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<b>Document title</b>	Proposal for splitting Bornholm Basin into two assessment units for eutrophication assessment: separation of the Pomeranian Bight
<b>Code</b>	5-1
<b>Category</b>	DEC
<b>Agenda Item</b>	5- Any other business
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<b>Reference</b>	

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## Background

During the process of checking the data and the eutrophication assessment for HOLAS II, it became obvious that Bornholm Basin was more eutrophied than the surrounding basins which was a surprising and implausible result (IN Eutrophication 7-2017). The reason for this was further investigated after the meeting and found to be due to the influence of water from the river Odra. High values of especially DIN, DIP, Chla and low values for secchi depth have been observed in open sea areas near the estuary of the river Odra.

In the thematic assessment of eutrophication (2018), the influence of the Odra plume on the nutrient concentrations was explicitly mentioned: "Average concentrations in the Bornholm Basin were high due to influence from shallow stations in the Pomeranian Bay under influence from the river Odra plume." And with regard to chlorophyll: "A deteriorating trend was detected only in the Bornholm Basin, which is attributed to influence from measurements at shallow stations in the Pomeranian Bay and outflow from the river Odra."

The problem was discussed at STATE&CONSERVATION 6-2017. It was decided to show the assessment results for Bornholm Basin as they are, but to add a comment (see HOLAS II report: "Generally, indicators for nutrient levels were furthest away from good status, and thus had highest influence on the integrated assessment results. This was especially evident for Bornholm Basin where shallow stations located in the Pomeranian Bay had significant impact on nutrient level results."). It was further decided to look for a better solution for future assessments and suggested to create a separate assessment unit for eutrophication assessment which considers the impact of the Odra plume. This suggestion was made in the understanding that the MAI/CART target values and assessments will remain as they are and be untouched by a new assessment unit for eutrophication. IN Eutrophication was given the task of further working on this issue and developing a proposal.

## Action requested

The Meeting is invited to:

- consider and discuss the proposal to have a new assessment unit "Pomeranian Bight" as described in this document and recommend a way forward to STATE-14 in spring 2021.

## Introduction

During the process of checking the data and the eutrophication assessment for HOLAS II, IN Eutrophication 7-2017 notified that the Bornholm Basin is more eutrophied than the surrounding basins.

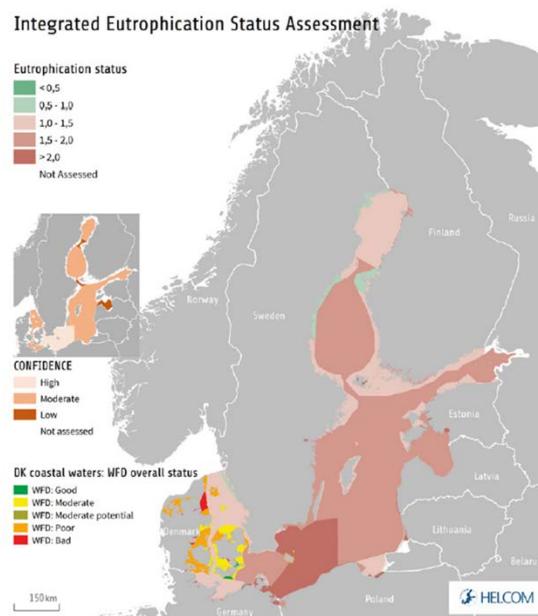


Fig. 1: Integrated Eutrophication Status Assessment – Source: HELCOM Status of the Baltic Sea Report 2018

The reason for this was further investigated after the meeting and found to be due to the influence of water from the river Odra. High values of especially DIN, DIP, Chla and low values for secchi depth have been observed in open sea areas near the estuary of the river Odra.

