Sediment quality guidelines in Belgium: approach and implementation

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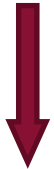
SEDNET Conference - 2017

Background

Legislation concerning obligations related to sediment contamination is currently written

Step 1: list of 'risk activities'

Step 2: chemical characterization
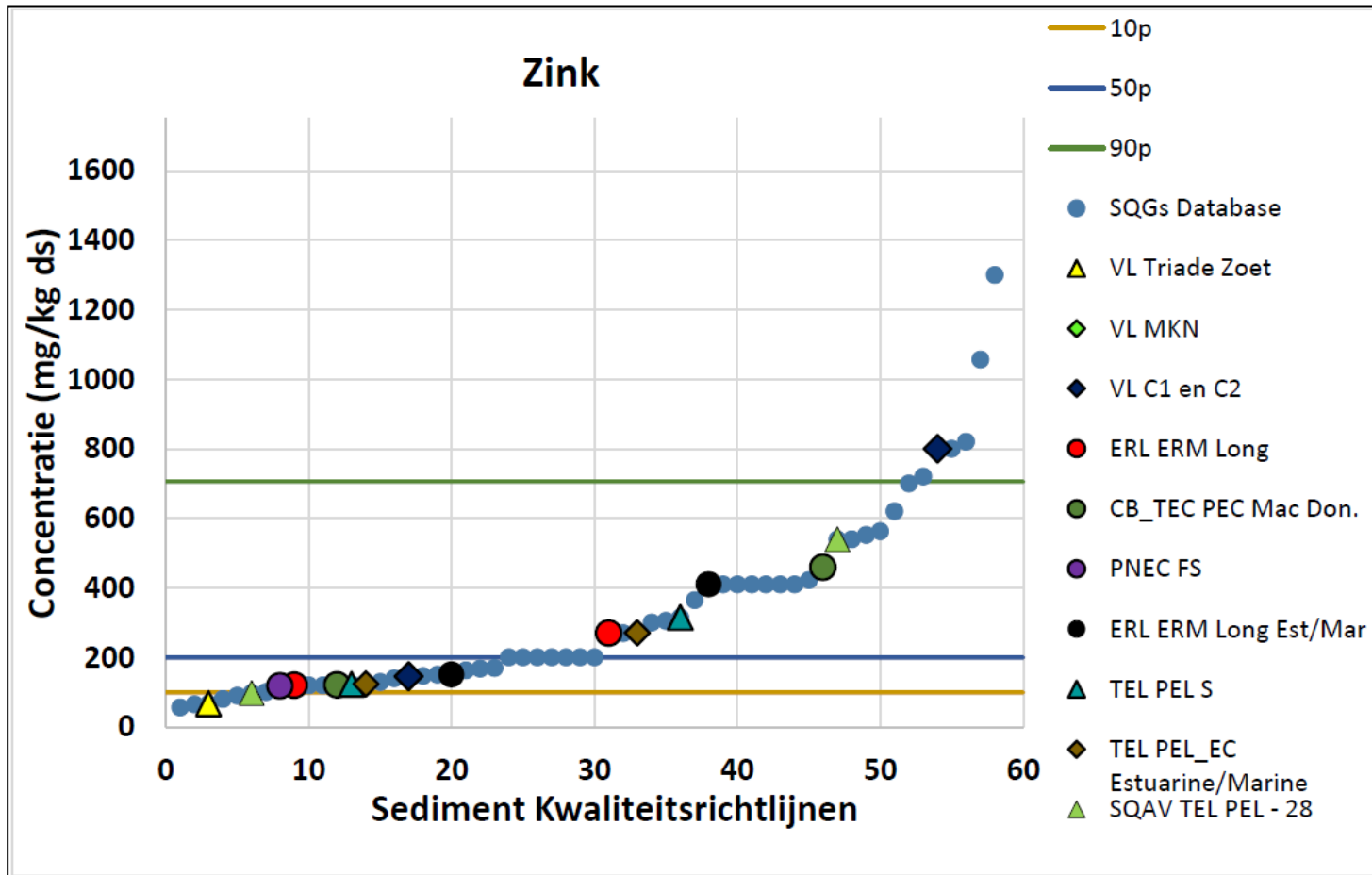
Sediment Quality Guidelines

