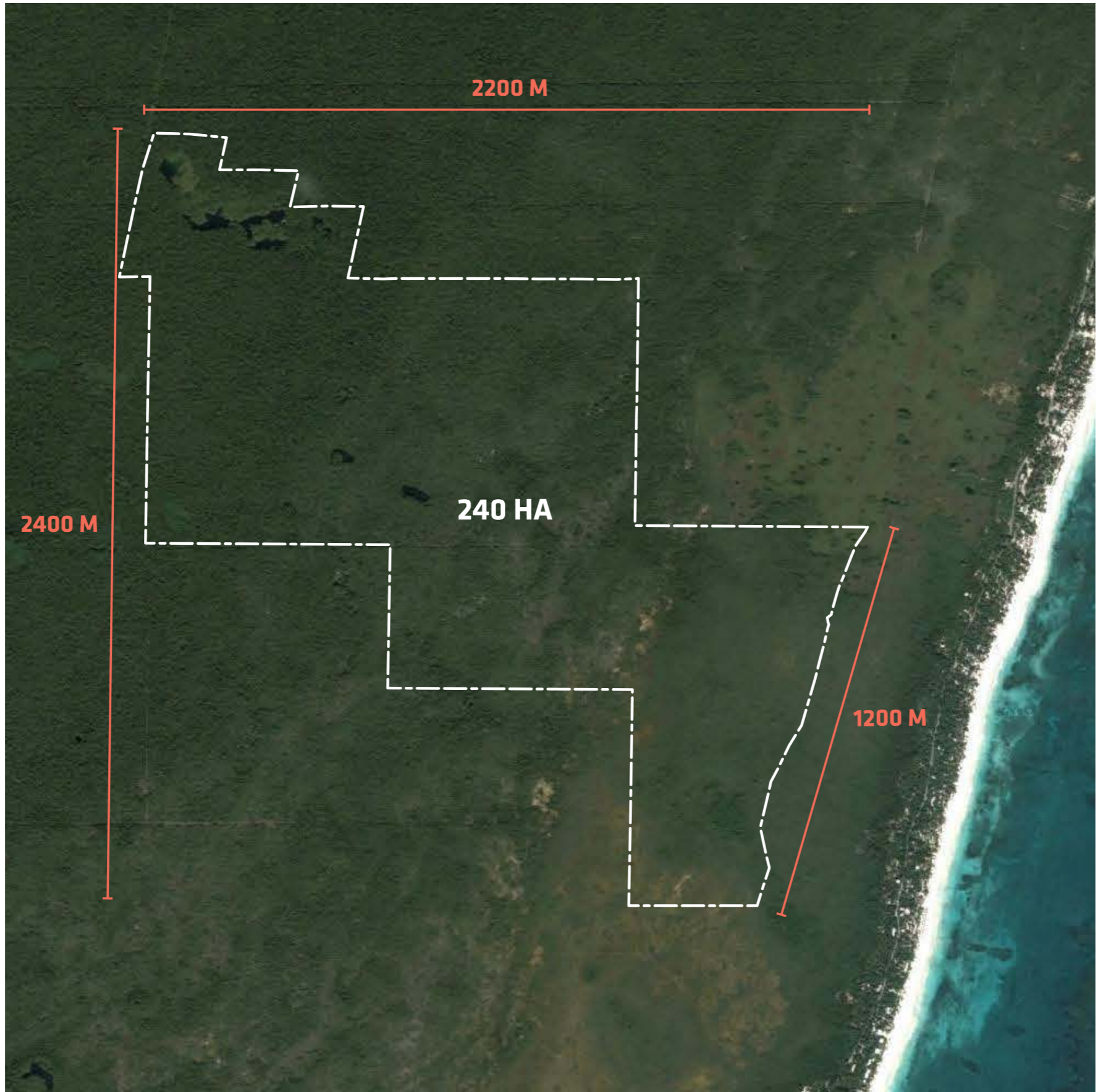
TULUM

PUERTAS

**TULUM'S SURFACE AREA IS APPROX. 390HA. THE PROJECT SITE IS 240HA = 61% OF TULUM!**

# **SITE ANALYSIS**





**AREA**

AMERICAS | TULUM JOURNAL

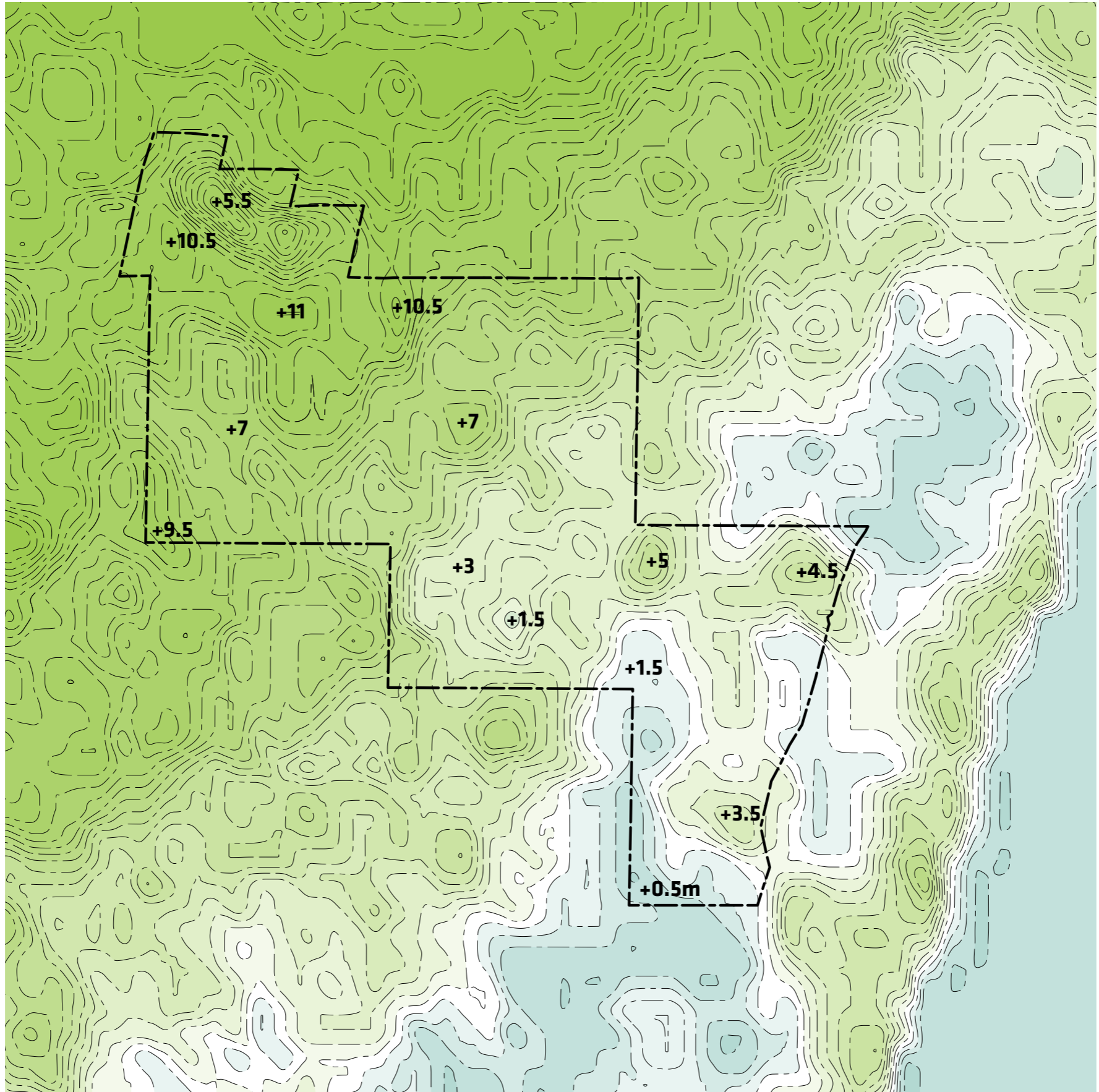
# *Evictions by Armed Men Rattle a Mexican Tourist Paradise*

By KIRK SEMPLE AUG. 16, 2016

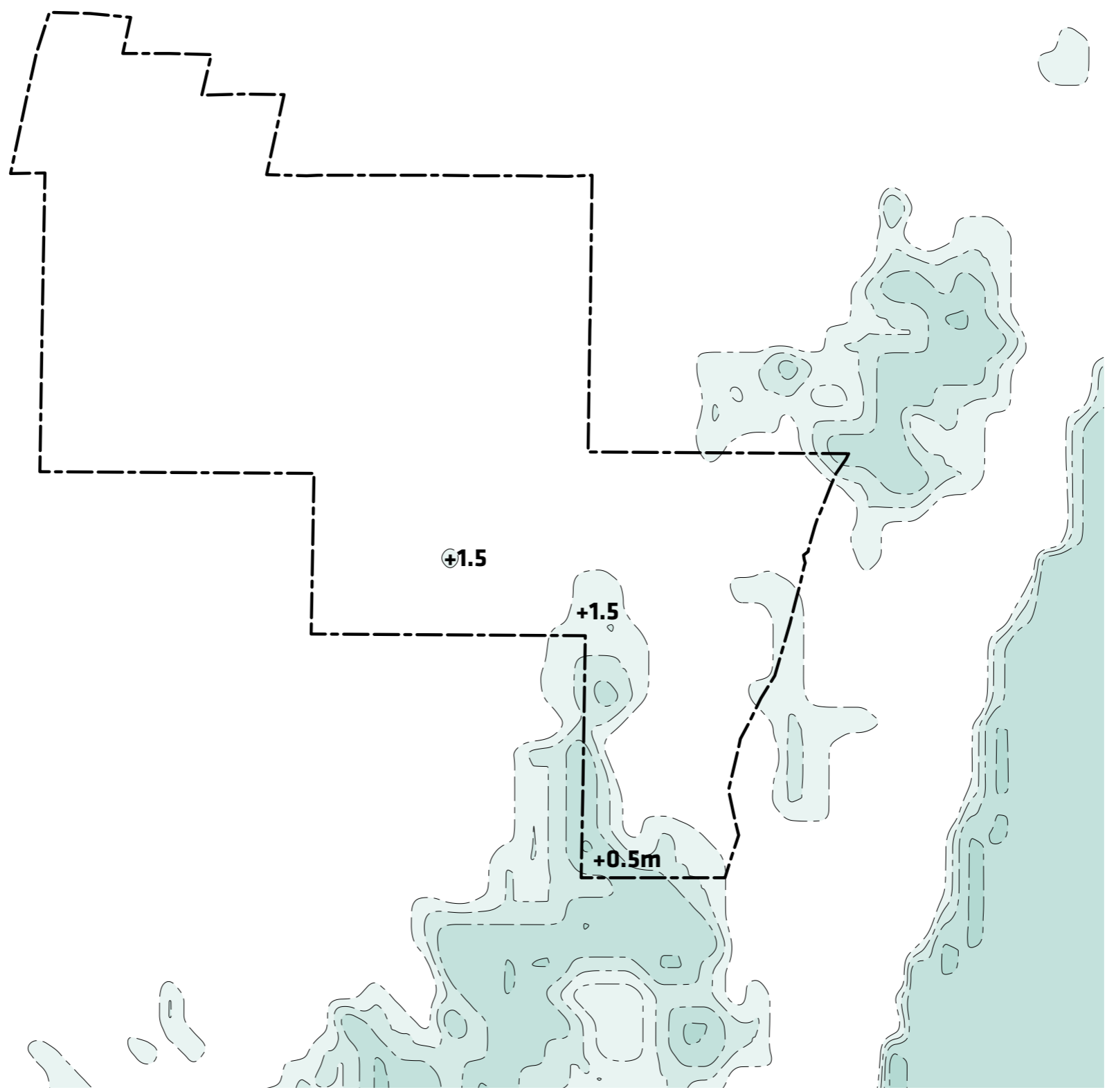
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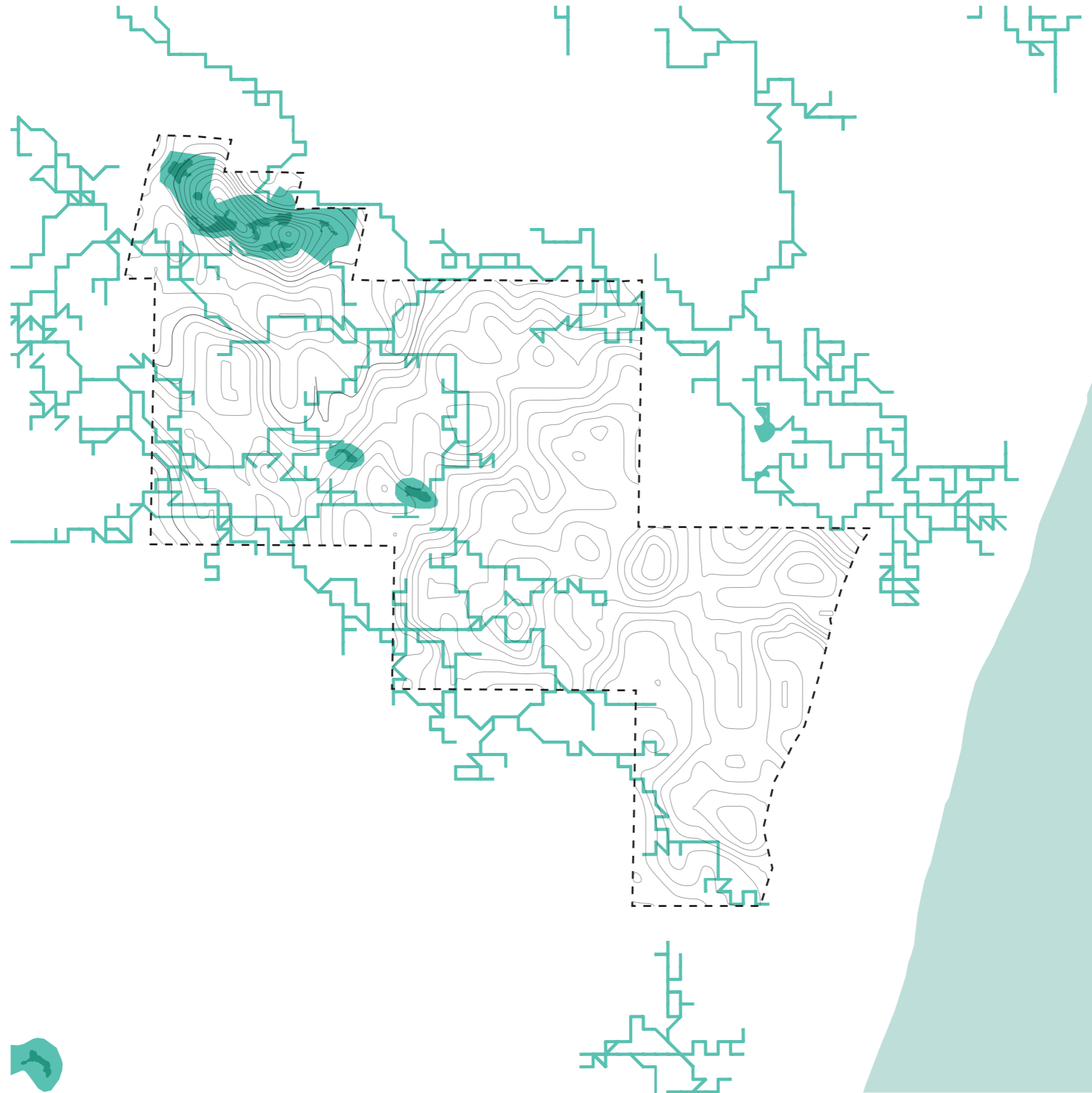




