

Botngaard AS

Perma skirts



4th. Sea lice Multination
Trondheim 11th and 12th November 2013

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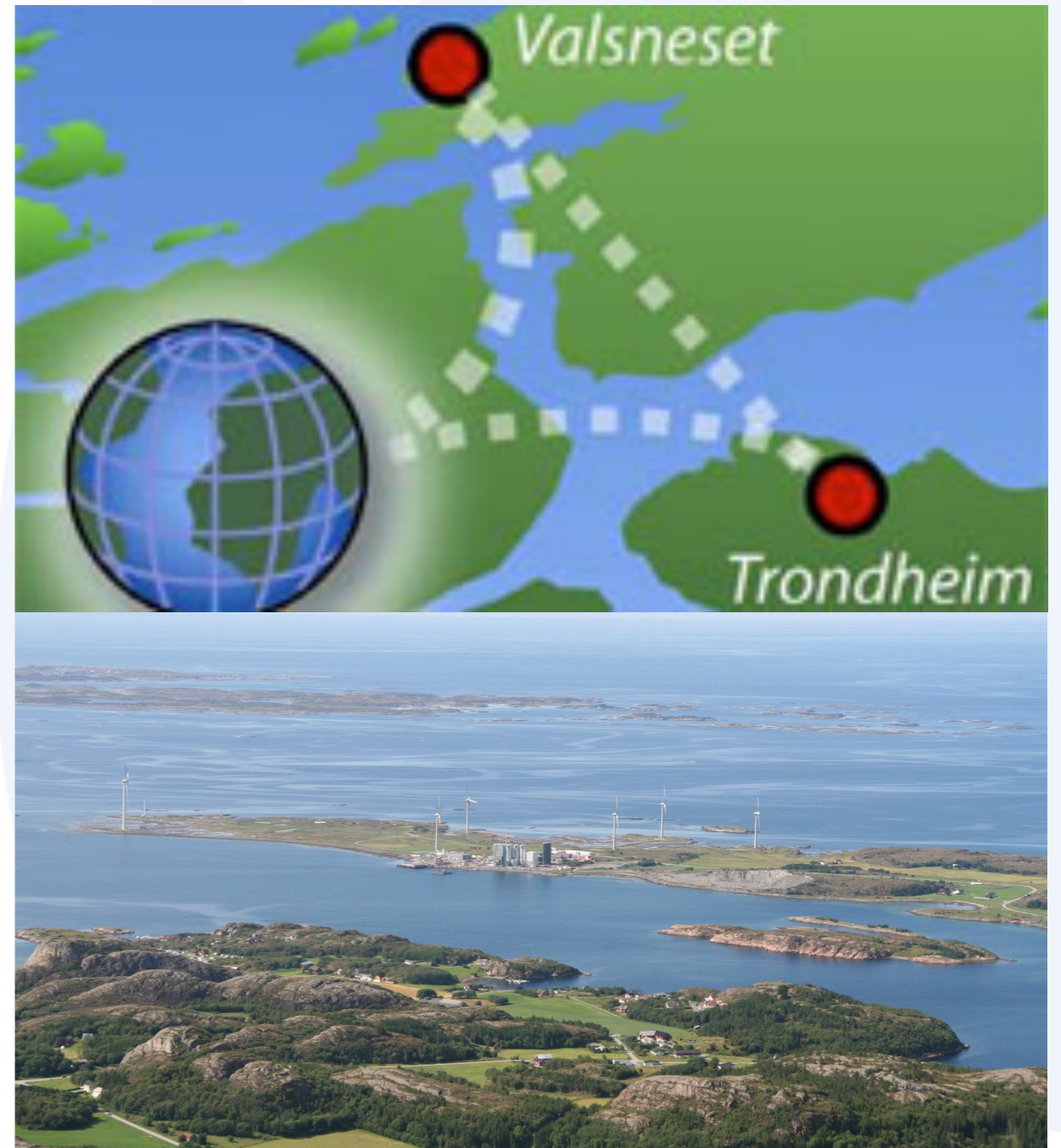
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TRYGGERE HAVBRUK

Botngaard AS

- Est.2009
- Develop and make tarpauline solutions to fishfarming. And only that.
- The Company has initiative to several projects on delousing, prevent lice marks, closed cage to postsmolt and also closed cages with full cleansing to slaughter. Together with fishfarmers, research company and suppliers.
- We are project owner or partner in R&D projects with a total value of 40 mill.NOK in the period 2010-2015



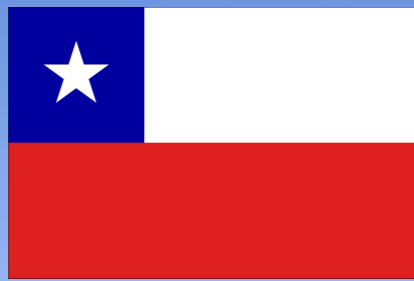
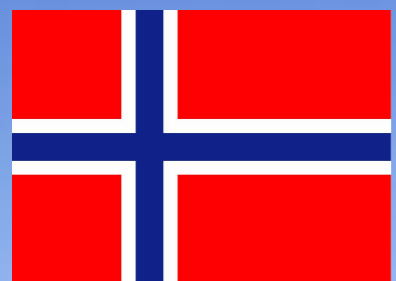
- The Company moved into a new site in november 2010





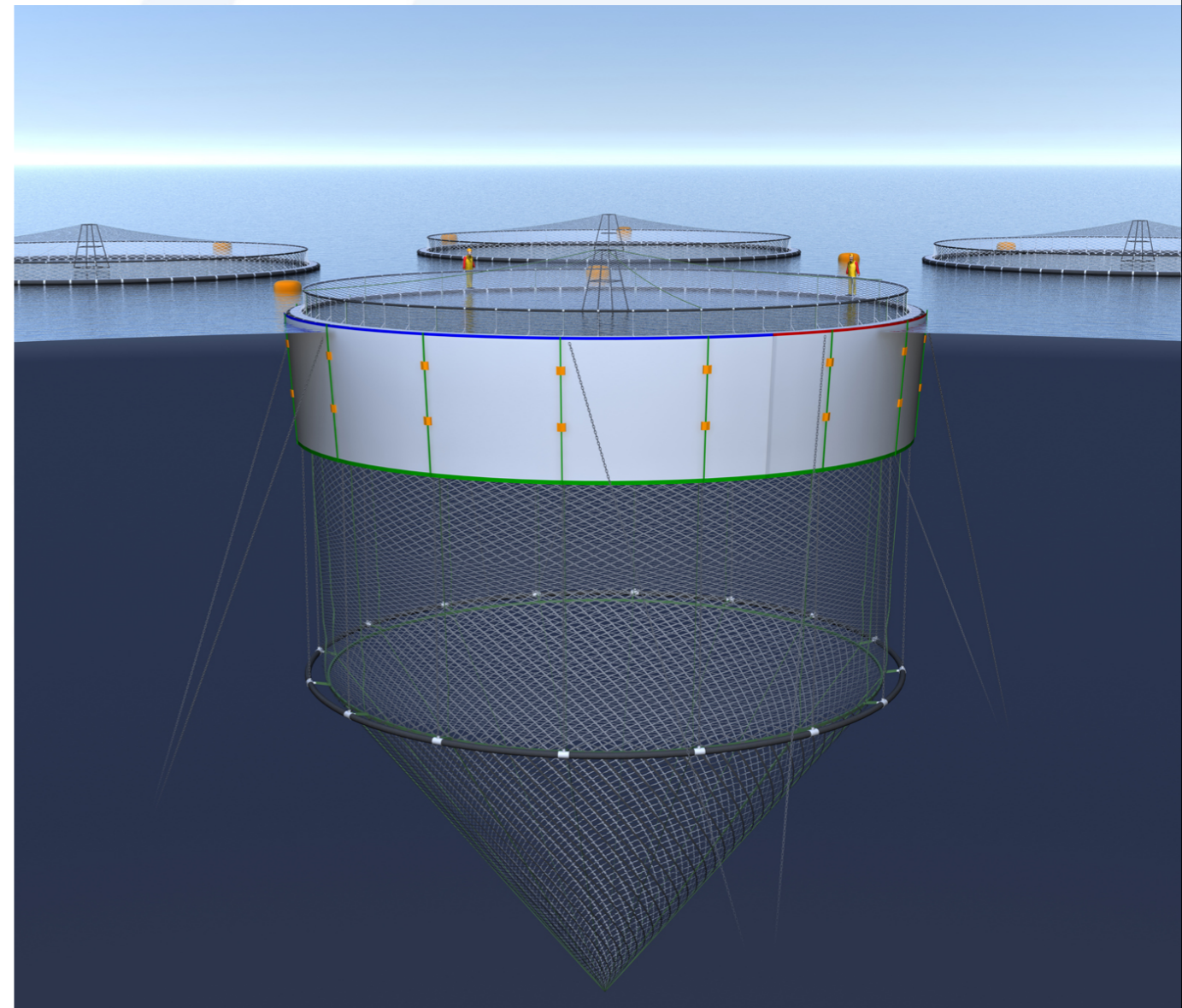
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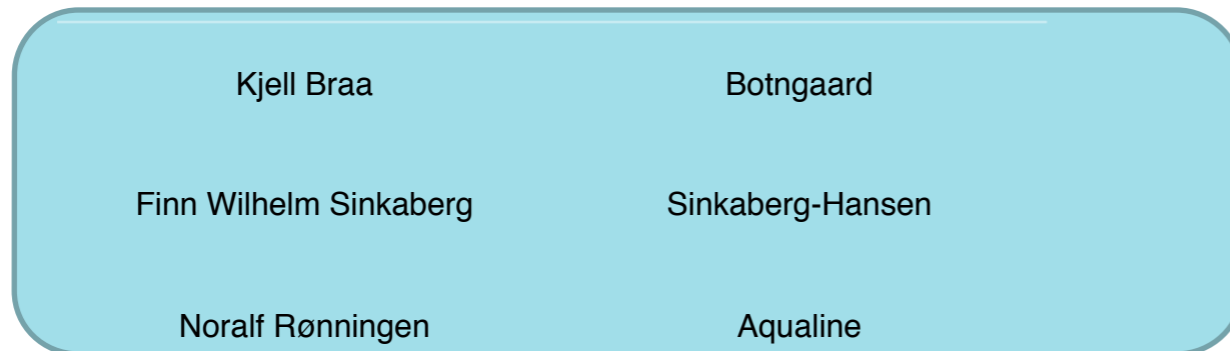
Perma skirts.
To prevent lice marks.
Two skirts with overlap.
5m deep.



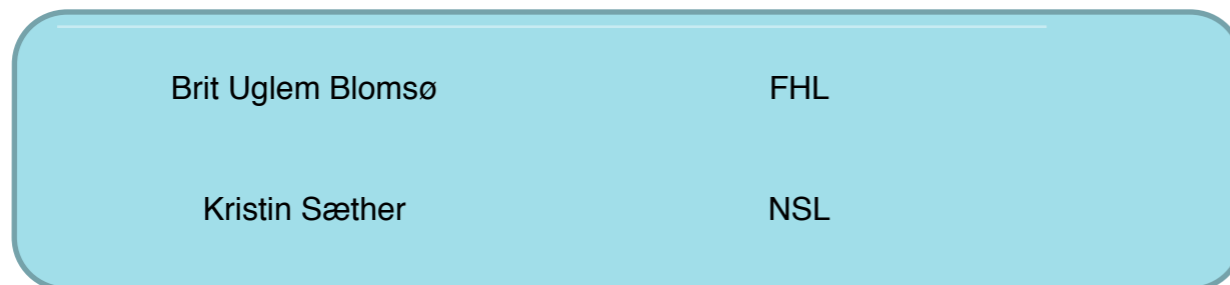
Permaskirt to reduce Lice marks

- Financed by Norwegian Seafood Research Fund
- 3 year's project. Start in January 2012

