SUPERCOBAM WORKSHOP

NEA PANACEA

North East Atlantic project on biodiversity and eutrophication assessment integration and creation of effective measures

Workshop Report

20-22 October 2021

Online & at Rijkswaterstaat LEF Future Center, Utrecht (NL)

OSPAR QSR2023

Co-funded by the European Maritime and Fisheries Fund

Rijkswaterstaat
Ministry of Infrastructure and Water Management

Preface

You are reading the report of NEA PANACEA's SuperCOBAM workshop, which was held from 20 to 22 October 2021 at Rijkswaterstaat's LEF Future Center in Utrecht, the Netherlands. Participation of this workshop consisted of 25 persons that were physically present and an online group of 40 persons.

During these three days the participants worked towards the delivery of assessments of the status of biodiversity in the North East Atlantic Ocean for OSPAR's Quality Status Report due in 2023. These assessments in turn can be used to feed into the reporting for EU's Marine Strategy Framework Directive for those OSPAR Contracting Parties that are also EU member states.

The workshop was organized by the NEA PANACEA project (funded by EU's DG Environment) with support from Rijkswaterstaat and the LEF future center. The organizing team consisted of NEA PANACEA's Activity 5 (Evert Jan van den Berg, Lyke Bosma, Lisette Enserink and Jos Schilder, during the workshop kindly supported by René Dekeling) with professional support from moderator Marinda Hall.

Table of contents

1 Background and Aims of the workshop

1.1 NEA PANACEA

NEA PANACEA is an EU-funded project in which 8 partners from 5 OSPAR Contracting Parties (Germany, France, the United Kingdom, Spain and the Netherlands) collaborate to deliver biodiversity assessments for OSPAR's Quality Status Report (QSR) 2023. Our focus lies specifically on pelagic habitats, benthic habitats, food webs and marine birds assessments. These assessments can be used by EU member states in the North East Atlantic region to inform their reporting to the EU for the Marine Strategy Framework Directive (MSFD). We work on the development of new biodiversity indicators as well as on the improvement of existing ones, for example in terms of data flow, indicator operability, expansion of geographical coverage or the development of threshold values. In addition, we explore what the best ways are to integrate multiple indicators to deliver a single integrated assessment of a specific ecosystem component (e.g. pelagic habitats).

NEA PANACEA also pays special attention to the coherence between state (biodiversity) and pressure (most notably eutrophication and climate change) assessments. Examples of questions we address are: Do we assess state and pressure on similar (comparable) scales? Are the threshold values (below or above which "good status" is achieved) for pressure and state compatible? Does the information from state indicator assessments optimally flow into the (integrated) state assessments? To this end OSPAR's biodiversity experts join forces in this project with OSPAR's eutrophication modelling experts.

NEA PANACEA also aims to have value for those members of the OSPAR family that are not directly involved. In addition to delivering assessments that are of use to all OSPAR Contracting Parties, and especially for those that are also EU Member States, NEA PANACEA will organize two 3-day workshops in which the wider OSPAR community can interact and work together on the QSR products. We also aim to organize a workshop dedicated to the exchange of experience and information about marine birds between the 4 European regional sea conventions.

1.2 SuperCOBAM

SuperCOBAM is one of the two abovementioned workshops NEA PANACEA delivers in order to facilitate the delivery of OSPAR's biodiversity assessments. It is inspired by 2019's S.U.P.E.R. COBAM workshop in Paris, where all seven expert groups[1] under OSPAR's Intersessional Correspondence Group on Coordination of Biodiversity Assessment and Monitoring (ICG-COBAM) convened to discuss

[1] *Marine birds, Marine mammals, Fish and cephalopods, Food webs, Non-indigenous species, pelagic habitats & Benthic habitats*

cross-cutting issues and exchange knowledge, experiences and views (meeting report enclosed in Annex B, SuperCOBAM Resource Library). The present edition of SuperCOBAM also aimed to discuss cross-cutting issues amongst ICG-COBAM expert groups, with a special view to deliver assessments for the upcoming QSR, albeit somewhat hampered by the Covid-related travel and meeting restrictions. SuperCOBAM also provided an opportunity for the OSPAR secretariat to bring the QSR guidance, requirements and instructions under the attention of the biodiversity experts and for a conversation between biodiversity experts and experts involved in delivering the Drivers, Activities, Pressures and Response sections of the DAPSIR framework (see Annex G) used to write the Thematic Assessments for the QSR. Finally, interaction between eutrophication and biodiversity experts to further the achievement of NEA PANACEA deliverables was on the agenda.

1.3 Aims of the Workshop

The general aim of the workshop, also reflected in the NEA PANACEA project proposal, is to promote interaction between experts working on the ICG-COBAM biodiversity assessments, allow for exchange between the eutrophication & physical conditions experts from NEA PANACEA and the ICG-COBAM community and promote interaction with other OSPAR groups. While the main focus for this workshop was on delivery of the indicator assessments (there is another workshop scheduled for the thematic assessments), the thought and exchange process on thematic topics such as integration and state-pressure relationships were also to be kickstarted at SuperCOBAM.

In addition to the general aims set beforehand, the physical participants discussed at the start of the workshop what would be methods and outcomes they envisioned. In Annex D the resulting whiteboard can be viewed. While dealing with all mentioned elements in the three days was never feasible, it does provide a good overview of the state of the art of many processes the ICG-COBAM community is dealing with. Moreover, it might serve as a starting point and check list for future initiatives in the community. Highlights from this discussion include:

The ICG-COBAM community should:

- Shift gear, there's a lot of work ahead towards QSR 2023
- Obtain (and maintain?) an overview from each expert group per topic:
    - Where are we?
    - What are stumbling blocks?
    - What is our ambition (next steps)?
    - What can we learn from other groups?
    - What are common themes / stumbling blocks?
    - Develop common approach to tackle issues
- Develop narratives for Threshold Value development and develop strategies to effectively engage policy makers in this process
- Consider compatibility of OSPAR assessments with MSFD reporting requirements
    - Further develop concepts
    - Explore limitations
    - Develop holistic view of marine ecosystems and translate that to common/policy language

- Develop a storyline for the thematic assessments
- Perform reality checks, what is feasible and then: prioritize
- Send messages to ICG-COBAM/BiTA/BDC/CoG
    - What can and will we deliver?
    - Keep on stressing the resourcing issue

1.4 Structure of the workshop

1.4.1 Cross-cutting discussions

The workshop programme can be found in Annex A. In consultation with the expert group leads, three main cross-cutting themes were identified:

- Assessment scales and spatial integration
- Integration of indicator assessments
- Threshold values

Each day of the workshop was dedicated to one of these themes, to be addressed by a "train" of sub-meetings (see Figure 1). A brief discussion among expert group leads to align thinking and aims of discussion between groups, an online expert group meeting on the topic, a physical discussion with groups of mixed experts and then a plenary, physical wrap-up discussion at the end of the day. For practical reasons, members of the NIS expert group were joined with the Benthic Habitats expert group during the expert group meetings and the members of the Food Webs expert group were distributed amongst the other expert groups in accordance with the expertise of each Food Webs expert group member. The physical meetings had a slight hybrid character because the leads of the expert groups not directly involved in NEA PANACEA (Fish and cephalopods, Non-indigenous species, Marine mammals and Food webs) as well as one of the co-conveners of ICG-COBAM were invited but not able to travel to the Netherlands. They therefore joined the discussions via Zoom.

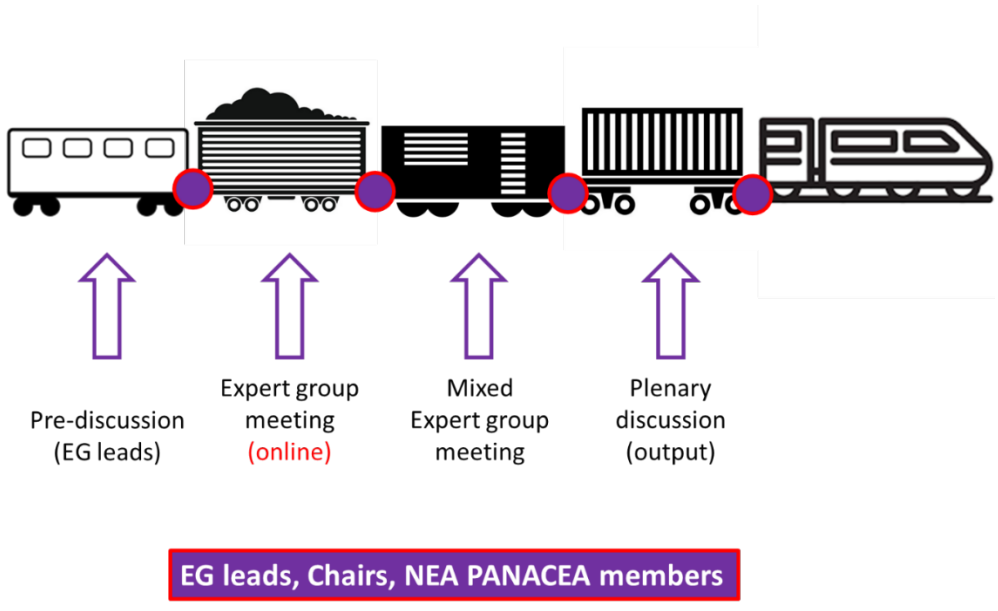


Figure 1. All 3 main cross-cutting themes were addressed through a "train" of sub-meetings, where the expert groups leads and those physically present were responsible for bringing information from one "coach or car" to the next (see text above for more information).

1.4.2 Interaction with other OSPAR bodies

During the online part of the workshop (daily from 11:00 – 15:00) there were, in addition to the online expert group meetings, sessions during which other bodies in OSPAR could interact with the ICG-COBAM expert community. On day 1 and 3, Lena Avellan (deputy secretary at the OSPAR secretariat) talked the expert community through the QSR resources that are available for writing the assessments, the requirements associated with a coherent production of the QSR and answered questions that were raised during the session. On day 2 Adrian Judd (representing ICG-EcoC, Ecosystem Assessment Outlook – Cumulative Effects Assessment) introduced the attendants to the DAPSIR approach used to shape the Thematic Assessments in the QSR, with a specific focus on the DAP (Drivers, Activities, Pressures) section and then had a session with expert group leads on how DAP and S (state) are connected. On day 3 Emily Corcoran, who is contracted to deliver the R (Response) section of the DAPSIR framework, introduced herself and the work she plans to do, and she could reach out to the ICG-COBAM community to lay a foundation for future cooperation.

A view from the control room during an online session

1.4.3 Activity 2 Café

On day 2 and 3 we dedicated a couple of hours to interaction between the various NEA PANACEA project work packages (called Activities). Activity 2 is dedicated to exploring and promoting the use of products and outcomes from the OSPAR eutrophication assessments in the biodiversity assessments and using modeling approaches to link physical conditions (also, for example, climate change in addition to nutrients) to status (biodiversity) changes. In a world café setting those attending the meeting physically (with some NEA PANACEA members attending remotely) could discuss and exchange at three themed tables: 1) Assessment scales developed for eutrophication assessments, 2) Remote sensing data on primary productivity and 3) Model approaches to investigate food web characteristics, biotic-abiotic interactions and cumulative pressures (LiAcAT: Literature analysis and Cumulative Assessment Tool, and ENA: Ecological Network Analysis). In addition, on day 3 we held a session to align the thinking in the process of threshold value setting, also based on the EU MSFD Horizontal Issues: Threshold Values workshop preread document and report.

1.5 In this report

The most important activity during these three days was intensive face-to-face interaction within the expert community in various compositions, often many occurring parallel. Many unanticipated gems, which include both the scientific and the social aspects, have therefore not been recorded on paper or whiteboard but will no doubt be reflected in the future works of the different expert groups. The discussion and expert group leads / NEA PANACEA Activity leads have been asked to keep record of outcomes as well as possible in the high-paced sequence of events and sub-meetings. Below you can find the notes and key messages recorded during the workshop. They are ordered by topic (e.g. assessments scales and spatial integration) and discussion type (e.g. expert group meeting). The presenters have also been asked to summarize their message and provide a copy of their presentation to be attached to this report.

In the main body of this report, the outputs from all the expert group meetings are ordered by topic. The integral expert group minutes for the benthic habitats expert group, the pelagic habitats expert group and the marine birds expert group can be found in Annexes L, M and N. Leads of the other expert groups did not submit minutes.

Joining remotely does not mean your presence is not prominent!

2 Assessment scales and spatial integration

2.1 Expert group meetings

2.1.1 Marine Birds

Birds GP Leads discussed Key points to consider for the EG discussion:

- Assessment scales for Marine Birds are defined (cannot change boundaries)
- Ideally, we want to do Bird Indicators assessments at subdivision level but we need to account of practicalities issues (e.g. time to apply species models for B3 indicator at subdivision level will cause delays with the timeline)
- Consider QSR guidance:
    - choose the assessment scale for your component for indicators
    - Thematic assessment should be done at OSPAR region scale
    - Integrated assessments within the thematic assessment are done at feature level (i.e. species group)
- Consider differences between OSPAR and MSFD assessment scales
- There are going to be gaps, these needs to be flagged
- Outcome: what we think we can deliver
- Can we make a table with what we assess in what area for each indicator, what is practical?

Birds GP Leads joined online discussion with some members of JWGBIRD
And discussed options for assessments of the common indicators Marine Bird Abundance (B1) and Marine Bird Productivity (B3).
Stefano presented an overview of data obtained from data call

The following points were considered:

- IA17 assessments based on subdivision but QSR23 will use Regions
- Germany will use assessment for IId for MSFD reporting
- B3 needs data from B1, there is a tie between the two indicators
- It is crucial to understand ASAP the assessment scale for B3 given that the indicator involves production of species-specific models which is very time consuming
- The use of smaller subdivision would be more accurate but the downside is that quality of the data would be lower (as there are less sites/datapoints available at subdivision scale)
- It would be useful to do a checklist of breeding & non-breeding data available for each country so we understand the type of national assessments that each country will deliver

OSPAR vs MSFD assessment scales:

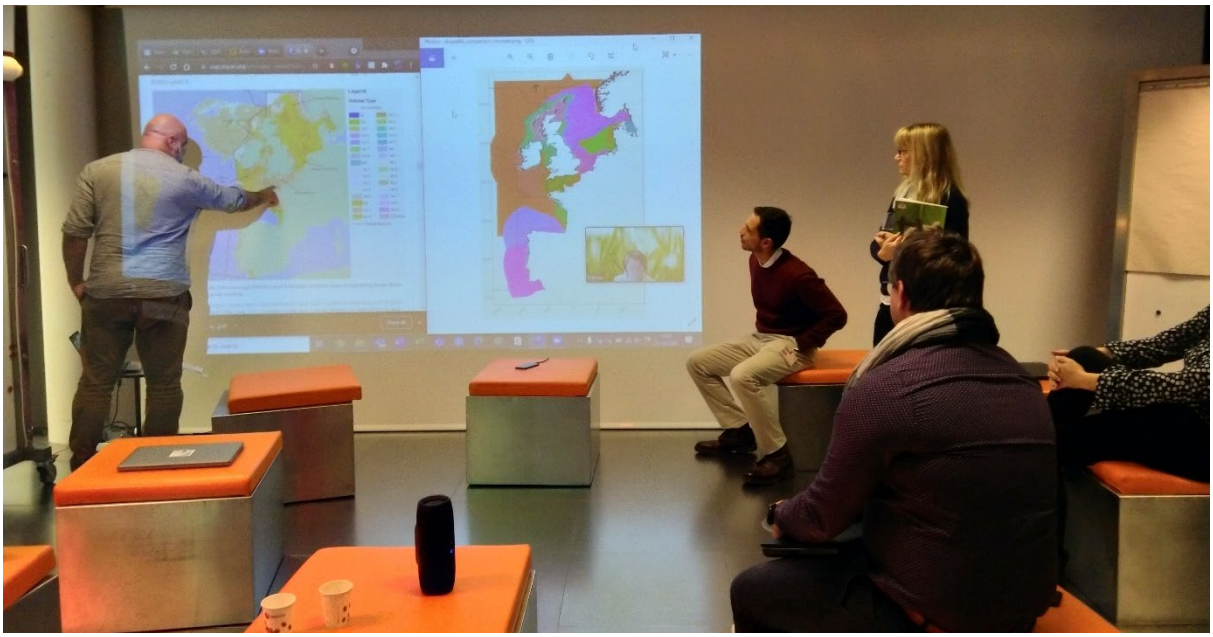
- Fredrik Haas (Sweden): Good idea to use the OSPAR assessment for MSFD reporting, but question on geographical scale. Regional scale might not be accurate from Sweden
- Ib Krag Petersen (DK) –there are no particular guidance from the government on the scale to use
- Most CPs would use MSFD data where they can, so for QSR do we really need to align or not.
- Ib Krag Petersen (DK) mentioned that non-breeding data are on the way

Key messages

- Assessment Units are bird specific and defined (no need to modify boundaries)
- The indicator assessments ideally would be run at subdivision scale but not all indicators can be assessed in all subdivisions because of data gaps
- Indicator integration will only happen at regional level but we will also apply indicators to subdivision level to help interpretation of results, subdivision assessment only based on abundance data because of data availability
- OSPAR vs MSFD scales – main mismatches are for UK that will follow the approach done for OSPARIA17 and use the OSPAR regions also for MSFD reporting

2.1.2 Pelagic Habitats

- Spatial integration
    - The thematic assessments should be at the OSPAR regional scale (In the Annex of the QSR guidance doc)
    - Outcome of Expert Group (EG): Figure out what we can deliver
- Spatial assessment units
    - How can we quantitatively decide which assessment unit is best, COMP4 areas or gridded?
        - Using COMP4 areas is best aligned with eutrophication
    - Is it possible to assign each COMP4 area to the MSFD water/habitat types? This could help clarify the diversity of pelagic landscapes and link more closely to the wording the Directive.
    - Action Arnaud (and to liaise with Matt): we have testing to do on working out if we can link the wide pelagic habitats from the MSFD text to the areas, allowing us to rationalise areas to simplify assessment. We could then compare the indicators and pressures across areas of the same class.
- For PH3 how do we deal with different taxonomical units since not all species are definitively IDed and if you use genus level data the weighting is wrong since some genus have multiple species?
    - Felipe – we use genus but still have the raw data to interrogate. LCBD highlights years of big change. Important Value Index (IVI) interrogate the data for years characterized by big changes and highlights the taxonomic units responsible for those changes.



2.1.3 Benthic Habitats & Non-indigenous species

Sander Wijnhoven (NL) gave a presentation on the Biogeographic subdivision proposal of marine assessment units for OSPAR and MSFD by TG Seabed and ICES.

During the discussion, it was recognised that subdivision based on pelagic and ICG-EUT marine landscapes would make sense for benthic habitats as it implies specific biogeographical context. The potential consequences for each indicator was discussed:

- BH3 and BH4: Assessment are done at (Broad) Habitat Types scales, for each OSPAR Region. Thus, further subdivisions will not affect the resulting disturbance/lost maps, but rather the percentage of disturbance/lost per habitat type and per assessment unit (Region versus subdivision of Region).
- BH2a: Assessment is done at the Water Framework Directive waterbodies scale. Further subdivision will thus not affect the resulting waterbodies quality status, but rather the number and proportions of GES/not GES waterbodies per assessment unit.
- BH1 and BH2b: These indicators are at even finer scales (benthic habitat communities), and the natural composition of the benthic communities may vary depending on the biogeographical context and area. It was not planned in the current Nea Panacea timeline, but it should be tested in the future, if sufficient data are made available, about the applicability and variation of results (including reference lists of species, biological traits) of these two indicators between biogeographical area (e.g. subdivision of Regions according to TG Seabed proposal).

As a first conclusion, it was agreed that subdivision of marine Regions, according to biogeographical areas influencing benthic communities (e.g. TG Seabed initiative), would make sense for benthic habitat assessments. Nevertheless, the exact delineation and source of subdivision have to be further

discussed during this workshop. These subdivisions should then be tested, notably by studying the variations of the results of fine scale indicators (BH1, BH2), to be able to conclude. This will be considered in the works on data planned, but this test at OSPAR maritime area scale is not planned currently and will need extra resources, data and time to be conducted.

2.2 Mixed expert groups and plenary wrap-up

There was a number of issues flagged on this topic during the discussions. Not having been able to meet in person has led to miscommunication on complex topics such as these. The layered character of most notably (but not necessarily exclusively) benthic habitats assessments complicates spatial integration. It was noted that MSFD regions and OSPAR regions do not align, which seems to make the work unnecessarily more complex (or at best requiring more effort). For some indicators, there is not sufficient data in some regions. During the discussion, we did manage to get an overview of the state of play / plans for the three ecosystem components present (see Table 1).

Table 1. Assessment scales and spatial integration discussion outcomes.

Group	Scale planning to use for assessment	Can you do a regional scale assessment?	What method of integrating up from small to big scale?
Pelagic	Either gridded or COMP4 areas. Both work, but which is better?	It doesn't make sense to combine our assessment units – we lose ecological meaning. The regions are big and the plankton are patchy.	None.
Benthic	MSFD subregions, COMP4 areas, ICES areas, or IA2017 units. Is it better to align with other ecosystem components or maintain the units used in IA2017? Might have different scales for different indicators. Need to do testing.	Should be possible with BH3. Don't know for other indicators.	BH3 - % area
Birds	Can assess a regional scale (for some indicators) and smaller scales (for others)	Will use all indicators.	Indicator integration will only happen at regional level but we will also apply indicators to subdivision level to help interpretation of results, subdivision assessment only based on abundance data because of data availability

For integration between biodiversity component, common or nested assessment units are prerequisites. It would be interesting to test the current overlapping of the different assessment units used for indicators of the different biodiversity components. The gaps in data coverage will probably limit this exercise, but some areas could be identified where to compare assessment units at finer scale. It would also help to identify areas which requires new data acquisition, notably in specific biogeographic areas, risk areas, or biodiversity hotspots.

It was recognised that this study was not planned initially for SuperCOBAM and requires more time, data and resources to be done properly. Its technical aspects and cooperation between experts should be identified and described for next steps and action plan resulting from Nea Panacea for QSR2023. Nevertheless, attending experts expressed the need to further progress this important step, even conceptually.

Key headlines

- Benthic and birds can assess at regional scale for some indicators. Some indicators can also be used at a smaller scale. Pelagic will use ecologically-appropriate assessment areas.
- What we don't know is at which scales contracting parties want to assess. Some may only want to assess at national scale. This would be useful info for us.
- More work is needed to conclude and especially define subdivisions of OSPAR regions relevant for all or several biodiversity components. The technical aspects were discussed and this task should be part of the action plan. Nevertheless, the conceptual and potential subdivision will be further worked during this workshop.
- The ground-truth data currently available limit the models and possibility to characterise relevant biogeographical assessment units for several components, notably for benthic and pelagic habitats' species communities.
- We feel that it is important to use the assessment scale appropriate for the biodiversity. Whatever the assessment units or integration methods developed, it will be important to clearly communicate underpinning ecological reasons, and limits, for MSFD and other management requirements.

3 Integration of indicator assessments

3.1 Expert group meetings

3.1.1 Marine Birds

Birds GP Leads joined online discussion with some members of JWGBIRD and discussed options for integrations of marine birds' indicators. Volker presented an overview of method for indicator integration.

The following points were considered:

- Marine bird for QSR 2023 and MSFD Article 8 assessments shall use indicators for 5 criteria: D1C1 (bycatch), D1C2 (abundance), D1C3 (demography), D1C4 (distribution), D1C5 (habitat for the species)
- MSFD differentiation between primary and secondary criteria
- D1C5 is a secondary criterium, the indicator has candidate status
- Integration is done at multiple levels: from indicators to criteria > from criteria to species > from species to species group > from species group to ecosystem component (not required by MSFD)
- In 2020 JRC produced a report reviewing different methods for aggregation from criteria to species and some recommendations. Methods considered are: One-out-all-out (OOAO), proportional method (75%), average, weighted average, probabilistic methods, conditional rules (ICES Advice)
- Pros and cons of each method was presented by Volker, alongside results from preliminary testing conducted on a selection of species in the German Baltic Sea (mixture of real data and estimates)
- JRC developed conditional rules for integration from criteria to species, considering the importance (expressiveness) of the individual criteria/indicators
- JRC recommendation for integration from species to species group is to apply proportional method (75%) if at least five species of a species group can be assessed and OOAO if not

For the conditional rules for integration from criteria to species, it was suggested to:

- Define where better data are needed for a criteria > this would help address whether the value of an indicator can be increased in the future
- The order of the criteria in the conditional rules can be modified to reflect importance of each criteria (i.e. Can secondary criteria be weighted differently?)
- According to Com Dec 2017/848, status of bycatch should be contributing to abundance but unclear how.

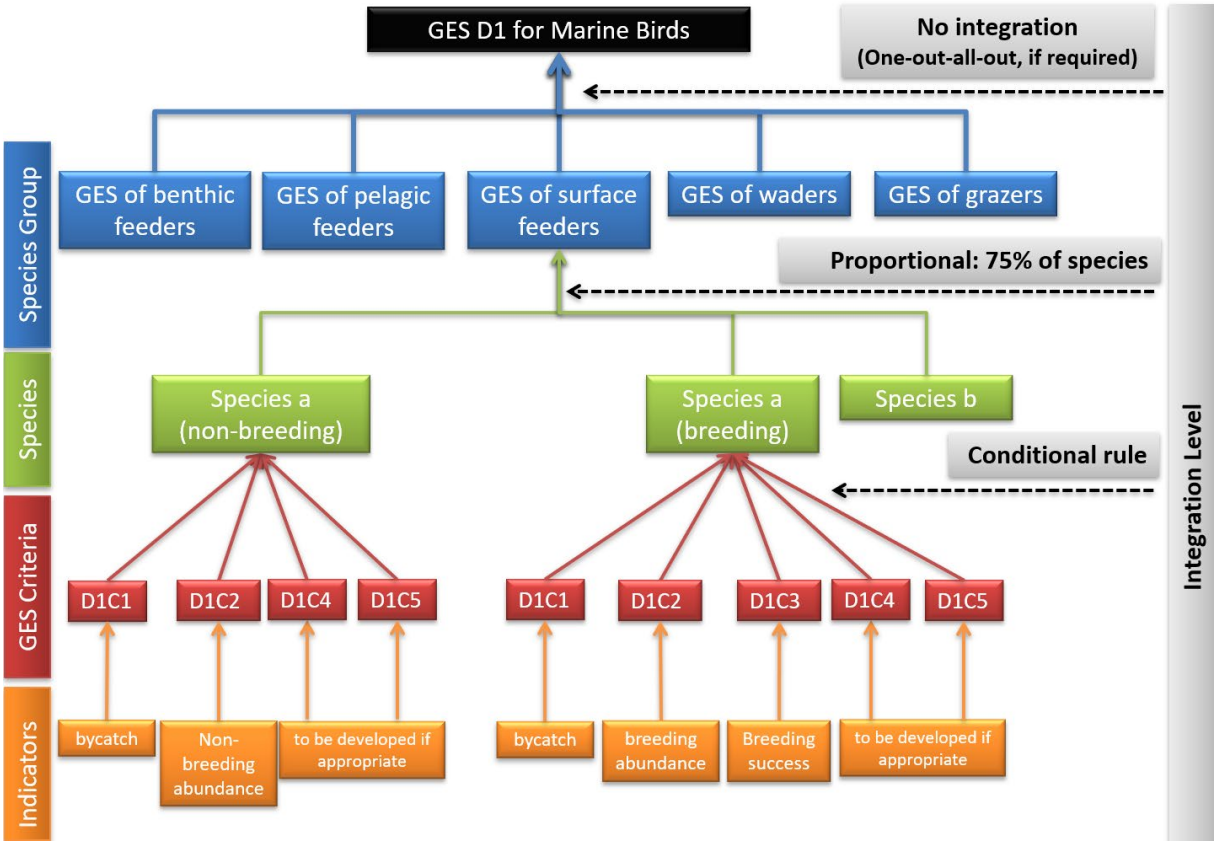


Figure 2. Integration of marine bird indicators: Tree of integration

3.1.2 Pelagic Habitats

Points to consider:

- Are all indicator components (e.g. lifeforms) weighted equally?
- Some taxa are in multiple lifeforms – double counting
- All three indicators are from the same data
- What if we normalise our data (as birds do)?
- Can we use approaches based on conditional or proportional rules (not one-out-all-out) to integrate?
- At what stage do we integrate?
- Do we lose all meaningful info if we integrate?
- How can the integrated info be used to inform management measures?
- How to go about testing?

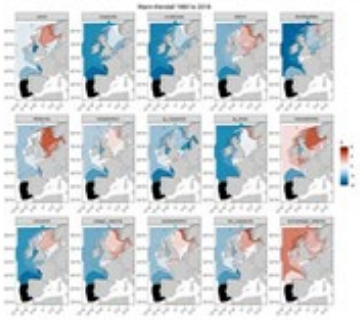
PH1:

Let's think of what our final output should be to work out how far we want to go with integration. What do we want to show in reporting? Last time we showed a table of lifeform pair PIs by EHDs. The new COMP4 regions are even more complex, meaning this table would be more complicated. Alternately, we could show maps of change in lifeforms, or change in lifeforms linked to drivers of

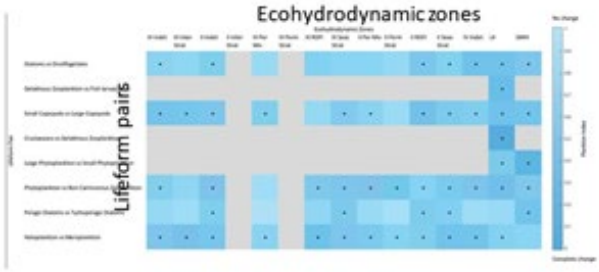
change, which is probably more helpful for policy, but means we are leaving out the PI step. We could cover the PI step in the narrative?

What do we want to show in assessment?

Maps of lifeform change (and/or correlations with SST)



Or



- Skips PI part of our analysis
- Alignment with other indicators
- Succinct (one map per lifeform)
- Intuitive
- Can show links to drivers of change
- More useful for management measures

- Can include in SOM
- Part of our protocol of PI -> change in LF time-series -> triggers further research in LF and component taxa
- We are unsure of ecological meaning of significant change in PI
- Consistent with IA2017 (though now we look at assessment period differently)

PH2 and PH3:
Suggests using table to report but can also map according to level of change

- Mike: Maps more clear for policy and placing management measures
- We will have assumptions either way so need to document those and be clear

If we detect sig change in part of an indicator, for each indicator, the more indicators (and parts of indicators) that show change gives more weight to the evidence that plankton are changing. We lose this information if we integrate to a single number per indicator or across indicators, and, not all datasets have all lifeforms, or both zoop and phyto, so the simplification hides nuance and can be misleading.

Are our indicators picking up the same thing (such as a bloom of a particular spp)? We need to be cautious about double counting through integration. For example if we have a *Karenia* bloom that could show up in all three indicators – that's not a bad thing, but we need to be clear about what it means. A narrative allows us to interpret via expert judgement so the nuance here can be articulated and the message clarified.

French approach for the ecological evaluation of the Pelagic Habitats: Use of the Ecological Quality Ratio (EQR).

- The EQR is a metric comparing two periods (ref. vs assess.) ranging between 0 (far from ref. conditions) and 1 (close to ref. conditions).

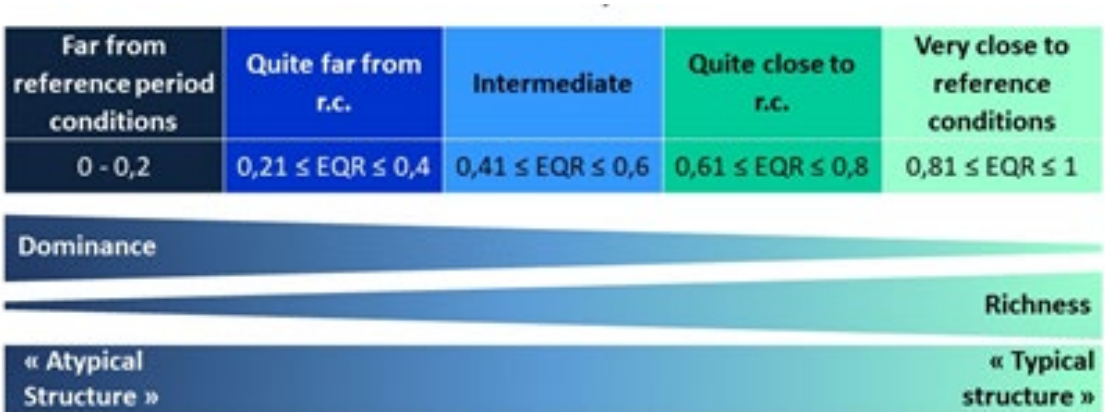


Figure 3 Ecological Evaluation of French Pelagic Habitats 2018 (Duflos et al., 2018), inspired from Facca et al. (2014). Duflos et al., 2018

- This approach turns continuous data into discrete. It can be mapped, but would it be better to show instead, on a continuous scale, this same information? We need to test this with PH1/FW5. We could map all indicators using this method for all datasets. This would encourage consistency between pelagic indicators and help the thematic assessment.

Felipe: For the thematic assessment, we could just very simply show the number of indicators which change in each assessment unit

- But what about direction of change – we need to capture this too?
- And are all indicators equal, or are data available for all indicators in all places, since not all stations have both phyto and zoop or all lifeforms.

Decision: We should focus on our key messages for each indicator for each report card and use the figures that best support those key messages.
Decision: We must keep our policy audience in mind and focus on what will help them most
Action Matt and Arnaud: to discuss consistent mapping of indicator results and test for discussion

Pelagic experts going with the flow

3.1.3 Benthic Habitats & Non-indigenous species

In light of the previous day's discussion (and today's sessions), and as new methodological elements to be considered for integration method between benthic habitats' indicators, it was decided to discuss around two recent national initiatives from UK (MarESA method) and Spain (integration of BH1 and BH3, according to Elliott et al, 2018).

Presentation by Liam Matear (UK): the UK initiative on the spatial aggregation of sensitivity of habitats: the MarESA method

This method is interesting as it proposes a compilation of known (and unknown) sensitivity categories, from species communities' level to Broad habitat types, which is one of the key methodological gaps highlighted in the current integration method (Elliot et al, 2018). It has the advantage to keep all finer scale information available, but the rule how to set a value (or range of values) to broader scales is still to be defined. Several options exist (OOAO, average, percentile, etc.) and would need more discussion depending of the aim and context of assessments.

These compiled sensitivity categories per habitat type may also contribute to define "confidence maps", based on the more or less complete level of knowledge, per habitat type, on species communities' sensitivities and variabilities. However, it was acknowledged that, whatever available and accurate would be a confidence map, in general, most of people will first look at the disturbance map, and few will make the effort to relativize the results according to the related confidence.

Before the next presentation on this integration methodological gap, a slide was presented to remind or present to new OBHEG members the method developed during EcApRHA and OBHEG, and as published in Elliot et al (2018).

Presentation by Laurent Guérin (co-chair): EcApRHA Benthic integration method

The Spanish colleagues presented a national initiative based on this method and recent indicators progress.

Presentation by José Manuel González (ES): The Spanish initiative on fine scale/wide scale integration between BH1 and BH3

This method, applied for Spanish MSFD assessment, and submitted for publication in Marine Policy, is also interesting as based on OBHEG previous works and proposing a simple and quantitative method for combining both indicators results. However, uncertainties linked to both indicators (sensitivities species lists, spatial resolution of state and pressure data, etc.) are also combined. With BH1, the species list used is a key element and depends of the (biogeographical) assessed area considered. For example, there is a need to include Region IV specific lists to BH3 matrices to enable its assessment in Region IV.

As a conclusion, it was acknowledged by the group that these two methods are both progressing the thoughts on the benthic indicators' integration methods, even if some methodological details still need to be clarified and tested to develop a fully operational methodology. These methods address different methodological gaps and could even be complementary if adapted in the integration method context. Respective UK and Spanish teams were encouraged to report progress on this at next OBHEG, where discussion on these aspects should be also progressed with the perspective of (sub)regional integrated assessments methods.

For MSFD, the recommendation discussed in TG Seabed should also be considered, and interactivity with OBHEG works facilitated. Each indicator, and integration methods, contribution to MSFD criteria should be clarified. A draft document was notably cited as important for integration rules.

- Action: OBHEG to propose and discuss during the next meetings, specific lists of species, related to sensitivities at defined pressure, or functional groups. UK and Activity 2 teams to interact to incorporate relevant sensitivity species lists, notably with Spanish, French and Portuguese teams for Region IV, and in general with experts from any relevant biogeographical (sub)region to be assessed by BH3.
- Action: Methods to be clearly described in each indicator CEMP document, and clearly highlighting for BH3 what is new compared to previously agreed BH3 CEMP guideline.
- Action: Further progress and application of these methods to be reported and discussed in the OBHEG future meetings, also with Nea Panacea tasks 3.2 (BH1), 3.4 and 3.5 (BH3 development and scenario) and 3.7 (thematic assessment).
- Action: Links between indicators, integrated methods and MSFD GES criteria to be clarified by indicator leads and OBHEG. Petra Schmitt (DE) to send the TG Seabed doc to all group + Silke: *SEABED_6-2021-03rev2_GDArt8-D6_short-draft_20210628.doc*

For benthic habitats, one of the common assessment units is the broad habitat (or other specific) type. The assessment units are thus nested in the assessment at Region or subregion levels. However, the biogeographical specificities of species communities (finer biological scale) and related sensitivities to each pressure type may influence each indicator assessment, per habitat type. Before any operational quantitative integration between indicators, the use of each of them and associated species and sensitivities lists should be tested and fixed. All indicator leads and teams are encouraged during them future works (short or longer term) to test this, notably between subdivision of the current OSPAR Region as discussed during this workshop and future works in OBHEG.

- Action: Indicator leads (and teams) to consider biogeographical variation (and related subdivision) of species communities and sensitivities lists of habitat types in each OSPAR (sub)Region when testing or assessing indicators, notably for BH1 and BH2 indicators, and sensitivity data underpinning BH3 and BH4 assessments. A coherence is needed to enable integration between indicators.

A discussion started about integration perspectives for non-indigenous species (NIS). An expert remind that this discussion took place during a previous mixed group workshop (SuperCOBAM, June 2019, Paris). A preliminary idea was to combine the distribution/abundances of targeted NIS invasive species (as MSFD D2C2 criteria, biological pressure) to habitat maps, with a similar approach that BH3 and Elliot et al (2018) integration method, to produce a disturbance maps of habitats (as MSFD D2C3 criteria). Some functional aspects and case studies by the Food Web expert groups were also discussed. This should be further discussed in both groups, or better, together, to check relevant data (or area with data) available, and additional resources and work plan to test this. The consideration of NIS in benthic communities' lists, both for sensitivity to pressure, resistance/resilience and related biotope structure, functional groups and dynamics. These technical works are not possible during Nea Panacea and OSPAR QSR2023 timelines, but is identified as a perspective for future inter-component and

experts' groups works. These perspectives could also be discussed and reported by experts in other working groups (e.g. TG Seabed, ICES, etc.)

- Action: Benthic, NIS and any other interested expert group lead to plan mixed discussion and potential resources for progressing conceptual integrated methods, based on current respective indicators and assessment methods, to assess the effect of NIS on biodiversity component (as part of biodiversity AND a biological pressure).

3.2 Mixed expert groups and plenary wrap-up

Birds GP Leads joined online discussion with other species EG and explored communalities with marine mammals (Anita Gilles)

- Bycatch: use precautionary approach if there is evidence of bycatch but not enough data to assess mortality
- Integration species to species group: marine mammals have difficulties in assessing the relevant scale as different species within the same group would have wide differences in the relevant assessment unit > suggestion to use the largest spatial scale available for assessing species groups

Methods for integration of indicators are well developed for Marine Birds. Points that other biodiversity component can consider when developing their methods:

- Integration method should reflect the importance of each indicator descriptor (criteria) i.e. should have ecological sense
- Other biodiversity components should look at criteria to develop integration methods
- Birds integration method consider breeding and non-breeding species as separate entities. Other biodiversity components can do something similar, e.g. fish: consider fish stocks as separate species.
- Recognise links between criteria (e.g. link between by-catch and abundance). This can also be done by other species groups interested by-catch?

While the species experts (birds, mammals, fish) discussed integration of indicator results in mixed groups, the habitats experts decided to focus more on the spatial assessment aspects. The COMP4 eutrophication assessment areas were projected and discussed. It was noted that especially for pelagic habitats these assessment units appear functional and practical. For benthic habitats, the assessment units (in which the broad habitat types are assessed) used in OSPAR's Intermediate Assessment of 2017 were reviewed. The discussion that followed led to a proposal for assessment units with just a few question marks to be worked out / decided upon (Figure 4, see also Annex L).

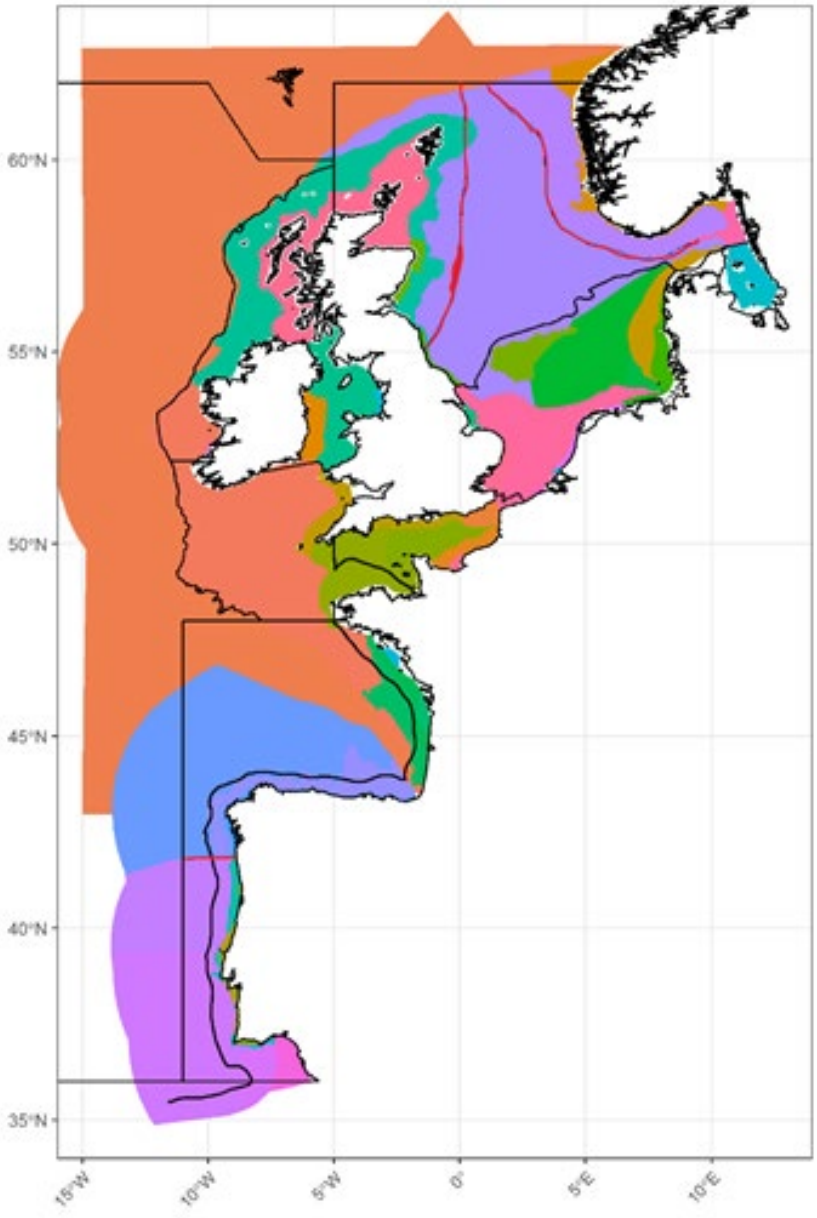


Figure 4. Sketch of conclusions from benthic habitats assessment unit discussion. Red lines need to be decided after further national consultation.

4 Threshold values

4.1 Expert group meetings

4.1.1 Marine Birds

Birds GP Leads joined online discussion with some members of JWGBIRD. Matt presented an overview of methods and threshold values used by different marine birds indicators: Marine Bird Abundance (B1), Marine Bird Breeding Success (B3), Marine Bird Bycatch (B5), Marine Bird Habitat Quality (B7).

The following points were considered:

- B1 and B3 are common indicators, B5 and B7 are being used for pilot studies
- Discussion around Bycatch Indicator (B5):
    - is bycatch considered deliberate killing? No
    - if you can't come up with level of bycatch use precautionary principle
    - the current target approach used on the method is a further elaboration of what was discussed at the Copenhagen workshop (but it is agreed by CP)
    - JWGBIRD in November to further discuss this indicator

Key outputs

Thresholds values for B1 and B3 indicators have already been defined and agreed. Further discussion needed with JWGBIRD to determine thresholds for candidate indicators B5 and B7

Threshold value inventory

Bird indicators were assigned to appropriate cells in the matrix of status of development and TV narrative, see also Table 2 in section 4.2.1.

indicator	Baseline/threshold value narrative	Status TV development
B1	Limit reference level	Policy acceptance
B3	Limit reference level	Policy acceptance
B5	Removal and conservation targets	Policy acceptance
B7	Acceptable deviation from historic or pristine state	Not started

Marine birds experts nesting comfortably in a quiet corner of the Threshold Value discussion room

4.1.2 Pelagic Habitats

- Our approach is to detect change and link to drivers of change to interpret meaning of change. It is important to consider different lengths of time periods (depending on the available data), as the observed changes may be lower in shorter time periods.
- The narrative is key in interpreting indicators.
- Action UoP**:** We need to test threshold options to evaluate if they are actually telling meaningful information, e.g. by defining upper and lower thresholds as a corridor of change or different percentages for short or long-term trends or quartiles. NEA PANACEA will test determining importance of change and quantify magnitude of change.
- Our current thinking:
    - PH1/FW5 – two parts of indicator. Sig change in PI triggers interrogation of lifeforms and component taxa. Narrative interprets change. No TVs.
    - PH2 – trend-based. Narrative interprets change. No TVs.
    - PH3 – Indicator identifies important change, which is then investigated for component taxa. Narrative interprets change. No TVs.

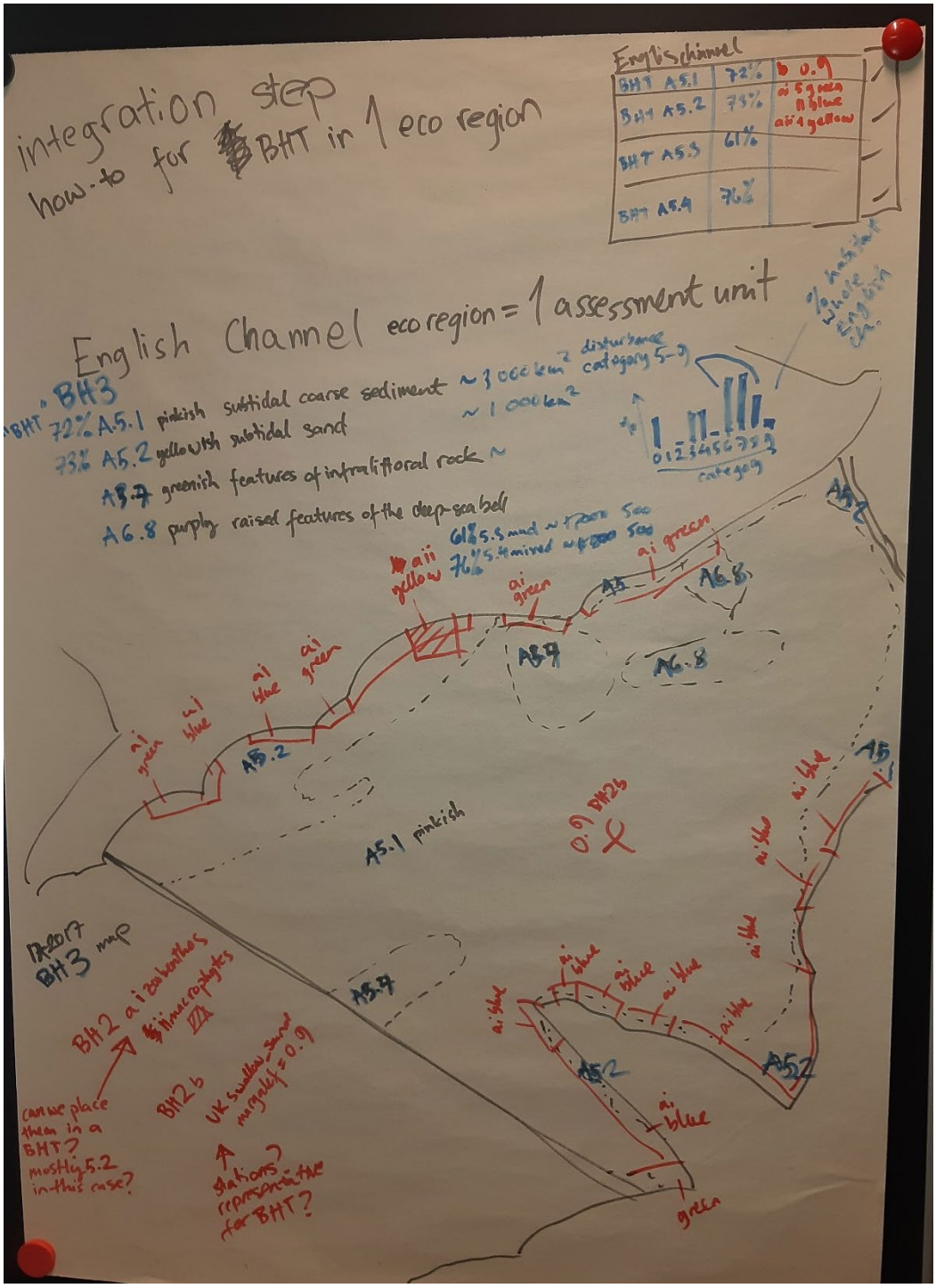
4.1.3 Benthic Habitats & Non-indigenous species

Discussion started around the drawn draft proposal presented by Lena of the structure of the "State" part of the DAPSIR benthic habitats' thematic assessment (Figure 5). In the light of previous discussion on assessment scales, subdivision of regions and integration, this proposal was received by the expert group as a very good structure, compatible with all indicators and previous discussions, and making also much clearer and concrete what to produce as a deliverable for the QSR2023. The main elements of this structure (also compatible with MSFD requirements) is about assessments per:

- OSPAR (sub)Region (sub to be further discussed through biogeographical previous are discussed)
- (Lines) Broad habitat types
- (Rows) Indicator results and/or related pressure type assessed (by each indicator)

During this discussion, it was made clear that there would currently make no sense (both ecologically, scientifically and for management issue) to merge the values from each indicator and pressure types (rows) to a unique value (MSFD D6C5 criteria) per habitat type, and it would be better to have all rows values available as a dashboard, to identify specific impacts… and gaps in state/pressure relationships currently assessed.

