

# The importance of coastal resilience and considerations on the use of NbS for management of coastal areas

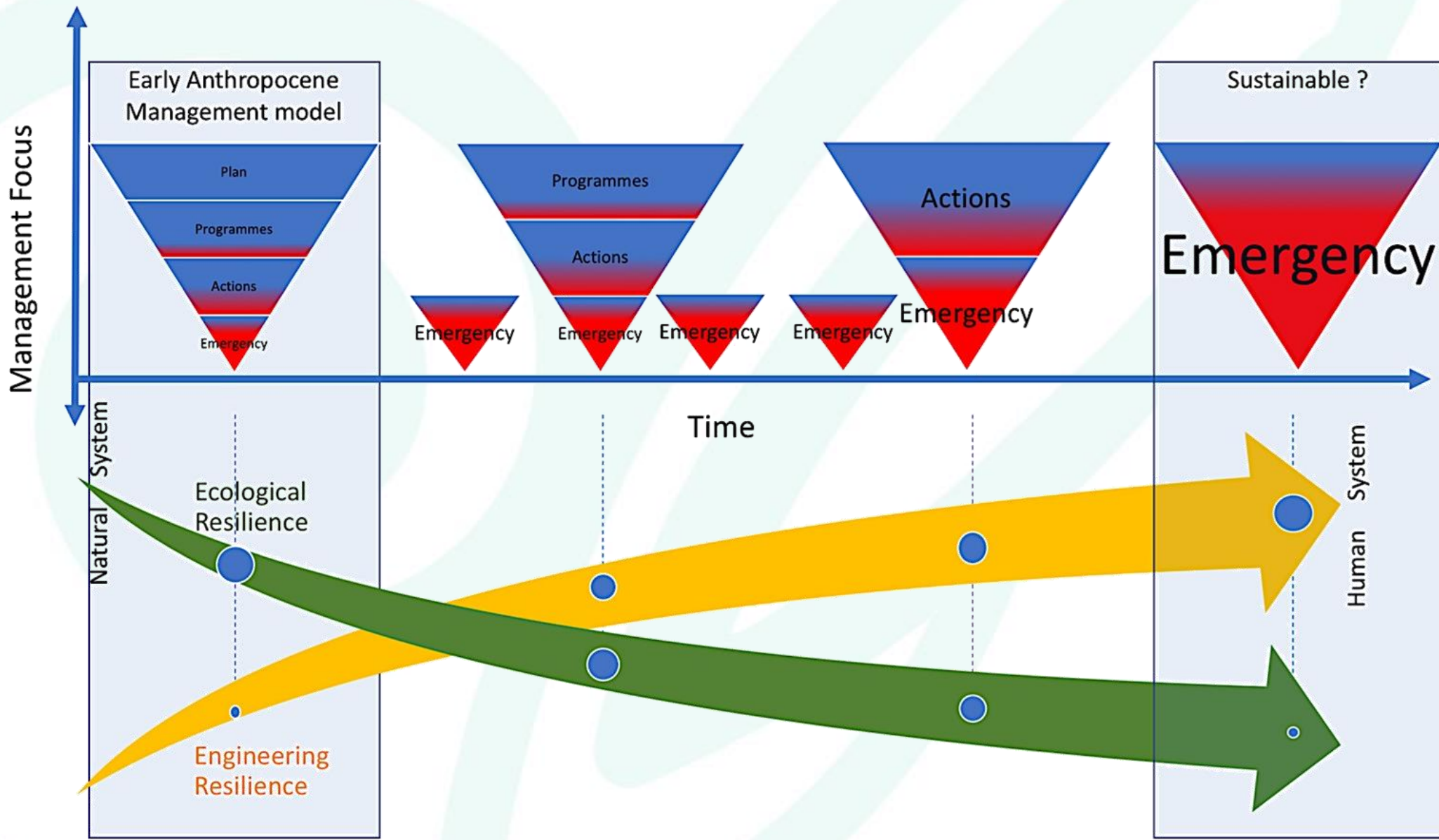
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**PRESENTED BY:**

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# Using the NbS Concept

This presentation is about:

- *Nature based...what Nature?*
- *Coupled Systems*
- *Resilience...of which system?*
- *Typologies: breaking it down to build it up*



 **WARNING**

Read and fully understand operator's manual before using this machine.

Failure to follow operating instructions could result in death or serious injury.



# Backdrop

- The general tendency in nature is for energy balance: most **inorganic processes** on our planet **lead** directly **towards entropy**: adjustments that are resolved with the release of energy that is transferred somewhere else in the system or outside of it generating changes to achieve equilibrium.
- This **entropy may appear inefficient**, but it is good, essential in fact, and it is the way our planet has managed evolution and adapted over and over again as the energy is free flowing and then captured elsewhere.

Photo from:  
Wright, Guza, and Short (1982)

# Backdrop

- Organic systems, in contrast, generate **synergies**: their dynamics activate mechanisms that result in **more than the sum of its components** after a conflict is generated and resolved.
- Adaptation in these scenarios is added energy in the system, thus synergy dominates. Both the **natural and the human environments** can show abundant examples of synergic behaviour **through complex patterns**.
- **Humans**, in particular, are capable of superlative effects (good and bad) due to our **enormous capacity to generate societal and cultural synergies**.

