

Sensors for stakeholders?

Citizen science meets technical hiccups



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Real-time data from seven Nordic streams, shown on the project website: <https://projects.au.dk/nordbalt-ecosafe>



The purpose: Using sensors to motivate and inform stakeholders

Can we get local stakeholders, managers, farmers and other parties more interested in water quality if we show them real-time data from their nearby water bodies? This is one of the questions asked in the EU-funded NORDBALT-ECOSAFE Project.

We focus on turbidity and nitrate sensors in streams, but also show pH, conductivity, temperature and water level.

Presently, real-time data from seven Nordic streams are displayed on the project internet page as well as national web pages.

We will monitor if stakeholders check in on these web-pages and ask them to which extent they find the data useful (<https://projects.au.dk/nordbalt-ecosafe/sensor-monitoring>).

A meeting in the fall of 2024 will be held to ask how useful stakeholders find this information. Here, we will also show managers the inaccuracy of infrequent sampling when estimating average concentrations and flux calculations used in the EU Water Framework Directive.

The photo below shows the Danish monitoring station in Horndrup Stream, one of our seven stations in small, agricultural streams.

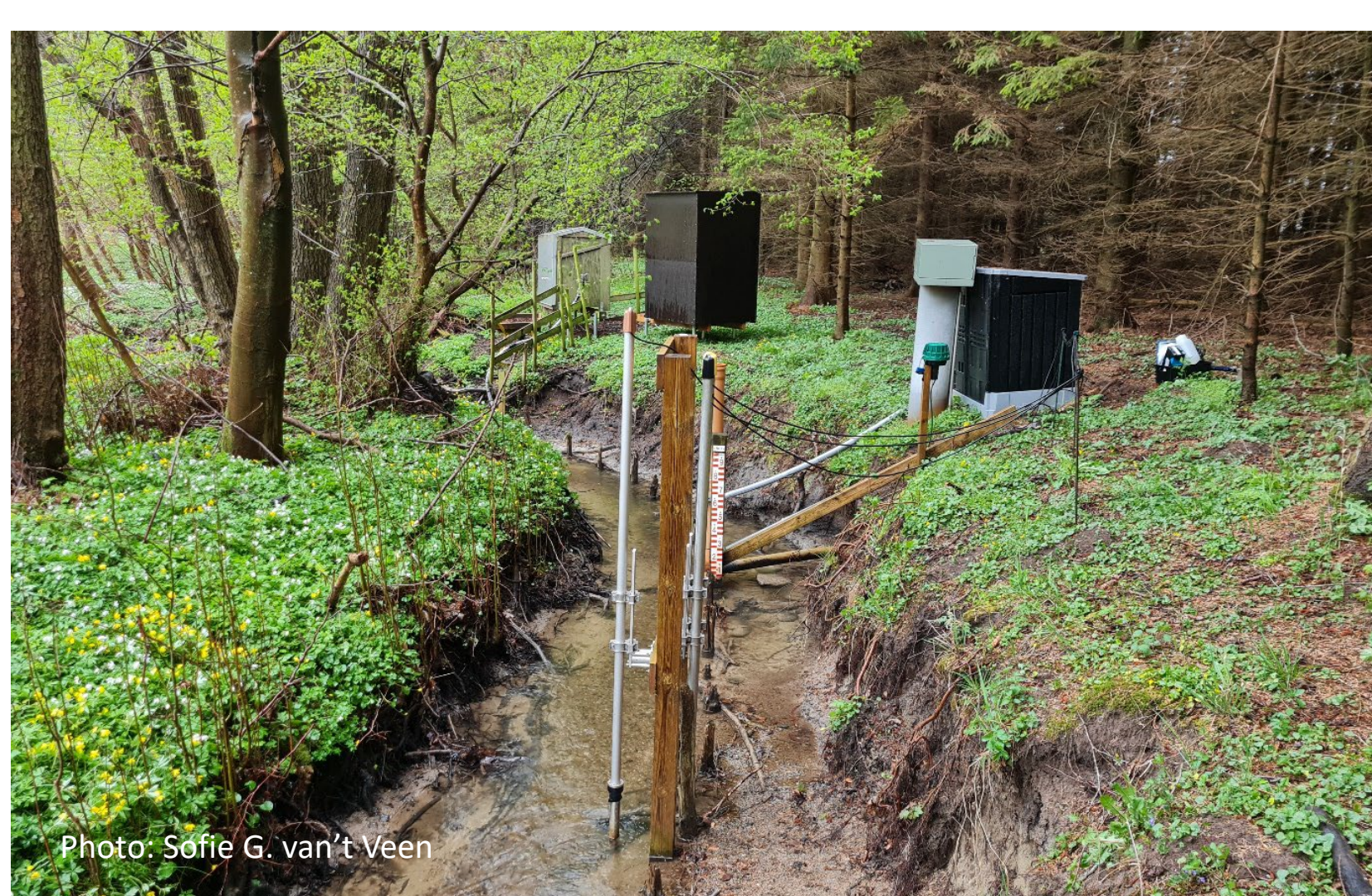
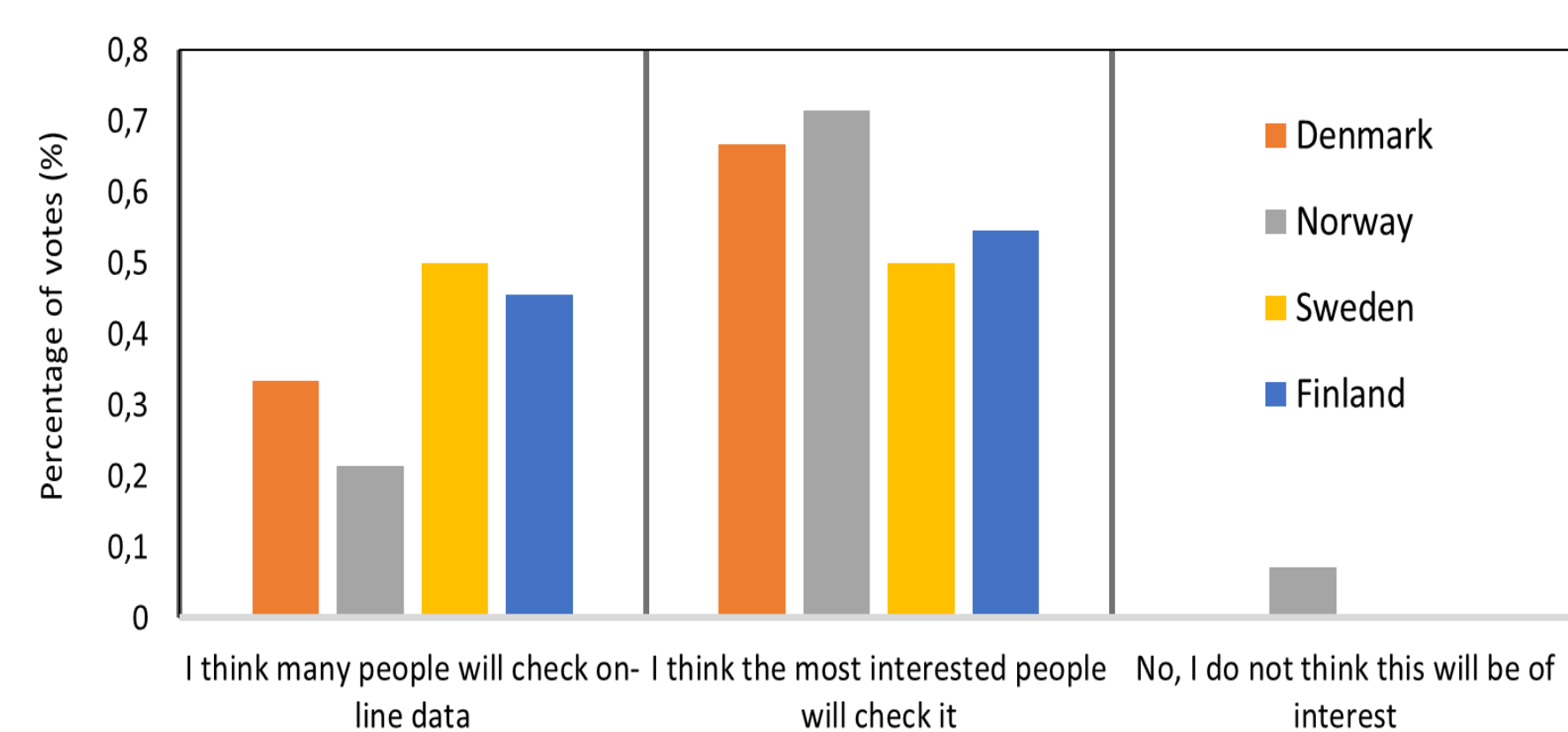