Step 3: integrated risk assessment

Need for SQG - screening values – to decide if the integrated risk assessment should be performed
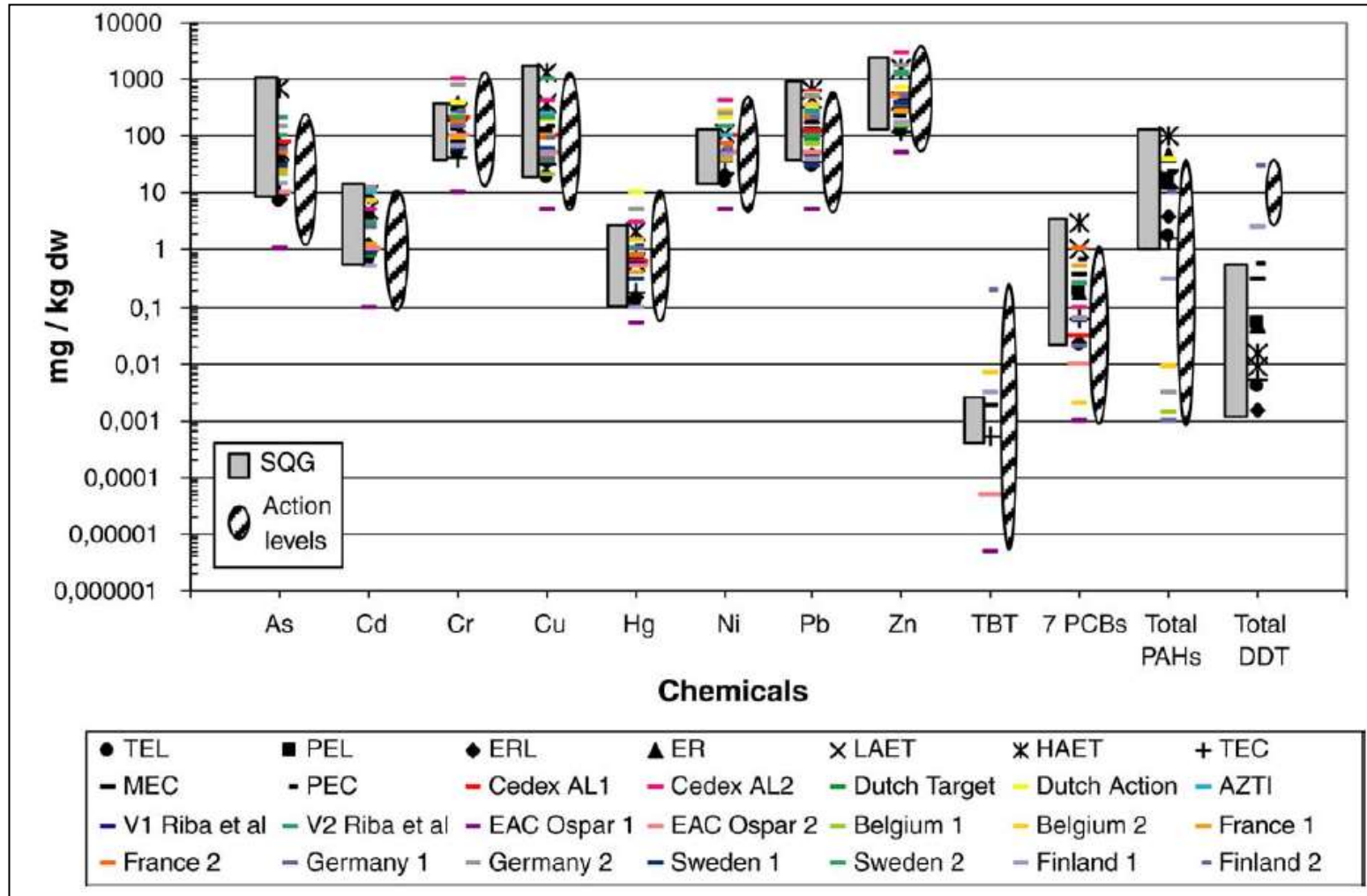
SQG around the world

Loads of papers, regulatory documents, books on SQG are existing ➡ *can we recycle these existing values?*

