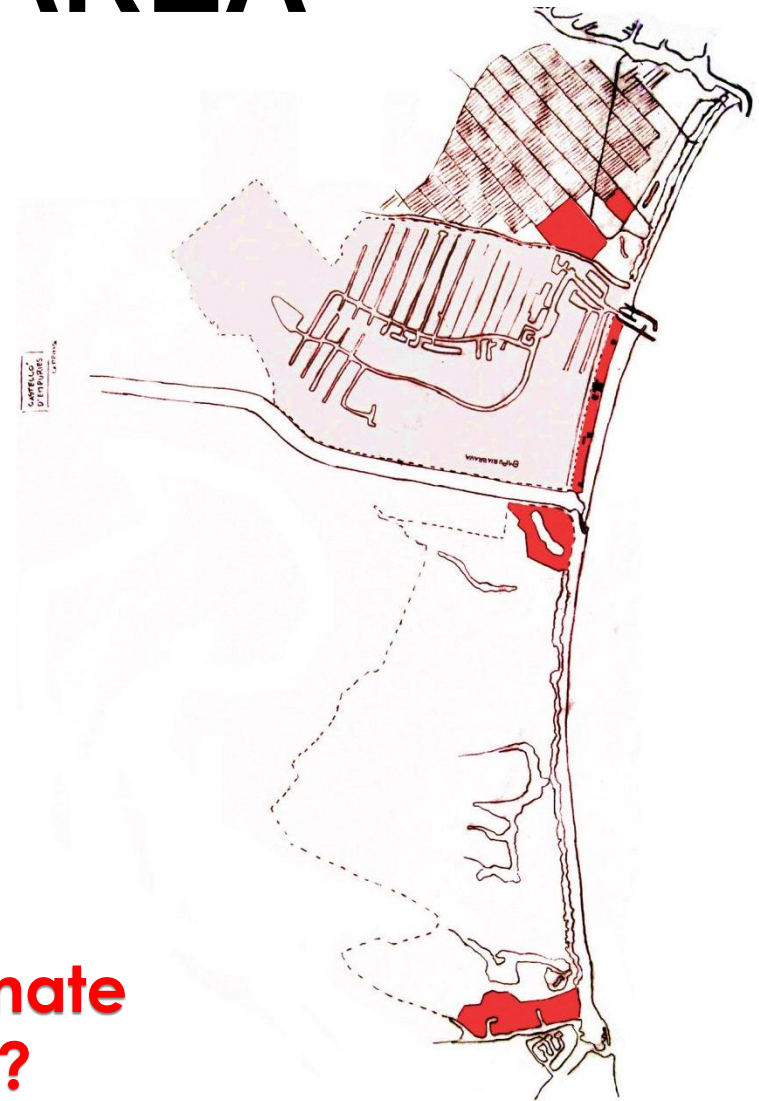


Adaptation to climate change

# in the COASTAL AREA



**What will be the effects of climate change in coastal landscape?**

First scenario <sup>1</sup> (moderate)	Second scenario (less optimistic) <sup>1</sup>
Sea level: +20 <sup>2</sup> cm	Sea level: +80 <sup>3</sup> cm
Population: +14 %	Population: +40 %
Temperature: + 0,2 °C	Temperature: + 0,9 °C
Precipitation: -0,7% (from 500 mm to 496 mm)	Precipitation: -11,9% (from 500 mm to 440 mm)
Wind: -6,6%	Wind: +1,3%

---

<sup>1</sup> *“Primer informe sobre la generaci o d'escenaris clim atics regionalitzats per a Catalunya durant el segle XXI”*

<sup>2</sup> Source: Ministerio de Medio Ambiente

<sup>3</sup> Extreme situation hypothesized

## Swot analyse

### **STRENGTH:**

- **Parc Natural de Cap de Creus and Parc Natural dels Aiguamolls of l 'Empordà**
- **Environmental heritage (dunes, biodiversity)**
- **Unique ecological place (ex. closes and wet lands)**

### **WEAKNESSES:**

- High habitat fragmentation
- High seasonality so high pressures in short time
- Cost of maintenance (ex. problem of leaves, clean services)
- Bad quality of water in Empuriabrava
- Nautical mobility
- High anthropic use of the beach (parking and pounding)

### **THREATS:**

- Sea level rise
- Erosion/loss of beach
- Sea storms
- River flooding risk
- Soil salinisation
- Change of the natural ecosystem
- Change of economic tourism induced

### **OPPORTUNITIES:**

- Different kinds of tourism (naturalistic and rural tourism) so change of economic tourism induced
- Longer touristic season so an deseasonalisation of tourist flows
- Possibility of european projects



## STRENGTH:

- Parc Natural de Cap de Creus and Parc Natural dels Aiguamolls of l'Empordà
- Environmental heritage (dunes, biodiversity)
- Unique ecological place (ex. closes and wet lands)

## WEAKNESSES:

- **High habitat fragmentation**
- **High seasonality so high pressures in short time**
- **Cost of maintenance (ex. problem of leaves, clean services)**
- **Bad quality of water in Empuriabrava**
- **Nautical mobility**
- **High anthropic use of the beach (parking and pounding)**

## THREATS:

- Sea level rise
- Erosion/loss of beach
- Sea storms
- River flooding risk
- Soil salinisation
- Change of the natural ecosystem
- Change of economic tourism induced

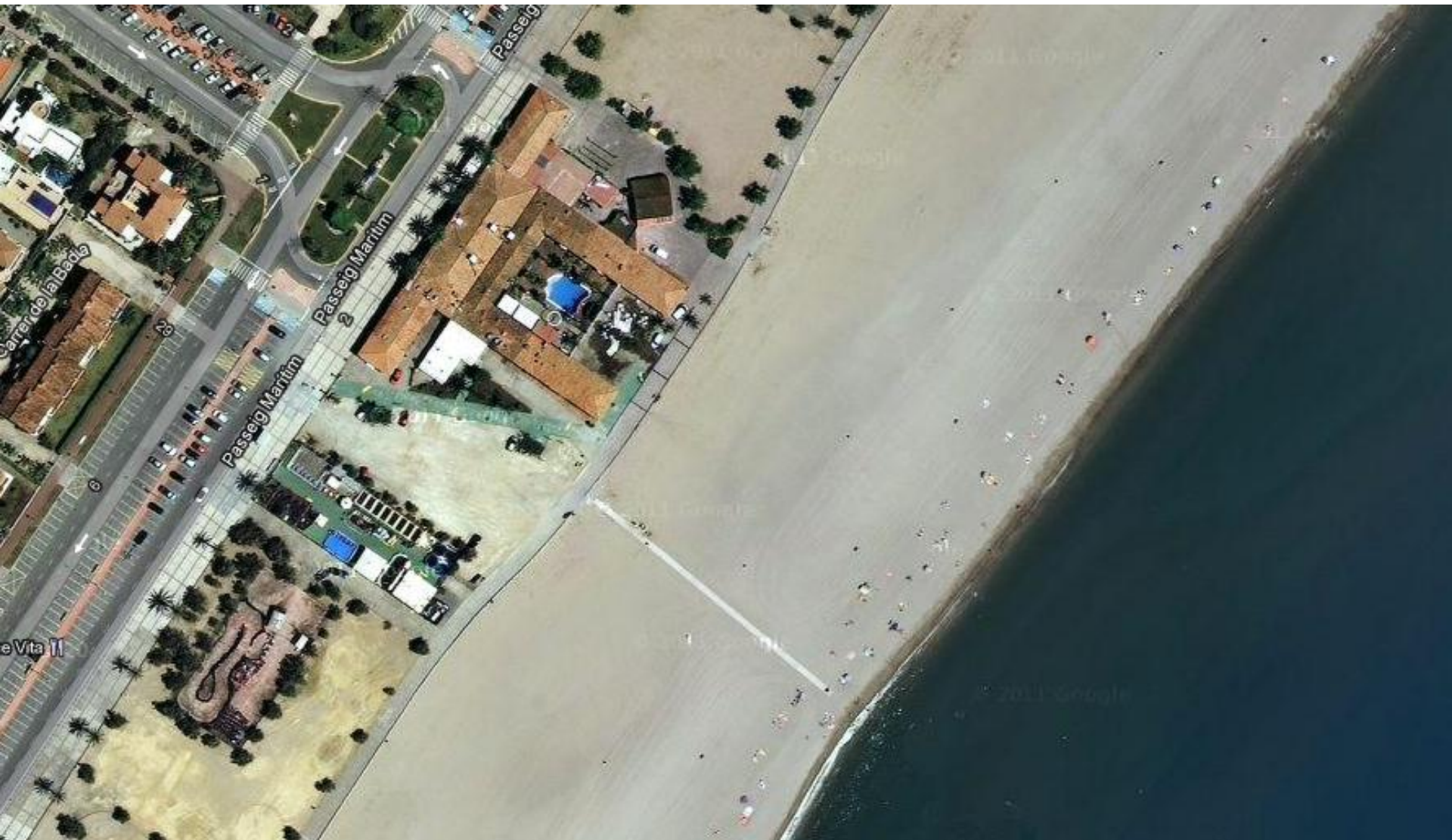
## OPPORTUNITIES:

