Impact of sediment transport in the River Scheldt on the manageral aspect

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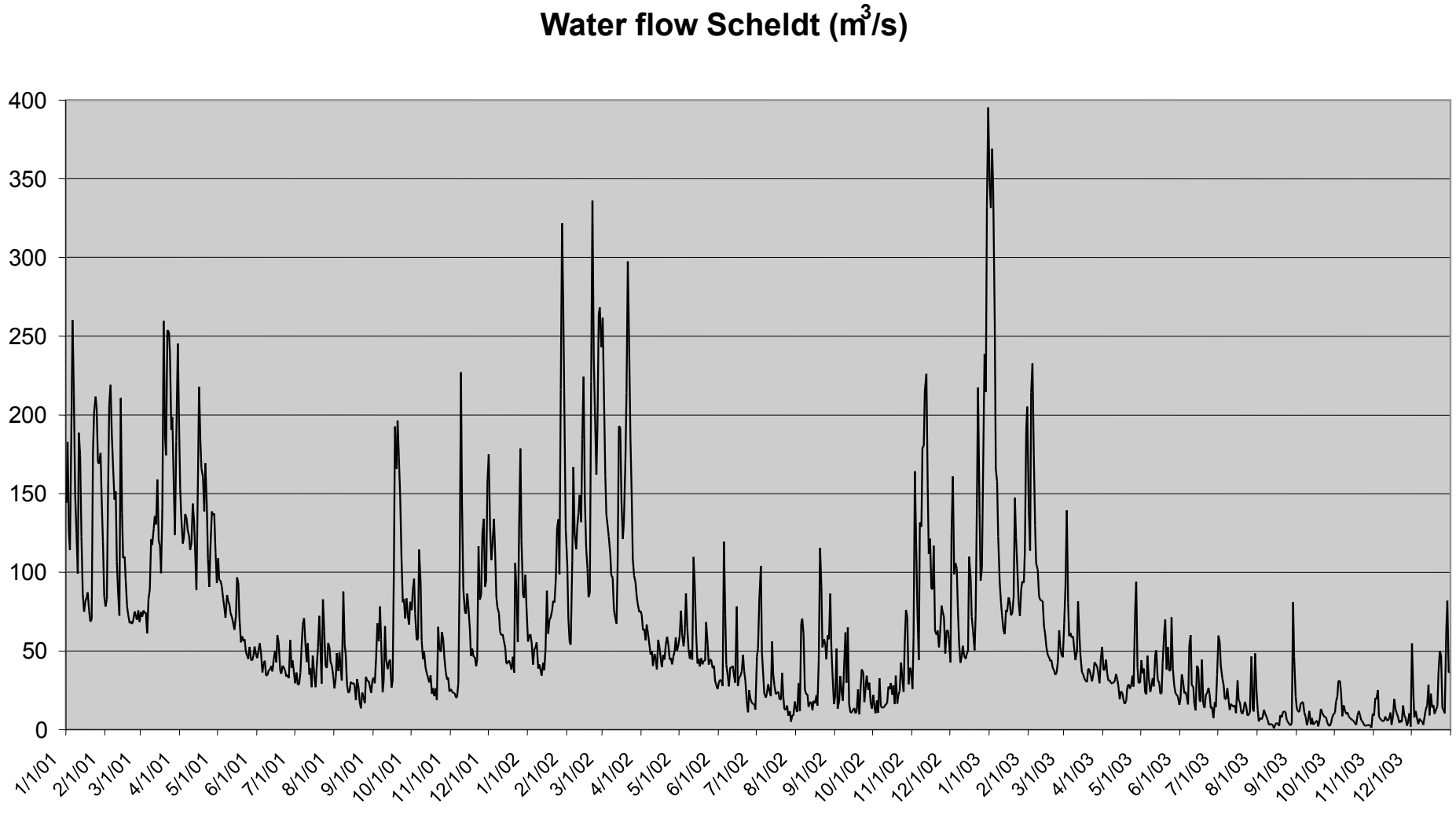
Maritime access division

Origins of sediment input into the River Scheldt

- Upstream: river bed and banks erosion
- the North Sea
- Run off:farm land: 140.000 tonnes/year
- hardened surfaces
- sewers and wastewater purification plants: 55.000 tonnes/year
- infrastructural activities (Wester Scheldt Tunnel, deepening activities, …)
- wind erosion: saltation, etc…

