

A new disposal strategy in the Schelde-estuary, conciliating port accessibility and nature



EMBRACING ESTUARIES

Management of Natura 2000 Sites in Estuaries and Sea Ports
Workshop: 15 – 16 September 2016, Hamburg, Germany



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Hamburg, September 16th 2016

Schelde-estuary

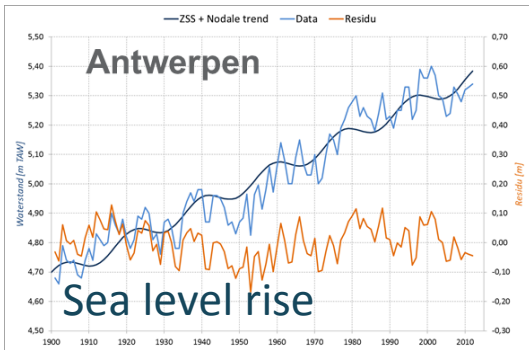
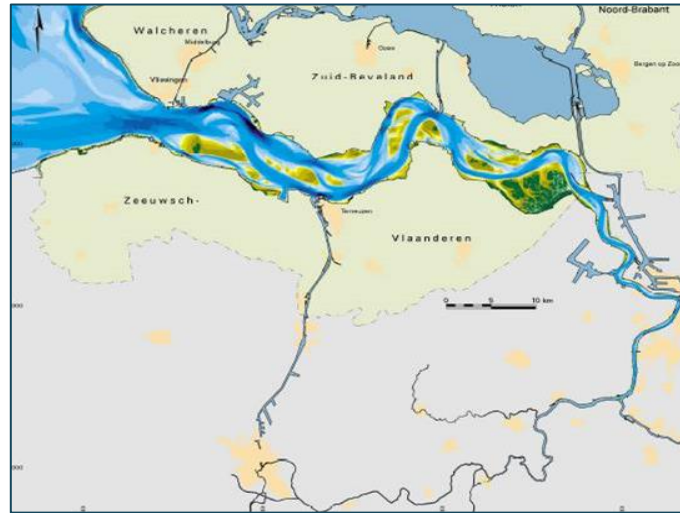


- . Tides (range = 4 m)
- . Salt water
- . Sandy sediments



- . Discharge (120 m³/s)
- . Fresh water
- . Muddy sediments

Future challenges



Long Term Vision

- ▶ In 2001 Dutch and Flemish government agreed on a LongTerm Vision for the Schelde-estuary, focussing on 3 principal functions:

→ Safety against flooding

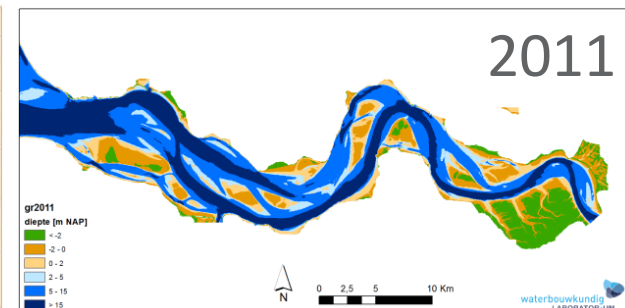
→ Port accessibility

→ Ecology

- ▶ Importance of morphology: “preservation of physical characteristics is the cornerstone for management”