- Different kinds of tourism (naturalistic and rural tourism) so change of economic tourism induced
- Longer touristic season so an deseasonalisation of tourist flows
- Possibility of european projects



Anthropic use

# Anthropic use



## STRENGTH:

- Parc Natural de Cap de Creus and Parc Natural dels Aiguamolls of l'Empordà
- Environmental heritage (dunes, biodiversity)
- Unique ecological place (ex. closes and wet lands)

## WEAKNESSES:

- High habitat fragmentation
- High seasonality so high pressures in short time
- Cost of maintenance (ex. problem of leaves, clean services)
- Bad quality of water in Empuriabrava
- Nautical mobility
- High anthropic use of the beach (parking and pounding)

## THREATS:

- **Sea level rise**
- **Erosion/loss of beach**
- **Sea storms**
- **River flooding risk**
- **Soil salinisation**
- **Change of the natural ecosystem**
- **Change of economic tourism induced**

## OPPORTUNITIES:

- Different kinds of tourism (naturalistic and rural tourism) so change of economic tourism induced
- Longer touristic season so an deseasonalisation of tourist flows
- Possibility of european projects



# Costa Brava



# Costa Brava



# Costa Brava



## STRENGTH:

- Parc Natural de Cap de Creus and Parc Natural dels Aiguamolls of l'Empordà
- Environmental heritage (dunes, biodiversity)
- Unique ecological place (ex. closes and wet lands)

## WEAKNESSES:

- High habitat fragmentation
- High seasonality so high pressures in short time
- Cost of maintenance (ex. problem of leaves, clean services)
- Bad quality of water in Empuriabrava
- Nautical mobility
- High anthropic use of the beach (parking and pounding)

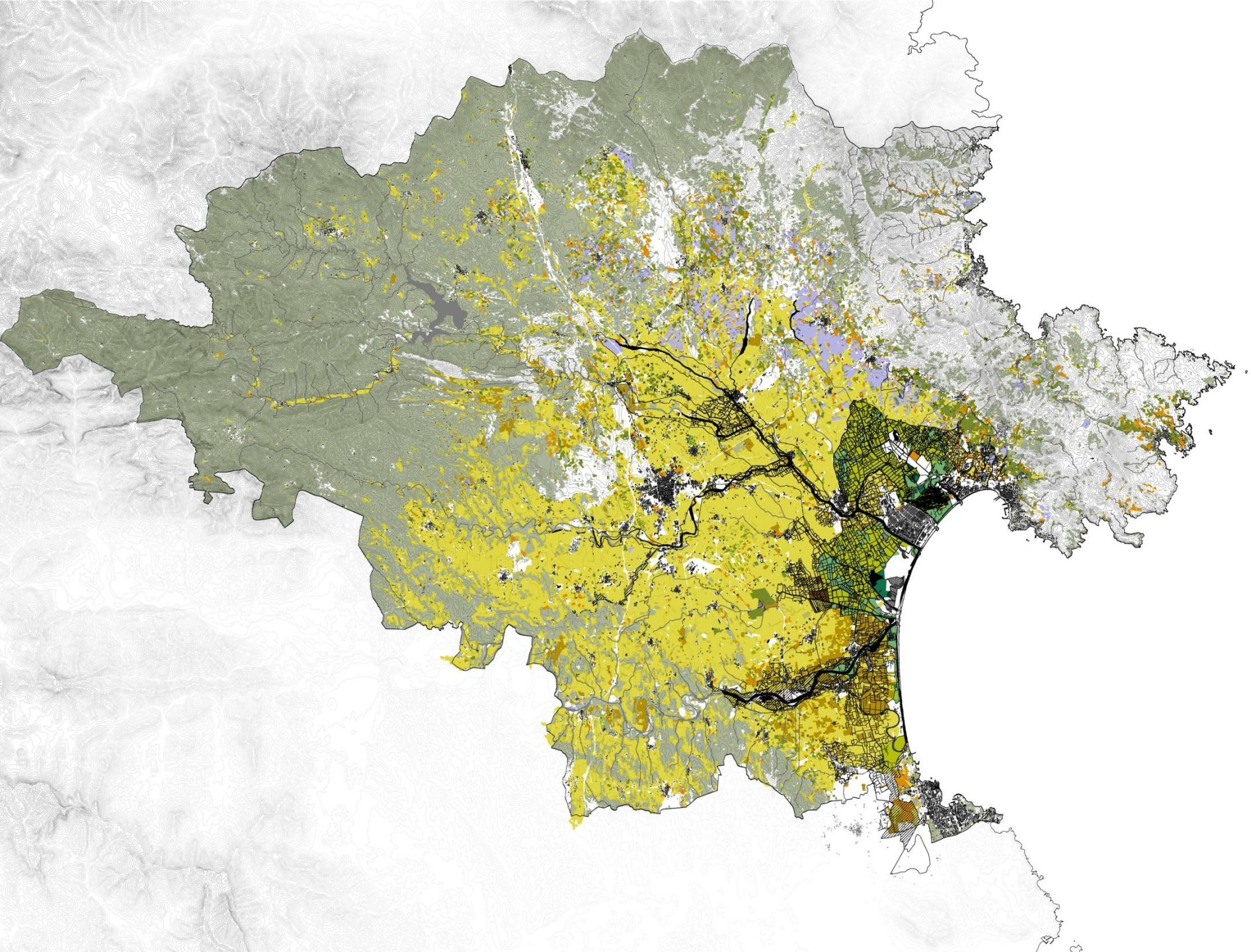
## THREATS:

