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<b>Document title</b>	Metals core indicator - GES boundary proposal for Cd and Pb in offshore assessment units
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## Background

HOD 48-2015 agreed on the Metals core indicator GES boundaries taking note of general study reservations by Denmark and Germany (paragraph 3.63 of the outcome). The indicator includes three metals, mercury (Hg), cadmium (Cd) and lead (Pb). At HOD 49-2015 Denmark lifted its study reservation on the indicator (paragraph 4.125). At HOD 50-2015 study reservations were placed on the new GES-boundary proposals for the offshore assessment units by Sweden, Poland and Denmark and noting that the general study reservation by Germany remains. The study reservations of Sweden and Poland concerned the proposal of using a threshold based on measurements from fish muscle for cadmium (Cd) and lead (Pb), as monitoring data is not available for this assessment and conversion factors would be needed noting that currently such conversion factors are not available. The Danish study reservation was placed on all hazardous substances indicator GES boundaries that are not based on a commonly agreed EU threshold boundary or agreed in Danish national legislation.

HOD 50-2016 recognized the need to reach clarity regarding the use of indicators in HOLAS II and urged the Contracting Parties with study reservations to clarify their position as soon as possible, further noting that the HELCOM Expert network on hazardous substances (HELCOM EN-HZ) will discuss the issue with the aim to clarify remaining issues of a technical nature (paragraph 4.49). The HELCOM Expert Network on Hazardous substances discussed the GES boundary for the core indicator 'Metals' at three consecutive online meetings; [EN-HZ 2-2016](#) (point 3-11 of the outcome), [EN-HZ 3-2016](#) (point 11-12 of the outcome) and [EN-HZ 4-2016](#) (point 3-11 of the outcome).

This document presents the proposal for the GES boundary for cadmium (Cd) and lead (Pb) for which an expert level consensus was reached at EN-HZ 4-2016.

## Action requested

The Meeting is invited to endorse the proposed GES boundary for cadmium and lead in offshore assessment units.

## Metal core indicator GES boundary proposal for Cd and Pb in offshore assessment units

The core indicator 'Metals' includes three substances, namely mercury (Hg), cadmium (Cd) and lead (Pb). The GES boundary for the indicator defines substance specific GES boundary values. The GES boundary value for Hg was agreed at HOD 48-2015 (paragraph 3.63 and Annex 2 of the outcome) and is defined as 20 µg/kg wet weight in fish and the value is an EQS<sub>biota secondary poisoning</sub>. For Cd and Pb EQS values are available only for the water matrix, and this value 0.2 µg/l EQS<sub>water</sub> was agreed for the coastal assessment units.

The proposal under discussion regarding the offshore units GES boundary for Cd and Pb is due to the HELCOM Expert Network on Hazardous substances noting that the water matrix is generally not sampled for Cd and Pb in the offshore area. In the offshore area the biota and sediment matrices are considered more relevant. The biota matrix is generally preferred in HELCOM assessments if a relevant threshold value is available.

In order to clarify and resolve the specific study reservations of Sweden and Poland on the GES boundary proposal for Cd and Pb in the offshore assessment units the issue was discussed at EN-HZ 4-2016. The group concluded that it is important to ensure comparability between the coastal- and the offshore assessment units and proposed to also apply the EQS<sub>water</sub> as the GES boundary for Cd and Pb in the offshore assessment units (Table 1.). EN-HZ 4-2016 further considered that secondary GES boundary values are needed in the offshore assessment units as the majority of the available environmental monitoring (also the HELCOM COMBINE monitoring) samples Cd and Pb in biota and/or sediment matrices. EN-HZ 4-2016 proposes to use the OSPAR BAC values for fish liver and mussels for Cd and Pb in the offshore assessment units and the sediment value from the QS of the EQS dossier (Table 1.).

Table 1. GES boundary proposal for the 'Metals' core indicator in relation to cadmium (Cd) and lead (Pb) to be applied in both coastal- and offshore assessment units. The indicator is to be used for assessing D8 in MSFD.

