



***MARINE STRATEGY FRAMEWORK DIRECTIVE: SUPPORT TO
THE PREPARATION OF THE NEXT 6-YEAR CYCLE OF
IMPLEMENTATION***

“DG ENV/MSFD 2020”



Interim Report

(01 Mar 2021 - 28 Feb 2022)

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Title – NEA PANACEA (North East Atlantic project on biodiversity and eutrophication assessment integration and creation of effective measures)

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1. General remarks

In general, the Activities are well on track. NEA PANACEA has provided a major input of energy into the associated expert groups, promoting the work of OSPAR towards delivery of the QSR and EU Member States' MSFD reports. Interaction between expert group members from different OSPAR Contracting Parties has increased, interaction between OSPAR expert groups was achieved (also those not directly associated with NEA PANACEA) and the conversation between biodiversity experts and experts from the pressures and human activities groups was stimulated. In terms of problems encountered, we note that most delays are data-related. Part of the success of NEA PANACEA is that not only could data calls actually be issued, but they were also broader in scope than previous data calls. This resulted in many Contracting Parties delivering data late, not quite in the right format or not with for example the anticipated taxonomical resolution. Personnel issues (finding and hiring personnel timely, replacing of personnel switching jobs) were also in some cases encountered. Dealing with the mentioned problems has led to delays, and while it is expected that the intended products can be delivered there may be a need for some additional time at the end of the Action (see section 5).

By communicating the projects' aims in multiple relevant OSPAR fora (most notably ICG-COBAM, ICG-QSR, BDC and HASEC) we have ensured that all OSPAR Contracting Parties, and therefore also all EU members states that are Contracting Party to OSPAR but not directly involved in this project were not only aware of the project but also in a position to reflect and comment. The scientific work is being channelled through the relevant Expert Groups under ICG-COBAM (benthic habitats, pelagic habitats, food webs and marine birds) giving all EU member states opportunity to monitor progress and contribute where they see fit through their experts. By having the SuperCOBAM workshop (as well as the UltraCOBAM workshop still planned to happen) also cover biodiversity topics outside the scope of the project (fish, non-indigenous species and marine mammals) NEA PANACEA has also managed to support delivery of the OSPAR products underpinning MSFD reporting for EU MS for those ecosystem components.

2. Activities taken and problems encountered

In this section the progress for each of the 23 Tasks executed by the 5 Activities in NEA PANACEA is described. These Tasks and Activities correspond directly with those in the grant agreement. A general description of activities undertaken is provided as well as a description of the problems encountered (if any). The state of play on delivering the associated milestones and deliverables is reported in section 3.

Activity 1 – Pelagic Habitats

Activity 1 focuses on 3 pelagic habitats indicators, but also supports 2 food web indicators associated with the pelagic habitat, delivering products that support EU MS MSFD reporting on D1C6, D4C1, D4C2 and D4C4:

- PH1 - Change in plankton communities
- PH2 - Change in plankton biomass
- PH3 - Change in plankton diversity
- FW2 - Phytoplankton productivity
- FW6 - Biomass, species composition and spatial distribution of zooplankton

It features one task (1.1) on improving data coverage (spatial and data type), facilitating data ingestion after the data call, and making data available to OSPAR CPs and EU MSs. There are three tasks (1.2, 1.3 and 1.5) focused on the development and delivery of the abovementioned indicators and one (1.4) on the integrated assessment of pelagic habitats using information from all pelagic indicators. Task 1.5 also focuses on linking the pelagic and food web indicators to each other and to eutrophication assessments (consider e.g. assessment scales, data used and interpretation of trends).

[Task 1.1: Expanding data coverage and developing data tools to support robust assessment](#)

Activities undertaken

- The initial data call was issued with a deadline of 31 August 2021.
- The deadline was extended to 1 December 2021 to allow additional late submissions.
- 32 abundance and 15 biomass datasets were received from the data call from contracting parties: BE, DE, DK, ES, NL, PT, SE, UK.
- This has greatly expanded the datasets available for the pelagic assessment, which were previously limited to SE and UK.
- The datasets have been cleaned and uploaded to DASSH, where they are now available to be downloaded via the PLET tool.
- Additional Aphia IDs from the new datasets have been included in a new version of the master taxa list, which is still awaiting expert feedback before it can be integrated into the PLET.
- DOIs have been added for some datasets, but some of the new datasets still need to be issued DOI with appropriate metadata.
- “Copepod” has been added to the PLET as an additional option for lifeform extraction to support development on PH2.

Problems encountered

- Several data providers were unable to organise their datasets or receive their necessary internal approvals in time for the 1 December deadline. This resulted in several contracting parties having no data for this assessment.
- Ingestion of new datasets resulted in many errors (mostly inconsistent formatting issues, missing values, data holders modifying the submission template etc.) which were not remedied by the data providers prior to submission of data. This required considerable back and forth correspondence with data providers and additional cleaning effort on behalf of University of Plymouth and MBA to ensure datasets were suitably clean to host on DASSH. This may be inevitable but the need for this step could possibly be reduced with better early communication of requirements to data providers.
- Ingestion of new datasets resulted in ~1000 Aphia IDs which were previously not represented on the master taxa list. Functional trait information for these new taxa had to be added manually, which took considerable time and effort.
- There is a persistent issue with zero-values in the tool which is currently patched with a work-around. A structural solution may be devised after the assessment work and other deliverables are finished. A no-cost extension (see section 5) would give the involved post-doc the time needed to do this.

