



Document title	Pilot study on aligning the assessments of Good Environmental Status in the MSFD/BSAP with assessments of Favourable Conservation Status in the Habitats Directive regarding status for seal populations in the HELCOM area
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Background

Under the EU co-financed BalticBOOST project a pilot study comparing the assessment of the status of seal populations based on criteria of the Marine Strategy Framework Directive (MSFD) or the Habitat Directive (HD), has been carried out. The aim of the study was to recommend how to harmonize the assessment of seal population status under the two directives.

This document contains the final report of WP 1.4 Deliverable 1: Pilot study on aligning the assessments of Good Environmental Status in the MSFD/BSAP with assessments of Favourable Conservation Status in the Habitats Directive regarding status for seal populations in the HELCOM area.

This deliverable from the BalticBOOST project was coordinated by HELCOM and co-financed by the European Union in 2015-2016 as part of the programme DG ENV/MSFD Action Plans/2016.

Action requested

The Meeting is invited to take note of and make use of the report as appropriate.



THEME 1: Biodiversity



This is a deliverable from the BalticBOOST project that was coordinated by HELCOM and co-financed by the European Union in 2015-2016 as part of the programme DG ENV/MSFD Action Plans/2016.

WP 1.4 Deliverable 1: Pilot study on aligning the assessments of Good Environmental Status in the MSFD/BSAP with assessments of Favourable Conservation Status in the Habitats Directive regarding status for seal populations in the HELCOM area

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1. Introduction

HELCOM EU Member States carry out assessments of the state of the Baltic Sea seal species based largely on the same monitoring data for the HELCOM Baltic Sea Action Plan (BSAP) and MSFD purposes of assessing progress towards good environmental status (GES) as well as for assessing Favourable Conservation Status (FCS) under the Habitats Directive (HD). Ongoing work to develop HELCOM core indicators for assessing environmental status has identified marine mammals as a good case study for streamlining the reporting and aligning the assessments for the mentioned legislative needs.

The assessments of GES and FCS may differ as the requirements as well as assessment scales differ. Furthermore, FCS assessments include a historical requirement to assess abundance, distribution, structure and function of species largely using qualitative judgements whereas MSFD GES assessments strive to define quantitative threshold values representing GES. Guidelines for the implementation of the MSFD recommend that threshold values for the criteria used in the assessment should be 'consistent with' the Favourable Reference Population and Range values established under the HD.

BalticBOOSTWP 1.4 has carried out a pilot study to evaluate the possibility of aligning the HD and MSFD assessments with a focus on seal abundance and distribution in the HELCOM area. The basis for the study is a comparison of the assessment criteria and assessment results under HELCOM and MSFD as well as the HD for the three seal species in the HELCOM area: grey seal, harbour seal, ringed seal. The work was challenged by the European Commission providing new guidelines for assessments of environmental status i.e. the revised Commission Decision on GES criteria for which the Marine Strategy Regulatory Committee gave a positive vote in November 2016 (here after 'revised COM DEC'). The revised COM DEC is however reflected in this report.

A summary of the assessments results is provided in Annex 1.

2. Comparison of assessment criteria for MSFD and HD

The aim of the EU Marine Strategy Framework Directive (MSFD) is to achieve "good environmental status" (GES) of European marine environments by 2020. The HELCOM Baltic Sea Action Plan (BSAP) is a joint programme of the Contracting Parties of the Helsinki Convention to restore the good ecological status of the Baltic marine environment by 2021. In the Baltic Sea marine region, HELCOM is the coordination platform for the regional implementation of the MSFD and indicators and tools to assess the state of the environment are developed with the aim of being used to follow-up both the MSFD and BSAP strategies which have similar goals and objectives.

In the BSAP, the relevant ecological objective for mammals is described as 'Viable populations of species'. To follow-up this objective HELCOM core indicators for "Population trends and abundance of seals" as well as for "Distribution of Baltic seals" have been developed under the HELCOM CORESET projects. The evaluations only recognize two outcomes: GES or sub-GES. Threshold values for the two status classes have been defined for both seal core indicators. The threshold values for the core indicators are based on ensuring a viability of the stocks (see also Section 3).

The MSFD definition of GES is stated as:

"good environmental status" means the environmental status of marine waters where these provide ecologically diverse and dynamic oceans and seas which are clean, healthy and productive within their intrinsic conditions, and the use of the marine environment is at a level that is sustainable, thus safeguarding the potential for uses and activities by current and future generations, i.e....." (MSFD, Article 3, 5)."

Further guidance is given by the European Commission Decision on GES criteria; currently 2010/477/EU is in force, but in the ongoing revision of this decision the proposed GES criterion under the MSFD for species abundance is:

“Population abundance of the species is not adversely affected due to anthropogenic pressures, such that its long-term viability is ensured” (revised COM DEC).

Consequently, **sustainable use of the environment** is a main focus of the MSFD definition of GES, but it does not include historical considerations.

The Habitat Directive defines a species to have achieved “favourable conservation status” (FCS) when the following criteria are met:

1. a) *population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its (HD) natural habitats, and*
b) *the natural range of the species is neither being reduced for the foreseeable future, and*
c) *there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.*

2. *Favourable Reference Values (FRV) are key concepts in the evaluation of Conservation Status (see [DocHab-04-03/03 rev.3.](#)). FRVs consist of *Favourable Reference Population (FRP)* , *Favourable Reference Range (FRR)* and *Favourable Reference Areas (FRA)*, where where the FRP and FRR are relevant to consider in the comparison with HELCOM indicators on abundance and distribution respectively. The HD reporting format under the Article 17 requires EU Member States to identify the reference population for the species of Annexes II, IV and V. According to EC (2006) for non-coastal marine species it is probably more sensible to set FRV for the whole marine region by the concerned Member States.*

3. *The FRP is furthermore defined as the “population in a given biogeographical region considered the minimum necessary to ensure the long-term viability of the species; *favourable reference value* must be at least the size of the population when the Directive came into force; information on historic distribution / population may be found useful when defining the favourable reference population; best expert judgement may be used to define it in absence of other data”.*

Thus, the definition for FCS under the HD is more detailed as compared to the GES of the MSFD, and includes historical, future as well as spatial components. The main difference is that the FCS uses qualitative assessments on abundance, function and structure of species, whereas the evaluations of HELCOM core indicators are quantitative. One comparable example would be that FCS for xenobiotics such as PCB would be zero (pristine levels), whereas the threshold value would be quantitative i.e. a level where no effects can be detected in organisms. Furthermore, the assessment scale differs since the FCS is to be evaluated on a national basis, whereas the GES evaluation, as it concerns wildlife species, is for populations or management units, and thus independent of national boundaries.

