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Background

DG BSAP EUTRO 1-2020 considered the first draft of the BSAP segment preamble for eutrophication and the comments to the preamble by PRESSURE 13-2020. DG BSAP EUTRO 1-2020 gave recommendations on the update of the preamble and invited the Secretariat to draft a new version of the preamble based on the recommendations and send it to the members of the drafting group by 30 October 2020. The attached document includes the updated preamble. The drafting group is invited to provide suggestions to change the new version to the Secretariat **by 11 November 2020**. All suggestions will be compiled to one document and considered at the next meeting on 16 November 2020. The compilation will also include comments by GEAR and AGRI.

Action requested

The Meeting is invited to continue drafting the preamble considering all received comments and agree on the draft for submission to HOD 59-2020.

Segment Eutrophication - A Baltic Sea unaffected by Eutrophication - continued and renewed actions to limit inputs of nutrients and organic matter

Eutrophication is a condition where high nutrient concentrations stimulate the excessive growth of primary producers and this leads to imbalanced functioning of the aquatic ecosystem. In the Baltic Sea, symptoms of eutrophication include intense algal growth, increase in oxygen consumption and oxygen deficiency. Eutrophication contributes to the depletion of oxygen on the bottom of the sea, leading to vast areas with anoxic or hypoxic conditions in the central Baltic Sea.

Contracting Parties to the Helsinki Convention have agreed on the following ecological objectives to describe the characteristics of a Baltic Sea unaffected by eutrophication:

- Concentrations of nutrients close to natural levels,
- Clear water,
- Natural level of algal blooms,
- Natural distribution and occurrence of plants and animals,
- Natural oxygen levels.

Eutrophication is caused by excessive inputs of nitrogen and phosphorus

Nutrients reach the Baltic Sea via water and air. Waterborne input includes transport by rivers and direct discharges from point sources. The riverine input is dominating for both nitrogen and phosphorus constituting 69 and 95 percent respectively. Airborne transport plays significant role for the input of nitrogen contributing 27 percent of the total load. The remaining 3 percent of nitrogen and 5 percent of phosphorus are supplied by direct sources. Phosphorus containing particles are also transported by air, but they are primarily of natural origin and the input is constant throughout the observation period. Thus, airborne input of phosphorus is not a subject for this segment.

Total input of nutrients consists of natural losses constituting natural background and inputs originating from various human activities on land and at sea. Current estimation of natural background losses performed for riverine input to the Baltic Sea is around 33 percent for both nitrogen and phosphorus. The remaining part is induced by human being. Obviously, the proportion of natural background in the total load highly varies in different part of the catchment area from 65 percent in the Bothnian Bay to 11 and 19 percent to the Gulf of Riga or Baltic Proper.

Excessive input of nutrients to the Baltic Sea lasting for a long time caused accumulation of huge phosphorus resources in the bottom sediments. It builds up internal load, when phosphate is released from the sediments, contributing to the total nutrient load on the marine ecosystem.

Impacts of eutrophication are exacerbated by climate change and other human pressure

Climate change increases the eutrophication management challenge. An important uncertainty is how changes in temperatures and precipitation will affect runoff from land and the amount of nutrients that comes with the runoff. The level of effect also depends on human activities for climate change mitigation and adaptation. In the water mass, climate change is expected to cause increased temperature, decreased salinity levels and altered seasonal patterns. Importantly, climate change also contributes to the development of oxygen depleted areas and to internal loading from nutrient rich sediments.

ACTION AREAS

The management objective of the Baltic Sea Action Plan in respect to eutrophication is to minimize human-derived inputs of nitrogen and phosphorus to the Baltic Sea. Significant reduction of the total input has achieved by all countries in the past two decades. It constitutes 14 percent for nitrogen and 24 percent for phosphorus. But the original goal set by the Baltic Sea Action Plan adopted in 2007 has not been achieved by 2021.

The regional targets to reach good environmental status of the Baltic Sea are the maximum allowable inputs of nutrients (MAI) - indicating the maximal level of inputs of water- and airborne nitrogen and phosphorus to Baltic Sea sub-basins. The maximum nutrient input to the Baltic Sea that can be allowed so that good environmental status regarding eutrophication can still be reached is 792,209 tons of nitrogen and 21,716 tons of phosphorus. The maximum allowable inputs of nutrients for the Baltic Sea sub-basins, based on the currently available data on nutrient fluxes in the marine ecosystem, are given in the table.

