



Document title	Status of development of HELCOM core indicators
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Background

Status of adoption of core indicators

HOD 39-2012 agreed on targets for five eutrophication core indicators (Outcome, para 2.20).

HOD 48-2015, taking note of study reservations by Denmark and Germany, agreed on GES boundaries for 19 additional core indicators and on the further development of the set of indicators as indicated in Annex 4 of the Outcome of HOD 48-2015, including their use in HOLAS II assessment according to the recommendation by the Gear Group, and the publication of agreed core indicator reports at the HELCOM website as they become ready for publishing (Outcome para 3.63). At present 10 core indicators reports have been published on the [HELCOM website](#).

At HOD 49-2015 Denmark lifted the study reservation on GES boundaries for the core indicators on Abundance of waterbirds in the wintering season, Abundance of waterbirds in the breeding season, Hexabromocyclododecane (HBCDD), Perfluorooctane sulphonate (PFOS), Polybrominated Diphenyl, Ethers (PBDE), Metals (Cd, Pb, Hg) and Radioactive substances.

HOD 49-2015 adopted the core pressure indicator on oil spills affecting the marine environment, pending the confirmation by Germany by end of the year (para 4-93).

Working arrangement for further development of indicators

HOD 48-2015 agreed that the further indicator development in HELCOM will be based on a Lead Country approach and that the development should be taken forward using HELCOM expert groups, projects and networks as a platform for the development of the indicators. Contracting Parties were invited to inform the Secretariat on their possibility to take the Lead or co-lead in the indicator development (para 3.64). The most recent update on representatives Lead and co-Lead countries are included as [Attachment 1](#) to this document.

HOD 48-2015 furthermore requested HELCOM groups, projects and networks to prioritize their role as platform for development of indicators and as support for HELCOM assessments and to make arrangements for the work as necessary (para 3.54). The most recent update on participants in these expert bodies is included in [Attachment 1](#) to this document.

Status and plans for indicator development

HOLAS II 4-2015 requested that the stage of development of the pre-core and candidate indicators should be clarified and that an evaluation should be made to indicate which indicators are likely to be ready, with GES-boundaries or comparable GES assessment criteria, for use in HOLAS II. This requires that the indicators are adopted by HOD in December 2016 at the latest and that they are presented for technical review by previous relevant Working Group meetings (paragraph 3.4).

While indicator development is to be taken forward through a Lead Country approach, offers to Lead the development is missing for some indicators, in particular for benthic, phytoplankton and hazardous substance indicators (see Attachment 1). Representatives of Co-Lead Countries have highlighted that the lack of Lead Country severely hampers the further development of the indicators and due to the lack of a dedicated lead the indicators may not be ready in 2016.

This document contains an evaluation received from Lead and Co-Lead Countries and relevant expert meetings on whether the pre-core and candidate indicators are anticipated to be finalized for adoption in 2016 and ready for use in HOLAS II. This document also presents summaries of plans for further development work during 2016 that the Lead Countries have been requested to provide.

HOLAS II 5-2015 (26-28 April 2015, Helsinki, Finland) will discuss the availability of indicators for the planned assessments.

Action requested

The Meeting is invited to:

- take note of the indicators anticipated to be available for HOLAS II as the basis for the assessment
- take note of the planned work to be carried out through a Lead Country approach in 2016 and the importance of ensuring national representation in the relevant expert bodies linked to the indicator development.

Status pre-core and candidate core indicators for use in HOLAS II

A summary of the status of pre-core and candidate indicators in relation to anticipated use in HOLAS II is included in Tables 1 and 2. Their use in thematic assessments of HOLAS II is dependent on endorsement by STATE & CONSERVATION 5-2016 (7-11 November 2016) of GES-boundaries or comparable GES assessment criteria and adoption by HOD in December 2016. It can be further noted that one core indicator, 'Population structure of long-lived macrozoobenthic species', is not anticipated to be available as full indicator evaluation in HOLAS II. More detailed information on the status and reasons why are provided in the next section (Plans for continued indicator development).

Based on this evaluation by Lead Countries, Figure 1 shows the number of indicators anticipated to be available for use in HOLAS II. It includes only those pre-core and candidate indicators marked as YES (green) in Table 1. It should be noted that while indicators with GES boundaries or targets may not be available for all descriptors (at this time for marine litter and seafloor integrity), the topics will still be possible to address in HOLAS II e.g. through information on current levels or trends.

Table 1. Information on pre-core indicators and their anticipated readiness for use in HOLAS II as judged by Lead/co-Lead countries. More details are given in the next section.

Pre-core indicator	Ready for use in HOLAS II
Seasonal succession of functional phytoplankton groups	YES
Diatoms/ dinoflagellates index	NO – No Lead Country
Cumulative impact on benthic biotopes	TENTATIVELY – the required assessment scale is not determined and thus it is not clear if the concept can be developed in time
Distribution, pattern and extent of benthic biotopes	YES -in some form, possibly not full evaluation
Lower depth limit distribution of the macrophyte community	NO – State and Conservation 2-2015 advised that WFD assessments for comparable indicators should be used in HOLAS II
Total nitrogen concentration	Tentatively, pending GES target modeling/availability
Total phosphorous concentration	Tentatively, pending GES target modeling/availability
Cyanobacterial surface accumulations	Tentatively, pending GES target setting
Phytoplankton spring bloom intensity based on chl-a	Tentatively, pending work on combining with PEG cyanobacteria fact sheet
Acetylcholinesterase inhibition	NO – No Lead- nor Co-Lead Country
Diclofenac concentration	Continued work pending consideration by State and Conservation 4-2016
Estrogenic-like chemicals and effects	Continued work pending consideration by State and Conservation 4-2016
Lysosomal membrane stability (LMS)	YES – in some form, data might not be available from the whole Baltic Sea
Reproductive disorders: malformed eelpout and amphipod embryos	YES – in some form, data might not be available from the whole Baltic Sea
Fish disease Index	NO – No Lead Country
Micronucleus test	NO – No Lead Country
Beach litter	TENTATIVELY - GES-boundary might not be in place but available data will be presented in some form.

Table 2. Information on candidate core indicators and their anticipated readiness for use in HOLAS II as judged by Lead/co-Lead countries. More details are given in the next section.

Candidate core indicator	Ready for use in HOLAS II
Harbour porpoise distribution and abundance	NO
Maximum length fish in the pelagic community	TENTATIVELY – concept is available however data availability for indicator testing in other areas than SE EEZ unclear
Phytoplankton community composition as a food web indicator	YES
Phytoplankton species assemblage clusters based on environmental factors	NO – no Lead Country, not prioritized by State and Conservation 2-2015
Biomass ratio of opportunistic and perennial macroalgae	TENTATIVELY – testing to be done by June to conclude on relevance of the indicator in the area and conclude on whether development should continue
EROD activity	TENTATIVELY – proposal available however data availability for indicator testing is currently restricted to Swedish data
Litter on the seafloor	NO
Microlitter in the watercolumn	NO
Continuous low frequency anthropogenic sound	YES
Distribution in time and space of loud low- and mid-frequency impulsive sounds	YES

Figure 1. Minimum anticipated indicators for use in HOLAS II, based on the agreed core indicators and information from tables 1 and 2 above. Indicators in bold are pre-core and candidate core indicators under development towards approval during 2016. List of abbreviations and full names of indicators is provided in Annex 1.

