Baltic Marine Environment Protection Commission

Making the HELCOM eutrophication assessment operational (EUTRO-OPER)
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Background

One of the aims of the EUTRO-OPER project is further scrutiny of the assessment tools. EUTRO-OPER 1-2014 agreed, that the assessment should go beyond only estimating whether GES is met, to actually provide information on progress toward GES. This was supported by GEAR 6-2014, with a request to present possible alternatives for solutions. This work is listed as subtask 1c.i in the EUTRO-OPER roadmap.

Action required

The Meeting is requested to discuss the alternative approaches and plan the way forward, with the aim of presenting a proposal to GEAR 10-2015.

Alternative approaches for estimating progress toward achieving GES

In a case such as the Baltic Sea, imposed by severe eutrophication, the visual presentation of the eutrophication assessment result faces new challenges in comparison to a completely or partly non-eutrophied area. When all sub-basins are estimated to be in non-good status, presenting the actual intensity of the eutrophication problem becomes more useful than simply showing whether targets have been met.

When considering additional approaches to illustrate distance from GES for eutrophication status in the open sea, several features should be taken into account (table 1). First and foremost, the approach should be applicable to the MSFD criteria. Other useful properties are the possibility for harmonization against the WFD requirements. For practical reasons, the presently used assessment tools should be able to use the approach, either directly or after some adjustments. And in order to provide additional value for management purposes, the assessment should provide information on estimating approach form SubGES to GES as well as warning on the risk of falling from GES to SubGES – in the present situation the prior seems more convenient than the latter, if one or the other has to be chosen. In general introducing uncertainty as part of the status assessment, instead of on the side, might be useful.

We introduce below four possible approaches for estimating distance to GES, and discuss their characteristics (Fig. 1).

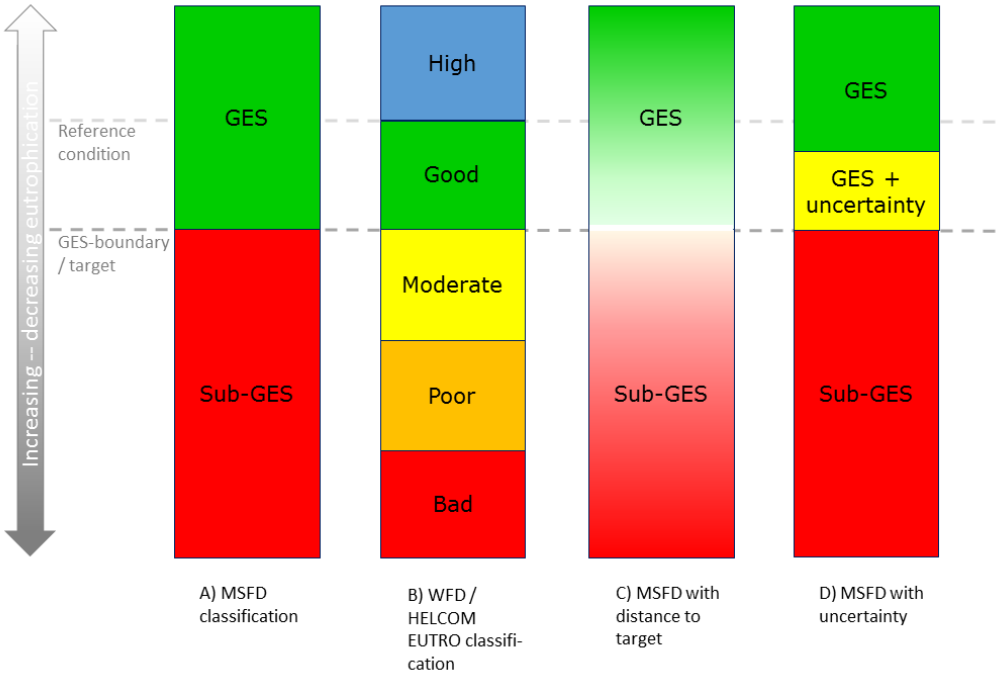

Figure 1. Illustrations of four alternative approaches for visualizing eutrophication status and whether the GES-boundary has been achieved.

