Document title	List of synopses of new actions related to the Maritime Group
Code	3-2
Category	DEC
Agenda Item	3 - Update of the Baltic Sea Action Plan
Submission date	24.02.2020
Submitted by	Secretariat
Reference	

Background

As part of the update of the Baltic Sea Action Plan the sufficiency of existing HELCOM actions is evaluated and proposals on new HELCOM actions developed. The analysis of sufficiency of measures is carried out through the *ad hoc* HELCOM SOM Platform and through HELCOM ACTION project which is co-financed by the EU.

To support the selection of new HELCOM actions, proposals can be submitted for consideration in the BSAP update process. The proposals should be developed as synopses and make use of a common format that is available for download at a site with basic information on the BSAP update process. HELCOM 40-2019 agreed that proposals can be submitted by HELCOM subsidiary bodies, Contracting Parties, international projects and HELCOM observers. The synopses should be submitted by end of 2019 at latest but earlier submission is encouraged.

Such a request to submit proposals for new actions to the updated Baltic Sea Action Plan (BSAP) was circulated by the Secretariat to all HELCOM Working Groups, expert groups, networks, observers etc. in May/June 2019. In particular, the request was submitted to contacts and observers of HELCOM Maritime Group on 4 June 2019.

This document contains the list of synopses related to the Maritime Group for consideration by the Meeting.

Action requested

The Meeting is invited to undertake a technical review of the synopses for proposed new BSAP actions contained in the document using the guidance contained in document 3-3.

List of synopses related to the Maritime Group

Title	Submitted by	Initial categorization
1. Ship's ballast water and sediments management (BWM) by the HELCOM parties' domestic merchant fleets and naval forces as a supplementary measure to control introductions and secondary spread of Harmful Aquatic Organisms and Pathogens (HAOP) in the Baltic Sea.	CCB	Measure
2. Proposal to regulate sewage discharges from cargo ships to reduce nutrient input into the Baltic Sea	Finland	Measure (regulation)
3. Hydrographic surveys in HELCOM Re-Survey Scheme Cat III areas	Finland	Mapping
4. Measures to minimize the discharge of food waste from ships in the Baltic Sea	Finland	Step towards Measure
5. Proposal to develop a roadmap for managing grey water discharges from ships to reduce nutrient input into the Baltic Sea	Finland	Step towards Measure
6. Enhance mitigation measures to decrease GHG emissions from shipping- Alternative fuels and sources of energy	Finland	Measure
7. More Research on underwater noise	Finland	Knowledge
8. Work for the harmonized implementation of the IMO Biofouling Guidelines and Guidance documents, and further work toward the International Biofouling Convention by contributing to the work carried out in the International Maritime Organization (IMO)	Finland	
9. Reducing the impact of **continuous underwater sound** on marine biodiversity [from shipping]	CCB	Measure
10. Reducing the impact of **continuous underwater sound** from recreational boating on marine biodiversity	CCB	Measure
11. Adoption and implementation of a HELCOM Roadmap on Biofouling Management	COMPLETE (project)	Measure
12. Develop an adequate network of Port Reception Facilities (PRFs) in Baltic ports to recieve ship hold washing water	CCB	Measure
13. Develop a HELCOM joint submission to IMO with the intention to recognize nutrients in cargo hold washing water as Harmful for the Marine Environment in the Baltic Sea.	CCB	Step towards measure
14. Reduce nutrient losses to zero from dry bulk fertilizer storage and handling in Baltic ports	CCB	Measure
15. Ensure no-special-fee system for marine litter applies to all passive fished waste, as well as all other wastes captured or generated in the Baltic Sea.	CCB	Measure

Title

1. Ship's ballast water and sediments management (BWM) by the HELCOM parties' domestic merchant fleets and naval forces as a supplementary measure to control introductions and secondary spread of Harmful Aquatic Organisms and Pathogens (HAOP) in the Baltic Sea.

Submitted by:

Coalition Clean Baltic (observer)

Description of measure

Each party of the Helsinki Convention should prevent the transfer of HAOP by the control and management of ship's biofouling and of ballast water and sediments in its ports and waters under its jurisdiction with respect to the BWM. The attainment of the relevant international agreements needs to be promoted. BWM Convention does not apply for ships only operating in waters under its national jurisdiction, warships and naval auxiliary ships, but these vessels could potentially introduce HAOP into the Baltic. Hence, each Party shall adopt appropriate measures without impairing operational capabilities, to act reasonable and practicable with BWM Convention. These assumptions should be verified and reflected in national management strategies by each party.

Activity:

Transport – shipping (incl. anchoring, mooring)
Transport – shipping infrastructure (harbours, ports, ship-building)

Pressure:

Input or spread of non-indigenous species
Input of microbial pathogens

State:

Non-indigenous species

The introduction of invasive species into the Baltic is regulated in part by the International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM 2004), which is supposed to be an effective way to control the spreading of HAOP.
According to Article 3 of the BWM 2004, this convention does not apply to ships which only operate in waters under the jurisdiction of one party, unless that party determines that the discharge of ballast water of such ships would impair or damage their environment, human health, property or resources, or those of other states.
Moreover, BWM 2004 does not apply to warships, naval auxiliary or other ship owned or operated by a State and used, for the time being, only on government non-commercial service. Both exceptions also potentially enable the import of HAOP.
Hence, each Party of the Helsinki Convention shall ensure by the adoption of appropriate measures without impairing operational capabilities, to act reasonable and practicable with the BWM Convention.
With respect to the two above mentioned groups of ships, the proposed measure takes also future regulation(s) on biofouling into account.
By verifying and reflecting these assumptions in national management strategies by each party, the input of HAOP could be reduced, which would protect the Baltic ecosystem.

Extent of impact:

Proposed measure, although addressing shipping activities within national areas of the Parties, should be coordinated internationally through HELCOM, thus it has the Baltic wide scale.

Effectiveness of measure

Effective implementation of the proposed measure in ports and waters under jurisdiction of the coastal countries in the HELCOM area would mean to discharge ballast water exclusively under the rules set by the BWM Convention.

Regardless, ballast water is discharged by ships arriving from abroad or those operating exclusively in waters under the jurisdiction of one party. This may not apply for domestic ships, if the party determines that the discharge of ballast water from such ships would impair or damage their environment, human health, property or resources, or those of other states. This, however, should require a risk assessment according to the IMO G7 Guidelines and the Joint Harmonized Procedure developed by the Helsinki and OSPAR Commissions in each individual case. Biofouling of ships operating internationally should also be controlled in a consistent way under existing and future international agreements.

Managing activities related to the domestic fleets of the coastal states, as outlined in this proposed measure, will complement the agreed measures addressing international shipping set by the International Maritime Organization. The latter, in turn, will never be effective enough if shipping activities addressed by this measure are not managed. They will also in part constitute a continuation of the activities outlined by the HELCOM Ballast Water Road Map adopted as a part of the HELCOM Baltic Sea Action Plan, which hopefully will be successfully completed in 2020 with the last ratification of BWM Convention carried out by Poland.

This measure will also help to reduce the risk of new introductions of HAOP to the EU member states, required by the Marine Strategy Framework Directive (Descriptor 2).

Cost, cost-effectiveness of measure:

Baltic coastal states should make sure that some of the ships which operate only in waters under their jurisdiction manage their ballast water and sediments in a way consistent with that applied to the ships operating internationally, as set by the BWM Convention. That will need to retrofit certain ships by installing on-board ballast water treatment systems, or to oblige them to discharge the ballast water and sediments to the reception facilities in ports. The latter, in turn, would require ensuring that such reception facilities are available in ports where these ships call. This would spell additional costs for ship owners and some companies operating in ports.

The question if the management of biofouling will generate any additional costs in future needs further considerations.

The role of the maritime administration and other administrations of respective Parties with respect to national regulations addressing the management of ballast water and sediments on board such ships, or in harbours, would be the same or very similar as in case of the management resulting from the BWM Convention.

Development and progress in implementing the described activities should be reported to HELCOM.

Feasibility:

This measure will constitute an extension of similar measures adopted by every coastal State as a result of the BWM Convention ratification.

Follow-up of measure:

Aquatic alien species monitoring programme in ports and coastal waters (including coastal lagoons)

Background material:

This measure proposal is based on the analysis of BWM Convention, especially its Article 3, but also on the national laws on BWM developed by the Baltic coastal states, which have ratified the Convention. Additionally, scientific papers showing the thread of the NIS dispersal by the domestic ships in other parts of the world were referred to.