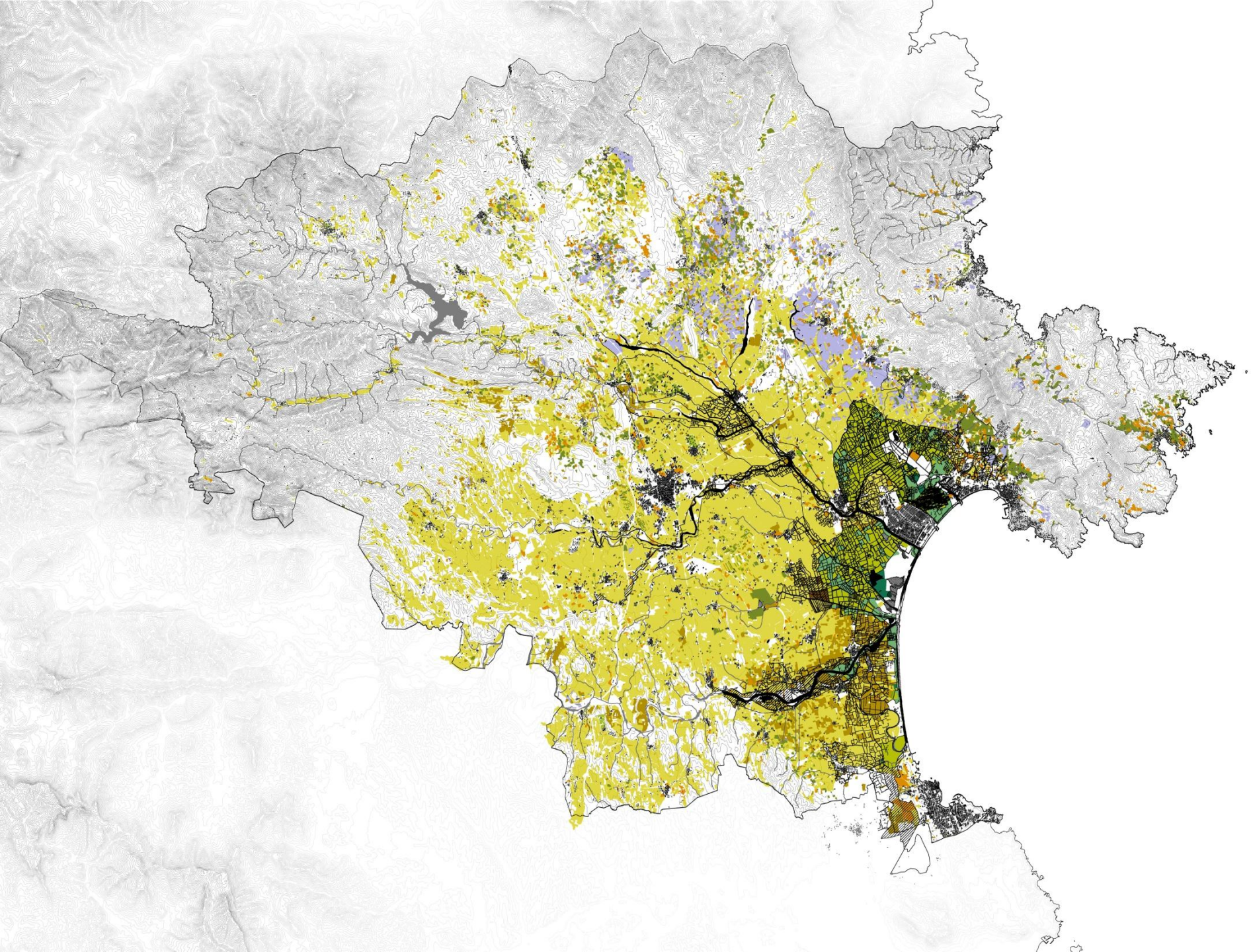
- Sea level rise
- Erosion/loss of beach
- Sea storms
- River flooding risk
- Soil salinisation
- Change of the natural ecosystem
- Change of economic tourism induced

## OPPORTUNITIES:

- **Different kinds of tourism (naturalistic and rural tourism) so change of economic tourism induced**
- **Longer touristic season so an deseasonalisation of tourist flows**
- **Possibility of european projects**

