

TIDE kick-off conference

17 February 2010

The Loire Estuary restoration project



Content of presentation

- Background information about the Loire
- The GIP Loire Estuaire
- The Loire estuary restoration project
- The tools

The Loire Estuary



The Loire Estuary

Key figures:

- River Loire catchment : 110 000 km²
- Length : around 1000 km
- Flows varying from 150 to 6200 m³/s
- Flow control on the upstream part only
- Tidal range at Nantes : around 6 m

What went wrong ?

Major river training works took place over 2 centuries for navigation purpose

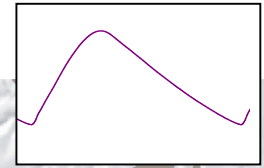
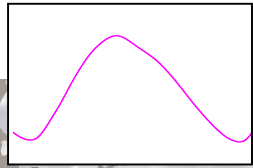
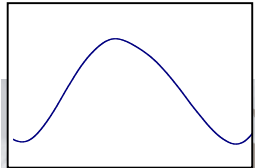
- guide banks
- removal of natural bars
- channel deepening works
- filling up of secondary channels et mudflats

1850

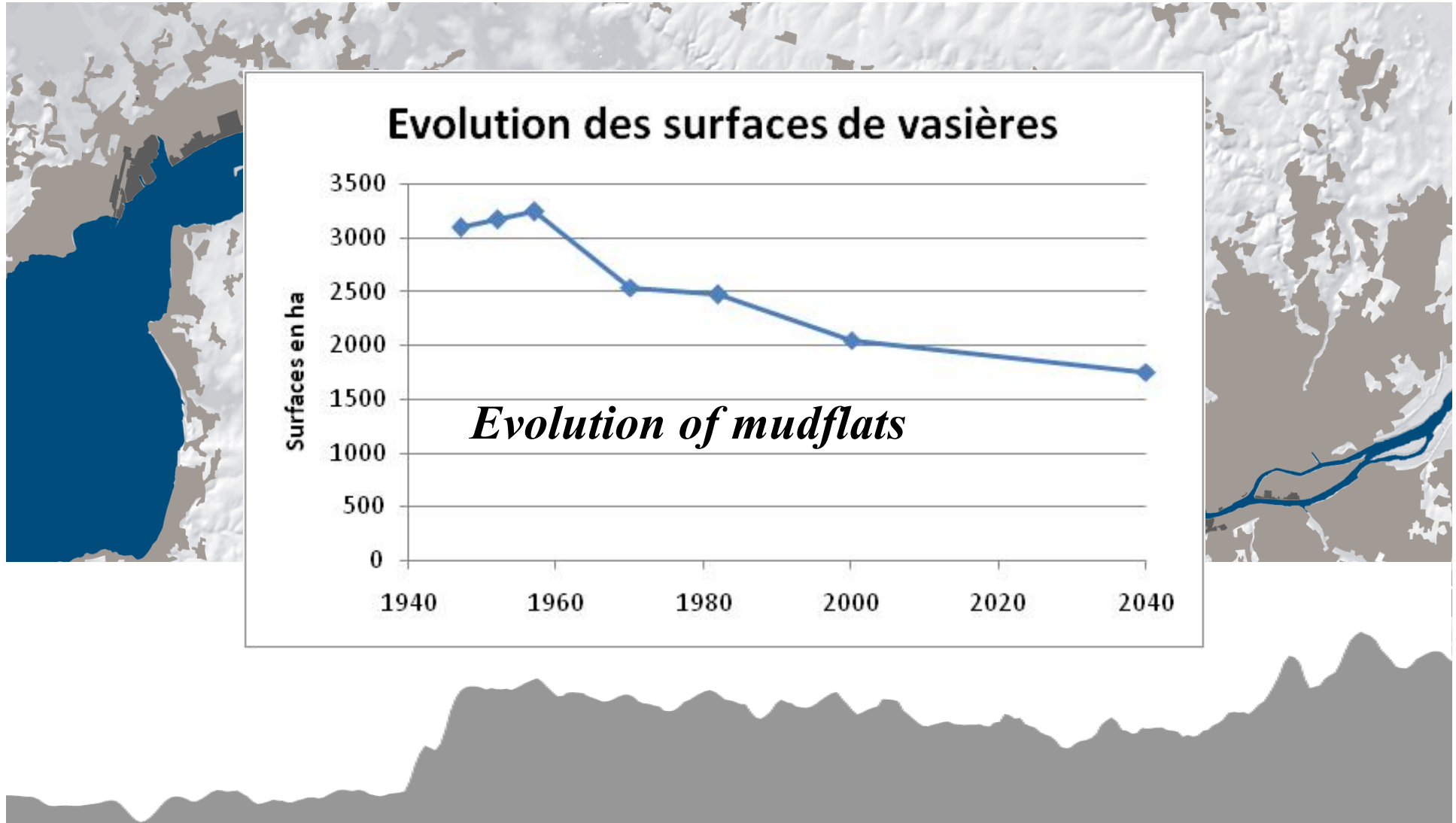
1900

2002

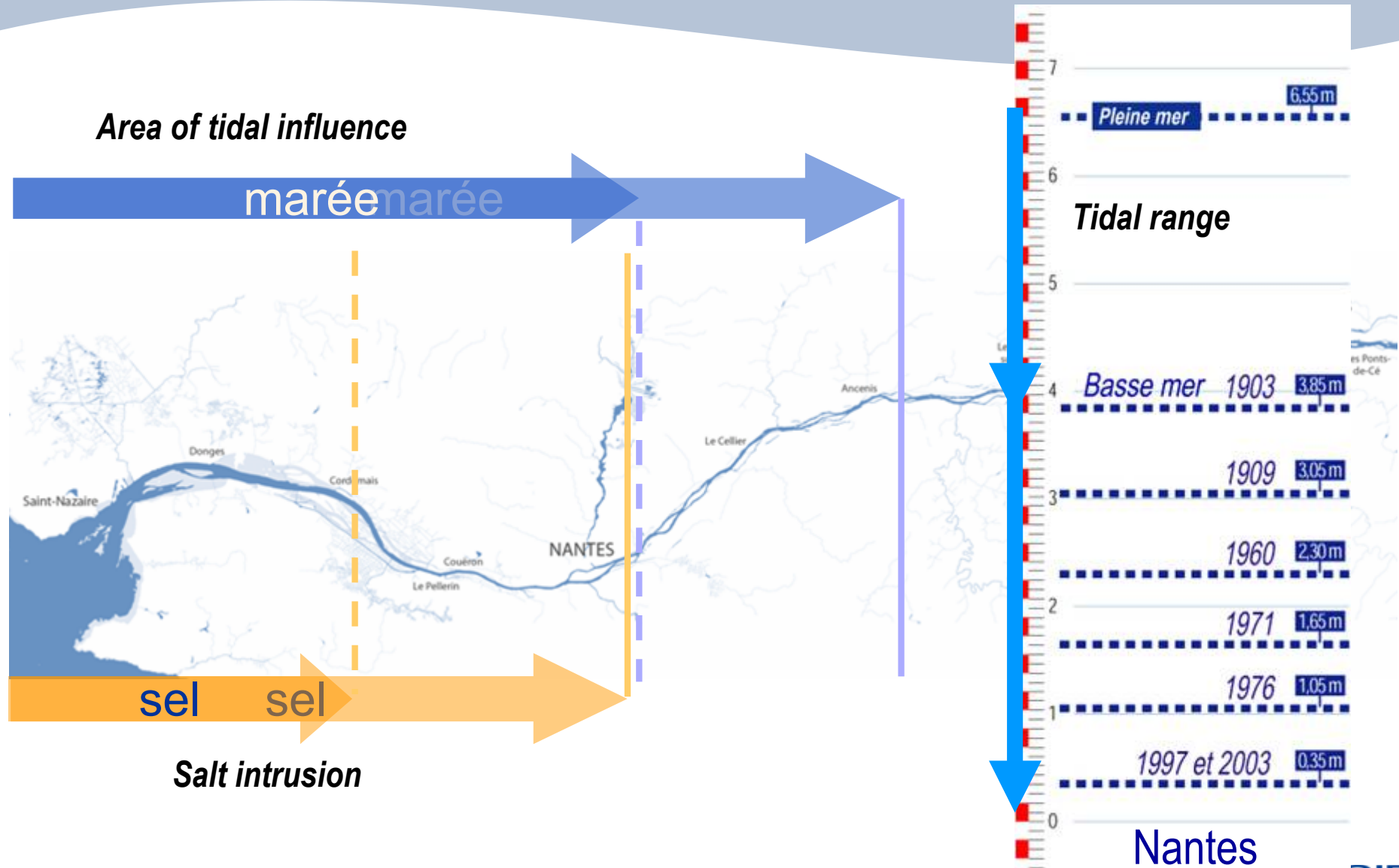
The consequences



The consequences

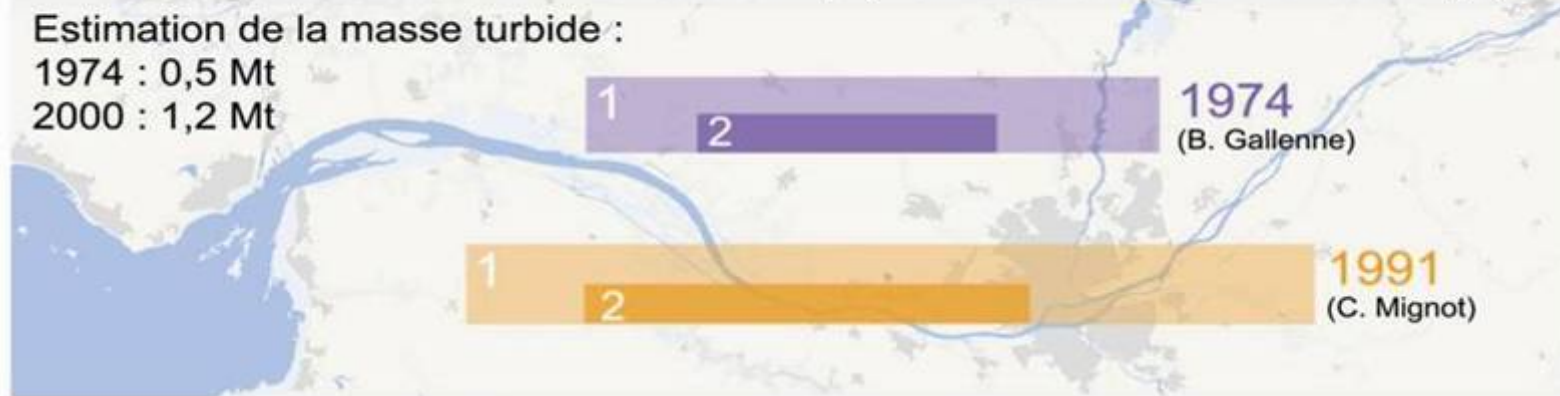


The consequences

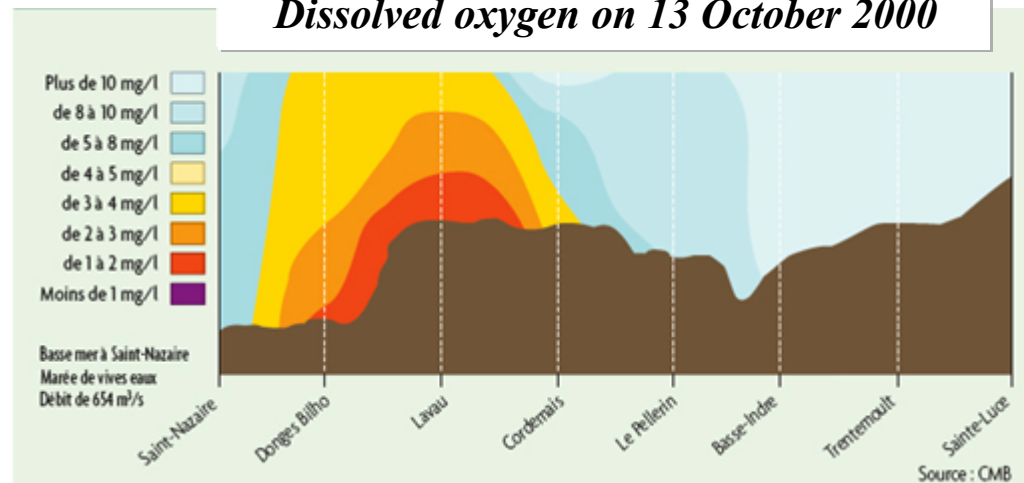


The consequences

Location of turbidity (1) and liquid mud (2)



