



Document title Outcome of the HELCOM SPICE Workshop on biodiversity assessment

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Introduction

The Project for Developing the Second Holistic Assessment of Ecosystem Health in the Baltic Sea (HOLAS II) runs from December 2014 to June 2018. The project will assess the overall environmental status of the Baltic Sea and its pressures, and evaluate progress in relation to the goals of the Baltic Sea Action Plan (BSAP). It will be developed so that it can also be used by the Contracting Parties also being EU Member States in the reporting under the EU Marine Strategy Framework Directive (MSFD). A first version of the 'State of the Baltic Sea' report will be published in June 2017.

The biodiversity assessment for HOLAS II uses the integrated assessment tool BEAT 3.0, which has been developed under the HELCOM BalticBOOST project and guided by the previous workshops [HELCOM HOLAS II Biodiv 1-2015](#), [HELCOM BalticBOOST Biodiv WS 1-2106](#), and [HELCOM BalticBOOST Biodiv WS 2-2106](#).

The implementation of the biodiversity assessment is carried out under the HELCOM SPICE project: 'Implementation and development of key components for the assessment of Status, Pressures and Impacts, and Social and Economic evaluation in the Baltic Sea marine region'. HELCOM SPICE is an EU co-financed project¹ with the task to support the HOLAS II project. The project runs from January 2017-December 2017.

Workshop

The workshop was held on 15 March 2017 at the premises of the Helsinki Secretariat, Finland.

The aim of the workshop was to review, verify and summarize the results of the integrated assessment of biodiversity to be presented in the 'State of the Baltic Sea' report. The agenda of the Meeting is contained in **Annex 1**.

The Meeting was attended by representatives of Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, Sweden, and observers. The list of Workshop Participants is contained in **Annex 2**.

Ulla Li Zweifel, professional secretary, welcomed the participants to the workshop.

The Workshop was chaired by Samuli Korpinen, Finland and Lena Bergström, HELCOM Secretariat, acted as secretary to the workshop.

¹ under the call "Implementation of the Second Cycle of the Marine Strategy Framework Directive: achieving coherent, coordinated and consistent updates of the determinations of Good Environmental Status, initial assessments and environmental targets" (DG ENV/MSFD Second Cycle/2016)

Draft results of the integrated assessment of biodiversity

1. The Chair clarified the framework for the workshop:
 - a. The aim of the workshop is to conclude on results and propose key messages to be included in the State of the Baltic Sea report.
 - b. The methodology for assessment of biodiversity in HOLAS II has been agreed and will not be open for discussion at this time,
 - c. The approval process for biodiversity data was still ongoing when the workshop documents were prepared. Thus the results presented in document 3 has in some cases already changed; the latest status assessment will be used as a basis for discussion at the meeting,
 - d. No additional indicators can be introduced at this time,
 - e. Only corrections to data can be accepted at this time while potential new data sets can be added when the 'State of the Baltic Sea report' will be updated in 2018,
 - f. If the review of the results reveals problems in data or methodology, the workshop is invited to recommend short-term and long-term solutions to improve the assessment,
 - g. The final biodiversity assessment results and outcome of the workshop will be presented to HOLAS II-2017 (4-6 April 2017, document deadline 21 March),
 - h. Key messages will be updated as needed if data added at a later stage will change the results.
2. The Project coordinator of the HOLAS II project presented the content of and timeline to finalize the first version of the State of the Baltic Sea report by June 2017 (Document 1, Presentation 1). The workshop recalled that additional aspects will also be covered in the report but will not be discussed during the workshop, e.g. information on other indicators or important species that are not covered by core indicators.
3. The workshop considered document 2:
 - a. Denmark informed that they will be able to support the suggested integrated method for species as presented in document 2.
 - b. The workshop noted that the data used in BEAT are the data that were reported by the countries for use in HOLAS II, and which have been approved nationally.
4. The workshop welcomed the information that Denmark and Sweden have agreed to include the assessment of Kattegat and the Sound in the State of the Baltic Sea report, recognizing that this is a regional report to be used widely for HELCOM purposes, but since these areas belong to the North Sea in the MSFD context, summary results should also be extractable only for the MSFD Baltic Sea region.

