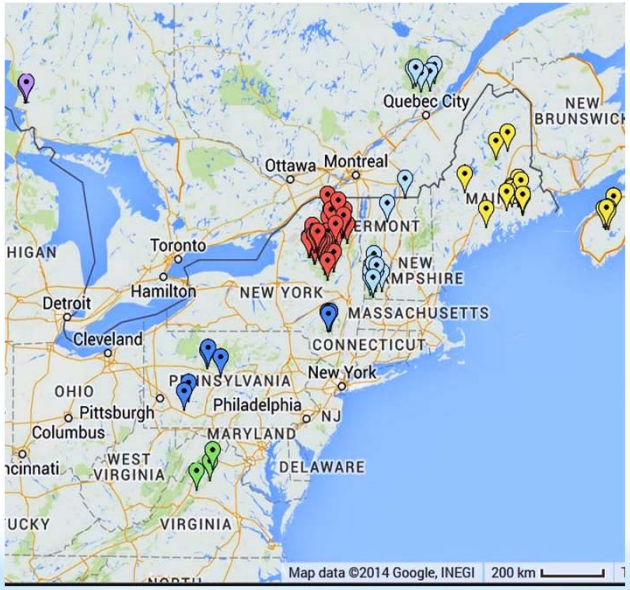
ICP Waters
Long-term monitoring of surface waters

a) the current state, strength and weaknesses
b) How are the data used in modelling?
c) Usefulness in policy context

ICP Waters monitoring network – water chemistry

North America



Europe

Ca 200 active sites (with data)

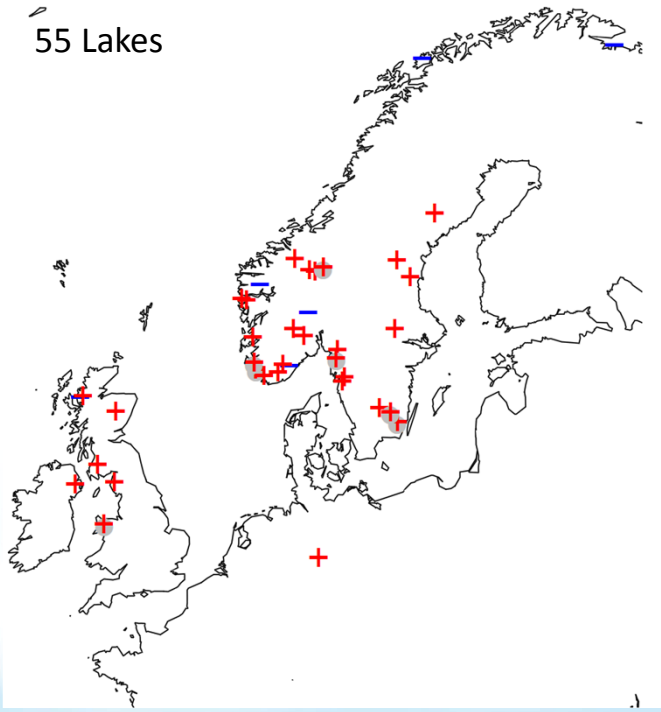
New sites and re-established sites
- Poland, EECCA countries

