



# Ecological characterisation of sediments (Flanders)

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Flemish Environment Agency

- Definitions, research & milestones
- Monitoring Quality Network: why – how
- Triad-approach
- D-base – Geoview – mapping
- SQC

# Belgium and Flanders in Europe

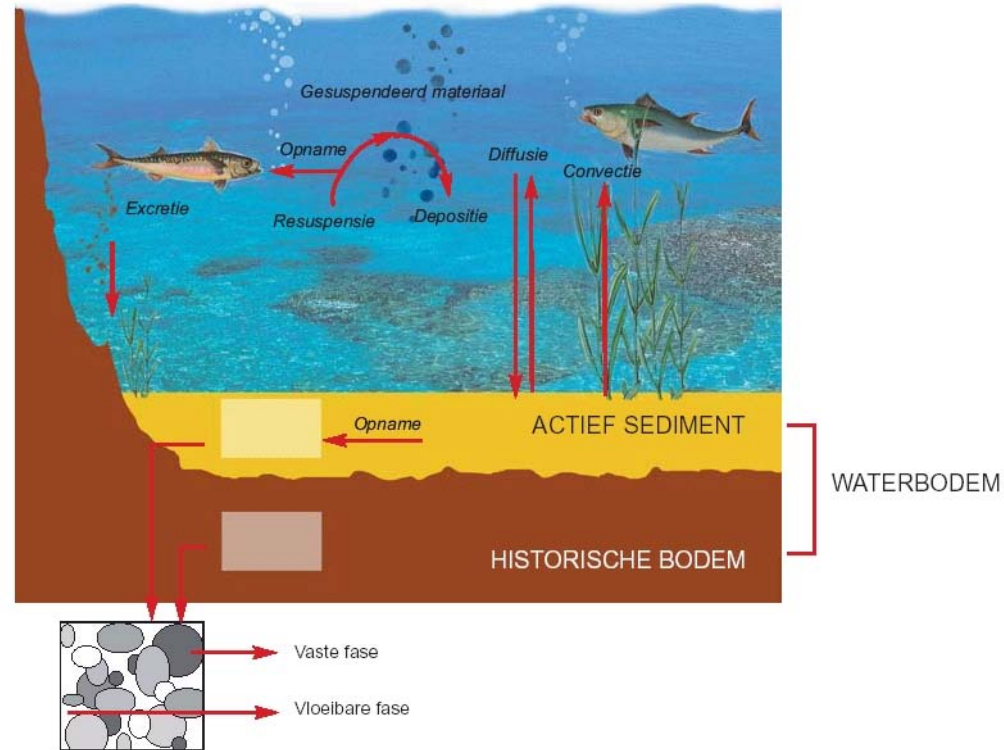


## Organisation chart



# Definitions sediment

- **Natural sediment:**
  - part of aquatic ecosystem underneath sedimentlayer, or the ecological soil of the region (sand, clay, loam)
- **Sediment (active layer):**
  - disposed suspended sediments (sedimentlayer).



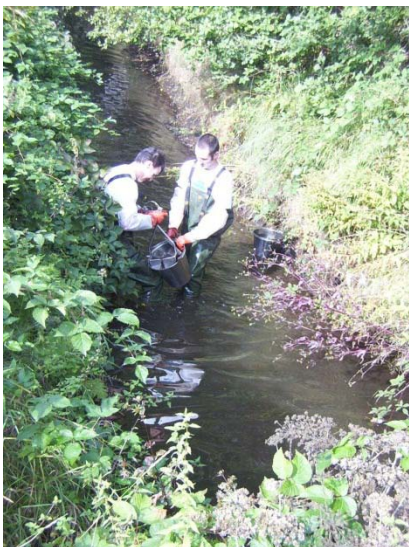
# Milestones of the last 17 years



# Why monitoring??

- Collecting abiotic and biotic information of the aquatic ecosystem
- Sediment quality/quantity inventory with respect to
  - integrated water management
  - sediment policy
  - international reporting of sediment quality
- Reporting sediment quality/Quantity (on maps)
- Assessment changes before and after dredging programs
- Evaluation environmental policy

