Havforskningsinstituttets ferskeste forskning

Karen de Jong
karen.de.jong@hi.no

Knowledge acquisition for coexistence between fisheries and offshore wind industries (2022-2023 - avsluttet)

Elucidate possible effects and consequences offshore wind farms in Sørlig Nordsjø II, Utsira Nord and Hywind Tampen (the opened Norwegian OWF area) will have for the fishing industry based on the currently available knowledge.

- Start with fishers' concerns
- Using fishers' knowledge (interview)
- combined with scientific papers and reports
- Contact: anne.Christine.utne.palm@hi.no

Partners:

mareano
samler kunnskap om havet

Om Mareano | Resultat | Kart og data | Bilde og video | Tema | English | Søk

Hjem / Nyheter / Nyheter 2022 / Kartlegger havbunnen på Utsira Nord

Forskningsfartøyet G.O. Sars rett utenfor Utsira, på vei for å starte kartlegging av biologi, geologi og kjemi på havbunnen. Foto: Christine Fagerbakke / HI

Kartlegger havbunnen på Utsira Nord

Vi vet at områdene utvalgt som mulige havvindområder har god og stabil vind. Nå undersøker vi hvordan havbunnen ser ut og hva som lever der.

Publisert: 18.10.2022 Oppdatert: 01.02.2023 Forfatter: Beate Hoddevik

frithjof.moy@hi.no

The Research Council of Norway

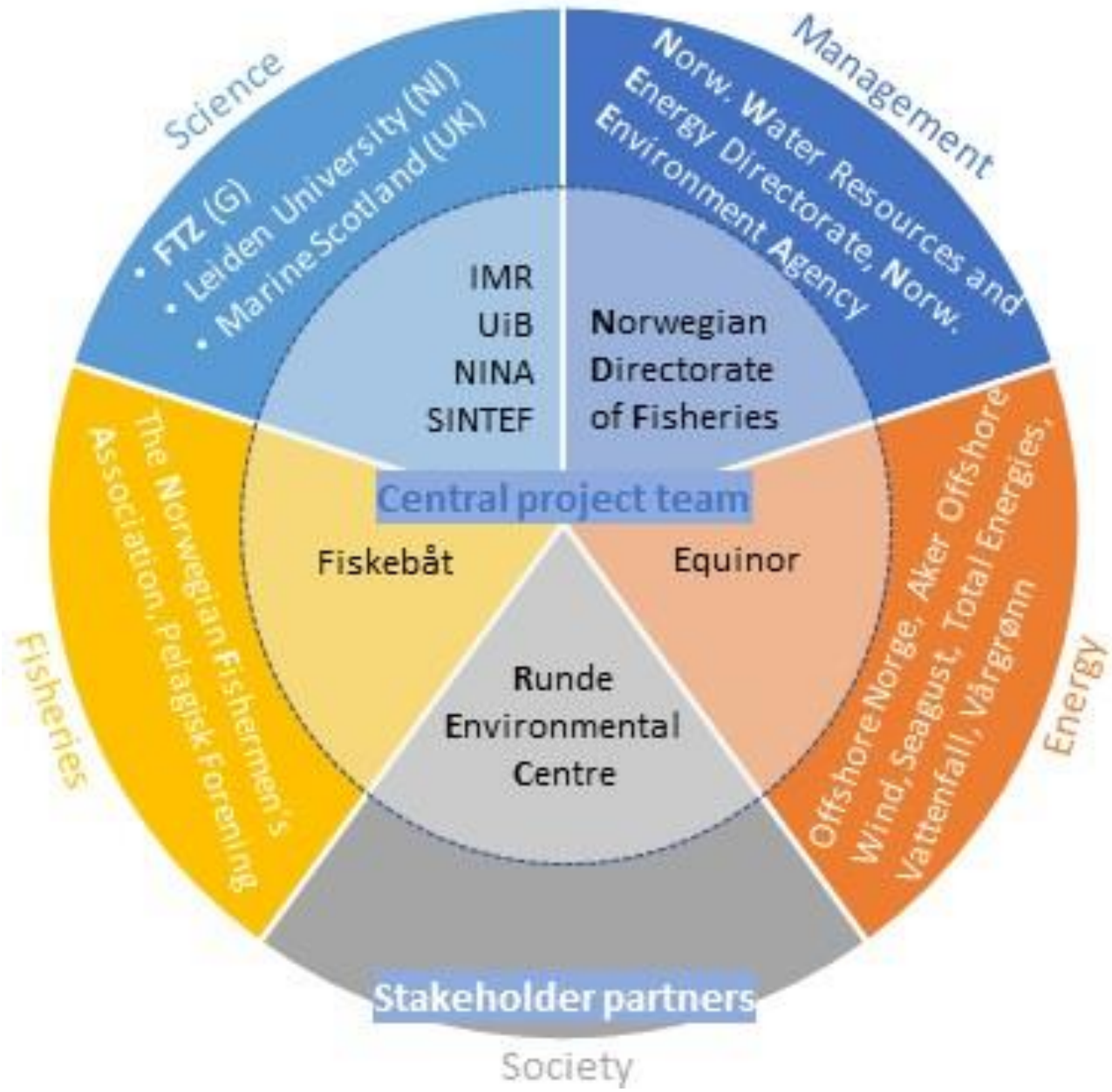
WindSys (2023-2026)

Objectives

To understand the impact of FOWFs on marine life and a co-existing industry.

1. Outline the social and political effects
2. Facilitate a common understanding of potential impacts
3. Describe changes in the ecosystem
4. Measure the spatiotemporal patterns of underwater noise
5. Predict the direction of population-level effects
6. Develop novel techniques to monitor changes

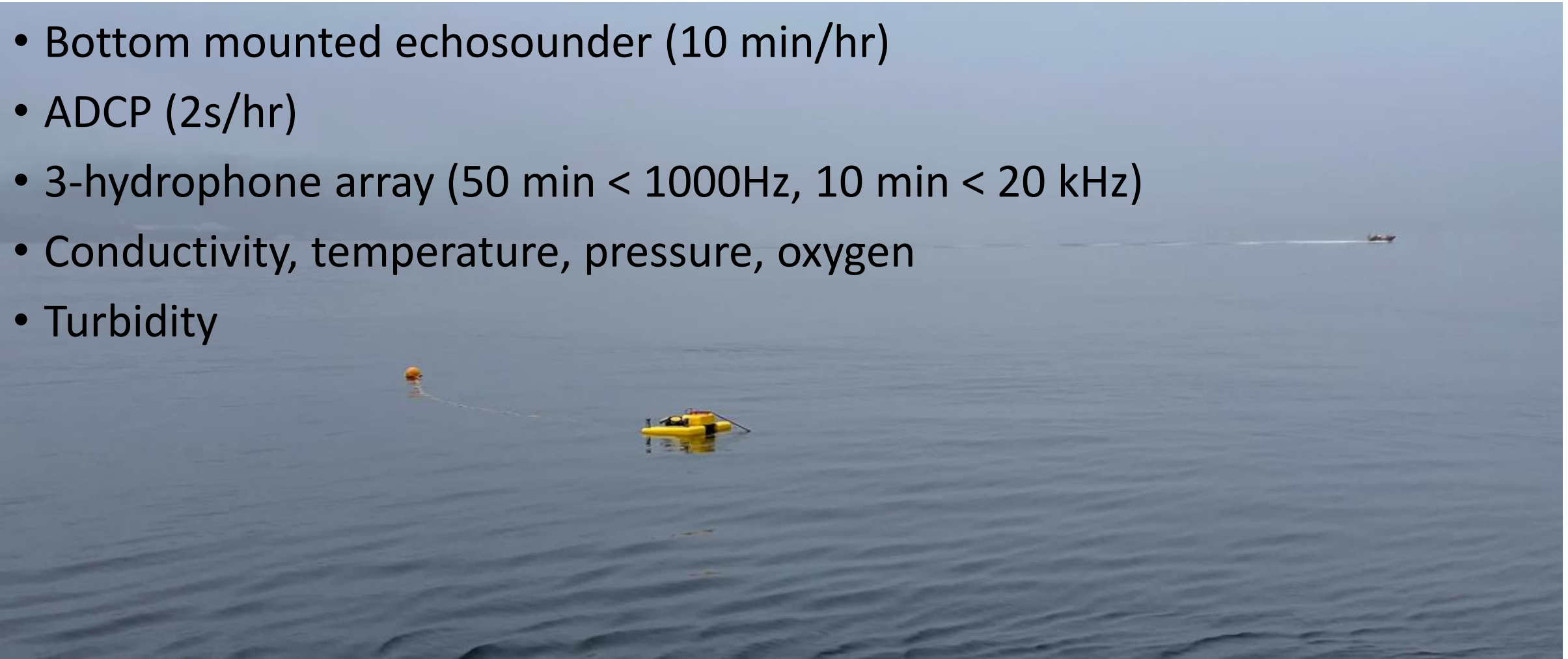
Cross sector team



Contact: Karen.de.jong@hi.no

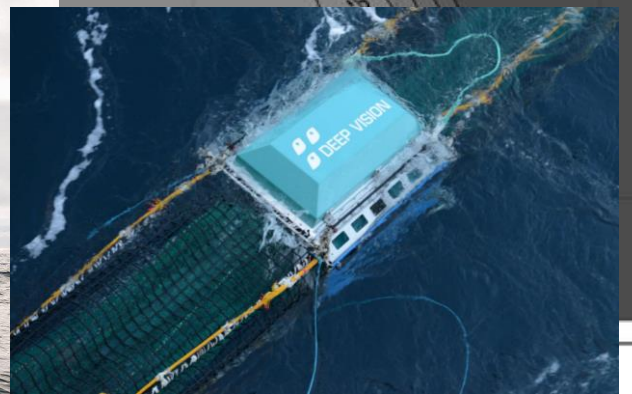
Bottom lander tested and ready for deployment

- Bottom mounted echosounder (10 min/hr)
- ADCP (2s/hr)
- 3-hydrophone array (50 min < 1000Hz, 10 min < 20 kHz)
- Conductivity, temperature, pressure, oxygen
- Turbidity