**C** COUPLED

**H** HUMAN

**A** AND

**N** NATURAL

**S** SYSTEMS

- Interpreting natural behaviour and intensity of use from non Mediterranean environments is VERY common, but not entirely successful.

- Exporting methods to “control” natural behaviour has not proved entirely successful or sustainable

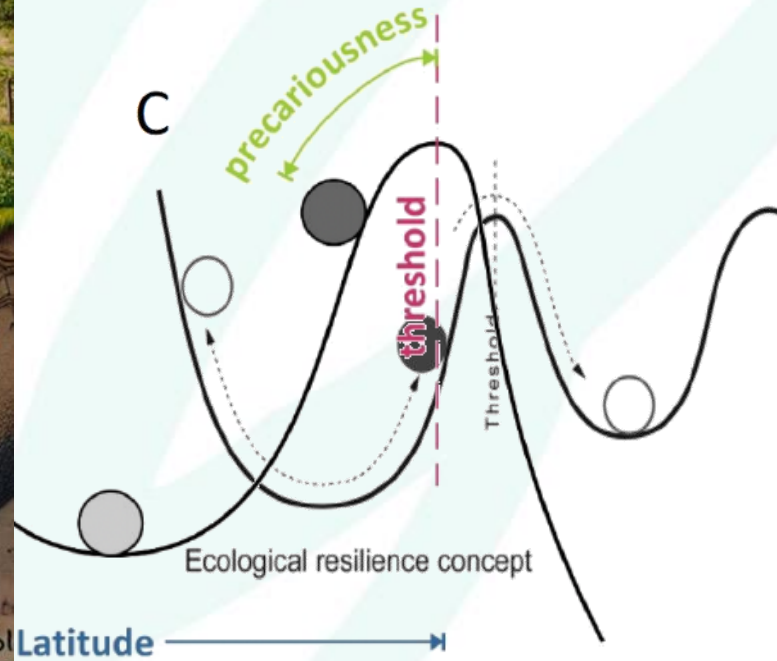
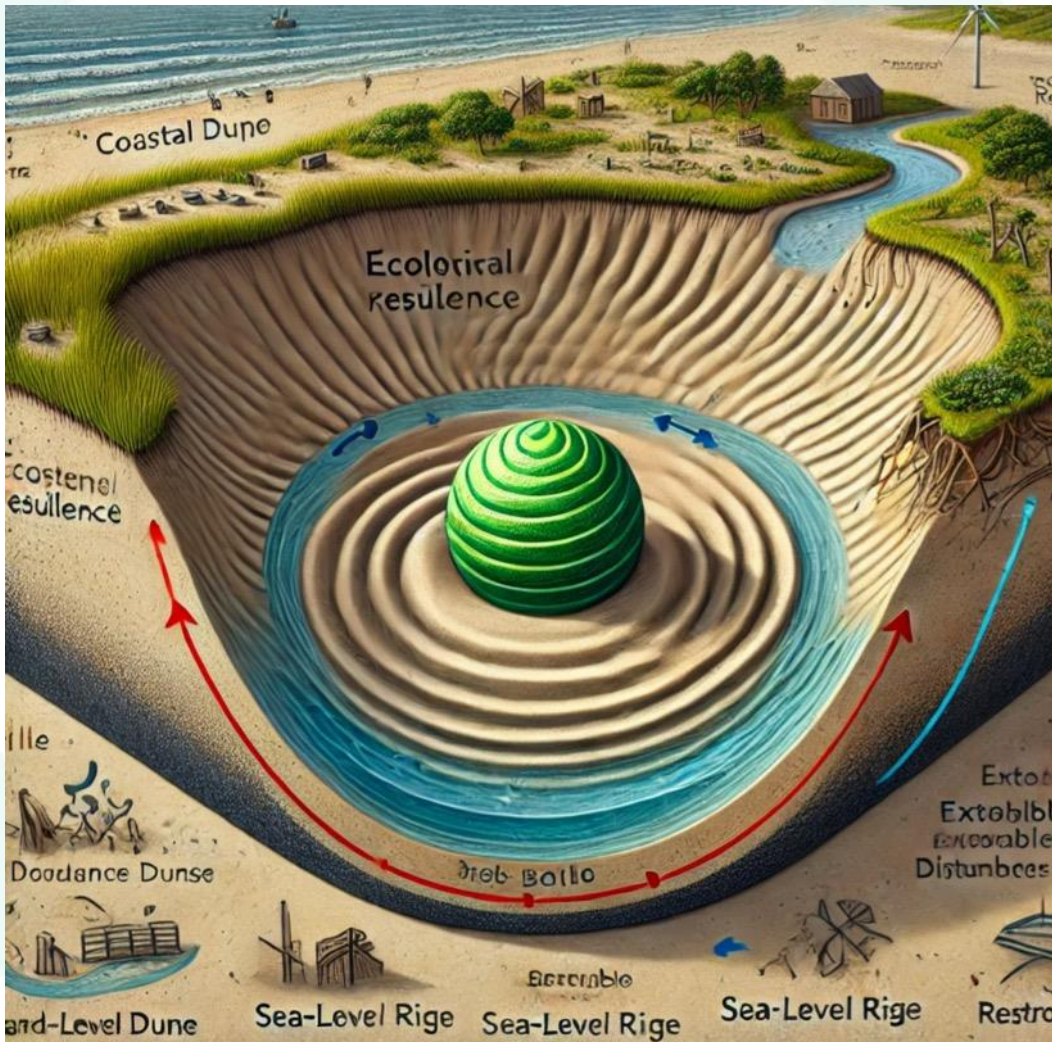
- Most “solutions” (a significant component in shoreline management) has not worked because most measures were exported from foreign environments.