SQG around the world

Large variation

DelValls et al. 2004

SQG around the world

Very different approaches

Concentrations deviating from natural background

Effect based

Biological

Ecotoxicological

Lab

Field

Very different objectives

Further investigation

Reuse

Relocation of dredged sediments

Remediation

Restoring natural values

➡ *Give insight in risk of contaminants in aquatic ecosystems*

SQG around the world

Large variation – approaches and objectives

➡ *All approaches have pros and cons*

➡ *Going site specific?*

Large database (TRIAD) existing

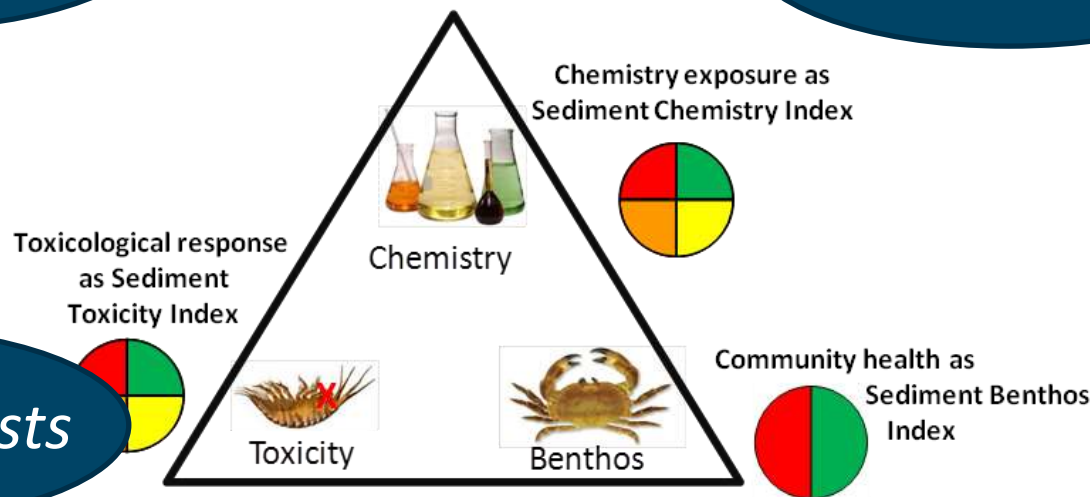*Already used to derive SQG by de Deckere et al. (2011)*

de Deckere et al. (2011)

More chemicals

Data 1995 - 2005

Data 1995 - 2017

Addit. Tox tests

Threshold Effect Level

Probable Effect Level

Lowest Effect Level

Severe Effect Level
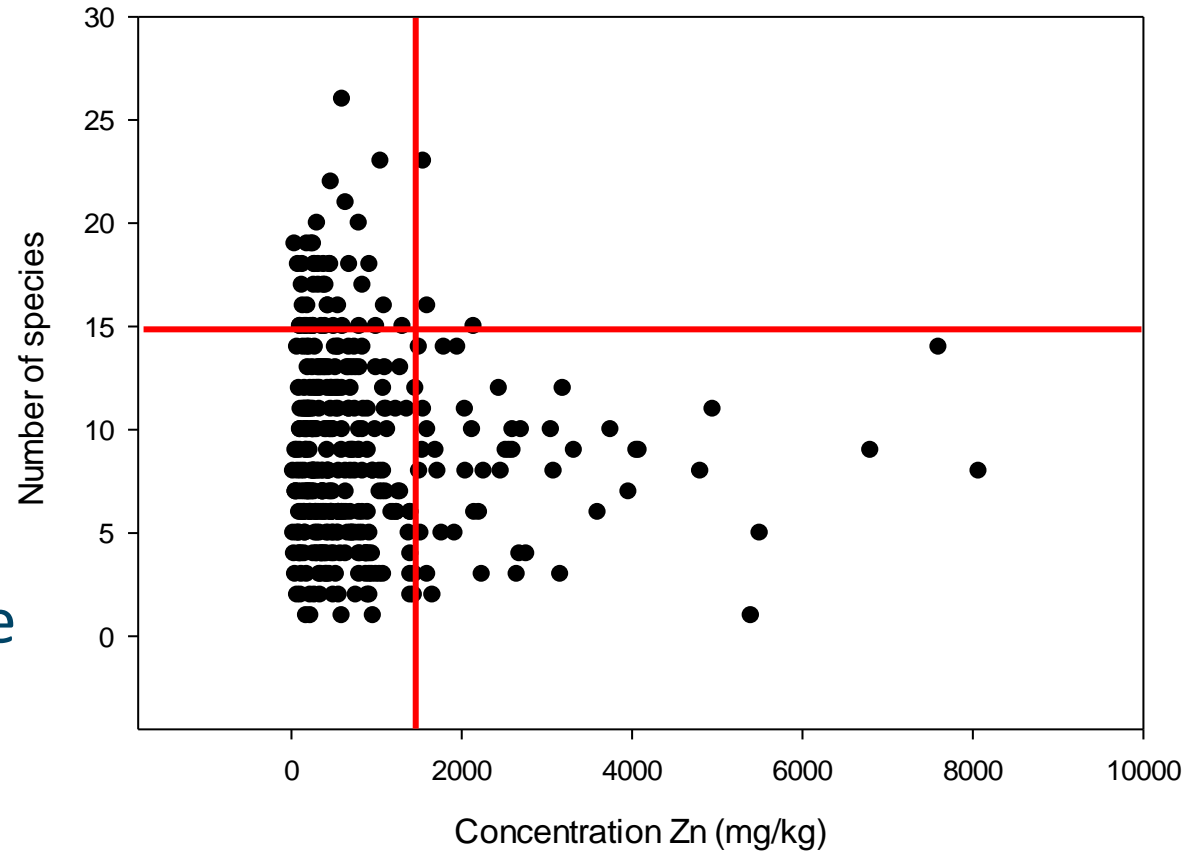
SQG low (Consensus 1) and high (Consensus 2)