D2 Non indigenous species	D1 Biodiversity, D3 Commercial fish, D4 Food-web, D6 Seafloor integrity			D8 Contaminants
NIS ARRIVAL (C-GES)	Birds	Mammals	Fish	HAZ HBCDD (C-GES) HAZ METALS (C-GES) HAZ PBDE (C-GES) HAZ PFOS (C-GES) HAZ RAD (C-GES) HAZ EAGLE REPR (C-GES) HAZ PCB (C)* HAZ PAH (C)* HAZ TBT IMPO (C)* HAZ EFF LMS (PC) HAZ EFF AMP EELP REPR (PC) *GES proposed to State and Conservation 4-2016
D3 Commercial fish	BIRDS ABUND BREED (C-GES) BIRDS ABUND WINTER (C-GES)	SEALS DISTR (C-GES) SEALS POP (C-GES) MAMMALS NUTRITION (C-GES) MAMMALS REPR (C-GES)	FISH COAST FUNCT (C-GES) FISH COAST KEY SP (C-GES) FISH SALMON REPR (C-GES) FISH SEATROUT REPR (C-GES) FISH LFI (C) Expected: COMM FISH 3.2 (ICES-GES)	
Expected: COMM FISH 3.1 (ICES-GES)				
D5 Eutrophication	Benthic habitats	Pelagic habitats	Food webs	
EUTRO DIN (C-GES) EUTRO DIP (C-GES) EUTRO CHLA (C-GES) EUTRO CLARITY (C-GES) EUTRO OX DEBT (C-GES)	BENTHOS BQI (C) BENTHIC DISTR BIOTOPES (PC)	PELA ZOOPLANKTON (C-GES) PELA SEASON SUCC (PC)	PELA PHYTO COMM (Cand)	
	D6 Seafloor integrity	D10 Marine litter	D11 Energy and noise	Annex III pressure
	- If indicator with GES is not available for HOLAS II, the BSII can provide information on impact and loss of extent.	- If indicator with GES is not available for HOLAS II, existing data on beach litter can be presented as a minimum.	NOISE CONTINUOUS (Cand) NOISE IMPULSTIVE (Cand)	EUTRO MAI (C-GES) INCIDENTAL CATCH (C) OIL SPILLS (C-GES)

Plans for continued indicator development

Development of indicators in HELCOM is currently taken forward by Lead and Co-Lead Countries in close communication with the relevant HELCOM expert group/network/project. Lead Countries have been asked to develop, in communication with Co-Lead Countries a plan for indicator development work in 2016, which are summarized in this document.

Plans for continued indicator developments are provided for all indicators where the Secretariat has received information from the Lead- and Co-Lead Countries.

The pre-core and candidate core indicators that are anticipated to be ready for use in HOLAS II will all submit a draft proposal on the indicator report including a GES boundary to STATE & CONSERVATION 5-2016 (7-11 November) for review and endorsement and tentative adoption at HOD December 2016.

It should be noted that Denmark and Germany placed a general study reservation on GES boundaries for the core indicators presented for adoption at HOD 48-2015. Germany furthermore placed a number of specific study reservations (Annex 4 of the Outcome of HOD 48-2015). Denmark lifted the reservation on some of the indicators at HOD 49-2015. In this document only the specific study reservations by Germany and the remaining study reservations by Denmark are indicated.

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Phytoplankton indicators

Representatives of Lead and Co-Lead Countries held an online meeting 1 February 2016 to discuss current state of indicators and feasibility of continued phytoplankton indicator development.

At the annual meeting of PEG (25-29 April 2016) a one day session will be held to discuss the indicators.

As requested by State and Conservation 2-2015, PEG has considered intersessionally the proposal from Finland to develop a new candidate core indicator on 'Phytoplankton community composition as a food web indicator' and agreed to its further development. Finland is Lead Country on the development of the indicator.

Seasonal succession of functional phytoplankton groups (pre-core indicator)

Lead Country: Estonia, **co-Lead Countries:** Finland, Latvia, Sweden

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: YES

Plan 2016:

- Definition of GES to be further discussed at annual PEG meeting 25-29 April, e.g. possible redefinition, coastal and open sea areas should possibly have different EQR values
- By June 30: defining which additional areas could be included in the assessment; depends on provision of data by countries
- By 30 September: Complementing the assessment protocol; e.g. final steps needed to evaluate whether an assessment unit is GES or sub-GES
- By October: Final indicator description to be presented for technical review and endorsement at the State & Conservation meeting 5-2016 (7-11 November) and tentative for adoption at HOD December 2016, provided that PEG supports that this pre-core indicator can be proposed for approval as a HELCOM core indicator.
- By February, 2017: The indicator analyses using phytoplankton data from all HELCOM PEG countries from years 2011-2015 should be ready for the first version of HOLAS II 2016.

Diatoms/ dinoflagellates index (pre-core indicator)

Lead Country: -, **co-Lead Countries:** Estonia, Finland, Germany, Latvia, Poland, Sweden

Indicator with GES-boundaries/GES-criteria anticipated as ready for use in HOLAS II: NO. As long as there is no Lead Country on the indicator the development will not be able to proceed according to HOLAS II time-table.

Phytoplankton community composition as a food web indicator (candidate core indicator)

Lead Country: Finland, **co-Lead Countries:** Estonia, Lithuania, Latvia, Poland, Sweden

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: YES

Plan 2016:

- By April 15: Data harmonization ready.
- At annual PEG meeting 25-29 April: preliminary description of the candidate indicator to be discussed.
- By May 31: Indicator analyses using harmonized data from the Co-Leads (and the other partners who sent data) ready.

- By July 31 Conclusions written by the experts are ready, and the environmental status of the tested sea areas is defined.
- By October: Final indicator description to be presented for technical review and endorsement at the State & Conservation meeting 5-2016 (7-11 November) and tentatively for adoption at HOD December 2016, provided that PEG supports that this candidate indicator can be proposed for approval as a HELCOM core indicator.
- By February, 2017: The indicator analyses using phytoplankton data from all HELCOM PEG countries from years 2011-2015 should be ready for the first version of HOLAS II 2016.

Phytoplankton species assemblage clusters based on environmental factors (candidate core indicator)

Lead Country: - **Co-Lead Countries:** Finland, Latvia, Sweden

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: NO. As long as there is no Lead Country on the indicator the development will not be able to proceed according to HOLAS II timetable. The indicator was also not prioritized by State and Conservation 2-2015. Focus will instead be placed on the candidate core indicator “Phytoplankton community composition as a food web indicator” for which Finland has offered to take the Lead.

Benthic indicators

The Lead Country and/or Co-Lead Countries of all the benthic core indicators were presenting the current status of development and plans for further work at the first meeting of the HELCOM intersessional network on benthic habitat monitoring (IN-BENHIC 1-2016) on 16-17 February.

Population structure of long-lived macrozoobenthic species (core indicator)

Lead Country: - **Co-Lead Country:** Finland, Germany

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: NO. The IN-BENTHIC considered that this indicator is relevant for future assessments, however, noted that monitoring data starting in 2011 is not readily available and that it seems unlikely that the indicator would be operational in time to be included in HOLAS II. The Lead Country recommends to use the results of the national case-studies on a regional/ sub-basin-wide scale if suitable for HOLAS II. In the sub-basins where none of the approaches is applicable, the state of populations of long-lived bivalve species might be assessed based on expert knowledge on changes of the distribution and density of particular species. National data series on size distribution could be included in HOLAS II as supporting information, and possibly some national case studies could be provided with tentative targets and methods demonstrated.

Plan 2016

Further development work mainly taken forward through national case studies.