Styringsgruppe



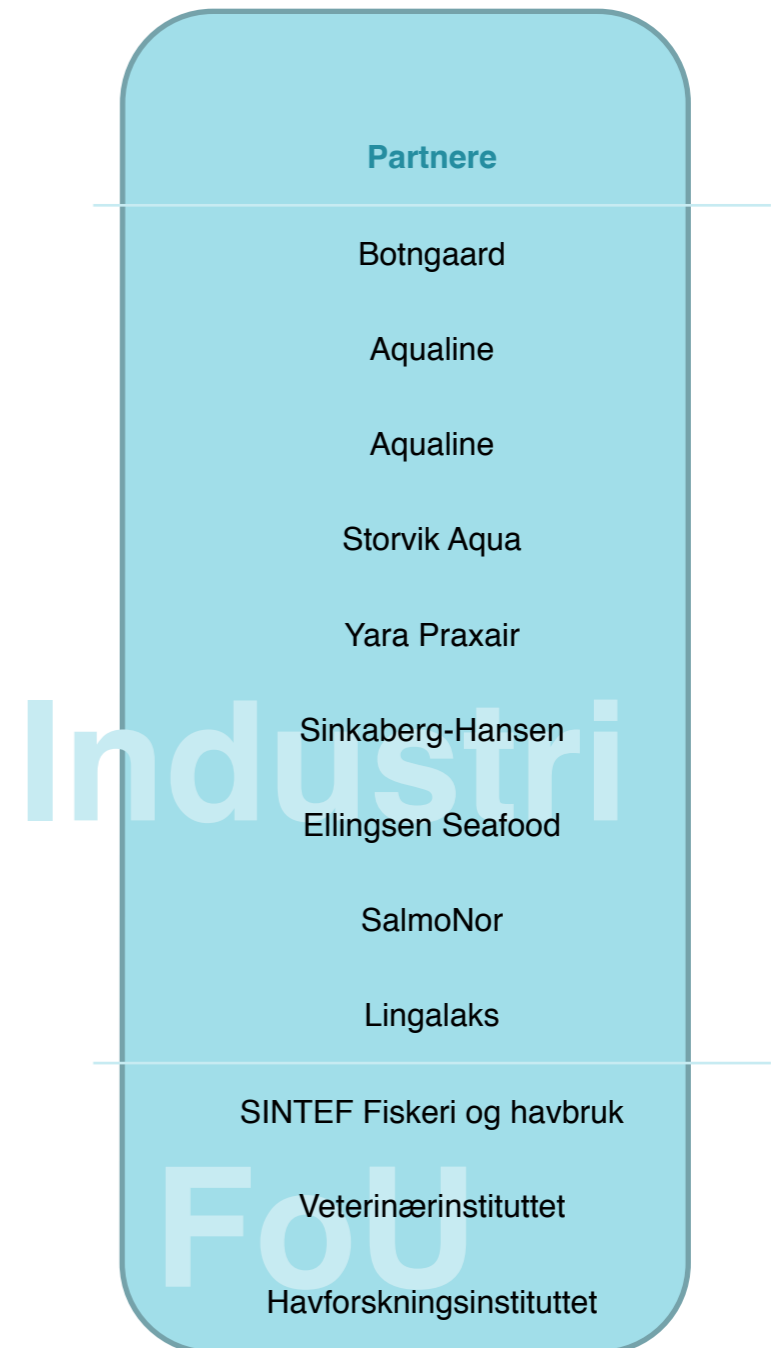
Observatører



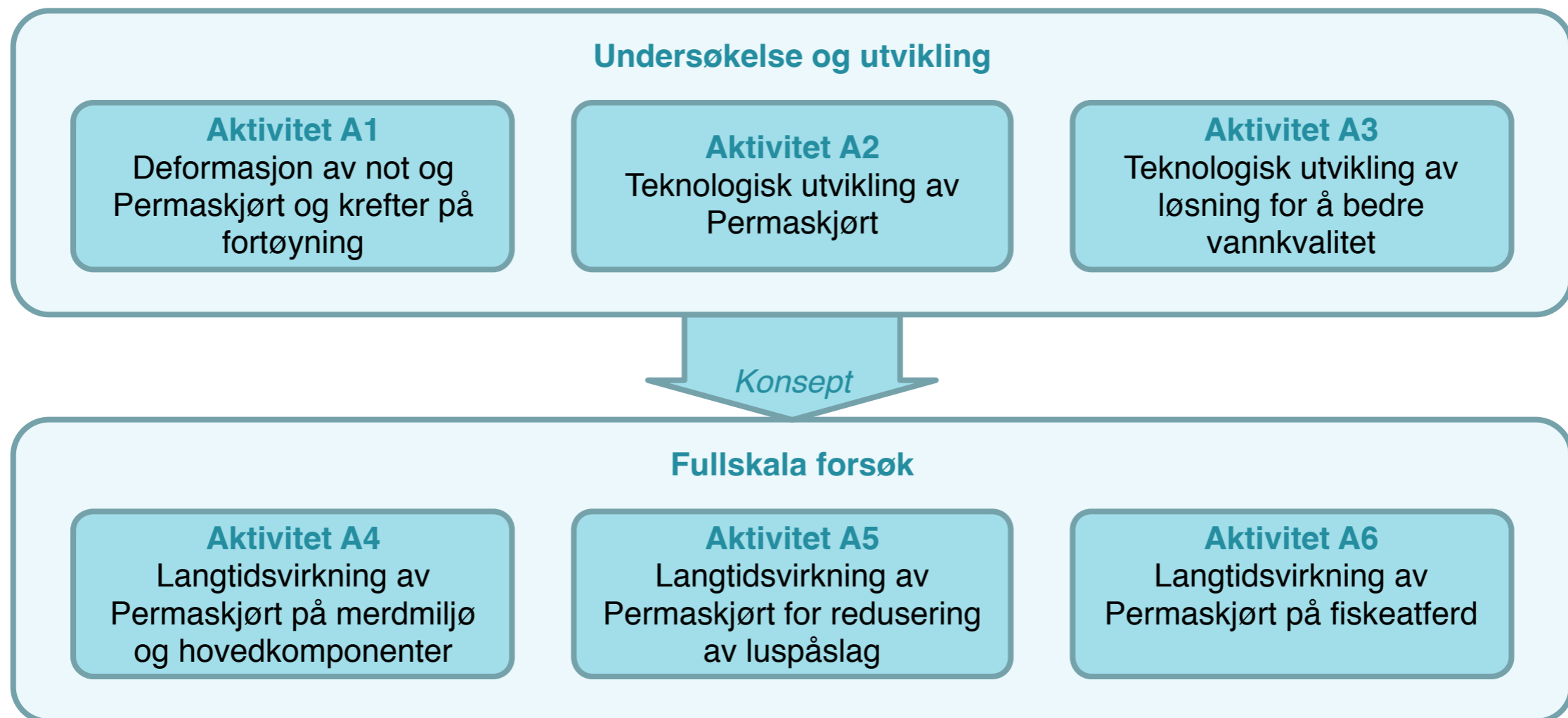
Ansvarlig hos FHF



Partnere



Aktiviteter



- Partners in the project:

- Botngaard
- Aqualine
- Xylem Flygt
- Sinkaberg Hansen
- SalmoNor
- Ellingsen Seafood
- Storvik Aqua
- Havforskningsinstituttet
- SINTEF Fiskeri og Havbruk
- Lingalaks
- Veterinærinstituttet
- Aquastructures
- Yara Praxair



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**Perma skirts:
the skirts is mounted
Outside the flow ring.
Skirt fastened with ropes over
the walkway in the band.**



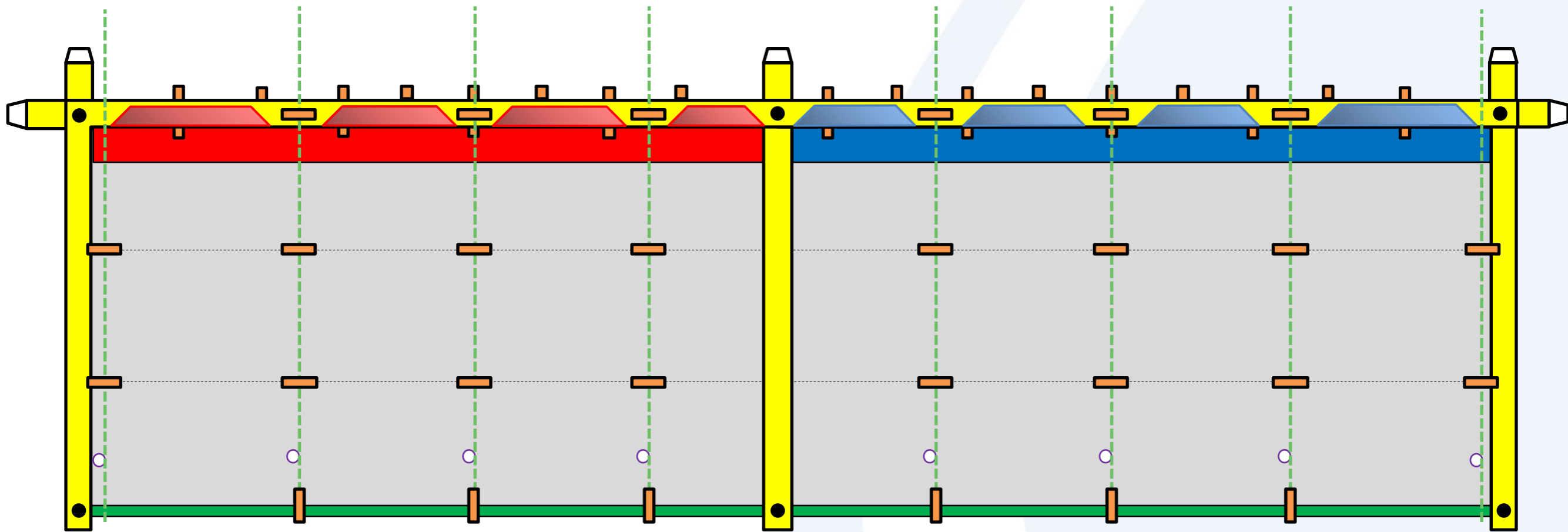


Not correct



Correct





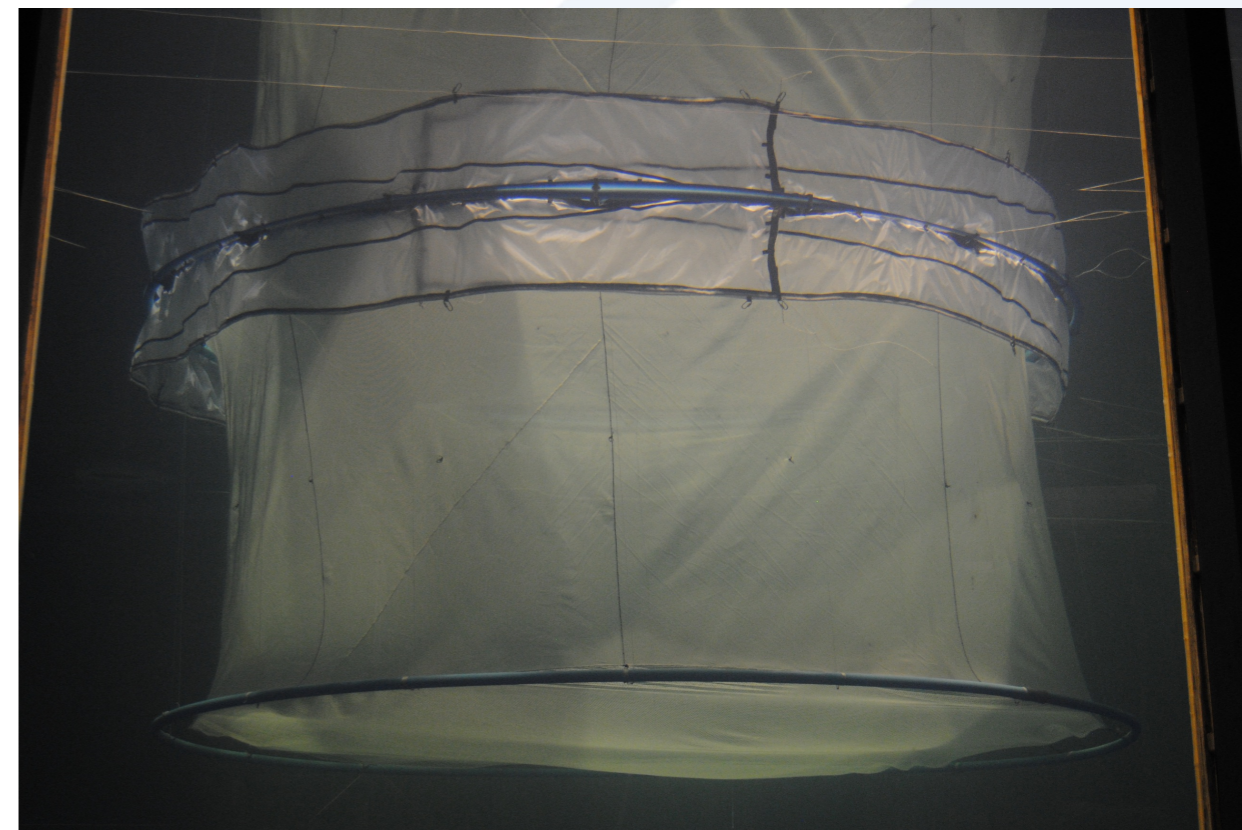
The skirts have a lift system, so it can quickly lifted

The items.oxygen drop in the ocean.