➡ *Large database, explore to set new SQG?*

Set the biological – ecotoxicological goals

- Species abundance
- # sensitive species
- Biotic indices
- Mortality
- Growth

Relation benthic species - Zinc concentrations

Relate this to the associated 'maximal' concentration

Dataset + the right choices and calculations

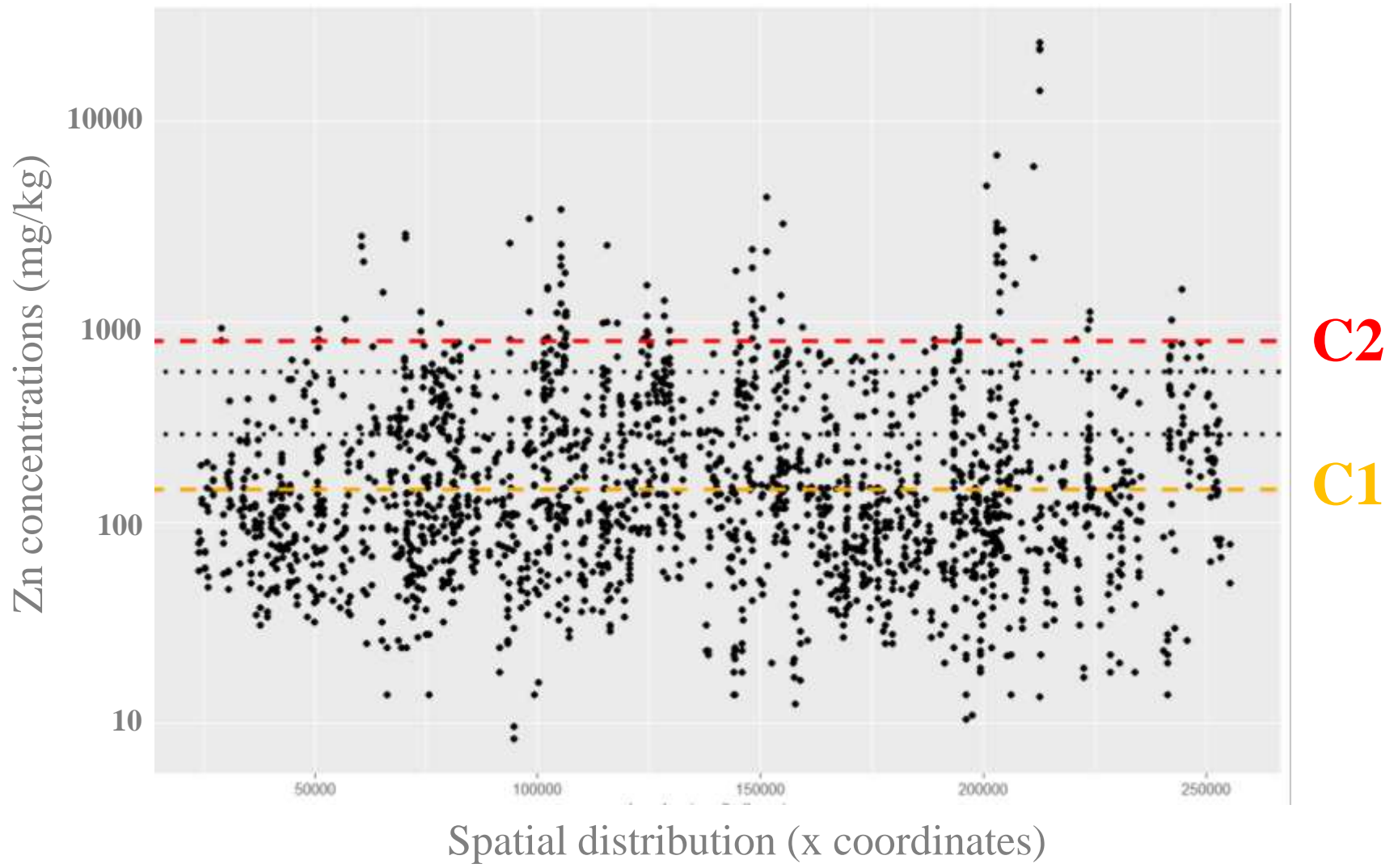➡ *Effect based sediment quality guidelines specifically for Flanders*

