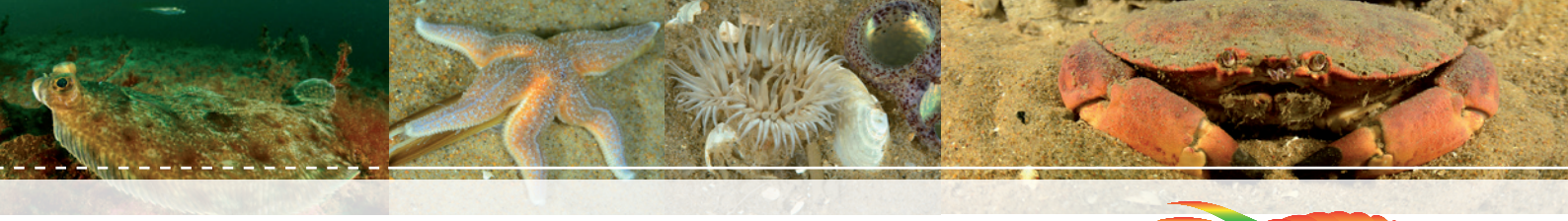


DISCLOSE symposium - monitoring and protecting the North Sea seafloor.

DISCLOSE

‘ACTIVELY LISTENING TO SCIENCE’

To protect the North Sea, we have to really understand it. The four-year research project DISCLOSE, which runs until October 2020, aims to map the habitats of the North Sea using a combination of techniques, paying particular attention to the dispersal, structure and functioning of vulnerable seabed communities. This project is a collaboration between Delft University of Technology (TU), the Royal Netherlands Institute for Sea Research (NIOZ), the University of Groningen and the North Sea Foundation, and is funded by the Gieskes-Strijbis Fund. DISCLOSE stands for DIstribution, StruCture and functioning of LOwresilience benthic communities and habitats of the Dutch North SEa.

The monitoring and protection of the North Sea seafloor is central to the DISCLOSE symposium held on November 6th 2019. Over a hundred attendees gathered in Utrecht. The list of speakers promises an inspiring day of science-based policy, mapping the seafloor and the challenges to, not just nominally, protect the seafloor.

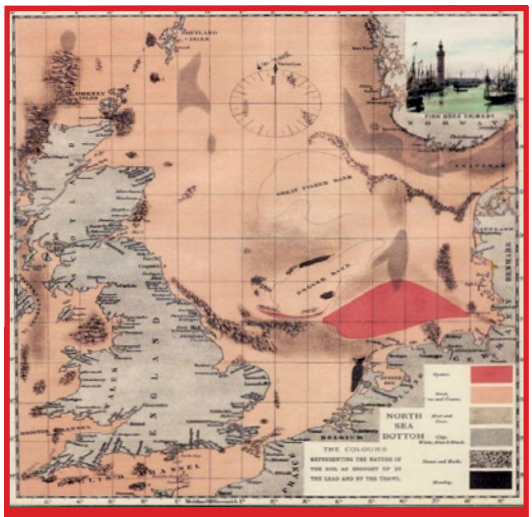
More than a hundred participants gathered in the historical monument ‘het muntgebouw’ in Utrecht to assimilate the latest results of DISCLOSE. “DISCLOSE aims to produce detailed information about the presence and vulnerability of habitats and species in the North Sea” explains *Floris van Hest* of the North Sea Foundation as first speaker. An ambitious goal, he states. Van Hest emphasized the importance of sciencebased policy. “We should keep investing in this. We strongly believe that good science results in good management. Nature organisations and policy makers should therefore actively listen to science”

Three-stage rocket

And listening is what takes place today. Representatives from universities, government, fisheries, nature organisations, and consulting and engineering companies typify the broad range of interest in this research. They are shown no less than thirteen presentations, distributed over four sessions: acoustic imaging, benthic biodiversity, habitat diversity, and effective conservation. Each session is designed like a three-stage rocket: first an introduction, followed by DISCLOSE specific results, and ending with an external reflection of the results. The day ends with a plenary, interactive discussion. This journalistic essay describes the content of the speakers in a nutshell. The shortened version does not do justice to the complexity of the research. Find here a synopsis of the presentations.

