Document title	Outcome of the HELCOM BalticBOOST workshop on the HOLAS II biodiversity assessment tool
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Introduction

The Project for Developing the Second Holistic Assessment of Ecosystem Health in the Baltic Sea (HOLAS II) started in 2014 and will continue until June 2018. The project will produce an update of the overall environmental status of the Baltic Sea and evaluate progress in relation to the goals of the Baltic Sea Action Plan (BSAP). The outcome of the project will be developed so that it can also be used in reporting under the EU Marine Strategy Framework Directive (MSFD) by Contracting Parties also being EU Member States. The assessment of environmental status will be indicator based and make use of assessment tools to integrate the results.

HELCOM BalticBOOST is an EU co-financed project which includes the task to develop a tool for Biodiversity assessment to be used in the HOLAS II project. The project runs from September 2015-December 2016. The development of the tool is to be guided by through two HELCOM workshops with participation of experts from HELCOM Contracting Parties, HOLAS II core team and the State and Conservation Working Group.

Workshop

The Workshop was held on 11-12 February, 2016 at the premises of NIVA Denmark, Copenhagen, Denmark.

The aim of the Workshop was to support the development of a tool for Biodiversity assessment to be used by the HOLAS II. The more specific aims of the workshop were to:

- evaluate proposed features of the tool and its planned assessment outputs;
- detail how the development needs could build on the results from HOLAS 2010, and the DEVOTES and Marmoni projects;
- consider how to include information on uncertainty and confidence in the assessment and
- consider the biodiversity related HELCOM Core indicators and how to include them in the assessment

The agenda of the Workshop is contained in **Annex 1**.

The Workshop was attended by representatives of Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland and Sweden, as well as ICES and BalticBOOST project partners. The list of Workshop Participants is contained in **Annex 2**.

Jesper Andersen, NIVA Denmark, and Samuli Korpinen, Finland, welcomed the participants to the workshop.

The Workshop was chaired by Samuli Korpinen, BalticBOOST lead partner SYKE. Lena Bergström and Lena Avellan, HELCOM Secretariat, acted as secretaries to the workshop.

Outline and timeline of the HOLAS II biodiversity assessment

1. HELCOM Secretariat presented the general aims of HOLAS II and the Biodiversity assessment in particular, as well as the guidelines for the biodiversity assessment according to HOLAS II 4-2015, including a draft list of indicators to be included in the assessment and a draft overall outline of planned outcomes of HOLAS II (Document 1, **Presentation 1**).
2. The assessment will cover data from the years 2011-2016. Data for the first biodiversity assessment needs to be delivered by September 2016, and should represent the years 2011-2015. The integrated assessment method is to be considered for adoption by HOD by December 2016. The assessment will be carried out in early 2017, and the first result released in mid-2017. Additional data for the year 2016 may be added in 2017 prior to the updating of the HOLAS II report in mid-2018.

Indicators to be included in the assessment

3. The workshop took note that all core indicators are to be included in the integrated assessment (**Annex 3**)
4. The workshop noted that agreed core indicators are still lacking for some important aspects of biodiversity and that work is ongoing to further develop HELCOM indicators for approval by end of 2016. Specifically, gaps with respect to indicators of phytoplankton, zoobenthos and macro-phytobenthos were pointed out.
5. The workshop took note of the tentative proposal from the HOLAS II 3-2015 (para 3.13) that additional supplementary indicators could be considered for inclusion in the biodiversity assessment if they are shared and agreed by Contracting Parties at the level of sub-basin, if this may cover an existing gap in the set of core indicators.
6. The workshop also discussed the option of substantiating the assessment of coastal assessment units with WFD indicators, in addition to those already considered in HELCOM, and also discussed the fact that an assessment based on HELCOM core indicators and assessment tools may be expected to result in different status assessment outcomes compared to an assessment based on WFD indicators and aggregation frameworks in the same area.

Recommendation from the workshop

7. BalticBOOST will identify key gaps in the existing set of indicators and propose to the HOLAS II core team ways of filling these as needed to meet the MSFD reporting requirements, e.g., by WFD indicators or additional supplementary indicators, ensuring at the same time adequate comparability at the regional scale.
8. BalticBOOST will test the precision and accuracy of integrated assessment results with 1) core indicators only, 2) core + WFD indicators, 3) core +WFD + supplementary indicators, 4) all indicators.