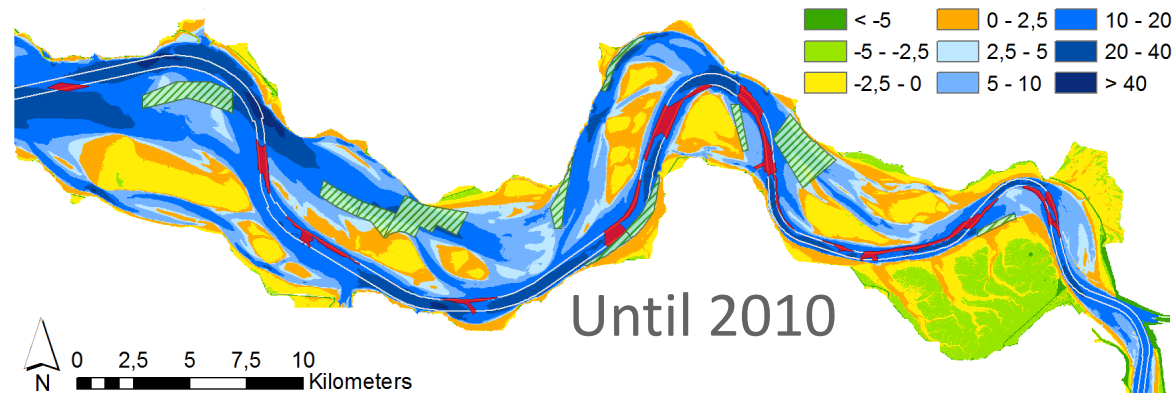


Flanders
State of the Art



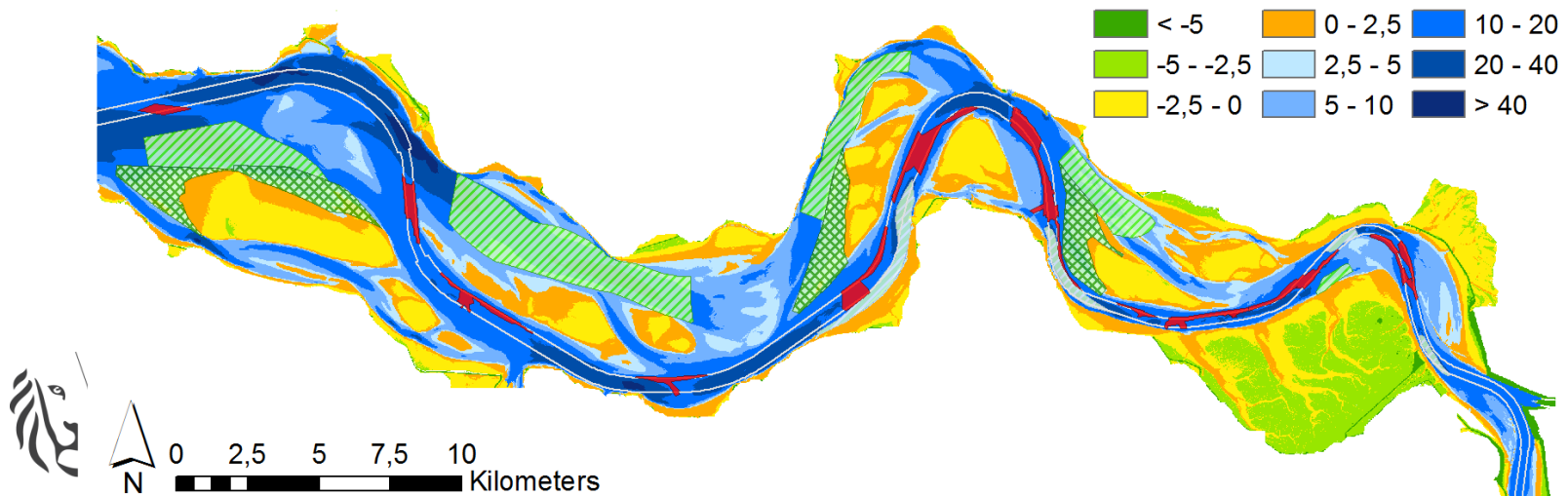
Development scheme 2010

- ▶ **First phase of LTV: 26 projects to reach intermediate goals:**
 - Execution of Actualised Sigmaphan (safety against flooding)
 - Deepening of navigation channel (accessibility)
 - Depoldering and reduced tidal areas (nature)
 - ...
- ▶ **Stakeholder involvement (OAP – advising organisations)**
- ▶ **Parallel: disposal strategy could jeopardise physical characteristics ⇔ feasibility of new disposal strategy**
“Walsoorden pilot case” (Port of Antwerp Expert Team)