Consequences

- Filling up of the shipping channel
- Important quantities of sediment material to be dredged
- material loaded with pollutants, such as heavy metals, PAH, PCB, mineral oils, …
- disposal of dredging sludge problematic


Water flow Scheldt (m3/s)
400
350
300
250
200
150
100
50
0
1/1/01
2/1/01
3/1/01
4/1/01
5/1/01
6/1/01
7/1/01
8/1/01
9/1/01
10/1/01
11/1/01
12/1/01
1/1/02
2/1/02
3/1/02
4/1/02
5/1/02
6/1/02
7/1/02
8/1/02
9/1/02
10/1/02
11/1/02
12/1/02
1/1/03
2/1/03
3/1/03
4/1/03
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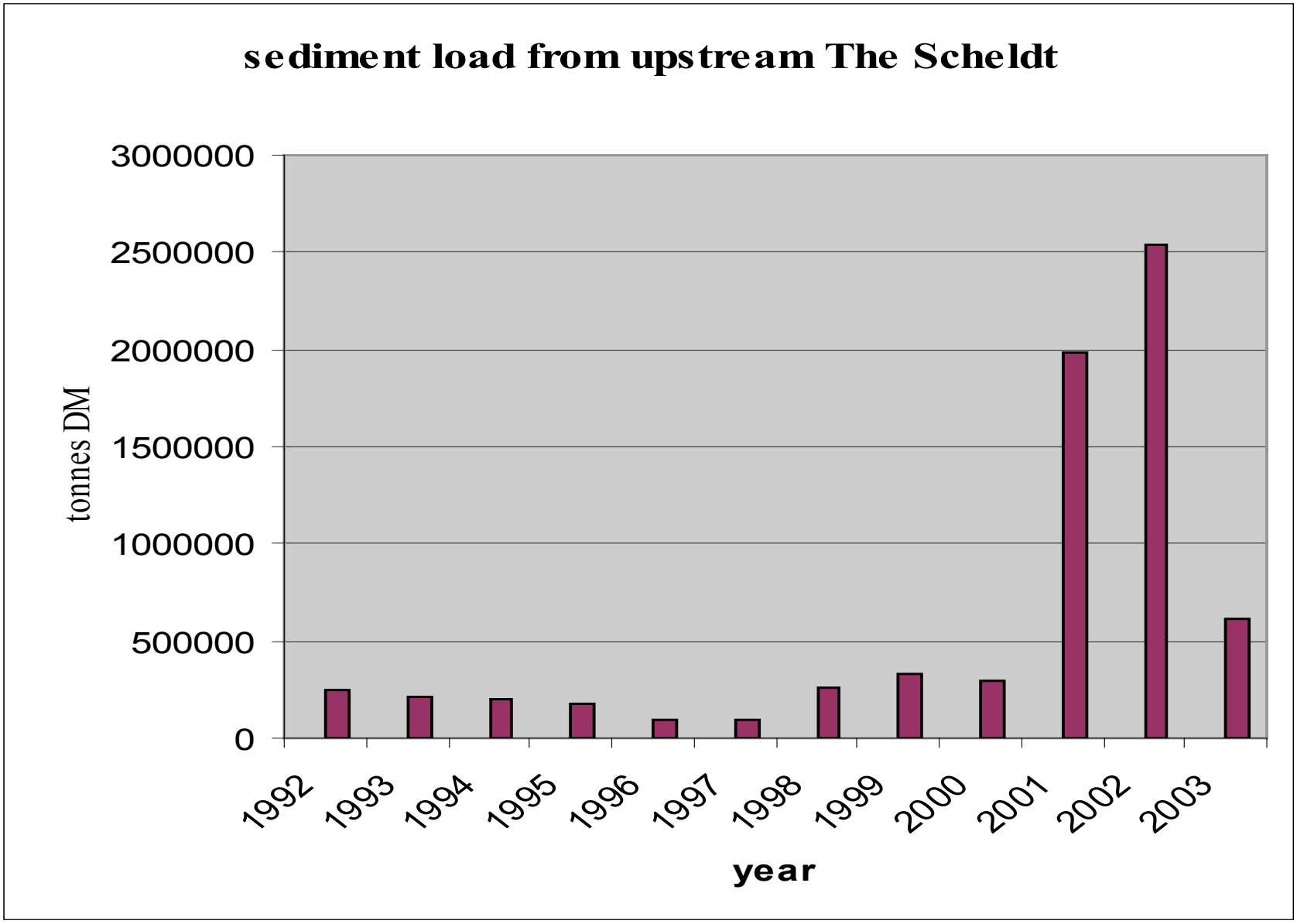
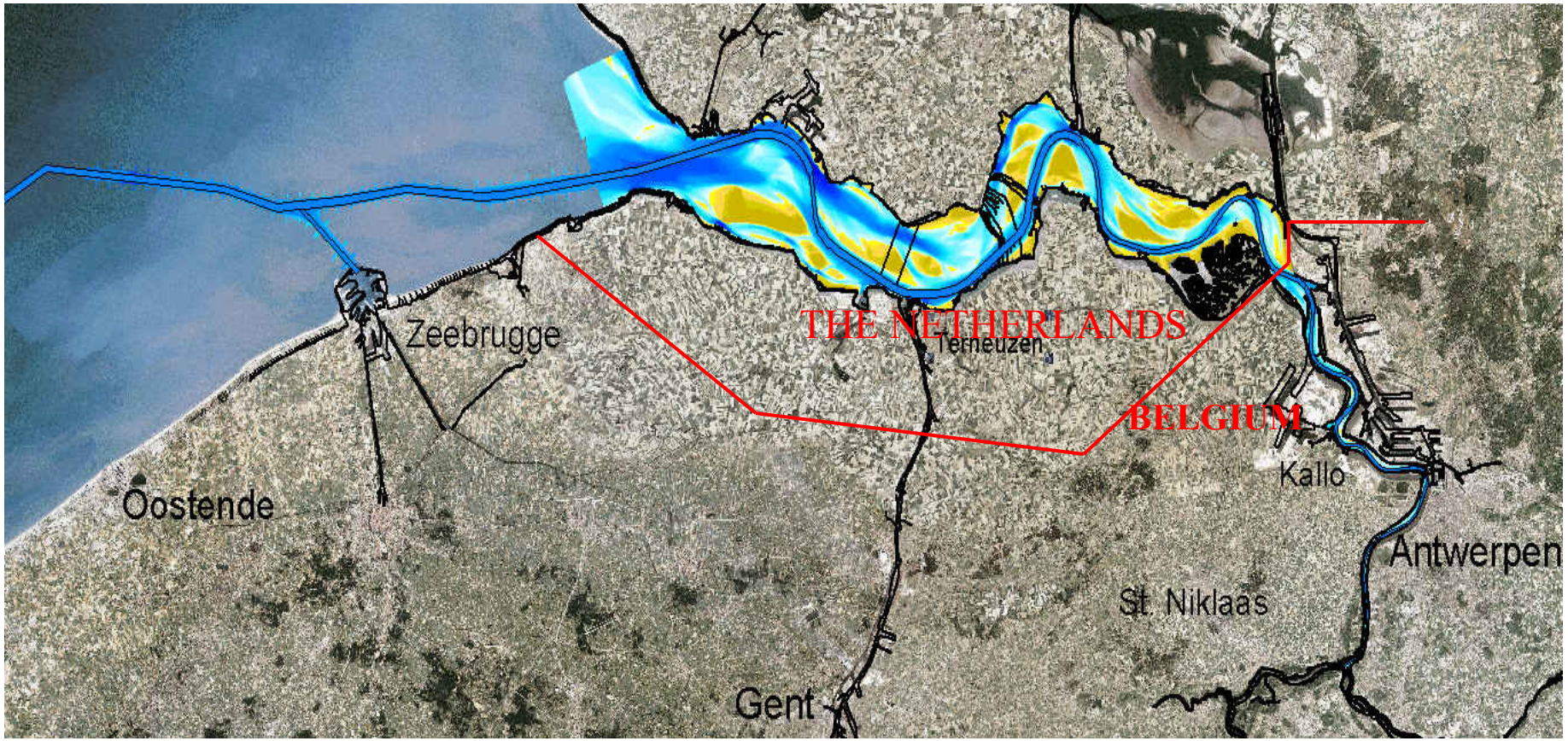
9/1/03
10/1/03
11/1/03
12/1/03