Photo: Sofie G. van't Veen

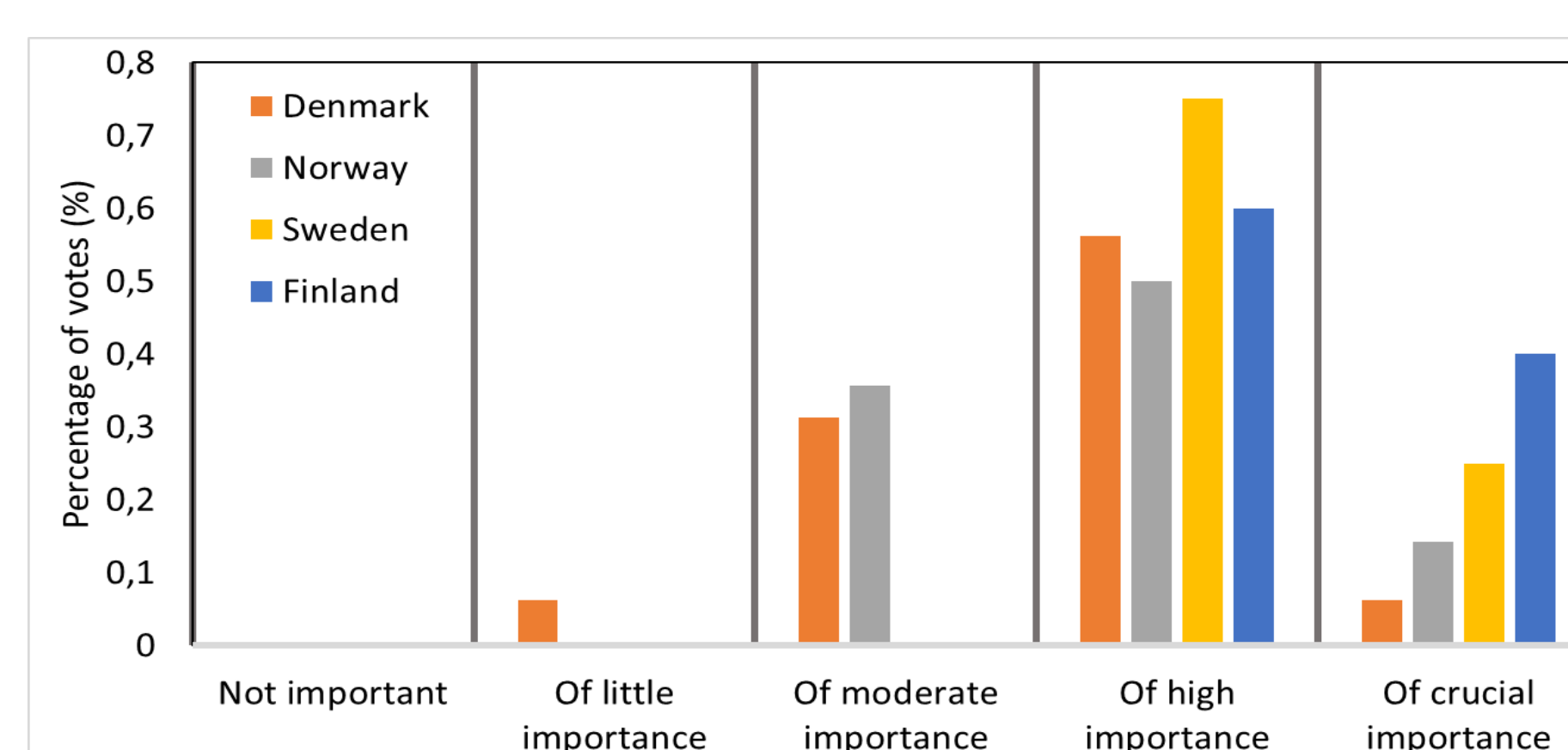
What do stakeholders think?

We asked stakeholders in the four Nordic countries of their views on the usefulness of sensors related to the needs for monitoring rivers under the EU Water Framework Directive.