- Nature based Solutions need to look closely into coastal typologies before identifying options and thus a first extensive exercise must be to identify how nature works in our Sea’s coasts to provide the right answers.

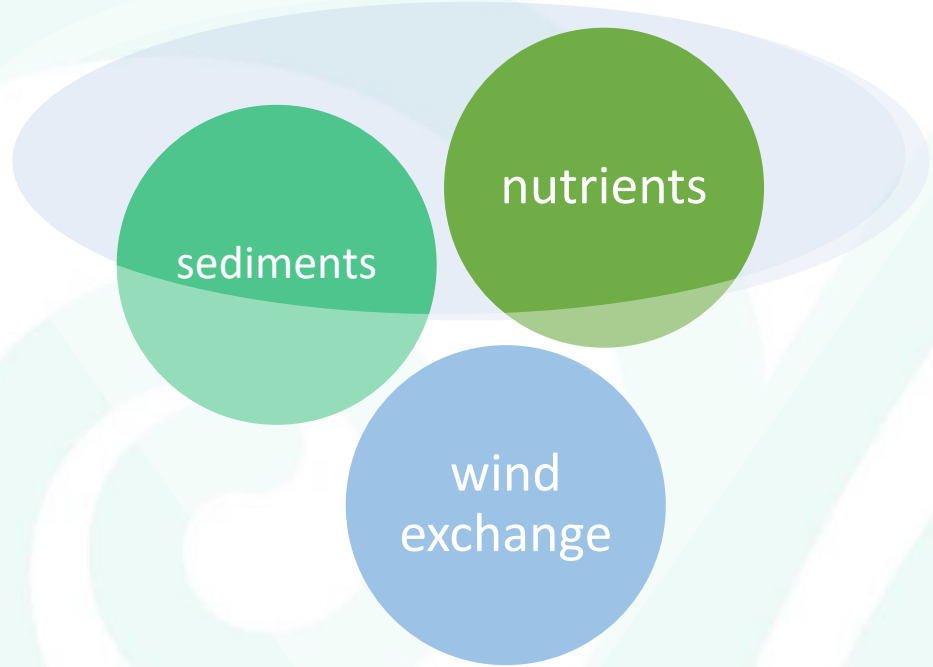
- ***But: what is NATURAL in the Mediterranean today?***

# Illustrating resilience of natural and managed systems

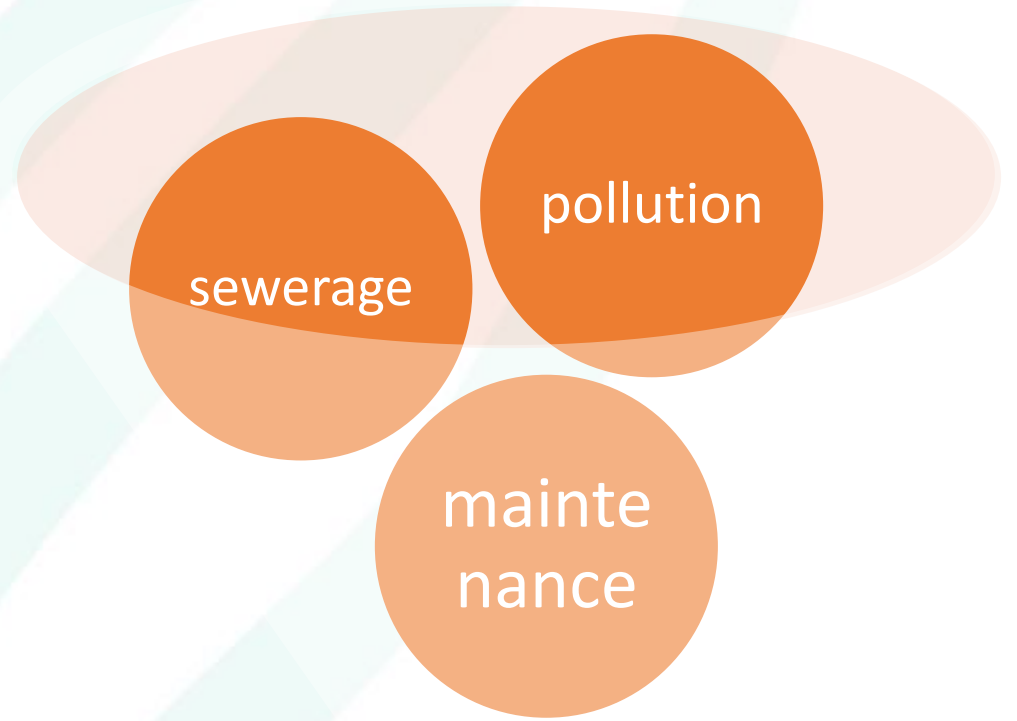
How much stress can the system take before failing to deliver expected services.