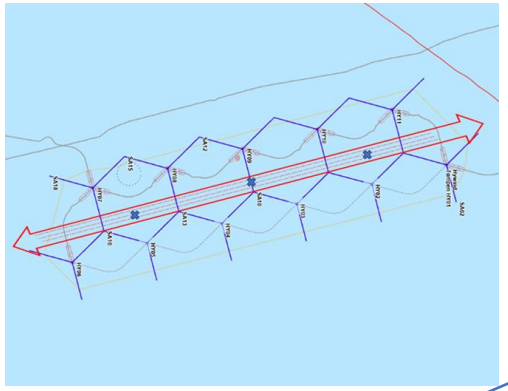
Traditional cruise + automated vessels in 2023, also planned for 2024

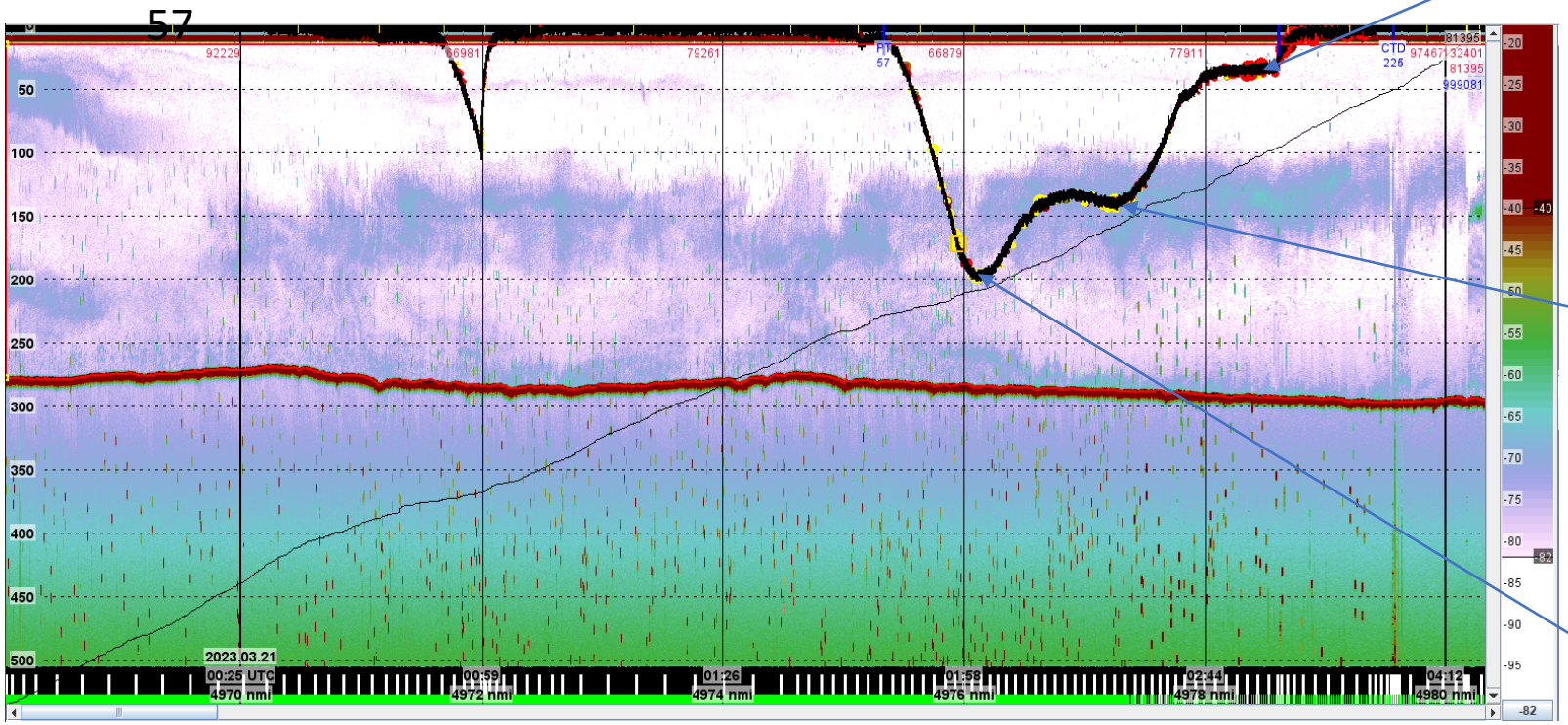
https://www.hi.no/hi/nettrapporter/toktrapport-en-2023-10

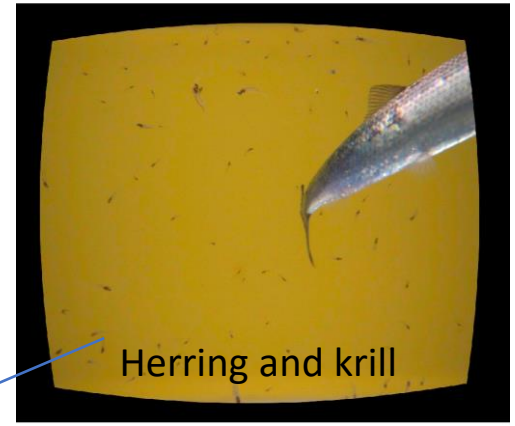


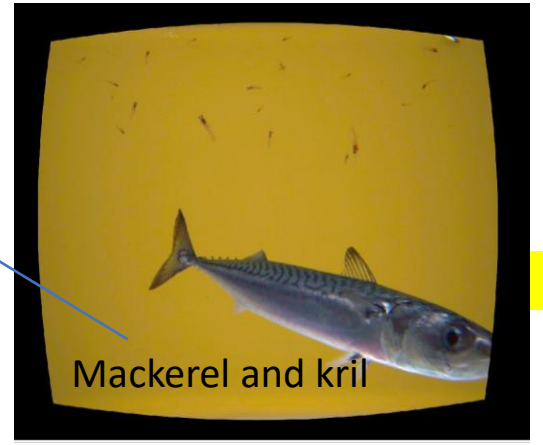
Acoustics and DeepVision

INSIDE Hywind Tampen at night-time (from 200 to surface)