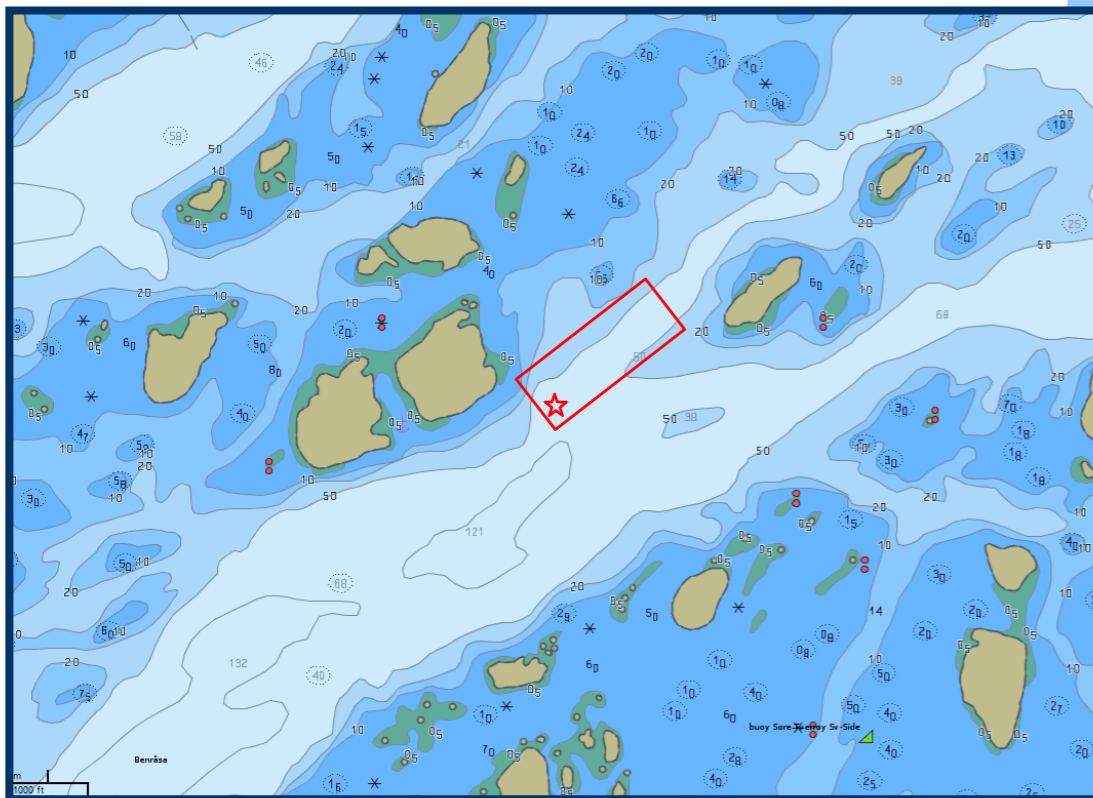
Developed in cooperation with Sintef and leading fishfarmers.

Permaskirt

Tested in SINTEF's flume tank in Hirtshals.
Tested in current up to 80 cm/sec.



One of test sites



157m Cage
5m deep at the side of net
20m deep in center of the net

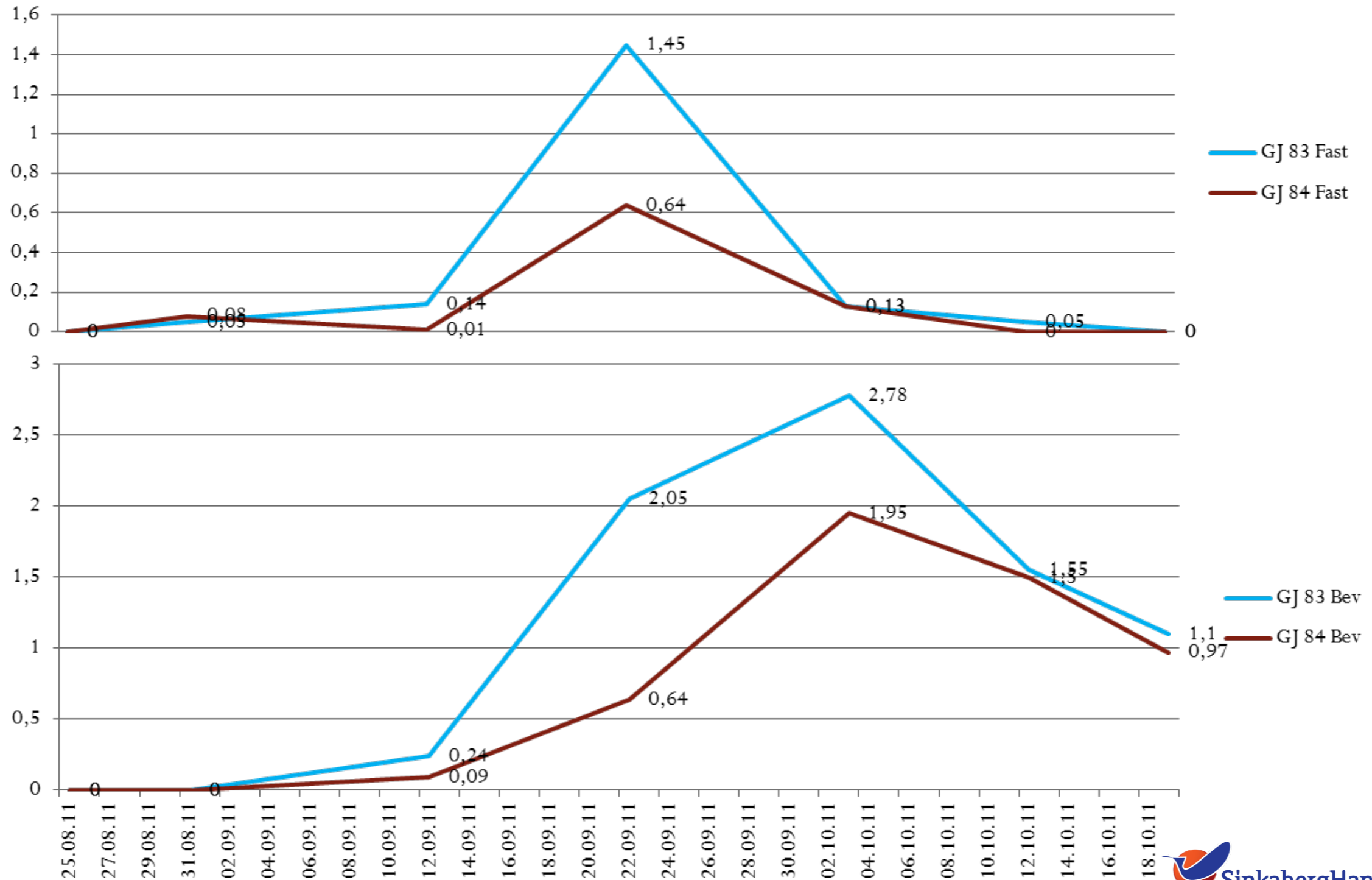
ca. 140.000 fish
Aproximately 0,9kg

Long-term effect of Permaskirt

- 4 Sites
 - Nord-Norge
 - Midt-Norge
 - Vest-Norge
- Field Testing of our 2013 Duration
- 12 months 3 cages with skirt
- Control Cages