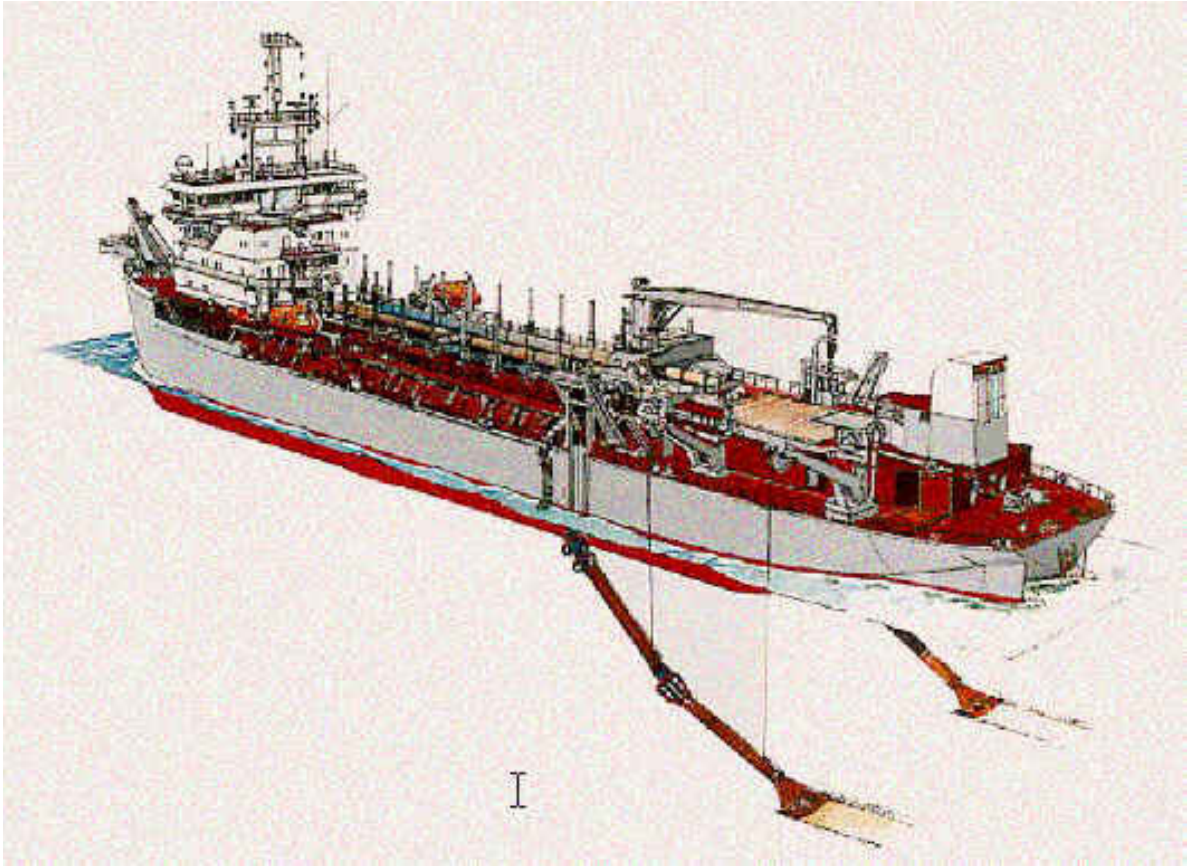

sediment load from upstream The Scheldt
3000000
2500000
2000000
1500000
1000000
500000
0
tonnes DM
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
year

