

First samples from exclusion areas of mobile bottom-contact fisheries (MGF) should provide important insights into the effects of MGF exclusion

The exclusion of mobile, *mobile bottom-contact fishing (MGF)* from parts of the marine protected areas (MPAs) in the German Baltic Sea marks a significant milestone in protecting sensitive marine habitats. The corresponding regulation was adopted in September 2024 and enforced November 2024. Although not all MPAs are covered, this decision represents a turning point in the management of seabed use—particularly regarding the balance between conservation and fisheries activities.

The collaborative project MGF-Ostsee is using this new opportunity to address critical questions about the impacts of MGF on the Baltic Sea ecosystem. Its objectives are to: (i) analyze ecological recovery processes after the exclusion, (ii) assess MPA effectiveness, and (iii) provide evidence-based advice for management and conservation strategies.

In spring 2025, the first sediment samples from the newly established exclusion zones were collected by scientists from IOW as part of the Baltic Sea Monitoring Program (BMP) and processed in close collaboration with GFZ. These samples include intact sediment cores, which are now being analyzed for sulfate reduction rates and other microbiological and geochemical parameters. These indicators reflect microbial activity within the seabed and offer valuable insights into past fishing impacts and the potential speed of ecosystem recovery.

During the upcoming MGF-Ostsee survey cruise in June/July 2025, all study sites—Rönnebank, Oderbank and Fehmarnbelt—will be intensively sampled for the first and likely only time within the current project framework following the exclusion. Particular focus will be placed on comparing data from areas under active MGF pressure and recently closed zones. The goal is to develop a process-based understanding of different stages of ecological recovery and to scale this knowledge to broader spatial contexts. In doing so, MGF-Ostsee aims to contribute valuable insights not only for Germany's MPA strategy but also for international marine spatial planning initiatives.

In Germany's EEZ of the North Sea, mobile bottom-contact fishing was already excluded from the Borkum Reef Ground and parts of the Sylt Outer Reef – Eastern German Bight MPAs as early as March 2023. The MGF-Nordsee project initially established a comprehensive ecological baseline and is now tracking the early dynamics of ecosystem change following the exclusion. Research focuses on both abiotic characteristics and the biological development of microbiota and benthic communities.

Particular attention is being paid to comparing conventional and alternative monitoring methods. Results from traditional sampling (using dredges and beam trawls) are being compared with those obtained via non-invasive techniques, such as environmental DNA (eDNA) analysis and

baited remote underwater video systems (BRUVs). Sample processing and data analysis are well underway, and we are looking forward to sharing exciting results, which will also be closely compared and aligned with findings from MGF-Ostsee.

At the strategic level, the MGF projects are actively engaged: during meetings of the German Marine Research Alliance (DAM) on 21 February in Hamburg and 25 March in Berlin, both sustainMare research consortia—MGF-Ostsee (represented by Klaus Jürgens and Torben Bruhns) and MGF-Nordsee (represented by Sabine Horn and Peter Schupp)—presented their work to key committees.

Despite strong interest in the results achieved so far, a central challenge remains: the delayed exclusion of MGF activities in both the North and Baltic Seas initially hindered the mission’s original aim of promptly monitoring ecosystem changes post-exclusion. This situation has now improved, with the necessary conditions for robust scientific monitoring finally in place. However, future management of areas such as the Dogger Bank MPA in the North Sea remains uncertain, as MGF activities continue there.

The DAM stakeholders expressly acknowledged the important work carried out by the project. They emphasize the need for a potential third pro-



Figure 1: Peter Schupp (MGF-N, left) and Torben Bruhns (MGF-O, right) at the DAM stakeholder-forum in Berlin. © P. Conrad | DAM

ject phase to deepen ongoing investigations and to capture longer-term ecosystem changes. There is a strong political and societal demand for robust evidence to inform MPA management and fisheries governance—and the MGF projects are ready to make a decisive contribution.