- Q1: discussion of further steps during the meeting of IN-BENTHIC 1-2016
- Q2: end of June, A) finalization of German case-study on *Arctica islandica*, B) clarification whether the current collated information is sufficient to finalize the indicator concept (via email, skype-meeting presumably end of May if required)
- Q3: beginning/mid-July: skype meeting tasks: discussion on a common approach for GES-boundaries, monitoring protocol, assessment protocol

NOTE: further development beyond this point strongly depends on the outcome of the previous steps and the participation of more Contracting Parties

Summary of the state of the indicator

The indicator report gives a framework covering different national case-studies from Finland, Estonia, Latvia, Poland and Germany. The case-studies differ significantly in the chosen species, the evaluated parameter (distributional range, mean size, relation of size classes), the approach to define the GES-boundaries and in the related pressures. The development of this indicator is retarded mainly due to the lack of feasible actual (and historical) data as size-measurements have not been part of the standardized protocol in most monitoring programs. Therefore, data for testing and operationalization are missing and monitoring guidelines still have to be developed.

State of the soft-bottom macrofauna community (core indicator)

Lead Country: - , **Co-Lead Countries:** Estonia, Finland, Germany

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: YES

The HELCOM core indicators is developed to be applicable in open sea assessment units. If coastal assessment units are to be assessed in HOLAS II, then national WFD assessment results of comparable indicators will be included separately.

Plan 2016:

- End of May: suggestions on GES approaches for each sub-basin and specifying the concept further so that the indicator is only applicable in open sea assessment units.
- End of September: GES proposal defined in all sub-basins
- End of December: updated indicator data by the end of 2016

Cumulative impact on benthic biotopes (pre-core indicator)

Lead Country: -, **Co-Lead Countries:** Estonia, Finland, Germany, Latvia, Lithuania

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: TENTATIVE, open issues regarding spatial scales of the assessment and the level at which biotopes are to be assessed are still open and it is not clear how this will influence the development work.

Plan 2016:

- In spring: consider available biotope maps, EUSeaMap2 to be considered after expected release in June expected to be on EUNIS level 2. Currently expected that areas in EE and LV could be covered on HUB Level 3, in DE and FI possibly on HUB level 5/6.
- By June information to be collated in various related activities:
 - o German national project on operationalizing the indicator on a national scale with high resolution spatial maps of biological communities i.e. biotopes, and of pressures will test the indicator approach, testing development of system using QGIS and during first phase compiling data on pressures and considering spatial scale of these.
 - o BalticBOOST WP 3.1 will collate basic information on impacts of e.g. dredging and construction using test cases to explore cumulation of effects on a regional scale, while WP 3.2 will collate basic information on impacts of fishing activities. This information will support impact evaluation in the indicator
 - o TAPAS project to collate biological component layers, pressure layers and impact scores of relevance for the indicator development. Timing not agreed, however possibilities to run

the indicator calculations through TAPAS at SYKE using software developed in HARMONY project,

- 2nd/3rd week of June: Skype meeting to review development work and outcomes of related activities (e.g. ICES benthic meeting linked to BalticBOOST activities). The meeting to conclude on which level of biotope-detail the assessment can be made, consider how results are to be displayed based on these conclusions, and plan in detail the further work to be carried out during autumn.
- June/July: Clarify if Estonian and Latvian national projects are funded in a way to allow closer engagement of experts in the indicator development
- By September/October: first test results available on German national project with delivery to BfN on operationalizing the indicator, conclude on what software and assessment protocol is used-

Distribution, pattern and extent of benthic biotopes (pre-core indicator)

Lead Country: Estonia, **Co-Lead Countries:** Finland, Germany, Latvia, Lithuania, Sweden

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: YES in some form, possibly not full evaluation. Due to lack of appropriate monitoring programmes and possible gaps in data coverage to fully support this indicator it can likely not be fully assessed as part of HOLAS II. However, the indicator should be possible to reflect in some form in HOLAS II.

The HELCOM pre-core indicator for assessing status of benthic habitats in terms of distribution, pattern and extent is developed as part of the TAPAS project. Maps for benthic biotopes will be developed through the HELCOM Secretariat as part of TAPAS, based on the data call issued to Contracting Parties with deadline 14 March 2016. Guidelines on establishing GES levels for indicator on distribution and extent of habitats, development of proposal for monitoring and assessment protocol, and testing of developed methodology and protocols in a number of case study areas (depending on available data) will be conducted by Lead country Estonia. The HELCOM intersessional expert network on benthic habitat monitoring will be informed and consulted in the development of the GES boundary setting guidelines in accordance with the ToR for the network (State and Conservation 4-2016, document 4J-1).

Plan 2016:

Development of benthic biotopes maps:

- By August: explore the use EUSeaMap2 maps of Baltic Sea habitats for use as a basis for the indicator evaluation
- By August: develop as agreed by State and Conservation 3-2015 benthic maps for selected benthic species (*Fucus* spp., *Zostera marina*, *Mytilus* spp., *Furcellaria lumbricalis* and *Charales*) and habitats as defined in Annex 1 of the Habitats Directive, and 'predominant habitats' according to the MSFD, i.e. at EUNIS level 2. Note that this work is dependent on the submission of national mapping and modelling work by Contracting Parties.

Development of monitoring and assessment protocol:

- September: Develop a proposed assessment protocol, including monitoring strategies and processing of monitoring data to assess the status of the indicator on distribution, pattern and extent of benthic biotopes. This will take place in cooperation with the intersessional expert network on benthic habitat monitoring as indicated in ToR of the network (State and Conservation 4-2016, document 4J-1).

Development of indicator:

- March-August: carry out the test cases and develop draft guidelines for establish GES for distribution, patter and extent for benthic biotopes according to the TAPAS project application.
- September: carry out HELCOM expert workshop to elaborate on the draft guidelines and to agree on how to finalize the proposal for consideration by State and Conservation 5-2016.

Lower depth limit distribution of the macrophyte community (pre-core indicator)

Lead Country: - **Co-Lead-Countries:** Estonia, Finland, Germany, Latvia

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: NO, work has been ongoing on developing a regional concept, however State and Conservation 2-2015 recommended that for HOLAS II purposes assessments of comparable indicators under the WFD should be compiled and used.

Plan 2016:

- In spring: national data is being shared and the indicator concept is being further tested
- By September: complement the current proposals on assessment unit specific GES boundary values for the units for which these values are currently lacking

Biomass ratio of opportunistic and perennial macroalgae (candidate core indicator)

Lead Country: Estonia **Co-Lead-Countries:** -

Indicator with GES-boundaries/GES-criteria anticipated as ready for use in HOLAS II: TENTATIVELY, tests to be carried out by June to clarify relevance of the indicator in the whole Baltic Sea

Plan 2016

- By June: test the concept of the indicator on both biomass- and coverage data collated from several countries, with the aim to conclude on whether it is considered relevant for the whole Baltic Sea area to develop the indicator further towards operationalization

Marine Litter

The Lead Country and/or Co-Lead Countries of the marine litter indicators held an online meeting (18.03.2016) to discuss the plans for further work on these indicators and agreed the plans indicated below.

Beach litter (pre-core indicator)

Lead Country: Poland, **Co-Lead Countries:** Denmark and Sweden

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: TENTATIVELY. The indicator development aims to proceed according to HOLAS II time-table. Should it not be possible to propose a GES-boundary for the integration of the beach litter indicator into HOLAS alternatives will be sought. Three options would then be looked into: (i) establishment of decreasing temporal trends of beach litter; (ii) identification of the cleanest beach in the Baltic Sea as the base line for subsequent comparison with others; and (iii) set a fixed number to aim at.