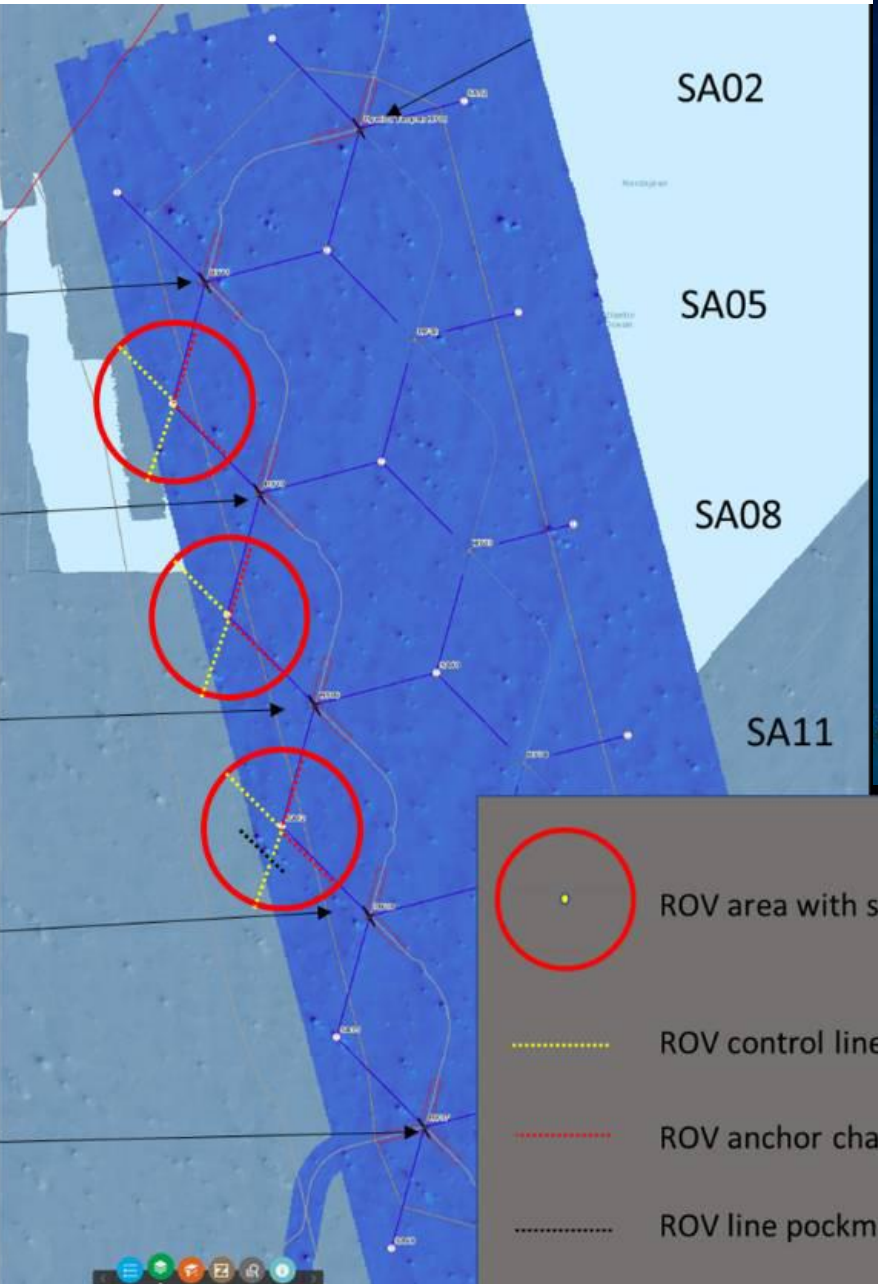


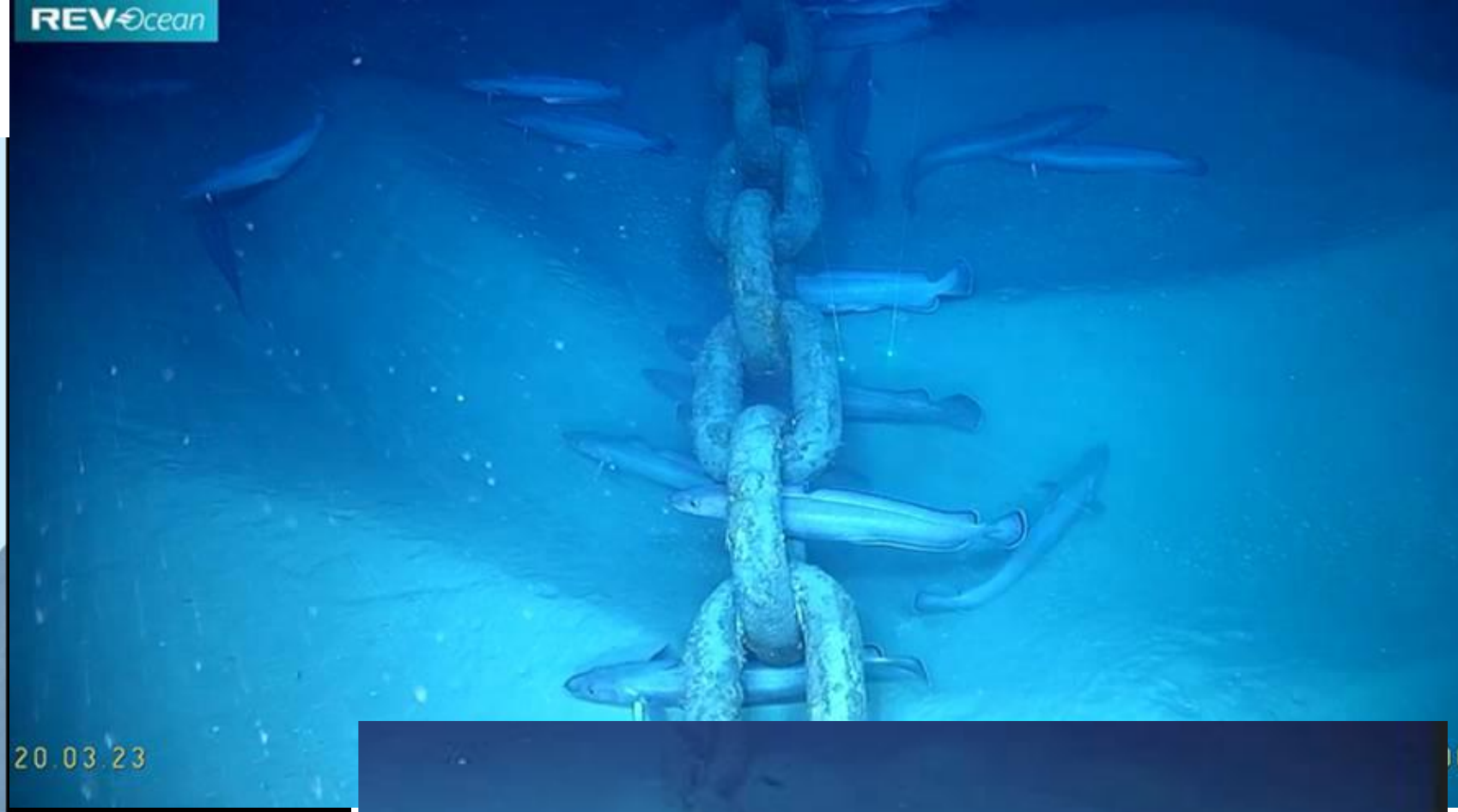






ROV transects





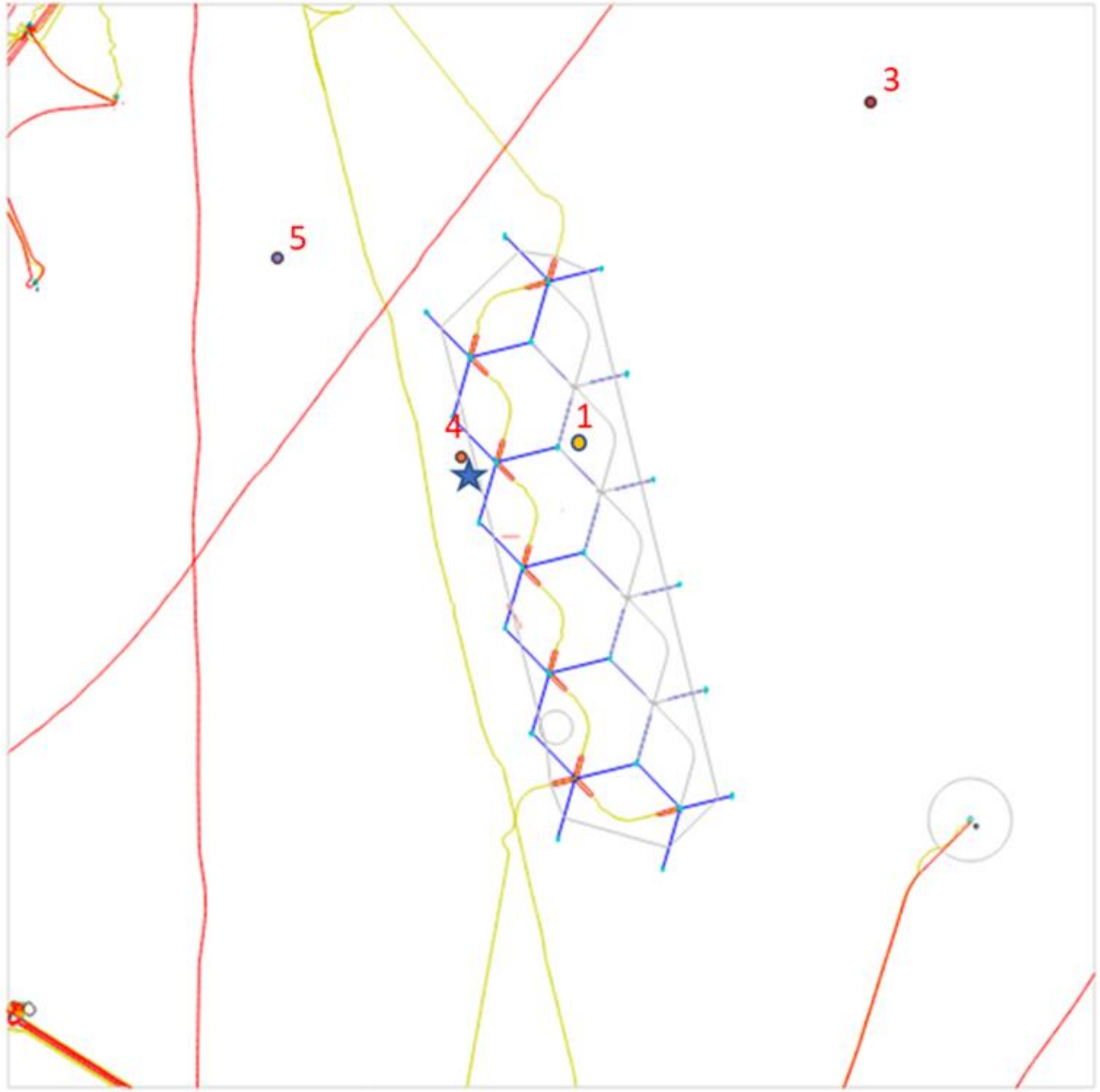
ROV area with suction anchor in centre

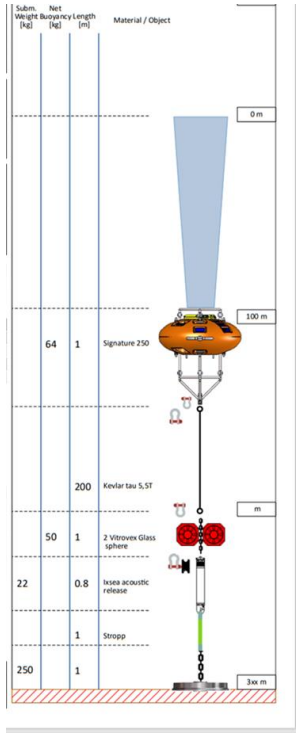
ROV control line

ROV anchor chain line

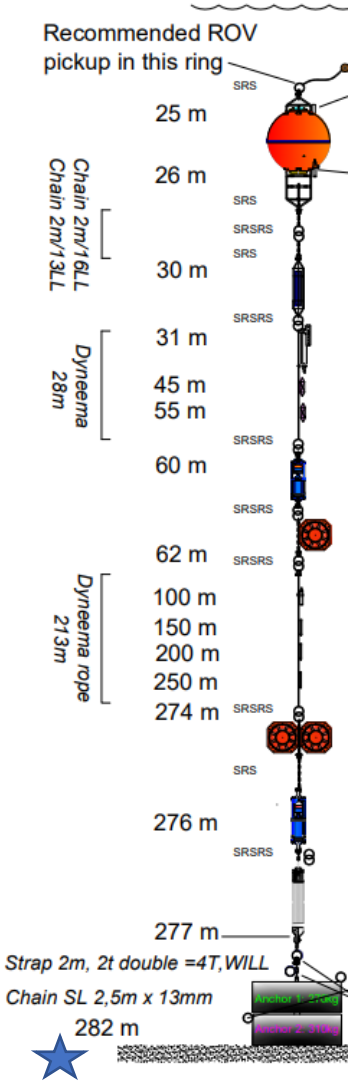
ROV line pockmarks

Additional temporary morings: 5 ADCP and one Hydrophone mooring





ADCP



Hydrophone

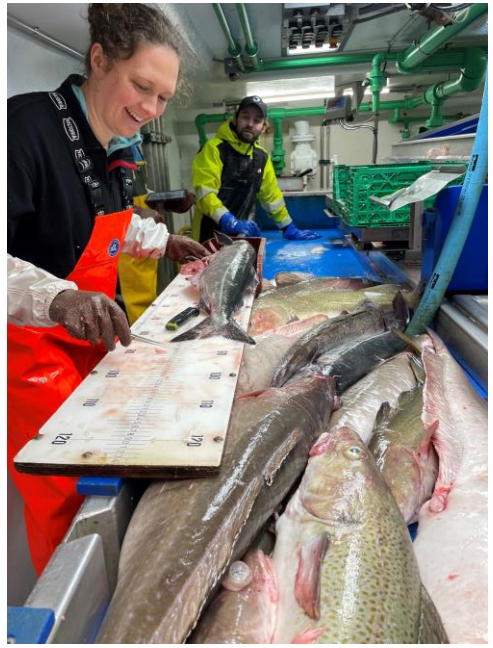
Fish capture studies in Hywind Tampen

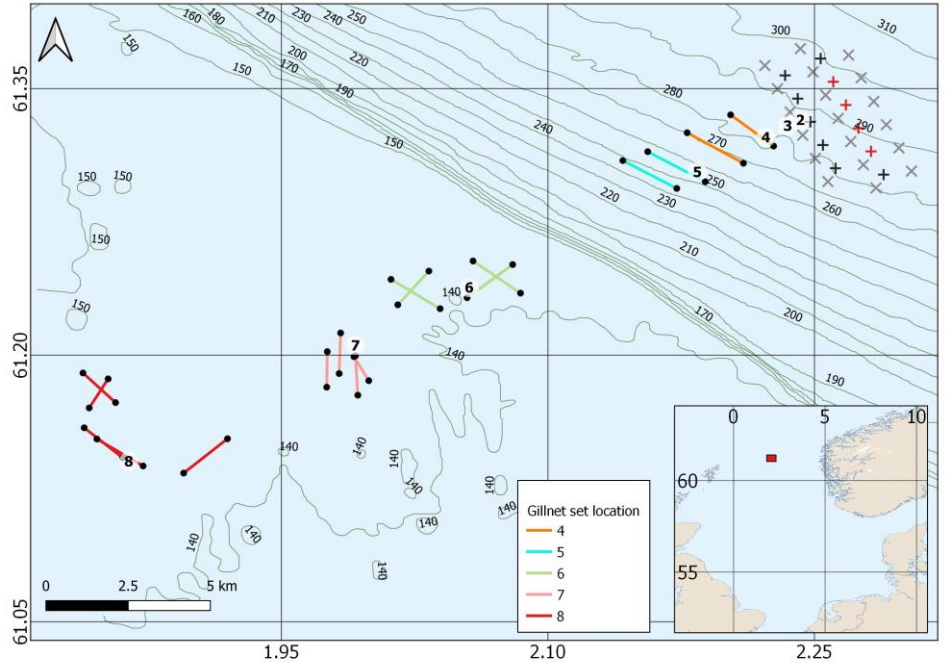
March 2022 and 2023

Longterm aim:	Describe and investigate changes in demersal fish populations near Hywind Tampen
Method:	Gradient fish capture study with demersal gillnets at stations with increasing distance to wind farm (0 – 18 nm)
Contact person:	Maria Tenningen, IMR (maria.tenningen@hi.no)

Experiences after 2 years of experiments

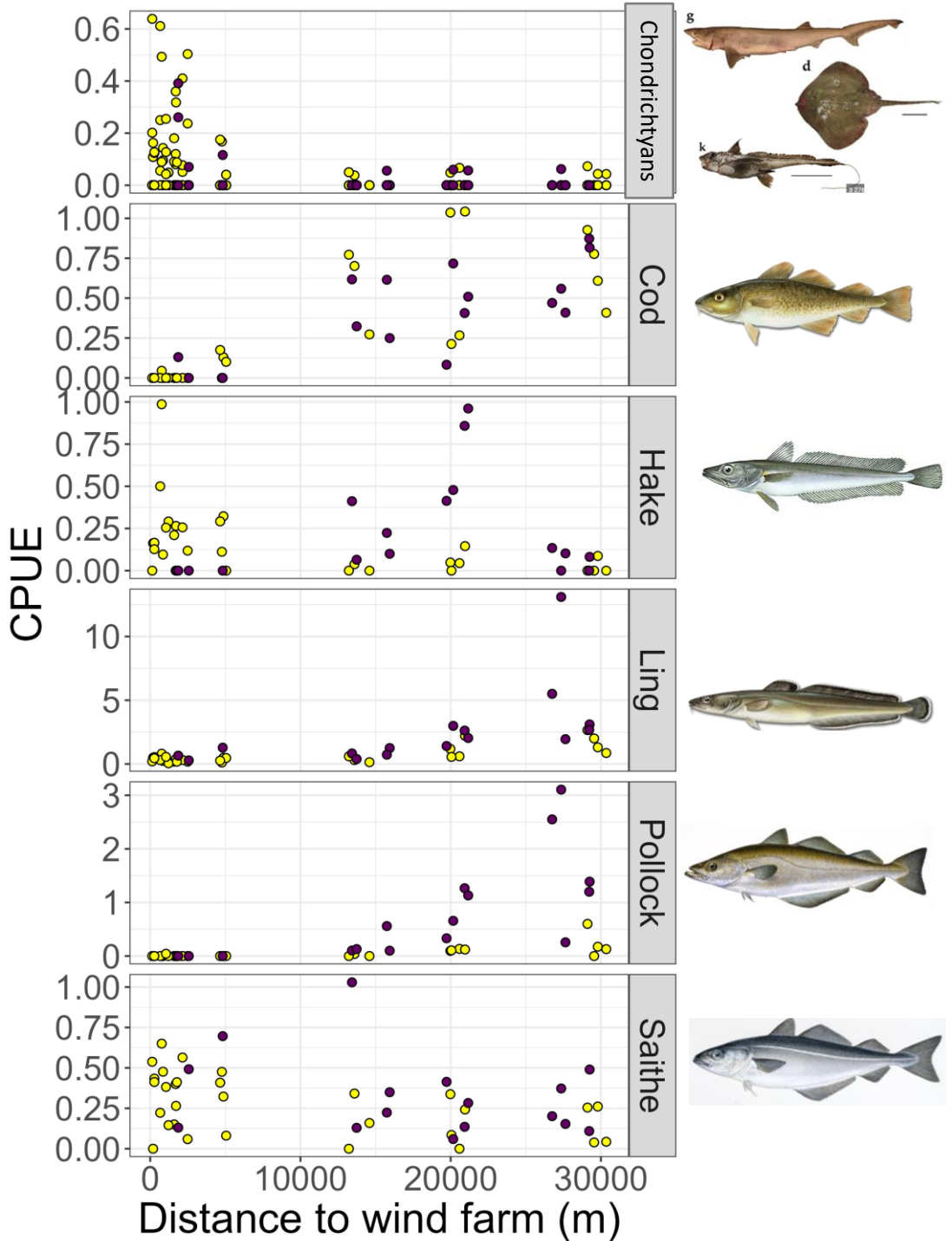
- We now have a relatively good overview of the distribution and biology of the most common demersal species in the area.
- Highest fish abundances were registered furthest away from the turbines in shallower waters and close to Tampen fishing bank.
- The bottom close to the wind farm is soft and the currents can be strong. This will affect the possibilities to fish near the windfarm.
