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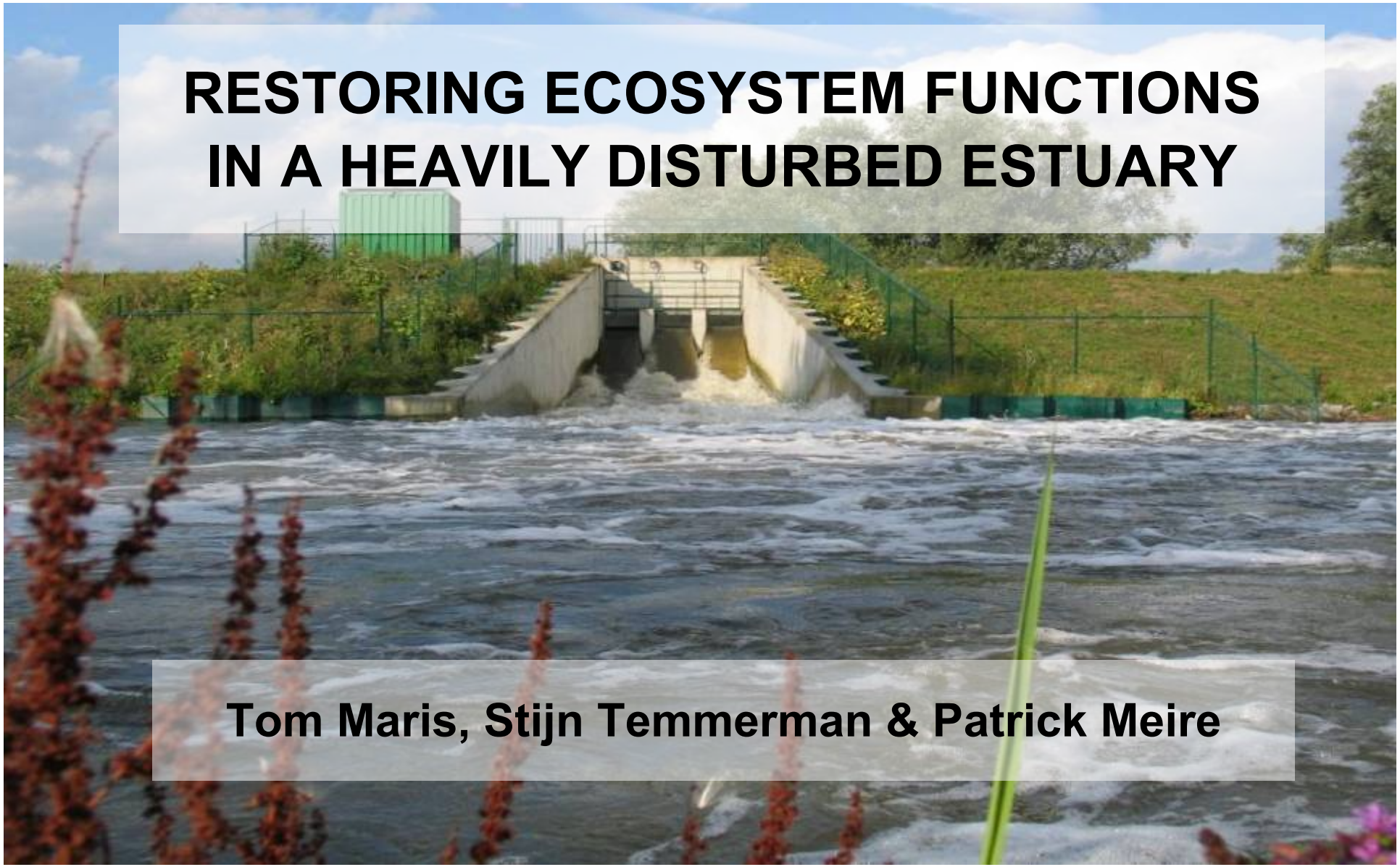

RESTORING ECOSYSTEM FUNCTIONS IN A HEAVILY DISTURBED ESTUARY

Tom Maris, Stijn Temmerman & Patrick Meire

Universiteit Antwerpen

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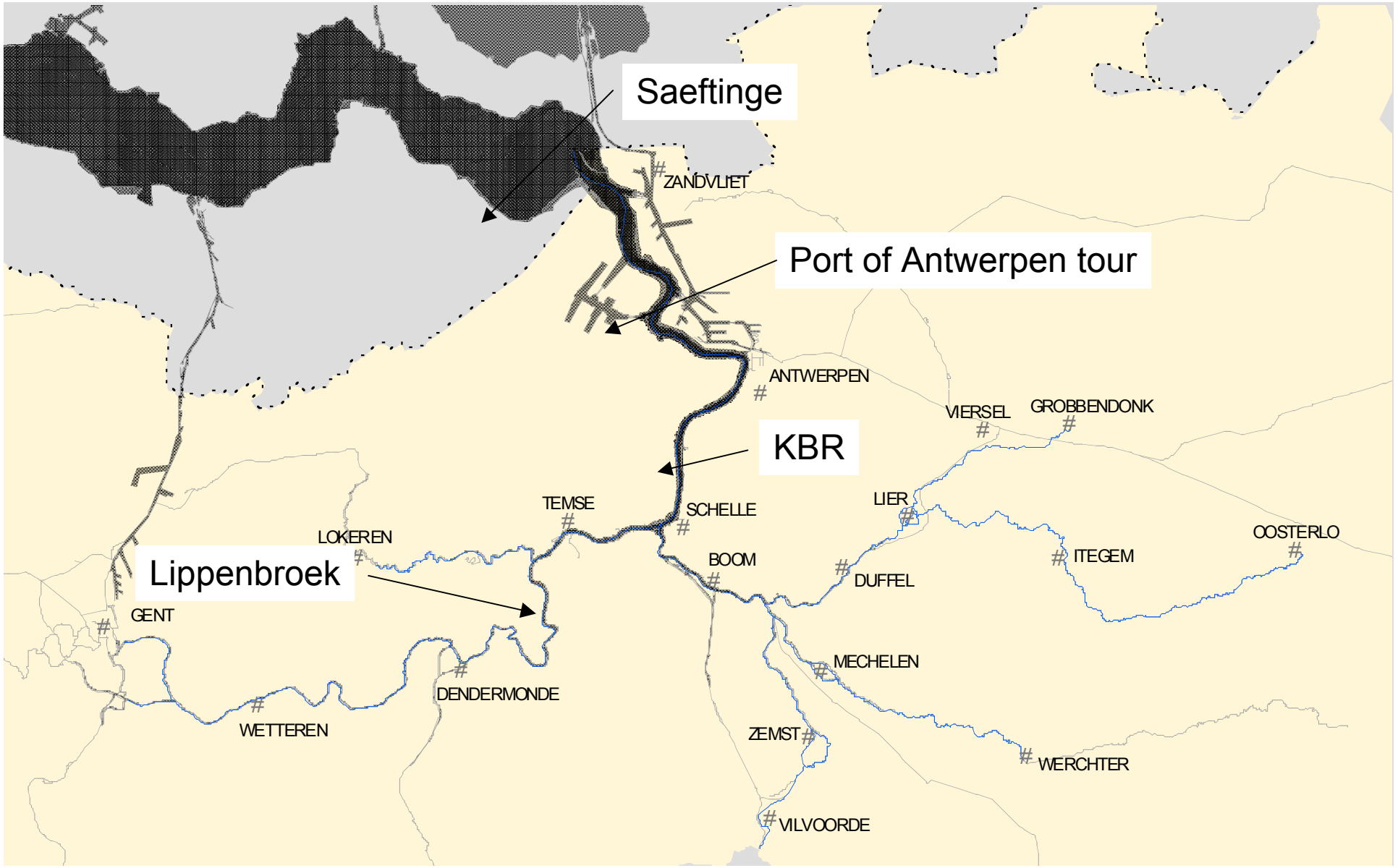
Pilot study Lippenbroek

How to restore estuarine nature in an area far below MHW?

TIDE Excursion map



Concept FCA – CRT
safety, ecology and a new ecosystem

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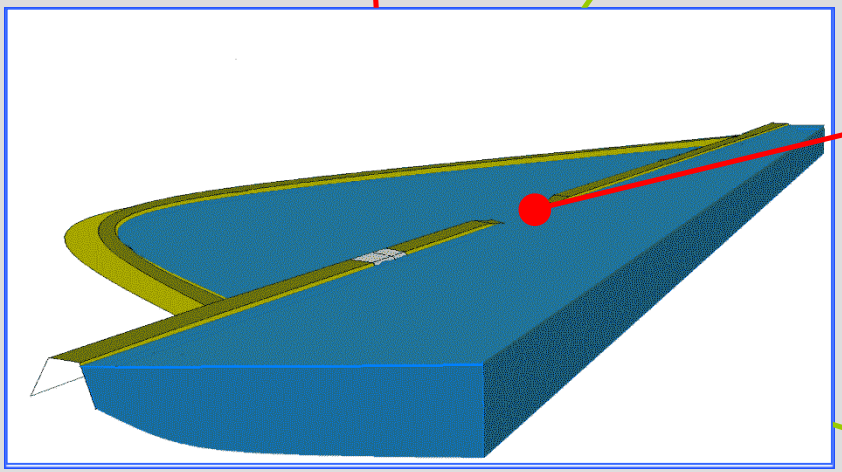
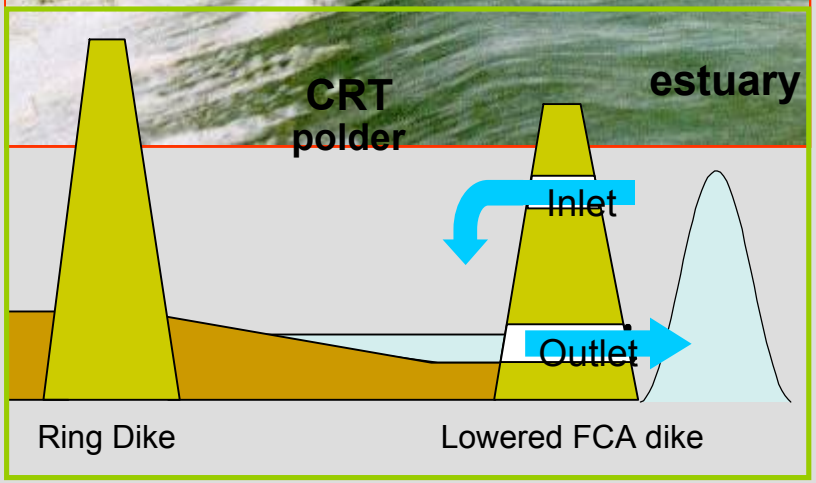