References

Adebayo, A.A., Zhan, A., Bailey, S.A., MacIsaac H.J. 2014. Domestic ships as a potential pathway of nonindigenous species from the Saint Lawrence River to the Great Lakes. Biological Invasions 16: 793 - 801. https://doi.org/10.1007/s10530-013-0537-5

Briski, E., Wiley C.J., Bailey S.A., 2012. Role of domestic shipping in the introduction or secondary spread of nonindigenous species: biological invasions within the Laurentian Great Lakes. J Appl Ecol 49:1124–1130

Desai, D.V., Narale, D., Khandeparker, L., Anil A.C., 2018. Potential ballast water transfer of organisms from the west to the east coast of India: Insights through on board sampling. Journal of Sea Research 133: 88-99.

International Convention for the Control and Management of Ships' Ballast Water and Sediments, London, 2004. International Maritime Organization. 38 p.

2017 Guidelines for risk assessment under regulation A-4 of the BWM Convention (G7). MEPC.289(71)

Title:

2. Proposal to regulate sewage discharges from cargo ships to reduce nutrient input into the Baltic Sea

Submitted by:

Finland

Description of measure

The Baltic Sea was the first sea area in the world to receive the status as a special area in MARPOL Annex IV (sewage) in 2016. Set to come into effect 1 June 2019 for new passenger ships, 1 June 2021 for existing passenger ships and in June 2023 for passenger ships entering the Baltic Sea in direct passage to the Russian ports in the eastern Gulf of Finland passenger ships, including cruise ships, will have to discharge sewage into port reception facilities or alternatively at sea only after treatment with very advanced on-board sewage treatment plants able to reduce nutrient input into the sea. However, these regulations for sewage discharges still apply only for passenger ships.

Given the fact that sewage from all ships contains nutrients, such as phosphorus and nitrogen, which aggravate algal blooms and other symptoms of eutrophication, one of the main environmental concerns in the Baltic Sea area, such regulations should be applied also to cargo ships with regard to discharges of sewage.

The following action is proposed:

- Action: To widen the scope of the Baltic Sea Special Area regulations under MARPOL Annex IV to cover also sewage discharges from cargo ships.

Activity:

Transport – shipping (incl. anchoring, mooring)

Pressure:

Input of organic matter — diffuse sources and point sources

State:

Nutrients

Extent of impact:

Compared to other sea areas, the Baltic Sea is unusually prone to eutrophication caused by input of phosphorus and nitrogen compounds. This is mainly due to its shallow water depth, large catchment area with a population of 85 million people and the slow rate of water exchange. The nutrient input stems partly from natural atmospheric and riverine input, but mostly from agriculture, municipal waste waters, fish-farms and atmospheric emissions from traffic and combustion of fossil fuels, *i.e.* nutrients from anthropogenic sources. To estimate the amount of nutrients discharged into the Baltic Sea from ships' sewage, a theoretical study was conducted in 2006 and updated in 2009 (Hänninen & Sassi 2009, see "References" below).

The results show that the annual amount of sewage from ships in the Baltic Sea area could contain in total a maximum 356 tonnes of N and 119 tonnes of P. Nitrogen content of sewage produced on ferries was estimated to be 113 t, on cruise ships 113 t and on cargo ships 131 t. Phosphorous content of sewage produced on ferries was estimated to be 38 t, on cruise ships 38 t and on cargo ships 44 t. Consequently, the ship-borne nutrient load of sewage from cargo ships exceeds that of ferries and cruise ships, respectively.

Although seemingly small compared to the total nutrient load into the Baltic Sea from all sources, this amount is far from negligible and one that can be reduced effectively. The nutrients from sewage are directly available for uptake by algae. Especially the growth of blue-green algae, which is limited by the amount of phosphorus in the water, is stimulated by sewage. One must also take into account that the discharges are concentrated spatially along the shipping routes, causing serious effects locally. Temporally the sewage discharges are concentrated in the summer season when algae normally have used up most of the nitrogen and phosphorus dissolved in the water. Therefore, the nutrients in sewage have far greater negative effects on the environment than the amount mentioned above would suggest.

Effectiveness of measure

According to the 2012 Guidelines on implementation of effluent standards and performance tests for sewage treatments plants (resolution MEPC.227(64)), the geometric mean of the total nitrogen and phosphorus content of the samples of effluent (discharged into the sea) taken during the test period should not exceed:

.1 total nitrogen1: 20 Qi/Qe mg/l or at least 70 per cent reduction;
.2 total phosphorus: 1.0 Qi/Qe mg/l or at least 80 per cent reduction.

These requirements indicate that, if the regulations currently only imposed on passenger ships would be implemented also for cargo ships, at least 70% reduction of nitrogen input and at least 80% reduction of phosphorous input would be achieved, if a cargo ship would use a sewage treatment plant on board and discharges treated sewage into the sea. Since we are lacking the data concerning nutrient loading from cargo ships through sewage discharges, i.e. amount of discharges, this kind of data should be collected.

If the ship does not use its sewage treatment plant or does not have such a plant on board, all sewage shall be discharged into port reception facilities. In this case all nutrient input from sewage into the sea from the ship would be eliminated.

Cost, cost-effectiveness of measure:

A ship can either use a sewage treatment plant, which fulfils the requirements given in resolution MEPC.227(64) for the Baltic Sea area, or discharge all sewage into port reception facilities.

Installation of a sewage treatment plant, which fulfils the requirements given in resolution MEPC.227(64) for the Baltic Sea area, causes some additional cost compared to a sewage treatment plant, which does not reduce nutrient input from sewage into the sea.

According to the information received from the Baltic Sea States, port reception facilities for sewage from passenger ships are already available in passenger ports. The number of crew members in cargo ships range from about 10 to 30 persons. Thus, the amount of sewage from a cargo ship is much smaller than the amount of sewage from a passenger ship, which may have 1000 to 3000, even up to 5000 passengers and additional crew members on board. Consequently, tank trucks can be used as port reception facilities in all ports in the Baltic Sea area. Such tank trucks are already available and delivery of sewage is included in the NSF-system in the Baltic ports meaning that there will be no extra costs for cargo ships.

Feasibility:

It would be feasible to have the same sewage discharge requirements for all ships sailing in the Baltic Sea area.

Follow-up of measure:

To be agreed later.

Background material:

MEPC 60/6/2, Proposal to amend MARPOL Annex IV to include the possibility to establish Special Areas for the prevention of pollution by sewage and to designate the Baltic Sea as a Special Area under Annex IV, submitted by Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, the Russian Federation and Sweden

MEPC 60/INF.4, Information on the proposal to designate the Baltic Sea as a Special Area under MARPOL Annex IV, submitted by Denmark, Estonia, Finland, Germany, Lithuania, Latvia, Poland, the Russian Federation and Sweden

References

HELCOM Maritime 19 document 3-6, Proposal for amendments to the BSAP, submitted by Finland.

HELCOM Maritime 19 document 13-4, Discharges to the sea from Baltic Sea shipping in 2006 – 2018, submitted by Finland.

Hänninen, S. and Sassi, J. 2009. Estimated nutrient load from waste waters originating from ships in the Baltic Sea area – updated 2009. VTT Research Report VTT-R-07396-08, see http://www.vtt.fi/inf/julkaisut/muut/2009/VTT_R_07396_08.pdf

Title:

3. Hydrographic surveys in HELCOM Re-Survey Scheme Cat III areas

Submitted by:

Finland
(Chairing the Baltic Sea Hydrographic Commission Re-Survey Monitoring Working Group)

Description of measure

Mandated by the HELCOM Ministerial Declarations in 2001,2010 and 2013 and since 2001 the MS have completed full-coverage / full seafloor search re-surveys to IHO S-44 hydrographic survey standard in the Baltic Sea. The progress has been excellent, totalling at the end of August 2019 about 86% of the commercial shipping navigable sea areas in the Baltic Sea, defined as HELCOM routes cat I and Cat II in Re-Survey Scheme. Cat I and II areas are estimated to be completed by the end of 2030.

The Baltic Sea Hydrographic Commission is updating the Re-Survey Scheme to include the HELCOM Cat III area surveying. These areas are typically the near coast shallow areas or deep open water areas, used sometimes for shipping, pleasure boating, Search and Rescue exercises, for flood prevention by public authorities (GIS data) as well as for oil recovery contingency.

Action 1. Take actions to ensure the completion of the re-surveys for CAT I and II areas used by navigation by 2030 at the latest. [*at existing Baltic Sea Action Plan to be continued*]

Action 2: Take actions to ensure the completion of the re-surveys for CAT III near shore and other areas used typically for safe boating, environmental and GIS data purposes and oil recovery contingency by the time specified in the revised BSHC HELCOM Re-Survey Scheme.

