

Water authority Noorderzijlvest

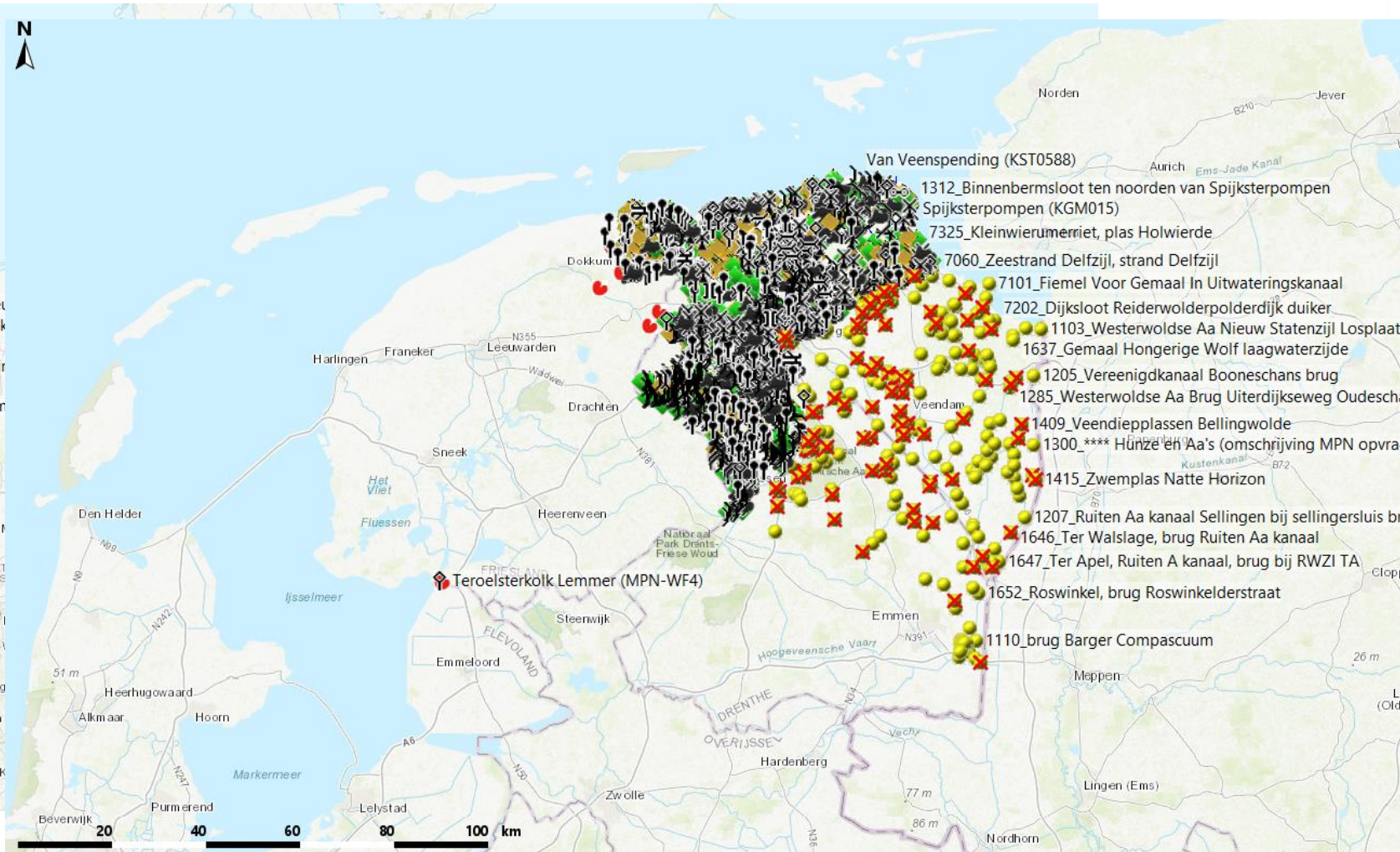
Waterschap NOORDERZIJLVEST



Jannes 06-06-2024



• Water authority Noorderzijlvest





Bestand Extra Dashboards Opties Help

Data Viewer

Selecties

Filters

- Meteorologie
- Waterkwantiteit
 - Oppervlaktewater
 - Grondwater
- Waterkwaliteit**
- Vergunning en Handhaving
- Waterketen
- Projecten