Benthic habitats

5. The workshop considered the presentation of benthic habitats in document 3:
 - a. The workshop supported the use of eutrophication indicators in the benthic habitats assessment to complement the information with aspects that are not covered by existing biodiversity indicators, provided that this fact is clearly stated in the presentation of results.
 - b. The division into circalittoral or infralittoral areas has currently been done by assumptions of photic depth but the results do not match at station level in several countries. It was recommended that the division into circalittoral and infralittoral should not be used, noting also that it is not needed for the HOLAS II report or for national MSFD reporting.
 - c. The current status shown for the Eastern Gotland Basin is incorrect due to a technical issue in how the normalisation has been applied for the 'oxygen debt' indicator, and will be corrected based on input by the IN-Eutrophication group.
 - d. The workshop discussed the concern raised by Sweden that the benthic and pelagic habitats should not be presented as maps, since data is limited and confidence in status assessment is low. One solution to give added clarity would be showing information on indicators on the

side of each map in parallel to the confidence assessment results. In addition, the underlying stations could be directly shown on the map in addition to the assessment results.

- e. Estonia noted that the WFD indicators in BEAT do not give the same results as the national assessment. The reason is that not all WFD class boundaries were used when normalizing the indicators. The issue can be solved by sending the WFD class boundaries for these indicators.
- f. For Estonia, the WFD indicators are intercalibrated and, hence, should be corrected to “high confidence”.
- g. Assessment results for the WFD eutrophication indicators in Danish areas are missing and should be included if technically possible..
- h. Denmark noted that uncertainties are still evident in the overall results but that they are based on reasonable solutions given the current data and methodological challenges, and that the results may be seen as a first step foreseeing that the assessment will be improved in the long term.

Pelagic habitats

6. The workshop considered the presentation of pelagic habitats in document 3:
 - a. In similar way as for benthic habitats, information on lacking indicators and data gaps should be displayed when presenting the results, and other options than presenting the results in a map should be considered.
 - b. It was noted that the spatial coverage of the zooplankton indicator is foreseen to be improved by the time of the updated HOLAS II report in June 2018.
 - c. The description on indicator results for WFD phytoplankton indicators used in coastal areas need to be improved and information on lacking data in different geographic areas should be reflected in the text, and including in an easy way the detailed information contained in Annex 4
 - d. The coastal assessment for Danish areas is missing and should be added if technically possible.
 - e. The status assessment for Curonian lagoon should be checked for potential need of correction.

Fish

7. The workshop considered the presentation of fish in document 3:
 - a. The workshop supported displaying maps for coastal assessment areas according to HELCOM level 3 and open sea areas according to ICES subdivisions, but recommended that coastal areas not assessed by core indicators should be striped.
 - b. All comments from the data approval process have not yet been included in the integrated assessment and will be corrected in the final version.
 - c. Denmark has provided a proposal on how to improve the input data for commercial fish (presentation 2). The workshop recommended to follow the proposal as outlined in Annex 3, and suggested that the results could be included in BEAT using 4 classes if this is possible to achieve for all assessed stocks, and in other case as two classes.
 - i. If four classes are used, class 1 (0.125) would be used if all years during the assessment period have an assessment value 1.0 or lower, class 2 (0.375) would be used if the average is 1.0 or lower but values during individual years are above 1.0. Class 3 (0.625) would be given if the average is above 1.0 but individual years show

values lower than that, and Class 4 (0.825) is used if the assessment values during all years are above 1.0).

- ii. If two classes are used, class 1 (0.25) would be used if the average for the assessment period is 1.0 or lower, and class 2 (0.75) would be used if the average is higher than 1.0, noting that these are input values to the BEAT tool which will then be transformed inside the tool as described in Document 2.
- d. The ICES list could potentially be used as a regional list for commercial fish species. Germany suggested that the regional list should also cover additional fish stocks. Non-assessed commercial stocks or additional species should be shown.
- e. Results for commercial stocks in Kattegat should be added, taking note of the new position of Denmark and Sweden.
- f. The widely distributed species Eel will be included in the report, although it is currently not included in the integrated assessment.
- g. Salmon and sea trout are currently not included in the integrated assessment. There were different opinions in the workshop if the salmon and trout core indicators should or should not be included in the integrated assessment.
- h. The salmon indicator is not applicable for all sub-basins, as also noted in the core indicator report.