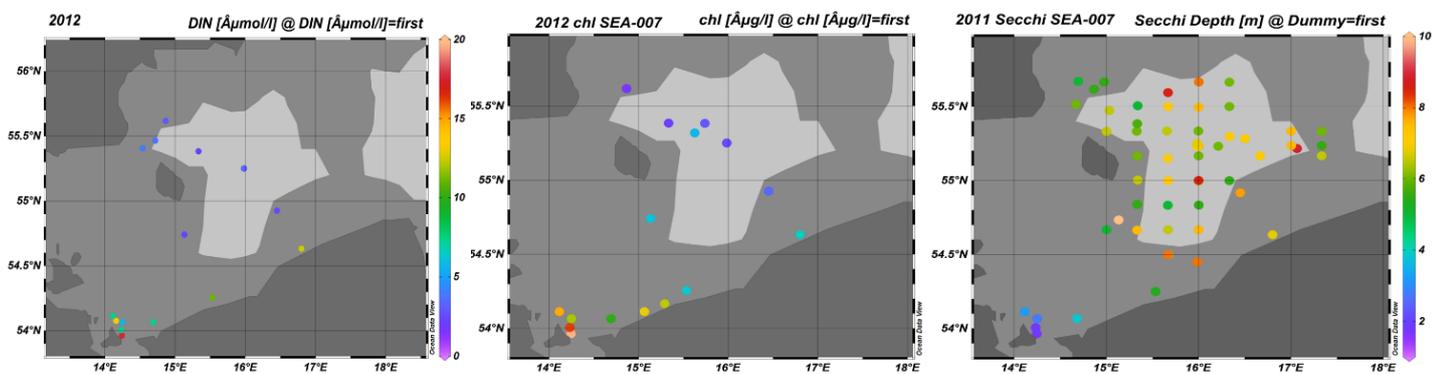


Fig. 2: DIN, Chla and Secchi depth for selected years in Bornholm Basin (source: Karin Wesslander, SMHI)

The following solutions were proposed: 1) using the median value instead of the mean to reduce the influence of outliers, 2) removing stations with high river influence, 3) not making any changes to data or method but highlighting this issue a) in the text and b) in accompanying maps showing the concentrations. Solution 3.a) was finally chosen for HOLAS II. Reference to the influence of the Odra plume on the eutrophication assessment result is made in the HOLAS II report as well as in the Thematic Assessment of Eutrophication (2018).

For HOLAS III it is desirable to find a better solution and to split off the area under influence of the Odra plume from Bornholm Basin to allow for a more realistic assessment of the main part of Bornholm Basin.

## Approach

As a starting point, it was decided to try to define the new assessment unit based on the Odra plume as such, making use of e.g. the chlorophyll or the nutrient plume, hydrographic parameters like salinity, water depth etc. This turned out to be complicated because the Odra plume is highly variable in space and time, depending on natural conditions (river water flow rate, floods, wind regime and currents in the Pomeranian Bay etc.). It is possible to delineate the average area influenced by the Odra plume using a modelling approach or Chl a satellite data, but this approach has the disadvantage of requiring substantial financial and personal resources as well as time. However, a solution is needed soon if to be applied in HOLAS III.

Therefore, a more pragmatic approach was used based on geographical or maritime maps. One option is to use the Odra bank as northern boundary (20 m isobath), another to look for definitions of the Pomeranian Bight in geographical or maritime maps. But while the name 'Pomeranian Bight' turns up in many maps, no clear delineation or definition is given.

It was decided to define the new assessment unit in a simple, pragmatic and practical way by using the Bornholm Basin boundary in the western part, the EEZ boundary in the northern part and the WFD water body boundaries in the coastal area as depicted in Fig. 3.