- We expect further data collection using the same design to give us insight into whether the distribution, diet, size distribution or spawning behaviours of the fish change near the wind farm.





Preliminary results

- High abundances of saithe, ling and chondrichtyans close to the wind farm site
- Cod catch increase as you move west
- Lack of samples from close to the wind farm in 2023
- Trends in abundances on the shelf similar between years

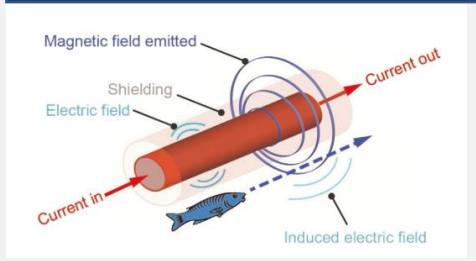


HI project 15655: Assessing the impacts of offshore wind on the early life stages of fish

Project team: Alessandro Cresci, Caroline M.F. Durif, Guosong Zhang, Torkel Larsen, Anne Berit Skiftesvik, Howard I. Browman

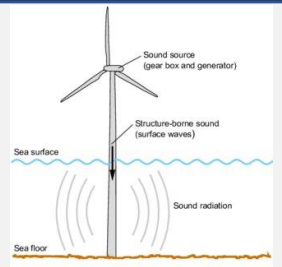
Signals from the turbines

Magnetic fields from subsea cables



Hutchinson et al. 2021

Operational low-frequency noise

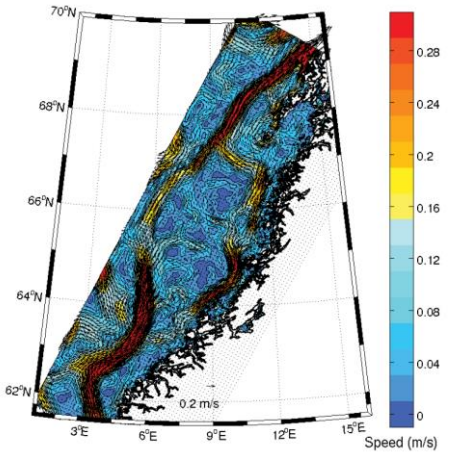


Research question

How do they affect the swimming kinematics and the orientation behavior of early and late-stage fish larvae drifting by the OW facilities?

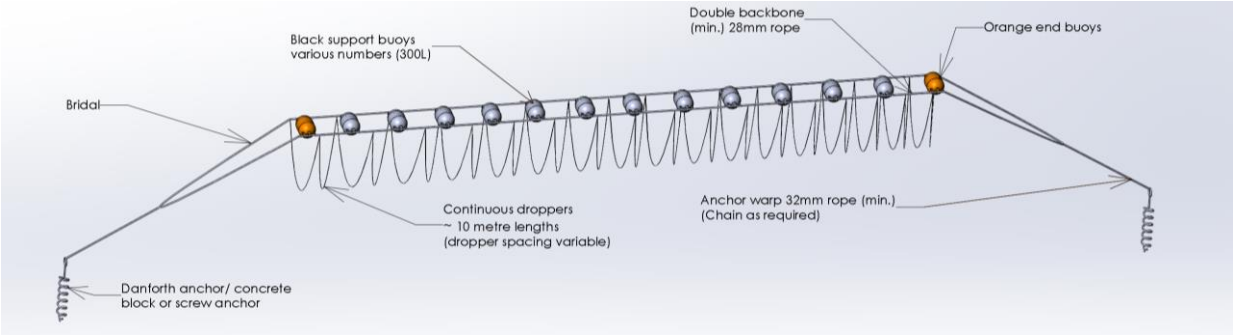
Implications

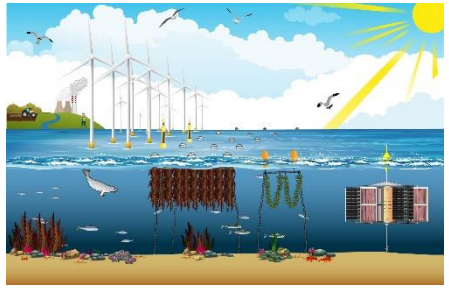
Effects on larval behavior could lead to altered dispersal, with consequences on survival and large-scale spatial distribution.



