Marshes recovery in the Txingudy Bay to increase climate resilience

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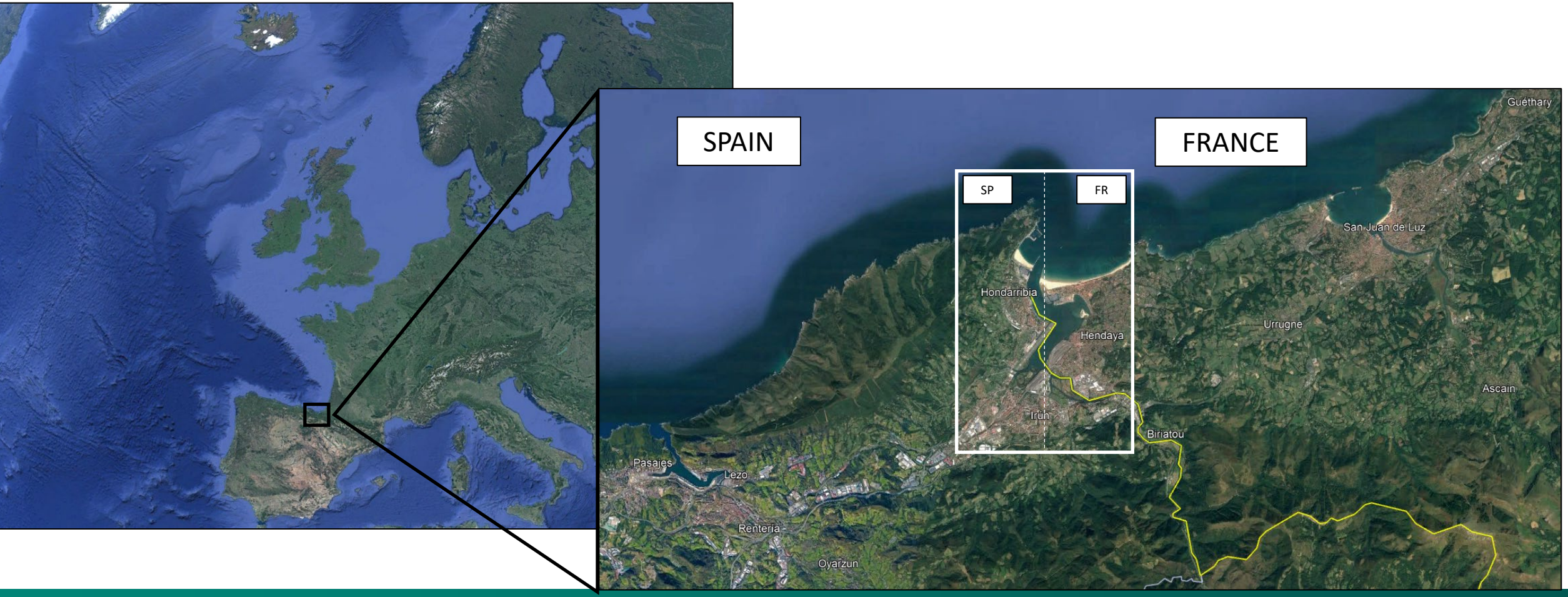
Co-funded by the Erasmus+ Programme of the European Union