Distinguishing between sediments

Mirjam Snellen from the TU Delft kicks off the first session with an explanation of the multibeam echosounder. "This measuring technique enables the mapping of large areas in high resolution using acoustic imaging. Gravel, sand, mud: we can determine the seabed composition in high detail from a distance." Her colleague *Leo Koop* used this methodology within DISCLOSE at the Brown Bank, a dynamic area within the North Sea. He shows detailed maps of large sand dunes, smaller sand waves and even smaller mega ripples. "At the scale of such a mega ripple, which has a wave length of ten to thirty meters, we can clearly distinguish separate sediment types. Sediment at the top, in the trough and at both slopes differs from each other."



This map from 1883 appeared in multiple presentations on the screen. According to *Ad Stolk* from the Directorate-General for Public Works and Water Management, this map represents one of the first habitat maps of the North Sea. The large red marking shows an area within which rich oyster-grounds were located at the time.

Interpolation of data

Acoustic methods widen the monitor's view. Later that day, *Han Olff* from the University of Groningen compares the traditional North Sea seafloor sampling with picking grass clumps from the side of the highway in the middle of the night to create a vegetation map of the entirety of the Netherlands. "That's exactly what is happening in the North Sea. Seafloor samples are taken here and there, what lies between is unknown." The main challenge, according to Olff: the spatial interpolation between samples. *Ad Stolk* from the Directorate-General for Public Works and Water Management agrees in his presentation.

Ad Stolk (Directorate-General for Public Works and Water Management):

'Because of the limited and expensive shipping time, acoustic methods have much potential.'

He calls for the development of a 'new recipe', a broadly supported improved method to map the North Sea seafloor. "Combine multiple measuring techniques and methodologies. Because of the limited and expensive shipping time, acoustic methods have much potential. But you always need other techniques to validate the acoustic data."

Integration of measuring techniques

Precisely this multidisciplinary approach, advised by Stolk, is what DISCLOSE is all about. Koop's detailed maps would not have been possible without seafloor samples and the local video footage of *Karin van der Reijden* from the University of Groningen. In her presentation, she links the mega ripples presented by Koop to the benthic communities. "Exactly in this area we find the reef-building tubeworm *Sabellaria spinulosa*. This worm seems to profit the multi-scale seabed morphologies, like the mega ripples. Van der Reijden is currently constructing a habitat map of the North Sea. She shows a preliminary map with fifteen habitats, all based on abiotic parameters like temperature, salinity and the relative water depth. "The remaining question is whether this abiotic map corresponds with benthic communities. It seems to be the case for commercially exploited fish species, according to my spatial study of fishing intensity." *Tom Ysebaert* from the Royal Netherlands Institute for Sea Research (NIOZ) also argues in favor of the interdisciplinary strategy of DISCLOSE. "By the combination of multiple different sampling methods we obtain a much more detailed image of the seafloor than otherwise would be possible."

Karin van der Reijden (University of Groningen)

Gigantic changes

Mapping benthic habitats and communities is one of the DISCLOSE aims in support of protection. A more effective protection is needed. "The ecosystem of the North Sea is subjected to gigantic changes", says final speaker *Ton IJlstra* from the ministry of Agriculture, Nature, and Food Quality. Climate change, demersal fisheries, spatial claims for new offshore wind farms, aquacultures, microplastics: they all pose an increasing threat to the marine ecosystem. *Christiaan van Sluis* of the North Sea Foundation also emphasizes this increasing human usage in his presentation. According to him, wind parks will increase from 4.5 GW in 2023 to potentially 75 GW in 2050.

Christiaan van Sluis (North Sea Foundation):

'Is protection sufficiently contributing to the balance between nature and usage?'

Fishing in protected areas

Van Sluis thinks that the current amount of nature protection falls short. He mentions that only 0.3% of the North Sea had year-round protection from demersal fisheries in 2017. "In 2020, this will become five percent, but even then fisheries are allowed in the majority of the protected areas. In the process of assigning completely closed areas within the protected areas, potential loss of income for fisheries is greatly taken into account. Is protection sufficiently contributing to the balance between nature and usage?" In his presentation, Olff shows a map of fishing activity in 2017. Protected areas like the Frisian Front and parts of the Cleaver Bank are shown in dark red. "In general demersal fisheries operate here more than four times a year while recovery of the seafloor after only one trawl can take up to fifteen years. The natural potential of these areas is therefore unknown." The urgent need for undisturbed reference areas is emphasized by multiple speakers.