In the revised COM DEC the European Commission provides new draft guidelines for evaluations of good environmental status (Anon 2016a), and below we highlight relevant statements made in the revised COM DEC .

1. As already mentioned, one primary criterion is that “the population abundance of the species is not adversely affected due to anthropogenic pressures”.

2. Assessments should be made on an **“ecologically relevant scale.”** This is in line with with the HELCOM core indicators, where populations or subpopulations are evaluated in different basins or sub-basins according to agreed management units of Baltic Sea seal populations in HELCOM. This approach contrasts with the HD, where assessments are made country by country.
3. Reference population values should be **consistent with** reference values of the HD. Consequently, threshold values used for core indicators do not need to be the identical as in the HD, only consistent with them. Our interpretation is that threshold values defined by the HELCOM are consistent with the HD FCS.
4. **“The species distributional range and, where relevant, pattern is in line with prevailing physiographic, geographic and climatic conditions”.** An implication of this is that reference values should not be based on historic conditions that no longer exist, but on prevailing conditions.
5. Use of criteria: **“Each species shall be evaluated individually”** and furthermore the overall status of species covered by Directive 92/43/EEC shall be derived using the method provided under that Directive. Our interpretation is that when concluding the status of a species for which several criteria are used (e.g. abundance and distribution), the one-out-all-out approach should be used between criteria.

3. Results for the HELCOM core indicator **“Population trends and abundance of seals”**

The status evaluation is given separately for the three seal species. The grey seal in the Baltic proper is evaluated as a single unit, whereas the Kattegat grey seals are not evaluated under BSAP, as the latter mostly represent seals of Atlantic origin (Fietz et al. 2016). The status of ringed seals is evaluated for two management units: the Bothnian Bay on the one hand, and the Archipelago Sea, the Gulf of Finland, and the Estonian coastal waters on the other. The reason for dividing ringed seals in two management units is that the two units show very different ecological statuses as shown in the HELCOM core indicator report **“Population trends and abundance of seals”**. The status of harbour seals is evaluated for four management units: Kalmarsund, southern Baltic Sea, the Kattegat including the Danish Straits, and the Limfjord. The evaluation of abundance of seals is based on data up to 2014. The threshold value for abundance is 10,000 individuals for isolated populations and also for clusters of populations connected by migrations. Beside the abundance requirement, there are further requirements for abundance trends for a population to be considered in good status which are differentiated according to the status of the unit relative to carrying capacity. More detailed description is given in the HELCOM core indicator report **“Population trends and abundance of seals”**.

In summary, a population or a cluster of populations will achieve GES if:

- Population abundance exceeds 10,000 animals,
- when the population growth rate is greater or equal to 7% per year in grey and ringed seals during exponential growth,
- when the population growth rate is greater or equal to 9% in harbor seals during exponential growth,
- when the population decline is less than 10% during a 10-year period when populations are at carrying capacity.

Ringed seals

The ringed seal management unit in the Bothnian Bay has been increasing at a rate of 4.8% per year since 1988 (Hårding & Härkönen 1999; Karlsson et al. 2008), which is less than half the intrinsic capacity and

below the threshold value of 7% (Results figure 4; Karlsson et al. 2008). Counted numbers of seals in the Bothnian Bay exceeded 8,000 in 2014, which indicates a true population size in the area exceeding the minimum viable size at 10,000 animals. A Bayesian-derived probability distribution shows that observed data do not support ringed seals having reached the threshold value of 7% population growth rate. This implies that ringed seals in the Bothnian Bay management unit have reached GES for population size but not for growth rate.

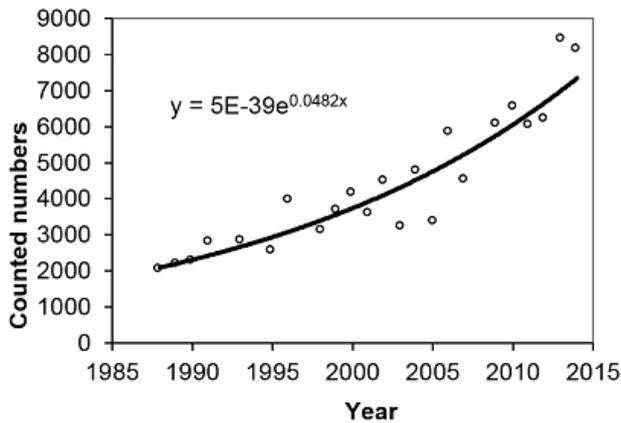


Figure 1: The ringed seals in the Bothnian Bay have been increasing at 4.9% per year since 1988, which is below the threshold value at 7% per year. The ringed seals in the area do not meet the criteria for good status. (From the HELCOM core indicator report "Population trends and abundance of seals").

The management unit with subpopulations in the Archipelago Sea, the Gulf of Finland, and Estonian coastal waters fail GES both because of low numbers, and insignificant or declining population growth rates (Anon. 2016b).

Grey seals

For the grey seal, a time series of data from 2000 and onwards is used to estimate the population growth rate and its confidence limits (Results figure 2). The annual population growth rate over the period was 7.9%. A Bayesian-derived probability distribution shows >80% support for a growth rate value $\geq 7\%$. Earlier data from the Swedish monitoring programme indicate that the grey seal population has been growing at a rate of about 8% per year from the early 1990s in the Baltic Sea (Stenman et al. 2005; Hårding et al. 2007). The population has thus achieved GES according to the growth rate parameter, and as 32,000 animals were counted in 2014, the population size is also well above the minimum viable population size (i.e. limit reference level (LRL) of 10,000 individuals).