Approach A: MSFD classification (GES / SubGES)

The present HELCOM eutrophication status assessment (2007-2011) has been produced using a simple classification into either good status (GES) or below good status (SubGES, Fig. 1 approach A).

This approach provides sufficient information to fulfill the requirements of Article 9 of the MSFD. It also allows using the HELCOM assessment for open-sea areas and WFD assessment of ecological status side by side, as was done in the present HELCOM eutrophication status assessment (2007-2011, Fig. 2 left pane). This line of thinking naturally assumes that the two assessments as well as their class boundaries are harmonized, which at present is not fully the case.

The main disadvantage of the present approach however is, that the magnitude of the eutrophication problem is not revealed in the present situation, where the entire open Baltic Sea is classified as SubGES (Fig. 3 panel A). It is difficult to follow the improvement or deterioration of status as response to human actions, unless the status is very close to the GES boundary. The manager is not provided with information on which areas are of most concern.

Approach B: Five-class system (High / Good / Moderate / Poor / Bad)

The previous HELCOM eutrophication status assessment (2003-2007) was based on a five-class classification system, which was used also for estimating ecological status in the WFD. In this approach, the status is estimated as HIGH, GOOD, MODERATE, POOR or BAD (Fig. 1 approach B).

As Approach A, approach B allows using HELCOM assessment for open-sea basins and the coastal assessment of ecological status side by side. This was however not done in the previous assessment, but instead the HELCOM assessment tool HEAT was used also in the coastal areas (Fig. 2 right pane). The criticism against assuming harmony between the two assessment methodologies (HEAT and WFD) has been greater than against approach A, motivated by the introduction of multiple class boundaries.

The use of five classes is however a considerable improvement from the two-class system used in approach A. For the open Baltic Sea sub-basins, the present SubGES eutrophication status can be classified into three "sub-classes", allowing the manager to recognize the areas of most concern (Fig. 3 panel B).

