

# Impact of sediment transport in the River Scheldt on the managerial aspect

*Ir. K. Mergaert*

*Maritime access division*

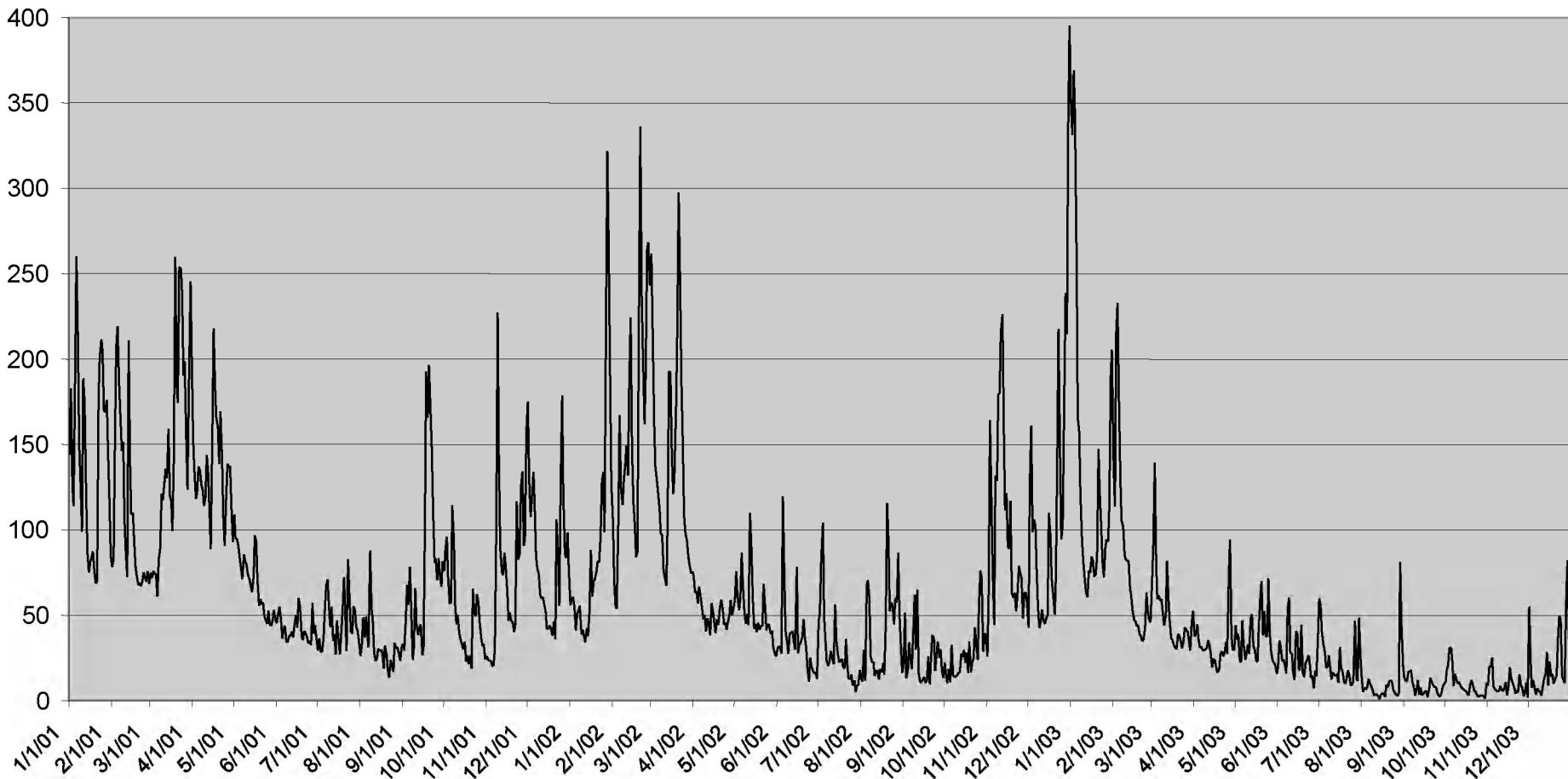
# Origins of sediment input into the River Scheldt

- 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...