Activity:

Transport – shipping (incl. anchoring, mooring)
Transport – shipping infrastructure (harbours, ports, ship-building)

Pressure:

Not applicable

State:

Not applicable

Extent of impact:

The re-surveys will cover areas used by shipping where old or otherwise inadequate depth information currently exists, and will thus allow safer sea areas for shipping and boating , increase the protection of the marine environment as well as flood prevention and oil recovery contingency.

Accurate and reliable full bottom coverage / full seafloor search of surveys allow for more flexible route planning, more precise navigation and more flexibility to utilise the increased loading of ships, and thus increasing the economic efficiency of shipping.

During the re-surveys, critical new shallows or shoals not previously known have been found and appropriate actions have been launched.

The area covers entire Baltic Sea.

Effectiveness of measure

Well-planned re-surveys enable revisions of fairways or routes, and planning of modified or new Traffic Separation Schemes.

Co-operation between the Member States has enhanced.

Modern full coverage depth information enables changed practices in navigation with ECDIS functionality (e.g. 3D navigation with real time dynamic water level information, precise warnings, utilising full Under Keel Clearance).

New surveys are a basis for a dense Baltic Sea Depth Model: http://data.bshc.pro/#2/58.6/16.2

Cost, cost-effectiveness of measure:

Studies (e.g. EU INEA CEF Transport funded FAMOS Odin) indicate fuel savings and therefore less emissions from shipping.

Feasibility:

Safer shipping and boating will lessen the risk of grounding.

Follow-up of measure:

Reporting the progress to BSHC annual conferences and HELCOM Maritime annual meetings

Background material:

HELCOM Ministerial Declarations in 2001 and 2010;
HELCOM Ministerial Declaration 2013: 14(M) and 15(M).

References

BSHC24 conference, 10-12.9.2019, Gdansk, Poland: items
BSHC24_C1.1_FI
BSHC24_C1.2_FI
BSHC24_C1.4_FI
available at https://www.iho.int/mtg_docs/rhc/BSHC/BSHC24/BSHC24.htm

Title:

4. Measures to minimize the discharge of food waste from ships in the Baltic Sea

Submitted by:

Finland

Description of measure

Regarding the prevention of pollution from ships, the Baltic Sea is defined as a special area under various MARPOL Annexes where the discharge regulations are stricter than outside Special areas. However, according to the MARPOL Convention it is still permitted to discharge food waste into the Baltic Sea. Based on regulation 6 of Annex V (garbage), ships are allowed to discharge comminuted or ground food waste while en route and as far as practicable from the nearest land, but no less than 12 nautical miles from the nearest land.

The nutrient load originating from shipping is not insignificant especially when noting that the nutrient load is concentrated along the shipping routes and is immediately available for uptake by e.g. blue green algae, intensifying the eutrophication of the Baltic Sea. The nutrient load from ships is also much easier to control when compared to the nutrient inputs from land-based sources or atmospheric emissions. The operational discharges of food waste from shipping can be considered as an unnecessary and easily preventable source of nutrient inputs to the Baltic Sea. The alternative for dumping the food waste is available, namely delivering the food waste to port reception facilities (PRF) under the incentive based no-special-fee system without additional cost.

Therefore the two following measures are proposed:

- Action 1: To prepare a HELCOM Recommendation to encourage voluntary agreements on delivering all food waste to the port reception facility (shipping companies, ports)
- Action 2: To develop a roadmap to minimize and eventually prevent the discharges of food waste into the Baltic Sea.

Voluntary agreements will reflect the willingness of the shipping companies to operate in a manner that exceeds the current legal framework of MARPOL Convention Annex V. This is already common practice on board the passenger ferries in regular traffic that deliver all food waste to PRF. Similarly, many cruise ships and cargo ships are following this practice voluntarily.

There are various reasons for this. Environmentally conscious passengers have been able to influence the shipping companies and their operational decisions, as the public awareness is growing stronger to protect the Baltic Sea in every possible way. In addition, the waste management practices onboard have been developed as well as the attitudes on board (crew). The recent EU waste legislation and circular economy are changing the concept of waste which will also influence the ports waste collection (ensure separate waste collection to facilitate reuse and recycling of waste).

To support the voluntary agreements and to prepare further actions within HELCOM context, a Road Map will be developed. The aim is to investigate and analyze whether regulatory amendment to MARPOL Annex V is needed and if so, prepare a joint submission to IMO.

To begin, more information on the actual food waste discharges from ships into the Baltic Sea is needed as well as information on existing food waste management practices on board (delivery to PRF, mixing food waste with sewage and/or grey water, technical treatment solutions). It is also essential to collect further information on adequacy and availability of port reception facilities for food waste (garbage) and evaluate the possible impact on stakeholders (ships, ports, authorities).

Activity: Transport – shipping (incl. anchoring, mooring)
Pressure: Input of litter (solid waste matter, including micro-sized litter) (among food waste may be solid waste matter: pieces of plastics, microplastics), (cooking oil) Input of nitrogen Input of nitrogen
State: Litter Nutrients
Extent of impact: The proposed measures (Action 1 and 2) aim to reduce (and eventually prevent) the nutrient input from food waste discharges from shipping into the Baltic Sea. Furthermore, the aim of the measures is to raise environmental awareness on board ships operating in the Baltic Sea area and promote the delivery of food waste to PRF under the no-special-fee system (without any additional cost) in the ports of the Baltic Sea states. In addition, it is necessary to confirm the adequacy of PRF. Impact of the measure therefore extends to all ships operating in the Baltic Sea area and all ports of the Baltic Sea states.

Effectiveness of measure

The effectiveness of Action 1 – to develop a HELCOM Recommendation to encourage voluntary agreements on delivering all food waste to the port reception facility (shipping companies, ports) – relates to raising environmental awareness and thereby promoting the voluntary action to deliver all food waste to PRF in the spirit of protecting the Baltic Sea.

These voluntary agreements can be unilateral commitments, bilateral agreement between shipping company/vessel and a port or even trilateral agreement including authority representative. An example of the latter is a multi-stakeholder 'Green Deal' on ship's plastic waste in the ports of Amsterdam and Rotterdam.

It is worth noting that the delivery of food waste (garbage) is included in the no-special-fee system, which is applied in all Baltic Sea ports. In addition, the recent revision of PRF Directive (883/2019) is incorporating the 100% no-special-fee system to garbage in all EU ports (to be applied by 6.2021).

However, the effectiveness of voluntary agreements can be limited. It is crucial to raise the awareness but the actual change in the environmental culture on board all ships operating in the Baltic Sea requires a wider approach, a consideration of a legislative action.

This will be initiated in Action 2 (To develop a Road Map) where the main focus will be gathering more information and finding possible solutions to minimize and eventually prevent the discharges of food waste into the Baltic Sea.

In order to evaluate the effectiveness as well as promote the aim of Action 2, we do need more data on the amounts of actual food waste discharges from ships into the Baltic Sea and evaluation of their impact on total nutrient loads in the Baltic Sea. The estimation of the nutrient load originating from shipping in the Baltic Sea area (VTT 2007, 2009) is focusing only on wastewaters. However, based on the on the vessel activity data from HELCOM AIS data and on modelled discharges to the sea, nitrogen emissions from food waste were estimated as 90 tonnes, of which 91% came from passenger traffic (2018) (HELCOM MARITIME 19, Document 13-4, Discharges to the sea from Baltic Sea shipping in 2006 – 2018, submitted by Finland).

The nutrient releases in comminuted food waste mainly come from passenger ships, due to big number of passengers and crew on board. All ships are modelled in the food waste estimates, based on the size of crew and passengers on board. According to the IMO MARPOL Annex V, 12 nautical mile distance is applied in special areas like the Baltic Sea. Total reduced nitrogen release to the Baltic Sea from food waste is estimated as 90 (-3.7%) tonnes (year 2018 and their development over the period of 2006-2018, HELCOM MARITIME 19, Document 13-4, Discharges to the sea from Baltic Sea shipping in 2006 – 2018, submitted by Finland).

Since food waste is often mixed with grey water from ships' galleys and discharged into the sea, more data is needed on the current waste management practices, especially on mixing food waste with sewage and/or grey water. This is important as it is anticipated that grey water also has a high nutrient content. In case grinded food waste from galley is mixed with grey water and led to the sewage treatment plant, type approval and compliance issues rise. Due to the problems encountered by some enforcement authorities, Norway is proposing to PPR7 –meeting to introduce measures to confirm the lifetime performance of sewage treatment plants (MARPOL Annex IV amendments).

Furthermore, based on the assessment made by Finnish Meteorological Institute (HELCOM MARITIME 19, Document 13-4) , grey water discharges from Baltic Sea shipping has been estimated to be 5.4 million cubic meters. Passenger ships are responsible for almost 89% of grey water discharges.