According to the big gaps (data and common indicator) in Regions I and V, there are currently initiative to inform them respectively by contributions from the Arctic Council and ICG-POSH (for listed habitats).



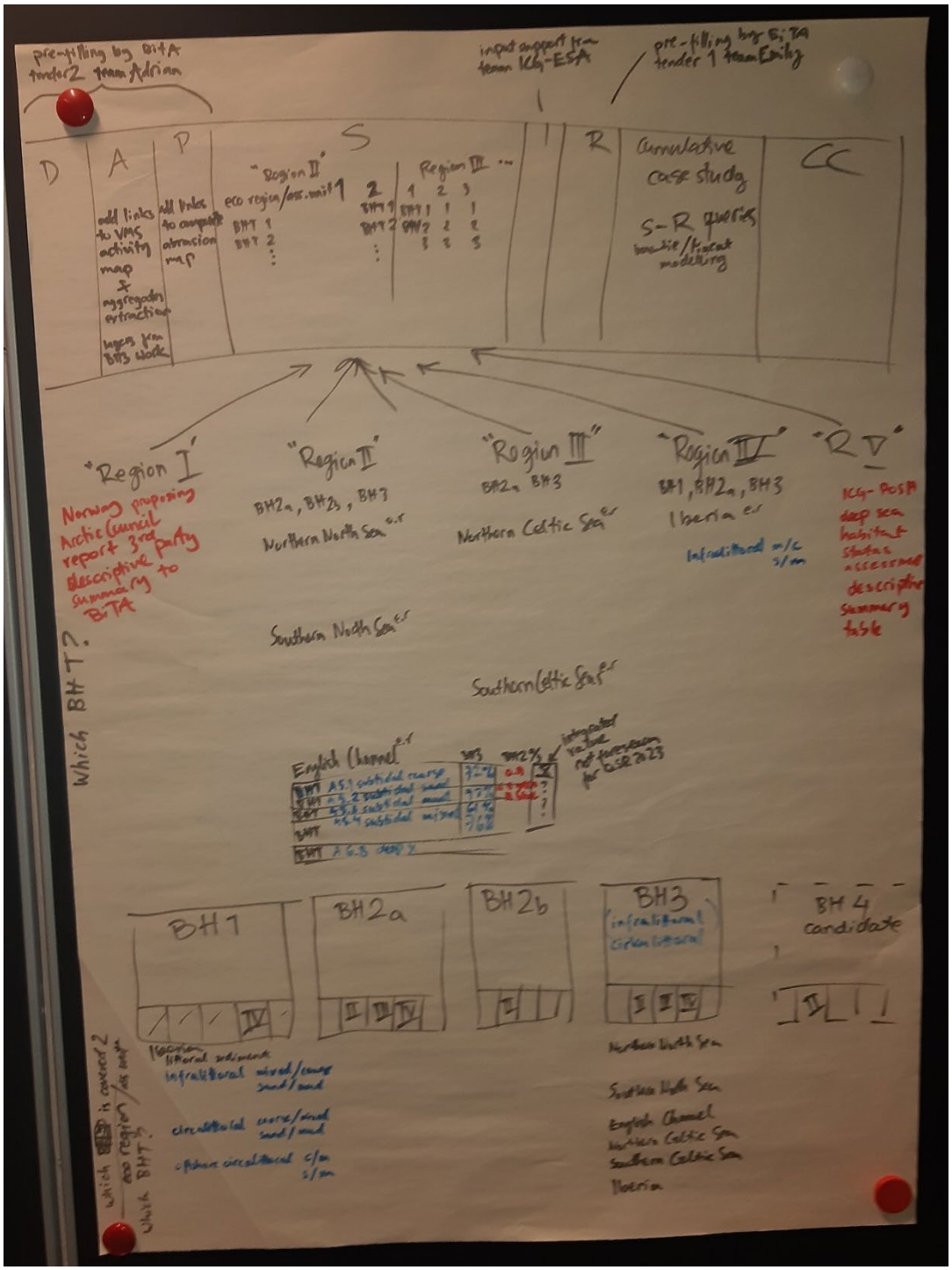


Figure 5 First and initial draws by Lena Avellan© of a proposed structure for the benthic habitats' thematic assessment

About combining indicators maps and assessments results (see the right part of Figure 5), by testing it conceptually in a subregion, it was recognised that there will be quite few overlaps, at least between BH2a (very costal waterbodies) and BH3 (offshore abrasion by fisheries, with gaps on very coastal fishing boats activity). Assessment of BH1 (BISI), BH2b and BH4 will be limited to parts of the Region II and should be tested when available. Same for the BH1 (SoS) assessment in Region IV, where there is

already an initiative to combine BH3 and BH1 assessment here as a case study for integration between these indicators.

As a conclusion, this structure seems promising but should be further tested when all draft indicator assessment will be available, hopefully next Spring 2022.

- Action: Laurent and Cristina (OBHEG co-chairs) to progress (numerically) this Benthic habitats' thematic assessment draft and share with OBHEG (and Lena) to progress discussion and testing contents at next OBHEG and COBAM meetings.

4.2 NEA PANACEA's Activity 2 session on Threshold Values

This part of the workshop is related to NEA PANACEA Task 2.4 "Inventory of baseline and TV setting methods used or considered in D1 (pelagic, benthic, birds), D4 and D5 assessments". Lisette Enserink introduced the topic. For a coherent assessment framework and where relevant (pressure-state relationships), the MSFD and also OSPAR asks us to look into the type of narrative (or philosophy) that is used to set the threshold value. If these narratives conflict, we may implement measures that steer in the wrong direction. For instance, if we take measures to reduce nutrient levels to reach good status for eutrophication (currently: historic pre-eutrophication level + 50%) and at the same time we aim for large populations of a specific species that flourishes in high productivity environments, this will be conflicting. This issue was discussed in an EU-level MSFD workshop called *Horizontal Issues – Threshold Values* (30 September 2020) and for that workshop a pre-read document was synthesized that was used as a source for this session (see Annex B for a link to that pre-read document). This document contains several types of narratives for setting TVs, but is still a work in progress. Comments and additions are much welcomed. For the present session the narratives that the Activity 2 group expects to be applicable to biodiversity indicators were selected (see below). SuperCOBAM's experiences and views are important to further develop a system that helps us to identify what type of narratives can be used and under which conditions, so as to harmonise approaches where this is useful.

The types of narratives that were considered are:

1. Acceptable deviation from historic or pristine state
    - Similar to Water Framework Directive and the Habitats and Birds Directive, whereby TVs are set in relation to natural characteristics, such as the distributional range of a species, the extent of a habitat or the condition of its biological community.
    - Example 1: OSPAR 50% deviation from background concentrations for eutrophication parameters such as nutrient concentrations.
    - Example 2: Changes in occupancy rate and shifts in distribution from OSPAR's Changes in Harbour Seal and Grey Seal Distribution. Changes in seal distribution assessed between assessment period, against the baseline distribution, which is the potential distribution area or observed area in the baseline period.
2. Non-deterioration
    - To maintain good status (Art. 1 MSFD).
    - If scientific knowledge to set TVs is lacking, in combination with an improving trend (Art. 4(2) Commission Decision (EU) 2017/848).

3. Points-of-no-return and tipping points
    - Points-of-no-return are system condition parameter values that indicate a level, which, when surpassed, will lead to irreversible alterations in system conditions. A point-of-no-return might be reached if, due to a pressure, an ecosystem component declines beyond recovery. This could also include declines as a result of cumulative effects of multiple pressures.
    - Tipping points are system condition parameter values that indicate a level, which, when surpassed, will alter system conditions drastically.
4. Removal and conservation targets
    - Removal targets are TVs based on "unacceptable mortality levels" caused by human activities for the indicator species.
    - Example: HELCOM indicator on drowned mammals and waterbirds in fishing gear.
    - Conservation targets are TVs relating to the state of biological management units (i.e. stocks or populations). A limit value for a safe human-induced mortality of marine species is usually the outcome of a simulation over a certain time period using a suitable population dynamic model. During the time period, the conservation target for the stock size is to be reached with a given certainty in a predefined fraction of the simulation time (e.g. at least 95% likelihood of reaching at least 80% of carrying capacity within 100 years).
    - Example: FMSY (Fishing mortality under the overall aim of Maximum Sustainable Yield) in the management of commercial fish species.
5. Limit reference level
    - Approach for defining TVs based on targeted estimated "optimal", "favourable" or "acceptable" condition.
    - Example: the Habitats Directive's Favourable Reference Range and Favourable Reference Area: The threshold value indicates how much habitat is needed to maintain its specialised species in viable populations.
6. Trend-based approaches
    - In the absence of knowledge of historic baseline and reference conditions and historical time-series, future state and trend-based approaches can be used individually or in combination with a baseline.
    - Example: OSPARs intermediate assessment for Harbour Seal and Grey Seal Abundance, and OSPAR's grey seal pup production.

About the timelines: the draft QSR 2023 was intended to be ready by the OSPAR Commission meeting in June 2022. Although we know that some NEA PANACEA indicator assessments will be delayed, deciding on TVs soon is important. Understanding how all these TVs fit together will contribute to drafting the thematic assessments and may help to communicate with the policy level in BDC 2022.

4.2.1 Session results

A large matrix was drafted on the wall of the meeting room, representing types of narratives (columns) and current development stage of TVs (rows), see picture below. Participants were invited to add the code of the indicator they are working on in the right cell. Table 2 gives the outcome of the exercise.

Furthermore, to better understand the reason for choosing a specific type of narrative, participants were invited to fill in a form, either on paper during the workshop or in digital version after the session. The results received so far are in Annex O. Unfortunately, there was not much time left to discuss the outcome of the inventory during SuperCOBAM. Lisette thanked the participants for their useful contribution to Task 2.4. The Activity 2 team will further develop and complete the outcome of this session under this Task.

Table 2 Threshold values: type of narrative and development phase. 16 indicators have been inserted: 5 benthic habitats, 3 birds, 2 pelagic habitats, 3 food webs, 3 eutrophication.

Development phase	Acceptable deviation from historic or pristine state	Non-deterioration	Points-of-no-return and tipping points	Removal and conservation targets	Limit reference level	Trend-based approaches	other
Policy acceptance	BH2a Multi Metric (WFD) (B1- Bird Abundance)*ideal				B1 (Bird Abundance)		
Policy consequences clear	D5/eutro: Nutrient concentrations Chlorophyll a concentrations			B5 (seabird bycatch)			
TV calculated					B3 (Bird productivity)	NIS3 (new introductions of species)	D5-eutro: O2 depletion near the seafloor (based on potential benthic impacts)
Narrative/method decided	B7: marine bird habitat quality				BH3 (extent physical damage) BH1 (SoS)[2]	PH2 (changes in plankton biomass/abundance) FW2 (changes in PP) FW6 (changes in zooplankton biomass)	BH3 (condition/disturbance based on sensitivity) PH3 (plankton diversity PH1/FW5 (plankton community)
Not started	BH2B (Margalev Diversity) BiSi (BH1?) BH1 (SoS)		BH1 (SoS)				
other							ICG-OA: no TV considered sensible

2 Explanation: can be used to determine limit reference level. Status of TV development not clear.

5 General expert group output

(not related to the three main themes) and other notes

5.1 Marine Birds

The analysis for DAPSIR chapter will be mostly qualitative (quantitative when possible)

Are we looking at things that are not in the bow-tie analysis

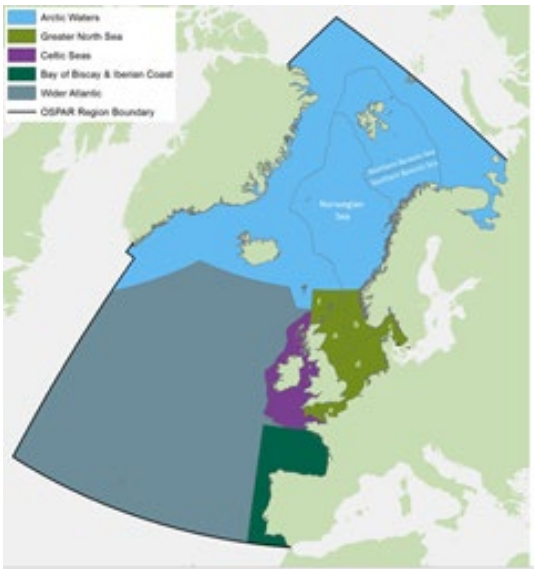
- Action for Birds GP Leads: consider whether to create an internal feeder report for the DAPSIR chapter

Discussion with Activity 2 on Assessment Scales:

- Activity 2 leads are defining new assessment areas using existing layers of chl-a, salinity, depth and stratification. These have been further refined by ECG-EMO to consider WFD areas and river catchment. Can the proposed assessment areas be used by other groups?
- The Activity 2 areas are smaller than the one used for marine Birds: implications on data availability (i.e. less data available for smaller units) and ecological meaning (birds subdivision were developed considering main oceanographic features and observed differences in seabirds' community structure and population trends). Smaller subdivision might not be adequate for some species that have wider habitat ranges
  Action: Share shapefile with Birds regions and subdivision with Activity 2 leads

Discussion off the sessions (Birds – Activity 2):

- Can food web models predict "optimal" numbers of birds, which in turn can be used to define threshold levels and baselines (other than arbitrarily using the beginning of the time series of data as the baseline)?
- Assessment scales: Combination of pelagic/benthic/etc indicators with bird indicators scientifically more appropriate if using raw offshore bird data for the respective assessment units rather than combining indicator outcomes (which usually have different assessment scales).



Assessment units specific for Marine Birds

OSPAR Region	Subdivision
I - Arctic Waters	Norwegian Sea
	Northern Barents Sea
	Southern Barents Sea
II - Greater North Sea	a (NE Britain)
	b (W Norway)
	c (Skagerak/Kattegat)
	d (S North Sea)
	e (English Channel)
	f (N Scotland)
III - Celtic Seas	
IV - Bay Of Biscay & Iberian Coast	
V - Wider Atlantic	

Figure 6. Assessment units specific for Marine Birds

Table 3. Theoretical example showing different data availability for B1 (bird abundance) and B3 (bird productivity) indicators. Regional scale assessment will be based on both indicators B1 and B3, assessment at subdivision scale will be only done for B1 as is the most data rich indicator

	UkIId	BE	NL	DE	DKIId	DKIIc	SEIIc
Breeding success	x	x	x	(x)			
Breeding abundance	x	x	x	x	x	x	x
Breeding status subdivision	IId = Abundance only					Abundance only	
Breeding status region	II = Abundance & Breeding success						

5.2 Pelagic Habitats

Plankton Lifeform Extraction Tool: https://www.dassh.ac.uk/lifeforms/

- We need to think carefully about our narrative – let's try to clarify this, this week
- Need to work on a common understanding of what is required to complete the QSR and to develop a common approach to addressing the problems rather than potentially repeating effort among research groups.
- Data call
    - Action – Abigail to ask PH experts if we are expecting any more data, what the barriers are and if we can help facilitate through the Secretariat. Abigail to notify OSPAR PHEG of data call closure on 1 Dec.

ENA LIACAT

- Food web indicator FW9 integrates across ecosystem components
- Will use an integrated approach, combining bio-phys-chem parameters for some case study areas, linked to Deltares and LiACAT models.
- Data (mainly biomass) can be annual means or monthly, using time-series data
- How can pelagic indicators be integrated into FW9? We need to identify case study areas with data from benthic, pelagic, etc in the same spot.
- Are we connecting indicators or raw data? Lifeforms and biomass needed, not overall indicator results. We need to work out what the best spatial scale is – does ENA need this by station and/or by spatial area?
- Next step for FW group and Activity 2 of NEA-PANACEA project – overlay all data locations shp to find areas with good biodiv data
- Action**:** Abigail and Matt to help Ulrike and Thomas work this out

Reporting and assessment:

- We really need to work out what is 'GES' and what is 'not GES' so we can give a clear message to policy makers in the assessments.
- Action Abigail and Felipe: to look at indicator templates on QSR Sharepoint and identify things that will stay the same. Anything that we retain already has policy approval so it's advantageous to keep as much as we can.
- Action Matt: to arrange next pelagic NEA PANACEA for November

- Action Abigail**:** to populate table in BiTA Sharepoint with potential table of contents for state chapter of thematic assessment and get feedback from group
- Action Abigail**:** to engage with HoD from UK (Andrew Scarsbrook)
- Action Matt and Arnaud: We need to present some example results for December COBAM so we need to make good progress on these actions by December. I think the focus should be on mapping indicators so COBAM has an idea of what our draft QSR might look like. We can get some feedback on maps v tables, etc

Next steps and ways of working:

- We need to keep in touch with the wider group more regularly. Therefore we should have an interim meeting, even if it's just a Webex. We need to devise a format that is not just Abigail talking.
- Action UoP**:** Work out date of next live in person meeting (May?) and set up two-monthly Zoom check ins for wider EG
- Next steps:
    - Nov 2021: GET YOUR DATA IN!!!!
    - Dec 1, 2021: Data call closes
    - Dec 2021: COBAM
    - Feb 2022: Expect draft of QSR indicator assessments for feedback
    - March 2022: Draft assessment submitted for policy feedback in
    - April 2022: BDC
    - May 2022: COBAM provides feedback on draft QSR
    - June 2022: UltraCOBAM to focus on thematic assessment
    - Summer 2022: Expect final QSR assessment for feedback
    - Sept 2022: Expect thematic assessment draft for feedback
    - Oct 2022: Final QSR assessment due
    - Oct 2022: Special BDC
    - Dec 2022: Thematic assessment due

Summary of Actions:

- Abigail to ask PH experts if we are expecting any more data, what the barriers are and if we can help facilitate through the Secretariat. Abigail to notify OSPAR PHEG of data call closure on 1 Dec.
- Matt and Arnaud: to discuss consistent mapping of indicator results and test for discussion in advance of Dec COBAM
- Matt and Arnaud – Obtain gridded data output from the Deltares model for examining drivers of change
- Arnaud – Process the PML primary production data into a format suitable for assessing as a driver of change
- Abigail and Matt to help Ulrike and Thomas work out candidate assessment areas with high resolution and long duration biodiversity data

- Abigail and Felipe: to look at indicator templates on QSR Sharepoint and identify things that will stay the same. Anything that we retain already has policy approval so it's advantageous to keep as much as we can.
- Matt: to arrange next pelagic NEA PANCEA for November
- Abigail: to populate table in BiTA Sharepoint with potential table of contents for state chapter of thematic assessment and get feedback from group
- Abigail: to engage with HoD from UK (Andrew Scarsbrook)
- Matt and Arnaud: We need to present some example results for December COBAM so we need to make good progress on these actions by December. The focus should be on mapping indicators so COBAM has an idea of what our draft QSR might look like. We can get some feedback on maps v tables, etc
- UoP: We need to test threshold options to evaluate if they are actually telling meaningful information, e.g. by defining upper and lower thresholds as a corridor of change or different percentages for short or long-term trends or quartiles.
- UoP**:** Work out date of next live in person meeting (May?) and set up two-monthly Zoom check ins for wider EG

5.3 Benthic Habitats & Non-indigenous species

The OSPAR Benthic Habitat Expert Group (OBHEG) had the opportunity to meet the day before and discuss the progress made for each indicator, notably on the data currently available and the work plans and progress made. Some work was done also to prepare SuperCOBAM sessions. It was decided notably to present and discuss the BH4 (by Petra), a TG Seabed document on assessment scales (by Sander) and the MarESA method (by Liam). About data, an action was already decided the previous day for indicator leads to state in a table on the data currently available (per country and data type), following OSPAR data calls. This will inform us on the real spatial coverage of the future assessment for each indicator.

During discussions during the workshop, the following actions were identified:

- Action: BH3 and BH4 leads to clarify with Danish and Swedish experts (Mats and Norbert) if data available (habitats and pressure) in the Kattegat and Skagerrak areas will enable respective assessments.
- Action: Laurent to contact urgently French responsible to provides the dates to which the French data could be made available for OSPAR.
- Some intersessional works was also done by some indicator leads to produce a table describing each indicator theoretical assessment scale and data requirement (See Annex L).
- Action: OBHEG to propose and discuss during the next meetings, specific lists of species, related to sensitivities at defined pressure, or functional groups. UK and Activity 2 teams to interact to incorporate relevant sensitivity species lists, notably with Spanish, French and Portuguese teams for Region IV, and in general with experts from any relevant biogeographical (sub)region to be assessed by BH3.
- Action: Methods to be clearly described in each indicator CEMP document, and clearly highlighting for BH3 what is new compared to previously agreed BH3 CEMP guideline.

- Action: Further progress and application of these methods to be reported and discussed in the OBHEG future meetings, also with Nea Panacea tasks 3.2 (BH1), 3.4 and 3.5 (BH3 development and scenario) and 3.7 (thematic assessment).
- Action: Links between indicators, integrated methods and MSFD GES criteria to be clarified by OBHEG. Petra Schmitt (DE) to send the TG Seabed doc to all group + Silke: SEABED_6-2021-03rev2_GDArt8-D6_short-draft_20210628.doc
- Action: Indicator leads (and teams) to consider biogeographical variation (and related subdivision) of species communities and sensitivities lists of habitat types in each OSPAR (sub)Region when testing or assessing indicators, notably for BH1 and BH2 indicators, and sensitivity data underpinning BH3 and BH4 assessments. A coherence is needed to enable integration between indicators.
- Action: Benthic, NIS and any other interested expert group lead to plan mixed discussion and potential resources for progressing conceptual integrated methods, based on current respective indicators and assessment methods, to assess the effect of NIS on biodiversity component (as part of biodiversity AND a biological pressure).
- Action: to all experts to review Emily's Excel file and identify gaps in the measures linked to them biodiversity component.
- Action: Laurent and Cristina (OBHEG co-chairs) to progress (numerically) this Benthic habitats' thematic assessment draft and share with OBHEG (and Lena) to progress discussion and testing contents at next OBHEG and COBAM meetings.

Benthic experts getting to the bottom of it

6 Activity 2 world cafés

6.1 Introduction

One key aspect of the NEA PANACEA project is the interaction between assessors of pressure (eutrophication and physical conditions) and of state/biodiversity. On one hand we aim to establish the exchange of products and lessons-learned, especially with a view to see if the products and knowledge developed by the OSPAR eutrophication experts and modelers can be of added value to the biodiversity community. On the other we aim to establish increased coherence between different elements in the QSR. This work is reflected in NEA PANACEA's Activity 2. The session started with an investigation of the knowledge level of the Activity 2 Tasks among participants. It appeared that the majority was only partly aware of the ambition and intended actions of this Activity. Perhaps the most complex Tasks involve the use of model approaches to better understand ecosystem functioning. An introduction to these model approaches was given as an oral (online) plenary presentation by Ulrike Schückel and Silke Eilers (see Annex K). This was used to set the scene for break-out sessions on these topics in a world café set up.

Silke Eilers presented the LiACAT model. One major aim of activity 2 is the quantification of the impact of eutrophication and climate change on ecosystem components as well as on the food web. For the analysis of eutrophication effects, we will apply the newly defined threshold values for the COMP4 assessment areas. For the analysis of climate change effects, we will apply different regional climate change scenarios and several aspects of climate change such as increased temperature, increased storminess and acidification. Moreover, cumulative interaction effects will be assessed in specialized models. The Deltares model will deliver spatial data of environmental parameters for the years 2009-2017. These model data will be input data for the models assessing the cumulative effects (Automated Cumulative Impact Model – ACIM and cumulative Dynamic Energy Budget Model – DEB model). Additionally, a literature search will be conducted to get data about interaction effects between stressors and between species. The Literature based Analysis and Cumulative Assessment Tool – LiACAT will be used to organize and visualize the literature data. The cumulative analyses will provide predictions about the combined effects of eutrophication and climate change scenarios on growth, reproduction, biomass, survival and other observations on selected ecosystem components. The results of these models will be integrated into the model for analysing impacts on the food web (Ecological Network Analysis). The Ecological Network Analysis (ENA) approach (OSPAR food web indicator FW9) can assess the status of food web in a holistic way. ENA allows (1) assessing the functioning of food webs based on the analysis of the interactions among all compartments/functional groups; (2) identifying the most important trophodynamic links between compartments/functional groups; (3) identifying limiting resources and keystone species in the food web; and (4) analysing the effect of specific pressures on ENA indices or biomass distribution of specific compartments/functional groups.

Biomass data of ecosystem components will be calculated all of these models and be compared between them and monitoring data for model validation. Model results will be linked to OSPAR indicators by providing the information about the magnitude of the influence of different scenarios on OSPAR indicators (e.g. on changes of phytoplankton biomass). ACIM can be combined with the Bow-Tie approach.

Ulrike Schückel explained that the Ecological Network Analysis (ENA) approach (OSPAR food web indicator FW9) can assess the status of food web in a holistic way. ENA allows (1) assessing the functioning of food webs based on the analysis of the interactions among all compartments/functional groups; (2) identifying the most important trophodynamic links between compartments/functional groups; (3) identifying limiting resources and keystone species in the food web; and (4) analysing the effect of specific pressures on ENA indices or biomass distribution of specific compartments/functional groups.

While common food web indicators (FW3, FW4) just focusing on one trophic guild/ecosystem component such as fish, this model-derived indicator represents the only ecosystem/food web indicator including all ecosystem compartments and trophic interactions (direct and indirect) within an ecosystem. FW9 comprises a set of five indices that best seem to be able to meet most of the requirements of different European Directives and wrap up most of the relevant MSFD criteria under Descriptor 4 (Safi et al., 2019, de Jonge and Schückel, 2021). The selection of these indices is based on (i) published results and expert judgement of the high sensitivity of theses indices to capture changes in food webs, (ii) the fact that these indices assessing the structure, diversity and functioning of ecosystems, which is an important quest emerging from European Directives and (iii) the potential of theses indices to be easily communicated to stakeholders.

The first step prior to calculating the ENA indices is the construction of the food web model for the targeted ecosystem. The complexity of the model (e.g. the number of species and trophic compartments) is related to the data availability and to the question that needs to be treated. In general, time-series data of the plankton biomass (i.e. phytoplankton, zooplankton) is required along with benthic organisms, fish and invertebrates, mammals, and bird biomass data. In addition, data of non-living compartments is require. Food web models are based on annually averaged values of biomasses (in carbon).
Once this information is available, the food web model is parameterized with biomasses per unit area, with several ratios of processes over biomass [such as production over biomass ratios (P/B), consumption over biomass ratios (C/B) or respiration over biomass (R/B)].

To gain a better understanding of the strength of the relationships occurring within a food web, a measure of the amount of each compartment representing a prey-item for another is needed (Who eats whom and at what rate?). In general, stomach content analysis and stable isotope analysis are used to account for these measures. If this information is not locally available, literature or online databases (e.g. DE database, fishbase.org, MARLIN BIOTIC) can be used to estimate these measures.

In order to facilitate exchange between experts, we held 3 world café sessions. In each session, 3 tables were available for participants to join and engage with Activity 2 representatives, each with its own theme and table hosts:

1. Model approaches to investigate food web characteristics, biotic-abiotic interactions and cumulative pressures (LiAcAT: Literature analysis and Cumulative Assessment Tool, and ENA: Ecological Network Analysis) (hosts Silke Eilers and Ulrike Schückel (both online) and Thomas Raabe).

2. Assessment scales developed for eutrophication assessments (host: Anouk Blauw).
3. Remote sensing data on primary productivity (hosts Gavin Tilstone (online) and Lisette Enserink).

Participants were encouraged to visit every table, but allowed to visit a specific table multiple times if they wanted. Below are the notes recorded during these sessions.

6.2 Models to investigate food webs, biotic-abiotic interactions & cumulative pressures

At this world café table, attendants could engage with Ulrike Schückel, Silke Eilers and Thomas Raabe to further discuss the model approaches that they presented.

Meeting day 2:

Role of LiACAT/ ENA in the project:

- Models will supplement Indicator assessment and include bowtie approaches to form a message regarding climate change/ eutrophication influences in general/as an addition to thematic assessments:
    - Giving answers in hindsight ("What *has* happened")
    - Making projections for the future ("What *will* happen")
- LiACAT and ENA modelling will connect to OSPAR thematic assessments via small area case studies

Model results shall flow directly into thematic analyses

Main Requests from Activity 2:

- Which areas/parameters should be included, according to the thematic groups? (benthic/pelagic...)
- Will it be possible to get a data call inventory from benthic? (Comparable to pelagic inventory introduced by Matt Holland)

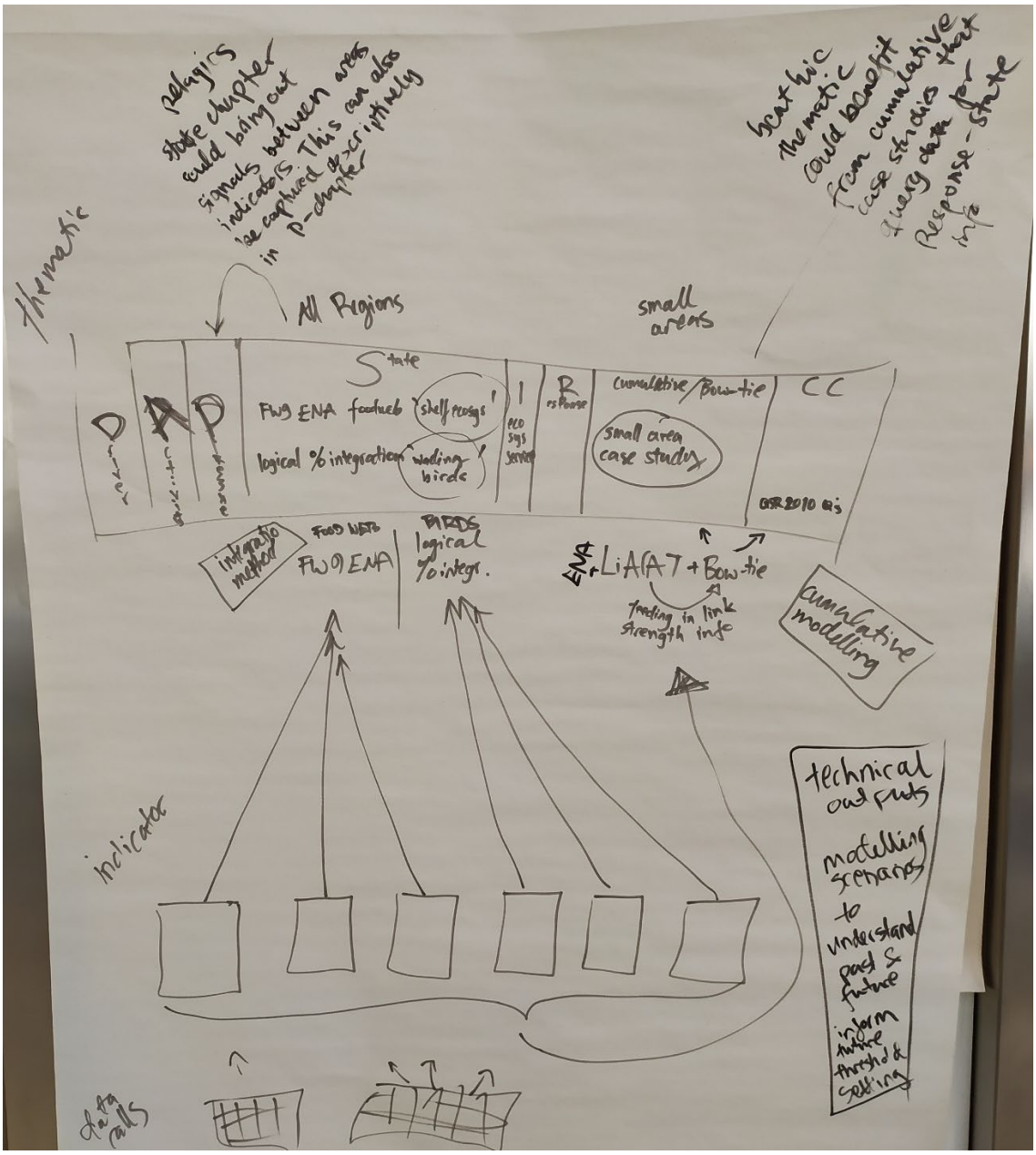


Figure 7 Where can Activity 2 be included in the OSPAR process? (Sketch by Lena Avellan, OSPAR secretariat)

Inputs from World Café participants:

- *Pelagic:* Areas with high biomass and harmful algae /microzooplankton are interesting for modelling, especially the main riverine plumes e.g., Elbe plume
- *Benthic:* Biogeography should be taken into account, data from Doggerbank area/UK will be sent to Ulrike Schückel

Questions answered in the collaborative session*:*

- *Question:* Are ACIM and ECOSEA parallel streams to send the same message or do they have different focus points/outcomes?
  Answer: Depending on the Bowtie models that ECOSEA will use, they can be seen as supportive/ collaborative work going in a similar direction. Not all the pressures can be linked, management options are not going to be included.

- *Question:* The analysis is made based on a selection of case studies. What are the criteria for the use of data? Does the selection depend on specific areas or studies where biomass output is available?
  Answer: Mostly depends on data availability, abundance information can also be converted into biomass input.

- *Question*: Is there always data needed for all of the thematic groups in a single region (e.g. birds, mammals, pelagic, benthic)?
  Answer: Chemical and physical Information is always needed; ideally representative regions with good data availability are looked for but not every single data set is required.

- *Question:* How is benthic data going to be treated? Are flows being regarded, is there analysis on a species level?
  Answer: Input is categorized for trophic guilds or functional groups, not on species level.

Meeting day 3:
(Strongly limited time frame due to technical problems with online communication)

- Short introduction to the links of Activity 2/ models to bowtie analysis
- General questions with regard to co-operation between all Activities:
  - Areas
  - Data
  - Time
- Requests/ wishes from biological groups à overlay of assessment areas, find common areas for combined approach
- Pelagics group: Areas with high phytoplankton biomass would be interesting, this refers to OSPAR region 30
- Proposal of Doggerbank as further common area of interest à good data conditions
- Time series data will be needed for Activity 2 co-operations
- UK coast: continuous benthic data since 1958
- Birds: 30-40 years of data including abundance and breeding success
- Life form pairing for larger areas à benthic functional groups, depend on data availability

Idea and final conclusion:
All Activities:

- Create shape files for data availability (inventory):
  - physical-chemical parameters (including model data)
  - pelagic data (plankton, fishes et al)
  - bird data
  - benthos data

Overlay maps and find best spots for common analyses

6.3 Assessment scales developed for eutrophication assessments

At this world café table, we discussed how coherence in assessment areas between thematic assessments can be improved and/or how the COMP4 areas for eutrophication can be re-used for other indicators. In general, there is agreement that it is very useful to harmonize assessment areas across themes to enable linking and integration of results.

Comments received from pelagic habitats group:

The COMP4 assessment areas are already used for the pelagic indicators and have been compared to gridded data at different resolutions with CPR data. The experiences were so far positive, but there are a few concerns for further implementation:

- There are very many areas and not for each area data are available for the assessment. The CPR data used so far have been interpolated to improve the coverage. But still this is not a satisfactory solution and one would like to have other data as well in each area.
- 10 years have been spent to develop indicators and their representation in a table and this table does not accommodate so many areas. Maybe a map representation (like Matt showed in his presentation) would be more suitable, but then the people involved need to be convinced to change the system again and throw away the system that was so carefully designed. Another issue of concern is that red areas (i.e. significant decrease of indicator value) may be perceived as negative signals by policy makers, whereas that is not necessarily the correct interpretation of the result. So more work is needed to translate the indicator results to narratives that communicate the story correctly.
- One possible solution to reduce the number of areas (and increase the number of data per area) could be to aggregate some areas that show similar results for pelagic indicators (i.e. the lifeform pairs, not the chlorophyll and primary production where satellite data are available).

Comments from benthic habitats group:

- Laurent: We are planning to compare the COMP4 areas with existing assessment areas for benthic indicators. Liam can provide the shape files for those.
- Laurent: Similar to the pelagics groups there are concerns that for some areas no data are available for the assessment.
- José Manuel Gonzalez Irusta mentions a method available 'region common profiles' (?) that provides modelled distribution data per species (?) and is willing to compare these with EUNOSAT maps. There is ongoing scientific work using these methods that he can share. Practically we cannot do this type of work in NEA PANACEA but we can use what is available from others. So, it is more relevant to compare current maps that have been developed from earlier research and expert knowledge to determine what assessment areas to use and whether the COMP4 areas are suitable
- Sander Wijnhoven: TGSeabed is already making use of EUNOSAT maps and has done an analysis of how to use these for benthic work.
- Petra Schmitt: DE government is using EUNOSAT maps. For benthic reporting assessment areas are designed, these match well with EUNOSAT areas.

Comments from marine birds group:

- Current assessment areas made for birds are ecologically relevant. There are maps available and these could be compared with COMP4 areas. For biomass indicators it is no problem to change the current assessment areas (which are also already ecologically relevant). Just for some birds that cover large areas during their life it is not sensible to define smaller assessment areas than currently used.
- Other indicators, such as breeding success, require quite demanding modelling and computation work, so these cannot be run for so many areas. It would be too much work.

6.4 Remote sensing data on primary productivity

At this world café table, we discussed the remote sensing products that NEA PANACEA Activity 2 has to offer to the biodiversity assessment community. Gavin Tilstone from the Plymouth Marine Laboratory joined through a remote connection to hold a presentation and answer questions. Below is a point-by-point record by Gavin with his answers to and views on the issues raised during the discussion. This is followed by a paragraph with input from visitors of this world café table.

Which type of satellite model do you use?

The model is wavelength resolving and therefore fully spectral. The input terms are Chla, max Chla-specific absorption, quantum yield, phytoplankton useable radiation (PUR), PAR at the surface and propagated through the water column over wavelength and depth. All input parameters are integrated over wavelength, depth and time. It is based on the original work of one of your former French colleagues, Andre Morel (Morel, 1991 Prog. Oceanogr., 26, 263–306; Antoine and Morel et al. 1996 Global Biogeochem. Cycles, 10, 43–55) who I considered as a real 'Guru' in the (bio-)optics field.

We adapted the model to account for CDOM absorption and TSM scattering in coastal waters using the radiative transfer model HYDROLIGHT, and to speed up the computation by developing a look-up-table for these other light absorbing water constituents, so that we can more easily apply it globally. For further details please see the following papers: Smyth, Tilstone, Groom 2005 JGR-Oceans 110, C10014, doi:10.1029/2004JC002784; Tilstone et al 2005, J. Plankt. Res, doi:10.1093/plankt/fbi075).

Do you have a seasonal pattern of "functional" absorption of phyto (or a similar variable) different from biomass? Or is it impossible to compute such parameters that are really independent with the satellite approach?

The Chla-specific absorption spectrum is normalized to PUR using a KPUR function determined from temperature (which is obtained from satellite SST). This accounts for any seasonal specific variation in absorption.

Do you have relationships between PP sat and biommass, but also PPsat and PP measured in situ (as part of your model calibrations) that would be different between the periods before, during and especially after the spring bloom?

The biomass term comes from Chla. In their original work, Morel et al. did quite a lot of research on accounting for the variability in photosynthetic parameters and biomass under different Chla regimes (eutrophic, mesotrophic, oligotrophic; see - https://www.sciencedirect.com/science/article/pii/0967063796000593?via%3Dihub)

Stock-flow decoupling is an issue that seems to me to be addressed within the framework of our FW2 works, by different approaches. I would like also to evaluate whether with the photobiological parameters of FRRf: we get the same vision, a different result or an added value.
Reconciling FRRf to 14-C measurements under variable Chla biomass can be a tricky task (e.g. Robinson et al. 2009, doi: 10.3354/ame01250), due to the different response times of photosynthetic electron transfer and actual carbon fixation / assimilation, matching the action spectrum of O2 (FRRf) to that of carbon (14-C P-E curves) to quantum yield and its variability in different phytoplankton groups and species.

Colleagues at PML are involved in the SCOR working group on FRRf and developing the necessary protocols to scale up to an integrated production rate. There has been some nice steps towards this (Oxborough et al. 2012 LO-Methods DOI 10.4319/lom.2012.10.142).
The caveat is that at the SCOR working group meeting, the originator of the instrument (Kolber) stated that the FRRf was never intended to be used as an instrument to determine primary production, but as a tool to assess variability in photo-physiology.

The use of all of these methods have benefits and limitations and the use and application of these depends on the research questions that are being addressed.

If the question is: what is the rapid photo-physiological response to an environmental driver (e.g. Fe;)? Then FRRf is the most appropriate method / tool to answer it.

If the question is: what are the threshold indicators and reference baseline for primary production for a particular area? Then 14-C is probably more applicable at this point of time, as there are a long time series and history of measurements going back to the 1960's.

However, all of these in situ measurements are still limited both spatially and temporally in providing sufficient coverage over large areas. This is where ocean colour remote sensing and estimates of primary production can really fill in these gaps.

Overlaid on this, the majority of satellite PP algorithms are calibrated using 14-C measurements and using the most accurate algorithms the differences between satellite and 14-C measurements are lower than the current differences between FRRf and 14-C based techniques.

As I highlighted in my presentation, developing satellite models of PP really has the potential to fill the gaps in spatial and temporal in situ measurements, but the estimates obviously have to be accurate. I have been doing a lot of work on validating and improving the wavelength resolving model over the years (e.g. Tilstone et al. 2005 doi:10.1093/plankt/fbi075 , 2009 doi:10.1016/j.dsr2.2008.10.034, 2014 http://dx.doi.org/10.1016/j.rse.2013.04.021, 2015a doi: 10.1016/j.rse.2015.03.017, 2015b doi:10.1016/j.rse.2014.10.013, Barnes et al. 2014 doi: 10.3354/meps10751, Curran et al. 2018 doi:10.3390/rs10091389, Lobanova et al. 2018 https://doi.org/10.3390/rs10071116, Ford et al. 2021 https://doi.org/10.1016/j.rse.2021.112435) and also deriving phytoplankton size-fractionated production rates from satellite, new, export and

net community production (but that is a different subject!!!). Our WRM PP satellite model is generally within 20% of in situ 14-C values.
Our adapted Morel model, always came in the top 4 most accurate models during the NASA PPAR3 inter-comparisons (Carr et al., 2006; Friedrichs et al., 2009; Saba et al., 2010, 2011).

Insights from other participants
All these considerations are interesting to discuss openly and are important for the future. Indeed, the production of phytoplankton estimated by the satellite tool is appropriate in offshore waters (this is also a very practical approach given the size of ocean basins such as the North Atlantic or the North Sea), but in coastal environments, where biomass can be very high and subject to river inputs (related to local meteorology and anthropogenic impacts), other approaches may be of considerable interest.

High-frequency active fluorescence (FRRf) measurement approaches, for example, have shown their usefulness even in the problem of production, not only that of physiology. Progress has been made on understanding active fluorescence and carbon fluxes. They make it possible to consider estimating flows (at least locally) with this method using parallel empirical models for the calculation of carbon equivalents. Automated buoy-based coastal FRRf approaches are underway and are expected to develop in the near future. Given the cycles of physiology and the photoacclimation processes that can occur on the scale of a few minutes and/or hours, this approach is to be supported, particularly in the context of the study of the decoupling between biomass and microalgae production. Moreover, in areas with maximum deep chlorophyll, studies also show that photoacclimation can occur and why not affect short-term production flows.

7 Interaction with other OSPAR bodies

Please find below and especially in the attachments mentioned in the text information shared by Lena Avellan (OSPAR secretariat), Adrian Judd (ICG-EcoC) and Emily Corcoran (contractor) during SuperCOBAM. While we had scheduled and hoped for a session with Stephen Dye of the Climate Change Expert Group (CCEG), we have not been able to make this happen.

7.1 OSPAR secretariat, Lena Avellan

On day 1 Lena Avellan, deputy secretary at the OSPAR secretariat, talked the ICG-COBAM expert network through the many resources available to them for delivering the QSR (indicator and thematic) assessments and pointed out various requirements the assessments need to meet. Many relevant resources are listed in Annex B: SuperCOBAM Resource Library, but the below ones are the ones that Lena drew our attention specifically to.

An overview of the indicator assessments that are going to be delivered by ICG-COBAM can be found in Annex E, which is also published as an Annex to the BDC 2021 meeting Summary Record.

All OSPAR assessments are published on the OSPAR Assessment Portal (OAP). The QSR2023 assessments will be presented under a tile that is presented next to previous QSR assessments https://oap.ospar.org/en/ospar-assessments/quality-status-reports/.

Templates for the common indicators are available on the QSR resources page: https://www.ospar.org/work-areas/cross-cutting-issues/qsr2023/assessment-templates. The common indicator template includes fields for text and a metadata section which provides a link to the associated 'snapshot data set' and the Addendum 1 file to the template which provides results in a format compatible with MSFD electronic reporting.

The common indicator assessment methodology should be provided as a technical document setting out the calculation protocol in a CEMP Guideline (Coordinated Environmental Monitoring Programme). The CEMP Guideline should be published at the same time as the indicator. Current CEMP Guidelines are available online: https://www.ospar.org/work-areas/cross-cutting-issues/cemp

Writing and style guides are available here: https://www.ospar.org/work-areas/cross-cutting-issues/qsr2023/style-and-writing-guides

The QSR drafting process is managed through the QSRSharePoint site: https://osparcsp.sharepoint.com/sites/QSR
There are dedicated folders for each assessment, including tailored templates. If you cannot access the SharePoint (but should be able to), please contact the secretariat to request to access.

7.2 ICG-EcoC, Adrian Judd: Addressing the DAP in DAPSIR

On day 2 Adrian Judd, the co-convenor of ICG-EcoC, updated the ICG-COBAM expert community on the work that is in place to address the DAP in DAPSIR (Drivers, Activities, Pressures, State, Impact, Response) and used the SuperCOBAM platform to further the discussion on how the workflows on this very cross-cutting work are optimized and how the COBAM community might contribute to the effort.

In Annex G an overview document can be found that details the use of the DAPSIR framework in the OSPAR QSR thematic assessments, and the presentation that Adrian held can be found in Annex F. Some questions were put in the meeting chat which were answered during the session, and Adrian was so kind to answer these (again) in writing, see Annex H. After the plenary exchange, Adrian and the expert group / thematic assessment leads had a session using a Miro board to inventory how (pathway) various pressures affect the different state components and how this is measured (see Figure 3, larger version in Annex I).

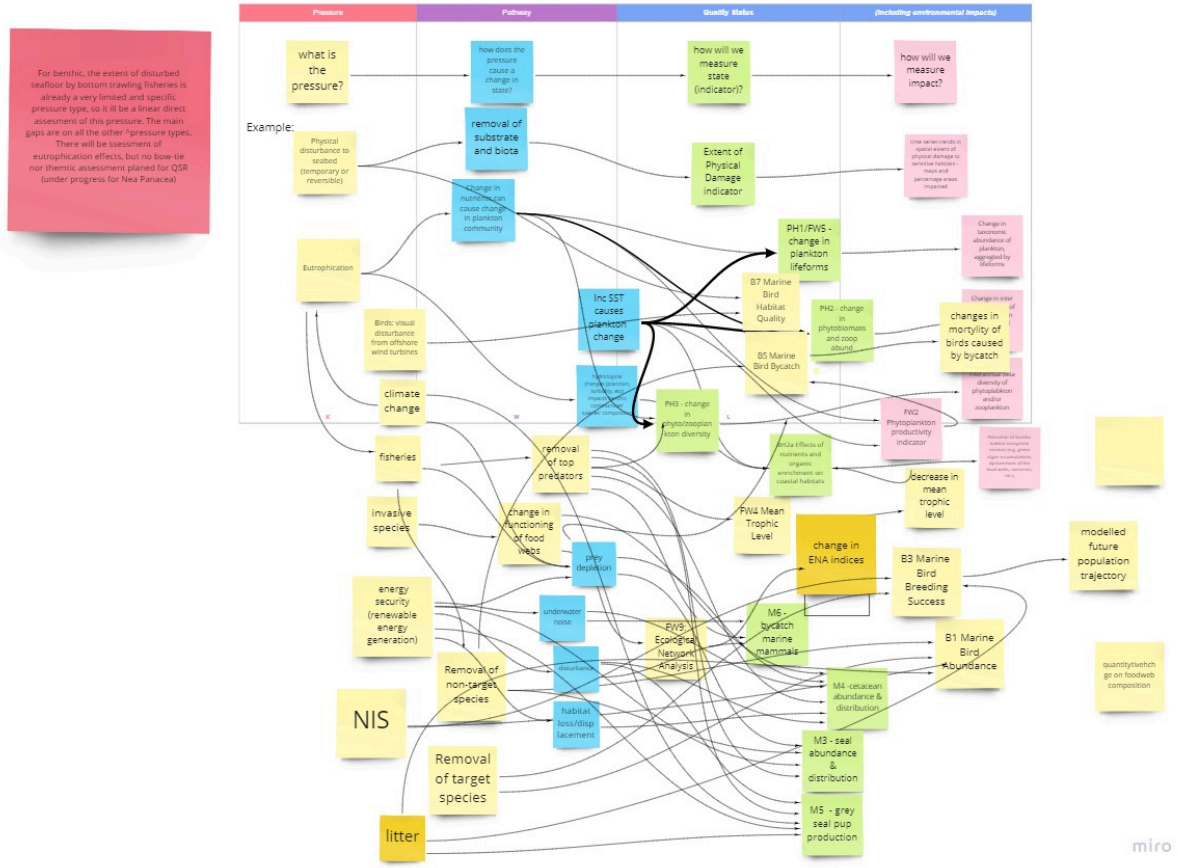


Figure 8. Results of the Miro board session between Adrian Judd and Expert Group and Thematic Assessments leads, see Annex I for a larger version

7.3 Emily Corcoran: Addressing the R in DAPSIR

On day 3 Emily Corcoran, who has been contracted until April 2021 by OSPAR to provide technical support to the development of the R (Response) component of the DAPSIR (see above) framework being applied to structure the Thematic Assessments, introduced herself and the work she plans to

do to the ICG-COBAM expert network. The purpose of her contract is to help develop a coordinated approach for the development of the Response chapters, and work with the relevant expert groups within ICG-COBAM, ICG-POSH and ICG-MPA to develop initial text for consideration by BDC 2022.