Dissolved oxygen on 13 October 2000



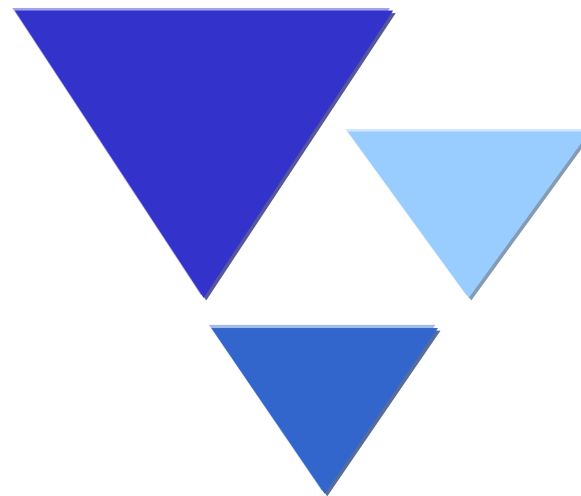
The time to act

- First studies initiated in the 1970's to better understand the degradation
- Starting point in the 1990's: shared understanding of the degradation by the major stakeholders
- Decision made to carry out a restoration master plan
- Based on shared objectives agreed after concertation

Shared objectives

Initially

Economy

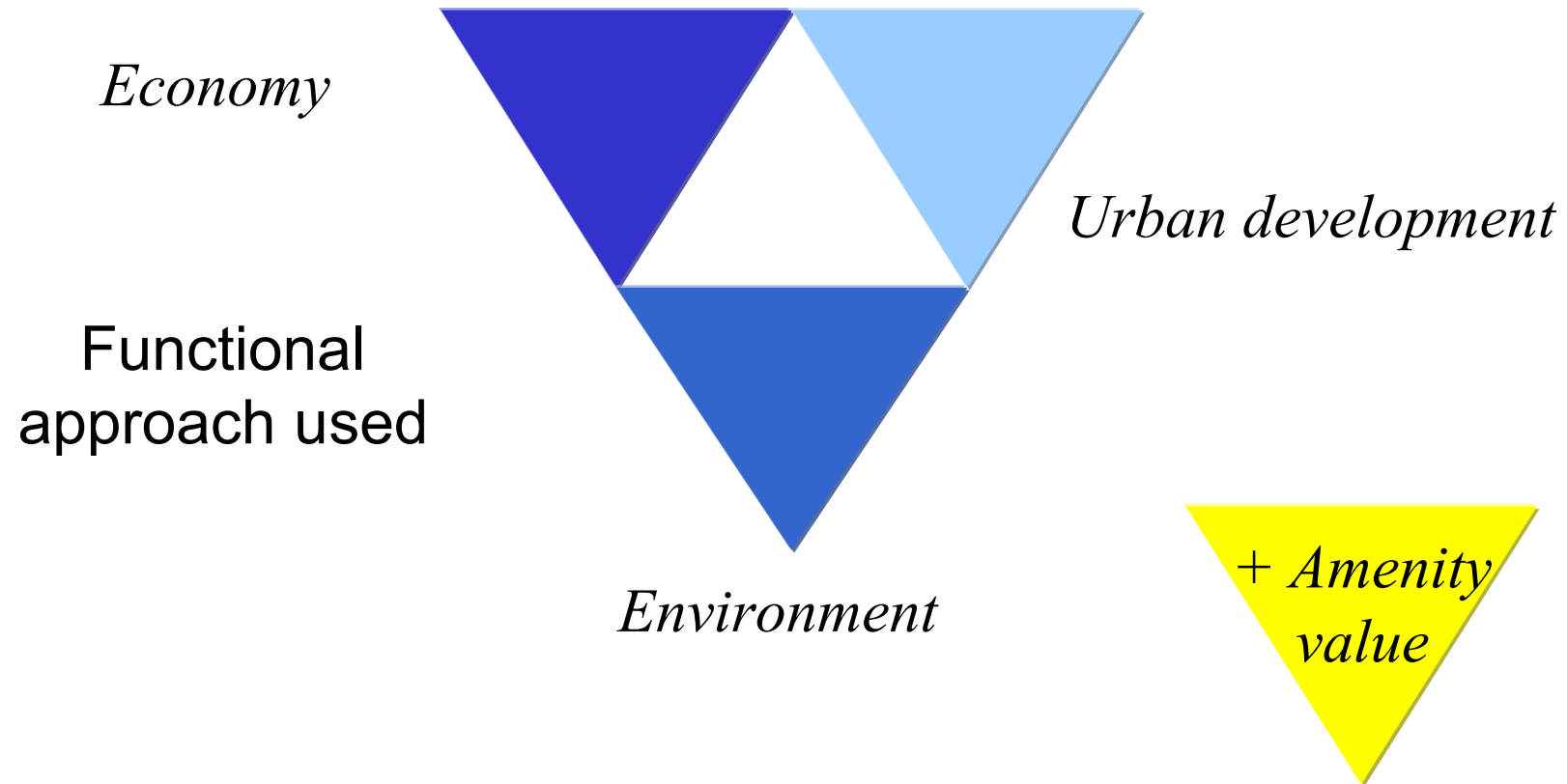


Urban development

Environment

Shared objectives

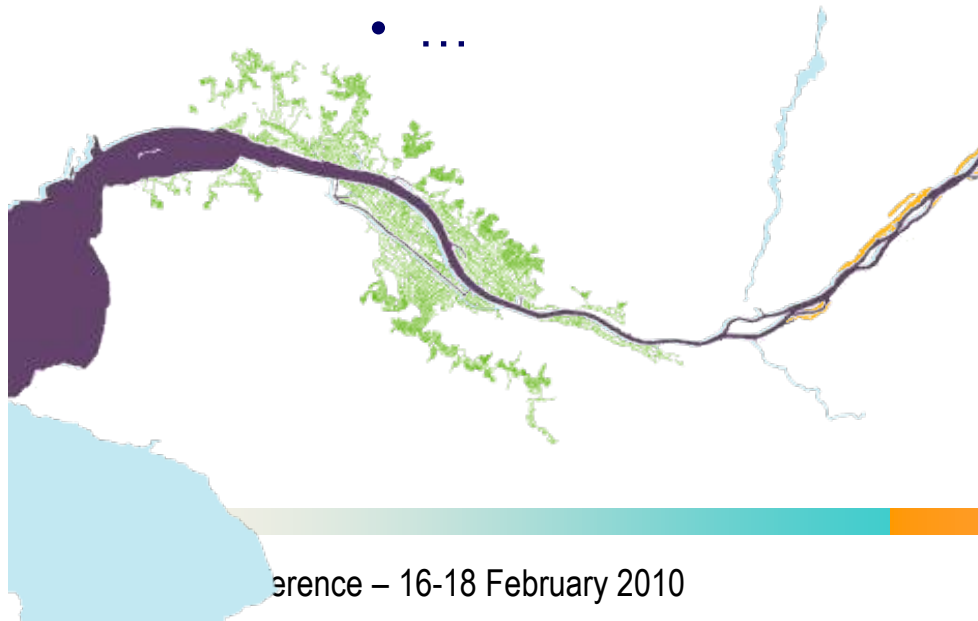
A common vision for the estuary



The GIP Loire Estuaire

- **Creation of an effective tool for managing the Loire : the GIP Loire estuaire**

- an organisation to progress and capitalize on knowledge on the Loire estuary and report to the stakeholders and the public
- a partnership between
 - French government
 - Local authorities
 - Nantes St Nazaire Harbour
 - ...



The framework for the action

The Plan Loire : a catchment-based management strategy

- Decided by the major stakeholders
- Defines the framework of actions to be carried out for the whole catchment : covers flood protection, environment restoration, research, etc
- The GIP in charge with the set of actions specific to the Loire estuary

Le GIP Loire Estuaire 2007 - 2013

One general mission : progress on knowledge and make it available to the main actors

