Union européenne :
Fonds Européen de
Développement Régional

The GeDSeT Project

Gestion Durable des Sédiments Transfrontaliers

Sustainable Management of Trans-boundary Sediments

Focus on Wallonia and the North of France

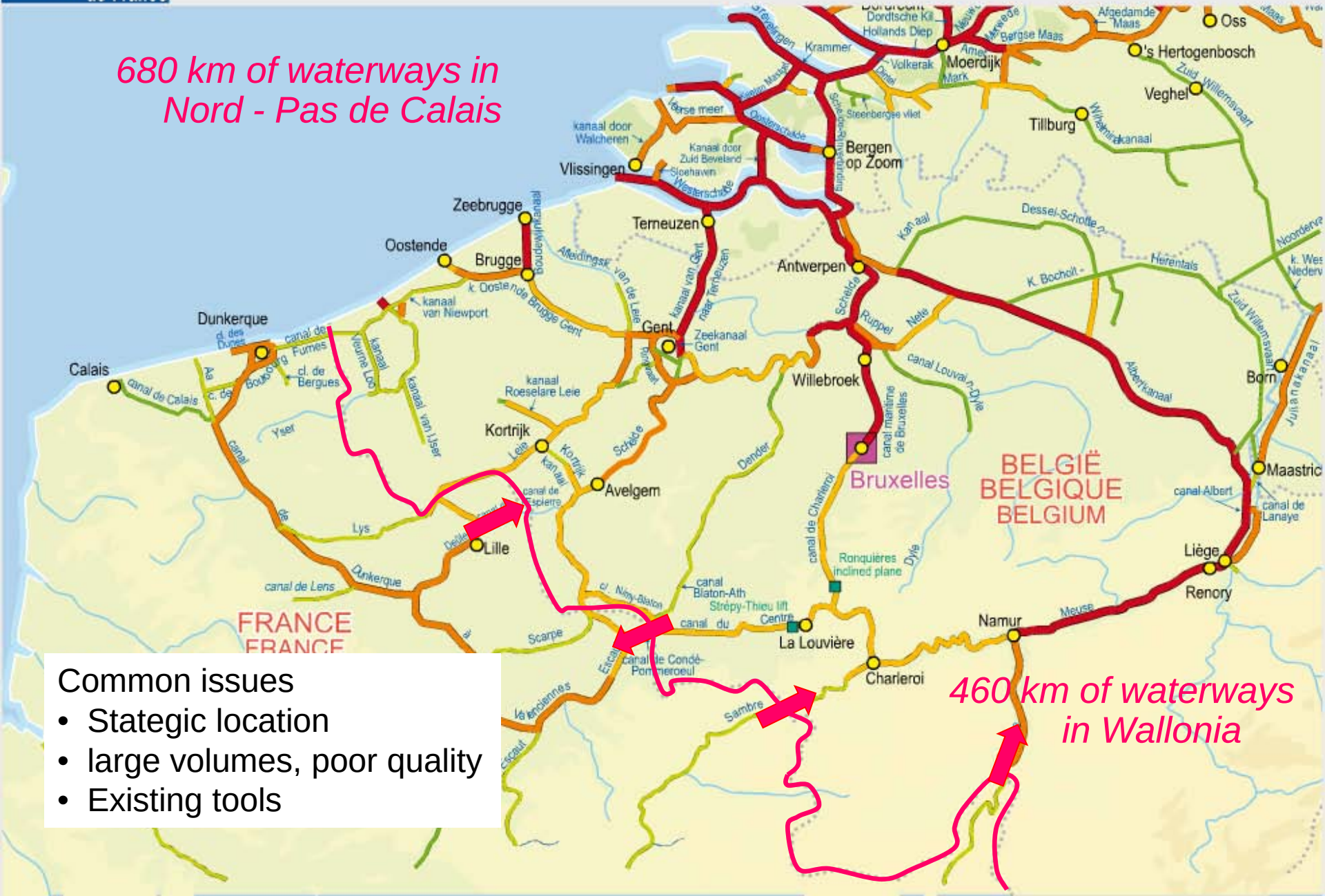
Agnès Laboudigue[1], Pascale Michel[2], Claire Alary[1], Laurence Haouche[3], Bruno Lemière[2], Fernando Pereira[4], Benoit Hazebrouck[5], Pierre Hennebert[5] and Christian Lucion[4]

