PREWORKSHOP COMMENTS ON DESCRIPTORS

THIS BOARD:

We have prepared separate areas in this Mural, one for each descriptor for you to add your comments to help us structure the break out sessions and enable a more productive session. **Please choose at least one descriptor** that you feel best equipped to comment on. Your input now will help structure and prioritise the issues and descriptors for discussion in the break out groups.

Go to "**How to use mural**" to move around and "**Instructions**" to get started with your descriptor(s) - outline to reach these areas is on top right

WORKSHOP OBJECTIVE

The main objective of the workshop is to complete proposed Short Scientific Summaries (SSS) of "Good Environmental Status descriptors", to validate and complement the content and knowledge gaps identified in these Short Scientific Sunnmaries developed for each of the descriptors.

HOW TO USE MURAL

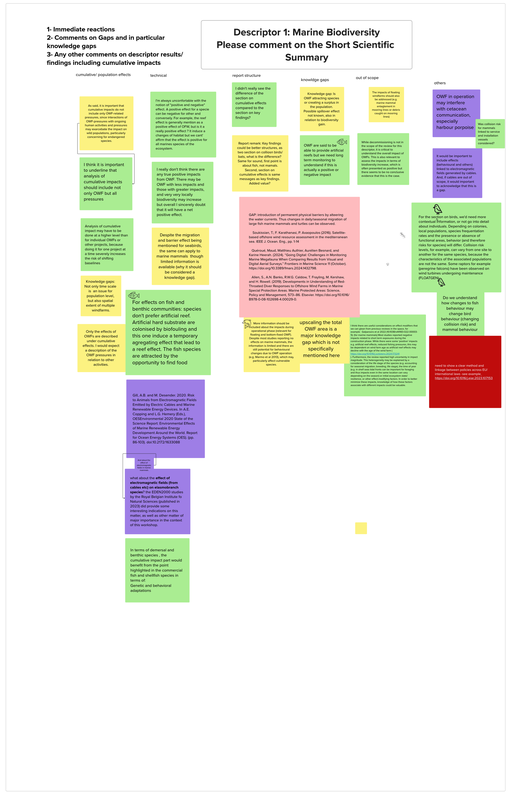
- Add a post-it: double-click anywhere then click-out of the box and back in to type in text
- At the bottom on the right you find the tools to zoom in and out and the hand to move the Mural without modifying anything.
- Top right: **you can click on the outline to go where you want and to each descriptor**
- On the left you have tools to add anything: text, image, forms, etc.

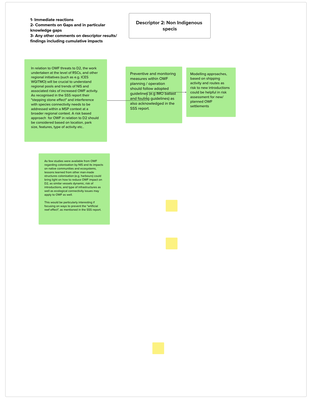
INSTRUCTIONS

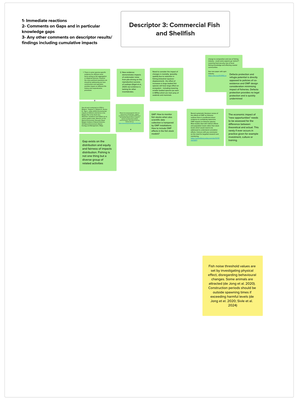
We would value **your comments, addings and suggestions** on as many descriptors as you want (at least one is already great!!)
For each descriptor you choose:

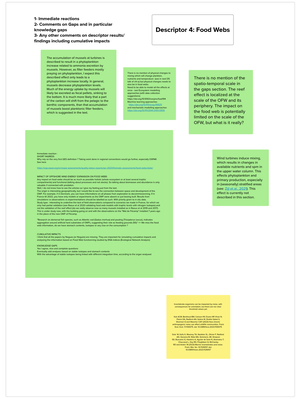
1- Read the SSS and keep it handy
2- Go to the Outline and click on the desccriptor
3- Provide comments on the key points listed on top of the area (general comments, methodology, key gaps etc.)
4- to provide comments: double click to create a stiky note, one idea/comment per sticky note`
5- Don't forget to comment on aspects like cumulative impacts

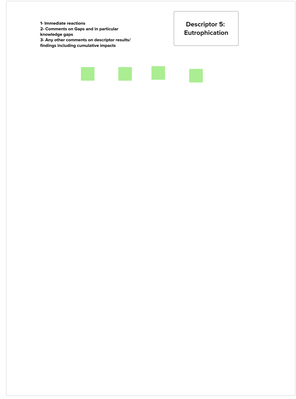
THANK YOU!!

