



## Summary knowledge needs SLU Water Forum 2020

### Background

To strengthen transdisciplinary collaboration on water at SLU, it was suggested during the spring 2020 meeting of WaterCOG (coordination group for water at SLU) to map future knowledge needs on water issues in light of current and future environmental- and societal challenges. Following this mapping activity, the suggested knowledge needs could be further grouped into thematic areas (e.g. Water and food, Water and forests, Water and agriculture....) with identification of key persons/groups and potential interdisciplinary connections and cooperation. Emerging and evident synergies are expected to follow. A next step could then later be to organize a seminar day/workshop with stakeholders and funding bodies focusing on a dialogue on future knowledge needs from the perspectives of all participants and also including presentations from SLU describing our expertise and key focal areas with respect to water. The ultimate aim of the seminar should be to inform and influence funding bodies on the needs for future calls focused on water. Another parallel step could be to summarize the mapping activity in one or several scientific review paper/papers.

Additional input from the following parts of SLU is very much appreciated:

IVM (eutrophication, load och biodiversitet), SES (the forest perspective), IMM (agriculture, farming, live-stock, and extreme weather), VFM (pharmaceutical residues, fish migration), Artdatabanken (biodiversity and habitats), Stad o land (environmental communication, societal aspects), Energi och teknik (waste water treatment, technical innovations).

Below are the contributions to the mapping of knowledge needs so far, including the identity of the sender.

### Kevin Bishop (IVM)

1. Knowing the **underlying hydrological processes that move water through catchments**. This has bearing on the following "miljömål" Giftfri Miljö, Övergödning, Försurning, Klimat

2. Several key unknowns:
  - a. **Wetlands as green infrastructure to moderate hydroclimatological extremes**
  - b. **The differences in runoff amount and timing from forests, agriculture and wetlands.** This has a major bearing on all efforts at pollution source apportionment, as well as “green infrastructure”
  - c. **Mercury cycling in relation to the UN Minamata Convention**
  - d. **Carbon cycling** – both inorganic and organic forms.
  - e. **The use of tracers of water to overcome equifinality in hydrological modeling**
  - f. **Water and Forests in Ethiopia**
  - g. **Managing water resources** (interdisciplinary)
  - h. **Monitoring water amount, quality and biology** (FOMA)

#### Stefan Bertilsson (IVM)

- The GHG balance (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O) of different types of freshwaters, now and in a future climate change scenario.**
- Strategies to mitigate eutrophication and algal blooms for sustainable use of freshwater resources.**
- Microbiologically safe freshwaters**
- Aquatic ecosystem responses to changing ice cover** predicted for the future (both freshwater and marine).
- Invasive species and their biological controls.**
- Bioindustrial use of freshwater resources** (aquaculture, paludiculture)

Karin Wiberg and Lutz Ahrens (IVM), and Johan Lundqvist, Stefan Örn, Gunnar Carlsson och Anders Glynn (BVF)

#### Future knowledge needs on water issues

- **Clean water** for everyone
- **Safe reuse** of water

- Identification of **chemical and microbial hazards in raw and drinking water**
- Early **warning methodology for water contamination**
- **Treatment technology for contaminated water**
- **Safe use of water in primary food production and in the food industry**
- **Waste water treatment plants (WWTPs) as sources of chemical and microbial hazards**
- **Urban run-off / Storm water as sources of chemical and microbial hazards**
- **Consequences of chemical and microbial contamination of aquatic systems for food safety**
- **Consequences of chemical and microbial contamination of aquatic systems for aquatic organism health**

#### SLU Aqua (via Anna Gårdmark and Sara Bergek)

- **Effects on connectivity** among freshwater, coastal and offshore systems **from future climate change and other anthropogenic disturbances** including development and fishing?
- **Do Baltic Sea top predators suffer from thiamine deficiency** and is there a connection to the imbalance of the Baltic Sea ecosystem (climate change, eutrophication and contaminants)?
- How to provide solutions across relevant scales (spatial and temporal scales) that address the **trade-offs between blue economy, sustainability, conservation measures, policy objectives and actions to meet aquatic biodiversity and climate change targets?**
- How to provide an **integrated transdisciplinary approach for linking aquatic biodiversity to ecosystem services and Nature's Contributions to People (NCP)** from local to the global scales to allow transformative changes that will **embrace the human dimensions of coastal and marine ecosystems?**
- How to provide **e-infrastructure and Open Access Science** for sharing information and building trust **between multi-sectors stakeholders and users?**

- What's the **impact of forestry practices on (Baltic Sea) coastal ecosystems?**
- How will **adaptation of the blue food sector to climate change affect aquatic food webs?**
- **Environmental adaption of hydroelectric power plants.** In relation to the establishment of a national competence center for the re-examination of all existing hydroelectric power plants in Sweden.
- How to plan for the future? **Multifunctional measures for ecosystem-based climate adaptation**, development of **green infrastructures** and **safe guarding biodiversity**.

## Potential future Thematic Research areas

Below suggestions on common thematic research areas on water at SLU are listed, including the identity of the sender and suggested key groups that should be included in the thematic area.

Karin Wiberg and Lutz Ahrens (IVM), and Johan Lundqvist, Stefan Örn, Gunnar Carlsson och Anders Glynn (BVF)

### 1. **Drinking water supplies**

IVM (Karin Wiberg, Stephan Köhler, Lutz Ahrens) and BVF (Anders Glynn, Johan Lundqvist, Stefan Örn)

### 2. **Water and Food**

IVM (Karin Wiberg, Stephan Köhler, Lutz Ahrens) and BVF (Anders Glynn, Johan Lundqvist, Stefan Örn, Gunnar Carlsson), BT (Malin Hultberg), Animal husbandry (Animal Environment and Health, Animal Nutrition and Management, NN ???), Crop production (Crop Production Ecology, NN ???)

### 3. **Aquatic system contamination and food safety/aquatic organisms health**

IVM (Karin Wiberg, Stephan Köhler Lutz Ahrens), BVF (Anders Glynn, Johan Lundqvist, Stefan Örn, Gunnar Carlsson), SLU Aqua (????), fler???