

Contaminants of Emerging Concern (CECs) in Lake Mälaren

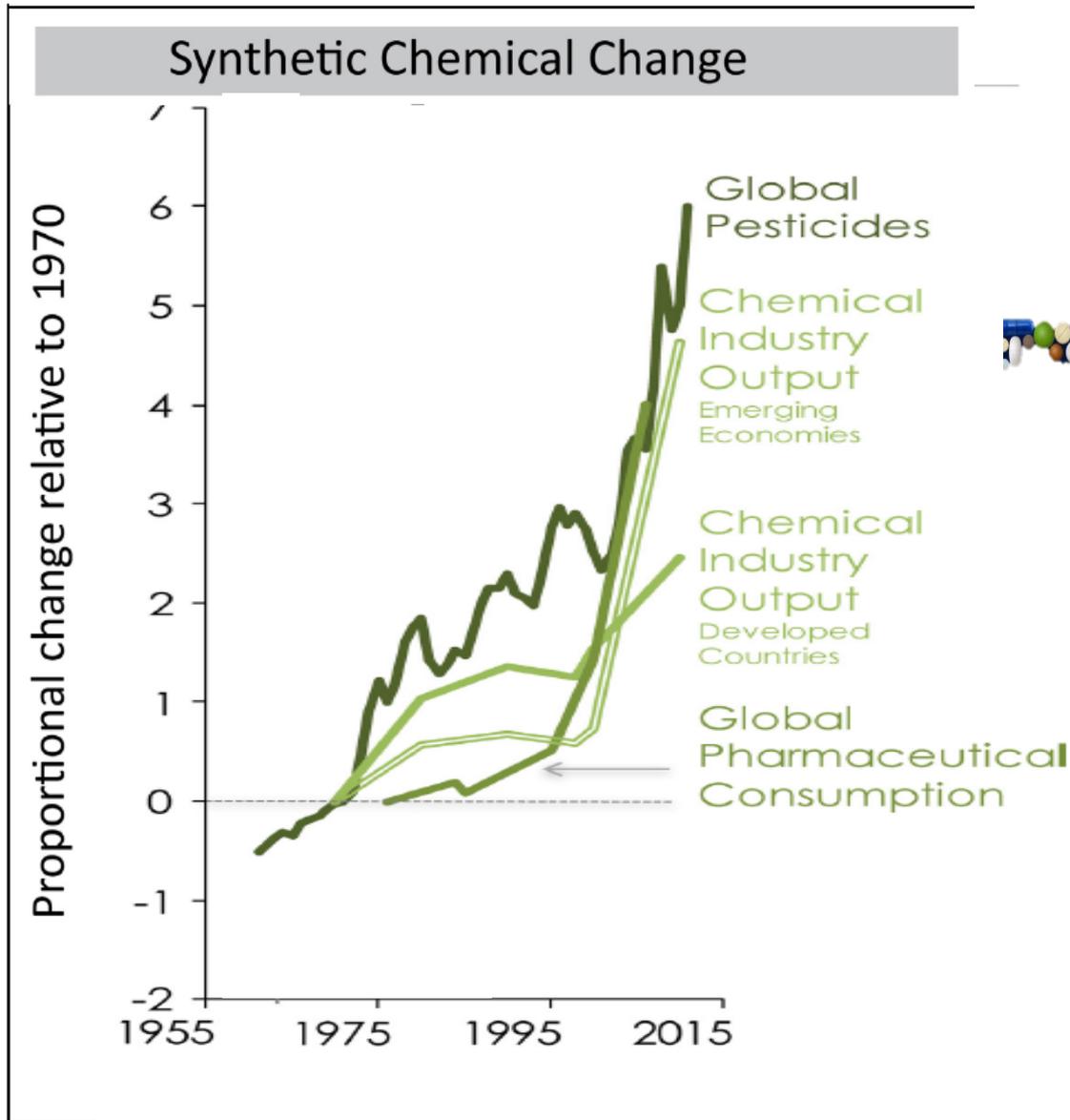
Oksana Golovko, PhD
Associate Professor in Environmental
Chemistry

Department of Aquatic Sciences and Assessment
Swedish University of Agricultural Sciences

Contaminants of Emerging Concern (CECs)