# Sediment quality/quantity inventory Sampling



- **Van Veen grab sampler (2 liter/6 liter)**
- **Zig zag sampling in 50 meter zones or stratified ad random sampling**
- **20-70 subsamples**
- **Mixed sample : ~40 à 50 liter**









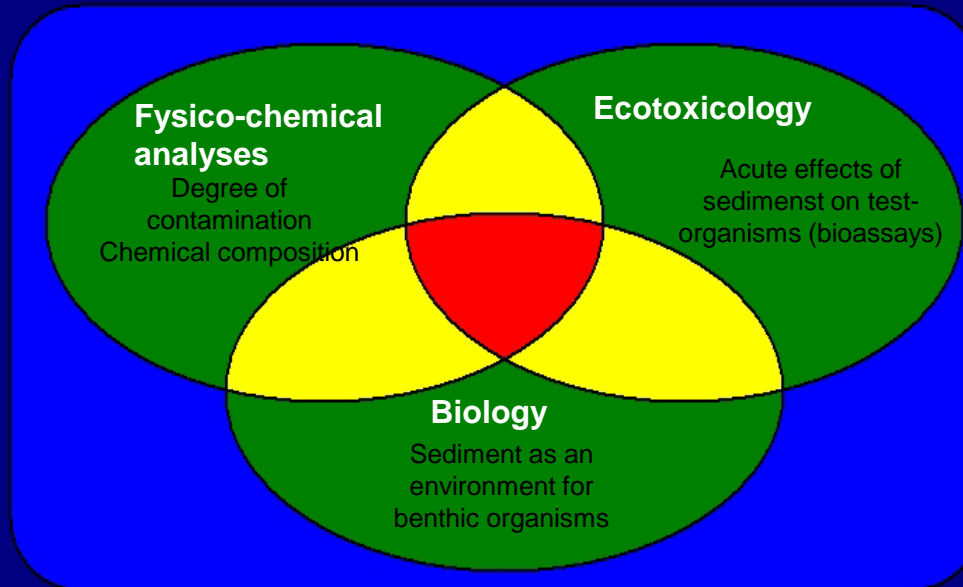
- Fysico-chemical analyses
  - chemical content
  - but: bioavailability or effects
- Ecotoxicological analyses:
  - effects
  - but: extrapolation to field conditions
- Biological analyses:
  - effects on in situ benthic community
  - but: effects of other ecological factors

# TRIAD-approach

## Fysico-chemical parameters:

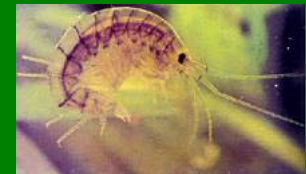
Fractions,  
Organic matter,  
Mineral oil,  
Heavy metals,  
OCP's,  
PAH's,  
PCB's.

