

CONSIDERATIONS ON THE POTENTIAL OF INCREASE IN COASTAL VULNERABILITY IN TINHARÉ AND BOIPEBA ISLANDS, BAHIA, BRAZIL, IN FACE OF CLIMATE CHANGE

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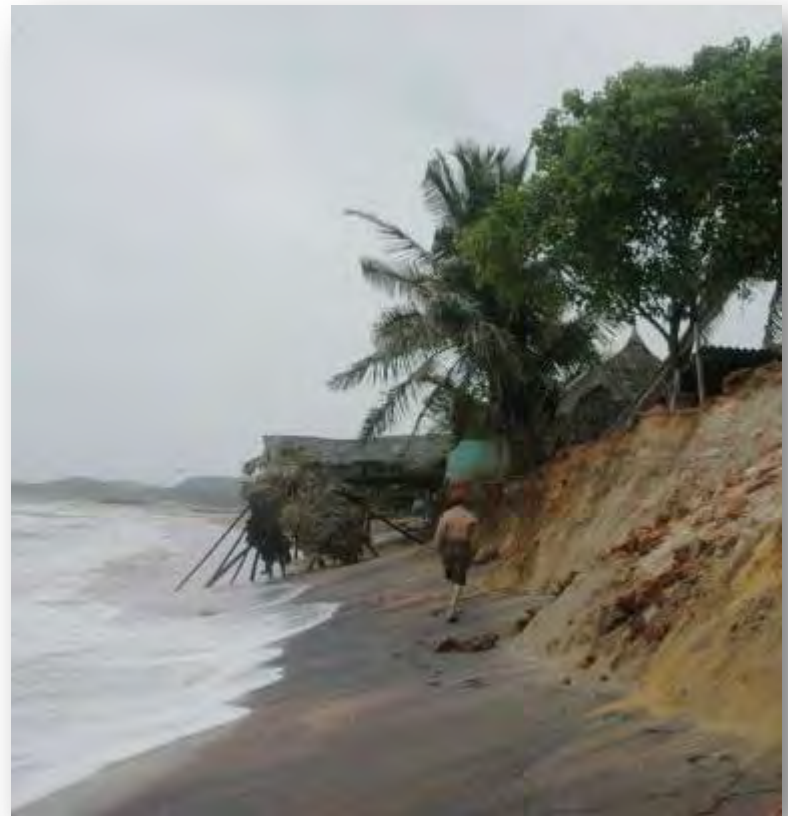