*contact: MGF-Ostsee:
Klaus.Jürgens@IO-Warnemuende.de;
MGF-Nordsee: sabine.horn@awi.de*

First meeting of the second phase of iSeal in Kiel

The iSeal project entered its second phase in December 2024 and on February 24.-25. 2025 the “Kick-off meeting” took place at GEOMAR in Kiel. The mission manager Kai Hoppe and Wanda Holzhüter, representing the PTJ, were present as well.

At this meeting, all work packages and objectives for the second project phase were presented and discussed. In addition, the 14 participants talked about the completion of the first phase of the project, as well as ways to incorporate the content



Figure 2: Group photo of the participants of the Kick-off-meeting at GEOMAR in Kiel. © M. Scotti | GEOMAR

and results of iSeal into university teaching. The focus in the second phase is especially on the transfer of the results, as well as collaboration in the project and within the mission. This is why such personal meetings are particularly important.

In addition to substantive discussions, new faces were also welcomed to the project. In December 2024, Lenke Tödter (NPV-SH) joined as the new project manager and research assistant for ecological network analysis. In February 2025, Kirsi

Forss (University of Oldenburg) joined the team, supporting them with her expertise in *Participatory Geographical Information System* (PGIS), and from July 2025, Sven Rossel (Senckenberg) will be investigating the smart farms of the North Sea. During a joint dinner, all new and familiar faces had the opportunity to exchange ideas and get to know each other.

contact: lenke.toedter@lkn.landsh.de

SpaCeParti – 2: Spatial solutions for a sustainability transformation of fisheries in the Western Baltic Sea

The commercially important cod and herring stocks are depleted, and this threatens the existence of western Baltic fisheries. In addition, fisheries face the challenge of increased spatial competition with offshore wind farms and increased demand for marine conservation to combat the climate and biodiversity crises.

Currently, government initiatives such as the Future Baltic Sea Fisheries Model Commission (LBK) and the Future Commission on Fisheries Opportunities, launched in March, offer prospects for transforming German western Baltic Sea fisheries into a sustainable future.

By combining research in ecology, economics, and social sciences in a modern transdisciplinary process, SpaCeParti will provide spatial solutions for a sustainability transformation of western Baltic fisheries.

Specifically, solutions relating to ecology, management, transdisciplinarity, and governance will be developed for a sustainability transformation of fisheries in the Western Baltic Sea. Due to its unique transdisciplinary approach, using the real-world laboratory format with the participation of

affected stakeholder groups, SpaCeParti can serve as a blueprint for sustainability transformations, even beyond fisheries.

SpaCeParti will contribute in particular to the achievement of the UN *Sustainable Development Goal* (hereafter SDG) **14** (*Life Below Water*), but also to **SDG 2** (*Zero Hunger*), **SDG 8** (*Decent Work and Economic Growth*), **SDG 12** (*Responsible Consumption and Production*), and **SDG 17** (*Partnerships for the Goals*).



Figure 3: SpaCeParti real-world laboratory (Stein und Wendtorf, Kiel Bay) with a graphic representation of the project's focus.

contact: mcreekhof@ae.uni-kiel.de

Wind farms in the spotlight at CoastalFutures: Research needs identified, particularly on cumulative effects of offshore expansion

As part of the CoastalFutures project, led by the Helmholtz Centre Hereon, the effects of large offshore wind farms on the overall ecological and economic context in the North and Baltic Sea, form a significant research focus. Among others, results are used in a report of the Office of Technology Assessment at the German Bundestag (TAB). However, analysis in CoastalFutures also points to a number of gaps in research. It shows that, on the one hand, we know a lot about the ecosystem, especially individual effects, but on the other hand, the changes associated with large-scale spatial expansion have mostly been studied individually. However, these processes are closely linked through the food web. In general, there is a lack of quantitative estimates of individual effects, their impact on the entire ecosystem, and specific ecosystem components. These cumulative effects must be considered more intensively in the future. In addition, the relationship with other marine uses and environmental changes must be considered. And, various possible installation configurations must be examined for differences in the amplification or attenuation of effects.