Cost, cost-effectiveness of measure:

All the Baltic Sea ports apply the no-special-fee system based on HELCOM Recommendation 28E/10. Furthermore, the EU Baltic Sea states also apply PRF Directive (2000/59, 2019/883).
Both instruments have a similar incentive based waste fee for garbage. The cost of garbage (food waste) delivery is included in the waste fee that is charged from ships irrespective of the delivery.

According to the various information sources (HELCOM, EMSA, GISIS), the port reception facilities for garbage are already available in all Baltic Sea ports. Therefore, no major costs are expected for the port sector. However, the level of the no-special-fee may rise slightly due to larger share of the food waste delivered to PRF. From the circular economy point, it is anticipated that ports will be able to utilize in future the waste material for the reuse and recycling in the downstream waste management.

In the shipping sector, no major technical changes are needed. In those ships that do not yet deliver food waste to PRF, the changes relate to on board waste management practices. Also education and environmental awareness training is needed for the crew – can be estimated as causing reasonable cost.

In case the vessel is mixing grinded food with grey water, new on board procedures are needed – can be estimated as causing reasonable cost.

Feasibility:

The measures described in Action 1 (HELCOM Recommendation) and Action 2 (Roadmap - investigate current practices and consider possible action to prepare a joint submission to IMO) are considered feasible to implement as described above.

Follow-up of measure:

Background material:

References

HELCOM Maritime 19, document 3-6, Proposal for amendments to the BSAP, submitted by Finland.
HELCOM MARITIME 19, INF document 13-10 , Preliminary results from the study on Zero-discharges from shipping

HELCOM MARITIME 19, INF document 2-5, Update of the HELCOM Baltic Sea Action Plan (2018); 3-1 Concretization of existing HELCOM actions (2019)

HELCOM Maritime 19, Document 13-4, Discharges to the sea from Baltic Sea shipping in 2006 – 2018, submitted by Finland.

Hänninen, S. and Sassi, J. 2009. Estimated nutrient load from waste waters originating from ships in the Baltic Sea area – updated 2009. VTT Research Report VTT-R-07396-08, see http://www.vtt.fi/inf/julkaisut/muut/2009/VTT_R_07396_08.pdf

Title:

5. Proposal to develop a roadmap for managing grey water discharges from ships to reduce nutrient input into the Baltic Sea

Submitted by:

Finland

Description of measure

The Baltic Sea was the first sea area in the world to receive the status as a special area under theMARPOL Annex IV (sewage) in 2016. Set to come into effect 1 June 2019 for new passenger ships, 1 June 2021 for existing passenger ships, and in June 2023 for passenger ships entering the Baltic Sea in direct passage to the Russian ports in the eastern Gulf of Finland, will have to discharge sewage into port reception facilities or alternatively at sea only after treatment with very advanced on-board sewage treatment plants able to reduce nutrient input into the sea.

Annex IV of the MARPOL Convention sets ambitious standards for sewage discharges, but discharges of grey water into the sea is not regulated at all. The next regulatory challenge for vulnerable sea areas, like the Baltic Sea, will most likely be the treatment of grey water to the same standard as black water, and HELCOM should address this challenge.

The following action is proposed:

- To formulate a roadmap to manage grey water discharges from ships to reduce nutrient input into the Baltic Sea.

Activity:

Transport – shipping (incl. anchoring, mooring)

Pressure:

Input of organic matter — diffuse sources and point sources

State:

Nutrients

Extent of impact:

According to the recent information given in HELCOM Maritime 19 document 13-4, grey water discharges from Baltic Sea shipping was estimated to be 5.4 million cubic meters. Passenger ships are responsible for almost 89% of grey water discharges. Since food waste is very often mixed with grey water from ships' galleys, and discharged into the sea, it is anticipated that grey water also has a high nutrient content.

Effectiveness of measure

According to the 2012 Guidelines on implementation of effluent standards and performance tests for sewage treatments plants (resolution MEPC.227(64)), the geometric mean of the total nitrogen and phosphorus content of the samples of effluent (discharged into the sea) taken during the test period should not exceed:

.1 total nitrogen1: 20 Qi/Qe mg/l or at least 70 per cent reduction;
.2 total phosphorus: 1.0 Qi/Qe mg/l or at least 80 per cent reduction.

These requirements indicate, that if the regulations currently only imposed on sewage discharges from passenger ships, would be implemented also for grey water discharges from ships, at least 70% reduction of nitrogen input and at least 80% reduction of phosphorous input would be achieved, if a ship would use a sewage treatment plant on board and discharges treated grey water into the sea.

If the ship does not use its sewage treatment plant or does not have such a plant on board, all grey water shall be discharged into port reception facilities. In this case all nutrient input from grey water into the sea from the ship would be eliminated.

Cost, cost-effectiveness of measure:

A ship can either use a sewage treatment plant, which fulfils the requirements given in resolution MEPC.227(64) for the Baltic Sea area, or discharge all grey water into port reception facilities.

Installation of a sewage treatment plant, which fulfils the requirements given in resolution MEPC.227(64) for the Baltic Sea area, causes some additional cost compared to a sewage treatment plant, which does not reduce nutrient input from sewage into the sea.

According to the information received from the Baltic Sea States, port reception facilities for sewage from passenger ships are already available in passenger ports. These port reception facilities can also be used for grey water discharges from cargo ships. Additionally, tank trucks can be used as port reception facilities in all ports in the Baltic Sea area and for discharges of grey water from cargo ships. Consequently, new managing measures (even regulations) would have a minimum additional cost for shipping in the Baltic Sea area.

Feasibility:

It would be feasible to have the same discharge requirements for sewage and grey water for all ships sailing in the Baltic Sea area. Therefore, there are clear reasons to impose measures to manage discharges of grey water from ships.

Follow-up of measure:

To be agreed later.

Background material:

MEPC 60/6/2, Proposal to amend MARPOL Annex IV to include the possibility to establish Special Areas for the prevention of pollution by sewage and to designate the Baltic Sea as a Special Area under Annex IV, submitted by Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, the Russian Federation and Sweden

MEPC 60/INF.4, Information on the proposal to designate the Baltic Sea as a Special Area under MARPOL Annex IV, submitted by Denmark, Estonia, Finland, Germany, Lithuania, Latvia, Poland, the Russian Federation and Sweden

References

HELCOM Maritime 19 document 3-6, Proposal for amendments to the BSAP, submitted by Finland.

HELCOM Maritime 19 document 13-4, Discharges to the sea from Baltic Sea shipping in 2006 – 2018, submitted by Finland.

Hänninen, S. and Sassi, J. 2009. Estimated nutrient load from waste waters originating from ships in the Baltic Sea area – updated 2009. VTT Research Report VTT-R-07396-08, see http://www.vtt.fi/inf/julkaisut/muut/2009/VTT_R_07396_08.pdf

Title:

6. Enhance mitigation measures to decrease GHG emissions from shipping- Alternative fuels and sources of energy

Submitted by:

FINLAND

Description of measure

In order to reach the targets set in the initial IMO strategy (2018) on reduction of GHG emissions from ships up to 2023, it is crucial to enhance the use of alternative fuels and sources of energy such as LNG, biofuels, wind energy, hydrogen, battery technology and fuel cells. Likewise, it is crucial to utilize the full potential of new technology, digitalization and data economy to scale the results globally.

Mitigation measures such as reduction of greenhouse gas emissions from international shipping should be a priority also for the HELCOM MARITIME working group and its sub-group GREEN TEAM. Therefore, the following actions are proposed:

• **Action 1**: to contribute in enhancing the use of alternative fuels and sources of energy in shipping as well as enhance the use of digitalization and other innovations in technology to optimize energy efficiency in the Baltic Sea area

• **Action 2**: to actively follow and contribute to discussions at IMO and ensure the Baltic Sea area meets targets of the IMO´s initial GHG strategy and its future update

- 2.1 Initiate discussions in the HELCOM GREEN TEAM to take the goals of the IMO`s initial GHG Strategy and its future update into account in all its activities
- 2.2 Ensure that ice navigation and its special requirements are taken duly into account in IMO discussions on GHG emission reduction

Activity:

Transport – shipping (incl. anchoring, mooring)
Transport – shipping infrastructure (harbours, ports, ship-building)

Pressure:

Input of other substances (e.g. synthetic substances, non-synthetic substances, radionuclides) — diffuse sources, point sources, atmospheric deposition, acute events

State:

Other – amounts of greenhouse gas emissions

Extent of impact:

It is of common knowledge that airborne emissions have no borders. Therefore, it is the responsibility of both global and regional actors to take swift and effective action to mitigate and decrease greenhouse gas emissions on all sectors – including shipping. Impact of the proposed measure and actions therefore extends to all ships operating in the Baltic Sea area and all ports of the Baltic Sea states.
Regional action should follow closely the development at global level and act accordingly. Work of HELCOM MARITIME and its subgroup GREEN TEAM on a Baltic wide scale on this action, will contribute to the global level of emissions and should act as a forerunner in climate change mitigation. The effective HELCOM regional convention and close co-operation between the contracting parties provides a promising platform for this work. On the regional branch of activity, this measure should affect the actions of all actors. This means that on the other hand it involves work of shipping companies, the shipping industry, ports and forwarding agencies, and on the other, work of administrations in different national and international forums.
Regarding numeric values, the Finnish Meteorological Institute has estimated that total emissions of CO_2 from IMO-registered vessels in the Baltic Sea region was about 15.7 million tonnes in 2018. Even though energy efficiency in the Baltic fleet has improved, due to the increase of transport work, total emissions have decreased in a decade (2008-2018) by only 6.2 %. This shows that development in the Baltic region is on the right track, but that further and more robust action is needed to meet global levels set in the IMO.