# Incompatible?



**Natural Coast**  
(conservation perspective)



**Artificial Coast**  
(urban planning perspective)

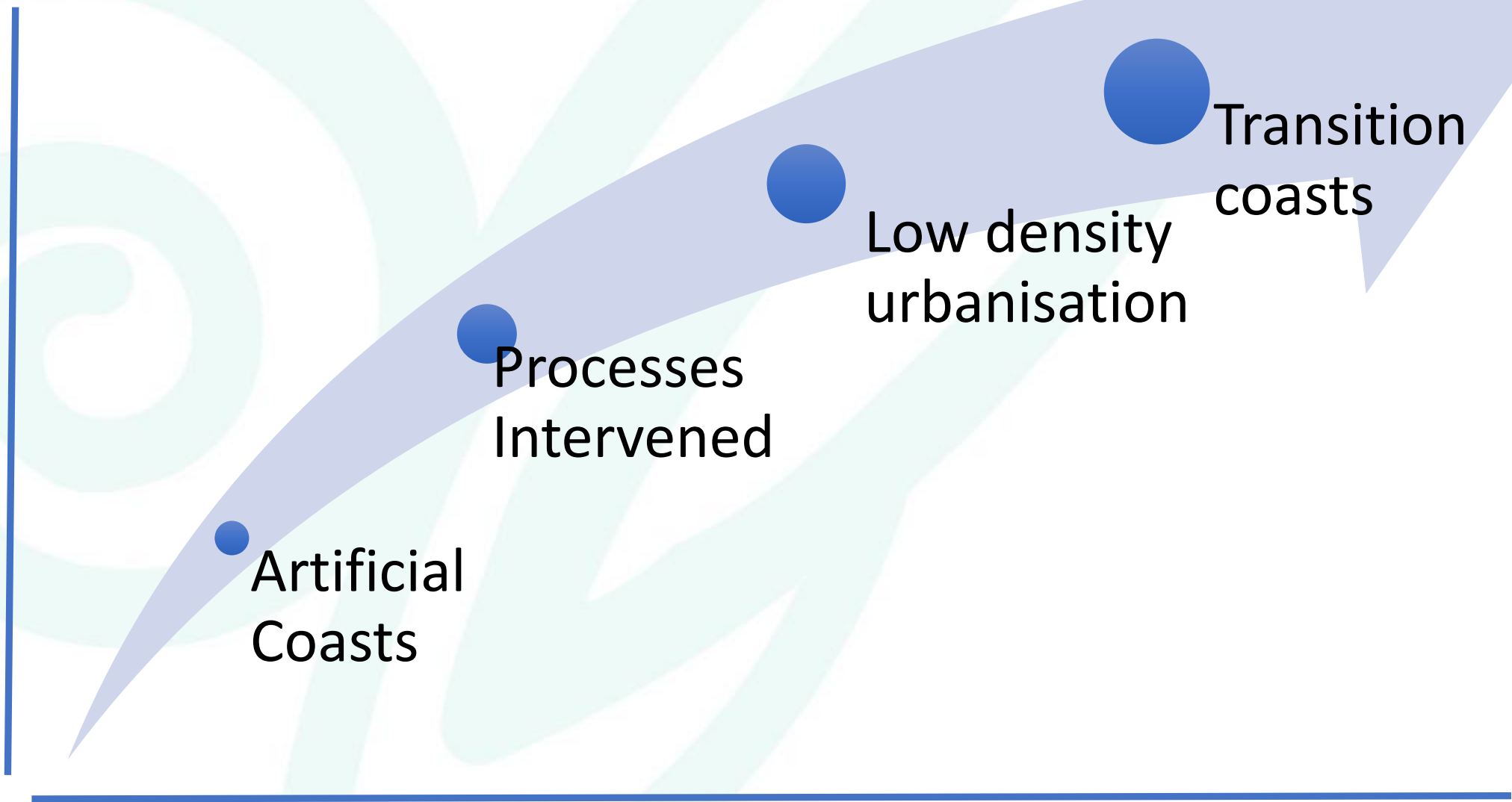
# Incompatible?

No, but we believe that defining coastal typologies (and their associated behaviour) is an important step to achieve efficient implementation