Plan 2016:

- Q1 2016: monitoring programs verification.
- Q2 2016: monitoring programs verification and acquisition of available monitoring data from HELCOM members. Lead country to prepare a questionnaire to compile available monitoring data and methodology to conduct a data call by mid-May 2016.

- Q3 2016: development of the assessment protocol.
- Q4 2016: finalization of the beach litter pre-core indicator report.
- Q1 2017: Completing indicator evaluation for the first version of the 2nd holistic assessment to be prepared by mid-2017.

Litter on the seafloor (candidate core indicator)

Lead Country: - **Co-Lead Countries:** Denmark and Sweden

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: NO. The indicator development will not be able to proceed according to HOLAS II time-table. However the aim is to present descriptive information on the distribution of seafloor litter from available data sources, i.e. bottom trawling for the south part of the Baltic Sea, and compare the situation with other regional seas.

Plan 2016:

- Q2 & Q3 2016: monitoring programs verification and acquisition of available monitoring data from HELCOM members. Co-Lead Countries to request available data from BITS (BALTic International Trawl Surveys) to ICES.
- Q4 2016: proposal drafting of a regionally coordinated monitoring programme and assessment protocol. Develop indicator report further.
- Q1 2017: Develop indicator report further. Descriptive information or presentation of baseline data for the use of HOLAS II.

Microlitter in the watercolumn (candidate core indicator)

Lead Country: Finland, **co-Lead Countries:** Denmark, Germany

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: NO. The indicator development will not be able to proceed according to HOLAS II time-table. However the aim is to present descriptive information on the distribution of microlitter in the different sea areas and hopefully also habitats. Since it is not possible to evaluate impacts of microlitter to the food webs at this point, and it is not possible to use the socioeconomic harm as criteria, only a baseline may be presented and maybe compared to other regional seas' situation.

Plan 2016:

- Q2 & Q3 2016: assessment of the current status of microlitter field survey: (methods used; compartment monitored; data coverage and assessment of present gaps; identification of methods development needs). A data call will be developed by mid-May by the Lead and Co-lead.
- Q4 2016: proposal drafting of a regionally coordinated monitoring programme and assessment protocol. Develop indicator report further.
- Q1 2017: Develop indicator report further. Descriptive information or presentation of baseline data for the use of HOLAS II.

Underwater noise

The Lead Country and/or Co-Lead Countries of the underwater noise indicators held an online meeting (16.03.2016) to discuss the plans for further work on these indicators and agreed the plans indicated below.

Continuous low frequency anthropogenic sound

Lead Country: Poland, **Co-Lead Countries:** Denmark, Finland, Germany and Sweden

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: YES. The indicator development aims to proceed according to HOLAS II time-table. Should it not be possible to propose a GES-boundary for the integration of the continuous noise indicator into HOLAS, an interim GES-boundary condition will be proposed.

Plan 2016:

- Q2 2016: proposal for a monitoring programme based on ongoing efforts (i.e. BIAS project) for submitted to STATE&CONSERVATION 4-2016 for consideration.
- Q3 2016:
 - o develop a proposal for assessment protocol;
 - o tentatively June 2016: identify needs for long-term data arrangements for ambient noise monitoring data, i.a. BIAS calculated data (not raw data) to be brought to HELCOM members;
 - o June 2016: workshop on GES on underwater noise envisaged in Germany.
- Q4 2016:
 - o 5-6 October 2016: BalticBOOST workshop on GES on underwater noise;
 - o propose an interim GES-boundary condition to relevant Working Group for a core indicator integration into HOLAS II based on the work conducted in the two workshops previously mentioned;
 - o finalisation of the continuous noise indicator report.
- Q1 2017: Completing indicator evaluation for the first version of the 2nd holistic assessment to be prepared by mid-2017.

[Distribution in time and space of loud low- and mid-frequency impulsive sounds](#)

Lead Country: Germany, **co-Lead Countries:** Denmark, Finland and Sweden

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: YES. The indicator development aims to proceed according to HOLAS II time-table. Should it not be possible to propose a GES-boundary for the integration of the impulsive noise indicator into HOLAS, an interim GES-boundary condition will be proposed.

Plan 2016:

- Q2 2016: HELCOM members have been invited to inform of their national arrangements in order to deliver data to the registry for the use in HOLAS II in the upcoming PRESSURE 4-2016 (19-21 April 2016).
- Q3 2016:
 - o June 2016: workshop on GES on underwater noise envisaged in Germany.
 - o follow up on the needs on the regional registry of impulsive activities as part of the joint HELCOM/OSPAR registry hosted by ICES;
 - o initiate testing the registry with available project/national.
- Q4 2016:
 - o 5-6 October 2016: BalticBOOST workshop on GES on underwater noise;
 - o develop a proposal for assessment protocol;
 - o propose an interim GES-boundary condition to relevant Working Group for a core indicator integration into HOLAS II based on the work conducted in the two workshops previously mentioned;
 - o finalization of the impulsive noise indicator report.
- Q1 2017: Completing indicator evaluation for the first version of the 2nd holistic assessment to be prepared by mid-2017.

Hazardous substances

The continued development of the hazardous substances indicators has in general been delayed due the fact that few indicators have a Lead Country. The Co-Lead Countries made use of the first meeting of the HELCOM expert network on hazardous substances (EN-HZ) on 2-4 February 2016 to discuss the current status of the indicators (for further details see document 4J-6). The experts present at the meeting discussed and developed proposals for GES boundaries for core indicators currently lacking specified values (for further details see document 4J-6). The Co-Leads of the core indicators for concentrations of hazardous substances, were of the opinion that the development steps needed during 2016 are very similar for the indicators, thus the same steps will solve remaining issues for several indicators simultaneously. For the pre-core indicators on bio-effects very few experts of the topic participated in the February meeting and it was not possible to make much progress with the planning.

Issues in data reporting to COMBINE for these indicators have been identified and discussed during the February meeting. Based on the conclusions relating to data-flow issues, the ICES Secretariat will work to develop the data-arrangements for the hazardous substance indicators through the HELCOM project BalticBOOST WP 2.2 during 2016 which will support the development of indicator evaluations as input to HOLAS II. Currently reported data relevant to the indicators, based on matrix used, is visualized on-line (<http://gis.ices.dk/sf/index.html?widget=boost>).

The EN-HZ was of the opinion that in order for the group to be able to deliver indicator evaluations as an input to HOLAS II, a physical meeting to review the evaluations will be needed in early 2017.

Hexabromocyclododecane (HBCDD) (core indicator)

Lead Country: -, **Co-Lead Countries:** Finland, Sweden

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: YES – GES boundary agreed at HOD 48-2015.

Plan 2016:

- February: specifying metadata requirements for the data to be used in the indicator
- April: on-line meeting with ICES Secretariat and OSPAR experts on developing a 'data view' for the indicator using the automated methodology developed in OSPAR MIME. If needed followed by physical meeting at the ICES Secretariat, depending on what is decided at the web meeting.
- September: conclude on the availability of data for HOLAS II reported by Contracting Parties through the regular COMBINE reporting and concluding on the calculation method for the indicator assessment protocol as an aspect of the integrated assessment of chemical status. Physical meeting (e.g. back to back with 2nd workshop for the development of a hazardous substances assessment tool)/web-meeting to deal with potential adjustments for trophic level etc. and other issues in the production of the indicators. Follow-up data availability in COMBINE with Contracting Parties.

Metals (core indicator)

Lead Country: Poland, **Co-Lead Countries:** Denmark, Finland, Sweden

Indicator with GES-boundary/GES criteria anticipated as ready for use in HOLAS II: YES – revised GES boundary proposal submitted to State and Conservation 4-2016.