[1] Mines de Douai, [2] BRGM, [3] ISSeP, [4] CTP, [5] INERIS

7th international SedNet event, 6-9 April 2011
Venice, Italy

CARTE D'EUROPE DU NORD OUEST DES VOIES NAVIGABLES

NORTH-WEST EUROPEAN WATERWAYS MAP

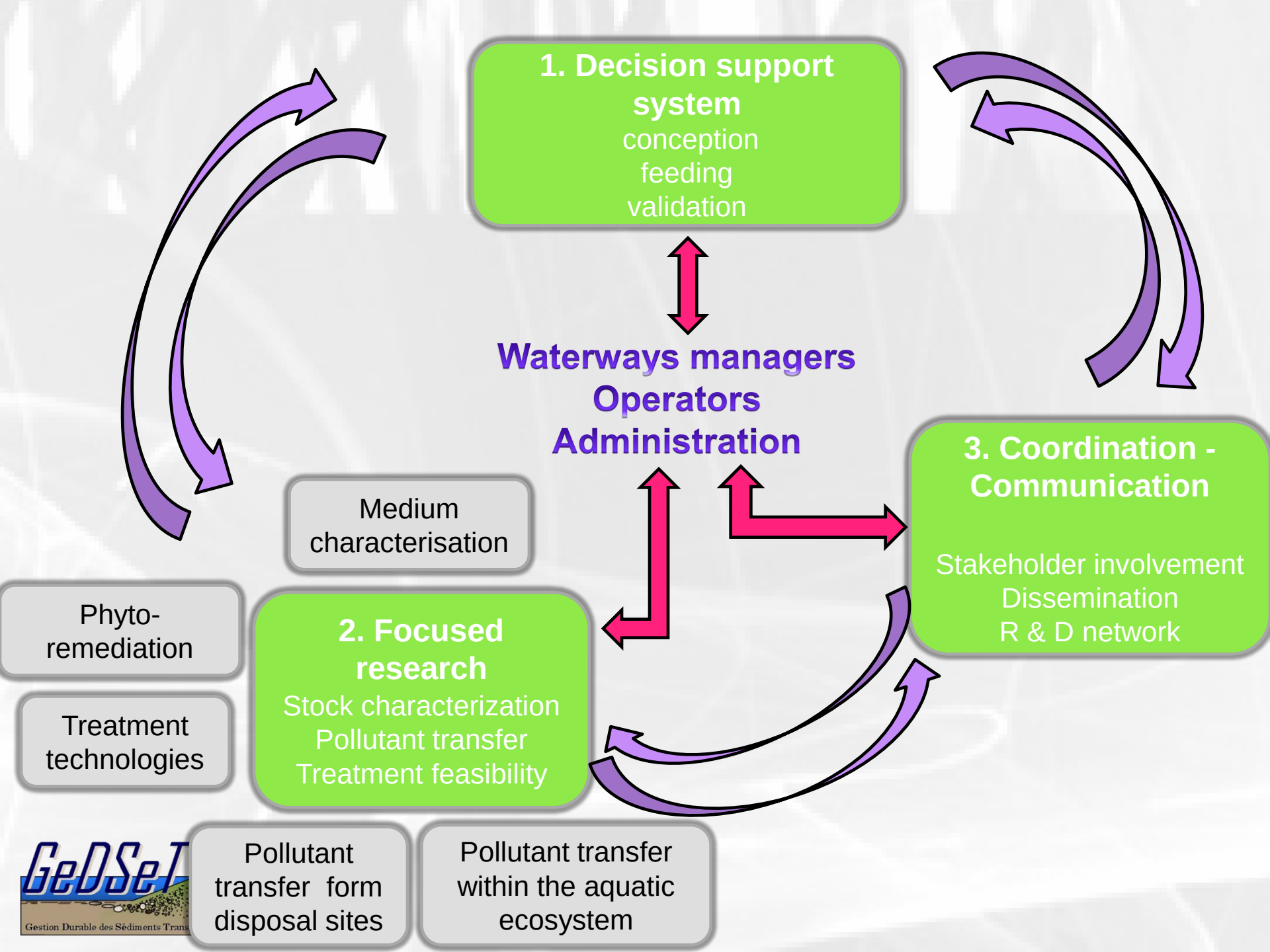


Objectives of the project

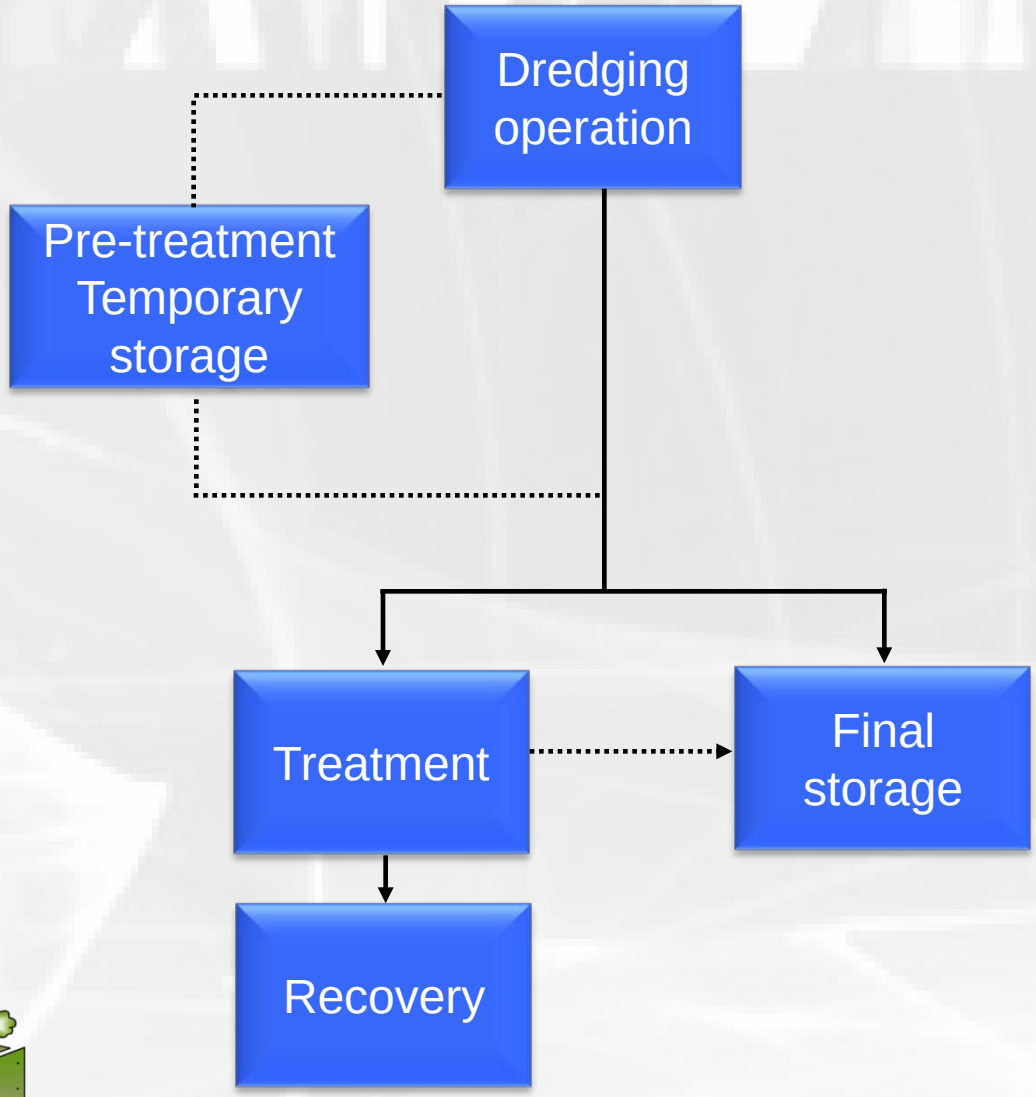
- To provide waterways managers with indicators and a decision support system in order to compare different management and recovery processes
- Taking account of all sustainable development criteria
- Taking account of local specificities

GeDSeT
Gestion Durable des Sédiments Transfrontaliers

$\Rightarrow$ 3 work packages

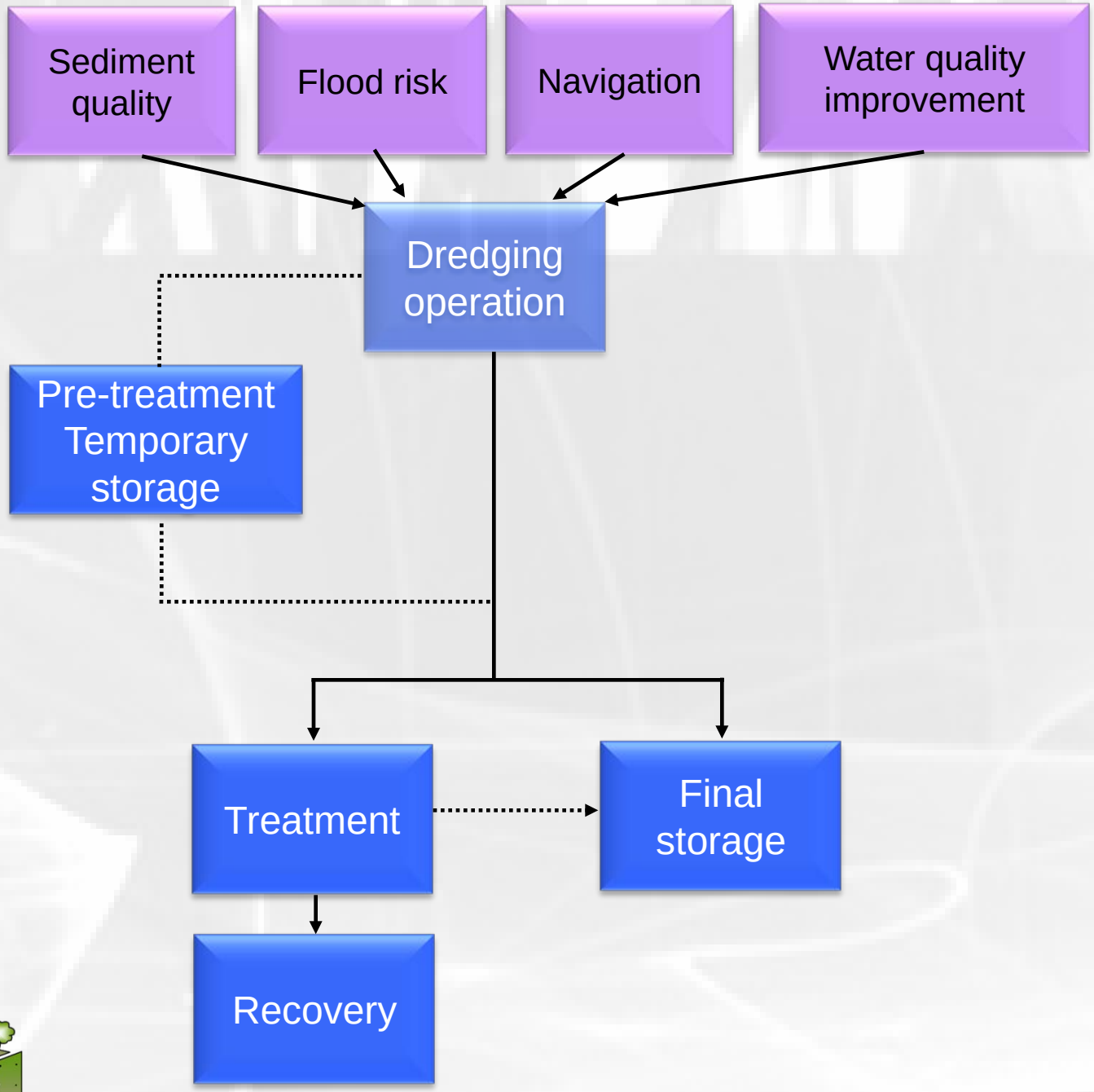

1. Decision support system
conception
feeding
validation
Waterways managers
Operators
Administration
3. Coordination - Communication
Stakeholder involvement
Dissemination
R & D network
Medium characterisation
Phyto-remediation
Treatment technologies
2. Focused research
Stock characterization
Pollutant transfer
Treatment feasibility
Pollutant transfer form disposal sites
Pollutant transfer within the aquatic ecosystem
GeDSeT
Gestion Durable des Sédiments Trans