Spatial scales of the biodiversity assessment

9. The workshop recalled that the biodiversity assessment will apply the nested system of HELCOM assessment units in accordance with the HELCOM Monitoring and Assessment Strategy (2013), and that each core indicator has been developed and assigned to a biologically relevant spatial assessment scale as well as to relevant assessment units. For example, if a species is not present or an indicator is not considered as relevant in one sub-basin, this indicator will not be included in the assessment of that sub-basin.
10. The workshop recalled that one of the agreed core indicators and one pre-core indicator are applied in the assessment units on scale 4.
11. The workshop also discussed the scale of the integrated biodiversity assessment and noted that the most detailed spatial scale (level 4) gives the most relevant outcome for the management purposes.

This will however raise another scaling issue: how to downscale level 1-3 indicator results to the level 4, as the indicator result may not be meaningful at the level of the smallest assessment units (e.g. abundance of wintering birds).

Recommendation from the workshop

12. The integrated assessment would be most useful at the most detailed spatial resolution. BalticBOOST will test integrated assessments both at smaller and larger levels of spatial aggregation and evaluate the outcome in relation to relevance in relation to data availability and presentation of results.
13. The assessment tool should allow switching on/off indicator results in the assessment units.

Technical requirements for the tool in relation to the Core indicators

14. Lead partner SYKE presented an evaluation of the features of existing core indicators that need to be considered when developing to tool, in particular the different approaches for setting GES (Document 3, **Presentation 3**).
15. Potential technical solutions for how to include trend-based indicators into the tool include to a) set an artificial threshold for defining interim GES value "if the desired trends was met, what would the value be in 2020?", b) treat the slope as it was a single value and use as a threshold, and c) develop the assessment tool to allow use of trend-bases GES.
16. Potential technical solutions for indicators that have a GES interval include to a) develop the indicator further e.g. apply distance from centre of GES as the indicator value, b) treat as two single GES values and include aggregation rules to the assessment tool, and c) develop the assessment tool to allow unimodal responses.
17. Potential technical solutions for indicators that are based on more than one GES assessed parameter include to: a) treat the parameters as separate indicators in the tool, and) aggregate into one GES decision before entering the data into the tool.

Recommendations from the workshop

18. The tool should be able to use all types of core indicators, and the concept applied for defining the GES-boundary should not have an impact on the weighting of the indicator in the assessment.
19. BalticBOOST will develop technical solutions together with Lead and co-Lead representatives on the indicators for how to enter data for core indicators that are not assessed in relation to one GES-boundary (e.g. trend-based, GES interval, conditional approaches).

Identified topics for future consideration

20. The workshop noted proposals from the expert review of Descriptor 4 of the Commission Decision, which outlines indicators that are not strictly linked to one pressure as 'surveillance indicators', for which it is appropriate to set upper- and lower bounds instead of a GES-boundary. If the indicator moves beyond the upper- or lower bounds it is considered as a signal of imbalance in the system, which would trigger a measure to study the cause of the deviation further. This would however still require setting the boundaries.
21. The workshop discussed the relevance of trend-based indicators in general, and noted that although they will not give information on the environmental status, they will still be informative within an adaptive assessment cycle, such as the HELCOM Monitoring and Assessment Strategy as well as the MSFD, for the purpose of evaluating ongoing management strategies.
22. For some of the core indicators, the trend-based assessment is an interim solution until the data/information needed for assigning quantitative GES boundaries is available.

Review of tools for integrated assessment of biodiversity

23. Finland presented a review of aggregation methods used in integrated assessment of biodiversity globally, including an evaluation of their benefits and of how they fit to the context of HOLAS II (Document 2, **Presentation 2**).
24. Integrated assessment tools formalizing assessment rules are scarce in the global context and when it comes to biodiversity they have only been presented for the Baltic Sea. From other parts of world assessments have focused on more limited scopes, such as biodiversity of fish or state of the seabed.
25. The review evaluated the usefulness of the integration methods of the tools and concluded that in the context of different monitoring data and variables, as is the case in international assessments, suitable integration methods would be based on hierarchical assessment structures, (weighted) averaging and possibly the one-out-all-out method at a higher end of the hierarchy. The only tools that use nested and hierarchical levels are the MARMONI, BEAT and the NEAT tools.
26. The workshop noted that there are very few formalised indicator-based assessment systems in use worldwide.
27. In cases where there is only one indicator per assessment element a tool is not needed.
28. A low number of indicators in the assessment will limit the confidence of the assessment result.