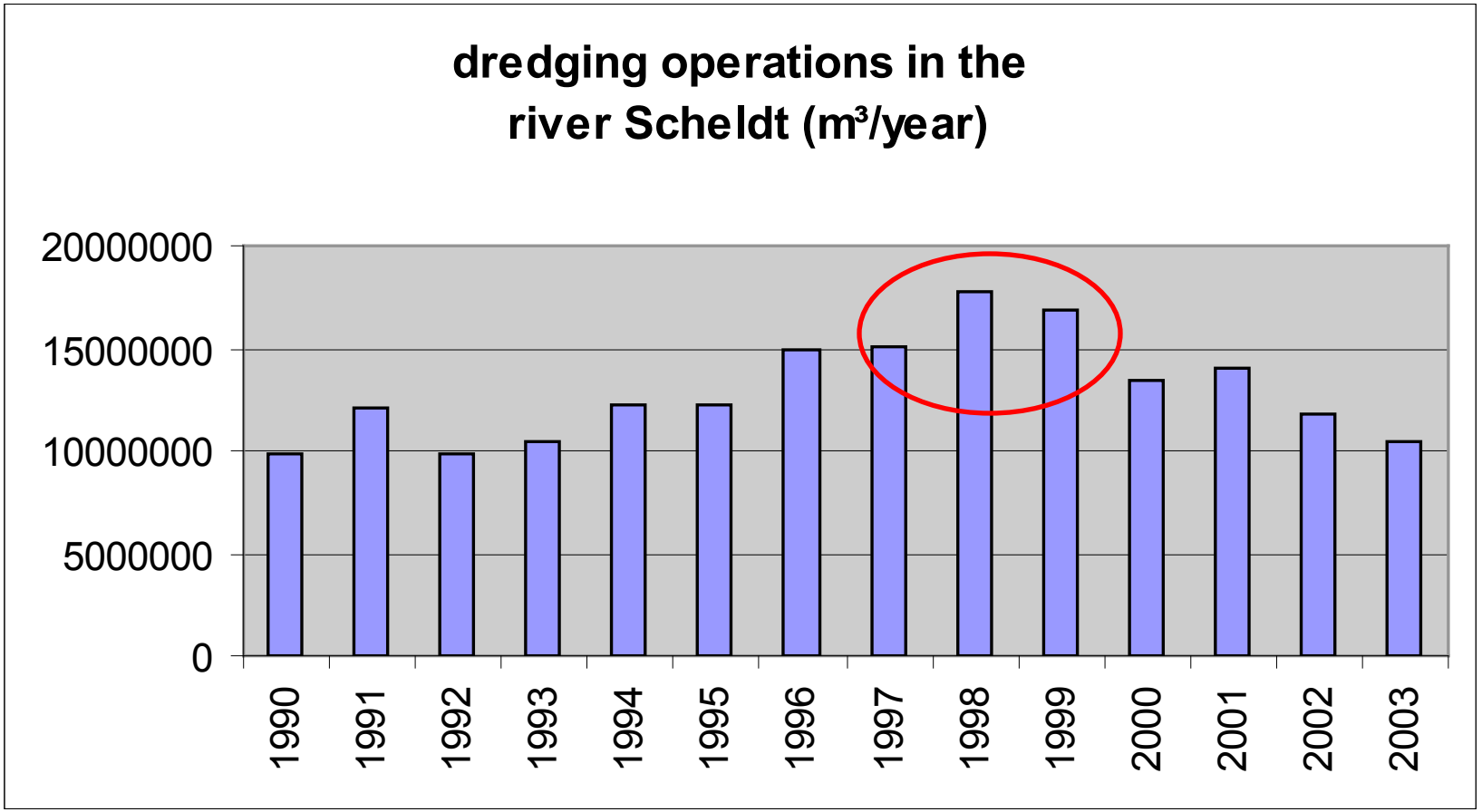
Maritime Access-channel
to the ports along the river Scheldt