Safety: **FCA**

- Lowered dike stretch
- Critical tides: whole storage capacity
- **Only few times/year!**



Pilot project Lippenbroek

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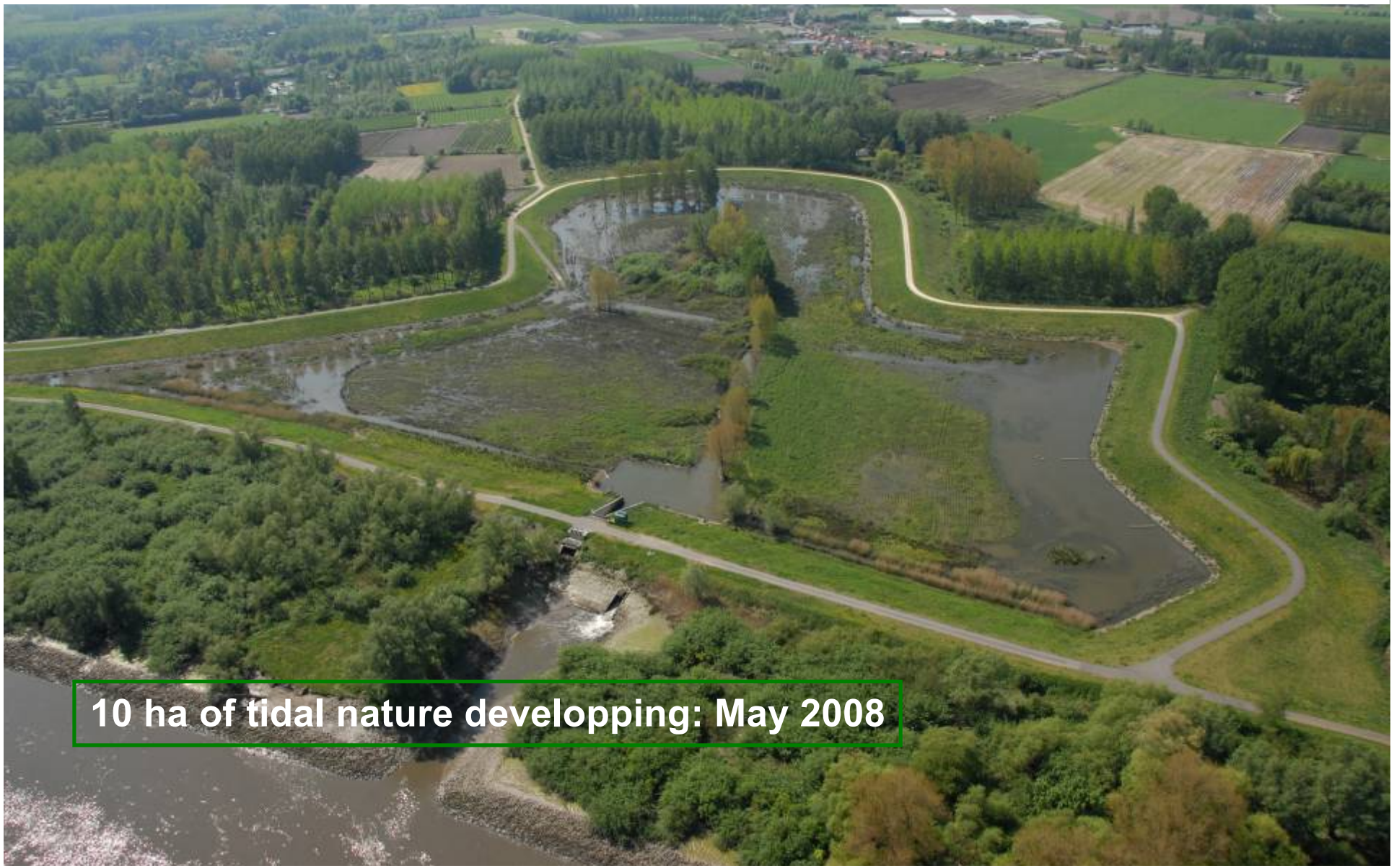
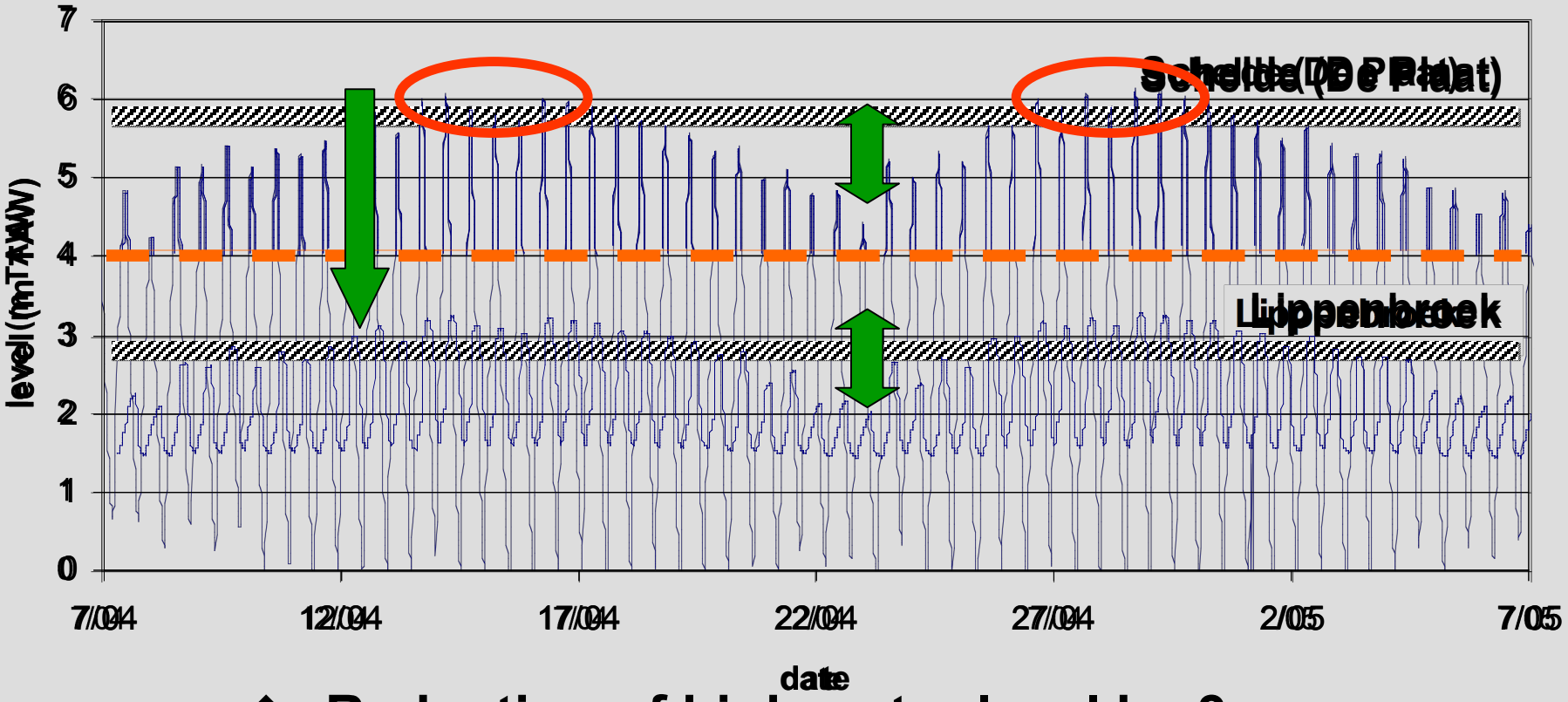


Introducing macrotidal regime



- Reduction of high water level by 3 meter
- No reduction of spring – neap variation

Introducing macrotidal regime

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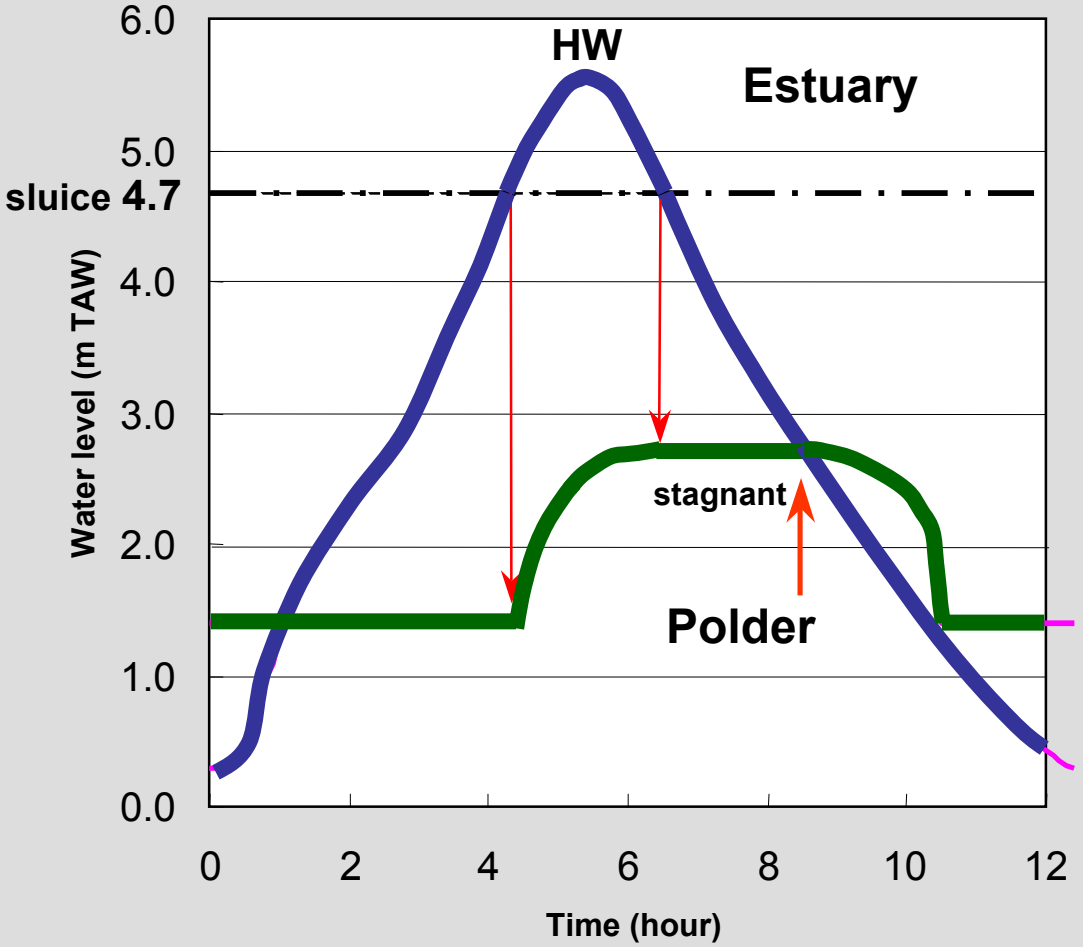