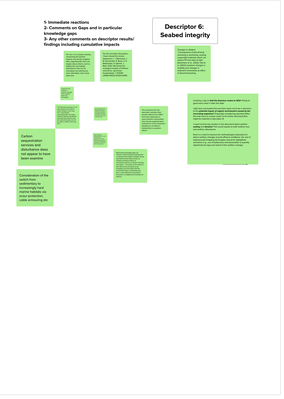


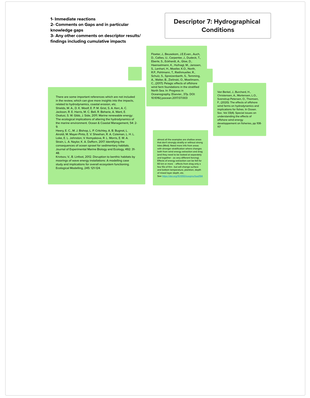


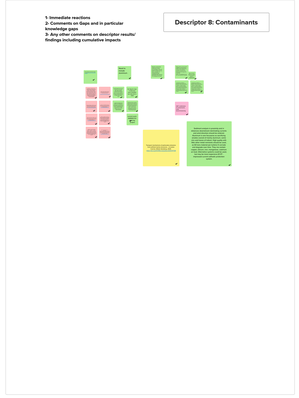


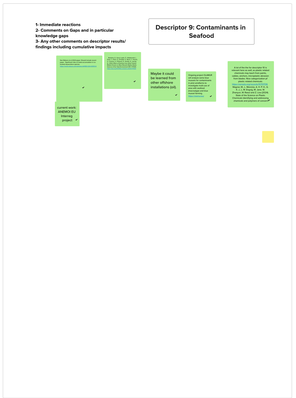


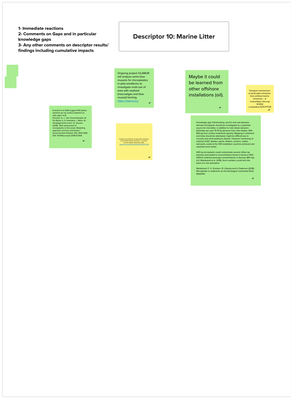


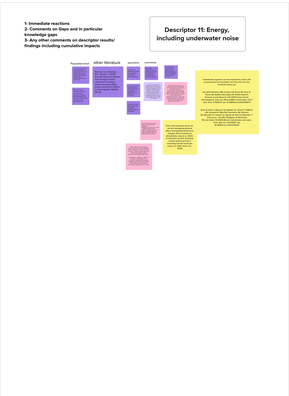












WORKSHOP REPORTING AND PLENARY DISCUSSION

Highlights from the Break-out groups

Descriptor 1: Marine Biodiversity

D1 overview and tools
- cumulative impacts, also consider impact from multiplane activities
- Environmental assessment mentioned as highly needed, current initiatives connected to define methodologies (ESS, OSPAR). Also need to consider cumulative impacts with other MPA
- Lifecycle: exploratory/ Operational phase, and construction phase (NL) decommissioning NL also the most experience. Also Belgium has some. Not critically assess the positive effect. Sometimes a positive effect is assumed (e.g. artificial reef). Also decommissioned piles if several OWFs are decommissioned in the same area
- Collisions, population effects there is a minimum of decommissioning and what will happened to those species. Also the effect of habitat will be used and these decommissioning will take like

D1 Benthic Habitats
Final Key takeaways:

The reef effect on the benthic habitats. Also the impact caused by underwater noise effect. Spillover for certain benthic species causing changes in their population.
The decommissioning.

Descriptor 2: Non-Indigenous Species

Final Key takeaways:

Adverse effects of NIS on the native system. Given the impacts of OWFs in D7, impacts on NIS dispersion should be acknowledged. Evaluation criteria where OWF and its impacts (independently and its dispersion). The effect of OWFs on ecosystem services.
The lack of knowledge on OWFs impact in regional scale.

As few studies were available from OWF regarding connectivity to NIS and its impacts on native communities and ecosystems, there is a knowledge gap in this topic that involves colonisation (e.g. hydroids) could be a potential vector for NIS. Also in relation to D7, as similar oceanic dynamic, risk of dispersion of NIS is also present. Also impacts such as ecological connectivity issues may apply to OWF as well.