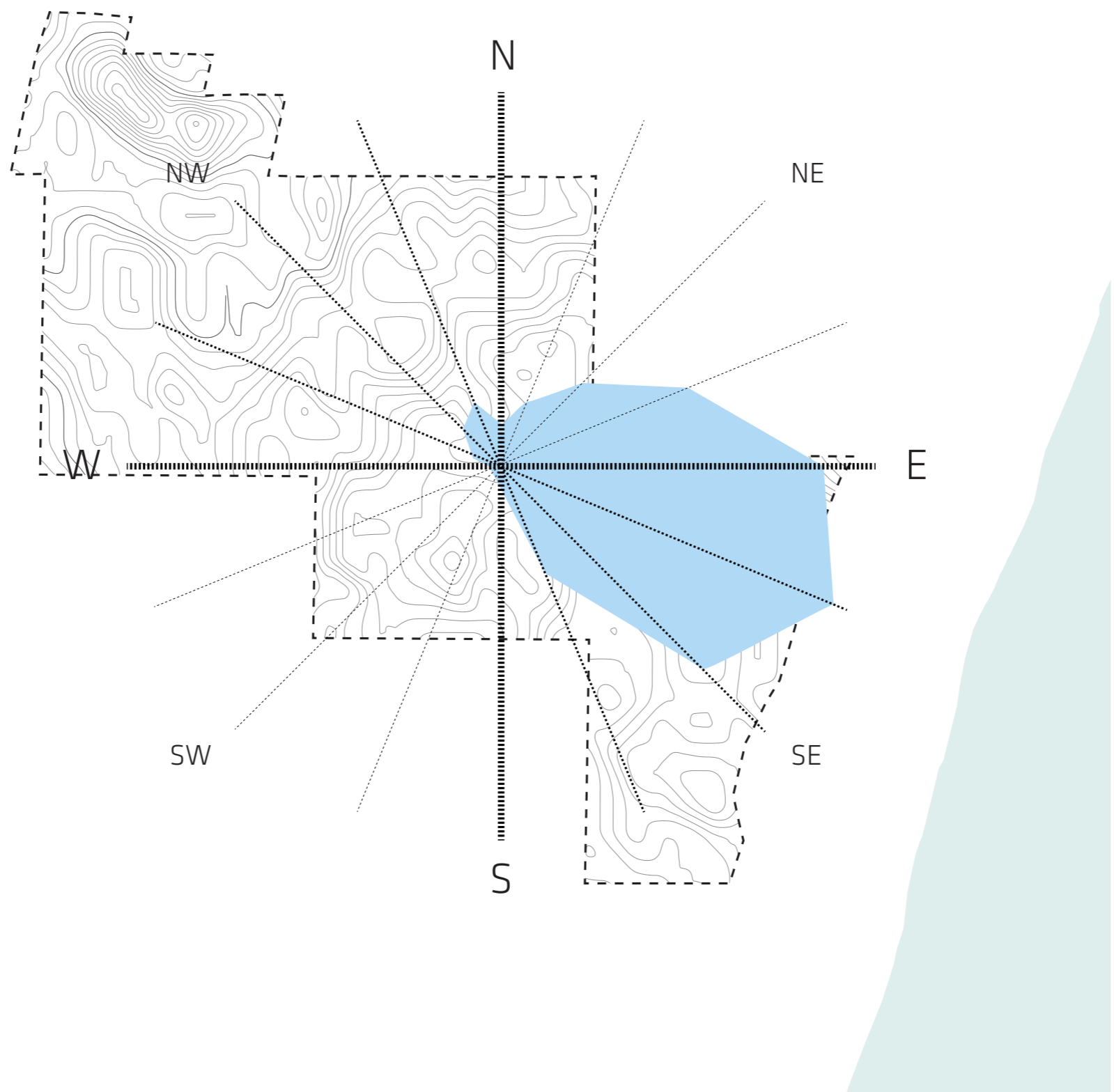
**CONTOURS**



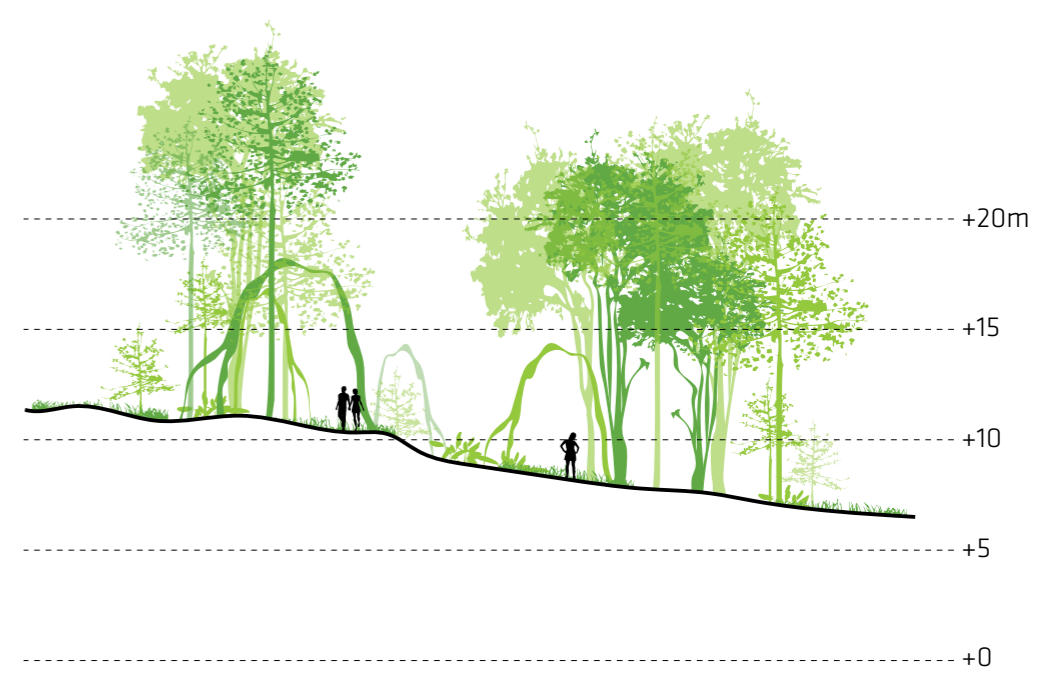
**FREQUENTLY FLOODED GRASSLAND**



**POSSIBLE UNDERGROUND RIVERS + CENOTES**



**PREVAILING WINDS**



**EXISTING LANDSCAPE TYPOLOGY: MATURE NATIVE WOODLAND**

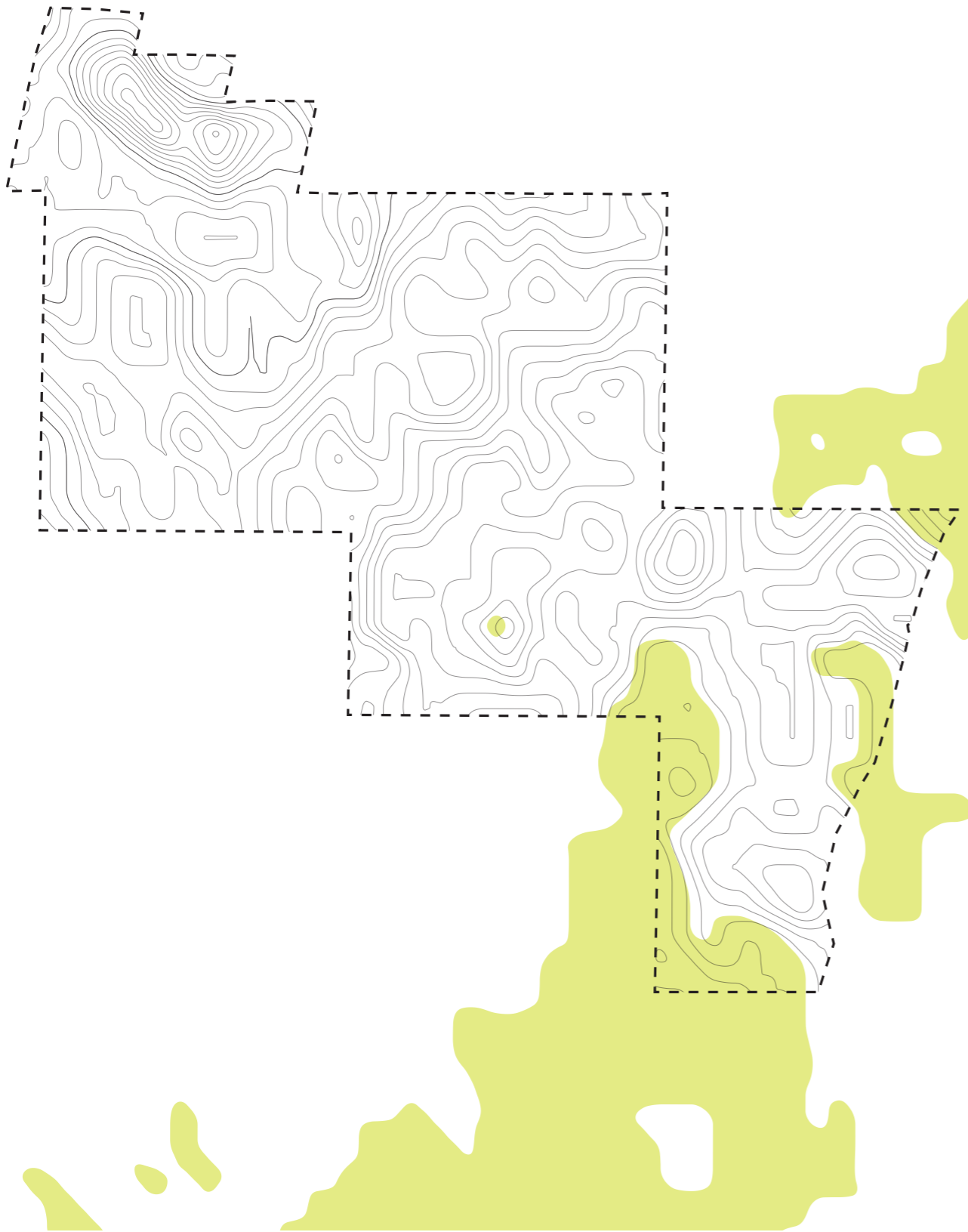




**EXISTING LANDSCAPE TYPOLOGY: DECIDEOUS FOREST**

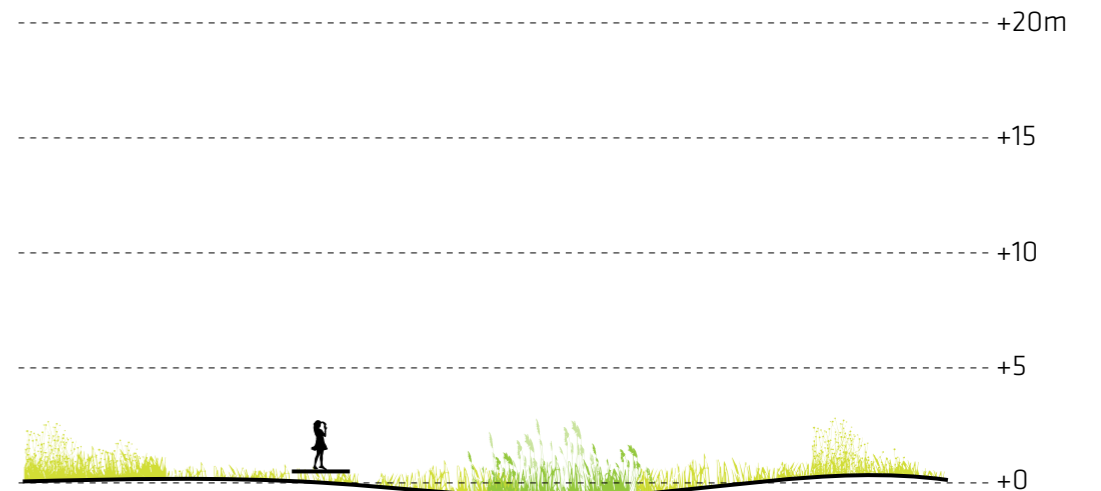