**Agricultural – Productive system Plana de l’Empordà**





**Spaces of connection between  
agricultural and coastal systems**



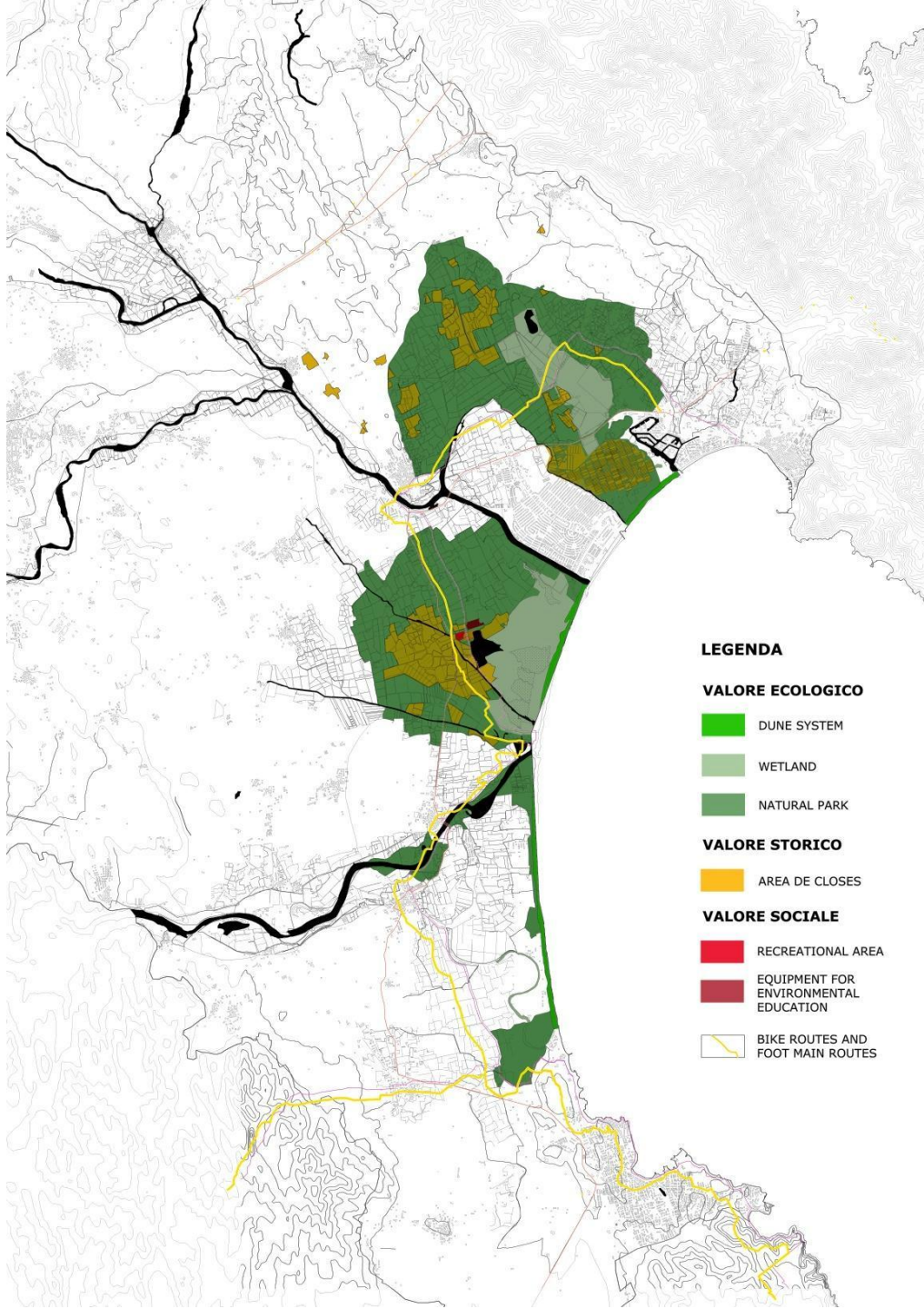








# Map of landscape values



## LEGENDA

### VALORE ECOLOGICO

- DUNE SYSTEM
- WETLAND
- NATURAL PARK

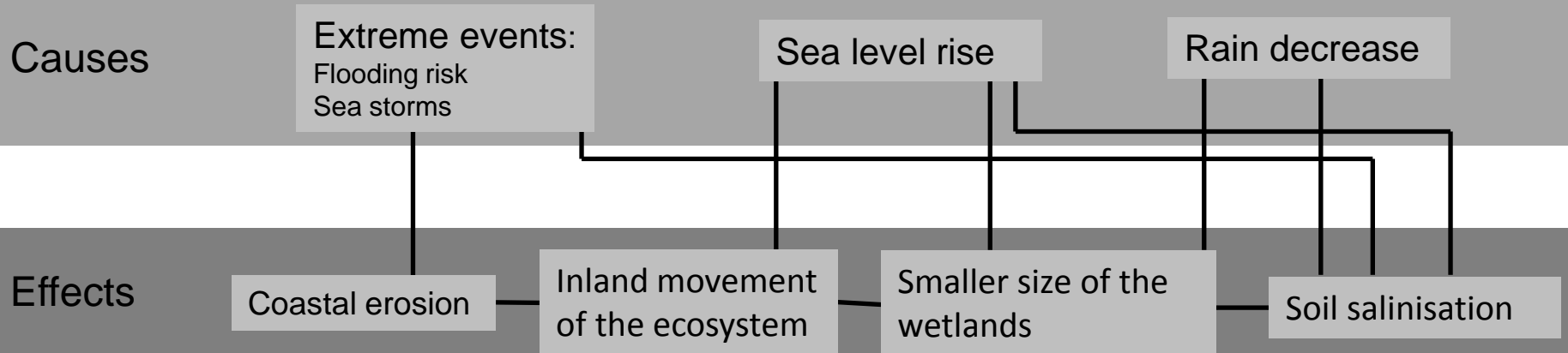
### VALORE STORICO

- AREA DE CLOSÉS

### VALORE SOCIALE

- RECREATIONAL AREA
- EQUIPMENT FOR ENVIRONMENTAL EDUCATION
- BIKE ROUTES AND FOOT MAIN ROUTES

# What will be the effects of climate change on the costal landscape?



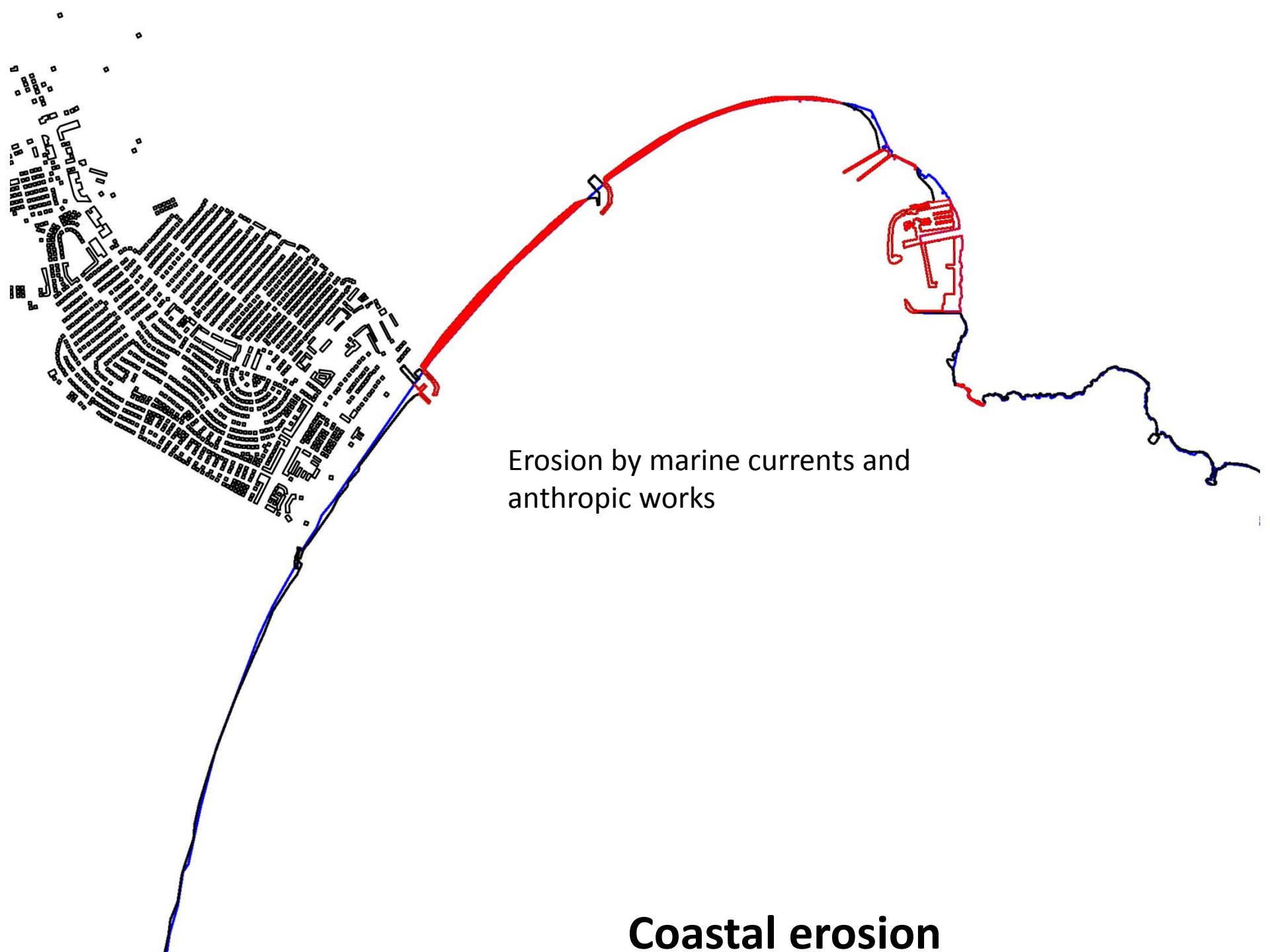