⇒ to facilitate decision making

Some specific missions

Programmes
de
restauration
amont aval
M2 et M4

Animation
du SAGE
M3

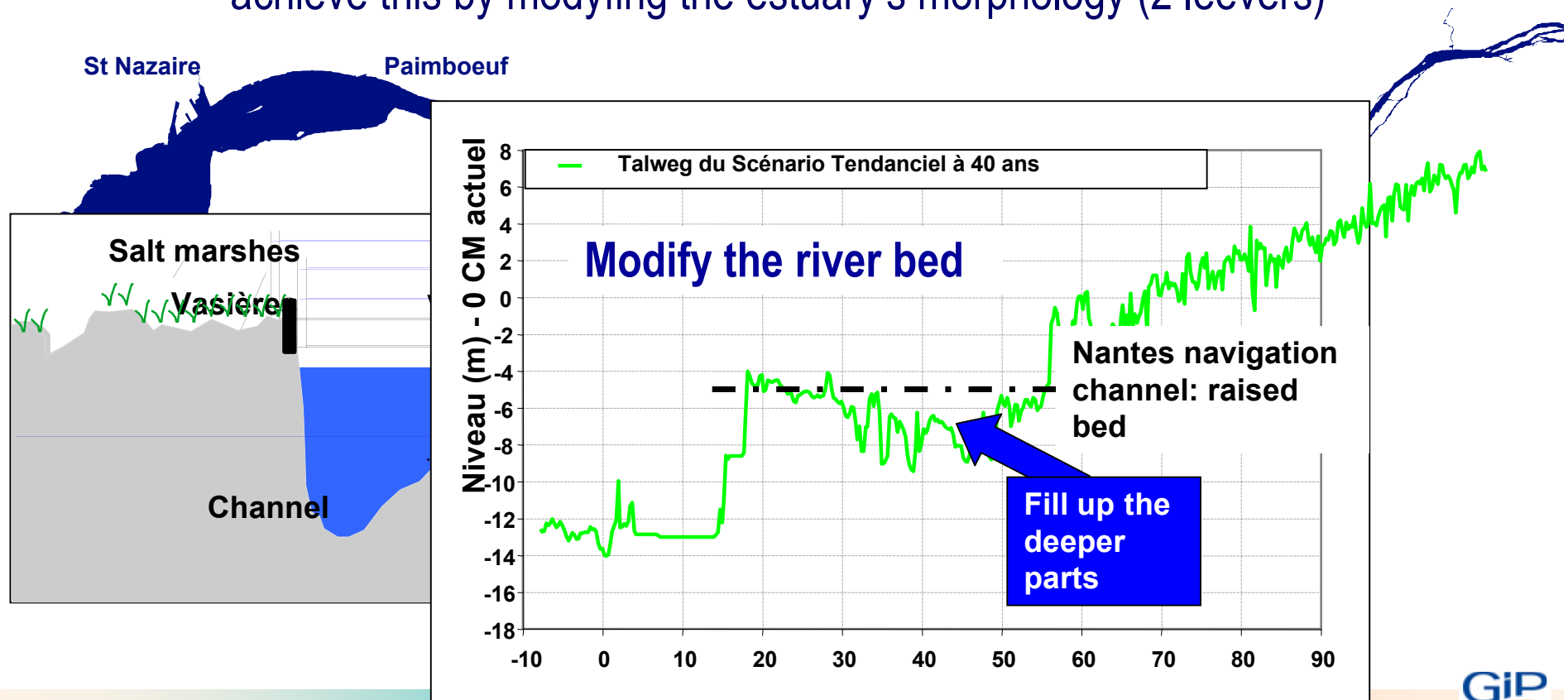
Programme
marais
estuariens
M4

Comité
d'estuaire
M4

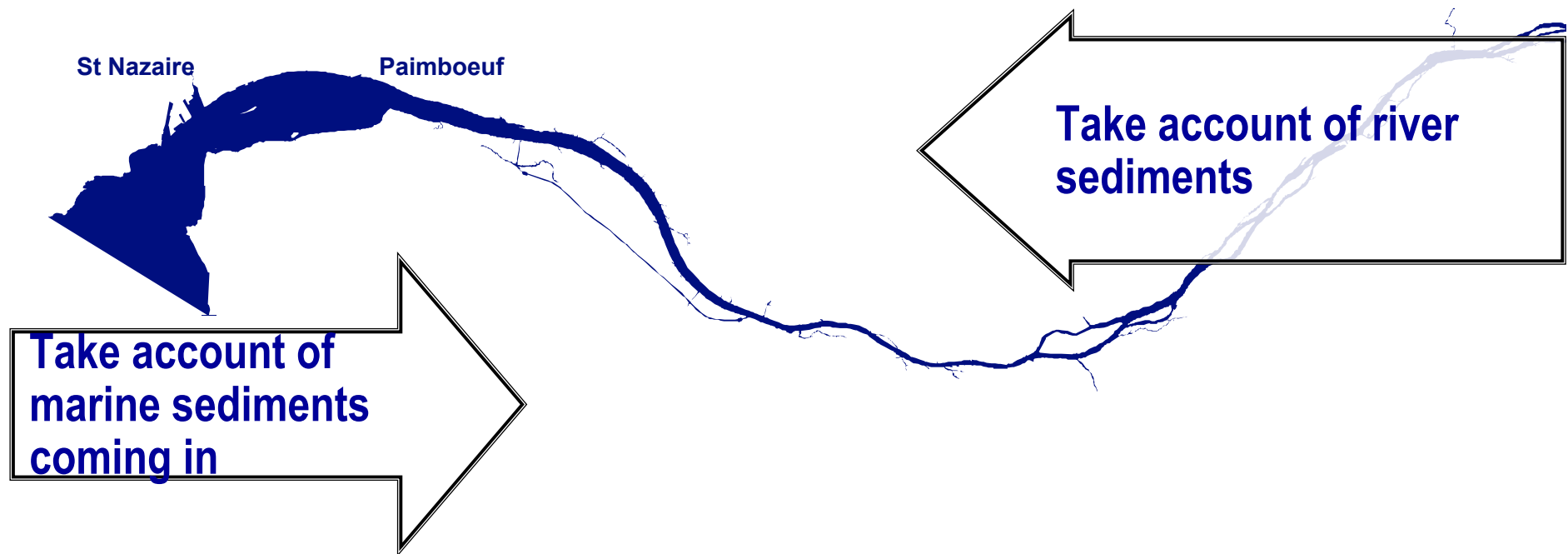
The morphological restoration scheme