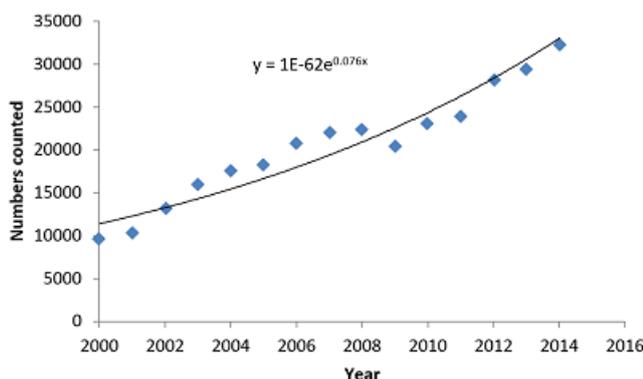


Figure 2. Counted numbers of Baltic grey seals showed an annual rate of increase at 7.9% over the period 2000-2014 and 80% support for a rate $\geq 7\%$. (From the HELCOM core indicator report "Population trends and abundance of seals").

Harbour seals

Kalmarsund

The population has increased annually by 9% since 1975 and counted numbers amounted to about 1,000 seals in 2014 (Results figure 6). See also Härkönen & Isakson (2011).

A Bayesian-derived probability distribution of the trend in abundance shows that there is less than 80% support for a growth rate of $\geq 9\%$, and the current population size is well below the LRL of 10,000 individuals, so this population does not achieve GES.

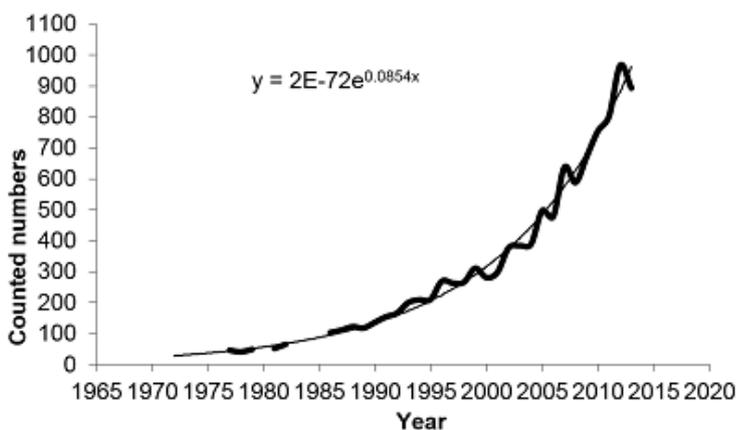
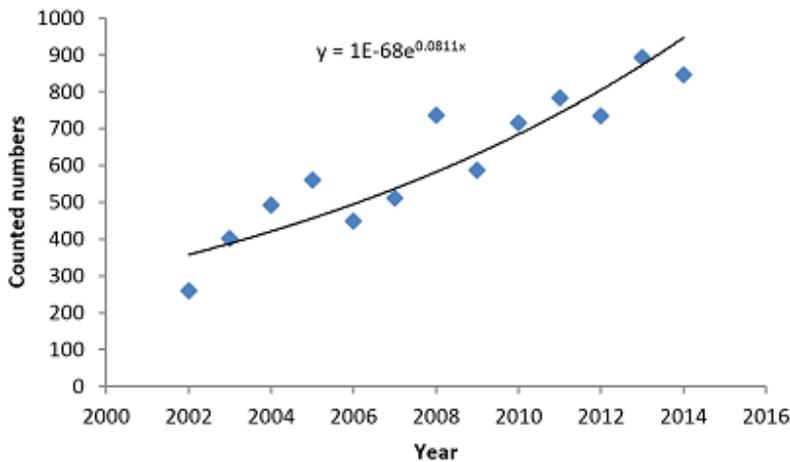


Figure 3. Changes in abundance of the Kalmarsund population of harbour seals since 1975. There is 80% support for a growth rate $\geq 8.4\%$, which is just below the GES boundary of 9%. The total number of individuals (approximately 1,000 animals) is well below the LRL of 10,000, which means that this population does not achieve GES. (From the HELCOM core indicator report "Population trends and abundance of seals")

The Southern Baltic Sea

There is less than 80% support for a growth rate at or above the threshold value ($\geq 9\%$). The abundance of seals is also below the set LRL. However, it is connected to the Kattegat population and should in this context be treated as a part of the larger unit, which would result in GES with regard to the LRL, but not the growth rate, and thus GES is not reached.



Results figure 4. The growth rate in the Southwestern Baltic harbour seal population was 8.4% over the period 2002-2014. There is 80% support for a growth rate $\geq 7.1\%$, which is below the threshold value of 9%. (From the HELCOM core indicator report "Population trends and abundance of seals")

Kattegat and the Danish Straits

The annual population growth rate was close to 12% until 2010, but data suggest that growth is levelling off, which could be caused by density dependent effects. Independent data on somatic growth indicate that the population is approaching the carrying capacity of the system (Harding et al in prep.). Additional surveys are needed to establish such mechanisms. Bayesian analysis shows 80% support for a growth rate $\geq 6.7\%$ for the period after 2002, which is below the threshold value of 9%. However, the management unit is regarded as approaching the carrying capacity in this assessment and will thus achieve GES since it meets the criterion "decline not $>10\%$ over a 10-year period".

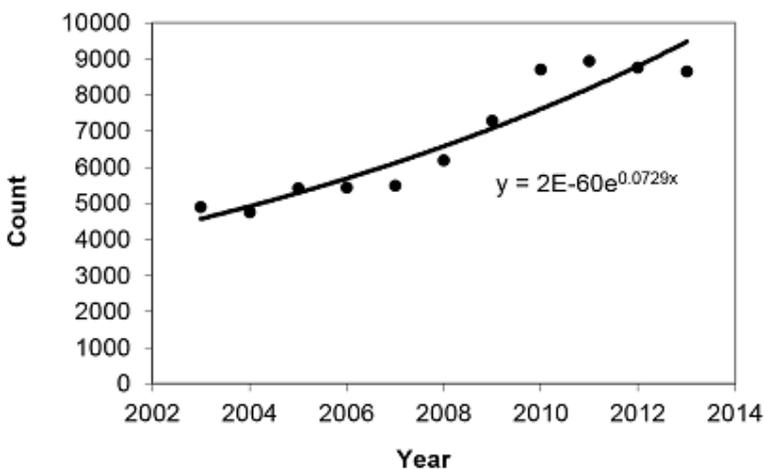


Figure 5. The harbour seal population in the Kattegat (including the Danish Straits) shows signs of stabilizing. No increase is seen during the four last years, but Power analyses suggest that a significant change in growth rate can only be detected after seven years.

