EUSBSR
EU STRATEGY
FOR THE BALTIC
SEA REGION

TOWARDS COMBATING EUTROPHICATION – EU MACRO-REGIONAL APPROACH

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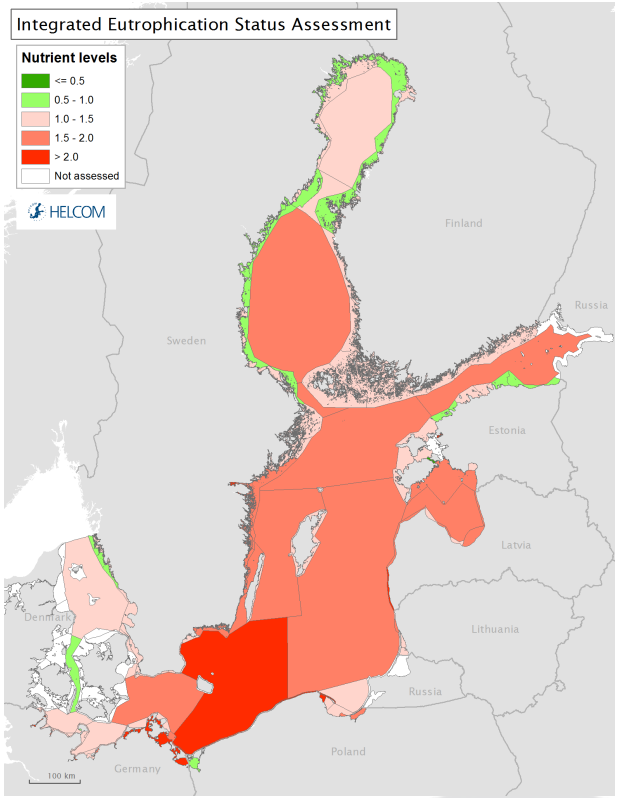
National Water Management Authority, Warsaw

2nd SUMBARINER Conference – Better Off Blue, 27-28.09.2017, Berlin

EUTROPHICATION STATUS - OVERVIEW

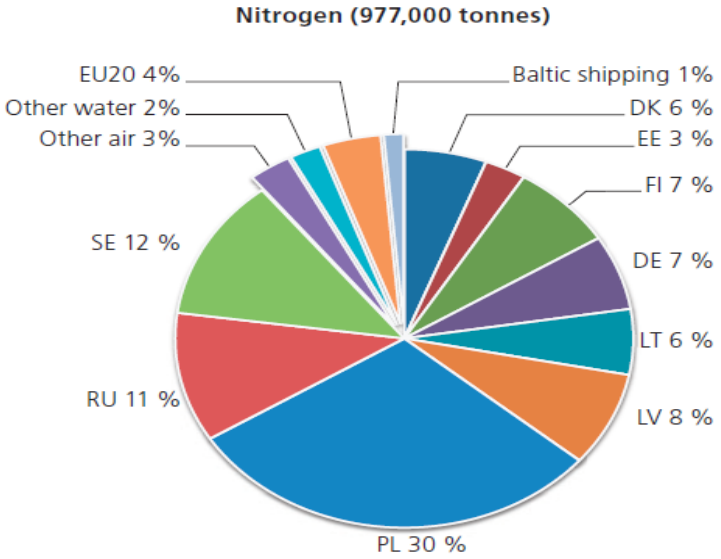
OVERVIEW

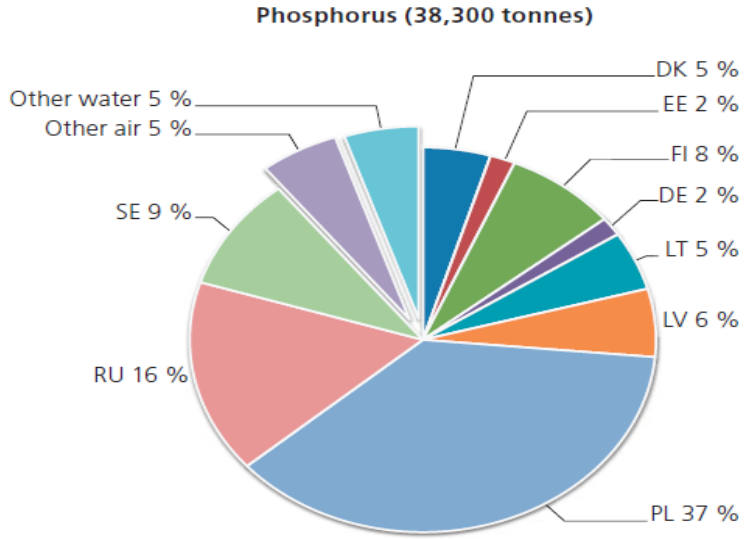


Eutrophication Status - Overview:

- eutrophication - one of the main environmental threats to the BS
- caused by excessive inputs of nutrients (N & P) to the marine environment
- nutrient over-enrichment causes elevated levels of algal and plant growth, increased turbidity, oxygen depletion, changes in species composition and nuisance blooms of algae
- despite measures taken to reduce external inputs of N & P to the sea, GES for eutrophication has not been reached yet
- the latest HELCOM assessment on eutrophication, in 2011-2015: > 95 % of the Baltic Sea area suffers from eutrophication. Signs of improvement, such as decreases in chlorophyll-a concentrations, are seen in some parts

