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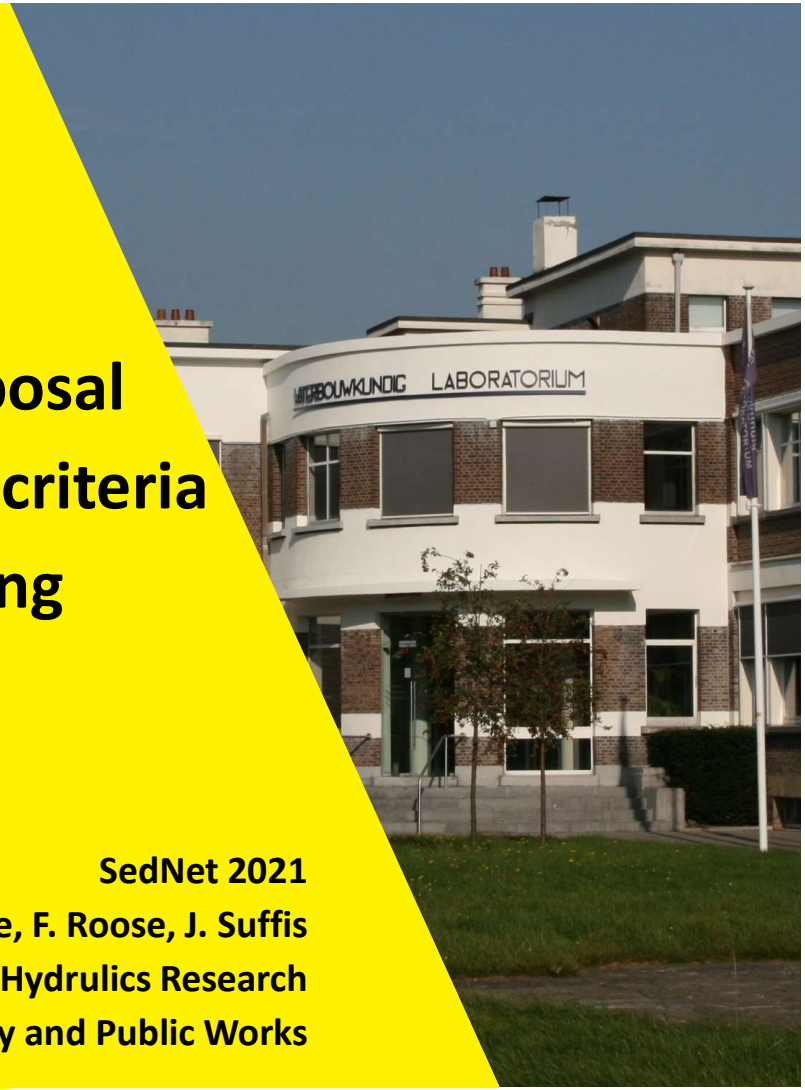
10 years of experience with a new disposal strategy in the Westerschelde: a multi-criteria decision making ride, bumpy but moving forward



SedNet 2021

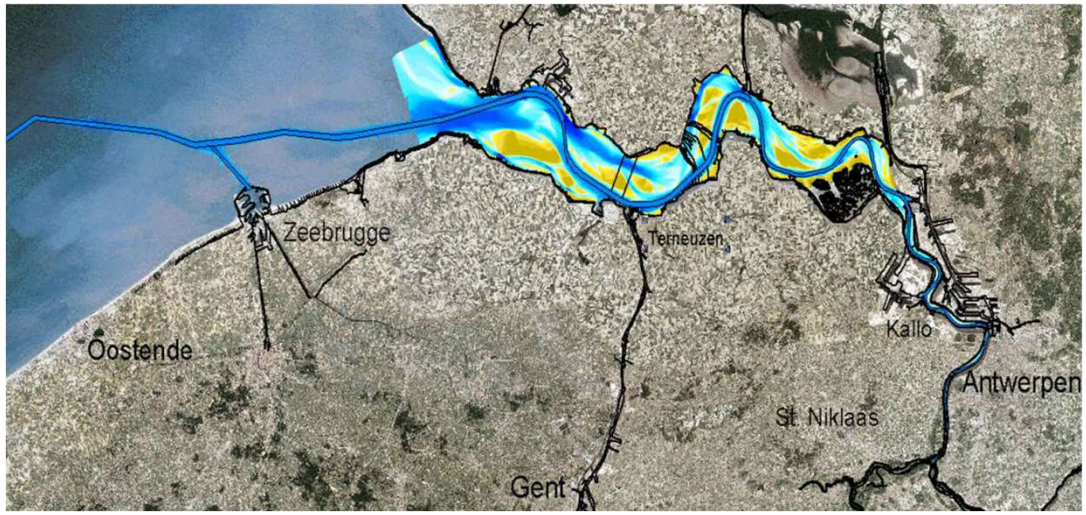
B. De Maerschalck, Y. Plancke, F. Roose, J. Suffis