Olivier Beauchard (NIOZ)

Degree of vulnerability

Resilience to recover after a disturbance turns out to vary between different areas. *Olivier Beauchard* of the NIOZ focusses on the vulnerability of species. Based on that, he distinguishes vulnerable and less-vulnerable regions in within the North Sea. "Vulnerable species are large, have a longer lifespan and become mature at older ages. These species are dominantly present in the muddy, deeper northern parts of the North Sea. Where waves reach the bottom, like coastal zones and near sand dunes, natural dynamics are high. Here we find short-lived species that can handle disturbance well. But even here we find some vulnerable species, like the *Sabellaria* reefs at the Brown Bank."

Tjeerd Bouma (NIOZ):

'In the past century a shift was observed to species that are less vulnerable to disturbances.'

Tjeerd Bouma from the NIOZ, in his presentation, describes a shift in species composition over time. "In the past century a shift was observed to species that are less vulnerable to disturbances. Most species are still present, but the more vulnerable species became rare."

Dive in the North Sea

The symposium starts with a spectacular dive in the North Sea. The movie shows the world at the seafloor. Among others the Sabellaria reefs at the Brown Bank and all associated underwater life are visited. Click here to watch the movie and other shown movies about life in the North Sea.

Eleven hotspots

If we want more protected areas, where should these be located? That question was answered by *Peter Herman* of the TU Delft. He studied long-term datasets, consisting of a million records of benthic species. "In the northern North Sea we find more species per sample than in the southern North Sea. The highest biomass is observed in the coastal areas", he states. Still, the picture is far from complete. "We don't know anything from most areas." With his immense dataset, Herman determined eleven hotspots that together comprise the highest biodiversity. "Conservation of biodiversity does not require many more protected areas. These hotspots are dominantly located within the existing nature areas like the Cleaver Bank and the Dogger Bank. But some are located in the not-protected southern sand wave areas. This is the home of some species that are not found elsewhere."

Call for better harmonization

Monitoring doesn't stop at state borders. Belgium also maps benthic communities by sampling in the North Sea. *Gert van Hoey* of the Belgian Flanders Institute for Agriculture, Fisheries and Food (ILVO) argues for a more joint and integral approach for the entire North Sea. "Every country has his own initiatives now. We should strive to a better harmonized and a broadly supported approach to monitor the North Sea seafloor."

Gert van Hoey (ILVO)

Reintroduction of the flat oyster

Recovery of the North Sea seafloor nature currently focuses on reintroduction of the flat oyster. *Tjeerd Bouma* of the NIOZ tells in his presentation. "At this moment, six projects are trying to reintroduce the flat oyster in the North Sea. Many parties are involved. Multiple projects are in combination with offshore wind farms. Some first perform research, after which they start a field experiment. Others conduct field experiments and learn by doing." A variety of structures are tested for oyster larvae to attach to, like mussels, roof tiles, baskets, steel constructions and BESE – biologically degradable structures. "Mussels seem the most successful substrate until now."

More flexibility

Both IJlstra and van Sluis agree that protection currently falls short. IJlstra has doubts about the current method of regulation. The traditional measures, like the assignment of protected areas, are not satisfactory. "Decision making in Europe and its implementations take too long. This slow motion policy making does not match the rapid changing reality. We should develop modern and flexible measures to protect nature." Although he does not have a clear-cut solution, a way forward might be in the recent initiative of Jacques Wallage. That is to invite all parties involved to the table for an open North Sea discussion. "That could mean a step forward, in which the government takes a step back. Why don't we ask the fisheries as a partner to jointly protect nature values?"

Click here for a synopsis of the presentations

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More information over the project
www.discloseproject.nl and from the project leader Dick Simons of the TU Delft, email: d.g.simons@tudelft.nl.

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