Source: HELCOM State of the Baltic Sea. Holistic Assessment. First Version 2017 (to be updated in 2018), http://stateofthebalticsea.helcom.fi/

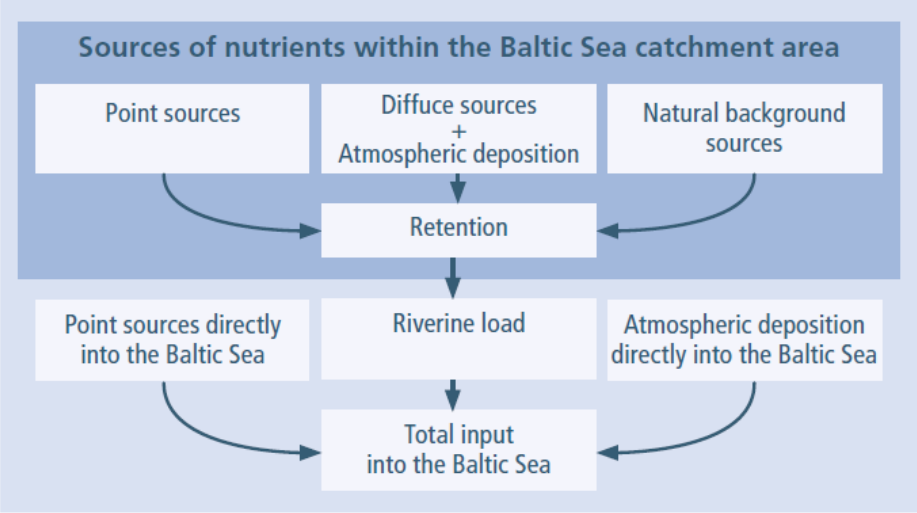




Figures 3.1a and 3.1b. Total actual water- and airborne inputs of nitrogen and phosphorus to the Baltic Sea in 2010 by HELCOM Contracting Parties and other sources. Atmospheric nitrogen deposition is divided into Baltic shipping, EU20 (the 20 non-HELCOM EU countries including Croatia) and 'other air' - which for nitrogen is other non-HELCOM countries and other distant sources (such as North Sea shipping) and for phosphorus all atmospheric sources. 'Other water' is transboundary waterborne inputs from non-HELCOM Contracting Parties entering the Baltic Sea (see **Table 3.3a**). See also note to **Table 2.2** regarding the pre-conditions on the PLC-5.5 data set.

Source: Review of the Fifth Baltic Sea Pollution Load Compilation for the 2013 HELCOM Ministerial Meeting, Baltic Sea Environment Proceedings No. 141, p.30.

OVERVIEW



Classifications:

point sources - stationary locations or fixed facilities from which the pollutants are discharged:

- discharges from municipal wastewater treatment plants,
- industries
- fish farms

diffuse sources - pollution from widespread activities with no specific point of discharge:

- natural background losses
- losses from agriculture and forestry
- atmospheric deposition on inland surface waters
- discharges from scattered dwellings and storm water

- **indirect discharges:** nutrients which enter inland waters by different pathways and are thereafter affected by a variety of processes in rivers and lakes, the amount of rainfall and the resulting water flow in rivers, as well as groundwater inflow to inland surface waters
- **direct discharges:** directly to the Baltic Sea

Source: Fifth Baltic Sea Pollution Load Compilation (PLC-5), Baltic Sea Environment Proceedings No. 128, p.13.