Flanders Hydrulics Research

Maritime Access, Dep. Of Mobility and Public Works

Scheldt Estuary

- **Acces to the ports of Flushing, Ghent and Anwerp**
- **Tide-independent access up to 13,1 m draft**
- **Maintenance depth 14,5 m LAT**
- **Nature 2000 Network**



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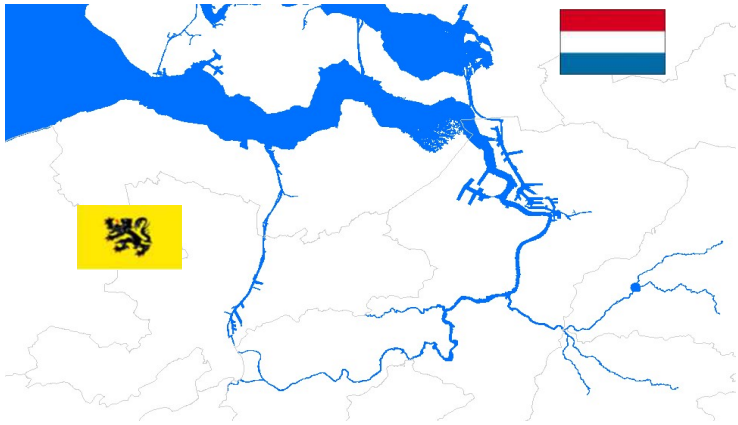
Common management of the Schelde estuary

- **Schelde Treaty (2005): a pillar for trust**
  - Supporting bilateral management and policy
  - Establish a long term common monitoring and research program
    - Integrated monitoring program (since 2008) and evaluation
    - Research program 2014-2018: following research agenda ‘Agenda voor de Toekomst’ (2013)



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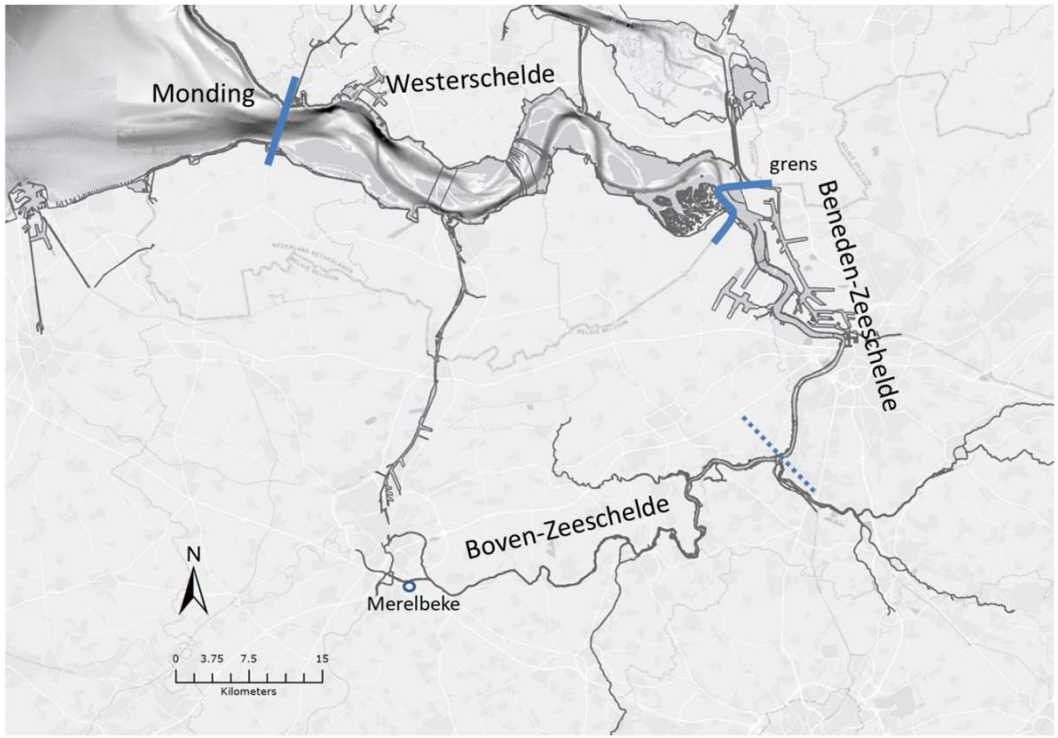
Scheldt estuary management zones