Start outflow

Introducing macrotidal regime

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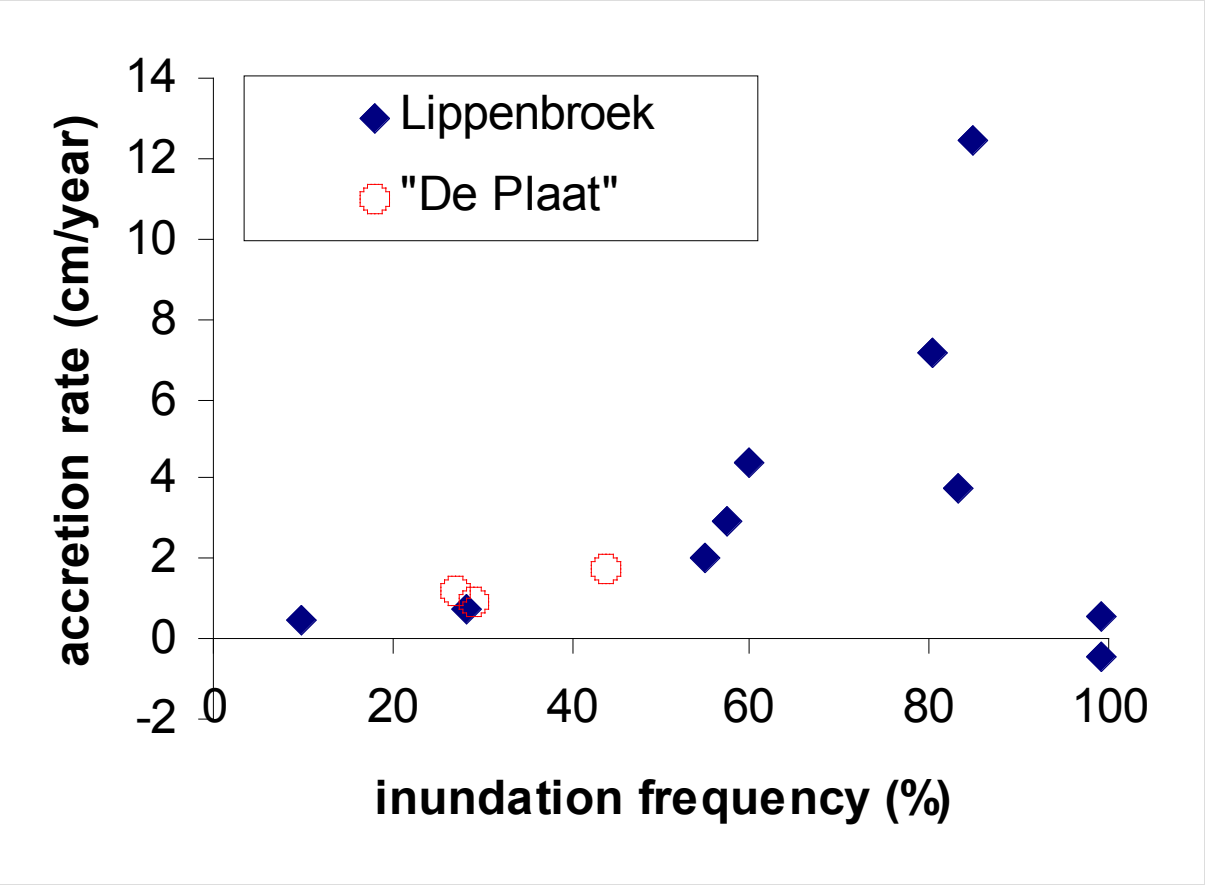
Tide - Sedimentation



Tide - Sedimentation

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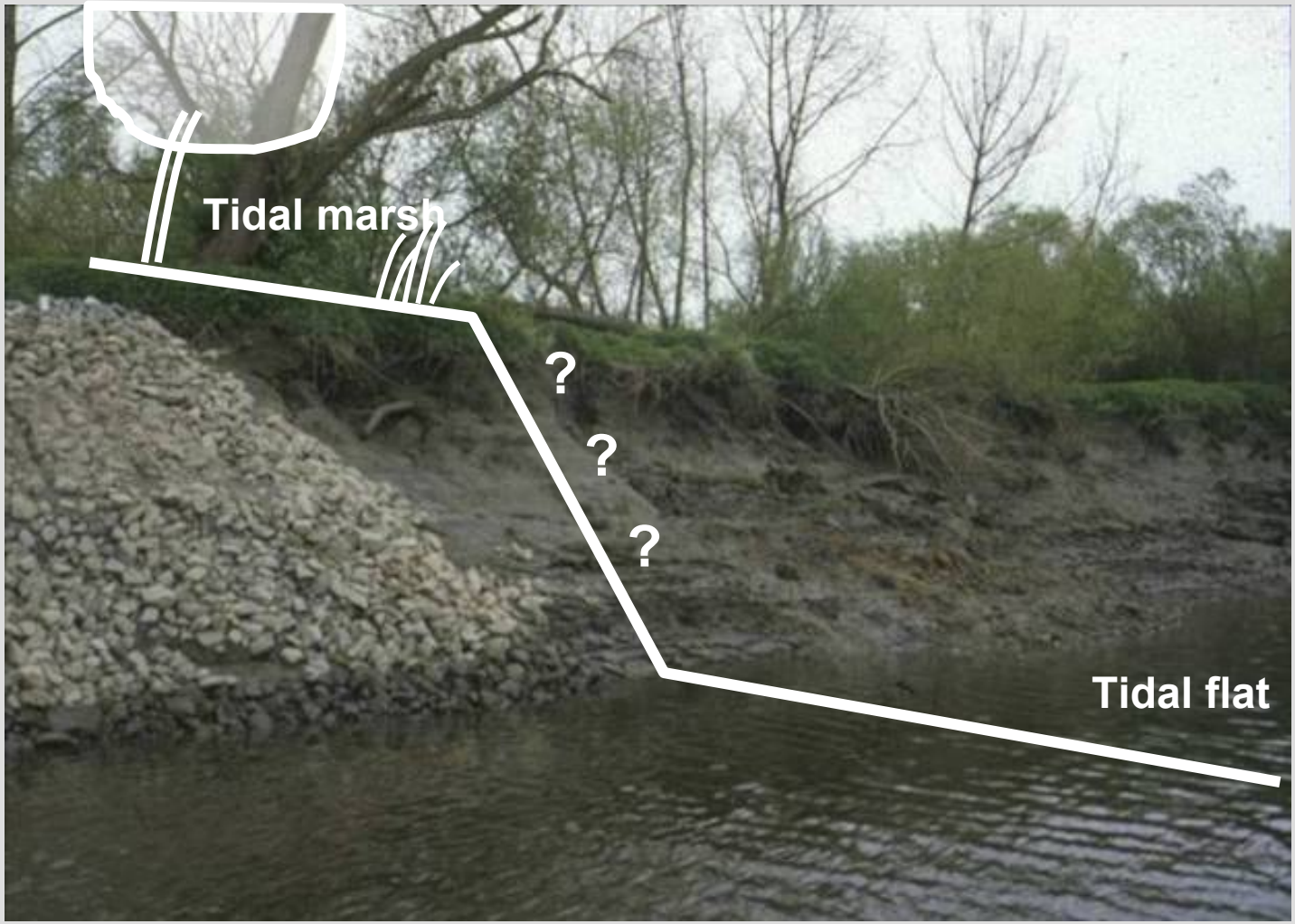
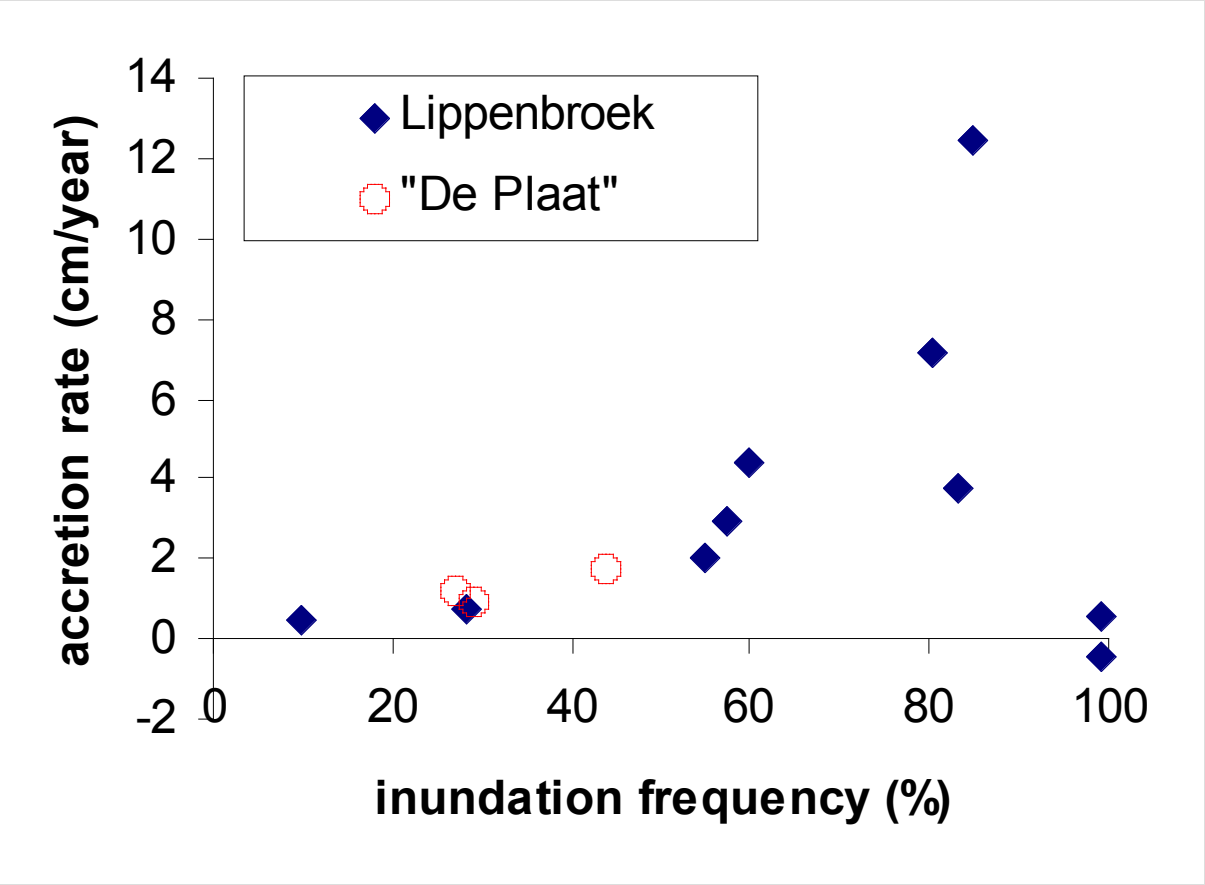