[Task 1.2: Refinement, operationalisation, and assessment of OSPAR's pelagic habitats \(and food web\) indicator PH1/FW5: Change in plankton communities](#)

Activities undertaken

- The base functions for the PH1/FW5 indicator tool have been translated from Matlab to R by Anthony Ndah at the Alfred Wegener Institute Helmholtz Centre for Polar and Marine Research.
- University of Plymouth has integrated these functions into an R markdown tool which integrates with output from the PLET to calculate the PH1/FW5 indicator for multiple polygon/lifeform pair combinations. It also assesses the time-series for all lifeforms, even if they are not part of a lifeform pair.
- This tool was developed from scripts written for the QSR2023 pelagic habitats assessment and has been thoroughly tested on the COMP4 eutrophication assessment areas developed by ICG-EUT which are currently used for reporting and have been developed with significant support from the EU funded JMP-Eunosat project.
- The tool has been tested extensively on multiple datasets with varying sampling duration and frequency.
- Some links to environmental drivers have been established at the scale of the COMP4 assessment areas through a random forest methodology. This method could not explain all lifeform abundance trends.
- Protocol for data ingestion has been written, based on content from the OSPAR data call, and has been uploaded to the QSR SharePoint.
- It has been decided that assessment thresholds will not be used for this indicator, as they do not make ecological sense in this context.
- A draft of the PH1/FW5 assessment for the QSR2023 has been developed. It has passed expert scientific feedback and has now been submitted to BDC to gain policy feedback.

Problems encountered

- There were some delays in initially receiving the base R functions, due to the author's requirements for extensive testing before they were comfortable sharing their functions.
- Linking to environmental drivers required the analysis to be limited to 1993-2019 due to the lack of older gridded environmental data (satellite or modelled) to correspond with older plankton samples.

[Task 1.3: Refinement, operationalisation and assessment of OSPAR's pelagic habitats indicators PH2: Change in plankton biomass and abundance and PH3: Change in plankton diversity](#)

Activities undertaken

- An already existing R code (developed for the French MSFD reporting) for PH2 and PH3 has been tested extensively on multiple datasets with varying sampling duration and frequency.
- This code has been tested on the COMP4 eutrophication assessment areas developed by ICG-EUT which are currently used for reporting and have been developed with significant support from the EU funded JMP-Eunosat project.
- Protocol for data ingestion has been written, based on content from the OSPAR data call, and has been uploaded to the QSR SharePoint.
- It has been decided that assessment thresholds will not be used for this indicator, as they do not make ecological sense in this context.
- A draft of the PH2 and PH3 assessment for the QSR2023 has been developed. It has passed expert scientific feedback and has now been submitted to BDC to gain policy feedback.
- A manuscript draft of the PH2 methodology is on track and should be submitted for publication in 2022.

Problems encountered

- Due to delays associated with the data delivery in response to the data call, draft assessments of PH2 and PH3 have not been fully completed (extended background and extended conclusion to be drafted still). The final version of each assessment will nevertheless be completed for BDC(2) 2022 in December 2022.

[Task 1.4: Integration within and across pelagic indicators](#)

Work on this Task had not yet started by the end of February 2022.

[Task 1.5: Linking pelagic indicators with food web indicators and their connection to other ecosystem components and MSFD-descriptors](#)

Work on this Task had not yet started by the end of February 2022..

Activity 2 - Eutrophication and physical conditions informing MSFD-D1, -D4 and -D6 assessments

NEA PANACEA specifically set out to connect MSFD descriptors horizontally and exchange data, tools and knowledge between different OSPAR (and MSFD) “silo’s”, because we considered this an area in which great advance can still be made to live up to the MSFD’s ambition of a holistic, integrated view on the marine environment. Activity 2 plays a central role in this aspect of NEA PANACEA, and is focused on eutrophication and climate change specifically. It also develops and delivers pilot studies of a food web candidate indicator (FW9: Ecological Network Analysis) that informs D4C1, -2 and -3 assessments of some EU MS.

Task 2.1 uses a literature-based model to investigate the projected impact of future climate change and eutrophication scenarios on biodiversity, to help interpret ongoing change in the indicators. It also seeks to link NEA PANACEA to the EU funded JMP Eunosat and Interreg V “Waterquality” projects. The FW9: Ecological Network Analysis indicator is further developed and pilot studies will be delivered in Task 2.2. In Task 2.3 the so-called COMP4 assessment units, which have been developed in the EU project JMP-Eunosat to assess OSPAR’s eutrophication indicators, are explored as a basis for also designating ecologically relevant assessment scales for pelagic and benthic habitats. Further, efforts are made to share the satellite data and model products that ICG-EUT and ICG-EMO have available. This Task aims to allow for more coherence in the interpretation of D5, and D1C6 and D6 assessments of EU MSs. Finally, Task 2.4 seeks to follow up on the MSFD Horizontal Issues: Threshold Values workshop held online in 2020. It investigates current baseline and threshold value narratives and methods developed in OSPAR for D1, D4, D5 and D6 and aims to promote coherence and invigorate the discussion on threshold value setting methods in OSPAR.

Task 2.1: Model tool LiACAT linking eutrophication and climate scenarios to biodiversity and food web indicators

Activities undertaken

- Investigation of available model input data together with Activities 1, 3 and 4.
- Decision reached on what pilot areas to use: Elbe Plume (eutrophication), Eastern North Sea (climate change), [Dogger Bank].
- Presentation delivered and engaged in discussion with biodiversity experts at the SuperCOBAM workshop.
- Species for input flow from LiACAT to ENA were selected.
- A data analysis of literature within LiACAT with regard to selected species was performed.

Problems encountered

- Analysis of input data was delayed because of unforeseen change in personnel at AquaEcology. New staff has been contracted, and data analysis has started.

Task 2.2: Operationalisation and assessment of OSPAR food web indicator FW9: Ecological Network Analysis (ENA)

Activities undertaken

- Investigation of available model input data together with Activities 1, 3 and 4.
- Decision reached on what pilot areas to use: Elbe Plume (eutrophication), Eastern North Sea (climate change), [Dogger Bank].
- Presentation delivered and engaged in discussion with biodiversity experts at the SuperCOBAM workshop.
- Draft indicator assessment in QSR template including further areas (Kattegat, Azores deep sea, POSH habitat blue mussel beds).
- Discussion between Activity 2 and the Food Web Expert Group about integration of food web indicators (related to Task 1.5).
- Presentation in ICG-EUT delivered on different case studies regarding selection of parameters related to climate change.

Problems encountered

- Analysis of input data delayed was because of unforeseen change in personnel at AquaEcology. New staff has been contracted, and data exchange between LiACAT and ENA has started.