1. Introduction: location of the Txingudi Bay



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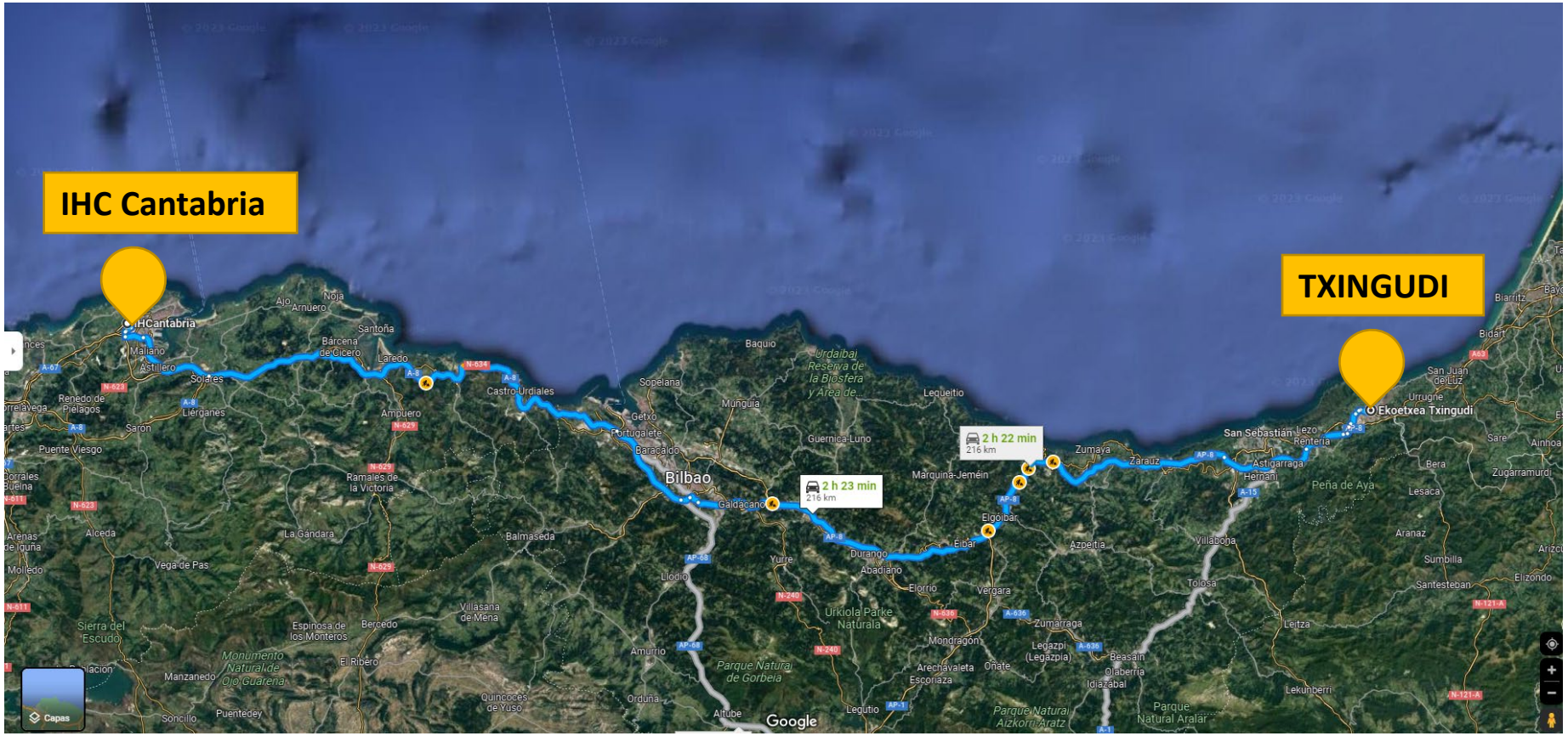