SAMEN MAKEN WE
MORGEN MOOIER
OVAM

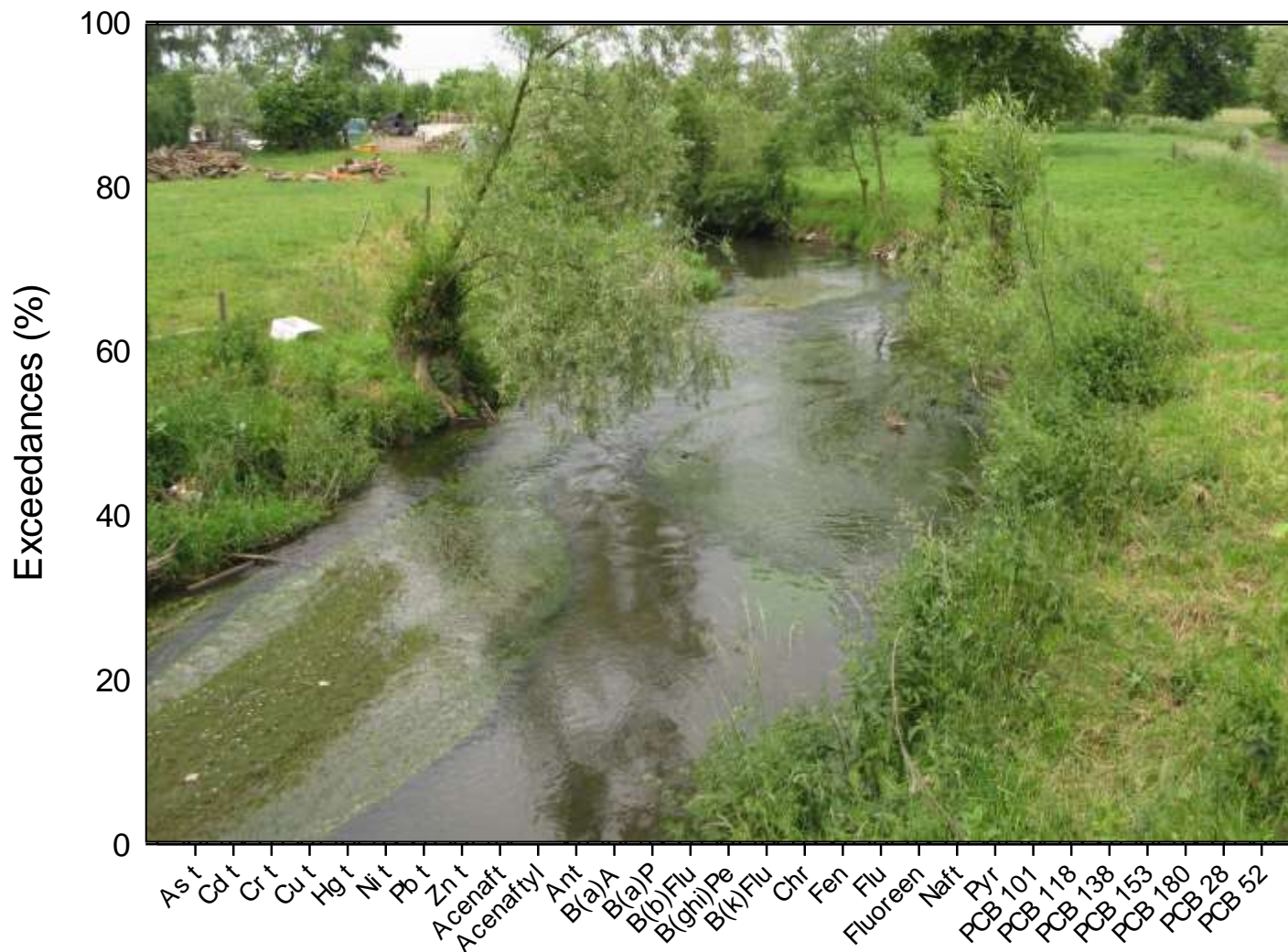*OBJECTIVES*

➡ *Prioritize among contaminated sites*

How realistic are the SQG?

How do the SQG relate to existing concentrations in Flanders?