Act on the hydrosedimentological processes in the estuary :

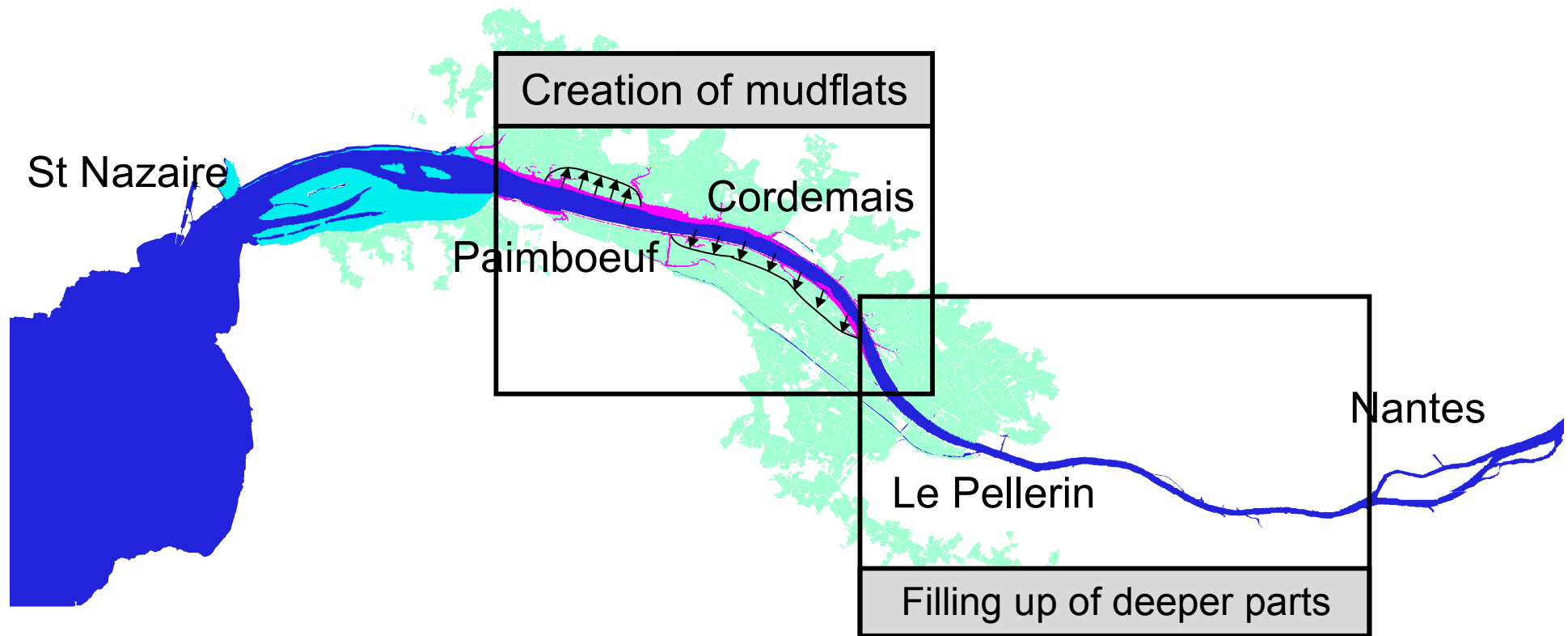
- reduce the capacity of the estuary to hold its sediments by reducing the asymmetrical character of the tidal wave
- achieve this by modifying the estuary's morphology (2 levers)