Marine mammals

- 8. The workshop considered the presentation of marine mammals in document 3:
 - a. The title of the maps should not be “marine mammals” but e.g. “seals” to represent better what is included in the maps, although the name of the chapter can be marine mammals.
 - b. It should be explained in the integrated results (the map) that the worst result for each map is shown in each assessment area.
 - c. The key message and the introduction to the section should also mention harbour porpoise, although there is currently no core indicator on the species.
 - d. The management units of the seal species are not fully aligned with the HELCOM assessment units. The workshop recommended that this should be reflected in the summary report. Furthermore the management units need to be consistently named throughout the report.
 - e. The workshop recommended to include in the map of seals, or as a separate graph, information on abundance of species in the different sub-basins and/or managements units to show the spatial variation in density.
 - f. It was noted that results of the core indicators and integrated assessment of species may differ from results of national assessments in relation e.g. to habitats directive. As this is mainly an issue of scale, this should be reflected on a general level in the State of the Baltic Sea report.

Sea birds

- 9. The workshop considered the presentation of sea birds in document 3:
 - a. The workshop noted that monitoring of the wintering birds is mainly coastal and this could be the reason why some of the species in the indicator give unexpected/incorrect results, in particular in the southwest Baltic Sea. This is likely to be improved for the 2018 assessment when more offshore data is expected, but should be clarified in the 2017 version. It was further noted that the wintering population Velvet scoter and Long-tailed duck has been categorized as endangered according to the HELCOM red list, however that the species assessment shows the species to be in good status.
 - b. The assessment results for the breeding bird indicator are not associated with the problem regarding offshore vs. coastal monitoring.

- c. The meeting discussed the integrated results for birds and noted that BEAT results indicated a better status than the results of the two indicators (both indicators are not reaching the agreed 75 %) or if simply summing up the proportion of species in good status. There were some concerns in the workshop if it is the right way to present the results for sea birds, because the suggested results differ from the indicator results and they may be incorrect. It was recommended to consider including also results for individual species in the 'State of Baltic Sea' report.

Recommendations – general comments to presentation of results in the State of the Baltic Sea report

10. The workshop split into three groups to discuss key messages for the biodiversity assessment. The results of discussion with proposals on key messages are presented in full in Annexes 4-6. The following elements were proposed to be addressed in the key messages:
 - a. The results in the summary report should represent the regional scale and give a general overview, and the deeper information would be presented in supplementary report
 - b. The results should be presented so that they are also evident for those coastal areas that are not clearly visible on the current map, proposals are given in Annex 4.
 - c. Number of indicators in the assessment should be made visible either in the status map (per assessment unit) or in some other way.
 - d. If there is a need to save space, the map of confidence assessment might not be needed in all cases, as this could also be shown in other way in direct connection to the status assessment map (e.g. proportions of confidence classes).
 - e. The coverage of each indicator that is included and its confidence should be reflected, at least in the supplementary report, noting also that the full evaluation of each indicator is provided in the core indicator reports.
 - f. Integrated assessment results should be summarized to show how much of the area is covered by assessment, and how much of the areas has a BEAT result within each of the five classes presented in document 3 (numeric values will be updated were needed).
 - g. Summary information on assessment results does not have to be shown separately for different countries.
 - h. In the summary report, highlight that compared to the previous HOLAS, the confidence in the biodiversity assessment has improved in that the approach is more systematic and includes additional indicators.
 - i. Reflect results of the Habitats Directive, for species where core indicators are missing.