Plan 2016:

- March: develop a proposal to review the GES boundary for the open sea assessment units for Cd and Pb (State and Conservation 4-2016, document 4J-6)
- Spring; Finalization of the heavy metals core indicator report. Heavy metals core indicator report will be complemented primarily by a detailed description of the assessment protocol to be developed in the first quarter. Based on the recommendations regarding assessment protocol, the section on results and confidence will be developed.
- By summer: Assessment protocol development:
 1. Survey of data (including matrices detail: sea water, biota (bivalves, fish tissues) available in databases. It is necessary to encourage contracting parties to provide data within the deadline
 2. Determination of the assessment level for heavy metals: Level 2 – only off-shore areas, or Level 4 - including coastal and transitional waters as waterbodies or -types (it should be taken into account (i) data availability (ii) the importance of the data from coastal areas for the holistic assessment and (iii) influence of the data from coastal areas on the holistic assessment.
 3. Selection of matrices and areas for assessment, taking into account the agreed GES boundaries. Conversion factors should be avoided as far as possible.
 4. Aggregation rules for holistic assessment (taking into account different matrices and the areas of evaluation).
- By September: Re-verification of the availability and adequacy of the data selected for assessment. At this stage it could be worth to start a discussion on monitoring programs for heavy metals, as regards unification of matrices and spatial resolution.

Polybrominated biphenyl ethers (PBDE) (core indicator)

Lead Country: - **Co-Lead Countries:** Finland, Sweden

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: YES– GES boundary agreed at HOD 48-2015.

Plan 2016:

- February: specifying metadata requirements for the data to be used in the indicator
- April: on-line meeting with ICES Secretariat and OSPAR experts on developing a 'data view' for the indicator using the automated methodology developed in OSPAR MIME
- September: conclude on the availability of data for HOLAS II reported by Contracting Parties through the regular COMBINE reporting and concluding on the calculation method for the indicator assessment protocol as an aspect of the integrated assessment of chemical status

Perfluorooctane sulphonate (PFOS) (core indicator)

Lead Country: -, **Co-Lead Countries:** Finland, Sweden

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: YES – GES boundary agreed at HOD 48-2015.

Plan 2016:

- February: specifying metadata requirements for the data to be used in the indicator
- April: on-line meeting with ICES Secretariat and OSPAR experts on developing a 'data view' for the indicator using the automated methodology developed in OSPAR MIME
- September: conclude on the availability of data for HOLAS II reported by Contracting Parties through the regular COMBINE reporting and concluding on the calculation method for the indicator assessment protocol as an aspect of the integrated assessment of chemical status

Polyaromatic hydrocarbons (PAH) and their metabolites (core indicator)

Lead Country: Germany **Co-Lead Countries:** Finland, Sweden

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: YES – GES boundary proposal submitted to State and Conservation 4-2016.

Plan 2016:

- March: develop GES boundary proposal to be submitted to State and Conservation 4-2016 for adoption (document 4J-6)
- No further plan communicated

Polychlorinated biphenyls (PCB) and dioxins and furans (core indicator)

Lead Country: - **Co-Lead Countries:** Finland, Sweden

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: YES – GES boundary proposal submitted to State and Conservation 4-2016.

Plan 2016:

- February: specifying metadata requirements for the data to be used in the indicator
- March: develop GES boundary proposal to be submitted to State and Conservation 4-2016 for adoption (document 4J-6)
- April: on-line meeting with ICES Secretariat and OSPAR experts on developing a 'data view' for the indicator using the automated methodology developed in OSPAR MIME
- September: conclude on the availability of data for HOLAS II reported by Contracting Parties through the regular COMBINE reporting and concluding on the calculation method for the indicator assessment protocol as an aspect of the integrated assessment of chemical status

TBT and imposex (core indicator)

Lead Country: Sweden **Co-Lead Countries:** Denmark, Finland

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: YES – GES boundary proposal submitted to State and Conservation 4-2016.

Plan 2016:

- 15 May: update a second draft of the indicator report, to include an assessment protocol which clearly describes the 'umbrella approach' of the indicator where it is not a requirement to have both a TBT concentration measurement and an imposex measurement to conclude on an evaluation of an assessment unit, and to develop the confidence assessment of the evaluation
- By September: review the available data in COMBINE, to conclude that all relevant data for HOLAS II assessment period 2011-2015 and all relevant stations are available.

White-tailed eagle productivity (core indicator)

Lead Country: Sweden **Co-Lead Countries:** Finland

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: YES – GES boundary agreed at HOD 48-2015, Danish study reservation.

Plan 2016:

- By August: conclude on suitable data format that ensures that indicator calculations are easy to perform and simultaneously complying with secrecy requirements
- By September: finalize the assessment protocol as it regards breeding pairs being assigned to the HELCOM assessment units, noting the conclusion that it is very challenging to assign pairs breeding on islands in an archipelago to either the scale 4 waterbody on either side of the island
- By October: update the core indicator report for the assessment period 2011-2015 as an input to HOLAS II

Acetylcholinesterase inhibition (pre-core indicator)

Lead Country: - **Co-Lead Country:** -

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: NO, Secretariat deems this indicator to be very unlikely to be available for HOLAS II due to the lack of both Lead- and Co-Lead Countries and the indicators current low stage of development.

Diclofenac concentration (pre-core indicator)

Lead Country: - **Co-Lead Country:** Denmark, Finland

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: TENTATIVELY, further development pending guidance from State and Conservation based on the report on pharmaceuticals (Agenda Item 4MA to State and Conservation 4-2016).

Estrogenic-like chemicals and effects (pre-core indicator)

Lead Country: Sweden, **Co-Lead Country:** Denmark, Finland

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: TENTATIVELY, further development pending guidance from State and Conservation based on the report on pharmaceuticals (Agenda Item 4MA to State and Conservation 4-2016)

Plan 2016

- Asap: Contracting Parties are to inform Lead Country Sweden on any currently unaccounted for data that is available (Danish monitoring data on effects as intersex in eelpout is available in national database, aimed to be reported to COMBINE by September)

Lysosomal membrane stability (LMS) (pre-core indicator)

Lead Country: - **Co-Lead Country:** Denmark, Finland

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: YES, Co-Leads proposing to prioritize the LMS indicator among the bio-effect pre-core indicator based on data availability at this time.

Plan 2016

- By 15 August: substantiate the indicator report and GES boundary proposal

- By September: review of available data in COMBINE to be included in the indicator, and conclude on whether data from national databases would be needed to be included in the indicator in addition to ensure a good data coverage
- By mid-October: produce initial assessment results based on the proposed GES boundary and include in the full indicator report to be submitted for endorsement to State and Conservation 5-2016

Reproductive disorders: malformed eelpout and amphipod embryos (pre-core indicator)

Lead Country: - **Co-Lead Country:** Denmark, Finland, Sweden

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: YES, Co-Leads proposing to prioritize the reproductive disorder indicator among the bio-effect pre-core indicators based on data availability at this time and the comparable high level of development compared to other pre-core indicators. Data-availability through COMBINE is identified as a challenge for this indicator as the current ICES DOME format does not include a separate sub-set of parameter code lists needed for the reproductive-data compared to other hazardous substance and bio-effect data.