The purpose of the presentation (Annex J) was to provide SuperCOBAM with an overview of the intention of the chapters, progress to date and to ensure the appropriate contacts were made within the different expert groups. It was also the intent to make sure that the consultant could establish contact with all of the expert groups for picking up future discussions. The discussion, facilitated by “Mentimeter" helped share information on the experts that were able to contribute to this work, and when. These outputs are available as part of the presentation.

8 General outcomes: Plenary closing discussion

To wrap up the workshop, we replaced the plenary Threshold Values discussion with a tour-de-table to identify outcomes and share experiences. Unavoidably, this discussion had a strong focus on the three expert groups active in NEA PANACEA and NEA PANACEA's Activity 2 (eutrophication and physical conditions).

Closing tour-de-~~table~~theater

General remarks

- Joining and mixing groups (such as biodiversity and eutrophication) in a physical meeting was very successful, this should be taken into account in the future and that such meetings should be resourced from OSPAR Contracting Parties.
- It was considered extremely fruitful to have mixed expert group discussions. We should consider back-to-back meetings for expert groups to allow for more mixing.
- Topics are dense and complex, difficult to come to closure on all topics so maybe need to focus on one topic that can be closed and concluded on in the future.
- QSR timelines are pressed, important to remember that NEA PANACEA should also have time and space to explore new approaches for example on food webs and be part of the project deliverables even if not QSR 2023 products.
- Come forward with proposals for what topics can be best handled at ultraCOBAM by those who will be invited to that meeting. UltraCOBAM will be physical meeting with biodiversity experts.
- Hybrid superCOBAM has been inclusive which is good, but it is also dragging down the live physical event. The ultraCOBAM would be fully live.

Pelagic habitats

- D1C6 is inappropriate for pelagic. It reduces ecosystem complexity so much that ecological meaning is lost. The pelagic habitat does not have consistent boundaries – water bodies move and plankton move within and between the water bodies. Pelagic habitats are 3 dimensions. For these reasons it doesn't make sense to give a percent of 'good' or 'bad' – would that be percentage of surface area? Water column? Finally, we don't support threshold values at this time, so it is impossible to arrive at a meaningful percentage of good or bad. We hope to bring this to the attention of the EU, through the OSPAR channels.
- Threshold values. Right now we feel that TVs probably won't work but we have some ideas to test around Ecological Quality Ratios or p values in trends, etc, that will allow us to interpret observed changes in relation to reference conditions or baselines compared to the current assessment period. Either way, the narrative is key in linking drivers of change to indicator change.
- Spatial assessment areas. We are going to use the COMP4 assessment areas (based on sub-divisions proposed by the JMP EUNOSAT project) for the upcoming OSPAR eutrophication assessment, but there are 64 in total (distributed in OSPAR Regions II, III and IV) and we would like to simplify due to data availability. However, we have testing to do on working out if we can link the wider pelagic habitats from the MSFD text (e.g., variable salinity, coastal, shelf) to the areas, allowing us to rationalise areas to simplify assessment. We may then be able to compare the indicators and pressures across areas of the same class.
- Integration between indicators. Integration to a single number (or GES/notGES) would 1) hide nuance, 2) obscure ecological meaning, and 3) double count certain taxa as all three of our indicators come from the same data. However, our indicators have multiple parts across multiple spatial areas, which can be overwhelming for policy. It's important that we retain the ecological meaning necessary to inform management measures and to interpret change in other indicators (through the food web). We will therefore start from a position of 'what would be useful for policy makers to know?' and test out some ways of displaying and interpreting data to simplify communication of our message.

Benthic habitats

- The stocktaking of data that is available was progressed and will enable when completed to clearly define area which will be really assessed (and start all indicators draft assessment!).

- Spatial assessment units: First proposal developed, shapefile to be created in next step. Aiming to align for all indicators which will make it easier to present information at the next level, notably the Benthic habitats' thematic assessment and explore links with other components, notably pelagic habitats' thematic assessment.
- Integration of indicators: The conceptual method exists to combine indicators exists (Elliot et al, 2018), and some methodological gaps were also progressed, but in terms of MSFD criteria integration, there is still a conclusion that the Broad habitat type is the last relevant integrated reporting unit, and that there is currently no sense to integrate the different information and results between different pressure type in a single value (D6C5). A dashboard of results of all other criteria contributing to D6C5 would be more relevant, both ecologically, scientifically and for management issues.

- Thresholds Values: this is a very challenging task, further work is foreseen on next steps, but it is not foreseen that Threshold Values will be fully developed by QSR2023. Different regions are at different level of development, both science and policy based questions need to be addressed. BH2a is the only benthic indicator with n agreed threshold. A 'Narrative' for a BH3 threshold has been described, and will be discussed in the next OSPAR relevant meetings.
- We will need to clearly indicate what will be each NEA PANACEA product and what could be a QSR input, because an agreement have to be reached at several OSPAR committees levels and this can be challenging according to QSR2023 timeline. Nevertheless, the Nea Panacea timeline is currently fitted to submit all products end 2022, which would enable submission of all products to end 2022 COBAM and BDC meetings, and agreement in Spring 2023 for QSR production.
- There is substantial progress expected in the benthic habitat OSPAR QSR outputs compared to previous (2017) assessment outputs, recognizing that some state-pressure relationships are still not yet developed.

NEA PANACEA Activity 2

- A plan has now been fully developed to formulate requirements from modelling side to the biodiversity side and also to physical-chemical data providers.
- Will overlap maps of available data to identify the best regions to be worked on and at what time-scales.
- DELTARES has provided modelled data for the whole region with high resolution for spatial and temporal scales. Content with the outputs and confident that outputs will be delivered.
- The "selling" of eutrophication tools has been successful. Have been able to clarify that the tools are to understand spatial and temporal aspects of plankton which can be a basis for understanding food webs.
- To have shared the assessment units for eutrophication for use in biodiversity indicators and assessments is considered a very good outcome.

Marine birds

- JWGBIRD is well placed for QSR assessment and good progress made
- Spatial scales: agreed B3 breeding success indicator to be the regional level, this will be communicated to the contractor to produce models for this spatial scale, contractor to do this under NEA PANACEA funding.
- Integration: similarities of birds and fish approach, thinking of species at different times of the year comparable to fish stock assessments, thus potential read-across possibility between groups.
- Thematic assessments: better understanding of how bird work streams will link up with work by contractors from BiTA on the thematic assessment. Modelling of cumulative chapter on pilot assessment was a good development and look forward to feeding in.
- Learned a lot from the other groups. Interesting with spatial scales to compare. For the future it could be good to compare the boundaries of sub-divisions between topics. Some bird results could maybe be explained if there was a spatial read-across to other assessments of other topics in the same area

Other

- BiTA query on State chapter content: Structure and components has been discussed and clarified. Post-meeting, would be good if experts could go into the 0301_doc in BiTA on sharepoint to fill it in.
- Bow-tie / ICG-EcoC and LiACAT approach, good discussion to clarify how they link up, follow-up on the agenda to continue the discussion.

9 Annexes

A. SuperCOBAM 2021 programme
B. SuperCOBAM resource library
C. Opening presentation by Jos Schilder
D. Whiteboard opening discussion
E. BDC2021 Annex 5: ICG-COBAM assessments to be delivered
F. Adrian Judd's presentation
G. Adrian Judd: document on DAPSIR and OAP
H. Adrian Judd's answers to questions
I. Adrian Judd & EG leads: Miro board
J. Emily Corcoran's presentation
K. Silke Eilers and Ulrike Schückel's presentation: LiACAT & ENA
L. OBHEG (benthic habitats) minutes
M. OPHEG (pelagic habitats) minutes
N. JWGBIRD (marine birds) minutes
O. Activity 2 threshold value inventory
P. List of participants

SUPERCOBAM WORKSHOP

NEA PANACEA

North East Atlantic project on biodiversity and eutrophication assessment integration and creation of effective measures

Workshop Report **ANNEXES**

20-22 October 2021

Online & at Rijkswaterstaat LEF Future Center, Utrecht (NL)

OSPAR QSR2023

Co-funded by the European Maritime and Fisheries Fund

Rijkswaterstaat
Ministry of Infrastructure and Water Management

Table of contents

SUPERCOBAM WORKSHOP

NEA PANACEA

North East Atlantic project on biodiversity and eutrophication assessment integration and creation of effective measures

Workshop Programme

Important information:

-We meet through **ZOOM**: https://us02web.zoom.us/j/83635762609
-We make use of **Mentimeter** (have it on your phone or have a browser available
-We make use of **Mori** (please register yourself in advance of meeting)
-Use of a head set is preferred

OSPAR QSR2023

20-22 October 2021, Utrecht (NL) and online (ZOOM)

Co-funded by the European Maritime and Fisheries Fund

3-day Overview

Day 1

08:00	Doors open, registration
08:30	Welcome live attendees
09:00	Pre-discussion: SuperCOBAM
10:15	Pre-discussion: Assessment Scales and Spatial Integration
10:45	Break

ONLINE

11:00	Welcome
11:30	Expert Group Meeting: update
12:30	Lena Avellan: OSPAR secretariat information and resources for the QSR
13:00	Lunch
14:00	Expert Group: Assessment Scales and Spatial Integration
14:50	Close

15:00	Tea break
15:30	Mixed Expert Group: Assessment Scales and Spatial Integration
16:30	Plenary discussion: Assessment Scales and Spatial Integration
17:30	Close of meeting
17:40	Publication talk in pub
	End

Day 2

08:00	Welcome back, coffee
08:15	Activity 2 café
10:15	Pre-discussion: Integration of indicator results
10:45	Break

ONLINE

11:00	Welcome
11:10	ICG-EcoC: Adrian Judd
12:05	CCEG: Stephen Dye
12:30	Lunch
13:30	Expert Group: Integration of indicator results
14:30	Close online

14:40	Adrian Judd: Provisions
15:10	Tea Break
15:40	Mixed Expert Group: Integration of indicator results
16:40	Plenary discussion: Integration of indicator results
17:30	Travel time
19:00	Food, drinks, fun to be had at the Greenhouse
22:30	*End*

Day 3

08:30	Welcome back, coffee
08:45	Activity 2 café
10:15	Pre-discussion: Threshold Values
10:45	Break

ONLINE

11:00	Opening/setting scene
11:15	Response/Measures: Emily Corcoran
11:55	Lena ex machina
12:35	Lunch
13:35	Expert Group: Threshold Values
14:35	Close online

14:45	Emily Corcoran: Provisions
15:00	Tea Break
15:30	Mixed expert group: Threshold values
16:30	Plenary discussion: Threshold Values
17:15	Close
17:30	*End*

Plenary information | Strategic/preparatory discussions | break | Sub-group discussions | Plenary discussions

Day 1: 20 October			
TIME	MINS	TITLE	DESCRIPTION
08:00	30'	**Doors open, registration**	The venue is at: LEF Future Centre, Griffioenlaan 2, Utrecht. This is the high rise building close to the P+R Westraven tram and bus stop. Report to the reception when you enter.
08:30	30'	**Welcome live attendees**	Informal start with live attendees, time to discover the venue and find a pleasant spot for logging in and breakouts later on.
09:00	75'	**Pre-discussion: SuperCOBAM**	Plenary with all physical attendants. What do want to achieve, how can we best do this, and what is the desired shape or format of the outcomes? We will also familiarize ourselves with the workshop setup.
10:15	30'	**Pre-discussion: Assessment Scales and Spatial Integration**	Expert Group Leads in a subgroup. We make sure all online discussion leaders are on the same page regarding topic, outcomes and mode of reporting / feeding back. Non-Expert Group Leads have catch-up talks & network time.
10:45	15'	**Break**	
ONLINE			
11:00	30'	**Welcome**	We welcome everyone, and wonder: - Why are we here? - What is Super Cobam? And NEA PANACEA? - What are the aims of the coming three days? - What are the aims of today? - When is the meeting a success? - Who is online? In addition, we dive into practicalities such are the workshop programme.
11:30	60'	**Expert Group Meeting: update**	Expert Groups each go to their own break out area. This moment is intended for the Experts to discuss amongst themselves what the desired outcome of the workshop is and how to achieve this. This is also a good moment to discuss the data that is available for the indicator assessments. Are there gaps that may be fixed?
12:30	30'	**Lena Avellan: OSPAR secretariat information and resources for the QSR**	Lena from the OSPAR secretariat will inform the COBAM expert network on practical matters concerning the delivery of indicator assessments and the QSR in general. There will be opportunity to ask questions in written form. On Friday we hope to welcome Lena again and she may have some answers for us.
13:00	60'	**Lunch**	
14:00	50'	**Expert Group: Assessment Scales and Spatial Integration**	The central topic of today is Assessment Scales and Spatial Integration. For every ecosystem component this has its own characteristic issues and problems, but there are of course also similarities in challenges with other ecosystem components. What is the state of the art for your indicators, where do we need to make steps forwards, and what do we seek to learn from others? Discussion leads (i.e. Expert Group Leads) are responsible for taking output to the later physical sessions.
14:50	10'	**Close**	
15:00	30'	**Tea break**	

Plenary information | Strategic/preparatory discussions | break | Sub-group discussions | Plenary discussions

15:30	60'	**Mixed Expert Group: Assessment Scales and Spatial Integration**	Armed with the output of the online Expert Group discussions, the group that is physically present in Utrecht splits into 3 groups to discuss and allow for exchange and cross-pollination between Expert Groups.
16:30	60'	**Plenary discussion: Assessment Scales and Spatial Integration**	Here we discuss the topic with all physical participants. An important aim is to generate an overview of the outcomes that can be shared with the wider COBAM community.
17:30	10'	**Close of meeting**	
17:40	290'	**Publication talk in pub**	Expert Group Leads to pick up ongoing discussion on publishing paper in an obscure bar somewhere in Utrecht
22:30			

Day 2: 21 October

TIME	MINS	TITLE	DESCRIPTION
08:00	15'	**Welcome back, coffee**	
08:15	120'	**Activity 2 café**	A NEA PANACEA-specific event aimed at cross-cutting aspects of the project. Programme to be announced.
10:15	30'	**Pre-discussion: Integration of indicator results**	Expert Group Leads in a subgroup. We make sure all online discussion leaders are on the same page regarding topic, outcomes and mode of reporting / feeding back. Non-Expert Group Leads have catch-up talks & network time.
10:45	15'	**Break**	
ONLINE			
11:00	10'	**Welcome**	We welcome back the online community and go through the topics and sessions of the day.
11:10	55'	**ICG-EcoC: Adrian Judd**	Adrian Judd will share his work on the Drivers, Activities, Pressures, State, Impact, Response (DAPSIR) approach to the biodiversity thematic assessment. What need ICG-EcoC and ICG-COBAM do for each other?
12:05	25'	**CCEG: Stephen Dye**	Stephen Dye to present the work of the Climate Change Expert Group (CCEG), and elaborate on how they seek to collaborate with ICG-COBAM.
12:30	60'	**Lunch**	
13:30	60'	**Expert Group: Integration of indicator results**	The central topic of today is Integration of indicator results. For every ecosystem component this has its own characteristic issues and problems, but there are of course also similarities in challenges with other ecosystem components. What is the state of the art for your indicators, where do we need to make steps forwards, and what do we seek to learn from others? Discussion leads (i.e. Expert Group Leads) are responsible for taking output to the later physical sessions.
14:30	10'	**Close online**	
14:40	30'	**Adrian Judd: Provisions**	An opportunity for Adrian to meet with the Expert Group Leads and make provisions for how to pick up the work in next steps. Non-Expert Group Leads have catch-up talks & network time.
15:10	30'	**Tea Break**	
15:40	60'	**Mixed Expert Group: Integration of indicator results**	Armed with the output of the online Expert Group discussions, the group that is physically present in Utrecht splits into 3 groups to discuss and allow for exchange and cross-pollination between Expert Groups.

Plenary information | Strategic/preparatory discussions | break | Sub-group discussions | Plenary discussions

16:40	50'	**Plenary discussion: Integration of indicator results**	Here we discuss the topic with all physical participants. An important aim is to generate an overview of the outcomes that can be shared with the wider COBAM community.
17:30	90'	**Travel time**	
19:00	210'	**Food, drinks, fun to be had at the Greenhouse**	https://www.thegreenhouserestaurant.nl/about-the-green-house/
22:30			

Day 3: 22 October

TIME	MINS	TITLE	DESCRIPTION
08:30	15'	**Welcome back, coffee**	
08:45	90'	**Activity 2 café**	A NEA PANACEA-specific event aimed at cross-cutting aspects of the project. Programme to be announced.
10:15	30'	**Pre-discussion: Threshold Values**	Expert Group Leads in a subgroup. We make sure all online discussion leaders are on the same page regarding topic, outcomes and mode of reporting / feeding back. Non-Expert Group Leads have catch-up talks & network time.
10:45	15'	**Break**	
ONLINE			
11:00	15'	**Opening/setting scene**	We welcome back the online community and go through the topics and sessions of the day.
11:15	40'	**Response/Measures: Emily Corcoran**	An opportunity for Emily Corcoran to present her work and plans for the response/measures section of the thematic assessments. How can you and she be of help to each other?
11:55	40'	**Lena ex machina**	Lena has the stage to address the no doubt many questions that were raised during the workshop. This is a follow-up of day 1.
12:35	60'	**Lunch**	
13:35	60'	**Expert Group: Threshold Values**	The central topic of today is Threshold Values. For every ecosystem component this has its own characteristic issues and problems, but there are of course also similarities in challenges with other ecosystem components. What is the state of the art for your indicators, where do we need to make steps forwards, and what do we seek to learn from others? Discussion leads (i.e. Expert Group Leads) are responsible for taking output to the later physical sessions.
14:35	10'	**Close online**	
14:45	15'	**Emily Corcoran: Provisions**	A chance for Emily to decide with Expert Group Leads how to pick up the work in the near future. Non-Expert Group Leads have catch-up talks & network time
15:00	30'	**Tea Break**	
15:30	60'	**Mixed expert group: Threshold values**	Armed with the output of the online Expert Group discussions, the group that is physically present in Utrecht splits into 3 groups to discuss and allow for exchange and cross-pollination between Expert Groups.
16:30	45'	**Plenary discussion: Threshold Values**	Here we discuss the topic with all physical participants. An important aim is to generate an overview of the outcomes that can be shared with the wider COBAM community.
17:15	15'	**Close**	
17:30			

SUPERCOBAM WORKSHOP

NEA PANACEA

North East Atlantic project on biodiversity and eutrophication assessment integration and creation of effective measures

Resource Library

For your convenience (not comprehensive)

Descriptor Specific

JRC report on Pelagic habitats under MSFD D1: current approaches and priorities

JRC report: Alignment of the Marine Strategy Framework Directive and the Habitats Directive: current state and future perspectives

Staehr ea (2020) Trends in records and contribution of non-indigenous species to marine communities in Danish waters. Potential indicators for assessing impact

Tsiamis ea (2019) Non-indigenous species refined national baseline inventories: A synthesis in the context of the European Union's Marine Strategy Framework Directive

JRC Review and analysis of EU Member States' 2018 MSFD reports

D1-Pelagic
D1-Species
D2
D3
D4
D5
D6

Integration

JRC report on integration of D1-species not covered under the species and habitats directive

Threshold Values

JRC review report on Species Threshold Values methods

EU MSFD Horizontal Issues: Threshold Values workshop pre-read document

Report of the EU MSFD Horizontal Issues: Threshold Values workshop

Tsiamis K, et al (2021), Marine Strategy Framework Directive- Descriptor 2, Non-Indigenous Species, Delivering solid recommendations for setting threshold values for non-indigenous species pressure on European seas

(Submitted to) BDC 2019: Setting regional threshold values for Non-Indigenous Species primary criteria: pros, cons and how it could be achieved:

BDC2019_NIS_TV.docx

Terminology and resources

OSPAR QSR2010 glossary

OSPAR resources page

OSPAR QSR Guidance document

Definitions Annex from QSR Guidance:

QSR guidance Annex 4_Definitions

OSPAR Intermediate Assessment 2017

OSPAR, 2012 MSFD Biodiversity advice manual (A bit old but definition of terms here were re-used in several other regional activities and reviewed MSFD)

EcApRHA Technical reports, often with glossary

SuperCOBAM 2019 workshop report:

SuperCOBAM2019 report.pdf

SUPERCOBAM WORKSHOP

NEA PANACEA

North East Atlantic project on biodiversity and eutrophication assessment integration and creation of effective measures

Co-funded by the European Maritime and Fisheries Fund

Rijkswaterstaat
Ministry of Infrastructure and Water Management

20 – 22 October 2021

Online & at Rijkswaterstaat LEF Future Center, Utrecht (NL)

What is NEA PANACEA?

North East Atlantic project on biodiversity and eutrophication assessment integration and creation of effective measures

EU funded

MSFD-oriented

Through QSR

4 COBAM EGs
+
Eutrophication Experts

8 Partners
5 CPs

OSPAR QSR2023

Supporting the Marine Strategy Framework Directive
WHY
WHAT
HOW
MSFD

Aqua Ecology
University of Plymouth
Rijkswaterstaat Ministry of Infrastructure and Water Management
BIO CONSULT Schuchardt & Scholle GbR
OFB Office Français de la Biodiversité
CSIC Consejo Superior de Investigaciones Científicas
JNCC
cnrs
LOG
ulco Université

What is NEA PANACEA?

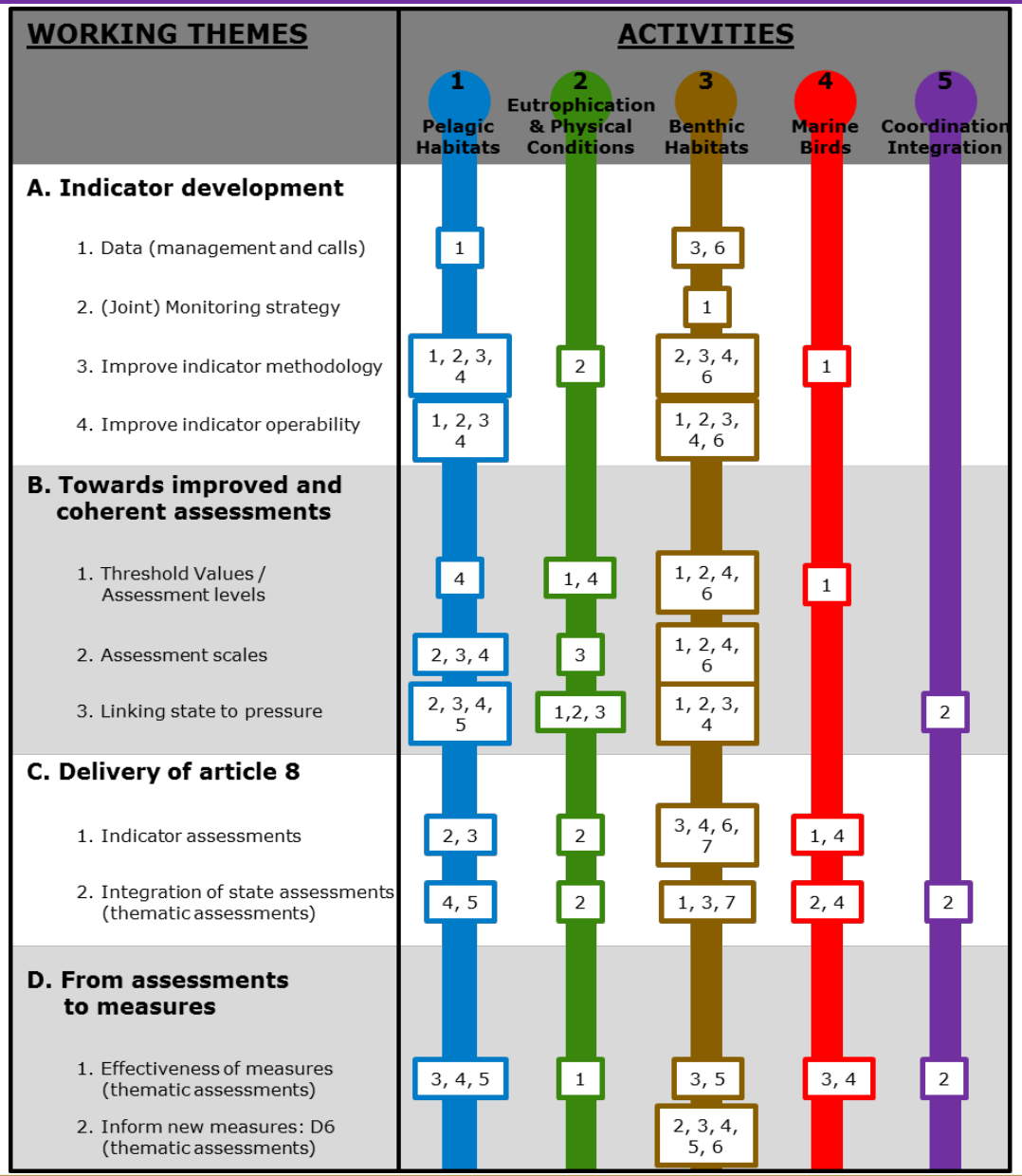
EU funded

MSFD-oriented

Through QSR

4 COBAM EGs
+
Eutrophication Experts

8 Partners
5 CPs



What is SuperCOBAM?

Pelagic habitats

Fish

Marine birds

NIS

Marine mammals

Food webs

Benthic habitats

COMMISSION OSPAR

OSPAR ICG-COBAM Expert Groups

Assessing Biodiversity Status Under Pressure: towards an Ecosystem Resilience approach

"S.U.P.E.R. COBAM" workshop report

Paris (France) 18th to 20th of June 2019

Location: Muséum National d'Histoire Naturelle (MNHN)

Co-chairs: Anita Gilles (chair Marine Mammals, Germany), Abigail McQuatters-Gollop (chair Pelagic Habitats, United Kingdom), Laurent Guérin (co-chair Benthic Habitats, France), Ian Mitchell (chair Seabirds, United Kingdom), Ulrike Schueckel (chair Food Webs, Germany), Paul Stebbing (chair Non Indigenous Species, United Kingdom), Cristina Vina-Herbon (co-chair Benthic Habitats, United Kingdom)

SuperCOBAM

Why are we here?

To learn about process and requirements
(ICG-QSR, OSPAR Secretariat)

To hear from relevant OSPAR bodies
(ICG-EcoC, BiTA)

To discuss cross-cutting issues

To exchange information, ask questions, interact, learn from each other & connect to collaborate

SuperCOBAM

Cross-cutting themes?

Assessment Scales and Spatial Integration

Integration of Indicator Results

Threshold Values

But also:

Thematic Assessments

The DAPSIR framework

(Drivers, Activities, Pressures, Status, Impact, Response)

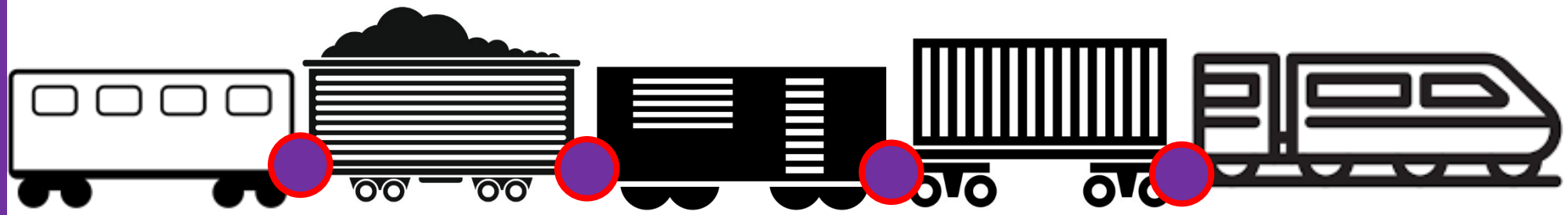
Climate Change

Workshop setup (main themes)

Assessment Scales and Spatial Integration

Integration of Indicator Results

Threshold Values



Pre-discussion (EG leads)

Expert group meeting (online)

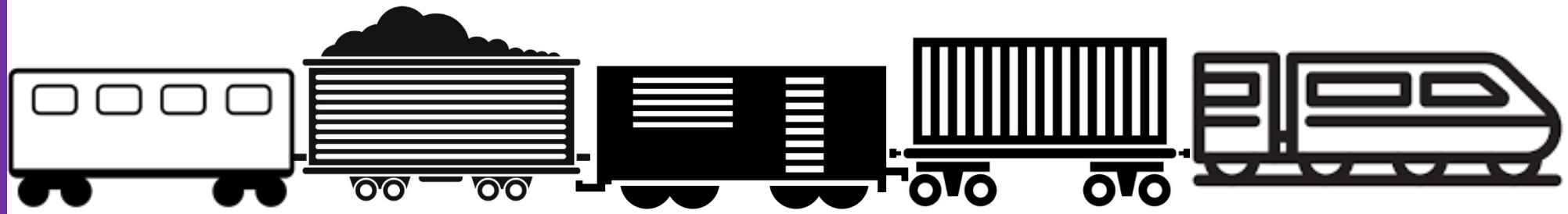
Mixed Expert group meeting

Plenary discussion (output)

EG leads, Chairs, NEA PANACEA members

Workshop setup (main themes)

Assessment Scales
and
Spatial Integration



Integration of
Indicator Results

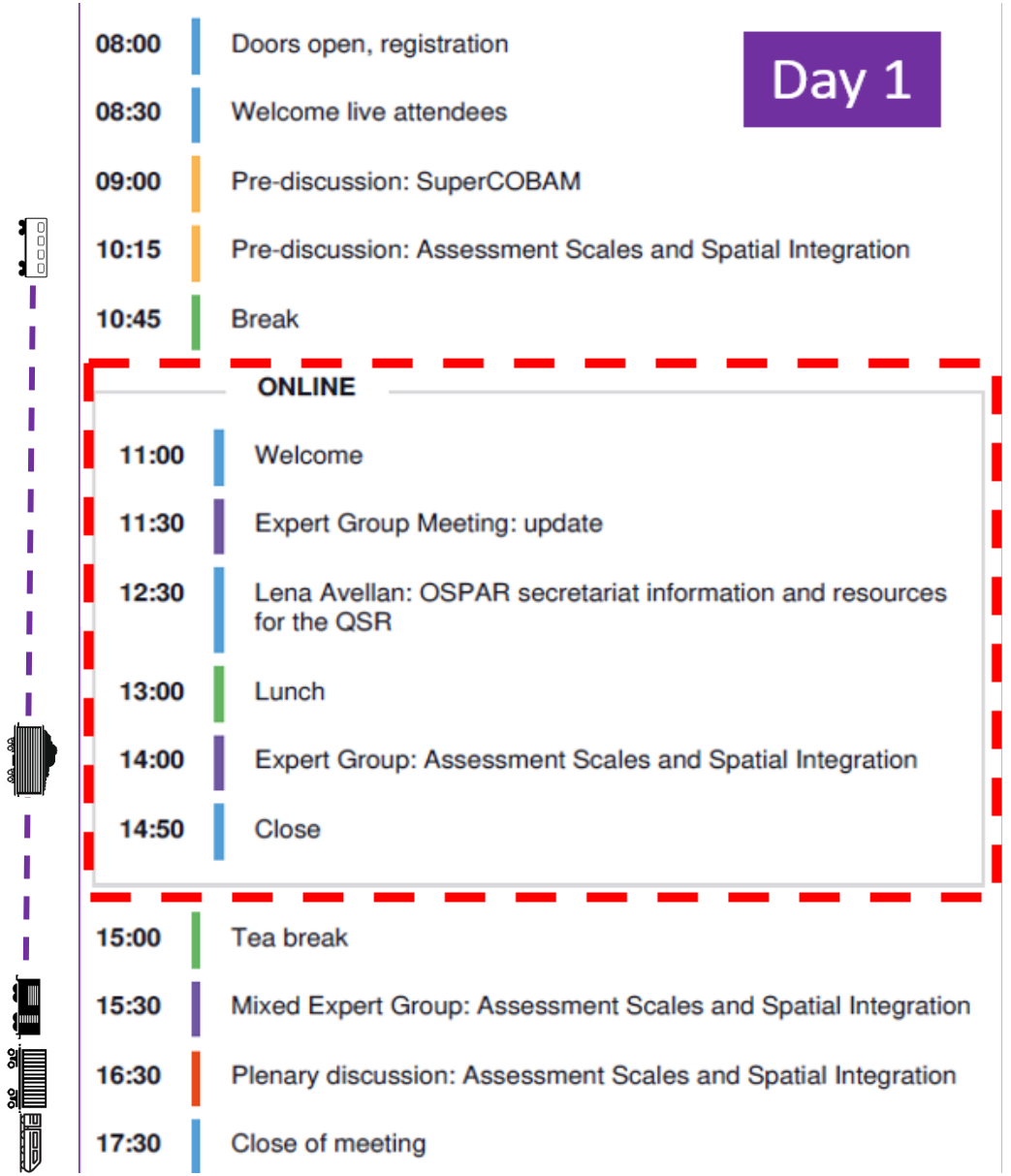
Threshold Values

Left luggage:
Any ideas, messages or afterthoughts?

Miro online whiteboard

Online Programme

DAY 1



Day 1

08:00	Doors open, registration
08:30	Welcome live attendees
09:00	Pre-discussion: SuperCOBAM
10:15	Pre-discussion: Assessment Scales and Spatial Integration
10:45	Break

ONLINE

11:00	Welcome
11:30	Expert Group Meeting: update
12:30	Lena Avellan: OSPAR secretariat information and resources for the QSR
13:00	Lunch
14:00	Expert Group: Assessment Scales and Spatial Integration
14:50	Close

15:00	Tea break
15:30	Mixed Expert Group: Assessment Scales and Spatial Integration
16:30	Plenary discussion: Assessment Scales and Spatial Integration
17:30	Close of meeting

Online Programme

DAY 2

Day 2

08:00	Welcome back, coffee
08:15	Activity 2 café
10:15	Pre-discussion: Integration of indicator results
10:45	Break

ONLINE

11:00	Welcome
11:10	ICG-EcoC: Adrian Judd
12:05	CCEG: Stephen Dye
12:30	Lunch
13:30	Expert Group: Integration of indicator results
14:30	Close online

14:40	Adrian Judd: Provisions
15:10	Tea Break
15:40	Mixed Expert Group: Integration of indicator results
16:40	Plenary discussion: Integration of indicator results

Online Programme

DAY 3

Day 3

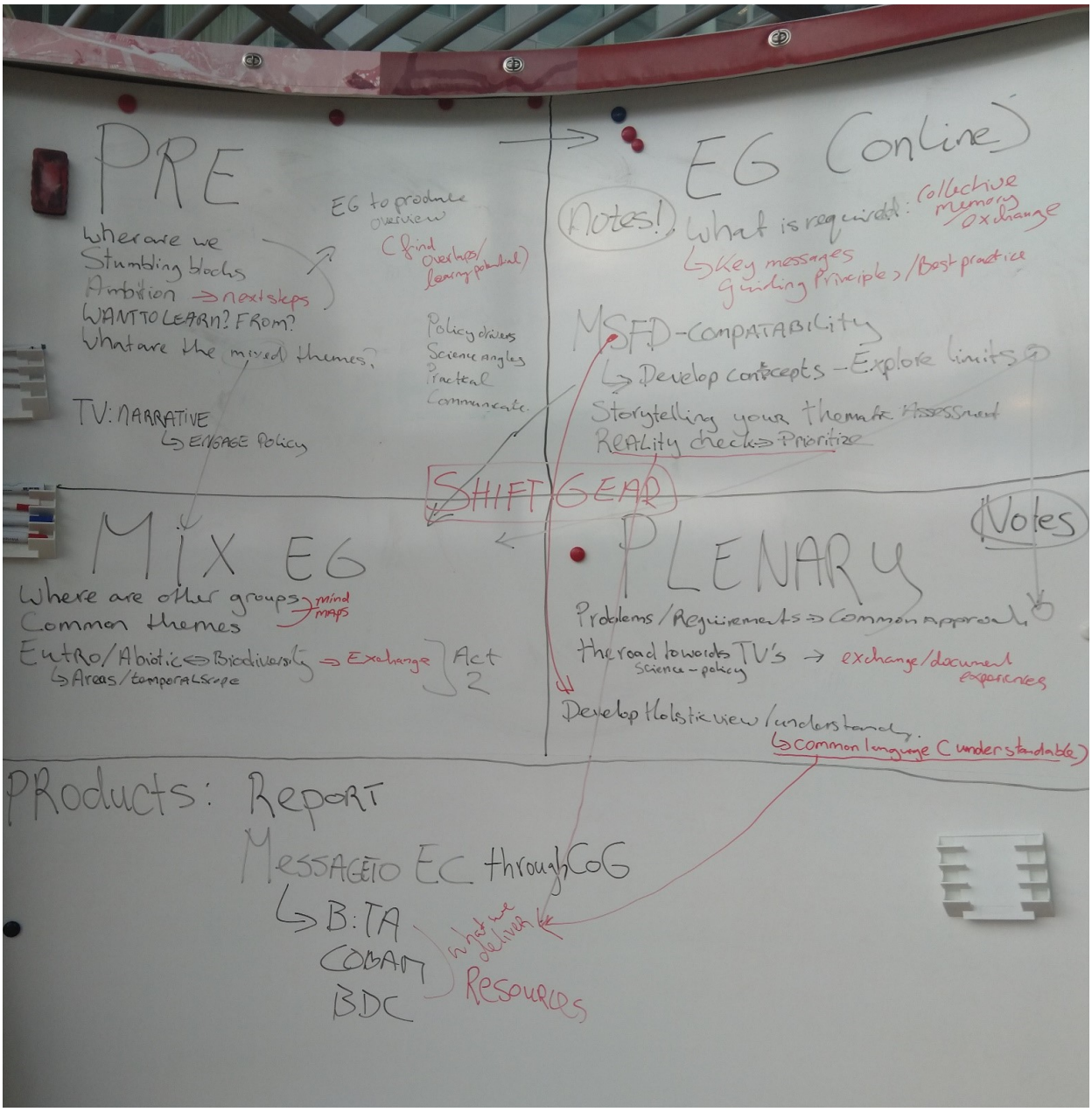
08:30	Welcome back, coffee
08:45	Activity 2 café
10:15	Pre-discussion: Threshold Values
10:45	Break

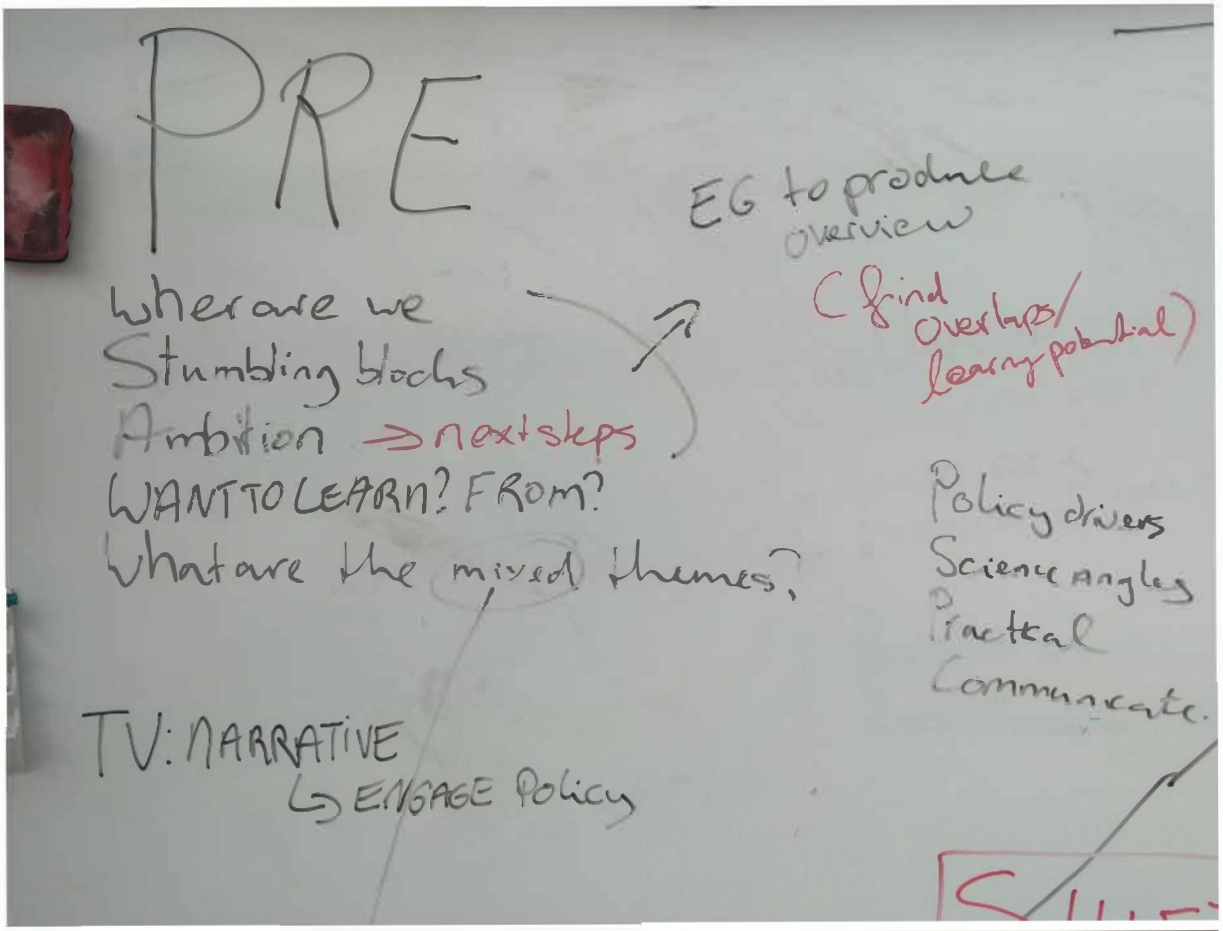
ONLINE

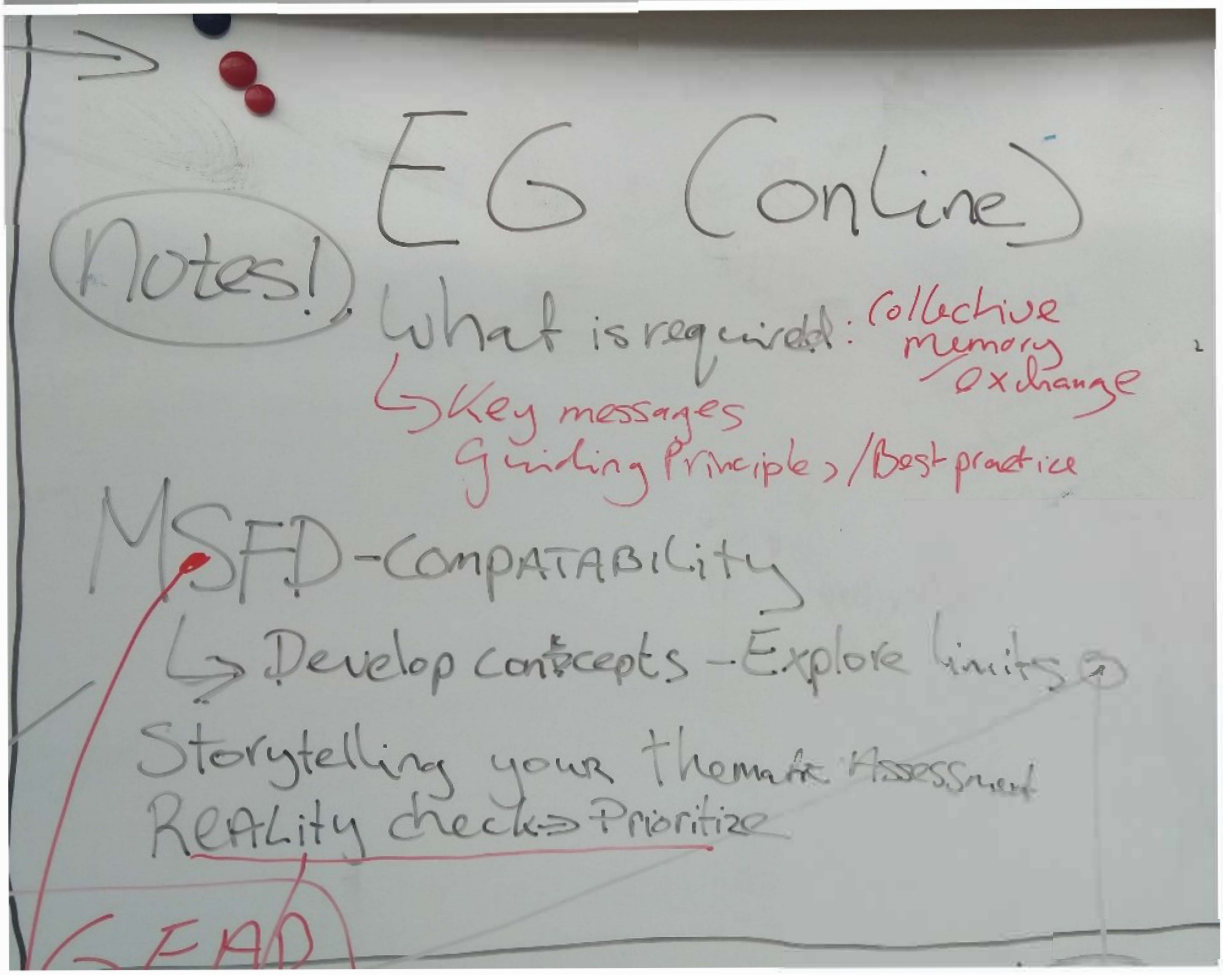
11:00	Opening/setting scene
11:15	Response/Measures: Emily Corcoran
11:55	Lena ex machina
12:35	Lunch
13:35	Expert Group: Threshold Values
14:35	Close online

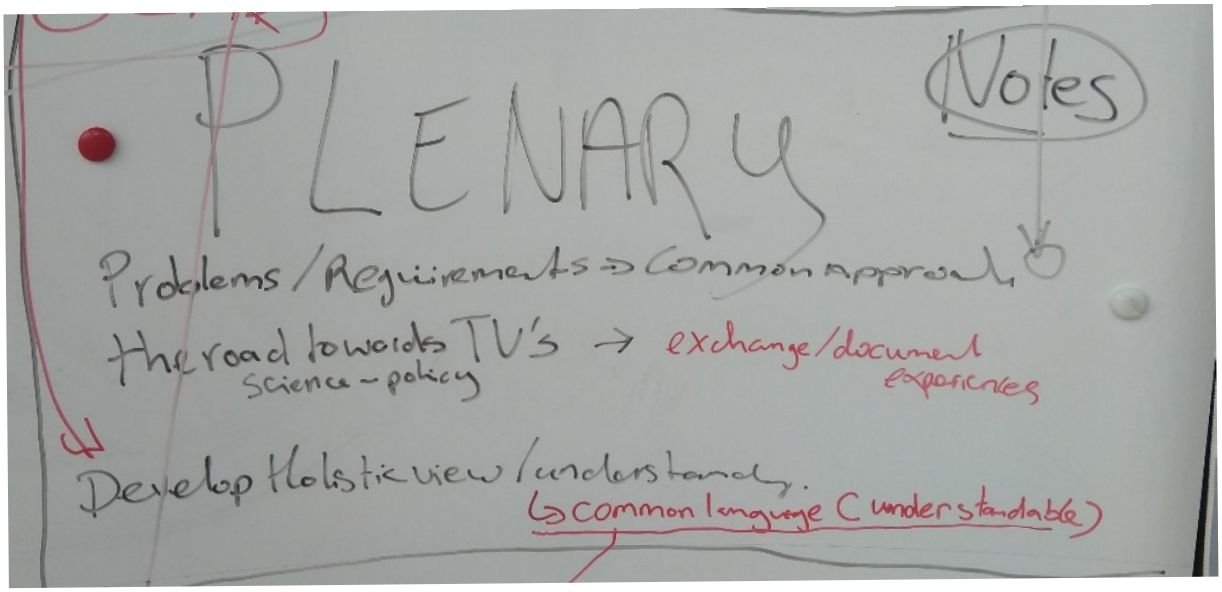
14:45	Emily Corcoran: Provisions
15:00	Tea Break
15:30	Mixed expert group: Threshold values
16:30	Plenary discussion: Threshold Values
17:15	Close

