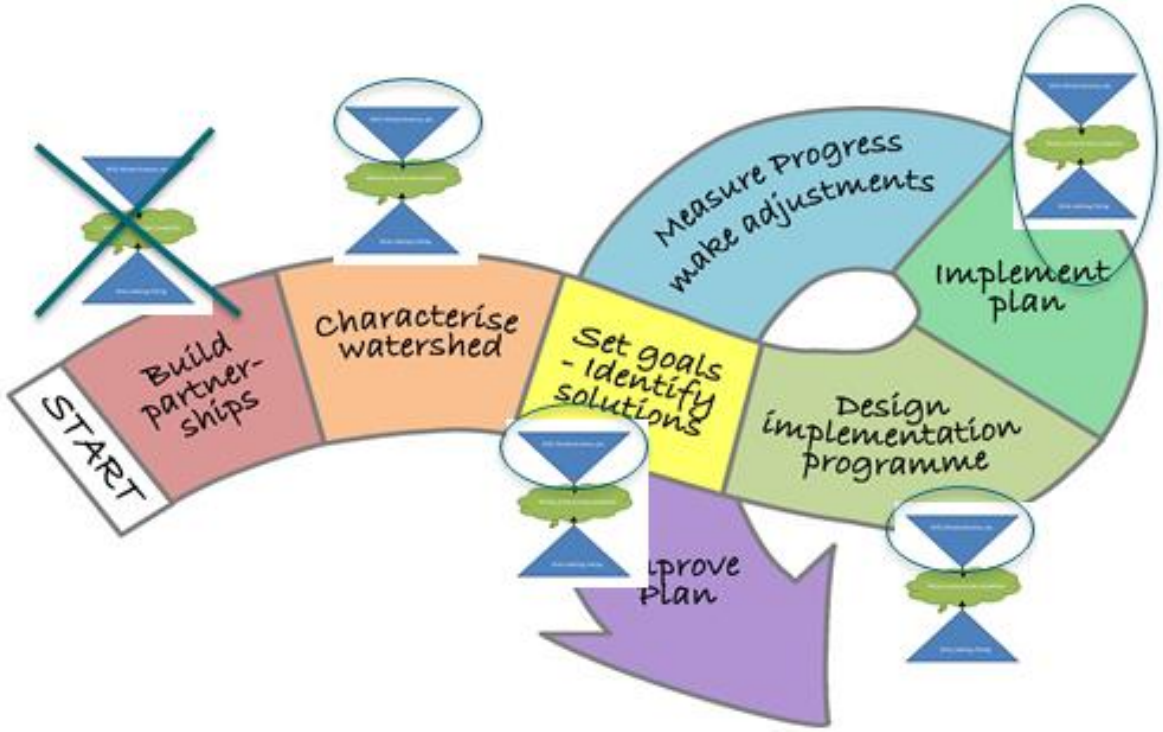
‘Drones in Denmark’



Innovative monitoring methods for high resolution quick scans of water quality

Boogaard, Floris [1][2], de Lima, Rui L.P. [3], Wilborg, Irene [3] Gertz, Flemming [3] Graversgaard, Morten [4]

[1] Hanze University of Applied Sciences, Groningen, The Netherlands
[2] KWR, Leeuwarden, The Netherlands
[3] SEGES P/S, Aarhus , Denmark
[4] Department of Agroecology, Aarhus University, Denmark

SEGES · Hanzehogeschool Groningen · AARHUS UNIVERSITY · indyma

Introduction

Water systems are critical to human and ecological survival and are changing faster than ever (climate change, population growth and urban development).

Aquatic Environments — Complex interactions: Chemical, Physical, Biological, Ecological

Water Co-Governance for Sustainable — interreg — WaterCoG: EU Interreg Project

- EU goals and objectives → EU Environmental regulations and standards (WFD).
- Difficult to characterize water quality, which varies in space, time (e.g. daily; 24h cycle), depth/stratification.
- How can the implementation of EU directives be achieved at a local level in the North Sea Region?
- Can water management frameworks be integrated with social, economic and environmental benefits?

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Methodology

Several methods were applied in different water management tasks, at multiple locations in The Netherlands, Indonesia and Denmark (ongoing) → participatory monitoring.