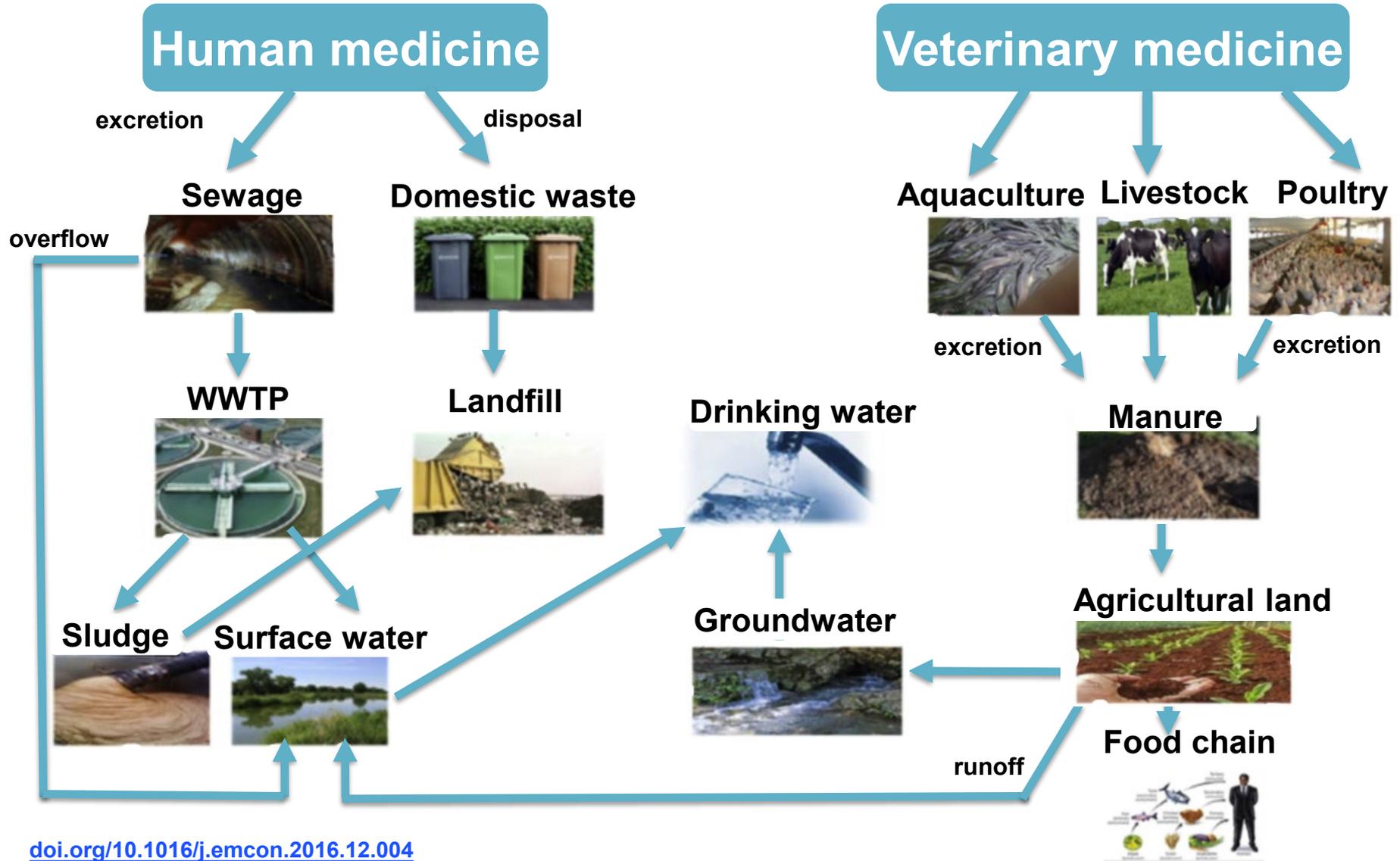


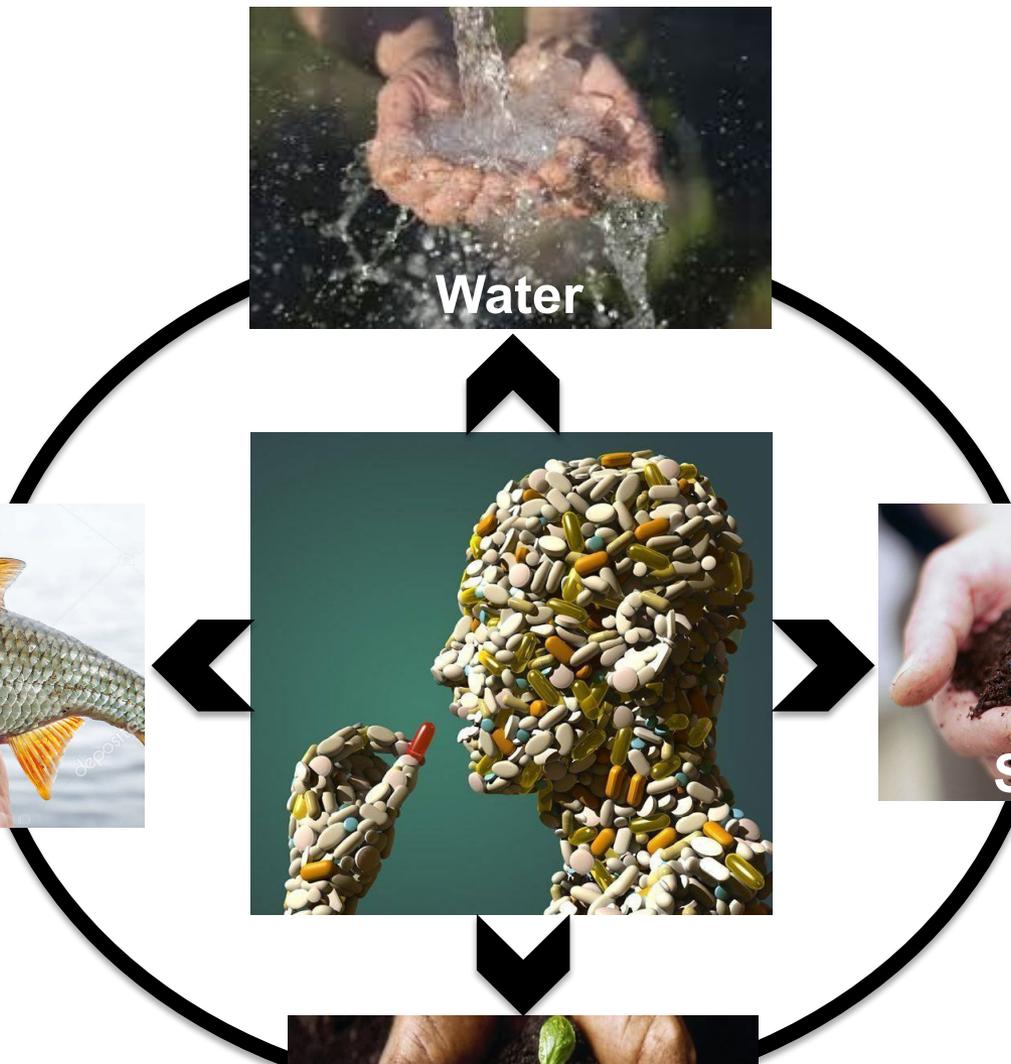
Society and CECs



