



The 20-year report

Monitoring effects of long-range transboundary air pollution in Europe since 1987

Background for the report



- ICP Waters was established in July 1987
- Most of the work has been focusing on the 1st and 2nd S-protocol and the G-protocol, with some visit towards the POPs and the HM protocols
- After the 25 years anniversary for the Convention and the review of the G-protocol it was a good opportunity
 - to sum up our achievements
 - to use this as a basis for discussing the road further for the ICP Waters Programme

Major achievements in the ICP Waters programme 1987-2008



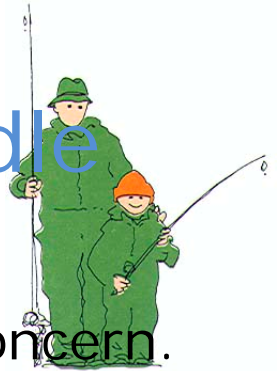
- Lakes and rivers shown strong signs of recovery in response to reduced acid deposition
- Biological recovery is slow and not widespread
- Long-term trends in nitrate in surface waters are poorly understood
- Increases in dissolved organic C are related to reduced S deposition
- Many sites in several regions of Europe will remain acidified after 2010.
- Climate change will affect acidification and recovery.
- Heavy metals and persistent organic pollutants (POPs) are found in fish, sediments and waters in remote areas
- Modelled critical loads for surface waters are supported by ICP Waters data
- ICP Waters holds a high quality database with long-term data from 200 surface water sites in 16 countries
- Monitoring = ground truth

Future acidification of surface waters –many lakes and rivers are still acidified to a level where biota is damaged



- The Gothenburg protocol is fulfilled with regard to S, there is still some way to go for N.
- In North America emissions reductions will continue
- Dynamic modelling suggests that many areas will continue to acidify in the future. Soil acidification continues, which jeopardizes the long-term recovery of lakes in these areas.
- ICP Waters will continue to raise awareness about the continued problems of acidified waters and the lack of biological recovery that occur in spite of reduced emissions, even in Europe where emission ceiling for sulphur has been attained.

Nitrogen is still an unsolved riddle



- The impacts of N-deposition will continue to be of concern.
- Current difficulties in predicting N-retention, and the multiple confounding factors (acidification, climate, natural variability) that affect the N cycle, mean that nitrogen will continue to be a key uncertainty in future recovery from surface water acidification.
- Nitrogen is a nutrient, elevated N deposition can also disturb aquatic biological communities in oligotrophic (nutrient-poor) lakes.
- ICP waters will continue to address both the acidifying and the nutrient nature of N

Biological response to acidification is slow and not well documented



- Recovery models predict significant time lags for biological recovery
- The lack of documented biological recovery is both related to the dynamic nature of biological responses but also to lacking monitoring data.
- Biological monitoring is crucial for us to demonstrate the efficiency of international emissions control for acid sensitive ecosystems.
- ICP Waters will continue to work on developing biological response models for use in assessing recovery from acidification.
- In this work, the continuation of biological and chemical monitoring at the same sites is essential.

ICP Waters will continue to play an active role in dynamic modelling and critical loads work



- Mapping critical loads for acidifying components is a key activity within the Convention work.
- Dynamic models provide an extension to critical loads by predicting the timescale of chemical recovery to emission reductions.
- Dynamic models can also be used to determine the deposition levels required to achieve a prescribed target chemistry within a given timescale, and so have direct utility in the formulation of further emission reductions (Target load functions).
- ICP Waters can use the expertise within our network to support the modelling work under the Convention, and to assess the possibilities for using dynamic modelling for surface waters in Europe and North America.
- ICP waters also holds much of the necessary data for calibration of such models.

ICP Waters will increase the focus on heavy metals and POPs



- Heavy metals (in particular mercury, lead and cadmium) and POPs (persistent organic pollutants) from long-range transport have not received the same attention in monitoring programmes as acidifying components.
- ICP Waters will
 - expand the Programme Manual to make recommendations for monitoring
 - contribute to development of appropriate dose-response relationships
 - participate in work on effect based approaches for POPs and heavy metals

Effects of climate change and other “unknowns” must be included in all future assessments



- Climate is widely believed to be undergoing long-term change, and the direction and degree of this change may significantly influence the behaviour of both terrestrial and aquatic ecosystems.
- Future monitoring, in particular and in combination with the use of dynamic models, is important to understand the effects of climate change and other unknowns for acidification (and recovery from acidification), nutrient N, heavy metals and POPs.

ICP Waters can contribute to other environmental policies



- The work of ICP Waters, the ongoing monitoring of waters, and the long and extensive databases, provide participating countries with important environmental information that can be used in conjunction with other national and international environmental policies.
 - Water Framework Directive, the Convention on Biological Diversity and the Habitats Directive
 - assessments of climate change impacts relevant within the United Nations Framework Convention on Climate Change (Kyoto protocol).

Success factors for ICP Waters in future work



- collecting and presenting high quality data from many countries
- good scientific collaboration within the programme, with other international projects, and with other monitoring networks
- a scientifically sound and active Task Force, focused aims, consistent programme management, frequent assessment of data, a detailed programme manual, and frequent intercomparison exercises
- close contact with policy-makers and other ICP's

The crown jewels of ICP Waters are the data!

Monitoring must continue and should be enhanced



- All data are contributed voluntarily by individual countries from national monitoring programs. Many of these programs are under severe budgets pressure.
- The value of all of these individual monitoring programs is best realized through collection, analysis and interpretation in the integrated, multi-national studies for which ICP Waters is famous.
- Continuation of the national monitoring programmes that submit their data to ICP Waters, yearly chemical and biological intercalibration exercises are crucial and the most important activity in future work of the ICP Waters programme.

Future work



- Continue to support the work under the various protocols
 - Continue to follow the effects from S and N on water chemistry and biota (**acidification**)
 - Study the effects of **nutrient N** on aquatic ecosystems
 - Follow the effects of deposition of **heavy metals** in aquatic ecosystems
 - Follow the effects of deposition **POPs** in aquatic ecosystems
POPs
 - Consider all effects in the view of **climate change**
- Continue to support and encourage national monitoring programmes
- Include new countries
- Contribute and harmonize work towards other conventions and Directives