Recommendations from the workshop

29. The workshop noted that the MARMONI tool's strength is in its ability in identifying areas 'not-reaching GES' while the BEAT/NEAT tools are better suited in assessing how far the status is from the GES boundary. The workshop supported that the developing HELCOM biodiversity assessment tool should have the same basic features as the BEAT/NEAT tools.

Identified topics for future consideration

30. The Contracting Parties represented at the workshop generally agreed with the evaluation of aggregation methods as presented in document 2, and found the developing integrated assessment methodology to agree with national plans. In particular the following was noted
    a. Germany: Will harmonise its MSFD-assessment and reporting as far as possible with respective habitats directive obligations.
    b. Latvia and Estonia have also been considering using the Marmoni tool, but would be in favour of using the HOLAS II assessment tool instead.

Presentation of structure and functions of the NEAT biodiversity assessment tool

31. Denmark gave a presentation on how the NEAT tool (developed in FP7 DEVOTES project) could potentially be customised in order to meet the needs of a HOLAS II biodiversity assessment as the tool is flexible to customization (**Presentation** 4), noting that:
    a. the tool is flexible in that it allows for filtering of indicators based on MSFD descriptors or other groups as needed and provides results for the different spatial scales of the HELCOM assessment units;
    b. the current classification is based on five classes but could be changed to a 2-class system, which could also show the distance to GES in the similar way as currently used for HELCOM eutrophication assessments
    c. the one-out-all-out (OOAO) approach is not used in the current version of NEAT, not even at a high aggregation level, but can be applied between the ecosystem components (mammals, birds, fish, benthic, pelagic and food web) if seen necessary;
    d. options are available for taking in indicators with GES-boundaries based on ranges and multi-metric indicators although they are not currently implemented;

e. the tool allows for weighting of indicators according to 'area' and 'quality', and if this feature is to be used then weighting factors need to be defined;
f. confidence in the assessment is based on resampling based on information on precision in the indicator estimate (standard error) that is given together with each indicator and assessment unit an propagated through the integrated assessment in order to give the probability of a certain classification in the end results (e.g. GES /sub-GES);
g. as input data for each indicator assessment unit, the tool requires information on the indicator value, standard error (for the confidence assessment), the GES boundary and in addition estimates of minimum and maximum values for the indicator.

Recommendations from the workshop

32. The workshop recommends the BalticBOOST project to further modify and evaluate the NEAT tool for the Baltic Sea specific purposes and specifically propose solutions how all types of core indicators can be included.
33. The workshop recommended not adding extra levels of complexity to the aggregation of the results. For instance, weighting of the indicators should be carefully tested and, if chosen to be used, transparent and common approaches should be used over the entire assessment area.

Aggregation methods for integrated assessment of biodiversity

34. The review of aggregation methods presented by Finland (document 2, presentation 2) stated that applying the one-out-all-out (OOAO) principle in integrated status assessments inflates the bias towards failure to reach GES significantly. While other conditional rules could be developed and possible, the review as presented in document 2 concluded that weighted averaging would be better suited for the MSFD context. Also, it was proposed that hierarchical aggregation rules (with OOAO in the high end) are well suited to the MSFD context, as they give a good account of evidence, allows for confidence in the assessment and still supports a precautionary approach.

Recommendations from the workshop

35. The workshop recommended to test the use of averaging and OOAO at lower and higher aggregation levels. It was proposed that BalticBOOST will carry out the respective tests.

Identified topics for future consideration

36. Germany informed the workshop that it will at least for those descriptors which base on indicators that will be assessed in harmonisation with the obligations from the Habitats Directive use the OOAO-principle at all levels.