- Mobile sensors (attached to boats or underwater drones)
- Test strips and mobile apps
- Bio-monitoring (sediments)
- Ecology scans using underwater cameras
- Continuous/static measurements

Research locations WaterCoG (www.allmeasser.nl)

Using apps for (citizen)quality measurements

Results

- Technology enable high resolution monitoring of basic water quality parameters such as turbidity, electrical conductivity, dissolved oxygen or nutrients (ammonium/nitrate, phosphate).
- Water quality parameters can vary widely in space (x, y and depth) and time (day / night and seasonal).
- Drones, apps, and other user-friendly monitoring tools create awareness and stimulate participation of locals and all stakeholders involved

Catchment officer create awareness of water quality among farmers by using sensors for monitoring

Conclusions and perspectives

- Innovative/dynamic monitoring → living environment (water, ecology, sediment)
- Field work activities revealed potentials as awareness actions
- cooperation between organizations and international partners are crucial for the process of adaptation and strengthening of regulations
- WaterCoG will demonstrate, implement and integrate various water management frameworks in and outside EU region.

Example of in depth sensor data by stones

This study would not have been possible without the funding of the Interreg projects WaterCoG and support from stakeholders in The Netherlands and Denmark

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Drone Day

- Harbour near Sea – Diving
- Profile from bridge – which sensor??
- Fjord near the beach – GPS
- Harbour City 1 – clear water
- Harbour City 2 – near floating pool
- Harbour city 3 – poluted

Boat day

- Coast trip with big boat
- Boat trip through the Fjord

content

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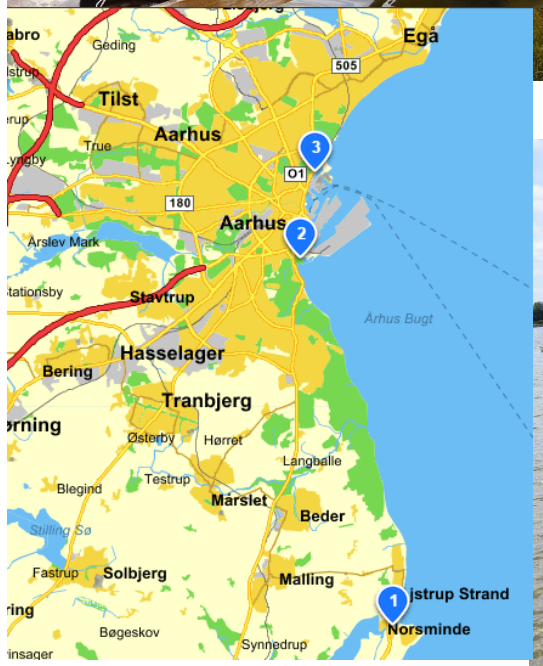

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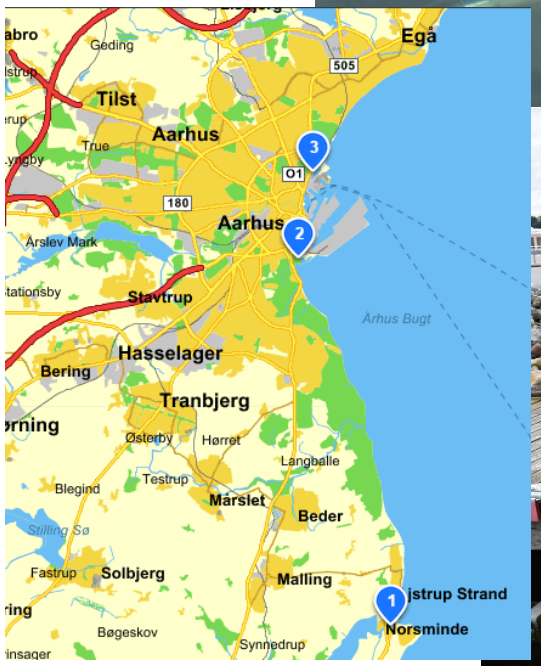