The most significant and potentially interesting if knowledge gaps around the "artificial reef effect" as mentioned in the SSS report.

Descriptor 3: Commercial Fish and shell Fish

cumulative effects on single species and ecosystem functioning. Monitoring plans often focus on single species rather than ecosystems, yet, holistic view is needed as flows in ecosystems change

Regulates on fisheries and restrictions of fisheries in and around OWF vary, with much data yet forthcoming, transboundary effects are unclear

Moving beyond data on individual countries towards joint understanding

Descriptor 4 Food webs

Food webs need to have a whole ecosystem approach with new technologies for data collection and monitoring emerging

SSS - more concluded about this, but still some description on impacts are analysed

Descriptor 5 Eutrophication

Final Key takeaways:

The degree or magnitude of the effects is highly uncertain due to knowledge.
Complex interactions in scientific findings and technical findings.
The risk of NIMBs in nutrient dynamics - relevant impact but difficult to connect.

We need to better understand the links between hydrological changes (D7), changes in OM, nutrients, transparency (D5) and the effects on D1 and D6, which not clearly established

Descriptor 6 Seabed integrity

Final Key takeaways:
Interactions with D1. Reef effects (covered in D1).
The ecosystem changes during the operational and other phase and the cumulative effects of enrichment and ban + long-term

A challenge to balance the impacts of OWF. The decommissioning. The extent of the effects. Carbon sequestration and ecosystem services.

Descriptor 7 Hydrographical conditions

Reoxygenating the sea with Hydrogen parks - to consider: Contaminants in the sediments, temperature increase and salinity increase

Physical aspects of change due to OWF - amount of mixing significant in stratified areas leads to increased bottom temperatures

Turbity is the increase the level in the water column

Salinity has an increase due to decrease in stratification

Descriptor 8 Contaminants

Descriptor 9: Contaminants in Sea food

Descriptor 10 Marine Litter

Descriptor 11: Energy including underwater noise

Summary discussion:

electro magnetic field 40), in the SSS it could also be due to the keywords

Artificial lights from the turbines, electromagnetic fields are also Key KEs

Primary is listed to one of the biggest impacts

Secondary is the actual construction phase there is the construction phase that produce big impacts.

For artificial lights the gaps is connected to the ecological and physiologic scale? If the north sea is not seen incorporated, only vessels are included (?), there is no proper metric.

Key KEs: in the EEA: define a continuous noise as a key issues in all the stage of the life cycle of the OWF also vessels

Plenary Discussion

Descriptor 1: Marine Biodiversity

Impacts are very hard to account for assessments. How are we going to tke new evidence in acount, use this for some policy action? Without an adeuqate assessment and evaluate framework . How to get National assessment for implementing evidence. especially in decommissioning.

For underwater noise it is important to make comparison with other activities makes sense. Monitoring and data collection: dutch approach tendering system for offshore WF involves quality criteria for winning the lease. Criteria for monitoring biodiversity through the full life cycle.

Management systems are they fit for purpose? Are they capturing info that allow us to make decisions?
Licensing rating are considered adequate, but need specific indicators for translating good research into management. Have some mandatory indicators about maangement and governance good practice and shared good practices

MFSD: we stick to env impact assessment frameworks. For some desciptors OWF are already reflected in the asst for imp noise, the use of , D2 also for NIS, D6 we also take in consideration the habitat loss. For other descriptors it is harder and complicated. Mortality due to bycatch but not collision, very variable from a descriptor to another

Descriptor 2: Non-Indigenous Species

To get a framework: comparison between alternatives would be useful, espacially with other energy sources. For ex with oil. as part of the assessment.
Monitoring: contaminants/ 16000 possible contaminants so not possible to track everything. Mandatory disclosure of what is put there to focus on the right ones.

We are talking about suspected impacts and not rela and documented ones. The Ecosystem based management and spatial approach would enable assessment off cumulative impacts. To combine these two: monitoring is very important to have comprehensive assessments of cumulative impacts.

Different appraoches depending on countries: ex dutch approach. They have guidelines and indicators to mitigate management of building OWF. Alos in Licensing systm. Aligned management practices/ OSPAR. There is still a gap that in many countries data are still industrial and not governmental. Need to have a national strategy for appropriate data. Integrated monitoring across Ecosystem compoents is a goo practice.

Descriptor 3: Commercial Fish and shell Fish

Challenge is also for assessments to aggregate the effects to cumulative impact assessment. There are uncertainties related to these and need to link monitoring with more strategi planning levels. For management planning: we need to review plans based on monitoring results.