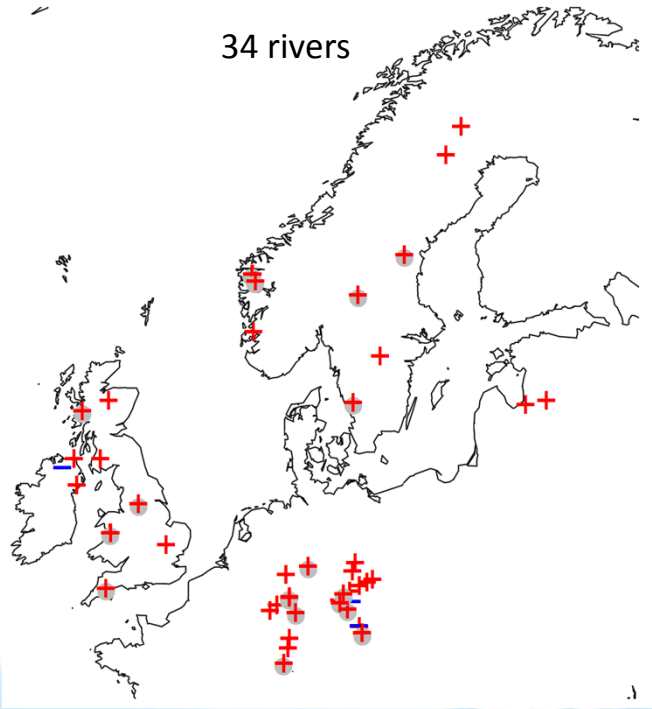
Ca 175 acid-sensitive sites
- 100 in North America
- 75 in Europe

Long-term water chemical records
- Most sites have data from 1990+
- Some sites have data from 1970+
- Some sites started around 2000