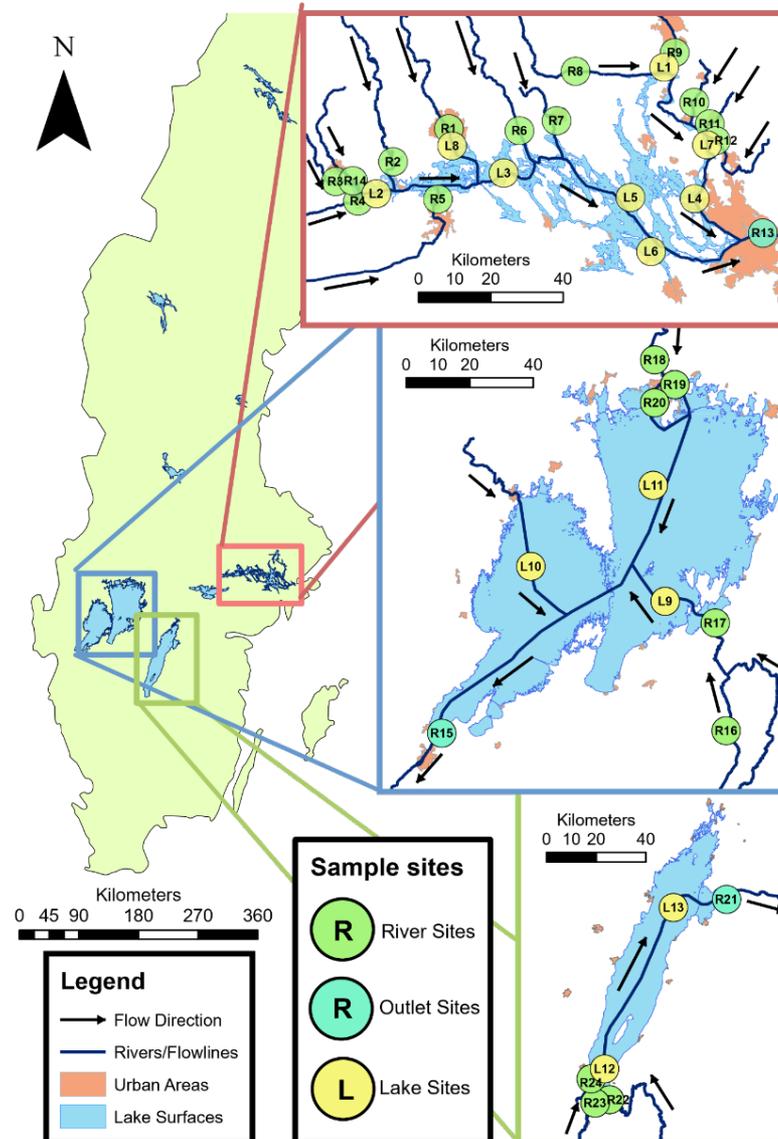
E. S. Bernhardt et al. 2017.
<https://doi.org/10.1002/fee.1450>