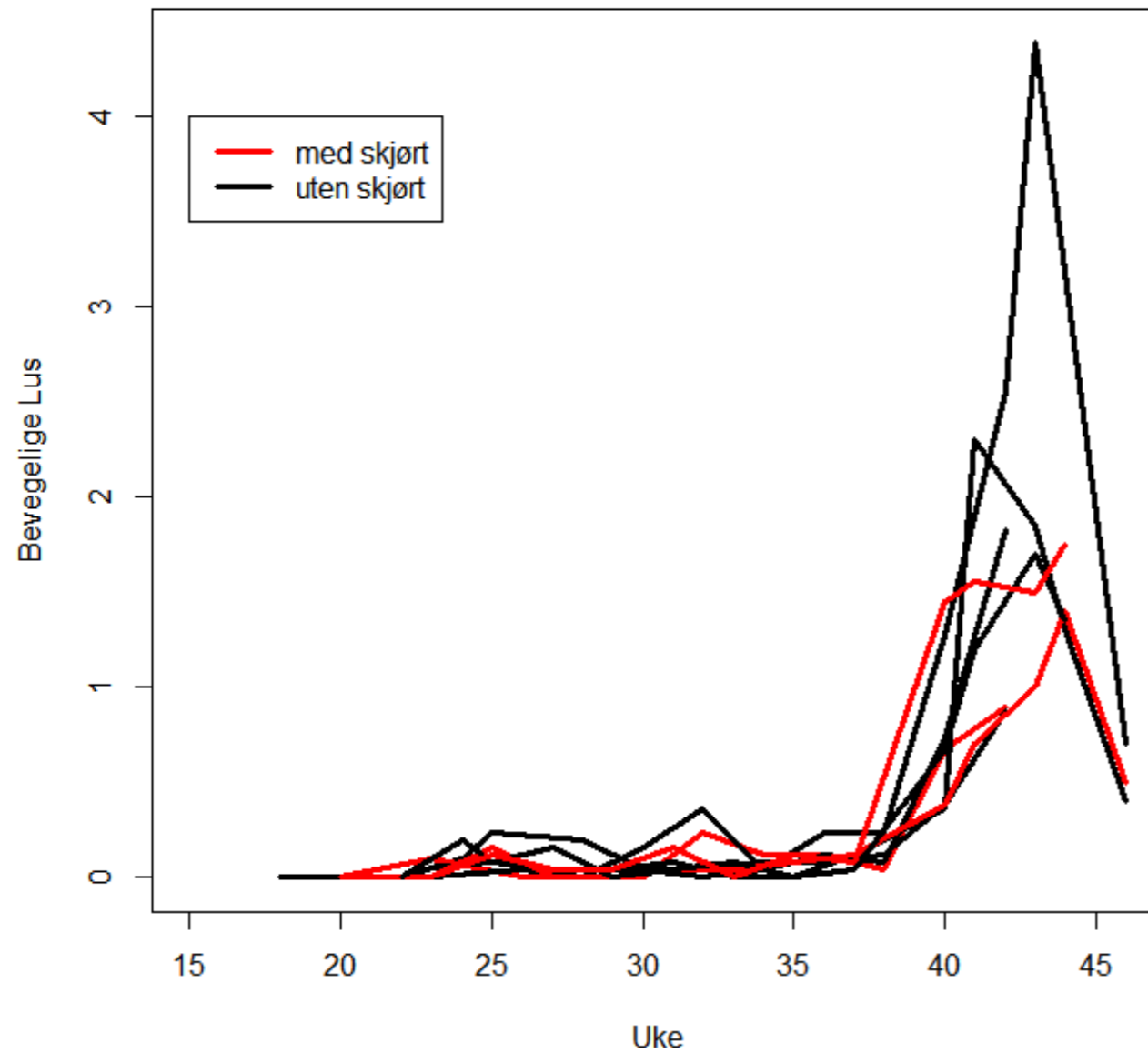


Reduce lice marks



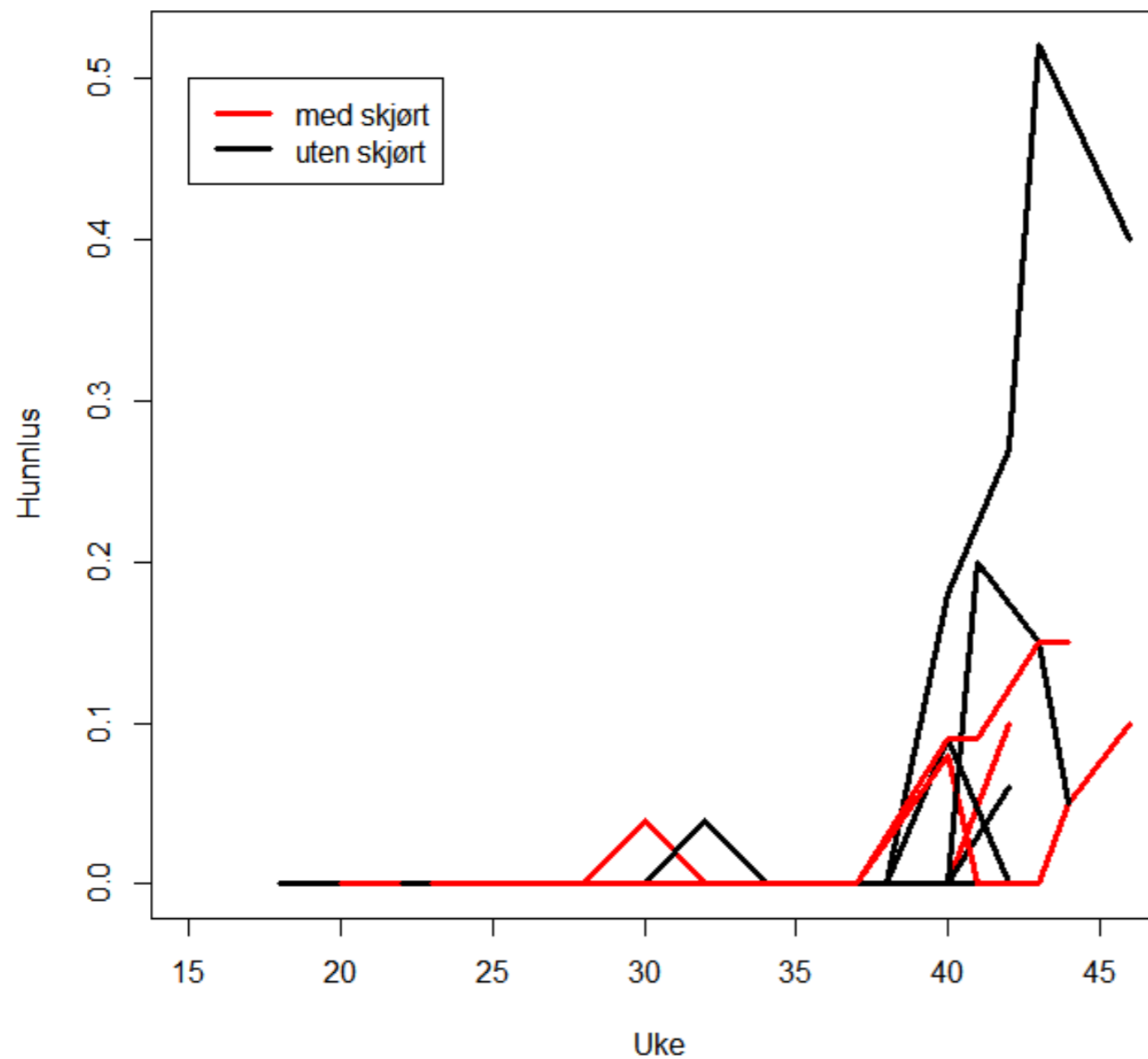
Permaskirt Sinkaberg-Hansen 2012

Bevegelige Lus



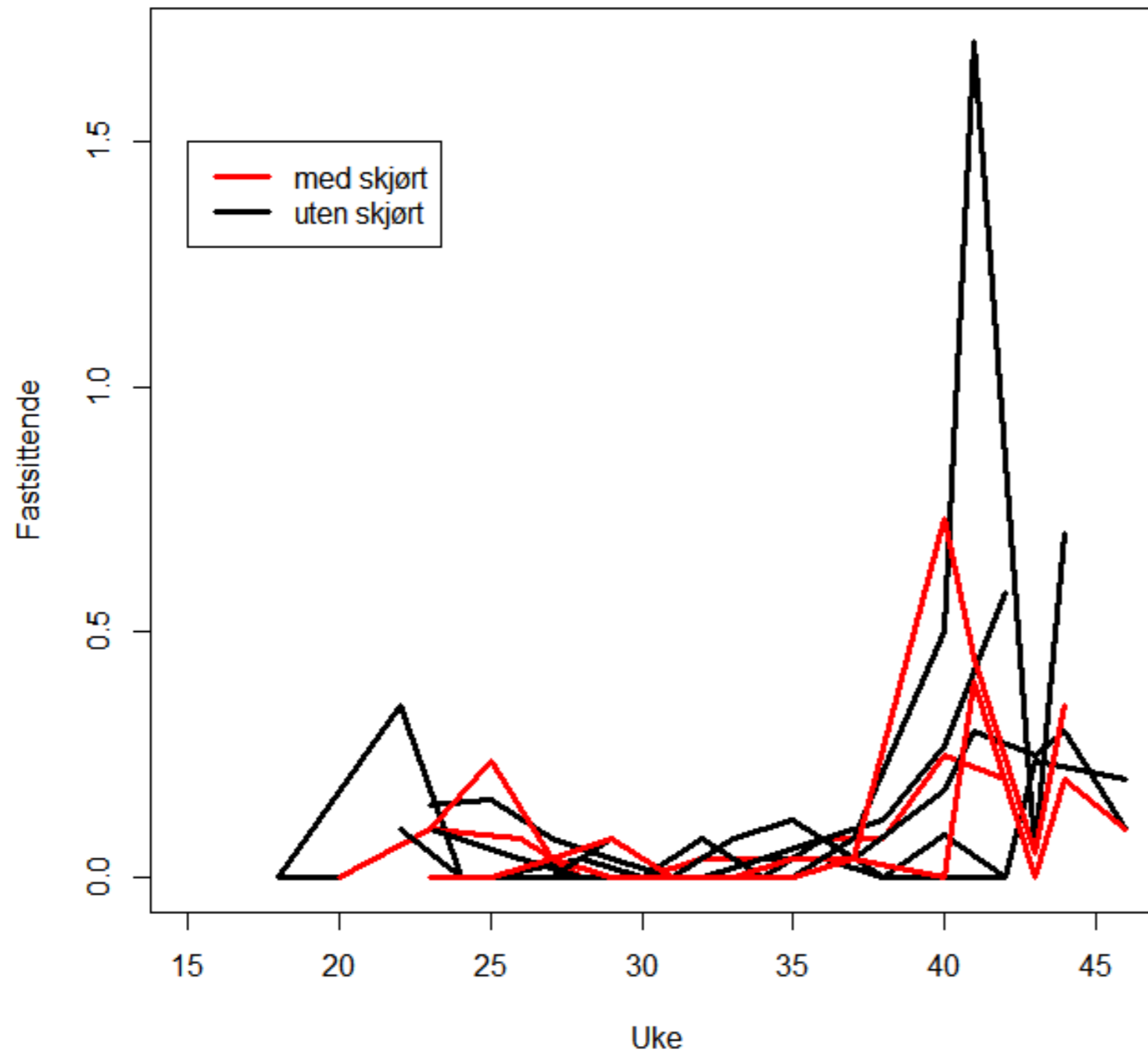
Permaskjørt, Sinkaberg-Hansen 2012

Hunnlus

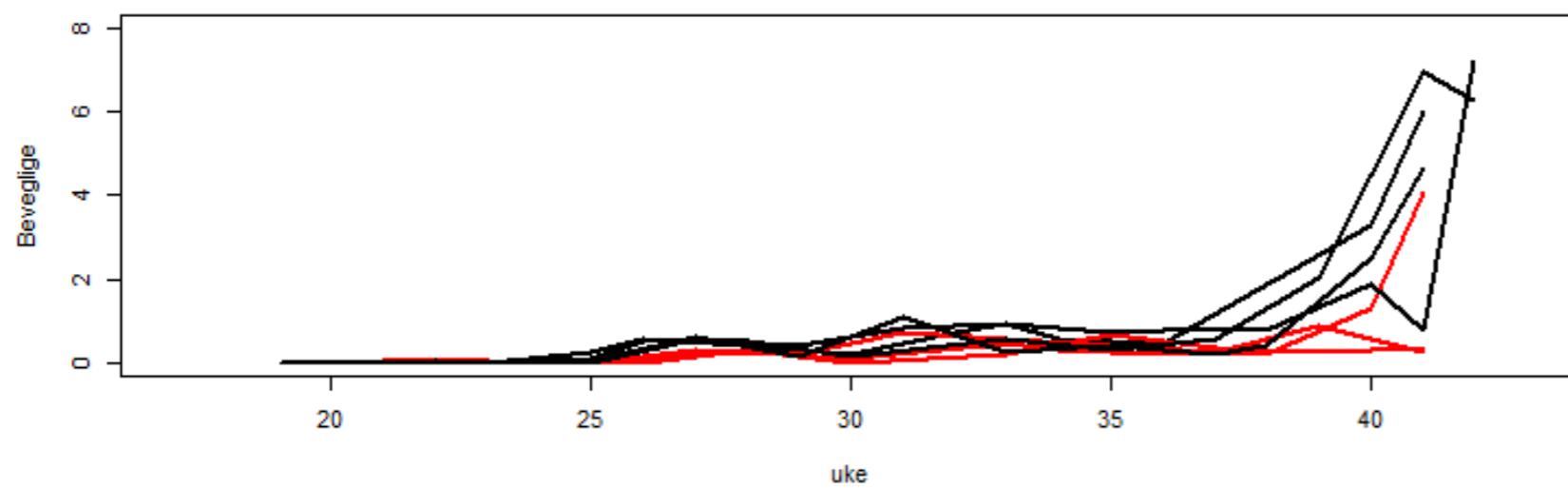
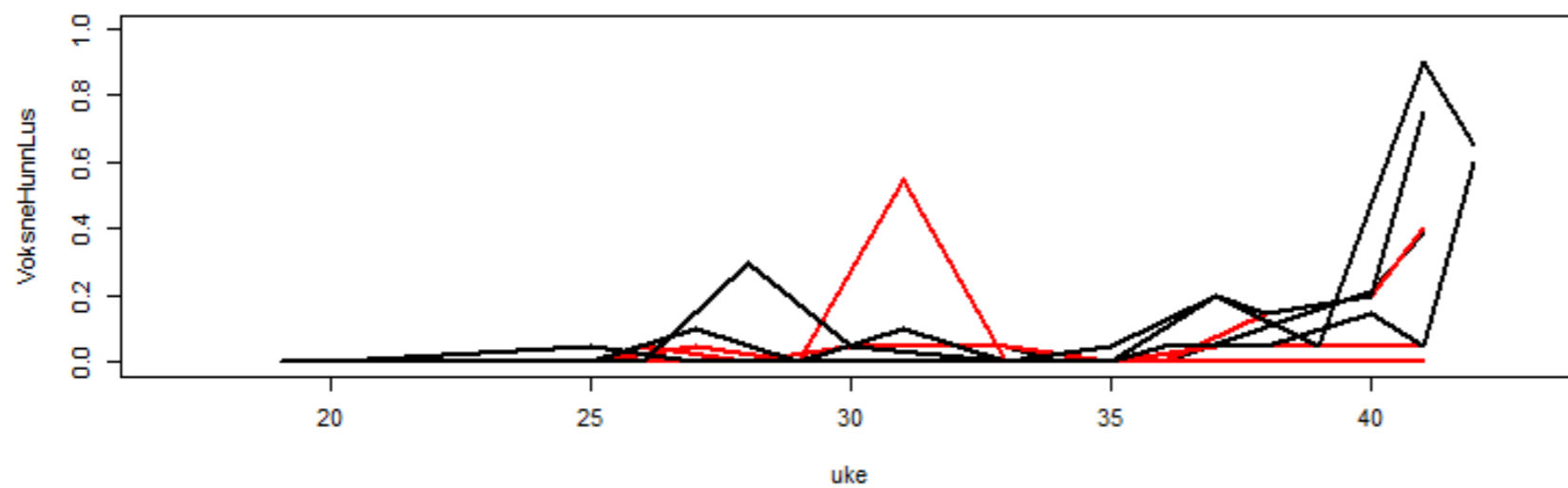
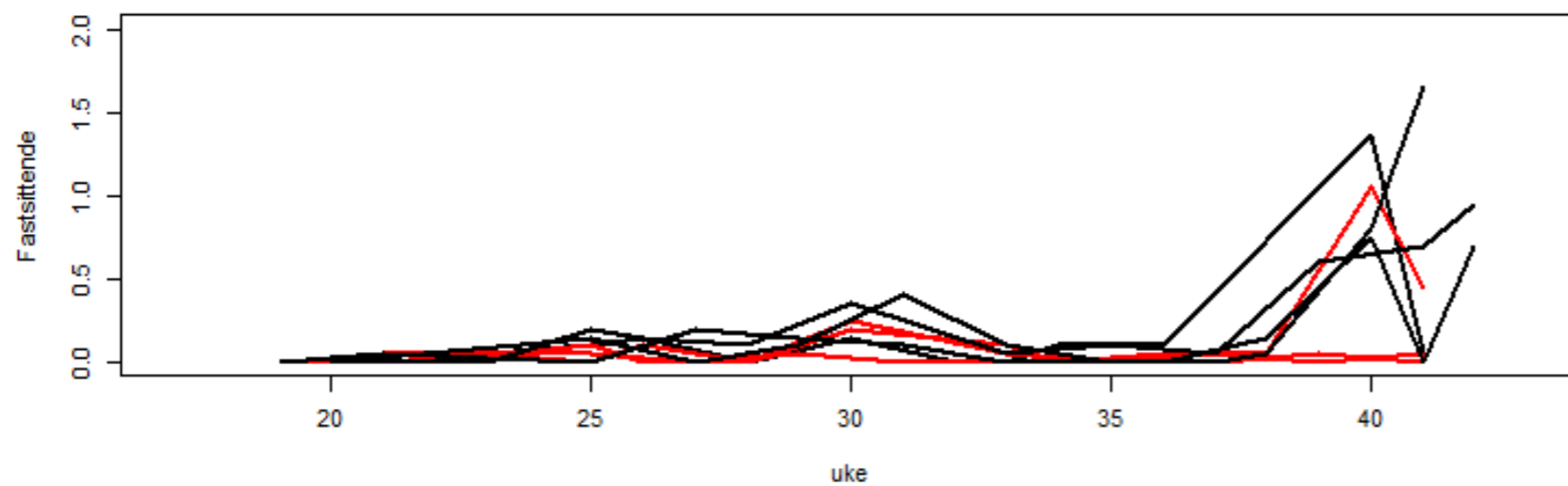