Spatial aggregations

37. The NEAT tool has the possibility of making integrated assessments at higher aggregated spatial scale by aggregating results of the smaller assessment units upwards. The results are weighted by the area of the underlying assessment unit and then averaged. That is; for the largest assessment scale, all information is used, and the underlying information at smaller spatial scale is aggregated. The tool does not dis-aggregate downwards, thus an indicator covering the whole Baltic Sea is disregarded in assessments at smaller spatial scales, but this could be resolved technically by assigning the indicators from larger scale as replicates with similar values in each of the smaller scale units.

Recommendations from the workshop

38. As a general rule, the assessment should aim for the highest possible spatial resolution

39. Downscaling of indicator results to smaller assessment units might however result in ecologically irrelevant outcomes and in such cases different options need to be tested.
40. The workshop recommended BalticBOOST to explore the possibility to downscale indicator results, including the possibility to weight indicators, e.g. if and indicator applicable for the assessment level 1 (Baltic Sea) is considered less relevant for assessment at levels 2-4, the indicator could potentially be given a lower weight.

Weighting based on ecological relevance

Recommendations from the workshop

41. The workshop noted that weighting of indicators, e.g. based on ecological relevance, is a very challenging issue to solve and that there are also good reasons for treating all indicators in the same way, recalling also that while the NEAT tool allows for specific weighting, it has not been used much.

Identified topics for future consideration

42. Weighting by ecological relevance could for example be considered for indicators covering the whole Baltic Sea, but for which some areas are more important than others, e.g. the wintering birds that are assessed over the whole Baltic Sea but feeding areas which are more important are identified.

Classification in the final output of the assessment

43. Finland informed about experiences from the eutrophication assessment where it was observed that the legal requirement to provide outputs as GES or sub-GES will not provide sufficient information for interpreting the results, and that a more detailed results are displayed in shades of red and green.

Recommendations from the workshop

44. The workshop recommends that the BalticBOOST project will explore the option of providing more detailed results of distance to GES displayed in three shades of red (sub-GES) and two shades of green (GES), as applied in the eutrophication assessment, also for the biodiversity assessment.

Normalization of indicators and the definition of maximum and minimum values

45. One pre-requisite for the assessment approach used by NEAT is that indicator information on GES is associated with information on their minimum and maximum values. This information is used in the tool in order to normalize indicators and make them quantitatively comparable with each other.
46. HELCOM secretariat, Finland and Denmark gave a presentation on draft proposals on how the HELCOM biodiversity core indicator values could be normalized in order to apply them in the integrated assessment tool (presentation 5).
    a. For indicators where sufficient data is available, historical data and data from disturbed areas can be used in order to identify relevant minimum and maximum values. In these cases, reference conditions can be used to define the maximum value and the minimum value can be identified in the data.
    b. For cases where no such data is available, minimum values could be based on extreme values from deteriorated conditions, or be set to zero if biological knowledge motivates this, and maximum values could be defined based on the distance between minimum value and GES, assuming linearity. By this approach, the distance between the minimum values and the GES boundary is 3 units, and the maximum value would be set at 5 units above minimum (Hence, the GES boundary is scaled at 3/5 of the distance between minimum and maximum).
    c. For indicators which have information on class boundaries as applied in the WFD, these can be used in the tool (linearity does not have to be assumed).

   d. For indicators were GES is defined by an interval with an optimum value, the value at optimum is the maximum value
   e. For trend-based indicators, minimum and maximum values could be defined based on deviations from the target slope.
2. The Secretariat informed that the experts responsible for indicator development have been informed that they are expected to identify min-max values for the indicators.

Recommendations from the workshop

47. BalticBOOST will develop further the draft proposed principles for defining minimum and maximum values for the different type of core and pre-core indicators, and will as soon as possible make contact with Lead and co-Lead country representatives for the indicators to communicate these proposals and agree on suitable approaches to apply in the case of each indicator.

