

SeBS Workshop on Water Quality Management

The workshop was organised as a virtual meeting taking place on 9th June 2022. Those attending are listed in the annex.

Context:

The goal of the workshop was to bring together experts in water quality management in different countries, to understand where and how Sentinel data is being used in products and services to support the management of lakes and rivers across Europe and to consider what benefits this use is bringing already or could potentially bring. The project team are also seeking more cases to analyse.

The project team explained how SeBS cases are being analysed and how the focus which initially was almost entirely on the economic benefits, had shifted to embrace 5 other “dimensions” of value. It is often the case that non-monetary benefits are of more value to public organisations than those which are monetized. For example, to promote the activities of the agency to the general public or to enable more efficient working between organisations by creating collaborative platforms or working practices.

Discussion:

The case of [water quality management in Germany](#) has been published and Thomas Wolf from the LUBW (Environmental Institute for Baden Wurttemberg) talked about the institute’s use of satellite data to monitor lakes in their region, but not for reporting purposes. The service, provided by a small German company Eomap, enables many more lakes to be monitored more often and for sampling in larger lakes (i.e. Lake Constance) to be more dense. It cannot replace in-situ monitoring but can complement. Currently, the LUBW is considering making this routine for a number of lakes in the Baden Wurttemberg region and to encourage adoption across Germany.

A second case is currently being analysed in Finland and Jenni Attila from SKYE explained how they are using Sentinel data to analyse lakes and coastal water quality in the country. Finland has 4500 lakes and 250 coastal water bodies which need to be monitored hence automated processes are necessary. Responsibility to gather and provide measurement data lies with 13 regions. SYKE generates a satellite derived picture of water quality which is used to compare and complement the data each region provides. This is made available through a service called TARKKA which is available to government and the media and STATUS which provides numerical products and is used by the 13 regions responsible for water quality monitoring.

Other participants had been asked to provide a one slide summary of the situation in their country answering to 5 questions proposed in advance (see annex).

Therese Harvey is from the Norwegian Institute for Water Research (NIVA) which is contracted by the Norwegian Environmental Agency to provide the national water quality monitoring as well as advice, including ocean colour and remote sensing. They have several research projects but no operational use. Norway has a very long coastline and many lakes but clouds, shadowing by mountains as well as the small size of many lakes makes monitoring a challenge.

Annelies Hommersom from the Dutch SME Water Insights provides services in the Netherlands. Monitoring of lakes and coastal waters are the responsibility of the regional authorities with a few larger lakes monitored by the national water authority. Satellite data is not used in WFD reporting but there is growing interest in its use to complement in-situ data. There has been some success in its use for soil moisture and evapotranspiration measurements.

Alexis Foussard from the French ministry for the environment reported that monitoring is carried using in-situ data involving 12 regional authorities. There is potential for systematic monitoring using Sentinel data but at present this is still a research activity.

Ils Reusen from VITO provided an overview of the situation in the Flanders region of Belgium. Some research has been made on using satellite data for water monitoring, but this is not yet used as a part of the operational process. An operational viewer ([WaterMonitor](#)) has been developed and is under evaluation for its accuracy.

Summary of National Situations:

Which organisation(s) in your country is(are) responsible for compiling the data and reporting against the EU Water Framework directive and the Bathing Waters Directive?

Germany/Baden-Wurttemberg	Environmental Institute for Baden Wurtttemberg (LUBW)
Belgium/Flanders	Flanders Environment Agency (VMM)
Finland	SYKE + 13 regions
France	Ministry of the Environment - through the Office Francais de la Biodiversite (OFB) + 12 water agencies
Norway	Norwegian Environment Agency
Netherlands	National Governmental executive organisation + regional water agencies

Is satellite data used by this (or these) organisations to support their work on water quality management? If "yes", then for which purpose(s) is the satellite data being used?

Germany / Baden-Wurttemberg	Yes, but not for reporting purposes. Used to monitor 300 lakes in the region over above the WFD.
Belgium / Flanders	Yes, but not for reporting. Used for an on-line water quality monitor whose performance is under evaluation.
Finland	Yes. Used by SYKE to provide control information to the regional bodies which gather reporting information through in-situ sampling.
France	No, but under evaluation.
Norway	No, but under evaluation along with research to overcome technical limitations of shadowing due to deep fjords and clouds at higher latitudes as well as development of regional adapted algorithms
Netherlands	Yes, it is used for soil moisture, evapotranspiration and other pilots, but not for reporting because it is not specified in the Directive.

Main Findings:

- The utility and potential benefits of using Sentinel data for water quality management are well understood.
- The benefits lie with being able to monitor many more water bodies cost-effectively, more frequently and with a better spatial sampling.
- Investment and an operational budget are required by organisations to introduce EO services into their operations.
- Institutes/Agencies are unable to justify this investment without a formal recognition or requirement to use satellite data, expressed in the regulations i.e. the WFD.
- In addition to the organisational and regulatory barriers, there may also be technical limitations to address, or issues related to local validation. For instance, in Norway, issues related to shadowing from adjacent hills have been mentioned.

Conclusions:

The experts on both demand and supply sides working on water quality are generally aware of the benefits that can be obtained from the use of satellite-based monitoring of water bodies. This provides the capability to monitor a large number of lakes that is not possible using traditional in-situ measurements. The latter is not replaced but complemented and hence an investment and annual budget is required.

It was suggested to make contact with the working group ECOSTAT of the Common Implementation Strategy (CIS) of the Water Framework Directive (WFD) with a view to developing a wider view and support for the introduction of EO data into the WFD.

Follow-up will be possible between experts and with the project team which could result in further analysis and a full case study.

- To analyse commonalities and differences among different actors and potential uses of Sentinels data in different countries/regions
- to establish a benchmark of cases that can allow improving the current understanding related to the use of Sentinels data.

To establish a set of best practices which can inform environmental agencies and on the benefits of using Sentinel data.



Annex:

Participants:

Thomas Wolf (Baden-Württemberg State Institute for the Environment - Germany)

Jenni Attila (SYKE – Finland)

Caroline Whalley (European Environment Agency)

Alexis Foussard (Ministry for Transition Ecologique- France)

Annelies Hommerson (Water Insight – Netherlands)

Therese Harvey (Norwegian Institute for Water Research, NIVA & Denmark Water Research)

George Kalisperides (Cyprus Telecoms Authority)

Andreas Economides (Cyprus Telecoms Authority)

Selima Ben Mustapha (Swedish Space Agency)

Ils Reusen (VITO)

Benjamin Palmaerts

Alessandra Tassa (ESA)

Lefteris Mamais (Evenflow)

Lauriane Dewulf (Evenflow)

Christopher Oligschläger (EARSC)

Geoff Sawyer (EARSC)

SeBS Water Quality Management Workshop

Each participant to the SeBS Water Quality Management workshop should prepare one slide responding to the following questions:

1. Which organisation do you represent and what is its role?
2. Which organisation(s) in your country is(are) responsible for compiling the data and reporting against the EU Water Framework directive and the Bathing Waters Directive?
3. Is satellite data used by this (or these) organisations to support their work on water quality management? If “yes”, then for which purpose(s) is the satellite data being used?

{note: this could be for policy development, design of legislation, implementation of the policy, reporting, enforcement, analysis of its impacts, or to support communication with the public}.

4. Are there other benefits arising from the use of satellite data?
5. Any further comments on your use of satellite data?

(for example: is the use operational or research based? What are the main data being used? What are the main impacts of using the data? What are the main reasons for not using the data?)