Annex 1. Provisional Agenda

Time	Activity
9:30	Words of welcome Introduction to the work of the day and key questions for the workshop Plenary discussion on <ul style="list-style-type: none"> - the integrated assessment results - proposals for presenting the assessment of biodiversity status in the HOLAS II report
<i>12:30-13.30</i>	<i>Lunch break</i>
13:30-15:00	Work in subgroups on the key questions <ul style="list-style-type: none"> - recommend on results to be shown in the State of the Baltic Sea report and discuss ideas on how the results could be presented - review of assessment results - draft key messages based on the results
<i>15:00-15:30</i>	<i>Coffee break</i>
15:30-18:00	Recommendations from the workshop

Annex 2. Participant list

Representing	Name	Organization	Email address
The Chair			
SPICE project	Samuli Korpinen	Finnish Environment Institute	samuli.korpinen@ymparisto.fi
Contracting Parties			
Denmark	Lone Søderberg	Danish Environmental Protection Agency	lomu@mst.dk
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Annex 3. Proposal for how to improve results for commercial fish in BEAT

Purpose: to propose an alternative to the approach outlined in Document 3, Annex 3. The alternative proposal is developed based on comments from Denmark.

To get more reliable assessment results per stock

To improve the assessment results for commercial fish and to ensure consistency between the CFP and the HELCOM/MSFD assessments it is proposed that the input data to BEAT is the average values for 2011-2015 for the evaluation of spawning stock biomass only (SSB). Currently, only information from 2015 is used. This is considered problematic because MSY Btrigger is not defined as a level to be exceeded with a high probability. The probability of being above this point in any single year varies from very high to approximately 50% for some stocks. In contrast to this, the mean over prolonged periods should have a substantially higher probability of being above MSY Btrigger. Information on fishing mortality (FMSY) is not used in BEAT but is shown in other parts of the HOLAS II report.

The average values are based on annual estimates of SSB during 2011-2015 relative to the reference point, which is the FMSY SSB trigger. The reference point and the annual estimates of SSB are obtained from the ICES advice sheets of 2015.

Potentially: To get more detailed assessment results

The improved data could be entered into BEAT at either of the following levels of detail

- Two classes, representing either good or not good status (entered into BEAT as either 0.25 or 0.75). This is the same level of detail as is currently used.
- Four classes, as is currently done for example for coastal fish biodiversity indicators (entered into BEAT as either 0.125/0.375/0.625 or 0.825. This can be done if rules for how to assign these classes can be proposed and agreed.
- A full quantitative information could be provided if a principle for the how to identify minimum and maximum values can be agreed on. Minimum values would be zero, but maximum values are substantially more difficult to agree on, and require more work.

An example is provided below. The yellow parts concerns BEAT, and the yellow plus blue concerns the assessment of commercial fish.

EXAMPLE: Herring SD25-29

Year	Recruitment (age 1)	Stock Size: SSB	Total	Fishing Pressure: F
			Catch	Ages 3-6
	Thousands	tonnes	tonnes	Year-1
...
2010	14378664	759222	136706	0.227
2011	9173344	753878	116785	0.176
2012	23276495	804999	100893	0.126
2013	20427114	907367	100954	0.111
2014	16568898	1029218	132700	0.144
2015	27746226	1013132	174433	0.183

Reference points

	SSB ^{MP}	
Management Plan	FMP	
MSY Approach	MSYBtrigger	600000
	FMSY	0.22
Precautionary approach	Blim	430000
	Bpa	600000
	Flim	0.52
	Fpa	0.41

Outcome showing assessment values for individual years and as an average for all years

	SSB/MSY trigger	F/FMSY
2011	1.256463	0.8
2012	1.341665	0.572727
2013	1.512278	0.504545
2014	1.715363	0.654545
2015	1.688553	0.831818
Average	1.502865	0.672727

Annex 4 Proposal on key messages for the State of the Baltic Sea report

Group 1 on Benthic and pelagic habitats:

BENTHIC

Overall status of benthic habitat:

Disclaimer: with correct scaling Baltic proper will decrease in status, but Bothnian bay will remain green, which corresponds to previous assessments. For the coastal areas, there will be a rerun on the normalized data