First step : Identification of key factors from the decision flowchart (simplified)



GeDSeT
Gestion Durable des Sédiments Transfrontaliers

MOTIVATION



GeDSeT
Gestion Durable des Sédiments Transfrontaliers

MOTIVATION

Sediment quality

Flood risk

Navigation

Water quality improvement

KEY FACTORS

Volumes generated

Sediment heterogeneity

Costs and schedule

Impact on ecosystems

Dredging operation

Pre-treatment Temporary storage

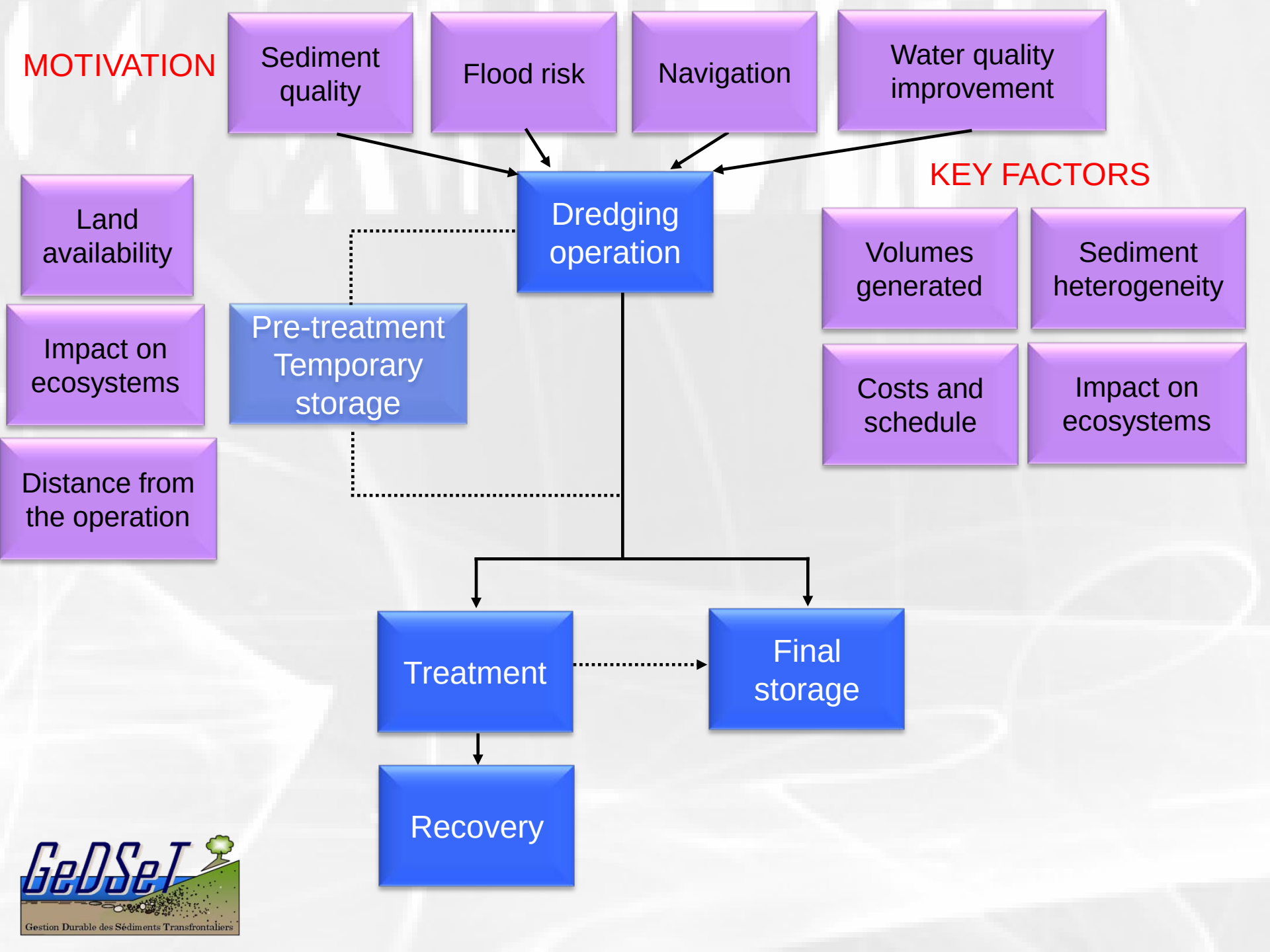
Treatment

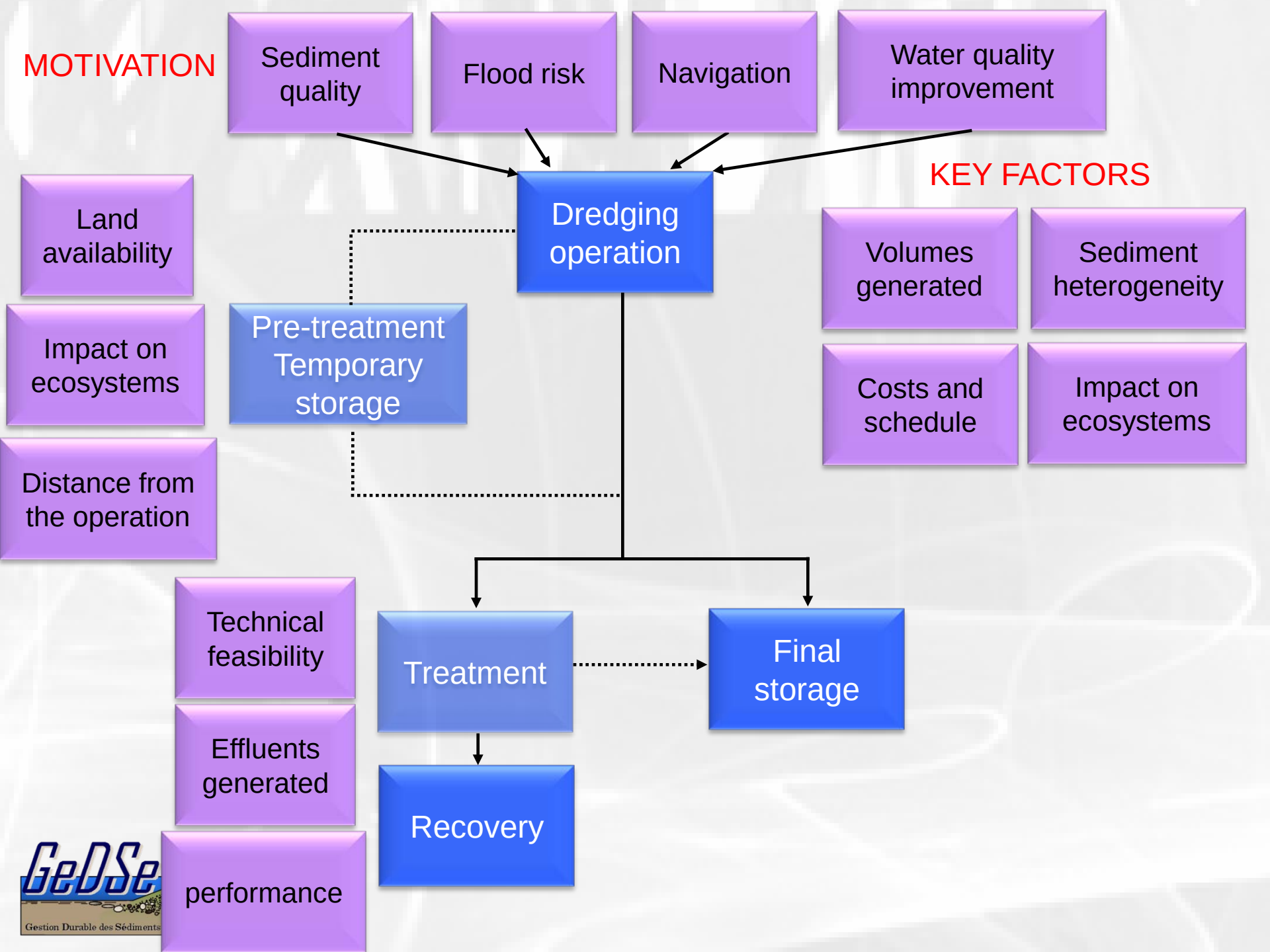