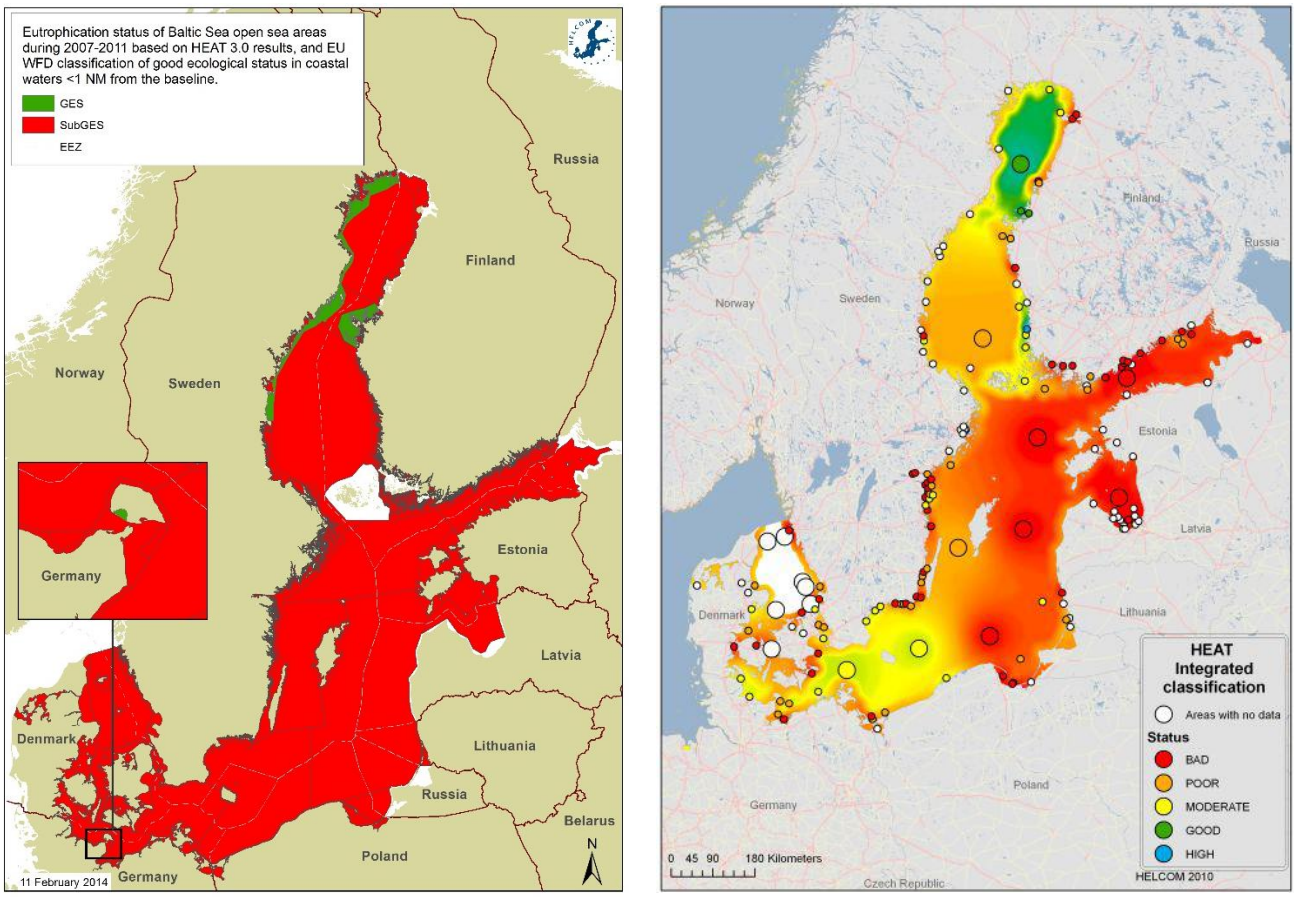

Figure 2. The eutrophication status for coastal and open sea areas, as assessed for the present (2007-2011, left) and the previous (2003-2011, right) HELCOM assessment.

Approach C: MSFD classification (GES / SubGES) combined with distance to target information

A new approach not used in previous eutrophication assessments is adapting a numeric scale instead of a class scale. This could be done by using simply the Eutrophication Ratio (ER) based on the indicator status and GES target, introduced as a replacement for the Ecological Quality Ratio. The eutrophication ratio could be

visualized in shades of green (where ER ≥ 1 and status is GES) and red (where ER < 1 and status is SubGES, Fig. 1 approach C).

The most significant disadvantage of approach C is that it is not compatible with the methodology used in the assessment of ecological status under WFD, where EQR is still used. Approach C would thus not allow combining the WFD assessment for coastal waters with the HELCOM assessment for open-sea basins.

For management purposes, approach C provides a more detailed picture of the eutrophication status than the other approaches presented. This would be very useful in the Baltic Sea, where all open-sea basins are classified below good status, but actually to a varying degree (Fig. 3 panel C)

Approach D: MSFD classification combined with information of uncertainty when estimating GES

Another new approach, discussed also informally at the level of certain pressure indicators (the HELCOM nutrient inputs) as well as in other contexts, would be to include information of uncertainty into the status assessment, especially in the case when classifying into GES. In practice, the approach introduces a new sub-class, where GES has been estimated but with low confidence (Fig. 1 approach D). Applying the precautionary principle would actually lead to actions in these areas, at least in the form of introduced monitoring activities, instead of blindly accepting the calculated GES-status.

However, in the case of the open Baltic Sea, applying this approach in the present eutrophication status (2007-2011) would not bring any added information, as no single sub-basin is classified into GES (Fig. 3 panel D).

Table 1: A summary on the degree in which the alternative approaches (presented in Fig. 1) fulfil possible requirements identified to an assessment. Green = Fulfills more or less completely, orange = fulfills partly, red = does not fulfill.