## Ecological quality of sediments TRIAD-concept



## Ecotoxicological parameters:

Solid-phase test:  
• *Hyalella azteca*



Liquid-phase test:  
• *Raphidocelis subcapitata*



Liquid-phase test:  
• *Thamnocephalus platyurus*

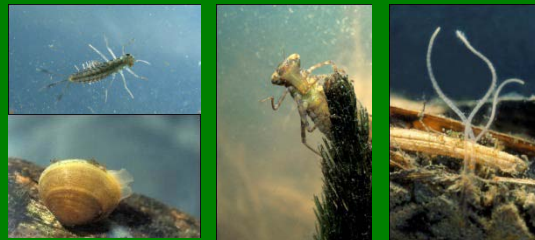


## Biological parameter:

Benthic macro-invertebrates



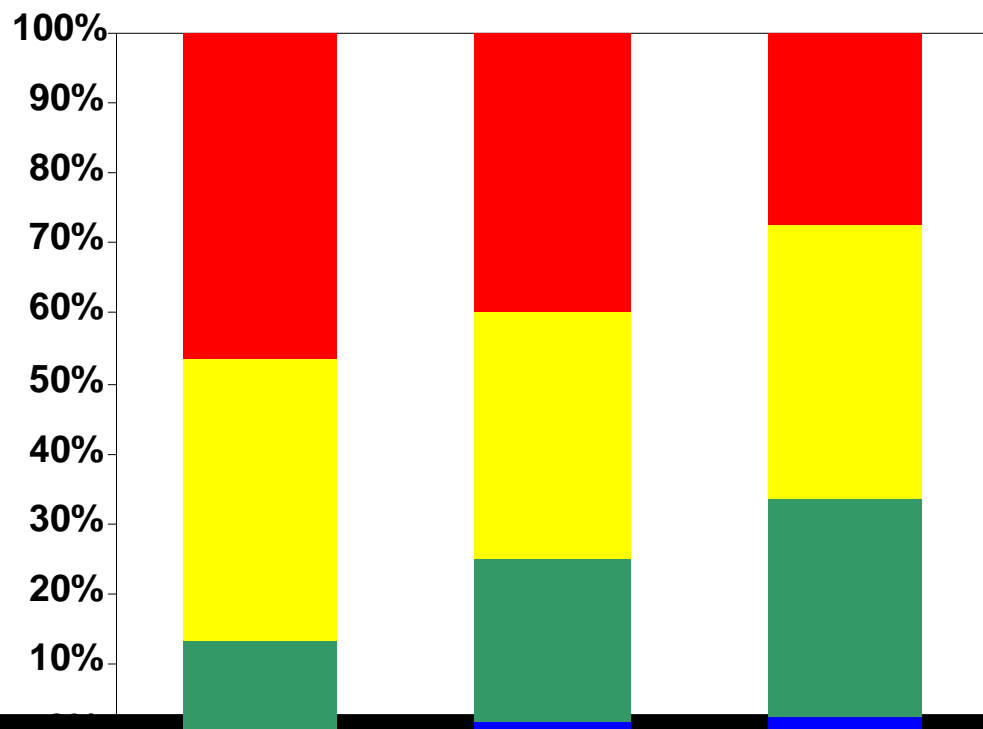
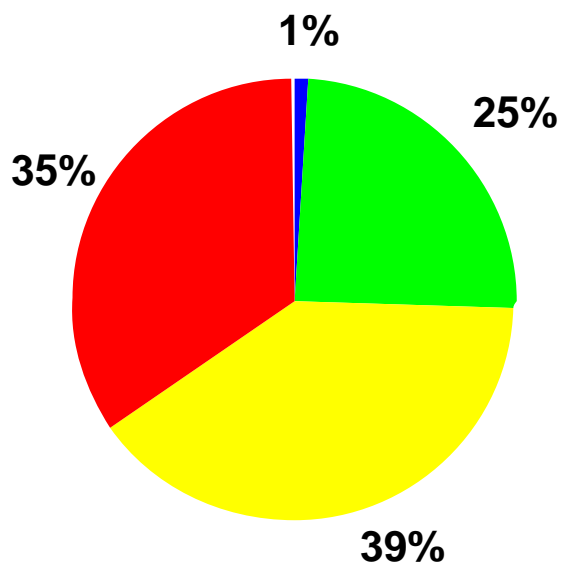
Biotic Sedimentindex (BSI): presence of indicator organisms and taxonomic diversity