Increased Demand for minierals for solar industry from the sea floor

Decommissioning: it is a policy gap first. It is making a decision on what to do with the area where you have OWF. Effects are to be studied. Evidence: which effects you want to keep, energy needs, go back to original area. Do you want to keep the changes created by the OWF.

Descriptor 4 Food webs

Descriptor 5 Eutrophication

Descriptor 6 Seabed integrity

Descriptor 7 Hydrographical conditions

Horizon projects make a toolbox to evaluate cumulative impacts: challenge is that there is no toolkit validated and mainstreamed to be the ones used.

Cumulative effects looked at Ecosystem level. Ecosystem models not at one species level.

Regulatory perspective: way to force the information flow and assess what is happening right now/colelct data for working on this

Decommissioning: even without enough evidence need to apply the precautionary principle

Descriptor 8 Contaminants

EEA project: we studied some tools and the main SCAIM: Spatial cumulative Assessment .

The solution is to communicate about the toolkits and pros and cons. OSPAR: Eco-C, GNSBI CIA-work track. Great if the same tools are used at a transnational perspective.

Descriptor 9: Contaminants in Sea food

Toolboxes: on we are building on previous developments ICES and previous horizon europe projects.GES4Seas

No model is perfect, look at range of different models looking at the same thing. Exs from the UK. Not standardising but if they are giving same answers it will help

We have a responsibility to not make it more complicated for sustainable energy as for oil and gas.

Be a bit more ahaed in time and learn from other sources.

Descriptor 10 Marine Litter

Descriptor 11: Energy including underwater noise

Are there any to come research projects on decommissioning?

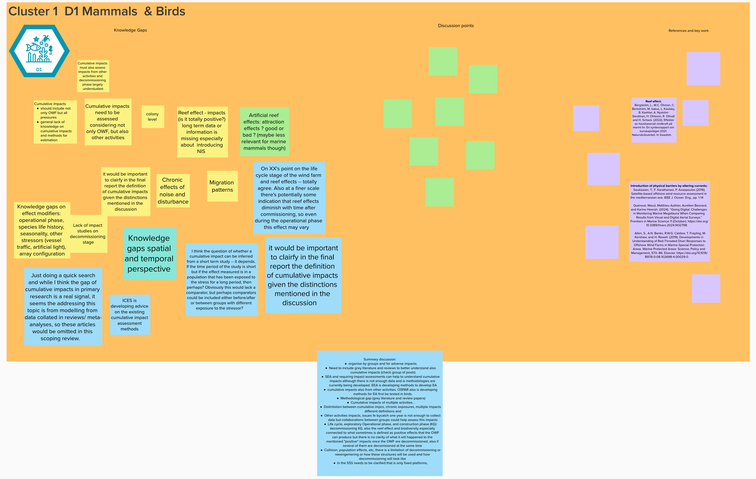
Could we use the same frameworks for decommissioning as the ones used for licensing/ building OWF.

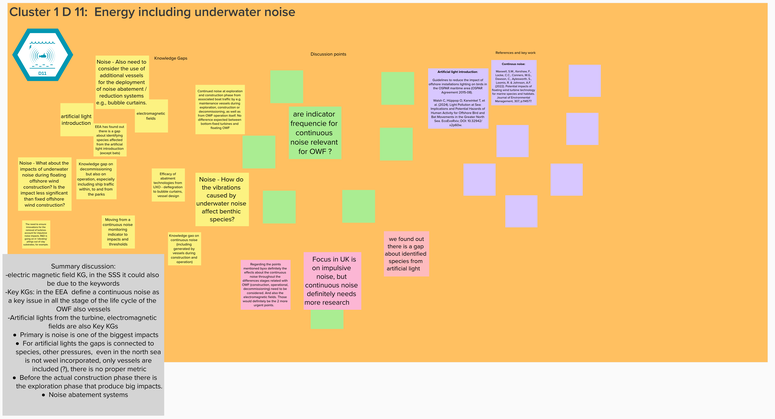
Lessons fro the oil and gas industry should be taken in consideration as they ar well ahead. Decommissioning in particular.

CLUSTER 1: D1 Mammals & Birds, D11

Key comments from preparatory work

What do you think are the key gaps and especially knowledge gaps for these descriptors based on the Short Scientific Summaries?