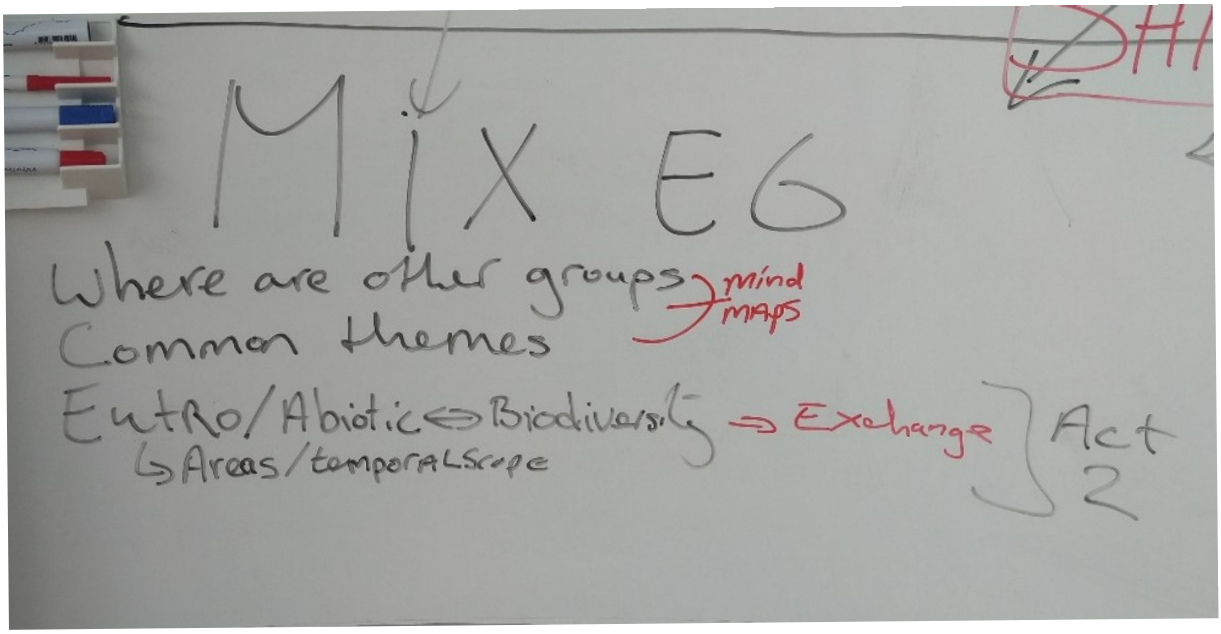
SuperCOBAM workshop report Annex D

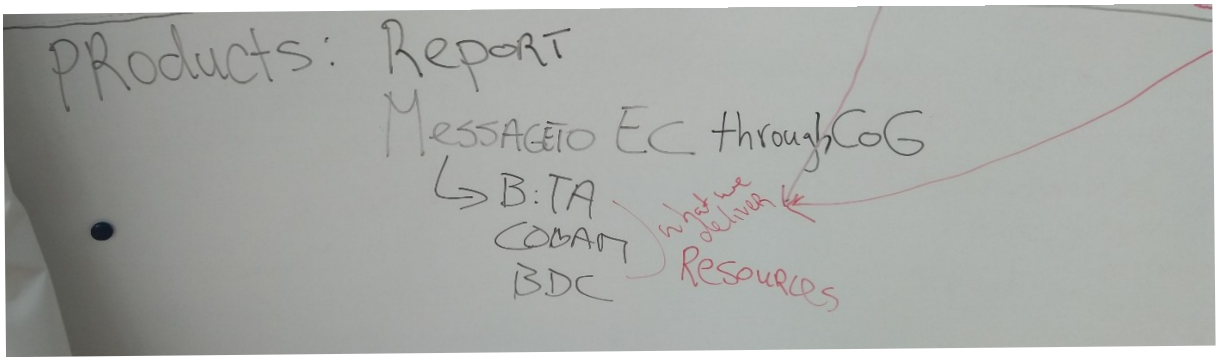



PRE
EG to produce overview
(find overlaps/learning potential)
Where are we
Stumbling blocks
Ambition → next steps
WANT TO LEARN? FROM?
What are the mixed themes?
Policy drivers
Science angles
Practical
Communicate.
TV: NARRATIVE
↳ ENGAGE Policy


EG (online)
Notes!
What is required: Collective memory exchange
↳ Key messages
Guiding Principles / Best practice
MSFD-COMPATABILITY
↳ Develop concepts - Explore limits
Storytelling your thematic Assessment
REALity checks → Prioritize
LEAD


PLENARY
Votes
Problems / Requirements ⇒ Common approach
the road towards TV's → exchange/document experiences
science-policy
Develop Holistic view / understanding
↳ common language (understandable)


MIX EG
Where are other groups → mind MAPS
Common themes
Eutro/Abiotic ⇔ Biodiversity ⇒ Exchange
↳ Areas / temporal scope
Act 2


PRoducts: Report
Message to EC through CoG
↳ B:TA
COMAM
BDC
what we deliver
Resources

Annex 5
Ref. §4.30

OSPAR Convention for the Protection of the Marine Environment of the North-East Atlantic

Meeting of the Biodiversity Committee (BDC)

Videoconference: 12–16 April 2021

Overview of biodiversity common indicator assessments foreseen for QSR 2023

Table 1. Status of contribution of COBAM common and candidate indicators to QSR 2023

	Common indicator contributing to the QSR 2023,
	Candidate indicator
	Proposal for extension to an additional region
	Candidate indicator for a pilot assessment is proposed for QSR 2023
	There are questions to resolve before a recommendation for an extension or a pilot assessment can be given, such as texting or data availability (see notes)
	No assessment will be done
new	New assessment
IA2017	IA2017 assessment will be used (either no resources or no new data expected)
update	The indicator assessment will be updated with new data or methods
[……..]	**Resource question.** An update or new assessment will only be possible if additional resources are made available including both to support the indicator lead and for confirmed partners in the work

Code	Indicator name	Lead country	Region I	Region II	Region III	Region IV	Region V	EU MSFD Descriptor	MSFD Criterion; Relevant **primary,** secondary, (Other)[1]
M3	Seal abundance and distribution	UK	new	update	update for UK, new for Ireland			D1	**D1C2,**

[1]See BDC 18/04/06

Code	Indicator name	Lead country	Region I	Region II	Region III	Region IV	Region V	EU MSFD Descriptor	MSFD Criterion; Relevant **primary,** secondary, (Other)[1]
M4	Abundance and distribution of marine mammals	NL/FR		update	update	update		D1	**D1C2,**
M5	Grey seal pup production	UK	new	update	update for UK new for Ireland			D1	**D1C3**,
M6	Marine mammal bycatch	UK	new	new	new	new		D1	**D1C1**
B1	Marine bird abundance	UK, DE	update (R1 data in IA2017)	update New (at-sea data pilot)	update	new		D1	**D1C2,**
B2	*Breeding success of kittiwake*	*UK*						*D1*	*(D1C3)*
B3	Marine bird breeding success	UK, DE	update (R1 data in IA2017)	update	update	new		D1	D1C3
B4	*Non-native/invasive mammal presence on island seabird colonies*	--						*D1*	*(D1C5)*
B5	*Marine bird bycatch*	*DE/NO*	*new*	*new*	*new*	*new*	*new*	*D1*	***D1C1***
B6	*Distribution marine birds*	--						*D1*	*(D1C4)*
B7	Marine bird habitat quality	DE		New				D1	D1C5
FC1	Recovery in the population abundance of sensitive fish species	UK		update	update	New	New	D1	D1C2
FC4	*By-catch rates of Chondrichthyes*	--						*D1*	***D1C1***
FC5	*Conservation status of elasmobranch and demersal bony-fish species (IUCN)*	*DE*						*D1*	*(D1C2)*
FC6	*Proportion of mature fish*	--						*D1*	*(D1C3)*

Code	Indicator name	Lead country	Region I	Region II	Region III	Region IV	Region V	EU MSFD Descriptor	MSFD Criterion; Relevant **primary,** secondary, (Other)[1]
FC7	*Distributional range*	*DE*	*new (note 2)*	*new (note 2)*	*new (note 2)*	*new (note 2)*	*new (note 2)*	*D1*	*D1C4*
FC8	*Fish distributional pattern*	*DE*	*new (note 2)*	*new (note 2)*	*new (note 2)*	*new (note 2)*	*new (note 2)*	*D1*	*(D1C4)*
BH1	Typical species composition	ES		[new] Testing ongoing (note 3)		new		D1& D6	**D6C3, D6C5**
BH2	Condition of benthic habitat communities: The common conceptual approach	FR	Update					D1 & D6	**D6C3, D6C5**
BH2a	Assessment of coastal habitats exposed to nutrient and organic enrichment.	FR	[Update Study reservati DK & IS update CoG(1)21]	update	update	update	[New PT study reservation for Azores update CoG(1)21]	D1, D5& D6	**D6C5, D5C6, D5C7, D5C8**
BH2b	Benthic Multi-Metric Index quality assessment of the Southern North Sea	FR/NL		[update]				D1& D6	**D6C3, D6C5,**
BH3	Extent of physical damage of predominant and special habitats	UK/DE		update	update	update		D1& D6	partly **D6C2, D6C3, D6C5,** D2C2, D2C3
BH4	*Area of habitat loss*	*UK/DE*		*new*				*D1& D6*	*partly **D6C1, D6C4,***
BH5	*Size-frequency distribution of bivalve or other sensitive/indicator species*	*ES*						*D1& D6*	***D6C3, D6C5,***
PH1/ FW5	Changes of plankton functional types (life form) index Ratio	UK		updated	updated	updated		D1	**D1C6, D4C2,** D4C3
PH2	Plankton biomass and/or abundance	FR		update	update	update		D1	**D1C6, D4C2**
PH3	Changes in biodiversity index (s)	FR		updated	new	updated		D1	**D1C6, D4C1**
NIS3	NIS Trends in New Records of Non-	UK		update	update	update		D2	D2C1

Code	Indicator name	Lead country	Region I	Region II	Region III	Region IV	Region V	EU MS FD Descriptor	MSFD Criterion; Relevant **primary,** secondary, (Other)[1]
	Indigenous Species (NIS) Introduced by Human Activities								
NISx	NIS abundance/spread	FR, UK						D2	D2C2
FW1	*Reproductive success of marine birds in relation to food availability*	--						*D4*	*D4C4*
FW2	*Production of phytoplankton*	*[no lead]*		*update*	*update*	*[new]*		*D4*	*D4C4*
FW3	Size composition in fish communities (TyL)	UK		update	update	update	partial update	D4	D1C3, D4C3
FW4	Changes in average trophic level of marine predators in the Bay of Biscay (cf MTI)	ES		new		update		D4	D4C2
FC2	Proportion of large fish (Large Fish Index)	UK		update	update	[New Study reservations from FR & PT update at COG(1)21]	[New study reservation PT update at COG(1)21]	D4	D4C3
FC3	Mean maximum length of demersal fish and elasmobranchs	NL/UK		Update (promotion proposed study reservation NO, DK, PT)	Update (promotion proposed and supported by R III CPs, study reservation NO, DK, PT)	Update (promotion proposed study reservation NO, DK, PT)	Partial IA2017 [partial update]	D4	**D4C1**
FW6	Biomass, species composition and spatial distribution of zooplankton	SE		[new] note 5	[new] note 5	[new] note 5		D4	**D4C2,** D4C3
FW7	Fish biomass and abundance of dietary functional groups	UK/ES		New	New	New		D4	**D4C2**
FW8	Biomass trophic Spectrum	--						D4	
FW9	Ecological Network Analysis	DE		New		[new] note 5	[new] note 5	D4	D4C1, D4C2, D4C4

Notes

1. FC7 and FC8. Possibilities for preparing a pilot assessment of these indicators will be explored at the next fish biodiversity assessment workshop.
2. BH1. Testing of a revision to the BH1 method is ongoing. Testing of the existing BH1 method has been taking place in Region II. Possibilities for extending the indicator to Region II need to be reviewed when the consequences of this testing are clearer (possibly ICG-COBAM 2021).
3. FW6. Possibilities for a pilot assessment of this indicator in Regions II, III and IV will be reviewed within the NEA-PANACEA project and reviewed at ICG-COBAM 2021.
4. FW9. Possibilities for the pilot assessment to include Regions IV and Region V to be examined by ES and PT in communication with the ICG-COBAM Convenors in January 2021.

DAPSIR in the QSR 2023 – ICG-EcoC update for super COBAM

Adrian Judd

Together we are working for **a sustainable blue future**

Centre for Environment Fisheries & Aquaculture Science
Cefas

Ecosystem Approach in OSPAR

"... the comprehensive integrated management of human activities based on the best available scientific knowledge about the ecosystem and its dynamics, in order to identify and take action on influences which are critical to the health of marine ecosystems, thereby achieving sustainable use of ecosystem goods and services and maintenance of ecosystem integrity."

To fully apply the Ecosystem Approach in the QSR

Requires an understanding of:

- The **drivers** of change [D]
- How human **activities** and **pressures** affect ecosystems [AP]
- Health, integrity and dynamics of marine ecosystems – baseline vs impacted **state** [S]
- **Impact** of changes on ecosystem goods and services [I]
- Integrated management measures (**responses**) [R]

DAPSIR (extended DPSIR)

Drivers of basic human needs require **Activities** which lead to **Pressures** which can lead to changes in the **State** (environmental impact) of the natural system, which lead to **Impacts** on Ecosystem Services which in turn influence the Drivers.

These interrelationships require management **Responses** (as Measures). *[e.g. EC, 1999, Patricio et al 2016, Elliot et al 2017]*

DAPSIR – environmental, social and economic

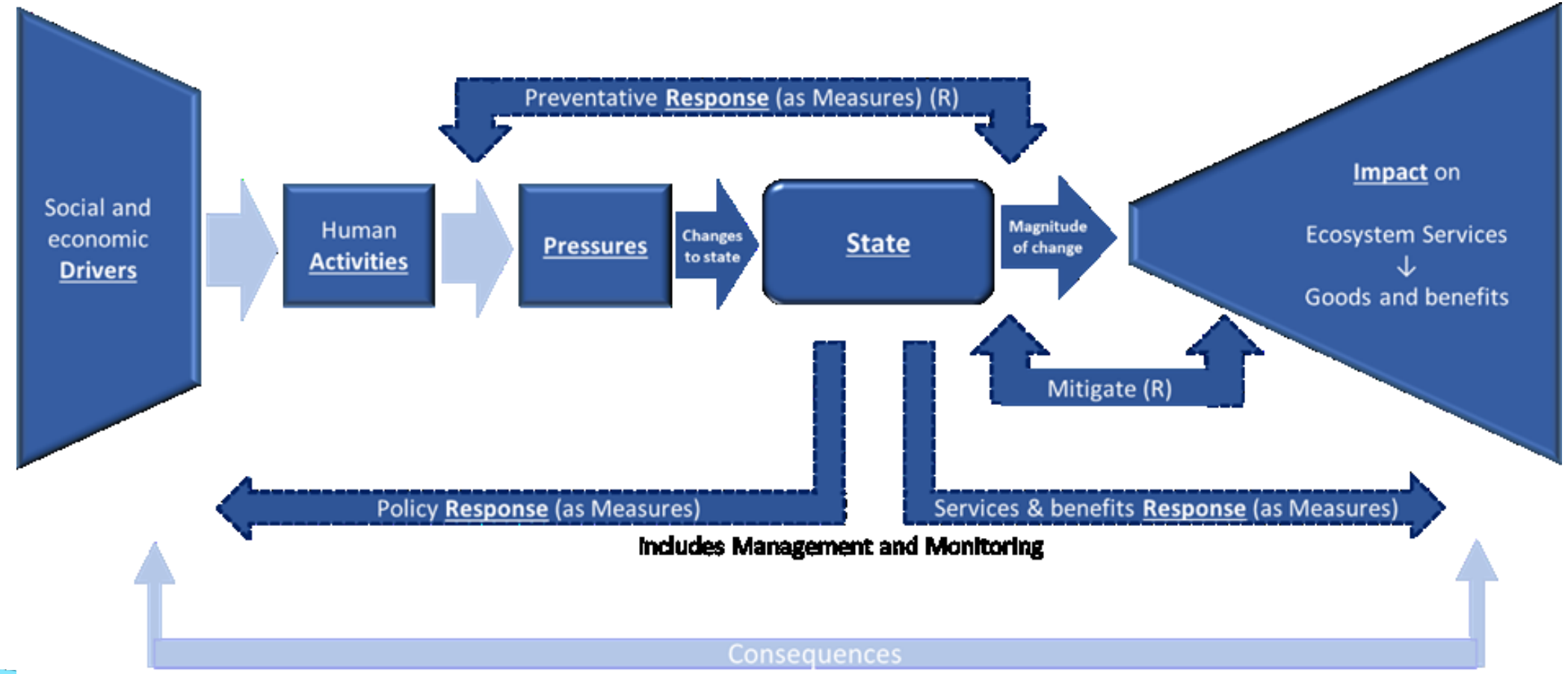
- Driver – society needs food
- Activity – fisheries
- Pressure – seabed disturbance
- State – damage to habitats
- Impact – reduced biomass
- Response – closed areas

Decreased CPU

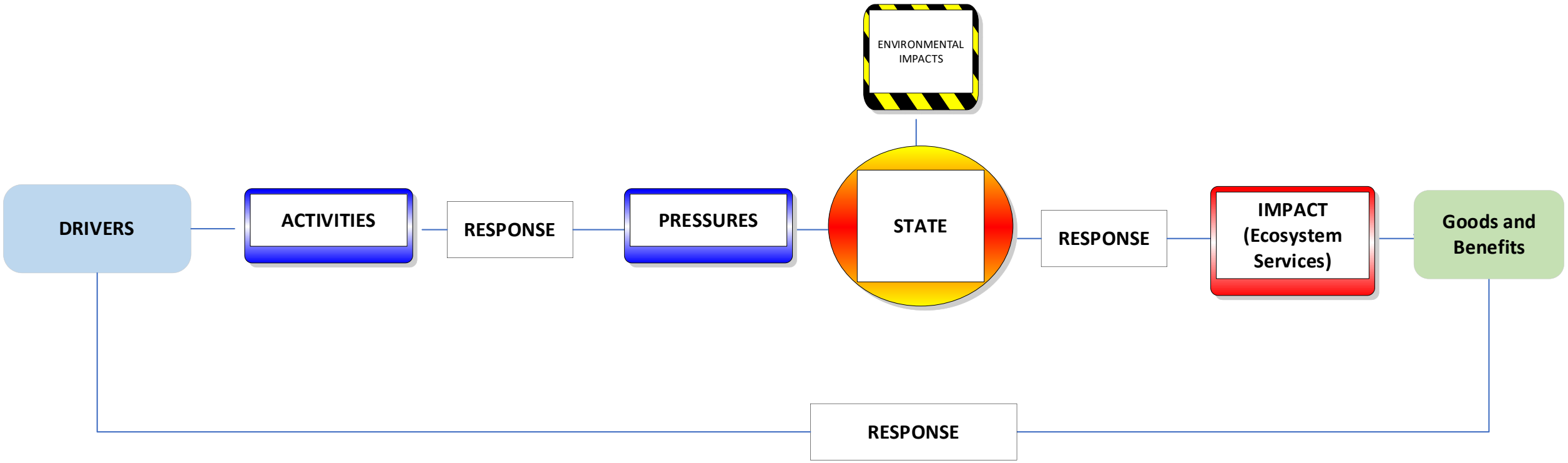
- Driver – society needs energy
- Activity – offshore wind farms
- Pressure – underwater noise
- State – species displacement
- Impact – reduced health
- Response – restricted energy development

Net Zero targets compromised

DAPSIR QSR Guidance – Systems Approach



DAPSIR pathways → Bow Tie Analysis



	ACTIVITY			
DRIVER	X		X	
		X		
			X	X
			X	

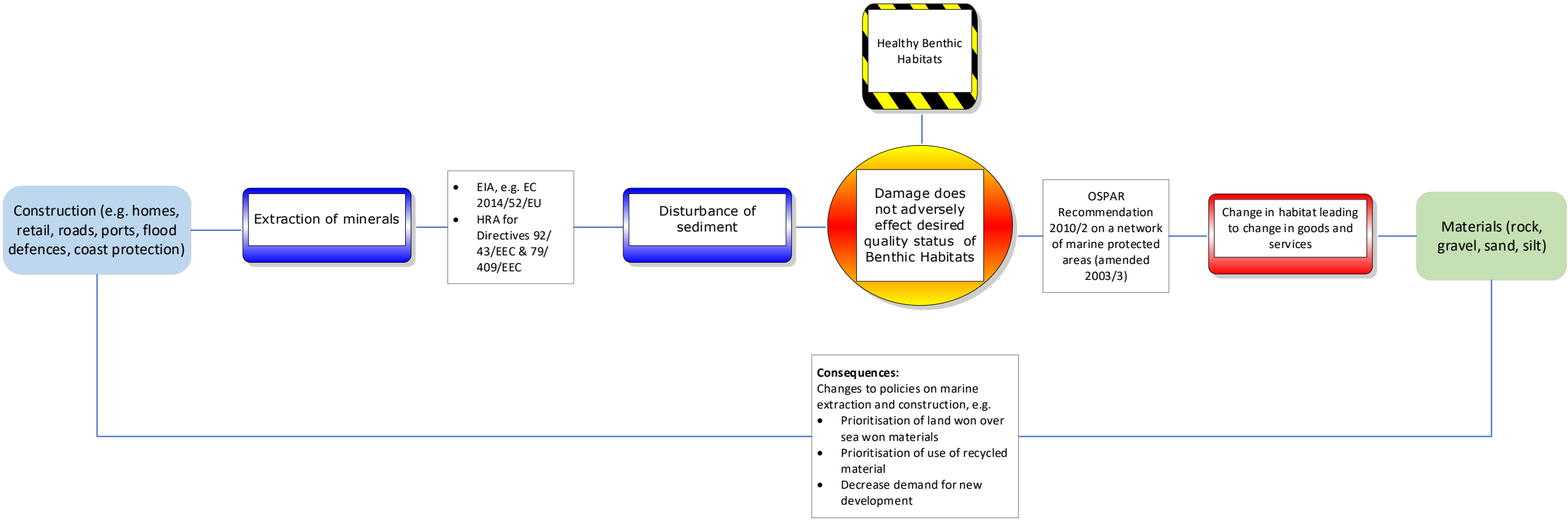
	PRESSURE			
ACTIVITY	X		X	
		X		
			X	X
			X	

	STATE			
PRESSURE	X		X	
		X		
			X	X
			X	

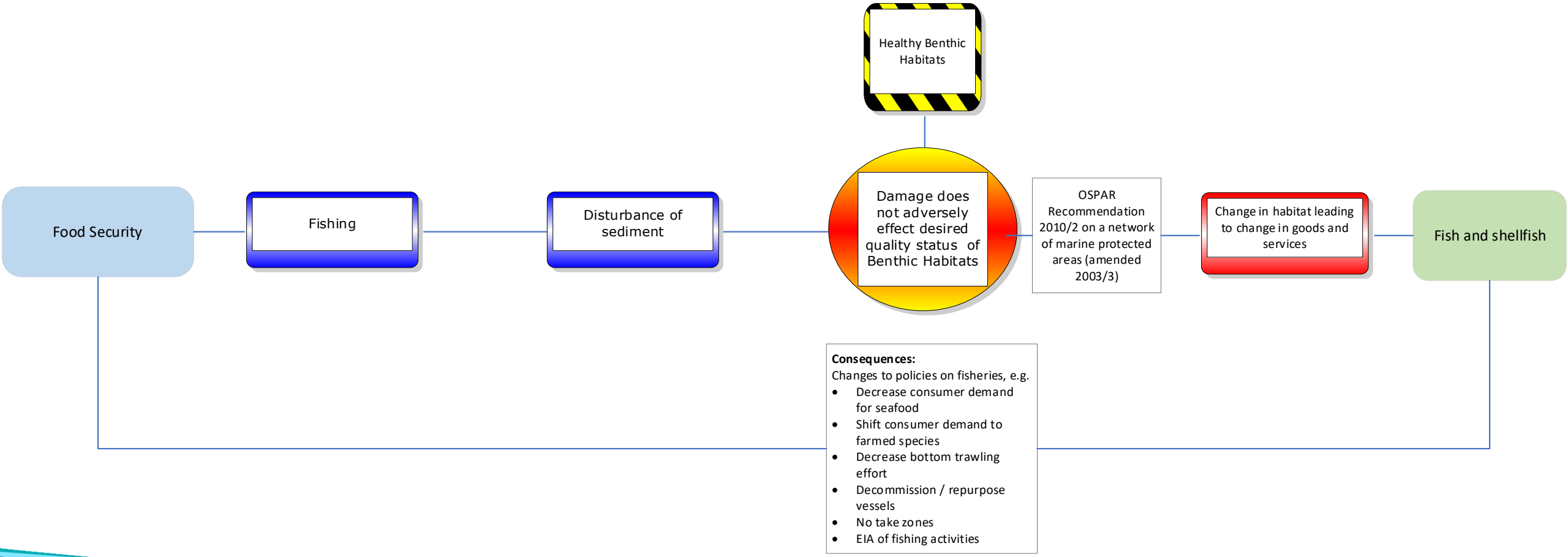
	IMPACT			
STATE	X		X	
		X		
			X	X
			X	

	RESPONSE			
ACTIVITY / STATE	X		X	
		X		
			X	X
			X	

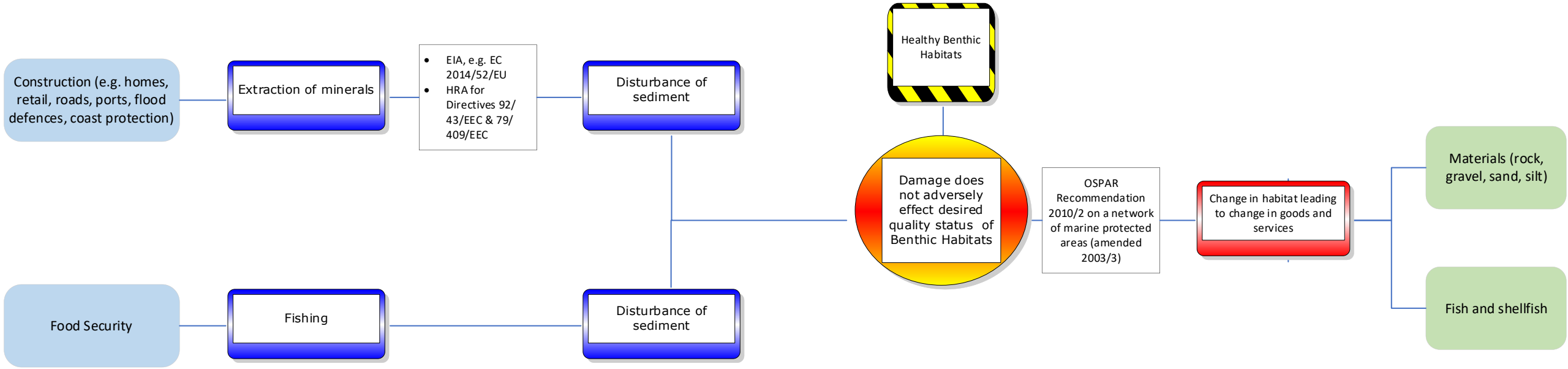
Benthic habitats – aggregate extraction



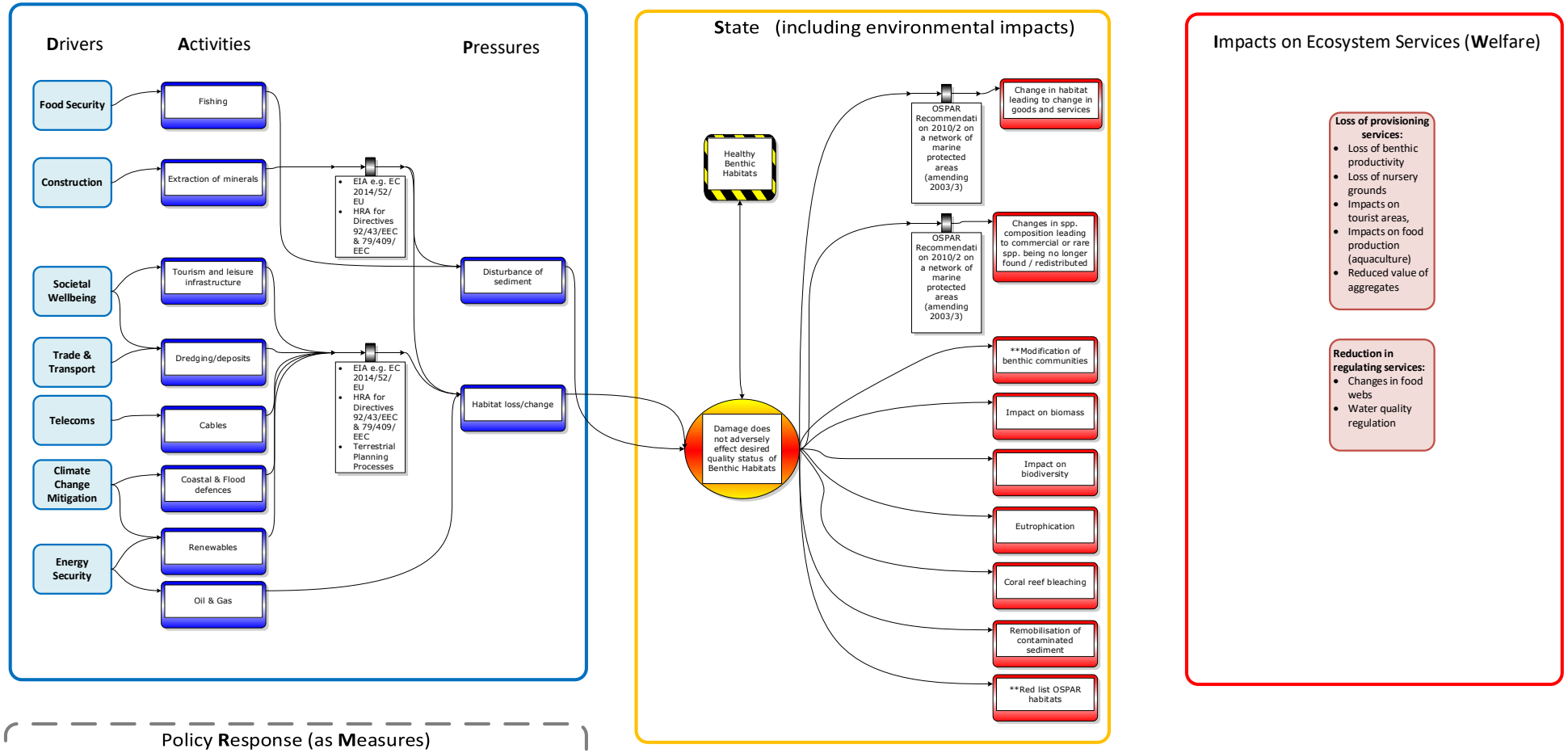
Benthic habitats - fisheries



Benthic habitats – aggregate extraction and fisheries



Benthic habitats – full bow tie analysis



Policy Response (as Measures)

Policy response include: set areas planned for activities e.g. OWF. Strategic Environmental Assessments (SEA) for specific activities

Services & benefits Response (as Measures)

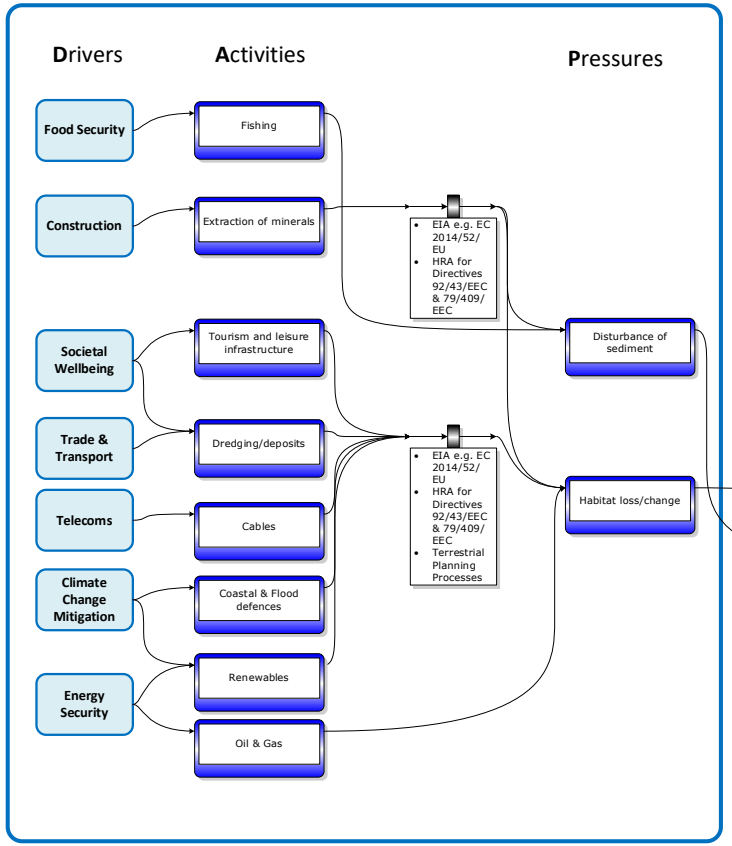
Most mitigation policy responses refer to the use of MPAs
Indirectly:

- loss of provisioning services from reduced fishing grounds,
- Changes in Cultural Services through decrease of macrofauna (leisure watching and subsequent economic benefits).
- Reduction in regulating services of hazard regulation (flood and coastal defence)

Centre for Environment Fisheries & Aquaculture Science

Cefas

Benthic habitats – full bo



Policy **R**esponse (as **M**easures)

Policy response include: set areas planned for activities e.g. OWF. Strategic Environmental Assessments (SEA) for specific activities

(**W**elfare)

OSPAR QUALITY STATUS REPORT 2023

COMMISSION OSPAR

Please consult the associated guidance document (updated 25/05/2021) for more information on how to populate this template and associated content, including all the elements of the DAPSIR framework, the Bow-Tie Analysis, and the section on climate change.

QSR template for Thematic Assessments

Submitting thematic assessment material

Drivers	
Activities	
Pressures	
State	
Impact	
Response	

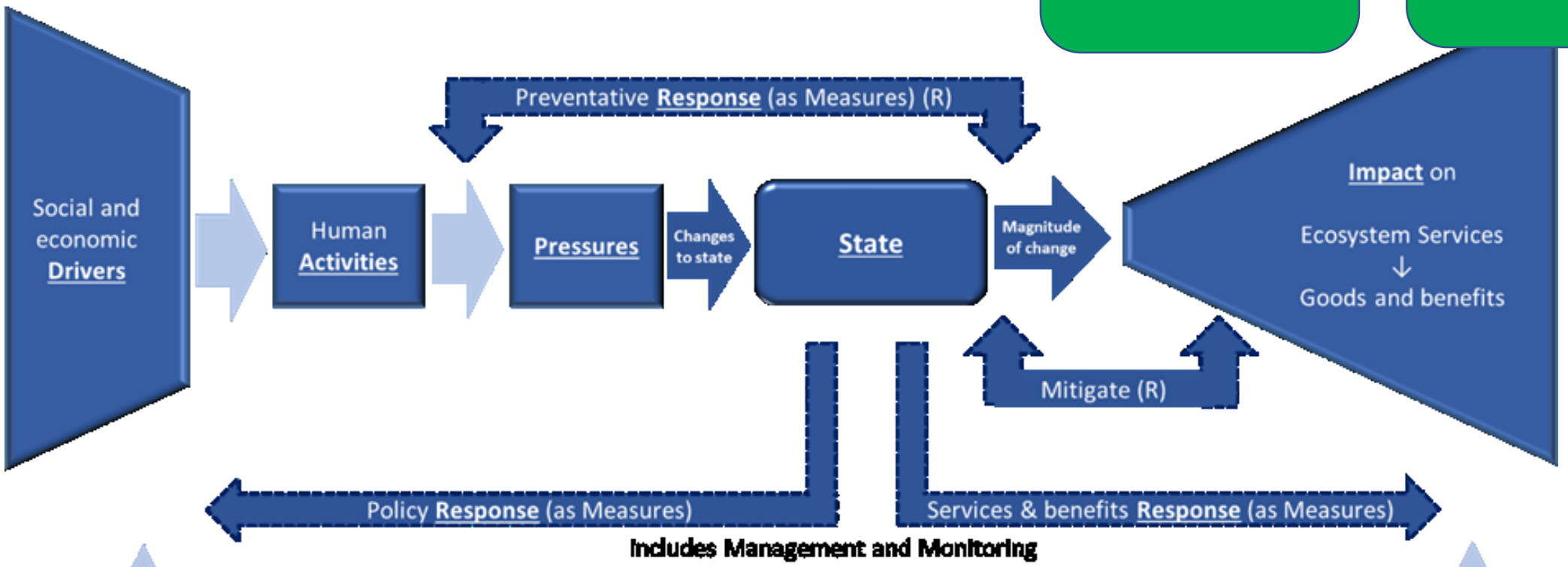
Centre for Environment Fisheries & Aquaculture Science

Cefas

DAPSIR QSR Guidance

All parts of the [eco]system are connected

All actions have consequences



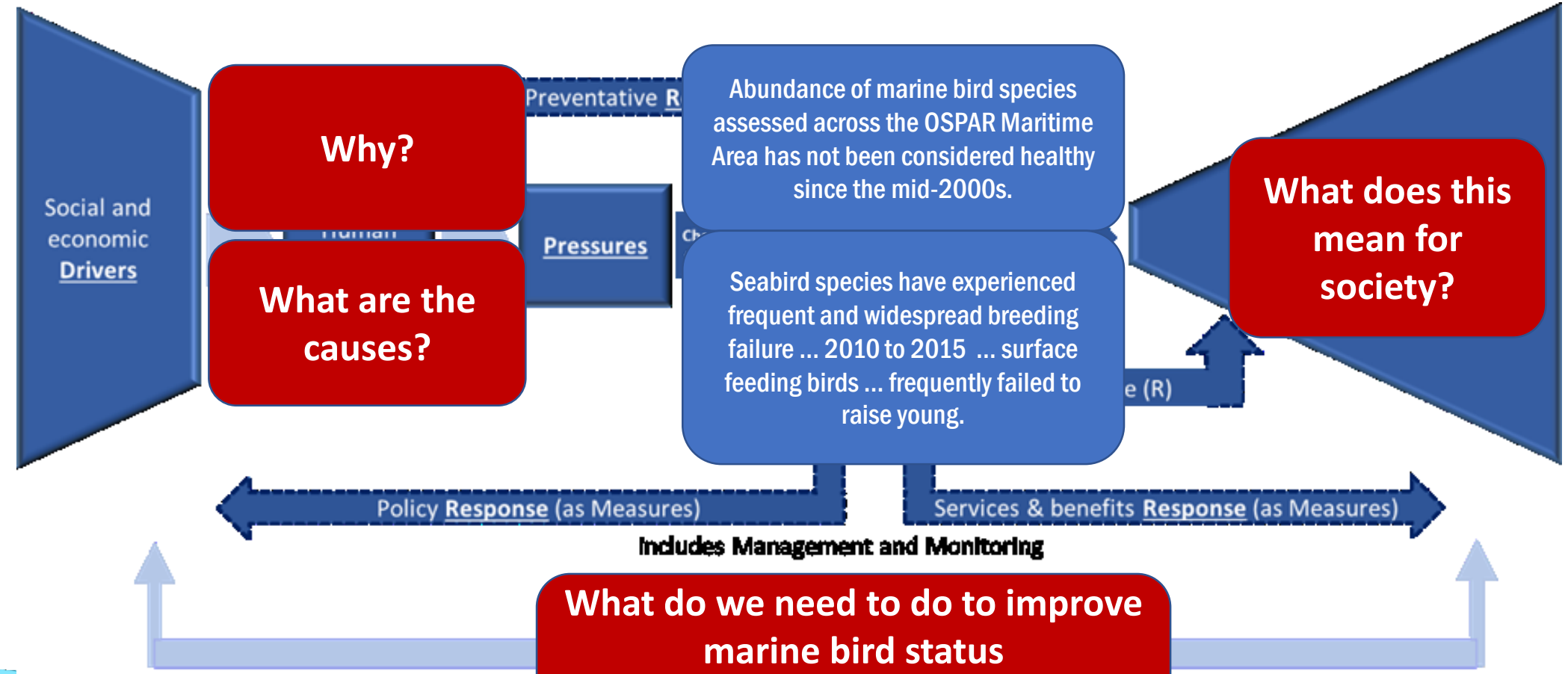
No component can be managed independently

Management responses need to be targeted and proportionate

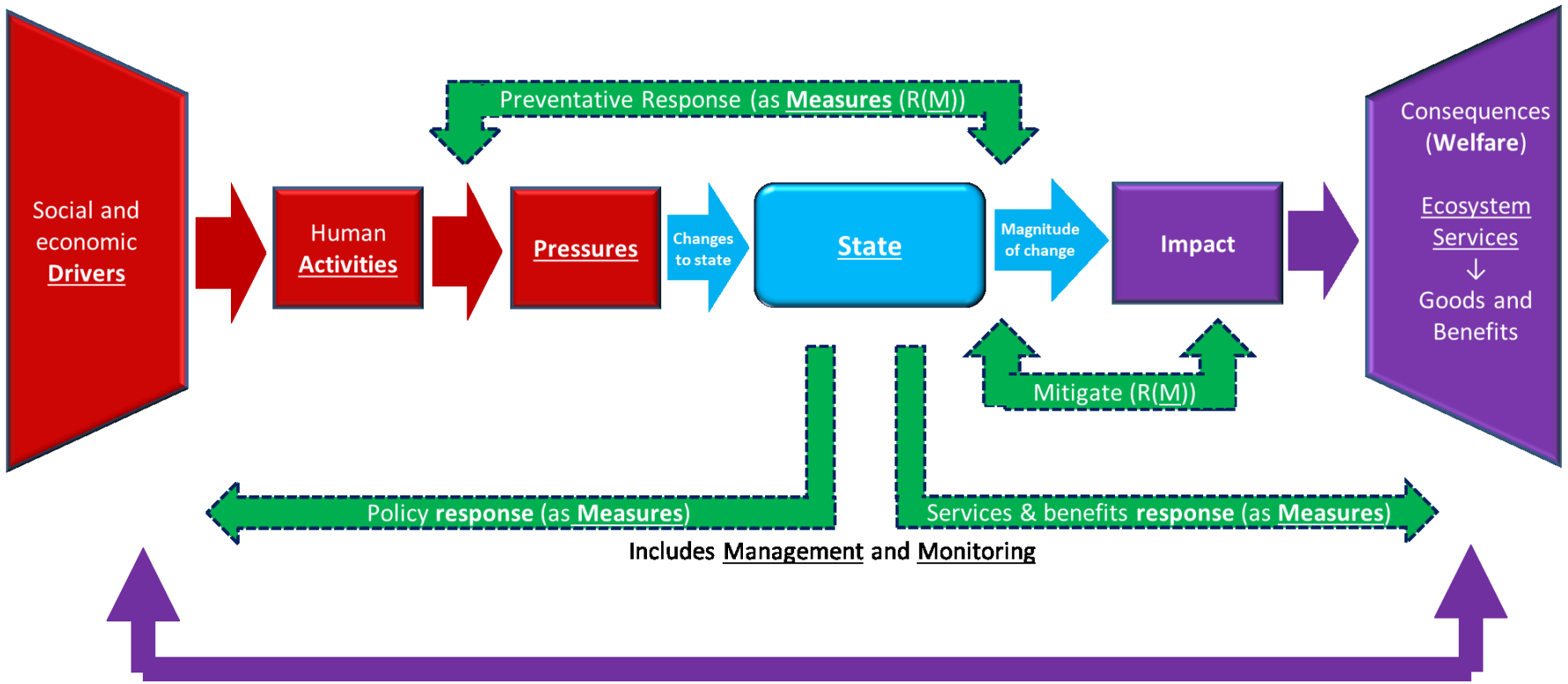
Sustainable Development Goals require holistic assessments

Cefas

DAPSIR QSR Guidance



DAPSIR workstreams



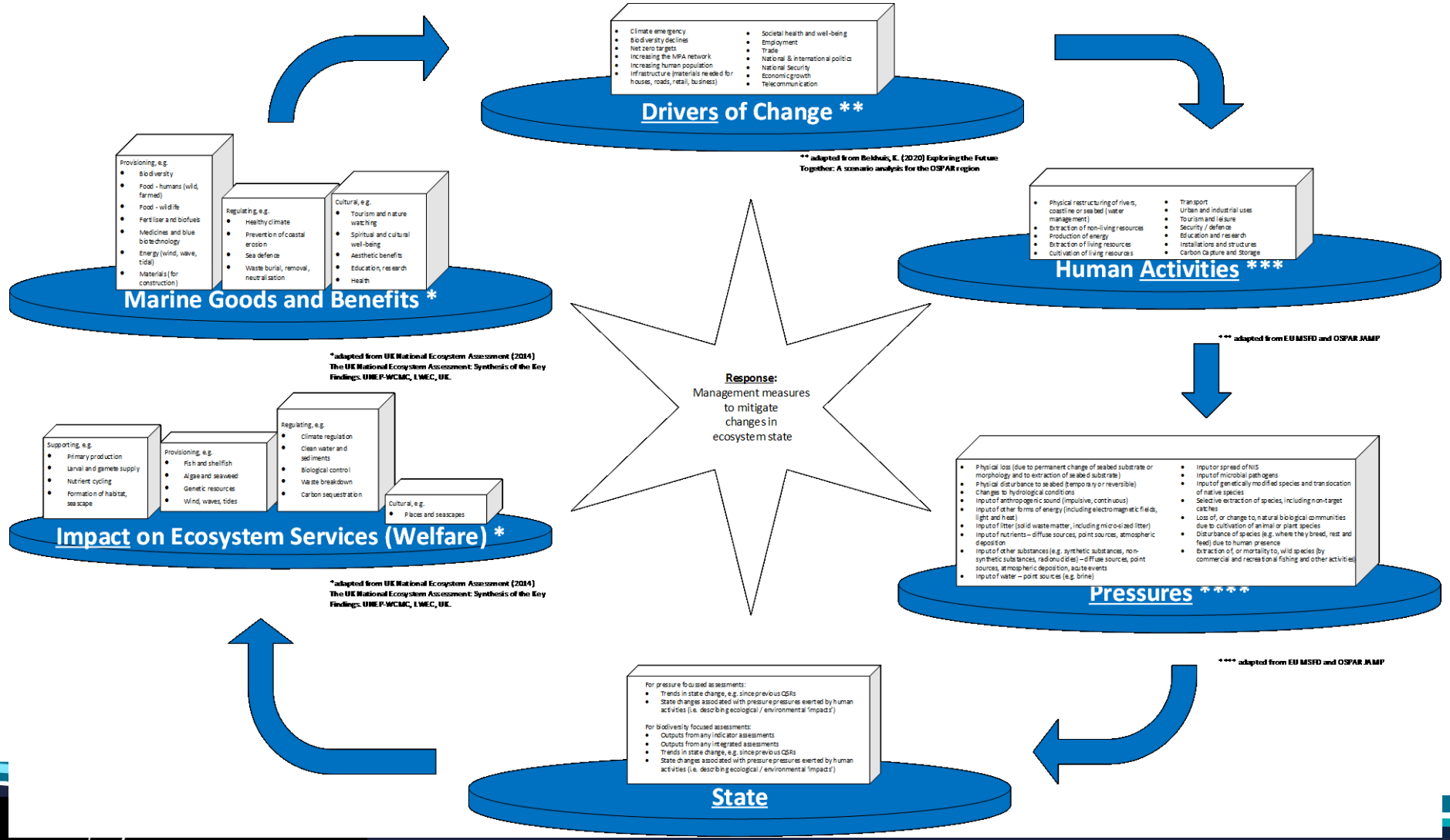
ICG-EcoC, ICG-ESA, EIHA + BiTA Project on DAP (Contractor – Cefas)

Thematic Assessment Leads + NEA PANACEA

ICG-ESA Project – Impact on Ecosystem Services (Contractor – Federico Cornacchia)

BiTA Project on Responses (Contractor – Emily Corcoran)

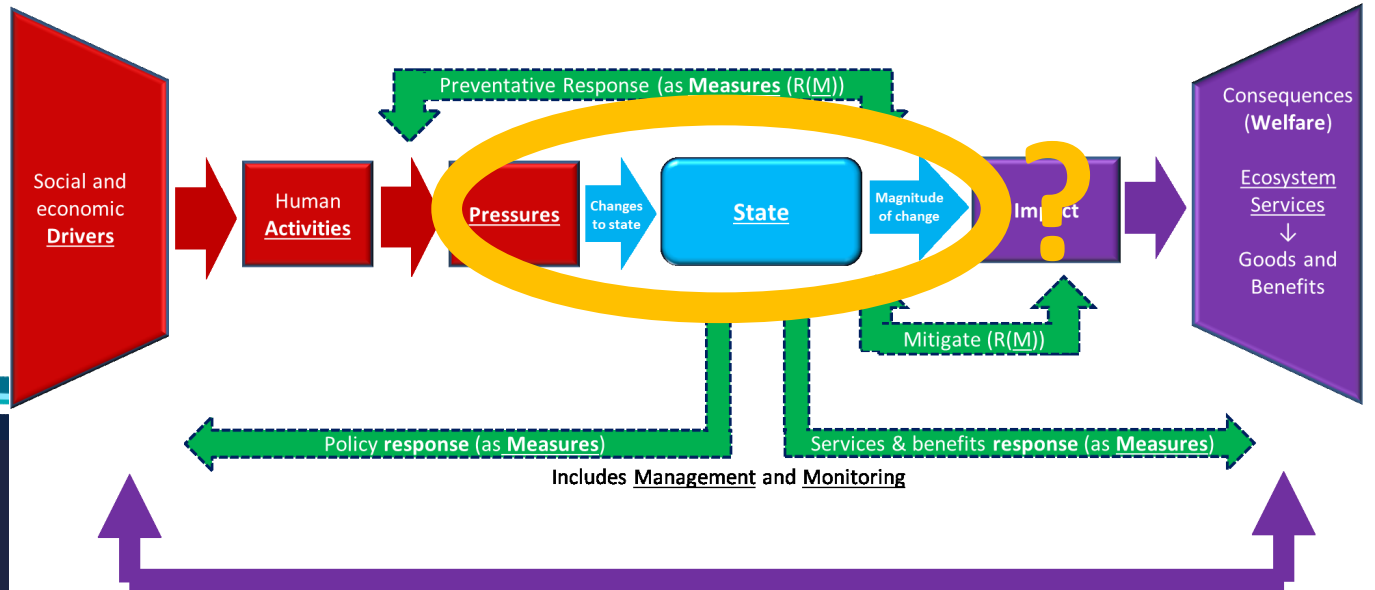
DAPSIR standard list and definitions



Collaboration – connecting DAPSIR for QSR

ICG-EcoC, ICG-ESA, BiTA & committee (EIHA, HASEC, OIC, RSC) workstreams describing relative relationships for **DAP-IR**

- How will thematic assessment experts / NEA PANACEA use the bow tie analyses and DAP-IR outputs?
- Is the focus of biodiversity thematic assessment experts / NEA PANACEA project to describe **S**?
- Will Biodiversity thematic assessment experts / NEA PANACEA project quantify:
  - Pressure – state changes?
  - Environmental impacts?
- If yes, how?
- If no, will these be discussed qualitatively?



MIRO exercise with Experts

Pressure	Pathway	Quality Status	Environmental Impact
what is the pressure?	how does the pressure cause a change in state?	how will we measure state (indicator)?	how will we measure impact?
Example:			
Physical disturbance to seabed (temporary or reversible)	removal of substrate and biota	Extent of Physical Damage indicator	time series trends in spatial extent of physical damage to sensitive habitats - maps and percentage areas impacted
ICG-EcoC are producing a standard set of pressures descriptions (from JAMP/MSFD lists) ICG-EcoC have produced DAP pathways (bow tie analyses) for each biodiversity thematic assessment	How will NEA PANACEA / TA Experts use the pressure list and BTA pathways? Which state changes will NEA PANACEA / TA Experts be assessing? How will NEA PANACEA / TA Experts measure the 'strength' of pathways?	What measurements, units etc will NEA PANACEA / TA Experts use?	What measurements, units etc will NEA PANACEA / TA Experts use?