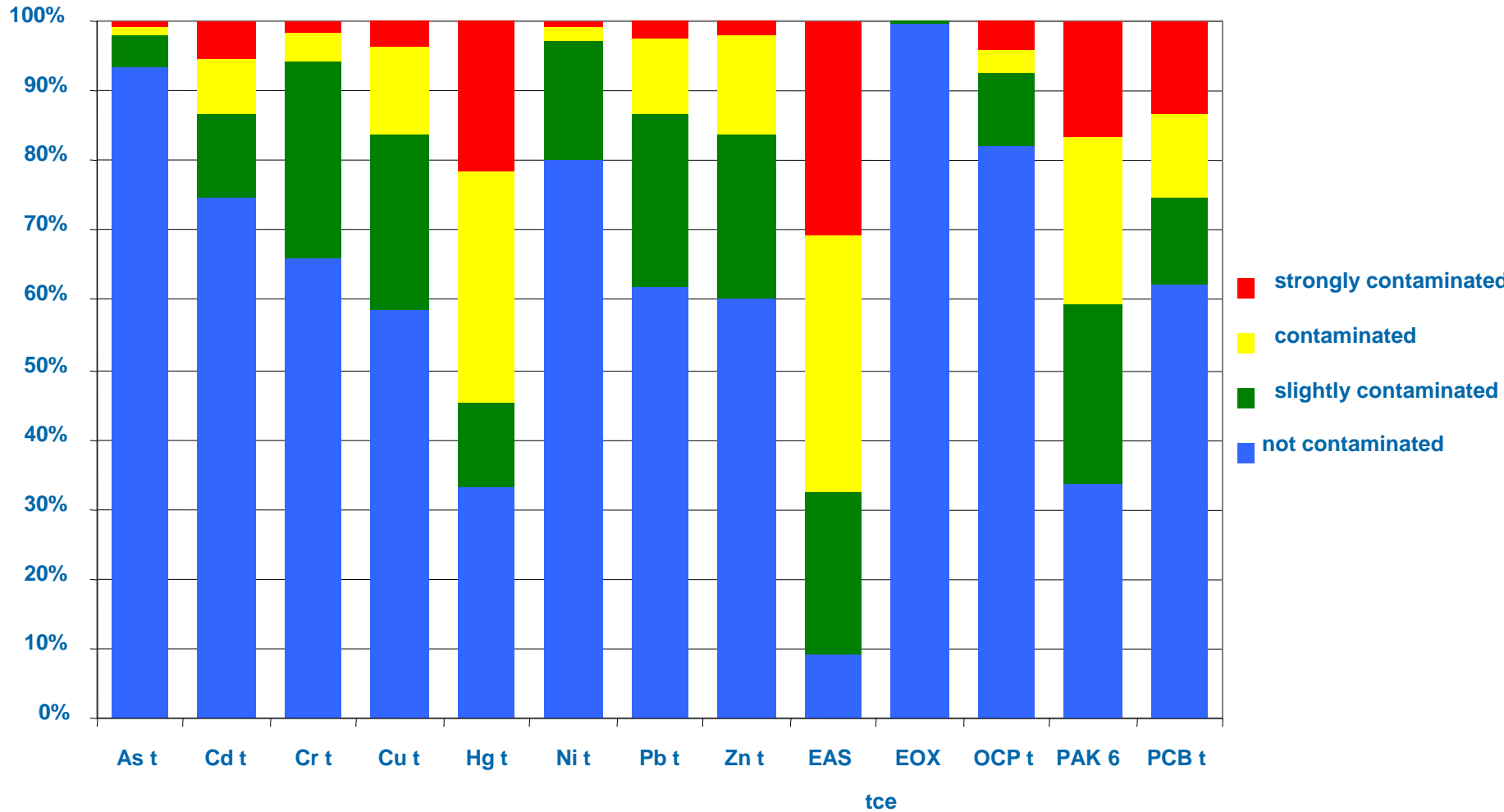
# Ecological characterisation of sediments in Flanders