Garmo et al 2014 Water Air Soil Poll
ICP Waters report 119/2011

ICP Waters monitoring network - invertebrates



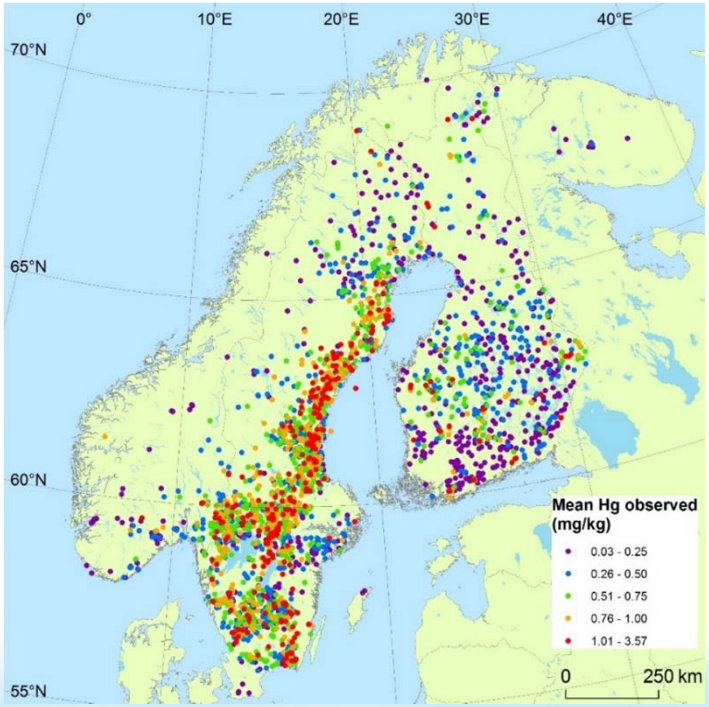


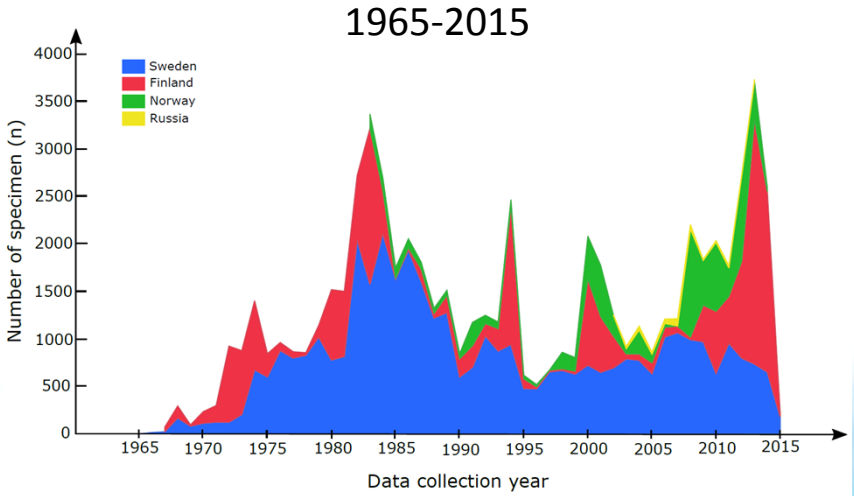
Entire dataset covers 1982-2014

- varying start and end of time series
- Combined with water chemical records

Velle et al., ICP W report 127/2016

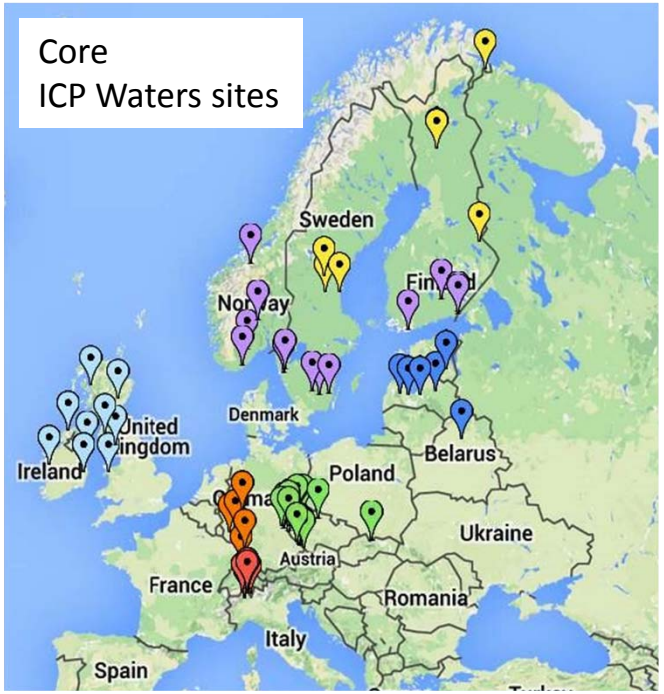
ICP Waters monitoring network – Hg in fish