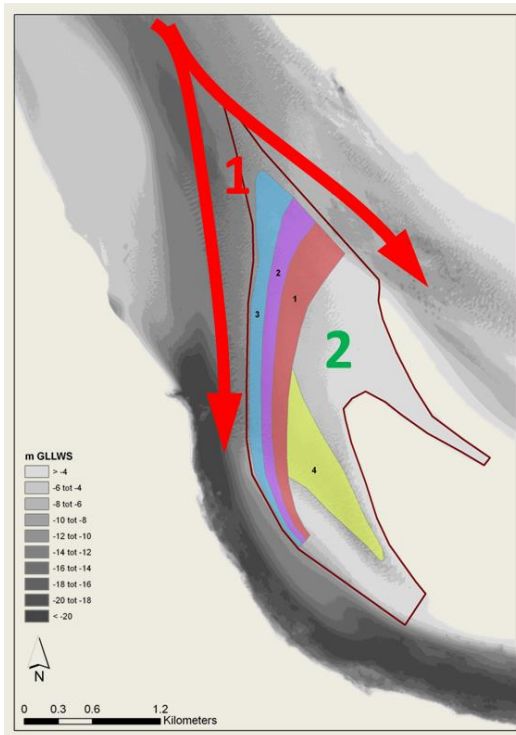
New disposal strategy Westerschelde

- ▶ Tide-independent draught up to 43' to port of Antwerp
- ▶ 7.7 Mm³ (capital) + ca. 10 Mm³/year (maintenance)
- ▶ Uncertainties on potential long term effects
- ▶ Three-stage rocket approach



3-step rocket approach: STAGE 1

- ▶ EIA most environmental friendly alternative: using dredged material to create new valuable areas for ecology (contributing to “**estuarine restoration**”) => mitigate possible effects



Dredged sediment used to create “soft” flow guiding structures:

1. Megadune: splitting flow
2. Sandspit: guiding flow

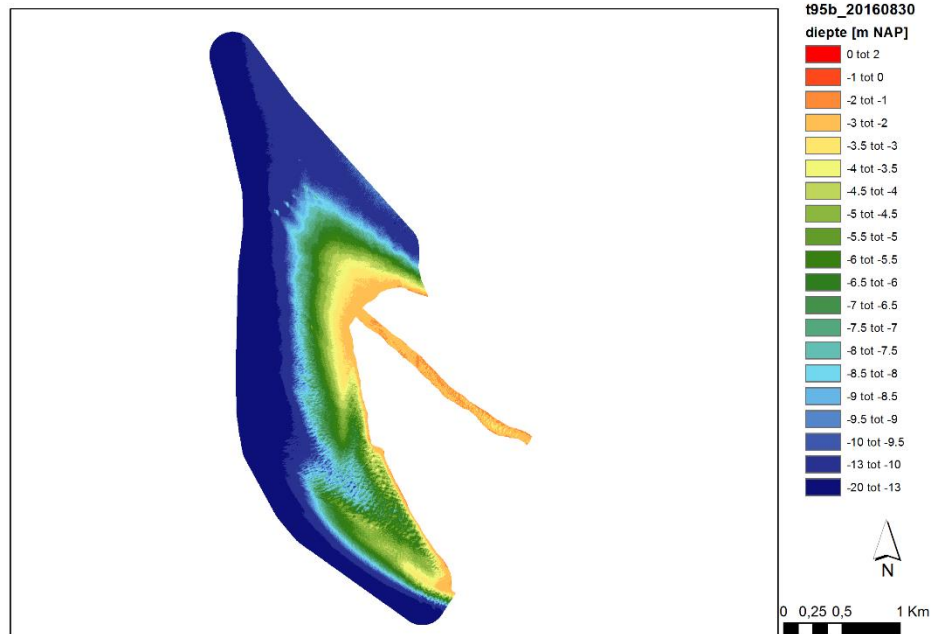
E.g. Walsoorden sandbar (type 1):

- Multiple channel system
- Self-eroding capacity sill
- Reduction of currents on sandbar