Coastal Vulnerability

- Exposure to erosion and inundation

+

- Population



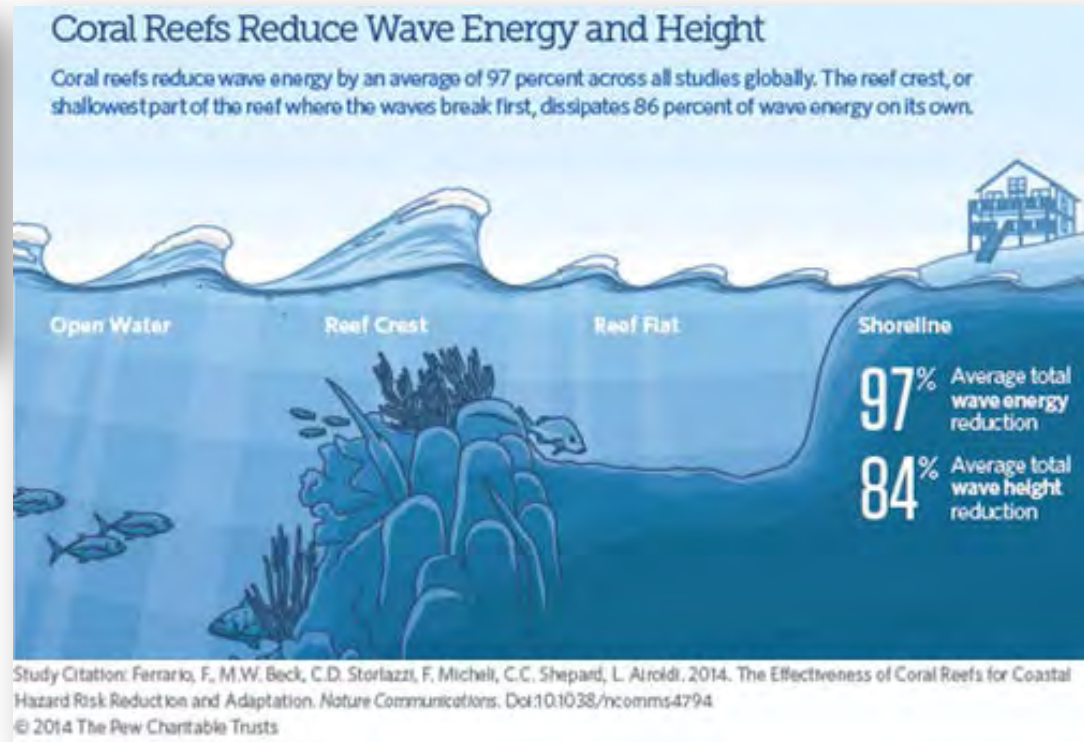
Coastal Vulnerability

- Biological and geophysical factors → increase/decrease in CV



Natural Capital

Ecosystem Services



Coral Reefs in Brazil

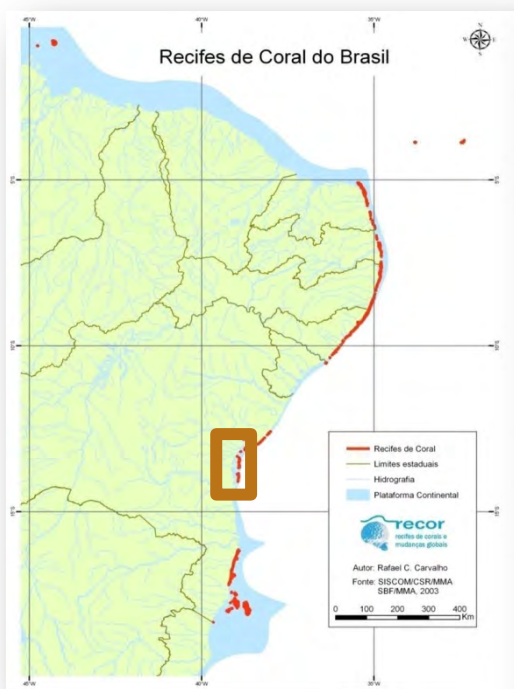
- High endemism
- Low diversity
- Siliciclastic sediments on nearshore reefs



Stressful factor: decrease in luminosity



Tinharé and Boipeba Islands



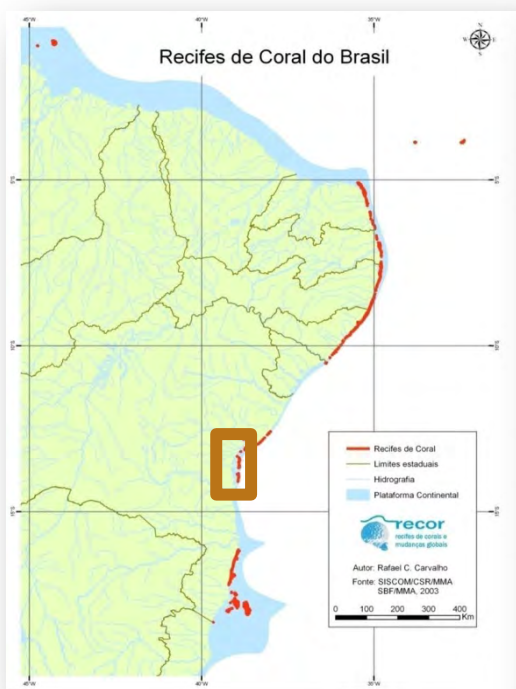
- Fringing reefs
- Important ecosystem services
- MPA
- Chronic human impacts

Tourism: *Morro de São Paulo*

Lack of sewage system

Fisheries

Tinharé and Boipeba Islands



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Tourism: *Morro de São Paulo*

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Fisheries

Climate change impacts?

Objective

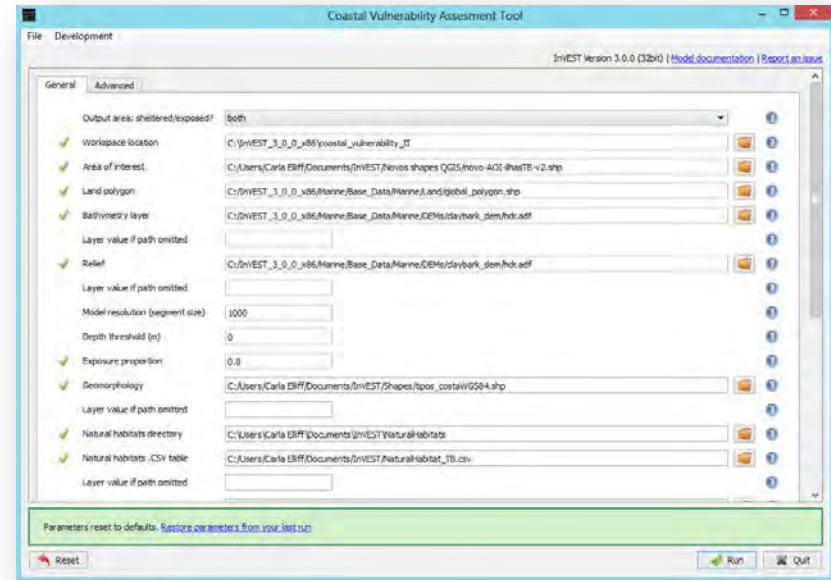
- Assess the **potential coastline protection** provided by these **coral reefs** in the **current scenario** and in a **scenario of coral reef absence** (extreme reef decline)