The morphological scheme



Indicative location of leveers

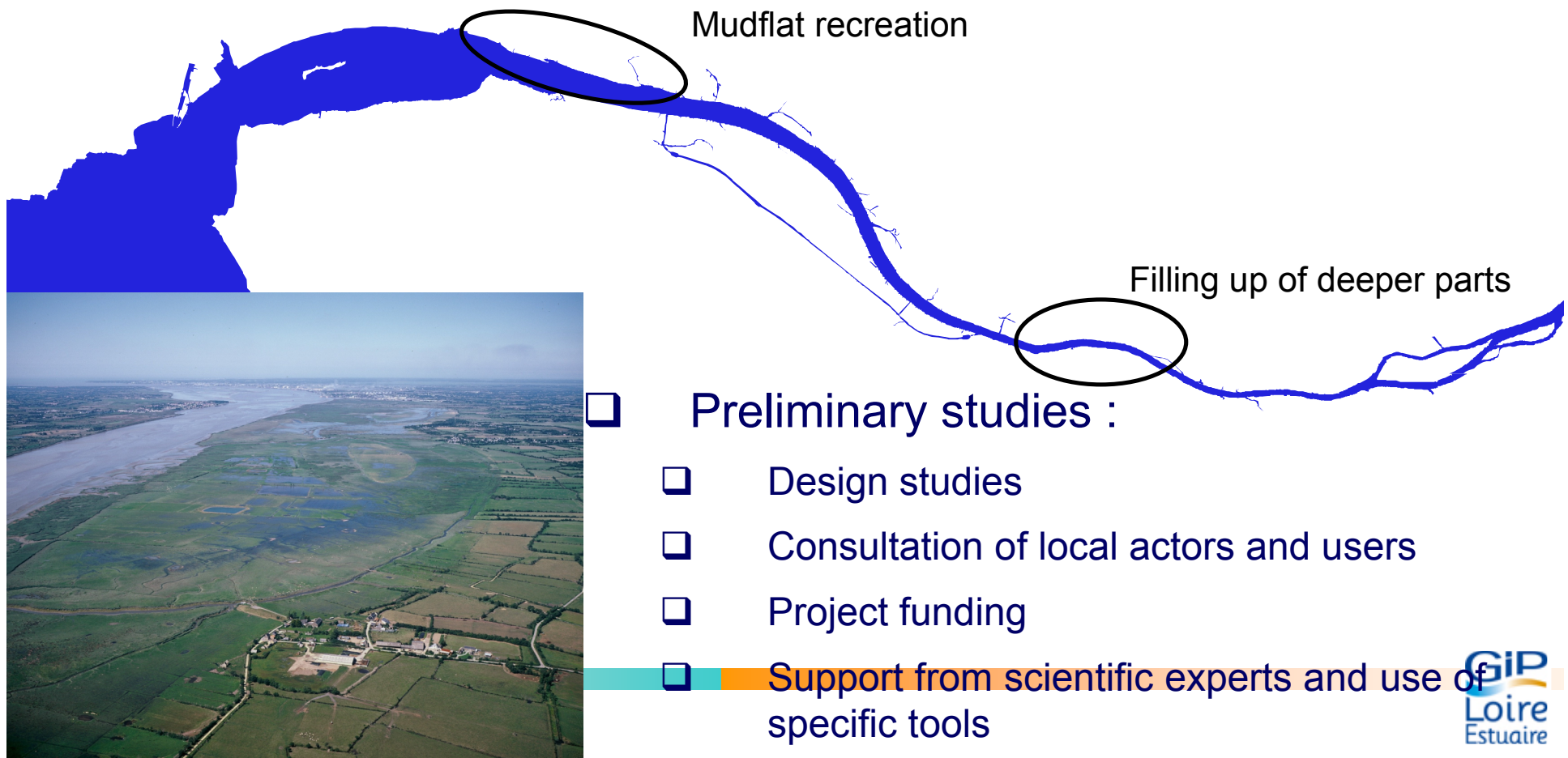


The benefits of the morphological scheme

- **Processes of degradation reversed**
 - Reduction of the estuary's capacity to trap sediment
 - Raising of water levels at low tide
- **Improvement of uses and restoration of habitats**
- **Progressive and experimental approach**

The 2007-2013 programme

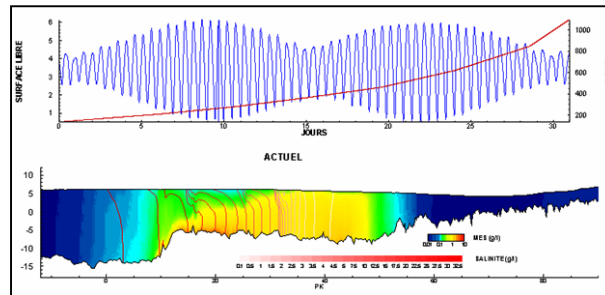
- Carry out an experiment



The tools

Use of 'state of the art' modelling and ecological habitats mapping tools

- 3D hydrosedimentological model



- Ongoing development to represent water/fluid mud diphasic behaviour
- Habitats mapping tool based on the estuary's major ecological functions

Mapping of ecological functions

40 main habitats

Naturalité : (score)

Sensibilité des habitats :

Marnage : +
 Marnage halin : +
 Submersibilité : +
 Salinité : -
 Sédimentation : -
 Evolution morphologique : =

Patrimonialité : (score)

Patrimonialité : (score)

Sensibilité des espèces

Durée immersion : --
 Marnage : +
 Marnage halin : +
 Courant : -
 Submersibilité : ++

Relation trophique :

(score)

Habitat

Scirpaie maritime

Fonctionnalité (potential)

Feeding (summer)

Resting, comfort (winter)

Feeding (winter)

...