- **Scheldt mouth and Western Scheldt: Dutch**
- **Lower and Upper Seascheldt: Flemisch**



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Capital and maintence dredging

- **2010: Deepening and enlaregement of the channel**
  - Western Scheldt (NL): 7,7 Mm^3
  - Sea Scheldt (B): 7 Mm^3
- **Maintenance dredging:**
  - Wester Scheldt: 9,5 Mm^3/year, sand, 12 sills
  - Lower Seascheldt and Deurganckdok: 4 Mm^3/year, muddy sediments, 6 sills

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Sediment management strategy

- **Before 2010:**
  - Relocation of the sediment mainly in the secondary channels
  - This stratgey was jeoparidizing the multichannel system

- **Current strategy: flexibel relocation**
  - *"Adapting relocation of dredged sediment in the Westerschelde based on monitoring and new insights"*

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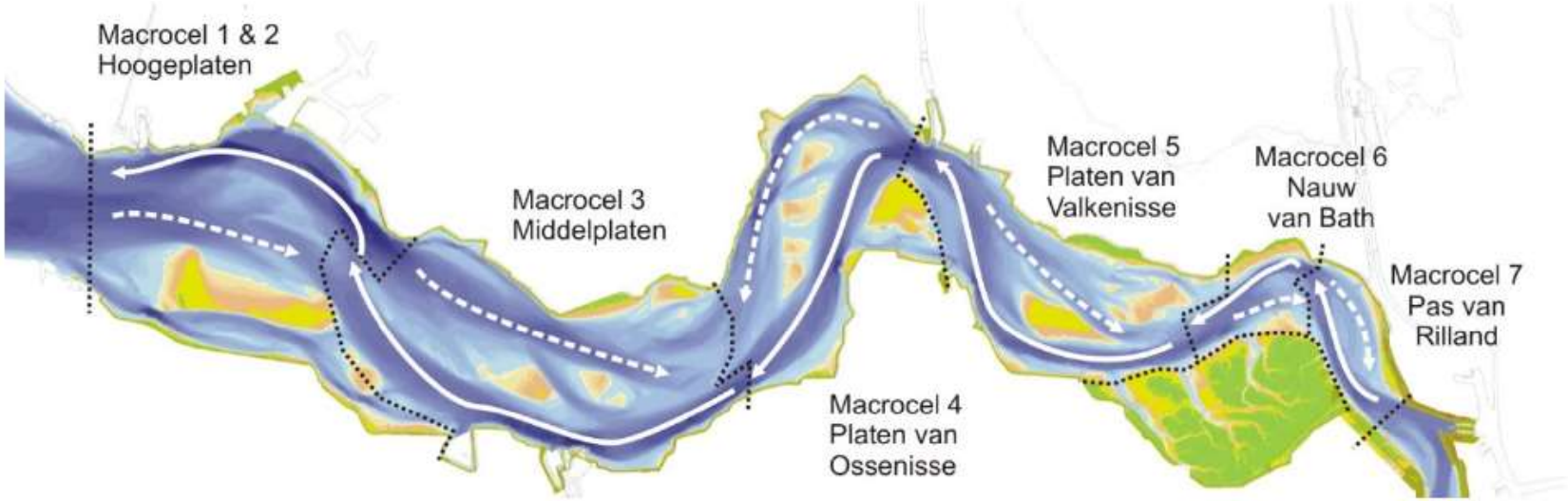
Westerschelde – Flexible relocation