- Gulf of Bothnia is in a good state
- In the open sea, except for the Gulf of Bothnia, the overall status of other Baltic sea areas is not-good
- Disclaimer for the coastal areas can be added, since their status vary
- Generally, there is a difference between coastal and open sea conditions
- There are national differences for coastal areas, which can be specified if needed
- Can go deeper to explain basin by basin differences, if needed

On-going trends

- There are no changes in the general trends across the Baltic sea compared to previous assessment period (Bothnian Gulf and Arkona basin are the only ones in good condition)
- Macrofauna trend seems to show similar pattern for deep areas
- Coastal macrophyte complex of indicators wasn't previously used. In many cases macrophyte based indicators show good status for different areas, this should be reflected, showing a good trend, something that is new

Geographical areas in bad status

- South-Western coastal Finland – infralittoral – Fucus depth, oxygen debt and secchi depth indicators are bad
- Parts of the German coastal waters – infralittoral
- These two areas are particularly problematic
- Below halocline in central parts of areas will be red after corrections, above halocline it looks good

Can we give information separately for coastal and open sea areas?

YES

Positive examples

- WDF Macrophytes indicators are good in Estonia, Finland, Germany, Latvia, Lithuania, Poland and Sweden
- Macrophyte based indicators are showing good results in many coastal areas

Why is the status bad there for benthic biodiversity?

- Due to eutrophication light penetration is bad, that affects Fucus; Fucus depth, oxygen debt and Secchi depth indicators are bad also due to that

When can improved status be reached

- Eastern parts of Gulf of Finland are getting better on a local scale
- Probably in the coastal areas with bad status where water exchange is lower, we can speculate that improved status can be reached if eutrophication sources can be reduced
- In coastal areas local pressure is decreasing, locally signals are improving, but still it takes times to see the effect on a larger scale

Reflect results of the Habitats Directive

PELAGIC

Based mostly on eutrophication indicators, only in the Northern part also zooplankton indicator is used

Overall status

- Worse than benthic, Bothnian Bay is also not-good
- For some areas large differences between coastal and open sea areas
- Coastal seas show generally better status than the open sea, apart from Finland, (which is most likely due to difference in classification methodology between WFD and Core indicators)
- Zooplankton indicator shows that Gulf of Bothnia is in good status

General trends

- Nothing to compare, different set of indicators used last time

Areas in particularly bad status

- Parts of Gdansk Basin, Some German coastal waters, Archipelago sea in the South-Western Finland

Separate information on coastal and open sea areas?

- In general coastal areas are in better status, than open sea

Positive examples

- Kattegat and coastal waters of Swedish east coast
- Curonian lagoon, coastal areas of northern Estonia

Why is the status bad

- In the coastal waterbodies the bad status is the direct effect of riverine inflow
- Open sea northern parts are bad due to cyanobacterial blooms

General wording for project future

- Good positive signs, status is improving
OR
- Despite of many measures the status is still bad

Planned visual material

Map on overall results

- Good to include additional information, either stations, arrows, boxes, number of indicators used. Coastal areas are small and contain too many details, so add separate boxes for that
- For the future assessment, the whole sea should be divided on a grid bases
- Confidence could be on the same map, change the transparency of the colour, if it is transparent the confidence is low, if bright then high confidence.

Pie charts

- Petal charts combining information per basin and number of indicators – separately in a box, not on the map: divide chart into sectors, each sector is an indicator; Sub-basin wise shows number of indicators used in the assessment in this area and what is the status of each indicator; it would show, that in different basins different number of indicators is used, or when the same indicator is used its status may differ between basins.

Biodiversity core indicators which are worth highlighting, show trends over time:

- One pelagic core indicator and one benthic, but the time series are not relevant and pelagic cannot be used all over the BS
- As we have very limited number of core indicators with limited coverage we propose to use information from Habitat Directive assessment or HELCOM red-list, concerning benthic habitat.
- Time-series information: from single stations; there is no larger regional data for time-series. Time series probably available for some stations, but not ready, effort needs to be invested to collect the data and visualize the results. Fucus trends are available since 1989- 2001, or in a Swedish areas some data is available since 1940, need to add new data, somebody has to do that? Coverage and intensity of cyanobacterial blooms, data since 1997?