Sources of CECs





Occurrence of CECs in the surface water



Occurrence of CECs in rivers

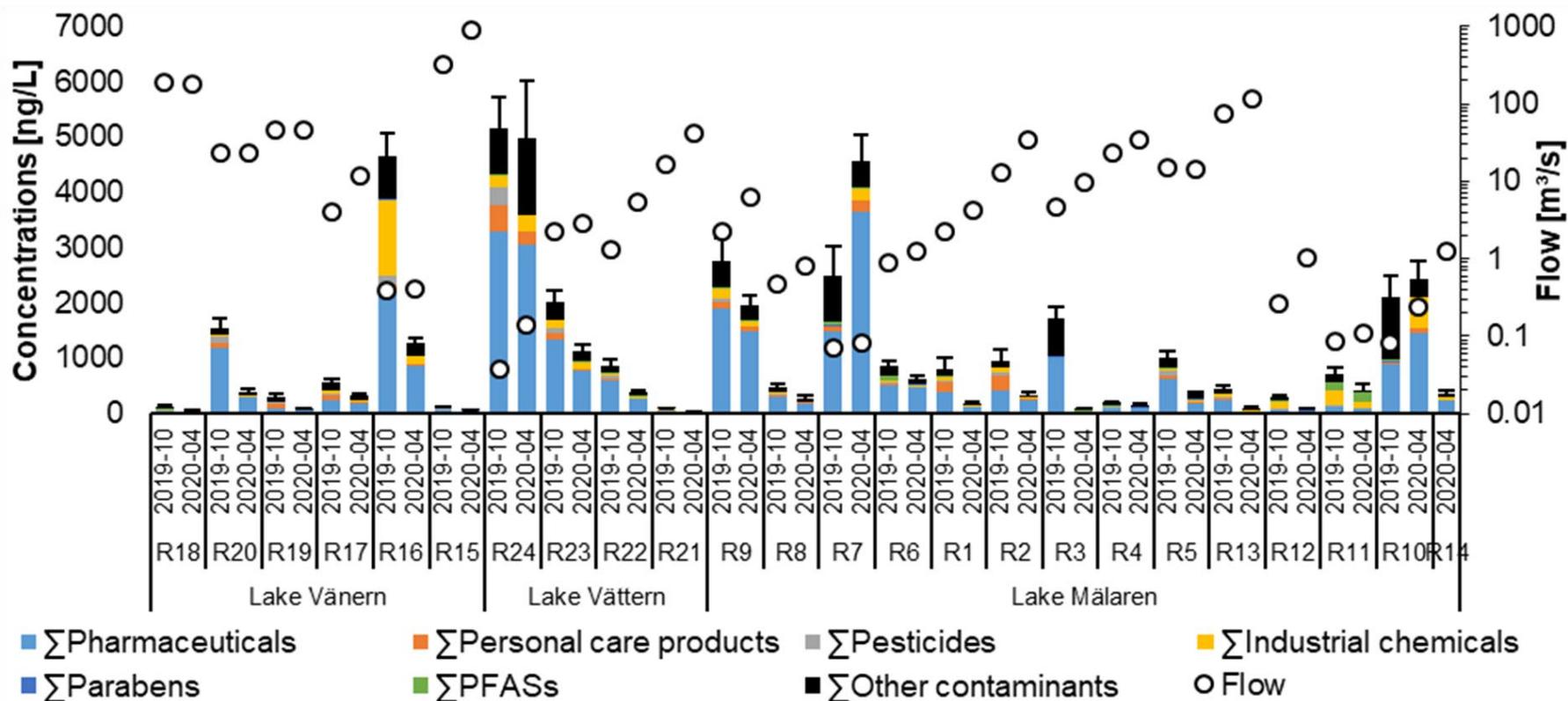


Figure 2. Σ CEC concentrations and river