Increasing of the beach width



Coastal erosion since 1956 at 2010

## Coastal erosion

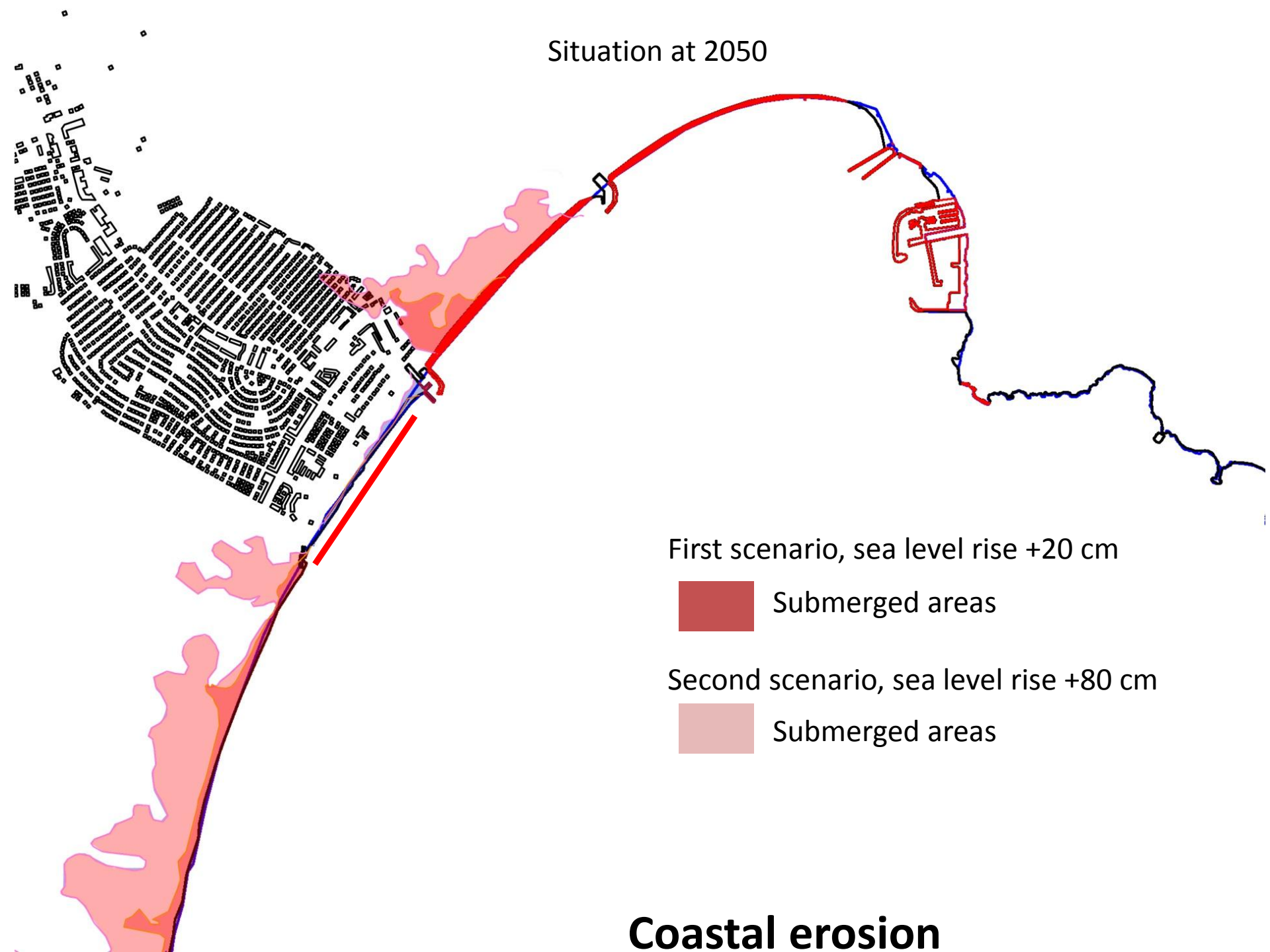


Erosion by marine currents and anthropic works

**Coastal erosion**



Situation at 2050



**Coastal erosion**

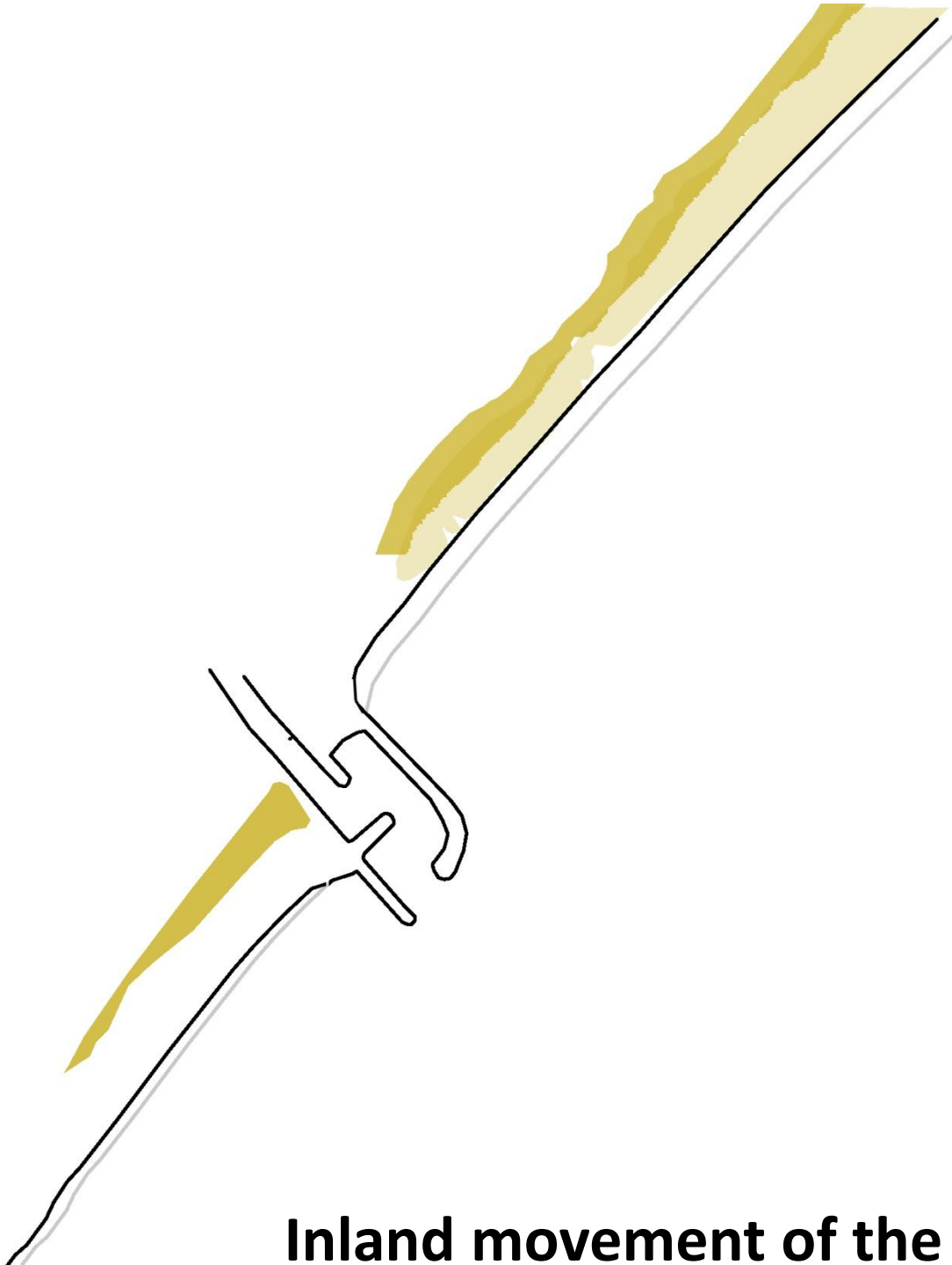


**Inland movement of the ecosystem**



Inland movement of the ecosystem

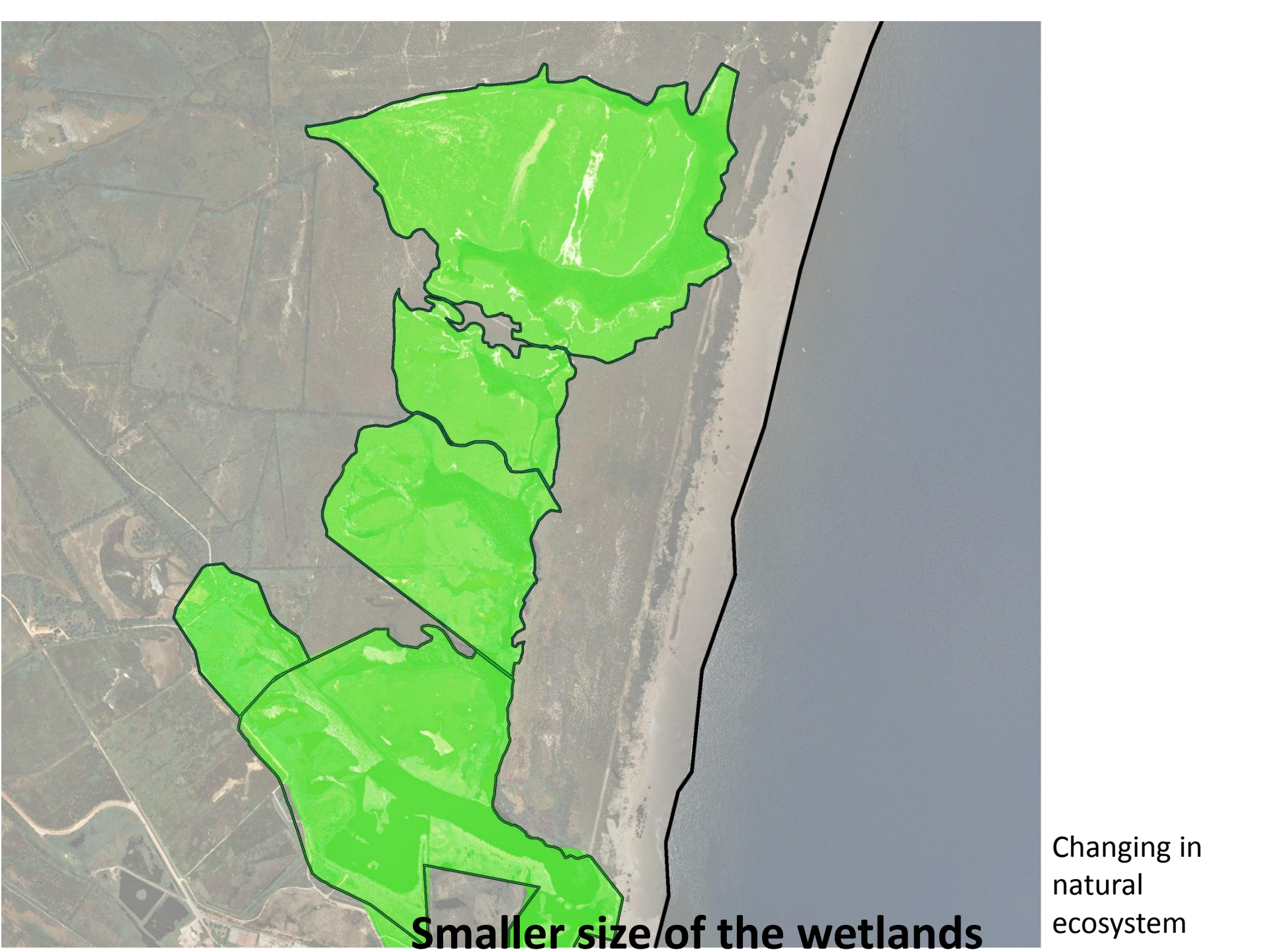
**Inland movement of the ecosystem**



**Inland movement of the ecosystem**

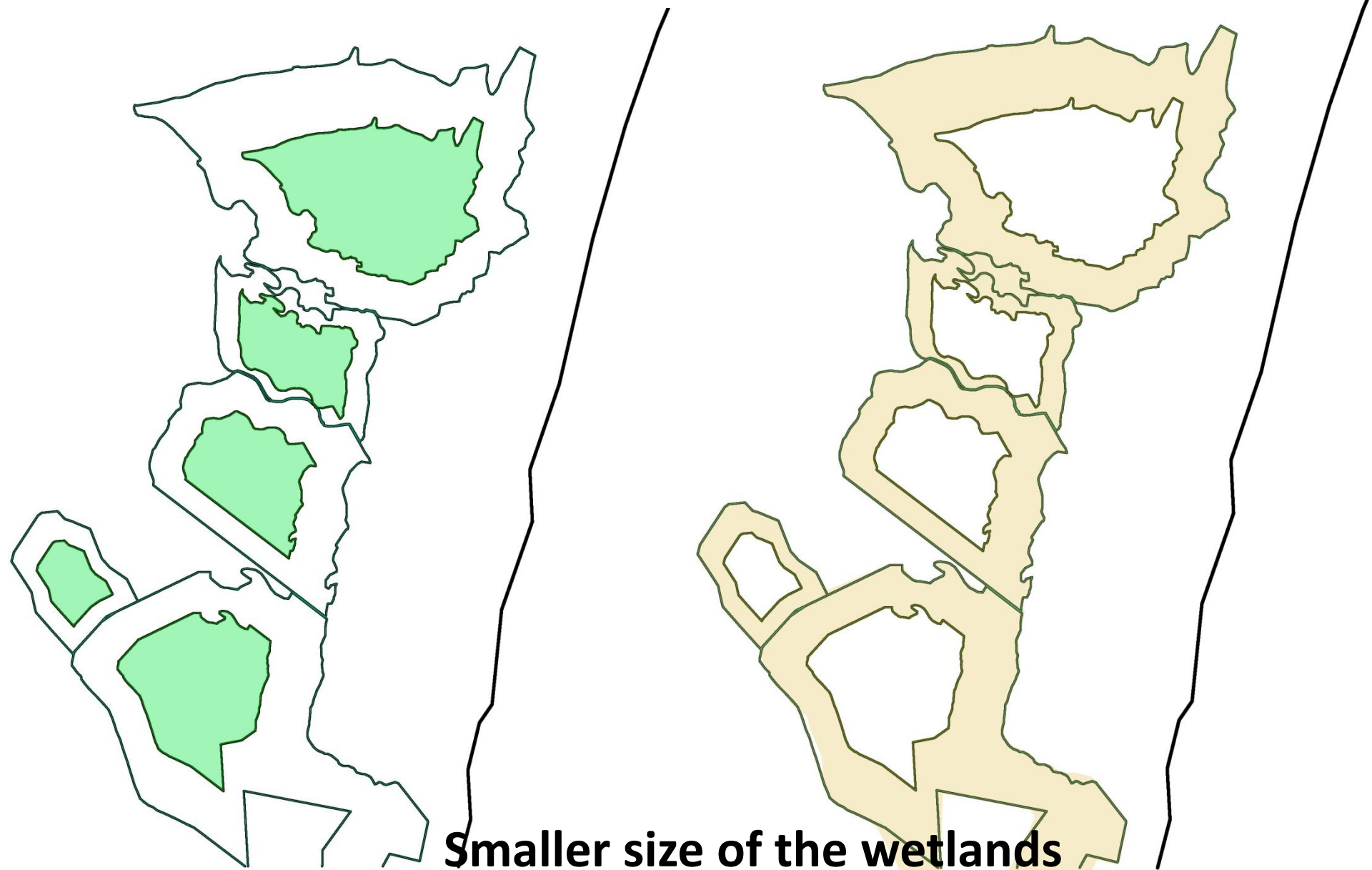


**Smaller size of the wetlands**



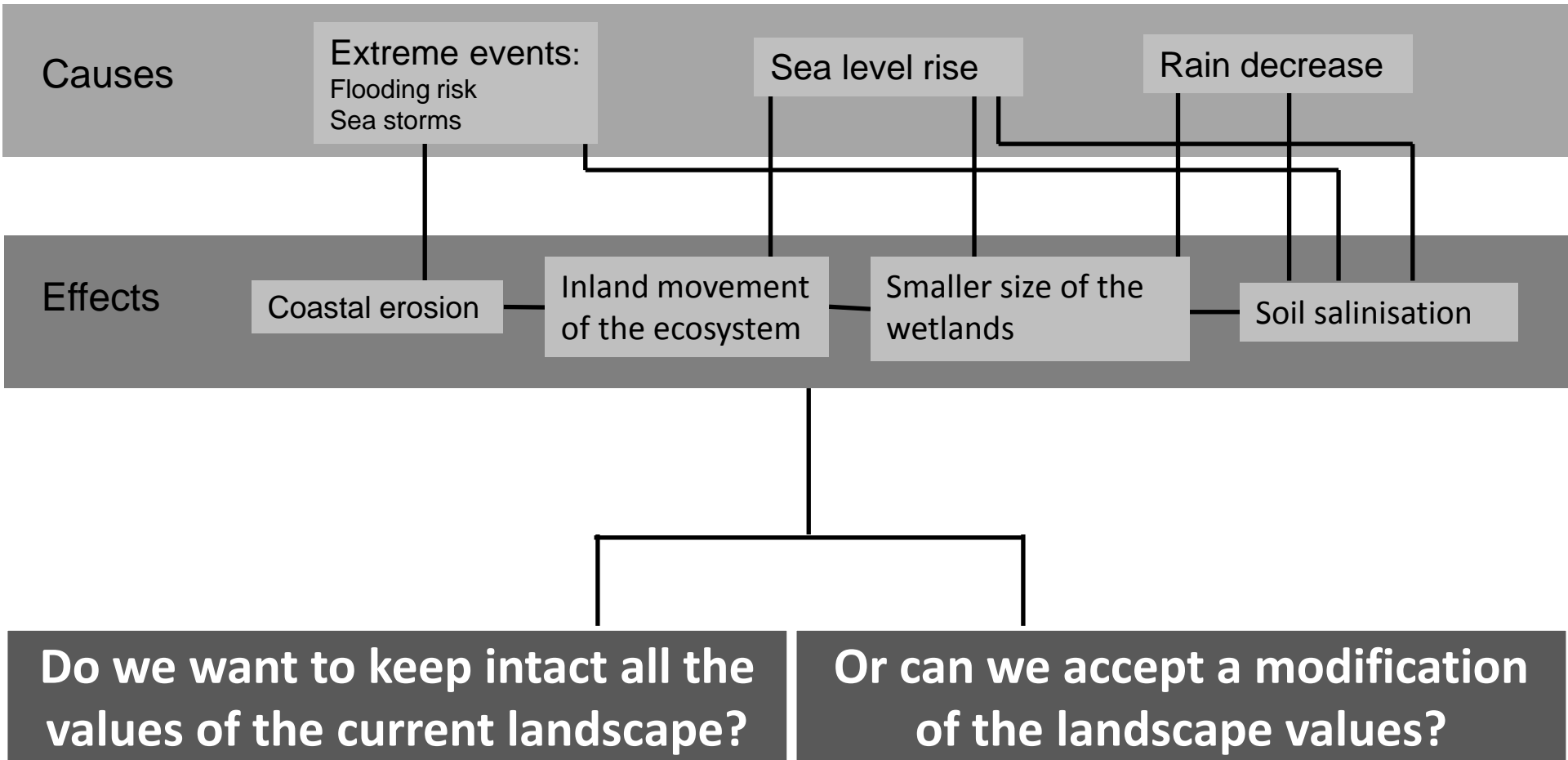