Contact:
Alessandro Cresci
alessandro.cresci@hi.no
Fishlarvae.org

Slides by Prof Bela Buk AWI





EU-Project OLAMUR

Offshore Low-trophic Aquaculture in Multi-Use Scenario Realisation

Demonstrating Open Ocean Multi-Use

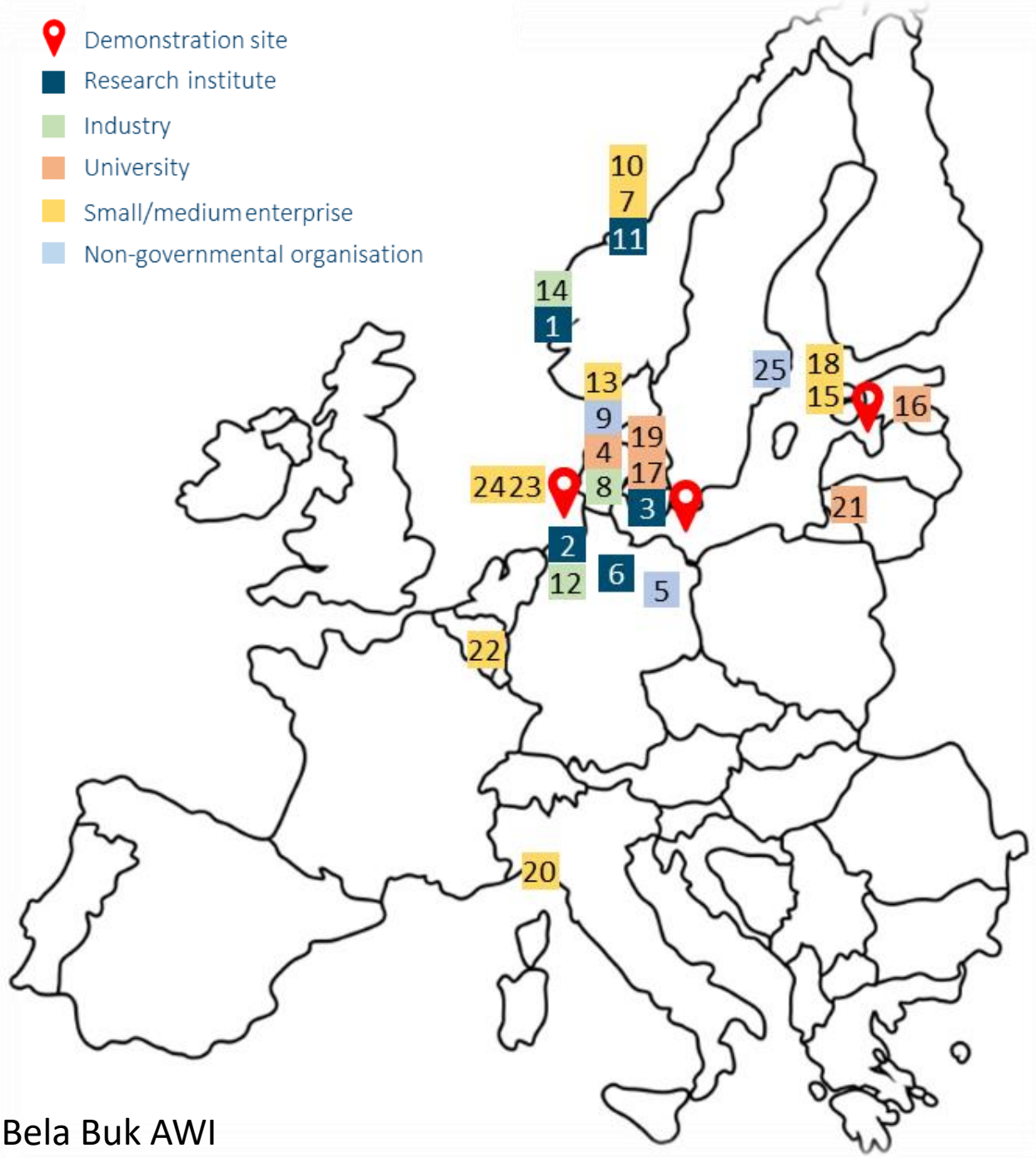
Øivind Bergh, Marie Maar, Bela H. Buck, Wolf Isbert, Antonio Novellino, Giulia Dapueto, Øivind Strand, Antonio Aguera Garcia, Jun She, Marianne Thomsen, Dorothy Dankel, David Bassett, Joanna Staneva, Georg Martin, Annette Bruhn, Jonne Kotta, Rocio Castano Primo, Helge Sagen, Anita Jacobsen

oeivind.bergh@hi.no

Project ID: 101094065

25 partners from research, organisations and industry

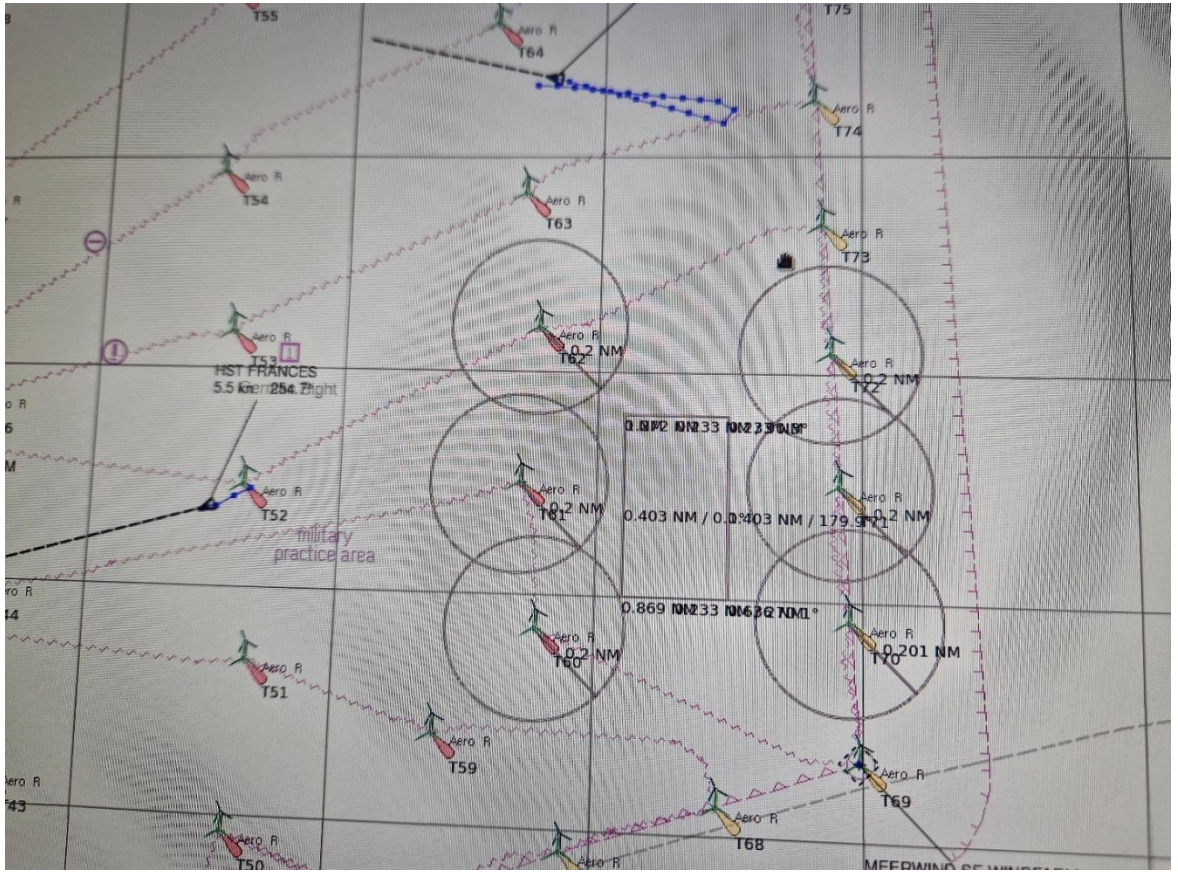
1 Havforskningsinstituttet, Norway
2 Alfred Wegener Institute Helmholtz Centre for Polar and Marine Research, Germany
3 Danmarks Meteorologiske Institut, Danmark
4 Aarhus Universitet, Danmark
5 GCF - Global Climate Forum EV, Germany
6 Helmholtz-Zentrum Hereon, Germany
7 Maritime Robotics AS, Norway
8 Vattenfall Europe Windkraft AS, Danmark
9 Kattegatcentrets Driftsfond, Danmark
10 Skarv Technologies AS, Norway
11 SINTEF Ocean AS, Norway
12 WindMW GmbH, Germany
13 Kerteminde Seafarm Aps, Denmark
14 Lerøy Seafood Group ASA, Norway
15 RedStorm OÜ, Estonia
16 Tartu Ulikool, Estonia
17 Danmarks Tekniske Universitet, Danmark
18 Ösel Aquafarm OÜ, Estonia
19 Københavns Universitet, Danmark
20 ETT Spa, Italy
21 Klaipedos Universitetas, Lithuania
22 Platforme Technologique et de l'innovation de l'aquaculture Europeenne ASBL, Belgium
23 Nordfriesische Seemuschel GmbH, Germany
24 Wyk 8 Muschelfischereibetrieb GmbH, Germany
25 Stiftelsen Voice of the Ocean, Sweden