CLUSTER 2: D1 Benthic habitats D2, D5, D6

Key comments from preparatory work

Descriptor 1: Marine Biodiversity

In terms of demersal and benthic species , the cumulative impact part would benefit from the point highlighted in the discussion on the shellfish species in terms of Genetic and behavioral adaptations

For effects on fish and benthic communities: species don't prefer artificial reef habitat, but are rather predominated by biofouling and this one induce a temporary aggregating effect that lead to a reef effect. The fish species are attracted by the opportunity to find food

OWF are said to be able to provide artificial reefs but we need long term monitoring to understand if this is actually a positive or negative impact

Descriptor 2: Non-Indigenous Species

Preventive and mitigation measures within OWF planning / operation should follow adopted guidelines (e.g. IMO ballast and fouling guidelines) and acknowledged in the SSS report.

Modelling approaches, based on shipping activity and routes as risk to new introductions could be helpful in risk assessment for new/ planned OWF settlements

Descriptor 3 Commercial Fish and shellfish

Descriptor 4 Food Webs

Descriptor 5 Eutrophication

If we follow the MSFD, in D5 you have changes in sensitive and opportunistic species in macroalgae, HABs and macrofauna, and these can change due to hydrodynamic changes and changes in nutrients and OM

Descriptor 6 Sea bed integrity

For me, it is a surprise starting mentioning the positive impacts and not the negative. Also, regarding D6, there are targets about criteria, such as habitat loss and habitat disturbance, that can be calculated, but nothing has been attempted, even some data exist

For this and other descriptors, I have missed this review: Galparsoro, I., I. Menchaca, J. M. Garmendia, A. Borja, A. D. Maldonado, G. Iglesias, J. Bald, 2022. Reviewing the ecological impacts of offshore wind farms. npj Ocean Sustainability. 1 10.1038/ s44183-44022-00003-44185.

In general, the content is relevant and align with my expert opion and knowledge.

The following conclusion is not right, based on the refered study: "Anaiyse on the long term...macrofaunal communities (61). This study looked to impact of installation itself and also looked to long term data of the area, but not the effect of OWF on the long term.

Descriptor 7 Hydrographical conditions

The conclusion for this descriptor mentions that positive effects from OWFs have been detected on macro-benthic communities. How has the positivity been assessed or is this conclusion equating an increase in biodiversity to a positive effect?

Mentioned knowledge gaps are relevant. Hydrodynamic connectivity is important (ecosystem changes during operational phase takes times), as indeed cumulative effects of enrichment and ban on bottom trawling and fisheries (D3). The extent of the effects is also little know and seems to be changing over time (signs that the enrichment effect is extending over time) (soft-sediment environment). Ecosystem is adapting and finding new balance.

Maybe additional conclusion is that it seems that the fouling community is a bit less biodivers if you compare it with other offshore hard substrates, even artificial ones (cf shipwrecks).

Changes in siltation: Consequence of pile-driving/ removing or anchoring, causing suspended materials which can reduce PP and input of light (Dannheim et al., 2020). Hall et al. (2022) mentions changes in turbidity and changes in sediment movements as effect of decommissioning.

Certainly a pity to **limit the literature review to 2021**. Plenty to good work came in after this date!

Light have overlooked this, but there seem not to be a reference to the **potential impact of organic enrichment caused by bio encrusting organisms**? Especially considering upscaled effect this may have on a basin scale? to be further discussed (this might be reported in descriptor 5)

I could not find any mention in the document about seafloor **scaling** and **abrasion**? this would equate to both seafloor loss and seafloor disturbance

there is a need to improve the methodologies dedicated to monitor the effects of operational offshore windfarms. the role of hydroacoustic/mapping technologies should be highlighted somewhere e.g., use of bathymetry and backscatter to quantify objectively the type and extent of the seafloor changes

General effects (enrichment, attraction effect) are common for each OWF or offshore infrastructure, except that the local context will determine which species, the magnitude of the effect and time frame wherein the ecosystem adapt to the OWF setting.

Descriptor 8 Contaminants

Descriptor 9 Contaminants in Seafood

Descriptor 10 Marine litter

Descriptor 11: Energy, including underwater noise

What do you think are the key gaps and especially knowledge gaps for these descriptors based on the Short Scientific Summaries?

Cluster 2 D1: Benthic Habitats

D1

OWF are said to be able to provide artificial reefs but we need long term monitoring to understand if this is actually a positive or negative impact

I think that another gap is related to the ecosystem services provided by benthic habitats and the changes produced by OWF

IF the change of benthic community from mostly soft-sediment organisms to organisms preferring hard substrates is considered positive. A major knowledge gap is what is going to happen with decommissioning

Are OWF really acting as spillover for certain benthic species (editable crab, lobster), increasing their overall population?