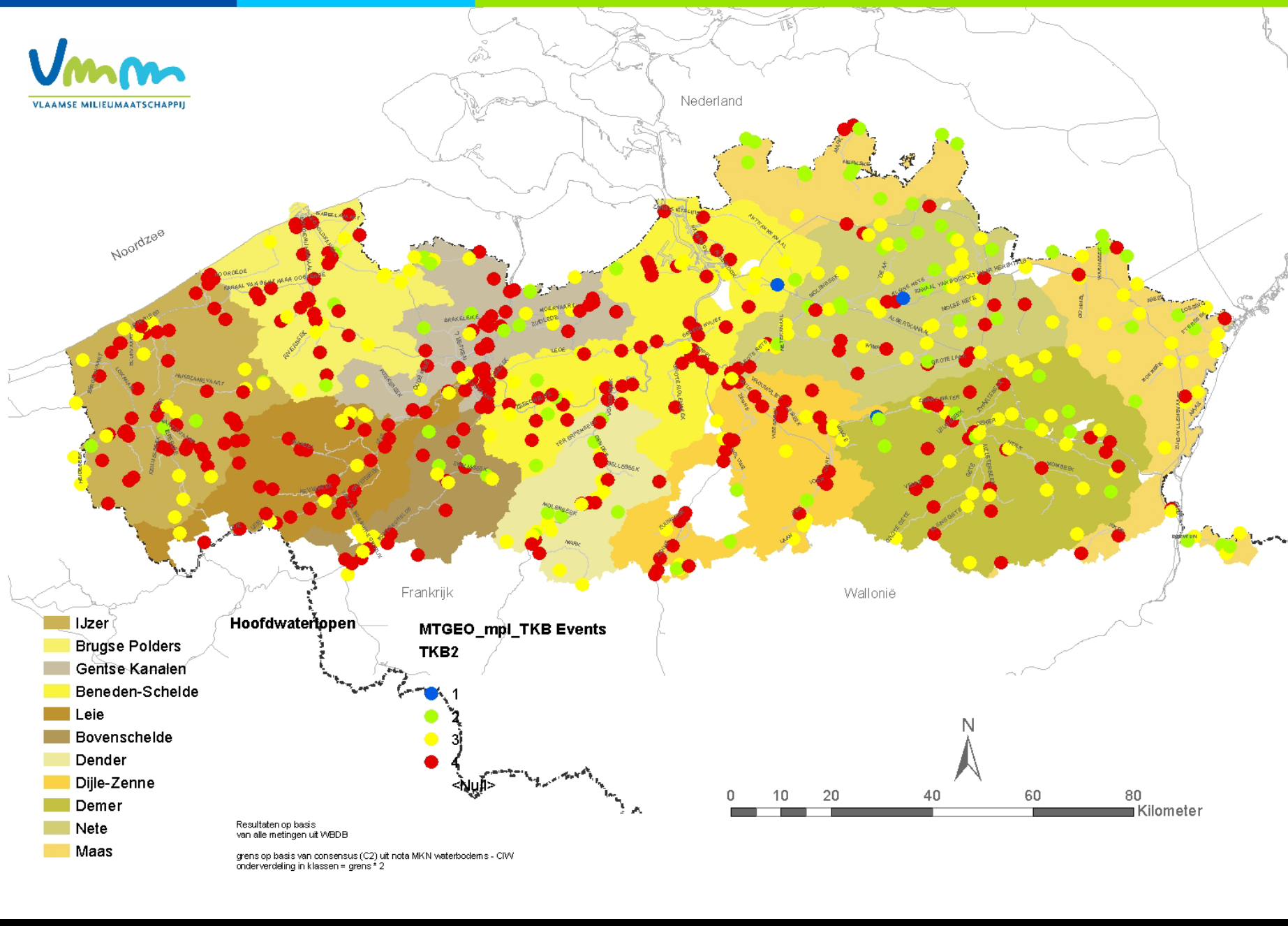
## Integrated results

Triad Assessment of 600 points  
(2006-2009)



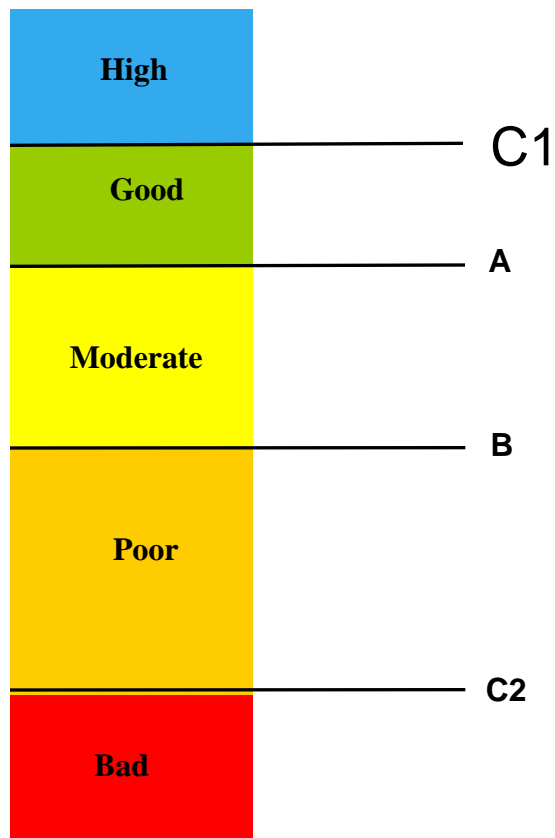
# Fysico-chemical assessment





Resultaten op basis van alle metingen uit WBDB  
 grens op basis van consensus (C2) uit nota MKN waterbodems - CIW  
 onderverdeling in klassen = grens \* 2