**EXISTING LANDSCAPE TYPOLOGY: PALM GROVE**

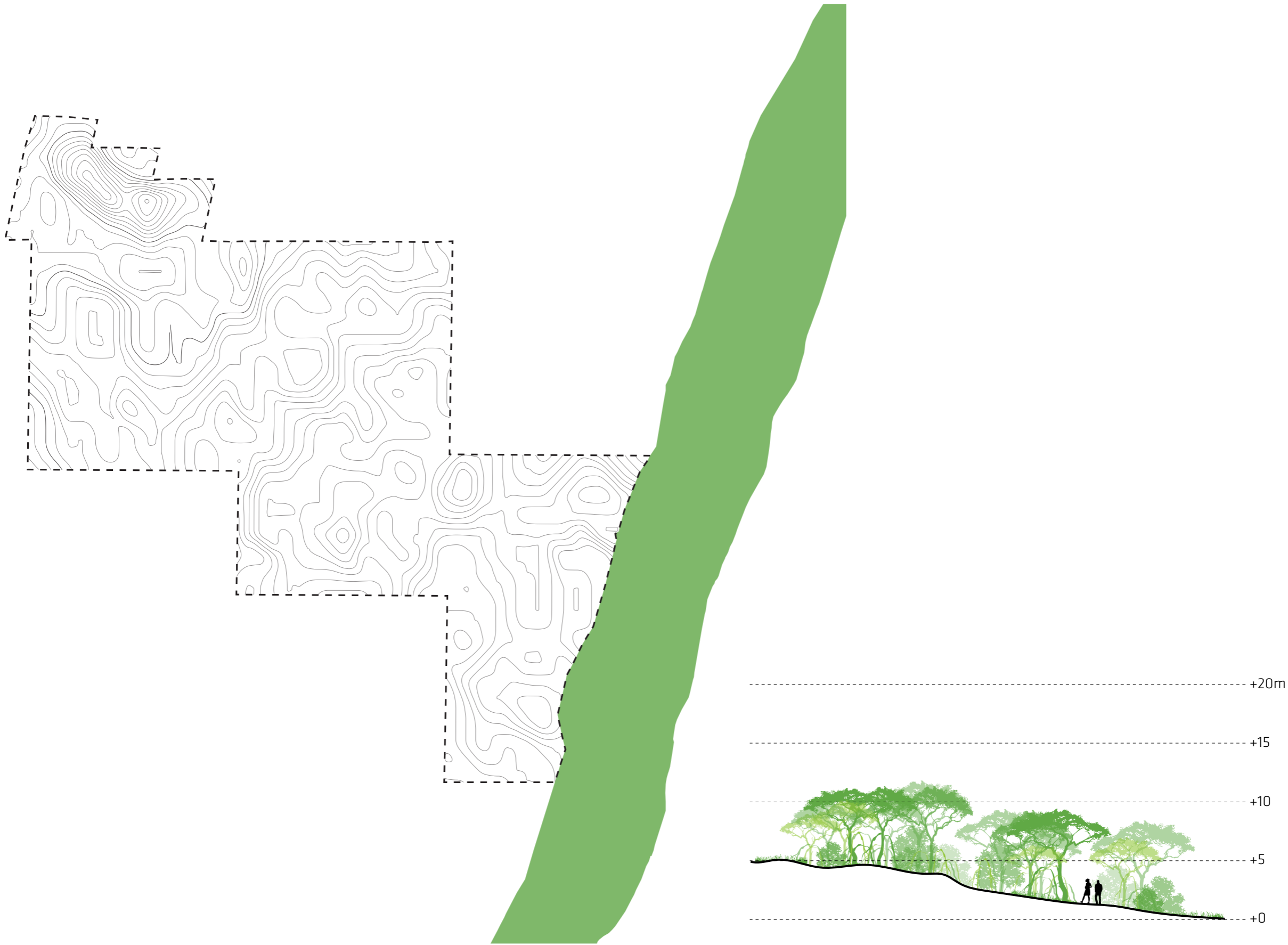


**ZONES PRONE TO FLOODS YEARLY**

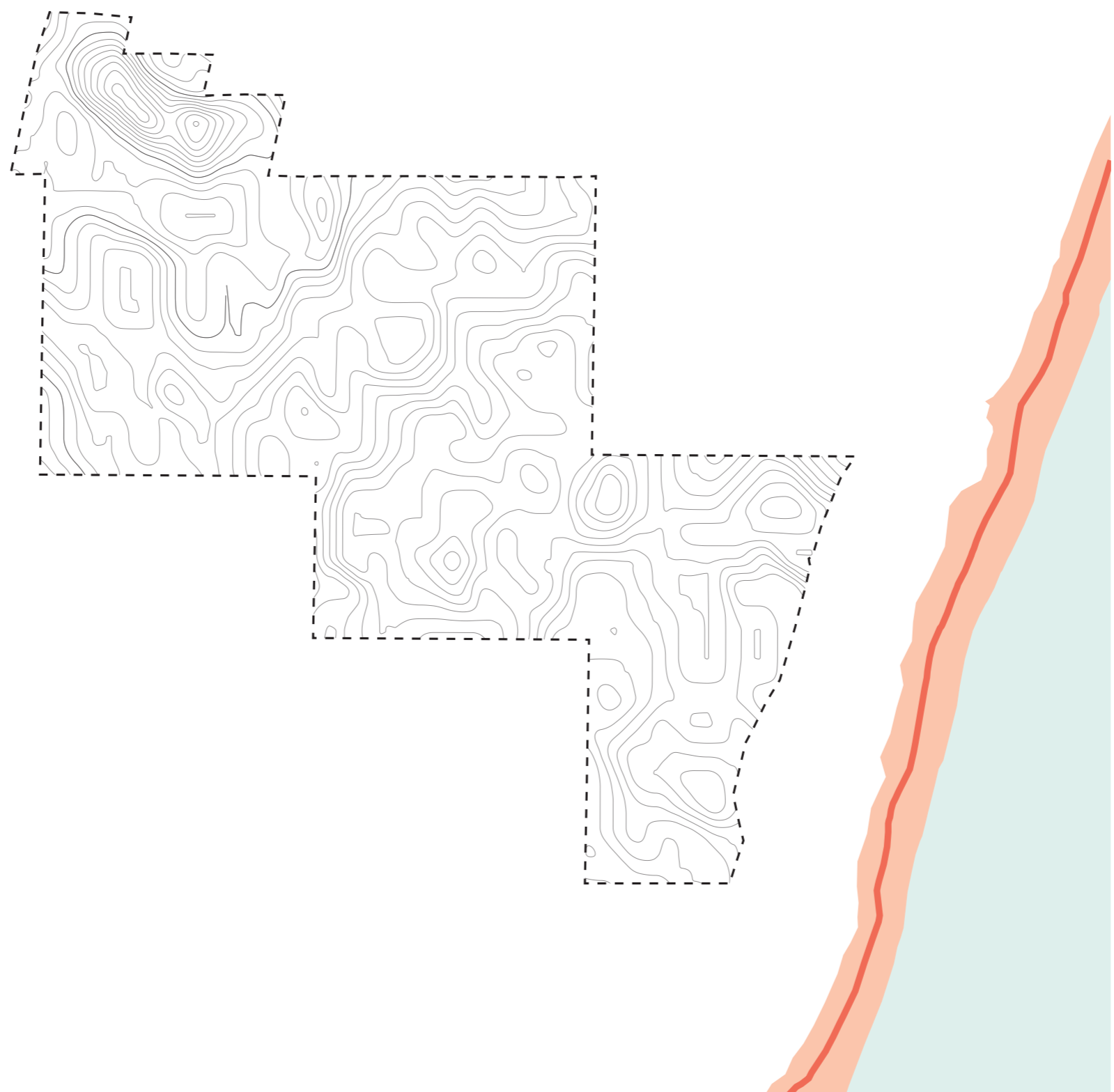
**DO THESE AREAS HAVE SIGNIFICANT ECOLOGICAL VALUE? HOW COULD WE ENHANCE THIS VALUE?**



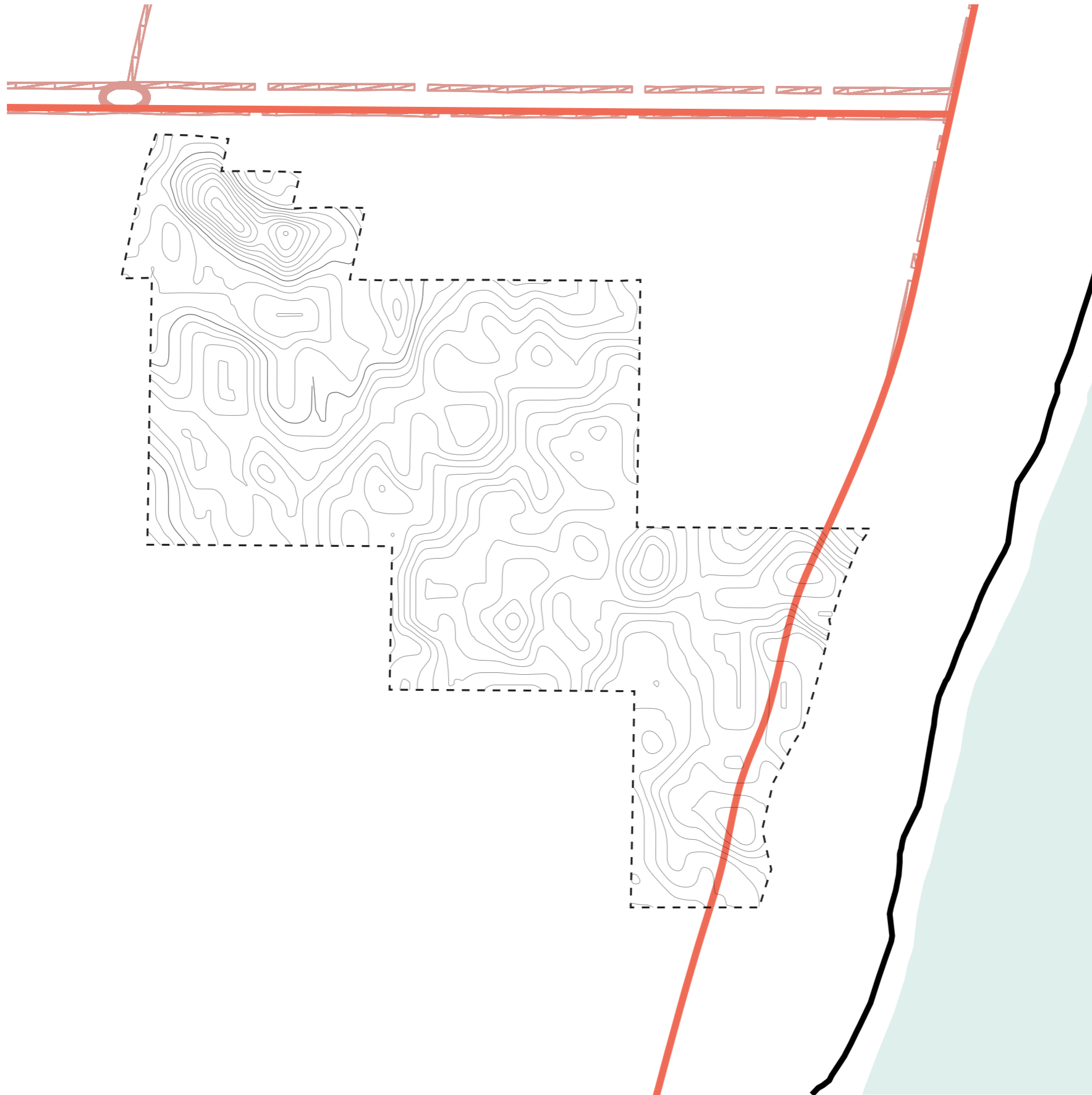
**EXISTING LANDSCAPE TYPOLOGY: BRACKISH GRASSLAND**