Permaskirt, Sinkaberg-Hansen 2012

Fastsittende

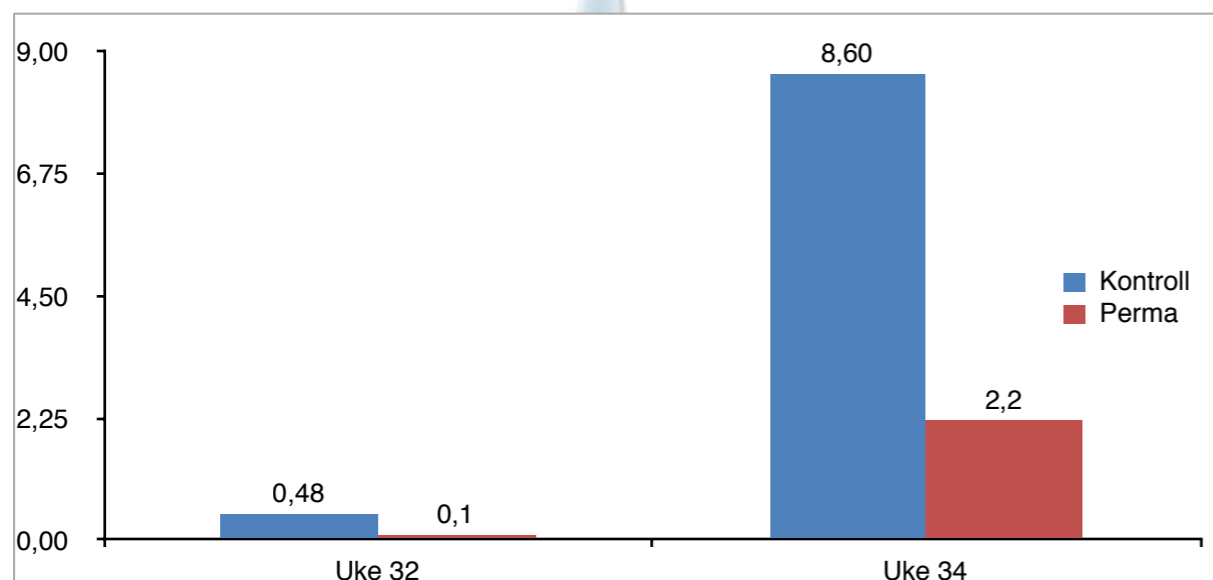


Nord-Gjæslingan



Lusetall

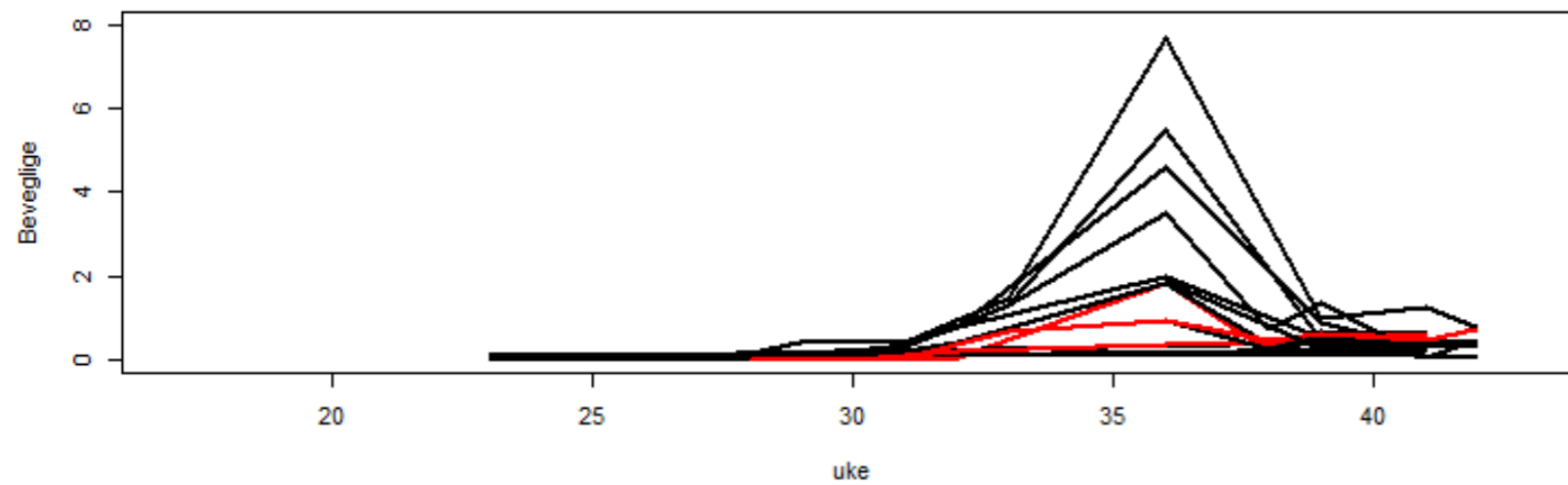
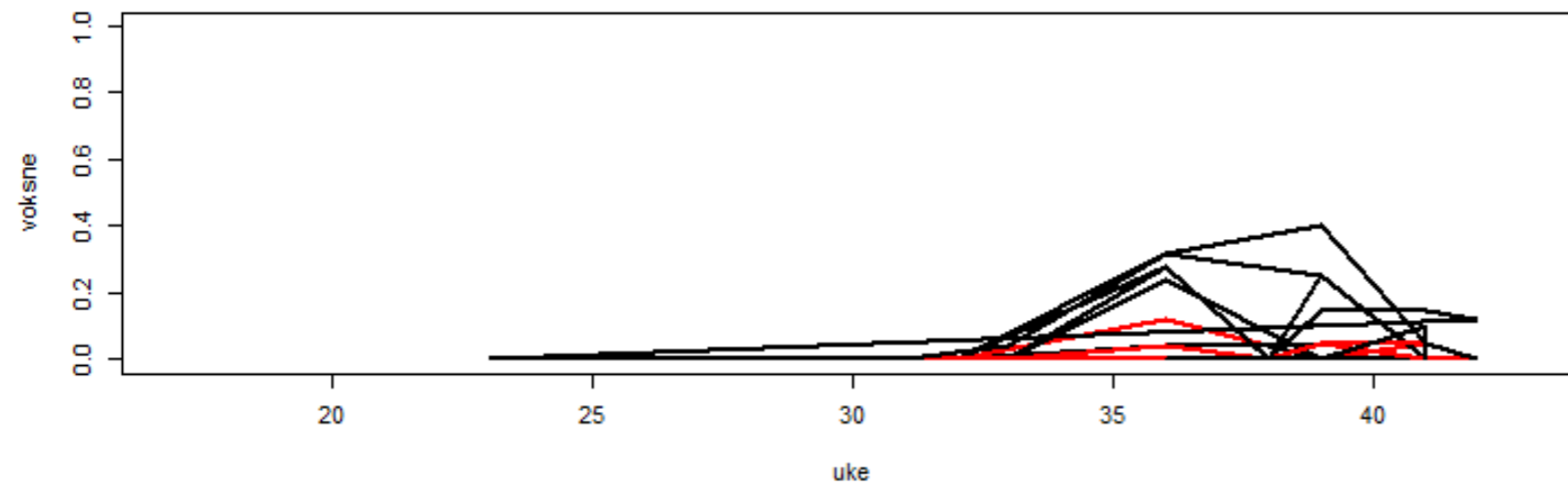
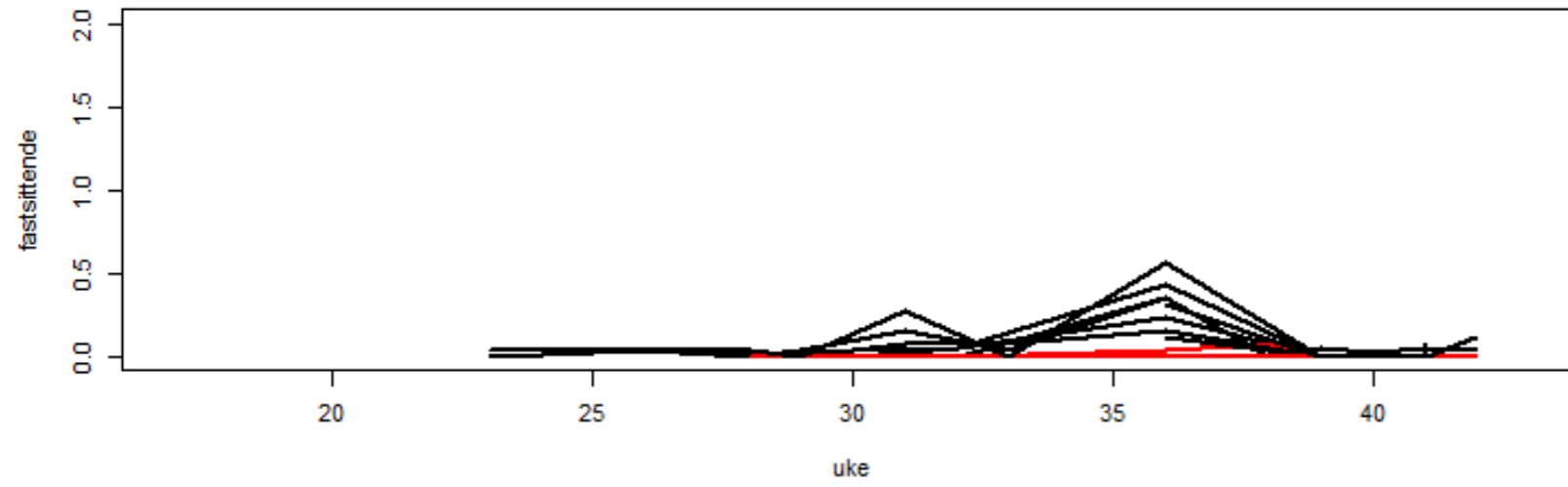
Lusetelling alle stadier.