OVERVIEW

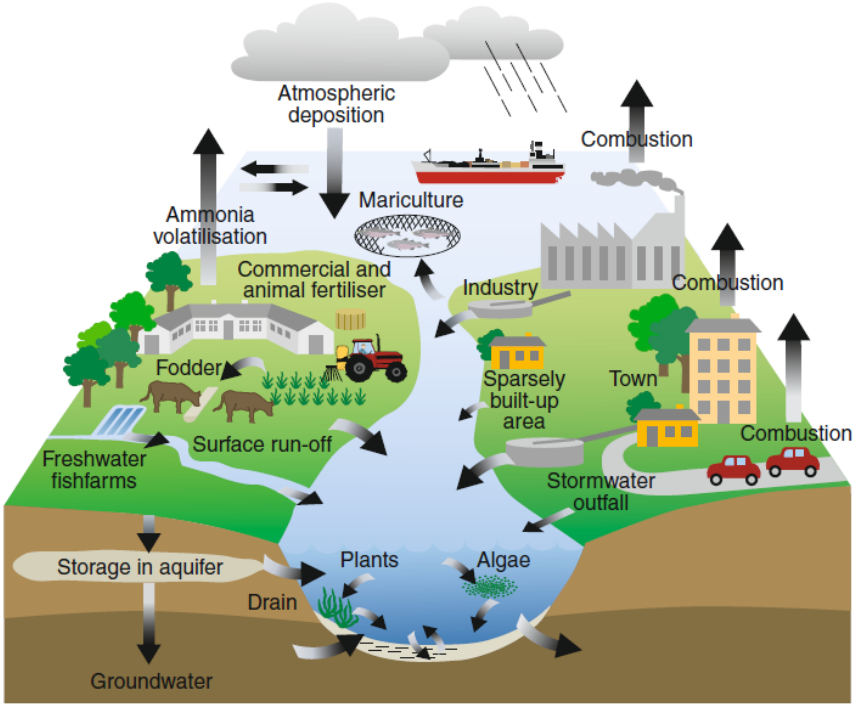


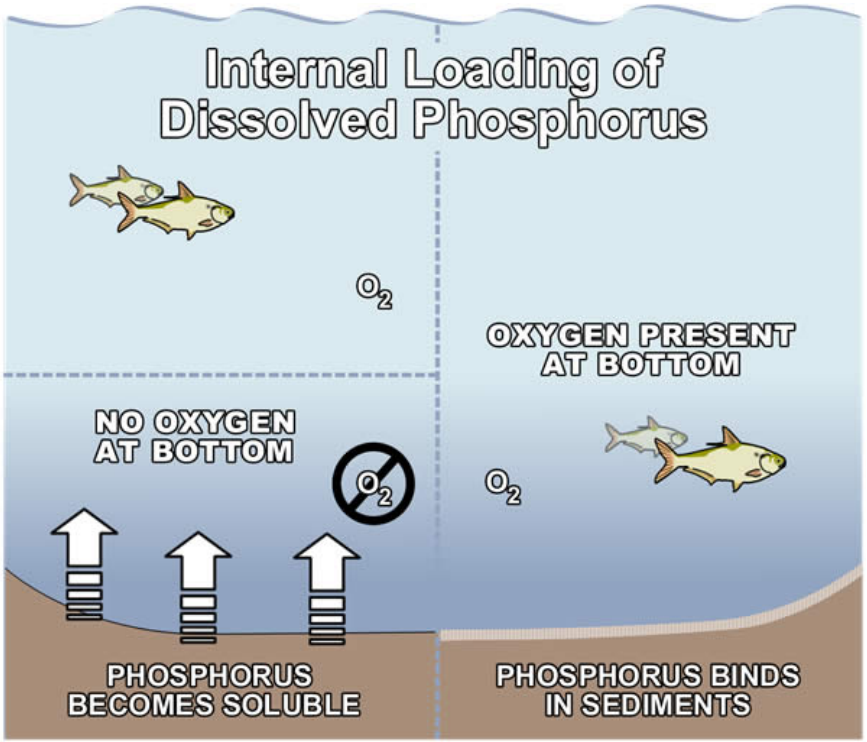
Figure 1-2 Different sources of nutrients to the sea and examples of nitrogen and phosphorus cycles (Source: Ærtebjerg et al. 2003).

The main pathways of nutrients to the sea:

- riverine inputs
- atmospheric deposition of nitrogen to the water surface
- direct waterborne discharges to the sea: coastal point sources, run-off from diffuse sources in coastal areas, discharges from ships

Source: Fifth Baltic Sea Pollution Load Compilation (PLC-5), Baltic Sea Environment Proceedings No. 128, p.13.

OVERVIEW



Source: http://www.lmvp.org/Waterline/fall2006/pwithin3.htm, 2017

Internal Nutrient Reserves

- another cause for increased nutrient levels in the sea, especially in the case of P
- excess nutrients stored in bottom sediments can enter the water column and enhance primary production of plants
- caused by P pools accumulated in the sediments of the sea bed being released back to the water under anoxic conditions
- sediment release affects the balance of P in the Baltic Sea, especially in the Baltic proper, the Gulf of Finland and the Gulf of Riga