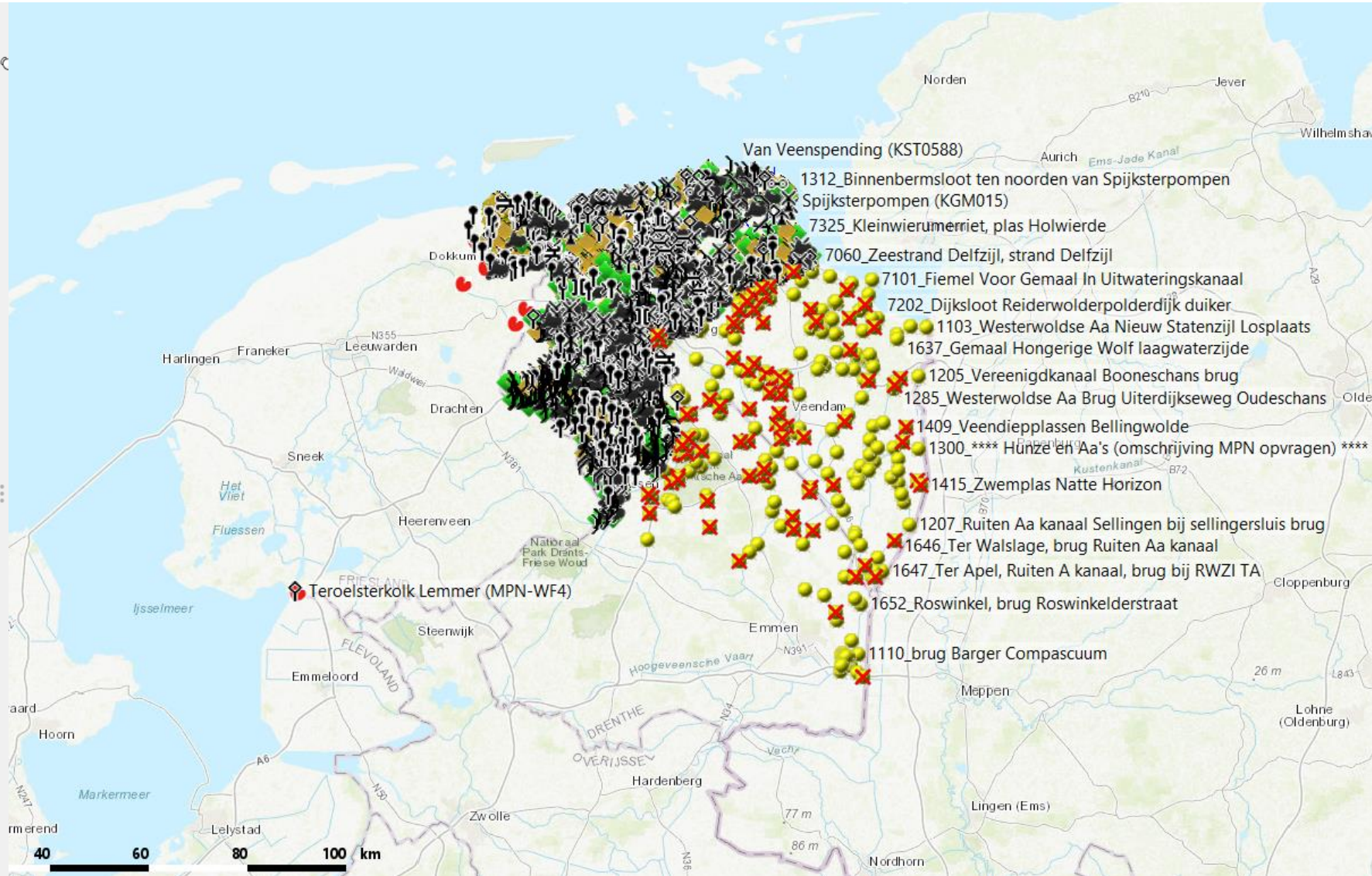
Locaties

- 0003_Dongerdielen slaat uit op Lauwersmeer
- 0006_Dokkumer Nieuwe Zijlen
- 0038_Gaarkeuken
- 0127_Ijsselmeer Lemmer

Parameters

- 1,1,1-trichloorethaan [ug/l][NVT][OW]
- 1,1,2,2-tetrachloorethaan [ug/l] [NVT] [OW]
- 1,1,2-trichloorethaan [ug/l][NVT][OW]
- 1,1-dichloorethaan [ug/l][NVT][OW]
- 1,1-dichlooretheen [ug/l] [NVT] [OW]
- 1,1-dichloorpropan [ug/l] [NVT] [OW]
- 1,2,3,4,6,7,8,9-octachloordibenzo-p-dioxine [ng/l][NVT][OW]
- 1,2,3,4,6,7,8,9-octachloordibenzofuraan [ng/l][NVT][OW]
- 1,2,3,4,6,7,8-heptachloordibenzo-p-dioxine [ng/l][NVT][OW]
- 1,2,3,4,6,7,8-heptachloordibenzofuraan [ng/l][NVT][OW]