**Smaller size of the wetlands**

Changing in  
natural  
ecosystem



**Smaller size of the wetlands**

# What will be the effects of climate change on the costal landscape?



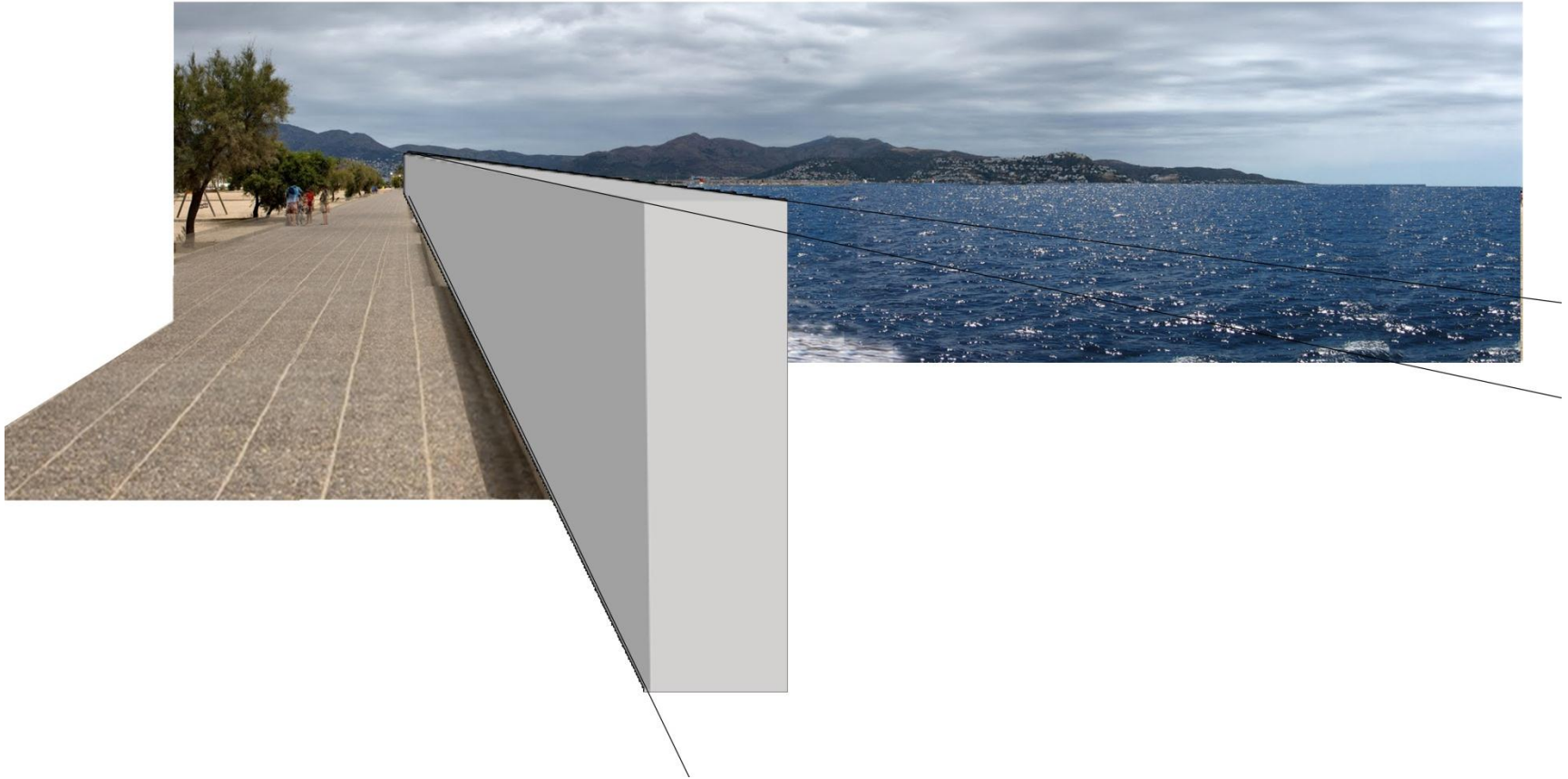


# Situation at 2012



# Do we want to keep intact all the values of the current landscape?

High impact coastal protection works



In our opinion this is not possible because of the high environmental impacts and economic crisis

**If we accept that the nature takes its course changing the landscape values... we can also start thinking about other uses of costal area...**



Rio Muga 2012