flow rate in river water samples (n=47).

Occurrence of CECs in Lakes

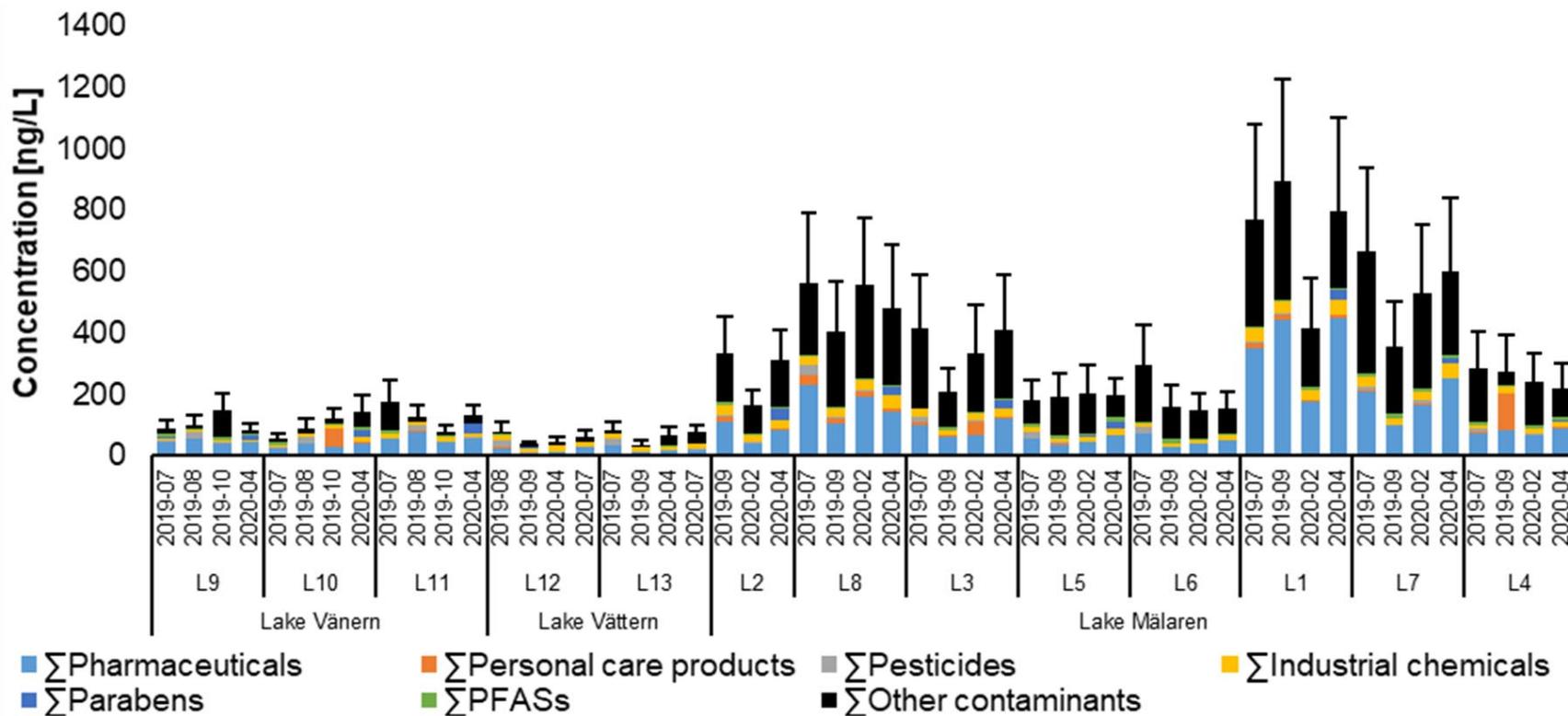


Figure 3. Σ CEC concentrations in lake water samples (n=51).