	A	B	C	D
Applicable to MSFD criteria				
Possibility for hamonizing against WFD				
Present assessment tools supports the approach fully / after some adjustments				
Provides information on estimating approach from SubGES to GES				
Provides information on warning of risk on falling from GES to SubGES				
Includes the uncertainty into the assessment				

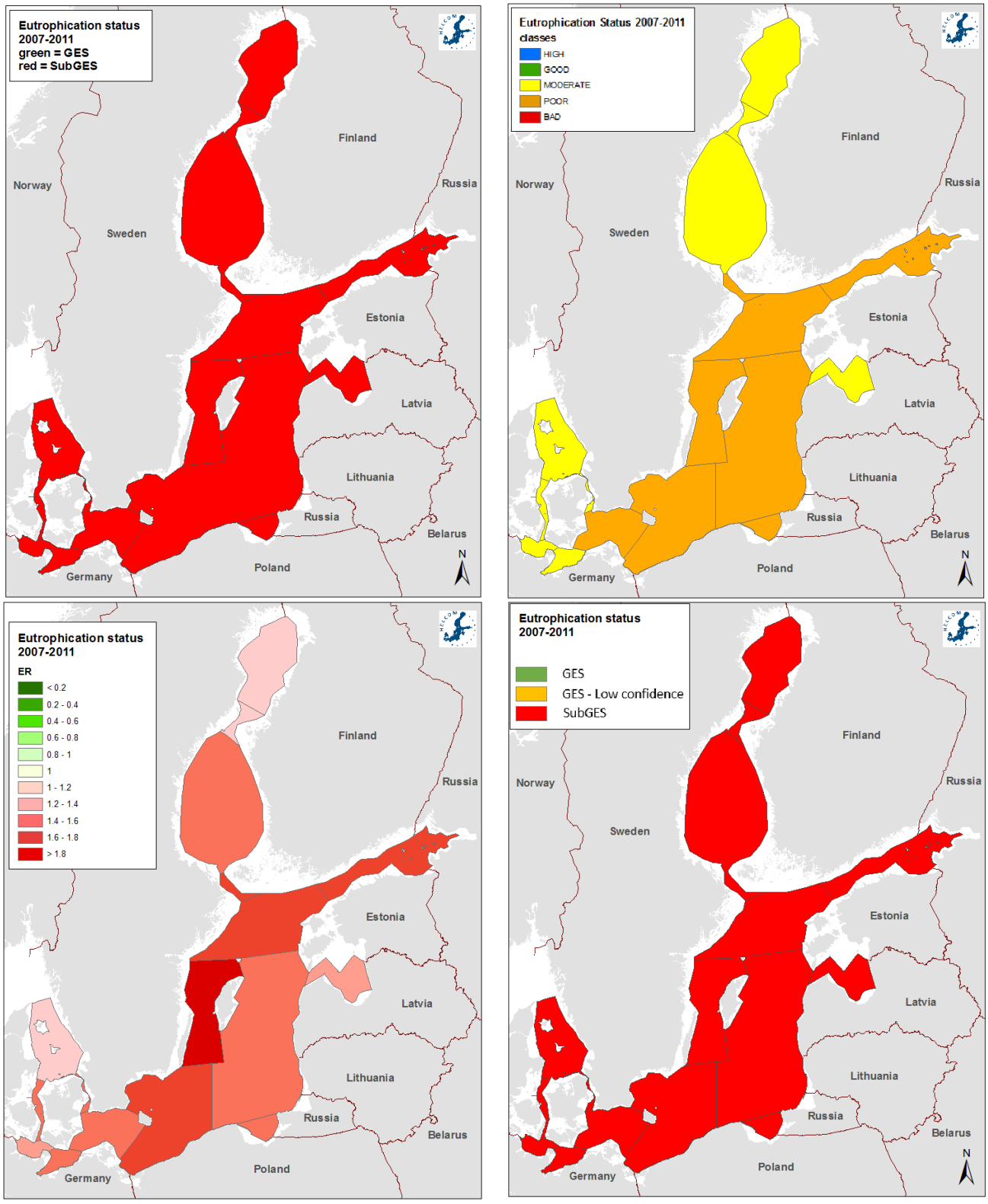

Figure 3. Eutrophication status for 2007-2011 in the Baltic Sea expressed using the four approaches: A) MSFD classification, B) the five-class system, C) MSFD classification combined with distance to target information and D) MSFD classification with uncertainty information.