Plan 2016

- By 15 August: substantiate the indicator report and edit the GES boundary proposal in particular for other amphipods than *Monoporeia affinis*
- By September: review of available data in COMBINE to be included in the indicator, and conclude on whether data from national databases would be needed to be included in the indicator in addition to ensure a good data coverage, for this indicator it is most likely that national data will be needed, as a separate parameter code list is needed for the data and this has not yet been accommodated fully in COMBINE due to the different nature of the data structure
- By mid-October: produce initial assessment results based on the proposed GES boundary and include in the full indicator report to be submitted for endorsement to State and Conservation 5-2016

Fish disease Index (pre-core indicator)

Lead Country: - **Co-Lead Country:** Denmark, Finland,

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: NO, Co-Lead Country deems this indicator to be very unlikely to be available for HOLAS II due to the indicators current low stage of development.

Micronucleus test (pre-core indicator)

Lead Country: - **Co-Lead Country:** Denmark, Finland,

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: NO, Co-Lead Country deems this indicator to be very unlikely to be available for HOLAS II due to the indicators current low stage of development.

EROD activity (candidate core indicator)

Lead Country: Sweden **Co-Lead Country:** -

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: TENTATIVELY, concept is well developed and was presented to State and Conservation 2-2015 for shift to pre-core status, however few countries carries out the relevant monitoring and at the time the indicator was not shifted.

Plan 2016

- Asap: Contracting Parties are to inform Lead Country Sweden on any currently unaccounted for data that is available (Danish monitoring data available in national database, aimed to be reported to COMBINE by September)

Radioactive substances

Radioactive substances: Cesium-137 in fish and surface waters (core indicator)

Lead Country: Poland **Co-Lead Country:** Finland

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: YES – GES boundary agreed at HOD 48-2015, Germany to clarify position on GES boundary.

Plan 2016:

- By summer: Data on ¹³⁷Cs concentrations in seawater and fish for 2015 was agreed to be ready during summer 2016. Then the core indicator report will be updated regarding figures, maps and comments. The updated information will be also used for short chapter on ¹³⁷Cs as a core indicator for the Thematic assessment of long-term radioactivity in the Baltic Sea, 2011-2015. The assessment should be finalized in December 2016. The radioactivity assessment will be used for the HELCOM holistic assessment on the ecosystem health of the Baltic Sea.
- By September: The core indicator report will be updated with 2015 data.

Oil-pollution

The pressure core indicator with an environmental target and the report was agreed on for publication by HOD 49-2015 (para 4.93) with the change that Figure 1 should include both flight hours and estimates of volume of spills.

Oil-spills affecting the marine environment (core indicator)

Lead: HELCOM IWGAS

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: YES, target agreed at HOD 49-2015.

Plan 2016

- March: IWGAS 2016 (7-8 March 2016) reviews monitoring data from 2015 and discusses needed updates to the indicator report
- By the end of September: The IWGAS group processes the data used to update the indicator evaluation for the assessment period 2011-2015 as an input to HOLAS II by submission to the RESPONSE 22-2016 (October/November 2016) that will conclude on the delivery of the evaluation to HOLAS II

Eutrophication

Further development of eutrophication indicators is taken forward under the HELCOM Intersessional network on eutrophication. The network discussed the indicator and agreed on Lead countries at their second meeting held 10 March 2016. In addition to the agreed pre-core indicators on eutrophication the network will also develop proposals for indicators on 'Shallow-water bottom oxygen' (Lead Country pending) and 'Deep-water oxygen consumption' (Lead Country Sweden). Status of development and plans for 2016 will be clarified by 15 April at the latest and will be submitted to the meeting of HOLAS II 5.2016.

Total nitrogen concentration and Total phosphorous concentration (pre-core indicators)

Lead Country: Germany

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: Tentatively. To be clarified by HOLAS II 5-2016 (26-28 April 2016, Helsinki, Finland). The only element missing for the indicators are GES boundaries. Simulating these by ecological models is difficult due to lack of validation data in the open sea and due to resource limitations. Lead Country Germany will investigate other options, taking advantage of existing results from the TARGREV project together with expert judgement. If this does not turn out successfully, the indicators are not expected to be ready for use in HOLAS II.

Cyanobacterial surface accumulations

Lead Country: Finland

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: Tentatively. To be clarified by HOLAS II 5-2016 (26-28 April 2016, Helsinki, Finland). Further development is needed in order to include the PEG fact sheet on quantitative cyanobacteria biomass into the present indicator. The indicator has the potential to be ready for use in HOLAS II.

Phytoplankton spring bloom intensity based on chl-a)

Lead Country: Finland

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: Tentatively. To be clarified by HOLAS II 5-2016 (26-28 April 2016, Helsinki, Finland). The GES boundary is missing, and would require additional resources for model simulations. Indicator data based on satellite images will be provided also for the southern open Baltic Sea sub-basins.

Existing eutrophication core indicators

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: YES – GES boundaries agreed at HOD 39-2012.

HELCOM eutrophication core indicators on Chlorophyll-a, Nitrogen/DIN, Phosphorous/DIP, and Water clarity are fully operational and their evaluations are integrated in the HELCOM eutrophication data flow developed under the EUTRO-OPER project. No further development work is scheduled for these indicators during 2016. The core indicator on 'Oxygen debt' is fully operational but will require recoding to be fully integrated into the eutrophication data flow.

Inputs of nitrogen and phosphorous to the sub-basins (core indicator)

Lead: HELCOM RedCore

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: YES, target agreed at HOD 48-2015.

This pressure core indicator based on the MAI (maximum allowable input) target is fully operational. Further development work is not scheduled for the indicator, however ongoing work on operationalizing the assessment in the MAI-CART OPER project will support evaluations to be made through this indicator.

Mammal indicators

Communication has been established between the Lead and co-Lead Countries on the mammal indicators.

Distribution of Baltic seals (core indicator)

Lead Country: - **Co-Lead Countries:** Denmark, Sweden

Indicator with GES-boundaries/GES-criteria anticipated as ready for use in HOLAS II: YES – GES boundary agreed at HOD 48-2015, study reservation by Germany, Finland and Denmark.

Plan 2016:

- April: Revised version of core indicator report on distribution of Baltic seals with new approach to assess GES for ringed seals and new assessment units for grey seals presented for endorsement at STATE & CONSERVATION 4-2016,
- New database for seal data developed as part of BalticBOOST,
- September: Countries to report 2015 data in advance of SEAL 10-2016 (5-7 October 2016),
- October: Updated indicator calculations to be carried out at SEAL 10-2016.

Population trends and abundance of seals (core indicator)

Lead Country: - **Co-Lead Countries:** Denmark, Sweden

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: YES – GES boundary agreed at HOD 48-2015, study reservation by Denmark.

Plan 2016:

- April: Revised version of core indicator report on population trends and abundance of seals presented at STATE & CONSERVATION 4-2016,
- New database for seal data developed as part of BalticBOOST,
- September: Countries to report 2015 data in advance of SEAL 10-2016 (5-7 October 2016),
- October: Updated indicator calculations to be carried out at SEAL 10-2016.

Nutritional status of marine mammals (core indicator)

Lead Country: Sweden **co-Lead Countries:** Finland

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: YES – GES boundary agreed at HOD 48-2015, study reservation by Germany and Denmark.

Plan 2016:

- April: Revised version of core indicator report on nutritional status, including new proposal for assessment units, presented at STATE & CONSERVATION 4-2016.
- October: Updated indicator calculations to be carried out at SEAL 10-2016.

Reproductive status of marine mammals (core indicator)

Lead Country: Sweden **Co-Lead Countries:** Finland

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: YES – GES boundary agreed at HOD 48-2015, study reservation by Germany and Denmark.

Plan 2016:

- April: Revised version of core indicator report on nutritional status, including new proposal for assessment units, presented at STATE & CONSERVATION 4-2016.
- October: Updated indicator calculations to be carried out at SEAL 10-2016.