- **Principles**
  - Relocation sediment within the same morphological unit (‘macrocel’)
  - Maximaly use the relocation capacity at sandbars
  - When capacity in a macrocel is insufficient: relocate sediment to the adjacent macrocel (downstream)



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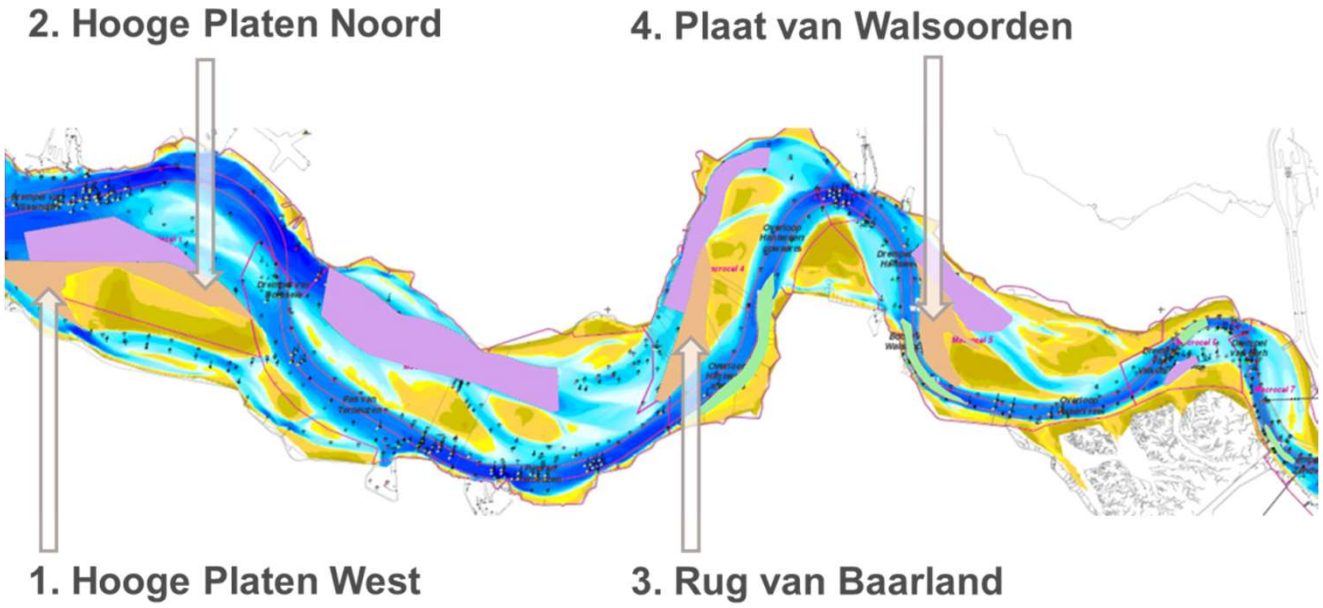
Current strategy: relocation sites near sandbars

- **Create low dynamic areas which are beneficial for ecology**
- **Applies at four locations:**



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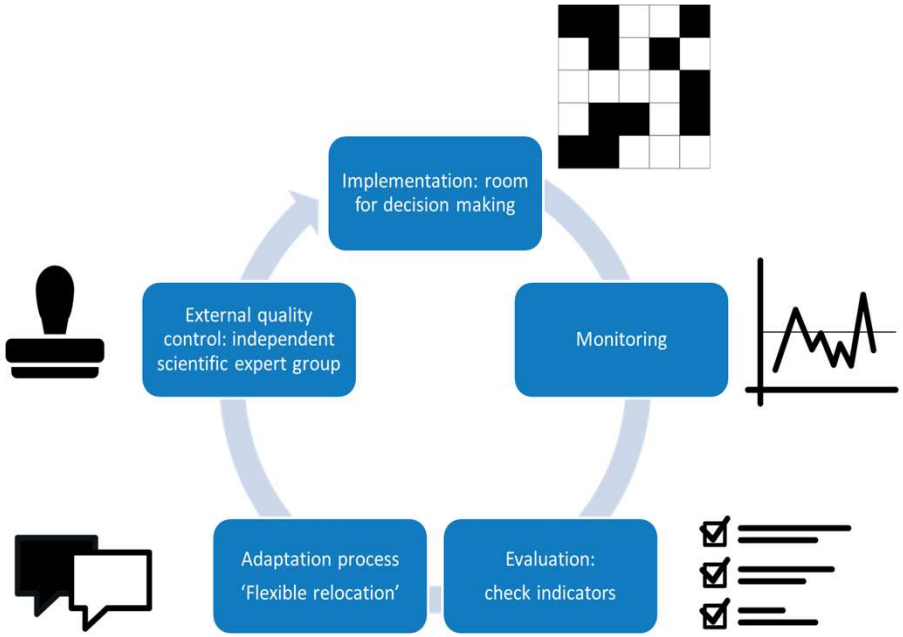
Flexible relocation as application of Adaptive Management