Final storage

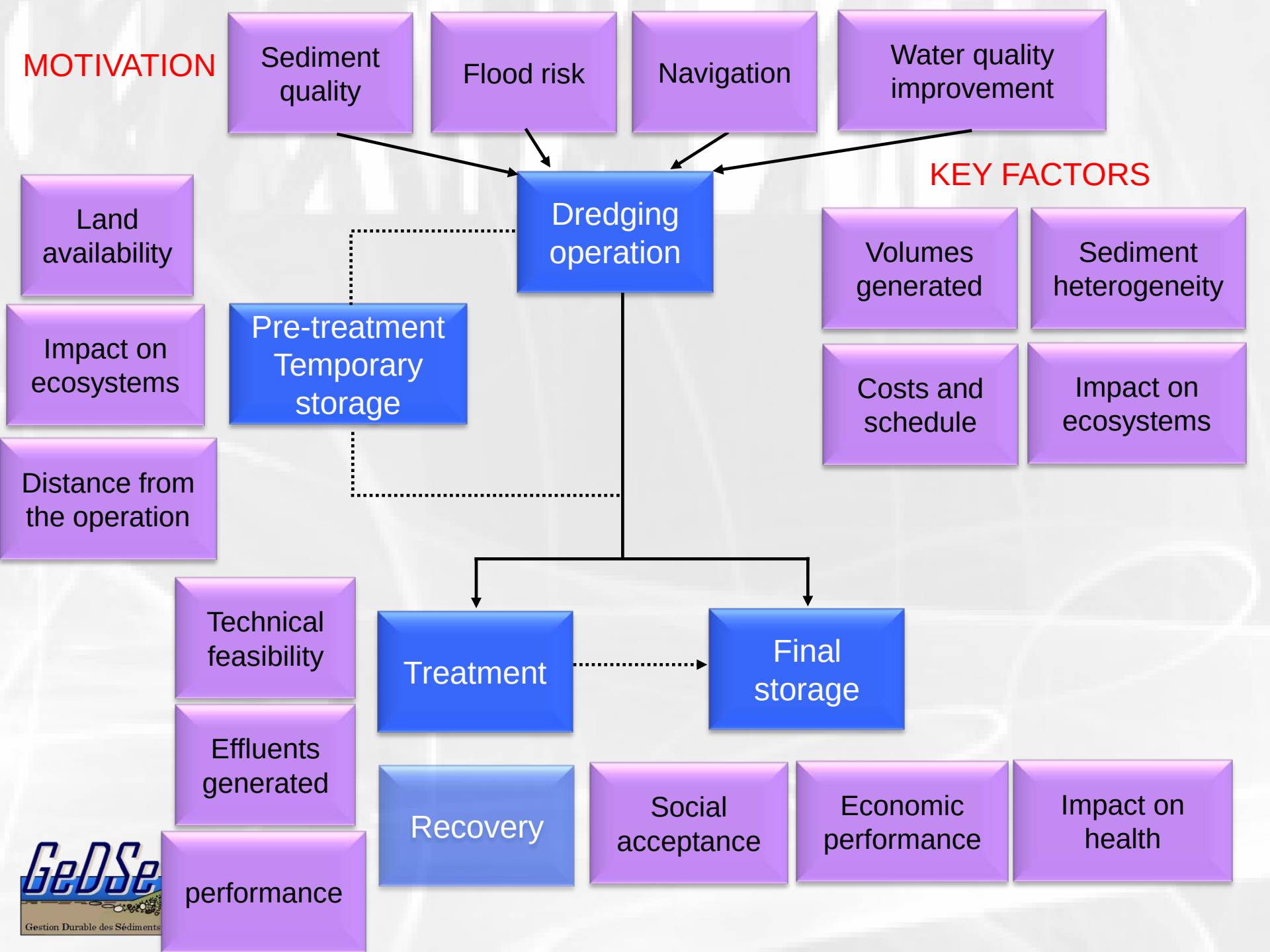
Recovery

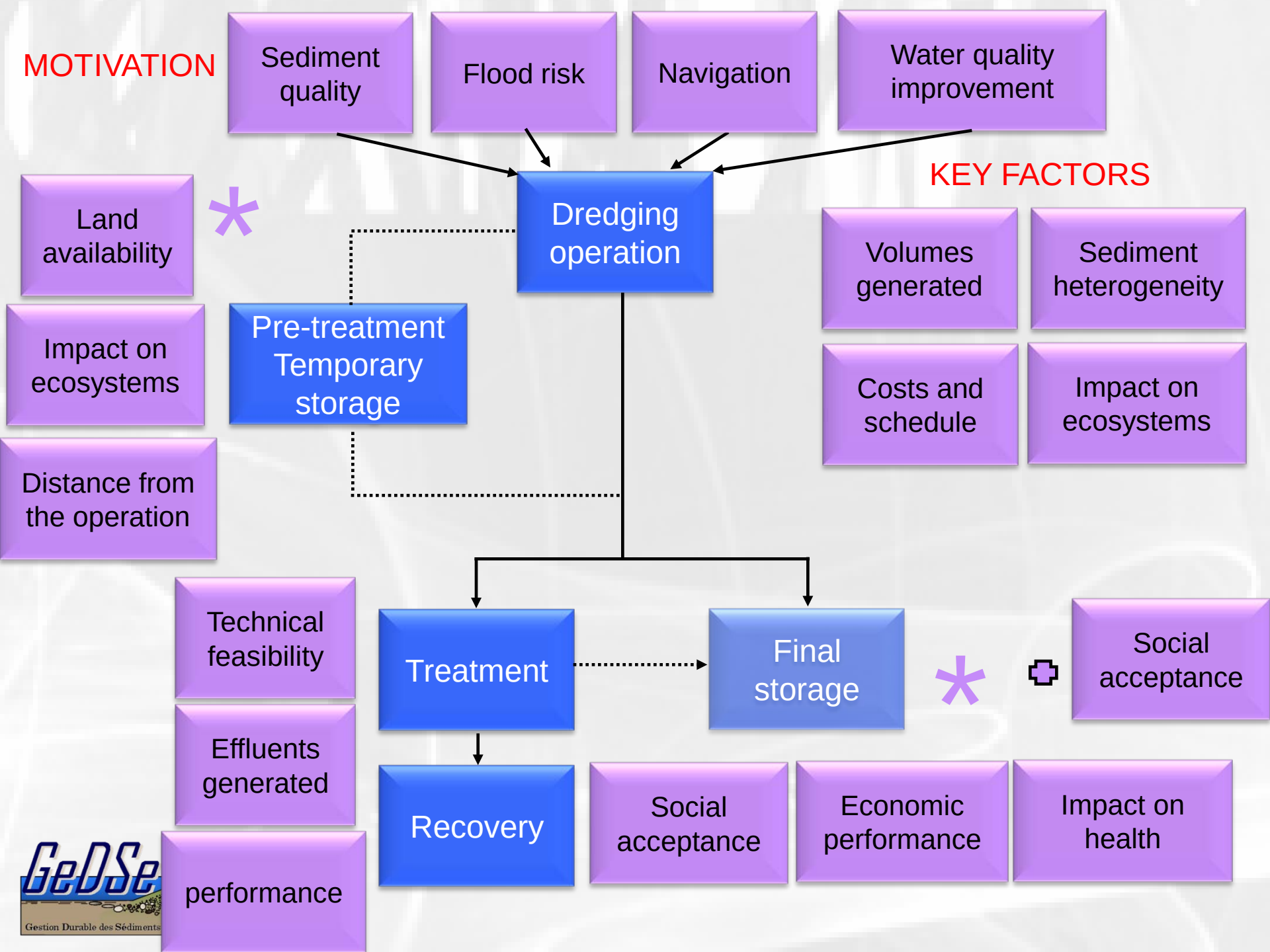
GeDSeT

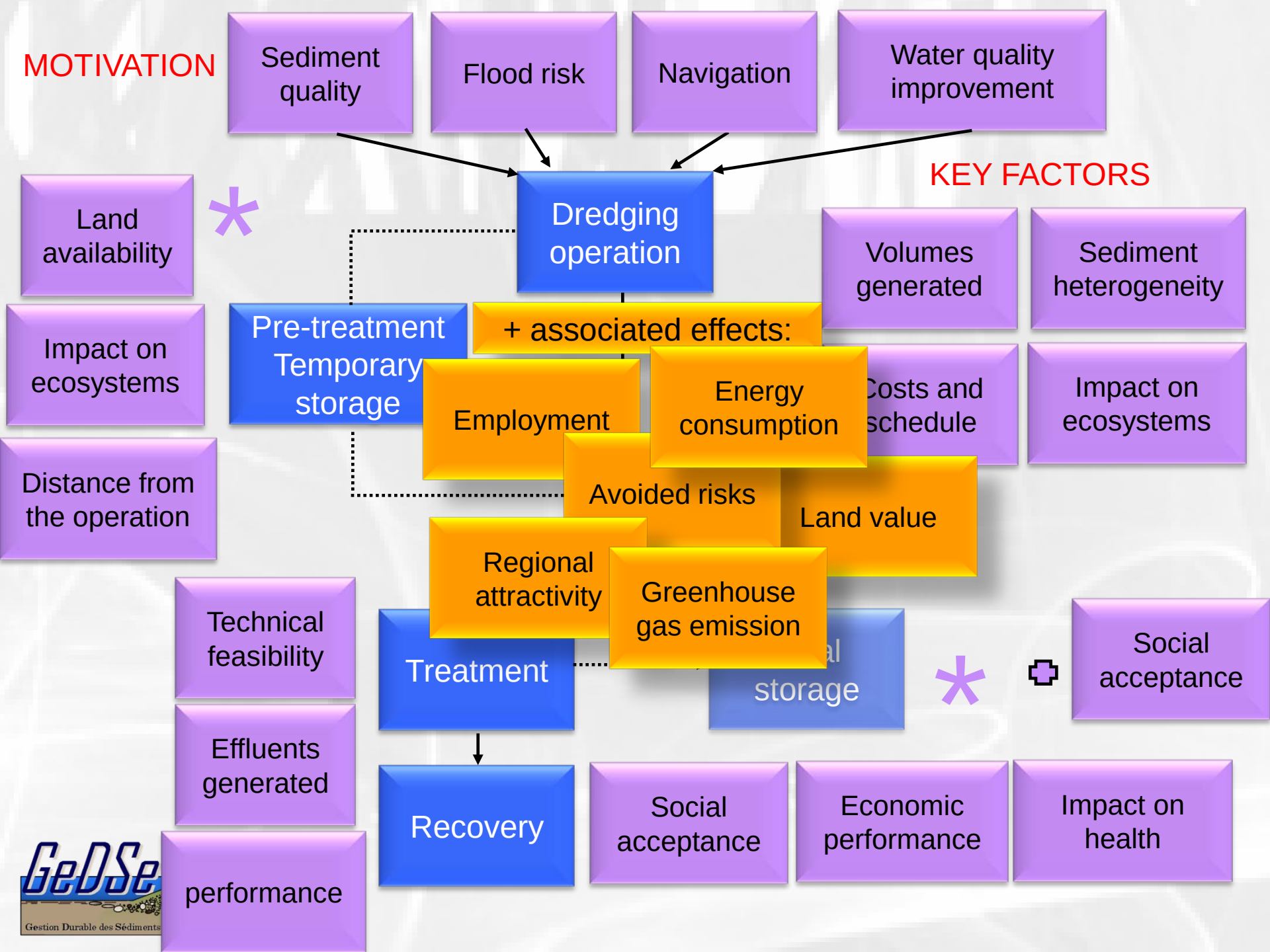
Gestion Durable des Sédiments Transfrontaliers


MOTIVATION
Sediment quality
Flood risk
Navigation
Water quality improvement
KEY FACTORS
Land availability
Dredging operation
Volumes generated
Sediment heterogeneity
Impact on ecosystems
Pre-treatment Temporary storage
Costs and schedule
Impact on ecosystems
Distance from the operation
Treatment
Final storage