Qualifiers



Water Quality at Noorderzijlvest and neighbors



FEWS WAM (Water Analyse Managementsysteem) Noorderzijlvest (Operator Client)

Zoomuitsnedes

6 : Data Viewer

Selecties

Filters

- Waterkwaliteit
 - Fysisch-Chemisch
 - Alle meetpunten
 - Meetnetten
 - KaderRichtlijn Water (KRW)
 - Gewasbeschermingsmiddelen
 - Zwemwater
 - Zoetwaterplan
 - Trendanalyses
 - Projecten
 - Overige meetnetten
 - Landelijk meetnet nutriënten MNLSO
 - Landelijk meetnet radioactiviteit
 - Meetnet tbv NFI
 - Potentieel Stadswater
 - RIKZ-meetpunten
 - Parametergroepen
 - Veld- / Labresultaten (ongevalideerd)
 - Noorderzijlvest
 - Extern beheergebied
 - Validatiereeksen
 - Ecologie
 - Vergunning en Handhaving

Locaties

- 0002_Dongerdijken slaat uit op Lauwersmeer

Parameters

- 1,1,1-trichloorethaan [ug/l][NVT][OW]
- 1,1,2,2-tetrachloorethaan [ug/l] [NVT] [OW]
- 1,1,2-trichloorethaan [ug/l][NVT][OW]

Qualifiers

05-06-2024 09:37:54 INFO - Reading time series info snapshot for 05-06-2024 08:10:00 finished in 19 s. available:484593 skipped:12196 missing:0 size:6.1 MB

05-06-2024 09:35:22 INFO - Reading time series info snapshot for 05-06-2024 08:10:00 finished in 18 s. available:484593 skipped:12196 missing:0 size:6.1 MB

05-06-2024 09:34:57 INFO - Reading time series info snapshot for 05-06-2024 08:10:00 finished in 19 s. available:484593 skipped:12196 missing:0 size:6.1 MB

Logs

Jannes Schenkel

Huidige systeemtijd: 05-06-2024 09:00 CEST

09:38:05 CEST

nlnowapmc00

166374 , 605293

0,0 MB/s

933 MB

Typ hier om te zoeken

Bijna record

09:38

5-6-2024



- Satelliet
- Combination with sensor's



Figure 3-7 WISPstation, constantly monitoring water quality on Paterswoldsemeer⁵⁶

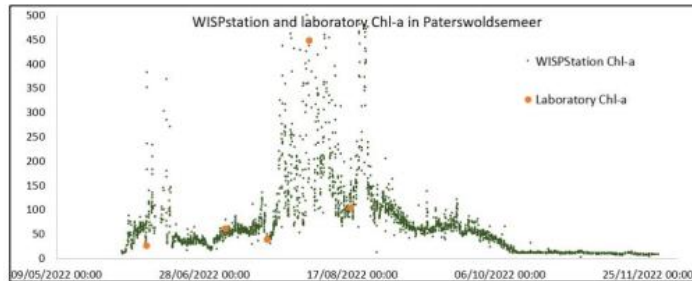


Figure 3-8 Example of a Chl-a time series from the WISPstation in Paterswoldsemeer⁵⁷

2. WISP-3



European Association of Remote Sensing Companies

Sentinels Benefits Study (SeBS)

A Case Study

Water quality management in the Netherlands





- Project Cymons

- [CyMonS | ESA Space Solutions](#)

- Project Eomores

- [Water Insight](#)

- Operationeel

- Simwater

- Krw Water Framework Directive (WFD)



Figure 3-7 WISPstation, constantly monitoring water quality on Paterswoldsemeer⁵⁶

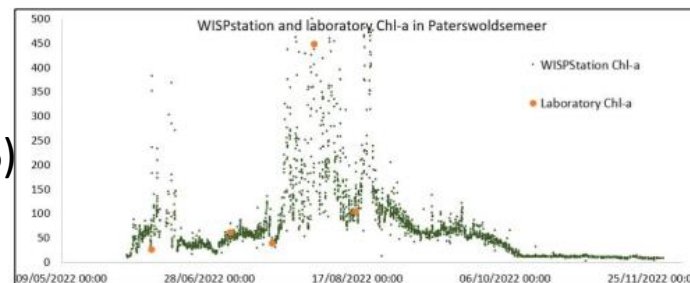


Figure 3-8 Example of a Chl-a time series from the WISPstation in Paterswoldsemeer⁵⁷