# Coastal Types?

Pristine

Artificial



Artificial  
Coasts

Processes  
Intervened

Low density  
urbanisation

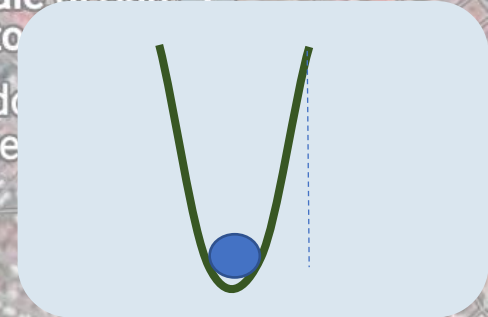
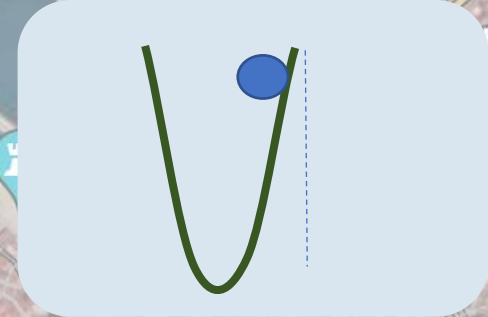
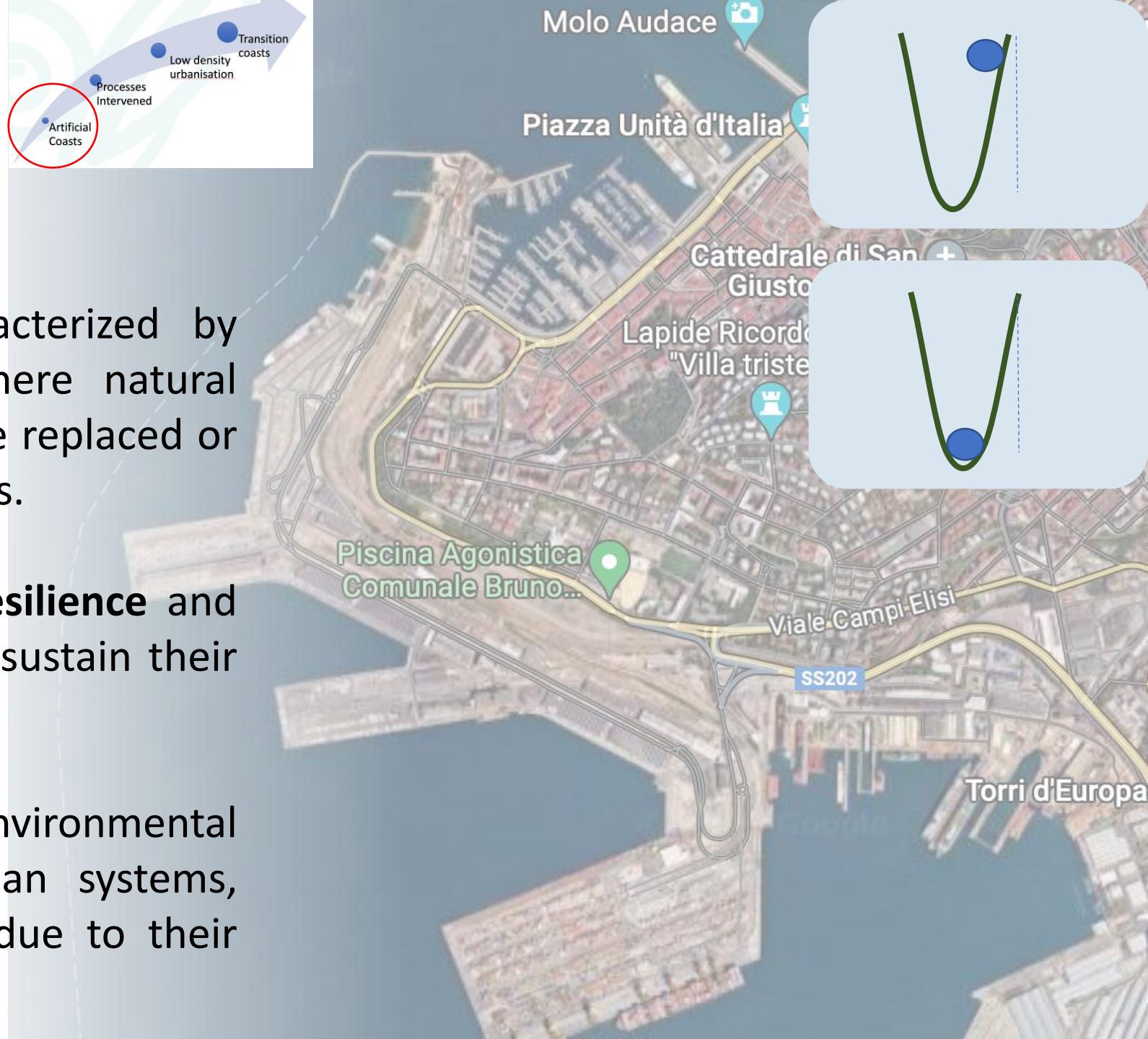
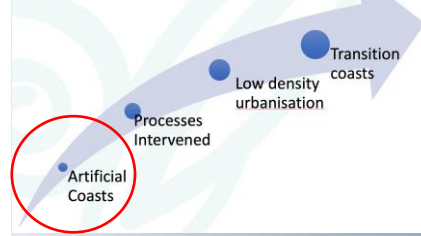
Transition  
coasts

# ENTIRELY ARTIFICIAL COASTS

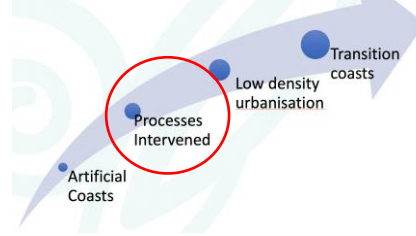
Entirely artificial coasts are characterized by **intensive human intervention**, where natural coastal land and water resources are replaced or heavily managed for human purposes.

These coasts rely on **engineered resilience** and require continuous maintenance to sustain their functionality.