Baltic Sea Sub-basin	**Maximum Allowable Inputs (MAI)**	
	TN, tonnes	*TP, tonnes*
Kattegat	74,000	1,687
Danish Straits	65,998	1,601
Baltic Proper	325,000	7,360
Bothnian Sea	79,372	2,773
Bothnian Bay	57,622	2,675
Gulf of Riga	88,417	2,020
Gulf of Finland	101,800	3,600
Baltic Sea	**792,209**	**21,716**

Net nutrient input ceilings define maximum inputs via water and air to achieve good status with respect to eutrophication for Baltic Sea sub-basins for each country. They are calculated as shares of the maximum allowable inputs to each sub-basin using the proportions of nutrient inputs in the reference period 1997-2003. The agreed net nutrient input ceilings (NIC) are given in the table. Nutrient input ceilings are also calculated for non-HELCOM countries in the Baltic Sea catchment area, other countries with airborne input (OC), Baltic Sea shipping (BSS) and North Sea shipping (NOS).

Net input ceilings for nitrogen

	BOB	**BOS**	**BAP**	**GUF**	**GUR**	**DS**	**KAT**
DE	946	3923	34077	1645	1747	23647	4662
DK	281	1149	9026	420	463	28067	28525
EE	113	404	1478	11330	13099	22	24
FI	35086	28677	1827	20482	295	76	89
LT	108	495	26661	305	7226	65	80
LV	74	330	5673	246	44669	31	34
PL	668	3127	151998	1406	1595	1481	1444
RU	839	1994	10316	61482	3296	238	246
SE	17718	32651	30691	625	525	6056	32810
BY			13456		12820		
CZ			3551				
UA			1693				
OC	1375	5008	26947	2985	2188	4933	4502
BSS	284	1141	5180	675	345	651	701
NOS	131	475	2427	196	150	729	884

Net input ceilings for phosphorus

	BOB	BOS	BAP	GUF	GUR	DS	KAT
DE			109			401	
DK			21			979	815
EE			9	225	185		
FI	1683	1245		317			
LT			709		142		
LV			162		1095		
PL			4293				
RU			242	2909	99		
SE	811	1134	318			116	754
BY			349		407		
CZ			57				
UA			47				

Net nutrient input ceilings for each country and sub-basin incorporate also national shares in the input ceilings identified for transboundary rivers. The breakup of net input ceilings is given in the Annex to this segment.

The input ceilings for nitrogen and phosphorus are based on current scientific knowledge and are subject to uncertainties thus following the precautionary principle, increase of nutrient inputs to a basin is not allowed until both MAI and [good status with respect to eutrophication] have been reached even in basins where nutrient inputs are already below the nutrient input ceilings.

As reductions in nutrient inputs in sub-basins may have wide-spread effects, extra reduction – reduction of nutrient input below the national nutrient input ceiling for a sub-basin - can be accounted for, in proportion to the effect on a neighboring basin, by the countries in reaching their nutrient input ceilings.

Connection to other segments

Failure to reach the objectives for eutrophication will impair the achievement of a favourable status of biodiversity.

Further, reaching the environmental objectives for eutrophication can be facilitated by other BSAP management objectives, since human activities addressed in other segments contribute to achieving of the good environmental status of the Baltic Sea in respect to eutrophication. Management objectives of the Sea-based segment such as minimize contribution to eutrophication and air emissions, zero discharge from sea platforms, ensure sustainable use of the marine resources contribute to achieving eutrophication related goals. Also, nature conservation measures from the Biodiversity segment aimed at reduction of pressures that cause food web instability may interact with eutrophication. For example, impacts related to effects of overfishing can induce instabilities and reduce the resilience of the ecosystem against both eutrophication and other pressures.