2. WISP-3



Figure 2-3 Lauwersmeer⁴

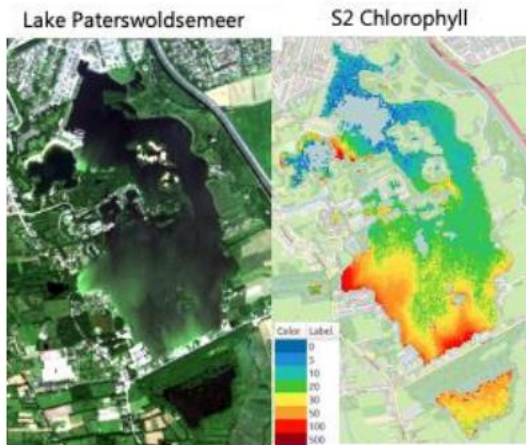
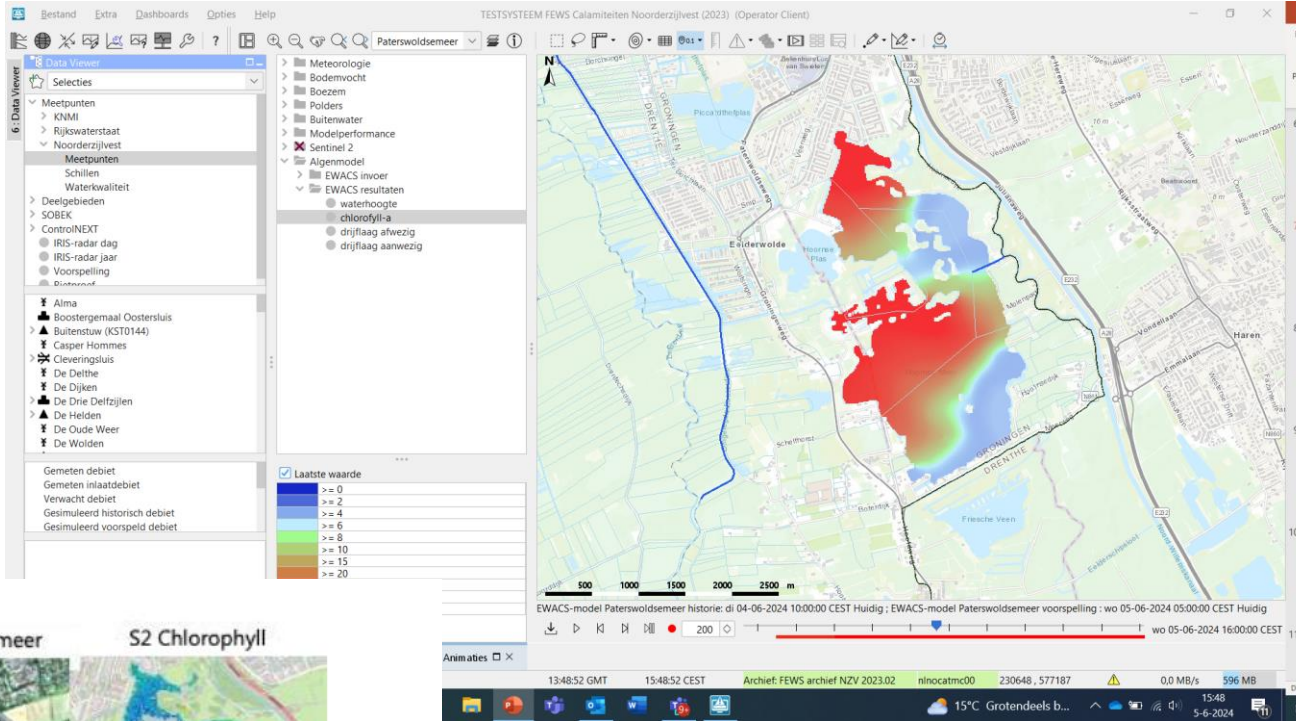


Figure 3-12 True colour images compared with Derived Chlorophyll concentration on Paterswoldsemeer.⁶⁰ Algal bloom is clearly identified on both pictures.



Figure 3-10 Lauwersmeer 30 May 2020 (left), 13 August 2020 (right), Sentinel 2 – True color.