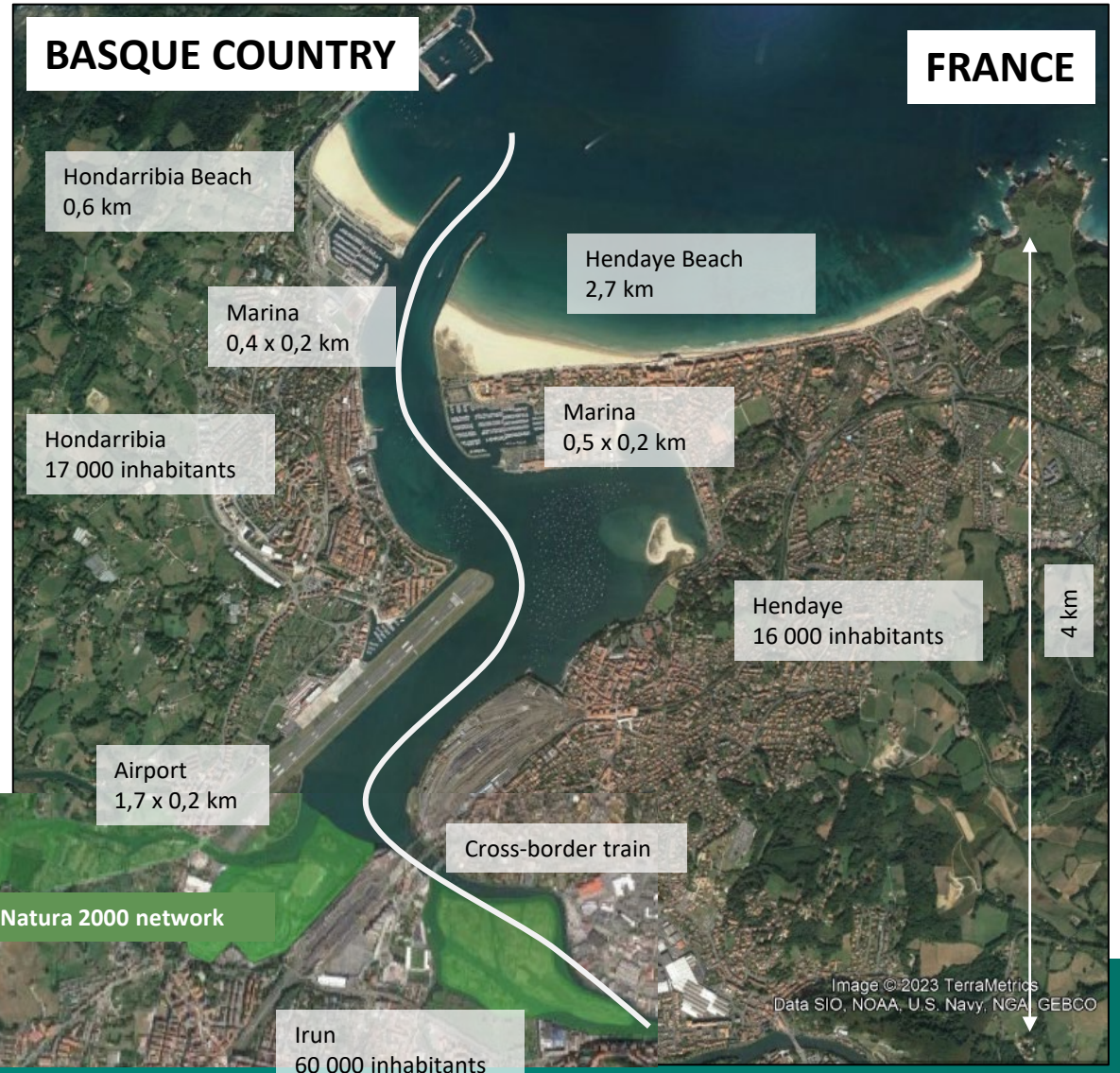
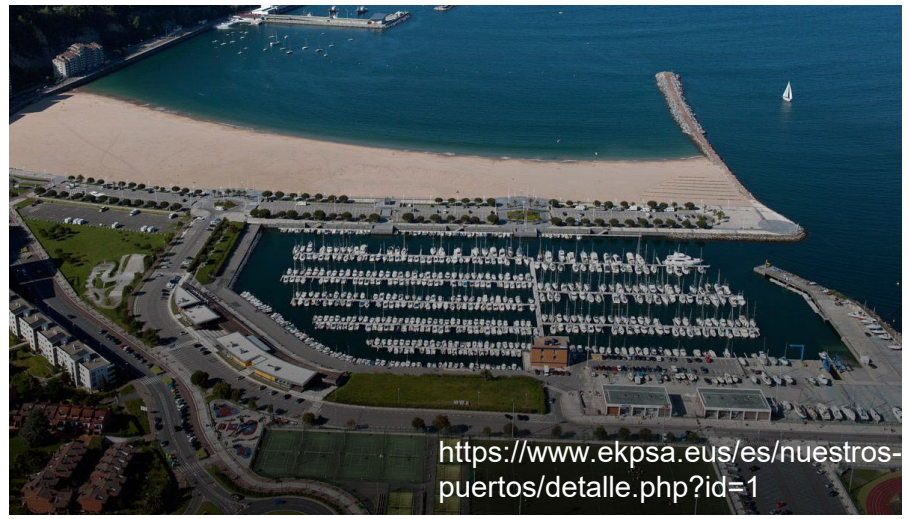
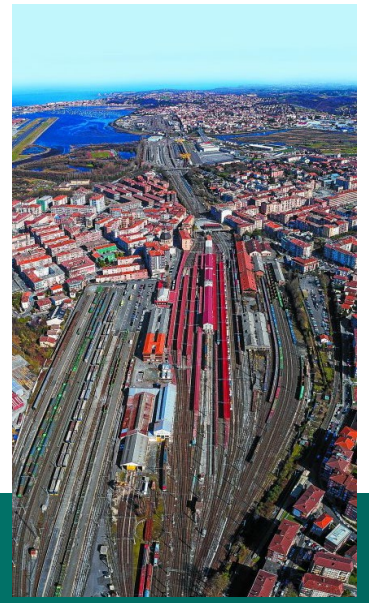