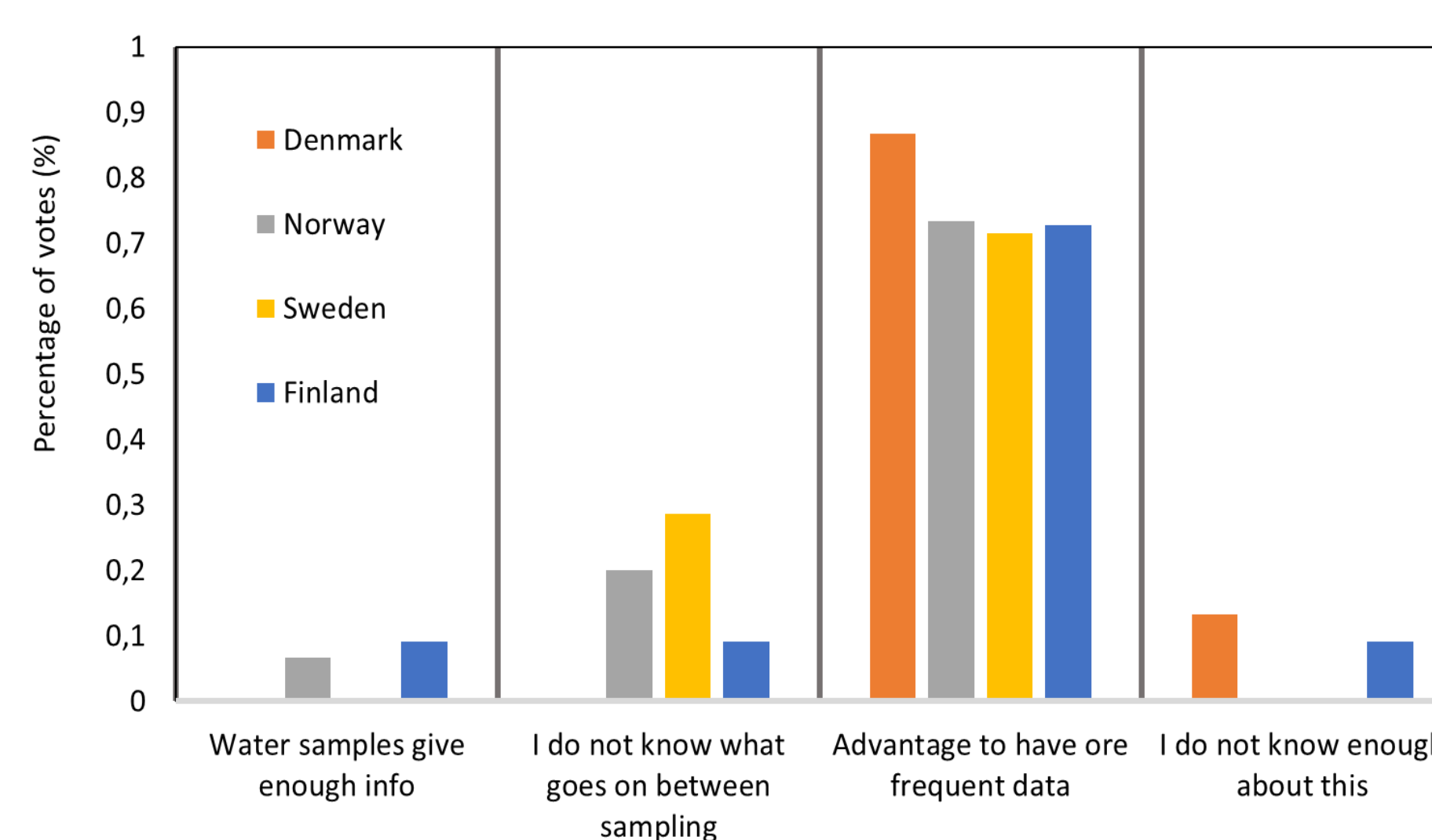
Do you think that sensors can be used to motivate and inform the people in the river basin?



How important do you think it is to have accurate estimates of nutrient and sediment concentrations and loads?



Do you feel that grab water samples give you the information you need (e.g. to find average concentrations and loads)?