Thank you for listening

Follow @CefasGovUK

Visit cefas.co.uk

Subscribe to our newsletters

Together we are working for **a sustainable blue future**

Centre for Environment Fisheries & Aquaculture Science

Cefas

Thematic Assessments – DAPSIR and OAP

Update by the ICG-EcoC co-convenor

Issue: To note the workstreams and collaborations in place to apply the DAPSIR framework to drafting of the Thematic Assessments for the QSR 2023 and proposals for presenting these on the OAP.

Background

1. Elliot et al 2017 describe how **Drivers** of basic human needs require **Activities** which lead to **Pressures** which can lead to changes in **State** (environmental impacts on the natural system) which lead to **Impacts** on Ecosystem Services which in turn influence the Drivers These interrelationships require **Responses** (as Measures). The complexity of any managed sea area in terms of multiple interlinked drivers, activities, pressures, receptors and impacts requires an understanding and analyses of the connectivity between these parameters.

2. To accommodate this complexity the QSR 2023 Guidance document, thematic assessment template and guidance set out the re u re ent to use Dr ers A t t es Pressures St te I p t esponse DAPSI framework to describe the interrelationships between environmental, social and economic causes and consequences of state changes to provide a practical application of the Ecosystem Approach (Figure 1).

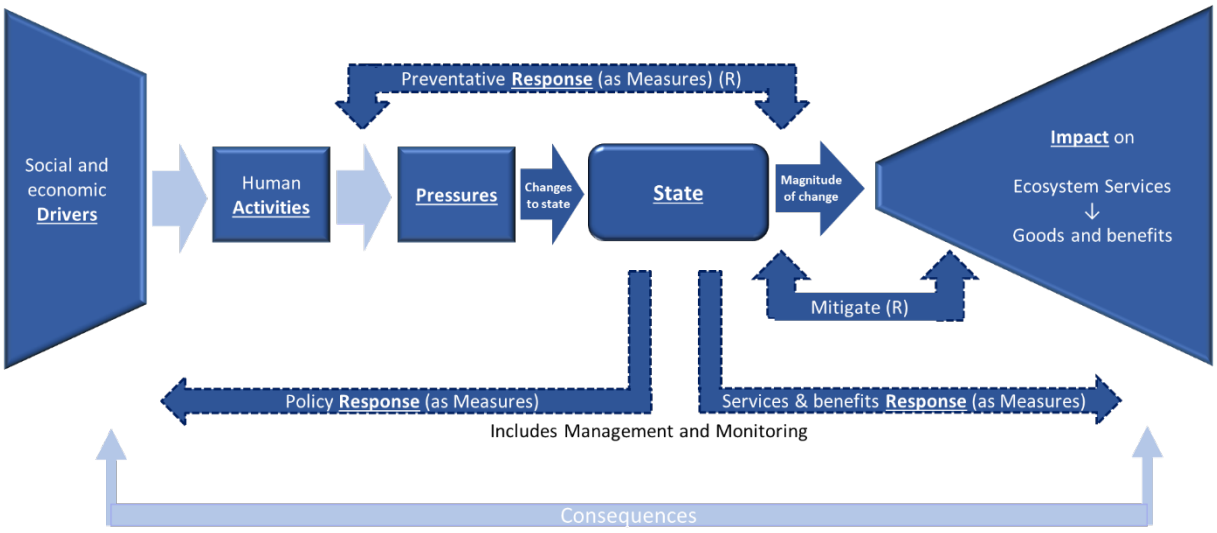


Figure 1. Framework to underpin thematic assessments[1]. This schema is compatible with the European Commission Staff Working Document DAPSES-MMM framework.

[1] (Developed by Cefas (Judd & Lonsdale, 2021) within the OSPAR ICG-EcoC

3. The OSPAR JAMP and EU MSFD Annex III provide the standard lists of human **activities**, **pressures** and ecosystem components to be used in the assessments of quality status (OSPAR) and good environmental status (EU) (**state**). Figure 2 is an annotated representation of the DAPSIR framework (Figure 1) demonstrating the relationships and interconnectivity between the multiple elements based on standard lists.

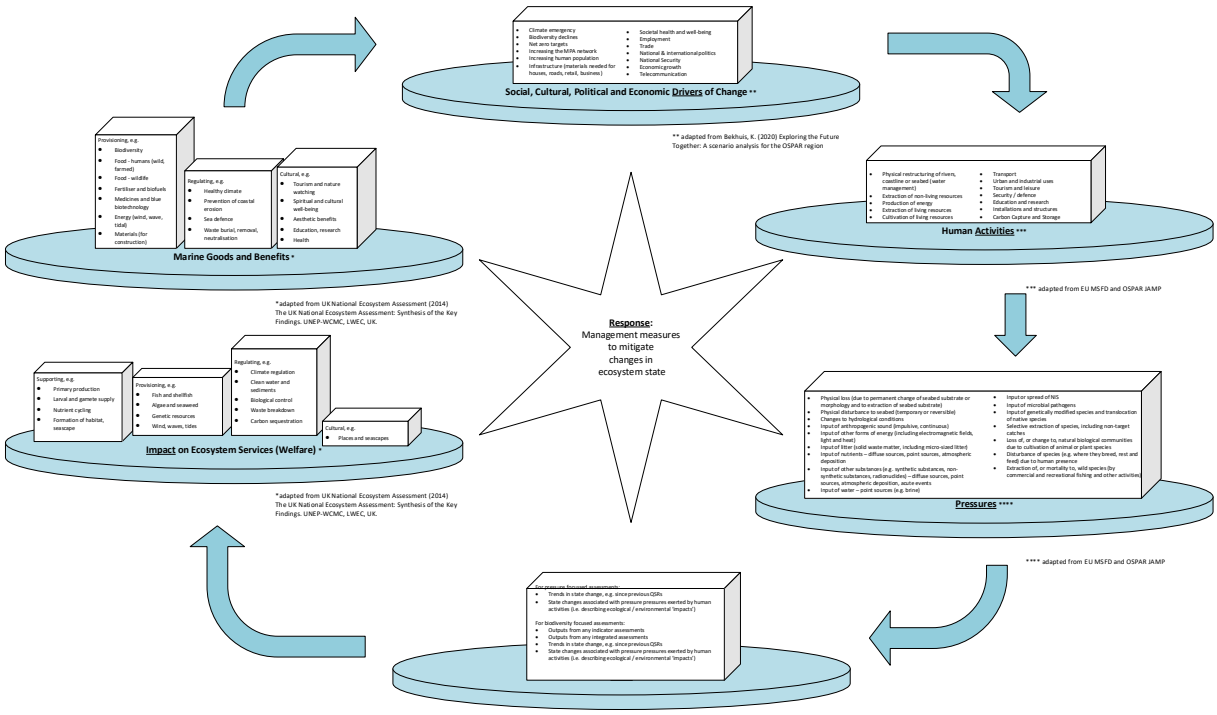


Figure 2. Annotated DAPSIR framework demonstrating how standard lists underpin thematic assessments (NB. This figure will be updated when work described in paragraph 4 has completed)

4. The ICG-EcoC co-convenor has discussed the work to produce generic descriptive texts for each of the DAPSIR elements with the Secretariat, and agreed that these can sit in each of the appropriate sections in OAP, to facilitate users understanding and provide context. It will be necessary to ensure that the information doesn't overwhelm or confuse the reader as it will be necessary for some repetition information in each of the assessments. The standard lists and descriptions of drives, activities, pressures and ecosystem services for use in all thematic assessments are on Sharepoint.

Collaboration to produce thematic assessments (DAPSIR components & Bow Tie Analyses)

5. At the superCOBAM meeting on the 21st October 2021 the co-convener of ICG-EcoC presented the use of the DAPSIR framework to structure the thematic assessments in the QSR 2023 (see **Annex 1** – superCOBAM – ICG-EcoC presentation). A summary of the questions raised in the 'chat' and responses are provided in **Annex 2** – superCOBAM – ICG-EcoC plenary chat on DAPSIR.

6. OSPAR has work underway to write generic descriptive narratives for each:
   i. activity and pressure (ICG-EcoC / BiTA building on work in the Human Activity Thematic Assessment (EIHA))

ii. driver (ICG-EcoC / BiTA building on work in the Human Activity Thematic Assessment (EIHA) and future scenarios assessment (ICG-ESA)
iii. impact on ecosystem services (ICG-ESA)
iv. responses (BiTA)

Figure 3 below illustrates the division of this work for the biodiversity thematic assessments under the guidance of BiTA.

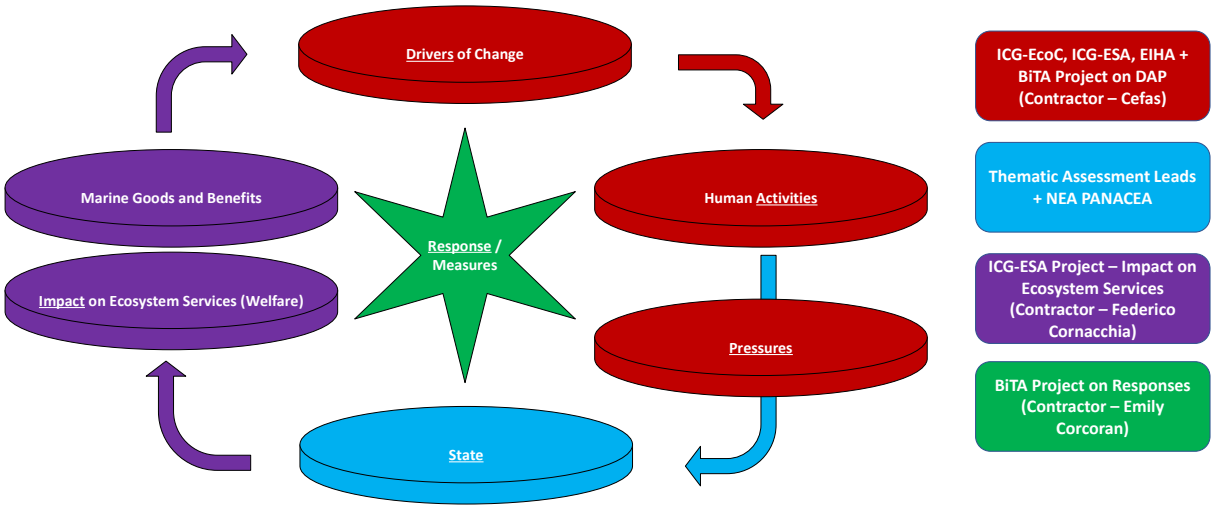


Figure 3. Division of the integrated DAPSIR workstreams for the biodiversity thematic assessments

7. ICG-EcoC are pre-populating the thematic assessment templates with DAP narratives (linked to the standard descriptions but specific to the theme). Thematic Assessment leads will need to focus their analyses and drafting of narratives in the template to expand (where necessary) descriptions of the mechanisms through which pressures from human activities lead to changes in ecosystem state. For the biodiversity thematic assessments these considerations are being addressed (for some ecosystem components, i.e. marine birds, benthic habitats, pelagic habitats) by the NEA PANACEA project.

8. DAPSIR provides a unifying framework to ensure consistency and communication between thematic assessments but in order to identify, understand and analyse the connectivity between multiple parameters we need to describe the individual and collective pathways of causes and consequences of changes in state. ICG-EcoC have introduced the risk analysis tool bow tie analysis (BTA) to identify and assess these pathways.

9. Bow tie analysis is a risk assessment tool designed to identify hazards so that they can be managed to prevent impacts (or where impacts have occurred to mitigate their effects). Focusing the BTA on the data associated with OSPAR suite of indicators ensures that that there are sufficient data for the analyses of collective pressures. For example, if we consider the seabed, the objective is to sustainably manage human activities to prevent damage to benthic habitats whilst recognising the drivers of human need behind those activities, and the consequences of any management interventions on those drivers, alongside the protection that may be afforded. Figure 4 breaks down interlinked components extracted from the bow tie analysis for benthic habitats to show the DAPSIR pathway of linkages for:

a. seabed disturbance arising from aggregate extraction.
b. seabed disturbance arising from bottom trawl fisheries.

c. seabed disturbance from aggregate extraction and bottom trawl fisheries combined.

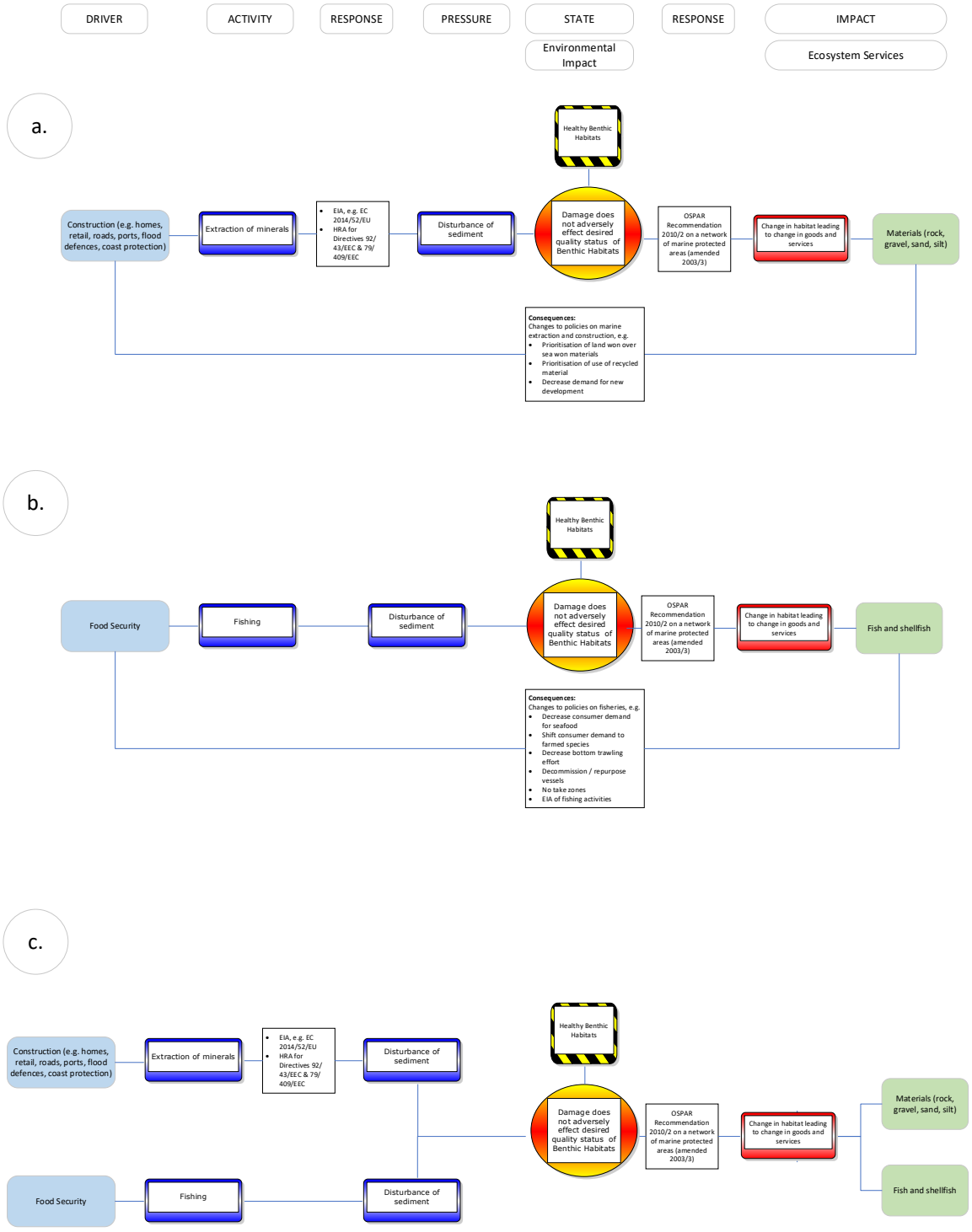


Figure 4. DAPSIR-bow tie analysis example for benthic habitats (extract only)

10. Management responses to prevent changes (e.g. environmental impacts assessment (EIA) and Habitats Directive Assessment) and mitigate changes (e.g. network of MPAs) are included – we can also consider how effective these measures are in reducing pressure on species and habitats and identify where there are gaps in measures and how we might fill them. Considering measures in this way also allows us to consider unintended consequences of actions, e.g. banning an activity may afford biodiversity gains but could have adverse environmental, social and economic consequences

which may need to be compensated (e.g. displacement of fishing activity outside of a protected site to areas not previously fished or over larger areas to ensure an equal catch (decreased catch per unit effort).

11. Impacts on ecosystem services are also identified and (a) and (b) demonstrate how these have consequences for the drivers and if/how policies may need to change for equitable solutions to environmental, social and economic considerations in line with the application of the ecosystem approach. ICG-ESA are progressing work on the Impact on ecosystem services will be meeting with thematic assessment leads to ensure needs are understood and mechanisms for collaboration established.

12. ICG-EcoC are considering if/how we could add weightings to the connections, e.g. with regards to Figure 4 is the greater concern for the condition of benthic habitats aggregate extraction or bottom trawl fishing? If we are able to progress this, we propose to follow the lead of the ICES Ecosystem Overviews which convened a small panel of experts to consider and rank relationships by expert judgement.

13. The DAPSIR narratives in the thematic assessment templates are expanded from these skeleton BTA pathways individually and collectively. There are various ways in which these collective pathways can be described and presented, all by definition are complex. So, no apology is made for the complexity of the full version BTA for benthic habitats shown in Figure 5 (expanded from Figure 4). Figure 5 demonstrates the complexity which all managers face of identifying, assessing and managing interrelated demands. BTA provides a systemic approach to the consideration of this complexity and demonstrates that activities and pressures cannot be managed unilaterally.

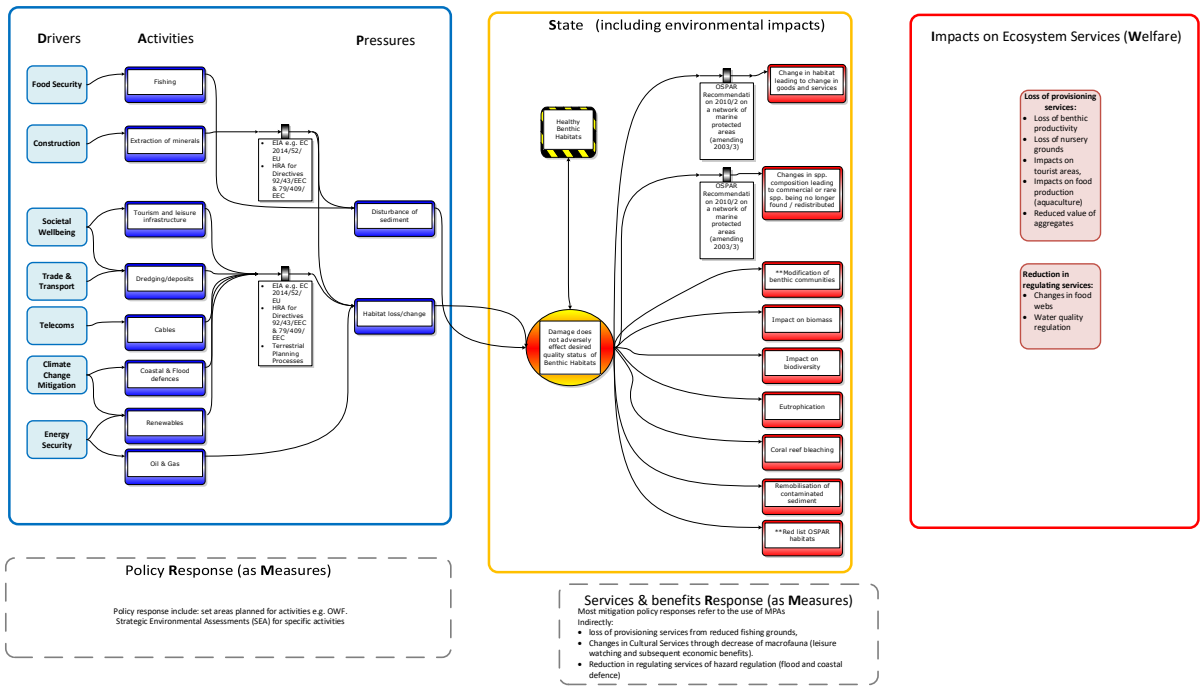


Figure 5. DAPSIR-bow tie analysis example for benthic habitats (complete)

14. The ICG-EcoC DAPSIR-BTA approach provides the basis for the first fully integrated Quality Status Report combining environmental, social and economic considerations in line with the ecosystem approach. This systemic integration is focused on the thematic assessments. Working

under this unifying framework allows us to integrate workstreams from different committees. The example in Figure 5 brings together knowledge and outputs from the Benthic Habitats Expert Group (plus BDC, COBAM & BiTA), EIHA, ICG-ESA and ICG-EcoC.

15. The DAPSIR approach for the QSR has been designed to be future proofed to allow for advances in analytical techniques. For example, the report "Natural capital accounting for the North East Atlantic" produced by ICG-ESA demonstrates how with relatively little effort existent OSPAR indicators and workstreams can be expanded to produce physical accounts (extent, condition and flows), with a direct correlation between the DAPSIR outputs describing how state changes affect ecosystem services (the S and I) with natural capital accounting outputs describing stocks and flows. These physical accounts are the basis for any monetary accounting of asset supply and use.

16. DAPSIR and BTA are being used to identify the parameters to be included within the thematic assessments (QSR inputs). The approach can also be used to summarise the QSR outputs in the BTA section in each thematic assessment. For example, 'simplified' BTAs describing the trend relationships between the DAPSIR components could be produced (where the information is available in thematic and other assessments). The mock up in Figure 6 show how we could present the relative relationships between trends in activities, pressures, state and ecosystem services. The underlying approach equates to that used in the regional summaries in the QSR 2010, see:

- Chapters 9 - Table describing regional summary of past trends and outlook for human activities;
- Chapter 10 – Table describing delivery of OSPAR Strategy objectives for biodiversity and ecosystems;
- Chapter 11 – Table 11.3 showing ecosystem component and human activity / pressure relationships; and
- Chapter 12 – Figure 12.1 qualitative summary of regional status.

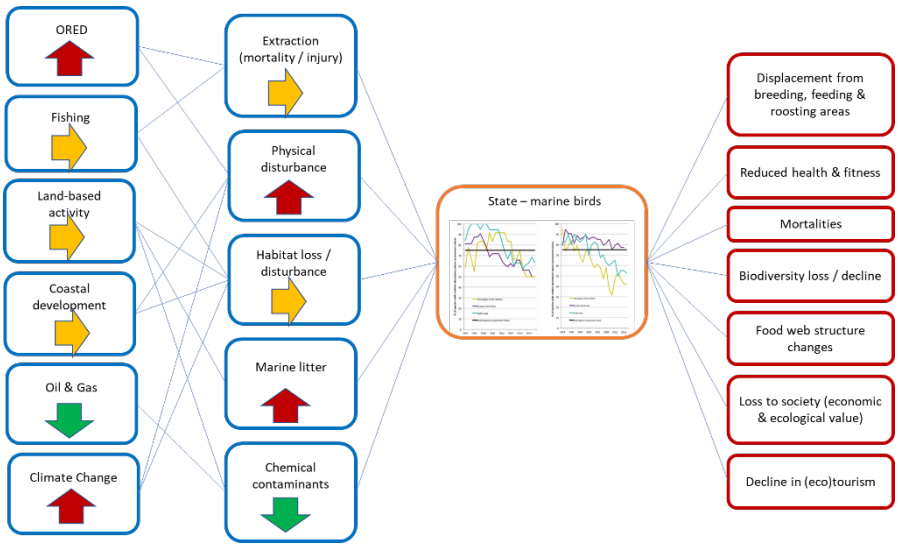


Figure 6. Bow analysis summary of trends (content used for illustrative purposes only)

superCOBAM – ICE-EcoC exercise on Pressure – State relationships (measuring change)

16. A virtual whiteboard exercise with the biodiversity expert group leads was undertaken at the superCOBAM meeting. The purpose was to gain understanding of the pressure – state pathways leading to state changes to be considered in the thematic assessments (building on the ICG-EcoC BTA work) and consider how environmental impacts would be considered / assessed. As we were working in a virtual environment it was difficult to manage the exercise, so the outputs will require some unpicking. Effectively, what the expert group leads produced was a series of mini, unstructured BTAs (of pressure – state relationships) for the different biodiversity thematic assessments, overlapping on a single sheet (see **Annex 3** superCOBAM – ICG-EcoC Pressure-State Exercise MIRO). This could also provide useful for the QSR synthesis report.

Adrian Judd's answers to questions

From Matt Parsons to Everyone: 10:33 AM

Adrian -does the bow-tie allow/require input of numerical values or just narrative ones? And are the outputs always narrative?

Response: Answered in the meeting but to reiterate, the bow tie analyses so far just make connections between the DAPSIR components (i.e. all associations weighted equally). However, where any of the associations can be quantified these can be incorporated to describe the strength of the connections. Where, they cannot be quantified we could (if appropriate) apply expert judgement to weight connects (and apply confidence scores where we are combining qualitative and quantitative outputs or decide to keep these separate). We need to be guided by NEA PANACEA and thematic assessment leads on what quantification is being applied to which connections (and which are not). If we apply expert judgement, we will most likely follow the lead of the ICES Ecosystem Overviews and convene a group of experts to apply weightings (see link provided in NL - Lisette Enserink to Everyone: 11:06 AM).

From NL - Lisette Enserink to Everyone: 11:06 AM

example of ICES ecosystem overview: see Figure 3: https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.ices.dk%2Fsites%2Fpub%2FPublication%2520Reports%2FAdvice%2F2018%2F2018%2FGreaterNorthSeaEcoregion_EcosystemOverview.pdf&psig=AOvVaw3KwLeYSTPxKeixcTIMhVaw&ust=1634896910691000&source=images&cd=vfe&ved=0CAsQjRxqFwoTCIiAreaf2_MCFQAAAAAdAAAAABAD

From Peter Anton Upadhyay Stæhr to Everyone: 10:47 AM

Is the aim to produce a DAPSIR analysis for each CP? and will the analysis be performed / facilitated by each of the expert groups?

Response: Answered in the meeting but to reiterate, the QSR (including DAPSIR) is applied at the North East Atlantic, and where appropriate, OSPAR Regions scale. The biodiversity thematic assessments are facilitated by BiTA, ICG-EcoC are supporting drafting the DAP narratives, Emily Corcoran the R narratives and Federico Cornacchia the I (ecosystem services) narratives. The expert groups are focussing on S but there needs to be dialogue to ensure alignment and connectivity of the workstreams.

From NL - Lisette Enserink to Everyone: 10:48 AM

Adrian, you refer to the ICES ecosystem overviews. They have interactive 'horrendogrammes' with arrows with different widths reflectin the relative importance. Is that also an output you're aiming for?

Response: This is something we are considering (not necessarily exactly the same but following similar logic). We have included this in the update for ICG-QSR. We were involved in the development of some of the ICES Ecosystem Overviews and for those an expert panel was convened to determine the strength of the connections (width of the arrows). ICES have only consider the APS connections. The ICG-ESA project is considering the 'weight' of -ve and +ve relationships between state and ecosystem services.

From AJelmert to Everyone: 10:52 AM

Does the DAPSIR allow for/consider also positive /facilitating effects of activities ? E-g-: the example of wind farms has identifiable negative effects (through noise and seabird hits). But it may also have (possibly large) positive effects as "MPA s" (Wind farms will greatly reduce fishing activities and will privide 3d structuring in the afflicted area ?

Re DAPSIR & positive effects question from Anders J

Response: Answered in the meeting but to reiterate, experience from these exercise shows that contributors are quick to identify -ve effects and it takes some gentle persuasion to bring in +ve effects. Now is a good time for us all to identify +ve effects and where these need to be incorporated if these are lacking in the current bow tie analyses / thematic assessment templates on Sharepoint.

From Sander Wijnhoven to Everyone: 10:59 AM

Relative importance of relations is highly area and case specific I think; Indicators from different expert groups should provide insight in th relative importance of for instance different pressures in states, etc.

Response: Answered in the meeting but to reiterate, agreed, we need to be guided on this by the thematic assessment experts. Previous QSRs have separately described the relative importance of activities / pressures and ecosystem state at the NEA and OSPAR regions levels so in essence this is not something new. The big difference for the QSR 2023 is that we are considering the relationships (and where appropriate the relative importance) of the DAPSIR elements in an integrated way. We are hoping that NEA PANACEA will assist with quantifying some of these relationships.

For benthic, the extent of disturbed seafloor by bottom trawling fisheries is already a very limited and specific pressure type, so it ill be a linear direct assesment of this pressure. The main gaps are on all the other ^pressure types. There will be ssessment of eutrophication effects, but no bow-tie nor themtic assessment planed for QSR (under progress for Nea Panacea)

SuperCOBAM Workshop report

Annex I

OSPAR COMMISSION

Protecting and conserving the North-East Atlantic and its resources

Developing the Biodiversity Thematic Assessment: Response Chapters

Super COBAM, 22 October 2021

Plan for the next 30-40 mins

- Introductions – who I am and what I am doing
- A bit more about the R-Chapter
- Developing an approach to take this forwards
- Where are we now, what next – clarifying the plan

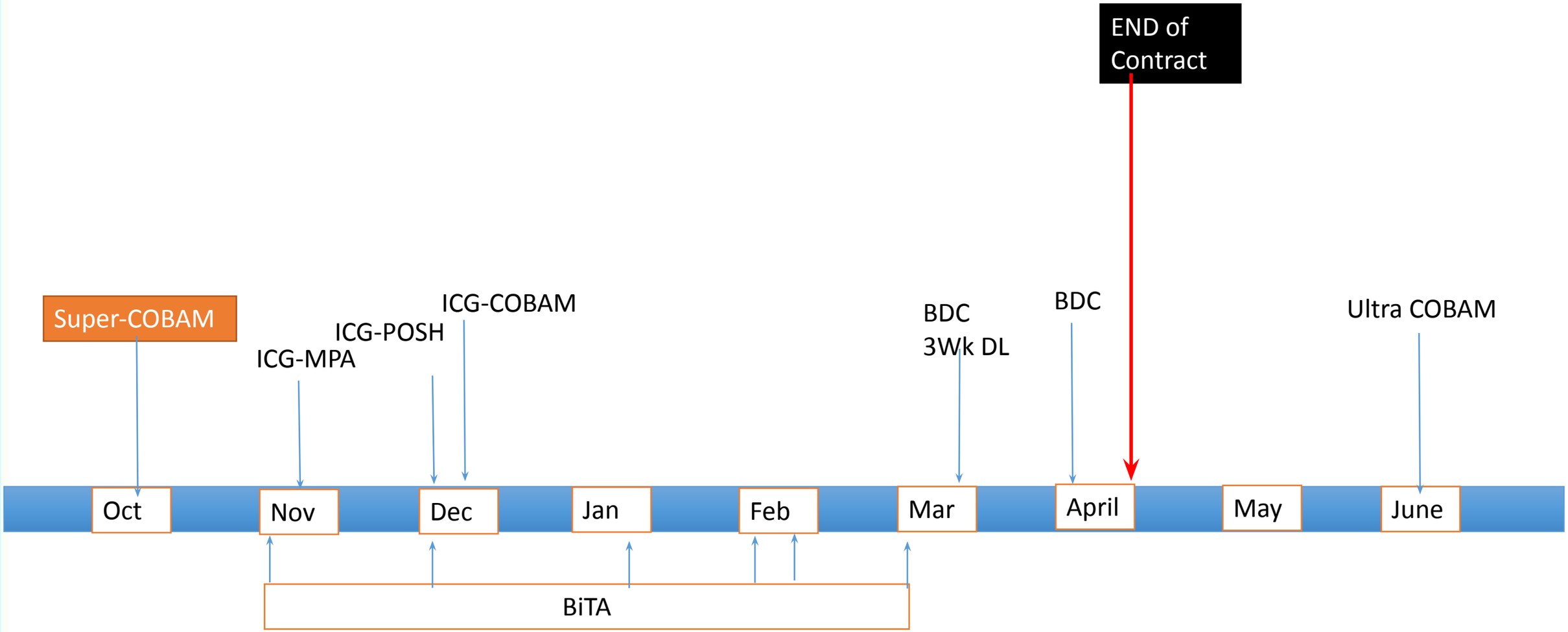
Part 1: Introduction

1. Who am I?
2. What have I been contracted to do?
3. My timeline

BDC Tender 1: Response/Measures chapter

- BiTA Technical assistance contract to develop the Response chapters and provide draft content.
- Help develop a concept of how OSPAR can assess sufficiency of measures; develop examples applying the sufficiency of measures approach for biodiversity measures as proof-of-concept;
- Elements to support on work linked to key OSPAR responses:
  - Help finalise the POSH 2019 overview assessment
  - Work with ICG-MPA task leads on the preparation of the 2021 MAP assessment

Timeline and key milestones (1 July – 30 April)

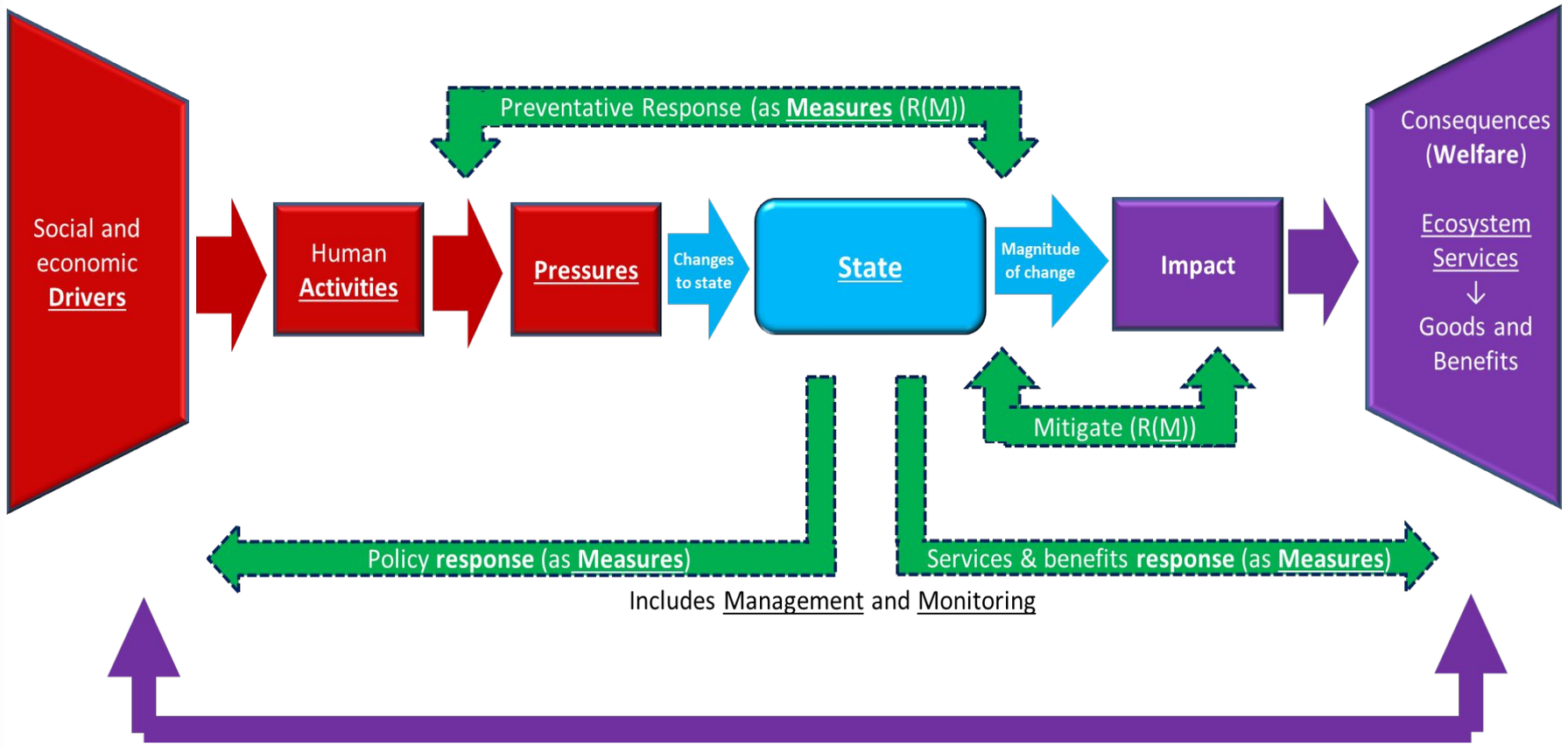


1 July 2021 START of Contract

Part 2: The Response Chapters

1. Purpose of the R-Chapter
2. Response elements in the Bow Tie approach
3. Linkages/connection with other elements
4. Ambition for the chapter – what are we aiming for? What will it look like? What is the narrative?

DAPSIR workstreams



Centre for Environment Fisheries & Aquaculture Science

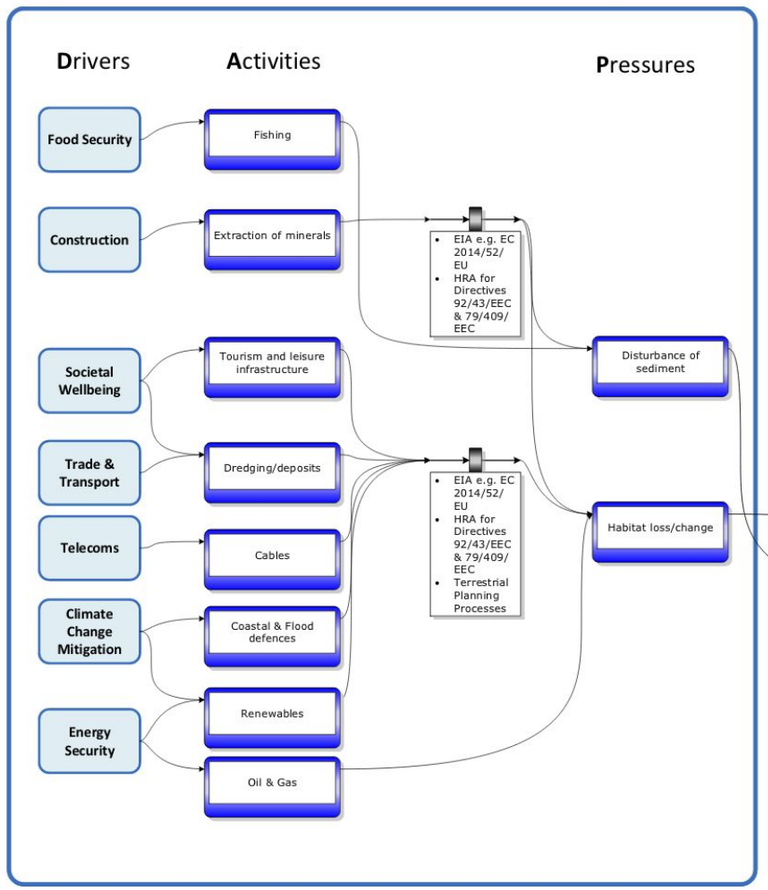
Cefas

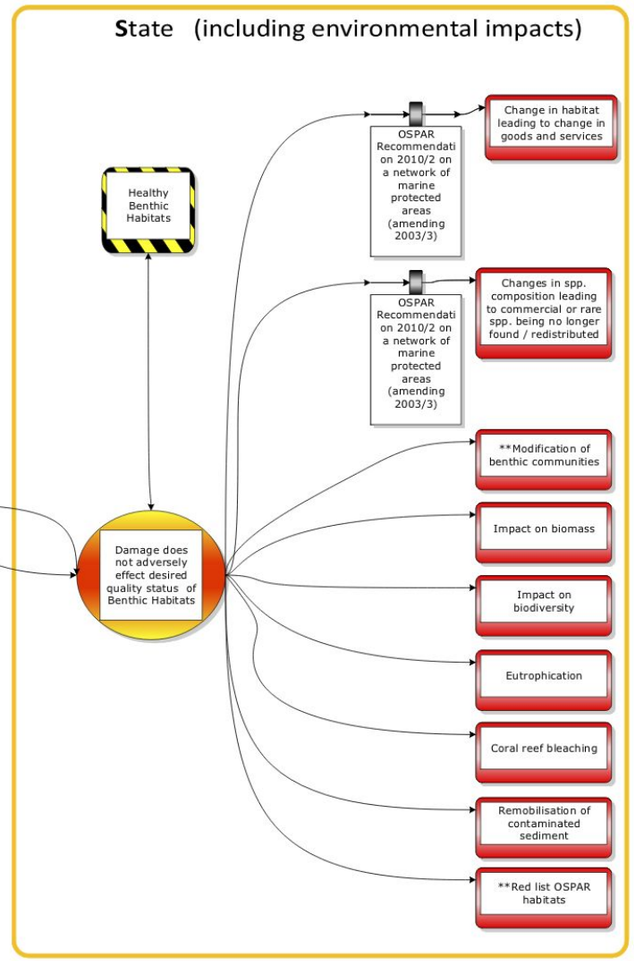
Borrowed with thanks from Adrian!

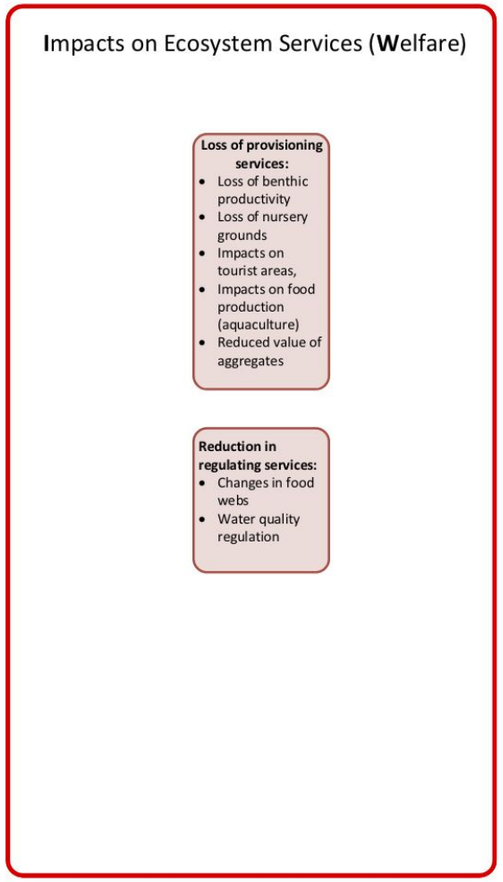
What is the story? (in 5-6 pages)

- What is it that OSPAR has done to address the change in status?
  - Listed and taken measures to protect species and habitats considered to be under threat and in decline
  - Network of protected areas
  - Adopted measures to address specific activities and pressures
- Other measures taken to address relevant actions at different policy frameworks
  - EU, RFMOs, Arctic Council; Nordic Council
- Case studies of responses/ measures that have had an effect
- Summary of implementation? Evidence of impact? Information on barriers
- What can we say about variation across the 5 OSPAR Regions
- Can we say anything about gaps in policy response?

The starting point and frame for the story…







Policy Response (as Measures)

Policy response include: set areas planned for activities e.g. OWF.
Strategic Environmental Assessments (SEA) for specific activities

Services & benefits Response (as Measures)

Most mitigation policy responses refer to the use of MPAs
Indirectly:

- loss of provisioning services from reduced fishing grounds,
- Changes in Cultural Services through decrease of macrofauna (leisure watching and subsequent economic benefits).
- Reduction in regulating services of hazard regulation (flood and coastal defence)

Part 3: Developing an approach

1. Theoretical approach – benefit from the experience of others!
   - Drawing on HELCOM SOM experience
2. Adapting the approach for OSPAR
3. Testing application of the approach

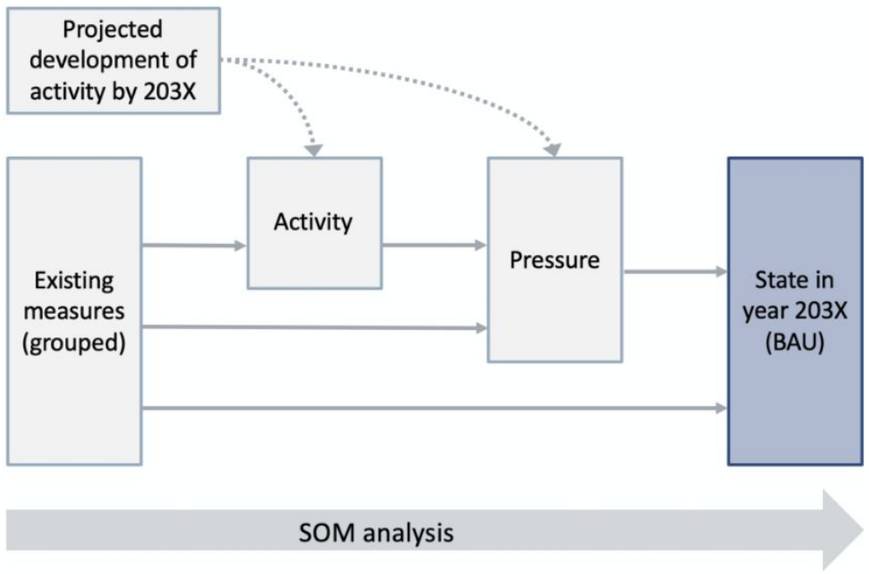
Sufficiency of measures

The aim of the sufficiency of measures (SOM) analysis is to assess what kind of improvements in environmental state and pressures can be achieved with existing measures by 2030-2035, and whether these are sufficient to achieve good environmental status (GES) in the Baltic Sea. The information will be used to support the update of the BSAP and identification of new measures.

This is the first time the sufficiency of measures is assessed in this extent in the Baltic Sea region. It brings together natural and social sciences approaches and addresses multiple environmental topics (birds, mammals, fish, benthic habitats, hazardous substances, marine litter, underwater noise, non-indigenous species and input of nutrients). The same approach is applied across all topics to ensure comparability and coherence.

Sufficiency of measures analysis is carried out by the HELCOM SOM Platform and HELCOM ACTION project.

Components of the SOM analysis



Concept for the approach to understand effectiveness of measures

Step	Option for Biodiv Response
1. Existing measures and measure types	• Collation of existing measures • Propose **focus** on OSPAR measures, but within the context of global/ regional measures incl EU with examples of national measures • Trying to determine the most useful catagorisation of measure types
2. Identifying main pathways for pressures using activity-pressure-linkage and how these relate to the measures	• Input from bowtie analysis + DAP chapters • needs info on the most relevant pressures/ activities for each theme, to be able to focus efforts in the resources chapter drafting
3. Estimating the effects of measure types	• Reporting • Literature • Expert consultation

OSPAR COMMISSION

Effectiveness

- Can the measure restrict the **activity** it is designed to restrict

Impact

- Importance of the pressure being addressed x effectiveness x scale of measure
- does the measure succeed in reducing the **pressure**?

Sufficiency

- Is what is being done enough to achieve a stated objective for status - e.g. GES
- OBS! for HELCOM this took 6 layers of analysis, produced a huge amount of output >> difficult to determine what was useful or not

Increasing level of ambition of analysis

Collating existing measures: Scope and priorities

- OSPAR Measures: Decisions, Recommendations, Other Agreements
  - Network of protected areas
  - Listed and taken measures to protect species and habitats considered to be under threat and in decline
  - Adopted measures to address certain human activities and pressures
- Other regional measures
  - EU, RFMOs, Arctic Council; Nordic Council
- Global measures
  - IMO PSSAs; Ballast water agreement; UNFCCC Paris Agreement
- National measures
  - As case studies/ examples

Sources of information

- OSPAR Matrix;
- MPA Assessment (especially ecological coherence work; possibly management status)
- POSH Recommendations/ status assessments
- OSPAR Implementation reports
- Indicator assessments
- EIHA Feeder Reports on key activities
- Reports of other relevant bodies (e.g. ICES reports/ assessments)
- Key EU reporting (e.g. relating to CFP; Birds Directive; Habitats Directive)

	A	B	C	D	E	F	G	H	I	J	K	L	
1	Response	URL	Year	Scale	Entity	Type of measure	KTM (MSFD)	Status of implementation	Description of implementation status (Narative)	Activity	Pressure	Assumption on management of activity/ reduce impact on state	relative activity pairing
2	IMO guidelines for the control and management of ships' biofouling were adopted in 2011	https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/RESOLUTION%20MEPC.207[62].pdf	2011	Global	IMO					Transport and shipping			
3	IMO guidance on minimising transfer of invasive aquatic species as biofouling (hull fouling) for recreational craft (MEP.1/Circ.792)	https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/MEPC.1-Circ.792.pdf	2012	Global	IMO					Transport and shipping			
4	MARPOL(Annex I - prevention of pollution from operational measures and accidental discharge); Annex II - (regulation of noxious substances); Annex V (discharge of waste from ships)	https://www.imo.org/en/About/Conventions/Pages/International-Convention-for-the-Prevention-of-Pollution-from-Ships-(MARPOL).aspx	1983 & 1988	Global	IMO					Transport and shipping			
5	PSSA designation (Wadden Sea; Western European waters)	https://www.waddenzee.nl/fileadmin/content/Dossiers/Overheid/pdf/PSSA_wsnl.pdf	2002	Regional	IMO					Transport and shipping			
6	PARCOM Recommendation 88/1 on Measures to Reduce Organotin Compounds Reaching the Aquatic Environment through Docking Activities	https://www.ospar.org/documents?d=32441	1988	Regional	PARCOM		WFD: 15 MSFD: 31			Transport infrastructure	loss/change Seabed disturbance Disturbance of		
7	OSPAR Recommendation 2016/01 on the reduction of marine litter through the implementation of fishing for litter initiatives	https://www.ospar.org/documents?d=35388	2016	Regional	OSPAR	Technical; awareness	MSFD: 29			Fishing	Mortality/injury (Direct catch/ entanglement)	marine litter that could be ingested or cause entaglement; increased awareness of fishing	
8	Regulation on the conservation of fishery resources and the protection of marine ecosystems through technical measures (2019/1241)	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019R1241&from=EN	2019	Regional	EU					Fishing	loss/change Seabed disturbance Disturbance of		
9	Habitats Directive (including to specifically address bycatch (Dolman et al., 2020)	https://www.seawatchfoundation.org.uk/wp-content/uploads/2020/12/Dolman-et-al_2020.pdf	2020										
10	RECOMMENDATION TO TEMPORARILY PROHIBIT THE USE OF GILLNETS, ENTANGLING NETS AND TRAMMEL NETS IN THE NEAFC REGULATORY AREA	https://www.neafc.org/system/files/rec-3_deep-water-gillnet-.pdf	2006	Regional	NEAFC	Technical				Fishing	Mortality/injury (Direct catch/ entanglement)	Reduce mortality through entanglement	
11	NEAFC Scheme of Enforcement Art 7, 7a and 7b (Net marking, removal or disposal of unmarked or illegal gear; and garbage at sea and retreival of lost gear)	https://www.neafc.org/scheme/Chapter2/article7	Ammended 2021	Regional	NEAFC	Binding				Fishing	Mortality/injury (Direct catch/ entanglement)	Reduce mortality through entanglement	
											Mortality/	pressure on prey species, but perhaps	

Seabirds_Measures | Lists | NOTES | Listed species | +

Sharepoint link here

Linking measures to an Activity/pressure

- Need to know which pressures/ activities are most significant? (link to work on DAP)
- Link the measures to the activities/ pressures
- Is there evidence that the measures have had an impact on the activity/ pressure?