Connection to other treaties

The achievement of good environmental status in relation to eutrophication in the Baltic Sea also relies on additional reduction efforts by non-Contracting Parties as follows: 52758 tons of airborne nitrogen and 5561 tons of waterborne nitrogen and 930 tons of waterborne phosphorus since the reference period (1997-2003).This reduction assumes full implementation of the Gothenburg Protocol of the UNECE Convention on Long-range Transboundary Air Pollution and National Emissions Ceilings (NEC) Directive until 2030. The waterborne reduction from non-Contracting Parties assumes that they take the same responsibility to reduce nutrients input as the Contracting Parties. Implementation of the IMO decision to establish NECA in the Baltic

Sea and North Sea leads to 16803 tons reduction of airborne nitrogen from shipping, assuming that vessels don't seek to achieve this reduction by replacing atmospheric emissions with direct discharges to the sea.

Implementation of the EU Marine Strategy Framework Directive, Water Framework Directive, Nitrates Directive, Urban Wastewater Treatment Directive and the Industrial Emissions Directive, as well as the Water Code and Law on Environment protection of the Russian Federation are prerequisites to the success of the Baltic Sea Action Plan. Achievement of the BSAP goals for this segment is also dependent on regulations and targets sets under global treaties.

SDGS

The eutrophication-related goal and objectives of the Baltic Sea Action Plan contributes to target 14.1 of the UN Sustainable Development Goals 2030 - Reduce Marine Pollution.

Operative section - Further efforts to achieve the BSAP goal are needed

Description of current state

The Baltic Sea still suffers from eutrophication. There has been a slight long-term improvement in many of the assessed indicators, which reflects an improved eutrophication management. However, according to the latest thematic assessment, 96% of the region is still below good eutrophication status, including all of the open sea area and 86% of the coastal waters (assessment years 2011-2016). Further, the eutrophication status has deteriorated in four of the 17 sub-basins during more recent time, which might be attributed to temporal variability in climate and hydrography.

Inputs of nutrients have decreased significantly to almost all sub-basins. Maximum allowable inputs of both nitrogen and phosphorus have been achieved in the Bothnian Sea, the Kattegat and the Danish straits. Nonetheless, remaining reductions for the whole Baltic Sea are still 13 percent of MAI for nitrogen and 38 percent for phosphorus. The highest reduction requirements remain for the Baltic Proper.

Most of the reduction so far has been achieved through measures addressing direct point sources, such as municipal and industrial sewerage systems and wastewater treatment facilities in the coastal areas. No visible reduction of diffuse loads has been achieved in the last two decades, though, diffuse nutrient run off contributes almost 35 percent of the riverine input. Agriculture is the main contributor to the diffuse load of nutrients to the Baltic Sea with the highest reduction potential. Nonetheless, remarkable reduction potential remains for point sources in the upper parts of the river catchments, including non-HELCOM countries in the Baltic Sea watershed. Another important source is scattered dwellings and individual houses. Reductions of air deposition of nitrogen, which constitutes almost a third part of total nitrogen load, have mainly been achieved in the energy and transport sectors. Emissions of ammonia remain at the same level and have even grown recently, indicating a need for renewed emission reduction measures in the agricultural sector.

Description of desired state

Maximum allowable nutrient inputs as defined by the updated Baltic Sea Action plan have been reached for all sub-basins, and the targets are continuously evaluated based on the best available scientific knowledge considering also the effects of external drivers including climate change.

The circular economy, which promotes sustainable production and consumption systems, is one of the key contributors to achieving and maintaining the eutrophication objectives. The HELCOM regional nutrient recycling strategy supplements the Baltic Sea Action Plan including also measures to be applied for smart nutrient management to close nutrient cycle. When nutrients are recycled within the production systems, fewer virgin raw materials are needed. The development of circular economy also contributes to climate change mitigation by cutting the dependency on fossil materials and fuels.

Continuous cooperation with River Basin Management Authorities is established to ensure that river basin management plans incorporate the nutrient input ceilings set by the HELCOM Baltic Sea Action Plan and measures in the plans are sufficient to achieve the BSAP goals. Official agreements between relevant authorities, to address transboundary waterborne nutrient inputs from non-Contracting Parties according to the HELCOM BSAP environmental targets are signed and cooperation continues with focus on harmonized implementation of measures to achieve the targets.

It should also be acknowledged that achieving of the maximum allowable inputs to all sub-basins does not imply immediate achieving of the good environmental status with respect to eutrophication related indicators such as nutrients concentrations, water clarity, algal blooms, benthic plants and animals, as well as oxygen levels. Restoration of the ecosystem which has been under the environmental pressure for more than a century requires according to various assessments from a few to a dozen of decades after the input has been reduced.