Recovery
GeDSeT
Gestion Durable des Sédiments Transfrontaliers

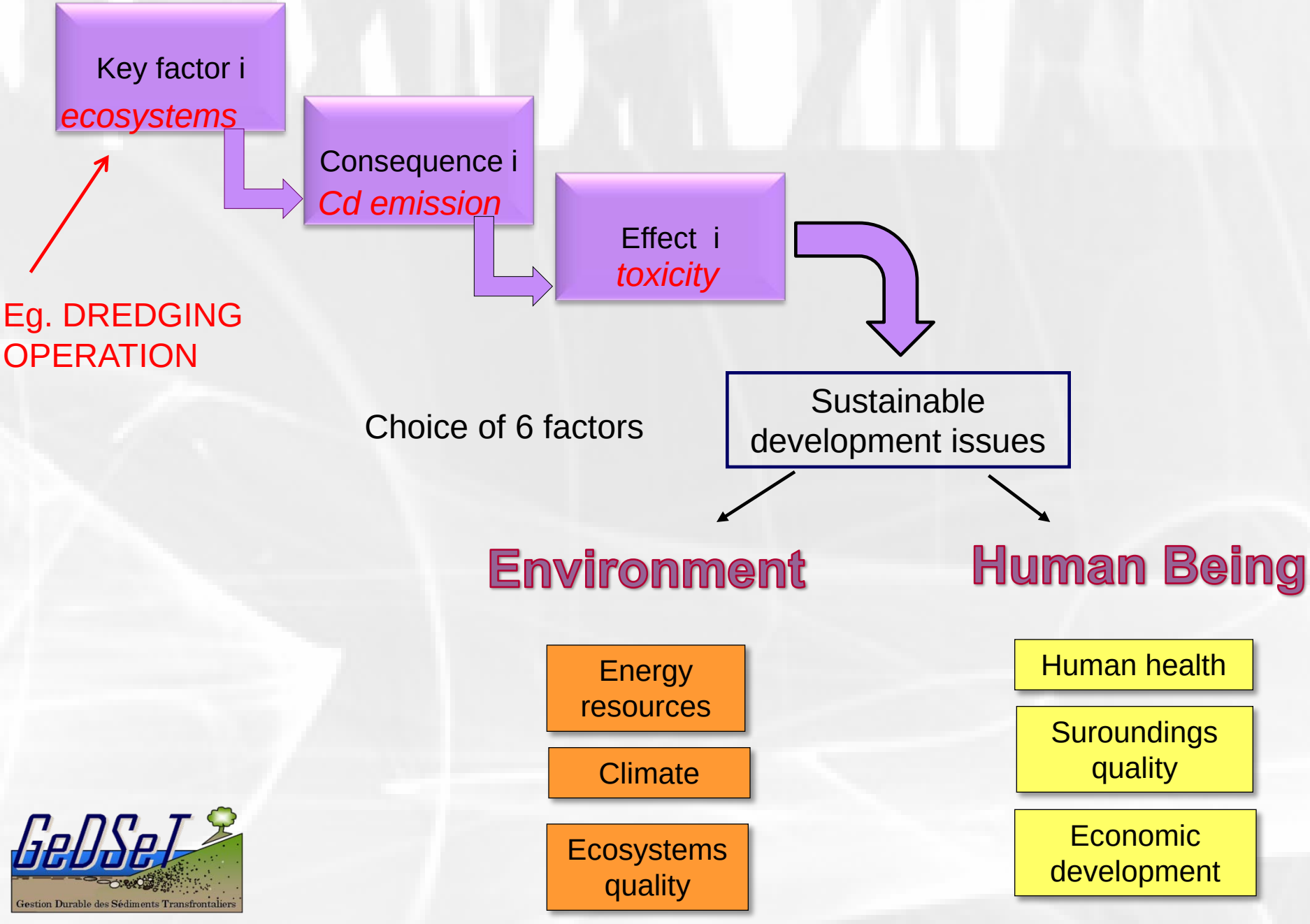

MOTIVATION
Sediment quality
Flood risk
Navigation
Water quality improvement
KEY FACTORS
Land availability
Dredging operation
Volumes generated
Sediment heterogeneity
Impact on ecosystems
Pre-treatment Temporary storage
Costs and schedule
Impact on ecosystems
Distance from the operation
Technical feasibility
Treatment
Final storage
Effluents generated
Recovery
performance
GeDSe
Gestion Durable des Sédiments