How do the vibrations caused by underwater noise affect benthic species?

Final Key takeaways:

The reef effect on the benthic species. The vibrations caused by underwater noise effect. Spillover for certain benthic species causing changes in their population. The decomissioning.

Cluster 2 D2: Non-Indigenous species

D2

Given the impacts identified on D7 by OWFs, particularly regarding currents, links to D2 need to be acknowledge due to connectivity impacts enhancing NIS dispersion.

there is no clear relationship between the implementation of offshore windfarms and the establishment of non-indigenous species on turbine foundations or scour protection (see Degraer, S., Brabant, R., Rumes, B., Vigin, L. (eds) (2019). Environmental impacts of offshore wind farms in the Belgian part of the North Sea: Emerging patterns in the establishment of non-indigenous species. Memoirs on the Marine Environment. Royal Belgian Institute of Natural Sciences: Brussels, Belgium. 138 pp. https://doi.org/10.5281/zenodo.3459902)

From studies in the southern North Sea, it became clear that most of the non-indigenous species were found in the hard substrates of the wind farms and not so much on the subtidal zone including the scour protection.

De Mesel, I., 2015. Succession and seasonal dynamics of the epifauna community on offshore wind farm foundations and the adjacent seabed. Doctoral thesis for non-bibliographic degree. Ghent University. Faculty of Sciences. 270 p. Hydrobiologia 756 (2015): 37-50.

OWF as stepping stone is a proved hypothesis, but we don't know if it really contribute to the spread of non-indigenous species on regional scale (many then other artificial structures, cf oil and gas, shipwrecks, shipping)

In relation to OWF threats to D2, the work developed in the frame of the MSFD Joint regional initiatives (such as e.g. ICES WGITMO) will be crucial to understand the cumulative impacts and the spatially associated risks of increased OWF activity. As recognised in the SSS report their contribution to the spread of non-indigenous species connectivity needs to be addressed within a MSP context at a regional scale and in a risk-based approach. So OWF in relation to D2 should be considered based on location, path size, features, type of activity etc.

Final Key takeaways:

Adverse effects of NIS on the native system. Given the impacts of OWFs in D7, impacts on NIS dispersion should be acknowledged. Evaluation criteria where OWF and its impacts (independently and its dispersion). The effect of OWFs on ecosystem services.
The lack of knowledge on OWFs impact in regional scale.

As few studies were available from OWF regarding colonisation by NIS and its impacts, the knowledge gained from ecosystems, lessons learned from other man-made structures colonisation (e.g. oil and gas platforms, ships, etc.) that reduce OWF impact on D2, as similar vessels dynamic, risk of introductions, and type of infrastructure as well as ecological and ecotechnic issues may apply to OWF as well.

This would be particularly interesting if focusing on ways to prevent the "artificial reef effect" as mentioned in the SSS report.

Cluster 2 D5: Eutrophication

D4

Enrichment of organic matter at OWF is this eutrophication? It is within the boundary values?

The impact from OWF on nutrients seems to be highly locatio-dependent and influenced by local hydrodynamic conditions, this makes it difficult to draw conclusions on general OWF effects on nutrient availability and primary productivity

If we follow the MSFD: in D5 you have changes in sensitive and opportunistic species in macroalgae, HABs and Macrofauna, and these can change due to hydrodynamic changes and changes in nutrients and OM.

Final Key takeaways:

The degree or magnitude of the effects of Eutrophication.
Gap in knowledge.
Complex interactions in scientific findings and technical findings.
The risk of HABs in nutrient dynamics - relevant impact but difficult to connect.

We need to better understand the links between hydrological changes (D7), changes in OM, nutrients, transparency (D5) and the effects on D1 and D6, which not clearly established

Cluster 2 D6: Sea bed integrity

D6

long-term perspective is important (ecosystem changes during operational phase takes times), as indeed cumulative effects of enrichment and ban on bottom trawling and others...

Consideration of the switch from sedimentary to increasingly hard marine habitats via scour protection, cable armouring etc

The extent of the effects is also little know and seems to be changing over time (signs that the enrichment effect is extending over time in soft-sediment environment). Ecosystem is adapting and finding new balance.

For MSFD the question is if the changes in benthic communities around the turbines is an adverse effect or not? And can we determine the extent of this extent (mostly local)?