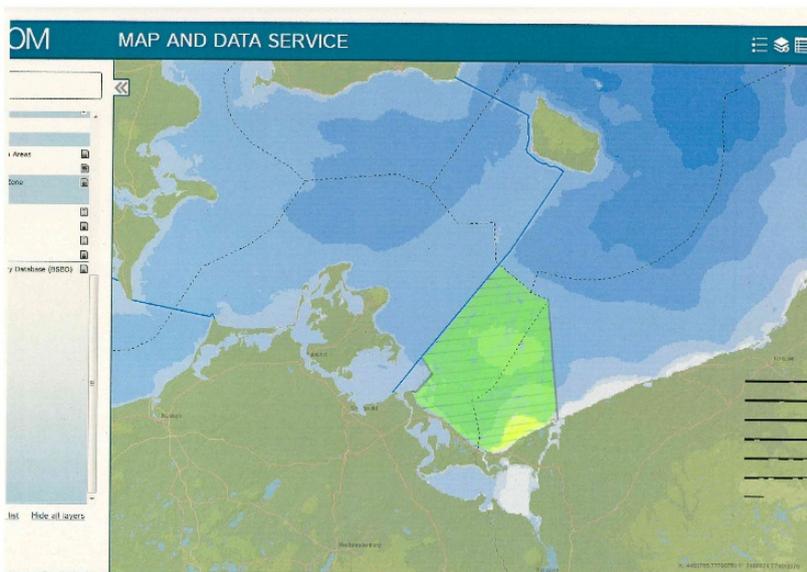


Fig. 3: Proposed new eutrophication unit "Pomeranian Bight" (highlighted in green).

The aim is to allow for a proper eutrophication status assessment of Bornholm Basin which is non-biased by stations influenced by the Odra plume. The proposal is made in the understanding that there are no implications for MAI/CART and NIC, respectively, as these will stay as they are for Bornholm Basin with the new unit "Pomeranian Bight" being in integral part of Bornholm Basin for PLC and MAI/CART and NIC assessments. The intention is to use the new unit "Pomeranian Bight" for eutrophication assessment only.

In the German part of Bornholm Basin, there is a small non-highlighted area near the coast (Fig. 3). This is because the current boundary of Bornholm Basin is cutting two WFD waterbodies into smaller units (Fig. 4). To avoid this, Germany will make a proposal via STATE & CONSERVATION to align the HELCOM and waterbody boundaries. If approved, the small non-highlighted part in Fig. 3 would be assigned to Arkona Basin, and this change would be a general one and not only be relevant for the eutrophication assessment. This change is already considered in the figure above, but please note that this is preliminary and included here for information.

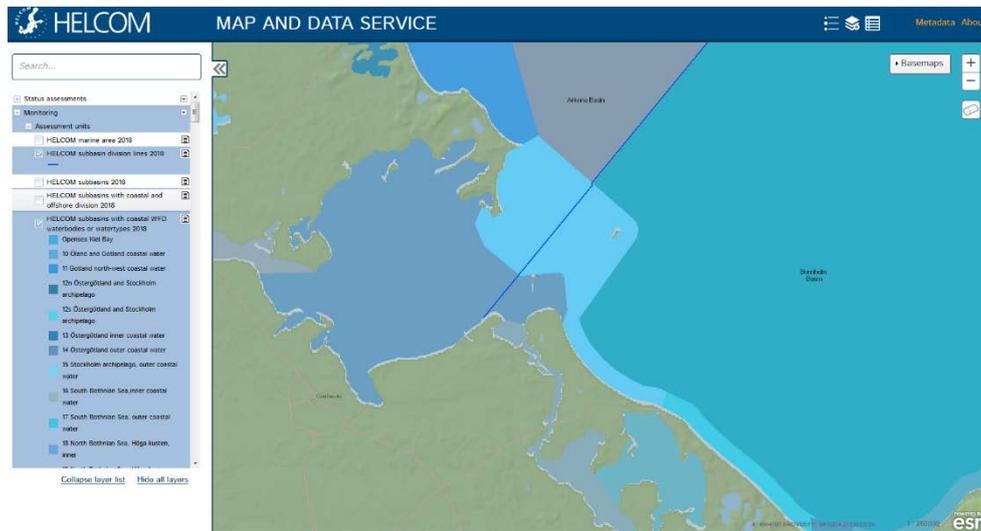


Fig. 4: Bornholm Basin boundary is cutting two WFD waterbodies into pieces.

IN Eutrophication is asked to consider the proposal to have a new eutrophication assessment unit “Pomeranian Bight” as shown in Figure 3.