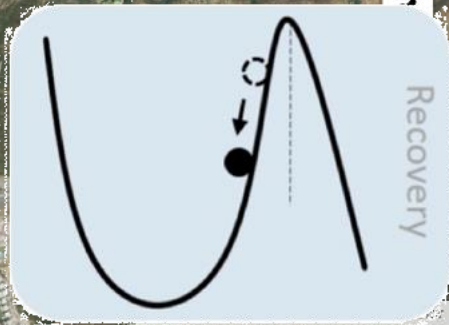
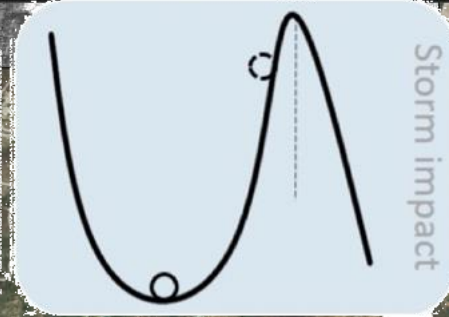
They face challenges such as environmental degradation, dependency on human systems, and **limited effectiveness of NbS** due to their extensive artificialization.



# PROCESSES INTERVENED

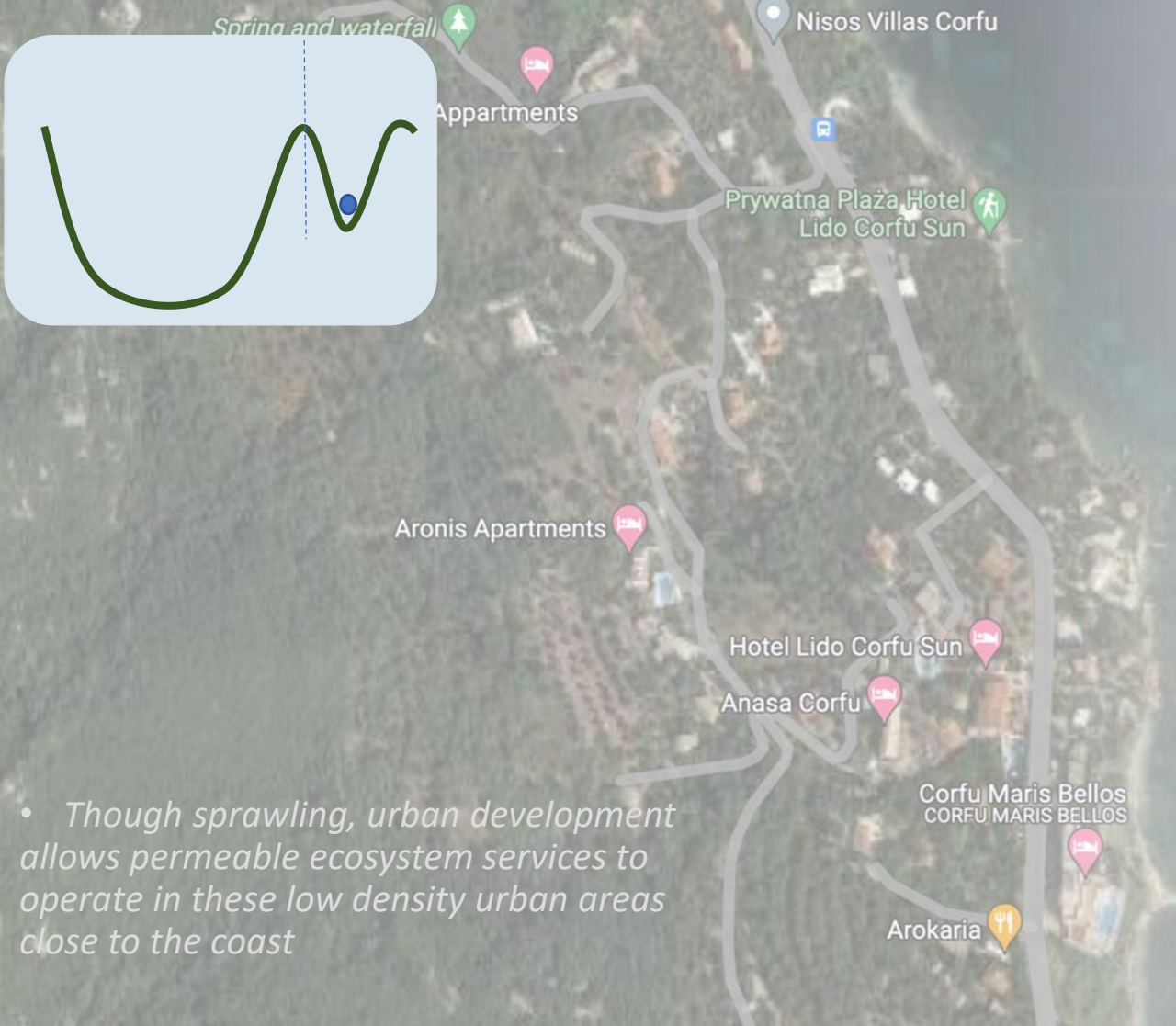
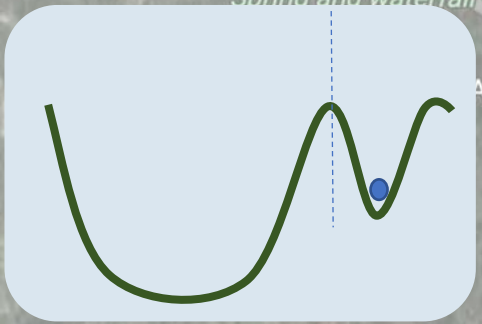
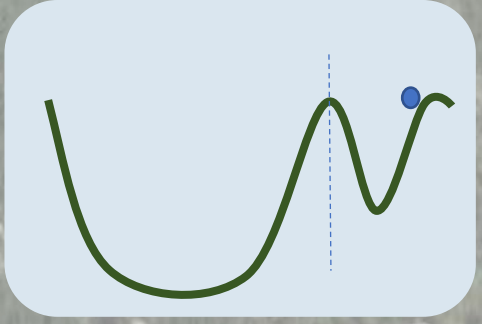
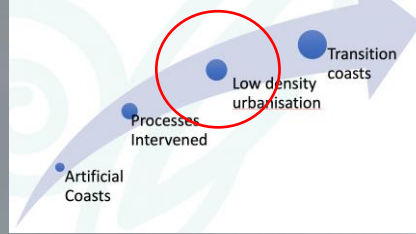