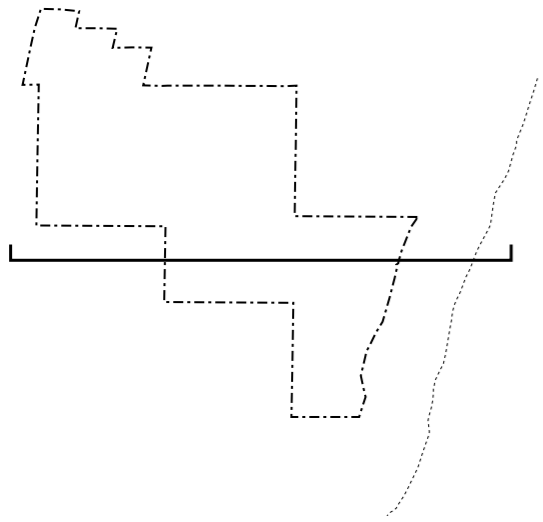
**EXISTING LANDSCAPE TYPOLOGY: MANGROVE**



**EXISTING BEACH ROAD**



**NEW PLANNED MUNICIPAL ROADS**



INLAND FOREST

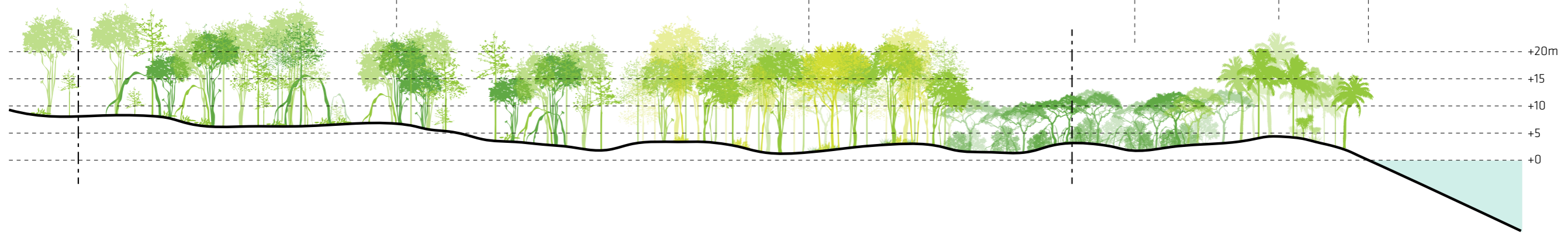
DECIDUOUS FOREST

PROTECTED MANGROVE

PALM GROVE

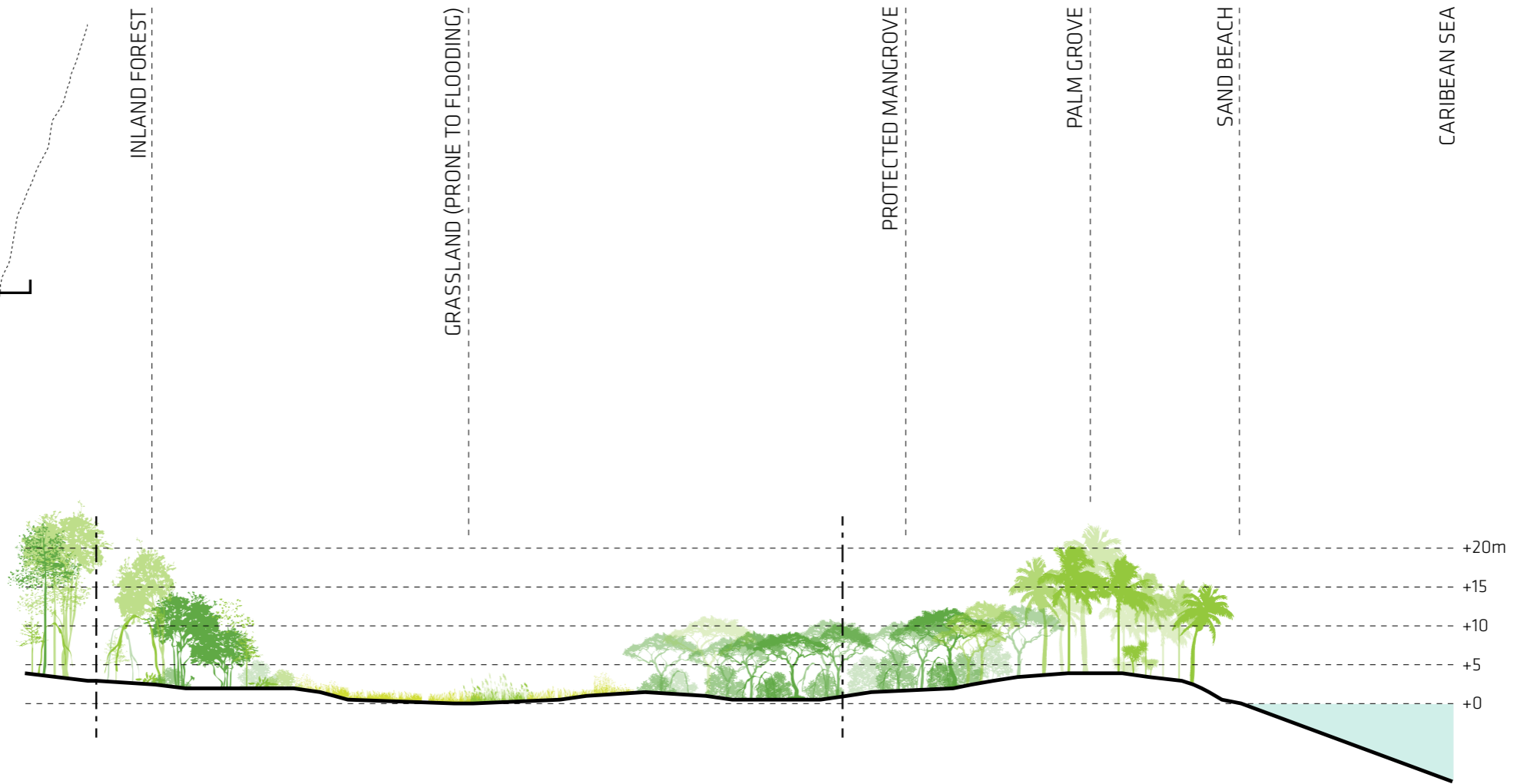
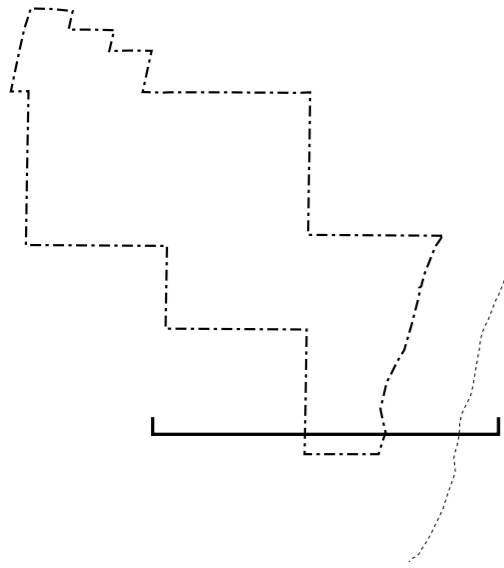
SAND BEACH