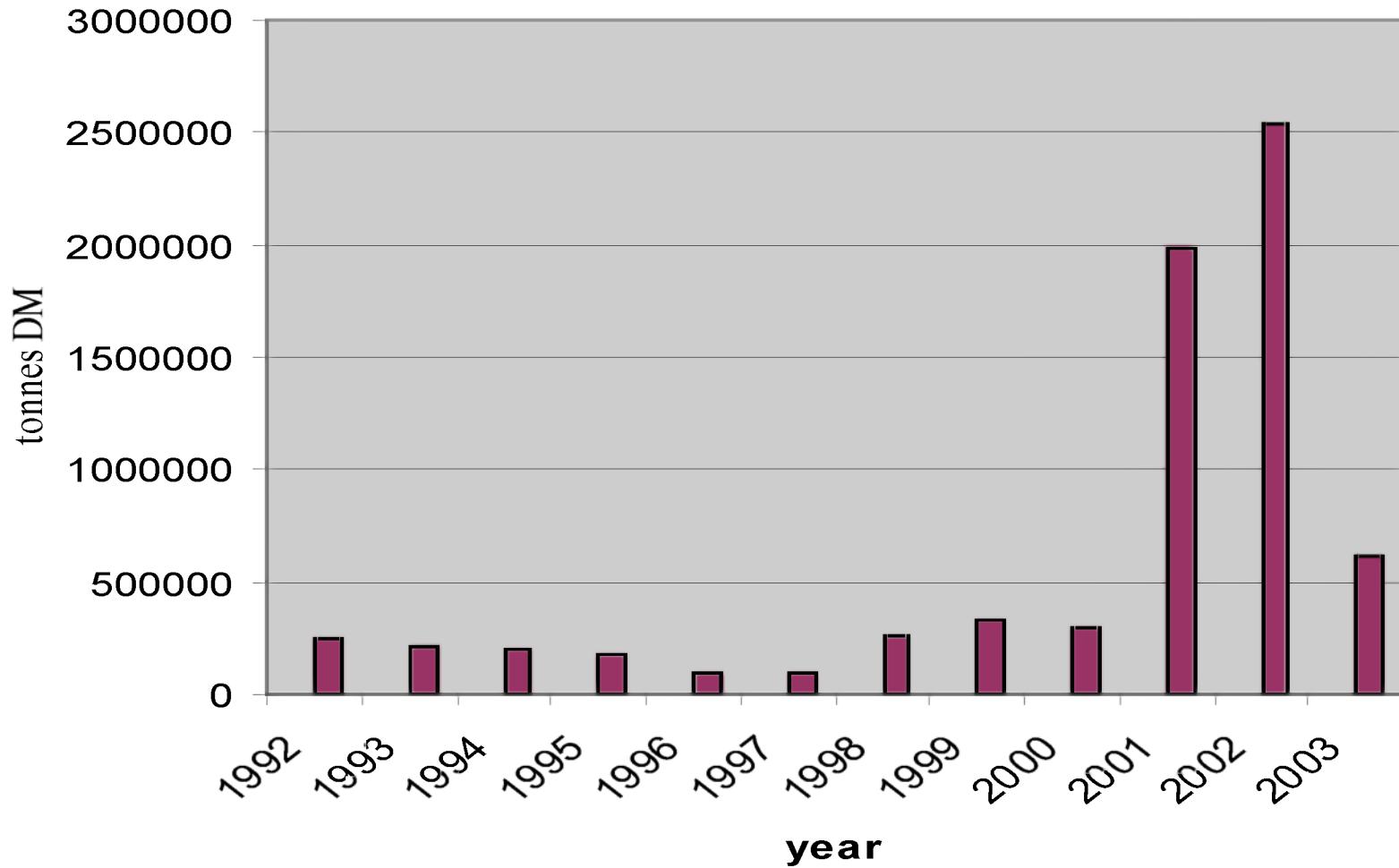
# Consequences

- 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