Task 2.3: Identification of ecologically-relevant scales and areas for assessment of pelagic and benthic habitats

Activities undertaken

- Satellite primary production input data delivered to Activity 1 for the PH2, PH3 and FW2 indicator assessments.
- Presentation on satellite primary productivity data delivered and discussed with biodiversity experts at SuperCOBAM workshop.
- Paper submitted to Science of the Total Environment, presentations at ESA workshop and UK climate change workshop.
- Modelled physical and low trophic level data delivered to Activity 1.
- Presentation on eutrophication assessment areas delivered and discussed with biodiversity experts at the SuperCOBAM workshop.

Task 2.4: Towards coherent threshold value setting methods (for D1, D4, D5 and D6, where applicable) and Activity 2 synthesis report

Activities undertaken

- Inventory of methods for baseline and threshold value setting for indicator assessments undertaken in Activity 1, 3 and 4.
- Presentation delivered at SuperCOBAM workshop. Information on state of play with regards to baseline and threshold value setting methods collected from all present expert groups (marine birds, marine mammals, non-indigenous species, fish, pelagic habitats, food webs, benthic habitats).

Activity 3 - Benthic Habitats

Benthic habitats, the largest Activity in NEA PANACEA, (further) develops and delivers 4 indicator assessments that inform EU MS MSFD reporting on D6:

- BH1 - Typical species composition (D6C3 and -5)
- BH2a - Coastal habitats exposed to nutrient and organic enrichment (D6C5, WFD)
- BH3 - Extent of physical damage (D6C2, -3 and -5)
- BH4 - Benthic habitats loss (D6C1 and -4)

Work on these indicator assessments is performed under Tasks 3.2, 3.3, 3.4 and 3.6. Furthermore, Task 3.7 is aimed at the development and delivery of the integrated assessment of seabed status, informed by all the common benthic habitat indicators.

Task 3.1 sets out to inventory the baselines and elements used to define and assess GES for D6 in EU MS, with a specific focus on OSPAR CPs and connectivity to D4 and D5. Also in the context of ongoing work in ICES and EU TGSeabed, the aim is to identify technical solutions on how to deal with discrepancies between MSs. Because the analysis is at EU scale, it may also benefit other sea regions. In Task 3.5 the use of the BH3 indicator to evaluate measures (MPAs) is explored, by looking at any changes in the degree of sea bed disturbance in MPAs aimed to protect benthic features. Such an approach may not only evaluate past measures, but the outcome can also inform future measures.

Task 3.1: Review of MSFD GES national reporting for D6 versus OSPAR indicators and relationships with D4 and D5

Activities undertaken

The review and analysis report of the MSFD D6 GES is under review (advanced draft) for finalisation. It will then be ready on time for next steps and notably to be submitted and contribute to other ongoing project tasks on thresholds and management measures (Activity 2 and Task 3.5) and benthic habitats (all tasks under Activity 3). The final product is expected to be ready by August 2022.

Problems encountered

The production of this report was delayed due to more recent and complex material available (national MSFD reports). For example, the latest update (which is included in the analyses) of Bulgaria's national MSFD report was only available as a text report in the national language on 23 December 2021. Fewer direct references to OSPAR standards were found in the reported documents than initially expected. Therefore, more time had to be spent to identify these links ourselves by analysing the texts in great detail, sometimes in the national language of that MS. In the course of preparing the report, it was also decided to expand its content. The report will also show the links with other European Sea Conventions (HELCOM, Barcelona and Black Sea), which make the analyses more complex but more complete. The final report is currently at an advanced draft stage and will include information on indirect links defined between descriptors 4 and 5 and descriptor 6, which will help development of coherence between indicators. The final report will be available end of the summer 2022. This delay had no impact on the work and timeline of other tasks of this project, and will still be in time to contribute to some other tasks, notably those on thresholds and benthic thematic assessment (respectively task 3.4 and 3.7).

Task 3.2: Final development and first assessment of the Sentinels of Seabed indicator (BH1)

Activities undertaken

- Recruitment of a post-doc.
- Data standardisation from different sources.
- Methodological development of the BH1 OSPAR common indicator (CEMP guidelines finished)
- Methodological process to apply the BH1 indicator has been summarised in a function of R to simplify its use.
- Develop an extended (with more than 400 benthic species) biological traits database for the BESITO index (the index that feeds the BH1 when trawling pressure is evaluated).
- Testing the indicator in different biogeographic regions, in different MSFD broad habitats and under different pressures (pollution and trawling disturbance) to show its full potential and plasticity.
- Comparison between BH1 and other indicators to demonstrate its suitability concerning its objective.
- Definition of a range of BH1-threshold based on ecological information and showing the different scenarios obtained.
- Publication of a scientific article in which the methodology and applicability of the BH1 indicator are tested (the paper has been submitted to Ecological Indicators and is currently under revision).
- Development of the draft BH1 OSPAR indicator assessment.
- Integration of indicators, using BH1 outputs as BH3 (see Task 3.5) inputs.

Problems encountered

- The post-doc has been hired, but with a delay (in month 11 instead of month 8).
- Delay in the delivery of the French and Portuguese data (still waiting to have access) necessary for the completion of this task (it has been carried out only for Spanish data).
- It has not been possible to test the indicator in the French Bay of Biscay and the Portugal waters (areas from the OSPAR Region IV where BH1 is a common indicator) because we still do not have access to data from these subregions. Both Portugal and France have, for reasons not made clear to the authors of the data call, not yet delivered the requested data.
- The ecological robustness of the BH1 thresholds will improve if we manage to include the French and Portuguese data that we are expecting.

Task 3.3: Update the OSPAR BH2a benthic habitats indicator assessment and explore how it can inform or be integrated with other assessments linked to eutrophication or coastal habitats

Activities undertaken

- The BH2a updated draft CEMP guidelines and assessment was produced in time and was presented (for information and potential comments by OSPAR Contracting Parties) both to ICG-COBAM (December 2021) and BDC (April 2022). This will contribute to other ongoing tasks, and notably task 3.7 on the Seabed disturbance Thematic Assessment, and tasks under Activity 2 linked to eutrophication. The work on BH2a will continue to produce the final advanced draft of BH2a in October 2022, to be submitted to ICG-COBAM (November

2022) and BDC (December 2022) to contribute to the OSPAR Quality Status Report 2023 and the final NEA PANACEA product.