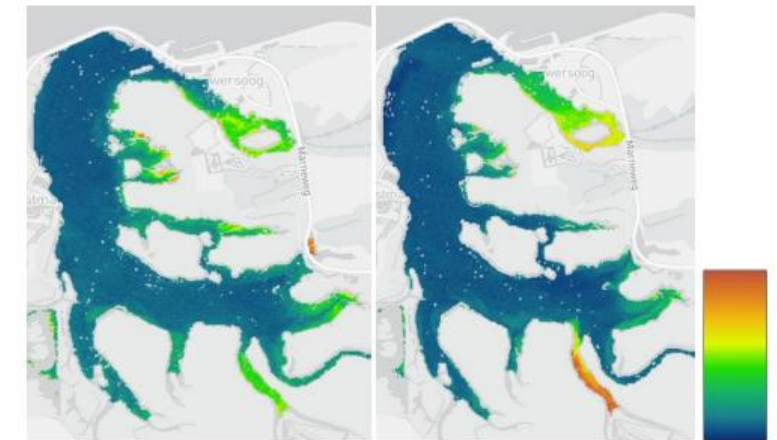


Figure 3-11 Lauwersmeer 30 May 2020 (left), 13 August 2020 (right), - Derived Chlorophyll concentration scale 0-200 µg/l.



Satellietdataportaal

https://www.satellietdataportaal.nl/?res=0.3%2C0.5&overlay=mos-3&usecase=waterkwaliteit

Netherlands Space Office

KAART HOE OVER ONS

ACTIES Mijn portaal

10-08-2020

Sluit vergelijking

Gebruik van aardobservatie voor waterkwaliteitsmonitoring

Met satellietbeelden zijn deze parameters frequent in beeld te brengen. Dit voorbeeld bevat een beeld van de satelliet Sentinel-2, en de daarop gebaseerde kaart van Chlorofyl-a concentratie. De kaart is gevalideerd met een meting ter plekke (in situ meting) van het Lauwersmeer. Sentinel-2 maakt ongeveer eens in de 2 à 3 dagen een beeld van Nederland, al zijn daar soms ook wolken op te zien en kun je in de praktijk dus niet iedere paar dagen een nieuwe kaart maken, maar vaak wel een paar keer per maand.

Waterschappers noemen kaarten gebaseerd op satellietdata een erg interessante, aanvullende bron van informatie. Waar traditionele monitoring vooral gedaan wordt met analyse van lokale watermonsters op specifieke plekken, brengt een satellietbeeld het hele waterlichaam in kaart. De toegevoegde waarde zit dus vooral in de ruimtelijke verschillen die zichtbaar worden. Voorbeelden van toegevoegde waarde zien waterschappers in het analyseren en beter begrijpen van het watersysteem, het evalueren van maatregelen die worden genomen in het kader van de Kaderrichtlijn Water, of als invoer voor of validatie van een ruimtelijk ecologisch model. Omdat Sentinel-2 automatisch foto's maakt en de beelden bewaard worden kan een analyse ook achteraf uitgevoerd worden. De verwachting is dat zeker in combinatie met andere gegevens van waterbeheerders, of bijvoorbeeld uit satellieten afgeleide kaarten van de watertemperatuur, er nieuwe inzichten zullen ontstaan in de processen die spelen in onze watersystemen.

De satellietkaarten zijn gemaakt door Water Insight.

e-shape EOMORES

- e-shape pilot Earth Observation based phytoplankton biomass for Water Framework Directive reporting
- EOMORES: monitoring inland and coastal water bodies from space
- White Paper Satellite-assisted monitoring of water quality to support the implementation of the Water Framework Directive