Limfjord

The size of the Limfjord harbour seal population appears to have been fluctuating around 1,000 individuals since the early 1990s and appears to have reached its carrying capacity, although an annual increase of 5.6% is suggested by surveys from 2003-2013 (Figure 6). However, genetic analysis indicates that the seals in the fjord originate from two different populations, (1) the population originally inhabiting the fjord and (2) seals from the Wadden Sea (Olsen et al. 2014). It is not known to what extent the seals from the Wadden Sea use the fjord for other purposes than hauling out and to which extent they interbreed with the native seal population. A proper assessment of the Limfjord harbour seals is contingent on clarification of these issues. Consequently, the status of the Limfjord population is uncertain since immigration may link it to the expanding Wadden Sea population.

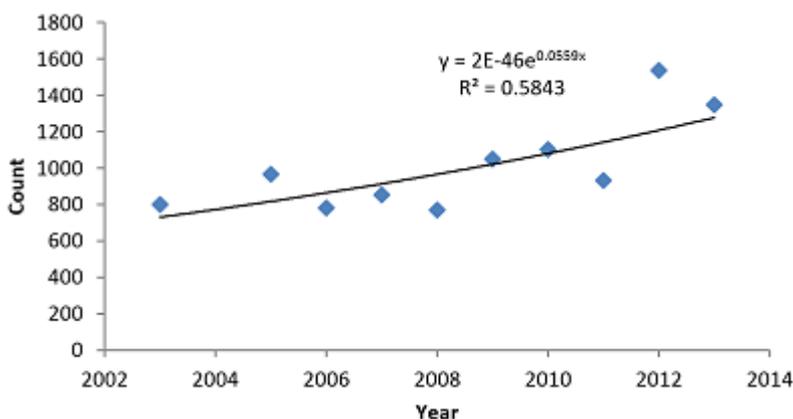


Figure 6. The harbour seal population in the Limfjord showed a 5.6% annual increase, and has been fluctuating around 1,000 seals for 25 years. Immigration from the Wadden Sea links it to the latter population, which is why the status of this population is uncertain.

4. Assessments of seal abundance using Habitat Directive criteria

According to the HD, Article 1, the conservation status of a species “favourable” when:

- a. *population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its(HD) natural habitats, and*
- b. *the natural range of the species is neither being reduced for the foreseeable future, and*
- c. *there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.*

However, we are in this section only addressing the FRP. According to the HD, a “Favourable Reference Population” size must be achieved. There have been many discussions regarding whether pristine conditions are applicable for defining the FRP, since factors such as productivity of the seas and intensity of fisheries have changed dramatically over the past century and pristine conditions thus may not be achievable.

Another way to define the FRP is: “The population in a given biogeographical region considered the minimum necessary to ensure the long-term viability of the species” (Anon 2011). Thus a possibility would be to use a “modern baseline” corresponding to long-term viability. Here, we will use the situation in the beginning of the 20th century as one basis for the evaluation as representative of the historic reference

population since detailed data are available on population sizes, but we will also assess the outcomes of evaluations using a “modern baseline”.

An important difference to MSFD evaluations is that HD evaluations are carried out on a national basis. There are however no national ringed, grey and harbour seal populations except for the Kalmarsund population of harbour seals in Sweden, and the Limfiord harbour seal population in Denmark. In all other cases, seals in national waters are parts of other populations extending to other countries. Thus, there is no Swedish or Finnish population of ringed seals and grey seals move around in the entire Baltic crossing national borders. This means that the basis for evaluations under the HD is the subset(s) of the biological unit(s) occurring within each nation’s borders. Thus, seals are not assessed as demographically independent units where intrinsic developments in distribution and abundance can be defined. Within a conglomerate of units used for one assessment, there may be substantial differences in relevant parameters such as density dependence and anthropogenic pressures, meaning that the different subunits involved will have independent demographics and trends of abundance and distribution. Also, the assessments are almost exclusively based on data collected during the moulting season of the seals. Distribution within populations may differ substantially during the year, with potentially profound effects on the ‘national’ abundances used for HD evaluation.

We use Denmark as an example of detailed definitions of favourable reference values and provide briefer definitions and evaluations for the other countries in the HELCOM region.

Baltic Ringed seals

Baltic ringed seals amounted to about 180,000 in the beginning of the 20th century (Harding and Härkönen 1999) and reproduced successfully in the Archipelago Sea, extending south to Uppland in Sweden, the Gulf of Finland as well as in Estonian coastal waters.

Finland: Although there are 10,000 ringed seals in the Finnish part of the Bothnian Bay, the ringed seals do not meet FRP, since the Finnish part of the Gulf of Finland stock is declining in numbers, and is likely to be extirpated in the near future. The size of the population is far below the historic FRP which would be about 90,000 seals (Hårding & Härkönen 1999).

Sweden: Population dynamic data for the Baltic ringed seal indicate that it is maintaining itself in the Bothnian Bay and also fulfills FCS criteria b and c. However, the population size is far below FRP (80,000) (Hårding & Härkönen 1999).

Estonia: There are two subpopulations of ringed seals in Estonia, one in the Gulf of Finland and one in the western and southern coastal waters. There are currently only few sightings of the species in the Gulf of Finland, and the southwestern coastal sub-population is at about 1,000 seals and is stable or declining. The ringed seals do not meet any of the three criteria for FCS since the stock is likely to be extirpated in near future. Population size is far below the historic FRP at about 9,000 ringed seals (Hårding & Härkönen 1999)

Russia: The few hundred ringed seals (FRP at 1,000) are likely to be extirpated in near future. For Russia, being a non-EU country, the HD does not apply but an assessment under the HD would not reach FRP.