1. Introduction: location of the Txingudi Bay

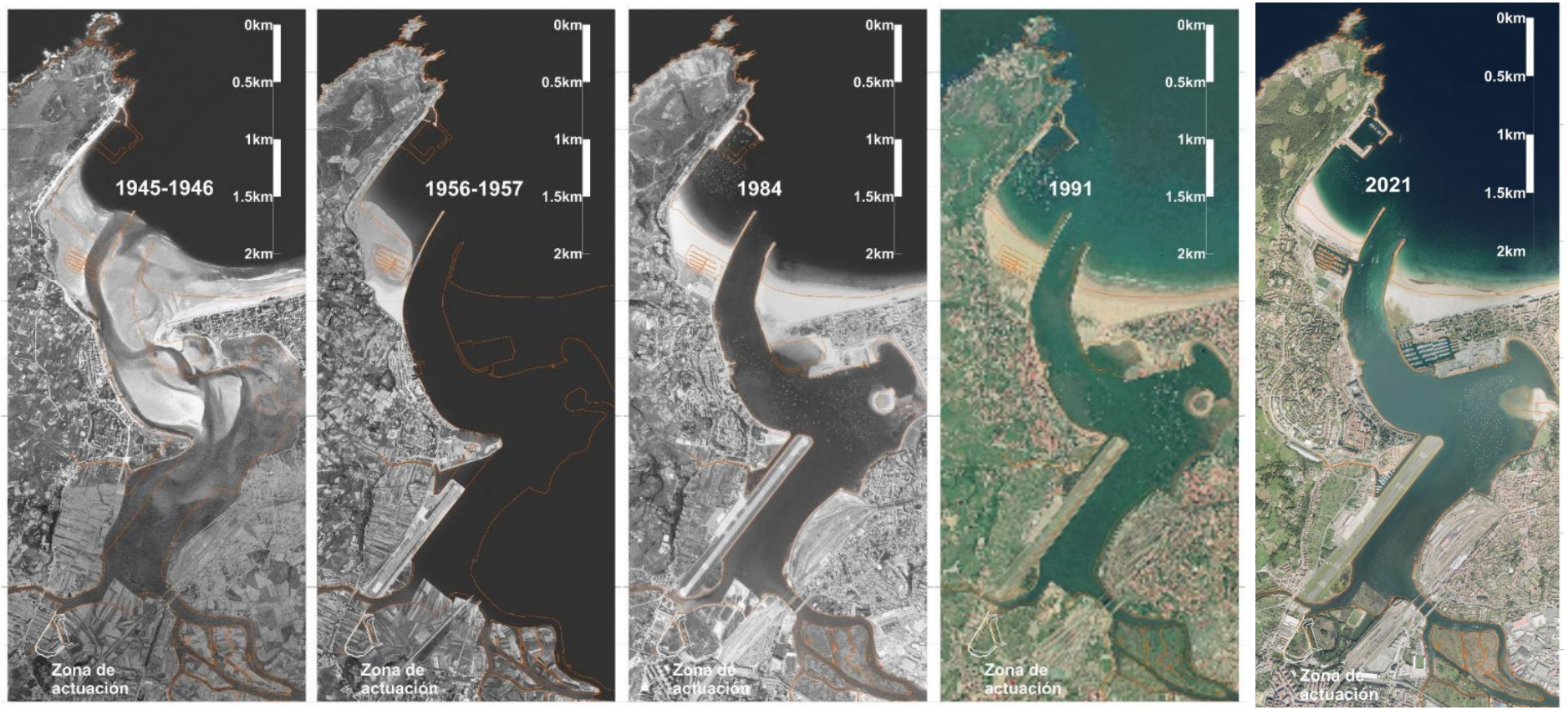
1. Introduction: socio-economic context







1. Introduction: socio-economic historical evolution



SOURCE: VULNER'HAB: Vulnerabilidad de los hábitats naturales del estuario del Bidasoa frente al ascenso del nivel del mar".

18th century: The Basque estuaries were modified by the occupation of the marshes for agricultural purposes.

1945-1946: Most of the marshland surface has been occupied.

Since the 1940s: The construction of the jetties on both sides of the estuary, and the systematic dredging of the estuary, interrupted the sediment transport. The extension of Hondarribia and Hendaye beaches greatly increased by the accumulation of the sediment.

1955 (see orthophoto of 1956-1957): Airport

1992: Marina (Hendaye)

2001: Marina (Hondarribia)

1. Introduction: climatic context

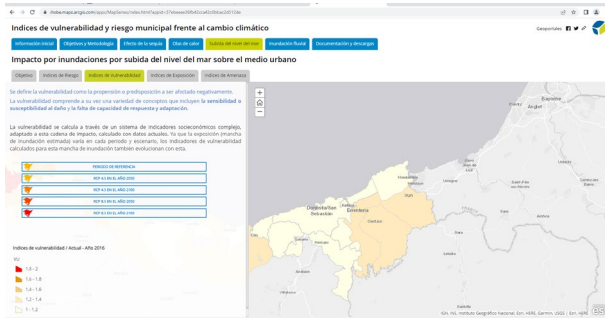
Impact of climate change: sea level rise scenarios

KOSTEGOKI: Basque coast`s vulnerability, risk and adaptation to climate change

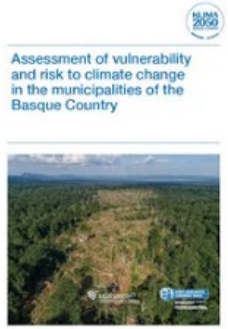
Financed by PIMA Adapta Costas (Ministerio para la Transición Ecológica y Reto Demográfico, Gobierno de España)

Current flooding scenario

https://gis.ihobe.eus/kostaegoki/



https://www.ihobe.eus/cambio-climatico#kit



1. Introduction: Gobernance context

4 Levels of public competences

Estate

- **Aena, Airports Management State-owned Company** (Ministry of Transport, Mobility and Urban Agenda of Spain)
- **Protection of the coast** (Ministry of Ecological Transition and the Demographic Challenge of Spain)