Estimation of confidence in the assessment

48. Finland gave a presentation on the assessment of confidence in the biodiversity assessment (Presentation 6), outlining confidence aspects at the level of the indicator (including reliability of data), the indicator assessment approach and the confidence of the assessment (including representability of elements).
    a. The NEAT tool applies a data-driven probability approach, which is based on the standard error of the indicator value, which is fed into the tool together with the indicator value. The tool integrates uncertainty information as part of the assessment in order to give the variance distribution for different status classifications. The result is presented as a separate confidence assessment.
    b. Alternatively, an approach based on categories of confidence can be used, as was done for example in the HELCOM HEAT 3 tool. An example of aspects to consider in such an approach is presented in **Annex 4**.

Recommendations from the workshop

49. Confidence should be shown as a separate assessment and will not affect the status assessment results.
50. BalticBOOST will develop further the approach based on categories of confidence, which is to be informed by data, as this is viewed as the most realistic option at this point of development, although in the long term a data-driven probability approach would be preferred.
51. BalticBOOST will develop questions to cover uncertainty aspects at different levels, with the purpose to use the replies in order to obtain a confidence classification for each indicator and assessment unit. The table in Annex 4 provides an overview of aspects that should be covered, however each point should be formulated into questions instead of statements. The questions should be evaluated to ensure that they are understood and answered in the same way for all indicators and so that the answers can refer to quantitative information whenever possible, rather than expert judgement. BalticBOOST will specify the content in the table further in line with the workshop proposal and will involve the Lead and co-Lead country representatives of core indicator development in this work. The questionnaire will ask for information on standard error for those indicators where such information is available.
52. The workshop was of the opinion that including aspects of the confidence in the GES boundary would not be relevant for the purposes of the assessment.
53. The workshop underlined the importance of presenting information on confidence in a transparent way, and make it possible to trace back the factors resulting in a specific confidence evaluation.

54. The workshop proposed that the confidence assessment of an indicator evaluation will be carried out when the indicator evaluation is made, and at this time the confidence-questions will be replied to by the relevant HELCOM expert networks, groups and projects compiling data for the respective indicator-based assessment.
55. The spatial scale of the confidence assessment will be the same as the spatial scale of the status assessment, for each indicator and assessment unit, in order to inform on varying confidence in different areas.

Potential development of a web workspace for the tool

56. SYKE demonstrated the web workspace for eutrophication assessment as developed by EUTRO-OPER (Document 4). The workshop considered how the elements and features of the EUTRO-OPER workspace could potentially be used also to support a biodiversity assessment, and Estonia gave a presentation on potential technical options for the HELCOM biodiversity assessment tool (Presentation 7).
57. In EUTRO-OPER there two alternative approaches for data entering, i.e. either the raw data is reported and extracted from the joint database to calculate the indicators through common algorithms, or, already calculated indicators can be added into the joint assessment system. The first option is the preferred while second option can be used e.g. to enter results from already calculated indicators used in the WFD.
58. The data needed for the biodiversity assessment will be derived from several databases. The HELCOM TAPAS project will develop data arrangements in order to build a joint platform for biodiversity data and assessment. Some of the data needed for the biodiversity assessment will be extracted from the Combine database (zoo- and phytoplankton), but for other indicators tailored-made solutions will be used. Through the HELCOM BalticBOOST project (WP 1.2) three new databases are also created within 2016 for coastal fish, birds, and marine mammals to be hosted by the HELCOM Secretariat.
59. Due to the lack of joint databases for some of the biological data it may not be possible to develop algorithms to automate the indicator calculations based on data for all indicators, and therefore ad hoc submission of data or already calculated indicators by countries or by expert groups and projects for the purpose of HOLAS II may be needed.
60. The work space will be used as a platform for internal communication and discussion at expert level and national level during the assessment. When the assessment is finalized the results will be made publicly available, documenting the data that was used in the assessment and the analytical process and any relevant adjustments made through the checking-procedure.

Recommendations from the workshop

61. The workshop supported developing a workspace for carrying out the biodiversity assessment similar as for eutrophication assessment. The biodiversity assessment workspace will be hosted by HELCOM and the BalticBOOST project will support its development, as well as the TAPAS project. It was noted that a key objective of the HELCOM workspaces is to provide transparency in how the assessment is carried out.
62. The workshop recommended identifying as soon as possible for which indicators that ad hoc submission of data or results is required to ensure that the data-arrangements needed can be arranged in time.
63. The assessment workspace should allow different levels of access/rights to different user groups. Following the approach of EUTRO-OPER, this could for example be so that national nominated experts have the rights to modify data within their domains, the expert network has rights to view

all data and make assessment, and everyone has full rights to view results after the assessment is finalized.