Thus, ringed seals fail to achieve abundance when pristine conditions are applied as FRP, but will meet all criteria only in Sweden, but in no other countries if a “modern baseline” is applied. The latter because the ringed seals in the Swedish sea area is maintaining itself in the Bothnian Bay and has been in growth (although slower than a depleted stock without impeding pressures) for recent decades.

Baltic grey seals

The population size at the beginning of the last century was about 90,000, whereas 32,000 grey seals were counted on land in 2016, suggesting a true population size of about 50,000 seals when seals at sea during the survey are included. This means that the FRP is not achieved in any of the countries using a 'pristine conditions' baseline (brackets). But using a "modern baseline", where a population is of the size that it is maintaining itself gives other results:

Denmark

The grey seal disappeared from Danish waters as a regularly occurring species in the early 20th century, during a culling campaign aimed at reducing interactions between seals and coastal fisheries. Previously, the species was common in all Danish waters and archaeological finds indicate that it was the most common seal species in Denmark (Søndergaard et al. 1976, Olsen et al. in prep.). Since around 2000, grey seals have again become more common in the Danish Marine Baltic Sea Region (Sveegaard et al. 2015). Since 2003, grey seals have been breeding annually at Rødsand in the southwestern Baltic, and sporadic breeding has been documented at three seal haulouts in Danish Kattegat (Sveegaard et al. 2015). No more than five grey seal pups have been recorded in any year since 2003 in the Danish Marine Baltic Sea Region (Sveegaard et al. 2015). The highest number of grey seals recorded at haulouts in the Danish Marine Baltic Sea Region during a survey is 850 in May 2015.

Population: Most of the grey seals in the Danish Marine Baltic Sea Region are part of the larger population of Baltic grey seals. Atlantic grey seals seem to be more numerous than Baltic grey seals in Danish Kattegat, but historically this area was dominated by Baltic grey seals (Fietz et al. 2016). There are no historic estimates of grey seal abundance in Danish waters. As the Danish waters have only held a smaller part of the Baltic grey seal population, models estimating historic Baltic grey seal abundance (e.g. Harding and Härkönen 1999) are of little use for estimation of Danish abundance. There are good indications that grey seals were historically the most common seal species in Denmark (Olsen et al. in prep). Thus, a conservative minimum estimate of historic grey seal abundance would be at 8,000 individuals, corresponding to FRP.

HD evaluation of grey seal population in the Danish Marine Baltic Sea Region: The highest recorded abundance of grey seals in the Danish region in recent years was 850 (Galatius et al. in press), far below the conservatively set reference value for the population. With respect to range, grey seals occur at haulouts throughout the Danish Baltic and Kattegat, although only in numbers <10 individuals at most localities (Sveegaard et al. 2015). With respect to breeding, only one haulout (Rødsand) is consistently used. Thus, despite rapidly increasing occurrence, grey seals in the Danish Marine Baltic Sea Region are far below reference values for population abundance.

Finland: Using a modern base line criteria for FRP are met, although current abundance is far below the historic FRP of 35,000 seals.

Sweden: All criteria for a modern FRP are met also in Sweden, although current abundance is far below the historic FRP of 35,000 seals.

Estonia: All criteria for a modern FRP are met also in Estonia, although current abundance is below the historic FRP of 10,000 seals.

Russia: All criteria for FRP are met also in Russia, although current abundance is below the historic FRP of 1,000 seals.

Germany

Grey seals occurred at some sandbanks in the German Baltic in the beginning of the 20th century, but vanished before 1912 as a consequence of an internationally coordinated extermination campaign (Gill

1978). There is no information on former numbers of seals and it is not possible to establish a FRP for this region. Current numbers hauled out seldom exceed some tens of animals.

Germany is difficult to evaluate using HD criteria, since there is insufficient information to establish FRP levels in the Baltic. Also the former area of occupancy, or the “favourable population range” according to HD wording is unclear. However given the very low numbers of animals occurring and the few haul-out sites used, in all likelihood, grey seals in the German Baltic fall below their historic abundance.

Poland

Both grey seals and harbour seals occurred in low numbers in the beginning of the 20th century, but were extirpated before 1912 (Gill 1978). After that, no regular pupping of harbour seals has occurred in Poland, although occurrence of harbour seals is suggested since some tens of dead harbour seals drift ashore annually (Pawliczka pers. comm.).

One site off the village Hel has been recolonized and 14 grey seals were observed there in 2015. There are further suitable haul-out sites, which have not yet been colonized on a consistent basis (Pawliczka pers. comm.).

Thus, grey seals in Poland fall below reference values for population abundance regardless of the choice of modern or historic base lines.

Latvia: No past or present colonies

Lithuania: No past or present colonies

Consequently, using the FRP based on the situation in the beginning of the 20th century, grey seals do not reach FRP in any of the countries where they occur. But using a “modern base line”, where “The population in a given biogeographical region considered the minimum necessary to ensure the long-term viability of the species” grey seals would reach FRP in Finland, Sweden, Estonia and Russia.

Harbour seals

Denmark

When the harbour seal received full protection in Denmark in 1977, there were less than 1,500 harbour seals in the Danish Marine Baltic Sea Region (Sveegaard et al. 2015). Since then, the abundance has grown to around 10,000 seals, despite two outbreaks of Phocine Distemper Virus, which killed up to 50% of the harbour seals in 1988 and 2002 (Sveegaard et al. 2015). The harbour seals in the Danish Marine Baltic Sea Region are divided in two populations, one in Kattegat and one in the southwestern Baltic (Olsen et al. 2014). Both populations are shared with Sweden, but for this assessment, only seals counted at Danish haulouts are included. The harbour seals in Denmark breed throughout their range, which covers all parts of the Danish Marine Baltic Sea Region except for the archipelago south of the island of Fyn and the area around Bornholm. In 2015, it was estimated that there were 10,200 harbour seals in the Danish Marine Baltic Sea Region (Galatius et al. in press).

