ESTUARY, SHIPS, NATURE, HUMANS: CAN WE LIVE TOGETHER?

A true story of the Scheldt estuary

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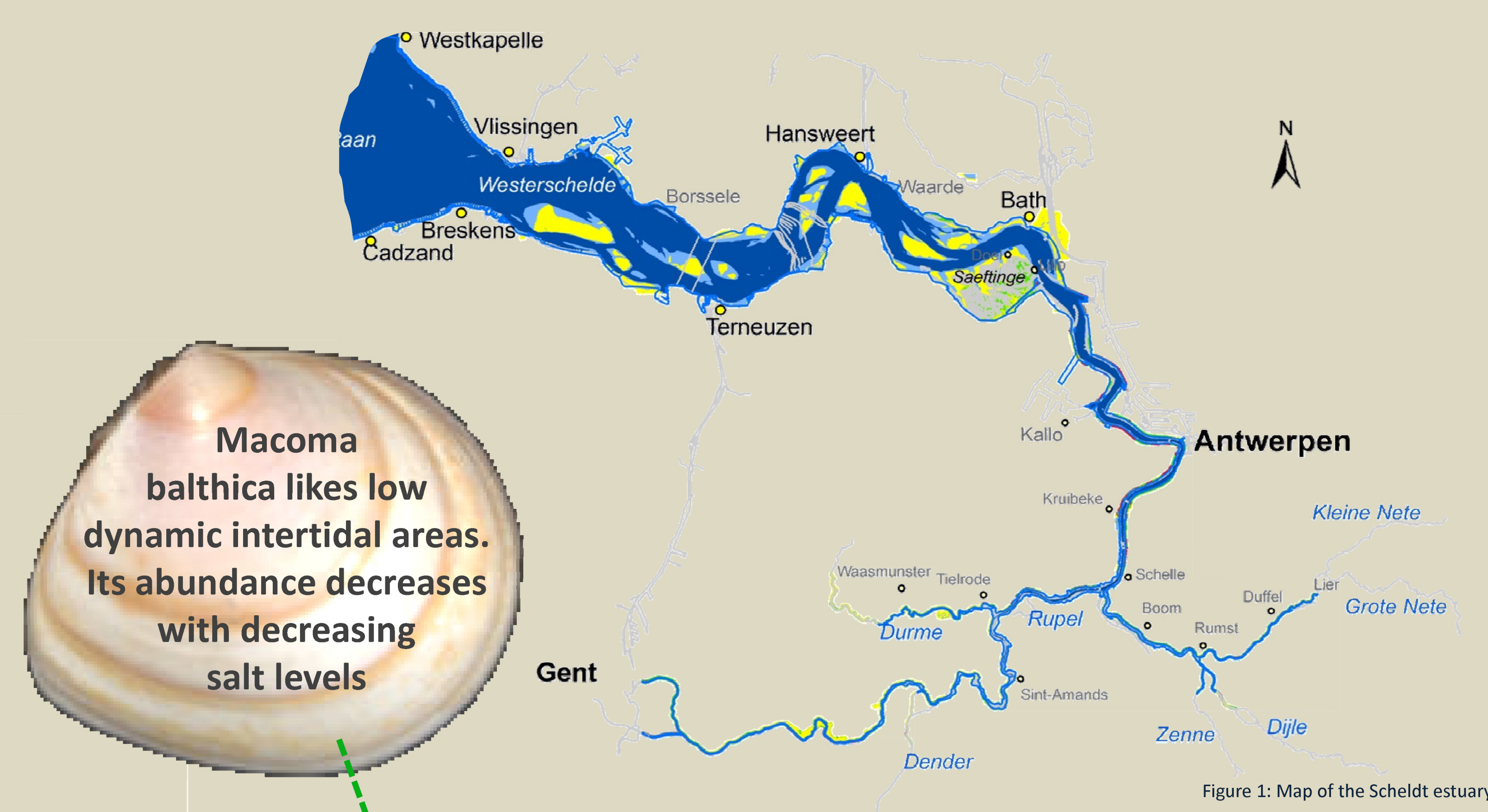**2** Flanders Hydraulics Research, Berchemlei 115, 2140 Antwerp, Belgium

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Introduction

Some basic questions about the Scheldt estuary:

-The estuary is a way for storm surges to reach the hinterland. Are we protected enough?