Problems encountered

- Much time was needed to upload and analyse all data available on the WISE-database. There were lots of discrepancies between data and waterbodies available between the 1st WFD reporting cycle (2004-2009) and the 2nd (2010-2015). In addition, the data on the 3rd WFD reporting cycle (2016-2021) are still not yet available on the WISE-database. This strongly limits the initially planned possibility to analyse trends. Nevertheless, links between works with other tasks (benthic habitats indicators, eutrophication, and Thematic Assessments) will enable the production of a more complete and advanced product than the one done for OSPAR 2017 intermediate assessment.

Task 3.4: Expansion and operationalisation of the OSPAR Extent of Physical Damage benthic habitats indicator (BH3)

Activities undertaken

- Review of the method and update some of the analytical steps for the fisheries data layers.
- Update method and collect new data on sensitivity for habitats and species for the production of a new spatial sensitivity data layer at higher resolution.
- Pilot the options for the aggregate extraction method.
- Data call on aggregate extraction activity issued through EIHA and BDC requesting data for the licenced areas, statistics and areas under activity/Volume and type of extraction and any spatial resolution data.
- Run of draft assessments with new fisheries data from the ICES data call and the updated sensitivity data layers to produce a first draft of seafloor disturbance from fisheries activities, and it was submitted to ICG-COBAM in December 2021.
- Organise and run a series of online regional focused technical workshop to review fisheries assessments results on fisheries disturbance and method, and identify any gaps.
- A hybrid workshop has been planned in London to review the final updated of fisheries disturbance method and to discuss the options for the aggregate extraction disturbance method with a view to produce a final draft assessment of results in June for submission to OBHEG and ICG-COBAM.
- A series of science-policy workshops were organised to discuss potential options for thresholds and a set of options was published alongside the draft assessments submitted to ICG-COBAM in December 2021.

Problems encountered

- The task is running according to the timetable but there have been issues regarding different views from experts on the update of the methods, which might cause problems later on.
- The data call on aggregate extraction has raised some queries regarding the availability of raw data from activities through public sources. We are currently in discussions with the OSPAR Secretariat on how to handle those.
- A large amount of resources was put on the coordination of engagement with experts, as much of that was done online, which is putting strain on the budget.

- At present there have been limited progress on the discussions of thresholds for BH3, partly hampered by the fact that all discussions have been online.
- The OSPAR thresholds for BH3 is also hampered by activities from the EU Commission TG SEABED which is currently undertaking a similar exercise for some of the benthic thresholds under MSFD D6 criteria. Some EU MSs in OSPAR were not willing to discuss scenarios developed under this task while the TGSeabed process was still ongoing.

Task 3.5: Evaluate the use of the Extent of Physical Damage indicator BH3 and other OSPAR information to guide assessment of effectiveness of management measures

Activities undertaken

- Exploratory options on the use of data layers have been taking place, but there have been some delays due to the work under task 3.6.
- Engaged with Emily Corcoran, contracted to lead the Response (DAPSIR) chapter of the 7 biodiversity Thematic Assessments, with views and comments.

Problems encountered

- Overall delays on this task due to the work under task 3.4, as there is a dependency of the method and data layers to be used for this task. This task being late in the chain of work that is planned, it has a risk of not being delivered before the end of the project or ending up being rushed, which would be unsatisfactory. It would surely benefit from a no-cost extension (see section 5).

Task 3.6: Development and first assessment of OSPAR indicator Area of habitat loss (BH4): Case study of OSPAR region II (Greater North Sea)

Activities undertaken

- The methodology for estimating physical loss by offshore structures has been further developed and an assessment of the spatial extent of offshore wind farms, oil / gas pipelines and platforms in OSPAR Region II (Greater North Sea) has been produced. A new method has been developed and applied for assessing the risk of loss by bottom trawling and aggregate extraction on benthic habitats. The indicator assessment is accompanied by an estimation of confidence. A draft assessment is available on the QSR sharepoint.

Problems encountered

- The indicator assessment is not yet finalised, as assessment units for benthic habitats are not yet agreed, an ongoing process in OSPAR expected to be resolved before summer 2022. Also, a separate assessment of OSPAR threatened and/or declining habitats is not yet included, as there were some issues with the data set. Final calculations of the indicator should be completed in May 2022.

Task 3.7: Production of the North-East Atlantic benthic habitats Thematic Assessment

Activities undertaken

- The Benthic habitats Thematic Assessment structure and elements were significantly progressed during the SuperCOBAM Workshop (October 2021), and online meetings throughout the past few months. A draft Thematic Assessment was presented (for information and potential comments by Contracting Parties) both to ICG-COBAM (December 2021) and BDC (April 2022), with the sections on Drivers, Activities and Pressures (DAPSIR) almost completed, and an advance draft on the Response (DAPSIR) chapter with measures and Impact chapter on impacts on Ecosystem services (DAPSIR). The next workshops planned in May (miniCOBAM) and June (UltraCOBAM) 2022 will be crucial to further progress this product, in line with advanced drafts of other tasks products. The final advanced draft of this Benthic Habitat thematic assessment is to be delivered in November 2022, to be submitted to ICG-COBAM (November 2022) and BDC (December 2022) to contribute to the OSPAR Quality Status Report 2023, EU MS MSFD article 8 reporting and the final NEA PANACEA product.

Problems encountered

- This Task and associated product strongly depend on progress made in other Tasks and input from, and agreement by, several OSPAR committees.
- The main structure and assessment unit was very recently (April 2022) agreed at OSPAR level. The strong links NEA PANACEA has with the OSPAR process should nevertheless enable the production of the final thematic assessment within the current OSPAR timelines (i.e. delivery of final version end of December 2022).
- There are some chapters which will still need further development in particular the Climate Change summaries and the finalisation on the chapter on impacts on ecosystem services (DAPSIR). These elements are part of the main focus of the UltraCOBAM workshop in June 2022.