Population: There are indications from archaeological and historic written sources that grey seals were the dominant seal species in the Danish Marine Baltic Sea Region until sometime during the 19th century. There are no historic estimates of harbour seal abundance in Danish waters. Using hunting statistics, it has been estimated that there were 7,000-14,000 harbour seals in the Kattegat-Skagerrak area in 1890, shared among Denmark, Sweden and Norway (Heide-Jørgensen and Härkönen 1988). Based on current distribution patterns, less than half of these seals would occur in the Danish sea area, so a favourable reference value

could be set at 5,000 individuals. This status in 1890 may, however, reflect a status that was already depleted, since substantial seal hunting already occurred before then (Olsen et al. in prep.).

We have evidence that harbour seals historically occurred throughout Danish waters except for the area around Bornholm and that breeding occurred throughout their range (Søndergaard et al. 1976, Olsen et al. in prep.). The abundance of harbour seals in the Danish Marine Baltic Sea Region exceeds 10,000, well above the population reference value. The high abundance compared to the reference value may be caused by the reference value representing an already depleted status or that the current low density of grey seals in the area give harbour seals more favourable conditions than they had previously.

The Danish harbour seals exceed the historic FRP.

Germany: The situation for harbour seals in German waters of the Baltic is similar to the grey seals. The last pupping seals were seen before 1912 at some sand banks of which several have vanished as a consequence of sand excavation. No data are available on historic abundance.

Given the very low numbers of animals occurring and the few haul-out sites used, in all likelihood, harbour seals in the German Baltic fall below their historic abundance.

Poland: There is no information on earlier status of harbour seals in Poland, which is why the current status cannot be evaluated

Sweden

Estimates based on hunting statistics indicate that the population size of harbour seals was about 5,000 in the beginning of the 20th century (Härkönen and Isakson 2011) in the Kalmarsund and about 7,000 along the Swedish west coast. Thus, the FRP would amount to 12,000.

Populations decreased rapidly in the 1930s as a consequence of an internationally coordinated extermination campaign, but started to increase after protective legislation came into place in the 1960s. The Kattegat population increased by 12% per year up to 1988, when the first PDV epidemic killed half of the west coast population, whereas the Kalmarsund population was unaffected (Härkönen and Isakson 2011). The Kattegat population again increased by 12 % per year up to 2002, when the second epidemic caused a 30% mortality in the Kattegat. Stocks again increased after 2002, but at a lower rate than previously.

Counted numbers of seals in 2015 were 6,600 in the Skagerrak, 3,600 in the Kattegat, and 1,000 in the Kalmarsund, totaling 11,200. The true population size is estimated at 17200.

The Swedish harbour seals fulfil criteria 1. a-c and exceed the FRP.

5. Results for the HELCOM core indicator “Distribution of Baltic seals”

The HELCOM [core indicator on distribution of Baltic seals](#) uses three different components for evaluating the distribution of the three species of seal that occur in the Baltic Sea. These components are:

1. distribution during breeding,
2. distribution during moulting, which occurs on land or ice, where data is achieved by surveys from land and air in both cases,
3. area of occupancy, which is the area used for foraging and transport. Data is obtained from satellite tagging data,

4. Historical information is based on hunting statistics and archaeological findings (Hårding & Härkönen 1999).

All three components are evaluated for each species in the relevant areas. Good Environmental Status (GES) is achieved if a species in a given area achieves the threshold value for all three components. If one component falls below the threshold value, then the result for the evaluation for the given species and area is sub-GES status.

The following criteria are used to determine the threshold value:

- The distribution of breeding sites for each management unit of harbourseals is evaluated against pristine conditions. GES is achieved when all previously used sites or areas are colonized, and distribution is not diminishing.
- The distribution of haul-out sites used for resting and moult of harbour seals are almost identical to the distribution of breeding sites. GES is achieved when all previously used sites or areas are colonized.
- Grey seals are facultative land breeders that switch between breeding on land and ice, where ice is favoured if available (Jüssi et al. 2008). GES is achieved when available land breeding sites or areas are colonized, and distribution is not diminishing.
- Grey seal haul-out sites used for resting and moulting may differ considerably from breeding sites, as moulting and resting sites can be locked in by ice and thereby inaccessible during breeding. GES is achieved when available haul-out sites are colonized and not diminishing.
- Ringed seals breed in lairs constructed in snow-covered broken and consolidated ice. The sizes of the breeding areas display substantial inter-annual variation. GES is achieved when the long-term breeding area is stable or not diminishing due to direct human activities
- Ringed seals rest and moult on ice if available. During ice free conditions ringed seals haul out on rocks or small islands. GES is achieved when ringed seals have access to all available haul-out sites and the numbers of used haul-outs are not diminishing.
- For the area of occupancy, GES is achieved when seals have access to all feeding grounds and they can move freely among haul-out sites and the feeding grounds.

The modern baseline approach is applied when pristine conditions cannot be achieved due to irreversible long-term environmental changes (e.g. sandbanks used for haul-out have vanished), or factors such as changing productivity that will persist for the foreseeable future. Since the environment has changed over the past century, and formerly used haul-out sites have disappeared in the Southern Baltic, current distributions are evaluated against colonization of currently available haul-out sites. This type of a modern baseline should be defined so that the species can thrive and persist in the future. Especially in cases where a modern baseline is applied, the additional criterion for GES 'distributional range is not diminishing' can be applicable for populations above the limit reference level (LRL). The LRL has in HELCOM been agreed to be set at 10,000 individuals per management unit.

This HELCOM core indicator is comparable to the OSPAR common indicator M-1; 'Distributional range and pattern of harbour and grey seal haul-outs and breeding colonies', which also applies a modern baseline approach. The difference between the OSPAR 'common indicator' and the HELCOM 'core indicator' is that the latter also encompasses the range of seals at sea during foraging and transport.

Assessments are performed according to the same management units as the abundance assessments under the indicator "Population trends and abundance of seals".