3-step rocket approach: STAGE 2

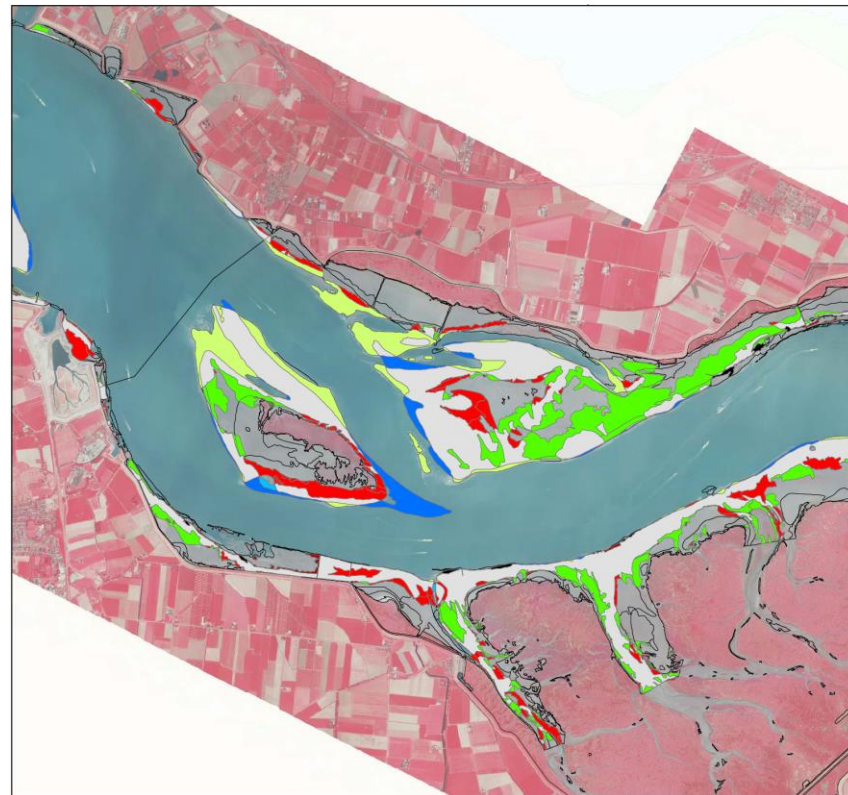
- ▶ Intensive monitoring (stability sediment, flow velocities, height of intertidal areas, grain size, ecology) and evaluation (bi-monthly meetings + annual evaluation of criteria)



3-step rocket approach: STAGE 3

- ▶ Stopping works (if necessary)
... but until now effects have been positive !!!

Location	LD area [ha]
HPW	-1
HPN	+51
RVB	+74
PWA	+35
SUM	+159



Ecotopen Westerschelde 14
Veranderingen 2010 t.o.v. 2015
in het Hoog dynamisch littoraal

Verandering in ecotooptype (was / wordt)

Afname in dynamiek

- Hoogdynamisch littoraal / Laagdynamisch laaglittoraal
- Hoogdynamisch littoraal / Laagdynamisch middenlittoraal
- Hoogdynamisch littoraal / Laagdynamisch supralittoraal
- Hoogdynamisch littoraal / Laagdynamisch hooglittoraal

Toename in dynamiek

- Laagdynamisch sublittoraal / Hoogdynamisch littoraal
- Laagdynamisch hooglittoraal / Hoogdynamisch littoraal
- Laagdynamisch laaglittoraal / Hoogdynamisch littoraal
- Laagdynamisch middenlittoraal / Hoogdynamisch littoraal
- Laagdynamisch supralittoraal / Hoogdynamisch littoraal
- Schor / Hoogdynamisch littoraal
- Pionierzone (potentieel schor) / Hoogdynamisch littoraal

Toename in hoogte

- Hoogdynamisch sublittoraal / Hoogdynamisch littoraal
- Hoogdynamisch littoraal / Hoogdynamisch supralittoraal
- Hoogdynamisch littoraal / Pionierzone (potentieel schor)
- Hoogdynamisch littoraal / Schor