Activity 4 - Marine birds - An assessment of marine birds in the Northeast Atlantic

Activity 4 revolves around Marine Birds assessments and collaboration between EU sea regions. Task 4.1 is dedicated to completion of the development of a threshold setting method for marine bird breeding productivity (D1C3) which will be applied in the QSR assessments for breeding productivity and therefore available for EU MSs in OSPAR to use in MSFD reporting. Moreover, this work is performed in the context of OSPAR/HELCOM/ICES JWGBIRD, which means that the method is also readily available to HELCOM EU MSs. Task 4.2 delivers the integrated assessment of marine birds at MSFD feature level, following the integration method developed by the JRC in collaboration with JWG-BIRD. Activity 4 also investigates the effectiveness of measures that have been put in place to reduce pressures on marine birds in Task 4.3. This supports EU MSs in their MSFD reporting and informs the OSPAR QSR marine birds Thematic Assessment. Finally, task 4.4 organizes a meeting with bird experts from the EU sea regions to share the developments in this project and exchange knowledge, with a view to increase coherence in marine bird GES assessments across the EU sea regions.

Task 4.1: Breeding productivity indicator

Activities undertaken

- The OSPAR Common Indicator B3 “Marine Bird Breeding Productivity” was applied to breeding productivity data from four OSPAR Regions (I-IV).

- Species-specific population models were fed with abundance trend data from the Common Indicator B1 “Marine bird abundance” and with observed breeding productivity.
- The models predicted the population growth and allowed to assess this against the threshold of no decrease of more than 30% over the next three generations.
- A first version of indicator results was finalised in March 2022, but a final and slightly amended/extended version is planned to be ready by September 2022.

Problems encountered

- Not all breeding productivity data delivered by OSPAR CPs could be used, because i) the time series were too short or ii) no accompanying abundance trend data were available from indicator B1.
- The data delivery was delayed by more than 8 months, so analyses could be started very late (in November 2021). This delay was caused by OSPAR CPs (including EU MSs) not replying timely to the data call, or not delivering full data sets.
- The delayed data delivery had even more consequences for indicator B1, which in turn affected indicator B3. Only after the analyses in B1 are finalised (expected by early June 2022), the finalisation of indicator B3 can be started.
- *However*, B1 and B3 indicator assessments will be delivered at BDC(2) in 2022, or even before that through written procedure (instead of as planned during BDC(1) 2022).

Task 4.2: An integrated assessment of marine birds in the Northeast Atlantic

Activities undertaken

- A preliminary integrated assessment for marine birds was finalised and entered into the Marine Birds Thematic Assessment by March 2022.
- As recommended by BDC 2021, the integration used methods developed by JRC for bird assessments under Article 8 MSFD in 2021. The methods comprise conditional rules for the integration from criteria to species and a proportional rule for the integration from species to species groups.
- These methods were applied to marine birds in four OSPAR Regions (I-IV) and were based on the indicators B1 “Marine bird abundance” and B3 “Marine bird breeding productivity”.
- Once final results are available for these indicators, a final version of the integrated assessment will be produced and feed into the thematic assessment (expected for September 2022).

Problems encountered

- The testing of the integration methods developed by JRC was limited insofar as the conditional rules for species assessment could make use of only two criteria (abundance, productivity). Other criteria were either only covered by pilot assessments of candidate indicators (bycatch, habitat) or not covered at all (distribution).
- BDC 2022 (1) noted that the pilot indicators were not as fully developed as the common indicators and only added information for very few species and decided to not use the pilot indicators in the integration, but BDC did encourage to use the information from the pilot indicators in the contextual information and narrative of the Thematic Assessment (meaning

that the information is not lost to EU MSs). It is to be expected that the next assessment cycle most or all of the pilot indicators can be presented for promotion to common indicator.

Task 4.3: Pressure impacts on birds and management responses

Activities undertaken

- The Thematic Assessment for marine birds was supported by analyses done for the sections Pressures, State and Response (for State see 4.2). Pressures and measures reported under MSFD, Birds Directive and in the OSPAR MPA database were extracted and analysed quantitatively.
- The most important pressures and the most often developed measure types were identified.
- The results of the analyses were entered into the Thematic Assessment in February 2022.

Problems encountered

- Technical problems arose because different terminology for pressures and measures is used in the various conventions and directives. Further, much of the information extracted was very general and geographically vague, limiting identification on the level of species groups or and regions. Little/null information on effectiveness of measures could be sourced.

Task 4.4: JWGBIRD-plus workshop

Activities undertaken

- The workshop called JWGBIRDplus is planned to be held in Aberdeen, 17-18 May 2022. Marine bird experts from countries in the OSPAR Region, the Baltic Sea, the Mediterranean Sea and the Black Sea have shown interest, and the number of participants is expected to at around 25.
- Preparations were started in late 2021.
- The agenda was planned around the items i) approaches to GES, ii) interpreting and communicating of marine birds assessments and iii) to discuss content and goals of a marine bird recovery plan under NEAES 2030.

Problems encountered

- The planning suffered from large uncertainties regarding COVID-19 restrictions. This included to find a suitable venue and led to unexpected costs.

Activity 5 - Coordination and integration

Task 5.1: Coordination

Activities undertaken

- The kick-off meeting was held at the 1st and 4th of March 2021.
- All partners were informed by the coordinating team on the administrative tasks and requirements.
- Ongoing support and liaising with DG ENV on behalf of partners when issues or questions arose.
- Periodic meetings of the Action Management (coordinating team with Activity leads) were organized and minutes were taken and shared.

Task 5.2: Super- and UltraCOBAM workshops

Activities undertaken

- Preparation of the SuperCOBAM workshop (registrations, programme, venue and facilities) in collaboration with Rijkswaterstaat's LEF Future Centre.
- Running the SuperCOBAM workshop 20-22 October 2021 in Utrecht, with 25 physical participants and 40 online participants from all ICG-COBAM expert groups and from the wider OSPAR network.
- Delivery of the report of the SuperCOBAM workshop.
- Initial preparations and date picking for UltraCOBAM (14-16 June 2022).

Problems encountered

- The situation with the pandemic made that preparing for large meetings involved planning on multiple tracks (live/online/hybrid options) with decision-making always as late as possible. Therefore, preparing for these meetings was more tasking and sub-optimal. Nevertheless, SuperCOBAM was successful.