L1-L8 from Lake Mälaren, samples L9-L11 from Lake Vänern, and samples L12-L13 from Lake Vättern.



ELSEVIER

Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

Chemosphere

journal homepage: www.elsevier.com/locate/chemosphere



Occurrence and mass flows of contaminants of emerging concern (CECs) in Sweden's three largest lakes and associated rivers

Daniel Malnes^a, Lutz Ahrens^{a,**}, Stephan Köhler^{a,b}, Malin Forsberg^a, Oksana Golovko^{a,*}

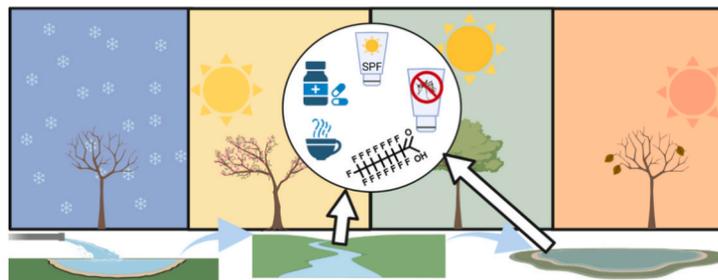
^a Department of Aquatic Sciences and Assessment, Swedish University of Agricultural Sciences (SLU), Uppsala, SE, 750 07, Sweden

^b Uppsala Water and Waste AB, Uppsala, SE, 754 50, Sweden

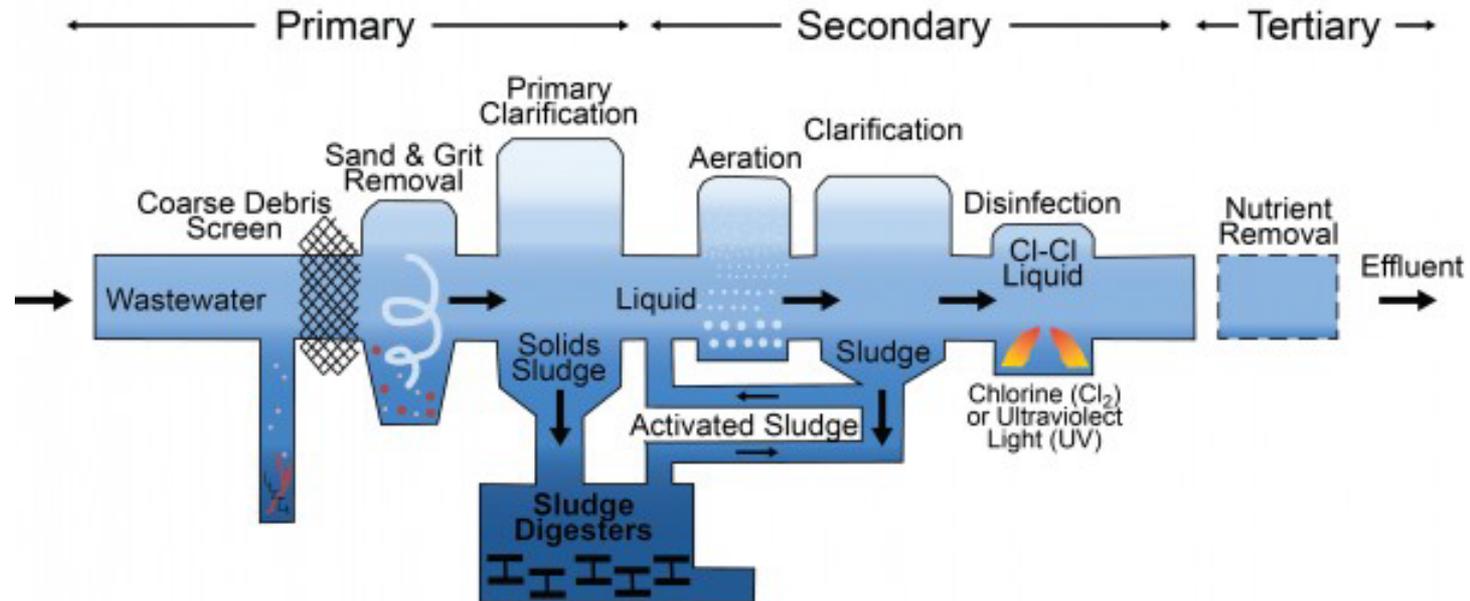
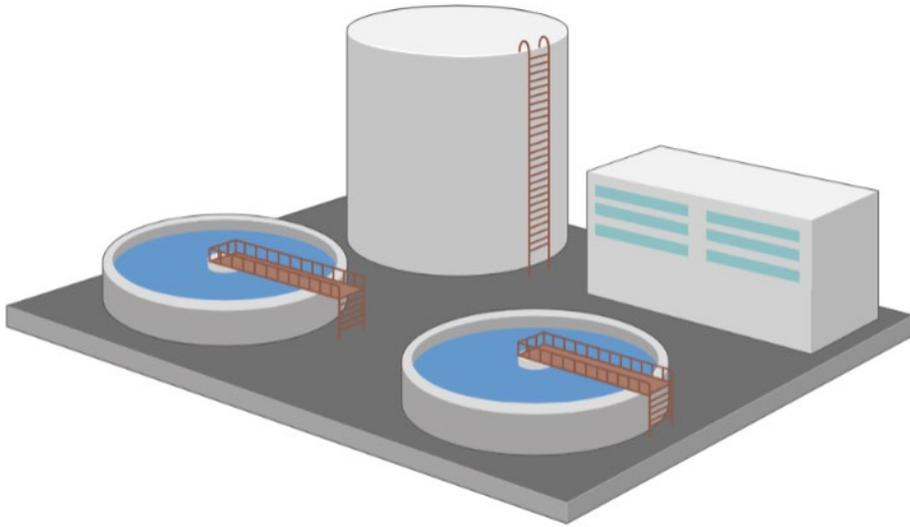
HIGHLIGHTS