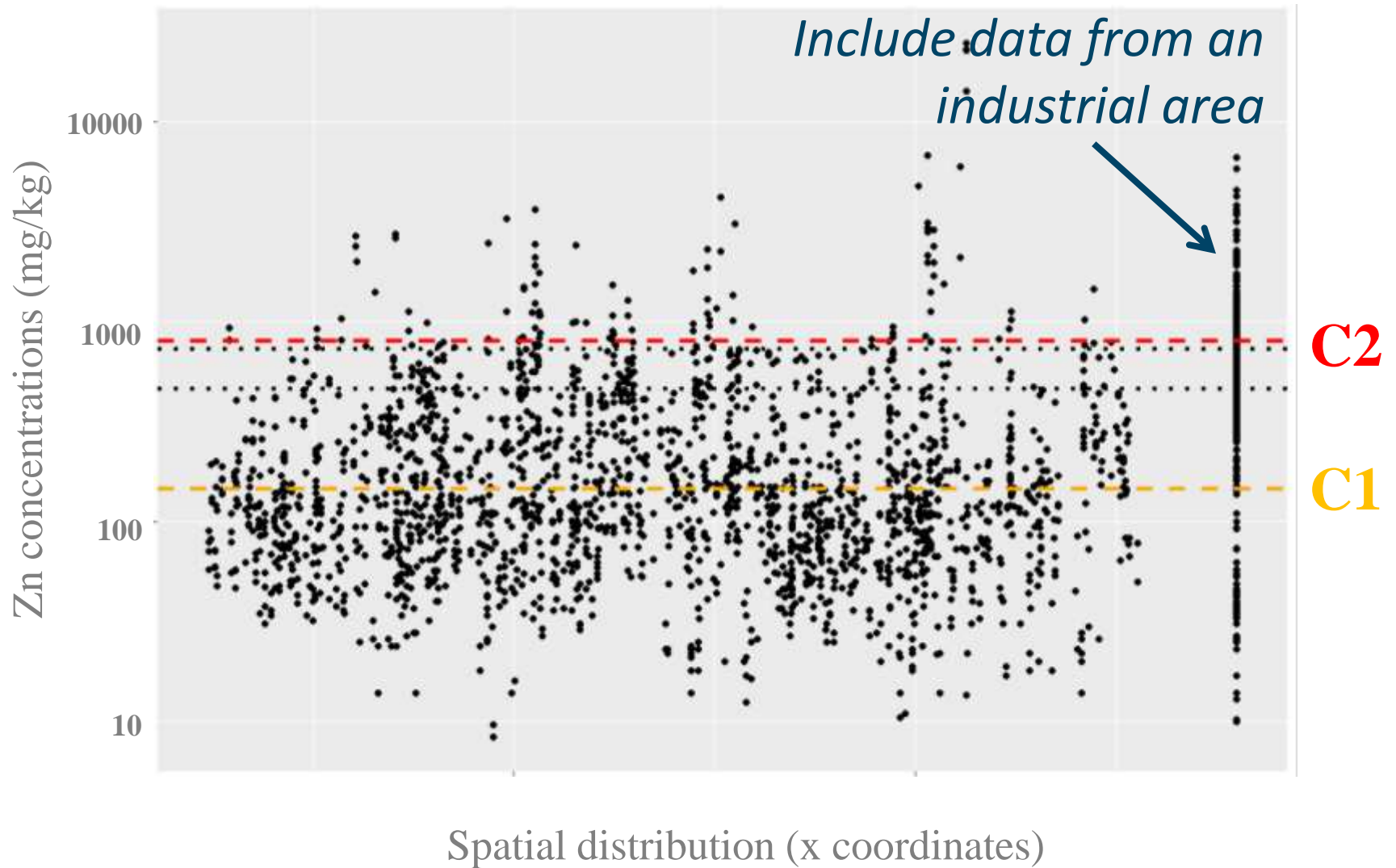Zinc concentrations Sediment Flanders

% of exceedances (C2) in all sites

Exceedances (%) (y-axis: 0, 20, 40, 60, 80, 100)

x-axis labels: As t, Cd t, Cr t, Cu t, Hg t, Ni t, Pb t, Zn t, Acenaft, Acenaftyl, Ant, B(a)A, B(a)P, B(b)Flu, B(ghi)Pe, B(k)Flu, Chr, Fen, Flu, Fluoreen, Naft, Pyr, PCB 101, PCB 118, PCB 138, PCB 153, PCB 180, PCB 28, PCB 52

➡ **29% of all sites exceed for at least 1 substance**

Zinc concentrations Sediment Flanders

Include data from an industrial area

Spatial distribution (x coordinates)

% of exceedances (C2) in all sites

Exceedances (%)

y-axis: 0, 20, 40, 60, 80, 100

x-axis labels: As t, Cd t, Cr t, Cu t, Hg t, Ni t, Pb t, Zn t, Acenaft, Acenaftyl, Ant, B(a)A, B(a)P, B(b)Flu, B(ghi)Pe, B(k)Flu, Chr, Fen, Flu, Fluoreen, Naft, Pyr, PCB 101, PCB 118, PCB 138, PCB 153, PCB 180, PCB 28, PCB 52

➡ 100% of all sites exceed for at least 1 substance

Are the C2 values useful, too conservative?