Policy on (bottom-trawling) fisheries within OWFs

So me, is at error considering a positive effect when referring to a bio encrusting organisms are changing a services, which can be considered a positive (artificial and the natural habitat) which could be shorted

Carbon sequestration services and disturbance does not appear to have been examine

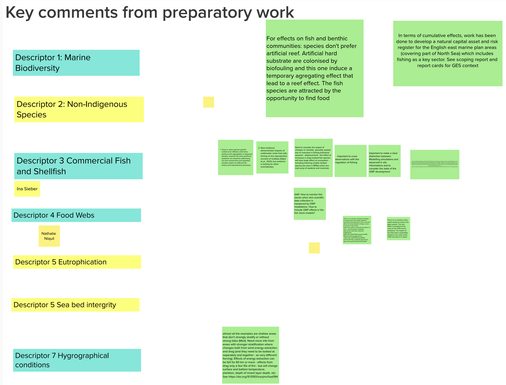
P

Final Key takeaways:
Interactions with D1. Reef effects (covered in D1). The ecosystem changes during the operational and other phase and the cumulative effects of enrichment and ban. + long-term

A challenge to balance the impacts of OWF. The decommissioning. The extent of the effects. Carbon sequestration and ecosystem services.

CLUSTER 3: D1 Fish and Cephalopods, D3, D4, D7

Key comments from preparatory work



D7 Salinity increase along with temperature and contaminants a real concern, Hydrographical effects studies and projects are underway

D4 food webs need to have a whole ecosystem approach with new technologies for data collection and monitoring emerging

D1 and D3 fisheries regulation and restrictions in and around OWF vary by country, with some data forthcoming. Transboundary effects are unclear.

Overall lots of new projects, that include modelling, how to take this into account in evidence synthesis.

Toolbox
https://app.mural.co/t/fixe85421/m/fixe85421/1746358221546/ea0f956af1a4f6c6385d0ed6c8212e47e404c5f3/d/

pre and post monitoring data projects upcoming.

new technologies and instruments (combining field measuremnts on fishing and hydrography)

cumulative impacts: do tend to focus on one thing at a time - but not holistic view. Rather, flows and ecosystems need to be conside
jhout the whol trophic ch
system modelling (comm
beth scott

cumulative effects on single species - fisheries and fisheries management plans often focus on single species rather than ecosystems.
UK: natCap asset register for cumulative effects, translated into GES effects. issue: spatial data lacks

transboundary cumulative effects - data at country level often abundant but not combined.

decisionmakers are rarely reached - too much information, (Mathilda)

functions actoss the food web - what functions are needed for the baltic see and how do the cumulative effects affect that? getting away from species perspective towards holistic picture (Mathilda)

What do you think are the key gaps and especially knowledge gaps for these descriptors?

Cluster 3 D1 Fish & Cephalopods

D1

Effects on migrating fish from a large scale development of OWFs

Effects on fish spawning due to operational noise pollution

Effects on connectivity (OWFs as stepping stones)

Cumulative effects

Multi-use parks - Effects on fish stocks

Cluster 3 D3: Commercial Fish and Shellfish

D3

Co-location

Species Recruitment

EMF captured under D11 and not D3 --> large part of evidence missing out

Link from changes in fisheries to changes in ecosystem
https://doi.org/10.1098/rstb.1994.0112

reef effect in published models assume different stock of mussels - but data suggests stronger decline - affects model results and requires validation with field data

regulation of fishieries inside OWF: in France, as much fisheries as possible even inside OWF

GES - many unaccounted impacts on the different descriptor, as impacts are inexplicit

New paper from fishing industry
https://doi.org/10.1016/j.enpol.2025.114555

GERMANY - alternative fisheries and Co-location, pots and squid production. experimental setups in the testing and monitoring in place

Cluster 3 D4: Food webs

D4

Impact of Decomissioning

overview of ecosystem approachICES Journal of Marine Science , 2023, Vol. 0, Issue 0, 1–12 https://doi.org/10.1093/icesjms/fsad194

OSPAR - 9 indicators to capture flow and structure of web - holistic and fucntional approach - D4 as descriptor rather wea
- e.g. mean trophic level (Comment NAthalie)

Biomass change has effect on food web. Flows within foodweb are important, also for D3 from biomass view to flow view for holistic understanding of food web

Cluster 3 D7 Hydrographical conditions

D7

Baltic sea: salinity increase

And the alocline may go deeper - today it is about 65 m deep

Hydrogen-Parks

Reoxygenating the sea with Hydrogen parks - to consider: Contaminants in the sediments, temperature increase and salinity increase