Task 5.3: Outreach and dissemination

Activities undertaken

- NEA PANACEA was invited to present its plans and/or progress at
 - NEA PANACEA kickoff meeting 2021
 - HELCOM BLUES kickoff meeting (sister project) 2021
 - ABIOMMED kickoff meeting (sister project) 2021
 - OSPAR BDC 2021, 2022
 - OSPAR HASEC 2021
 - OSPAR ICG-QSR 2021
 - OSPAR CoG 2021
 - OSPAR ICG-COBAM 2021
 - OSPAR BiTA 2021, 2022
 - The French MSFD team 2022.
- A website was designed and hosted at the OSPAR / Bonn agreement website.

Problems encountered

- Due to the pandemic interaction and exchange within the MSFD CIS community has been less intensive and meetings have been short and condensed. Without this circumstance there may have been more opportunity to highlight our work in this community.

3. Deliverables and milestones

To complement the reporting in chapter 1, where general progress and barriers are described, Table 1 presented below reports on the state of play of delivery of the milestones and deliverables. These milestones and deliverables are presented for every Task in each Activity (1: Pelagic, blue; 2: Eutrophication & Physical conditions, green; 3: Benthic, brown; 4: Marine birds, red; 5: Coordination, purple). In addition, the Gantt chart from the Grant Agreement is included in Figure 1 where per Task the status can be noted:

- **On track:** No modification
- **Finished:** Green “V”
- **Finished early:** Green “V” with green arrow
- **Delayed, but expected to finish fully before project end:** Orange arrow
- **Delayed, and would benefit from having a no-cost extension (see section 5):** Red arrow

Table 1. Progress status for all the deliverables and milestones in the project

Deliverable / Milestone name	Tasks	Month of delivery	Status / Progress (Finished, on track, delayed) (some clarifying text if applicable)
Update of online tool	T1.1	12	<p>Delayed</p> <p>Awaiting expert feedback on updated master taxa list before new datasets can be accurately aggregated into lifeforms via the PLET.</p> <p>While the technical work is done, delaying the publication also allows incorporation of French data, the delivery of which is severely delayed.</p> <p>An issue with zero-values that is currently patched through a workaround may be resolved structurally towards the end of the project, time permitting.</p>
Protocol for data ingestion	T1.1	12	<p>Finished</p> <p>Document has been uploaded to the QSR SharePoint.</p>
R version of Plankton Community change indicator (PH1/FW5) code	T1.2	4	<p>Finished</p> <p>Working version is available from: https://github.com/hollam2/PH1_PLET_tool</p>

			Awaiting feedback from data providers which are currently testing the tool.
Plankton Community Change indicator (PH1/FW5) extraction and assessment guidance	T1.2	21	Finished D1.1 Protocol for Data Ingestion has now been uploaded to the QSR SharePoint CEMP guidelines for PH1 have been updated and have been uploaded to the QSR SharePoint.
Assessment for Plankton Community Change indicator (PH1/FW5)	T1.2	13 (draft) 20 (final)	Finished (draft) Draft has been submitted to BDC for policy feedback to be incorporated into a final version.
Plankton Biomass and Abundance indicator (PH2) and Plankton Diversity indicator (PH3) code	T1.3	16	On track Minor bugs need to be fixed on the code
Plankton Biomass and Abundance indicator (PH2) and Plankton Diversity indicator (PH3) assessment protocols	T1.3	21	Finished D1.1 Protocol for Data Ingestion has now been uploaded to the QSR SharePoint CEMP guidelines for PH2 have been updated and have been uploaded to the QSR SharePoint. CEMP guidelines for PH3 have been updated and have been uploaded to the QSR SharePoint.
Assessments for Plankton Biomass and Abundance indicator (PH2) and Plankton Diversity indicator (PH3)	T1.3	13 (draft) 20 (final)	Finished (draft) Extended background and extended conclusion need to be developed. Draft has been submitted to BDC for policy feedback to be incorporated into a final version.
Options for integration within and between pelagic indicators, and setting pelagic baselines, targets, and thresholds	T1.4	20	On track Not yet commenced
Pelagic thematic assessment	T1.4	20 (draft)	On track Not yet commenced

		22 (final)	
Identification of synergies between pelagic and FW candidate indicators	T1.5	22	On track Not yet commenced
Calculation of FW indicators FW2 and FW6 and contribution to Food Web assessment	T1.5	13 (draft) 20 (final)	Finished (draft for FW2) FW6 delayed: not possible to calculate with data current format. Extended conclusion needs to be developed. Draft has been submitted to BDC for policy feedback to be incorporated into a final version.
Options for integrating pelagic biodiversity, biomass, productivity and eutrophication indicators	T1.5	22	On track Not yet commenced
Options for integrating pelagic indicators with those of other ecosystem components (benthic, mammals, birds) under food web indicator FW9	T1.5	24	On track Not yet commenced
LiACAT ready for eutrophication analysis (at UltraCOBAM workshop)	T2.1	16	Started, but delayed due to personnel issues (that have been resolved).
LiACAT analysis ready for target values under eutrophication	T2.2	20	On track
ENA setting for eutrophication analysis ready	T2.2	12	On track
ENA ready for eutrophication analysis	T2.2	16	On track
ENA analysis ready for target values under eutrophication	T2.2	20	On track
Receive draft pelagic and benthic indicator assessments	T2.3	13	On track: PH1/FW5, PH2, PH3, FW2, FW9, BH1, BH2a, BH3, BH4, B3. Delayed: FW6
Evaluation of assessment scales for pelagic and benthic indicators	T2.3	22	On track
Inventory of baseline and threshold value setting methods used or considered in D1/D6 (pelagic and benthic habitats, birds), D4 and D5 assessments	T2.4	9	Finished