Spécies

Aigrette garzette

Bécassine sourde

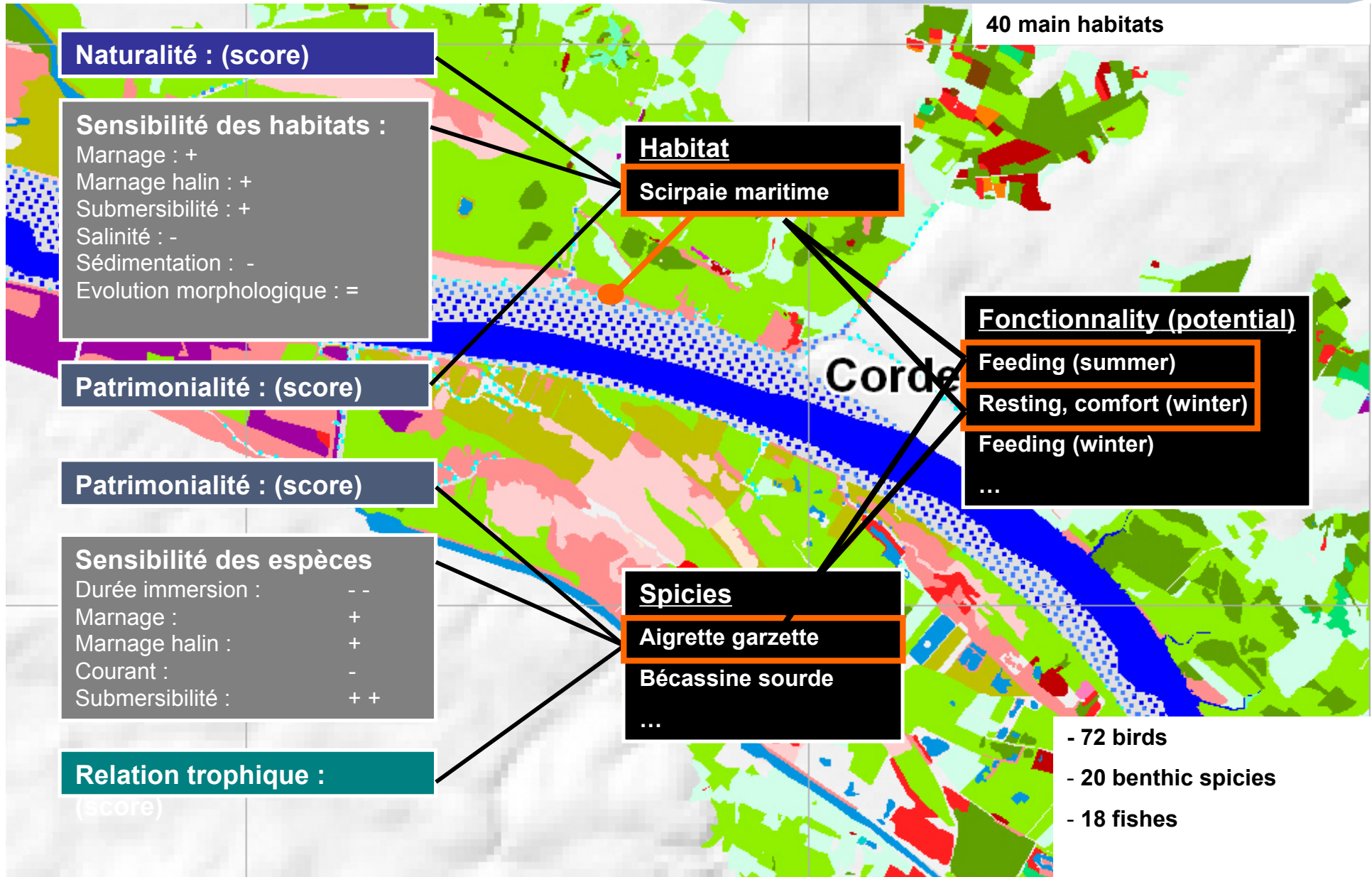
...