Concentratie Chlorofyl-a in µg/l

0 25 50 75 100

10:05 30-5-2024



Bathing areas and KRW

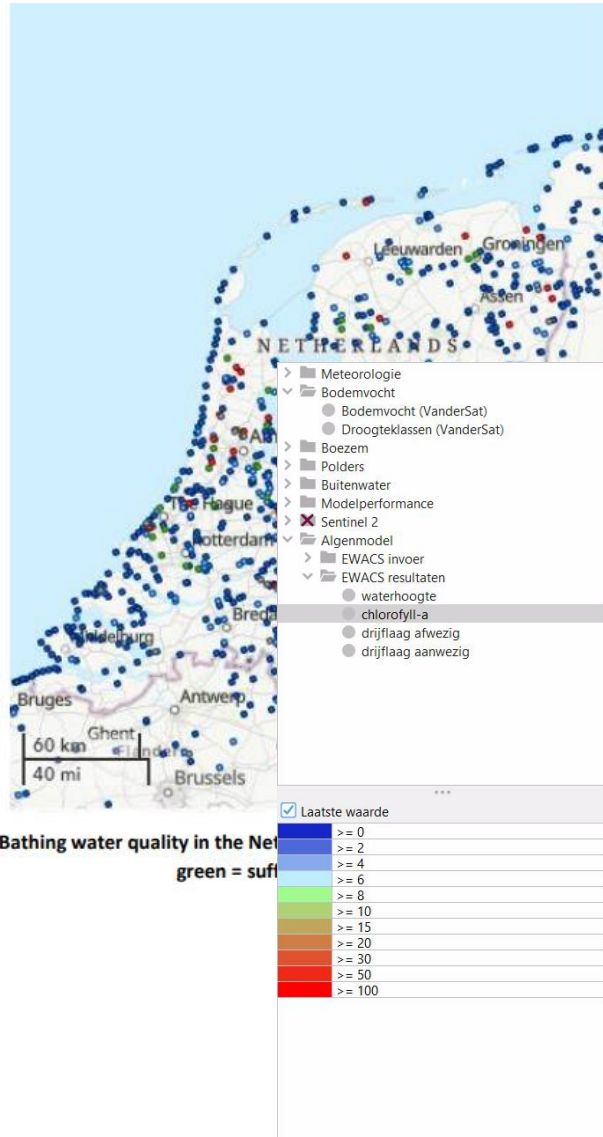
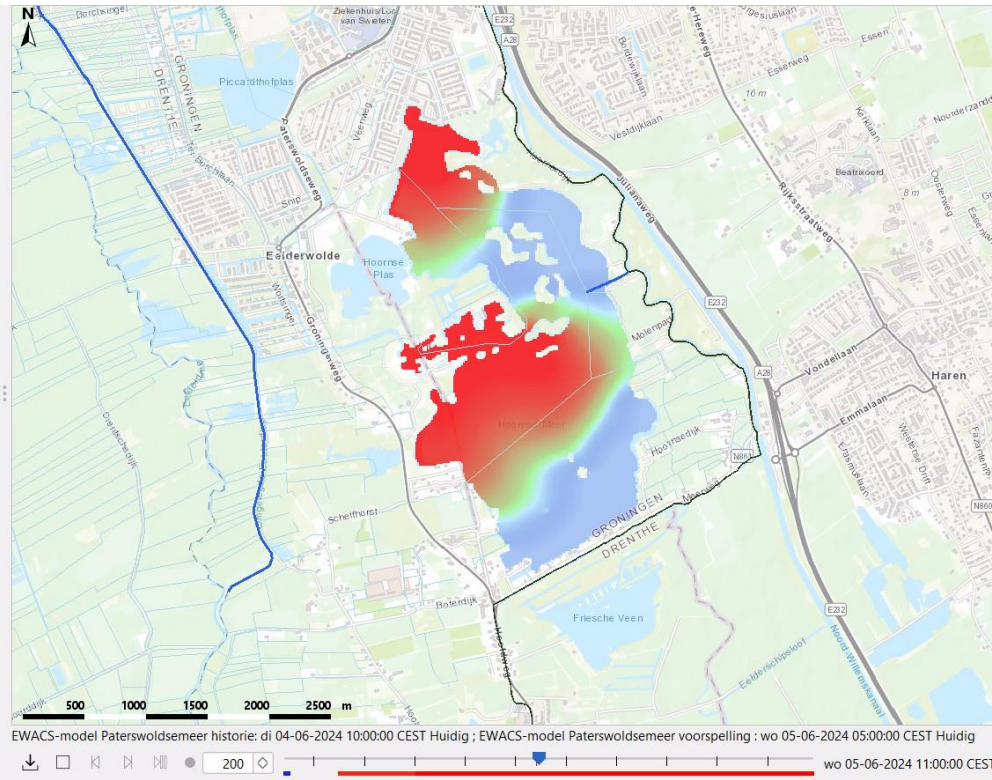


Figure 2-5 Bathing water quality in the Netherlands



Figure 3-7 WISP station, constantly monitoring water quality on Paterswoldsemeer⁵⁶





KRW Te European Water Framework Directive (WFD)





- *Start project*
 - Vegetation color, by satellite sentinel 2, handheld WIPS, normal monitoring field en lab
- Soil moisture
 - satellite, soil moisture, groundwater level sensor en Gamma ray sensor
- Why
 - make een good water balans en combin this with water quality monitoring to see what is coming out of the soil/ field
- Running project healthy soil
 - combine this how much water capacity there is in de soil
 - Its a sign of biological activity.
- Why soil moisture
 - this is every day its a radar product.



[WAM Portaal \(noorderzijvest.nl\)](https://www.waterinsight.nl/solutions/water-framework-directive)

[Homepage - Enabling Delta Life | Deltares](https://www.waterinsight.nl/solutions/water-framework-directive)

<https://www.waterinsight.nl/solutions/water-framework-directive>

https://e-shape.eu/images/2022/03/23/banner_water2.jpg

[Satellietdataportaal | Spaceoffice.nl](https://www.spaceoffice.nl)



EO based phytoplankton biomass for WFD reporting

Earth Observation for operational monitoring and system analysis of aquatic systems

The Water Framework Directive requires member states to monitor and, if necessary, improve water quality. One of the parameters to measure is the ecological status (good, moderate, poor, bad), based on phytoplankton biomass, measured as chlorophyll-a (Chl-a).