Effectiveness of measure

Effectiveness is achieved by close regional co-operation to maintain a level playing field and ensure an infrastructure and operational environment that encourages the transition to low-carbon or zero-carbon propulsion. HELCOM should bear in mind discussions and development on other levels, mainly at IMO and in EU. The purpose of this action is not to build double standards, but on the contrary, support and supplement the development on these levels. Work at HELCOM should ensure the Baltic area meets the target set out in the initial IMO GHG Strategy in due time.
Concrete actions to promote the use of alternative ways of propulsion should be made economically feasible. HELCOM member states should promote the research and development as well as use of alternative fuels and other propulsion methods, which are carbon-free or low-carbon, or which act as a pathway to the ultimate goal of carbon-free shipping. These include the synthetic options for traditional fossil fuels (biofuels, biogas, etc.) but also more conventional propulsion such as wind power, hydrogen and electricity. HELCOM member states should discuss and decide on a pathway forward to establish a carbon free Baltic Sea shipping by 2050 in line with the target of IMO.
As most of the Baltic Sea shipping is short-sea shipping, effectiveness can be achieved by means of synchronizing port facilities, i.e. bunkering to support use of alternative fuels or other sources of energy. This can include *inter alia* building a Baltic wide LNG bunkering network, providing onshore power at Baltic ports, promoting the establishing of environment based fairway dues, enhancing the role of digitalisation etc.
Furthermore, importance of digitalization on GHG emissions reduction should be considered as data- and service-based optimization of the whole supply chain and possibly drastic changes in the current roles and ownership models of the industry. This could have a significant effect on energy efficiency and through that on reduction of airborne emissions from shipping.
Digitalization is a way to reduce GHG emissions especially in port operations. Maritime ports act as digital links in the value chains of maritime logistics, especially regarding more accurate information on ship arrival times. HELCOM member states should promote voluntary projects developing data sharing along the supply chain on a platform-based structure, combined with machine learning algorithms and predicting analytics including i.e. the use of artificial intelligence, utilization of data, optimizing the utilisation of port facilities and other ways that create emission decrease. One concrete example is the further development of Just-In-Time arrivals. HELCOM member states should also ensure that Baltic ports have sufficient means to meet the needs of alternative propulsion systems as appropriate.

Cost, cost-effectiveness of measure:

Action to reduce GHG emissions will be costly. However, it is widely accepted among contracting parties that the cost of non-action will be significantly higher. By maximizing synergy within the Baltic states, these costs can be reduced. Systemic integration within the Baltic states can lower both operational and infrastructure costs.

Feasibility:

IMO will set out a legal framework paving the way to complete this action.
An innovation incentive is key for the industry to work towards completing this action and introduce new technical solutions and innovations.
Climate change and CO_2 emissions are discussed on various levels. Economical feasibility depends on future political decisions, including the possible addition of shipping into the EU ETS.

Follow-up of measure:

Meeting the global levels of ambition and emissions reductions.

Background material:

Emissions from Baltic Sea shipping in 2006-2018

Authors: Jukka-Pekka Jalkanen, Lasse Johansson Address: Atmospheric Composition Research, Finnish Meteorological Institute, Erik Palmen's Square 1, FI-00560 Helsinki, Finland

Key Messages

1. **Total emissions from IMO-registered vessels in the Baltic Sea in 2018 were 301 thousand tonnes of NOx, 9 thousand tonnes of SOx, 9 thousand tonnes of PM, 21 thousand tonnes of CO, 3 thousand tonnes NMVOC and 14 million tonnes of CO2.** The CO2 amount corresponds to 4.7 million tonnes of fuel, of which 26% was associated to auxiliary engines. These emissions contain only the IMO-registered traffic and do not include any contribution from inland waterway traffic or non-IMO registered vessels. **With all vessels sailing the Baltic Sea (excluding the inland waterway traffic), emission totals are NOx: 330 thousand tonnes, SOx: 10 thousand tonnes, PM: 10 thousand tonnes, CO: 24 thousand tonnes, NMVOC: 3 thousand tonnes and CO2: 15.7 million tonnes.**

2. **The most significant contribution to emissions can be associated with RoPax vessels, cargo ships, tankers and container ships.** In terms of fuel consumption, the respective shares for these vessel types in the presented order are 1235 (+4.3% increase from previous year), 967 (-1.6%), 968 (+9.6%) and 769 (-3.6%) thousand tonnes of fuel consumed.

3. **The emissions of SOx have decreased, (-0.2%) but all other emissions have increased; CO (+3.4%) but emissions of NOx (+0.2%), PM (+0.1%) NMVOC (+1.6%) and CO2 (+0.6%) have slightly increased, when compared to year 2017.** The emissions of CO2 from non-IMO registered vessels were 9.1% of total CO2 emitted from ships. During the 2018 study period, the number of IMO-registered vessels has increased by +3%.

4. **Overall transport work has increased by +2.4% while the total travelling distance of IMO-registered vessels have increased by +6.2%**. The transport work of RoPax, dry cargo, vehicle carrier and containership segments increased by +14%, +12%, +7% and +2.1% whereas the transport work of tankers decreased by -0.4%.

5. Analysis of one decade of CO2 emissions from Baltic Sea ships reveals a downward trend and indicates a **20% increase in energy efficiency of the Baltic Sea fleet during 2008-2018**. In absolute terms, the CO2 emissions from ships have decreased by -6.2% and transport work has increased by +12.5% when compared to year 2008 totals. Estimated fleet operational index was 18.7 g ton-1 km-1 in 2008 and 15.6 g ton-1 km-1 in 2018.

The emission estimates for the year 2018 are based on over 638 million AIS-messages sent by 26 680 different ships, of which 7 914 had an IMO registry number indicating commercial marine traffic. The AIS position reports were received by terrestrial base stations in the Baltic Sea countries and collected to regional HELCOM AIS data server. Emissions are generated using the Ship Traffic Emission Assessment Model (STEAM; (Jalkanen et al., 2009b, 2012b; Johansson et al., 2013, 2017).

International Maritime Organisation, *3rd IMO GHG Study 2014*,

Resolution MEPC.304(72) (adopted on 13 April 2018) *Initial IMO Strategy on Reduction of GHG Emissions from Ships*

References

HELCOM Maritime 19 document 3-6, *Proposal for amendments to the BSAP*, submitted by Finland.
HELCOM Maritime 19 document 5-2 *Emissions from Baltic Sea shipping in 2006 – 2018*, submitted by Finland.
Rantanen A., Berg N., Kanto E., 2019 *Traficom Research Reports 28/2019* Digitalization as a tool to reduce GHG emissions in maritime transport https://www.traficom.fi/sites/default/files/media/publication/Traficom_maritime_digitalization_CO2_20190927_ABSTRACTS.pdf

Title:

7. More Research on underwater noise

Submitted by:

Finland

Description of measure

Anthropogenic underwater noise as an environmental issue has been gathering increasing attention in recent years. Scientific evidence suggests multiple detrimental impacts to marine fauna from both impulsive (e.g. pile driving, explosions) and continuous (e.g. shipping) sources. Global research, however, has been focusing more on oceanic environments and accordingly, all the results might not be directly compatible to the Baltic Sea.

Proposed Action: More research is needed to increase the understanding of underwater noise in the Baltic Sea. One of the ways to promote the need for further research is to raise the awareness of policy makers, stakeholders and the general public of this relatively new and still poorly known pressure to the marine environment. Underwater noise is a very timely issue both at regional level in the Baltic Sea area, and global level at IMO.