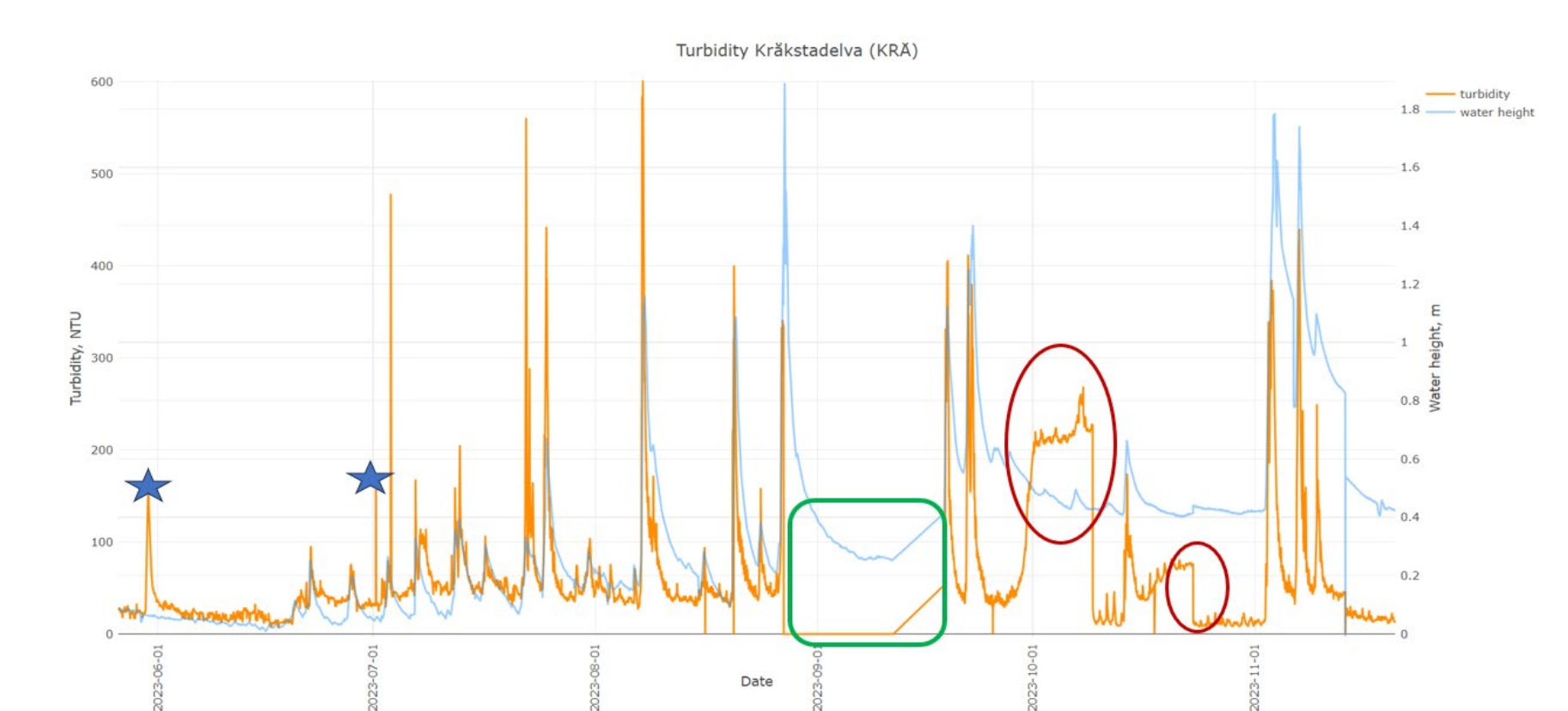


The hiccups: Raw data – what about quality control?

A challenge is that real-time data are not yet quality controlled or calibrated. We risk losing interest if the stakeholders log in when the sensor is malfunctioning.

We have therefore provided information on typical errors on the website.

To trigger more interest, we have also prepared a 4-page policy brief in both English and national languages, where we outline advantages and challenges with sensors, and where we also summarise how sensors are used by science and managers in different countries



The figure illustrates typical quality issues with a turbidity sensor. Blue stars: Turbidity peaks without corresponding water level increases: These can be caused by e.g. organic debris that block the lens. Green square: Period where the turbidity sensor was not working (power outage). Red circles: Assumed too high levels, possibly due to biofilm or sediments clogging the lens for longer periods, before the sensor was manually cleaned. An obvious drop in NTU after cleaning is a good indicator on this problem. (Example stream: Kråkstadelva in Norway).

NORDBALT-ECOSAFE aims to ensure that N and P concentrations and loadings in water bodies in the Nordic-Baltic region are reduced and will remain within safe ecological boundaries. Nordbalt-Ecosafe's partners are from Denmark (lead), Norway, Sweden, Finland, Latvia and Poland. <https://projects.au.dk/nordbalt-ecosafe>



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