Tide - Sedimentation



Zoobenthos

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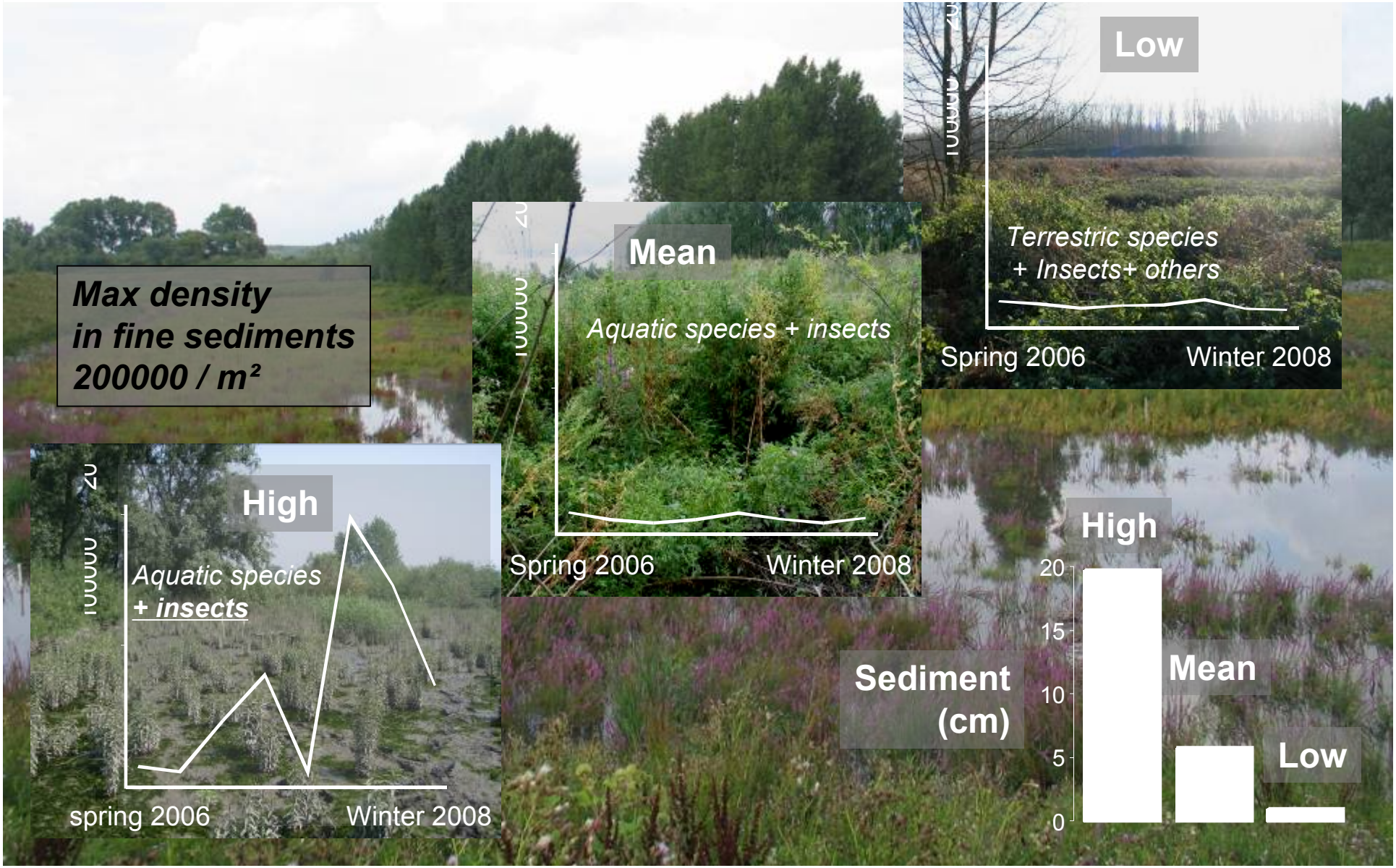

Vegetation: colonisation of bare sites

Phragmites australis

Ranunculus repens

Salix sp.

Typha latifolia

Lythrum salicaria

Iris pseudacorus

Callitriche sp.

Veronica beccabunga

Alisma plantago-aquatica

Colonising species (40)

Low inundation frequency:

30 species

-Wetland + ruderal species

-Salix and Phragmites potentially dominant

Averaged inundation frequency:

27 species

-Ruderal + wetland species

-Salix, Phragmites, Typha: pot. dominant

-**High inundation frequency:**

10 species

- typical wetland species

- Typha potentially dominant

Water quality

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Water quality: oxygen

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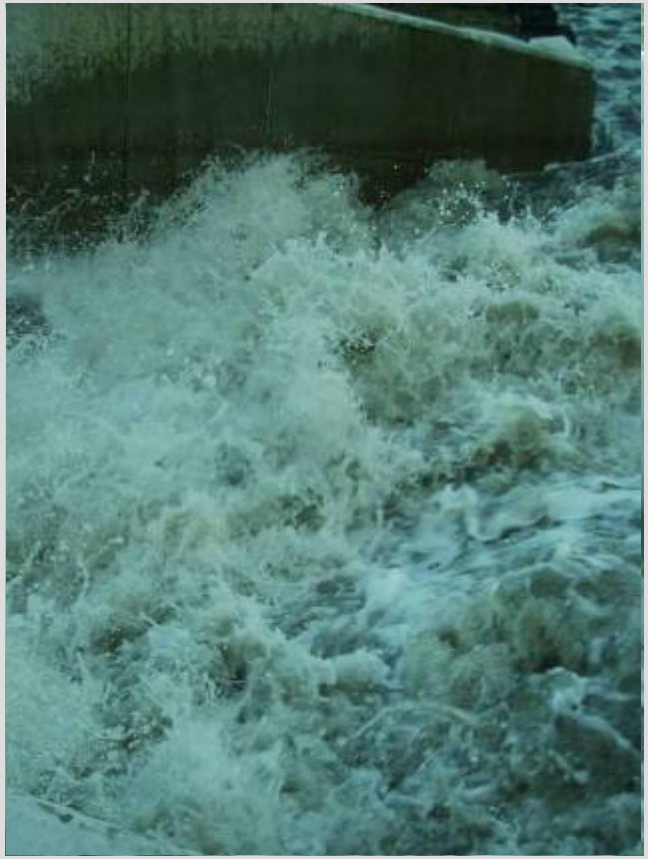
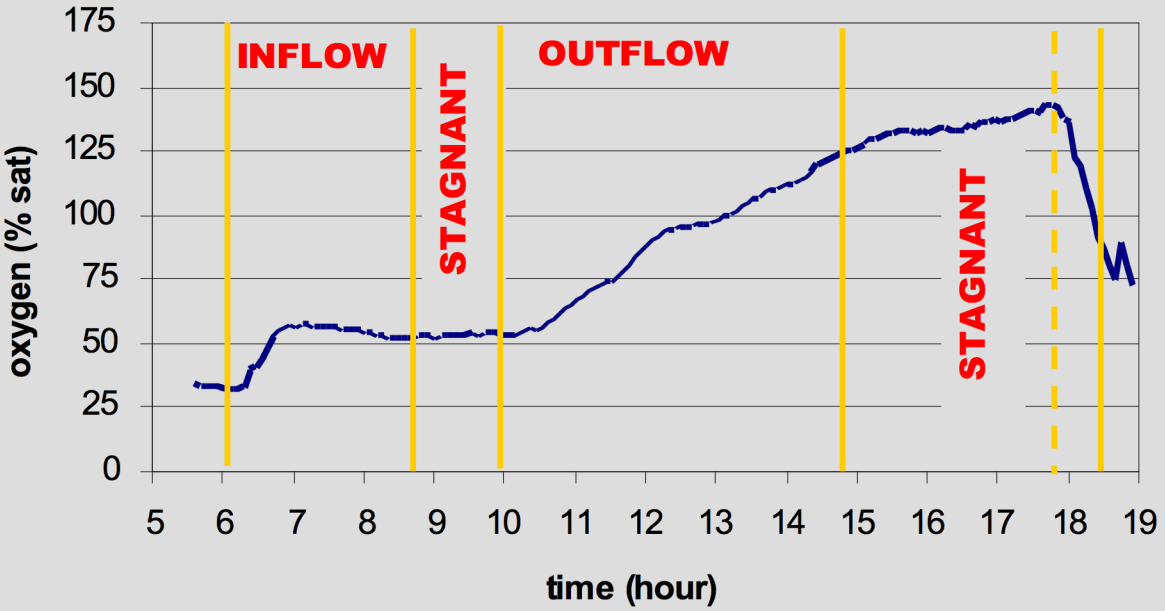
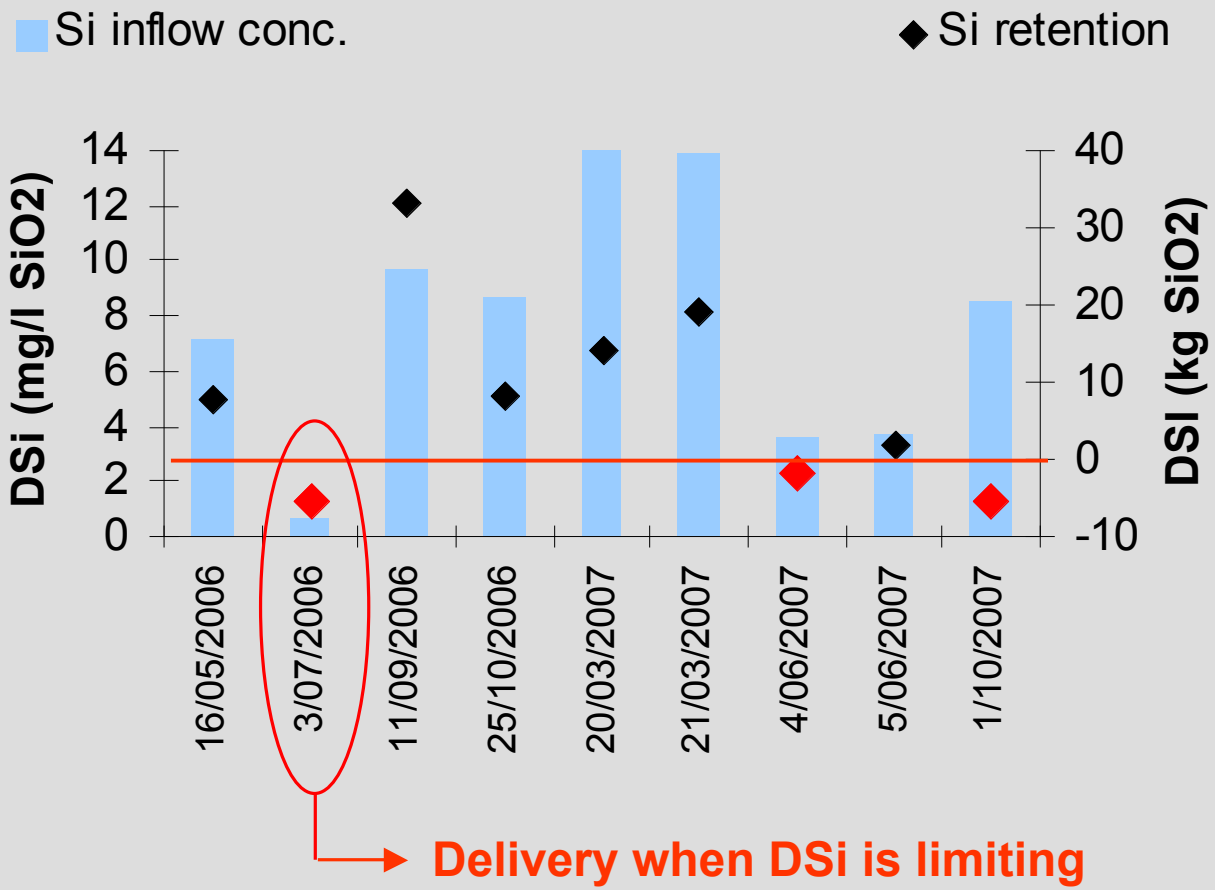
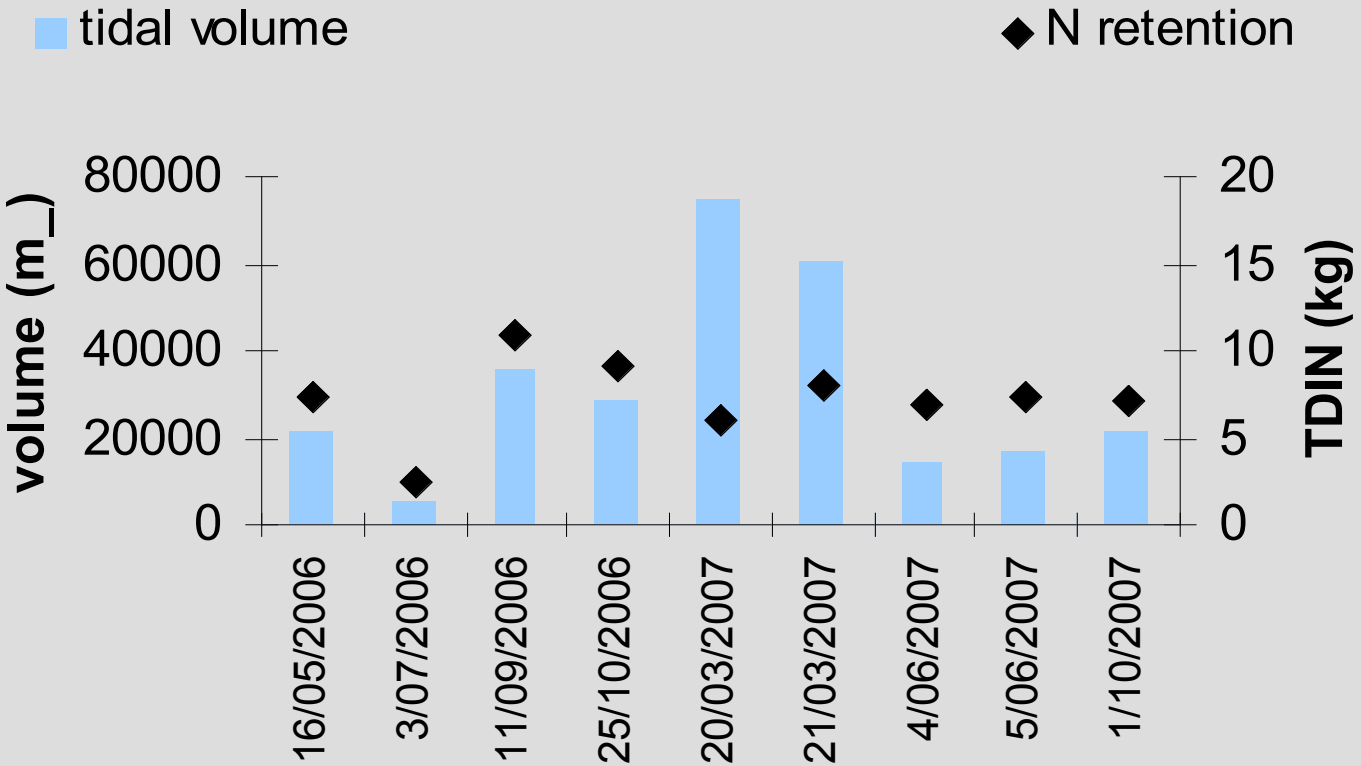