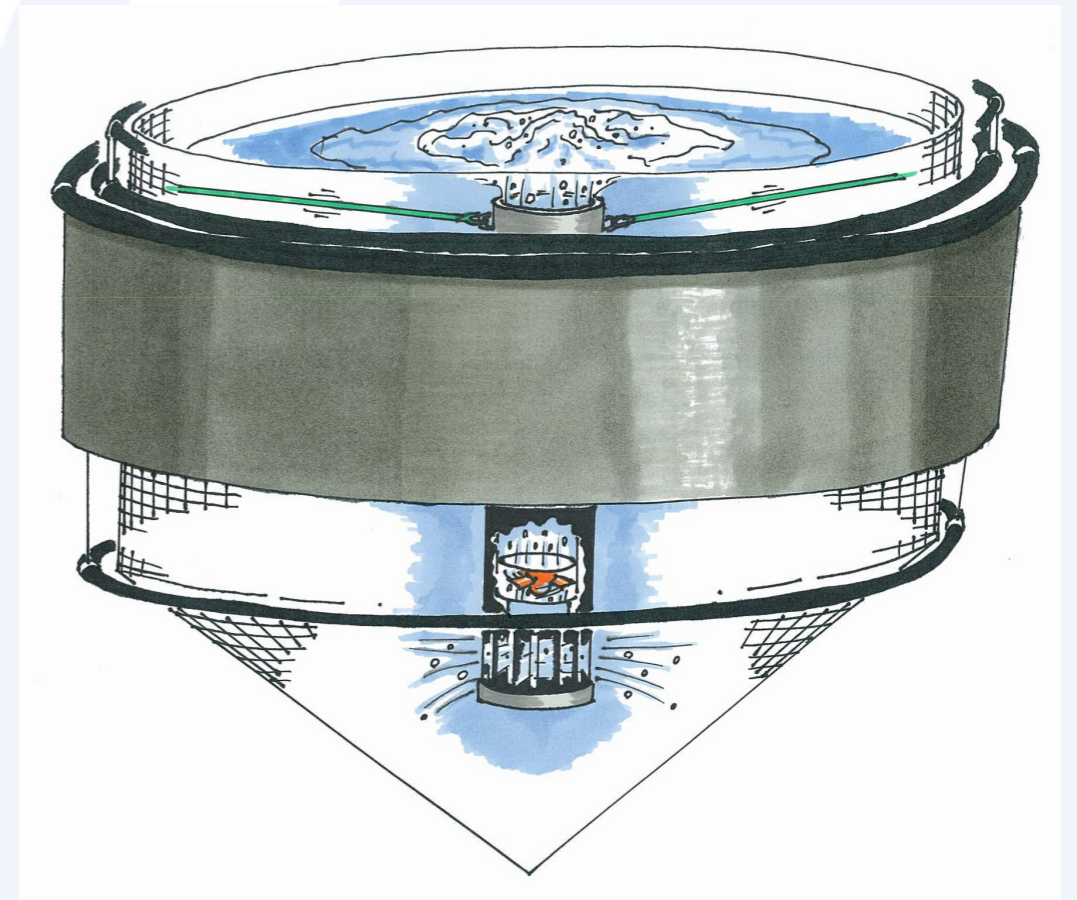
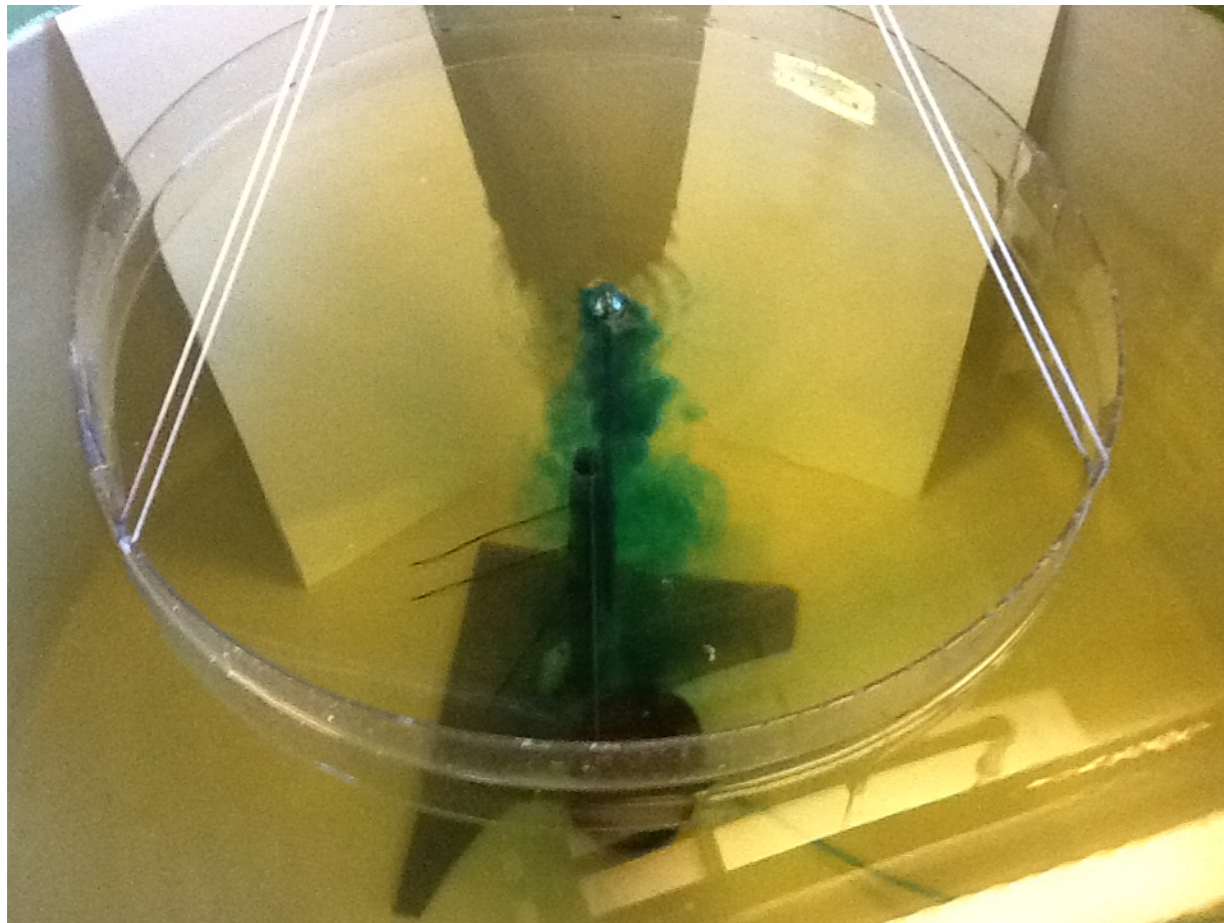
To merder med permaskjørt og to uten. Smolten er satt ut med en ukes mellomrom. Kontrollgruppa ble satt ut først.

Jeg var selv med og telte i uke 34. Vi har en del merder med taperfisk i overflate. Derfor kan den blå søylen være noe for høy. Likevel var det et betydelig påslag av lus på den friske fisken også. Skal jeg tippe vil et rettere tall på blå søyle være mellom 6 og 7 lus i snitt. Når det er sagt fikk vi også opp taperfisk i merder med permaskjørt som var lusefrie. En svært bra indikasjon.

Ellingsen



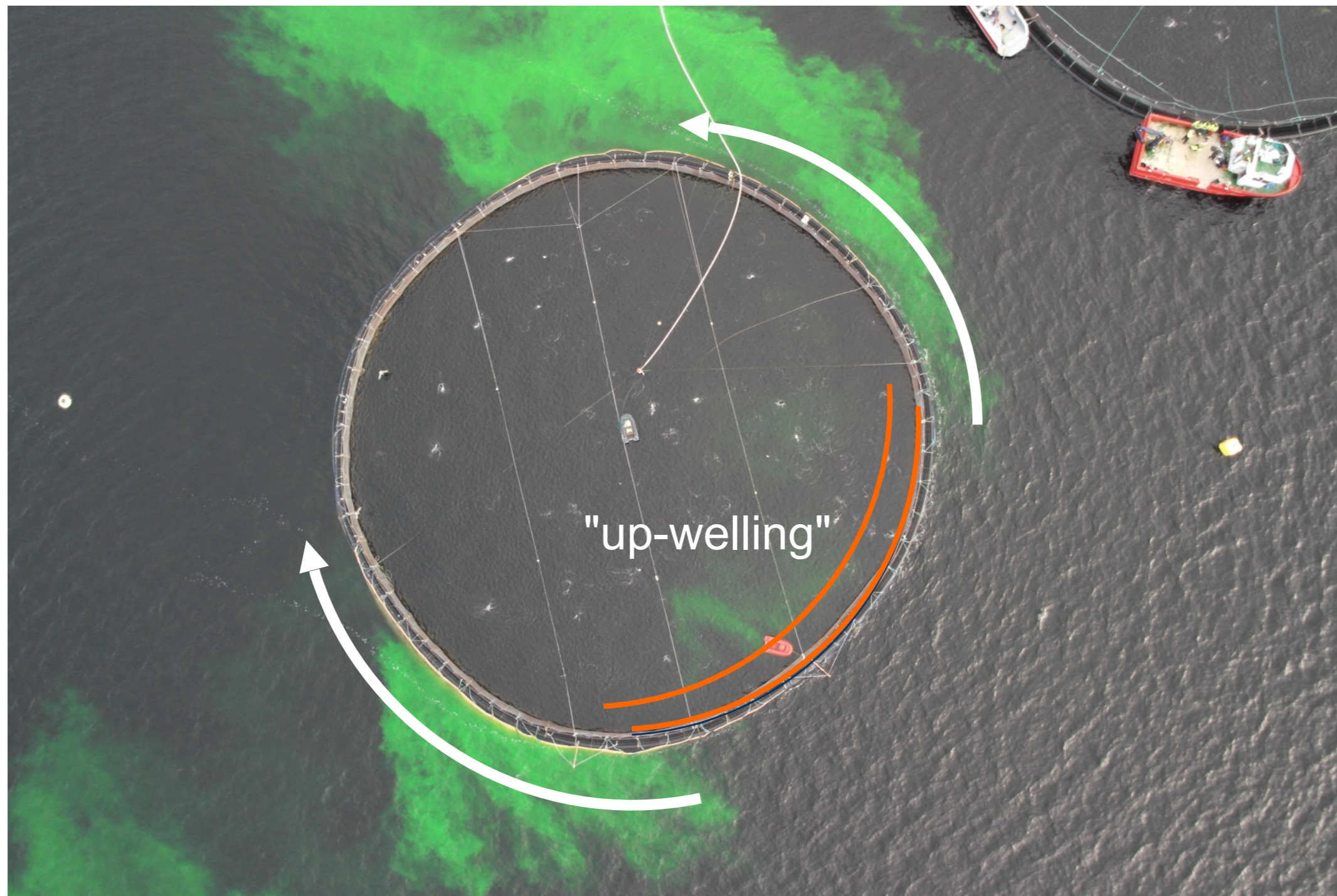
Oxygen level Pumping of water from greater depths: Currently, out of the question due to weight / distribution of water.