OLAMUR

Slides by Prof Bela Buk AWI

A: German Case Study: Meerwind Süd |Ost

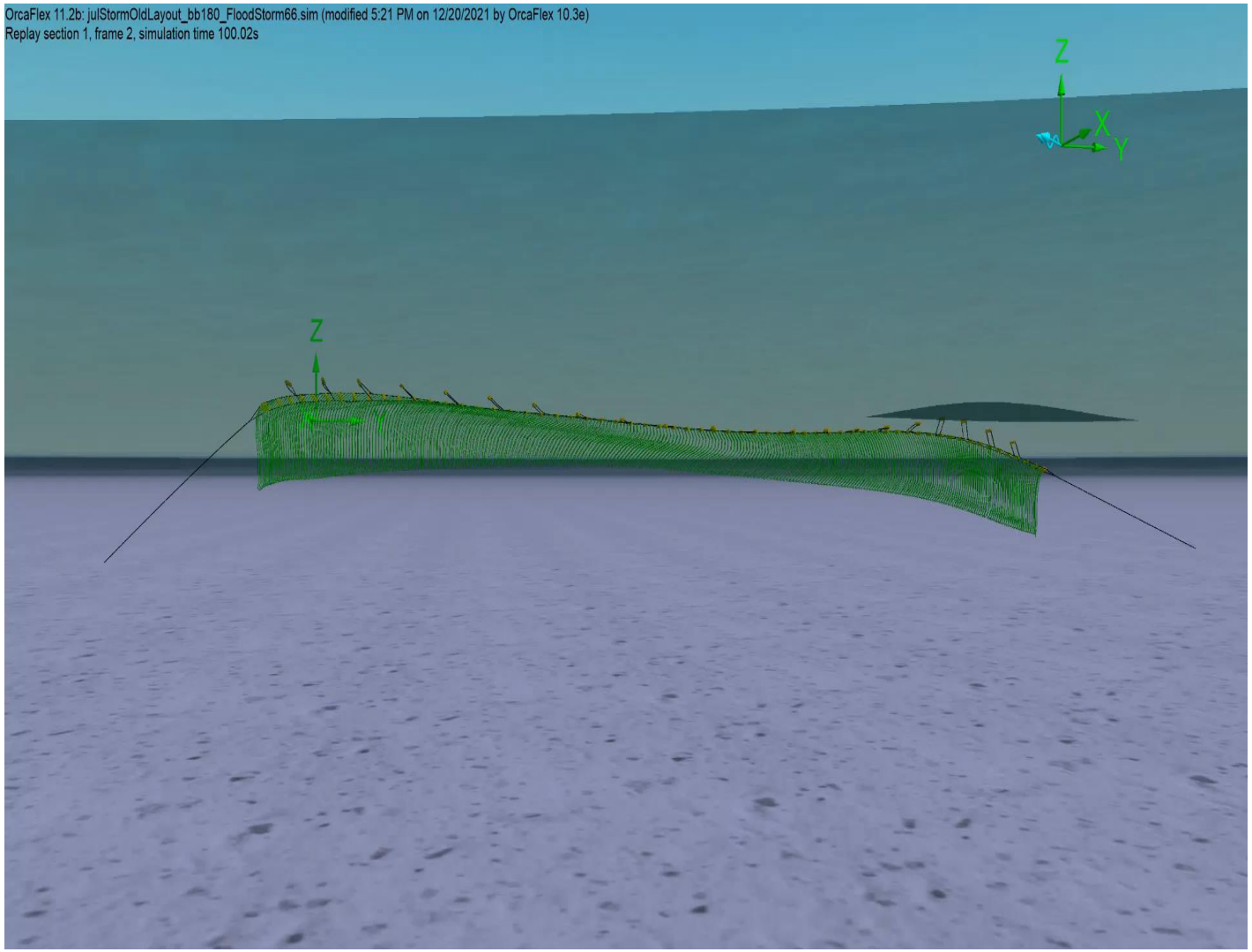


Nordfriesische Seemuschel GmbH (NFS)

Wyk 8 Muschelfischereibetrieb GmbH

Slides by Prof Bela Buk AWI

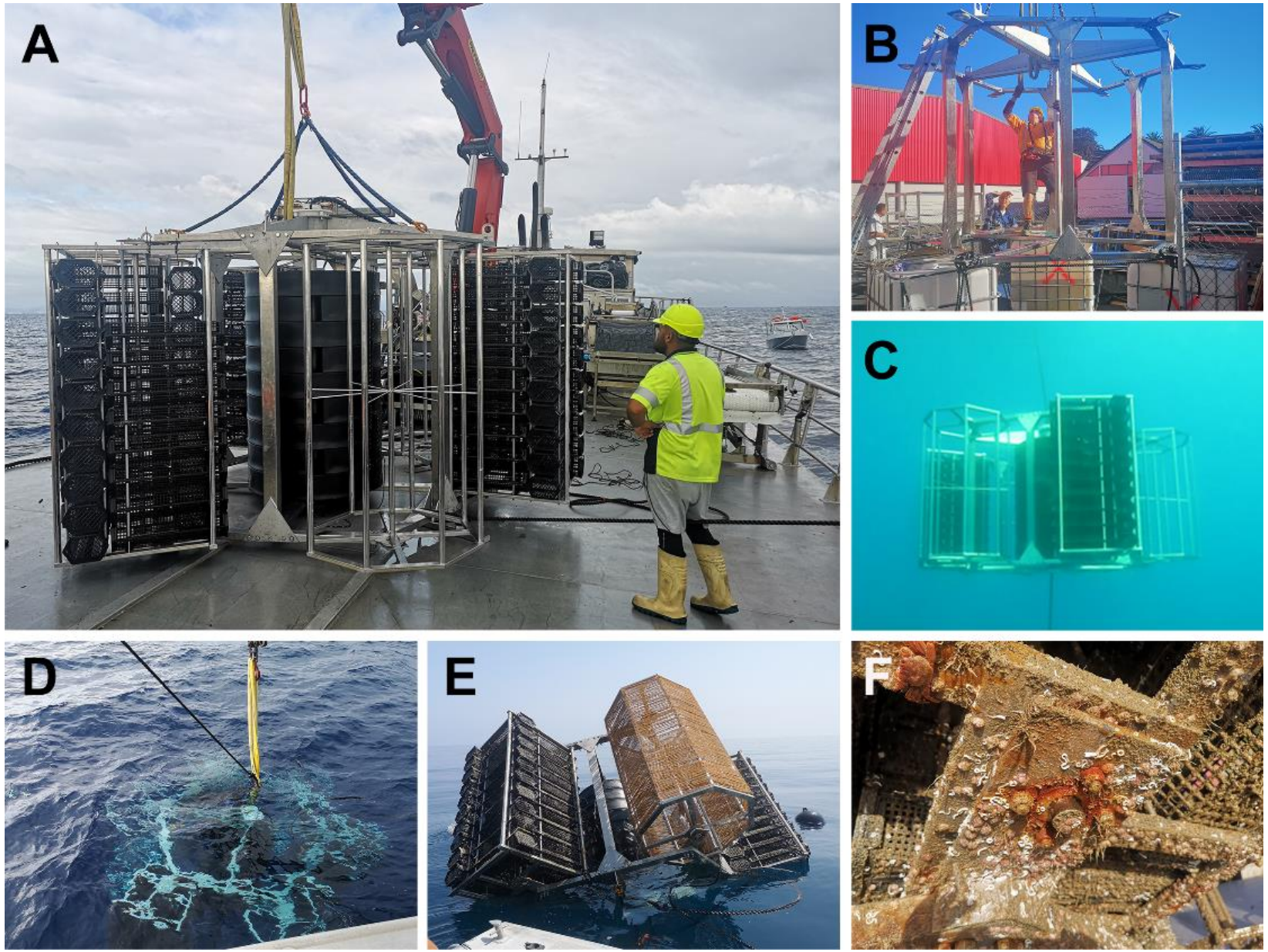
- → Modelling via ORCAFLEX @ AWI, UNH & Kelson Marine (US), Blue-C (D), Cawthron (NZ)
- → Wave tank Braunschweig (D, Goseberg)
- → Corrections via ORCAFLEX
- → Construction
- → … and then AQ starts

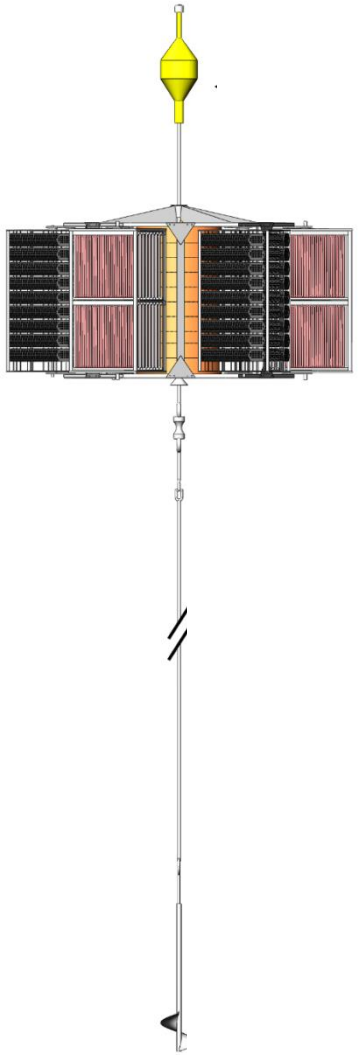


With permission of
Dr Kevin Heasman, Cawthron Institute, NZ

Slides by Prof Bela Buk AWI

Shellfish Tower:

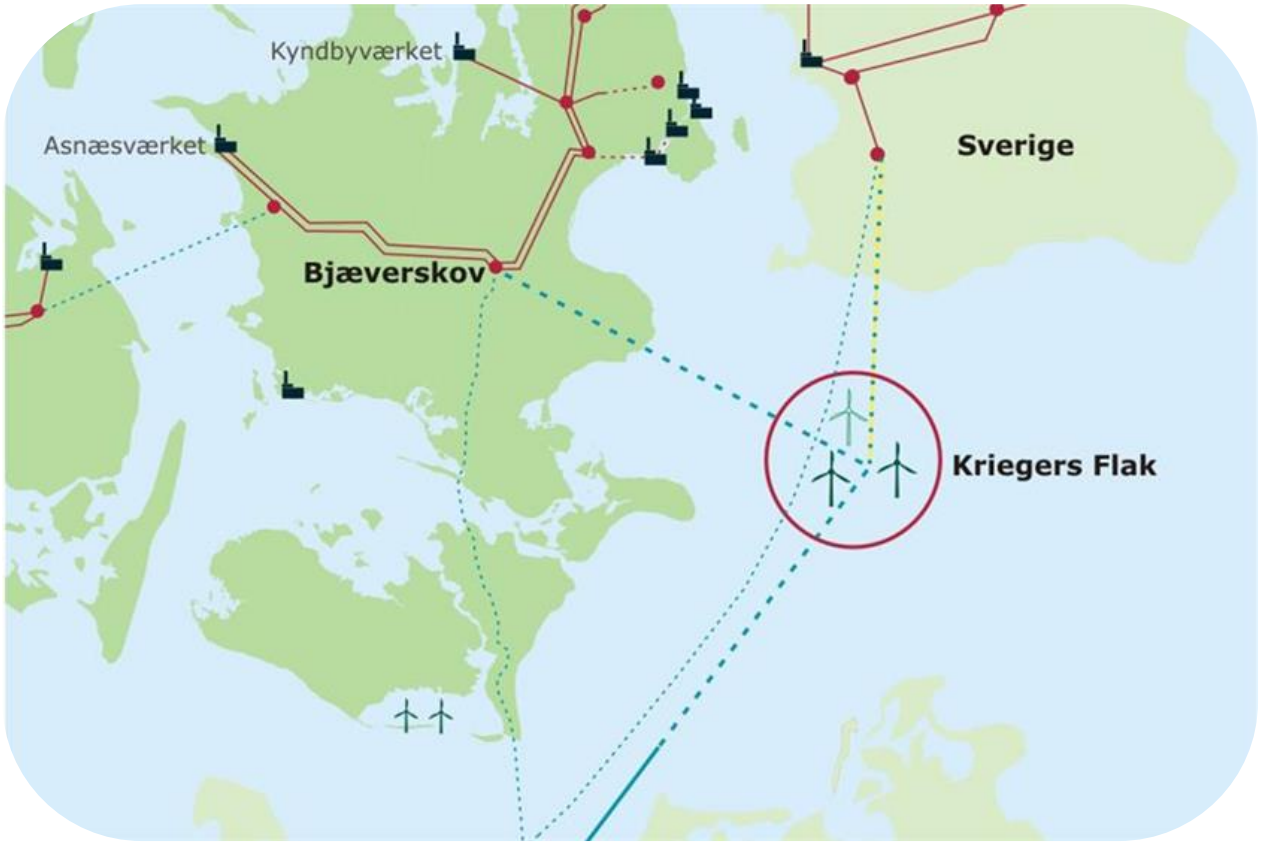


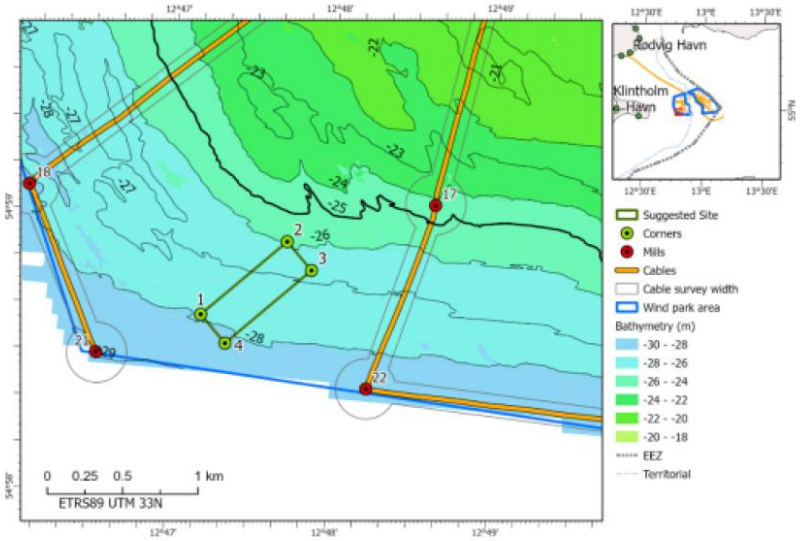


Heasman et al. 2021 (Ocean Engineering)

Slides by Prof Bela Buk AWI

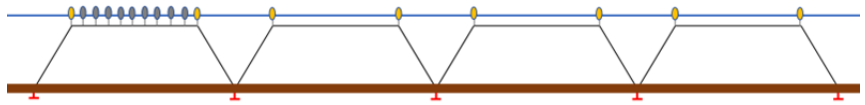
B: Danish Case Study: Kriegers Flak





Rig design

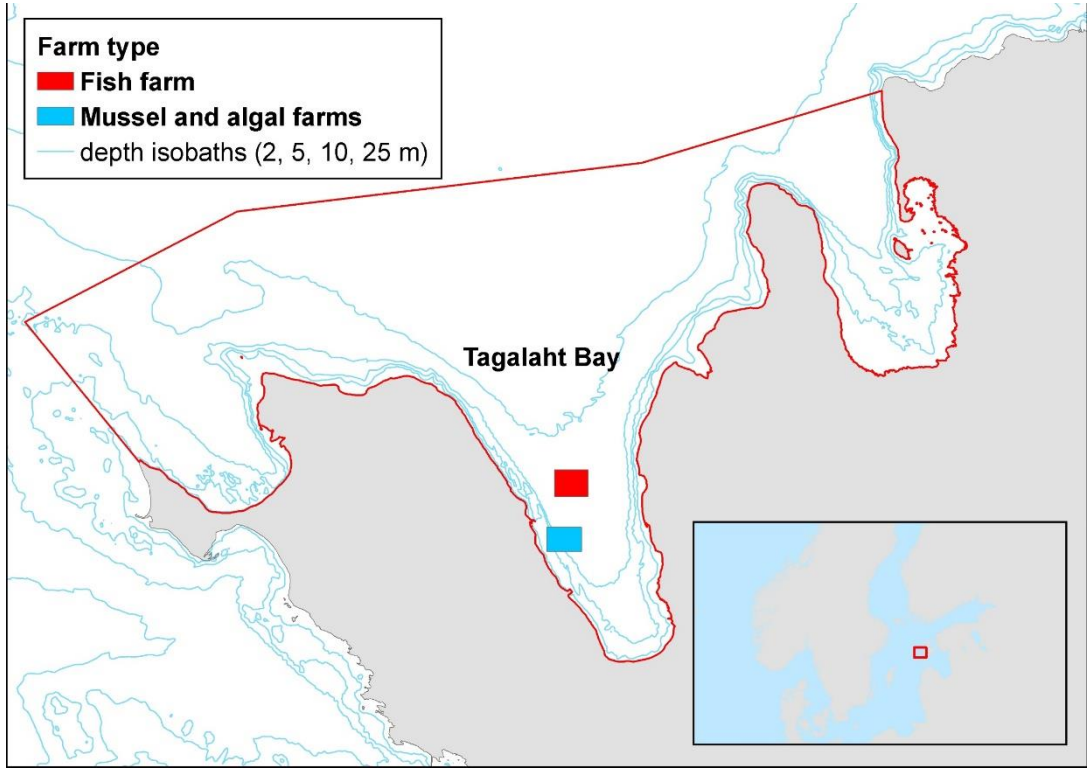
- Drill anchor 3 - 6m in the seabed.
- Main Line (ML) 3-strand 18mm PP rope.
- 150m between each drill anchor, which gives a total of 4 x 100m ML in the Surface.
- 20-50 pcs. 18 liter buoys on each ML and 5 pcs. at each end to keep the line tight.
- 15 pcs. concrete weights of 40 kg on each ML.

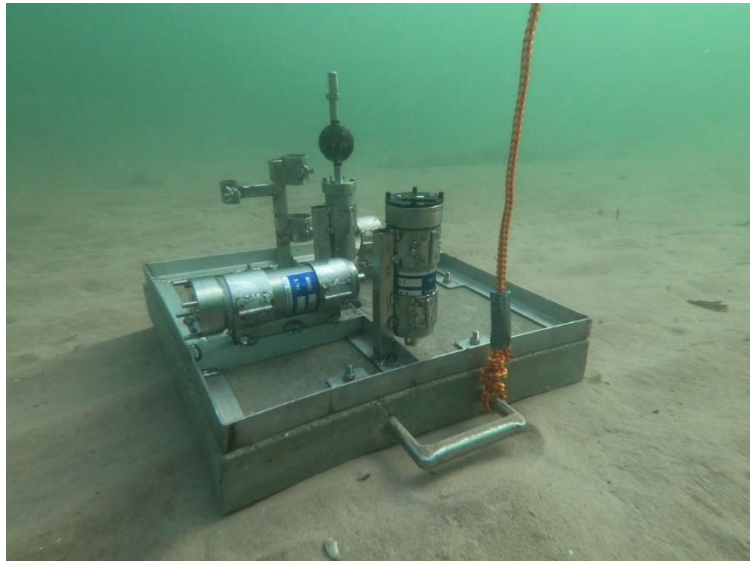


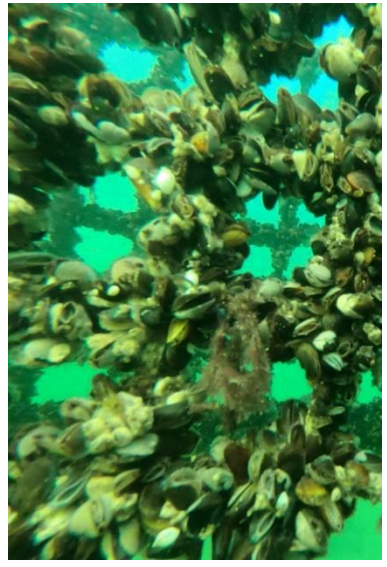
AARHUS UNIVERSITY VATTENFALL UNIVERSITY OF COPENHAGEN Kattegatcentret DTU Kerteminde Seafarm