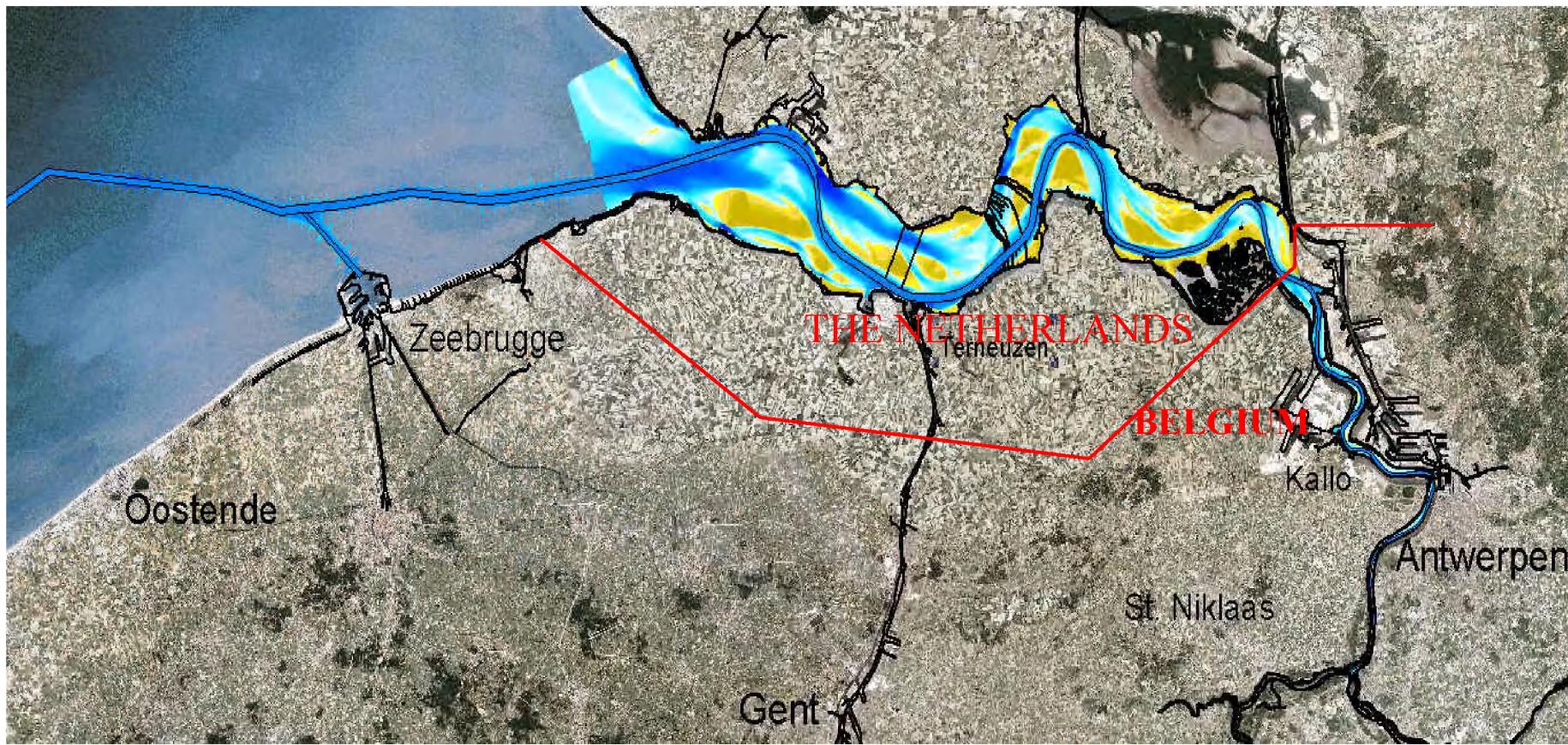
## Water flow Scheldt ( $\text{m}^3/\text{s}$ )