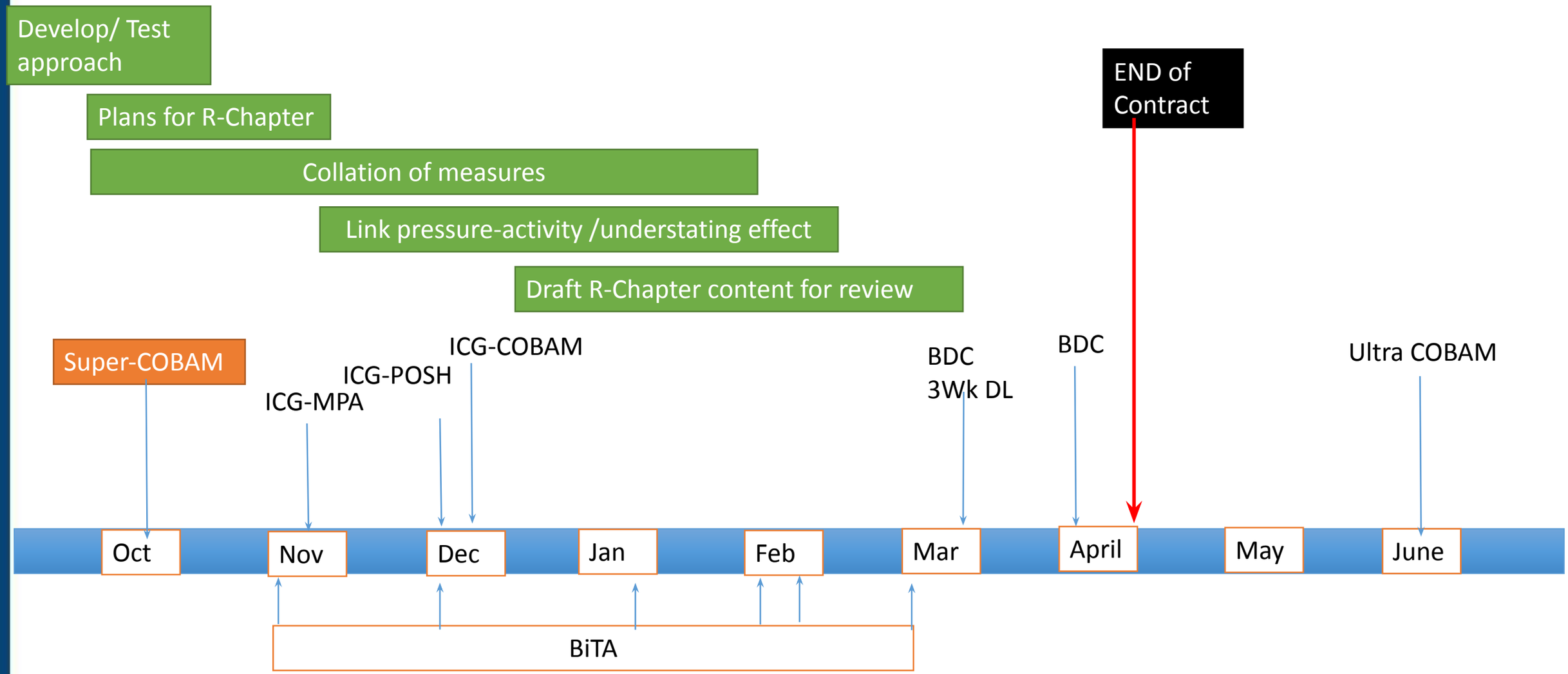
Part 4: Progress and next steps

1. On going: Collating existing measures
2. On going: Understanding the 7 thematic assessments (neuances of each, capacity, timeline)
3. Next step: Developing a first attempt high level storyline

… all steps will need engagement with expert groups – and this will look different for each expert group.

	Birds	Fish	Mammals	Benthic	Pelagic	Food Web	NIS
Contact established	Matt, Volker, Stefano	Maurice	Anita	Laurent/ Cristina	Abigail	Ulrike	Peter
Developed timeline/ plan							
Resource/ ability to engage	Via NEA Panacea	Help write; after COBAM	No resource; assist with review	Via NEA Panacea			
Collation of existing measures	V1	In progress	V1	In progress			
Understanding priority DAP							
Effectiveness of Measures							
Outline story	Testing						

Timeline and key milestones (1 July – 30 April)



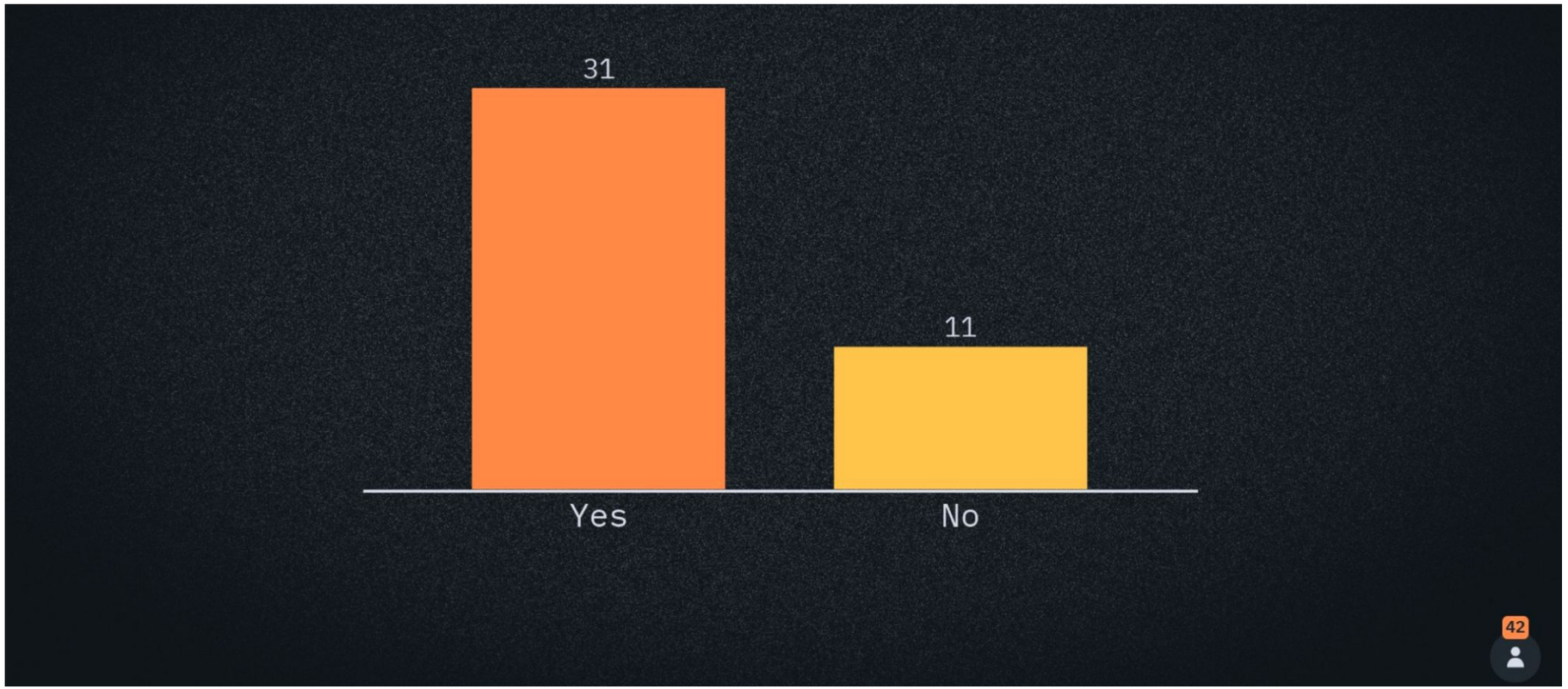
1 July 2021 START of Contract

Applying the approach – observations so far

- One size will not fit all 7 thematic assessments
- Definitely not just about the threatened and /or declining species and habitats – thematic assessments are broader than that -
- Level of detail - may need to vary according to resource – perhaps use NEA PANACEA activities to dive deeper into the effectiveness approach where activities align (e.g. birds) – how to bring the work together?
- How do you cluster? unlikely to be able to look at individual species – how can each theme be clustered in a way that makes sense? Use the MSFD features? Does that work for all groups? (e.g. Fish – Commercial sp (Demersal, pelagic, coasal); rare/ vulnerable species) – how does that work for other thematic areas?

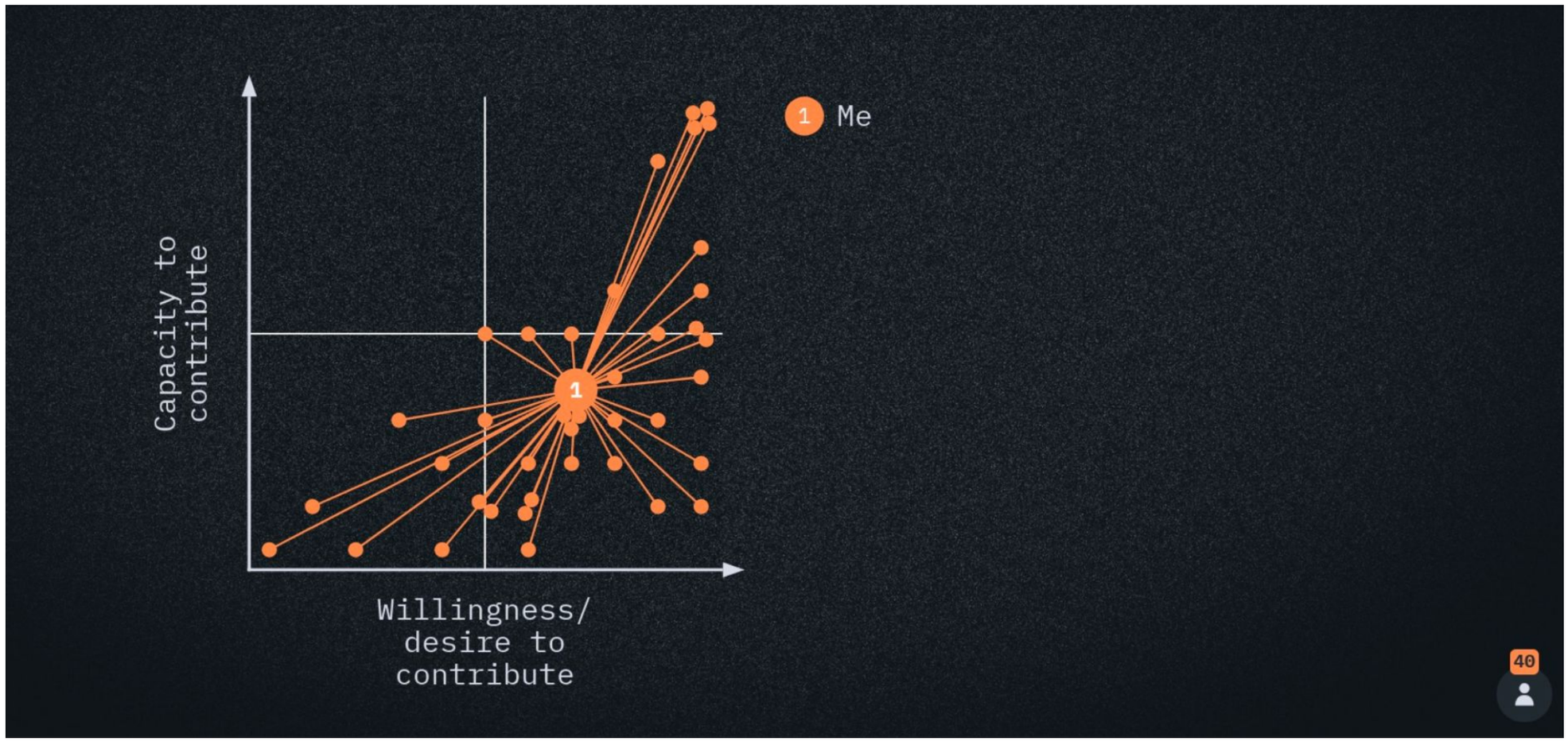
Mentimeter questions and answers

Question – are you expecting to contribute to the development of the R-Chapter? About ¾ of the experts at the session said yes - this will be coordinated through the expert group leads/ sense checkers for the Thematic Assessments



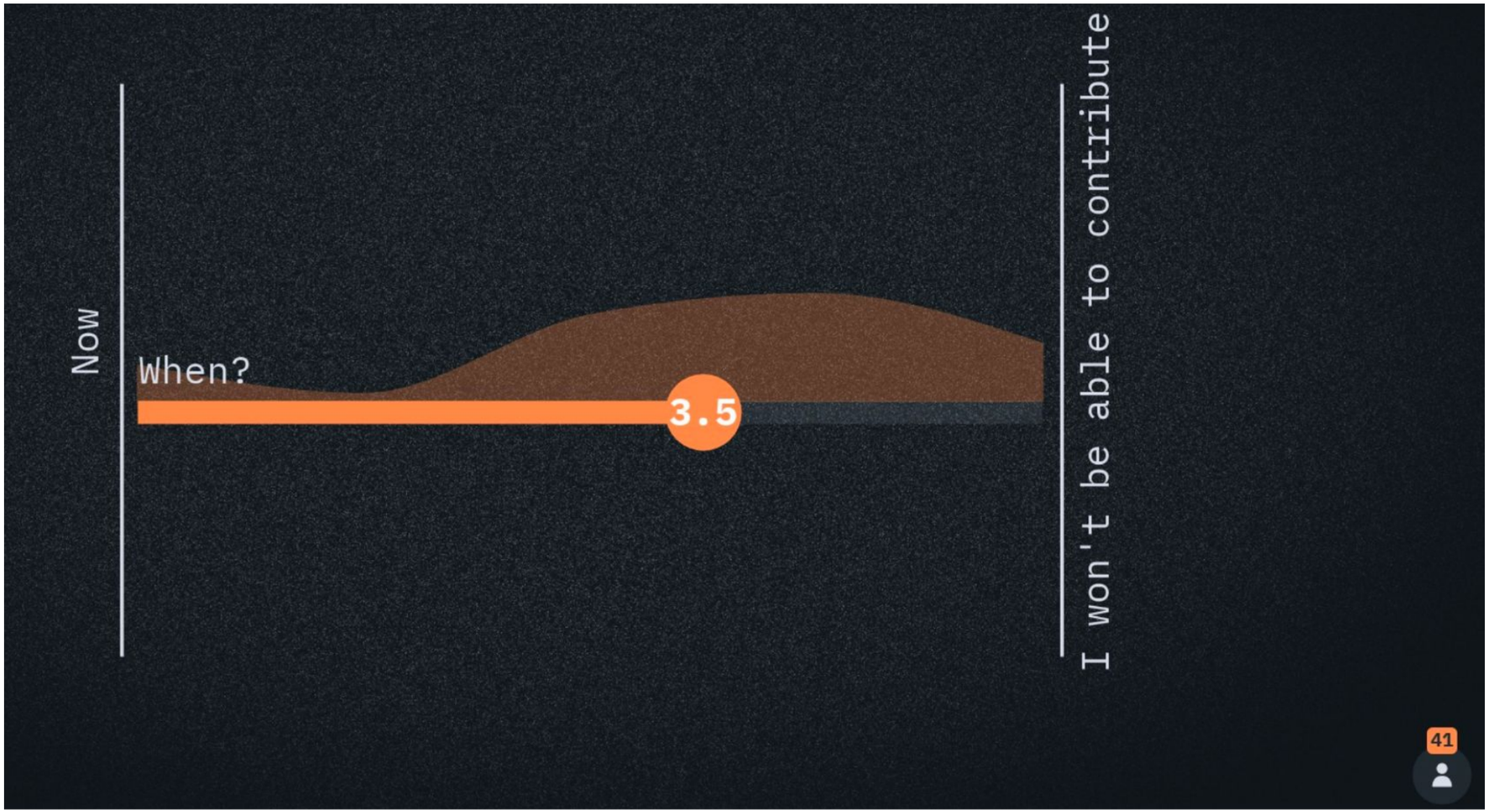
Mentimeter questions and answers

Question – **what is your willingness and capacity to contribute?** The predominant answer is that people are willing but there are challenges with capacity. Some individuals identified they did have capacity and names were provided in the chat.



Mentimeter questions and answers

Question – When will you have capacity to contribute? The options were now, after COBAM, after Christmas and later in the New Year: the consensus was that certainly there would not be much capacity to engage until the New Year, once the indicator assessments had been developed



Mentimeter questions and answers

The final question asked experts to provide examples of management measures that may be interesting to look into as case studies. The following were provided:

- Vessel speed restrictions for right whales
- Noise mitigation piling in relation to marine mammals
- Noise regulation at windfarm construction sites
- Southern right whale found to move northwards. Reduction in shipping traffic reduced mortality in the NW Atlantic Ocean
- reduction of nutrient load in the southern North Sea resulting in changes in phytoplankton balance of organisms, towards 1960s conditions
- management of HABs
- web alert system using satellite data for HABs
- Regulation and reduction of nitrate and phosphate loads on phytoplankton biomass
- Nutrient management in the EU is so good that eutrophication is only a problem in some coastal areas
- thresholds for the MSFD
- POSH Recs that are more widely applicable than the species/ habitats for which they were designed
- EU wide trawl bans in Macaronesia
- Note to link to NEA Panacea Benthic habitat task on measures (especially MPAs) starting April 2022
- some aspects of the CFP
- Measures in teh CFP are not (sufficiently) linked to OSPAR/MSFD - short term political decisions
- Fisheries managagement as examples
- UK MPAs for large skates
- Restoration of eel grass
- Birds: fishing restrictions, bycatch mitigation, eradicate NIS, biosecurity
- Ballast water management convention (NIS) - some success. Eradication efforts for established NIS - usually costly and low success.

Activity 2 contribution

NEA PANACEA

North East Atlantic project on biodiversity and eutrophication assessment integration and creation of effective measures

AquaEcology, University of Hamburg, LKN SH
Silke Eilers, Thomas Raabe, Birgit Heyden, Hermann Lehnhart und Ulrike Schückel

Co-funded by the European Maritime and Fisheries Fund

Overview

- 2.1 Model tool LiACAT linking eutrophication and climate change scenarios to biodiversity and food web indicators
- 2.2 Operationalisation and assessment of OSPAR food web indicator FW9: Ecological Network Analysis
- 2.3 Identification of ecologically-relevant scales and areas for assessment of pelagic and benthic habitats
- 2.4 Towards coherent threshold value setting methods and Activity 2 synthesis report

Co-funded by the European Maritime and Fisheries Fund

Conceptual setup in task 2

- Concerning the impact of eutrophication and climate change Task 2 has a conceptual approach to quantify the impacts of these two drivers on ecosystem components such as pelagic habitats, benthos, and birds

Co-funded by the European Maritime and Fisheries Fund

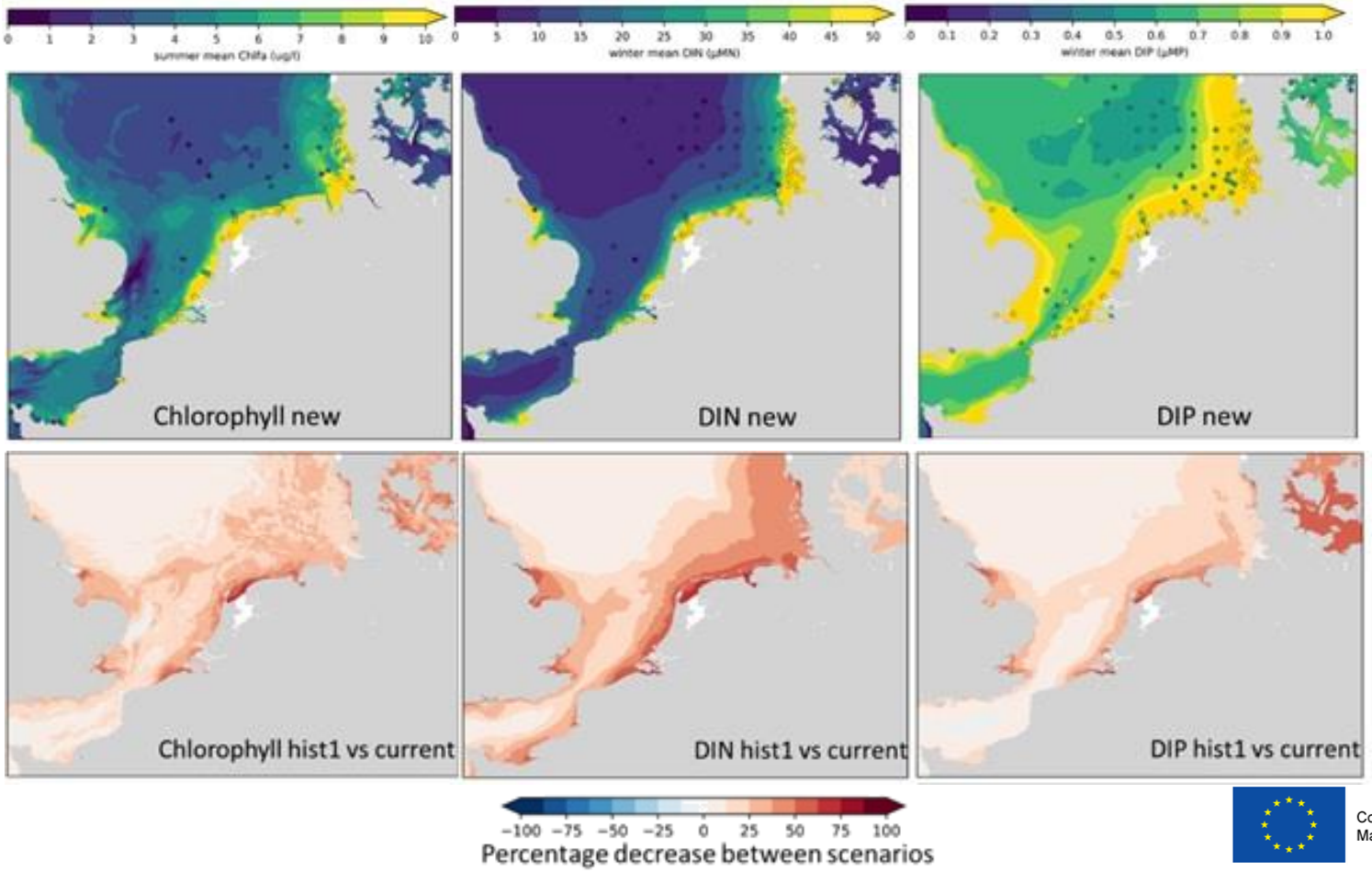
Conceptual approach for eutrophication

- The OSPAR group on eutrophication provides coherent threshold values for newly defined COMP4 assessment areas for key eutrophication parameters
- Based on the definition of GES for eutrophication, activity 2 will quantify the impact on selected ecosystem components of relevance for the other activities

Co-funded by the European Maritime and Fisheries Fund

Example Deltares output

Current state vs. pre-eutrophic scenario



Co-funded by the European Maritime and Fisheries Fund

Conceptual approach for climate change

- The publication on regional model applications for climate change scenarios only provide inconsistent, partly contradicting, conclusions

→ There is not simply THE „one scenario“

→ We will define a range of scenario definition based on literature research

→ We will provide a bandwith of possible related impacts for selected ecosystem components

Co-funded by the European Maritime and Fisheries Fund

Conceptual approach for climate change

Example: Literature study on the impact on bottom oxygen in the North Sea

Study	Storyline / Findings	Consequences on Oxygen	Impact
Lowe et al., 2009 Meire et al., 2013	Earlier onset and increased intensity of stratification	Lower ventilation	
Weston et al. 2008	General increase in water temperature	Reduce solubility of oxygen increased bacterial metabolism	
Gröger et al., 2013	Reduced winter nutrient import by Atlantic	Reduced NetPP by 30 % followed by reduced organic matter export	
Mathis and Pohlmann 2014	Higher increase in winter temperature vs. summer	Decrease in stratification/ ventilation Reduced solubility/increased metabol.	

Co-funded by the European Maritime and Fisheries Fund

Conceptual setup in NEA PANACEA

IN: Climate change and eutrophication estimates

DELTARES model

oxygen concentration,
temperature,
shear stress
other physical parameters
chlorophyll-a
primary production,
nutrient cycles
biomass

LiACAT (Literature based Analysis and Cumulative Assessment Tool)

Analyses and visualization of literature data and assessment results

Automated Cumulative Impact Model (ACIM)

Modelling **interactions and links**
Impacts on habitats

Cumulative Dynamic Energy Budget Model

Modelling cumulative effects on **selected species**

Ecological Network Analysis

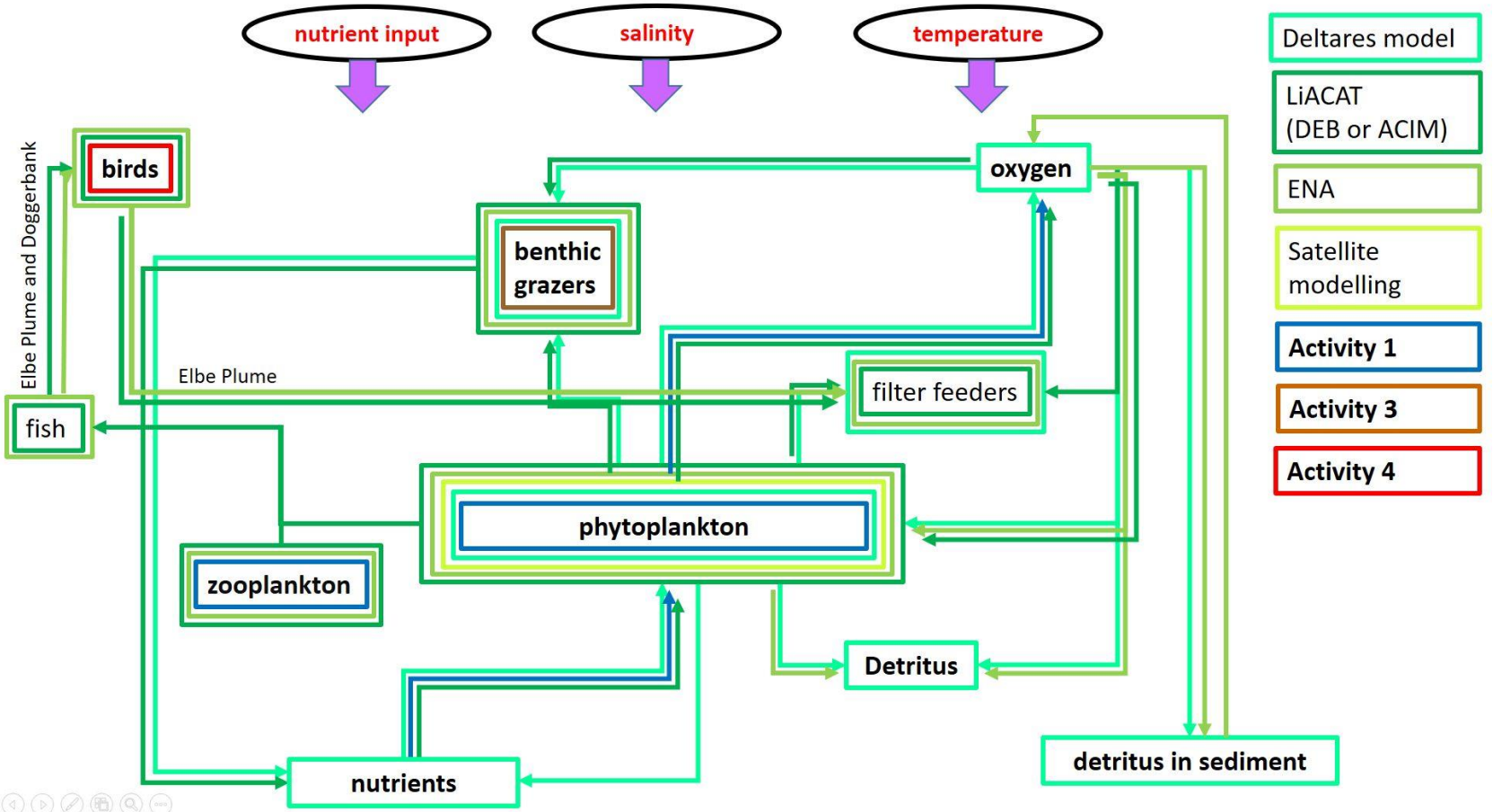
Modelling the food web structure and functioning

OUT: Projection of possible range of related impacts

Aqua Ecology

Conceptual setup in NEA PANACEA

Eutrophication and climate change scenarios



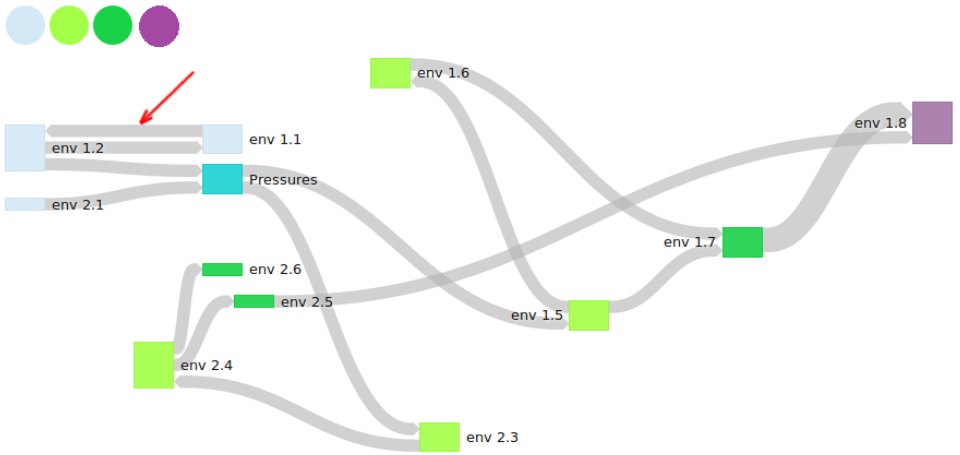
LiACAT - Overview

Literature management of complex data

Visualization of literature data

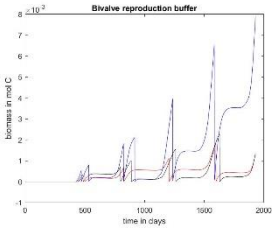
Taxonomic filter

MSFD structured filters

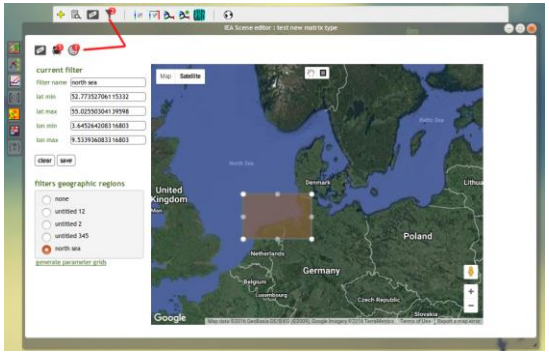


Mathematical model Toolbox

Output: Temporal dynamics of cumulative effects

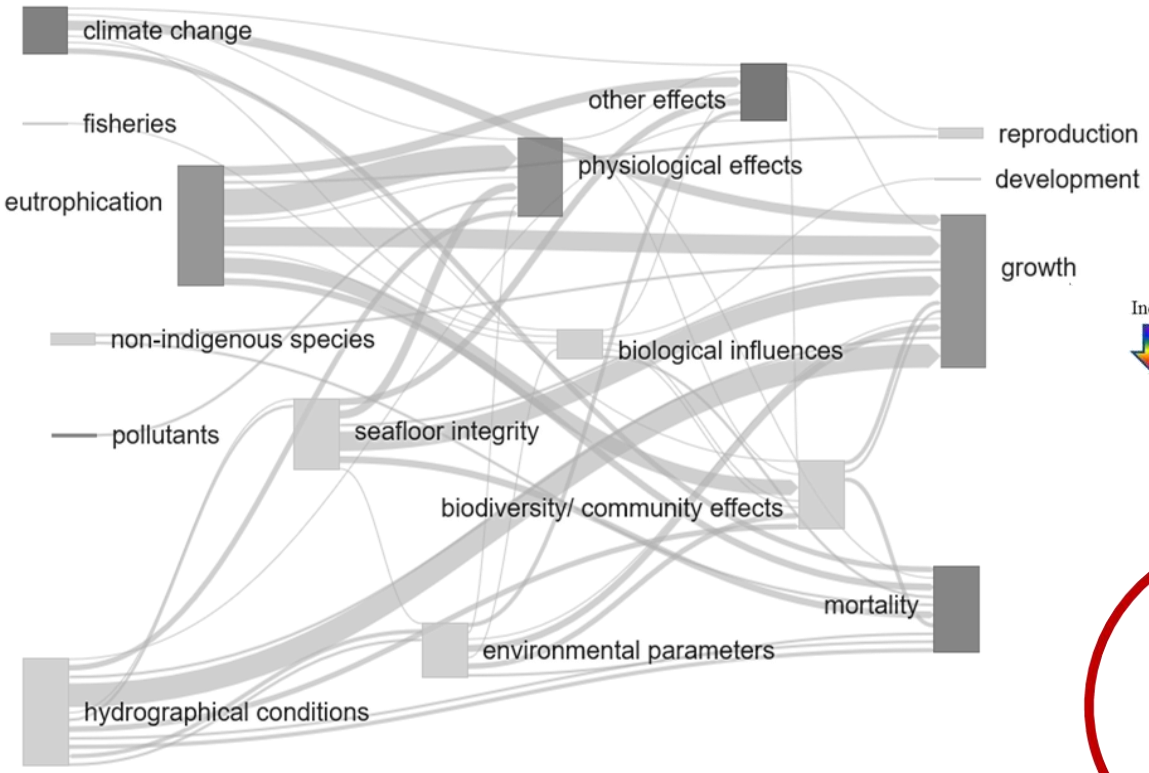


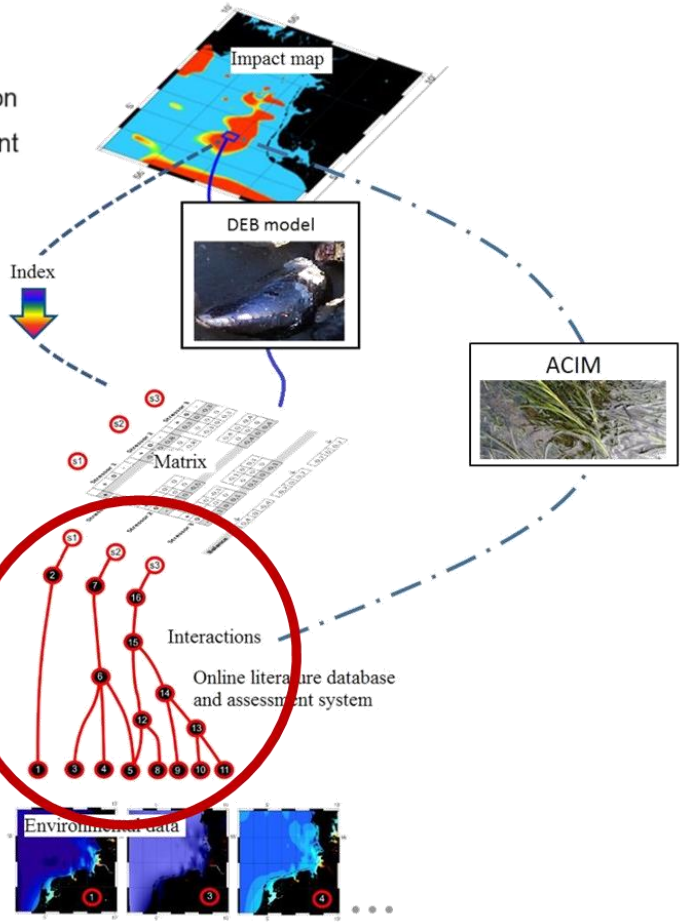
Impact maps



Co-funded by the European Maritime and Fisheries Fund

LiACAT



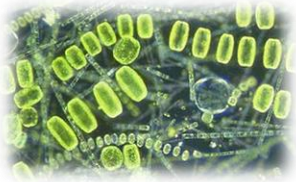


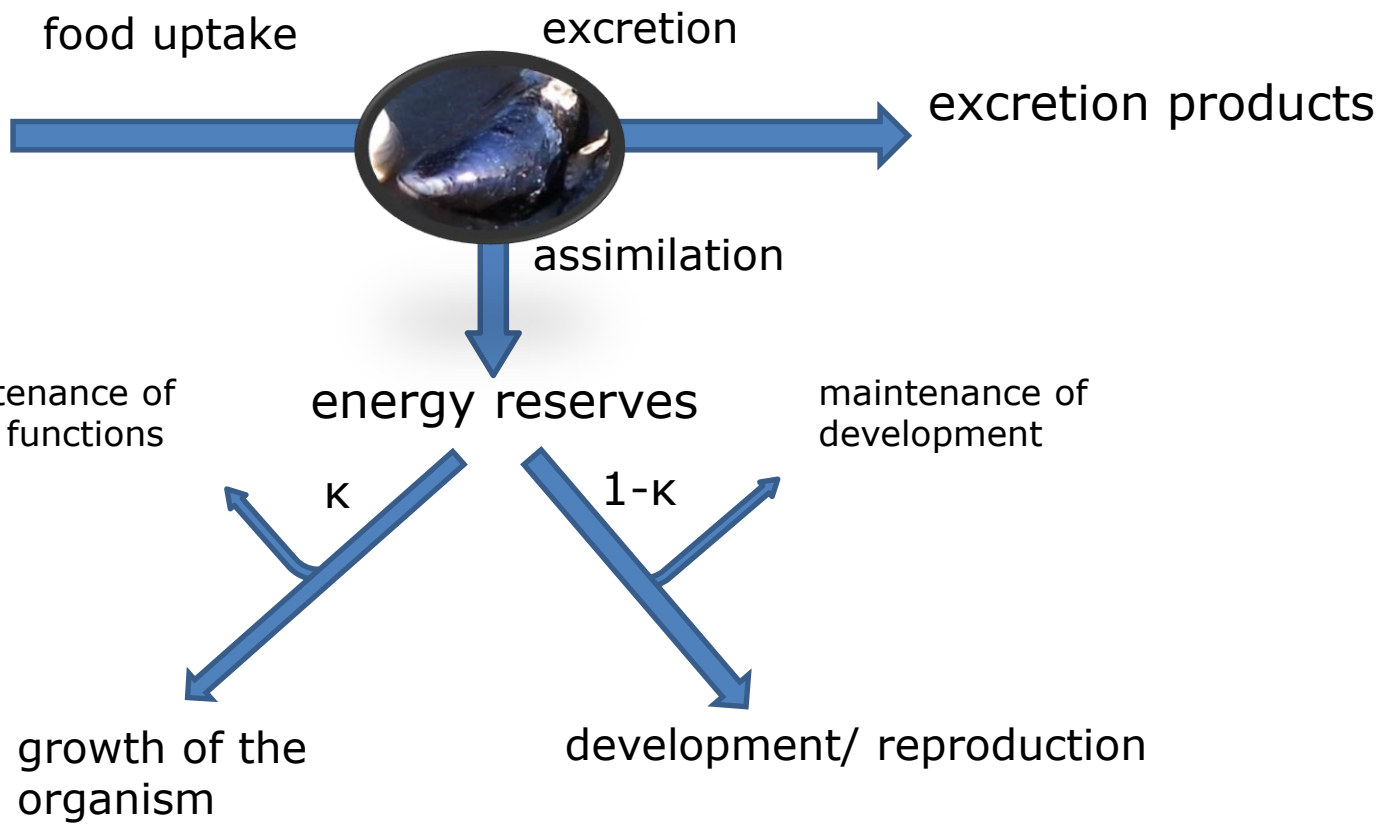
https://kladia.info/klados/

Co-funded by the European Maritime and Fisheries Fund

Mathematical models

Dynamic Energy Budget Models – modified to model cumulative effects

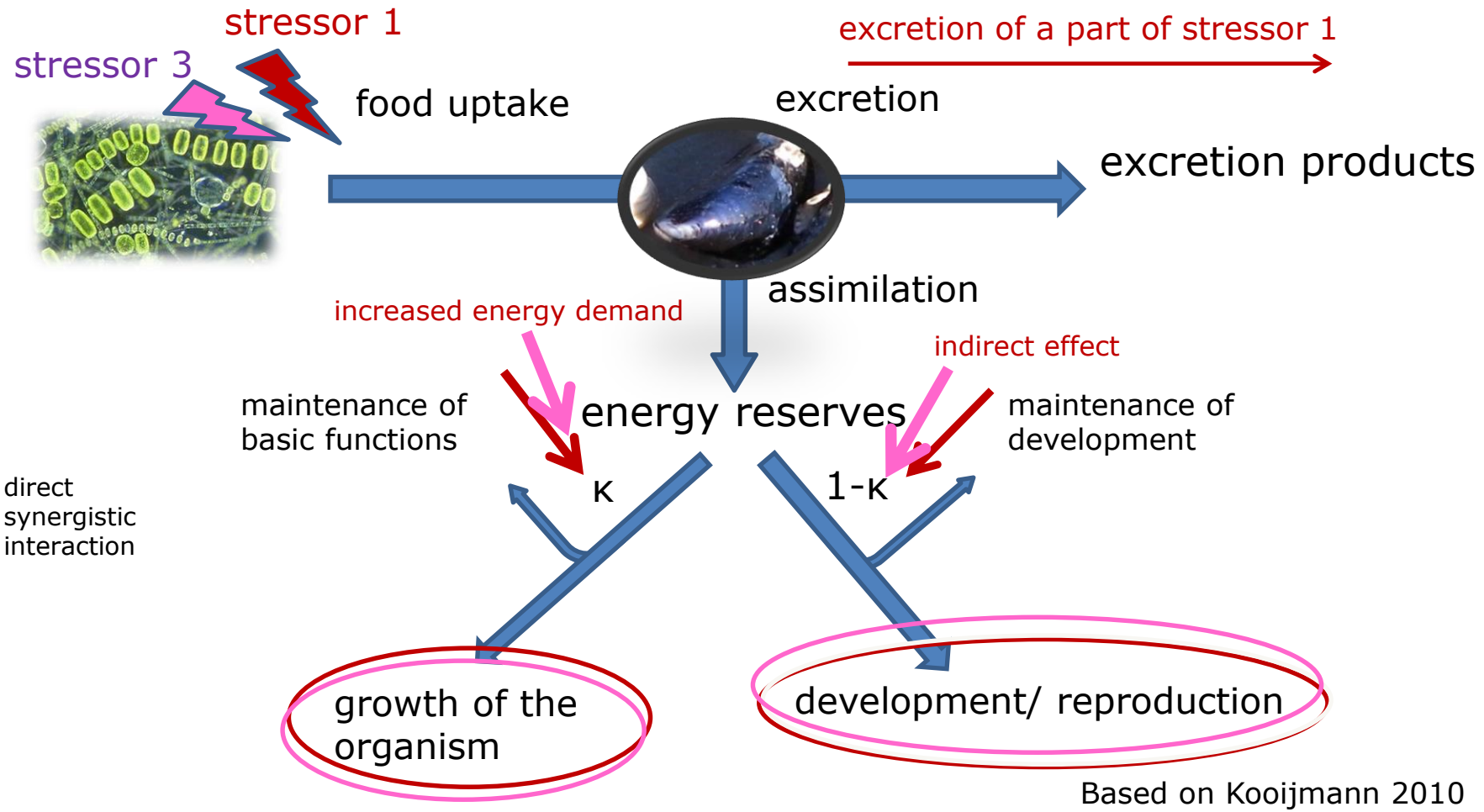




Based on Kooijmann 2010

Mathematical models

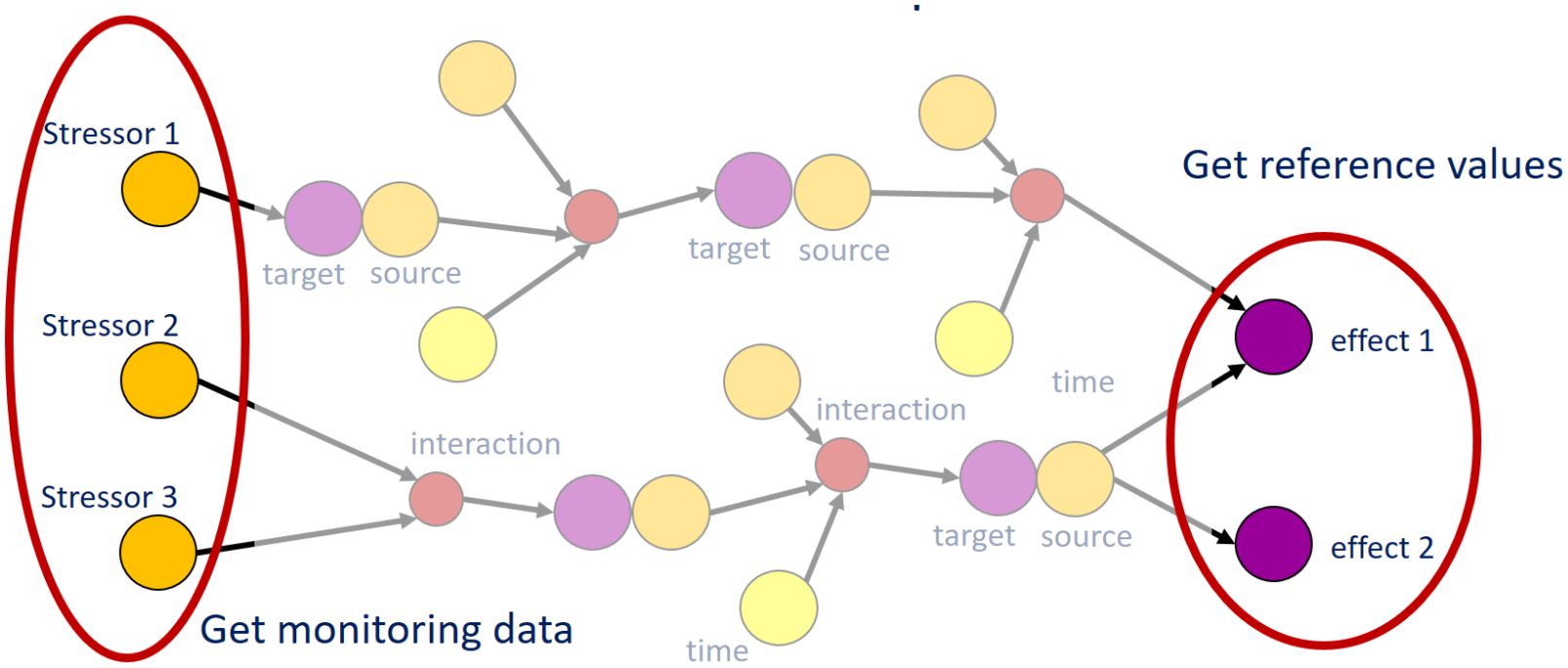
Dynamic Energy Budget Models – modified to model cumulative effects



Based on Kooijmann 2010

Mathematical models

Automated Cumulative Impact Model (ACIM)

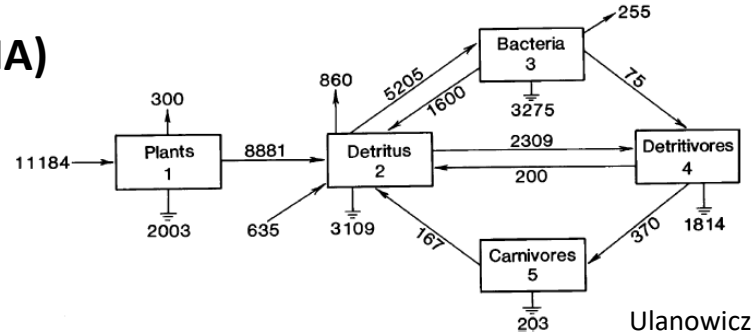


Co-funded by the European Maritime and Fisheries Fund

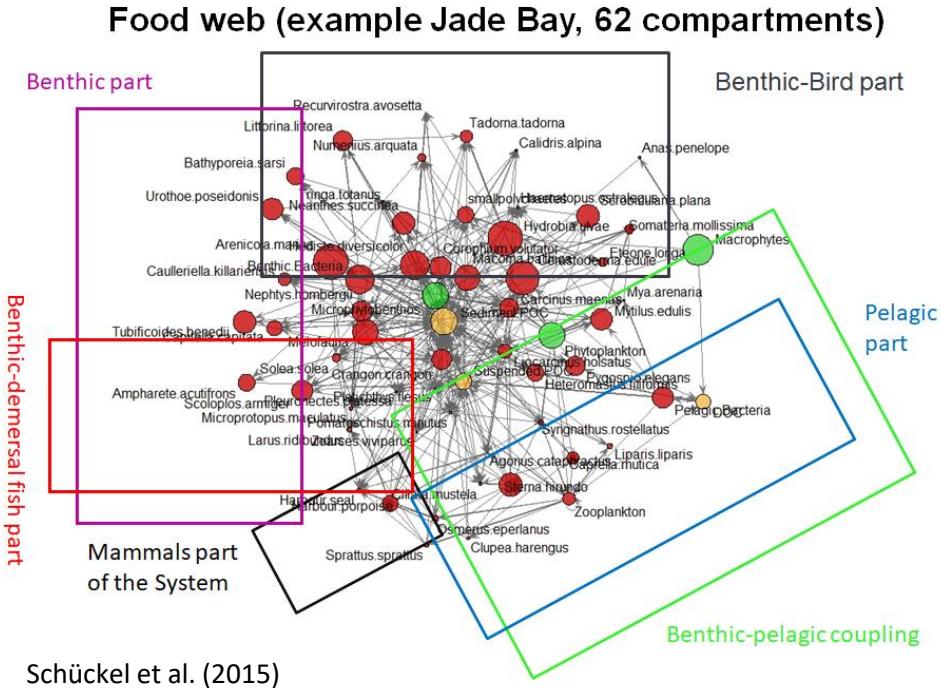
Mathematical models: ENA

Ecological Network Analysis Model (ENA)

- Holistic approach, analyzing all direct and indirect flows and interactions among compartments within the food web
- Link to OSPAR food web and biodiversity indicators



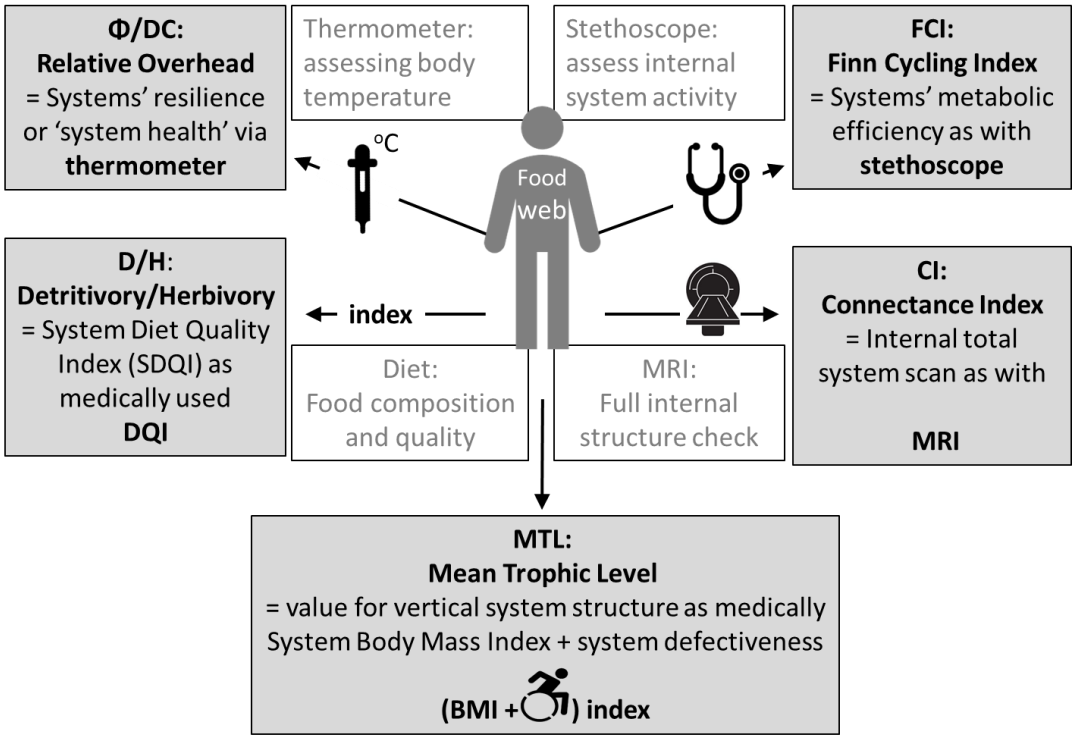
Ulanowicz (2004)



Schückel et al. (2015)

Output ENA

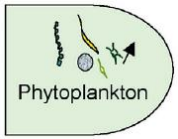
- ENA describes the trophic structure and functioning of the food web
- Assessment of food webs by using ENA indices



Comparison between ENA indices and human medical world: medical „check-ups" (Indicators) indicates whether a system/food web operates well and is most likely free of disturbances

de Jonge & Schückel (2021)

Data basis ENA model





- community composition
- abundance & biomass (mg C m^2) of compartments

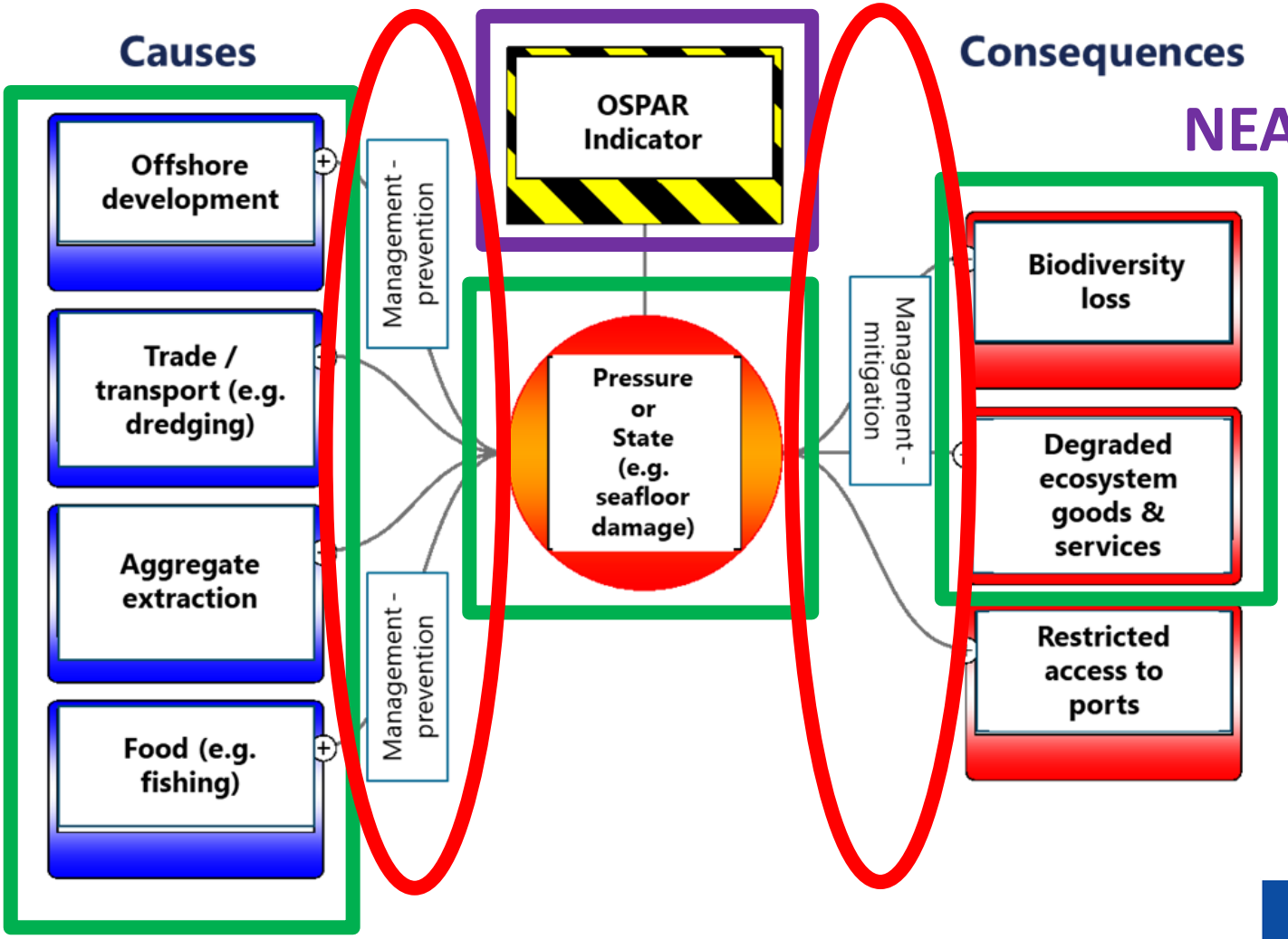
  [monitoring data, OSPAR data calls, literature]
- Population energetics (Consumption, Respiration, Egestion, Production)

  [Ratios (P/B etc. literature, projects, DEB models]
- diet composition (diet matrix): “Who eats whom ? And at what rate ?”