Better not to have integrated assessment results by country, in case there are any discrepancies with MSFD reporting

Group 2 on Benthic and pelagic habitats:

Suggested key messages (given limited status information)

Detailed benthic habitat information is limited in a majority of the assessment areas...

The overall status of presented data is unknown due to scaling issues.
Important to solve the scaling issue when integrating indicators!

Oxygen debt in open sea below the halocline has a long history (since 1893) of not good status in deep basins since 1950.

Status of sediment living macrozoobenthos above the halocline is in general good.

Key message from coastal areas??? (need to look at data for individual indicators in the coastal assessment)

Suggestion concerning visual presentation

Do we need the integrated map for coastal and open sea?

What about the differences in status between open sea and coast?

There could be a table with information on the indicator results for each assessment area in the open sea.

Need additional information on the indicators causing the bad status (which are those) in the sub basins? Pie chart, table with indicators in sub-GES

Table “Benthic habitats”- Open Sea 1-17 v.s. Indicators

Assessment area - Indicator	Macrozoobenthos Above halocline	Oxygen Debt Below halocline
Bornholm Basin	Value/Color Status Value/Color Confidence	Value/Color Status Value/Color Confidence
Gulf of Gdansk		
Eastern Gotland Basin		
Western Gotland Basin		
Northern Baltic Proper		

Confidence could also be presented in similar

How to visualize coastal results.

Suggestion to zoom in coastal areas assessed as not good / low confidence...

Confidence presentation on the areas not achieving high confidence level to illustrate what it is caused by. (from the 4 criteria used for the confidence evaluation).

Table “Benthic habitats”- Coastal areas 1-17 v.s. WFD and coastal Indicators (Alternatively Pie diagrams) could be presented as area weighted status (nEQR in number or color) and area weighted or number of areas (%) in good status of neighboring coastal waters to the Open sea basins, see example

Coastal areas bordering open sea area...	Macrofauna WFD	Oxygen concentration	Macrophytes WFD	Secchi depth WFD
Bornholm Basin	% good	% good	% good	% good
Gulf of Gdansk				
Eastern Gotland Basin				
Western Gotland Basin				
Northern Baltic Proper				

Biodiversity core indicators...

Group 3 on mobile species (seals and sea birds)

Mammals

Marine mammals are important as one of the top predators in the marine ecosystem. The overall assessment of seals show that the majority of the assessment areas are not in good status, only Kattegat has reached good status. Harbour porpoise couldn't be assessed with core indicators due to lack of operational indicators under HOLAS, but general results for the Baltic region under from habitats directive reporting show harbour porpoise to in unfavourable conservation status from all HELCOM countries.

All three species of seals were also evaluated under the habitats directive, due to differences in assessment areas evaluation results can differ between the assessments under the habitats directive and HOLAS.

Future perspectives are species specific, due to different habitat preferences. For ringed seals available breeding sites are expected to decrease, therefore the species are not expected to reach good status. Grey seals population and abundance is in good status, however nutritional and reproductive status are preventing a good status, due to....

The indicator *Number of drowned mammals ...*

Birds

The Baltic Sea is an important resting, feeding and breeding area for a number of seabirds. And the integrated assessment indicate that seabirds are in good status.

Pelagic feeding birds are in good status, whereas benthic feeding birds are in bad status.

However, it is important to note that if you look at the individual functional groups of both wintering and breeding birds only four of nine groups are in good status. Furthermore, for some individual species evaluations do not match HELCOM 2013 red list assessments this is for instance the case for the velvet scoter.

The indicator Numbers of drowned mammals and birds...

Note: Pie charts would bring useful information to each of the maps, showing both the number of species are evaluated in each group as well as the number of species evaluated in each status? Possibly separate pie charts for each indicator.

Several species of birds evaluated are off shore species, the data used does not necessarily cover this as much data is coastal. [note: there is a bias towards coastal species – this is also reflected in the confidence assessment]

Regarding confidence maps they should either be smaller than the results map, or they could be included in the right corner of the result map, or the confidence could be added as a number 1-3 to the results map. Alternatively a pie chart or a simple text explaining the confidences.