Current with skirt

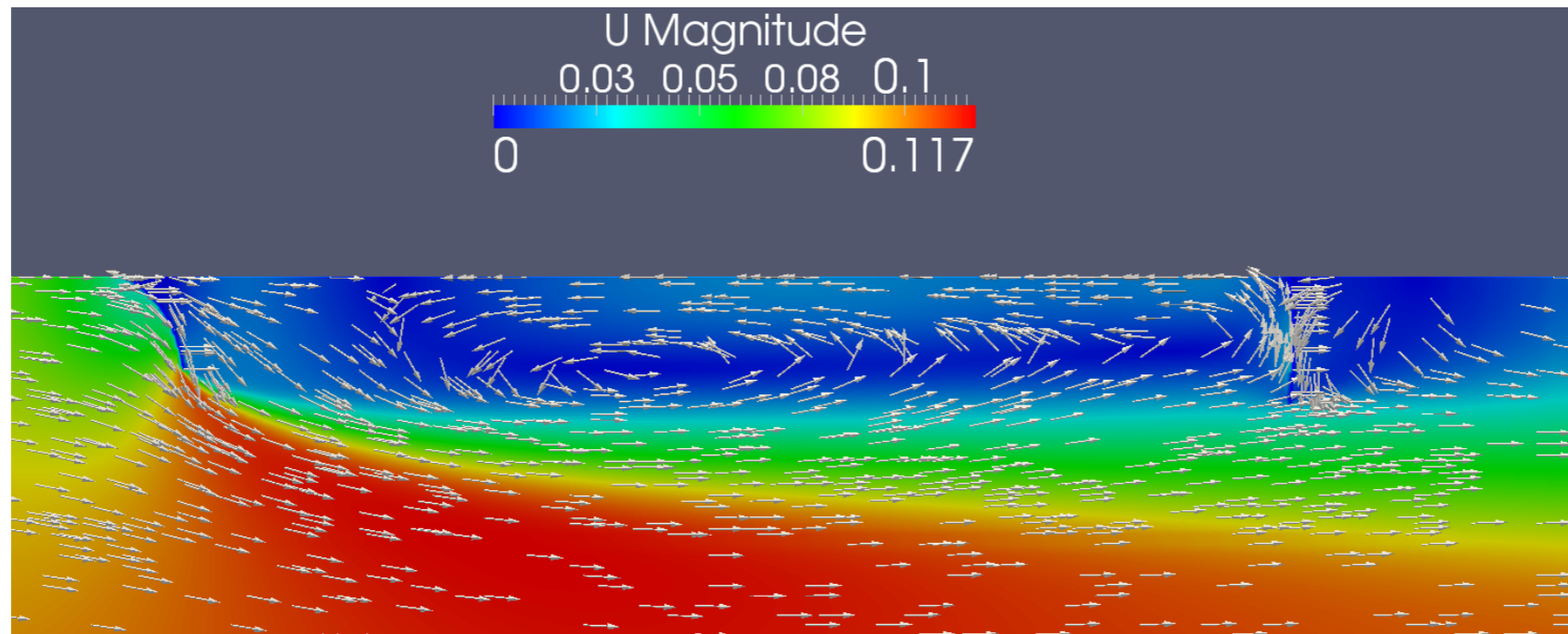


Current with skirt



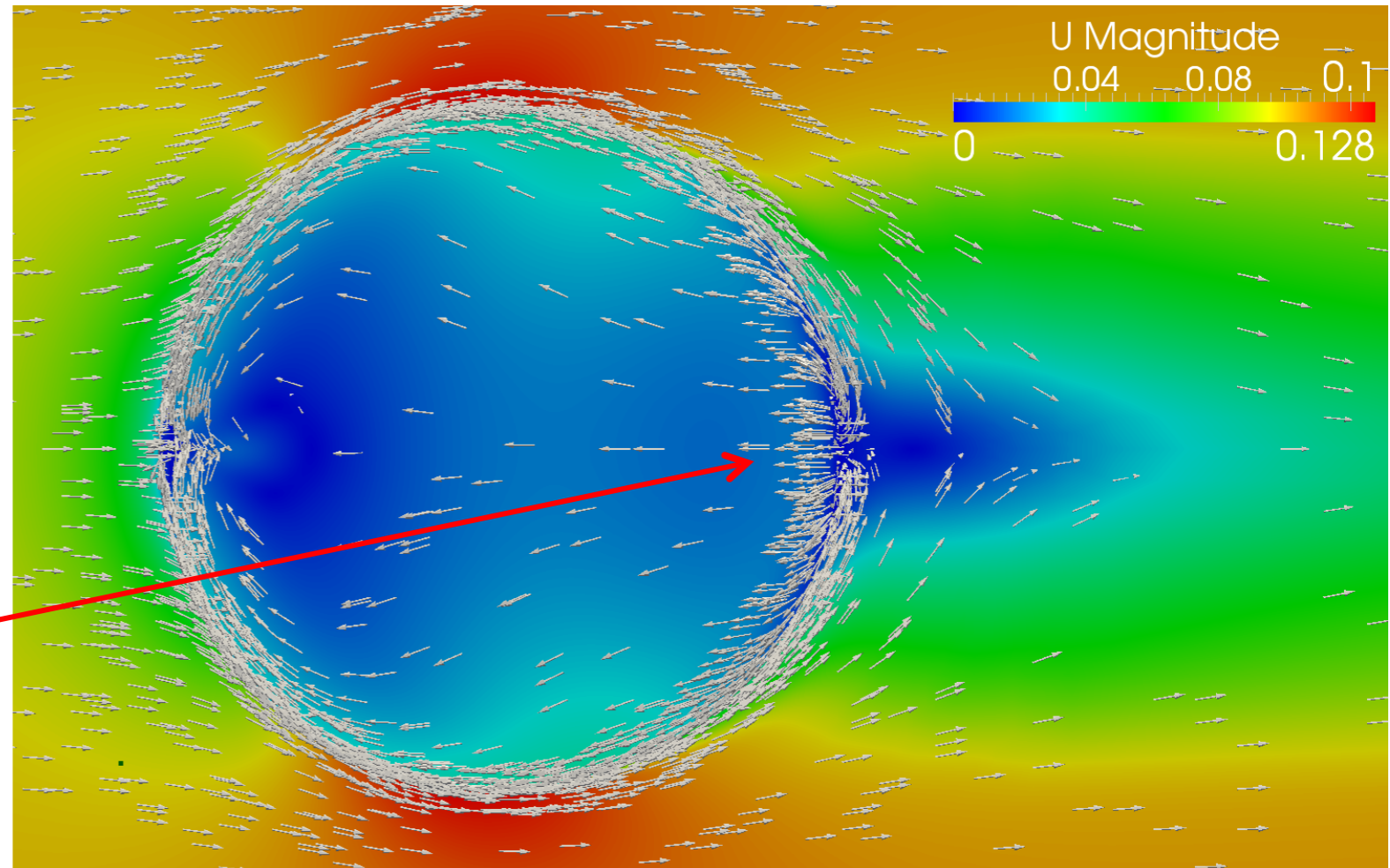
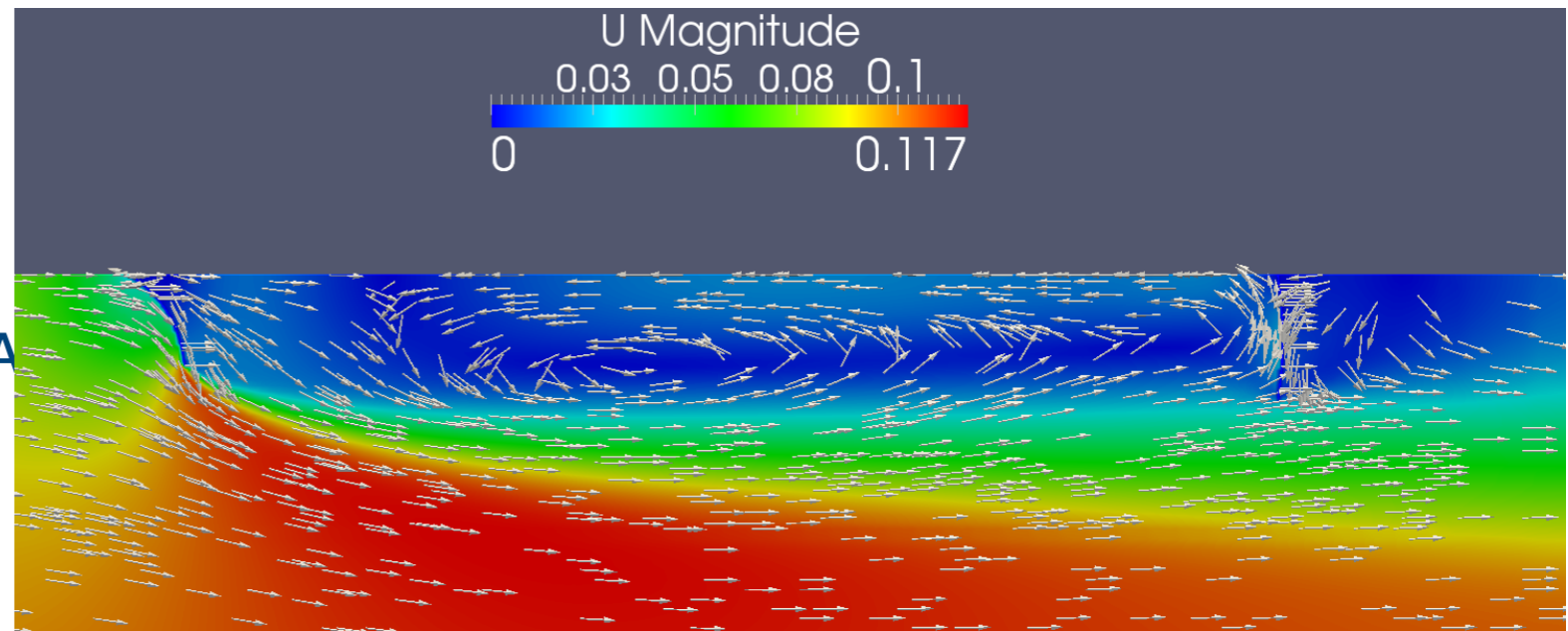
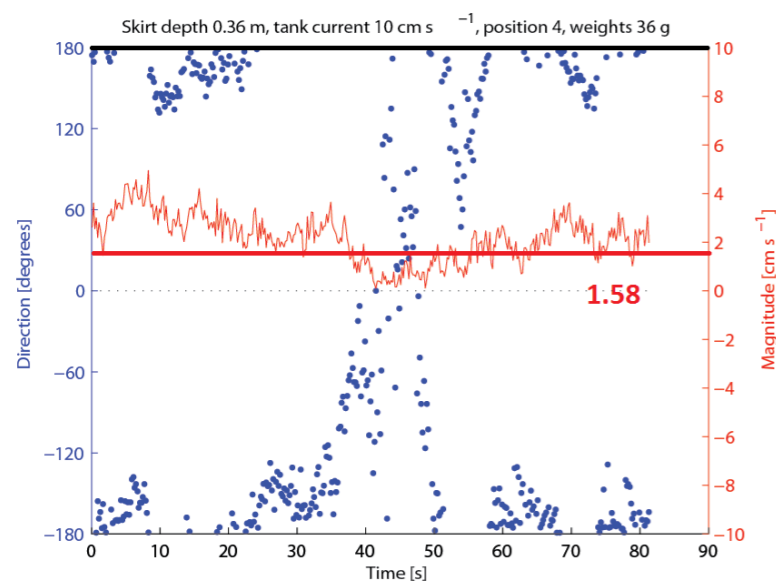
Aktivitet A3