  [stabile Isotope, stomach contents, literature]

Co-funded by the European Maritime and Fisheries Fund

LiACAT and the Bow-Tie approach



NEA PANACEA

LiACAT

To be developed

Co-funded by the European Maritime and Fisheries Fund

Link to OSPAR indicators

General link

- Model results for predicted effects of eutrophication and climate change on selected species/ species groups/ lifeforms
- Output can be used to calculate OSPAR indicators for these scenarios
- Unit: percent change due to given scenarios for different exposure times
- AddOn for QSR report: giving an outlook on upcoming threats – based on sound quantitative model results linked to the OSPAR indicators

Co-funded by the European Maritime and Fisheries Fund

Link to activity 1 – Pelagic habitats

- Phytoplankton is a central element in the modelling framework of activity 2
- Strong link to eutrophication due to related algal blooms etc.

Relevant OSPAR indicators

- Changes in phytoplankton and zooplankton communities (PH1/ FW5)
  - Scenario-outputs for selected lifeforms
- Changes in phytoplankton biomass and zooplankton abundance (PH2)
  - Scenario-outputs for phytoplankton biomass

Co-funded by the European Maritime and Fisheries Fund

Link to activity 3 – Benthic habitats

- (Cumulative) Dynamic Energy Budget Models for selected benthic species already prepared
- LiACAT is particularly designed to analyse multiple stressor effects

Relevant OSPAR indicators

- Extent of physical damage to predominant special habitats (BH3)
  - Pressure and impact maps for eutrophication and climate for seafloor → extended view on cumulative impacts
- Condition of benthic habitat-defining communities (BH2)
  - Species sensitivities to eutrophication and climate change of habitat-forming species

Co-funded by the European Maritime and Fisheries Fund

Link to activity 4 – Birds

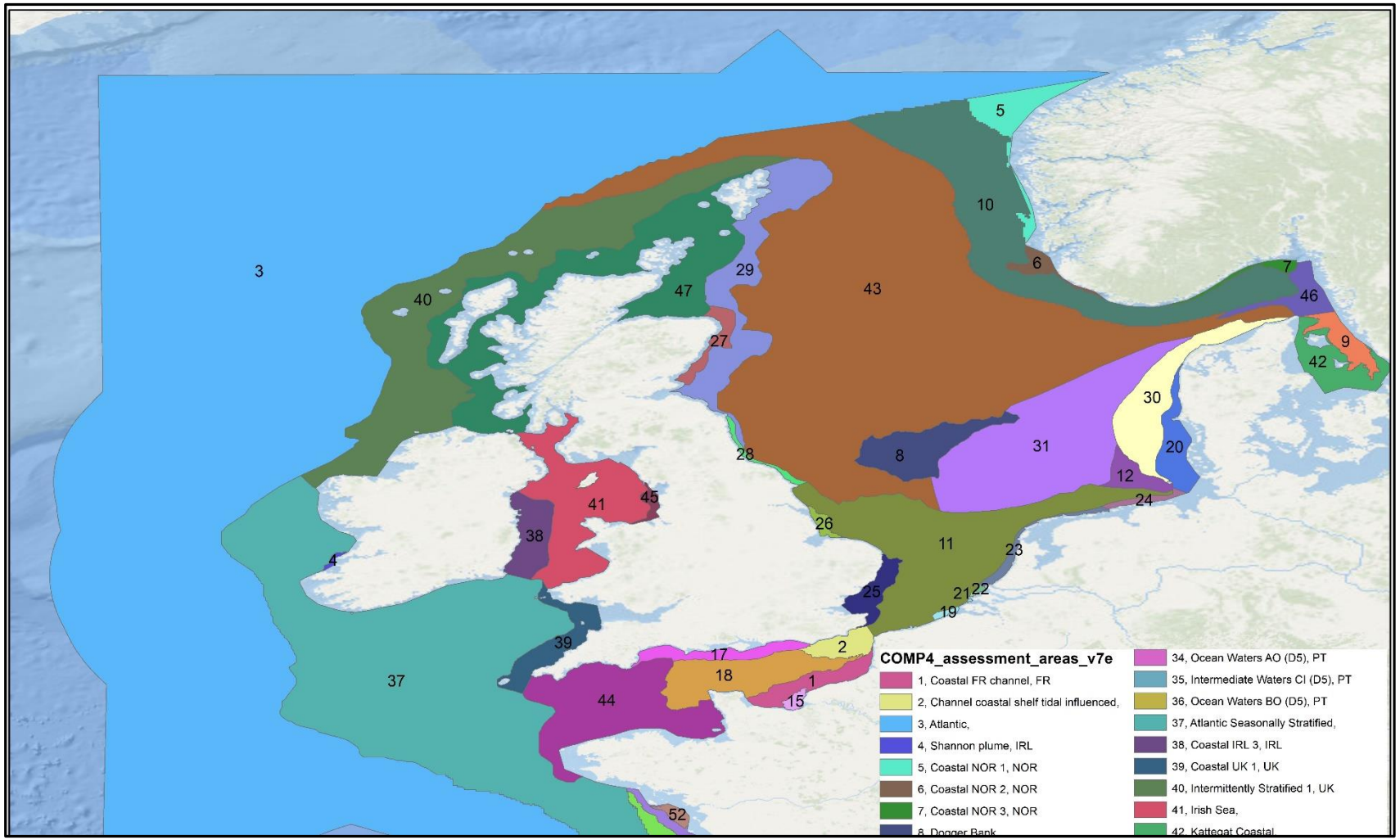
- Link to filter feeders and fish important
- Indirect effects of eutrophication and climate change can be assessed with the models
- Water depth and Chl-a could be important for birds
- Models analyse energetic costs of birds due to pressures

Relevant OSPAR indicators

- Marine bird abundance (B1)
  - Scenario-outputs for selected species
- Marine bird breeding success/ failure
  - Percent reduction due to climate change and eutrophication scenarios for selected species

Co-funded by the European Maritime and Fisheries Fund

Study areas


COMP4_assessment_areas_v7e
1, Coastal FR channel, FR
2, Channel coastal shelf tidal influenced,
3, Atlantic,
4, Shannon plume, IRL
5, Coastal NOR 1, NOR
6, Coastal NOR 2, NOR
7, Coastal NOR 3, NOR
8, Dogger Bank
34, Ocean Waters AO (D5), PT
35, Intermediate Waters CI (D5), PT
36, Ocean Waters BO (D5), PT
37, Atlantic Seasonally Stratified,
38, Coastal IRL 3, IRL
39, Coastal UK 1, UK
40, Intermittently Stratified 1, UK
41, Irish Sea,
42, Kattegat Coastal

Thank you

We are looking forward to a nice World Café meeting

Co-funded by the European Maritime and Fisheries Fund

SuperCOBAM 2021

Pelagic minutes

Key messages:

- **D1C6 is inappropriate for pelagic.** It reduces ecosystem complexity so much that ecological meaning is lost. The pelagic habitat does not have consistent boundaries – water bodies move and plankton move within and between the water bodies. Pelagic habitats are 3 dimensions. For these reasons it doesn't make sense to give a percent of 'good' or 'bad' – would that be percentage of surface area? Water column? Finally, we don't support threshold values at this time, so it is impossible to arrive at a meaningful percentage of good or bad.
- **Threshold values.** Right now we feel that TVs probably won't work but we have some ideas to test around Ecological Quality Ratios or p values in trends, etc, that will allow us to interpret observed changes in relation to reference conditions or baselines compared to the current assessment period. Either way, the narrative is key in linking drivers of change to indicator change.
- **Spatial assessment areas.** We are going to use the COMP4 assessment areas (based on sub-divisions proposed by the JMP EUNOSAT project) for the upcoming OSPAR eutrophication assessment, but there are 64 in total (distributed in OSPAR Regions II, III and IV) and we would like to simplify due to data availability. However, we have testing to do on working out if we can link the wide pelagic habitats from the MSFD text (e.g., variable salinity, coastal, shelf) to the areas, allowing us to rationalise areas to simplify assessment. We may then be able to compare the indicators and pressures across areas of the same class.
- **Integration between indicators.** Integration to a single number (or GES/notGES)- would 1) hide nuance, 2) obscure ecological meaning, and 3) double count certain taxa as all three of our indicators come from the same data. However, our indicators have multiple parts across multiple spatial areas, which can be overwhelming for policy. It's important that we retain the ecological meaning necessary to inform management measures and to interpret change in other indicators (through the food web). We will therefore start from a position of 'what would be useful for policy makers to know?' and test out some ways of displaying and interpreting data to simplify communication of our message.

Key materials for QSR including QSR guidance: https://www.ospar.org/work-areas/cross-cutting-issues/qsr2023

Plankton Lifeform Extraction Tool: https://www.dassh.ac.uk/lifeforms/

Wednesday 20 October:

- We need to think carefully about our narrative – let's try to clarify this, this week
- Need to work on a common understanding of what is required to complete the QSR and to develop a common approach to addressing the problems rather than potentially repeating effort among research groups.

- Spatial integration
    - The thematic assessments should be at the OSPAR regional scale (In the Annex of the QSR guidance doc)
    - Outcome of Expert Group (EG): Figure out what we can deliver
- Data call
    - **Action** – Abigail to ask PH experts if we are expecting any more data, what the barriers are and if we can help facilitate through the Secretariat. Abigail to notify OSPAR PHEG of data call closure on 1 Dec.
- Spatial assessment units
    - How can we quantitatively decide which assessment unit is best, COMP4 areas or gridded?
        - Using COMP4 areas is best aligned with eutrophication
    - Is it possible to assign each COMP4 area to the MSFD water/habitat types? This could help clarify the diversity of pelagic landscapes and link more closely to the wording the Directive.
    - **Action Arnaud (and to liaise with Matt):** we have testing to do on working out if we can link the wide pelagic habitats from the MSFD text to the areas, allowing us to rationalise areas to simplify assessment. We could then compare the indicators and pressures across areas of the same class.

- For PH3 how do we deal with different taxonomical units since not all species are definitively IDed and if you use genus level data the weighting is wrong since some genus have multiple species?
    - Felipe – we use genus but still have the raw data to interrogate. LCBD highlights years of big change. Important Value Index (IVI) interrogate the data for years characterized by big changes and highlights the taxonomic units responsible for those changes.

Thursday Oct 21

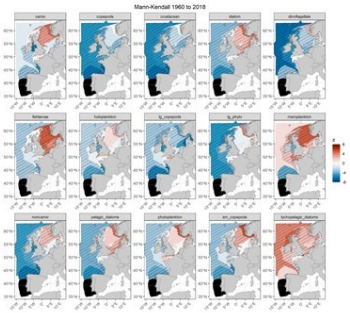
Indicator integration:

- **Points to consider:**
    - Are all indicator components (e.g. lifeforms) weighted equally?
    - Some taxa are in multiple lifeforms – double counting
    - All three indicators are from the same data
    - What if we normalise our data (as birds do)?
    - Can we use approaches based on conditional or proportional rules (not one-out-all-out) to integrate?
    - At what stage do we integrate?
    - Do we lose all meaningful info if we integrate?
    - How can the integrated info be used to inform management measures?
    - How to go about testing?
- PH1 – let's think of what our final output should be to work out how far we want to go with integration. What do we want to show in reporting? Last time we showed a table of lifeform pair PIs by EHDs. The new COMP4 regions are even more complex, meaning this table would be more complicated. Alternately, we could show maps of change in lifeforms, or change in

lifeforms linked to drivers of change, which is probably more helpful for policy, but means we are leaving out the PI step. We could cover the PI step in the narrative?

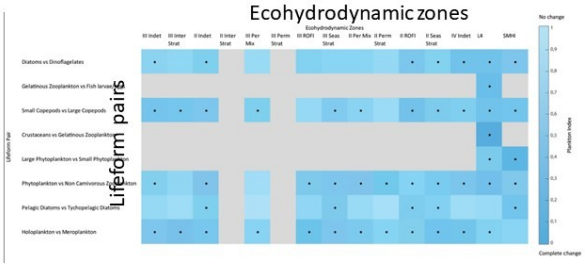
What do we want to show in assessment?

Maps of lifeform change (and/or correlations with SST)



- Skips PI part of our analysis
- Alignment with other indicators
- Succinct (one map per lifeform)
- Intuitive
- Can show links to drivers of change
- More useful for management measures

Or



- Can include in SOM
- Part of our protocol of PI -> change in LF time-series -> triggers further research in LF and component taxa
- We are unsure of ecological meaning of significant change in PI
- Consistent with IA2017 (though now we look at assessment period differently)

-
- PH2 and PH3 – suggests using table to report but can also map according to level of change
    - Mike: Maps more clear for policy and placing management measures
    - We will have assumptions either way so need to document those and be clear
- If we detect sig change in part of an indicator, for each indicator, the more indicators (and parts of indicators) that show change gives more weight to the evidence that plankton are changing. We lose this information if we integrate to a single number~~s~~ per indicator or across indicators, and, not all datasets have all lifeforms, or both zoop and phyto, so the simplification hides nuance and can be misleading.
- Are our indicators picking up the same thing (such as a bloom of a particular spp)? We need to be cautious about double counting through integration. For example if we have a *Karenia* bloom that could show up in all three indicators – that's not a bad thing, but we need to be clear about what it means. A narrative allows us to interpret via expert judgement so the nuance here can be articulated and the message clarified.
- French approach for the ecological evaluation of the Pelagic Habitats: Use of the Ecological Quality Ratio (EQR).
    - The EQR is a metric comparing two periods (ref. vs assess.) ranging between 0 (far from ref. conditions) and 1 (close to ref. conditions).

Far from reference period conditions	Quite far from r.c.	Intermediate	Quite close to r.c.	Very close to reference conditions
0 - 0,2	0,21 ≤ EQR ≤ 0,4	0,41 ≤ EQR ≤ 0,6	0,61 ≤ EQR ≤ 0,8	0,81 ≤ EQR ≤ 1

Ecological Evaulation of French Pelagic Habitats 2018 (Duflos et al., 2018) , inspired from Facca *et al.* (2014)

Duflos et al., 2018

    - This approach turns continuous data into discrete. It can be mapped, but would it be better to show instead, on a continuous scale, this same information? We need to

test this with PH1/FW5. We could map all indicators using this method for all datasets. This would encourage consistency between pelagic indicators and help the thematic assessment.

- Felipe: For the thematic assessment, we could just very simply show the number of indicators which change in each assessment unit
    - But what about direction of change – we need to capture this too?
    - And are all indicators equal, or are data available for all indicators in all places, since not all stations have both phyto and zoop or all lifeforms.
- **Decision:** We should focus on our key messages for each indicator for each report card and use the figures that best support those key messages.
- **Decision:** We must keep our policy audience in mind and focus on what will help them most
- **Action Matt and Arnaud:** to discuss consistent mapping of indicator results and test for discussion

Friday October 22

ENA LIACAT

- FW9 integrates across ecosystem components
- Will use an integrated approach, combining bio-phys-chem parameters for some case study areas, linked to Deltares and LiACAT models.
- Data can be annual means or monthly, using time-series data
- How can pelagic indicators be integrated into FW9? We need to identify case study areas with data from benthic, pelagic, etc in the same spot.
- Are we connecting indicators or raw data? Lifeforms and biomass needed, not overall indicator results. We need to work out what the best spatial scale is – does ENA need this by station and/or by spatial area?
- Next step for FW group and Activity 2 of NEA-PANACEA project – overlay all data locations shp to find areas with good biodiv data
- **Action:** Abigail and Matt to help Ulrike and Thomas work this out

Reporting and assessment:

- We really need to work out what is 'GES' and what is 'not GES' so we can give a clear message to policy makers in the assessments.
- **Action Abigail and Felipe**: to look at indicator templates on QSR Sharepoint and identify things that will stay the same. Anything that we retain already has policy approval so it's advantageous to keep as much as we can.
- **Action Matt:** to arrange next pelagic NEA PANCEA for November
- **Action Abigail:** to populate table in BiTA Sharepoint with potential table of contents for state chapter of thematic assessment and get feedback from group
- **Action Abigail:** to engage with HoD from UK (Andrew Scarsbrook)
- **Action Matt and Arnaud:** We need to present some example results for December COBAM so we need to make good progress on these actions by December. I think the focus should be on mapping indicators so COBAM has an idea of what our draft QSR might look like. We can get some feedback on maps v tables, etc

Threshold values and reference periods

- Our approach is to detect change and link to drivers of change to interpret meaning of change. It is important to consider different lengths of time periods (depending on the available data), as the observed changes may be lower in shorter time periods.
- The narrative is key in interpreting indicators.
- **Action UoP:** We need to test threshold options to evaluate if they are actually telling meaningful information, e.g. by defining upper and lower thresholds as a corridor of change or different percentages for short or long-term trends or quartiles. NEA PANACEA will test determining importance of change and quantify magnitude of change.
- Our current thinking:
    - PH1/FW5 – two parts of indicator. Sig change in PI triggers interrogation of lifeforms and component taxa. Narrative interprets change. No TVs.
    - PH2 – trend-based. Narrative interprets change. No TVs.
    - PH3 – Indicator identifies important change, which is then investigated for component taxa. Narrative interprets change. No TVs.

Next steps and ways of working:

- We need to keep in touch with the wider group more regularly. Therefore we should have an interim meeting, even if it's just a Webex. We need to devise a format that is not just Abigail talking.
- **Action UoP:** Work out date of next live in person meeting (May?) and set up two-monthly Zoom check ins for wider EG
- **Next steps:**
    - Nov 2021: GET YOUR DATA IN!!!!
    - Dec 1, 2021: Data call closes
    - Dec 2021: COBAM
    - Feb 2022: Expect draft of QSR indicator assessments for feedback
    - March 2022: Draft assessment submitted for policy feedback in
    - April 2022: BDC
    - May 2022: COBAM provides feedback on draft QSR
    - June 2022: UltraCOBAM to focus on thematic assessment
    - Summer 2022: Expect final QSR assessment for feedback
    - Sept 2022: Expect thematic assessment draft for feedback
    - Oct 2022: Final QSR assessment due
    - Oct 2022: Special BDC
    - Dec 2022: Thematic assessment due

Summary of Actions:

- **Abigail** to ask PH experts if we are expecting any more data, what the barriers are and if we can help facilitate through the Secretariat. Abigail to notify OSPAR PHEG of data call closure on 1 Dec.
- **Matt and Arnaud:** to discuss consistent mapping of indicator results and test for discussion in advance of Dec COBAM
- **Matt and Arnaud –** Obtain gridded data output from the Deltares model for examining drivers of change

- **Arnaud –** Process the PML primary production data into a format suitable for assessing as a driver of change
- **Abigail and Matt** to help Ulrike and Thomas work out candidate assessment areas with high resolution and long duration biodiversity data
- **Abigail and Felipe**: to look at indicator templates on QSR Sharepoint and identify things that will stay the same. Anything that we retain already has policy approval so it's advantageous to keep as much as we can.
- **Matt:** to arrange next pelagic NEA PANCEA for November
- **Abigail:** to populate table in BiTA Sharepoint with potential table of contents for state chapter of thematic assessment and get feedback from group
- **Abigail:** to engage with HoD from UK (Andrew Scarsbrook)
- **Matt and Arnaud:** We need to present some example results for December COBAM so we need to make good progress on these actions by December. The focus should be on mapping indicators so COBAM has an idea of what our draft QSR might look like. We can get some feedback on maps v tables, etc
- **UoP:** We need to test threshold options to evaluate if they are actually telling meaningful information, e.g. by defining upper and lower thresholds as a corridor of change or different percentages for short or long-term trends or quartiles.
- **UoP:** Work out date of next live in person meeting (May?) and set up two-monthly Zoom check ins for wider EG

Mixed expert group notes from Wed afternoon (led by Ian)

Group	**Scale planning to use for assessment**	**Can you do a regional scale assessment?**	**What method of integrating up from small to big scale?**
Pelagic	Either gridded or COMP4 areas. Both work, but which is better?	It doesn't make sense to combine our assessment units – we lose ecological meaning. The regions are big and the plankton are patchy.	None.
Benthic	MSFD subregions, COMP4 areas, ICES areas, or IA2017 units. Is it better to align with other ecosystem components or maintain the units used in IA2017? Might have different scales for different indicators. Need to do testing.	Should be possible with BH3. Don't know for other indicators.	BH3 - % area

Birds	Use IA2017 areas. For some indicators will only do regional assessment.	Will use all indicators.	Not integrating results but just aggregating data at different scales.

Key headlines:

- Benthic and birds can assess at regional scale for some indicators. Some indicators can also be used at a smaller scale. Pelagic will use ecologically-appropriate assessment areas.
- What we don't know is at which scales contracting parties want to assess. Some may only want to assess at national scale. This would be useful info for us.
- We feel that it is important to use the assessment scale appropriate for the biodiversity.

SUPERCOBAM WORKSHOP

NEA PANACEA

North East Atlantic project on biodiversity and eutrophication assessment integration and creation of effective measures

ACTIVITY 4 (MARINE BIRDS) NOTES

Attending (physical + online): Volker Dierschke, Stefano Marra, Matt Parsons (Birds GP Leads) + Ian Mitchell (OSPAR co-convener)

DAY 1 Assessment Scales and Spatial Integration

PRE-DISCUSSION

Birds GP Leads discussed Key points to consider for the EG discussion:

- Assessment scales for Marine Birds are defined (cannot change boundaries)
- Ideally, we want to do Bird Indicators assessments at subdivision level but we need to account of practicalities issues (e.g. time to apply species models for B3 indicator at subdivision level will cause delays with the timeline)
- Consider QSR guidance:
    - choose the assessment scale for your component for indicators
    - Thematic assessment should be done at OSPAR region scale
    - Integrated assessments within the thematic assessment are done at feature level (i.e. species group)
- Consider differences between OSPAR and MSFD assessment scales
- There are going to be gaps, these needs to be flagged
- Outcome: what we think we can deliver
- Can we make a table with what we assess in what area for each indicator, what is practical?

EXPERT GROUP MEETING UPDATE

Birds GP Leads joined online discussion with some members of JWGBIRD
And discussed options for assessments of the common indicators Marine Bird Abundance (B1) and Marine Bird Productivity (B3).
Stefano presented an overview of data obtained from data call

The following points were considered:

- IA17 assessments based on subdivision but QSR23 will use Regions
- Germany will use assessment for IId for MSFD reporting
- B3 needs data from B1, there is a tie between the two indicators
- It is crucial to understand ASAP the assessment scale for B3 given that the indicator involves production of species-specific models which is very time consuming
- The use of smaller subdivision would be more accurate but the downside is that quality of the data would be lower (as there are less sites/datapoints available at subdivision scale)

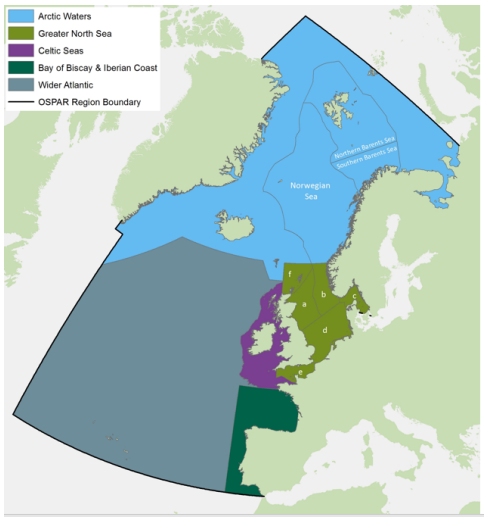
- It would be useful to do a checklist of breeding & non-breeding data available for each country so we understand the type of national assessments that each country will deliver

OSPAR vs MSFD assessment scales:

- Fredrik Haas (Sweden): Good idea to use the OSPAR assessment for MSFD reporting, but question on geographical scale. Regional scale might not be accurate from Sweden
- Ib Krag Petersen (DK) –there are no particular guidance from the government on the scale to use
- Most CPs would use MSFD data where they can, so for QSR do we really need to align or not.
- Ib Krag Petersen (DK) mentioned that non-breeding data are on the way

KEY OUTPUTS From EG

- Assessment Units are bird specific and defined (no need to modify boundaries)
- The indicator assessments ideally would be run at subdivision scale but not all indicators can be assessed in all subdivisions because of data gaps
- Indicator integration will only happen at regional level but we will also apply indicators to subdivision level to help interpretation of results, subdivision assessment only based on abundance data because of data availability
- OSPAR vs MSFD scales – main mismatches are for UK that will follow the approach done for OSPARIA17 and use the OSPAR regions also for MSFD reporting



Assessment units specific for Marine Birds

OSPAR Region	Subdivision
I - Arctic Waters	Norwegian Sea
	Northern Barents Sea
	Southern Barents Sea
II - Greater North Sea	a (NE Britain)
	b (W Norway)
	c (Skagerak/Kattegat)
	d (S North Sea)
	e (English Channel)
	f (N Scotland)
III - Celtic Seas	
IV - Bay Of Biscay & Iberian Coast	
V - Wider Atlantic	

Figure 1. Assessment units specific for Marine Birds

Table 1. Theoretical example showing different data availability for B1 (bird abundance) and B3 (bird productivity) indicators. Regional scale assessment will be based on both indicators B1 and B3, assessment at subdivision scale will be only done for B1 as is the most data rich indicator

	UkIId	BE	NL	DE	DKIId	DKIIc	SEIIc
Breeding success	x	x	x	(x)			
Breeding abundance	x	x	x	x	x	x	x
Breeding status subdivision	IId = Abundance only					Abundance only	
Breeding status region	II = Abundance & Breeding success						

MIXED EXPERT GROUP

Key question discussed:

- What scale the group is planning to do for assessment?
- Can you do a regional scale assessment and integration?

PELAGIC: definition of assessment scales is extremely complex for pelagic
BENTHIC: several options for assessment areas, it would be ideal to have the same assessment area for all indicators but also would be good to be consistent with previous assessments. Different scales from different indicators.
BIRD: Indicator integration will only happen at regional level but we will also apply indicators to subdivision level to help interpretation of results, subdivision assessment only based on abundance data because of data availability
Benthic and birds can assess a regional scale (for some indicators) and smaller scales (for others)

Lena Avellan: OSPAR secretariat information and resources for QSR

OSPAR Assessment Portal – you can look at the previous assessments. QSR2023 – will look at status but also measures
https://www.ospar.org/work-areas/cross-cutting-issues/qsr2023 you find all resources including QSR Guidance document (important to read)

- Annex 3 – assessment unites
- Annex 4 – definitions
- Table 3 pg 15 – spatial scales for thematic assessments and integrated assessments therein

For QSR we want to see summaries at region scale – a result for each species group

DAY 2 Integration of Indicator Results

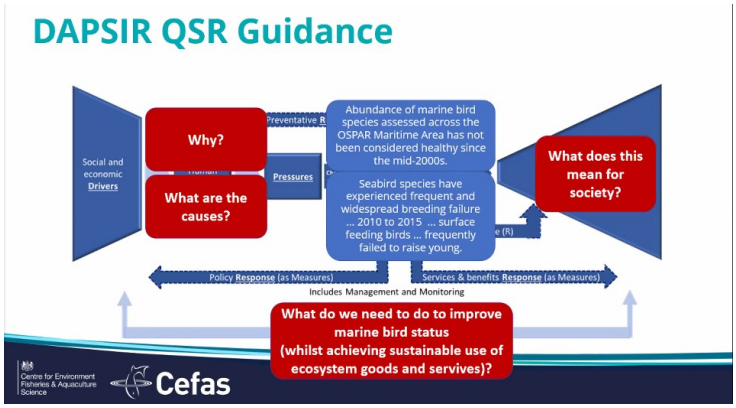
Activity 2 Café

Assessment Scale Group:

- Activity 2 leads are defining new assessment areas using existing layers of chl-a, salinity, depth and stratification. These have been further refined by ECG-EMO to consider WFD areas and river catchment. Can the proposed assessment areas be used by other groups?
    - The Activity 2 areas are smaller than the one used for marine Birds: implications on data availability (i.e. less data available for smaller units) and ecological meaning (birds subdivision were developed considering main oceanographic features and observed differences in seabirds' community structure and population trends). Smaller subdivision might not be adequate for some species that have wider habitat ranges
        - ACTION: Share shapefile with Birds regions and subdivision with Activity 2 leads

Adrian Judd: ICG-EcoC

DAPSIR: Drivers – Activities - Pressures – State – Impact – Responses > Bow Tie Analysis
Making associations between each level of the DAPSIR (e.g. D vs A, AvsP etc..)



The analysis for DAPSIR chapter will be mostly qualitative (quantitative when possible)
Are we looking at things that are not in the bow-tie analysis

- ACTION for Birds GP Leads: consider whether to create an internal feeder report for the DAPSIR chapter

PRE-DISCUSSION

EXPERT GROUP

Birds GP Leads joined online discussion with some members of JWGBIRD And discussed options for integrations of marine birds' indicators
Volker presented an overview of method for indicator integration

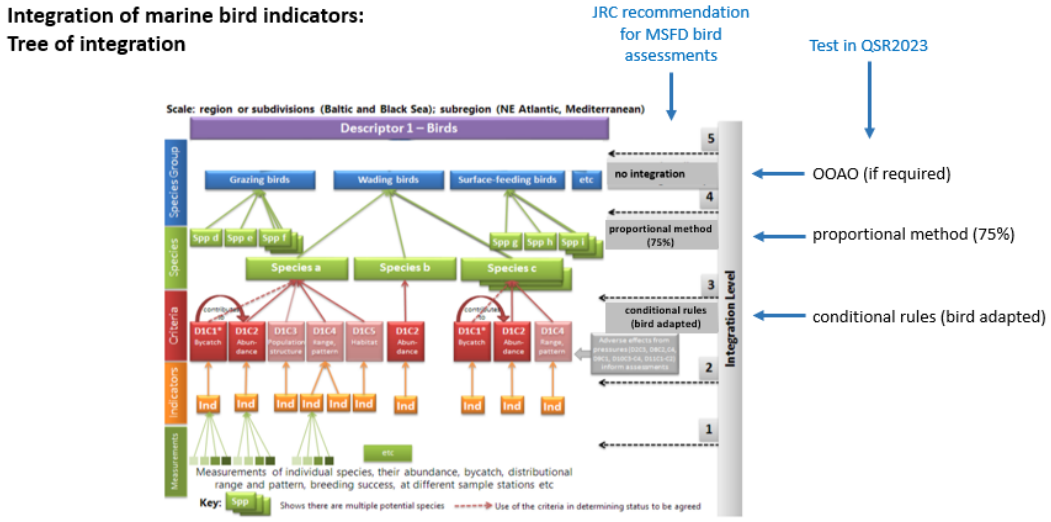
The following points were considered:

- Marine bird for QSR 2023 and MSFD Article 8 assessments shall use indicators for 5 criteria: D1C1 (bycatch), D1C2 (abundance), D1C3 (demography), D1C4 (distribution), D1C5 (habitat for the species)
- MSFD differentiation between primary and secondary criteria
- D1C5 is it secondary criteria, the indicator is candidate
- Integration is done at multiple levels: from indicators to criteria > from criteria to species > from species to species group > from species group to ecosystem component (not required by MSFD)
- In 2020 JRC produced a report reviewing different methods for aggregation from criteria to species and some recommendations. Methods considered are: One-out-all-out (OOAO), proportional method (75%), average, weighted average, probabilistic methods, conditional rules (ICES Advice)
- Pros and cons of each method was presented by Volker, alongside results from preliminary testing conducted on a selection of species in the German Baltic Sea (mixture of real data and estimates)
- JRC developed conditional rules for integration from criteria to species, considering the importance (expressiveness) of the individual criteria/indicators
- JRC recommendation for integration from species to species group is to apply proportional method (75%) if at least five species of a species group can be assessed and OOAO if not

For the conditional rules for integration from criteria to species, it was suggested to

- define where better data are needed for a criteria > this would help address whether the value of an indicator can be increased in the future
- the order of the criteria in the conditional rules can be modified to reflect importance of each criteria (i.e. Can secondary criteria be weighted differently?)

- According to Com Dec 2017/848, status of bycatch should be contributing to abundance but unclear how



MIXED EXPERT GROUP

Birds GP Leads joined online discussion with other species EG and explored communalities with marine mammals (Anita Gilles)

- Bycatch: use precautionary approach if there is evidence of bycatch but not enough data to assess mortality
- Integration species to species group: marine mammals have difficulties in assessing the relevant scale as different species within the same group would have wide differences in the relevant assessment unit > suggestion to use the largest spatial scale available for assessing species groups

KEY OUTPUTS From EG

Methods for integration of indicators are well developed for Marine Birds. Points that other biodiversity component can consider when developing their methods:

- Integration method should reflect the importance of each indicator descriptor (criteria) i.e should have ecological sense
- Other biodiversity components should look at criteria to develop integration methods
- Birds integration method consider breeding and non-breeding species as separate entities. Other biodiversity components can do something similar, e.g. fish: consider fish stocks as separate species.
- Recognise links between criteria (e.g. link between by-catch and abundance). This can also be done by other species groups interested by-catch?

DAY 3 Threshold Values

Activity 2 Café

LIACAT-ENA model Group:
Activity 2 leads will get in touch to request time series of bird (we have abundance data that can be converted in biomass – Matt says this is relatively easy to do)

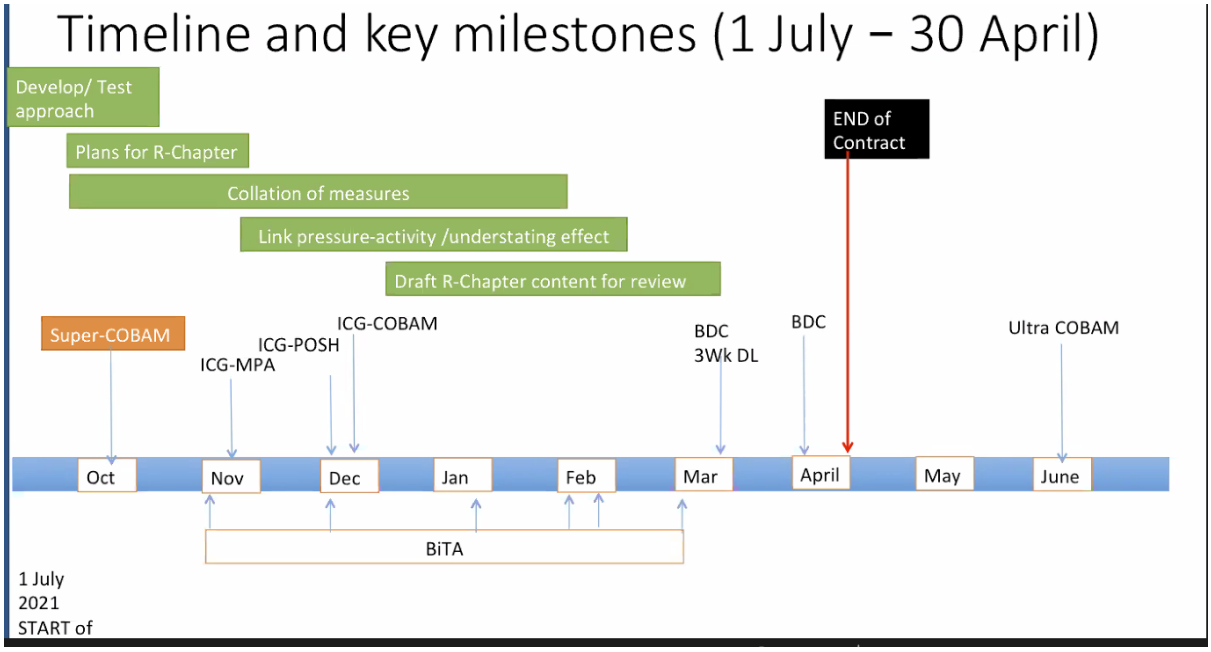
Threshold value inventory

bird indicators were assigned to appropriate cells in the matrix of status of development and TV narrative.

indicator	Baseline/threshold value narrative	Status TV development
B1	Limit reference level	Policy acceptance
B3	Limit reference level	Policy acceptance
B5	Removal and conservation targets	Policy acceptance
B7	Acceptable deviation from historic or pristine state	Not started

Emily Corcoran: Response/Measures

The Response chapter in the DAPSI**R** should be 5-6 pages long and will cover what has been done to address activities and pressures by OSPAR and other policy frameworks
The starting point for the draft is the bow-tie and the approach to construct the response chapter was taken from the HELCOM SOM (sufficiency of measures analysis).
Initial drafts of the R chapter is in SharePoint. Emily will need the R chapter to be reviewed by EGs after Christmas



PRE-DISCUSSION

Birds GP Leads discussed Key points to consider for the EG discussion:

- Standardising language – interpretation of terms in the same way
- What are the main issues for different groups?

EXPERT GROUP

Birds GP Leads joined online discussion with some members of JWGBIRD
Matt presented an overview of methods and threshold values used by different marine birds indicators: Marine Bird Abundance (B1), Marine Bird Breeding Success (B3), Marine Bird Bycatch (B5), Marine Bird Habitat Quality (B7).

The following points were considered:

- B1 and B3 are common indicators, B5 and B7 are being used for pilot studies
- Discussion around Bycatch Indicator (B5):
    - is bycatch considered deliberate killing? No
    - if you can't come up with level of bycatch use precautionary principle
    - the current target approach used on the method is a further elaboration of what was discussed at the Copenhagen workshop (but it is agreed by CP)
    - JWGBIRD in November to further discuss this indicator

KEY OUTPUTS From EG

Thresholds values for B1 and B3 indicators have already been defined and agreed. Further discussion needed with JWGBIRD to determine thresholds for candidate indicators B5 and B7

Discussion off the sessions (Birds – Activity 2)

Can food web models predict "optimal" numbers of birds, which in turn can be used to define threshold levels and baselines (other than arbitrarily using the beginning of the time series of data as the baseline)?
Assessment scales: Combination of pelagic/benthic/etc indicators with bird indicators scientifically more appropriate if using raw offshore bird data for the respective assessment units rather than combining indicator outcomes (which usually have different assessment scales).

Minutes of the Benthic outcomes from the SuperCOBAM workshop

Wednesday the 20th to Friday the-22nd of October 2021

LEF Future Centre, Griffioenlaan 2, Utrecht (Netherlands) + online meeting

N.B.: These minutes complement the minutes of the 19/10/2021 OBHEG meeting (Annex 1), and should be completed by the full Super-COBAM report.

Attending benthic experts

Physically: Ana García-Alegre (ES), José Manuel González (ES), Laurent Guérin (FR), Anna Lizińska (FR), Stefano Marra (UK), Liam Matear (UK), Petra Schmitt (DE), Cristina Vina-Herbon (UK), Sander Wijnhoven (NL)

Online: Ricardo Araújo (PT), Mats Blomquist (SE), Aurélien Boye (FR), Maria Ana Almeida Colaço (PT), Paul Coleman (IE), Grete Dinesen (DK), Stephen Duncombe-Smith (UK), Marie-Louise Krawack (DK), Filipe Henriques (PT), Axel Kreutle (DE), Yvonne Leahy (IE), Jorge Lobo-Arteaga (PT), Giacomo Montereale-Gavazzi (BE), Karl Norling (SE, ICG-CC), Alexandre Robert (FR), Hans Ruiter (NL, ICG-EUT), Gert Van-Hoey (BE), Kirsty Woodcock (UK).

Key messages on benthic outcomes from this workshop

- The stocktaking of data that is available was progressed and will enable when completed to clearly define area which will be really assessed (and start all indicators draft assessment!).
- Spatial assessment units: First proposal developed, shapefile to be created in next step. Aiming to align for all indicators which will make it easier to present information at the next level, notably the Benthic habitats' thematic assessment and explore links with other components, notably pelagic habitats' thematic assessment.
- Integration of indicators: The conceptual method exists to combine indicators exists (Elliot et al, 2018), and some methodological gaps were also progressed, but in terms of MSFD criteria integration, there is still a conclusion that the Broad habitat type is the last relevant integrated reporting unit, and that there is currently no sense to integrate the different information and results between different pressure type in a single value (D6C5). A dashboard of results of all other criteria contributing to D6C5 would be more relevant, both ecologically, scientifically and for management issues.
- Thresholds Values: this is a very challenging task, further work is foreseen on next steps, but it is not foreseen that Threshold Values will be fully developed by QSR2023. Different regions are at different level of development, both science and policy based questions need to be addressed. BH2a is the only benthic indicator with n agreed threshold. A 'Narrative' for a BH3 threshold has been described, and will be discussed in the next OSPAR relevant meetings.
- We will need to clearly indicate what will be each NEA PANACEA product and what could be a QSR input, because an agreement have to be reached at several OSPAR committees levels and this can be challenging according to QSR2023 timeline. Nevertheless, the Nea Panacea timeline is currently fitted to submit all products end 2022, which would enable submission of all products to end 2022 COBAM and BDC meetings, and agreement in Spring 2023 for QSR production.
- There is substantial progress expected in the benthic habitat OSPAR QSR outputs compared to previous (2017) assessment outputs, recognizing that some state-pressure relationships are still not yet developed.

Main conclusions and actions on benthic outcomes from this workshop

ACTION: BH3 and BH4 leads to clarify with Danish and Swedish experts (Mats and Norbert) if data available (habitats and pressure) in the Kattegat and Skagerrak areas will enable respective assessments.

ACTION: Laurent to contact urgently French responsible to provides the dates to which the French data could be made available for OSPAR.

ACTION: OBHEG to propose and discuss during the next meetings, specific lists of species, related to sensitivities at defined pressure, or functional groups. UK and Activity 2 teams to interact to incorporate relevant sensitivity species lists, notably with Spanish, French and Portuguese teams for Region IV, and in general with experts from any relevant biogeographical (sub)region to be assessed by BH3.

ACTION: Methods to be clearly described in each indicator CEMP document, and clearly highlighting for BH3 what is new compared to previously agreed BH3 CEMP guideline.

ACTION: Further progress and application of these methods to be reported and discussed in the OBHEG future meetings, also with Nea Panacea tasks 3.2 (BH1), 3.4 and 3.5 (BH3 development and scenario) and 3.7 (thematic assessment).

ACTION: Links between indicators, integrated methods and MSFD GES criteria to be clarifie by OBHEG. Petra Schmitt (DE) to send the TG Seabed doc to all group + Silke: *SEABED_6-2021-03rev2_GDArt8-D6_short-draft_20210628.doc*

ACTION: Indicator leads (and teams) to consider biogeographical variation (and related subdivision) of species communities and sensitivities lists of habitat types in each OSPAR (sub)Region when testing or assessing indicators, notably for BH1 and BH2 indicators, and sensitivity data underpinning BH3 and BH4 assessments. A coherence is needed to enable integration between indicators.

ACTION: Benthic, NIS and any other interested expert group lead to plan mixed discussion and potential resources for progressing conceptual integrated methods, based on current respective indicators and assessment methods, to assess the effect of NIS on biodiversity component (as part of biodiversity AND a biological pressure).

ACTION: to all experts to review Emily's Excel file and identify gaps in the measures linked to them biodiversity component.