CARIBBEAN SEA



SCALE 1D 10x

**EXISTING CONDITIONS: SCHEMATIC SITE SECTION**

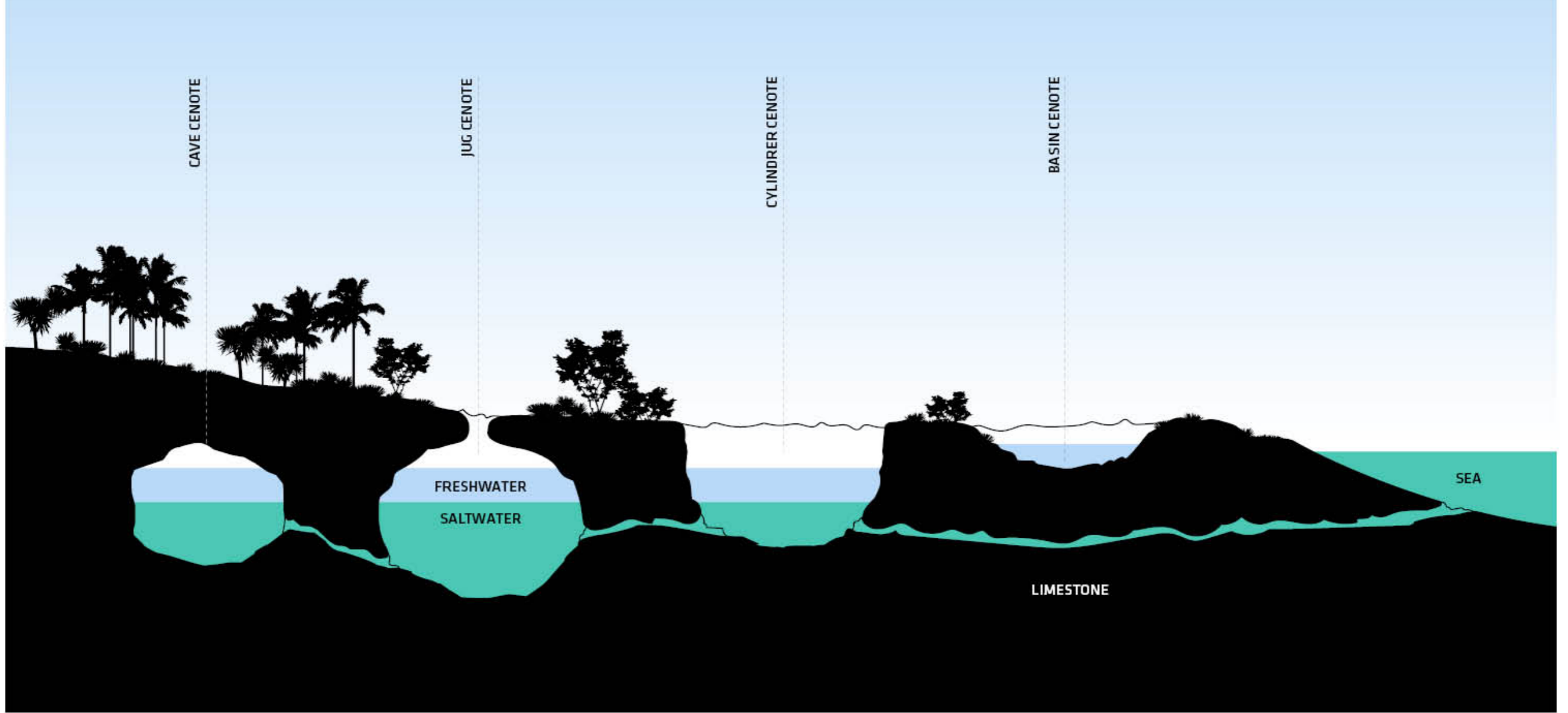


← SCALE 1D 10x →

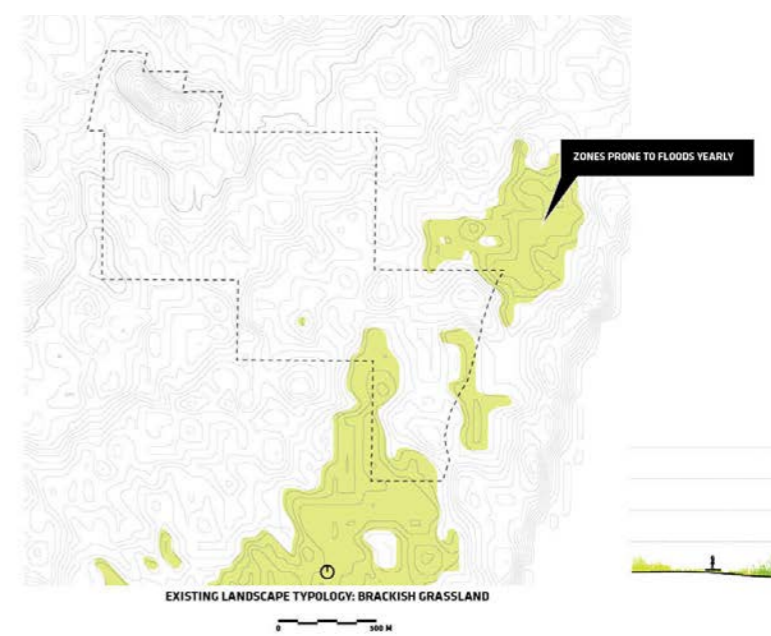
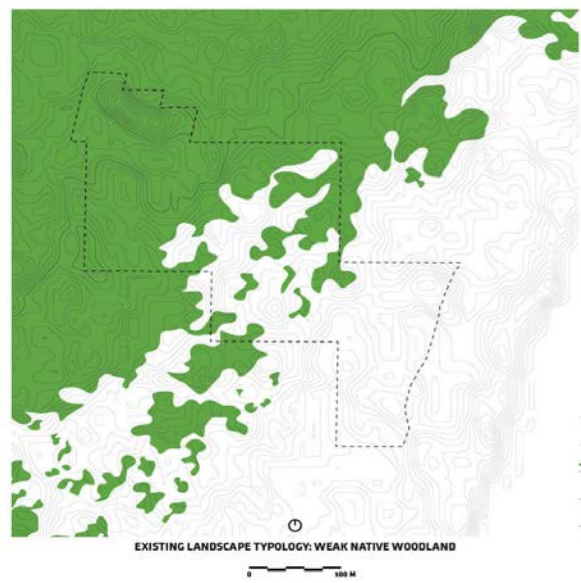
**EXISTING CONDITIONS: SCHEMATIC SITE SECTION**



# **PROPOSED PROGRAM**



CENOTES & UNDERGROUND RIVERS



- TOWN HOUSES
- VILLAS LOW END
- VILLAS HIGH END

- HAMMOCKS
- TENTS
- CABINS
- TOWN HOUSES

- CABINS
- TOWN HOUSES
- VILLAS LOW END
- VILLAS HIGH END

- HAMMOCKS
- TENTS
- CABINS
- TOWN HOUSES
- VILLAS LOW END
- VILLAS HIGH END

- HAMMOCKS
- TENTS
- CABINS
- TOWN HOUSES
- VILLAS LOW END
- VILLAS HIGH END



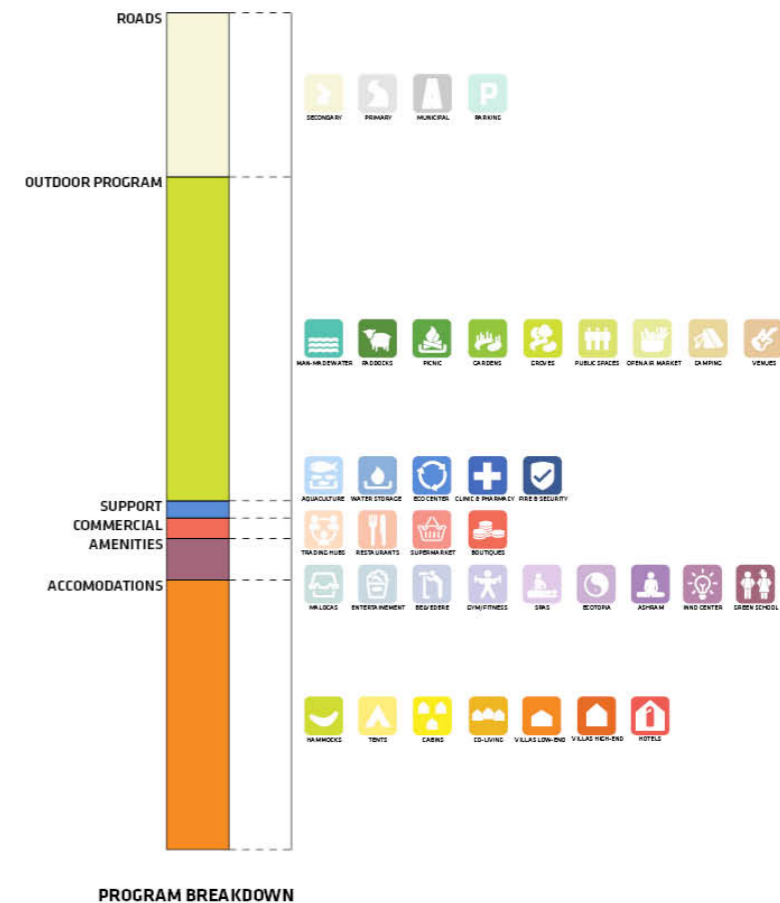
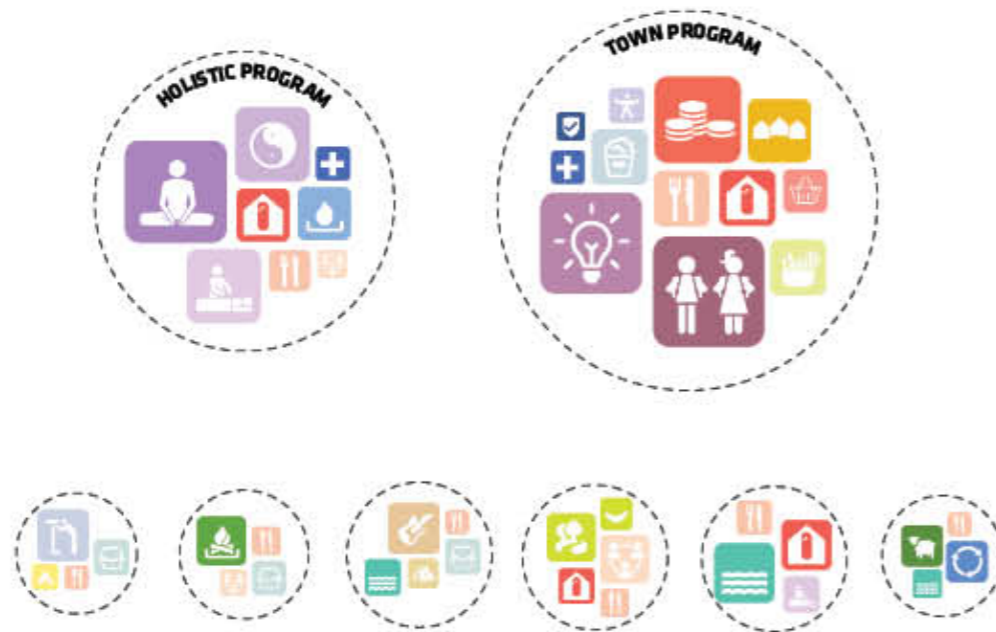
PERMANENT RESIDENTS  
30-40%