Slides by Prof Bela Buk AWI

C: Estonian Case Study: Kriegers Flak





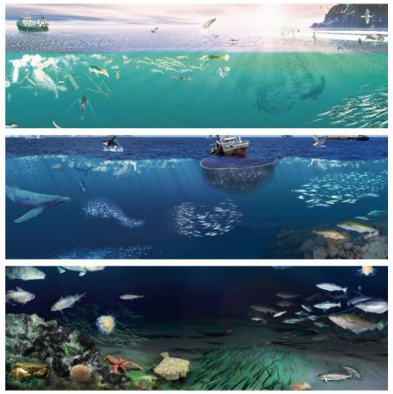


REDSTORM OU

Slides by Prof Bela Buk AWI

Reports

Samlet påvirkning i foreslåtte særlig verdifulle og sårbare områder i norske havområder



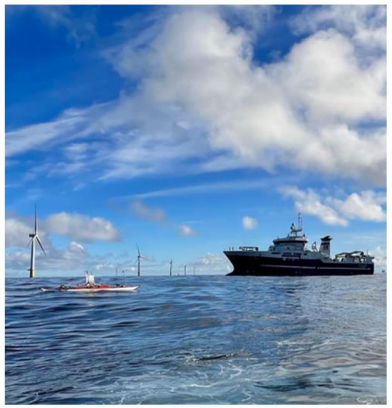
Forfatter(e): Cecilie Hansen , Johanna Myrseth Aarflot , Elena Eriksen , Berengere Husson (HI), Per Fauchald (NINA), Geir Odd Johansen , Lis lindal Jørgensen , Gro van der Meeren , Nina Mikkelsen , Geir Ottersen (HI), Cecilie H. von Quillfeldt (Norsk Polarinstitutt) og Mette Skern-Mauritzen (HI)

Rapportserie: *Rapport fra havforskningen 2022-46* ISSN: *1893-4536* Publisert: *19.12.2022* Prosjektnr: *15852*
Oppdragsgiver(e): *Miljødirektoratet*
Forskningsgruppe(r): *Økosystemprosesser*
Program: *Barentshavet og Polhavet*, *Norskehavet*, *Nordsjøen*, *Marine prosesser og menneskelig påvirkning*
Godkjent av: Forskningsdirektør(er): Geir Huse Programleder(e): Maria Fossheim

Forord

Cruise report Hywind Tampen 13 to 28 March 2023

— Cruise no. 2023001004 G.O. Sars



Author(s): Anne Christine Utne Palm , Henrik Søiland , Anne Kari Sveistrup , Angelika Renner , Rebecca Ross , Frithjof Moy (IMR), Mostafa Bakhoday Paskyabi University of Bergen, Atle Totland , Sigurd Hannaas , Karen de Jong , Genoveva Gonzalez-Mirelis , Terje Hovland , Geir Pedersen , Jan Frode Wilhelmsen (IMR), Markus Antti Majaneva NINA, Sverre Waardal Heum , William Skjold (IMR), Stig Vågenes REV Ocean, Georg Skaret , Finn Corus , Andrey Voronkov (IMR), Patrick Vågenes REV Ocean and Leonard Kielland Equinor
Cruise leader(s): Anne Christine Utne Palm (IMR)

Report series: *Toktrapport 2023-10* ISSN: *1503-6294* Published: *24.08.2023* Updated: *22.06.2023*
Cruise no.: *2023001004* On request by: *Institute of Marine Research*
Research group(s): *Fangst*, *Økosystemakustikk*, *Oseanografi og klima*, *Bunnsamfunn* Subject: *Havvind*
Program: *Nordsjøen*
Research group leader(s):
Svein Løkkeborg (Fangst), Rolf Korneliussen (Økosystemakustikk) og Sigurd Heiberg Espeland (Bunnsamfunn)
Approved by: Research Director(s): Geir Huse Program leader(s): Henning Wehde

Fisheries survey in the offshore wind power field Hywind Tampen before development

Forfatter(e): Karen de Jong , Kate McQueen , Nils Roar Hareide , Maria Tenningen , Gavin John Macaulay (HI), Markus A. Majaneva og the Norwegian Institute for Nature Research (NINA)
Toktleder(e): Karen de Jong (HI)

Rapportserie: *Toktrapport 2022-15* ISSN: *1503-6294* Publisert: *09.01.2023* Oppdatert: *20.02.2023*
Toktnr: *2022005* Prosjektnr: *15864* Oppdragsgiver(e): *Equinor* Referanse: *Kari Mette Murvoll*
Godkjent av: Forskningsdirektør(er): Geir Lasse Taranger Programleder(e): Henning Wehde

English summary

Havforskningsinstituttets rådgivning for menneskeskapt støy i havet

— Kunnskapsgrunnlag, vurderinger og råd for 2023

Forfatter(e): Lise Doksæter Sivle , Tonje Nesse Forland , Karen de Jong , Guosong Zhang , Tina Kutti , Caroline Durif , Geir Pedersen , Henning Wehde (HI) og Endre Grimsbø (UiT - Norges arktiske universitet)

Rapportserie: *Rapport fra havforskningen 2023-2* ISSN: *1893-4536* Publisert: *01.02.2023* Oppdatert: *24.02.2023*
Prosjektnr: *14921*
Forskningsgruppe(r): *Økosystemakustikk* Tema: *Seismikk*, *Havvind*, *Biologisk lyd* Program: *Nordsjøen*
Forskningsgruppeleder(e): Rolf Korneliussen (Økosystemakustikk)
Godkjent av: Forskningsdirektør(er): Geir Huse Programleder(e): Henning Wehde

Potensielle effekter av havvindanlegg på havmiljøet

Forfatter(e): Karen de Jong , Henning Steen , Tonje Nesse Forland , Henning Wehde (HI), Daniel Nyqvist (HI / Politecnico di Torino), Anne Christine Utne Palm , Kjell Tormod Nilssen , Jon Albretsen , Tone Falkenhaug , Martin Biuw , Lene Buhl-Mortensen og Lise Doksæter Sivle (HI)

Rapportserie: *Rapport fra havforskningen 2020-42* ISSN: *1893-4536* Publisert: *13.11.2020* Prosjektnr: *14384*
Forskningsgruppe(r): *Bunnsamfunn*, *Fangst*, *Bærekraftig utvikling*, *Økosystemakustikk*, *Oseanografi og klima*, *Plankton*, *Sjøpattedyr*
Tema: *Havvind* Program: *Nordsjøen*
Godkjent av: Forskningsdirektør(er): Geir Huse Programleder(e): Henning Wehde

English summary

Kunnskapsinnhenting for Sameksistens mellom fiskeri- og havvindsnæring

— En kartlegging av eksisterende kunnskap og erfaringer om effekter og konsekvenser av etablering av havvind for norsk fiskerinæring.

Forfatter(e): Anne Christine Utne Palm , Nils Roar Hareide , Karen de Jong , Maria Tenningen (HI) og Dorothy L. Dankel SINTEF

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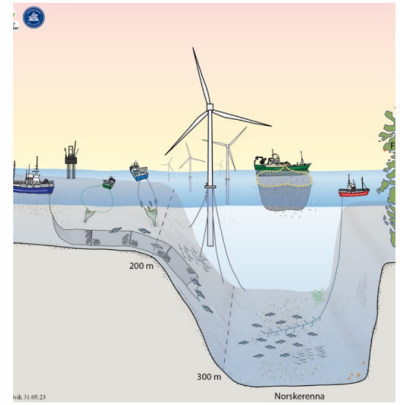
English summary

Sammendrag



Tegningen viser fiskeriaktivitet i området rundt Hywind Tampen før vindparken ble bygget. (Illustrasjon: Liz Kvalvik).

Takk for oppmerksomheten!

En stor takk til alle som er med
- Anne Christine Utne Palm
- Maria Tenningen
- Kate McQueen
- Geir Pedersen
- Angelika Renner
- Nils Roar Hareide
- Guosong Zhang
- Sigurd Hannaas
- Erik Shuster
- Atle Totland
- Anne Kari Sveistrup

Og mange flere

Pilot farms: parameter			Case Study A Germany	Case Study B Denmark	Case Study C Estonia
sea basin			North Sea German EEZ (offshore)	Baltic Sea Danish EEZ (offshore)	Baltic Sea Estonian Sea (nearshore)
Case Study lead			AWI	AU	UT
condition of water column			open ocean/ extremely exposed	open ocean/ exposed	Sheltered
water depth			28 m (TR 4.5 m)	16-30 m (TR 0.5 m)	25 m (TR 0.2 m)
multi-use partner	co-use partner	type of partnership	low-trophic aquaculture candidates: blue mussel (*M. edulis*) Eur. Oyster, (*O. edulis*) sugar kelp (*Saccharina latissima*) sea lettuce (*Ulva sp.*)	low-trophic aquaculture candidates: blue mussel (*M. edulis*) sugar kelp (*Saccharina latissima*) sea lettuce (*Ulva sp.*)	low-trophic aquaculture candidates: blue mussel (*M. edulis*) sea lettuce (*Ulva intestinalis*)
		technology	longline/"SF Tower"	longline	longline
		location at the host partner	in the area of the OWF, to be defined in T1.1		within 500 m
	host partner	type of partnership	OWF Meerwind Süd/Ost (WindMW)	OWF Kriegers Flak (Vattenfall)	fish farm (RedStorm OÜ, Ösel Aquafarms)
		distance to next harbour	12.4 nautical miles (Helgoland)	8 nautical miles (Klintholm Havn)	2 nautical miles (Port of Veere)
		n turbines/ fish farms	80	72	1
		coordinates	54°23′0″ N, 7°41′0″ E	55°1′34″ N, 12°56′20″ E	58°27′41″ N, 22°4′30″ E

TR = tidal range, SF = Shellfish

From a high energy environment to a "duck pond"

Extractive Species (LTA only)

Slides by Prof Bela Buk AWI