Metal	GES boundary proposal			Comment
	Matrix	Threshold value	Reference	
Cd	Water	0.2 µg/l	EQS	
	<i>Secondary GES boundary Mussels</i>	<i>960 µg/kg dw</i>	<i>OSPAR BAC</i>	Long-term aim to calculate HELCOM BAC to verify regional relevance
	<i>Secondary GES boundary Fish liver</i>	<i>26 µg/kg ww</i>	<i>OSPAR proxy BAC</i>	Long-term aim to calculate HELCOM BAC to verify regional relevance
	<i>Secondary GES boundary Sediment</i>	<i>2.3 mg/kg</i>	<i>QS from EQS dossier</i>	
Pb	Water	1.3 µg/l	EQS	
	<i>Secondary GES boundary Mussels</i>	<i>1300 µg/kg dw</i>	<i>OSPAR BAC</i>	Long-term aim to calculate HELCOM BAC to verify regional relevance
	<i>Secondary GES boundary Fish liver</i>	<i>26 µg/kg ww</i>	<i>OSPAR proxy BAC</i>	Long-term aim to calculate HELCOM BAC to verify regional relevance
	<i>Secondary GES boundary Sediment</i>	<i>120 mg/kg</i>	<i>QS from EQS dossier</i>	

### Further information on the reasoning for proposing OSPAR BAC values as secondary GES boundary values

The experts also agreed that for the offshore it is relevant to make assessments based on measurements in biota and sediment in addition to the water matrix. Sweden informed that studies to develop conversion factors between measurements in fish whole body, liver and muscle are planned to be carried out in 2017. Currently the monitoring data mainly stems from fish liver measurements, and it is relevant to apply a fish liver secondary GES boundary value. The experts concluded at EN-HZ 4-2016 that a biota GES boundary value derived based on ecotoxicological effects would be the best option, however agreed that since such studies are currently not available a background concentration value (BAC) can be used as secondary GES boundaries. BAC values are not effect-based threshold values however considered to be relevant for the purpose of assessing the concentration of metals in the marine environment as a reflection of the status.

Regional BAC values have been derived in OSPAR. Poland informed EN-HZ 4-2016 that a BAC value has been calculated based on national data for Pb and that this value corresponds very closely to the OSPAR value (additional background information available on EN-HZ 4-2016 meeting site). The expert level consensus was that BAC values should be calculated based on HELCOM COMBINE data, however the OSPAR BAC values can be applied if it is not possible to calculate HELCOM BAC values within the tight schedule of the HOLAS II project. In the capacity of Lead Country, Poland made an attempt to calculate BAC values based on COMBINE data after the EN-HZ 4-2016 meeting, however it was not possible to conclude the work in time for the submission to State and Conservation 5-2016. Thus the proposal for the GES boundary is to use the OSPAR BAC values for Cd and Pb.

EN-HZ 4-2016 concluded that the next step should be to calculate BAC values based on HELCOM COMBINE data and that a long-term goal would be to establish the boundary values based on ecotoxicology. The indicator Lead Country Poland made an attempt to perform these calculations, however it was not possible to complete the work in time for the State and Conservation 5-2016 submission. EN-HZ 4-2016 considered the OSPAR BAC values to be relevant and to ensure a sufficient level of protection for the Baltic Sea region, and recommends using them as GES boundary values in HOLAS II.

### Foodsafety threshold values for Cd and Pb

For cadmium (Cd) and lead (Pb) there are threshold values available for fish and mussels stemming from the EC foodstuff directive (EC 1881/2006). If a HELCOM assessment is made to evaluate the food safety aspect (cf. D9 of the MSFD) then EN-HZ 4-2016 recommends that the threshold values could be used (Table 2).

It should be noted that environmental monitoring has focussed on measuring concentrations in fish liver and that very few measurements are available in fish muscle. Sweden is aiming to fund studies to develop conversion factors between fish liver-, muscle- and whole body measurements in 2017.

*Table 2. Proposal on threshold values to use when assessing cadmium (Cd) and lead (Pb) for D9 purposes in the MSFD for both coastal and offshore assessment units.*

<b>Metal</b>	<b>Matrix</b>	<b>Threshold value</b>	<b>Reference</b>
Cd	Fish muscle	50 µg/kg ww	EC 1881/2006
	Bivalves	1000 µg/kg ww	EC 1881/2006
Pb	Fish muscle	300 µg/kg ww	EC 1881/2006
	Bivalves	1500 µg/kg ww	EC 1881/2006