Harbour porpoise distribution and abundance (candidate core indicator)

Lead Country: - **Co-Lead Countries:** Denmark, Finland, Germany

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: NO.

The draft indicator report on 'Harbour porpoise distribution and abundance' was discussed at SEAL EG 9-2015 and it was agreed that the report will be reviewed and it was furthermore proposed to distinguish more clearly between the two populations of harbour porpoise in the draft report. There are plans to develop the indicator under the MAMBO project (tentatively 2016-2021) which is still in the evaluation phase.

Information on the distribution on harbor porpoise is anticipated to be available for use in HOLAS II through the results from the SAMBAH project.

Bird indicators

The indicators were discussed at the first meeting of the JWG Bird (document 4J-5), especially noting that the current data storage in various national databases is a challenge.

Abundance of waterbirds in the breeding season (core indicator)

Lead Country: Germany **Co-Lead Countries:** Finland, Sweden

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: YES– GES boundary agreed at HOD 48-2015.

Plan 2016:

- Spring 2016: data call for breeding bird data for the years 1991 to 2015 (or as far as available). Unit will be number of breeding pairs per site and year or number of breeding individual per site per year coupled with species specific conversion factors as available.
- Spring 2016: In case of problems with data availability regarding spatial and/or temporal coverage, skype conference (national bird experts) about how to handle the problems.
- Summer 2016: Preparation of data and calculation of the indicator (TRIM analysis), performed by Ainars Aunins and probably funded by Germany.
- Summer 2016: Skype conference (national bird experts) concerning problems and first results of the analysis.

- Autumn 2016: Updating indicator report, including the first assessment of the Baltic by the help of breeding bird data. To be prepared by the indicator leads and discussed by the national bird experts.

Abundance of waterbirds in the wintering season (core indicator)

Lead Country: Germany **Co-Lead Countries:** Finland, Sweden

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: YES– GES boundary agreed at HOD 48-2015.

Plan 2016:

- Spring 2016: data call for wintering bird data for the years 1991 to 2015 (or as far as available). Unit will be number of birds per site and year. Instructions for data submission have already been prepared.
- Spring 2016: In case of problems with data availability regarding spatial and/or temporal coverage, skype conference (national bird experts) about how to handle the problems.
- Spring 2016: Discussing the procedure of the successful Baltic wide offshore survey in winter 2015/2016. Listing positive and negative experiences as a basis for development of indicator section dealing with waterbirds in offshore areas of the Baltic (see below).
- Summer 2016: Preparation of data and calculation of the indicator (GAM), performed by Ainars Aunins and probably funded by Germany.
- Autumn 2016: Updating indicator report, including replacement of the former assessment (based on data until 2010) by a new one (based on data up to 2015).
- 10-14 October 2016, meeting of ICES/OSPAR/HELCOM JWGBIRD (Thetford, U.K.): developing a concept how to incorporate at-sea waterbird data into wintering bird abundance indicator. Survey methods have been developed in HELCOM BALSAM, a proposal for an assessment will be prepared by Germany. Developing concept for continued large-scale surveys to feed the indicator, based on the experiences made during the coordinated survey across nearly the entire Baltic.

Mammal and bird indicators

Number of drowned mammals and waterbirds in fishing gear (core indicator)

The indicator was adopted for publication by HOD 48-2015, recognizing that quantitative GES boundary values can only be developed at a later stage due to current unavailability of monitoring data.

The indicator was considered by FISH 3-2015 (para 4.1-4.6) with the aim to review ongoing activities in Contracting Parties regarding monitoring of incidental by-catch, noting some ongoing research projects of relevance and concluding that besides Council Regulation (EC) No 812/2004, applicable for those HELCOM Contracting Parties which are also EU Member States, no systematic data collection on incidental catches of marine mammals or birds in the Baltic Sea is currently taking place and that this shortcoming should be addressed at the appropriate level as soon as possible. In particular data on incidental catches in gillnets is needed.

In the indicator development work the experts have been in contact with experts working with the same topic in OSPAR. A discrepancy in the target for incidental by-catch of harbour porpoise was noted.

Lead Country: Germany **Co-Lead Countries:** Poland

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: YES – principles for target agreed at HOD 48-2015, Denmark to clarify its position. Only a partial indicator evaluation is

however expected as the indicator and the current documentation in the indicator report will be available, however no quantitative boundaries are anticipated to be available as the current lack of monitoring data is impeding further development.

Plan 2016:

- Spring 2016: focus on 4 species to start the indicator (harbour porpoise and 3 waterbirds), elaborate on assessment method
- Contact German WGBYC member Christian von Dorrien (Thuenen Institute) re porpoise data used in WGBYC 2015
- April/May 2016: Figure out where to get bycatch data and fishing effort data from - will ICES WGBYC porpoise bycatch data suit our needs? Are additional data available? Some basic gillnet effort data for the sub-basin areas maybe from STECF.
- 10 May 2016 Gothenburg SE, Sven to participate in HELCOM fish workshop on fish specific indicators, (hopefully) fruitful discussion about the way forward, data needs etc.
- spring/Summer 2016: formulate task for JWGBIRD meeting in October (see below)
- June (?) 2016: e-mail circulation (to selected harbour porpoise bycatch experts) concerning problems and results of initial analysis. Discuss whether data is suitable for the assessment (if data set is older than assessment period: is an additional expert judgement a way forward?)
- Summer 2016: e-mail circulation (to bird experts also co-operating on the bird indicators) concerning problems and first results of the analysis. Discuss whether data is suitable for the assessment (if data set is older than assessment period: is an additional expert judgement a way forward?)
- 10-14 October 2016 Thetford/UK, Volker to participate in JWGBIRD meeting with by-catch as one topic to be discussed
- Autumn 2016: Updating indicator report, including the first assessment to be prepared by the indicator leads and discussed by the national bird/porpoise experts in e-mail group.

Fish indicators

The FISH-PRO II 3-2016 meeting on 16-18 February discussed the development made on the core indicators since their adoption by HOD 48-2015 and plans for future work (see outcome of the meeting for further details, document 4J-3).

Abundance of coastal fish key functional groups (core indicator)

Lead Country: Sweden **Co-Lead Countries:** Finland

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: YES– GES boundary agreed at HOD 48-2015, German study reservation, Denmark to clarify its position.

Plan 2016:

- By September; clarify the approach of both trend- and baseline approaches in one assessment unit, and clarify the relative importance of the listed anthropogenic pressures
- By the end of the year; develop an indicator evaluation for the assessment period 2011-2015 as an input to HOLAS II

Abundance of key coastal fish species (core indicator)

Lead Country: Sweden **Co-Lead Countries:** Finland

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: YES– GES boundary agreed at HOD 48-2015, German study reservation, Denmark to clarify its position.

Plan 2016:

- By September; clarify the approach of both trend- and baseline approaches in one assessment unit and develop a table on which key species is used in which unit, and clarify the relative importance of the listed anthropogenic pressures
- By the end of the year; develop an indicator evaluation for the assessment period 2011-2015 as an input to HOLAS II

Abundance of salmon spawners and smolt (core indicator)

Lead Country: Finland **Co-Lead Countries:** -

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: YES– GES boundary agreed at HOD 48-2015, Denmark to clarify its position.

Plan 2016:

- By the end of April: Lead Country and Secretariat to update the indicator report based on ICES WGBAST calculations of the indicator evaluation for the assessment period 2011-2015 as an input to HOLAS II.