CoastalFutures also investigates specific risks related to changes in sediment transport with impacts on coastal protection and the spread of oxygen-depleted zones, as well as weather changes, particularly with regard to extreme weather events. However, CoastalFutures research also shows that the changes associated with wind farm expansion pose new challenges for monitoring,

predicting atmospheric and ocean processes, and estimating fish stocks.

The quality of the models and the consistency of the data are likely to decline with increasing expansion, as this has not yet been considered in the models. There is therefore a considerable need for research to develop scientific methods that can keep pace with expansion and enable reliable predictions in the longer term.

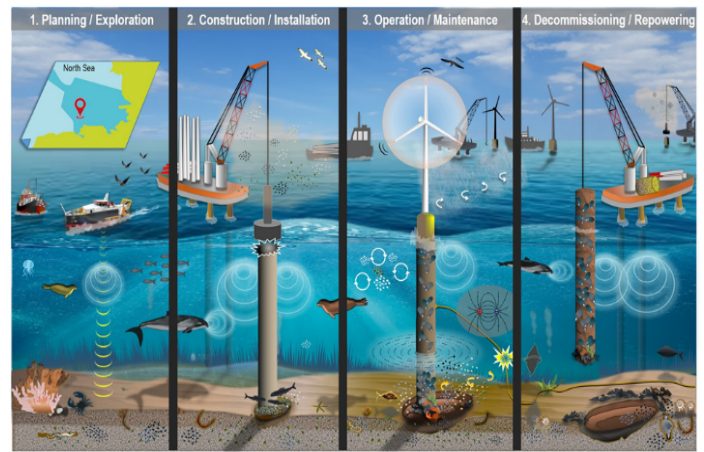


Figure 4: Planning of an Off-shore Windfarm

There is also an urgent need for research into politically desirable offshore hydrogen production in order to incorporate scientific findings into planning, the setting of limiting values, and environmental impact assessments. This also includes the investigation of effects of other technologies, such as energy islands. In addition, research is needed on the impacts of dismantling offshore wind farms and on sustainable multi-use concepts.

Concerning multi-use concepts, CoastalFutures is in dialogues with various stakeholder groups from nature conservation, industry, fisheries, and authorities on potential options and is discussing

sustainable concepts with a wide range of stakeholders within the KDM Strategy Group on *Marine Protection and Multi-Use*.

contact: andreas.kannen@hereon.de

Travelling with drifters: New dynamics for the 'Gesamtaufnahme Nordsee'

Every year, the Federal Maritime and Hydrographic Agency (BSH) undertakes a comprehensive oceanographic and chemical survey of the North Sea - the 'Gesamtaufnahme Nordsee'. This large-scale survey enables a well-founded assessment of the physical-chemical state of the North Sea and documents long-term changes. The integration of surface drifters, developed at the Institute for Chemistry and Biology of the Marine Environment (ICBM) at the University of Oldenburg, will now further develop this standard monitoring concept.

Traditional monitoring approaches are based on point measurements carried out along defined transects or at specific stations. However, this method does not provide any information about the movement of the water masses analysed before and after the measurement. This is precisely where the surface drifters come in: As passively drifting instruments, they follow the currents of the North Sea and continuously record their position. These trajectories provide valuable insights into the movements of water masses and their transport of heat, oxygen and nutrients.

The drifters have already been successfully tested as part of the CREATE project and their possible applications for investigating the connectivity of marine protected areas in the North Sea have been trialled. They are now being integrated into the 'Gesamtaufnahme Nordsee 2025' in order to increase the efficiency and precision of this centralised monitoring in the future.

The drifters are deployed in specific water masses and then drift with the current. Their recorded movements help to adapt the station planning of the survey to the prevailing environmental conditions. For example, it is possible to react



Figure 5: Surface drifters drift in the North Sea as a non-invasive tool for measuring currents, particles and water masses.

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better to the position of the thermocline - a temperature jump between surface and deeper water - which typically occurs in summer.