Joint list of feasible options to improve coherence of baseline and threshold value setting methods for (future) D1/D6 (pelagic and benthic habitats, birds), D4 and D5 assessments	T2.4	22	On track
Final Activity 2 synthesis report in discussion with activities 1 and 3	T2.4	24	On track
Postdoctoral researcher recruited	T3.1	3	Finished (same as task 3.2)
Reports on the review D6, in link with D4 & D5	T3.1	6 (draft) 8 (final)	Advanced draft and final product delayed. Advanced draft available (Month 10); final product planned for summer 2022 (Month 18).
Recruitment of postdoctoral researcher	T3.2	8	Finished with delay. The post-doc has been incorporated but in month 11 instead of month 8. The delay in incorporation is due to bureaucratic problems arising from the integration of the Instituto Español de Oceanografía (IEO) to the structure of the Consejo Superior de Investigaciones Científicas (CSIC).
BH1 2022 final OSPAR indicator assessment + CEMP guidelines	T3.2	13 (draft) 20 (final)	Finished Both drafts have been completed (BH1 2022 final OSPAR indicator assessment + CEMP guidelines). However, it should be noted that the BH1 assessment draft has been carried out (for now) only for the maritime waters of the north of Spain and the Gulf of Cadiz. To complete the evaluation of BH1 in OSPAR Region IV, data from Portugal and France will be very helpful. Unfortunately these data have not yet been delivered. Finished and on track. The CEMP guidelines has been completed. The BH1 2022 final OSPAR indicator assessment is on track. We are waiting to receive the Portuguese and French data before the deadline to complete the assessment in all OSPAR Region IV on time (already finished for the Spanish Bay of Biscay and the Gulf of Cadiz). If these data are not

			finally received, we will finish the assessment using the response curves fitted for Spanish data.
BH2a data call	T3.3	10 (first) 14 (final)	Finished
BH2a 2022 final OSPAR indicator assessment + updated CEMP guidelines	T3.3	13 (draft) 20 (final)	Finished (draft) On track (final)
Addition of new activities, threshold setting, improved tool	T3.4	13	Delayed that the delay is associated with the issues around the threshold values, which have not yet been resolved (see section 2). Because the delay is not related just to the science in this project but also developments on the policy-maker level in OSPAR and scientific developments in TGSeabed we expect this to be delivered towards the end of the project.
BH3 2022 final OSPAR indicator assessment + updated CEMP guidelines	T3.4	13 (draft) 20 (final)	Finished (draft) On track (final)
Receive draft BH3 assessment	T3.4 T3.5	13	On track for task 3.4 Delayed for task 3.5. This is due to the time required to undertake the updates under task 3.4.
Reports and maps on scenarios according to various options of thresholds and disturbance categories for BH3 indicator	T3.5	20	Some progress but still unresolved issues due to the new proposal being developed under TG SEABED
Contributions to D3.7b Benthic habitat 2022 advanced draft thematic assessment	T3.5 T3.7	20	On track

BH4 2022 final OSPAR indicator assessment + CEMP guidelines	T3.6	13 (draft) 20 (final)	Indicator assessment on track (draft available), CEMP guideline delayed (draft will be available in month 15)
Benthic habitat OSPAR final thematic assessment	T3.7	13 (draft) 20 (advanced draft) 22 (final)	On track
Indicator assessment of bird breeding productivity indicator	T4.1	13 (draft) 20 (final)	Finished On track
Integration method for marine bird indicators	T4.2	14	Finished (refers to method, finalisation of integrated assessment by September 2022)
OSPAR Thematic Assessment of marine birds	T4.2 & T4.3	13 (draft) 20 (final)	Finished On track
Draft Overview of pressures on marine birds	T4.3	13	Finished
Draft Overview measures for marine birds	T4.3	16	Finished
Completed Overview pressures for marine birds	T4.3	20	On track
Completed Overview measures for marine birds	T4.3	20	On track

JWGBIRD plus workshop	T4.4	14	On track (takes place May 2022)
Action plan for marine bird assessments across the European Marine Regions	T4.4	22	On track (starts in May 2022)
NEA PANACEA Kickoff meeting	T5.1	1	Finished
NEA PANACEA Final meeting	T5.1	24	On track (not commenced)
Periodic financial, administrative and scientific reporting	T5.1	Periodic, when needed	Finished (interim report) in month 16.
SuperCOBAM workshop	T5.2	8	Finished
UltraCOBAM workshop programme	T5.2	15	On track
UltraCOBAM workshop	T5.2	16	On track
UltraCOBAM workshop report	T5.2	17	On track
Exchanges with similar Actions under this call	T5.3	TBD	On track / in progress
Written and/or oral presentations to relevant groups and committees at EU and OSPAR	T5.3	When required / appropriate	On track / in progress

Figure 1: Next page. Gantt chart as it appears in the grant agreement with added symbols to reflect the current status (On track: No modification; Finished: Green “V”; Finished early: Green “V” with green arrow; Delayed, but expected to finish fully before project end: Orange arrow; Delayed, and would benefit from having a no-cost extension (see section 5): Red arrow).

4. Meetings and dissemination & communication

Meetings

Every Activity has held regular meetings, typically involving the relevant OSPAR ICG-COBAM ecosystem component expert group. In doing so, NEA PANACEA has provided an impulse to the activity of these expert groups and the conversation between experts from all OSPAR Contracting Parties. The Coordination Activity (5) has held weekly online meetings and organized Action Management meetings with all Activity leads once every ~6 weeks.

The kick-off meeting was held online on the 1st and 4th of March 2021. On day 1, project members, representatives from EU-DGENV, OSPAR-representatives and project members of NEA PANACEA's sister projects QUIETSEAS, HELCOM BLUES, HARMONIZE and ABIOMMED attended. The participants heard and discussed presentations on the project in general and the proposed work in each Activity, and the project members were instructed on the administrative and reporting requirements and the way the coordinating team proposed dealing with them. Further, the abovementioned sister projects were invited to present their plans. Day 2 was reserved for project members only. First all project members from each Activity were put in a breakout room in order to get to know each other (where needed) and discuss the Tasks in the Activity. Later, each Activity met each other Activity in break out groups to discuss cross-cutting issues, identify areas where cooperation was needed and agree on how to have this collaboration take place.

20 to 22 October 2021 NEA PANACEA organized the SuperCOBAM project workshop under Task 5.2 in Utrecht, the Netherlands. 25 NEA PANACEA members met physically in a 3-day workshop with digital components to facilitate exchange with OSPAR (biodiversity and other) experts not directly involved in NEA PANACEA. The meeting facilitated a leap forward in the work on the biodiversity indicator assessments, exchange with experts working on other aspects of the Quality Status Report and a forward look on the work needed for the Thematic (integrated) Assessments in the QSR.