Activity:

Transport – shipping (incl. anchoring, mooring)

Pressure:

Input of anthropogenic sound (impulsive, continuous)

State:

Noise

Extent of impact:

Anthropogenic underwater noise has been formally recognized as a pollutant to the marine environment (IISD 2018), originating from human activities such as shipping or underwater construction. Although the issue has been recognized, there is currently no binding international regulation in force. The International Maritime Organization (IMO) released a non-mandatory guideline in 2014 for reducing noise from ships (MEPC.1/Circ.833). Canada has been active in the recent IMO´s MEPC-meetings in advancing the international effort to reduce the impacts of underwater noise from shipping. The issue of underwater noise will be included in the agenda of the future sessions of the Marine Environment Protection Committee (MEPC) where possible international actions or regulations will be discussed.

The underwater noise has been proven to have detrimental effects on multiple marine species. The global research, however, has been focusing more on oceanic environments and marine mammals (Williams et al. 2015). Due to differences in the oceanographic features and species composition, the results of the research may not be directly applicable to the Baltic Sea.

The Baltic Sea, with high shipping activity and dense coastal human population, has multiple sources of anthropogenic underwater noise. Shipping activity has clear contribution to background noise levels in many areas at the Baltic Sea (Mustonen et al. 2019). There are many species likely to be impacted by noise (HELCOM 2019). More research is needed in order to understand the extent of the impacts and the effectiveness of possible mitigation measures. The increasing amount of research can also be utilized when defining the future actions at the upcoming MEPC meetings.

Effectiveness of measure

The increased amount of research enhances the understanding of the impacts of anthropogenic underwater noise, which enables both the mitigation of these impacts and assessment of the mitigation measures. Contribution of the Baltic Sea states to the discussions at the IMO ensures the unique characteristics of the Baltic Sea to be noted in the future discussions.

Cost, cost-effectiveness of measure:

N/A

Feasibility:

N/A

Follow-up of measure:

None

Background material:

MEPC.1/Circ.833, Guidelines for the reduction of underwater noise from commercial shipping to address adverse impacts on marine life

MEPC 73/INF.23, Scientific support for underwater noise effects on marine species and the importance of mitigation, submitted by Canada

MEPC 74/17/2, Advancing international collaboration for quiet ship design and technologies to protect the marine environment, submitted by Canada and France.

References

HELCOM (2019). Noise sensitivity of animals in the Baltic Sea. *Baltic Sea Environment Proceedings* N° 167

International Institute for Sustainable Development (2018). Nineteenth Meeting of the United Nations Open-Ended Informal Consultative Process on Oceans and the Law of the Sea: 18-22 June 2018. *Earth Negotiations Bulletin* 25: 158. http://enb.iisd.org/download/pdf/enb25158e.pdf

Mustonen, M., A. Klauson, M. Andersson, D. Clorennec, T. Folegot, R. Koza, J. Pajala, L. Persson, J. Tegowski, J. Tougaard, et al. (2019). Spatial and Temporal Variability of Ambient Underwater Sound in the Baltic Sea. *Scientific Reports* 9, 13237.

Williams, R., A. J. Wright, E. Ashe, L. K. Blight, R. Bruintjes, R. Canessa, C. W. Clark, S. Cullis-Suzuki, D. T. Dakin, C. Erbe, et al. (2015). Impacts of anthropogenic noise on marine life: Publication patterns, new discoveries, and future directions in research and management. *Ocean & Coastal Management* 115: 17–24.

Title:

8. Work for the harmonized implementation of the IMO Biofouling Guidelines and Guidance documents, and further work toward the International Biofouling Convention by contributing to the work carried out in the International Maritime Organization (IMO)

Submitted by:

Finland

Description of measure

The IMO has issued the Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species (Biofouling Guidelines) (resolution MEPC.207(62)). The intention of the guidelines is to give measures and best practices on how to prevent the spread of aquatic organisms on ships' hulls. In addition, the biofouling control measures will reduce the drag on ship's hull and consequently improve the ship's energy efficiency and reduce the fuel oil consumption and consequently GHG emissions.

The IMO biofouling guidelines will be revised in the IMO's Pollution Prevention and Response (PPR) sub-committee's 7th and 8th sessions in 2020 and 2021. It is also expected that an international convention for biofouling will be developed in the future. Consequently, the work needs to be started also at regional level. Especially in short sea shipping and recreational boating, biofouling may be an even greater vector for spreading aquatic organisms than ballast water.

The proposed action is related to the expectation that after the revision of the IMO Biofouling Guidelines, work toward an international convention will be started. Finland is of the view, that it is important that the Baltic Sea´s regional aspects (i.e. ice conditions in winter time, low-salinity water, short and frequent voyages, etc.) will be taken into account already at the beginning of the work.

Proposed action: Work for the harmonized implementation of the IMO Biofouling Guidelines and Guidance documents, and further work toward the International Biofouling Convention by contributing to the work carried out in the International Maritime Organization (IMO)

Activity:

Transport – shipping (incl. anchoring, mooring)

Pressure:

Input or spread of non-indigenous species

State:

Non-indigenous species

Species, which has ship hull fouling as a vector for spreading.

Extent of impact:

According to the HELCOM AIS data, in 2018 there were 26 680 different ships, of which 7 914 had an IMO registry number indicating commercial marine traffic, sailing in the Baltic Sea. The Finnish Meteorological Institute (FMI) has estimated wetted surface area of all AIS equipped vessels to be about 44 million square meters (2017: 41.5 million square meters; +6%). This estimate, however, does not include any contribution from small boats, the number of which exceeds 250 000 around the Baltic Sea coastline. Considering the length of boating season, which mainly concerns May-September period of each year, the contribution of small boats to wetted surface area may be as large as in the case of large ships. However, the activity patterns of small boats are very different from large ships. Large ships travel along the shipping lanes, whereas small boat traffic occurs close to the shore, extending tens of kilometres to the open sea, but no further.

Ships' in-water hull cleaning is usually conducted during the ships' port stay. Therefore, risk of the release of fouled organisms is significant at the ports or locations where cleaning is conducted. Merchant ships are usually docked in 5 years intervals where the ship coating is removed and renewed. Consequently, there is risk for spreading of fouling organisms at the shipyards. Pleasure boats' hulls are often cleaned with mobile or fixed cleaning stations, which are located in marinas. This means that impact from pleasure boats for marine environment is considerable there.

Effectiveness of measure

Proposed task is to work for the harmonized implementation of the IMO Biofouling Guidelines and Guidance documents in the Baltic Sea area, and work further towards the International Biofouling Convention by contributing to the work carried out in the IMO.

Harmonized implementation of the IMO biofouling guidelines (MEPC.207(62) - 2011 *Guidelines for the Control and Management of Ships' Biofouling to Minimize the Transfer of Invasive Aquatic Species*) and Guidance documents (MEPC.1/Circ.792 - *Guidance for Minimizing the Transfer of Invasive Aquatic Species as Biofouling (Hull Fouling) for Recreational Craft*) would reduce the risk of spreading the hull fouling organisms in the Baltic Sea and world wide shipping. One measure to promote harmonized implementation is e.g. developing of the HELCOM road map for biofouling in accordance with the concept agreed in the HELCOM MARITIME 2019.

It is also important to start work toward the International Biofouling Convention by contributing to the work carried out in the IMO. The International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 (BWMC) has been in force since 8 September 2017 and it aims for the preventing of the harmful aquatic organisms and pathogens which are spreading over the ballast water and sediment in ships' ballast water tanks. According to the 2011 Biofouling Guidelines (MEPC.207(62)) studies have shown that in addition to ship ballast water, biofouling can be a significant vector for the transfer of invasive aquatic species. Biofouling on ships entering the waters of the States may result in the establishment of invasive aquatic species, which in turn, may pose threats to human, animal and plant life, economic and cultural activities and the aquatic environment. Therefore, equal level of mandatory measures should be established for preventing the spread of harmful aquatic organisms, which are spreading via hull fouling.

Cost, cost-effectiveness of measure:

Costs for shipping, to prevent accumulation and removing of biofouling, are comprised today mainly of antifouling paints and in-water cleaning. In future, these cost may somewhat increase due to possible stricter biofouling control and water treatment requirements in hull cleaning. Then again, regular hull cleaning will reduce the drag and improve ship's energy efficiency and reduce GHG emissions. Therefore, total costs for shipping due to biofouling measures may most propably reduce due to savings in fuel used. Several ship-owner companies are already today voluntarily cleaning their ships hulls.

Feasibility:

Comprehensive feasibility study should be conducted. This could be done at the IMO level.
COMPLETE project (Completing management options in the Baltic Sea Region to reduce risk of invasive species introduction by shipping, 2017-2020), funded by the EU Interreg Baltic Sea Region Programme, will also provide information for implementation of IMO biofouling guidelines.