By precisely tracking the movements of water masses, stations can be strategically planned to capture relevant currents and water bodies. This not only increases the informative value of the data obtained, but also enables more efficient utilisation of resources during the large-scale measurement campaign.

contact: michelle.albinus@uol.de

New dissolution and movement experiments conducted with solid explosive material recovered from dumped munitions in Lübeck Bay

Laboratory experiments on the dissolution and physical movement of explosive material were conducted for the first time in March 2025 in a collaboration between the *MMinE-SwEEPER* project (EU Horizon), the CONMAR project (BMBF/DAM), and the initiative 'Immediate Action Program – Munitions in the Sea' (BMUKN).



Figure 6: Maria Khon (L.; GEOMAR) and Ansgar Leefken (r.; URO) sampling a current flume experiment at the KR D S-H facility. The flume allows precise control and measurement of current speeds over a solid explosive fragment, and water samples are simultaneously collected over time to calculate dissolution rates.

The explosive fill in sea-dumped munitions can become exposed to seawater when munition metal housings corrode.

Exposure leads to the release of toxic explosive chemicals to the environment, followed by accumulation in organisms, including those consumed by humans as seafood. In addition, solid explosive fragments can be transported by waves and currents, posing a risk to beachgoers and others.

Munitions typically contain a mixture of explosive types, and with more than 400 known mixtures, it is difficult to predict the dissolution and movement behavior without direct knowledge of the explosive composition.

As part of the test munition clearance work in the Immediate Action Program, the *Explosive Ordnance Disposal* (EOD) companies Eggers GmbH and Hansataucher GmbH recovered small fragments of exposed explosive material from the WWII-era Pelzerhaken munition dumpsite in Lübeck Bay and transferred them to the Schleswig-Holstein state EOD specialists (Kampfmittelräumdienst, KR D S-H).

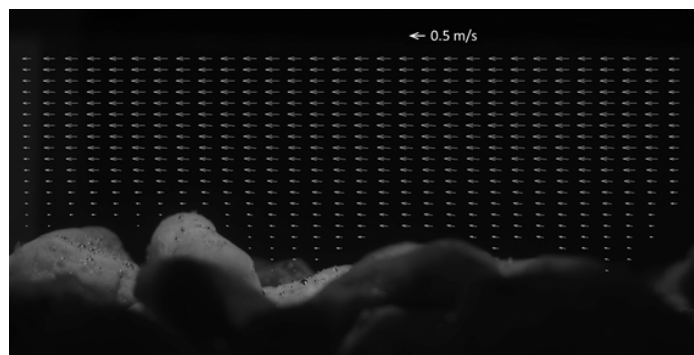


Figure 7: Velocity field from particle image velocimetry representing critical flow conditions, i.e. onset of rolling motion of the explosive chunks. The velocity field was averaged over 319 instantaneous velocity fields covering a period of 2 s.

The KR D S-H provided space at their secure facility for scientists from the GEOMAR Helmholtz Centre for Ocean Research Kiel and the University of Rostock (URO) to conduct laboratory tests on the recovered material to determine the explosive

composition, dissolution rate in water, and susceptibility to movement at different current speeds. Data from these experiments are currently being analyzed at GEOMAR and URO, and the results will support both the MMinE-SWEEPER and CONMAR II projects.

The results will help us understand the chemical source from dumped munitions and allow us to

predict the release of explosive chemicals to the environment. Results from the flume experiments will help us better understand the physical transport of solid explosive pieces and the potential for this material to reach public coastlines and beaches.

contact: ajbeck@geomar.de;
ansgar.leefken@uni-rostock.de

sustainMare at UNOC3 in Nice

After two initial editions in New York (2017) and Lisbon (2022), the third United Nations Ocean Conference (UNOC-3) took place in Nice from June 9 to 13, 2025. sustainMare was part of it.