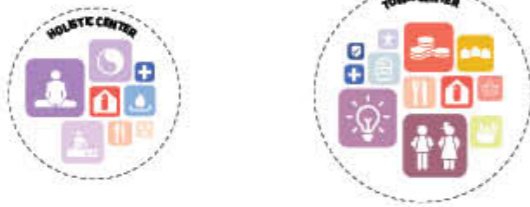
COMMUNITY SUPPORT  
TEACHERS & HEALERS  
FROM THE WORLD

PART TIME &  
SEASONAL RESIDENTS

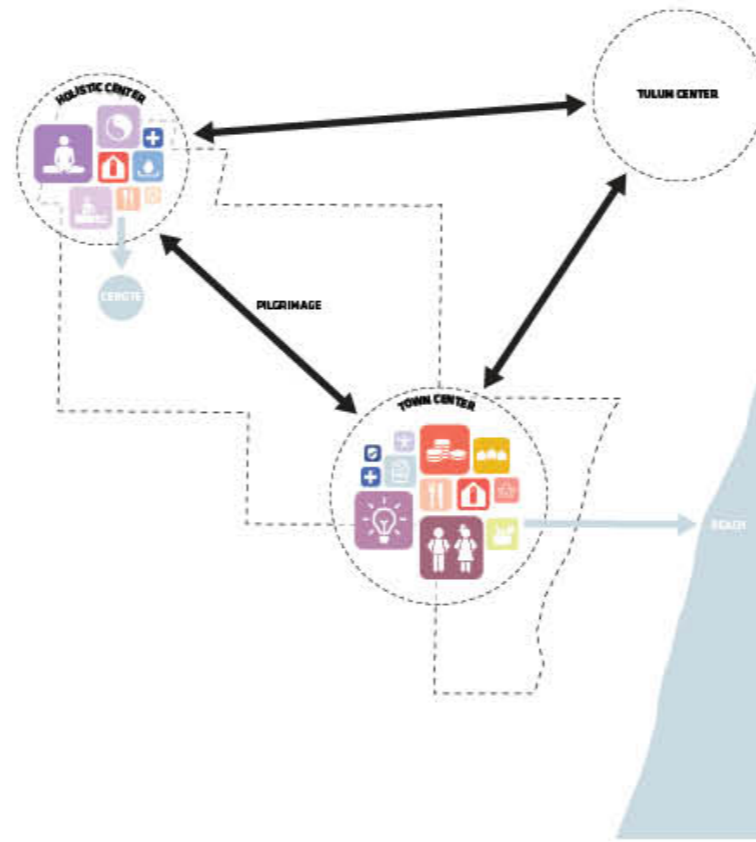
TOURISTS & VACATIONERS

EVENT TOURISTS





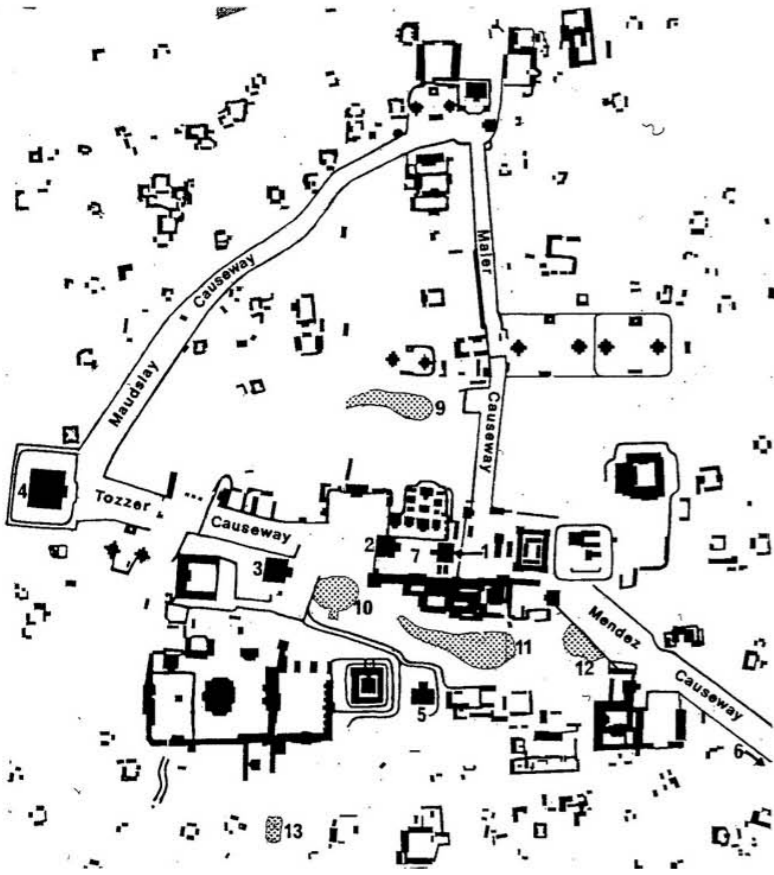
CREATING POLES



LOCATING & CONNECTING POLES

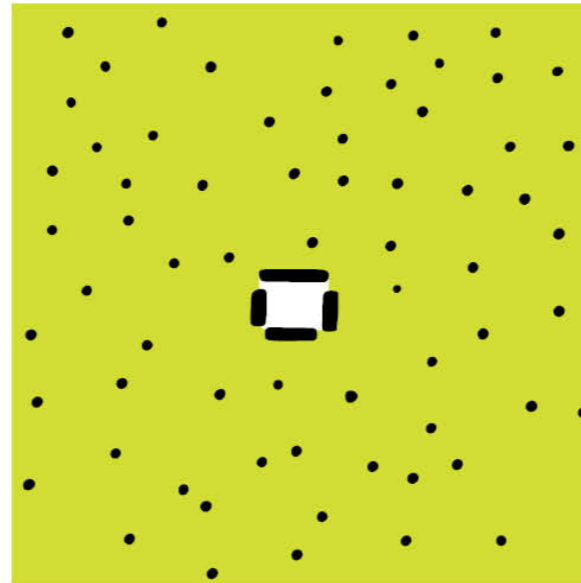


FILLING WITH ADDITIONAL PROGRAM AND HOUSES

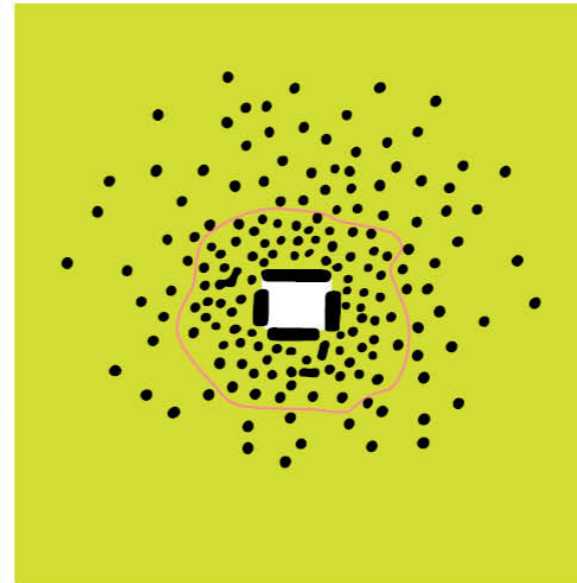


MAP FROM MAYAN CITY OF TIKAL

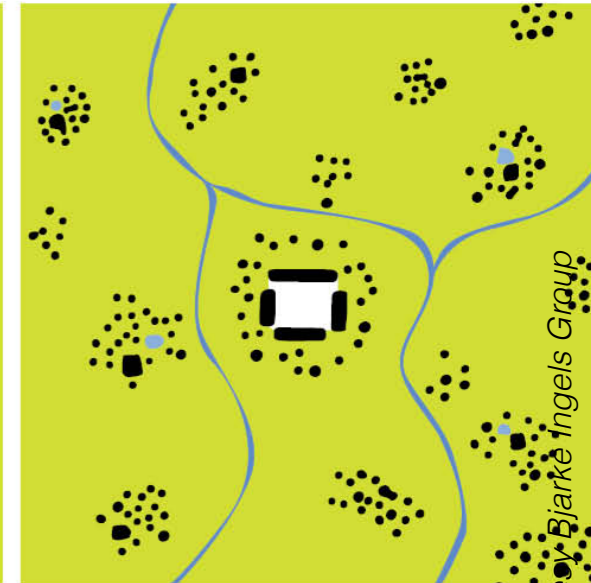
INSPIRATION FROM MAYAN SETTLEMENT TYPES



EVENLY SPACES -> TREE VILLAGE



GRADIENT -> TOWN CENTER

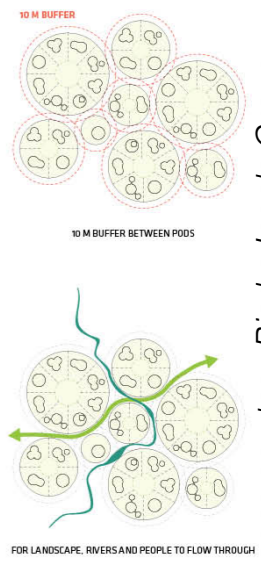
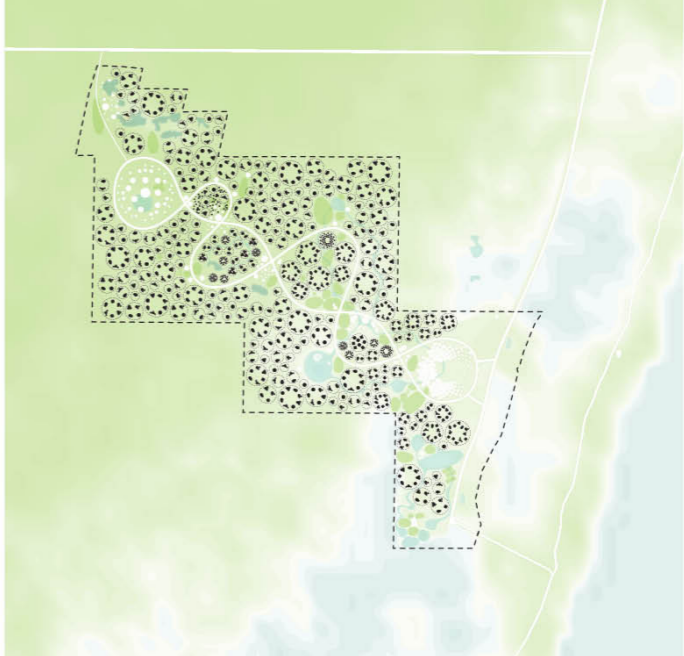
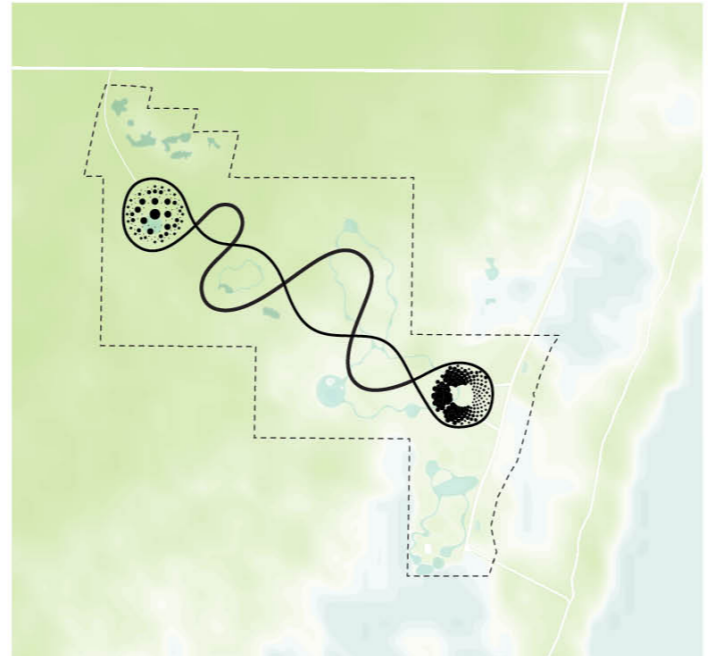
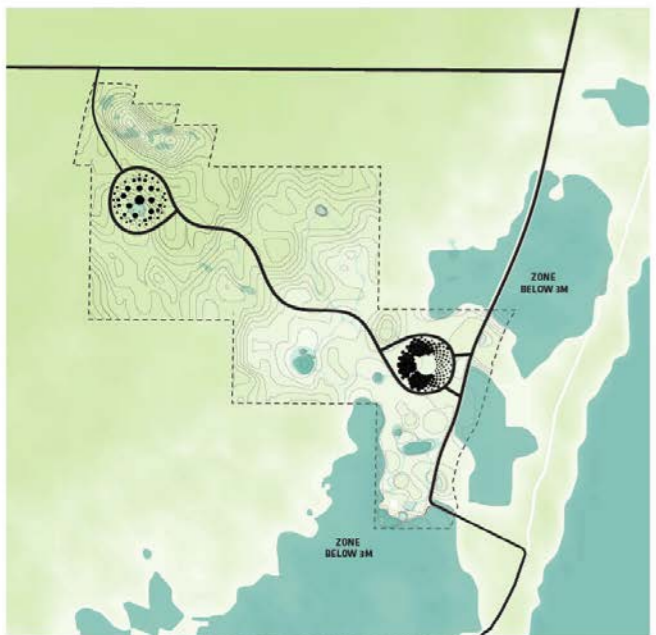
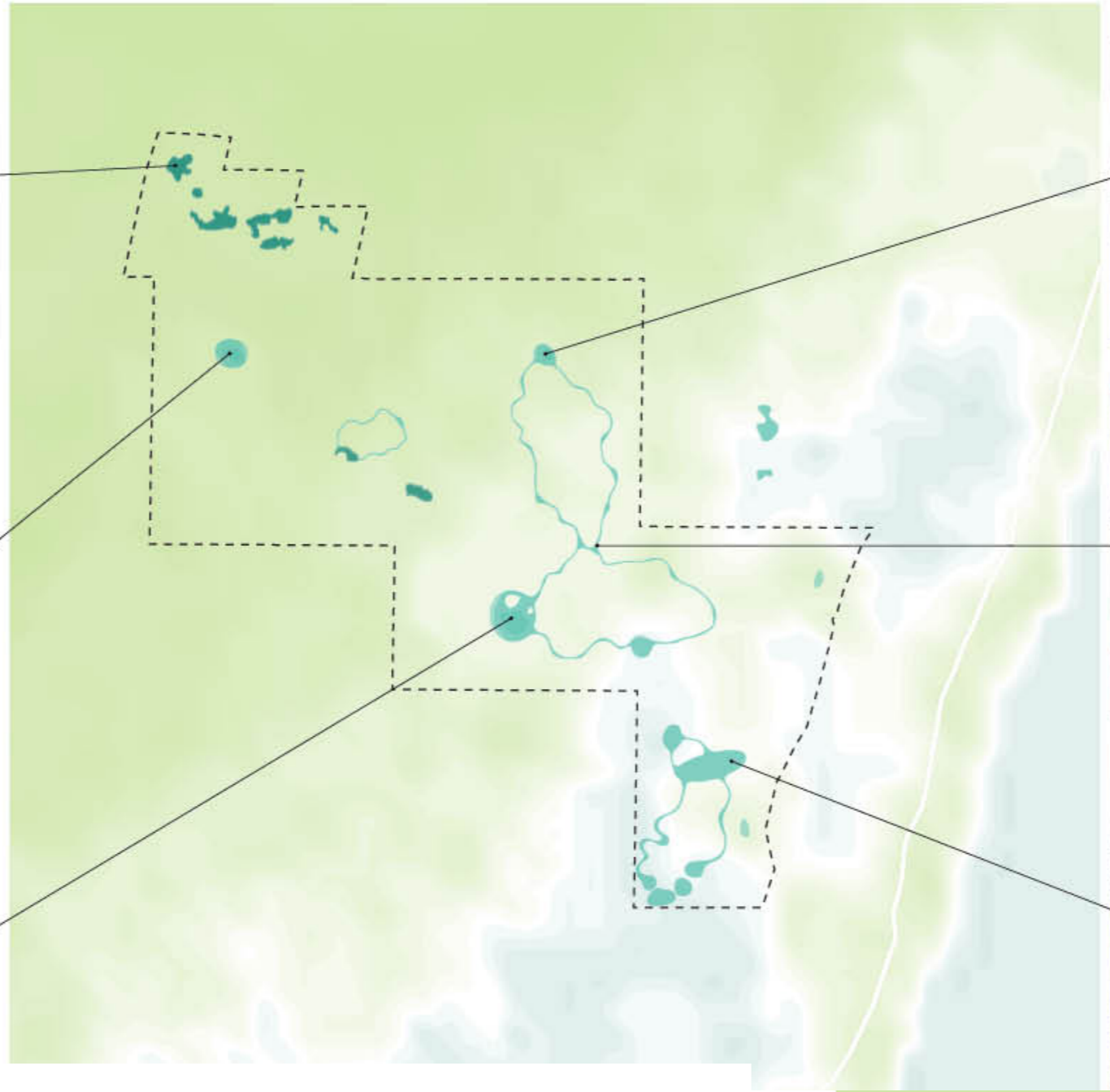