## **sediment load from upstream The Scheldt**



# Maritime Access-channel to the ports along the river Scheldt





HAVEN VAN ANTWERPEN

Heide

Verdonkse Land  
van Steenberg

HULST

NEDERLAND  
BELGIE

Schelde

Prosper-Polder

Doel

Lillo

CONTAINERDOEK  
DOODLOK  
WAALSHAVEN

WAALSHAVEN  
ZUID

Zandvliet

NEDERLAND

BELGIE

Puite (NL)

Puite (B)

KALMTHOUT

Kieldrecht

Verrebroek

KAPELLEN

Hoevenen

St. Marienburg

BRASSCHAAT

Ekeren

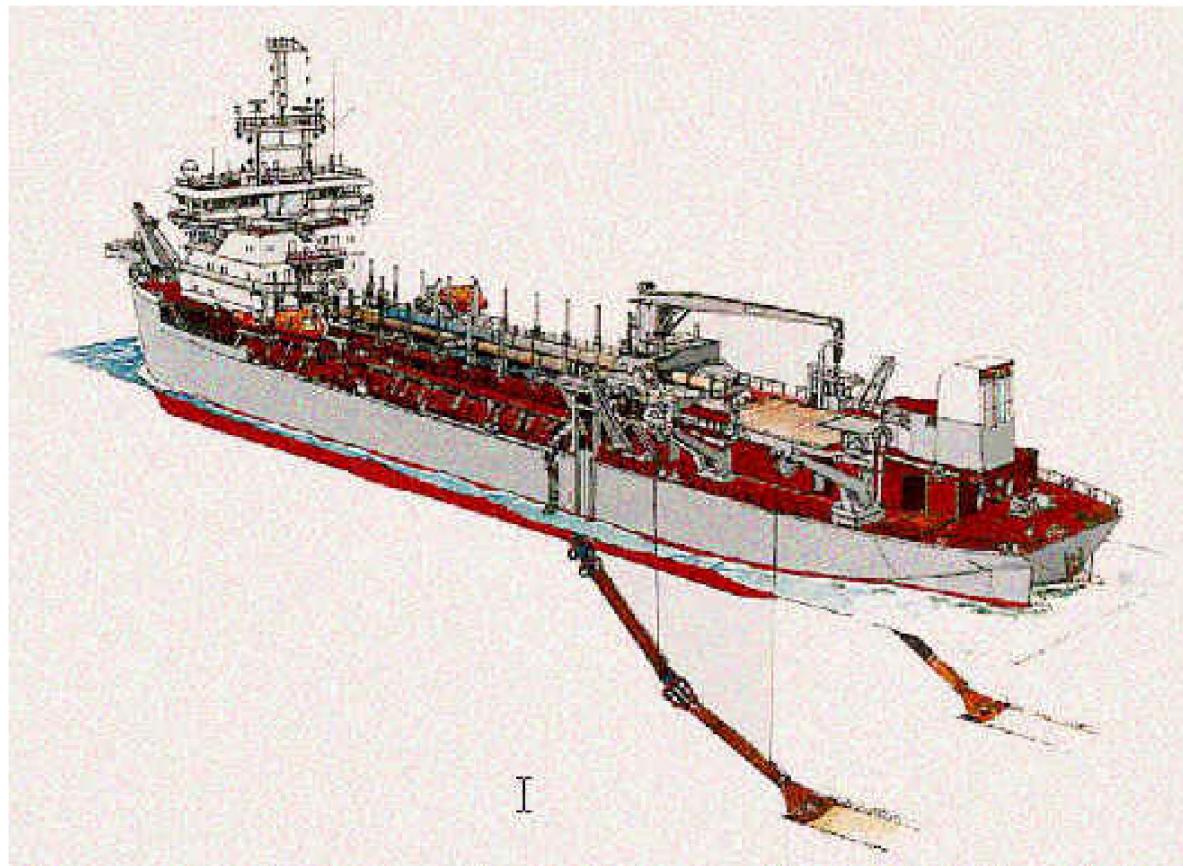
Merksem

Luchtbal

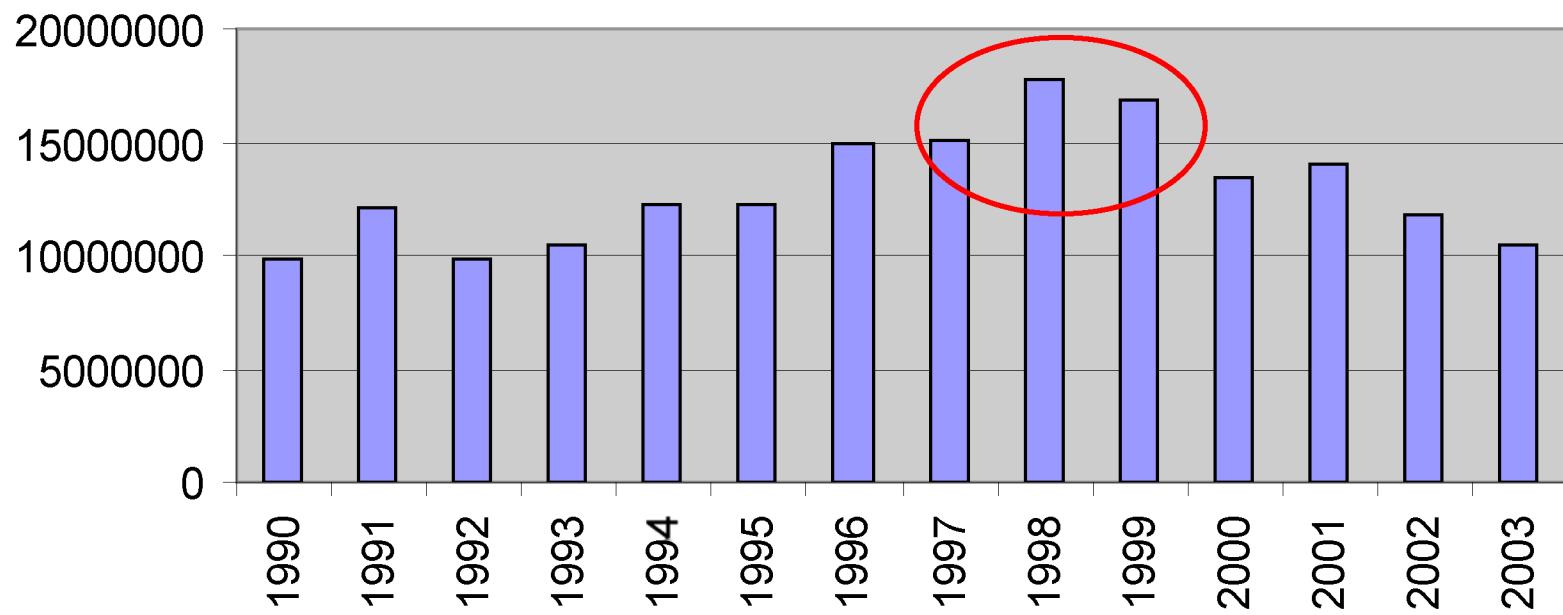
Sint-Anna

N49 Statie Koksijde

# CUTTER SUCTION DREDGER

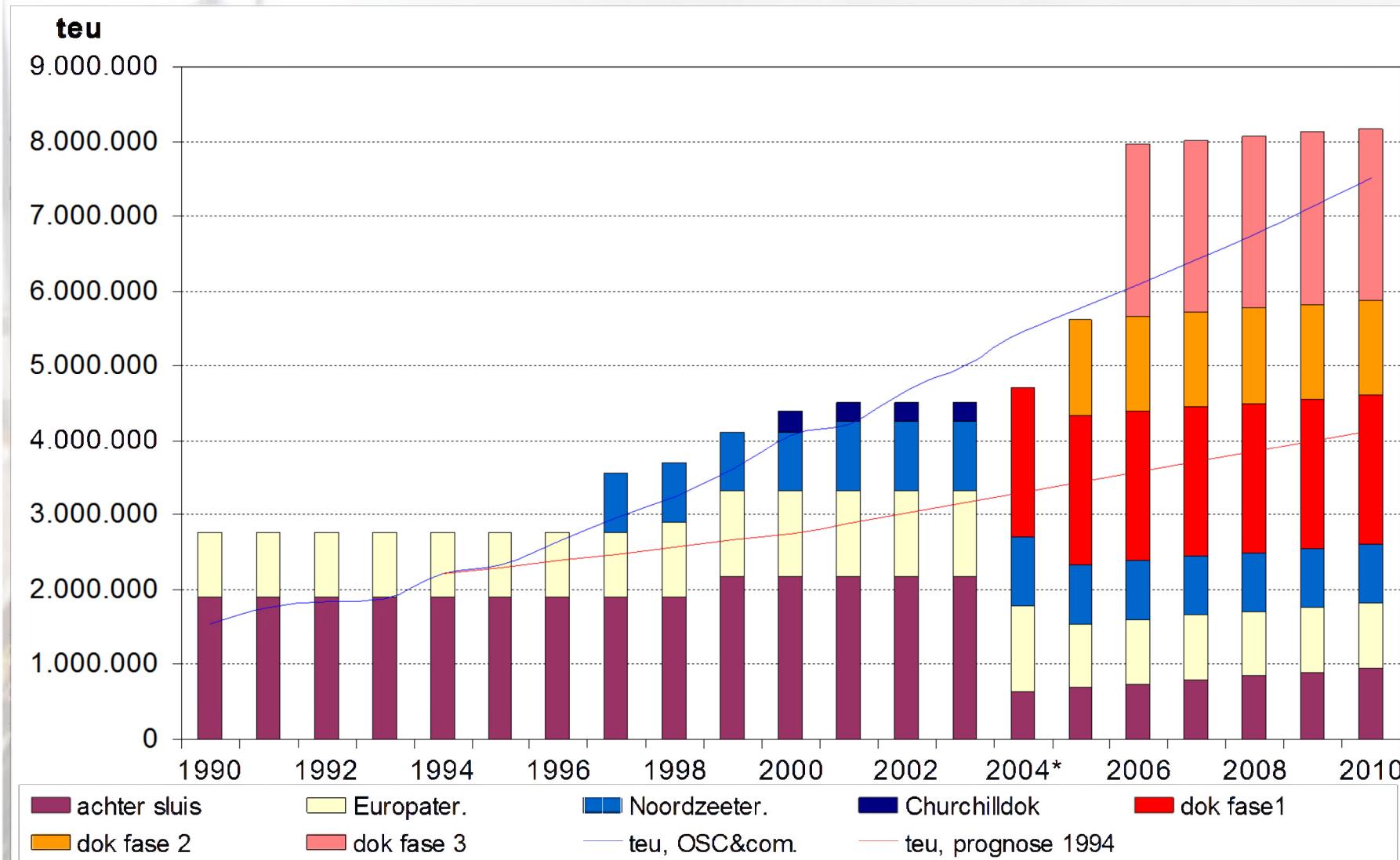


## **dredging operations in the river Scheldt (m<sup>3</sup>/year)**



# 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 agreement on future policy: LTV

# **2001:Long Term vision for the Scheldt Estuary**

*(The Netherlands-Flanders region)*

- *based on 3 main functions :*
- **1) maritime accessibility 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