Ringed seals

The state of distribution of ringed seals is sub-GES since the area of occupancy is currently restricted compared to pristine conditions in all the applicable areas where ringed seals occur, namely the Bothnian Bay, Archipelago Sea, Gulf of Finland, Gulf of Riga and Estonian coastal waters. Breeding distribution is confined to suitable breeding ice in all subpopulations.

Grey seals

In Kattegat grey seals are not evaluated because a modern baseline cannot be defined, and because the vast majority of grey seals in this area are visitors from the North Sea (Fietz et al 2016). The area of occupancy of grey seals achieves GES since grey seals forage in the entire Baltic. A "modern baseline" is used for the evaluation of distribution on land sites, since some haul-outs in the Southern Baltic have vanished due to human exploitation of sand. Grey seals achieve GES in most of the Baltic except for the southwestern areas.

Harbour seals

The state of distribution of harbour seals achieves GES in Kattegat where the distribution and area of occupancy are at pristine levels. In the Limfjord, no tagging has been done, but the distribution is at pristine levels. Harbour seals in most parts of the Baltic Sea are distributed on historically used sites, however the status is sub-GES for some areas of Germany and Poland, since although the area of occupancy are at pristine levels, some land sites are not used. In the Kalmarsund, the harbour seals are distributed among available land breeding sites, and sites used for moulting, but the area of occupancy is not known.

6. Assessment of range using the Habitat Directive Criteria

In contrast to the MSFD GES criteria, the HD criteria include a temporal aspect since it is stated that favourable conservation status can only be reached if "*the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future*".

A second criterion is that a species should occupy a "favourable reference range" (FRR)

- The "range within which all significant ecological variations of the habitat / species are included for a given biogeographical region and which is sufficiently large to allow the long term survival of the species; favourable reference values must be at least the range when the Directive came into force, if the range was insufficient to support favourable status the reference for favourable range should take into account of that and should be larger (in such a case information on historic distribution may be found useful when defining the favourable reference range); best expert judgement may be used to define it in the absence of other data" (Anon 2011). Our interpretation is that FRR can either be defined as the pristine distribution of a species or a "modern base-line". We will use the latter in the Southern Baltic since pristine conditions cannot be met, and define the modern base-line FRR as : all currently available haul-outs are used by seals.
- The third factor to be taken into account is that evaluations should be done country by country.

- A fourth factor is that only direct anthropogenic pressures should be taken into account, but not climate change.

Ringed seals

Ringed seals occur regularly in Finland, Sweden, Estonia, and Russia. The latter country will not be evaluated since it does not belong to the EU.

Finland: The distribution of ringed seals in the Bothnian Bay is similar to pristine conditions, but is more restricted in the Gulf of Finland and the Archipelago Sea than 100 years ago as a consequence of hunting and negative effects of xenobiotics. Furthermore, the natural range of ringed seals is likely to be reduced in foreseeable future, since the Gulf of Finland component is close to extinction, and ringed seals in the Archipelago Sea only amount to some 100 animals. Ringed seals do not meet the criteria for FRR in Finland.

Estonia: There used to be ringed seals off the Estonian coast in the Gulf of Finland 100 years ago, but recent surveys show no evidence of ringed seals in the area. Ringed seals also occur at sites along the Estonian west coast, but also this subpopulation is likely to be negatively affected in the future, since the reproductive output is low due to high pup mortality since suitable ice has been lacking 7 out of the last 10 years. Thus ringed seals in Estonia do not reach FRR.

Sweden: Ringed seals used to breed all the way south to the Stockholm County in the 1940s (Härkönen and Harding 1999), but no breeding occurs south of the North Quark at present. Consequently the range has been reduced dramatically and is smaller than FRR. Ringed seals do not reach FRR in Sweden.

Grey seals

Grey seals occur at least temporarily in all Baltic countries, but no haul-out sites are present in Latvia, Lithuania and Kaliningrad.

Finland: Grey seals are distributed at historically known haul-outs in Finland. There are no reasons to believe that their present range will decrease in the future, and thus grey seals meet the criteria for FRR in Finland.

Estonia: As for Finland all criteria are met for FRR in Estonia with regard to range.

Sweden: Grey seals are distributed at all known former haul-outs, and there are no imminent factors causing reduction of their distribution and thus FRR is reached

Denmark: There is evidence that grey seals historically occurred throughout Danish waters and that breeding occurred at several haulouts in the southwestern Baltic and Kattegat (Søndergaard et al. 1976, Olsen et al. in prep.), defining the reference value for range. Thus, grey seals do not meet the range criteria for FRR since grey seals have not recolonized many formerly used sites.

Germany: Many sandbanks historically used by grey seals have disappeared due to exploitation, precluding grey seals from attaining pristine distribution on land sites. One possibility is to establish a “modern base line”, consisting of currently present sand banks. Grey seals in Germany do not meet criteria for FRR.

Poland: Only one site is used by grey seals in Poland, and the situation is similar to that in Germany. Grey seals in Poland do not meet criteria for FRR.

Harbour seals

This species is distributed in Sweden, Denmark, and Germany, and some individuals have occasionally been observed in Poland.

Sweden: Harbour seals occur all along the coasts of Skagerrak, Kattegat, and southern Baltic up to Kalmar and Öland. They are present at all historically used haul-outs, and their range is not expected to be reduced in the foreseeable future. Criteria are met for FRR.

Denmark: With respect to range, harbour seals occur at haulouts throughout their historic range in the Danish Baltic and Kattegat, except for the archipelago south of the island of Fyn. Harbour seals disappeared from the area during the 19th century (Søndergaard et al. 1976) and the lacking recolonisation may be caused by disappearance of undisturbed haulouts. Thus, with current values exceeding or close to favourable reference range values, the harbour seal in Denmark meet criteria for FRR.

Germany: Only few harbour seals occur in German parts of the Baltic and their range and numbers are below reference range values, be they defined as historic or modern baselines Harbour seals do not reach FRRn Germany.

Poland: There is no constant presence of harbour seals in Poland. Their conservation status cannot be evaluated since we do not have access to population reference values.