In this pilot we developed maps of Chl-a for a lake in the Netherlands and the derived phytoplankton biomass WFD status classes maps.

Together with the local water authority that is in charge of this lake, and a group of Dutch water quality experts, we discussed the added value, cost/benefits and possibilities of the Earth Observation (EO) based maps.

Added value

The WFD status reporting requires samples from one or a few monitoring points. In the Netherlands, sampling for reporting is well-organized and complete. However, it is often not known if the monitoring stations are representative for the whole water body.

In the pilot we showed that EO-based maps can be used for checking if the sampling stations are representative, and in case they are not representative, EO can help to pinpoint representative locations.

Samples are usually collected from the shore at the most easy-to-reach locations, or from one point in the middle of a lake. To understand the whole system, e.g. for a thorough system analysis, more information is needed.

EO can be used to create additional monitoring locations. Concentrations from EO-based maps can be extracted each time at the same location and can be treated in the same way as in situ data (e.g. averaging over the season).

EO data even allows to obtain this information in retrospect, e.g. if a system analysis is needed now, EO data of previous years can be obtained and processed into water quality maps, so that the analysis can be performed without having to wait for data.

When measures are taken to improve the water quality, the effect of the measures must be evaluated. To do so, it is important to obtain spatial insights, especially in lakes where some areas respond different to measures.

EO-based maps can fill this knowledge gap. Maps can be made available the same day, and can therefore also be used to evaluate the results during a project, allowing the manager to adjust the plans to the response of the water body.

Costs / benefits

EO data is not seen as replacement of (all) in situ Chl-a measurements because: 1) over certain time periods there might be too little data because of clouds, 2) field sampling can be required for validation, 3) not all locations can be measured by EO data, e.g. small channels are too narrow for the satellite pixels. This brings the question on the table: Is the additional information worth the additional costs?

With the water quality experts, the following considerations were listed:

- EO-based Chl-a maps are not expensive.
- Costs can be re-allocated when the use of EO-based maps of just some regular samples are skipped.
- Measures to improve water quality are often quite costly. It is important to evaluate the effects preferably during such a project, with enough data, to be able to intervene and prevent unnecessary costs.
- Dutch water managers have experience with soil moisture monitoring with satellites, which is worth the costs. The expectation is that the same goes for surface water quality.

Possibilities

An important question we discussed was if it is allowed to use EO data for the WFD. There are two answers for this:

- 1) For status and trend monitoring and reporting, it is allowed to use EO data according to the WFD. However, national guidelines might prescribe the methods for each parameter. In some countries (such as Finland), methods include EO-based monitoring. In the Netherlands, this is not the case (yet). However, the prescribed methods are subject to updates for each new WFD cycle. National water quality experts write the updates.
- 2) For operational monitoring for analysis and evaluation, water authorities can use the methods they find most suitable. The use of EO data is therefore already allowed for these purposes.

The Dutch stakeholders that were present in the meetings see EO-based maps as a very valuable additional source of information.

How the story continues

It was agreed that the wealth of data from EO should be used. The present experts agreed to:

- Start using EO-based data for e.g. systems analysis when suitable
- Involve their team members and organisation in these projects, to introduce them to the use of EO-data
- Build a community of practise of water managers to exchange experience with using EO-based data to built capacity
- Communicate about the results at e.g. platform meetings, national fairs and in professional magazines to increase the awareness

Deltares into our services and contact e-shape Help Desk for more information <https://helpdesk.e-shape.eu>

Useful links
e-shape project www.e-shape.eu
Pilot 5.6 <https://e-shape.eu/index.php/showcases/pilot-5-6-ee-based-phytoplankton-biomass-for-wfd-reporting>