Sea level rise +20 cm

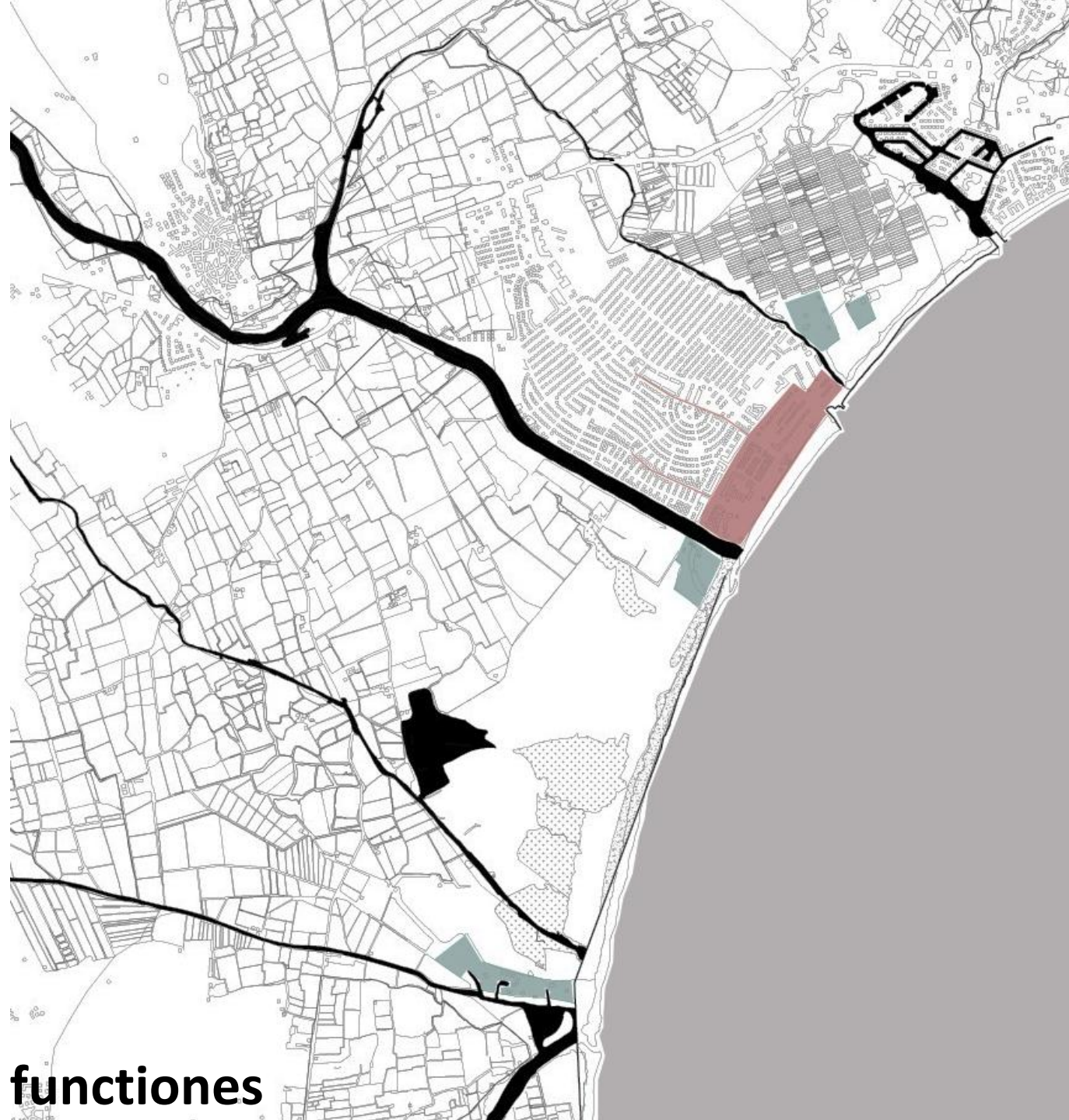


Sea level rise +80 cm



If we accept that the nature takes its course changing the landscape values... we can also start thinking about other uses of costal area... and rethinking of future landscape values

How can we rethink the use of coastal area?



**Current coastal functions**

What will be the public space in 2050?



**Futures coastal "values" for the City**



Where can we relocate the urban services?



**New system of “values”**

# Actions

- 1. Relocation of coastal tourism services to promote different kinds of tourism in according to rethinking of the protection levels natural parks
- 2. Dune system presevation through new forms of accessibility to the coastal areas
- 3. Rethinking of the spaces in the value of permanent population to new forms of environmental values



Rethinking of the  
protection levels  
natural parks

Relocation of coastal  
tourism services



C  
h  
a  
n  
g  
i  
n  
g  
  
i  
n  
  
w  
e  
t  
l  
a  
n  
d  
s

Fresh water Salt water



Fresh water Salt water

I  
l  
a  
n  
d  
s  
c  
a  
p  
e