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Content: day 1 15:35

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Content day 1 16:30

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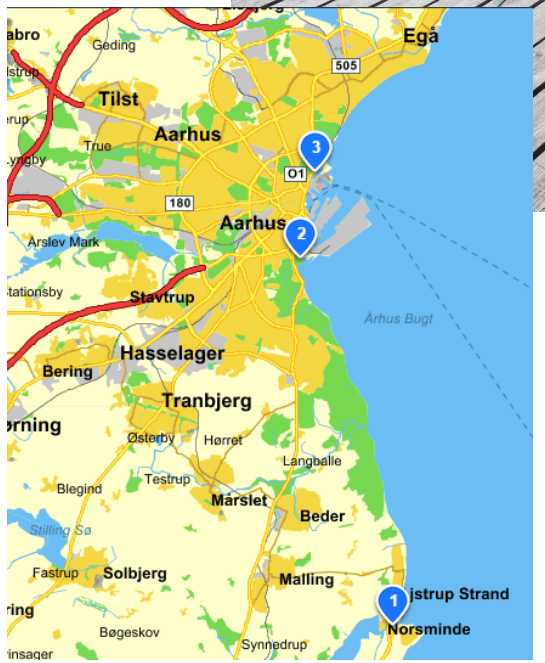

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Next?

- Link it with other waterCoG tools/pilots
  - Governance part, meeting in Danmark involve stakeholders
  - Make a video (rui)

- More in depth monitoring with sonar and seagrass

- Conductivity with higher range
- Now sensor N works
  - Bring it to wetlands

info

- 1) Gl Krovej 2, 8300 Odder
- 2) South: Marselisborg Havnevej 54, 8000 Aarhus C
- 3) North: Fiskerivej 8, 8000 Aarhus C