Regional

- **URA, Basque Water Agency** (Basque Government)
- **Basque Ministry of Economic Development, Sustainability and Environment** (Basque Government)

Provincial / County Councils

- Provincial Council of Gipuzkoa

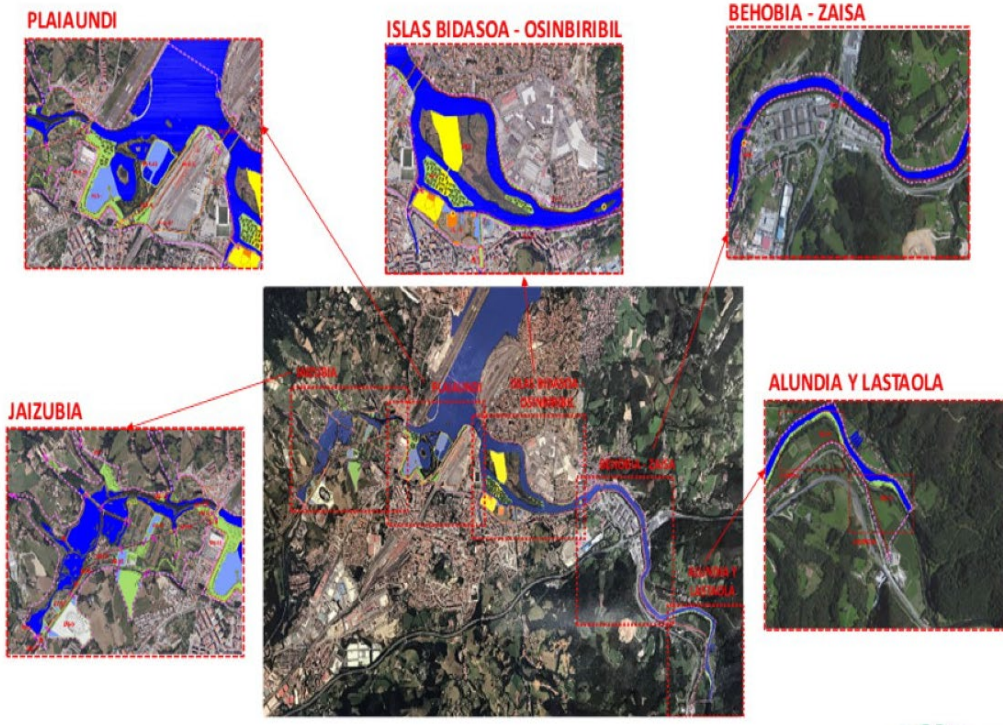
Local / Municipal

- Irún city Counil
- Hondarribia city council

1. Introduction: Planing instrument

Master Plan of Txingudi 2015-2026

Master plan for the restoration and connectivity improvement of the Txingudy Bay natural areas



- Improve the connection of the estuarine ecosystems of Txingudi, **reconnecting marsh and wetland areas**.
- **Enlarge the Txingudi wetlands**. Restore degraded areas or areas used for agriculture or other uses that were originally marshes and recover the dynamics and estuarine ecosystems.
- Connect the banks of the river Bidasoa with pedestrian and cycle routes.
- Preserve the most sensitive areas from mass visits.
- Improve connectivity for small terrestrial fauna
- Encourage cooperation between agents to improve the Txingudi marshes.