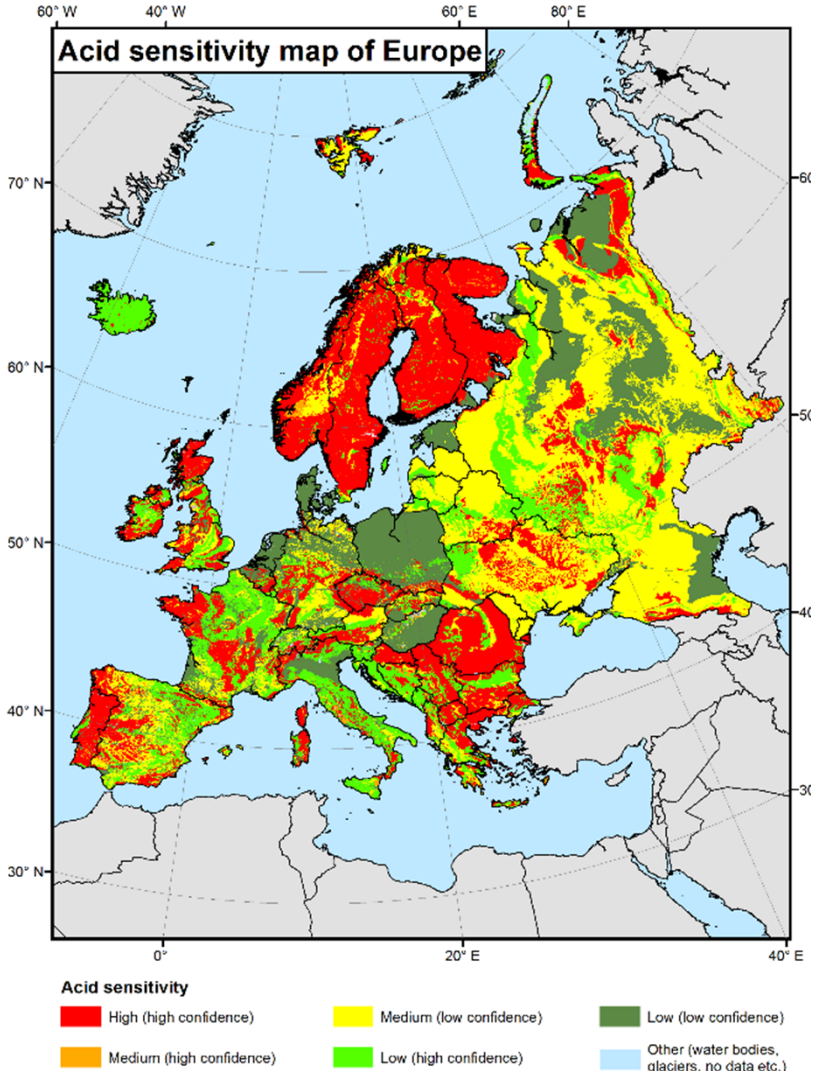




Braaten et al., ICP W report 132/2017

Acid sensitive regions





Strengths

- Designed to assess air pollution (sulfur and nitrogen) impacts on surface waters, so no impacts of local pollution sources
- Successful in assessing long-term trends in surface water acidification and recovery, and linking to deposition trends
- Good regional distribution
- High data quality
- Some overlap with other monitoring (ICP IM, Water Framework Directive, NEC Directive)
- Valuable for assessing biodiversity changes and effects of climate change

Weaknesses

- Challenges with national funding
- Biological time series are under threat for cuts in funding
- Some acid sensistive regions not covered
- Challenging to find suitable sites in new countries not impacted by local pollution

NIVA

How are ICP Waters data used in modelling? -1

Environmental Science & Technology

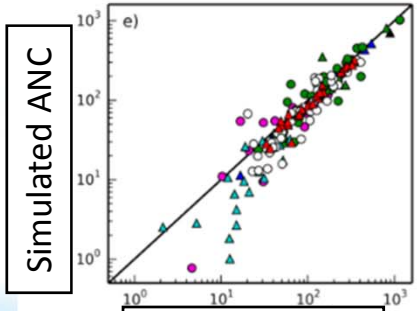
Article

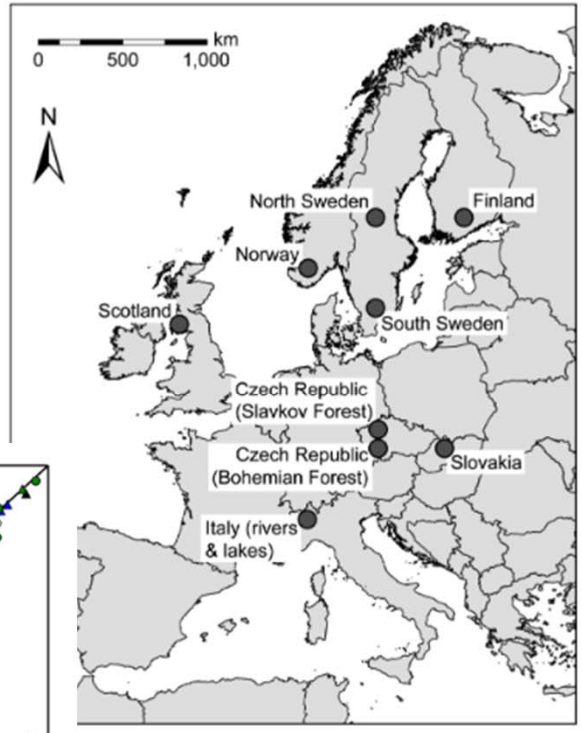
pubs.acs.org/est

Assessing Recovery from Acidification of European Surface Waters in the Year 2010: Evaluation of Projections Made with the MAGIC Model in 1995