Sediment Quality guidelines + C2
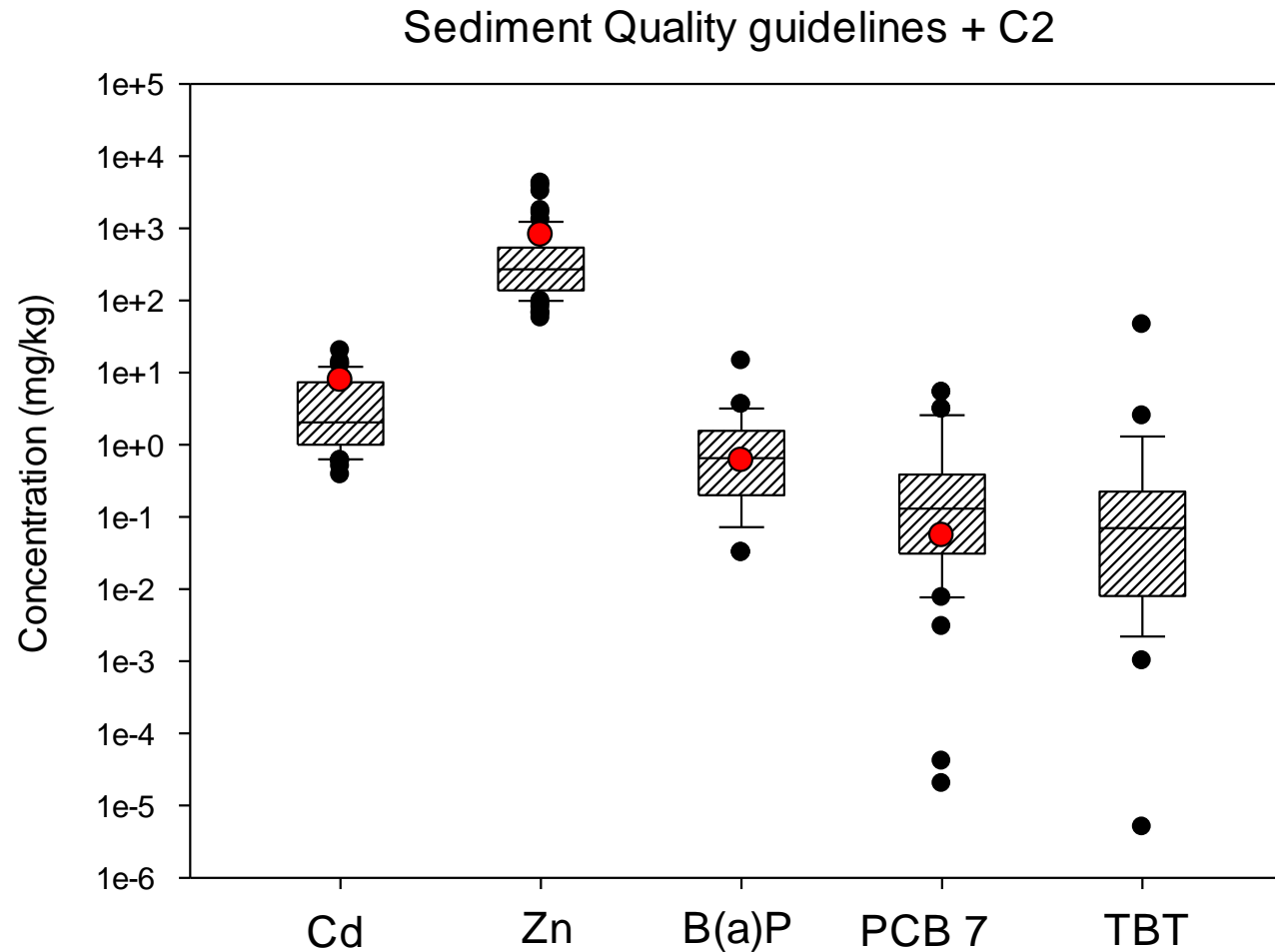
Do we need other SQG or another approach?