Water quality: Silica

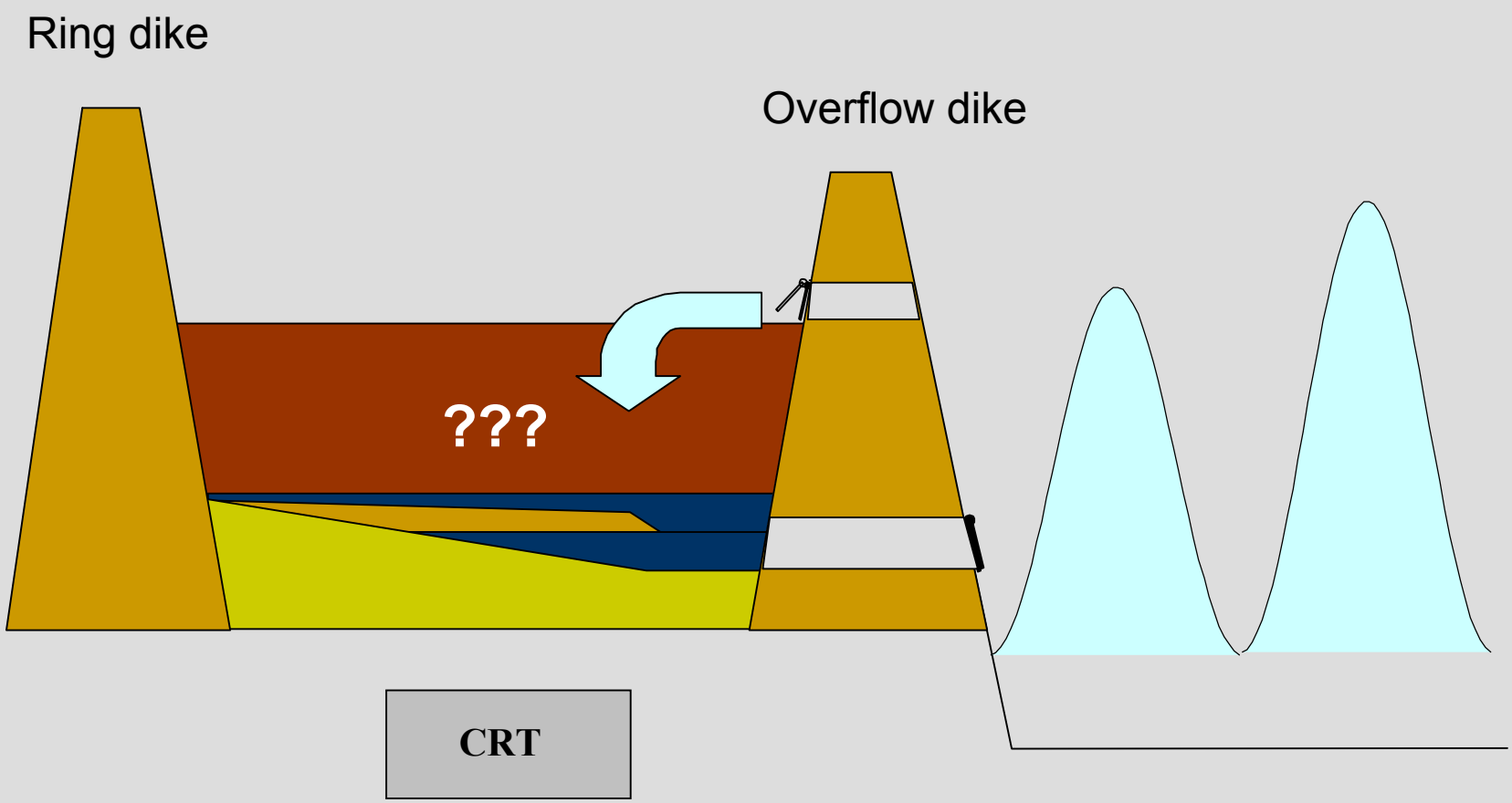


Water quality: Nitrogen

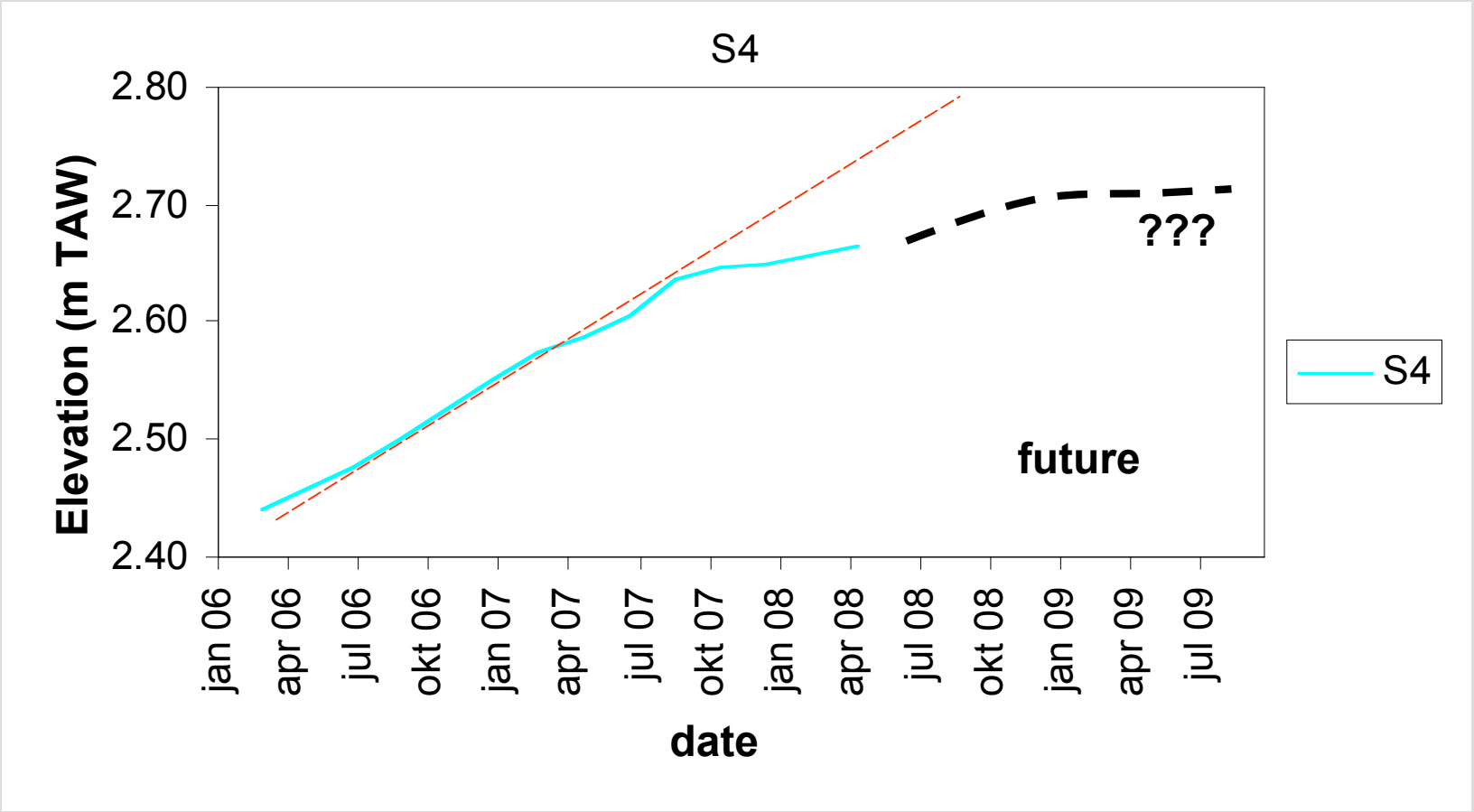


On average 1 kg N retention per ha per tide

FCA-CRT: sustainable?



Sedimentation



Flattening of the area

Changing inundation frequencies: decrease of accretion?

Erosion

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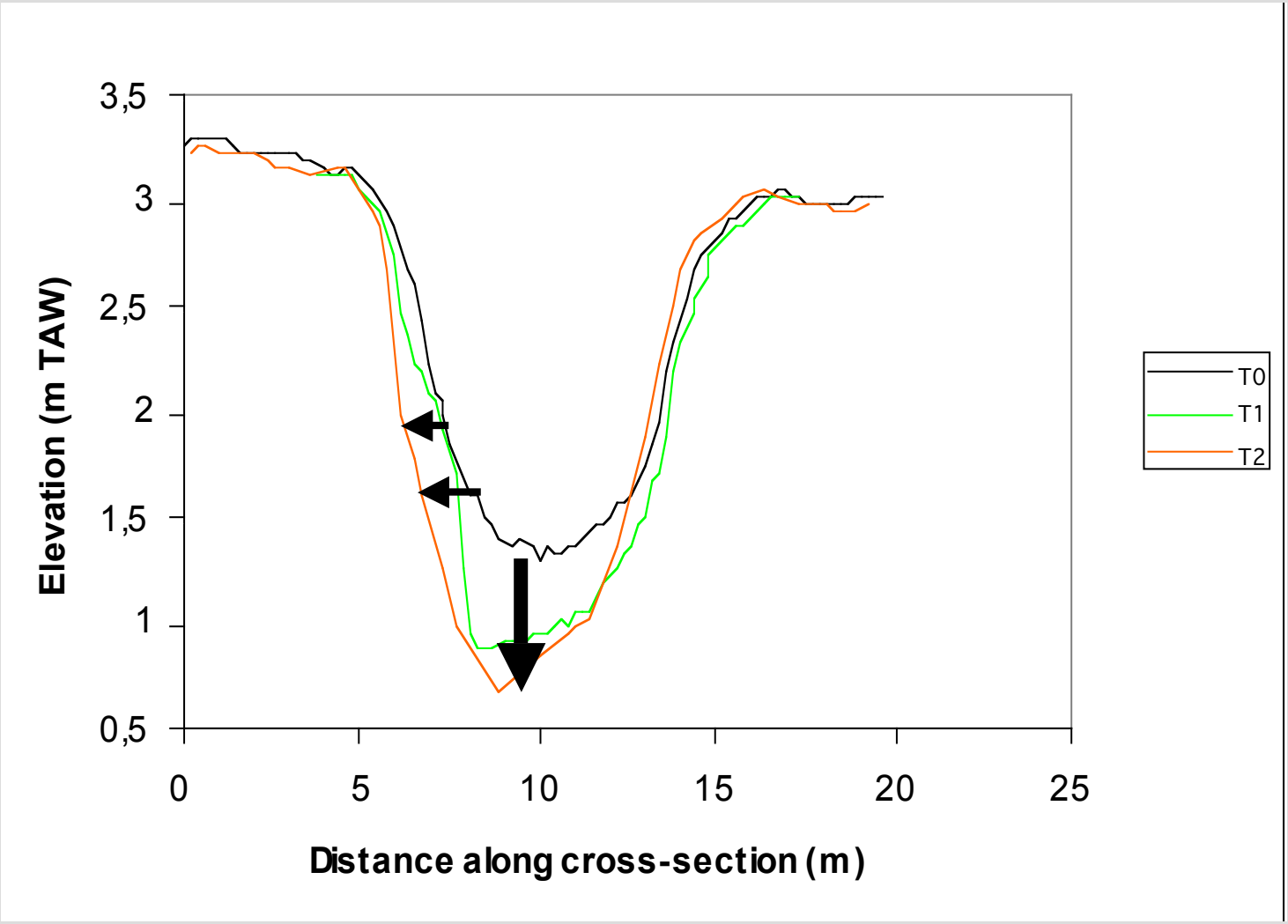

Lippenbroek conclusion

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- Tidal marsh restoration in area below MHW is possible
- Tidal regime and sedimentation can be tuned
- Sedimentation rate can be reduced to preserve storage capacity

Ready for the big work?

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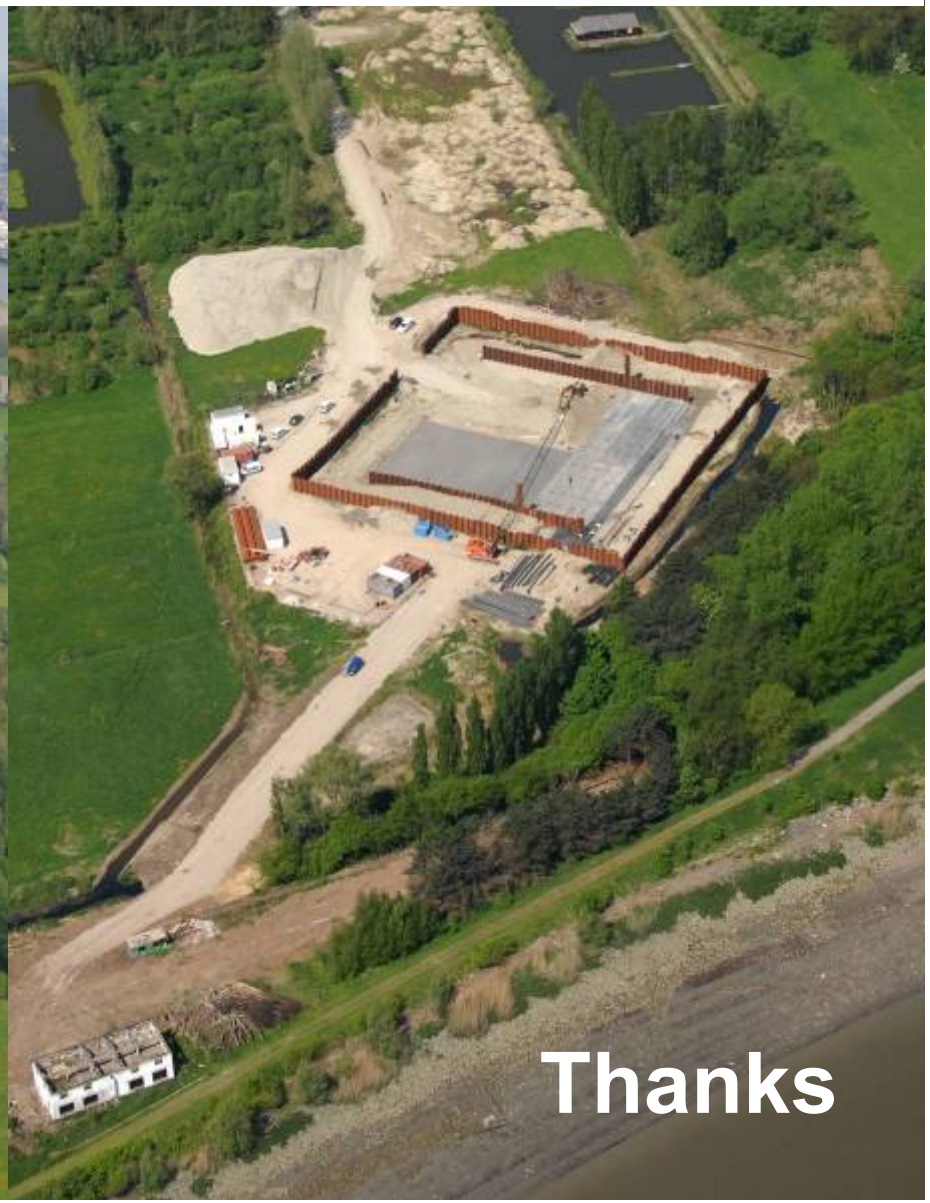