- Trace levels of CECs were found at all drinking water source area sites.
- Many CECs showed seasonal changes in concentrations.
- Riverine CEC concentrations were correlated to distance or discharge of WWTPs.
- Rarely investigated CECs were detected with potential PMT properties.

GRAPHICAL ABSTRACT

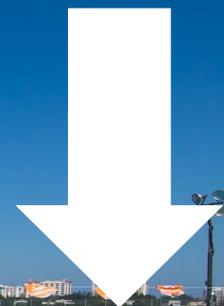


Waste Water Treatment Plant (WWTP)

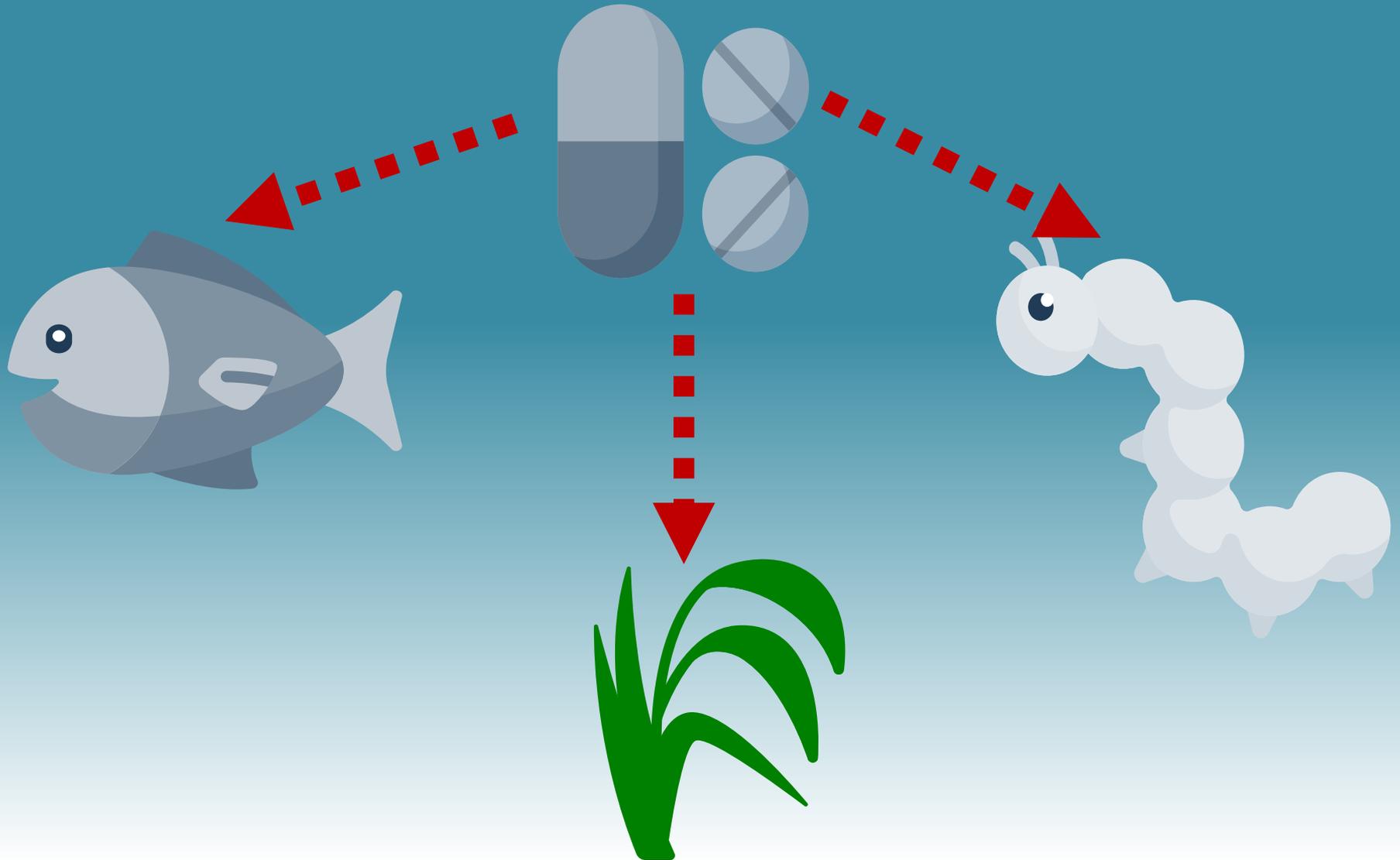


Occurrence of CECs in the aquatic environment

**Concentration of CECs
in surface water = ng/L**



Effects of CECs on organisms



The European Water Framework Directive

Specific WFD Objectives

To protect water-based ecosystems and water-dependent land-based ecosystems, with wetlands being particularly important

To promote sustainable water use and its long-term protection (for drinking water, industry and agriculture)