- This type of coasts experiences **extensive human intervention on key geomorphic systems of the coastal area.**
- These areas are often associated with **tourism development** and urbanization for tertiary purposes.
- While human activities such as water and shoreline management are prevalent, there is still **a degree of natural resilience present and thus some NbS replicating the missing geomorphological services have potencial** (rain gardens, dam by pass, estuarine re-generation...)



Ortofotografía de Máxima

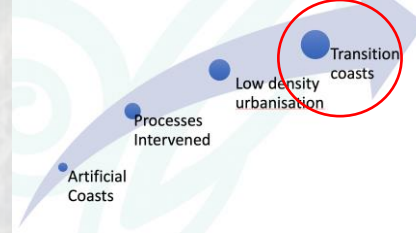
# LOW-DENSITY URBANISED COASTS



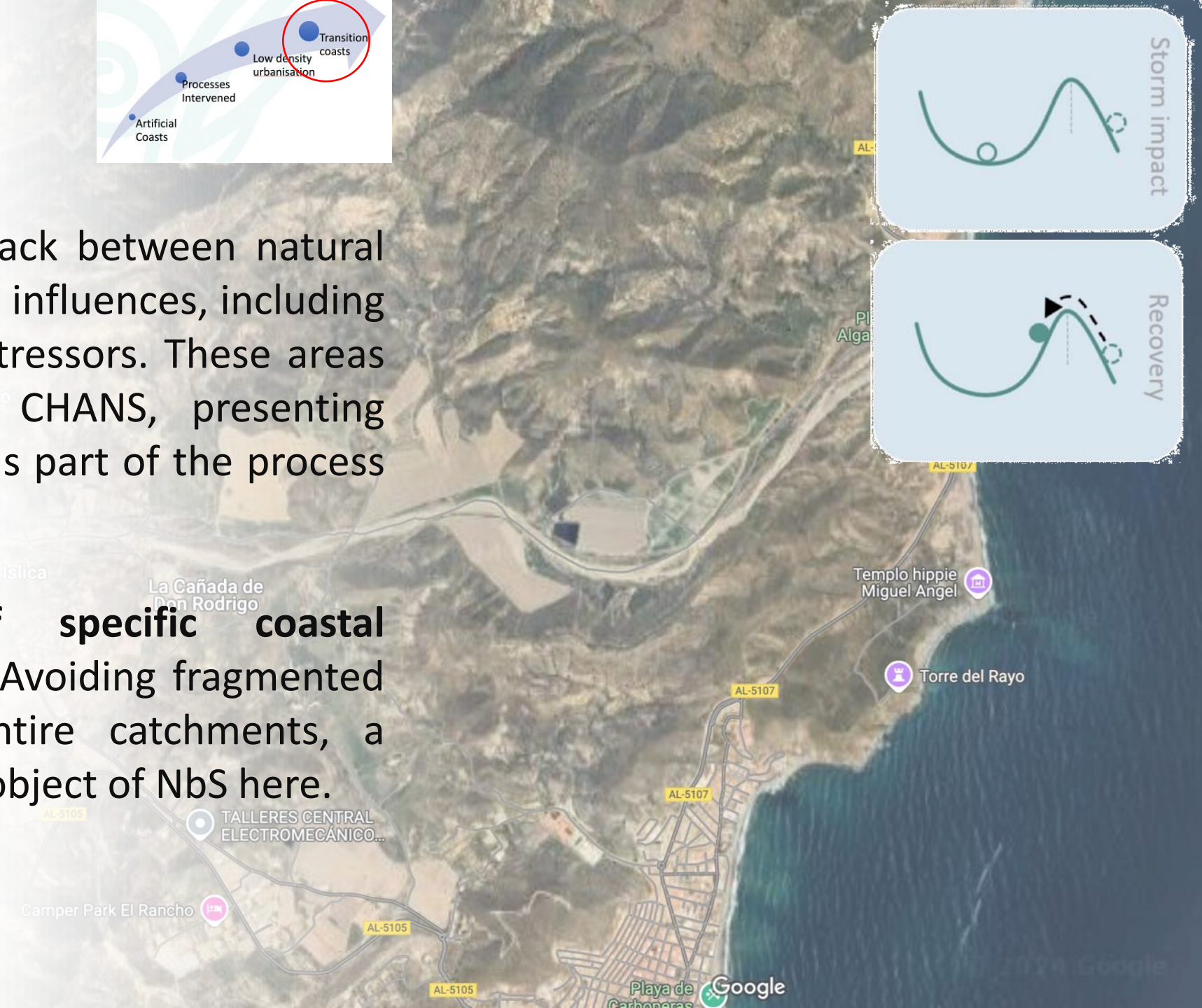
- While urban sprawl poses a threat to natural ecosystems, low-density urban development can provide opportunities for promoting **ecological corridors**.
- Despite the challenges, there is **potential for implementing NbS**, especially in areas where urban sprawl is integrated with forests, or where **planning practices** allow for the preservation and expansion of natural features.