ACTION: Laurent and Cristina (OBHEG co-chairs) to progress (numerically) this Benthic habitats' thematic assessment draft and share with OBHEG (and Lena) to progress discussion and testing contents at next OBHEG and COBAM meetings.

AGENDA ITEMS AND MINUTES

SuperCOBAM workshop main goals

SuperCOBAM is intended to support the delivery of the ICG-COBAM biodiversity assessments for the QSR2023 (this means all expert groups and the assessments they produce, not just those supported by NEA PANACEA). It is an opportunity for expert groups to convene and have some dedicated discussion or writing sessions (depending on the need of the expert group). At the same time, SuperCOBAM is an opportunity to exchange information with the other expert groups, align procedures and approaches where needed and discuss topics of a cross-cutting nature. Part of NEA PANACEA is executed by experts from the ICG's on eutrophication and eutrophication modelling (ICG-EUT, ICG-EMO), who will also be present to explore and discuss matters of a cross-cutting nature.

Day 1 – Wednesday the 20th of October 2021

Offline sessions

1. **Pre-discussion: SuperCOBAM**

This session aimed to discuss and agree about main aims and expected outcomes of this workshop, which are summarized here and in Figure 1:

- To inform each other about ongoing works, stumbling blocks, and to progress common understanding and language.
- To progress methods, also by learning from other groups (methods and spatiotemporal overlaps), keeping OSPAR and MSFD requirements and compatibilities in mind.
- Develop the narratives (story telling) of each thematic assessment. To develop concepts but prioritize what can really be done in the project timeline.
- To communicate results and produce key messages for OSPAR (ICG-COBAM, BiTA, BDC, COG, ICG-MSFD, ICG-QSR, etc), and European and national working groups (Science & Policy), about progress and anticipated products and remaining gaps towards a holistic assessment of the North East Atlantic Ecosystems.

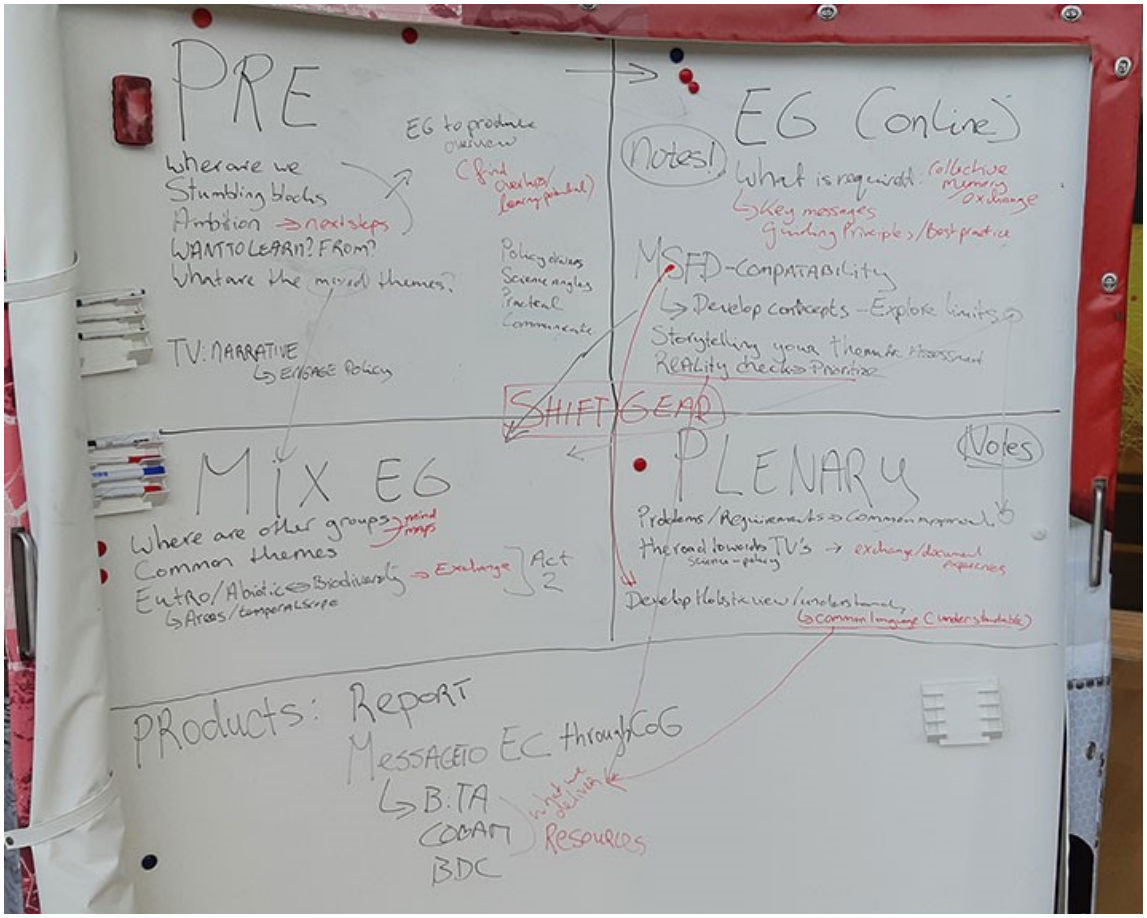


Figure 1: Live notes resulting of the pre-SuperCOBAM brains warm-up session

2. Pre-discussion: Assessment Scales and Spatial Integration

The Chair outlined the work plan. For each indicator, it is needed to present and discuss the features connected with state and pressure, as well as the theoretical (concept) and practical (data available) assessment area (region, subregion, part of the subregion, etc). For our works, we need to consider both OSPAR and MSFD marine regions.

Online sessions

3. Expert Group Meeting: update

Benthic group - *connection problems solved after several minutes,* tour de table of all participants.

The OSPAR Benthic Habitat Expert Group (OBHEG) had the opportunity to meet the previous day (See OBHEG 19/10/2021 minutes and presentations) and discuss the progress made for each indicator, notably on the data currently available and the work plans and progress made. Some work was done also to prepare SuperCOBAM sessions. It was decided notably to present and discuss the BH4 (by Petra), a TG Seabed document on assessment scales (by Sander) and the MarESA method (by Liam). About data, an action was already decided the previous day for indicator leads to state in a table on the data currently available (per country and data type), following OSPAR data calls. This will enable to know the real spatial coverage of the future assessment for each indicator.

During discussions in this session, some actions were decided in link with the data:

ACTION: BH3 and BH4 leads to clarify with Danish and Swedish experts (Mats and Norbert) if data available (habitats and pressure) in the Kattegat and Skagerrak areas will enable respective assessments.

ACTION: Laurent to contact urgently French responsible to provides the dates to which the French data could be made available for OSPAR.

Some intersessional works was also done by some indicator leads to produce a table describing each indicator theoretical assessment scale and data requirement (Annex 2).

4. Lena Avellan: OSPAR secretariat information and resources for the QSR

- Presentation by Lena Avellan (OSPAR Secretariat): OSPAR QSR2023 guidance document

This document notably includes a table describing current assessment scales and areas for biodiversity components. One challenge is to discuss/agree on common or nested (ecological) subdivisions of Regions for all integrated assessments. Works should also consider, and be in coherence with, those from ICES and other European working groups.

For benthic habitats, the integrated assessment units are currently set at the OSPAR Region scale. During this workshop, works will be done to discuss the need, opportunity and consequences to further subdivide these Regions, notably according to a recent TG Seabed document (See presentation by Sander in the following session), based on biogeographical/hydrological areas. It would be interesting, if possible, to have similar or nested assessment areas between benthic and pelagic habitats.

5. Expert Group: Assessment Scales and Spatial Integration

Benthic group

- Presentation by Sander Wijnhoven (NL): Biogeographic subdivision proposal, by TG Seabed and ICES, of marine assessment units for OSPAR and MSFD

During the discussion, it was recognised that subdivision based on pelagic and ICG-EUT marine landscapes would make sense for benthic habitats as it implies specific biogeographical context. The potential consequences for each indicator was discussed:

- BH3 and BH4: Assessment are done at (Broad) Habitat Types scales, for each OSPAR Region. Thus, further subdivisions will not affect the resulting disturbance/lost maps, but rather the percentage of disturbance/lost per habitat type and per assessment unit (Region versus subdivision of Region).
- BH2a: Assessment is done at the Water Framework Directive waterbodies scale. Further subdivision will thus not affect the resulting waterbodies quality status, but rather the number and proportions of GES/not GES waterbodies per assessment unit.
- BH1 and BH2b: These indicators are at even finer scales (benthic habitat communities), and the natural composition of the benthic communities may vary depending on the

biogeographical context and area. It was not planned in the current Nea Panacea timeline, but it should be tested in the future, if sufficient data are made available, about the applicability and variation of results (including reference lists of species, biological traits) of these two indicators between biogeographical area (e.g. subdivision of Regions according to TG Seabed proposal).

As a first conclusion, it was agreed that subdivision of marine Regions, according to biogeographical areas influencing benthic communities (e.g. TG Seabed initiative), would make sense for benthic habitat assessments. Nevertheless, the exact delineation and source of subdivision have to be further discussed during this workshop. These subdivisions should then be tested, notably by studying the variations of the results of fine scale indicators (BH1, BH2), to be able to conclude. This will be considered in the works on data planned, but this test at OSPAR maritime area scale is not planned currently and will need extra resources, data and time to be conducted.

Offline sessions

6. Mixed Expert Groups:Assessment Scales and Spatial Integration

This session was the opportunity to open the discussion on assessment scales and biogeographical subdivisions of Regions to a wider audience, with experts from other biodiversity groups. Several subgroups were meeting in parallel. The following points are resulting from the discussion of a subgroup attended by the author of these minutes.

For benthic habitat, even if known through models and abiotic parameters, the current limitation of sampled benthic communities' available data (including lack of monitoring), and resources, in many OSPAR maritime areas, limit the capacity to model or even test and clearly characterize different biogeographical subdivisions. For MSFD and management of anthropic pressures, the risk-based approach is recommended and drive the monitoring, but for characterizing reference natural communities, biogeographical areas, and climate change effects, additional monitoring is also required.

For Fish, assessment is done pragmatically at regional scale, but ideally, it would be interesting to test subdivision of biogeographical or specific area (e.g. shallow waters, islands archipelago, etc.), as it influences fish communities and populations.

For marine mammals, it would be useful to scale down information observed at wide scales, also for population distributions' models.

For pelagic and food webs, the development and use of ecological indicators, based on model approach, would help to better understand and define ecologically relevant assessment units for marine ecosystems.

For integration between biodiversity component, common or nested assessment units are prerequisites. It would be interesting to test the current overlapping of the different assessment units used for indicators of the different biodiversity components. The gaps in data coverage will probably limit this exercise, but some areas could be identified where to compare assessment units at finer

scale. It would also help to identify areas which requires new data acquisition, notably in specific biogeographic areas, risk areas, or biodiversity hotspots.

It was recognised that this study was not planned initially for SuperCOBAM and requires more time, data and resources to be done properly. Its technical aspects and cooperation between experts should be identified and described for next steps and action plan resulting from Nea Panacea for QSR2023. Nevertheless, attending experts expressed the need to further progress this important step, even conceptually. As time was lacking to progress this task, it was planned to be further discussed and progressed later to another dedicated session of this workshop.

ACTION: Another dedicated session to progress this important preliminary step towards integration between indicators will be proposed to be held during this workshop.

About spatial and indicator integrations (next step and in preparation of day 2 dedicated sessions), it was highlighted that current approaches and use of "integration" term is quite different between mobile species and habitats, even conceptually.

Benthic habitats developed a conceptual integration between benthic indicators (EcApRHA project deliverables 2.3 and 4.1; Elliot et al., 2018), to assess the state per habitat type. There is no integration between habitat types, which is the final assessment reporting unit. The effects of each specific pressure type, for which data are available, are currently assessed separately, and cumulative effects of pressure is still a scientifically challenge.

Pelagic habitats do not consider currently any integration between pelagic indicators.

Food webs is by definition cross-cutting/integrating several biodiversity components and scales, but indicators are currently assessed separately and most of them focussed on one biodiversity component.

Mobile species (mammals, birds, fish) developed "decision rules" for integration within or between indicators, which is different of what is called integration for benthic habitats. For endangered species and commercial species of fish, the "One Out, All Out rule" (OOAO) is often used as a decision rule for integration between indicators.

Non-indigenous species are currently assessed at OSPAR by a unique indicator (NIS3), which de facto prevent any integration method for now.

7. Plenary discussion:Assessment Scales and Spatial Integration

The main key message from experts' subgroups were reported, and following key messages the next day by the organisation team:

- Meeting in person, and mixing expert groups is very fruitful and efficient, improving also coherence and mutual understanding. This should happen more often, and for longer work sessions, and ideally by dedicated resources planned by OSPAR.

- More works is needed to conclude on, and especially define, subdivisions of OSPAR regions relevant for all or several biodiversity components. The technical aspects were discussed and this task should be part of a future action plan. Nevertheless, the conceptual and potential subdivision will be further worked during this workshop.
- The ground-truth data currently available limits the models and possibility to characterise relevant biogeographical assessment units for several components, notably for (offshore) benthic and pelagic habitats' species communities.
- Whatever the assessment units or integration methods developed, it will be important to clearly communicate underpinning ecological reasons, and limits, for its use under MSFD or any other environmental management issue.

Day 2 – Thursday the 21st of October 2021

Offline sessions

1. Activity 2 café - A NEA PANACEA-specific event aimed at cross-cutting aspects of the project

The Nea Panacea activity 2 is transversal between ecosystem components, as it is focussing on assessment scales, eutrophication and food webs aspects, investigating tools to link pressure and state indicators in the context of the climate change. Among these tools, works are planned using satellite observation data (JMP EUNOSAT) and model analyses (LiACAT and ENA). These dedicated SuperCOBAM sessions aims to present planned tasks and investigate with OSPAR indicator leads which data could be relevant and available, and where, and how to link works planned.

- Presentation by Silke Eilers (NL): LiACAT and ENA models

The participants split in three "world café" subgroups, where discussion was chaired by Activity 2 task leads, and focussing respectively on satellites observation, eutrophication assessment, and models. The results of this session will be detailed in the full SuperCOBAM workshop report.

2. Pre-discussion: Integration of indicator results

As a logical next step after the preliminary required assessment scales and units, some discussions already started the first day on integration. The activity 2 concrete tasks will also reinforce the link between biodiversity components assessment. After the presentation later today to all participants of ongoing works in OSPAR expert groups ICG-EcoC (DAPSIR and bow-tie approaches) and CCEG (climate change), the chairs of expert groups and mixed subgroups will encourage participants to further works on these aspects of integrating indicators results, considering all this context.

Online sessions

3. ICG-EcoC: AdrianJudd

- Presentation by Adrian Judd (ICG EcoC): Drivers, Activities, Pressures, State, Impact, Response (DAPSIR) and "Bow-tie" approaches for the OSPAR biodiversity thematic

assessment.

Discussions after this presentation was about what ICG-EcoC and ICG-COBAM could do for each other, to be further discussed in following groups' meetings.

4. **CCEG: Stephen Dye**

Session cancelled (Participant not available)

5. **Expert Group: Integration of indicator results**

Benthic group

In the following of the previous day discussion (and today sessions), and as new methodological elements to be considered for integration method between benthic habitats' indicators, it was decided to discuss around two recent national initiatives from UK (MarESA method) and Spain (integration of BH1 and BH3, according to Elliott et al, 2018).

- Presentation by Liam Matear (UK): the UK initiative on the spatial aggregation of sensitivity of habitats: the MarESA method

This method is interesting as it proposes a compilation of known (and unknown) sensitivity categories, from species communities' level to Broad habitat types, which is one of the key methodological gaps highlighted in the current integration method (Elliot et al, 2018). It has the advantage to keep all finer scale information available, but the rule how to set a value (or range of values) to broader scales is still to be defined. Several options exist (OOAO, average, percentile, etc.) and would need more discussion depending of the aim and context of assessments.

These compiled sensitivity categories per habitat type may also contribute to define "confidence maps", based on the more or less complete level of knowledge, per habitat type, on species communities' sensitivities and variabilities. However, it was acknowledged that, whatever available and accurate would be a confidence map, in general, most of people will first look at the disturbance map, and few will make the effort to relativize the results according to the related confidence.

Before the next presentation on this integration methodological gap, a slide was presented to remind or present to new OBHEG members the method developed during EcApRHA and OBHEG, and as published in Elliot et al (2018).

- Presentation by Laurent Guérin (co-chair): EcApRHA Benthic integration method

The Spanish colleagues presented a national initiative based on this method and recent indicators progress.

- Presentation by José Manuel González (ES): The Spanish initiative on fine scale/wide scale integration between BH1 and BH3

This method, applied for Spanish MSFD assessment, and submitted for publication in Marine Policy, is also interesting as based on OBHEG previous works and proposing a simple and quantitative method for combining both indicators results. However, uncertainties linked to both indicators (sensitivities species lists, spatial resolution of state and pressure data, etc.) are also combined. With BH1, the species list used is a key element and depends of the (biogeographical) assessed area considered. For example, there is a need to include Region IV specific lists to BH3 matrices to enable its assessment in Region IV.

As a conclusion, it was acknowledged by the group that these two methods are both progressing the thoughts on the benthic indicators' integration methods, even if some methodological details still need to be clarified and tested to develop a fully operational methodology. These methods address different methodological gaps and could even be complementary if adapted in the integration method context. Respective UK and Spanish teams were encouraged to report progress on this at next OBHEG, where discussion on these aspects should be also progressed with the perspective of (sub)regional integrated assessments methods.

For MSFD, the recommendation discussed in TG Seabed should also be considered, and interactivity with OBHEG works facilitated. Each indicator, and integration methods, contribution to MSFD criteria should be clarified. A draft document was notably cited as important for integration rules.

ACTION: OBHEG to propose and discuss during the next meetings, specific lists of species, related to sensitivities at defined pressure, or functional groups. UK and Activity 2 teams to interact to incorporate relevant sensitivity species lists, notably with Spanish, French and Portuguese teams for Region IV, and in general with experts from any relevant biogeographical (sub)region to be assessed by BH3.

ACTION: Methods to be clearly described in each indicator CEMP document, and clearly highlighting for BH3 what is new compared to previously agreed BH3 CEMP guideline.

ACTION: Further progress and application of these methods to be reported and discussed in the OBHEG future meetings, also with Nea Panacea tasks 3.2 (BH1), 3.4 and 3.5 (BH3 development and scenario) and 3.7 (thematic assessment).

ACTION: Links between indicators, integrated methods and MSFD GES criteria to be clarified by indicator leads and OBHEG. Petra Schmitt (DE) to send the TG Seabed doc to all group + Silke: *SEABED_6-2021-03rev2_GDArt8-D6_short-draft_20210628.doc*

Offline sessions

6. Adrian Judd:Provisions

The results of this session will be detailed in the full SuperCOBAM workshop report.

7. Mixed Expert Group:Integration of indicator results

For this session, expert groups' chairs summarized and shared information on what was discussed in

respective groups, about assessment scales and integration methods.

For benthic habitat, one of the common assessment unit is the broad habitat (or other specific) type. The assessment units are thus nested in the assessment at Region or subregion levels. However, the biogeographical specificities of species communities (finer biological scale) and related sensitivities to each pressure type may influence each indicator assessment, per habitat type. Before any operational quantitative integration between indicators, the use of each of them and associated species and sensitivities lists should be tested and fixed. All indicator leads and teams are encouraged during them future works (short or longer term) to test this, notably between subdivision of the current OSPAR Region as discussed during this workshop and future works in OBHEG.

ACTION: Indicator leads (and teams) to consider biogeographical variation (and related subdivision) of species communities and sensitivities lists of habitat types in each OSPAR (sub)Region when testing or assessing indicators, notably for BH1 and BH2 indicators, and sensitivity data underpinning BH3 and BH4 assessments. A coherence is needed to enable integration between indicators.

A discussion started about integration perspectives for non-indigenous species (NIS). An expert remind that this discussion took place during a previous mixed group workshop (SuperCOBAM, June 2019, Paris). A preliminary idea was to combine the distribution/abundances of targeted NIS invasive species (as MSFD D2C2 criteria, biological pressure) to habitat maps, with a similar approach that BH3 and Elliot et al (2018) integration method, to produce a disturbance maps of habitats (as MSFD D2C3 criteria). Some functional aspects and case studies by the Food Web expert groups were also discussed. This should be further discussed in both groups, or better, together, to check relevant data (or area with data) available, and additional resources and work plan to test this. The consideration of NIS in benthic communities' lists, both for sensitivity to pressure, resistance/resilience and related biotope structure, functional groups and dynamics. These technical works are not possible during Nea Panacea and OSPAR QSR2023 timelines, but is identified as a perspective for future inter-component and experts' groups works. These perspectives could also be discussed and reported by experts in other working groups (e.g. TG Seabed, ICES, etc.)

ACTION: Benthic, NIS and any other interested expert group lead to plan mixed discussion and potential resources for progressing conceptual integrated methods, based on current respective indicators and assessment methods, to assess the effect of NIS on biodiversity component (as part of biodiversity AND a biological pressure).

8. Plenary discussion:Integration of indicator results

For this session, expert groups' chairs summarized and shared information on what was discussed in respective groups, about assessment scales and integration methods.

The draft results of the discussions on potential subdivision of OSPAR subregions, notably for benthic habitats, is presented in the Annex 3.

Evening event: Dinner at the Green House Restaurant

https://www.thegreenhouserestaurant.nl/about-the-green- house/

Day 3 – Friday the 22nd of October 2021

Offline sessions

1. **Activity 2 café - A NEA PANACEA-specific event aimed at cross-cutting aspects of the project.**

After the verbal presentation of the aim of this session, and file template send by email, indicator leads were invited to summarize in a wall the state of development and policy acceptation and implementation of respective indicator thresholds. The results of this session will be detailed in the full SuperCOBAM workshop report.

ACTION: Indicator leads to send to Lisette requested filed file per indicator, describing the respective narratives.

2. **Pre-discussion: Threshold Values and Thematic assessment**

The previous session highlighted the very various stages of development of thresholds between indicators. For habitats and food webs, they are mostly still at a conceptual stage. As big progress was made previous days in mutual understanding and options for assessment scales and integration, and as these stages are required to discuss about thresholds setting, it was decided by some experts (notably benthic and pelagic) to dedicate the 3rd day session to further progress this and thematic assessment, instead of the initially planned thresholds. For benthic habitats, dedicated meetings were already planned in the following weeks, to discuss thresholds specifically, and will contribute later on this topic.

Online sessions

3. **Response/Measures:Emily Corcoran**

In the context of the DAPSIR approach applied to thematic assessments, the "R" is linked to measures. This specific task was presented by the OSPAR contractor, Emily Corcoran.

Presentation Emily Corcoran: The "Response" part of the QSR2023 thematic assessment: workplan and ongoing inventory of measures per biodiversity component.

ACTION: All experts to review Emily's Excel file and identify/forward her gaps in the measures linked to them biodiversity component.

4. **Lena ex machina**

Lena (OSPAR secretariat) had the stage to address the questions that were raised during the workshop. This is a follow-up of day 1 and a preparation to day 3 following sessions. For benthic

habitat, it was proposed to discuss on the structure of the benthic habitats' thematic assessment, and Lena kindly agreed to participate to the Benthic Habitat expert group to present her draft proposal and work on it with benthic experts.

5. **Expert Group: Thresholds values**

Benthic group: Thematic assessment, according to assessment scales and integration

Discussion started around the drawn draft proposal presented by Lena of the structure of the "State" part of the DAPSIR benthic habitats' thematic assessment (Figure 2). In the light of previous discussion on assessment scales, subdivision of regions and integration, this proposal was received by the expert group as a very good structure, compatible with all indicators and previous discussions, and making also much clearer and concrete what to produce as a deliverable for the QSR2023. The main elements of this structure (also compatible with MSFD requirements) is about assessments per:

- OSPAR (sub)Region (sub to be further discussed through biogeographical previous are discussed)
- (Lines) Broad habitat types
- (Rows) Indicator results and/or related pressure type assessed (by each indicator)

During this discussion, it was made clear that there would currently make no sense (both ecologically, scientifically and for management issue) to merge the values from each indicator and pressure types (rows) to a unique value (MSFD D6C5 criteria) per habitat type, and it would be better to have all rows values available as a dashboard, to identify specific impacts… and gaps in state/pressure relationships currently assessed.

According to the big gaps (data and common indicator) in Regions I and V, there are currently initiative to inform them respectively by contributions from the Arctic Council and ICG-POSH (for listed habitats).

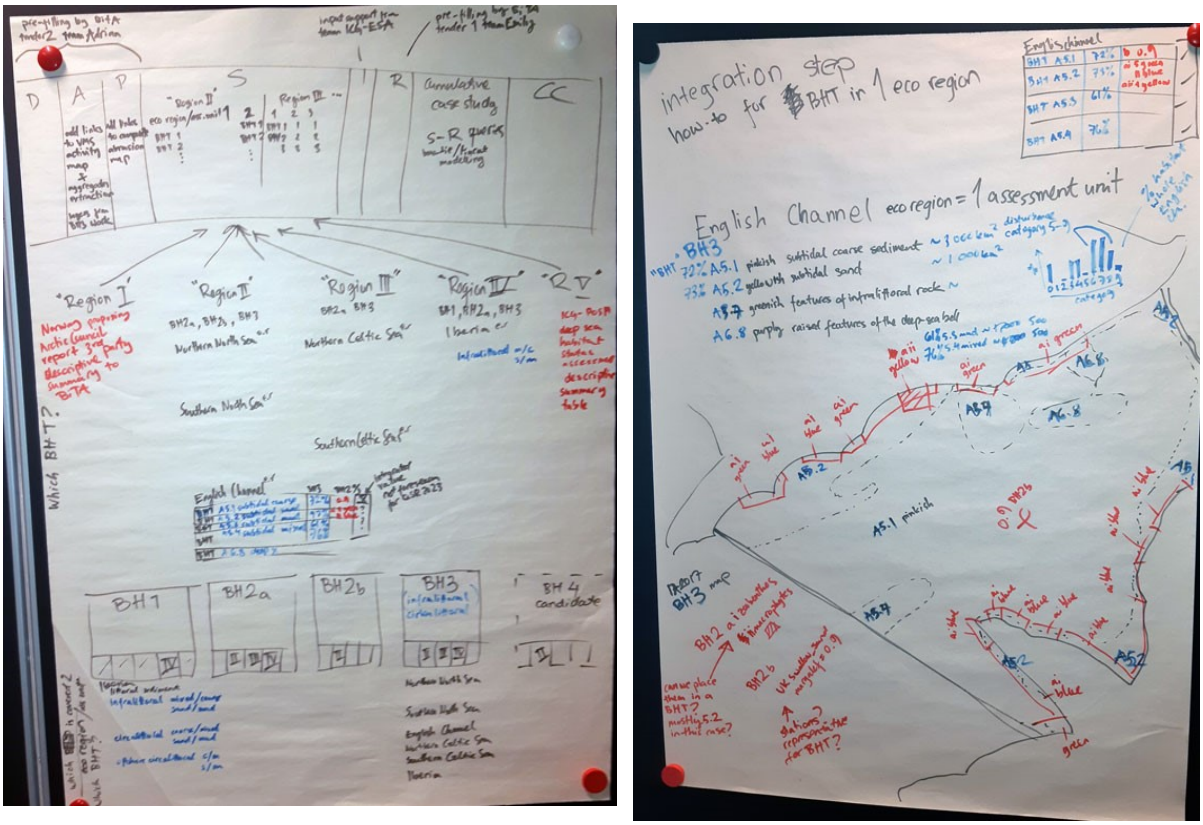


Figure 2: First and initial draws by Lena Avellan© of a proposed structure for the benthic habitats' thematic assessment

About combining indicators maps and assessments results (See the right part of Figure 2), by testing it conceptually in a subregion, it was recognised that there will be quiet few overlap, at least between BH2a (very costal waterbodies) and BH3 (offshore abrasion by fisheries, with gaps on very coastal fishing boats activity). Assessment of BH1 (BISI), BH2b and BH4 will be limited to parts of the Region II and should be tested when available. Same for the BH1 (SoS) assessment in Region IV, where there is already an initiative to combine BH3 and BH1 assessment here as a case study for integration between these indicators.

As a conclusion, this structure seems promising but should be further tested when all draft indicator assessment will be available, hopefully next Spring 2022.

ACTION: Laurent and Cristina (OBHEG co-chairs) to progress (numerically) this Benthic habitats' thematic assessment draft and share with OBHEG (and Lena) to progress discussion and testing contents at next OBHEG and COBAM meetings.

6. Mixed expert group:Thresholds values

For this session, expert groups' chairs summarized and shared information on what was discussed in respective groups, about assessment scales and integration methods.

For benthic habitat, it was recognised that there is currently only BH2a with agreed thresholds (through the benthic biological quality elements of the Water Framework Directive) and discussion for other indicator are currently at a preliminary stage, requiring more methodological development and to be tested by scenario when draft assessment will be available. There are notably some plans on this for

BH3 through Nea Panacea tasks 3.4 and 3.5. Nevertheless, progress made, presented and planned during these 3 days on indicator method and assessment development, assessment scales and integration, and thematic assessment are definitively building stronger foundation to enable in the future discussion and testing on benthic indicators' thresholds options and values.

Offline sessions

7. **Emily Corcoran (measures): provisions**

The results of this session will be detailed in the full SuperCOBAM workshop report.

8. **Lisette Enserink (thresholds): provisions**

The results of this session will be detailed in the full SuperCOBAM workshop report.

9. **Plenary discussion:Conclusions and take away key messages**

The workshop finished by a plenary session of all physical participants, trying in live to produce key messages about the outcomes of these 3 days workshop:

Pelagic experts

- D1C6 is not appropriate, justified with some bullet points, to be considered over the weekend
- Threshold values; might not be possible to develop so aiming for qualitative description on what is good status and what is not
- Spatial assessment unit: go for COMP4 eurosat units, further actions include exploring classifying by type
- Integration; SOMETHING

Benthic experts

- The stocktaking of data that is available was progressed and will enable when completed to clearly define area which will be really assessed (and start all indicators draft assessment!).
- Spatial assessment units: First proposal developed, shapefile to be created in next step. Aiming to align for all indicators which will make it easier to present information at the next level, notably the Benthic habitats' thematic assessment and explore links with other components, notably pelagic habitats' thematic assessment.
- Integration of indicators: The conceptual method exists to combine indicators exists (Elliot et al, 2018), and some methodological gaps were also progressed, but in terms of MSFD criteria integration, there is still a conclusion that the Broad habitat type is the last relevant integrated reporting unit, and that there is currently no sense to integrate the different information and results between different pressure type in a single value (D6C5). A dashboard of results of all other criteria contributing to D6C5 would be more relevant, both ecologically, scientifically and for management issues.

- Thresholds Values: this is a very challenging task, further work is foreseen on next steps, but it is not foreseen that Threshold Values will be fully developed by QSR2023. Different regions are at different level of development, both science and policy based questions need to be addressed. BH2a is the only benthic indicator with n agreed threshold. A 'Narrative' for a BH3 threshold has been described, and will be discussed in the next OSPAR relevant meetings.
- We will need to clearly indicate what will be each NEA PANACEA product and what could be a QSR input, because an agreement have to be reached at several OSPAR committees levels and this can be challenging according to QSR2023 timeline. Nevertheless, the Nea Panacea timeline is currently fitted to submit all products end 2022, which would enable submission of all products to end 2022 COBAM and BDC meetings, and agreement in Spring 2023 for QSR production.
- There is substantial progress expected in the benthic habitat OSPAR QSR outputs compared to previous (2017) assessment outputs, recognizing that some state-pressure relationships are still not yet developed.

BiTA query on State chapter content

- BiTA query on State chapter content: Structure and components has been discussed and clarified. Post-meeting, would be good if experts could go into the 0301_doc in BiTA on sharepoint to fill it in.
- Bow-tie / ICG-EcoC and LiACAT approach, good discussion to clarify how they link up, follow-up on the agenda to continue the discussion.

Bow-tie & LiACAT

- Good discussion to clarify how they link up, on the agenda to continue the discussion

General comments

- Joining and mixing groups (such as biodiversity and eutrophication) in a physical meeting was very successful, this should be taken into account in the future and that such meetings should be resourced from OSPAR Contracting Parties.
- It was considered extremely fruitful to have mixed expert group discussions. We should consider back-to-back meetings for expert groups to allow for more mixing.
- Topics are dense and complex, difficult to come to closure on all topics so maybe need to focus on one topic that can be closed and concluded on in the future.
- QSR timelines are pressed, important to remember that NEA PANACEA should also have time and space to explore new approaches for example on food webs and be part of the project deliverables even if not QSR 2023 products.
- Come forward with proposals for what topics can be best handled at ultraCOBAM by those who will be invited to that meeting. UltraCOBAM will be physical meeting with biodiversity experts.
- Hybrid superCOBAM has been inclusive which is good, but it is also dragging down the live physical event. The ultraCOBAM would be fully live.

Annex 1: Minutes of the OBHEG 19th of October 2021 meeting

Annex 2: SuperCOBAM initiative to start a table on some indicators to describe and compare their theoretical assessment scales and data requirements

Indicators assessment scale_HB_(Embedded Excel file)

OSPAR indicators: Data requirements and assessment scales

Indicator	Biodiv component	Pressure(s)?	Theoritical assessment scale	Type of Data (data calls & requests)	Data = 2022 pragmatic assessment area	Comment
BH1	community -> typical species	Any but species list adapted to pressure type	(biogeo) subdivision of region	Stational, several countries from Regions II, III, IV	(part of?) Region IV + (south) part of Region II (where commonly agreed + limited resources)	Action Laurent = check with FR "chantier collecte de données" for FR data BH1/BH2b
BH2a	community some coastal habitats	nutrient+organic enrichment (eutro)	coastal waterbodies	EEA WFD Database (to be completed by UK national data post-2017)	Coastal waterbodies region II, III, IV (data for all coasts, but political)	Action Anna = check with national experts/WFD contacts, if waterbodies shapefile are ok, and then after, if benthic quality results are ok and complete (after
BH2b	community	abrasion by fisheries	(biogeo) subdivision of region	Stational, several countries form Regions II, III, IV	South part of Region II (where commonly agreed + limited resources)	Action Laurent = check with FR "chantier collecte de données" for FR data BH1/BH2b
BH3 (abrasion fisheries)	Broad HT (+ OHT?)	abrasion by fisheries	OSPAR region	BHT EUSeamap 2021 + VMS abrasion (2021)	Offshore Region II, III, IV (data all region but political)	Spanish data in, but not PT = issue for part of Region IV where PT fleet operate with bottom trawling + VMS boats
BH3 (aggregates)	BHT? OHT?	aggregates extraction	(Coastal?) Areas where aggregate activities occurs	BHT EUSeamap 2021 + aggregate data call ongoing (2021)	Offshore Region II, III, IV (where data available)	
BH4 (~~cumulate~~ multi-activities)	Broad HT (+ OHT?)	Several activities (See DPSIR theatic)	(Coastal?) Area where assessed activities occurs	BHT EUSeamap 2021 + VMS abrasion (2021) + aggregate data call ongoing (2021) + Wind farms + etc...	All Region II including Channel (where pilot agreed + limited resources)	
PH1FW5	community - functional groups	climate change, eutrophication, maybe fishing	(biogeo) subdivision of region	Stational and Continuous Plankton Recorder, several countries from Regions II, III, IV	**Regions II, III, IV though there are some areas that may not have data**	**Still waiting on FR data. CPR data will be ready to use.**
NIS3	species (of taxonmic groups)	Is a (biological) (source of) pressure	*[(biogeo) subdivision of?]* region	National new introduction recorded per time periods	To be informed by Peter S (data available, works plan) and discussed through NIS-EG (relevant scale)	Action Laurent = check with FR "chantier collecte de données" for FR data NIS3

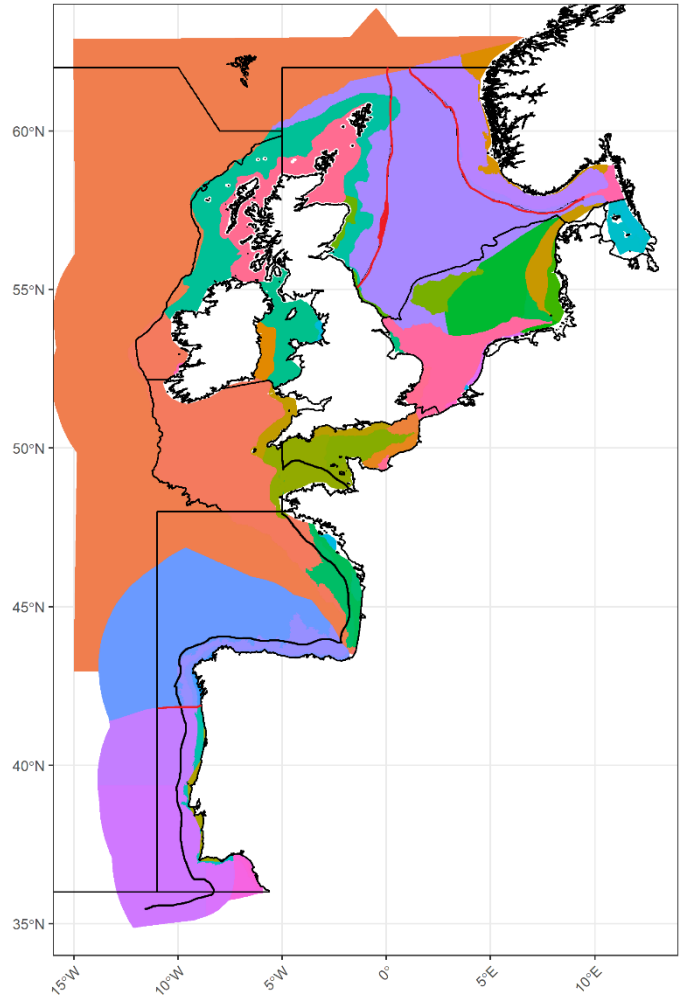
SuperCOBAM: Biogeographic subdivision of regions still to be decided, in link with marine pelagic landscapes (See TG Seabed/ICES proposal) to merge assessments for several issues (OSPAR, MSFD, national, etc)

Activity 2 (Silke) on Dogger bank : UK data = Stefano to check if Dogger bank data under BH1 call are included, and then can be used for FW to check also if biomass is a parameter in these data)

Kategatt/Skategatt = poor definition for habitats maps = limitation to apply BH3 and BH4. Data exists but still confidential. Cristina/Liam to check with Norbert how to solve this if possible to solve this in time for BH3/BH4 assessment needs

Annex 3: Draft results of the discussions on potential subdivision of OSPAR subregions, notably for benthic habitats

Red lines = to be decided, needs further national consultation to settle



- English channel as in IA2017 BH3 (note OSPAR Region II/III boundary change to align with MSFD sub-area)
- Southern North Sea as in IA2017 – but double check exact line to see if it can be aligned with ecoregion of ICG-EUT/pelagics line, check whether aligned with the bird-boundary as well
- Northern north sea 1 unit as in IA2017 or 3 as proposed by TG Seabed? CONFIRM if we are to ALIGN WITH MSFD sub-region boundary in the north?
- Celtic seas north as in IA2017 – CONFIRM if we are to ALIGN WITH MSFD sub-region boundary in the **north** and **westwards to 200nm**?
- Celtic seas south as in IA2017 - CONFIRM if we are to ALIGN WITH MSFD sub-region boundary in the **north** and **westwards to 200nm**?
- Iberia – split along 800m depth contour in shallow/deep, then split horizontally (keep where it is now ie. ICG-EUT/pelagic boundary alignment OR move a bit south to align with TG Seabed proposal) ADD a red line for Cadiz?

SuperCOBAM threshold values session

Inventory of baseline and threshold value narratives and underlying reasons for choosing a specific narrative

Expert group	Indicator	Expert name	Baseline Type of narrative	Motivation	Threshold value Type of narrative	Motivation
Food webs	FW9: Ecological Network Analysis (Multitrophic Level Indicator)	Ulrike Schückel	Still under discussion: Percentile approach (still under discussion) or to use the starting year of the Habitat-Directive (1992) for coastal food webs	A pristine/historic situation is currently missing	Trend-based approach/threshold setting method	A pristine/historic situation is currently missing
Pelagic habitats	PH1/FW5 (and PH2 and PH3)	Abigail McQuatters-Gollop	For PH1/FW5, we will use the assessment period as our consistent period across lifeforms, datasets, and spatial areas. We will then use the rest of each time-series as our comparison period.	We have this approach because we have time-series of all different lengths. If we take the oldest period available across all of them to use as our baseline (2008-2014) we lose way too much interpretive information and context.	What's most important for all three pelagic habitats indicators is what is driving the observed change. Therefore our narrative will focus on drivers of change as this is the information most useful to managers and for interpreting change in other food web indicators.	Right now we feel that TVs probably won't work for our pelagic indicators but we have some ideas to test around Ecological Quality Ratios or p values in trends, etc, that will still allow us to determine GES or not GES. Either way, the narrative is key in linking drivers of change to indicator change.

Marine birds	B1 (Bird Abundance).	Stefano, Matt, Volker	LIMIT REFERENCE LEVEL	In the lack of information of abundance level in pristine areas, the indicator uses the starting point levels from long term time series (30-40 years of data) as baseline. Considering the length of the time series the broad assumption is that pressures affecting bird abundance were less intense albeit unlikely at pristine levels	LIMIT REFERENCE LEVEL	The indicator uses 70% of the baseline as a threshold for good condition for species laying >1egg (or 80% for species laying 1 egg). These thresholds are derived from statistical properties of normal distribution (70% of observation will fall within one standard deviation of the mean) The higher TV for species laying more than 1 egg account of the greater resilience in terms of reproductive capacity
Marine birds	B3 (Bird Productivity)	Stefano, Matt, Volker	LIMIT REFERENCE LEVEL	The indicator does not use a traditional baseline. The indicator uses the population growth rate which, if sustained, would lead to a decline in population size of under 30% over three generations, this TV keeps the species above the IUCN level for Vulnerable	LIMIT REFERENCE LEVEL	The indicator does not use a traditional baseline. The indicator uses the population growth rate which, if sustained, would lead to a decline in population size of under 30% over three generations, this TV keeps the species above the IUCN level for Vulnerable
Marine birds	B5 (Seabird Bycatch)	Stefano, Matt, Volker	REMOVAL OF CONSERVATION TARGETS	The indicator does not use a traditional baseline. The indicator applies population viability analyses to model two scenarios of population trajectories (one with pressure occurring, one without), the difference in modelled population size between these two scenarios is used to assess whether bycatch has “threatened long-term viability”.	REMOVAL OF CONSERVATION TARGETS	The indicator does not use a numerical TV. The target is that the long-term population viability is not threatened by bycatch

	B7 (Sea Habitat Quality)	Stefano, Matt, Volker	ACCEPTABLE DEVIATION FROM HISTORIC OR PRISTINE STATE	The baseline for the indicator is Habitat undisturbed by human activity	ACCEPTABLE DEVIATION FROM HISTORIC OR PRISTINE STATE	Only a certain amount of disturbance would be acceptable but the TV is not yet defined
Marine mammals	M3: Seal abundance and distribution	Anita Gilles	Baseline set to 1992 (or start of the data series)	The baseline chosen (1992) relates to that used by some Member States for reporting under the European Union Habitats Directive (Council Directive 92/43/EEC).	Assessment value 1:" No decline in seal abundance of > 1% per year in the previous 6-year period (this is approximately 6% over 6 years)." (short-term); Assessment value 2: "No decline in seal abundance of >25% since the fixed baseline in 1992 (or closest value)." Long-term	The 25% (long-term trend) currently approximates to 1% a year since 1992. Testing shows that there is sufficient monitoring to assess against this assessment value with confidence. Where a shorter timescale is assessed, the 25% decline since the baseline is not equivalent to those AUs where data do extend to 1992 (for example, a 25% decline since 2003 describes a more rapid contraction in the population than a 25% decline since 1992). Two assessment thresholds were used to address the issue known as 'shifting baselines'. With a shifting baseline, each successive assessment is comparing slightly different sets of consecutive data points. This could allow an indicator to continually decline at a slower rate than the threshold value, so much so that after many years, the population may have declined substantially without actually being below the threshold value. To avoid the problem of shifting baselines when using the rolling baseline applied in assessment value 1, an assessment value relating to a fixed baseline is needed (assessment value 2).

Marine mammals	M4: Cetacean abundance and distribution	Anita Gilles	Baseline set to 1992 (or start of the data series)	The baseline chosen (1992) relates to that used by some Member States for reporting under the European Union Habitats Directive (Council Directive 92/43/EEC). The rate of decline (see below) is assessed for each species-specific assessment unit by comparing the latest abundance estimates with the baseline, equal to the earliest reliable population estimate for the assessment unit (e.g. from SCANS or SCANS II/CODA.)	For each assessment unit: Assessment (1) maintain [insert species name] population size at or above baseline levels with no absolute decrease of >30% AND Assessment (2) a rate of decrease no greater than 30% over three generations.	The proposed trend-based threshold has two parts: (1) The first part specifies no absolute decrease and is relevant irrespective of a time period. (2) The second part allows to compare an annual trend: i.e. thresholds are an annual rate of decline in abundance that must not be exceeded. These annual rates of decline, if sustained over three generations, will lead to 30% decline in abundance. The generation time varies between species which causes the different thresholds per species; e.g. the shorter the generation time the higher the annual threshold rate. Importantly, although thresholds are based on the IUCN criterion of a 30% decline over three generations, it is not necessary to wait for three generations for the assessment.

Marine mammals	M5: Grey seal pup production	Anita Gilles	Baseline set to 1992 (or start of the data series)	The baseline chosen (1992) relates to that used by some Member States for reporting under the European Union Habitats Directive (Council Directive 92/43/EEC).	Assessment value 1:" No decline in grey seal pup production of > 1% per year in the previous 6-year period (this is approximately 6% over 6 years)." (short-term). Assessment value 2: "No decline in grey seal pup production of >25% since the fixed baseline in 1992 (or closest value)." (long-term)	The 25% (long-term trend) currently approximates to 1% a year since 1992. Testing shows that there is sufficient monitoring to assess against this assessment value with confidence. Where a shorter timescale is assessed, the 25% decline since the baseline is not equivalent to those AUs where data do extend to 1992 (for example, a 25% decline since 2003 describes a more rapid contraction in the population than a 25% decline since 1992). Two assessment thresholds were used to address the issue known as 'shifting baselines'. With a shifting baseline, each successive assessment is comparing slightly different sets of consecutive data points. This could allow an indicator to continually decline at a slower rate than the threshold value, so much so that after many years, the population may have declined substantially without actually being below the threshold value. To avoid the problem of shifting baselines when using the rolling baseline applied in assessment value 1, an assessment value relating to a fixed baseline is needed (assessment value 2).

Marine mammals	M6: Marine Mammal Bycatch (Harbour porpoise Phocoena phocoena; common dolphin Delphinus delphis; grey seal Halichoerus grypus)	Anita Gilles	None	We do not need a baseline because the approach consists, for common marine mammal species, in setting the conservation objective as a maximum tolerable deviation from the carrying capacity (depletion).	For cetaceans - Conservation objective: “A “population” should be able to recover to or be maintained at 80% of carrying capacity, with 80% probability, within a 100-year period.” For seals - Conservation objective (follows the US Potential Biological Removal PBR approach): “A population will remain at, or recover to, its maximum net productivity level MNPL (typically 50% of the populations carrying capacity), with 95% probability, within a 100-year period.”	The threshold describes a limit to human-caused mortality. The threshold setting method is model-based and incorporates life-history and demographic parameters specific to the species and population assessed. The threshold has undergone thorough testing to ensure robustness against uncertainties and possible biases in the data.

NIS	Peter Anton Upadhyay Stæhr	focus on the approach applied in the IA2017. Basically this compares the number of new arrivals in separate 6 year periods. In addition to this, we have ongoing analysis to investigate thresholds based on absolute vs relative changes.

List of participants

Note that this list only includes the online participants that were registered. The organizers did not have a view on whether all registered participants actually attended all or parts of the sessions, nor whether unregistered participants took part in the sessions.

Physical presence (25)

Artigas, Luis Felipe
Avellan, Lena
Blauw, Anouk
Dierschke, Volker
Eilers, Silke
Enserink, Lisette
García-Alegre, Ana
Gilles, Anita
Gonzalez Irusta, José Manuel
Guérin, Laurent
Heyden, Birgit
Holland, Matthew
Lizinska, Anna
Lizon, Fabrice
Louchart, Arnaud
Marra, Stefano
Matear, Liam
McQuatters-Gollop, Abigail
Mitchell, Ian
Parsons, Matt
Raabe, Thomas
Schilder, Jos
Schmitt, Petra
Vina-Herbon, Cristina
Wijnhoven, Sander

Online presence (66)

Alves, Filipe
Angelico, Maria
Authier, Matthieu
Banga, Roma
Bartilotti, Cátia
Bear, Beth
Best, Mike
Blomqvist, Mats
Bluemel, Joanna
Bresnan, Eileen
Carbonell Quetglas, Aina
Carmo, Vanda
Chabrolle, Antoine
Churro, Catarina
Clarke, Maurice
Coleman, Paul
Comas, Robert
Devlin, Michelle
Dinesen, Grete E.
Dinis, Ana
Duncombe-Smith, Stephen
Emmerson, Richard
Frazao, Barbara
Frederiksen, Morten
Geelhoed, Steve
Gizzi, Francesca
Godinho, Lia
Haas, Fredrik
Haelters, Jan
Henriques, Filipe
Jakobsen, Hans
Jelmert, Anders
Johansen, Marie

Online presence (cont.)

Johns, David
Kabuta, Saa
Kreutle, Axel
Leahy, Yvonne
Leiknes, Øystein
Lloyd-Hartley, Hannah
Lobo-Arteaga, Jorge
Lynam, Christopher
Machairopoulou, Margarita
Menezes, dilia
Montereale Gavazzi, Giacomo
Moura, Teresa
Neves, Verónica
Nogueira, Enrique
Nunes, Pedro
Oliveira, Paulo
Otero Matias, Joana
Petersen, Ib Krag
Pierce, Graham
Rombouts, Isabelle
Ruiter, Hans
Schückel, Ulrike
Silva, Alexandra
Sobrinho Gonçalves, André
Stæhr, Peter Anton
Stern-Kluckner, Rowena
Taylor, Nikki
Tett, Paul
Tilstone, Gavin
Torres, Maria Angeles
Van Hoey, Gert
Wennhage, Håkan
Woodcock, Kirsty