InVEST (Integrated Valuation of Ecosystem Services and Tradeoffs)

- **Coastal Vulnerability Model**

- Qualitative → potential for shoreline protection
- Exposure Index
 - **Geomorphology**
 - **Relief**
 - **Habitats**
 - **Winds and waves**
 - **Storm surges**
- Simplification of processes



Coastal Vulnerability Model

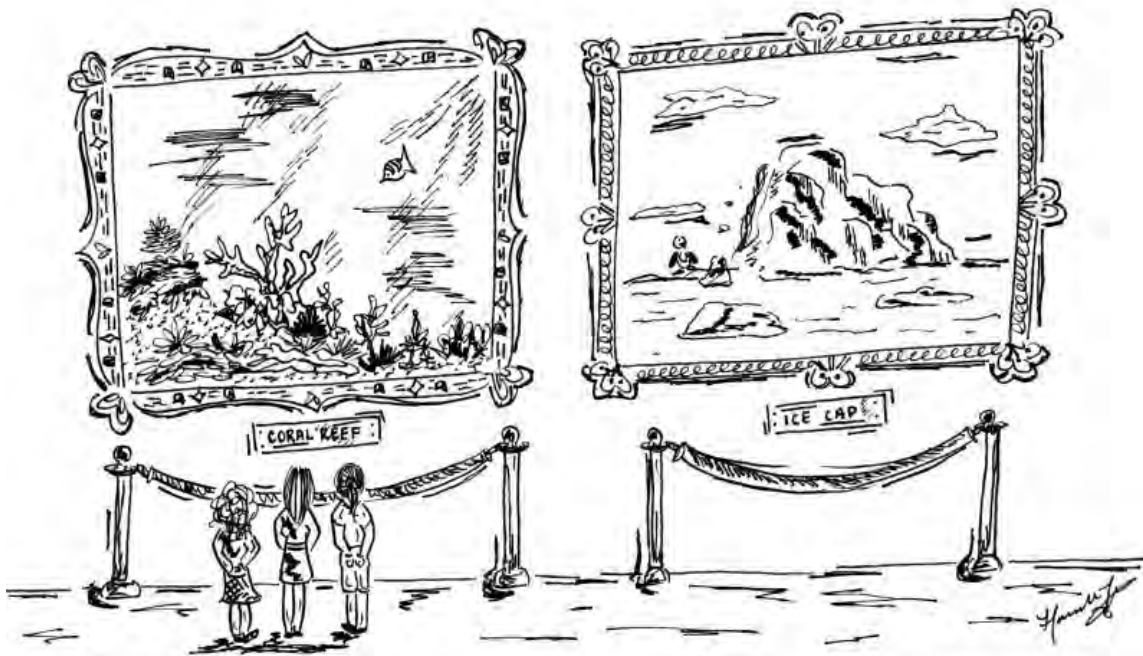
Input

- **Area of Interest** → must include WaveWatchIII points
- **Geomorphology** polyline → Exposure Index
- **Coral reef** polygon
- **Relief** and **bathymetry**
- **Population data**



Scenarios

- **Current scenario**
- **Scenario of absence of coral reefs**
 - Extreme
 - Chronic impacts + bleaching + ocean acidification...