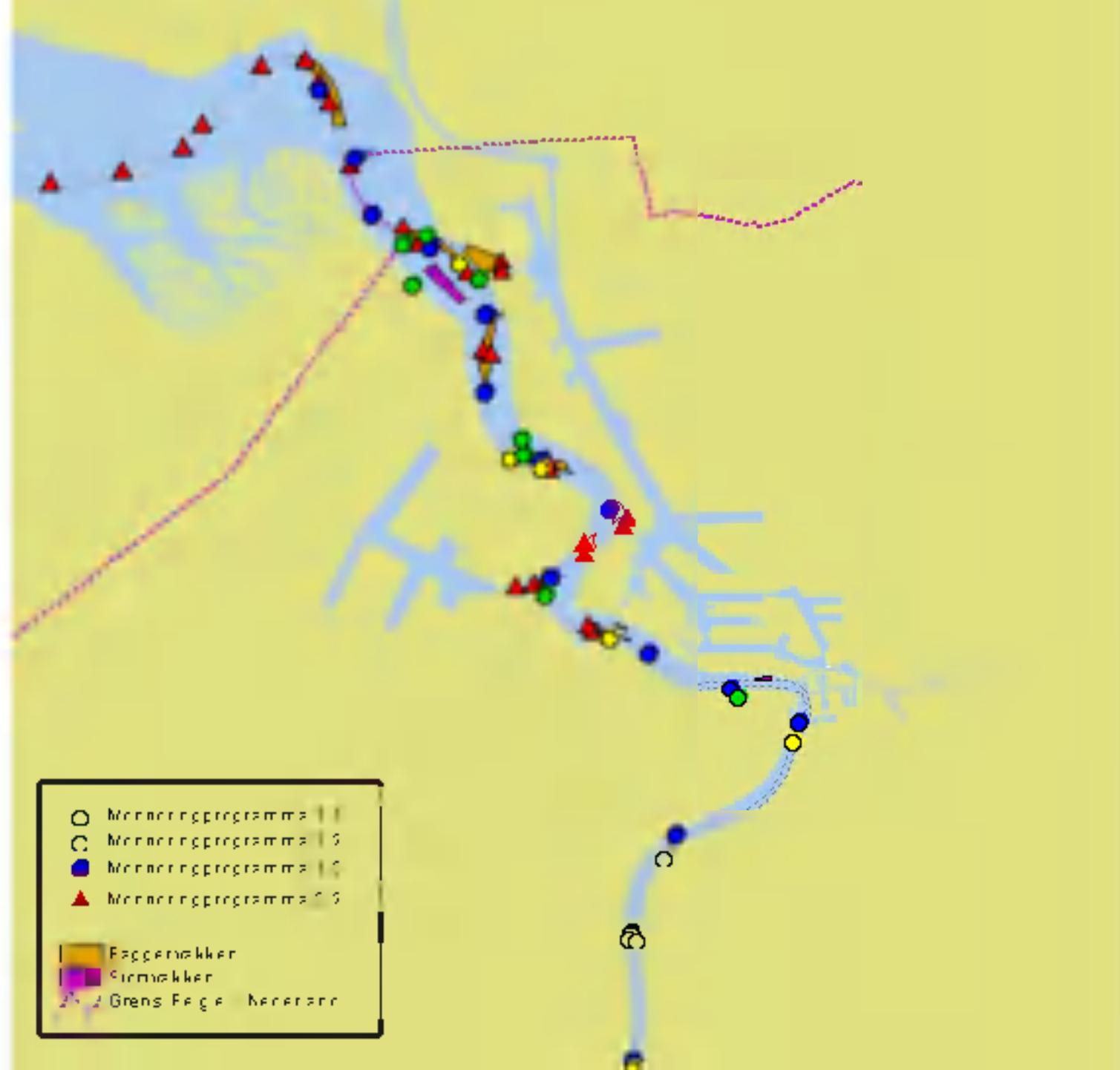
- Monitoring of the dredging sites: 2 x a year
- Follow up of the dredging and dumping activities (activity reports)
- extensive monitoring programme: yearly programme report