Take feasibility into account
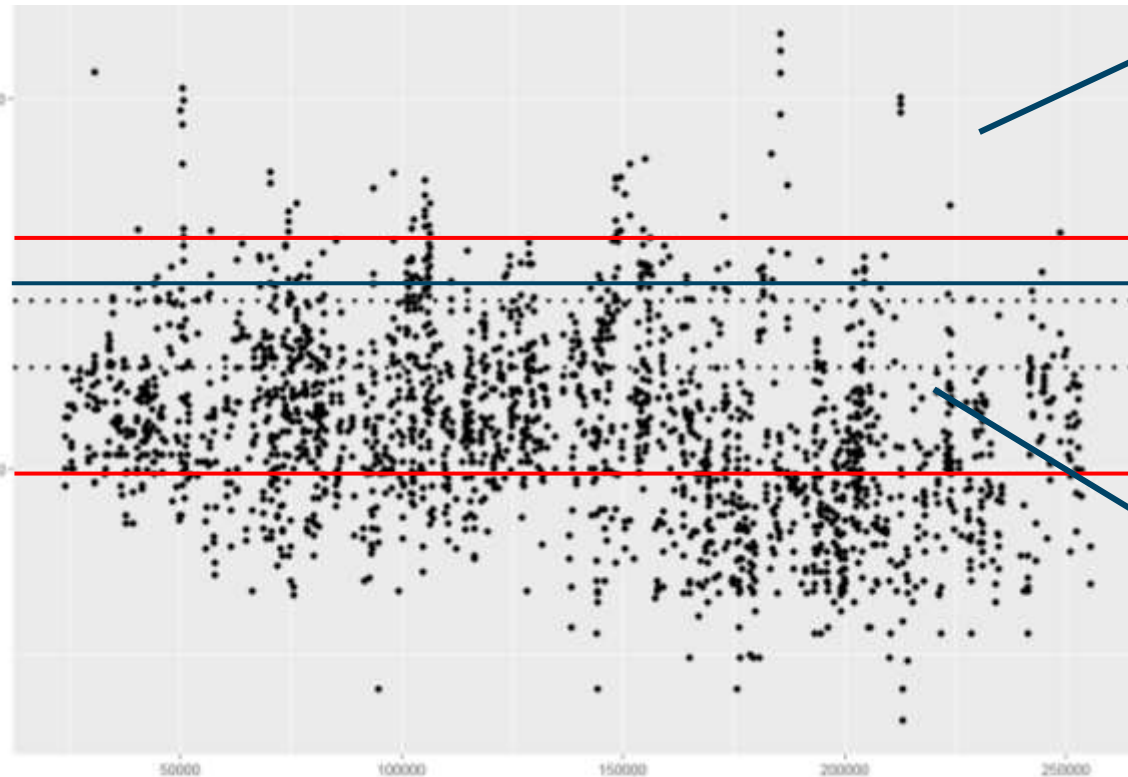
Hotspots

SQG **Urban baseline**

SQG

Levels found in industrialized areas, risk for recontamination

Sediment Quality Guidelines

Science

- **Predictability**
- **Uncertainty**

Policy

- **Prioritization**
- **Cost**
- **Feasibility**

Integrated Risk Assessment

Sediment Risk Assessment

Different lines of evidence

OBJECTIVES

Integrated Risk Assessment

Transport

Sediment – water fluxes

Other sources
Recontamination
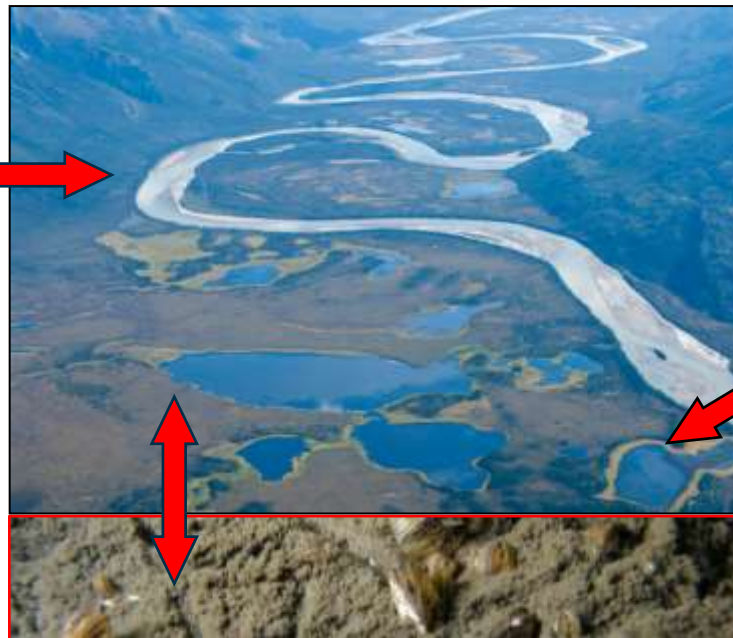
Different lines of evidence

Other factors can be included in prioritizing

OBJECTIVES