MOTIVATION
Sediment quality
Flood risk
Navigation
Water quality improvement
KEY FACTORS
Land availability
Dredging operation
Volumes generated
Sediment heterogeneity
Impact on ecosystems
Pre-treatment Temporary storage
Costs and schedule
Impact on ecosystems
Distance from the operation
Technical feasibility
Treatment
Final storage
Effluents generated
Recovery
Social acceptance
Economic performance
Impact on health
performance
GeDSe
Gestion Durable des Sédiments


MOTIVATION
Sediment quality
Flood risk
Navigation
Water quality improvement
KEY FACTORS
Land availability
*
Dredging operation
Volumes generated
Sediment heterogeneity
Impact on ecosystems
Pre-treatment Temporary storage
Costs and schedule
Impact on ecosystems
Distance from the operation
Technical feasibility
Treatment
Final storage
*
Social acceptance
Effluents generated
Recovery
Social acceptance
Economic performance
Impact on health
performance
GeDSe
Gestion Durable des Sédiments


MOTIVATION
Sediment quality
Flood risk
Navigation
Water quality improvement
KEY FACTORS
Land availability
Dredging operation
Volumes generated
Sediment heterogeneity
Impact on ecosystems
Pre-treatment Temporary storage
+ associated effects:
Employment
Energy consumption
Costs and schedule
Impact on ecosystems
Distance from the operation
Avoided risks
Land value
Regional attractivity
Greenhouse gas emission
Technical feasibility
Treatment
storage
Social acceptance
Effluents generated
Recovery
Social acceptance
Economic performance
Impact on health
performance
GeDSe
Gestion Durable des Sédiments

Second step : translate key factors into indicators



GeDSeT
Gestion Durable des Sédiments Transfrontaliers

Third step: quantify the effect

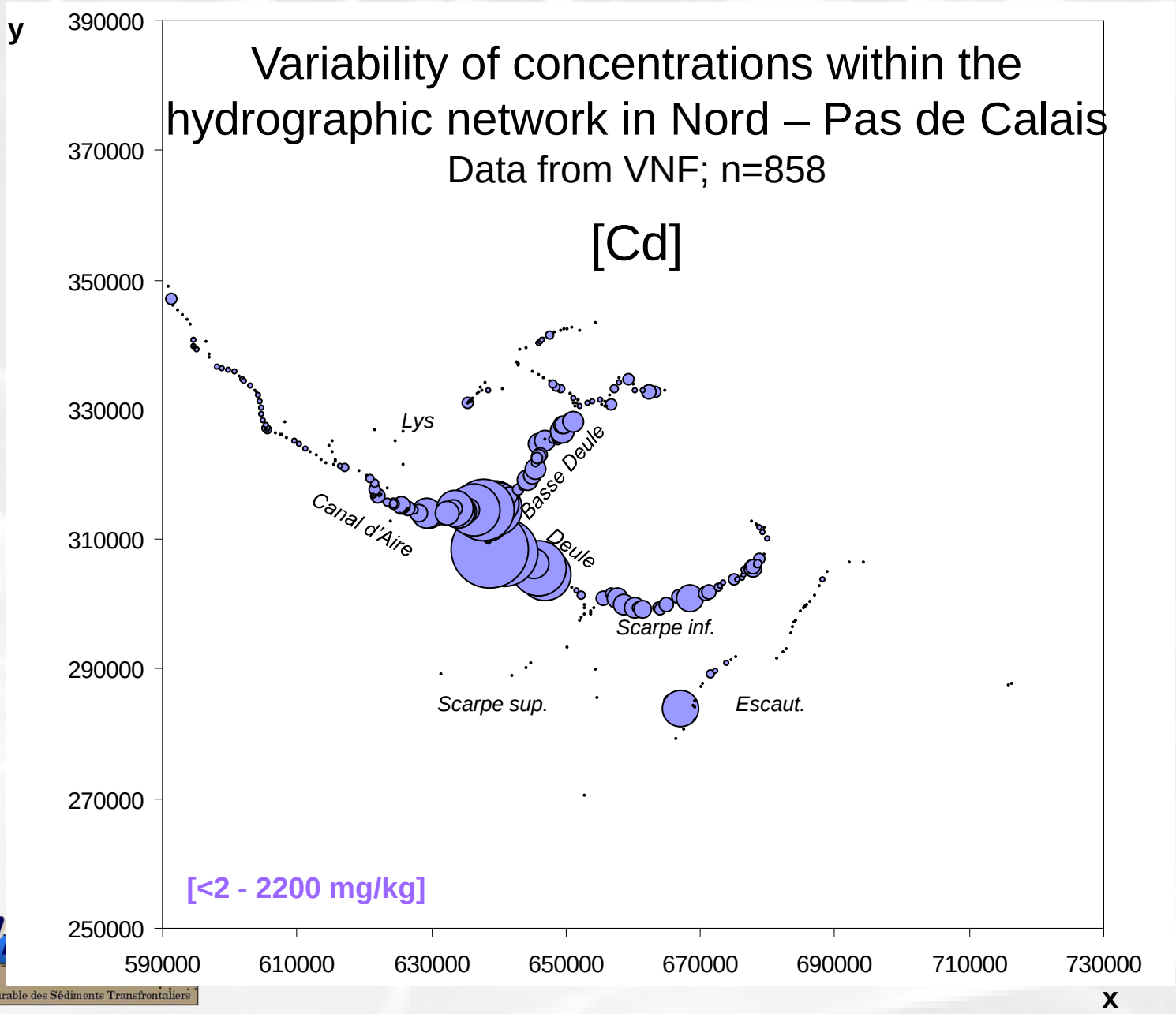
2 ways :