http://www.helcom.fi/baltic-sea-trends/eutrophication/inputs-of-nutrients, 2017

OVERVIEW

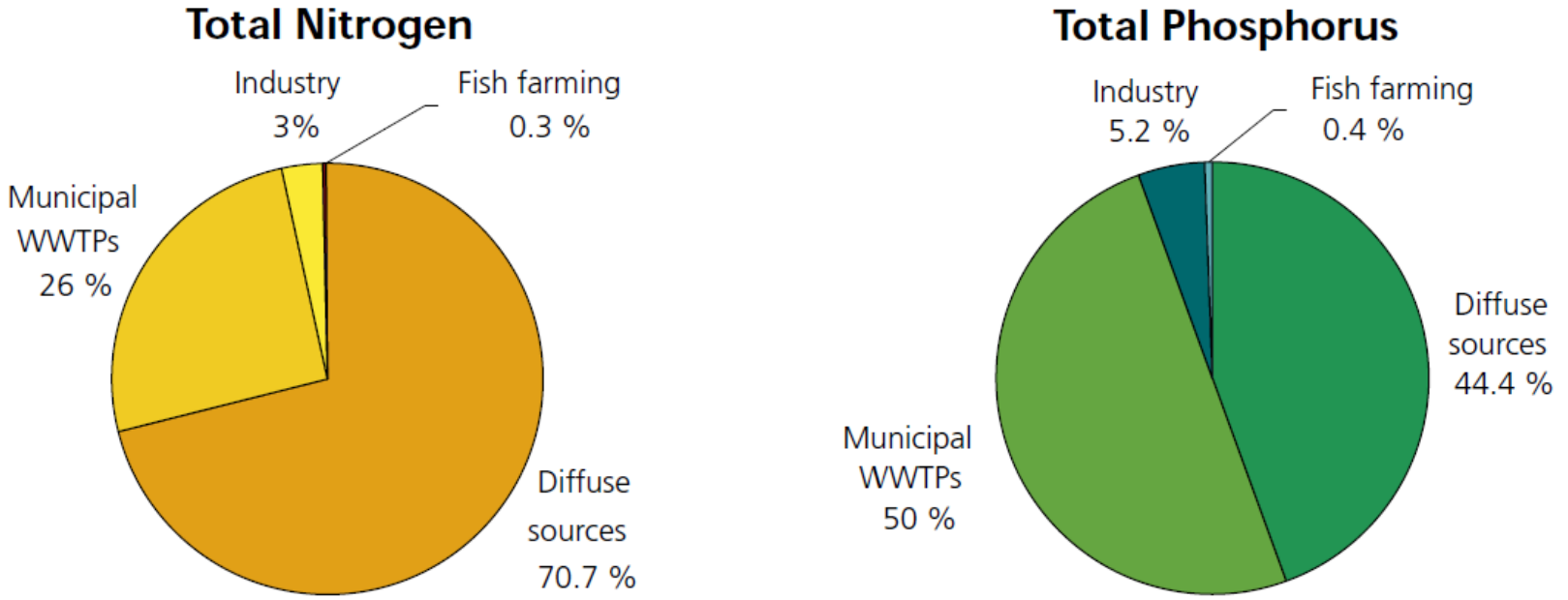


Figure 3.4 Proportion of the inputs of total nitrogen and phosphorus by source into surface waters within the catchment area of the Baltic Sea in 2000 (HELCOM 2004). WWTPs = wastewater treatment plants.

Source: Eutrophication in the Baltic Sea. An integrated thematic assessment of the effects of nutrient enrichment in the Baltic Sea region, Baltic Sea Environment Proceedings No. 115B, p.73.

OVERVIEW

Conclusions and Recommendations

The implementation of EU actions by the Member States has led to limited progress towards reducing nutrient inputs into the Baltic Sea. Investments in waste water infrastructure have been only partly effective, agricultural measures are not commensurate with the scale of the pressure and are insufficiently targeted and the added value of the EU Strategy for the Baltic Sea is difficult to assess.

- **Member States' plans lack ambition and appropriate indicators, and limited progress has been made as regards nutrient reduction**
- **Actions to reduce nutrient pollution from urban waste water are partly effective**
- **Reluctance of the Member States to make full use of the possible actions in the field of agriculture and lack of targeting to the areas in need**
- **[…] added value on the reduction of nutrients [in the Baltic Sea region] is difficult to asses**

PA NUTRI - PRIORITIES

THE EUROPEAN UNION STRATEGY FOR THE BALTIC SEA REGION

- approved by the European Council in 2009
- the first Macro-regional Strategy in Europe
- to deepen cooperation between the Baltic Sea States
- to tackle joint challenges facing the countries in the region today
- relies on use of existing EU instruments and funds, as well as other existing resources and financial instruments.

COMMISSION OF THE EUROPEAN COMMUNITIES

Brussels, 10.6.2009
COM(2009) 248 final

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

concerning the

European Union Strategy for the Baltic Sea Region

{SEC(2009) 702}
{SEC(2009) 703}
{SEC(2009) 712}

EUROPEAN COMMISSION

Brussels, 10.9.2015
SWD(2015) 177 final

COMMISSION STAFF WORKING DOCUMENT

European Union Strategy for the Baltic Sea Region

ACTION PLAN {COM(2009) 248}

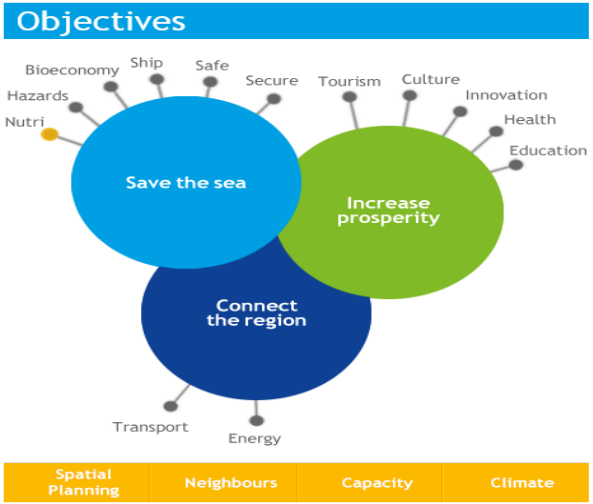
Annex to the Action Plan for the EU Strategy for the Baltic Sea Region

Ongoing and completed flagships of the EUSBSR

July 2016

EUSBSR
EU STRATEGY
FOR THE BALTIC
SEA REGION

POLICY AREA 'NUTRI'



Reducing nutrient inputs to the sea to acceptable levels

webstite:
http://groupspaces.com/eusbsr-nutrient-inputs

Saving the Sea sub-objectives:

1. ***Clear Water in the Sea***
2. ***Rich and Healthy Wildlife***
3. *Clean and safe shipping*
4. *Better cooperation*

PA NUTRI TARGETS & INDICATORS:

Sub-objective	Indicator	Baseline	Target	Data sources
Clear water in the sea.	Nutrient (P, N) inputs (tons).	Nutrient (P, N) input into the Baltic Sea (HELCOM BSAP baseline 1997 – 2003 average, reviewed 2013) – per sub-region – per country – point sources – diffuse sources – airborne Nitrogen.	Total nutrient reduction by putting in place the necessary measures by 2016 or jointly by 2020 at the latest as agreed in BSAP 2007 and revised by HELCOM in 2013.	HELCOM data (PLC-water, PLC-air/EMEP). HELCOM eutrophication core indicators.
Clear water in the sea; rich and healthy wildlife.	Share (km^2, %) of the sea area in good environmental status as defined by criteria of MSFD descriptor 5 Eutrophication and jointly assessed using HELCOM core indicators.	Initial joint regional assessments as required by MSFD and HELCOM.	Whole Baltic Sea is in a path to a full recovery to good environmental status by 2020 due to fully implemented measures and further decreased loads achieved.	Country reports 2012, 2018. HELCOM eutrophication core indicators.

PA NUTRI ACTIONS:

PA NUTRI Actions:

Action 1 — Managing nutrients more efficiently

Promote measures and practices which support nutrientrecycling and reduce nutrient losses from farming, fisheries, forestry, and waste-water treatment sludge.

Action 2 — Improving waste water treatment

Promote cost-efficient nutrient removal and sustainable sludge handling in urban waste-water treatment plants and in small-scalewaste-water treatment.

Action 3 — Facilitate cross-sectoral policy-oriented dialogue

Facilitate cross-sectoral policy-oriented dialogue among all sectors with an impact on eutrophication to develop an integrated approach to reducing nutrient loads to the sea.

Action 4 — Improve nutrient load data

Support efforts to improve the completeness and reliability of nutrient load data as a basis for monitoring success in reducing nutrient loads.

Action 5 — Cooperate with non-EU Member States

Cooperate with non-EU Member States, particularly Russia and Belarus, through HELCOM and the Northern Dimension Environmental Partnership.

Action 6 — Investigate cost-efficient nutrient reduction mechanisms

Study and cooperate in developing new sustainable innovative and socio-economic means for cost-efficient nutrient reductions.

PA NUTRI FLAGSHIP STATUS - CRITERIA

- ‚European Union Strategy for the Baltic Sea Region Action Plan' [document]
  - A single project or a set of projects (a group) operating in the same field or a process (e.g. network, new cooperation platform, etc.) which may develop key solutions, new methodology or practices, efficient forms of cooperation, or may concern key investments of regional importance
  - to be in line with at least 1 of the 6 Actions of the PA Nutri
  - not to overlap with other existing flagships or any other projects
  - to have **concrete sustainable results** for reducing nutrient loads to the Baltic Sea
  - submit **transferable results** which shall become public – a practical outcome
- ‚How to become a Policy Area Nutri Flagship?' [document]

LIST OF PROJECTS [June 2017]	Implementation Status	Flagship Status Approval (S.C.)	SEED Granted	Funds Granted	Project Period
Nutrient Trading Scheme (NutriTrade)	Ongoing	6th S.C. (2014.09.24.)		2015.08.26. CBP	2015-2018
Baltic Blue Growth (BBG)	Ongoing	5th S.C. (2014.06.05.)	2014.01.22. (SMF 2#S32)	2015.11.20. IBSR	2016-2018
Interactive Water Management (IWAMA)	Ongoing	6-7th S.C. (- 2015.06.16.)	2014.01.22. (SMF 2#S47)	2015.11.20. IBSR	2016-2018
Better Efficiency for Sewage Treatment (BEST)	Ongoing	5th S.C. (2014.06.05.)	2014.01.22. (SMF 2#S31)	2017.05.24.IBSR	2017-2020
Baltic Rural Wastewater (BaRuWa)	Applying	6th S.C. (2014.09.24.)	2014.09. (SMF 3#S61)		
Sustainable Communal Wastewater Management in the Baltic Sea Region (SUWMAB)	Applying	6th S.C. (2014.09.24.)	2014.09. (SMF 3#S62)		
Enhancing Efficiency of Small Wastewater Treatment Plants (SmallWWTPs)	Applying	6-7th S.C. (- 2015.06.16.)			
Increasing significance of midfield wetlands to combat Baltic Sea eutrophication (SIGWET)	Applying	9th S.C. (2016.04.27.)	2016.02.18. (SMF 4#S84)		
Sufficient and reliable nutrient loading data – The River Daugava catchment area (RelNutData)	Applying	9th S.C. (2016.04.27.)			
Consumer guide for Sustainably produced Meat (project leader: WWF Baltic Ecoregion Programme (CONSUME)	Applying	9th S.C. (2016.04.27.)	2016.11. (SI)		
DEvelopment of SustaInable wetland management by REstoration and biomass utilisation of peatlands in the Neman river catchment to improve water quality of the Baltic Sea (DESIRE)	Applying		2017.05.24. (1st IBSRP seed call)		
Evaluation of water quality and territories vulnerability in Daugava River Basin (QWATERA)	Applying		2017.05.24. (1st IBSRP seed call)		
Phasing Out of the Use of Phosphates in Detergents	Completed	Action Plan 2011.		SCA	2011
Putting Best Agricultural Practices into Work (BalticDeal)	Completed	Action Plan 2011.		IBSR	2011-2013
Assessment of Regional Nutrient Pollution Load and Identification of Priority Projects to Reduce Nutrient Inputs from Belarus to the Baltic Sea	Completed	Action Plan 2011.		BSAP Fund	2012-2013
Project on Reduction of the Eutrophication of the Baltic Sea Today (PRESTO)	Completed	Action Plan 2011.		IBSR	2011-2014