- 72 birds

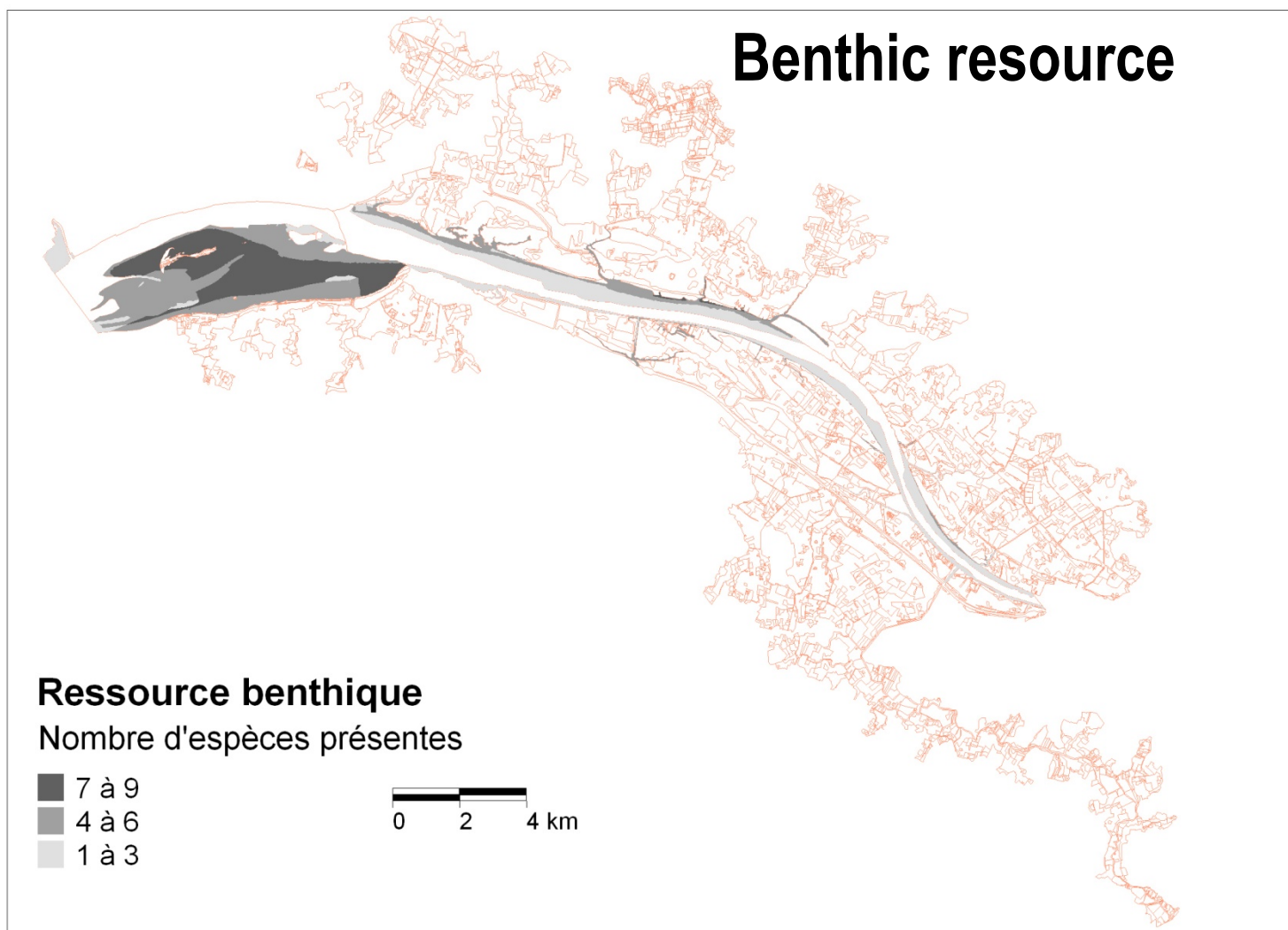
- 20 benthic species

- 18 fishes

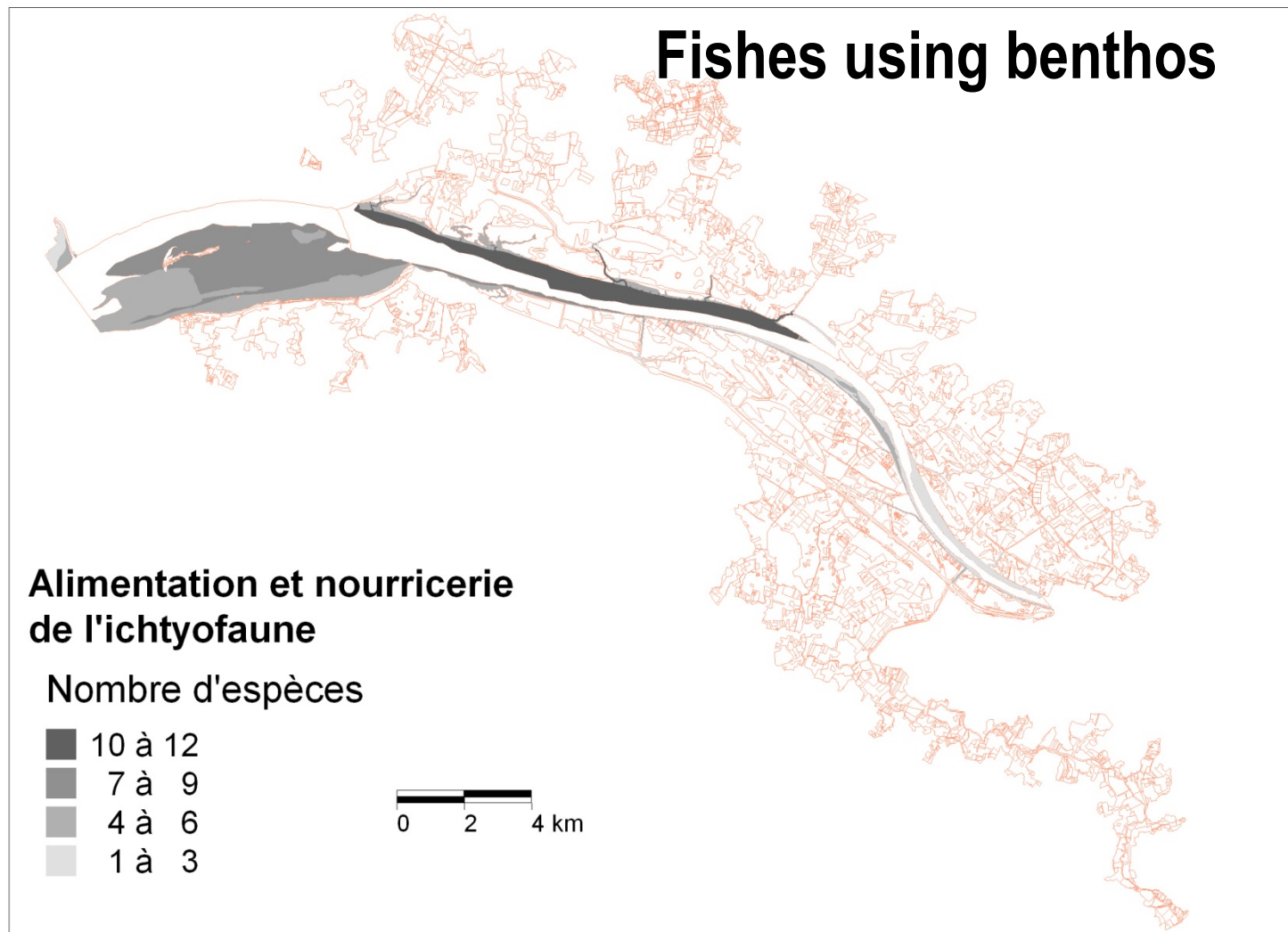
Corde



Nursery and feeding functions



Nursery and feeding functions



The weaknesses

Limited involvement of scientific community on the GIP's projects

- As a result : hydrosedimentological processes not fully understood yet

Conclusion

- The Loire estuary restoration plan: a favourable context due to
 - political support
 - a river catchment framework in place
 - common objectives shared by stakeholders
- Some more work to be done to identify new restoration leavers
- GIP Loire estuaire : the right tool for the estuary
- Functional analysis : a powerful approach to define common objectives