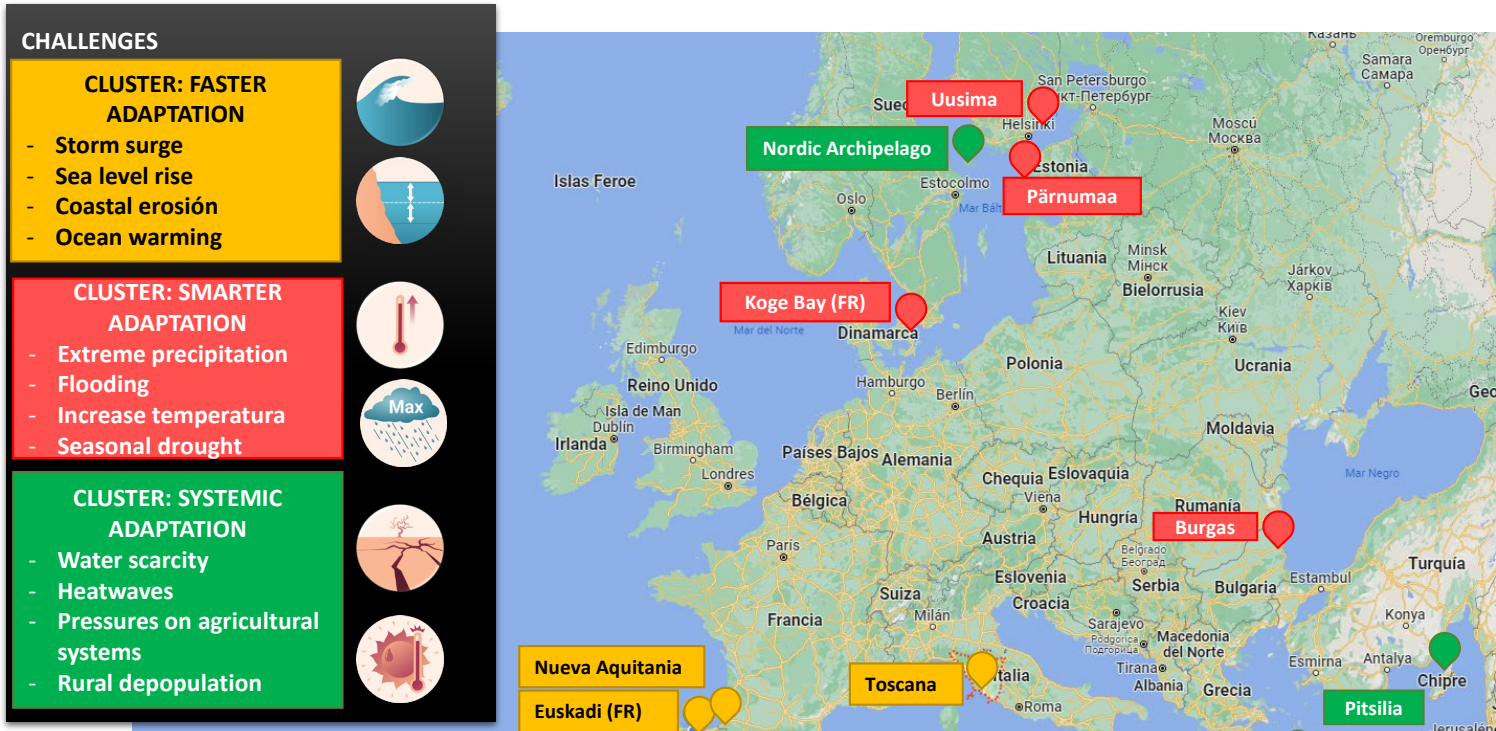
1. Introduction: Context of the action

Regions 4 Climate Building resilient communities

HORIZON-MISS-2021-CLIMA-02-04
Large scale demonstrators of climate resilience creating cross-border value

- EU Mission on adaptation to climate change
- Innovative solutions for climate resilience
- 12 european regions
- 3 clusters of climatical challenges

Regions 4Climate



- 12 Regions
- 8 Technological and Research centers
- 7 Universities

tecnalia · AZTI · zabala innovation consulting

3,5 M €

2. Objective: San Lorenzo marshes recovery

Restore degraded areas dedicated to agriculture that were originally marshes of Txingudi estuary

San Lorenzo lagoon

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Restore degraded areas dedicated to agriculture that were originally marshes of Txingudi estuary

San Lorenzo lagoon

Biodiversity perspective
- Enhace and protect the Special Protected Area for Birds
- Restore the marsh ecosystems

Climatic perspective
- Restoration of estuaries for climate adaptation, decrease floodability
- Innovative monitoring system to assess the efectiveness of the measure and transfer it

Economic perspective
- Deployment of the Basque Adaptation Mission to climate chage: Financing opportunities and stakeholders involvement (SME)

Social
- Citizen engagement

3. Methodology: Restoration of marhs

Intervention: Land removal to open the lagoon to the tides

- **50.000 m3 of agricultural soil** removal to obtain **largest posible sheet of water height 0,5m** with minimun posible soil balance (excavation-filling for natural barriers)
- **Gates** removal that regulate water inflow to the lagoon.