PA NUTRI ACTIVE FLAGSHIPS:

Baltic Blue Growth (BBG) – initiating a full-scale mussel farming in the Baltic Sea

Better Efficiency for Sewage Treatment (BEST) – increasing efficiency of municipal and industrial waste water treatment

Nutrient Trading Scheme (NutriTrade) – introducing platform for nutrient trading

Interactive Water Management (IWAMA) - developing the capacity and operational efficiency of municipal wastewater treatment plants

Consumer guide for Sustainably produced Meat (CONSUME) – developing guidelins for meat producers

Enhancing Efficiency of Small Wastewater Treatment Plants (SmallWWTPs) – increasing efficiency of small-scale municipal wastewater treatment plants

Sustainable Communal Wastewater Management in the Baltic Sea Region (SUWMAB) – promoting cost-efficient methods of nutrient removal in low-populated areas

Increasing significance of midfield wetlands to combat Baltic Sea eutrophication (SIGWET) - restoration of natural and construction of new midfield wetlands on 100 farms in 6 Baltic Sea countries

Baltic Rural Wastewater (BaRuWa) - developing and promoting waste water treatment technologies on small scale from rural and suburbian areas not connected to central communal waste water treatment systems

Sufficient and reliable nutrient loading data – The River Daugava catchment area (RelNutData) – improving nutrient loading data concerning River Daugava

DEvelopment of SustaInable wetland management by REstoration and biomass utilisation of peatlands in the Neman river catchment to improve water quality of the Baltic Sea (DESIRE)

Evaluation of water quality and territories vulnerability in Daugava River Basin (QWATERA)

ONGOING PROJECTS

NutriTrade
Nutrient Offsetting for the Baltic Sea

Interreg
Baltic Sea Region

EUROPEAN UNION
EUROPEAN REGIONAL DEVELOPMENT FUND

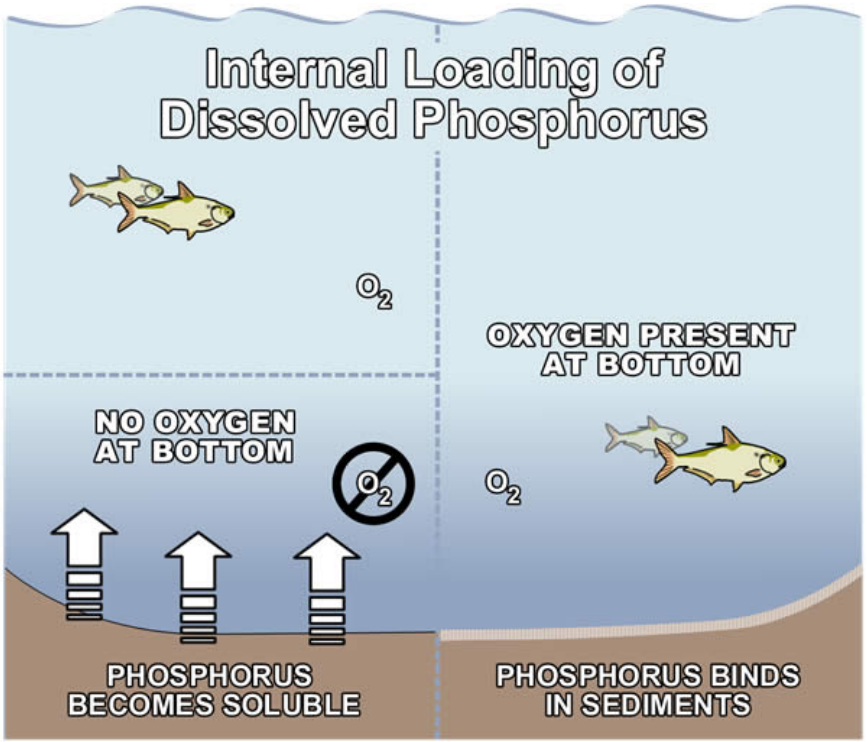
Baltic Blue Growth

IWAMS
Interactive Water Management

BEST

ISSUE OF INTERNAL NUTRIENT RESERVES

INTERNAL NUTRIENT RESERVES



Source: http://www.lmvp.org/Waterline/fall2006/pwithin3.htm, 2017

Source: Eutrophication in the Baltic Sea. An integrated thematic assessment of the effects of nutrient enrichment in the Baltic Sea region, Baltic Sea Environment Proceedings No. 115B, p.83, 104.