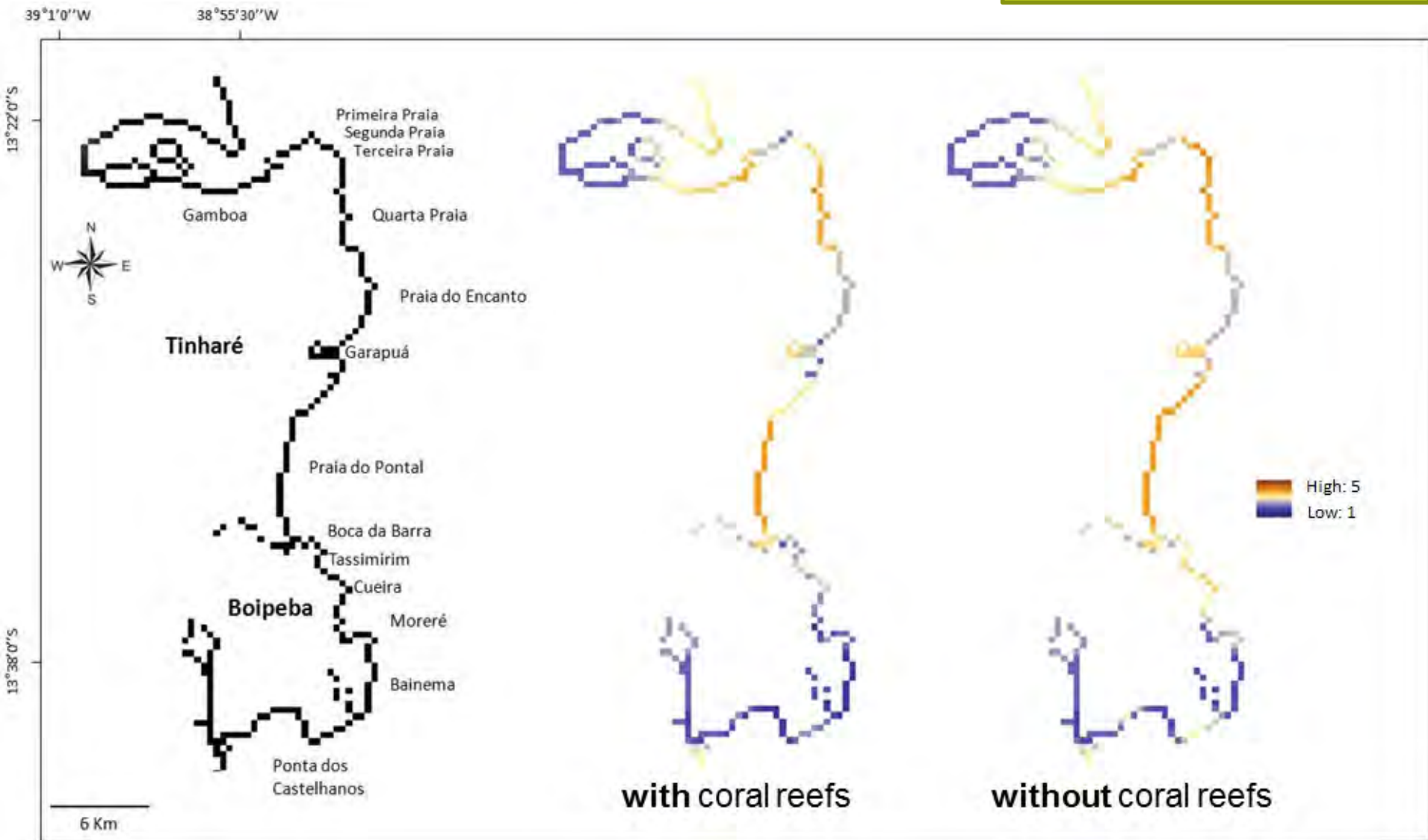


“Exhibition: Landscapes of the Past”