64. The confidence assessment will also be placed in the workspace and it was proposed to be filled once all data is in place.

Identified topics for future consideration

65. It was proposed that the web portal also could include the possibility to carry out separate projects with restricted access for defined users, allowing for different biodiversity assessments to be carried out by different user groups.

Planned outputs from the assessment

66. The Chair gave a presentation on potential outputs from the HOLAS II biodiversity assessment (**Presentation 8**). The outputs which are needed from the assessment tool depend on two things: (1) what results the holistic assessment report will include and (2) what results the MSFD reporting will require. Not all outputs can be obtained from the tool. Such are the trends in selected key indicators and information on red-listed species. Marine protected areas will be covered in other parts of the reporting.

Recommendations from the workshop

67. The integrated assessment should show results at the highest possible spatial resolution and provide results according to the MSFD requirements.
68. The BalticBOOST project is recommended to develop proposals for how to present the results of the integrated status assessment, its associated assessment of confidence and other summary information (e.g. number of indicators, number of GES criteria covered, number of ecosystem components, etc). This work will preferentially build on results from the Marmoni project regarding e.g. the display of indicators by petal charts.
69. Outputs needed from the assessment tool include:
    a. Main outputs:
        i. Integrated biodiversity status
        ii. Status per descriptor [for MSFD reporting]
        iii. Status per ecosystem component [for MSFD reporting]
        iv. Confidence of the integrated biodiversity status
        v. Confidence per ecosystem component
    b. Additional outputs:
        i. Data and status per indicator
        ii. Indicators and status per GES criteria
        iii. Confidence on indicator level

Identified topics for future consideration

70. It was proposed that in the HOLAS II report the biodiversity assessment should link to an assessment of relevant pressures whenever possible. This link could for example build on the information of main pressures identified in relation to core indicator development, and also on results from the assessment of the spatial distribution of pressures and impacts on ecosystem components (Baltic Sea Pressure and impact index) developed in the HELCOM TAPAS project.
71. The HELCOM Red List for species and biotopes should be taken into account in HOLAS II, as there are no indicators the results are not going to be included in the integrated assessment however the results were proposed to be reflected.

72. A section on joint measures of HELCOM is planned to be include and in this section the MPA implementation could be included, based on the results of the MPA eco-coherence assessment.
73. Potential graphs to include in the overall biodiversity assessment of HOLAS II include:
    a. Integrated biodiversity status in a map and in a graph.
    b. Integrated confidence in the assessment in a graph
    c. Other graphs, e.g.
        i. Integrated status of ecosystem components
        ii. Integrated status of descriptors
        iii. Trends of selected species

Annex 1 Workshop Agenda

Thursday 11 February	
10:00	- Arrival and words of welcome - Outline of the HOLAS II biodiversity assessment with timeline, including expected contributions of the BalticBOOST project (Document 1) - Evaluation of aggregation methods and tools for integrated assessment of biodiversity (Document 2) - Requirements for the tool in relation to the HELCOM Core indicators (Document 3)
12:30-13.30	*Lunch break*
13:30-18:00	- A proposal for structure and functions of the biodiversity assessment tool (Presentation). *The proposed tool is based on the NEAT tool from the FP7 project DEVOTES but customized by the HELCOM HOLAS II needs.*
Friday 29 January	
9:30-12.30	- Estimation of uncertainties and confidence in the assessment - Potential development of a web workspace for the tool (Document 4)
12:30-13:30	*Lunch break*
13:30-17:00	- Planned outputs from the assessment - Conclusions and further steps

Annex 2

Representing	Name	Organization	Email address
The Chair			
	Samuli Korpinen	Finnish Environment Institute	samuli.korpinen@ymparisto.fi
Contracting Parties			
Denmark	Ciarán Murray	DCE/Aarhus University	cim@bios.au.dk
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Poland	Jarosław Krogulec	Polish Society for Protection of Birds/ on behalf of Chief Inspectorate for Environmental Protection	jaroslaw.krogulec@otop.org.pl
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Annex 3. Core indicators tentatively available for the biodiversity assessment

The biodiversity assessment is to consider all indicators relevant for the BSAP biodiversity assessment and the state based variables within descriptors 1,3,4,6 of the MSFD. Pre-core indicators should be included if adopted as Core indicators by HOD on December 2016. NB also study reservations on the core indicators by Germany[1] and Denmark.