- **Plan and design were executed during EIA (2008)**
- **Implementation since 2010**
- **Extended monitoring plan**
- **Evaluation on agreed criteria 'Protocol quality indicators'**
- **Adaptation following an agreed process**

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Monitoring and evaluation

- Vlaamse Nederlandse Schelde Commissie (VNSC)
- Frequent (2 weeks, monthly) topobathymetric surveys of the disposal sites
- Seasonal sedimentation and erosion measurements intertidal and subtidal
- Velocity measurements near the disposal sites
- Every 3 months: 2D numerical flow simulation based on the measured bathymetrie
- Annual data report
- 2 years: progress report
- 6 years: System Evaluation Report
- Flemish-Dutch bilateral research program: Agenda for the Future

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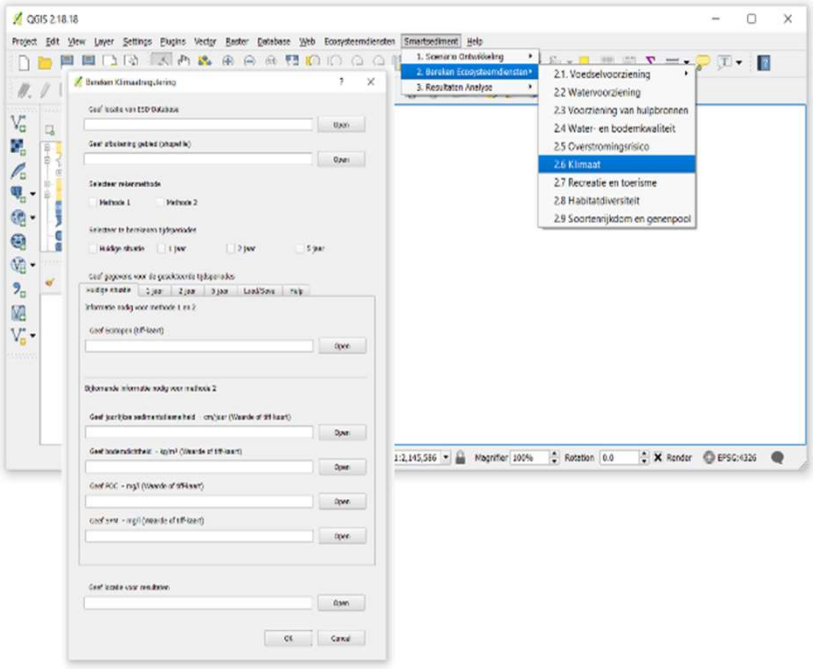
SMARTSEDIMENTS

- **EU interreg project**
- **Development of GIS-evaluation Tool (QGIS Plugin)**
- **Evaluation of the effects of the sediment strategies on the delivery of ecosystem systems**



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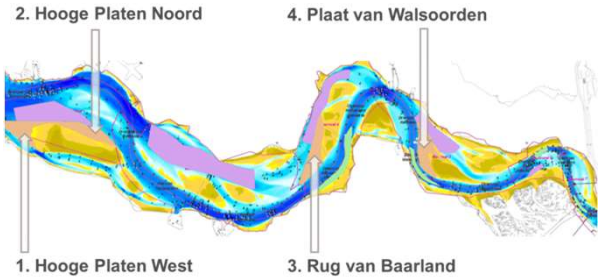
Monitoring results Hooge Platen West