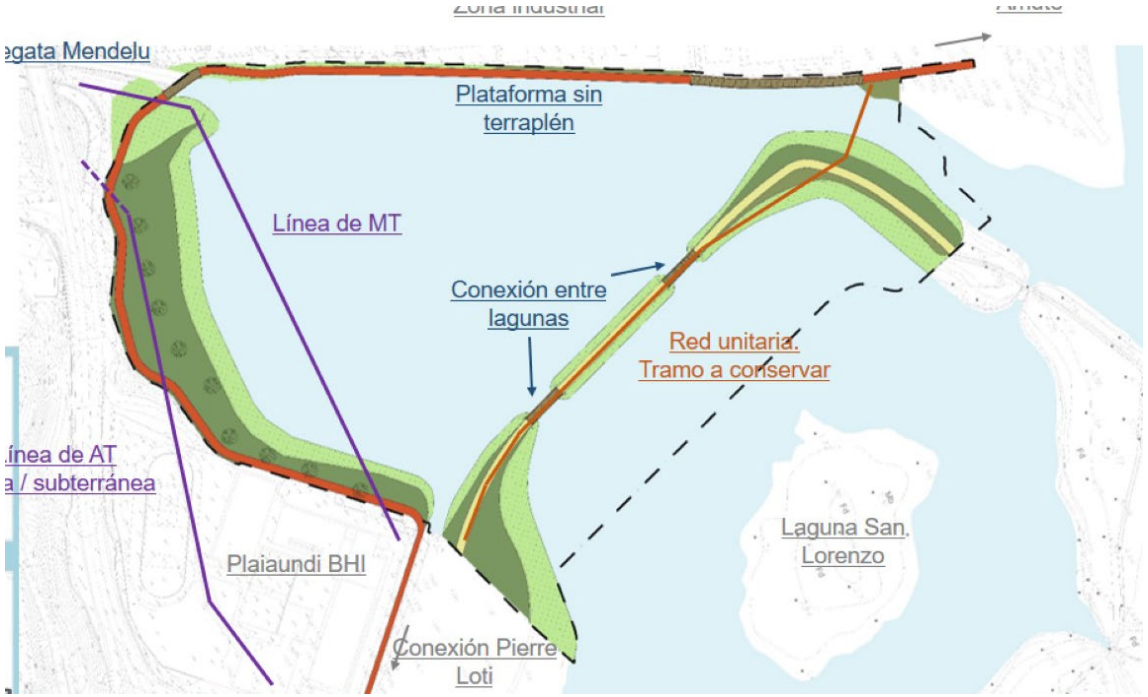
X

- **Conditioning works**: Pavement removal, modification of high and medium voltage power lines , grubbing and clearing trees.
- Creating **natural barriers** to protect “special areas for birds” from human action. No human access to protected areas

3. Results: Restoration of marsh

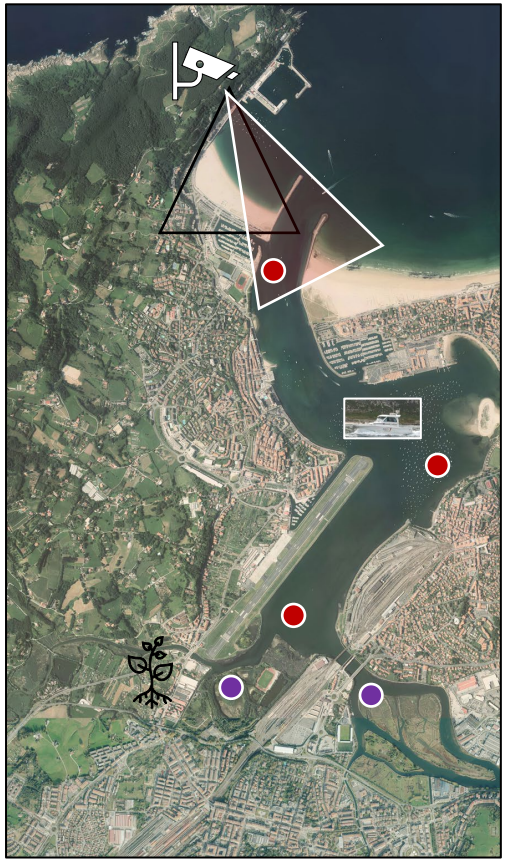
Results: 5,5 Ha of marsh

- Natural recovery of tidal regime (more floodable area)
- Create the proper conditions for birds in the protected area



Intervention under public procurement by (Ministry of Ecological Transition and the Demographic Challenge of Spain)

3. Results: Monitoring program



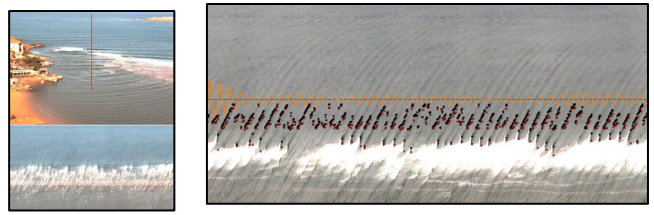
Evaluate impacts of restoration

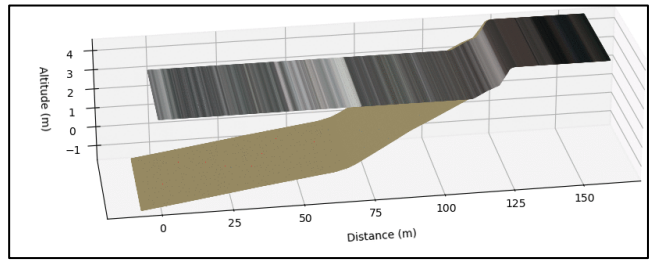
- Estuary hydrodynamics
- Updated inundation maps
- Morphodynamic modelling