Abundance of sea trout spawners and parr (core indicator)

Lead Country: Finland **Co-Lead Countries:** -

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: YES – GES boundary agreed at HOD 48-2015, Denmark to clarify its position.

Plan 2016:

- By the end of April: Lead Country and Secretariat to update the indicator report based on ICES WGBAST calculations of the indicator evaluation for the assessment period 2011-2015 as an input to HOLAS II.

Proportion of large fish in the community (core indicator)

Lead Country: Sweden **Co-Lead Countries:** Germany, Finland

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: YES, GES boundary proposal tentatively made, however at this time it is not possible to conclude on whether an expert level agreement can be reached by the end of 2016. Assessment protocol to be finalized pending expert level consensus on the GES boundary. Data-flow under development, supported by BalticBOOST. Unclear if a common database solution can be reached by the end of 2016, deemed possible for demersal data and unlikely for pelagic data. Currently the indicator can thus only be produced nationally for pelagic fish communities. Lead Country proposes to consider whether the information in the indicators could be used in HOLAS II as 'surveillance', i.e. to follow trends, in case consensus cannot be reached for a GES boundary.

Plan 2016:

- 30 March: online meeting to discuss next steps and consider if a lead for the demersal community work is available

- 11 April: compile a list of experts in addition to Lead Country and Co-Lead Country representatives that can be involved in consultation (with the aim to ensure common understanding of the indicator concept and target among experts working with conservation and fisheries)
- In April: consider comments from ICES WGBIFS meeting (week 13) on possibilities to use DATRAS data for demersal LFI and considerations on pelagic LFI based on catch statistics and/or acoustic abundance values
- End of April: second online meeting to discuss remaining issues (e.g. size threshold for estimation of LFI, species to be included, approach to define GES and method to relate state to GES, the potential need to split the indicator in two to have separate demersal- and pelagic LFI indicator, data-availability)
- 10 May: at HELCOM FISH IND WS 1-2016 discuss GES boundary, experts aim to participate physically or to organize a break out session allowing for on-line participation
- 10-11 May: HELCOM FISH 4-2016, inform all Contracting Parties on progress made
- Autumn: submission of indicator report to HELCOM Fish working group
- 17 October: submission of indicator report to State and Conservation 5-2016

Maximum length fish in the pelagic community (candidate core indicator)

Lead Country: Sweden **Co-Lead Countries:** -

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: TENTATIVELY, GES boundary proposal tentatively made, however unclear if an expert level agreement can be reached by the end of 2016. Assessment protocol to be finalized pending expert level consensus on the GES boundary. Data-flow under development, supported by BalticBOOST. Unclear if a common database solution can be reached by the end of 2016, deemed possible for demersal data and unlikely for pelagic data. Currently the indicator can thus only be produced nationally. Lead Country proposes to consider whether the information in the indicators could be used in HOLAS II as 'surveillance'.

Plan 2016:

- By autumn: develop the pelagic community approach further by including data from additional countries the currently included Swedish data when such become available

Zooplankton indicators

The core indicator GES boundary and the publication of the indicator report was agreed by HOD 48-2015, with the understanding that assessment unit specific GES boundary values are to be calculated in accordance with the agreed method.

Zooplankton mean size and total stock (core indicator)

Lead Country: Sweden **Co-Lead Countries:** Finland, Latvia, Estonia

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: YES – principles for GES boundaries agreed at HOD 48-2015, Denmark to clarify its position.

Plan 2016:

- Intersessional work to develop test evaluations against existing GES boundary values currently ongoing
- Lead Country to check and verify all calculations
- Evaluation of the individual biomass value variability in different Baltic Sea areas by independent expert

- ZEN ZIIM 2016 (planned for November/December) to deliver the indicator evaluation to HOLAS II, pending calculation of GES boundaries for sub-basins and representation by Contracting Parties (see document 4J-4).

Non-indigenous species

The non-indigenous species indicator GES boundary and report were agreed for publication by the HOD 48-2015. To ensure that all Contracting Parties are consulted in the further development of the core indicator report, the indicator is linked to the HELCOM TG Ballast.

Trends in arrival of new non-indigenous species (core indicator)

Lead Country: Finland **Co-Lead Countries:** Germany, Latvia, Sweden, Denmark

Indicator with GES-boundary/GES-criteria anticipated as ready for use in HOLAS II: YES – GES boundary agreed at HOD 48-2015, study reservation by Denmark.

Plan 2016

- March: scope opportunities to based indicator evaluation on data from the AquaNIS database
- By summer: Specify data-source(s) to be used as a basis for the indicator evaluation
- By autumn: Develop the indicator evaluation and present to TG Ballast for review as an input to HOLAS II for the assessment period 2011-2015

Annex 1. List of abbreviations and full name of indicators as in Figure 1.

Abbreviated name	Full indicator name
BENTHOS DISTR BIOTOPES	Distribution, pattern and extent of benthic biotopes
BIRDS ABUND BREED	Abundance of waterbirds in the breeding season
BIRDS ABUND WINTER	Abundance of waterbirds in the wintering season
BYCATCH	Number of drowned mammals and waterbirds in fishing gear
COMM FISH 3.1	D3.1 FISHING (ICES)
COMM FISH 3.2	D3.2 FISH (ICES)
EUTRO CHLA	Average chlorophyll-a concentration in the surface (0 – 10 m) during summer
EUTRO CLARITY	Average Secchi depth during summer
EUTRO DIN	Average DIN concentration in the surface (0 – 10 m) during winter
EUTRO DIP	Average DIP concentration in the surface (0 – 10 m) during winter
EUTRO MAI	Actual inputs of nitrogen and phosphorous to the basins
EUTRO NTOT	Total nitrogen concentration
EUTRO OX DEPT	Oxygen debt
FISH COAST FUNC	Abundance of coastal fish key functional groups
FISH COAST KEY	Abundance of key coastal fish species
FISH LFI	Proportion of large fish in the community
FISH SALMON REPR	Abundance of salmon spawners and smolt
FISH SEATROUT REPR	Abundance of sea trout spawners and parr
HAZ EAGLE REPR	White-tailed eagle productivity
HAZ HBCDD	Hexabromocyclododecane (HBCDD)
HAZ METALS	Metals
HAZ PAH	Polyaromatic hydrocarbons (PAH) and their metabolites
HAZ PBDE	Polybrominated biphenyl ethers (PBDE)
HAZ PCB	Polychlorinated biphenyls (PCB) and dioxins and furans
HAZ PFOS	Perfluorooctane sulphonate (PFOS)
HAZ RAD	Radioactive substances: Cesium-137 in fish and surface waters
HAZ TBT IMPO	TBT and imposex
HAZ EFF LMS	Lysosomal membrane stability (LMS)
HAZ EFF AMP EELP REPR	Reproductive disorders: malformed eelpout and amphipod embryos
LITTER BEACH	Beach litter
NIS ARRIVAL	Trends in arrival of new non-indigenous species
NOISE CONTINUOUS	Continuous low frequency anthropogenic sound
NOISE IMPULSIVE	Distribution in time and space of loud low- and mid-frequency impulsive sounds
OIL SPILLS	Oil-spills affecting the marine environment
PELA SEASON SUCC	Seasonal succession of functional phytoplankton groups
PELA PHYTO COMM	Phytoplankton community composition as a food web indicator
PELA ZOOPLANKTON	Zooplankton mean size and total stock
SEAFLOOR BQI	State of the soft-bottom macrofauna community
SEALS DISTR	Distribution of Baltic seals
SEALS NUTRITION	Nutritional status of marine mammals
SEALS POP	Population trends and abundance of seals
SEALS REPR	Reproductive status of marine mammals