7. Conclusion on the comparison of MSFD and HD assessments of seals in the HELCOM area

The definition of “good environmental status” (GES) in the Marine Strategy Framework Directive (MSFD) differs substantially from that of “favourable conservation status” (FCS) given in the Habitats Directive (HD) as outlined in this report. In November 2016 the Marine Strategy Regulatory Committee gave a positive vote on revising the Commission Decision on GES criteria (GES Decision_v10.11.2016). The proposed revision has been taken into consideration in the project.

The BalticBOOST project finds that the draft Commission Decision on GES criteria v. 10.11.2016 (MSFD GES criteria) is consistent with the HELCOM frame work and the core indicators for seals, but in many cases contrast with the Habitat Directive (HD) approach.

All stocks of seals in the HELCOM area have suffered severe depletions in the 20th century, so it is no surprise that many of the assessments results presented here indicate ‘bad status’ according to either Good Environmental Status (GES) sensu the MSFD or Favourable Conservation Status (FCS) sensu the HD. In this context, however, the prime interest regards the cases where the evaluations according to the MSFD GES criteria and HD approach frameworks diverge.

In HELCOM, two core indicators are used to represent the MSFD criteria for abundance and distribution: “Population trends and abundance of seals” and “Distribution of seals in the Baltic Sea”. The conflicting assessments of status between MSFD/HELCOM and HD approaches appear for two main reasons, best exemplified by the grey seal assessments. Using the MSFD GES criteria and HELCOM core indicators, grey seals are in GES with regard to population trends and abundance. However, when evaluated by the HD, the required spatial scale is limited to the national level. This causes the species to fail FRP in the countries which the species has recently re-colonised; Denmark, Germany and Poland, where it is still far from previous abundance. The grey seal would furthermore fail in all countries, if compared to pristine conditions as the abundance everywhere in the Baltic Sea is still below historic levels. This reflects another difference between the two frameworks of assessment: the MSFD framework, also used in HELCOM, is

focused on the viability of stocks and thus safeguarding their *future* as a viable part of the ecosystem. On the other hand, the HD also has an eye on the *past* and uses *past* abundances when defining favourable reference population values. The HD abundance assessment of grey seals in Estonia, Finland and Sweden is ambiguous: if a modern baseline is used, the grey seal achieves FRP in these countries.

Harbour seals differ from grey seals in that they have a much more distinct population structure because of the more limited movements of this species. This partially turns the results seen for grey seals on its head: where for grey seals, the MSFD /HELCOM evaluations are performed on a large scale and HD evaluations are on a national scale, for harbour seals, the MSFD/HELCOM assessment is carried out at a smaller scale being based on ecologically relevant management units. A result of this, in contrast to grey seals, harbour seals achieve FRP in their core countries, Sweden and Denmark, although only the Kattegat population reaches the threshold values of the HELCOM core indicator for population trends and abundance. Kattegat carries a great weight in the HD assessment of population size, as it is by far the largest management unit. In Poland and Germany, harbour seals have not re-colonised their former territories and have not reached either FRP or FRR.

Ringed seals have not recovered as well as the other species after the depletions of the 20th century and HELCOM and HD evaluations are identical: ringed seals do not attain FRP, FRR or GES in any assessments.

While MSFD/HELCOM evaluations may be seen as more biologically relevant assessments given their use of biologically meaningful units and being based on viability of stocks, it must be stressed that in the cases where an MSFD/HELCOM evaluation is good status and a HD assessment is unfavourable, the negative HD assessment reflects a real and documented negative state compared to the pristine or ideal conditions, within the national borders that are, to a large extent, arbitrary in a biological sense. Such evaluations may still have merit, as the many of the wildlife management and legislative initiatives are still implemented on the national scale.

8. References

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Annex 1. Summary of status assessments

Abbreviations used for HELCOM core indicators:

- GES = the indicator reaches the threshold value defined as representing good status
- sub-GES = the indicator does not reach the threshold value defined as representing good status

Abbreviations used of assessments based on HD criteria:

- FRP/FRR: the status is favourable as regards the FRP/FRR
- U-FRP/U-FRR: the status is unfavourable as regards the FRP/FRR

Ringed seals

Assessment of HELCOM core indicators

Management unit	HELCOM core indicator, abundance	HELCOM core indicator, distribution
Bothnian Bay	sub-GES	sub-GES
Archipelago Sea	sub-GES	sub-GES
Gulf of Finland	sub-GES	sub-GES
Estonian coastal waters	sub-GES	sub-GES

Assessment based on HD criteria

Country	FRP, historic	FRP, modern baseline	FRR
Finland, Gulf of Finland	U-FRP	U-FRP	U-FRR
Finland, Bothnian Bay	U-FRP	FRP	U-FRR
Sweden, Bothnian Bay	U-FRP	FRP	U-FRR
Estonia, Gulf of Finland	U-FRP	U-FRP	U-FRR
Estonia, coastal areas	U-FRP	U-FRP	U-FRR
Russia	U-FRP	U-FRP	Not assessed

Grey seals

Assessment of HELCOM core indicators

Management unit	HELCOM core indicator, abundance	HELCOM core indicator distribution
Baltic Sea	GES	GES
Baltic Sea, Southwestern areas	Not applicable	sub-GES

Assessment based on HD criteria

Country	FRP historic	FRP modern	FRR
Denmark	U-FRP	U-FRP	U-FRR
Estonia	U-FRP	FRP	FRR
Finland	U-FRP	FRP	FRR
Germany	U-FRP	U-FRP	U-FRR
Poland	U-FRP	U-FRP	U-FRR
Russia	U-FRP	FRP	Not assessed
Sweden	U-FRP	FRP	FRR

Harbour seals

Assessment of HELCOM core indicators

Management unit	HELCOM core indicator, abundance	HELCOM core indicator distribution
Kalmarsund	sub-GES	GES
The Southern Baltic Sea	sub-GES	sub-GES
Kattegat and the Danish straits	GES	GES
Limfjorden	uncertain	uncertain

Assessment based on HD criteria

Country	FRP-historic	FRP modern	FRR
Denmark	FRP	FRP	FRR
Germany	U-FRP	U-FRP	U-FRR
Poland	Not assessed	Not assessed	Not assessed
Sweden	FRP	FRP	FRR