Teknologisk utvikling av løsning for å bedre vannkvalitet

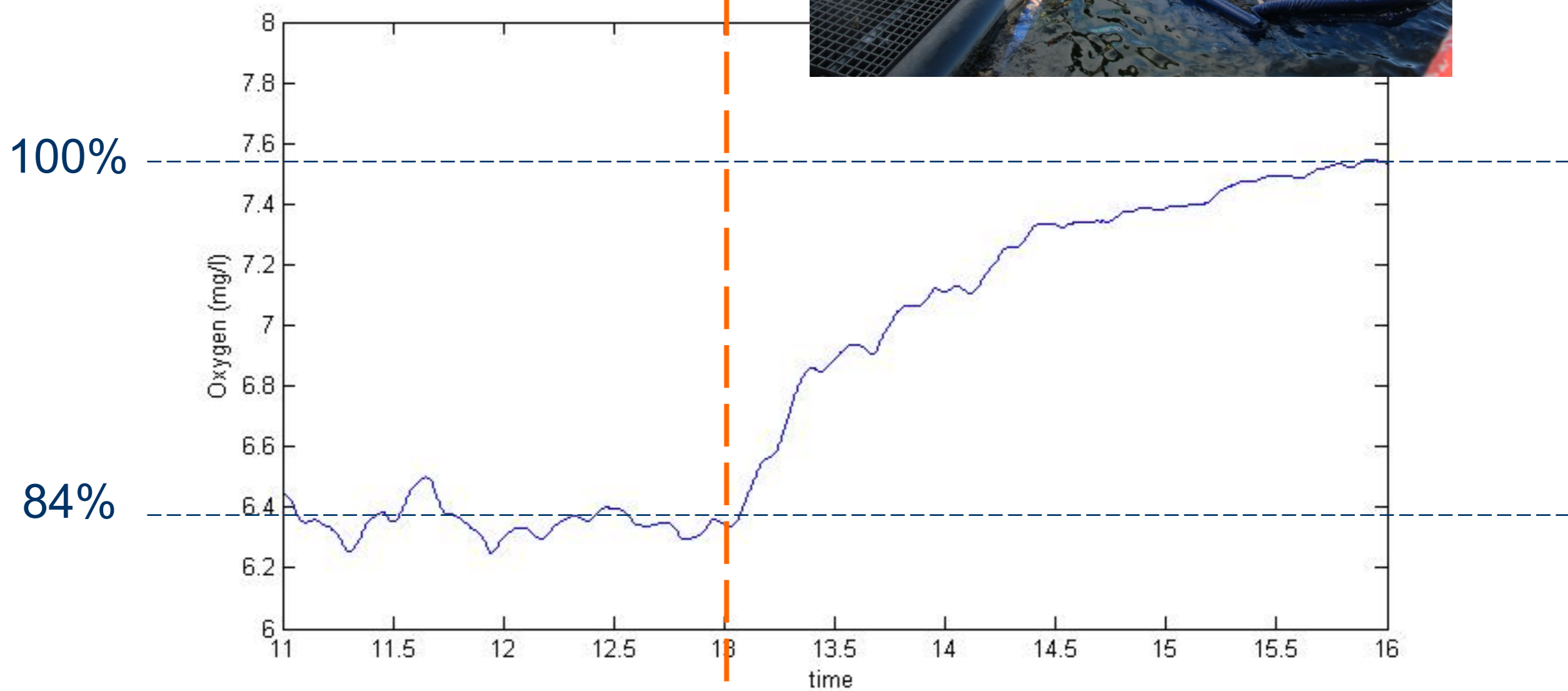


Aktivitet A3: CFD i OpenFOAM

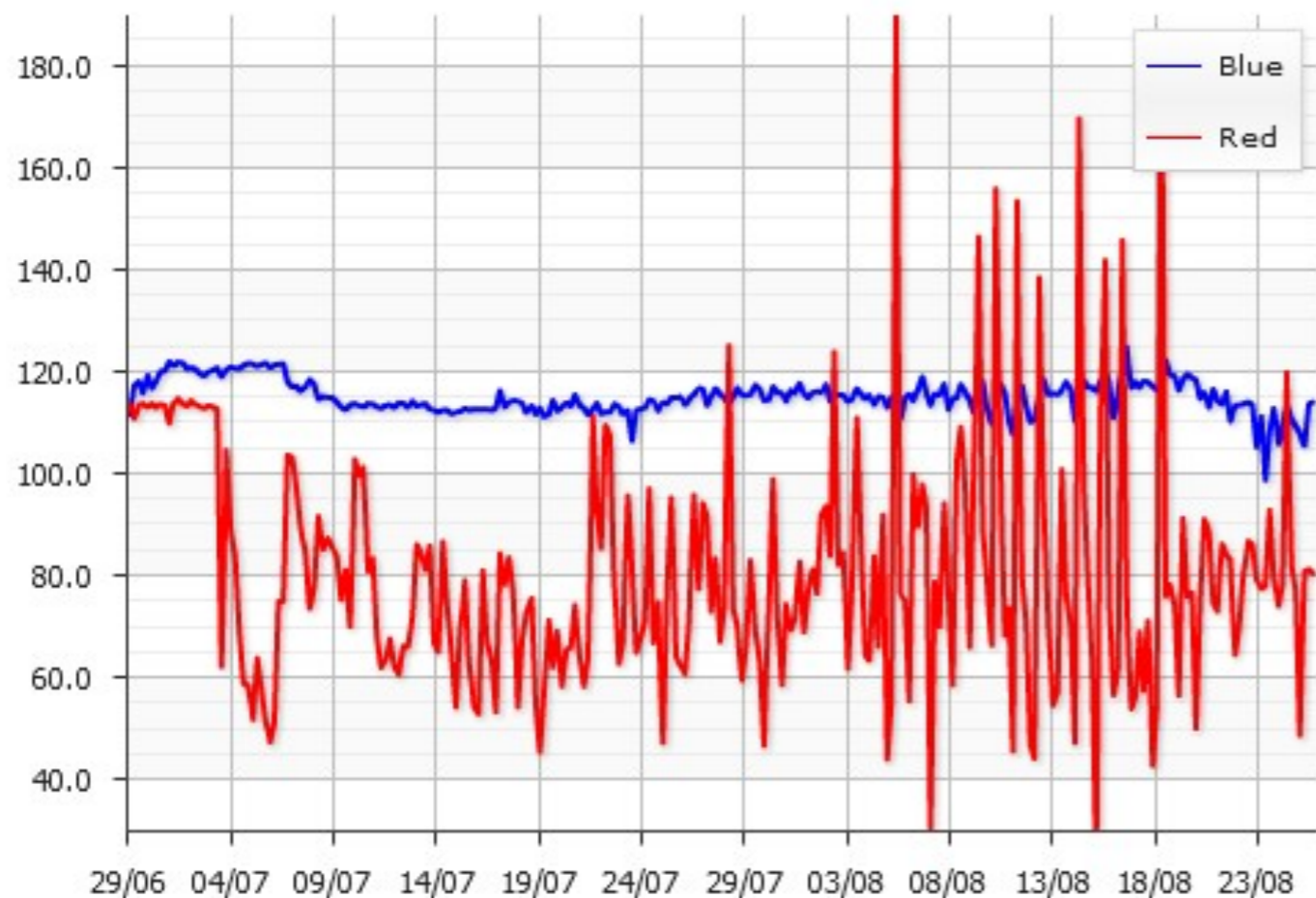
- Gjennomsnittlig strømbilde
- Ingen tidssimulering som viser ujevnheter
- Lite avvik fra strømmålinger fra Hirtshalsforsøk
- Dragkraft avvik 7.5 % fra Hirtshalsforsøk



Skirts and Oxygen Level at high temperature

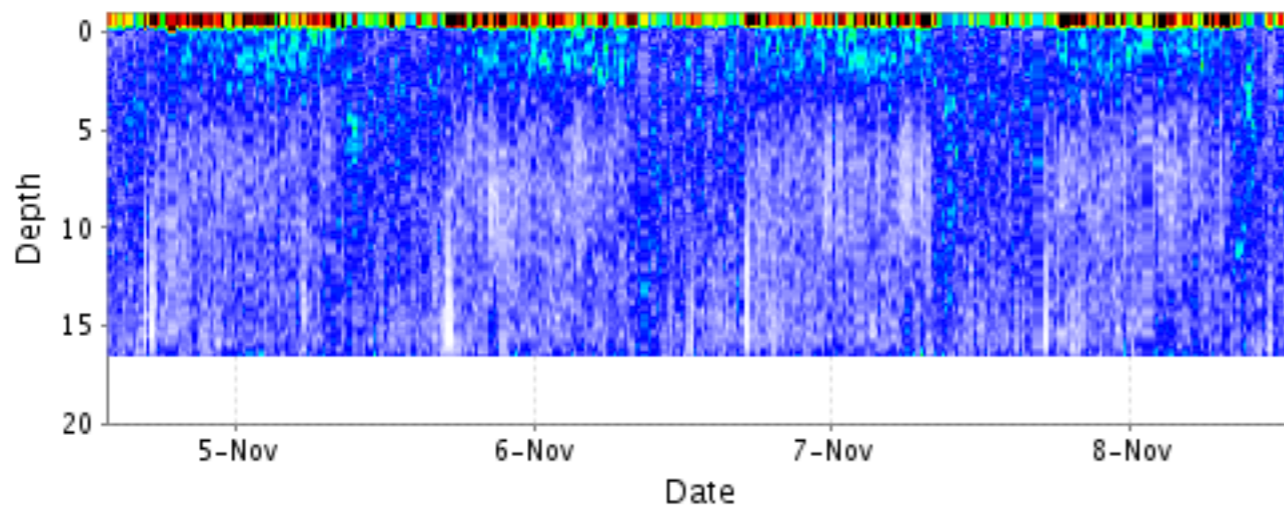


Oksygen

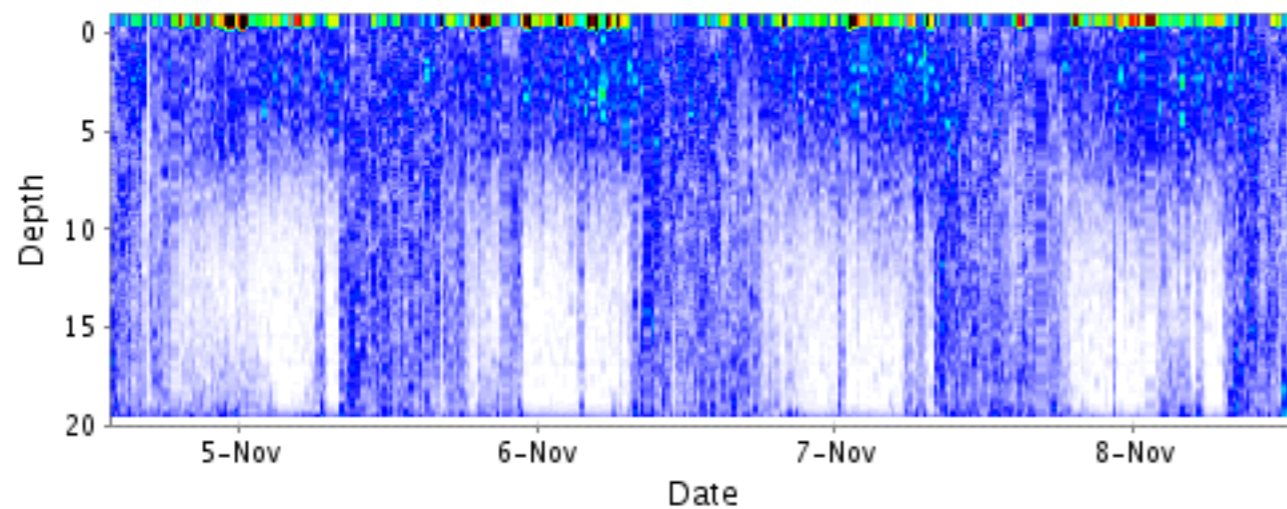


Vi har vært litt bekymret for oksygenmetning i merdene med permaskjørt. Rød sensor er inne i skjørtet på 2,5 meters dybde. Blå er referansen utenfor skjørtet. Vi har kommet fram til at på lav tetthet i merden er ikke dette veldig problematisk. Nøtene er 15 meter dype til bunntelne og fisken kan velge sjikt .

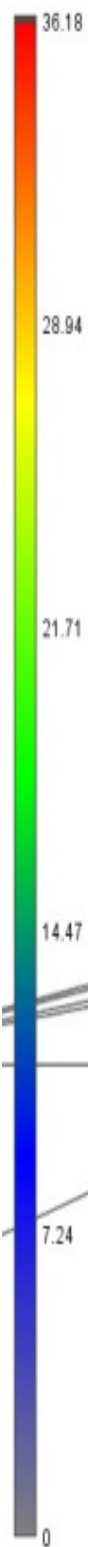
Sonar show the fish stay deeper in cages with skirt.



Later in the project we will have more data at this from 4 different sites.



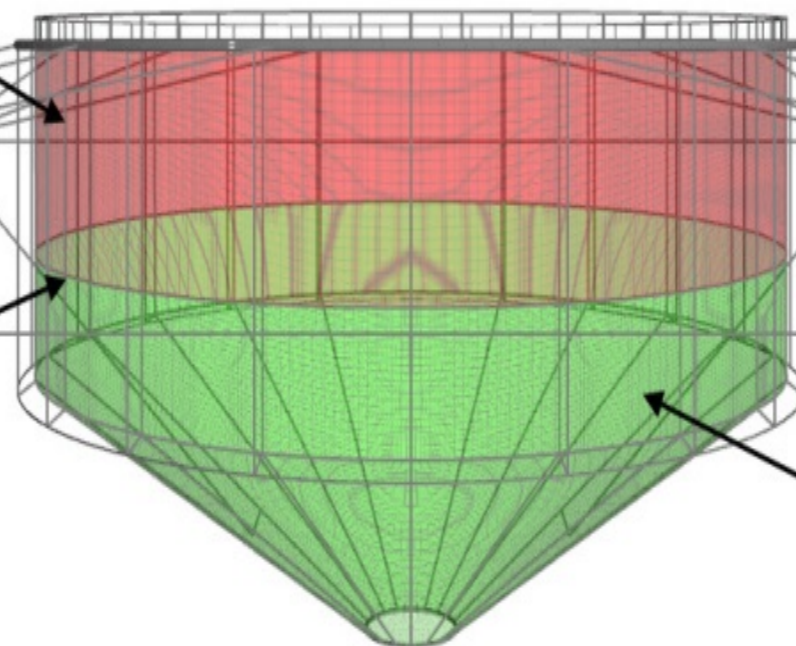
The data will be treated by IMR



1. Not (permaskjørt)
Sn=36 %

2. Tau (vekt til
permaskjørt)

3. Not



Permaskirt

- Permaskirt can be a lasting contribution to the toolbox.
- Preliminary results show: 50-80% reduced risk premium in periods.
- Oxygen levels will be challenging at high temperatures
- Permaskirt is Certified as an option.
- If we get the low oxygen level in periods, lift skirt or adding oxygen.



Thank you for attention!