by Hannah Luk

Results

*pixel size → 350x350 m



Results

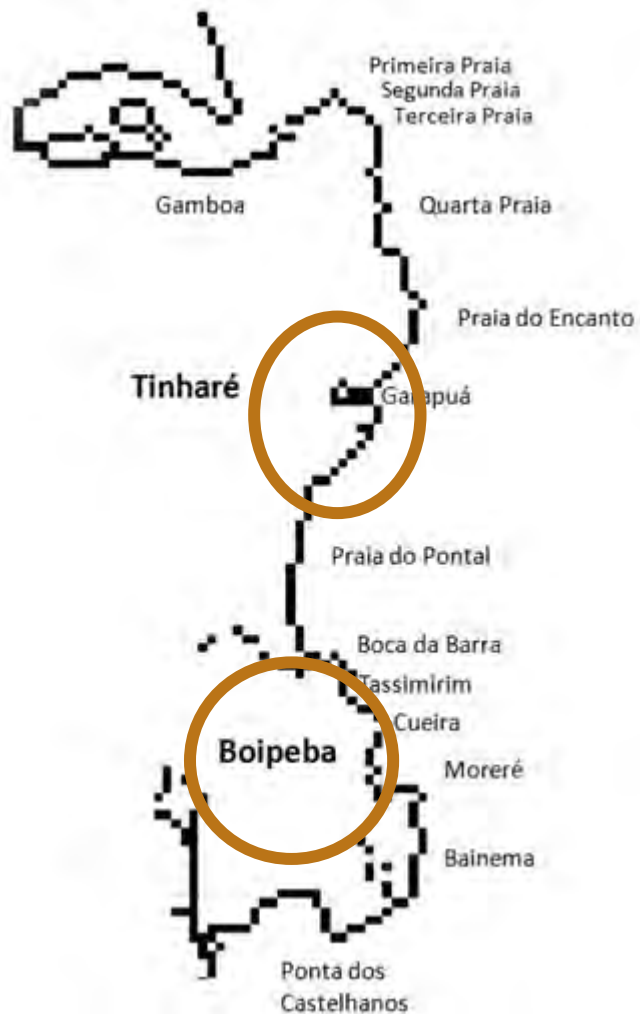
Population



- Morro de São Paulo
- Gamboa

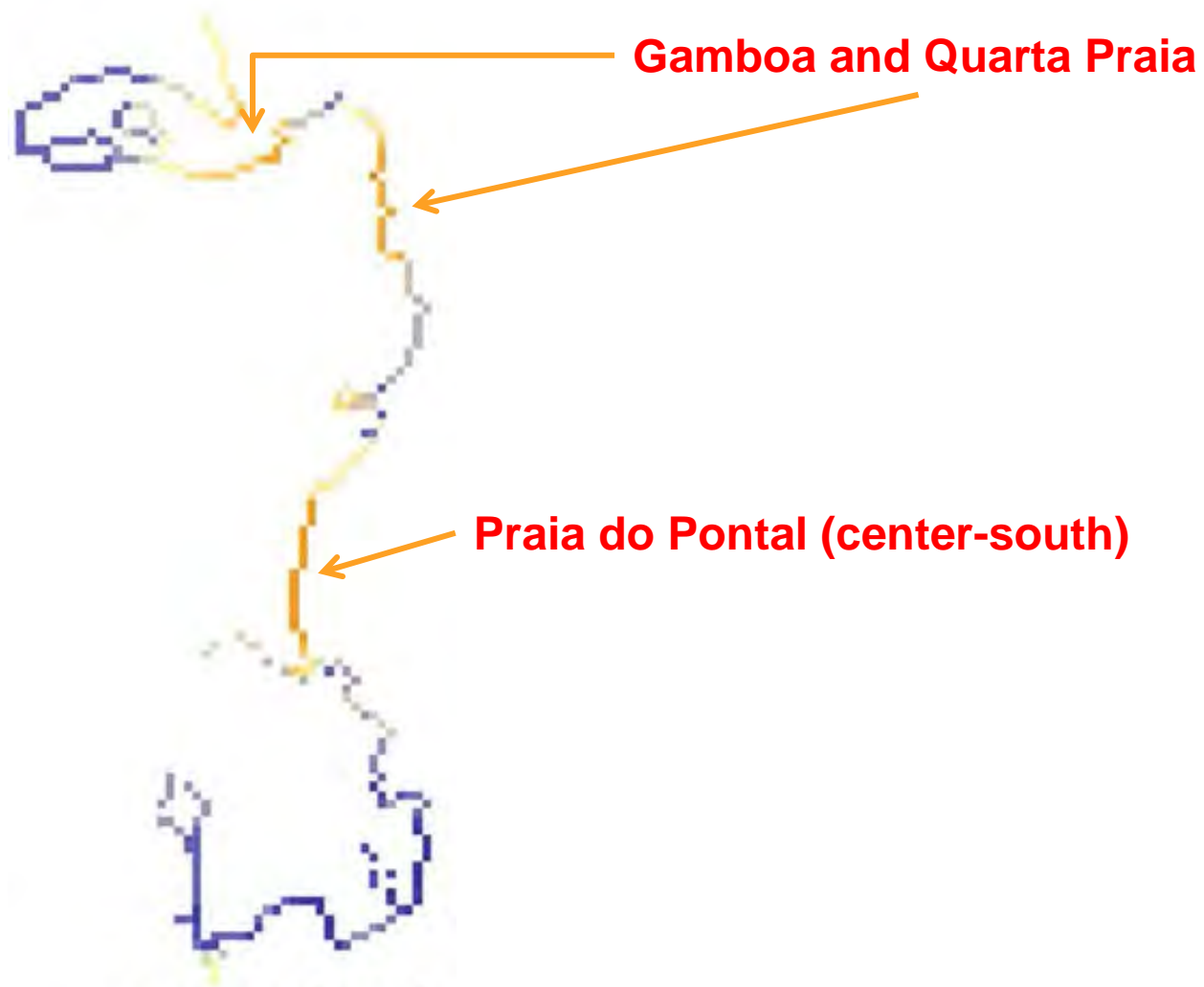
Results

Population



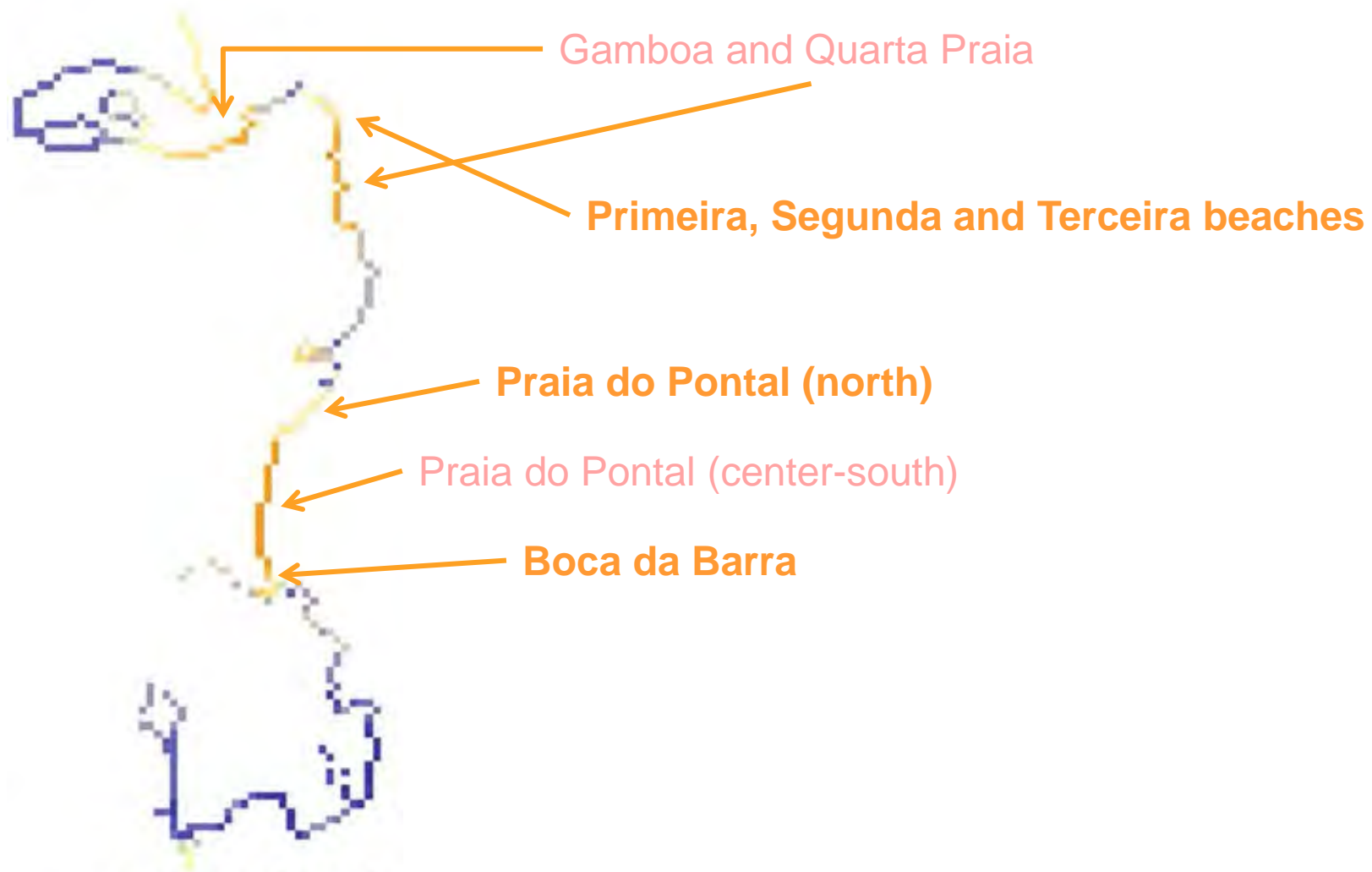
- Garapuá
- Boipeba island

Results



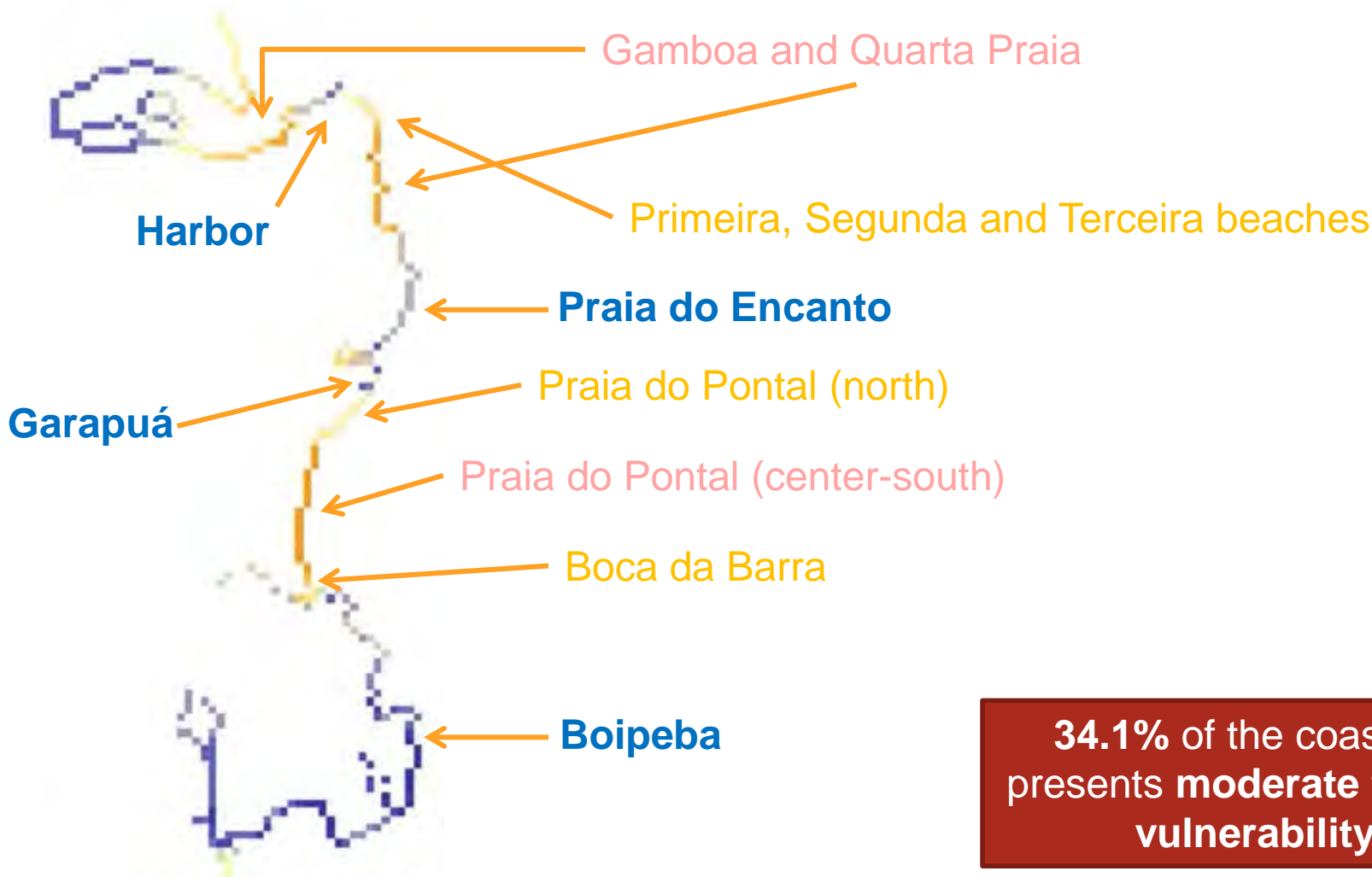
with the coral reefs

Results



with the coral reefs

Results



