ICP Waters
Heleen de Wit
Head Programme Centre
NIVA

Gunnar Skotte, Chair
Norwegian Environment Agency
Highlights since September 2015

• Two Task Force meetings
  – October 2015 in Monte Verita, Switzerland
  – May 2016 in Asker, Norway
    • Joint with ICP Integrated Monitoring

• Coordination of WGE trend report

• Biodiversity, acidification and climate report

• New homepage
TF meeting October 2015
Monte Verita, Switzerland

TF meeting May 2016
Asker, Norway
Participation in ICP Waters

- 20 countries participate regularly
- 12-14 countries at the TF meetings
- Number of TF participants around 30
- 2016 meeting was joint with ICP IM
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Webpage is being renewed (item 1.4.1)

- http://77.104.141.195/~icpwater/

- The water chemical data can be explored from the webpage
  - Focal centres can check their submitted data
  - The data become more visible outside of ICP Waters
Recent and upcoming reports

- Biodiversity, acidification and climate change (2015-16)
  - workplan 2014-2015 item 1.1.1.5, workplan 2016-2017 item 1.1.1.24

- Thematic report on mercury (2016-17)
  - workplan 2016-2017 item 1.1.1.8

- Thematic report on spatial extent of acidification (2017-18)
  - workplan 2016-2017 item 1.1.1.8
Aquatic biodiversity

• Report:
  – “Biodiversity of macro-invertebrates in acid-sensitive waters: trends and relations to water chemistry and climate”
  – Builds on 2013-report on biodiversity
Contributors

• Gaute Velle (Norway)
• Shad Mahlum (Norway), Don Monteith (UK), Heleen de Wit (Norway), Jens Arle (Germany), Lars Eriksson (Sweden), Arne Fjellheim (Norway), Marina Frolova (Latvia), Jens Fölster (Sweden), Natalja Grudule (Czech Republic), Godtfred A. Halvorsen (Norway), Alan Hildrew (UK), Jakub Hruška (Czech Republic), Iveta Indriksone (Latvia), Lenka Kamasová (Czech Republic), Jiří Kopáček (Czech Republic), Pavel Krám (Czech Republic), Stuart Orton (UK), Takaaki Senoo (Czech Republic), Ewan M. Shilland (Norway), Evžen Stuchlík (Czech Republic), Richard J. Telford (Norway), Lenka Ungeremanová (Czech Republic), Magda-Lena Wiklund (Sweden), Richard F. Wright (Norway)
Biodiversity in freshwaters

- Records of aquatic macro-invertebrates (insects, snails, crawfish) from long-term monitoring programmes (1982-2014)
- 1.8 million records of biota from 55 rivers and 34 lakes
- Water chemistry, temperature, precipitation

Velle et al., 2016. ICP W report 10.
Trends in species diversity

Lakes

Rivers

+ Increase – Decrease  ✮ Significant change
Trends in SO4 concentrations

Lakes

Rivers

+ Increase – Decrease  ○ Significant change
Temperature trends

Lakes

Rivers

+ Increase – Decrease  ● Significant change
Relation between diversity (nr of species) and water chemistry (sulphate, ANC)

- Time step of months-year.
- Sulphate, Acid Neutralizing Capacity (ANC; “buffering capacity”).
- Strong and significant relationships between diversity and water chemistry
Relations between diversity (nr of species) and climatic variables

- Monthly to annual time step
- Relation between diversity and temperature is NEGATIVE (lakes and rivers)
- Relation between diversity and precipitation is WEAKER and POSITIVE (lakes only)
- Note! Strong annual variation in climate, but few significant long-term trends
Long-term change in diversity strongly related to long-term change in SO$_4$

- Sites grouped according to pH
- In all groups, diversity has increased
- Most pronounced increases in diversity at sites with intermediate pH
CONCLUSIONS

• Biodiversity will probably continue to rise if chemical recovery of lakes and streams continues
• So far little documentation of effect of climate change on biodiversity
• Climatic change is expected to become more distinct, while changes in sulphur deposition are expected to decrease
  • Aquatic biodiversity may be impacted by climate in the future
  • Continued need for funding of biological monitoring programmes.
Mercury report

• Background:
  – Provide insights in relations between atmospheric deposition of Hg, climate and Hg in aquatic environment

• To be finished in 2017

• Support from Norwegian funded proposal Climer (Norwegian Research Council, 2016-2018; NIVA)

• Collaboration with ICP Integrated Monitoring
Status mercury report

- Ongoing analysis with fish Hg data from Norway, Sweden and Finland
- Russia, Canada may contribute data
- Relevance for AMAP

Key people involved

- **Circumpolar sharing of available data includes participation from:**
  - **Norway:** Hans Fredrik Braaten & Heleen de Wit (NIVA)
  - **Sweden:** Staffan Åkerblom (SLU)
  - **Finland:** Martti Rask (Luke)
    Jussi Vuorenmaa (SYKE)
    Kimmo K Kahilainen (University of Helsinki)
  - **Russia:** Tatyana Moiseenko and Marina Dinu (Vernadsky Institute)
  - **Canada:** t.b.d.
Existing data - contributions so far...

Sweden
~ 40,000 individuals
~ 3000 lakes
*Geography*: all regions
*History*: 1970s - 2016

Finland
~ 10,000 individuals
~ 500 lakes
*Geography*: data from all regions of Finland
*History*: 2009 - 2016

Norway
~ 6,000 individuals
~ 150 lakes
*Geography*: all regions
*History*: 1980s - 2016
Swedish data

Finland

- Finland
- Trends in lakes recovering from acidification

Norway

- Norway

Braaten et al. Presentation at ICP Waters, Asker, May 2016.
Possible future topics for thematic reports

• (reactive) nitrogen
  – Leaching of (reactive) nitrogen has acidifying and eutrophying effects in surface waters
  – The eutrophying effect of nitrogen depends on presence of phosphorus
  – Our call for data now includes total phosphorus
    • Evaluation of new data before deciding if this topic has potential as new topic for thematic report
Collaboration issues
Programme centres of ICP W and ICP IM sharing a limited resource…

Welcome to next joint meeting in Uppsala, May 9-11 2017!
Welcome to ICP Waters, the International Cooperative Programme (ICP) to monitor and assess the effects of air pollution on water quality in rivers and lakes.