SHORT NAME	Indicator name	State of develop-ment	Element (will be revised)	Desc-riptor	Primary criterion
BENTHIC VEG DEPTH	Lower depth limit distribution of the macrophyte community	Pre-core	BENTHIC HABITATS	1	1.5
BENTHOS DISTR HABITATS	Distribution, pattern and extent of benthic biotopes	Pre-core	BENTHIC HABITATS	1	1.4
BENTHOS POP STRUCTURE	Population structure of long-lived macrozoobenthic species	Core	BENTHIC HABITATS	1	1.3
BIRDS ABUND BREED	Abundance of waterbirds in the breeding season	Core	BIRDS	1	1.2
BIRDS ABUND WINTER	Abundance of waterbirds in the wintering season	Core	BIRDS	1	1.2
COMM FISH 3.2	D3.2 FISH (ICES)	Core	FISH	3	3.2
COMM FISH 3.3	D3.3 FISH (ICES)	Core	FISH	3	3.3
FISH COAST FUNC	Abundance of coastal fish key functional groups	Core	FISH	1	1.6
FISH COAST KEY	Abundance of key coastal fish species	Core	FISH	1	1.2
FISH LFI	Proportion of large fish in the community	Core	FISH	4	4.2
FISH LMAX	Maximum length fish in the pelagic community	Pre-core	FISH	4	4.2
FISH SALMON REPR	Abundance of salmon spawners and smolt	Core	FISH	1	1.2
FISH SEATROUT REPR	Abundance of sea trout spawners and parr	Core	FISH	1	1.2
PELA DIATOM DINOS	Diatoms/dinoflagellates index	Pre-core	PELAGIC	4	4.3
PELA SEASON SUCC	Seasonal succession of functional phytoplankton groups	Pre-core	PELAGIC	4	4.3
PELA ZOOPLANKTON	Zooplankton mean size and total stock	Core	PELAGIC	4	4.3
SEAFLOOR BQI	State of the soft-bottom macrofauna community	Core	BENTHIC HABITATS	6	6.2
SEALS DISTR	Distribution of Baltic seals	Core	MAMMALS	1	1.1
SEALS NUTRITION	Nutritional status of marine mammals	Core	MAMMALS	1	1.3
SEALS POP	Population trends and abundance of seals	Core	MAMMALS	1	1.2
SEALS REPR	Reproductive status of marine mammals	Core	MAMMALS	1	1.3

1) The workshop took note of the information that there exists a German reservation on the use of the indicators - Nutritional status of marine mammals and Reproductive status of marine mammals - which was announced at various HELCOM meetings.

Annex 4. Draft questions for evaluating confidence in the assessment

Confidence rating	Status evaluation
High	1) Full HOLAS II temporal coverage, i.e. all years in the range 2011-2016 included 2) Quality assured monitoring data used 3) Monitoring data considered to provide for the full needed temporal and spatial coverage to represent the ecological function the indicator is based on 4) Compliance check to GES boundary (threshold indicator specific, e.g. 80%), shows clear signal on whether GES has been achieved or not
Intermediate	1) Temporal coverage for HOLAS II range 3-5 years during 2011 - 2016 2) Data from mixed sources 3) Monitoring data considered to leave significant gaps in either spatial or temporal scope to represent the ecological function the indicator is based on 4) Compliance check to GES boundary shows that values are generally clearly GES/sub-GES however some outliers and variation in the data is present
Low	1) Only 1-2 years of HOLAS II range 2011-2016 data included OR only expert judgement 2) Data not quality assured 3) Monitoring data considered to leave significant gaps in both spatial and temporal scope to represent the ecological function the indicator is based on 4) Compliance check to GES boundary does not show clearly whether the data points are GES/sub-GES and/or the overall evaluation is very close to the boundary