-The estuary is almost entirely protected as NATURA 2000 area. Can port expansion on one of the crowdiest shipping ways go hand in hand with nature preservation?

- Larger and larger container ships are visiting the port of Antwerp. Has the estuary reached its limits yet?

The Western Scheldt is one of the crowdiest shiping way s in the world. In 2011 the port of Antwerp was visited by 15.240 seagoing ships and 59.428 barge calls.

Macoma balthica likes low dynamic intertidal areas. Its abundance decreases with decreasing salt levels

Figure 1: Map of the Scheldt estuary

Material and methods

Morphological scenario X:
- River discharges
- Water level sea
- Bathymetry

Telemac 2Dh hydrodynamical model

- Salinity (t)
- Flow velocity (t)
- Depth (t)
- Water level (t)
- Sediment D_{50}

Ecological model (Matlab) → **Potential habitat map per benthos species**

Morphological model → **Sedimentation/erosion map per scenario**

Morphology of system

Streamlines in red at ebb current

Bathymetry (m NAP)
- Above 2.5
- 0 to 2.5
- -2.5 to 0
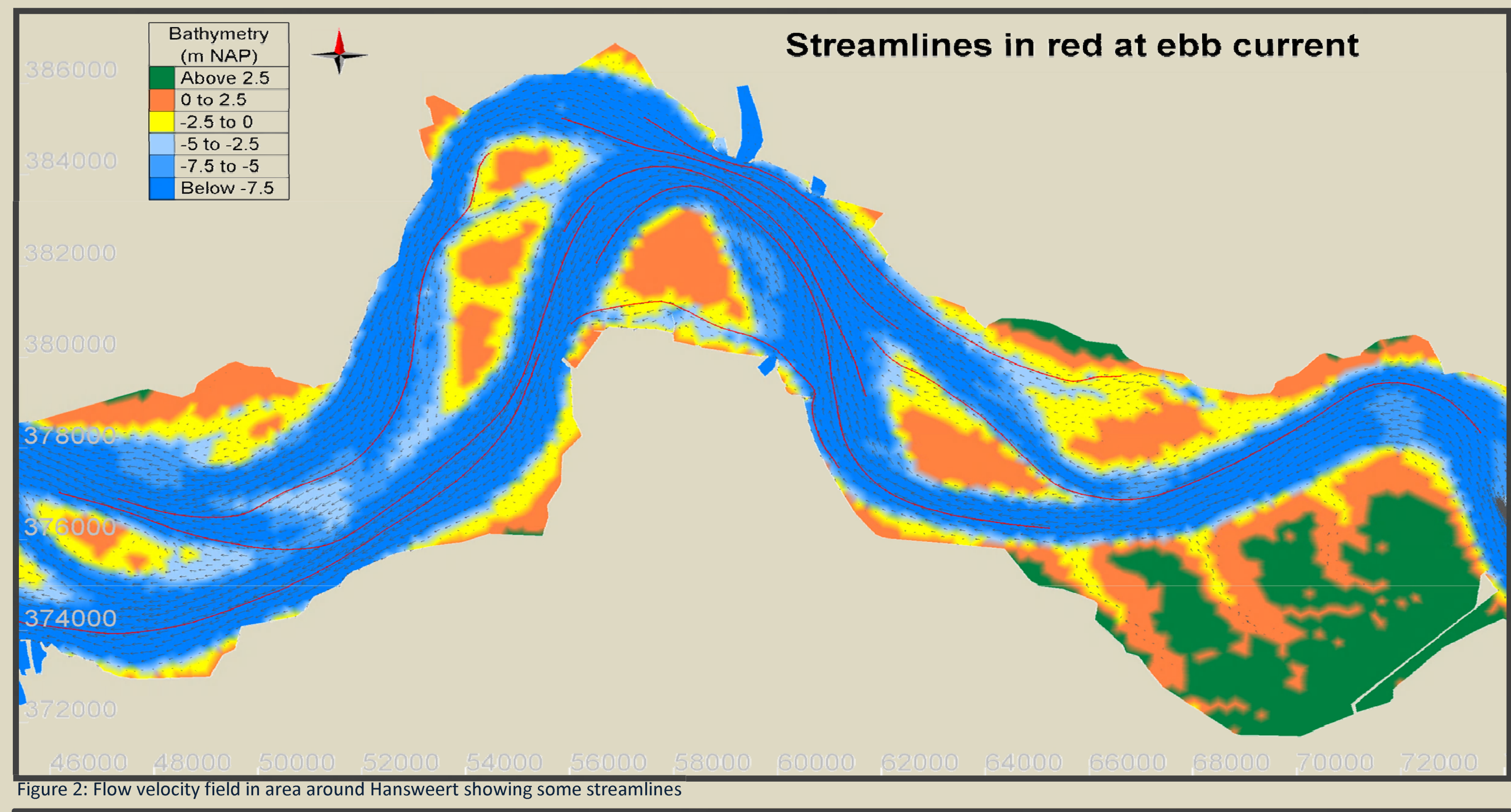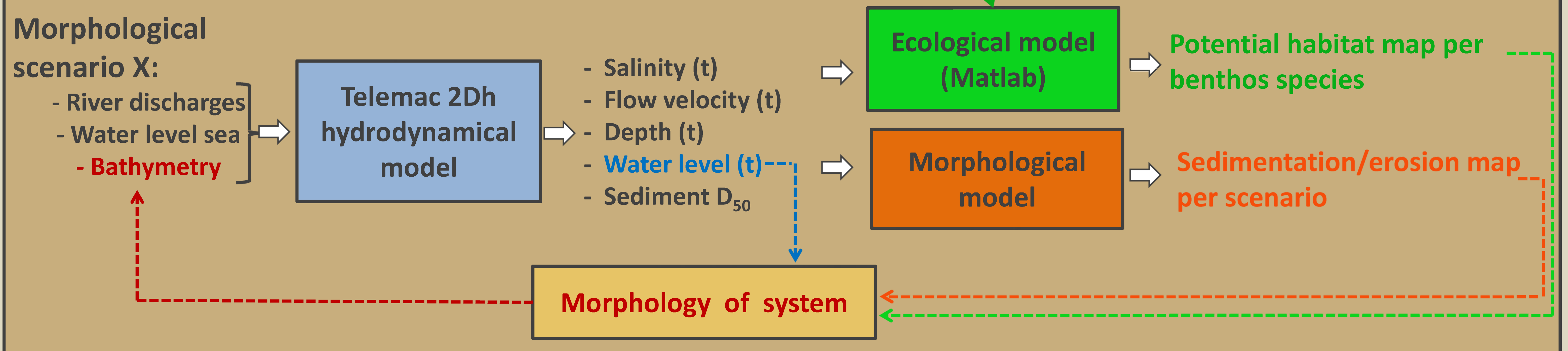- -5 to -2.5
- -7.5 to -5
- Below -7.5

Figure 2: Flow velocity field in area around Hansweert showing some streamlines

Results and discussion

➡ **Flood defense / Safety**

Based on water level results of different scenarios the risk on flooding can be estimated

➡ **Port accessebility / Navigation channel**

Based on sedimentation and erosion patterns for different scenarios the flow conditions in the navigation channel can be optimized to improve scouring on sills and decreasing maintenance dredging

➡ **Ecological value of the system**

Increase or decrease of potential habitat for a specific morphological scenario up to species level. Difference maps between current situation and different scenarios are made to estimate evolution

Conclusions

The morphology of the system that ensures a WIN-WIN-WIN situation between safety, accessebility and ecology can be found based on the specific needs of the system (dictated by its partners: ports, nature, humans).
Living together means mutual respect for each other and accomodation space for each partner.

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