**UNITED NATIONS
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CONMAR at UNOC3

On June 11, the European munition research, including CONMAR, of course, invited participants of the conference to an official UNOC3 side event on the research vessel Meteor under the motto: *No time to waste: Tackling submerged munitions in European Seas*. More than 70 international guests attended to learn about the topic of munition in the sea and the latest developments in solving the problem. The event was organized by GEOMAR, together with the BMUKN and HELCOM. Following the welcoming remarks (by Jens Greinert, GEOMAR, and Sebastian Unger, BMUKN), a panel discussion was held on the topic *The Baltic Perspective: front-runner regional approaches to addressing a global threat* with the participation of Rüdiger Stempel, Executive Secretary, HELCOM, Finland; Delilah Al Khudhairi, Director, Maritime Policy and Blue Economy Unit, European Commission (DG MARE), Belgium, Agnieszka

Jędruch, Researcher at IOPAN, Poland, and Stefan Mehlhase, Marine Pollution Officer, BMUKN, Germany.

Afterwards, participants were able to learn about various aspects of marine munition, such as the detection of munitions in the sea, legal aspects,



Figure 8: Panel discussion on the working deck of RV METEOR
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impacts on the environment and the blue economy, and potential safety risks. The European munition network was also presented. We look back on an exciting exchange in an international setting on the beautiful METEOR. We would like to take this opportunity to express our sincere thanks to everyone who made this event possible and helped to organize it. Special thanks go to the UNOC3 team at PtJ and the entire crew of the Meteor.

contact: dhenkel@geomar.de

CoastalFutures at UNOC3

At the UNOC3 Side Event *Beyond borders: uniting offshore-wind and MSP for healthy seas*, organized by Seas at Risk and Environmental Action Germany (DUH) in the Chagall museum in Nice, sustainMare co-speaker Andreas Kannen from CoastalFutures provided a sustainMare Keynote entitled ‘*Building bridges across scales, uses and ecosystems – A Challenge in maritime spatial planning*’. In the light of current large-scale offshore

wind development across the North Sea and climate change, his key messages were to focus on the management of change instead of status quo and to look more at transnational planning and policy scales instead of mostly national perspectives. In addition, Prof. Dr. Corinna Schrum participated in the roundtable of the German Marine Research Alliance (DAM) on *Solution-oriented Ocean Research*.

contact: andreas.kannen@hereon.de.

Mission – ‘Litfaßsäule’ – What else?

sustainMare Lecture series

Since 2023, for the third year in a row, the sustainMare lecture series (in German only) has been held during the summer semester at the University of Hamburg. The 2025 edition still runs until July 9 and provides information about the current work from the research mission sustainMare.

What’s particularly great is that if you miss an episode, you can watch it again anytime. Here you can find all recordings on [Lecture2go](#). While the number of participants on Wednesday’s evenings varies between 30 and 90 (depending on the weather and the World Cup), after 28 months and 40 lectures, the lectures have been viewed more than 44,000 (!) times. These figures give us particular pleasure.

In 2024, our series was also selected as an elective module for the extracurricular study program ‘*Certificate Intercultural Competence*’ at the University of Hamburg.

Furthermore, in 2024 and 2025, the sustainMare lecture series was used in the university course ‘*Protection and Use of Natural Resources*’ at Kiel University. In addition, some of the lectures were

taken over by [Deutschlandradio Nova](#) as podcasts and broadcast nationwide in the “Hörsaal” series.

contact: Kai.Hoppe@hereon.de

News from the mission datamanagement

In order to be able to share the extensive data sets collected within sustainMare during the project period internally, a data portal was created as an “*interim data room*” where mission members can log in and upload data.

After fulfilling their obligations (FAIR data management is obligatory!), creative minds can transform their results and those of the mission into appealing GIS representations and exciting websites/portals. One example is the [Munition Viewer](#) on the German Marine Research portal. All mission participants are invited to join the MWG “Research Data Management.”

Also the German Marine Research Alliance (DAM) has published a [new paper on data management](#), which provides an overview of how to handle research data from project planning to implementation.

contact: mkrueger@geomar.de;
Kai.Hoppe@hereon.de