HAVEN VAN ANTWERPEN

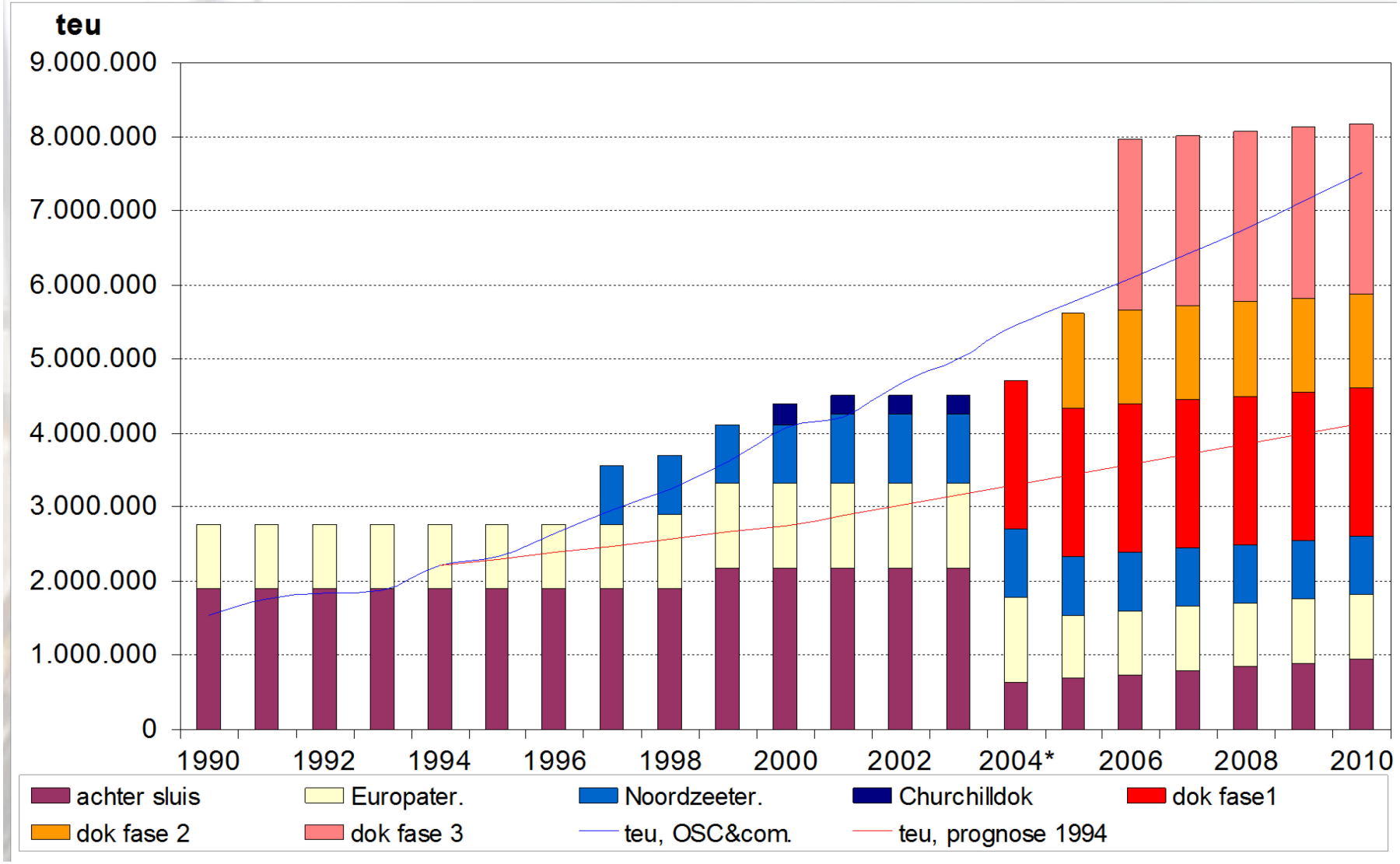
CUTTER SUCTION DREDGER




dredging operations in the river Scheldt (m³/year)
20000000
15000000
10000000
5000000
0
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003

Container: handling capacity at the port of Antwerp

Prognoses



Legal aspects of maintenance dredging

- 2 different permits
  - 2 Flemish permits: Vlarem 2 : 5 & 6 years
  - 1 Dutch permit:WVO : till 2006
  - problems:
    - 2 procedures, different permit durations
    - different conditions, standards
    - different approaches, cultures
  - need for monitoring & research
  - mutual aggreement on future policy: LTV

2001:Long Term vision for the Scheldt Estuary

(The Netherlands-Flanders region)

- *based on 3 main functions :*

- **1) maritime accessability of the port of Antwerp**
- **2) security against flood**
- **3) nature conservation and ecological development**

Monitoring programme

- 2 different programmes
  - related to the LTV
  - related to the Flemish and Dutch permits

Monitoring related to the LTV

- Dutch-Flemish Cooperation
- under TSC (Technical Scheldt Commission)
- Covering the 3 main aspect

Monitoring related to the Flemish Permit

- Established in the frame of the former environmental permits
- Research on different environmental compartments and aspects:
    - water
    - bottom
    - river bed
    - dredging
    - fauna & flora
    - ecotoxicity

Monitoring related to the Dutch Permit

- Chemical characteristics of the sediment
- Bio-assays

Quality control in relation to the environmental permit

- Monitoring of the dredging sites: 2 x a year
- Follow up of the dredging and dumping activities (activity reports)
- extensive monitoring programme: yearly programme report

Monitoring Water

- Semi-continuous monitoring - Flem. Environm. Agency
  - purpose: follow up of the water quality of the Scheldt
- Semi-continuous monitoring - UA (OMES)
  - purpose: follow up of the effects of the strengtening of Scheldt dikes (SIGMA-plan)
- Continuous monitoring - aMT
  - measurement of the tide dependant parameters: chloride, temperature, turbidity
- Semi-continuous monitoring – aMT
  - at changing tide: measurement of different parameters
- 13-hour measurements
  - different parameters: yearly