# Sediment Quality Criteria

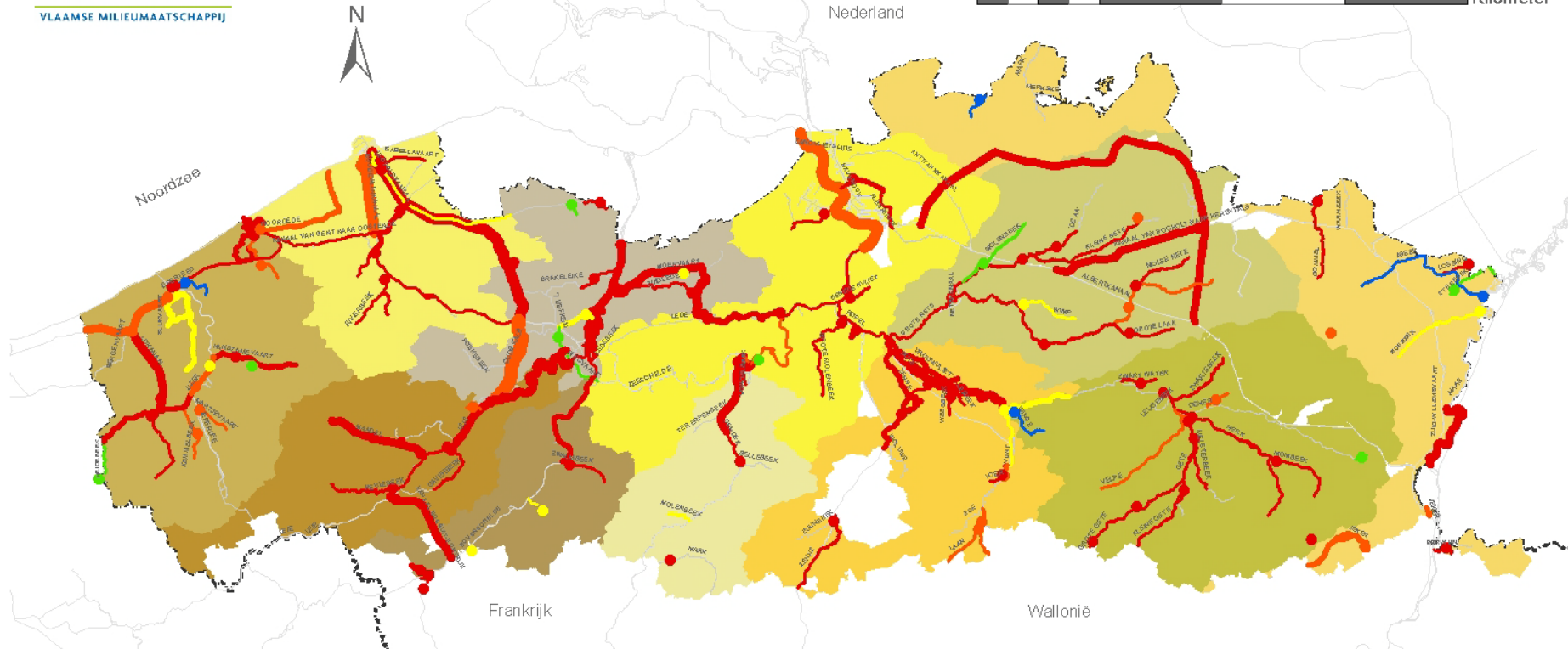


## Consensus between:

biological abundances  
(LEL and SEL)

ecotoxicological thresholds  
(TEL and PEL)





**Hoofdwaterlopen**  
**MT\_Maxklas\_OWL\_Qn Events**  
**MaxVanklasse**

- 1
- 2
- 3
- 4
- 5

**OWL\_CIW\_VHA**

**MT\_Maxklas\_OWL\_Qn\_Features.Qn**

- 1**
- 6,450000 - 1869,000000
  - 1992,000000 - 5508,000000
  - 7192,000000 - 14814,800000
  - 16000,000000 - 29600,000000
  - 406440,000000 - 480240,000000
- 2**
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  - 1992,000000 - 5508,000000

- 3**
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- IJzer
- Brugse Polders
- Gentse Kanalen
- Beneden-Schelde
- Leie
- Bovenschelde
- Dender
- Dijle-Zenne
- Demer
- Nete
- Maas



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