- **Erosion rate is acceptable**
- **Varying current velocities**
- **Relocated sediment is moved towards intertidal sandbar**

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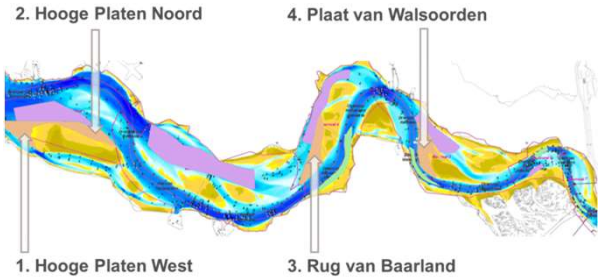
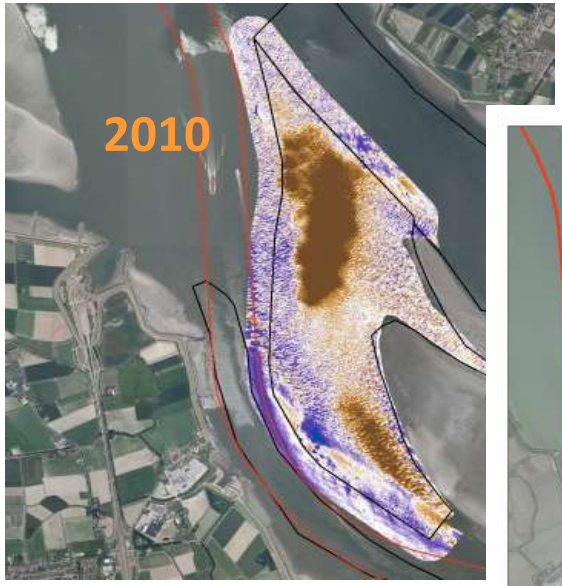
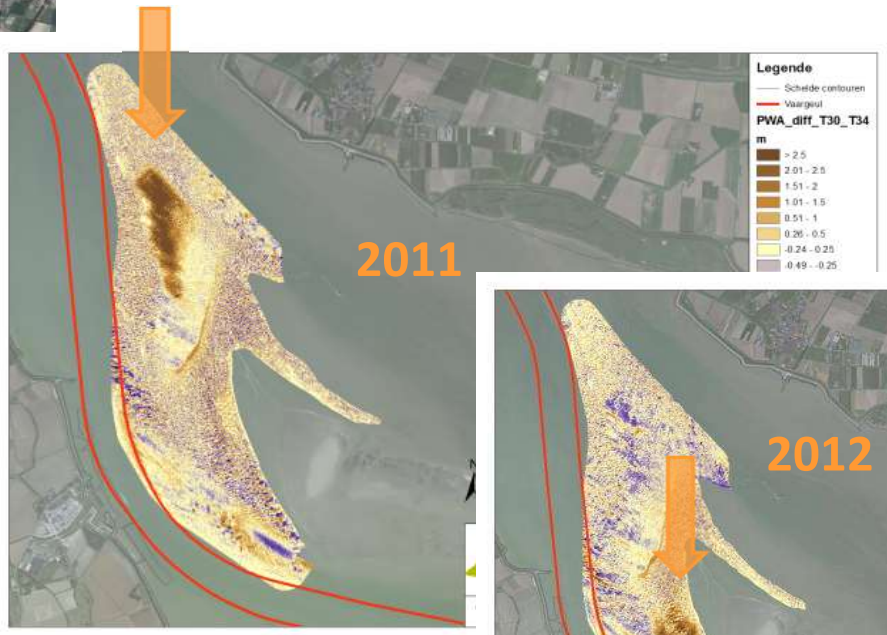
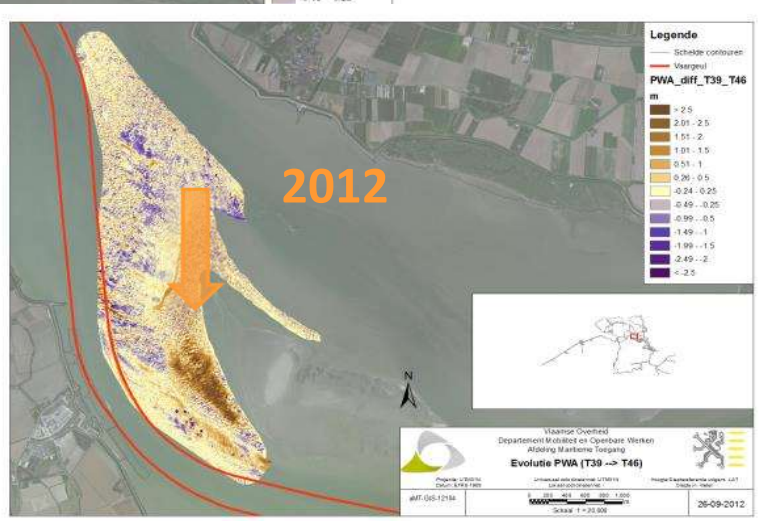
Monitoring results
Plaat van Walsoorden