Rachel C. Helliwell,*,† Richard F. Wright,‡ Leah A. Jackson-Blake,† Robert C. Ferrier,† Julian Aherne,§ Bernard J. Cosby,∥ Christopher D. Evans,∥ Martin Forsius,⊥ Jakub Hruska,# Alan Jenkins,¶ Pavel Kram,# Jiri Kopáček,⊗ Vladimir Majer,# Filip Moldan,∨ Maximilian Posch,× Jacqueline M. Potts,○ Michela Rogora,◇ and Wolfgang Schöpp+

- ICP Waters sites are used to calibrate and validate model predictions of recovery from acid deposition



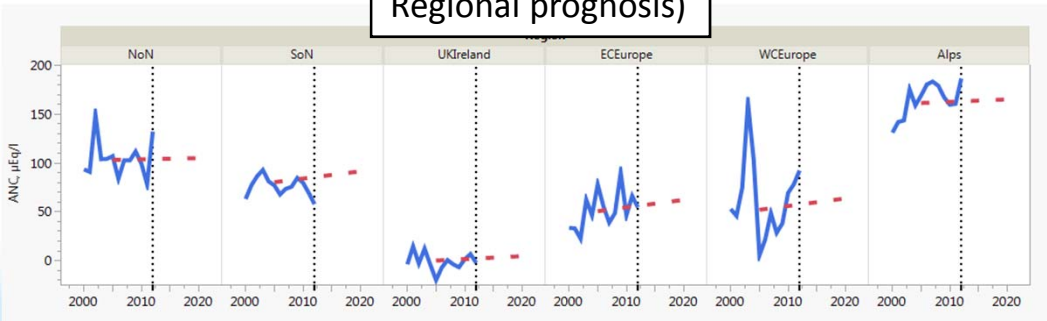


Helliwell et al., 2014 ES&T

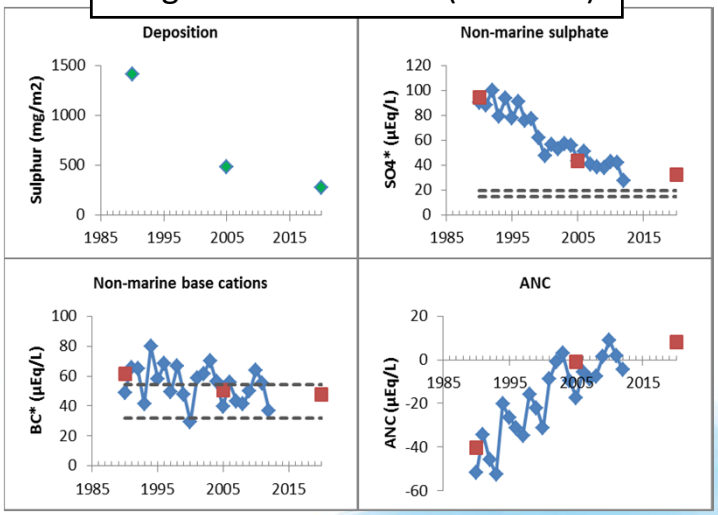
How are ICP Waters data used in modelling? -2

- Prognosis of water chemistry in 2020, given emission reductions from the revised Gothenburg protocol, using steady-state model (Henriksen&Posch 2001)

Regional prognosis)



Prognosis for one site (Birkenes)



Blue= monitoring. Red = modelled.

Use in policy context -1

LRTAP Convention

- Ground-truthing and documentation of recovery of acidified surface waters
- Calibration of models (MAGIC, others)
- Validation of model predictions of recovery
- Data are used in critical load modelling

Use in policy context

NEC Directive

- Provide help in design of monitoring system
- Sustain air pollution impact monitoring system for surface waters

Minamata Convention / LRTAP

- Long-term records of mercury in fish could provide benchmark for evaluation of impacts of Hg emissions
- Relevant for design of monitoring system of Hg pollution in freshwaters (atmospheric and local)