e-shape
EuroGEO Showcases
Applications Powered
by Europe



thank you

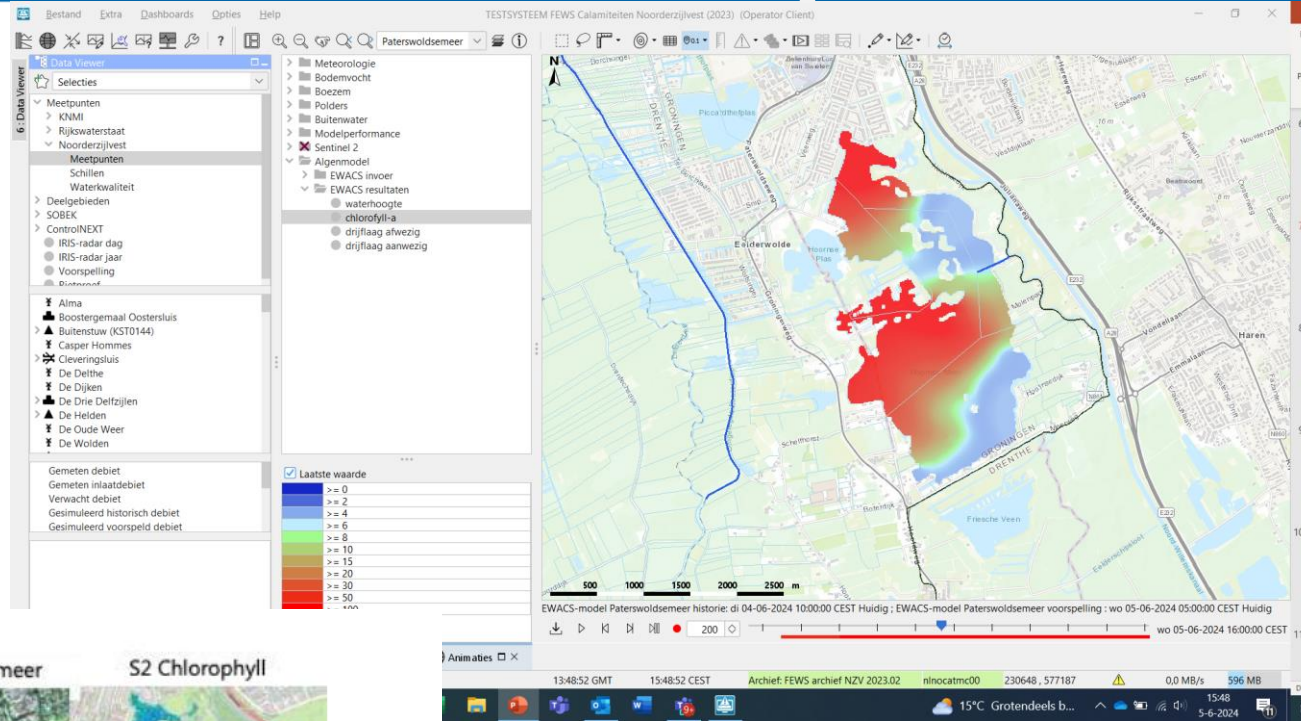


Figure 3-10 Lauwersmeer 30 May 2020 (left), 13 August 2020 (right), Sentinel 2 – True color.

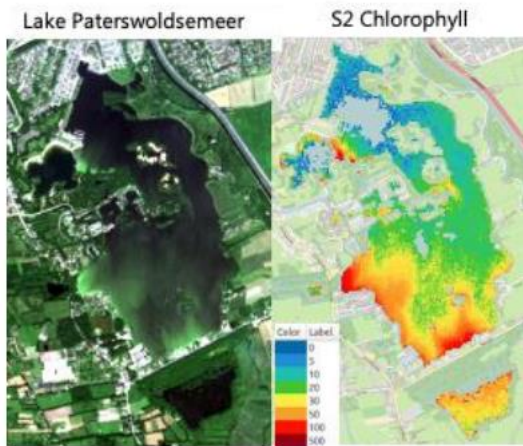


Figure 3-12 True colour images compared with Derived Chlorophyll concentration on Paterswoldsemeer.⁶⁰ Algal bloom is clearly identified on both pictures.

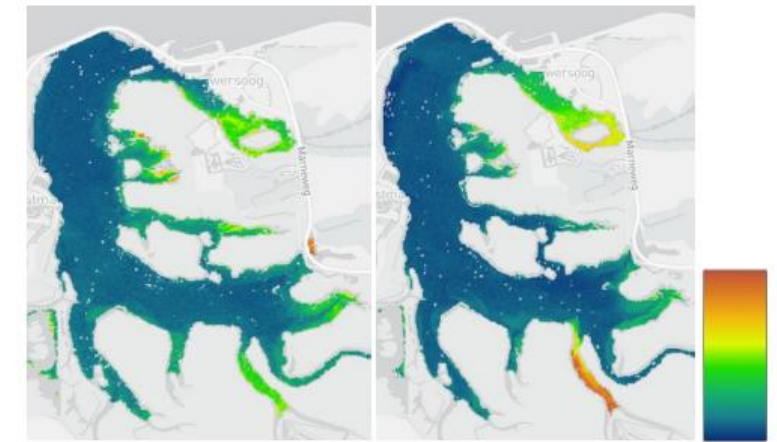


Figure 3-11 Lauwersmeer 30 May 2020 (left), 13 August 2020 (right), - Derived Chlorophyll concentration scale 0-200 µg/l.

Email j.schenkel@noorderzijvest.nl