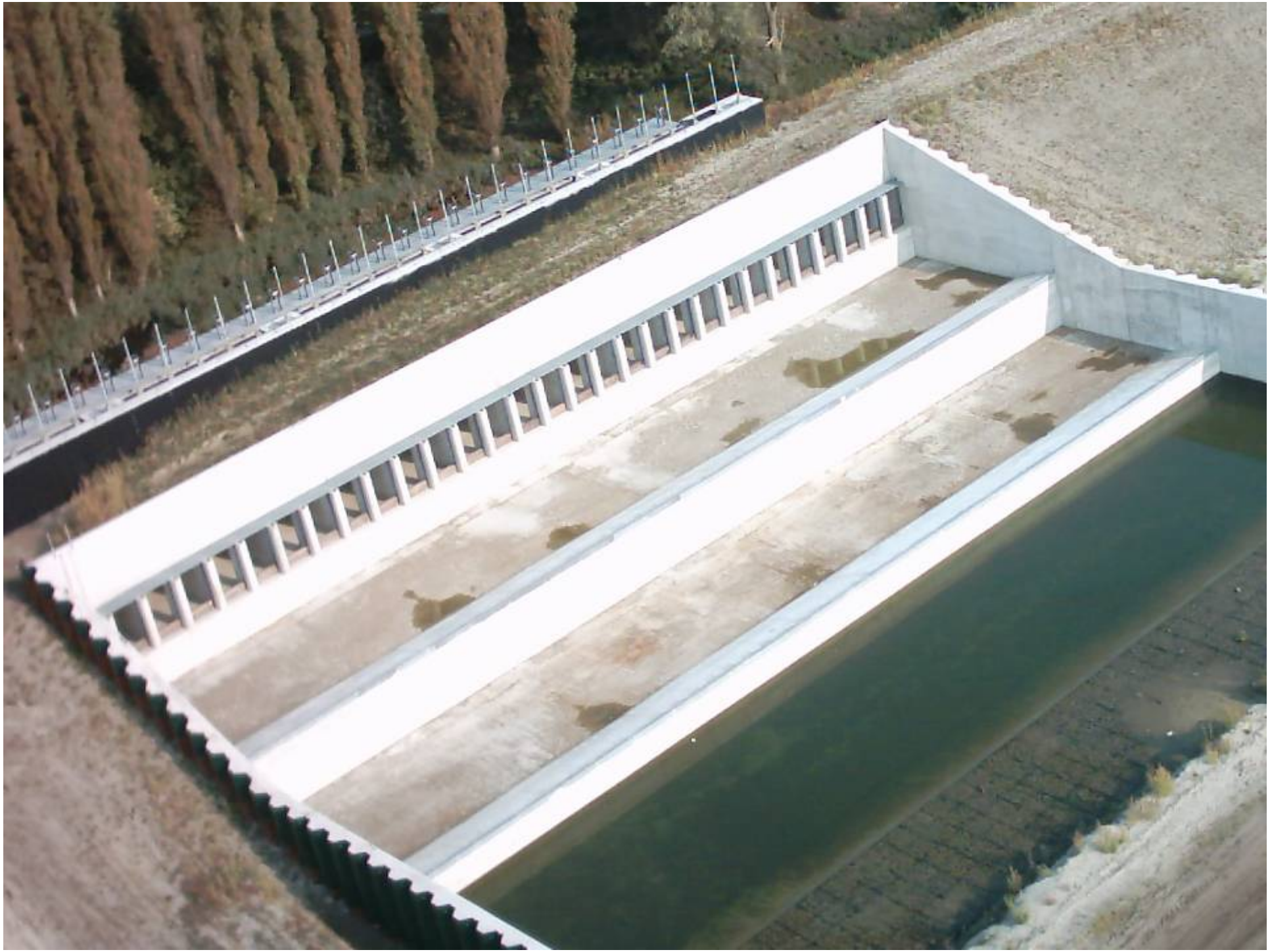

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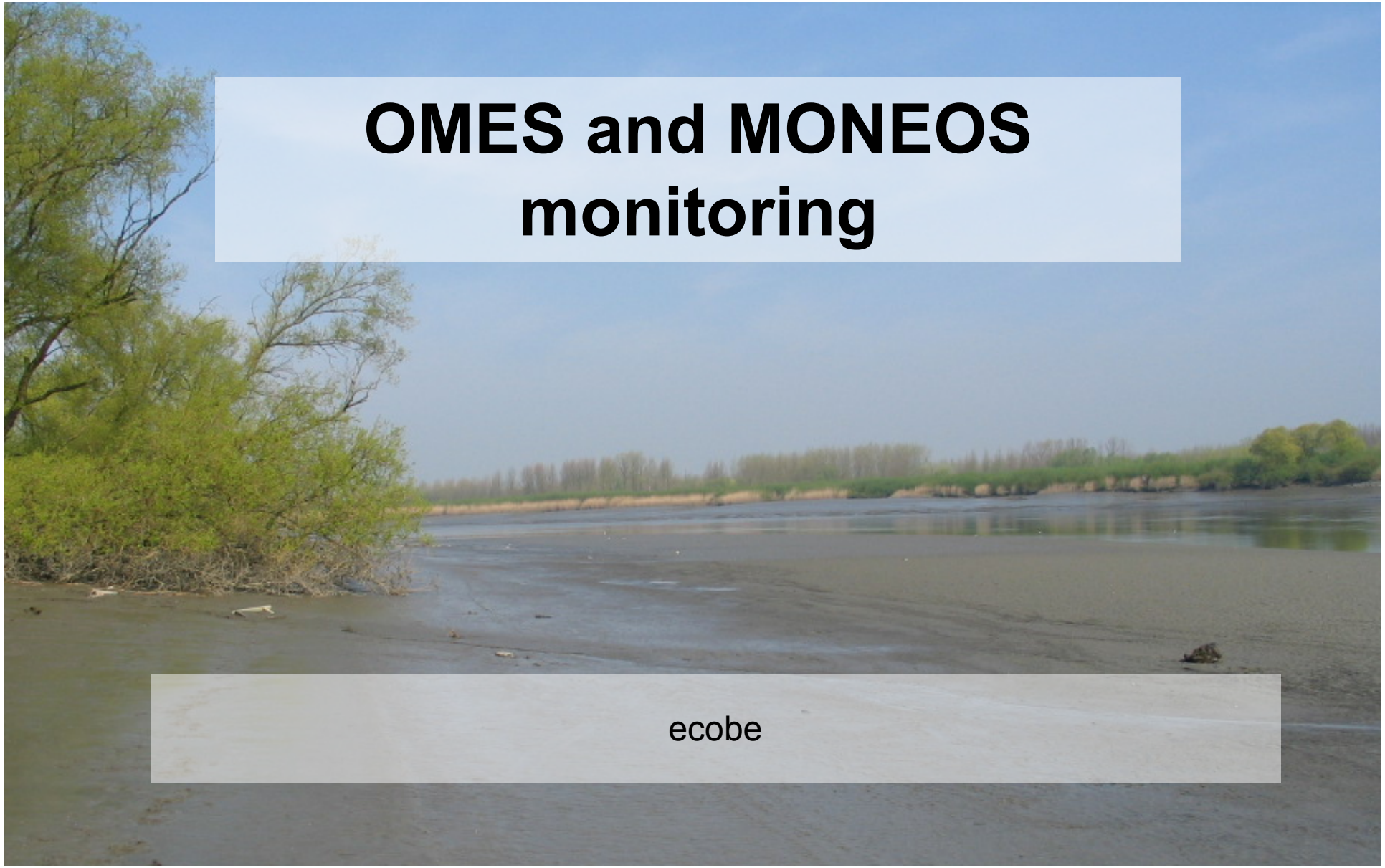
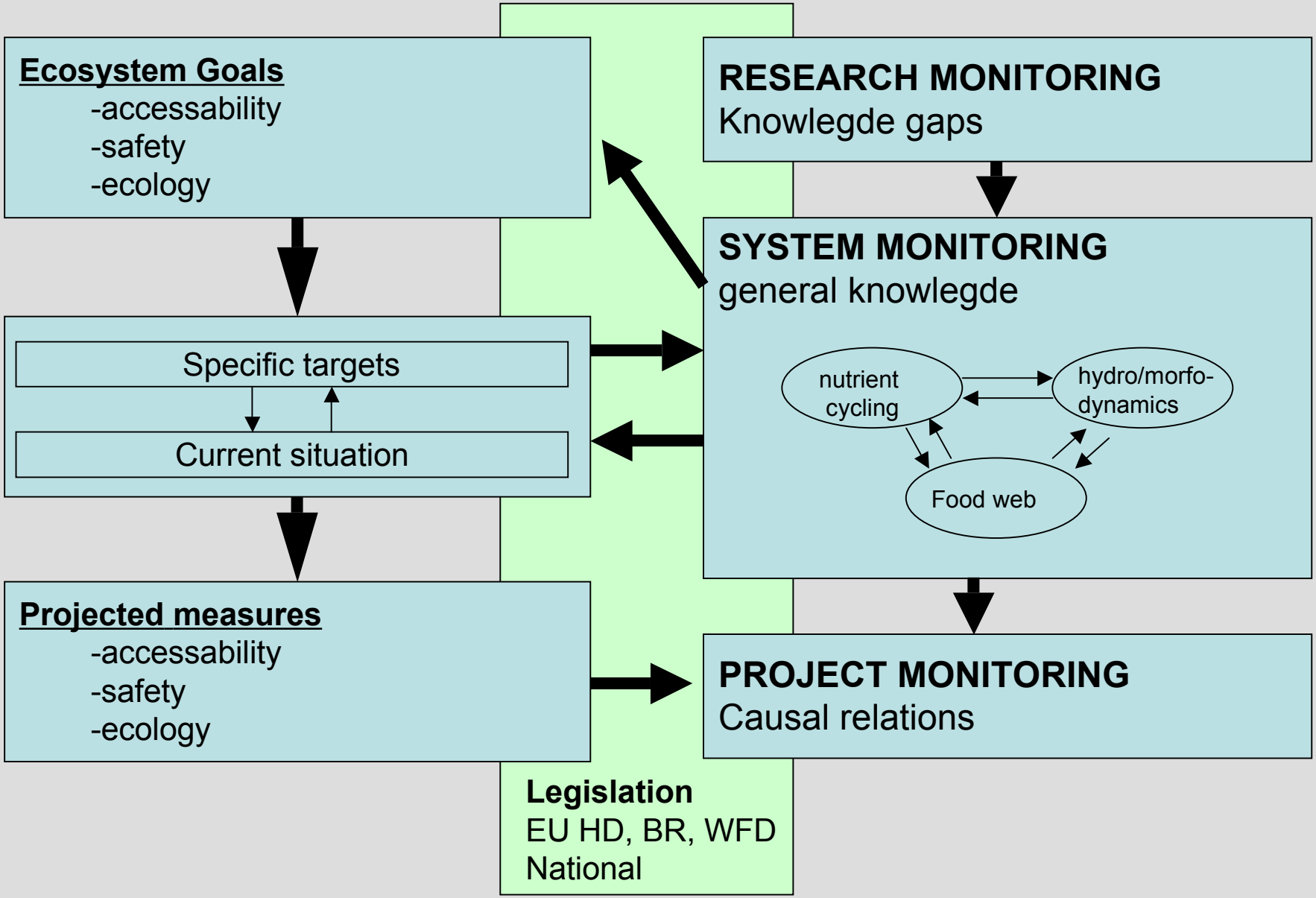
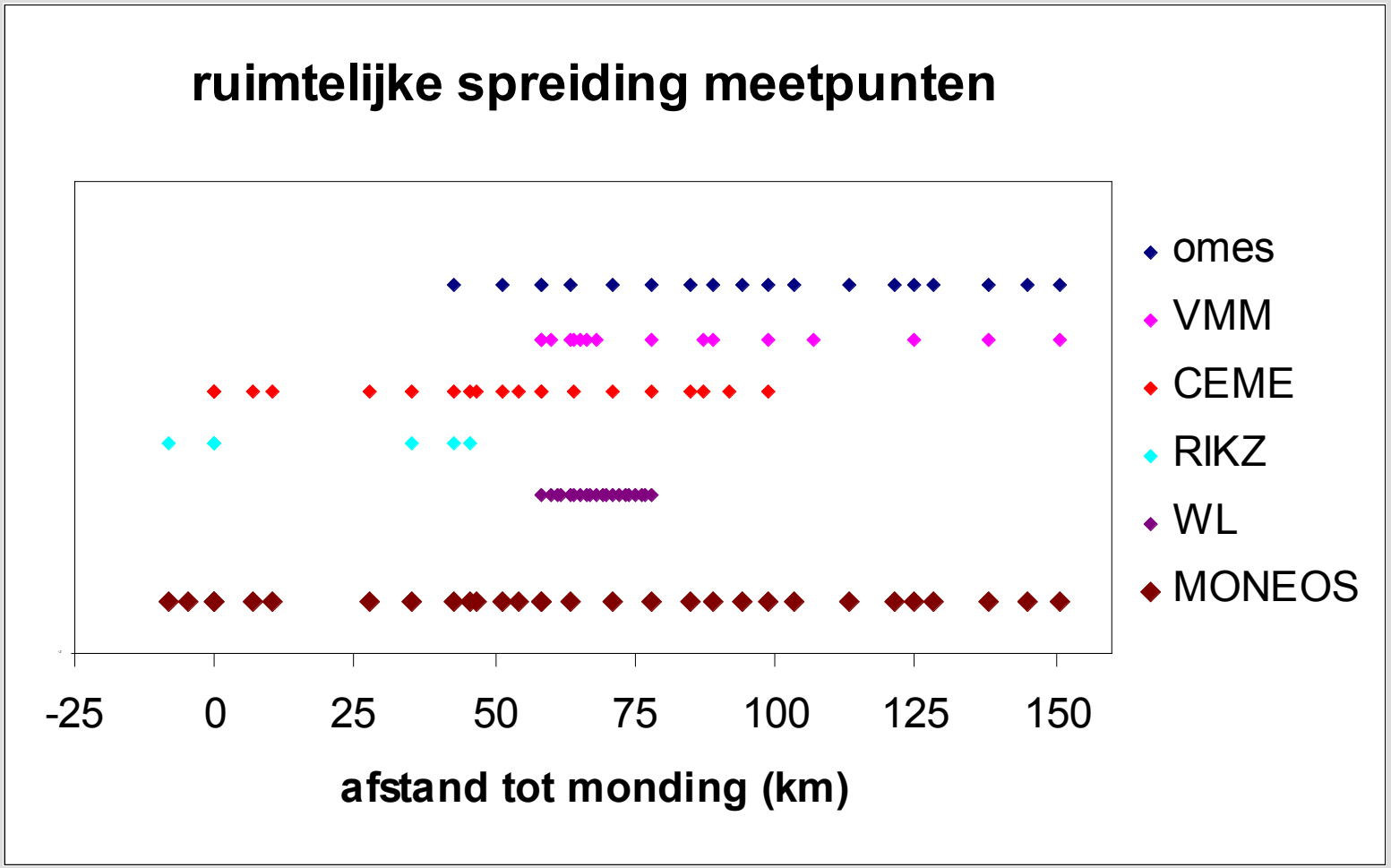