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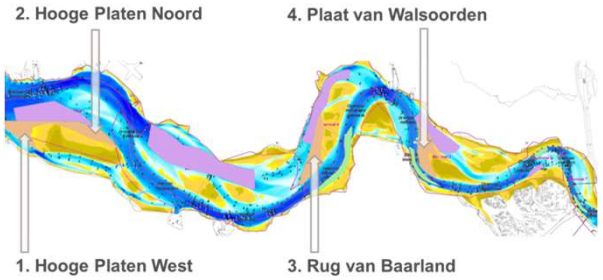
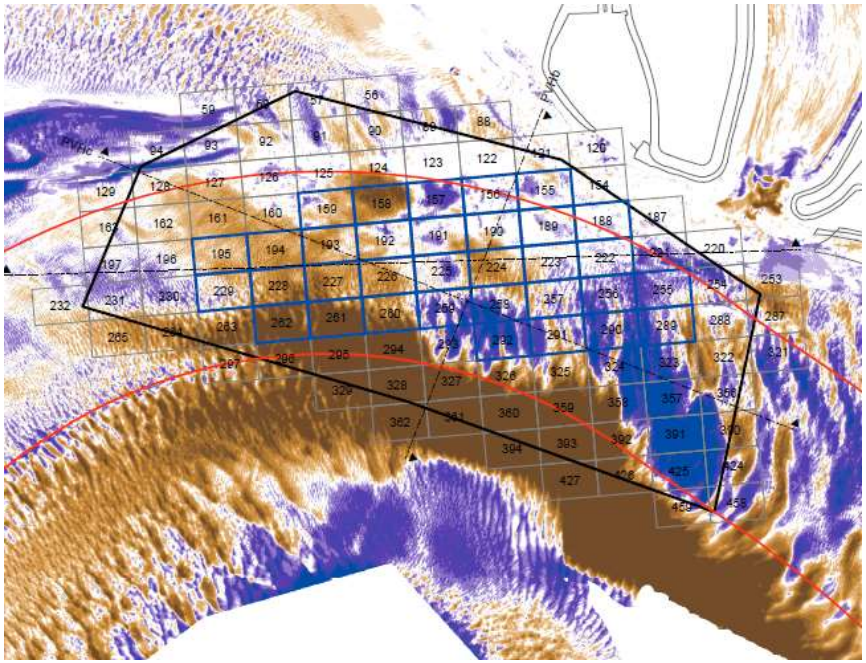
Monitoring results Main channel



- Main channel, near Hansweert
- Pilot area: 2 x 1 Mm³ (2016-2018)
- Stability: ca. 50%
- Sedimentation on slope along inner bend
- Need for further investigation



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Conclusions

- **Adaptive relocation management: 10 years of experience**
- **Increase of 125 ha of low dynamic habitat near 3 disposal sites**
- **Ecological value of the newly created habitat is similar to the existing**
- **There are limitations: an enhanced elevation of the bank was considered as undesired**
- **Key factors to succes:**
  - Continuous and extensive monitoring and evaluation
  - Bilateral consultation
  - Common resaerch programs: Long term effects of the strategy, adaptation of the strategy to sea level rise, estuarine turbidity maximum

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