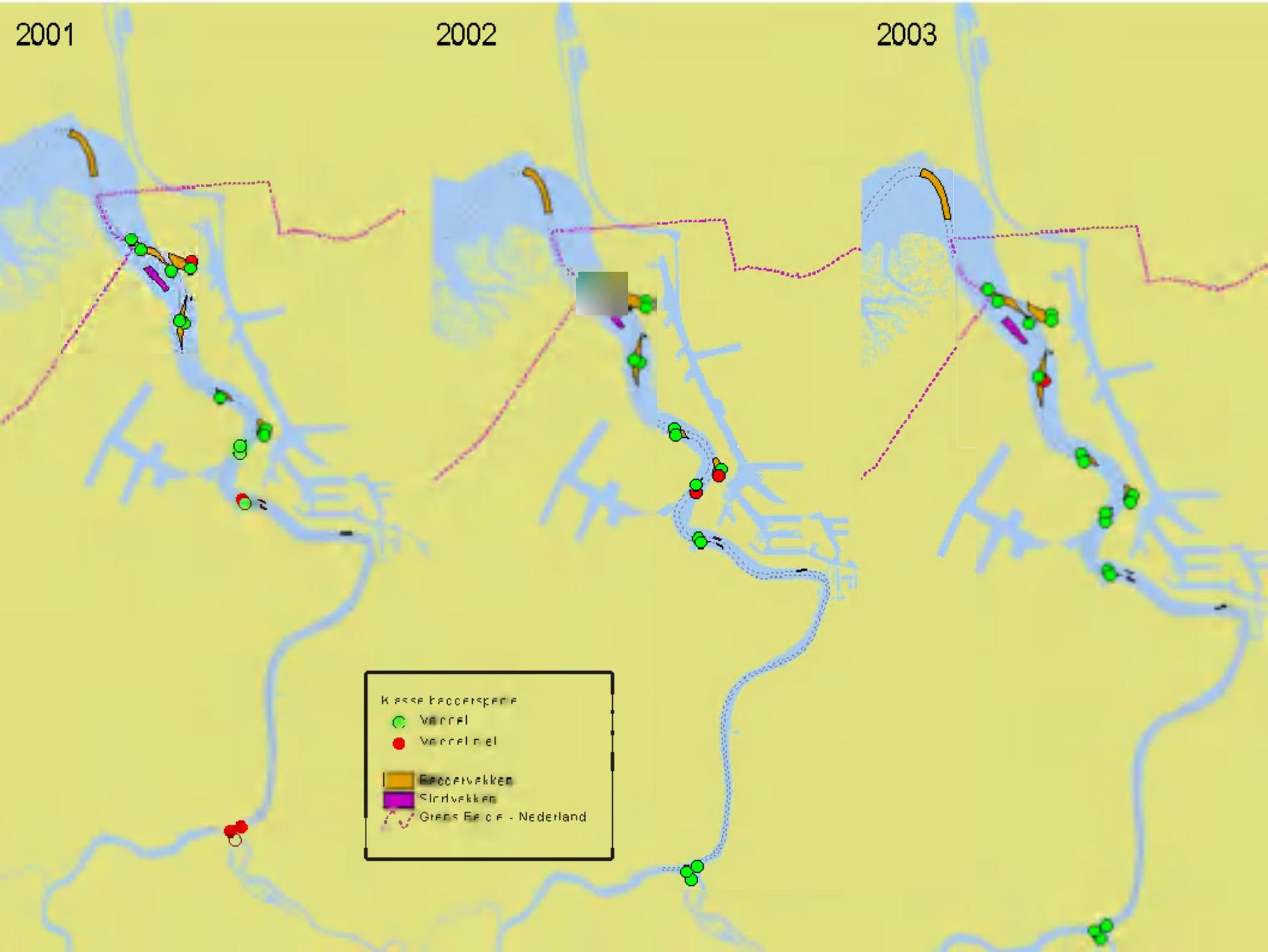
# Monitoring Water

- 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?





# 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 dealt with in an integrated way:different initiatives (Eur.Framework Directive, LTV, B&H dir. ...)
- has an internat. dimension (OSPAR, ...)
- implicates high efforts