OMES and MONEOS monitoring

ecobe


Ecosystem Goals
-accessability
-safety
-ecology
RESEARCH MONITORING
Knowlegde gaps
SYSTEM MONITORING
general knowlegde
Specific targets
Current situation
nutrient cycling
hydro/morfo-dynamics
Food web
Projected measures
-accessability
-safety
-ecology
PROJECT MONITORING
Causal relations
Legislation
EU HD, BR, WFD
National

OMES -> MONEOS


ruimtelijke spreiding meetpunten
omes
VMM
CEME
RIKZ
WL
MONEOS
-25
0
25
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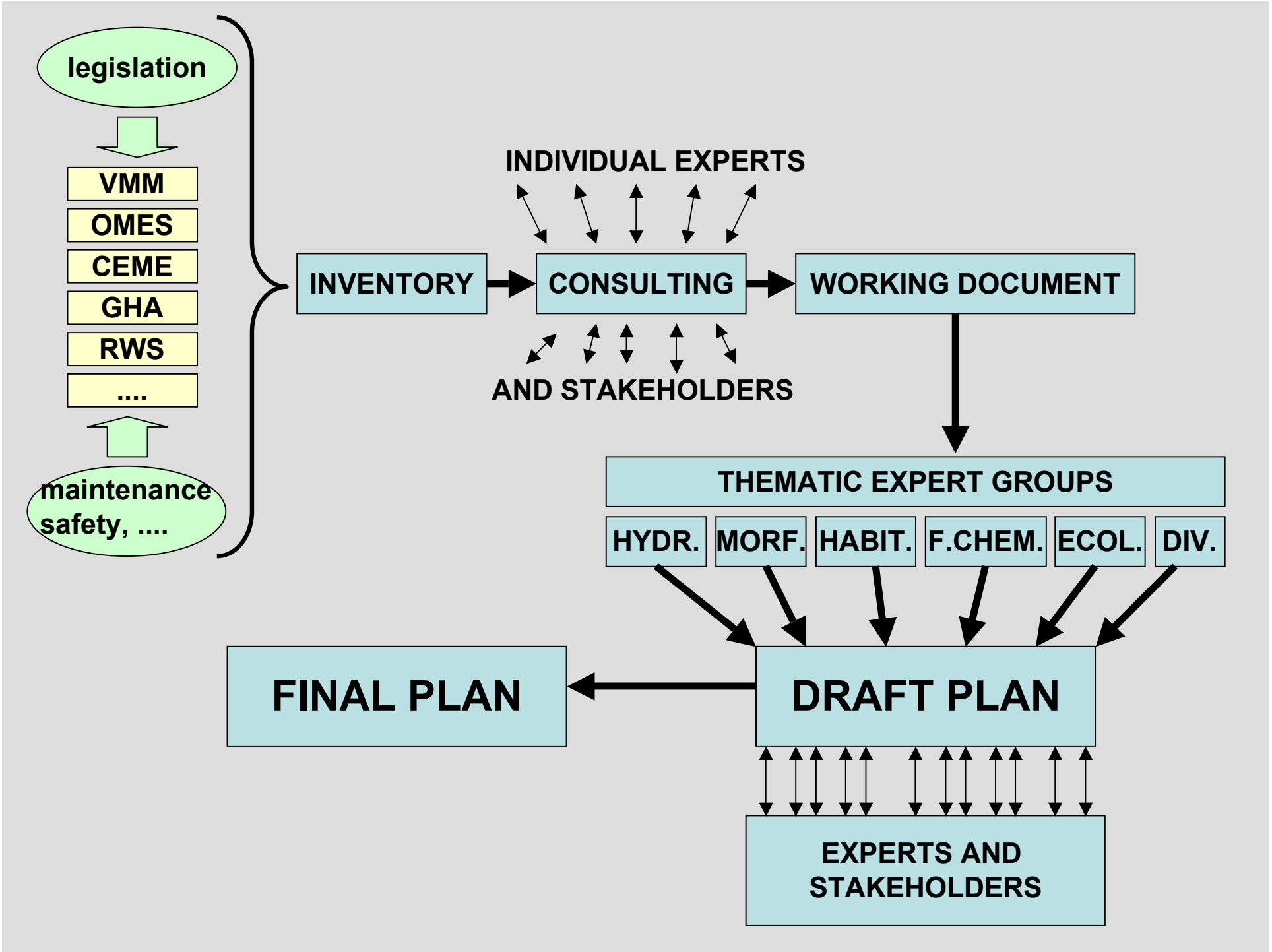
75
100
125
150
afstand tot monding (km)


legislation
VMM
OMES
CEME
GHA
RWS
....
maintenance
safety, ...
INDIVIDUAL EXPERTS
INVENTORY
CONSULTING
WORKING DOCUMENT
AND STAKEHOLDERS
THEMATIC EXPERT GROUPS
HYDR.
MORF.
HABIT.
F.CHEM.
ECOL.
DIV.
FINAL PLAN
DRAFT PLAN
EXPERTS AND
STAKEHOLDERS