During the reporting period, the ground work was performed for the organization of 3 workshops in the spring of 2022: A back-to-back meeting of the pelagic habitats, benthic habitats and food webs expert groups, also involving experts from NEA PANACEA's Activity 2 on eutrophication and physical conditions, JWGBIRD+ (a meeting of marine birds specialists from all EU Sea Regions to discuss and share the work done in OSPAR) and UltraCOBAM (a large 3-day workshop to work on the Thematic Assessments of all 7 ecosystem components).

Dissemination & communication

The project coordinator has advertised NEA PANACEA to the European MSFD expert network through presentations at the kick-off meetings of the ABIOMMED and HELCOM BLUES sister projects under the same call and an online meeting was held where the project and its products were presented to the French MSFD team. Further, NEA PANACEA was advertised and progress reports were delivered to many relevant OSPAR bodies (ICG-Coordination of biodiversity assessment and monitoring, ICG-Quality status report, Biodiversity thematic assessment working group, Biodiversity committee, Hazardous substances and eutrophication committee, Coordination group).

A project website (<https://www.ospar.org/about/projects/nea-panacea>) was set up, supported by the OSPAR secretariat, and for internal communication a NEA PANACEA Sharepoint has been provided by the OSPAR secretariat (though much of the work of NEA PANACEA happens in the OSPAR QSR Sharepoint).

A scientific article on the comparison on the OSPAR BH1 (Sentinels of Seabed) has been accepted for publication in *Ecological Indicators**, and a manuscript on the PH2 methodology is in preparation and to be submitted in 2022.

**Serrano, A., de la Torriente, A., Punzón, A., Blanco, M., Bellas, J., Durán-Muñoz, P., Murillo, F.J., Sacau, M., García-Alegre, A., Antolínez, A., Elliott, S., Guerin, L., Vina-Herbón, C., Marra, S., González-Irusta, J.M. (Accepted). Sentinels of Seabed (SoS) indicator: Assessing benthic habitats condition using typical and sensitive species. Ecological Indicators.*

5. Other issues

Personnel

As (in some cases) already mentioned in the chapters above, we have encountered some minor setbacks regarding personnel. The process of finding and hiring Post Docs took longer than anticipated in Activity 1 and Activity 3 (3 months delay), which exacerbated the pressure associated with dealing with ill-formatted and last-minute data resulting from the data calls. One person contracted for work on Activity 2 was so fortunate to find a position at a university, this meant that the leads of Activity 2 had to find a replacement, leading to delays in the work process. The contract of subcontractor Dr. Fredrikson who performed analyses to deliver Task 4.1 in Activity 4 had to be extended because the need for further refinement of the analyses was identified.

No-cost extension

The abovementioned delays associated with personnel issues in addition to the delays caused by late and poorly formatted data by Contracting Parties (which are also EU member states) has made us consider to apply for a no-cost extension of the project by 3 months later this year (2022). This would allow NEA PANACEA to get the most out of the experts that were hired and are currently dedicated to this work, who will then have more time to process and interpret the data and put provisions and infrastructure in place to (better) deal with future data calls and biodiversity assessments for the QSR and consecutively the MSFD reporting. Moreover, the experts will be available longer to support the development of MSFD reports by OSPAR CPs that are also EU MSs.

Specifically Tasks 1.1 (resolving the persistent issue with zero-values in the tool which is currently patched with a work-around), 3.4 (contributing scenarios, data and calculations to the discussion on Threshold Values for sea bed disturbance (BH3), which has been pushed back by EU MSs in OSPAR that opt to await TGSeabed products) and 3.6 (assessing the effectiveness of measures to protect the sea bed, which depends on all underlying assessments to be finished) would benefit from a no-cost extension. It would give the involved experts the opportunity to give these Tasks the attention they deserve, and prevent sub-optimal products because of a rushed process. From the point of view of Activity 5 (coordination), time after the delivery of many of the deliverables for the QSR (which results in a large work load in months 18 to 24 of the project) may be used to reach out and connect to NEA PANACEA's sister projects in other sea regions, most notably HELCOM BLUES and ABIOMMED which have a strong thematic overlap. Sharing developed knowledge and practices improves the geographical scope with which the funding under this MSFD call is effective and increases the likelihood that its fruits are picked up by the MSFD community in the future cycles.

The time after delivering the main assessment products that a no-cost extension would offer will be used to disseminate NEA PANACEA's products and insights to the scientific community through manuscripts submitted to scientific journals and presentations at (both academic and more policy-oriented) conferences and meetings. This extension would offer much needed time to write such products. A good example of such a publication is "Assessing the state of marine biodiversity in the Northeast Atlantic" (<https://www.sciencedirect.com/science/article/pii/S1470160X22006203>), which proposes a method for GES determinations in the absence of a TV. This paper is based on the work done for the EcApHRA project and appeared only recently online. Earlier publication (EcApHRA was an EU funded project in preparation of the 2018 MSFD reporting) would have allowed for much broader application of this knowledge in this assessment cycle, but the time schedule in EcApHRA did not allow for the associated writing to be done, and many involved scientist moved on to other tasks when the project was over, slowing down the production process of the manuscript significantly. This time around, we would like draft papers while the post-docs are still under contract and before the project ends (and leads have to divert their attention to the needs of their employers) to have the knowledge NEA PANACEA delivers disseminated and available to the wider MSFD community well before the next assessment cycle.

Having a no-cost extension would also allow the NEA PANACEA experts to stay involved in the QSR production and publication process (which is planned to run until the end of the first semester of 2023). Not only will this improve the way and the degree in which NEA PANACEA's products are embedded and used in the QSR products for EU MS MSFD reporting, it will allow for expert involvement in identifying future science needs in OSPAR to better cater to the MSFD obligations of its CPs and having NEA PANACEA's knowledge and "lessons-learned" embedded in the near-future work of the OSPAR biodiversity community right after delivering the QSR, and towards the next MSFD assessment cycle.



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