CLUSTERS -> WATER VILLAGE



INSPIRATION FROM MAYAN SETTLEMENT TYPES

courtesy Bjarké Ingels Group



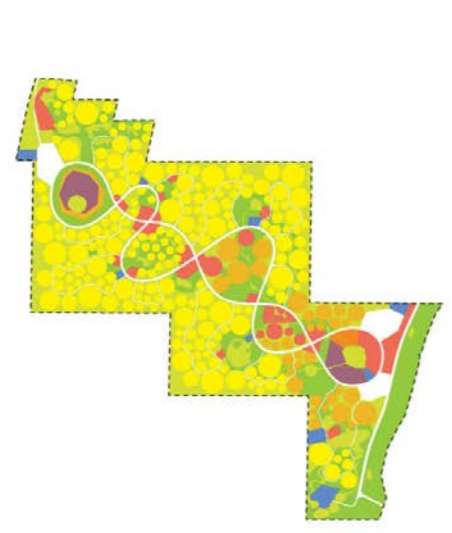
Images courtesy Bjarke Ingels Group

**LOCALLY GROWN PRODUCE  
STRAIGHT TO YOUR VILLA!**





- SUPPORT
- AMENITIES
- COMMERCIAL
- HIGH DENSITY RESIDENTIAL & CO-LIVING
- MEDIUM DENSITY RESIDENTIAL
- LOW DENSITY RESIDENTIAL
- INTERSTICIAL SPACES
- PUBLIC PARKS
- ROADS & PARKING



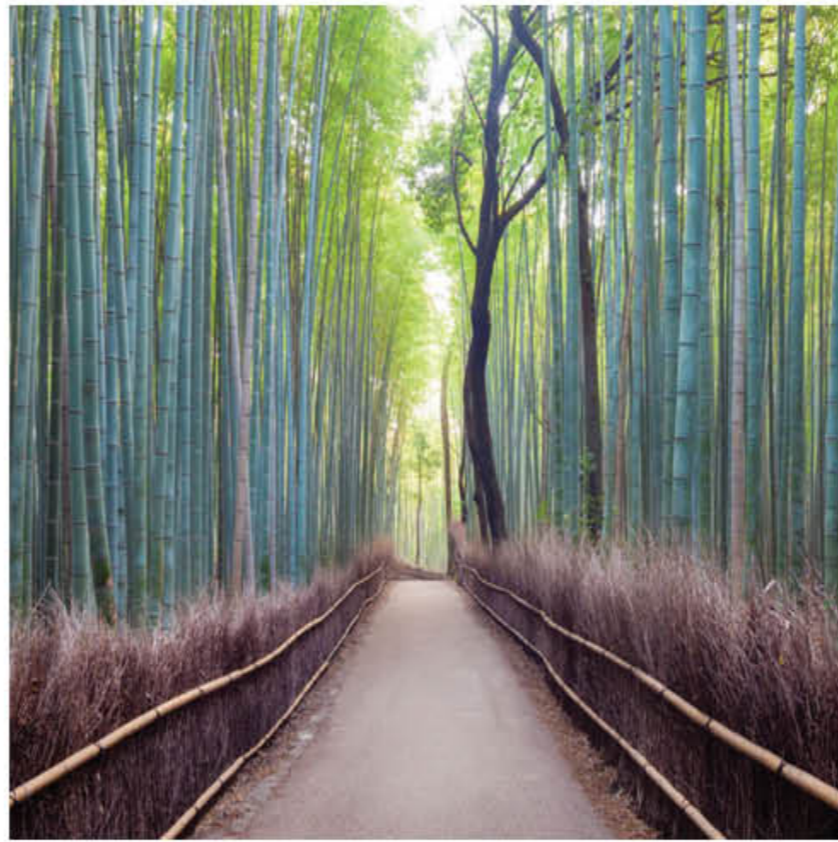
Images courtesy Bjarke Ingels Group







GROVES



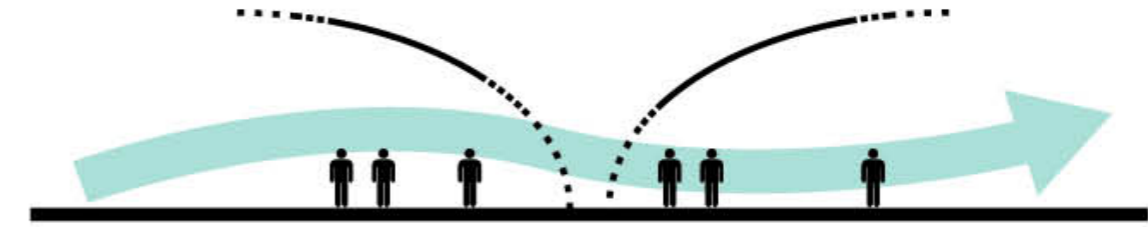
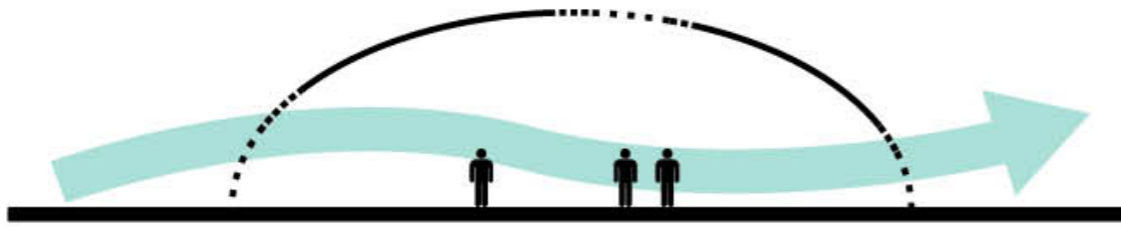
WALLS



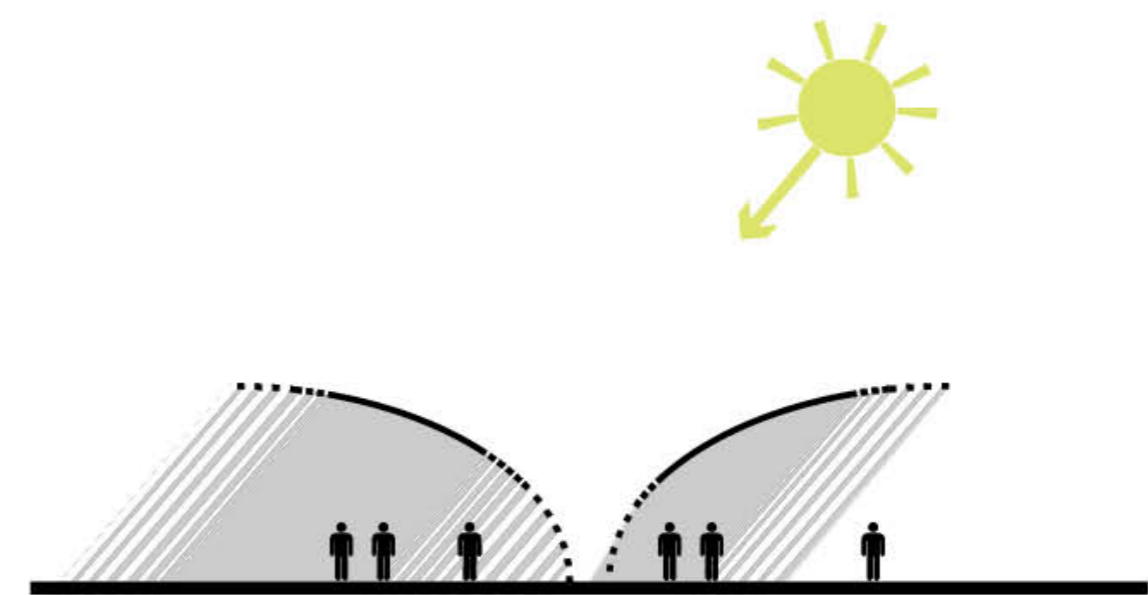
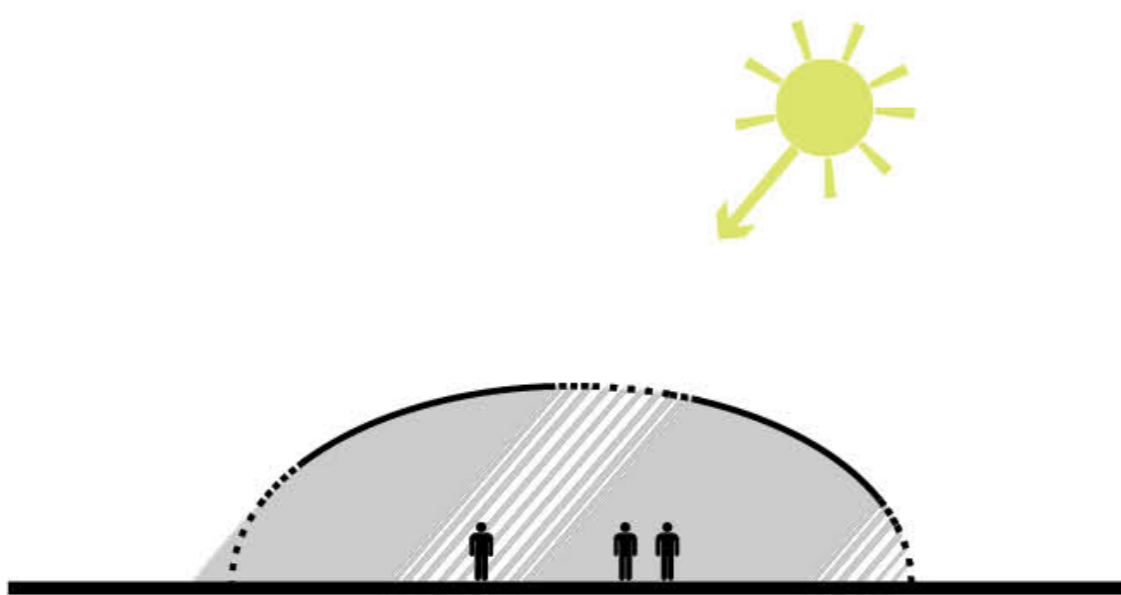
CLUSTERS

**CREATING BAMBOO ROOMS ALONG THE SPINES**



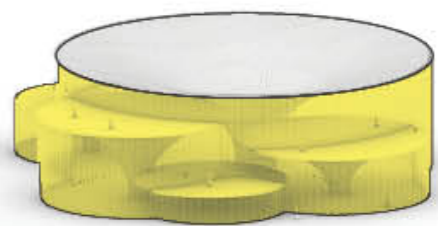
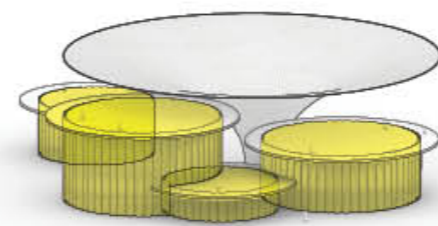
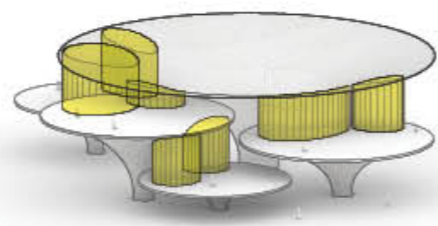
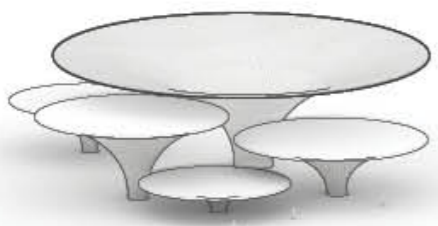