- the magnitude of sediment P release ('internal loading') **varies greatly** from year to year, largely as a result of physical forcing.
- Although in some years, especially in the Baltic Proper and the Gulf of Finland, the total annual sediment P release can be considerable and several times larger than the external nutrient load, the long-term average annual net release **is small** compared with external loads.
- As a whole, the Baltic Sea retains about **60%** of its external P load.
- Owing to the large intra- and inter-annual variations, far-reaching judgments on the relative roles of different input factors (e.g. external loading vs. sediment release) **cannot be made** on the basis of one or a few years alone, despite the clear effect on trophic conditions in those particular years leading, for example, to extensive cyanobacteria blooms.
- supplementary measures **are needed** - measures that can be envisaged in addition to those already agreed upon within the Baltic Sea Action Plan.
- Owing to the huge impact that the internal loading of nutrients can have on nutrient concentrations, further research and small-scale pilot projects on possible management measures and their impacts **should be encouraged.**

INTERNAL NUTRIENT RESERVES

Internal Load of Plant Nutrients in the Baltic Sea (2014):

- despite the fact that the anthropogenic load of nutrients from land-based sources is decreasing, the severe eutrophication of the offshore Baltic Sea continues and there is **no improvement** (algal blooms - on increase, the anoxic conditions of the deepwater – worsening)
- various existing measures such as P removal in waste water treatment plants are getting **maximum potential** (going beyond existing HELCOM Recommendations would be very costly)
- substantial nutrient reduction are only possible in the agricultural sector but these measures **are problematic**, slow, inefficient and costly
- the internal load of P from oxygen free sediments in the offshore and coastal areas of the Baltic Sea is **huge**
- **there is a potential** to develop innovative and cost-efficient measures to reduce the internal load in the Baltic Sea and restore low oxygen areas (extensive research and field tests on a number of potential measures to reduce this internal load including oxygenation, permanent inactivation of mobile phosphorous in sediments, low-flow dredging, and cultivation of organisms to absorb the plant nutrients carried out by SE **has confirmed** this statement)
- the issue of internal loading in the Baltic Sea **should be addressed** as complementary measures to the reduction of plant nutrients from land-based sources

HELCOM HOD 46-2014, document 4-20, Internal load of plant nutrients in the Baltic Sea

INTERNAL NUTRIENT RESERVES

Joint NGO position (2016):

1. Internal load **is not a cause** of eutrophication, but it is a consequence of numerous years of mismanagement of nutrient inputs from the Baltic Sea catchment.
2. There is **no evidence** that the Contracting Parties have taken and implemented all relevant measures to reduce eutrophication, as agreed in HELCOM BSAP – especially from land-based sources, so there **is no sense and need** to change the path and turn to sea-based measures.
3. Although positive effects of reduced land-based input could be seen in some coastal areas, there is still a **need for further improvement**, especially addressing diffuse runoff and losses from agriculture.
4. Proposed sea-based measures to address internal loading **have not proven** to be (a) effective, (b) cost-efficient, (c) polluter-specific and (d) harmless at a larger scale and in a longer-term perspective.
5. **Very few** end-of-pipe solutions have appeared to be more efficient than source reduction measures, hence the latter should be further promoted and supported.
6. External nutrient reduction before entering the sea is **the only truly effective** long-term strategy to combat eutrophication.

Baltic environmental NGOs, represented by Coalition Clean Baltic network consisting of 18 grass-root organizations from 11 countries in the Baltic Sea catchment and the WWF Baltic Ecoregion Programme

INTERNAL NUTRIENT RESERVES

HELCOM position (2016):

8.36 […] the internal load has been **already taken** into account in the calculation of maximum allowable input.
8.37 […] the continued importance of implementation of measures to reduce external loading with the understanding that achievement of the GES is a long process. {…] the methods and technologies aiming at reduction of internal load **should not be implemented** without an appropriate impact assessment.
8.38 […] the measures to manage internal load **should not be excluded** from consideration and supported further research activities to create a knowledge base, highlighting that the research **should also take into account** a potential adverse effect of measures. […] view of DE that **there is no need to apply** measures to reduce internal phosphorus loads for the Baltic Sea to achieve GES.
8.39 […] a call from both PA Nutri and PA Hazards for **better national consultation** and more active involvement of national representatives in the work of the policy areas, particularly in evaluation of project proposals.
48 […] that fish farming **may have a significant local effect**, especially in the areas with low nutrient load. Some Contracting Parties also pointed out to the Ministerial Declaration 2013, where the Contracting Parties have committed to implement nutrient reductions to improve environmental status even if no reduction requirements were established for certain basins.

HELCOM PRESSURE 4/2016 Outcome

INTERNAL NUTRIENT RESERVES

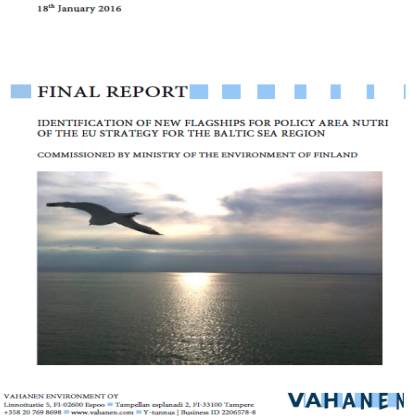
EUSBSR PA Nutri action 6.
'Investigate cost-efficient nutrient reduction mechanisms'

- Study and cooperate in developing new sustainable innovative economic frameworks as means to promote efficient sharing and allocation of costs of nutrient load reductions. These tools could include new mechanisms to allocate the cost of nutrient reduction to different actors of sectors or among the Baltic Sea region countries in a fair and efficient way.