Follow-up of measure:

None

Background material:

MEPC.207(62) - 2011 *Guidelines for the Control and Management of Ships' Biofouling to Minimize the Transfer of Invasive Aquatic Species*

MEPC.1/Circ.792 - *Guidance for Minimizing the Transfer of Invasive Aquatic Species as Biofouling (Hull Fouling) for Recreational Craft*

MEPC.1/Circ.811 - *Guidance for Evaluating the 2011 Guidelines for the Control and Management of Ships' Biofouling to Minimize the Transfer of Invasive Aquatic Species*

Biofouling documents submitted by Australia et al. to the IMO MEPC Committee's 75th meeting.

HELCOM MARITIME 19, 4-3.INF Outcome of a biofouling workshop

HELCOM MARITIME 19, 4-2 Concept for a Regional Baltic Biofouling Management Roadmap

References

HELCOM Maritime document 13-4, Discharges to the sea from Baltic Sea shipping in 2006 – 2018.

MEPC.207(62) - 2011 *Guidelines for the Control and Management of Ships' Biofouling to Minimize the Transfer of Invasive Aquatic Species*

Outcome of the 19th Meeting of the Maritime Working Group (Maritime 19-2019), p. 7-9 and Annex V

HELCOM MARITIME 19, 4-2 Concept for a Regional Baltic Biofouling Management Roadmap

Title

9. Reducing the impact of **continuous underwater sound** on marine biodiversity [shipping]

Submitted by:

Coalition Clean Baltic (Observer)

Description of measure

The negative impact of underwater noise on several cetacean, fish and invertebrate species has been shown and documented, thus the reduction of underwater noise is an urgent issue that needs to be addressed with consequent measures. While assessment and monitoring are being put in place through the Regional Action Plan Underwater Noise, measures that take immediate effect are needed.
It is suggested to reduce ship speed for all commercial vessels as an ad-hoc measure in areas with noise sensitive species including MPAs designated for harbour porpoises or other known feeding or breeding areas of sensitive species. The resulting noise reduction is specific for ship propulsion systems and thus dependent on the ship type. Further measures could complement this measure to optimise ship operation with respect to noise emissions. Simultaneously, an analysis of further potential to reduce noise from shipping in the Baltic (e.g. identification of noise hot spots and further areas where noise has to be reduced, development of a noise threshold for continuous noise in the Baltic) needs to be conducted.

Activity:

Transport – shipping (incl. anchoring, mooring)
Transport – shipping infrastructure (harbours, ports, ship-building)

Pressure:

Input of anthropogenic sound (impulsive, continuous)
Disturbance of species: Visual, presence, boating, recreational activities, above-water noise

State:

The measure would immediately reduce the impact of underwater noise from shipping on Baltic marine species.
Noise
Mammals
Fish

Extent of impact:

While impacts have been reported for a range of noise sources, the largest contributor of anthropogenic noise to the marine environment is considered to be commercial shipping (IMO MEPC 73/INF.23). The greatest impacts from underwater noise will occur where there is most overlap between shipping and marine species that are particularly sensitive to underwater noise, but shipping has generally raised ambient noise levels across the Baltic.

Effectiveness of measure

The impacts of underwater noise from shipping have become increasingly recognized. The IMO agreed to guidelines for the reduction of underwater noise from commercial shipping to address adverse impacts on marine life in 2014 (IMO, 2014). A recent report commissioned by Seas at Risk and Transport and Environment ("The multi-issue mitigation potential of reducing ship speeds", see reference below) shows that by reducing ship speed, not only the underwater noise, but also greenhouse gas emissions, air pollution and fatal whale strikes can be significantly reduced.
The modelled data is supported by measured data currently emerging from the ECHO (Enhancing Cetacean Habitat and Observation) Program, led by the Port of Vancouver. ECHO is a voluntary commercial vessel slowdown and underwater sound measurement trial in shipping lanes overlapping critical habitat of the southern resident killer whale. The first slowdown trial in 2017 resulted in measured reductions in broadband noise exposure from all commercial vessel types, as well as noise reductions across most frequency bands. Comparison of measured data from the ECHO Program with modelled data demonstrate that the well-established model of Ross (1976) which has been used for decades to estimate the relationship between sound energy and vessel speed aligns well with the results of the ECHO Program. This model indicates that a 10% reduction in speed would reduce underwater sound energy from shipping by around 40%; whilst a 20% reduction in ship speed would reduce underwater sound energy by around 67%.
Thus, speed reduction can be an ad-hoc measure to reduce underwater noise from shipping in specific areas where sound sensitive species are being disturbed. The resulting noise reduction is specific for ship propulsion systems and thus dependent on the ship type. Further measures could complement this measure to optimise ship operation with respect to noise emissions.

Cost, cost-effectiveness of measure:

Ship speed reductions usually also have a positive effect on fuel consumption which would save operational costs. On the other hand, in some cases the increase of shipping time may be involved in some costs. The global container ship fleet uses slow steaming to save costs. Thus it can be assumed that in general this measure is cost-effective.
Reduced harbour fees could be an incentive for speed reductions. These costs for port operators could be compensated for by increasing port fees for louder ships.

Feasibility:

The ECHO shows that the measure is feasible. Even though some of the species that are harmed or disturbed by underwater ship noise are different in the Baltic Sea Region compared to the Southwest of Canada, the same mitigation measure could be used to reduce the pressure of underwater ship noise on marine ecosystems.

More information about the project can be found here:
https://www.flipsnack.com/portvancouver/echo-haro-strait-slowdown-trial-summary/full-view.html

Follow-up of measure:

In addition to the alongside monitoring of the measure, it is essential to develop and implement a comprehensive underwater station network for real-time monitoring following on from the BIAS project. Such a network would greatly improve awareness in stakeholders about the noise input into the marine environment, allow for better determination of sources and consequently better set-up of efficient measures.

Background material:

In the 2013 Ministerial Declaration it was agreed that “the level of ambient and distribution of impulsive sounds in the Baltic Sea should not have negative impact on marine life and that human activities that are assessed to result in negative impacts on marine life should be carried out only if relevant mitigation measures are in place”. In the Baltic Sea Environment Proceedings N° 167 the strong impact of noise on the Baltic is made clear, thus immediate action is needed and - as stated above - is possible.

HELCOM Regional Action Plan on Underwater Noise.

References

BSEP 167: Noise sensitivity of animals in the Baltic Sea:
http://www.helcom.fi/Lists/Publications/BSEP167.pdf

ECHO project:
https://www.flipsnack.com/portvancouver/echo-haro-strait-slowdown-trial-summary/full-view.html

Leaper, R., Renilson, M. R., and Ryan, C. (2014). Reducing underwater noise from large commercial ships: current status and future directions. J. Ocean Technol. 9, 50–69.

Leaper R (2019) The Role of Slower Vessel Speeds in Reducing Greenhouse Gas Emissions, Underwater Noise and Collision Risk to Whales. Front. Mar. Sci. 6:505. doi: 10.3389/fmars.2019.00505

IMO (2014). “IMO MEPC.1/Circ.833 Guidelines for the reduction of underwater noise from commercial shipping to address adverse impacts on marine life,” in Proceedings of the 21st ASCOBANS Advisory Committee Meeting, (Gothenburg).

GL Reynolds; Environmental Sustainability Consultants (2019). “The multi-issue mitigation potenzial of reducing ship speed”, https://seas-at-risk.org/24-publications/988-multi-issue-speed-report.html, Report for Seas at Risk & Transport and Environment

Weilgart, L. 2018. The impact of ocean noise pollution on fish and invertebrates. Report for OceanCare, Switzerland. 34 pp.: https://www.oceancare.org/wp-content/uploads/2017/10/OceanNoise_FishInvertebrates_May2018.pdf

Title

10. Reducing the impact of **continuous underwater sound** from recreational boating on marine biodiversity

Submitted by:

Coalition Clean Baltic (Observer)

Description of measure

The negative impact of underwater noise on several cetacean, fish and invertebrate species has been shown and documented, thus the reduction of underwater noise is an urgent issue that needs to be addressed with consequent measures. While assessment and monitoring are being put in place through the Regional Action Plan Underwater Noise, measures that take immediate effect are needed.
In some areas of the Baltic the high density of recreational boats results in regionally and seasonally high noise pressure on the marine ecosystem. The noise sources are the engine and propeller, but also results from sonar/echo sounder systems that the boats use to locate fish and to monitor depth.
For the reduction of noise from engine and propeller, it is suggested to reduce ship speed for all recreational vessels as an ad-hoc measure in pilot areas with noise sensitive species including MPAs designated for harbour porpoises or other known feeding or breeding areas of sensitive species. The resulting noise reduction is specific for ship propulsion systems and thus dependent on the ship type.
Sonar/echo sounders should be designed to be switched on only when needed (no constant monitoring) and must use frequencies above 150 kHz. Simultaneously, an analysis of further potential to reduce noise from recreational boating in the Baltic (e.g. identification of noise hot spots and further areas where noise has to be reduced, development of a noise threshold for recreational boating in the Baltic) needs to be conducted.