Annex to the eutrophication segment of the BSAP - “Input ceilings for transboundary rivers and other sources”.

Almost half of the waterborne input of nutrients enters the Baltic Sea via transboundary rivers which requires setting nutrient input ceilings for 9 major transboundary rivers, addressing inputs from the whole river catchment areas, separately from other sources.

National net nutrient input ceiling for each sub-basin is the sum of national share in the transboundary river ceiling and ceiling for remaining sources of input to the respective sub-basin. The input ceilings for transboundary rivers are not additional requirement but an integral part of the national net input ceiling and, thus, countries are free to implement measures where they are most appropriate to meet their net input ceilings.

Nutrient input ceilings for transboundary rivers and other sources, including input ceilings for national parts of transboundary river catchments are given in the tables below.

Nutrient input ceilings for nitrogen for HELCOM countries, transboundary rivers and other sources:

	BOB	BOS	BAP	GUF	GUR	DS	KAT	BAS
DE	946	3923	32281	1645	1747	23647	4662	68852
DK	281	1149	9026	420	463	28067	28525	67931
EE	113	404	1478	11330	13099	22	24	26471
FI	35086	28677	1827	15627	295	76	89	81677
LT	108	495	3620	305	462	65	80	5135
LV	74	330	2789	246	12223	31	34	15727
PL	668	3127	35486	1406	1595	1481	1444	45206
RU	839	1994	7321	22875	662	238	246	34175
SE	17718	32651	30691	625	525	6056	32810	121076
OC	1375	5008	26947	2985	2188	4933	4502	47938
BSS	284	1141	5180	675	345	651	701	8978
NOS	131	475	2427	196	150	729	884	4992
NEMUNAS			29338					29338
BARTA			957					957
VENTA			6033					6033
LIELUPE					15864			15864
DAUGAVA					38801			38801
ODER			49298					49298
VISTULA			74808					74808
PREGOLYA			5494					5494
NEVA				43462				43462
MAI	**57622**	**79372**	**325000**	**101800**	**88417**	**65998**	**74000**	**792209**

Waterborne nitrogen input ceilings for HELCOM and non-HELCOM countries within transboundary river basins:

River	Basin	NIC	DE	FI	LT	LV	PL	RU	BY	CZ	UA
NEMUNAS	BAP	29338			18934				10404		
BARTA	BAP	957			377	581					
VENTA	BAP	6033			3730	2303					
LIELUPE	GUR	15864			5867	9996					
DAUGAVA	GUR	38801			897	22450		2634	12820		
ODER	BAP	49298	179				43951			3551	
VISTULA	BAP	74808					70063		3052		1693
PREGOLYA	BAP	5494					2498	2995			
NEVA	GUF	43462		4855				38607			

Nutrient input ceilings for phosphorus for HELCOM countries, transboundary rivers and other sources:

	BOB	BOS	BAP	GUF	GUR	DS	KAT	BAS
DE			71			401		472
DK			21			979	815	1815
EE			9	225	185			418
FI	1683	1245		297				3224
LT			50					50
LV			62		499			560
PL			543					543
RU			146	1531				1677
SE	811	1134	318			116	754	3133
OC	181	394	1046	150	93	105	118	2087
NEMUNAS			914					914
BARTA			25					25
VENTA			106					106
LIELUPE					302			302
DAUGAVA					942			942
ODER			1554					1554
VISTULA			2350					2350
PREGOLYA			147					147
NEVA				1398				1398
MAI	**2675**	**2773**	**7360**	**3600**	**2020**	**1601**	**1687**	**21716**

*Sources of atmospheric deposition of phosphorus cannot be allocated to countries.

Waterborne phosphorus input ceilings for HELCOM and non-HELCOM countries within transboundary river basins:

RIVER	BASIN	NIC	DE	FI	LT	LV	PL	RU	BY	CZ	UA
NEMUNAS	BAP	914			628				286		
BARTA	BAP	25			5	20					
VENTA	BAP	106			26	80					
LIELUPE	GUR	302			109	193					
DAUGAVA	GUR	942			33	403		99	407		
ODER	BAP	1554	38				1459			57	
VISTULA	BAP	2350					2240		63		47
PREGOLYA	BAP	147					51	96			
NEVA	GUF	1398		20				1378			