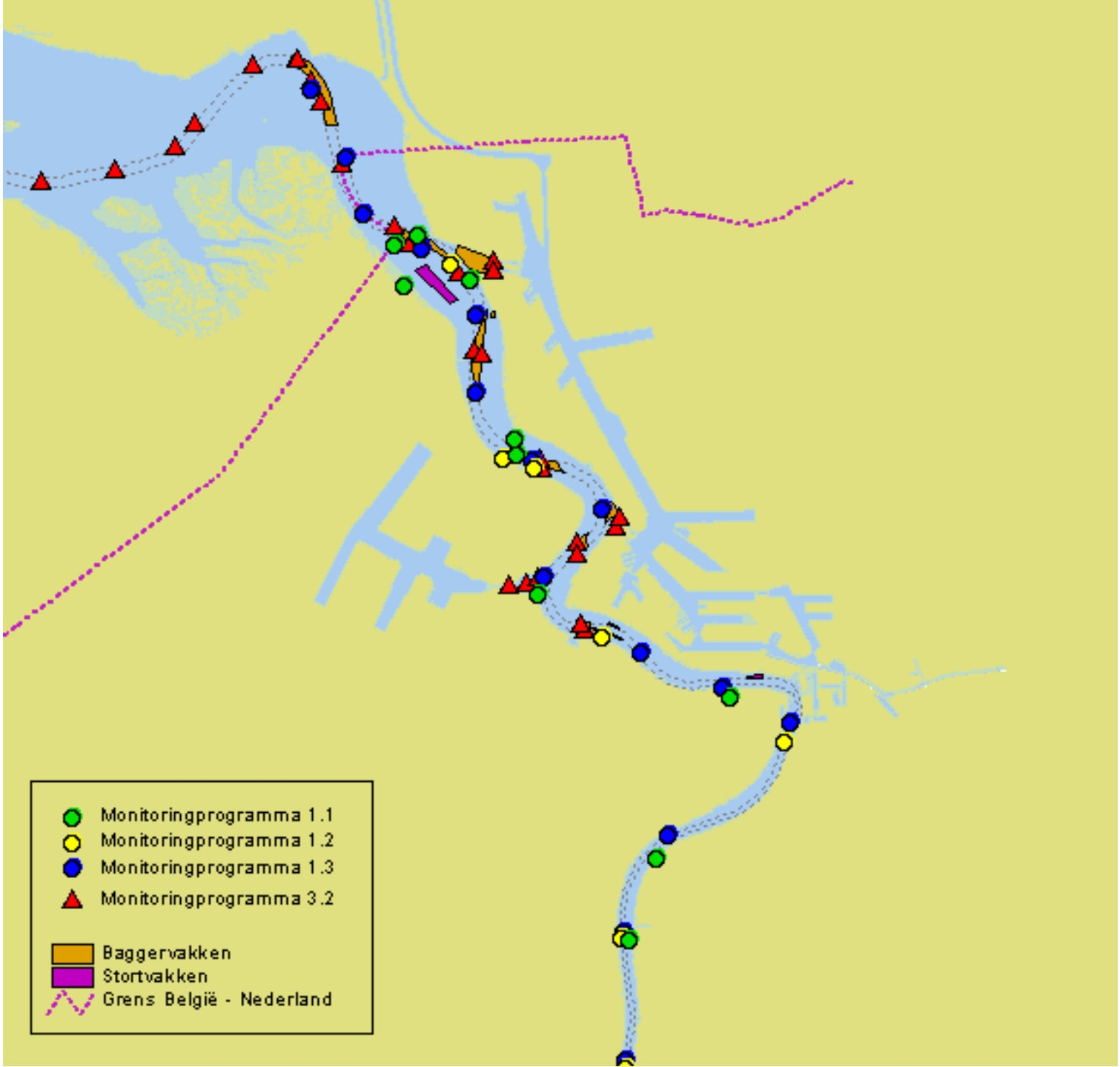
Morphological research

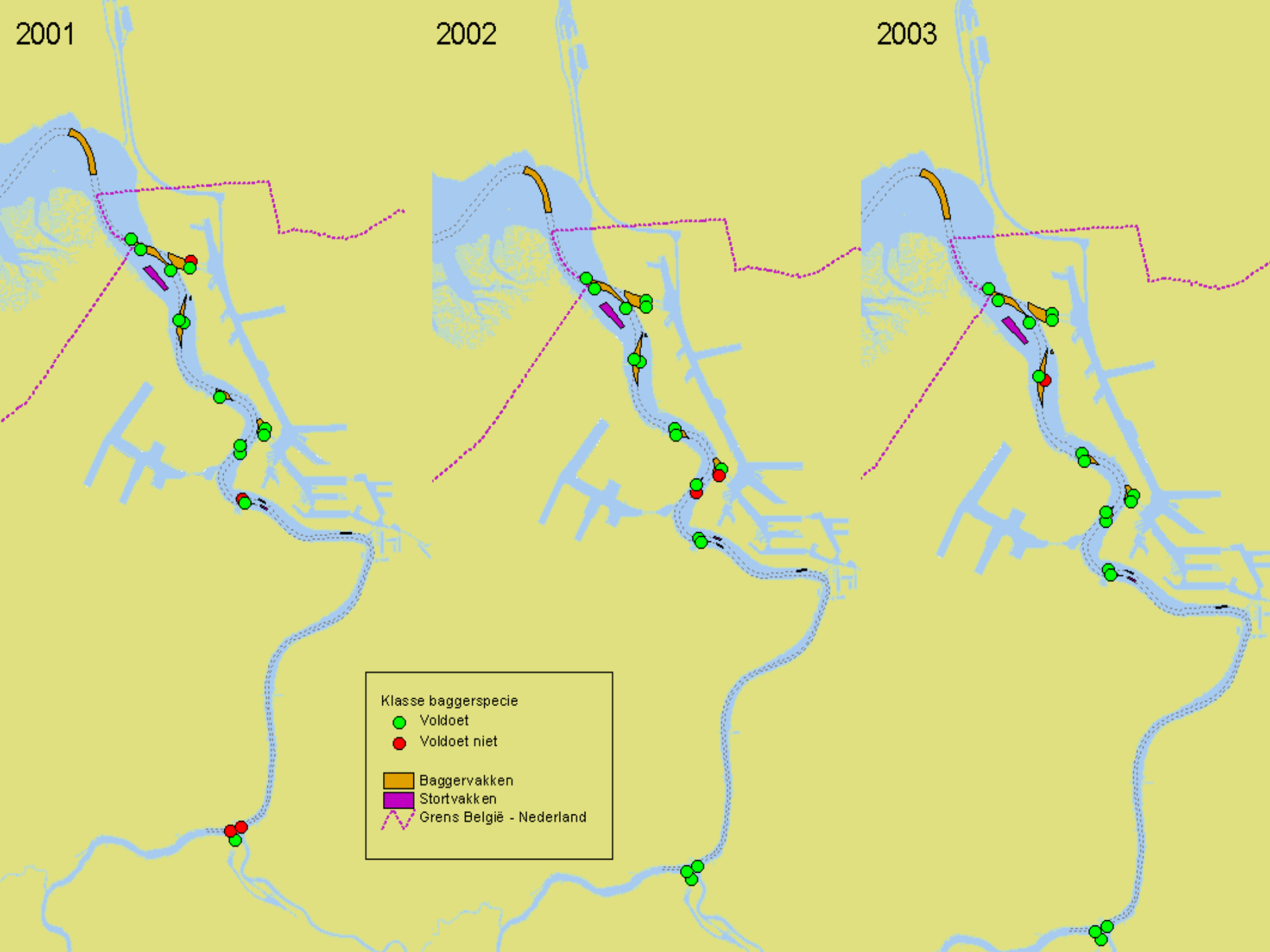
- **Main questions to be solved:**

  - changes in the flood and ebb channels and sandbars

  - the impact of important dredging activities and dumping in the river, the sea

  - how to preserve the multi channel characteristics of the Scheldt?


Monitoringprogramma 1.1
Monitoringprogramma 1.2
Monitoringprogramma 1.3
Monitoringprogramma 3.2
Baggervakken
Stortvakken
Grens België - Nederland


2001
2002
2003
Klasse baggerspecie
Voldoet
Voldoet niet
Baggervakken
Stortvakken
Grens België - Nederland

Bedding

- bathymetric research
  - section maps
  - schip maps
  - detailed mapping for the follow up of the dredging activities
- detailed sounding
  - follow up of the evolution of intertidal areas

River Bottom

- Lithological and granulometric bottom mapping
  - every 5 years
- chemical quality of the sediment
  - twice a year as required in the permit

Conclusions

- Sediment problem is complex
- involves broad range of expertise
- must be dealed with in an integrated way:different initiatives (Eur.Framework Directive, LTV, B&H dir. …)
- has an internat. dimension (OSPAR, …)
- implicates high efforts