To reduce or stop the discharge of pollutants to water

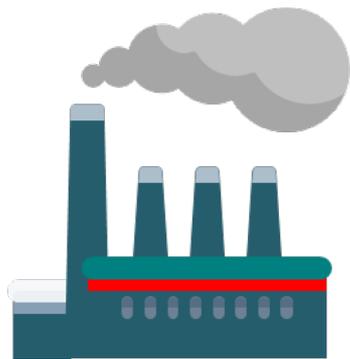
To help mitigate the effects of floods and droughts

TEXTE

126/2019

REACH: Improvement of guidance and methods for the identification and assessment of PMT/vPvM substances

Future prospective



the source(s)

important to identify
the source(s)



map

spatial and temporal
patterns



monitoring data

lack monitoring data
and risk assessments

Take home message



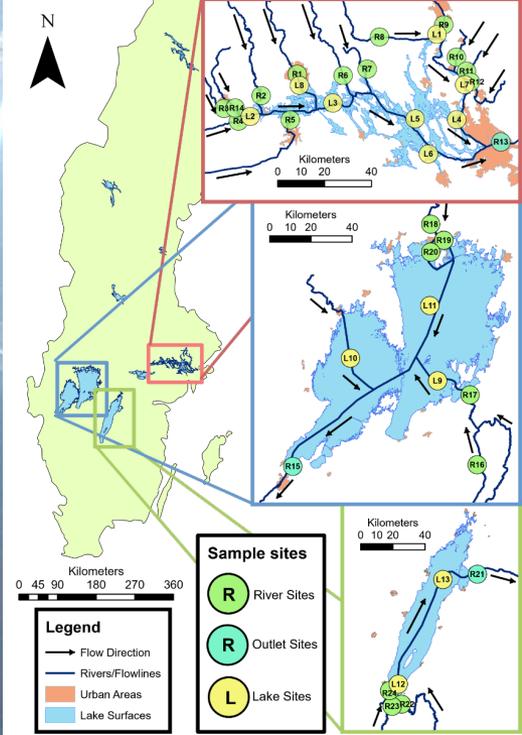
more studies are needed to effectively regulate and evaluate the number of CECs found in environmental matrices



support for programs aiming to reduce CECs emissions to aquatic environments



monitoring work - new CECs are continually being introduced on the market



Thank you for attention