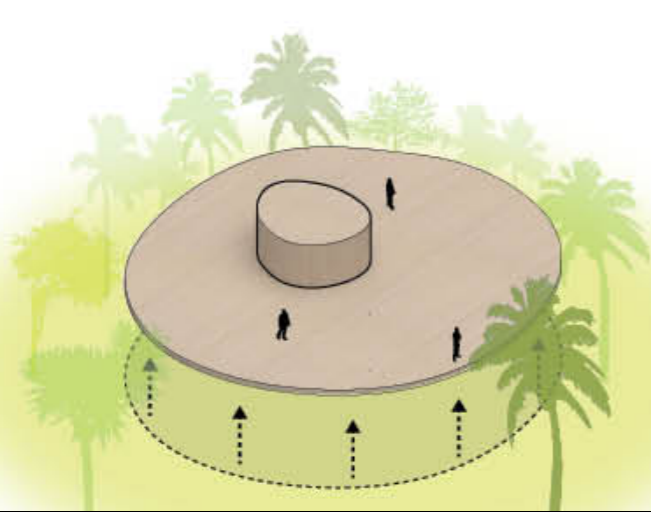
BREATHING ENVIRONMENTS





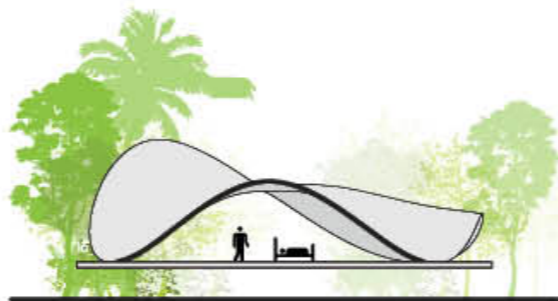
TOWN CENTER



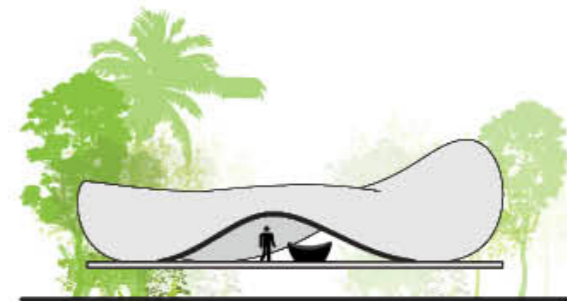




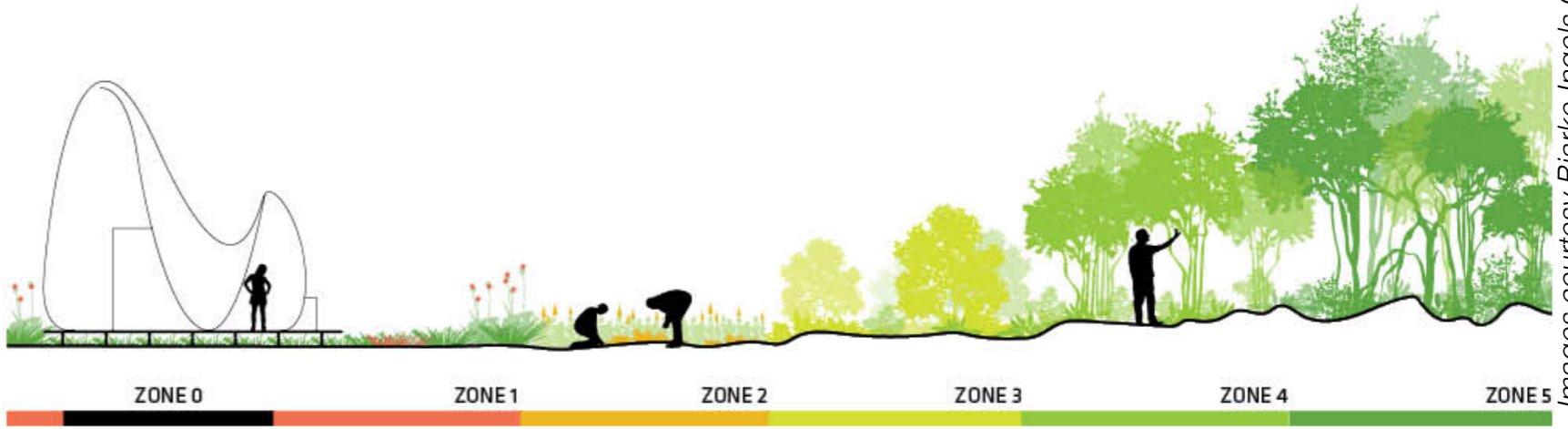
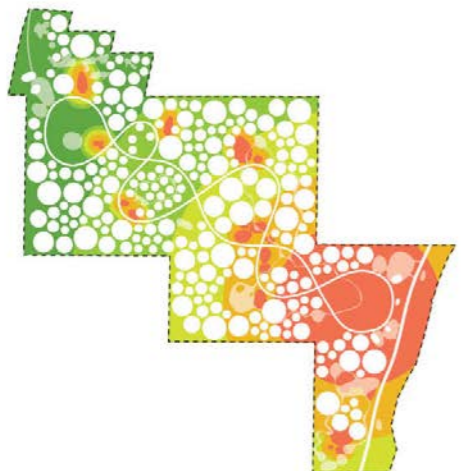
HIGH LIET ADIACENT TO THE GATHERING AREA



MEDIUM LIET ADIACENT TO THE RESTING AREA



LOW LIET ADIACENT TO THE WASHING AREA



Images courtesy Bjarke Ingels Group

# Cool Villages

*Take Back The Climate*



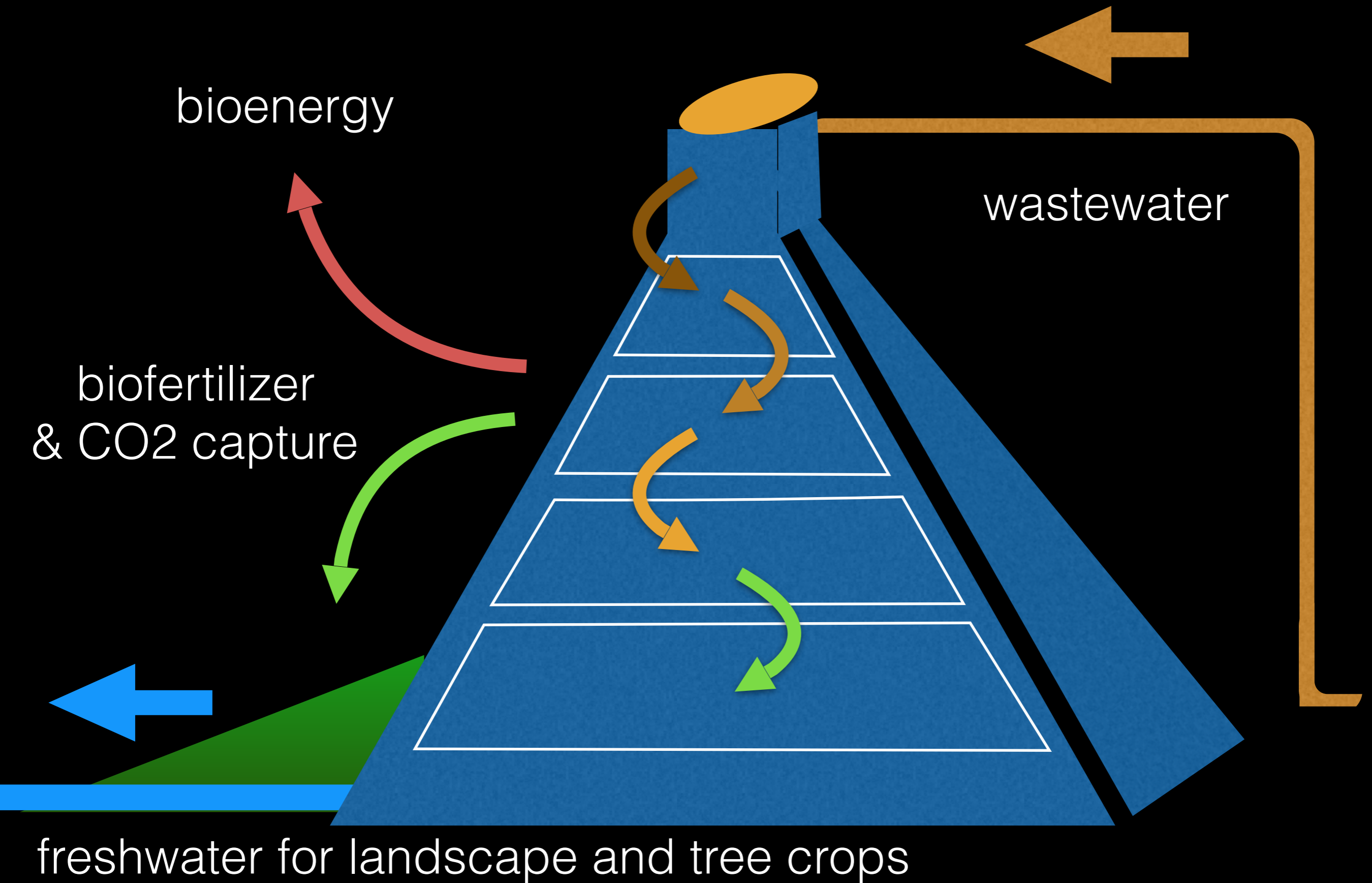


# closing the carbon circle

feedstocks from wastes  
waste heat recapture  
carbon sequestration  
ecologically beneficial  
high ROI



# Living Machine Pyramids



**COOL.DESIGN**  
Unincorporated Working Group

**ECO2**  
B-corporation (pending)

**GLOBAL VILLAGE**  
US Charity / Fiscal Sponsor (est. 1976 - 501(c)(3))

**CO2OL**  
Limited liability company  
(est. 2016 Dominican Republic)



**BIG?**

SOIL

SUB-SOIL



**THE VIEW FROM SEBASTIAN'S ROOF TODAY...**



**PUERTAS COMMUNITY TOMORROW.**



Palenque

Chichen

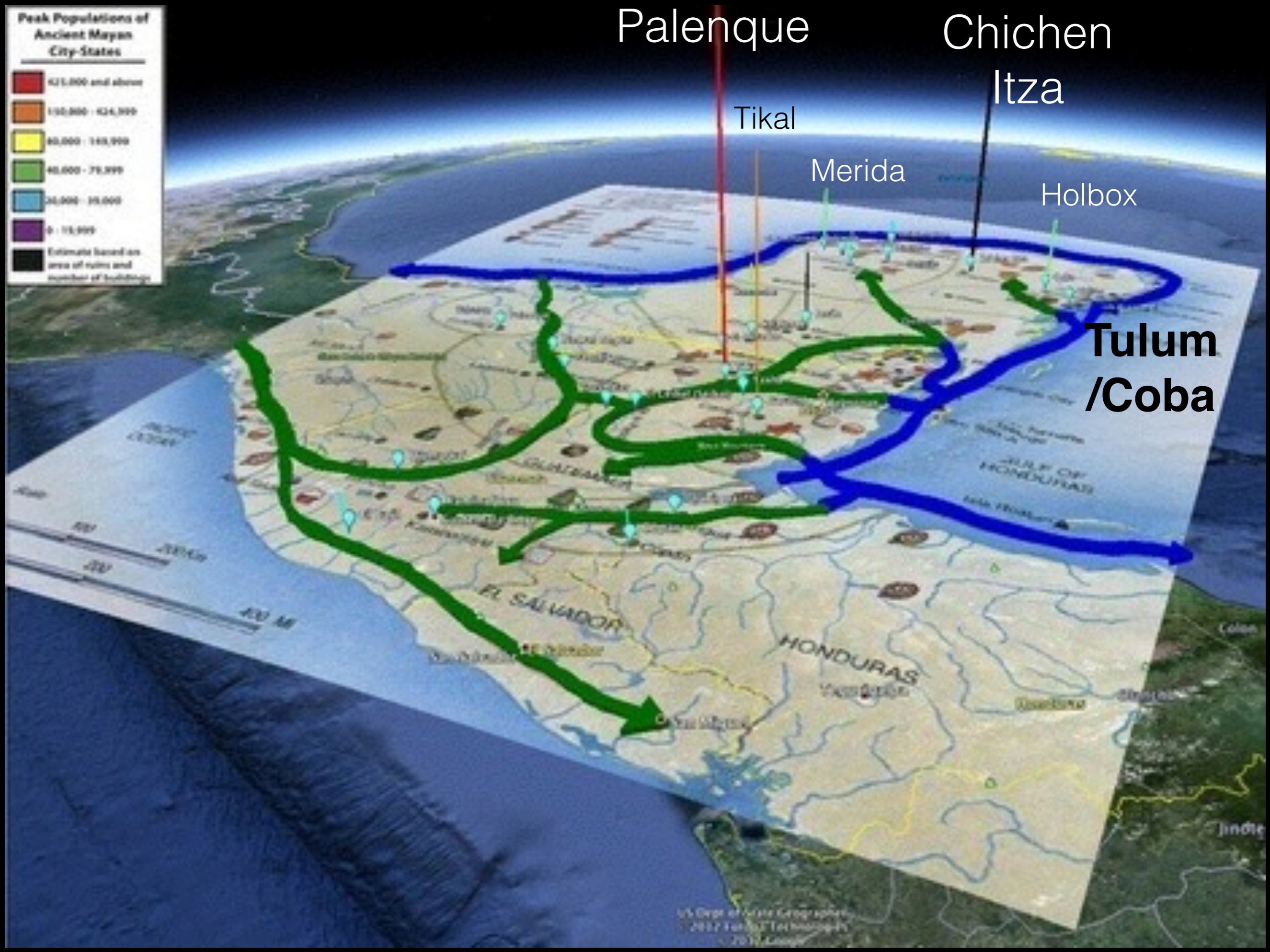
Itza

Tikal

Merida

Holbox

**Tulum  
/Coba**



We can reverse climate change and  
return the planet to the comfortable Holocene.

At the same time we can grow more nutritious food.

Albert Bates

The Farm Ecovillage Training Center  
Summertown TN 38483 USA

Ridgedale Permaculture • August 18, 2016

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Q1

COOL.DESIGN



Cool Design