Literature data, and feedback from stakeholders

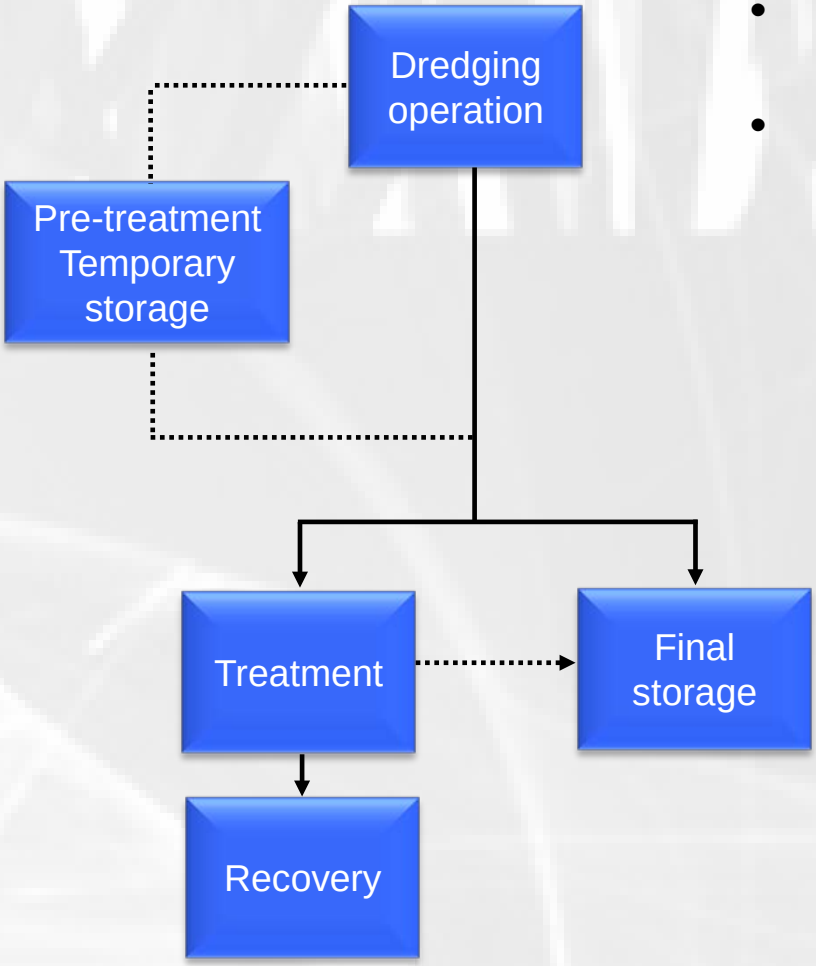
Knowledge acquisition : research WP

GeDSeT
Gestion Durable des Sédiments Transfrontaliers

Using and improving data from waterways operators



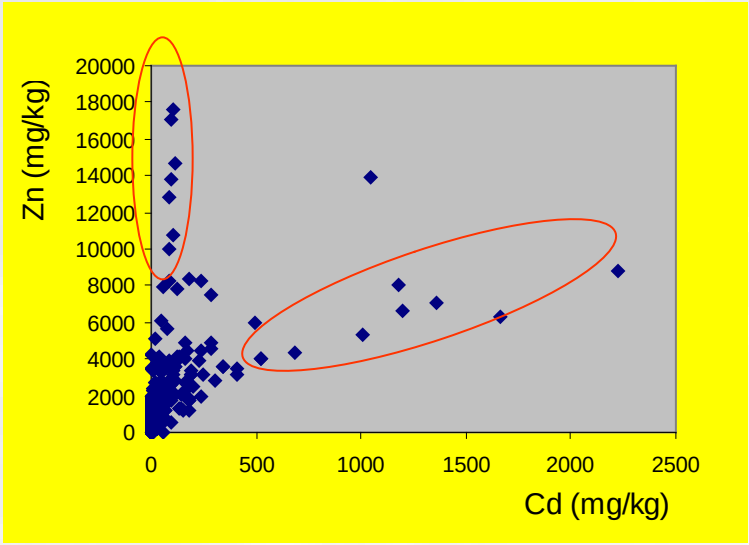
Gestion Durable des Sédiments Transfrontaliers



1. Crossing data :
- Help to prioritize : Motivation for dredging
- Management options

➢ imputs

2. Interpretation of data : Prevention of Sources and transfer modelisation

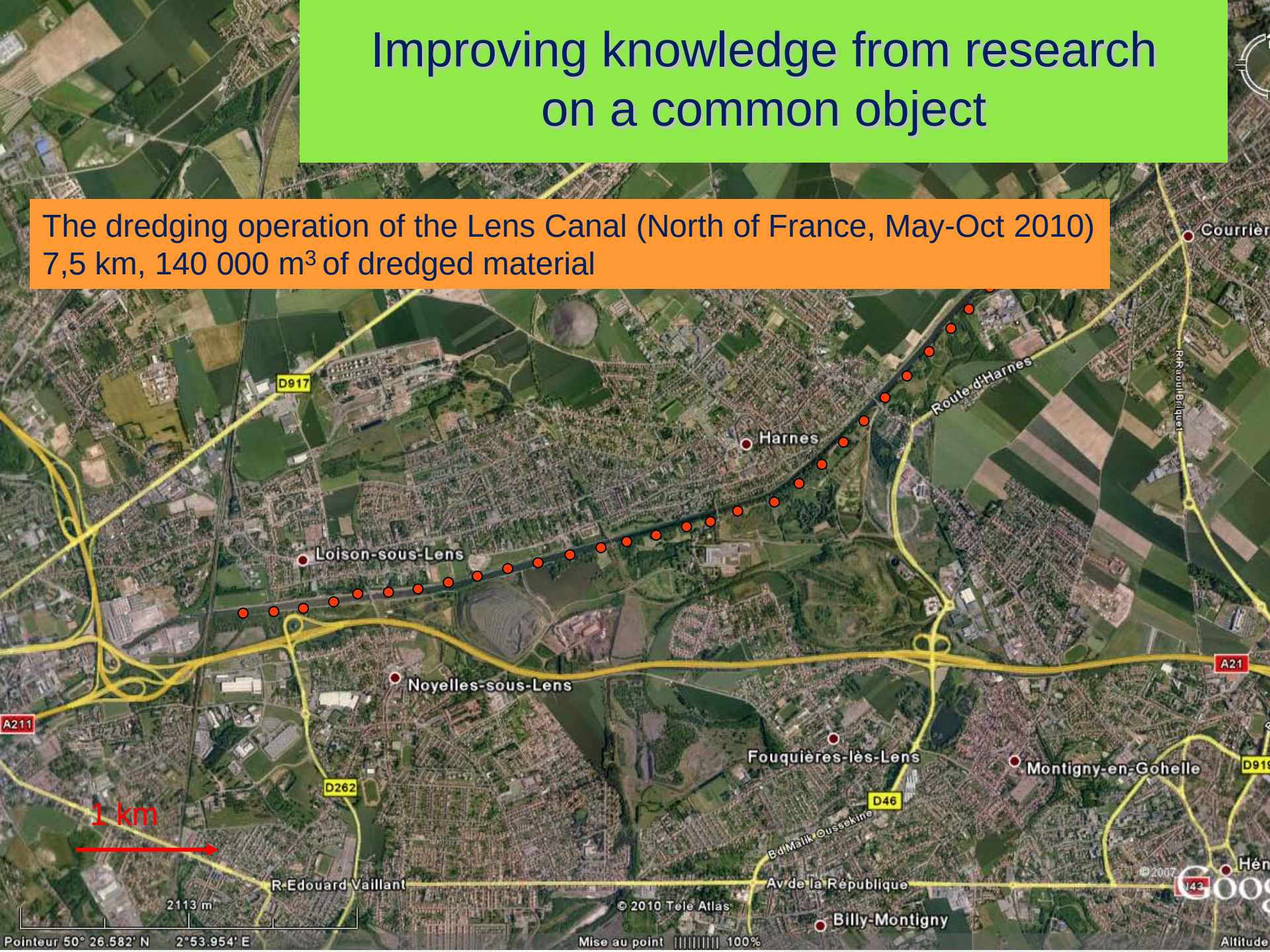


- Different transport media within the canal ?
- Different Sources ?

GeDSeT
Gestion Durable des Sédiments Transfrontaliers

Improving knowledge from research on a common object

The dredging operation of the Lens Canal (North of France, May-Oct 2010)
7,5 km, 140 000 m^3 of dredged material