*Though sprawling, urban development allows permeable ecosystem services to operate in these low density urban areas close to the coast*

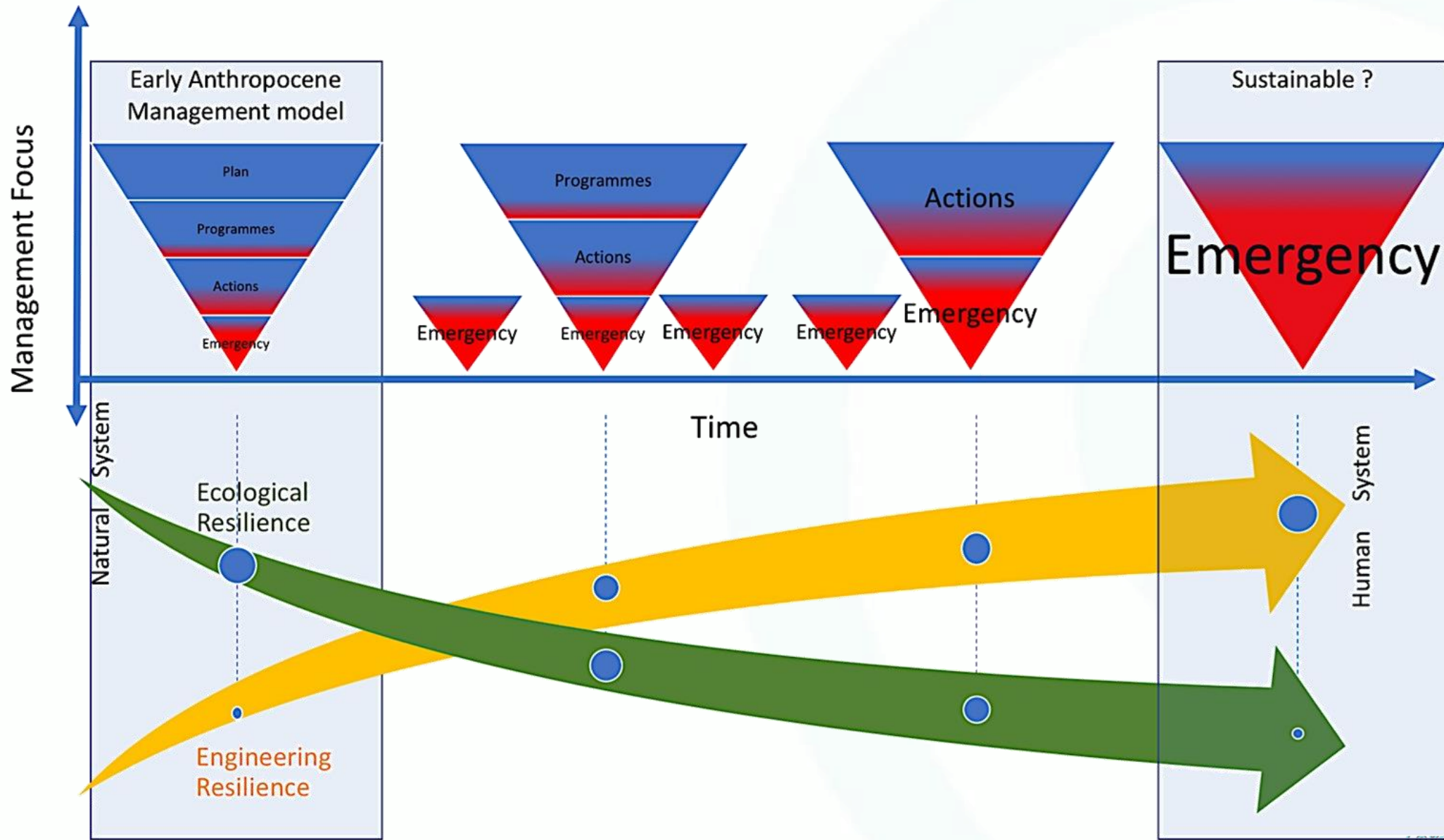
# TRANSITION COASTS



- These show positive feed back between natural coastal dynamics and human influences, including **both natural and artificial** stressors. These areas need to be managed as CHANS, presenting opportunities to apply NbS as part of the process of coastal recovery.
- Significant **fragments of specific coastal ecosystems** need restoring. Avoiding fragmented interventions. Estuaries, entire catchments, a complete biocenosis can be object of NbS here.



# OBJECTIVE





# THANK YOU

<https://pandoteira.cy>

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