- it promotes restorative techniques, e.g. oxygenisation, chemical precipitation, dredging and recycling nutrients in organic substrates at the sea, to improve the environmental status of the Baltic Sea, provided these techniques pass sustainability and risk assessment procedures.

Recommendation in European Court of Auditors' Special Report „Combating eutrophication in the Baltic Sea: further and more effective action needed", 2016:
(c) collect information on the cost-effectiveness of nutrient load reduction measures in order to have a robust analysis for establishing future programmes of measures

INTERNAL NUTRIENT RESERVES


18th January 2016

FINAL REPORT

IDENTIFICATION OF NEW FLAGSHIPS FOR POLICY AREA NUTRI OF THE EU STRATEGY FOR THE BALTIC SEA REGION

COMMISSIONED BY MINISTRY OF THE ENVIRONMENT OF FINLAND

VAHANEN ENVIRONMENT OY

VAHANEN

NutriTrade
Nutrient Offsetting for the Baltic Sea

Interreg
Baltic Sea Region

EUROPEAN UNION
EUROPEAN REGIONAL DEVELOPMENT FUND

Baltic Blue Growth

EUSBSR PA Nuti action 6.
'Investigate cost-efficient nutrient reduction mechanisms'

- Report „Identification of new flagships for Policy Area Nutri of the EU Strategy for the Baltic Sea Region" comissioned by The Ministry of Environment of Finland, 2016: flagship project proposals related to the issue of internal loading

  BASROD *– Studies of Baltic Sea restoration by oxygenation of the deepwater (University of Gothenburg, SE)*
  CIL *– Combating internal leakage and recycling of phosphorus (TechMarket Sweden AB)*

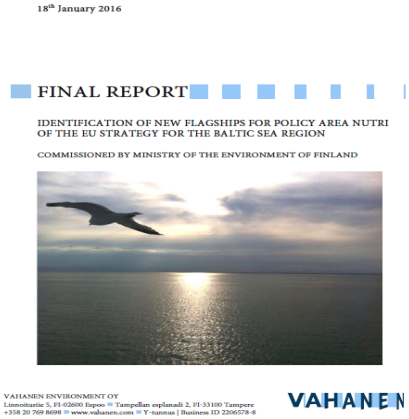
- External flagship project proposal related to the issue of internal loading

  SEA-BASED *- Project Sea-based measures for improving the ecological status of the Baltic Sea (John Nurminen Fundation, FI)*

- PA Nutri flagship-project status:

  Baltic Blue Growth *- Initiating full scale mussel farming in the Baltic Sea (Region Östergötland, SE)*
  NutriTrade *- Nutrient Offsetting for the Baltic Sea (John Nurminen Fundation, FI)*

INTERNAL NUTRIENT RESERVES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INTERNAL NUTRIENT RESERVES

Investigating different perspectives/ monitoring on-going discussion

7th Strategy Forum of the EUSBSR, 8-9.11.2016:

- ***Saving the Baltic Sea in 20 years*** – innovative methods to extract the nutrient surplus from the sea water (by Policy Area Bioeconomy Fishery/Aquaculture and Swedish Board of Agriculture)
- ***Is there so much phosphorus coming from Baltic Sea sediments that taking action on land is useless?*** (by Baltic Eye at the Stockholm University Baltic Sea Center)
- ***Finding innovative ways to fight eutrophication in the Baltic Sea*** (by Nordic Environment Finance Corporation)

Main Conclusions:

- addressing the topic from different perspectives is required
- there is a need for further knowledge and dialogue between the various actors both for and against sea-based measures of combating eutrophication.
- It is important to study and test the cost-efficiency, sustainability and risks of sea-based measures, even if the main focus should remain on reducing the external loading to the sea.

INTERNAL NUTRIENT RESERVES

EUSBSR
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SEA REGION
POLICY AREA 'NUTRI'

HELCOM-EUSBSR Workshop on internal nutrient reserves

28-29 November 2017 in Gothenburg, Sweden

- arranged jointly by SE and FI
- to highlight the knowledge-base across BSR countries
- to promote open discussion and to identify concrete ways forward

- participation by invitation only
- for more information, please contact robert.almstrand@havochvatten.se and sanni.j.turunen@ym.fi

Day 1. Ecological aspects

- a. Spatial and temporal dynamics of internal phosphorus reserves in the Baltic Sea, especially between sediment, deep water and productive layer.
- b. Nautral and anthropogenic factors affecting burial and release of phosphorus from bottom sediments – identification of hot-spots
- c. Approaches to manage internal reserves of phosphorus in the Baltic Sea.
- d. Effectiveness and potential environmental impacts and risks of management measures.
- e. Knowledge gaps and how to address them – wrap up of the day
- Variability in speciation and ease of release

Day 2. Political, legal and socio-economic aspects

- a. How far we are from reaching the HELCOM nutrient load reduction targets and where is the remaining load reduction potential?
- b. Review of national approaches to manage internal nutrient reserves.
- c. How costly are measures to manage internal nutrient reserves?
- d. Legal aspects of potential measures to manage internal nutrient reserves
- e. Is there potential in measures managing internal nutrient reserves? What next?

EUSBSR
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About PA NUTRI:

http://groupspaces.com/eusbsr-nutrient-inputs