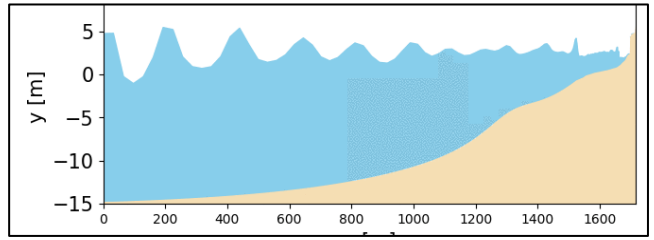
Baseline study – Short term monitoring (before/after actions) – long term monitoring

Txingudi monitoring program (measurements and modelling):

- KostaSystem videometry in the inlet
- SET deployment in the upper estuary
- Bathymetric/Topographic surveys
- Sensors for hydrodynamic measurements
- Blue carbon measurements
- Saltmarsh/seagrass mapping







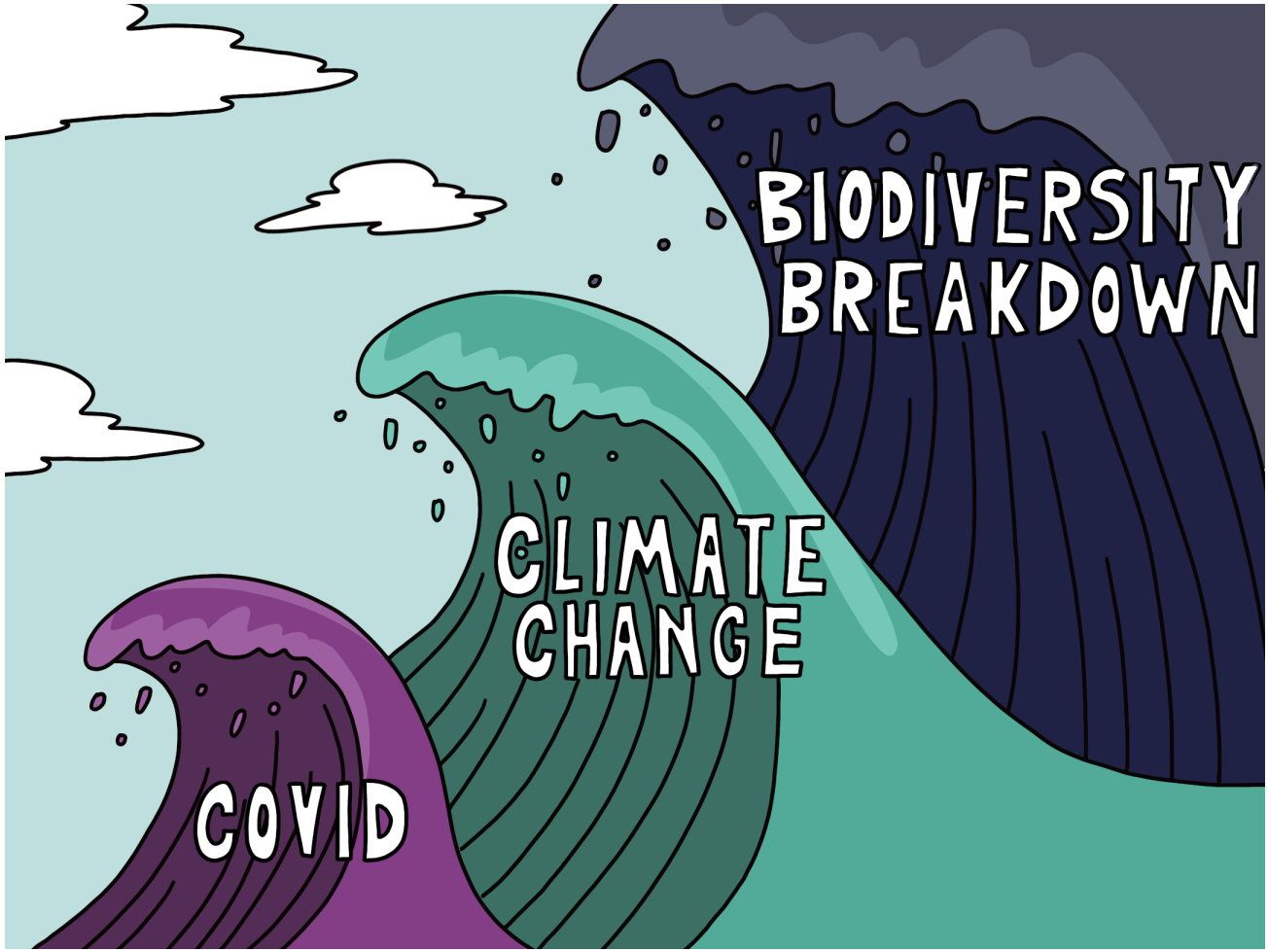
SOURCE: Kostasystem https://www.kostasystem.com/

AZTI (Marine Research Institute)

AZTI
MEMBER OF
BASQUE RESEARCH
& TECHNOLOGY ALLIANCE

4. Conclusions and reccomendations

The more biodiversity the more resilience



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