How to measure what is happening to physical environment
https://www.gov.scot/publications/monitoring-offshore-wind-scotlands-observation-programme-six-key/

Physical aspects of change due to OWF - amount of mixing significant in stratified areas leads to increased bottom temperatures

Link to ECOWind Program web site
https://ecowind.uk/

CLUSTER 4: D8, D9, D10

Key comments from preparatory work

Descriptor 1: Marine Biodiversity

Descriptor 2: Non-Indigenous Species

Descriptor 3: Commercial Fish and shell Fish

Descriptor 4 Food webs

Descriptor 5 Eutrophication

Descriptor 6 Seabed integrity

Descriptor 8 Contaminants

Descriptor 9: Contaminants in Sea food

Descriptor 10 Marine Litter

Descriotor 11: Energy including underwater noise

Descriptor 7 Hydrographical conditions

What do you think are the key gaps and especially knowledge gaps for these descriptors?

Cluster 4 D8 : Contaminants

D8

If you had offshore ships and company, they could support the identification the balance of pollution

Synergies with oil industry is interesting and should be added to calculate impacts.

Better monitoring and reporting of materials used such as in sacrificial anodes and antifouling paint which contains Al and Zn

OWF companies/ developers should be transparent about their environmental foot print

Contamination should be tracked from the sources and not after. monitor what is put in the sea

Review of MidFD: impacts of MSFD 1. Where should the requirements be asked to industry? What are tathe potential remote industries to monitor those?

Understand where contaminants may come from : blades vs body of turbine and common materials used -declarations from producers needed. Transparency.

Gas pollution is not so strong in Ireland

Importance to consider alternative methodologies

Aluminium was not included in the papers we found, does it mean that ere is a gap in research here

Observation in north sea would need comparison with Irish toxicity (castings ...) need to have a look at the data we have from materials use moving in water

background data is missing for emerging contaminants

Impacts on the environment, maybe we could join forces with oil industries to try to monitor the impacts.

cumulative effects: one study on pile driving sound and Cd contamination

Aluminium Toxicity is proven

Lack of regulatory requirement for OWF developers to disclose the contaminants in the materials they use

Companies/ developers should consider alternative technologies for anodes to to reduce release of harmful substances

Importance of precautionary approach

From a policy standpoint, there is need to know the level at which measures should be implemented to monitor contaminant release from OWFs, whether at the project level, country level or European level.

Importance of comparing the risks of oil and gas with those of offshore wind farms, particularly in terms of contaminants released and their behaviour in water

Holistic planning and policy adjustment to address cumulative impacts

Integration of remote monitoring for OWFs and the potential for these systems to include concerns about pollution

Cluster 4 D9: Contaminants in Sea food

D9

Positive impacts: under the OWF, blue mussels are present and water is cleaner in terms of metals

Aluminium: Its biodisponibility is not clear

Contaninants in sea food may be present (eg North sea) coexistence of OFWT with fisheries, Risks to health from contaminants not clear (still open use of fish for consumption)

Cluster 4 D10: Marine Litter

D10

methods for marine environment are not far developed or are currently in the study phase and it takes time, and f we try to see the results of long time impacts

cumulative effects comes from different turbines and OWF, but also boats or rivers. It is hard to track and assess this impacts from each of them. How to monitor? Where? how to sample? what are we looking for?

Hildebrandt, L., Fischer, M., Klein, O., Zimmermann, T., Fensky, F., Siems, A., Zondervan, A., Hengstmann, E., Kirchgeorg, T., Pröhaska, O., 2024. An analytical method for the detection of the microplastic family: Particles from anti-corrosion coatings. Journal of Hazardous Materials 470, 134173. https://doi.org/10.1016/j.jhazmat.2024.134173

microplastics should be monitpr, as it is one of the main litter coming from OWF

methods for microplastics studies are new and time consuming for long term effects- needs to be considered in lack of robust studies

new paper including the sediments but not the aluminium,Because the pourcentage is minumum

It would be important to get to the information and know what are the contaminants brought by companies (in paints for eaxmple)

If you change the sea floor from a sandy bottom to a hard substrate there will be a marked change in ecology and biological communities present in that space. This change might be less obvious where wind farms are installed in areas where the sea bottom is already a hard substrate e.g. rocky reefs.

When we think about ecological impacts and identification of any positives, we need to think of alternatives. What is ORE use compared to? For example, comparing with a sea bed not used or another one that is fished; may give a bias.