- https://map.krak.dk/m/kOTyY

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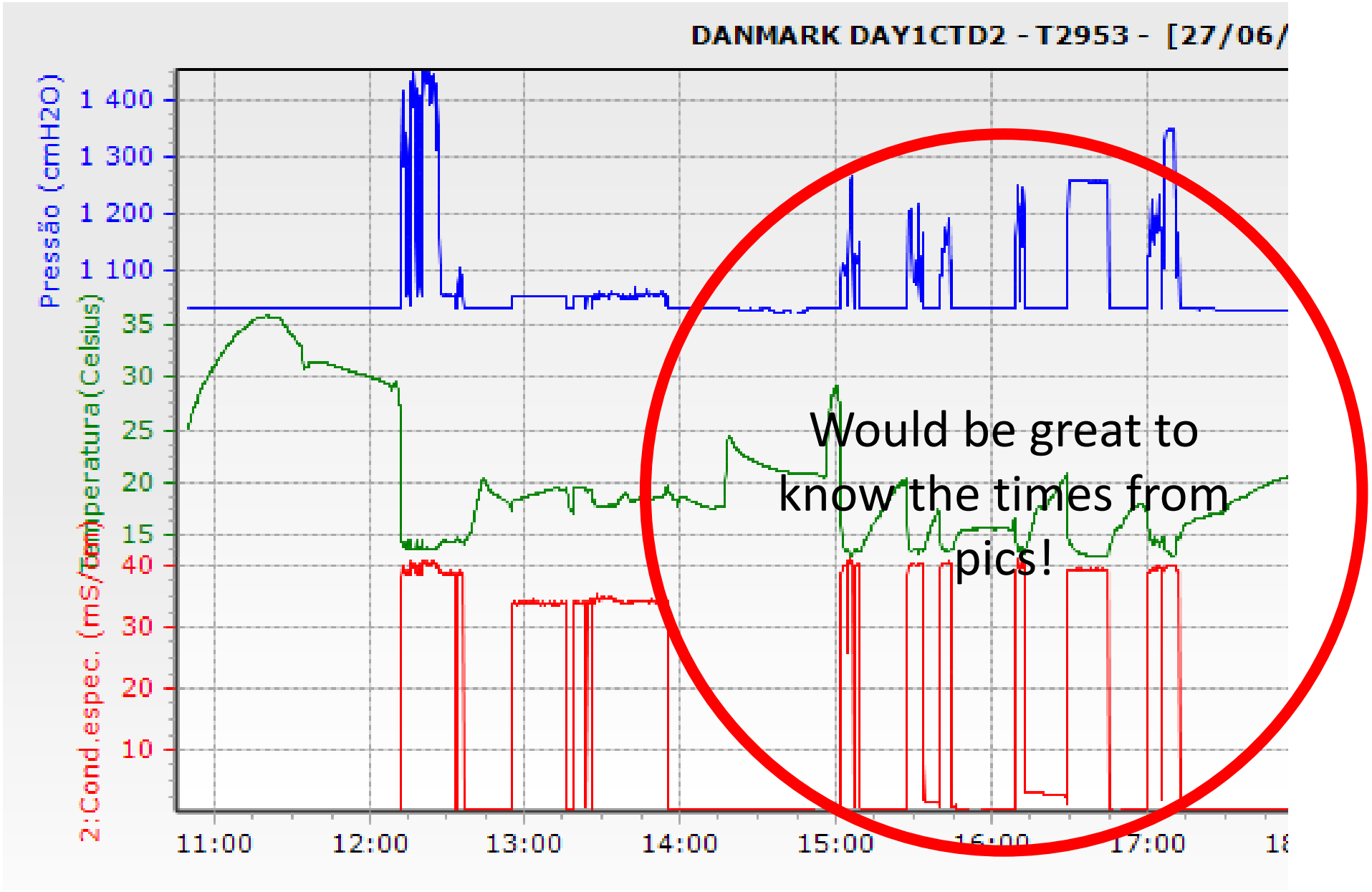
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1 300
1 200
1 100
Temperatura(Celsius)
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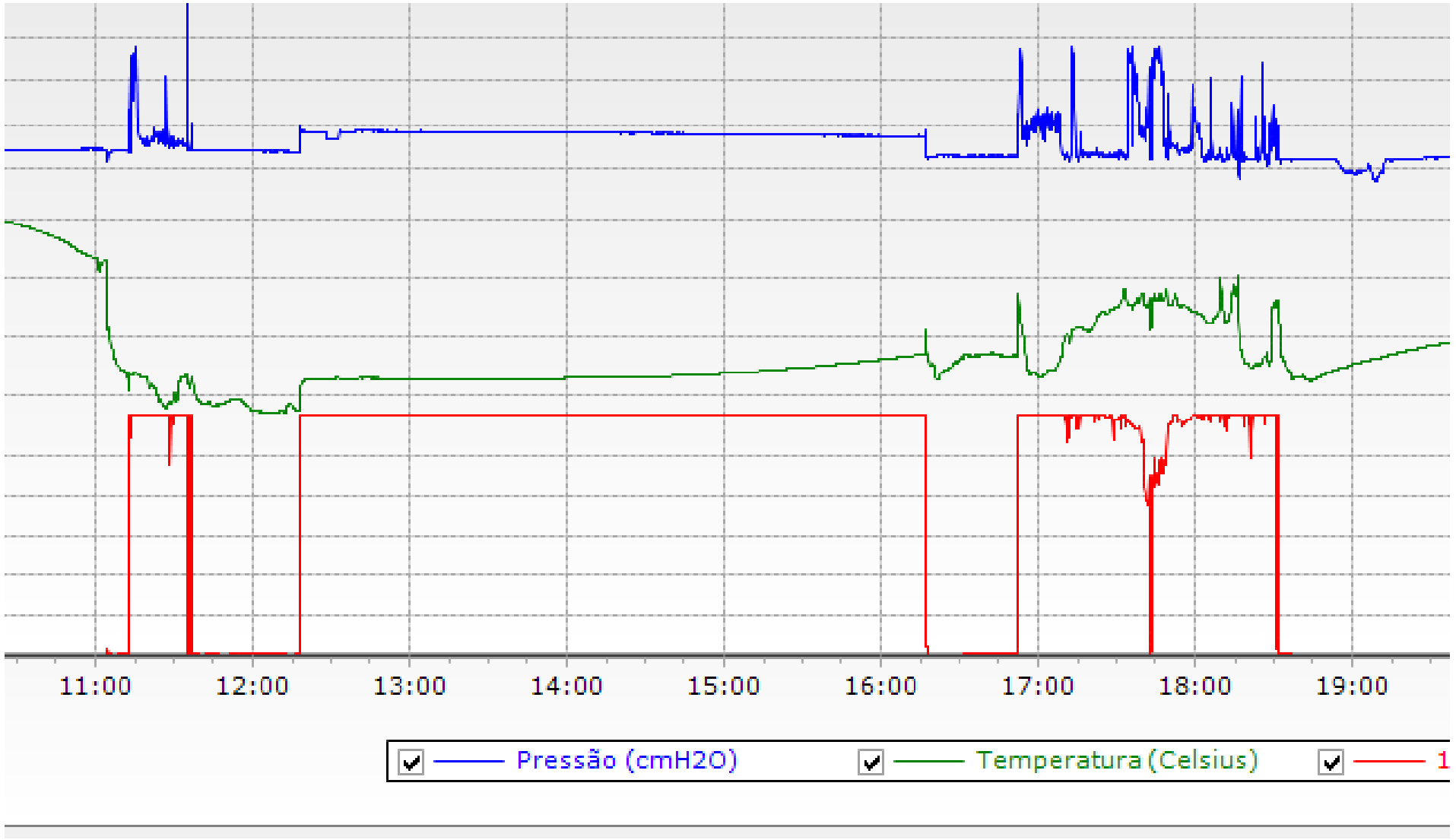
Would be great to know the times from pics!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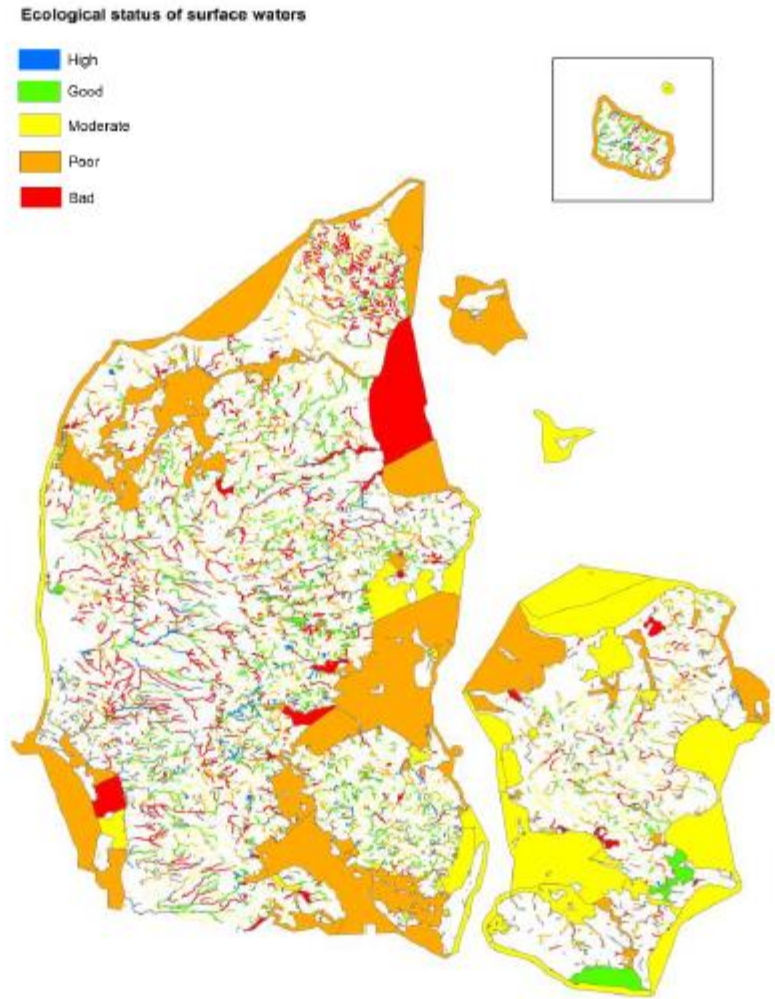

Figure 2.2.1 Ecological status of the Danish surface waters: Streams, Lakes and marine waters (Danish Nature Agency, 2014).

Anlæg & Miljø

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Landbrug & Fødevarer F.m.b.A.
Agro Food Park 15, DK 8200 Aarhus N
seges.dk

People involved

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M	+45 3092 1763
E	flg@seges.dk

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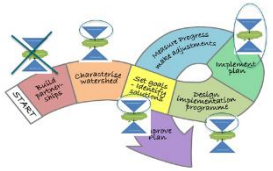

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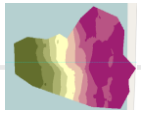
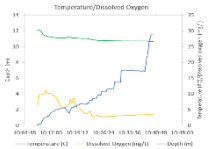

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