Afname in hoogte

- Hoogdynamisch supralittoraal / Hoogdynamisch littoraal
- Hoogdynamisch littoraal / Hoogdynamisch sublittoraal
- Hoogdynamisch littoraal / Laagdynamisch sublittoraal

Wijziging in substraat

- Hard substraat veen/Mei / Hoogdynamisch littoraal
- Hard substraat steen / Hoogdynamisch littoraal
- Hoogdynamisch littoraal / Hard substraat veen/Mei
- Hoogdynamisch littoraal / Hard substraat steen

Geen wijziging

- Hoogdynamisch littoraal / Hoogdynamisch littoraal

Overig

- Hoogdynamisch littoraal / Overig
- Overig / Hoogdynamisch littoraal

Auteur: R. Jentink
Datum: 26-5-2016
Kaartnummer: M151007166/23_ecotop14

Schaal 1:45.000
Bron: 0 0.18.34.56 08.05 1.7 km

Rijkswaterstaat
Ministerie van Infrastructuur en Milieu



Conclusions I

- ▶ **LTV 2030:**

- Taking into account different estuarine functions

- ▶ **Development scheme 2010:**

- Stakeholder involvement

- ▶ **Enlargement navigation channel:**

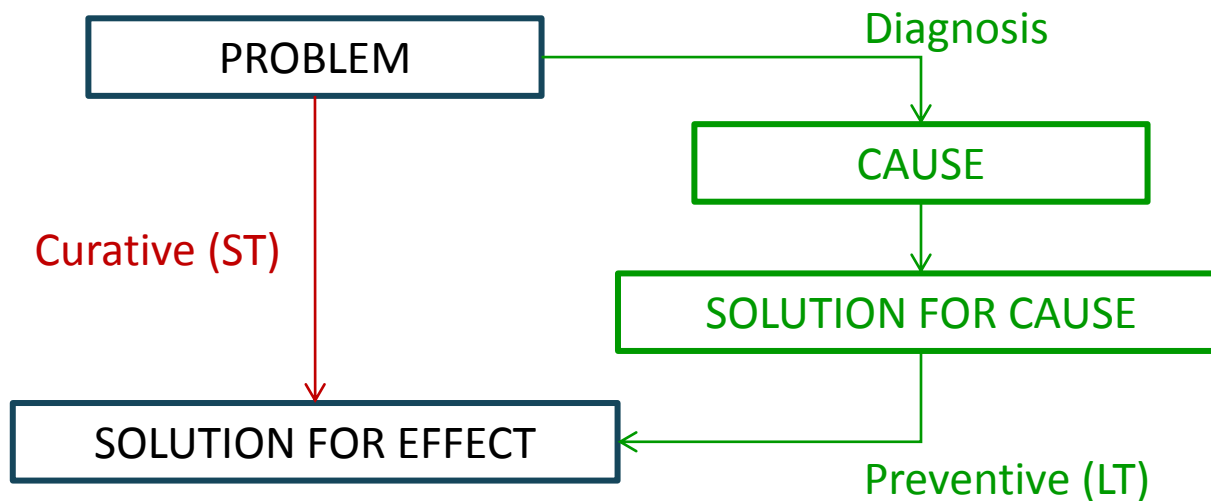
- External expertise introducing new disposal strategy

- Limitations of knowledge and tools => uncertainty

- 3-stage rocket approach, with important role for monitoring and evaluation of results (pre-defined criteria)

Conclusions II

- ▶ Holistic approach based on system understanding
 - ▶ Combining different ecosystem services and functions
=> striving for WIN-WIN-situations
- => MORPHOLOGICAL MANAGEMENT**



www.tide-toolbox.eu

TIDE
Tidal River Development

Morphological management of estuaries
Case study of the Scheldt estuary

December 2012

Port of Antwerp

The Learning 198 North Sea Region Programme

Project part-financed by the European Union (European Regional Development Fund)

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