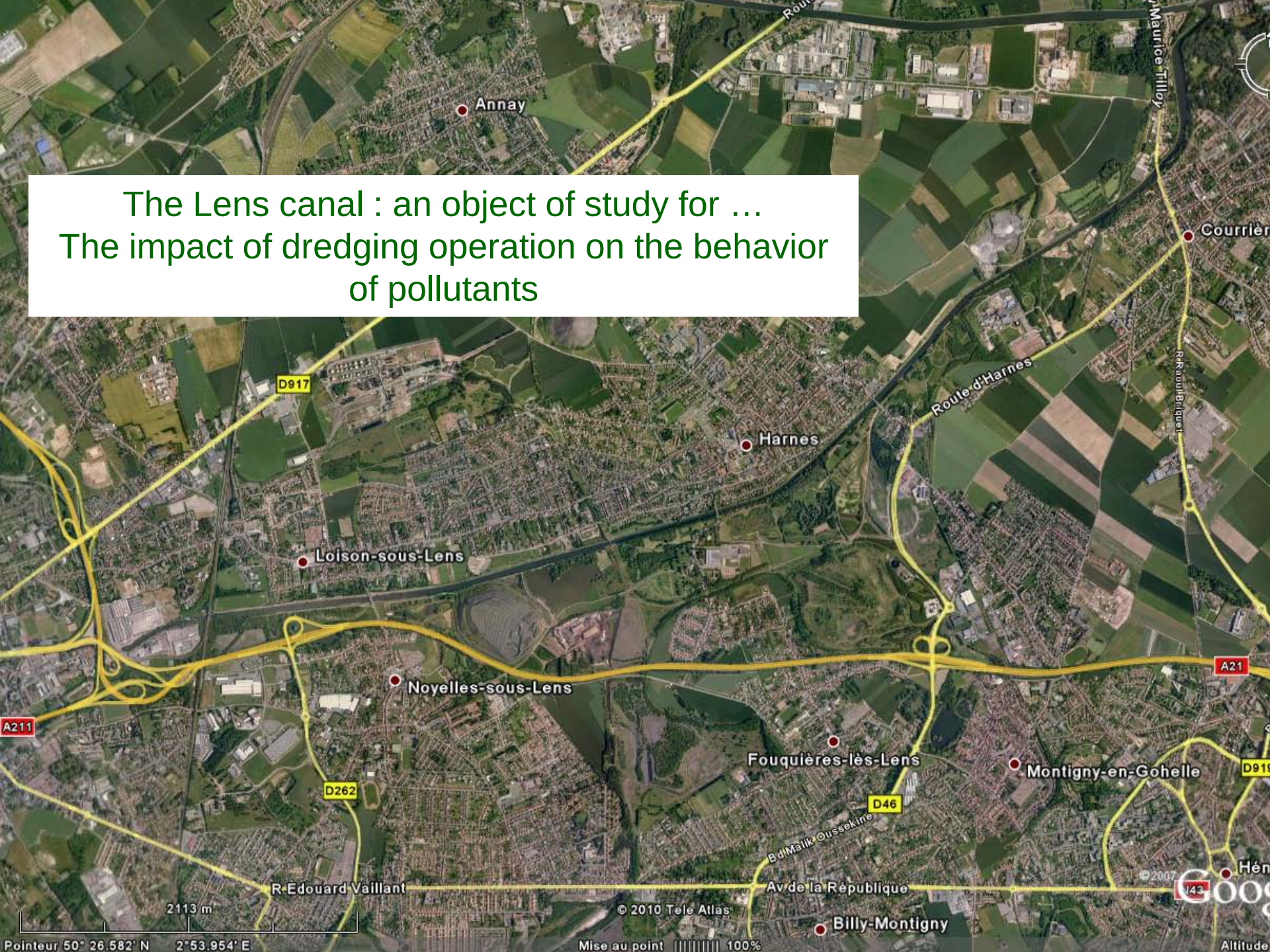


The Lens canal : an object of study for …
1. The development of *in situ* characterization methods*: X ray* fluorescence

- to selective dredging

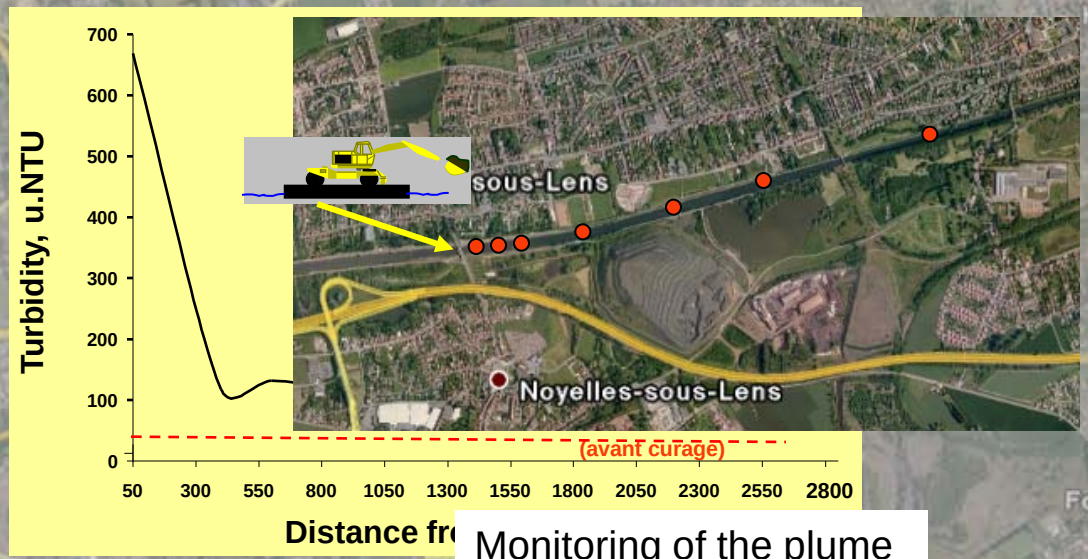
- Costs and benefits

- Cost for selective dredging
- Cost of disposal for heavily contaminated sediment
+ Reduction of disposal cost due to sediment reuse
+ Réduction of costs linked to large volumes



The Lens canal : an object of study for …
The impact of dredging operation on the behavior of pollutants

The Lens canal : an object of study for …
The impact of dredging operation on the behaviour of pollutants



Monitoring of the plume
See poster ALARY et al.

Remobilisation of pollutants to water

EMISSION

(SM, PAHs, metals…)

The Lens canal : an object of study for …
R & D on mineralogical treatments of dredged material

To treatment tests

- Alimentation
- Repulpage
- Tamisage à 2 mm
- Hydrocyclonage I
- Hydrocyclonage II
  - Flocculation
  - Flottation

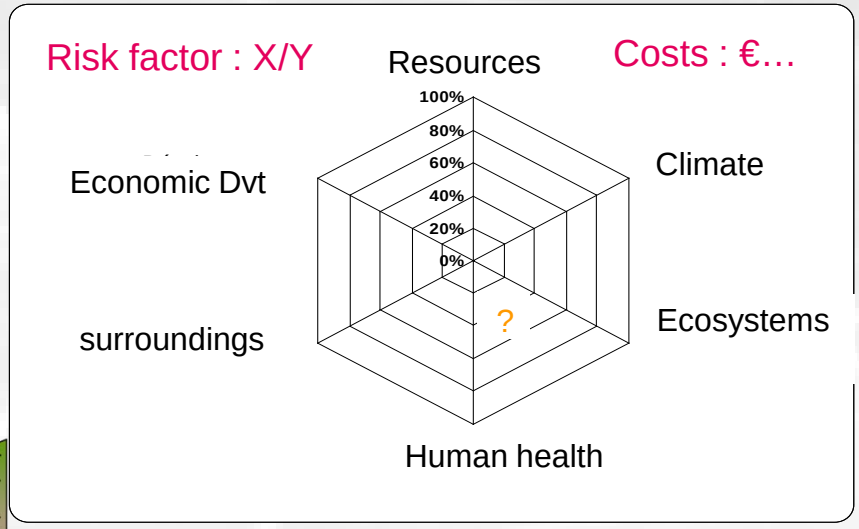
- Conception and implementation of a pilot scale treatment (100 kg/h) for testing processes
- assessment of the quality of outflows

As a conclusion

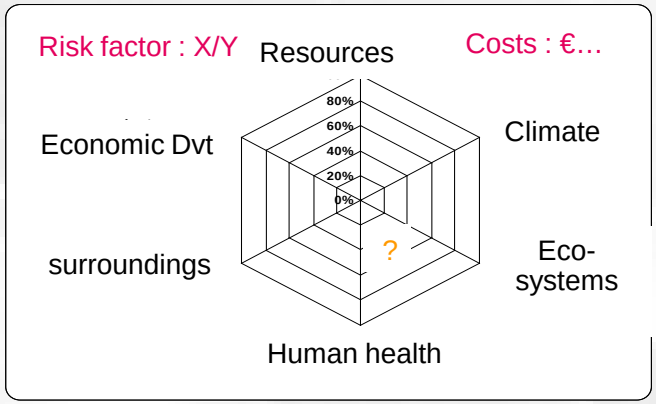
- Integration in the DSS of databases and management tools of waterways managers from F and W
- Analyses of databases
  - More information on metal transfer in the water column and stock of pollutants
  - Need for homogenization (characterization)
- Knowledge acquisition on pollutant behavior, environmental impacts, treatment efficiency…

Result form:

Management option: disposal site (exple)



Management option: do nothing



GeDSeT
Gestion Durable des Sédiments Transfrontaliers

Thank you for your attention