34.1% of the coastline presents moderate to high vulnerability

with the coral reefs

Results

Without the coral reefs

46.8% of the coastline with moderate to high vulnerability



Increase of **12.7%**

50.5% of the coastline had some increase in the vulnerability index

Areas with mangroves had low vulnerability



without the coral reefs

Results

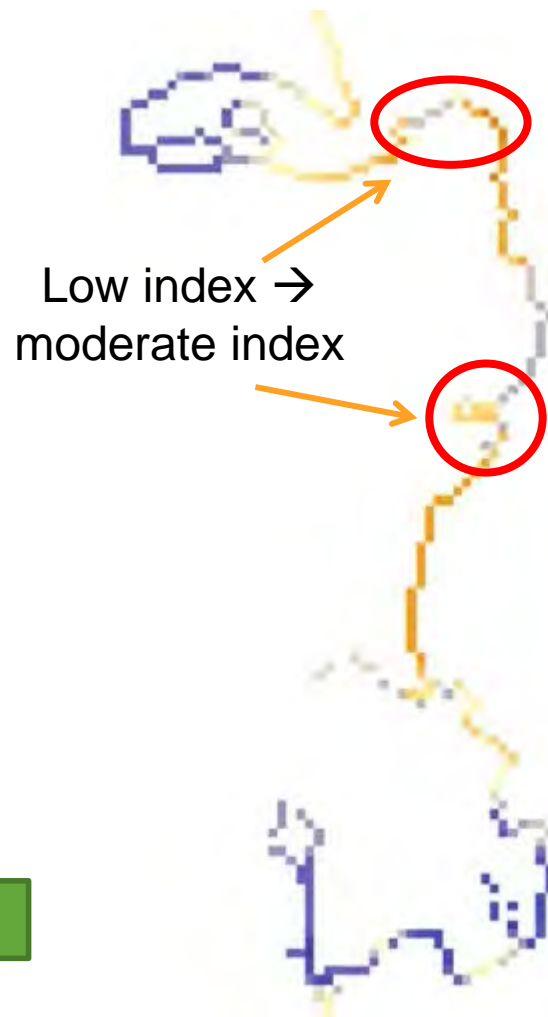
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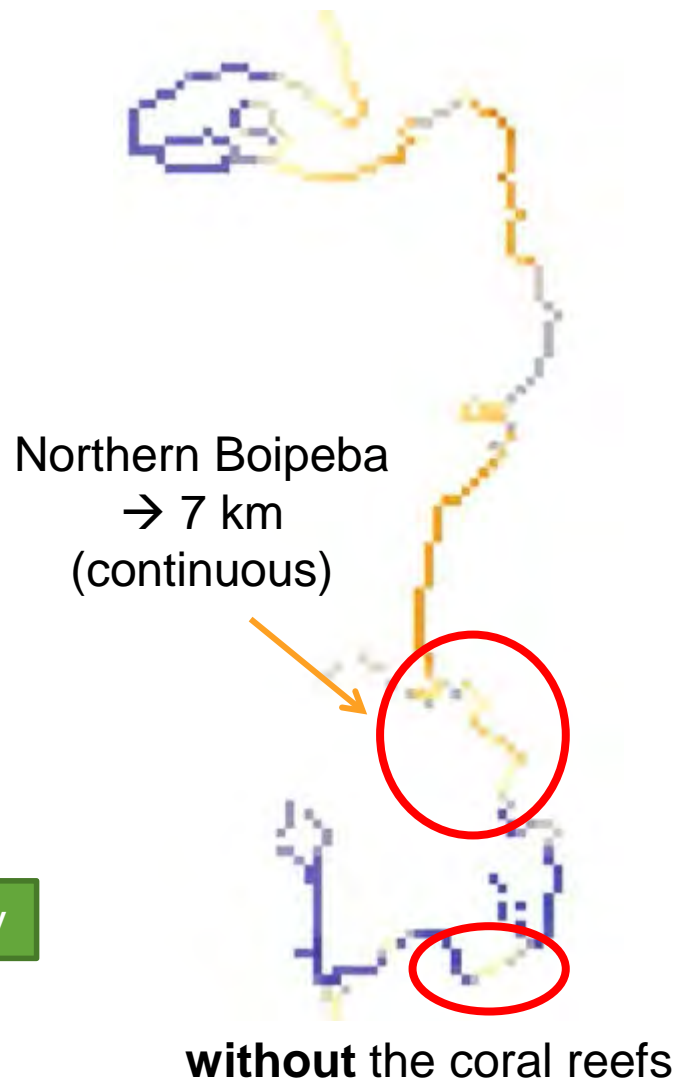
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46.8% of the coastline with **moderate to high vulnerability**

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Conclusions

- Concerning results → synergy between chronic impacts + climate change



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- **Management strategies**
 - Climate change adaptation
 - Address local stressors

Conclusions



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- Positive thermal anomalies, ocean acidification, sea level rise → tipping points
- Decrease in human well-being → more erosion, less tourism
- Management strategies
 - Climate change adaptation
 - Address local stressors
- Greater resilience → supply of **ecosystem services**

Thank you

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