Activity:

Tourism and leisure activities (boating, beach use, water sports, etc.)

Pressure:

Input of anthropogenic sound (impulsive, continuous)
Disturbance of species: Other (e.g. barriers, collission)
Disturbance of species: Visual, presence, boating, recreational activities, above-water noise

State:

The measure would immediately reduce the impact of underwater noise from shipping on Baltic marine species.
Noise
Mammals
Fish
Birds

Extent of impact:

While impacts have been reported for a range of noise sources, the largest contributor of anthropogenic noise to the marine environment is considered to be shipping. In some areas of the Baltic the high density of recreational boats results in regionally and seasonally high noise pressure on the marine ecosystem. The greatest impacts from underwater noise will occur where there is most overlap between shipping and marine species that are particularly sensitive to underwater noise, but shipping has generally raised ambient noise levels across the Baltic. Unfortunately, the BIAS project did not include recreational boats in its modelling exercise. Threshold values for noise from recreational shipping still need to be developed.

Effectiveness of measure

The impacts of underwater noise from shipping have become increasingly recognized. However, the focus lies mostly on commercial shipping. In some areas of the Baltic the high density of recreational boats results in regionally and seasonally high pressure on the marine ecosystem. Some of the guidelines and projects currently focussing on commercial shipping could be transferred to recreational shipping.
A recent report commissioned by Seas at Risk and Transport and Environment ("The multi-issue mitigation potential of reducing ship speeds", see reference below) shows that by reducing ship speed, not only the underwater noise, but also greenhouse gas emissions and air pollution can be significantly reduced.
The modelled data is supported by measured data currently emerging from the ECHO (Enhancing Cetacean Habitat and Observation) Program, led by the Port of Vancouver. ECHO is a voluntary commercial vessel slowdown and underwater sound measurement trial in shipping lanes overlapping critical habitat of the southern resident killer whale. The first slowdown trial in 2017 resulted in measured reductions in broadband noise exposure from all commercial vessel types, as well as noise reductions across most frequency bands. Comparison of measured data from the ECHO Program with modelled data demonstrate that the well-established model of Ross (1976) which has been used for decades to estimate the relationship between sound energy and vessel speed aligns well with the results of the ECHO Program. This model indicates that a 10% reduction in speed would reduce underwater sound energy from shipping by around 40%; whilst a 20% reduction in ship speed would reduce underwater sound energy by around 67%.
Thus, speed reduction can be an ad-hoc measure to reduce underwater noise from shipping in specific areas where sound sensitive species are being disturbed. The resulting noise reduction is specific for ship propulsion systems and thus dependent on the ship type.
All transducers used for sonar/echo sounders should be designed in a way that it can be switched on only when needed (no constant monitoring) and must use frequencies above 150 kHz. Already today, most sonar or combined GPS/sonar equipment has the possibility to switch off lower frequencies and such frequencies should always be the default.

Cost, cost-effectiveness of measure:

Ship speed reductions usually also have a positive effect on fuel consumption which would save operational costs. On the other hand, in some cases the increase of shipping time may be involved in some costs. The global container ship fleet uses slow steaming to save costs. Thus, it can be assumed that in general this measure is cost-effective also for smaller, recreational boats.

Feasibility:

The ECHO shows that the measure is feasible. Even though some of the species that are harmed or disturbed by underwater ship noise are different in the Baltic Sea Region compared to the Southwest of Canada, the same mitigation measure could be used to reduce the pressure of underwater ship noise on marine ecosystems.
More information about the project can be found here:
https://www.flipsnack.com/portvancouver/echo-haro-strait-slowdown-trial-summary/full-view.html

Follow-up of measure:

In addition to the alongside monitoring of the measure, it is essential to develop and implement a comprehensive underwater station network for real-time monitoring following on from the BIAS project. Such a network would greatly improve awareness in stakeholders about the noise input into the marine environment, allow for better determination of sources and consequently better set-up of efficient measures.

Background material:

In the 2013 Ministerial Declaration it was agreed that “the level of ambient and distribution of impulsive sounds in the Baltic Sea should not have negative impact on marine life and that human activities that are assessed to result in negative impacts on marine life should be carried out only if relevant mitigation measures are in place”. In the Baltic Sea Environment Proceedings N° 167 the strong impact of noise on the Baltic is made clear, thus immediate action is needed and - as stated above - is possible.

HELCOM Regional Action Plan on Underwater Noise.

References

BSEP 167: Noise sensitivity of animals in the Baltic Sea:
http://www.helcom.fi/Lists/Publications/BSEP167.pdf

ECHO project:
https://www.flipsnack.com/portvancouver/echo-haro-strait-slowdown-trial-summary/full-view.html

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Haviland-Howell G., Frankel A.S., Powell C.M., Bocconcelli A., Herman RL, Sayigh L. S. (2007). Recreational boating traffic: a chronic source of anthropogenic noise in the Wilmington, North Carolina Intracoastal Waterway. J Acoust Soc Am. 122(1), pp. 151-60.

Leaper, R., Renilson, M. R., and Ryan, C. (2014). Reducing underwater noise from large commercial ships: current status and future directions. J. Ocean Technol. 9, pp. 50–69.

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Weilgart, L. 2018. The impact of ocean noise pollution on fish and invertebrates. Report for OceanCare, Switzerland. 34 pp.: https://www.oceancare.org/wp-content/uploads/2017/10/OceanNoise_FishInvertebrates_May2018.pdf

Title

11. Adoption and implementation of a HELCOM Roadmap on Biofouling Management

Submitted by:

COMPLETE project

Description of measure

There is on-going work on the drafting of a HELCOM Roadmap on Biofouling Management, which is aimed to be the first regional instrument addressing biofouling management from both commercial shipping and leisure boating in the Baltic Sea. The Roadmap is to contain guidance on best practices for biofouling management such as choosing anti-fouling systems and methods, as well as cleaning methods, assessment of biofouling management on ship speed, fuel consumption and emissions and a prototype tool for evaluating the biofouling risk and its cost-effective management. Application of effective and sustainable anti-fouling systems and safe cleaning practices combined with proper waste disposal would directly reduce introductions of non-indigenous species, while simultaneously reducing chemical pollution and air emissions.

The proposed measure is for HELCOM Contracting Parties to implement the Roadmap, following its adoption.

This Roadmap together with the Regional Baltic Sea plan for harmonized ratification and implementation of the 2004 IMO Ballast Water Management Convention (BWMC) will close the loop of shipping and boating as vectors of non-indigenous species introduction in the Baltic Sea.

Activity:

Transport – shipping (incl. anchoring, mooring)
Tourism and leisure infrastructure (piers, marinas)
Tourism and leisure activities (boating, beach use, water sports, etc.)

Pressure:

Input or spread of non-indigenous species

State:

Non-indigenous species

Biofouled vessels have been responsible for a large proportion of marine invasive species globally: >30% of the non-native species in the North Sea, 69% in New Zealand, and 70% in the continental USA. Some of the most widespread invasive species, with dire ecological, economic, and human health impacts are considered to have been transported by fouled commercial and recreational vessels (ICES, 2019).

Preventing the introduction of potentially harmful non-indiginous species in the Baltic Sea through an appropriate biouling management will contribute to safeguarding the structure and dynamics of the ecosystems in the Baltic Sea, and the services these provide for society..

Extent of impact:

The extent of the impact will be the whole Baltic Sea.

Effectiveness of measure

Once a non-indigenous species (NIS) has become established and spread to a wide area, eradication is not a viable management option. Full recovery in the sense of returning back to a previous state is not possible either. Hence, management should primarily aim to prevent further introductions of NIS. Since there is on-going measures addressing the introduction of NIS via ballast water and sediments in the Baltic Sea, there is a need to also address biofouling as the proposed measure to be able to ensure that NIS introduction via shipping is fully addressed.

It is estimated that approximately 1/4 to 1/3 of all NIS in the Baltic Sea could have arrived via biofouling (AquaNIS, 2019). Biofouling is to be considered not only as community of sessile organisms, but as a whole – many potential invaders are simply hidden among attached ones. Thus, an amphipod *Melita nitida* and tanaid S*inelobus vanhaareni* could be examples of NIS potentially introduced on hulls (of commercial ships and recreational boats). They do not have larval stage and have been found in the biofouling material during port and marina surveys.

By addressing the contribution of biofouling to increased frictional resistance on ship hulls and the resulting increase in fuel consumption, there will be a contribution to reductions in global GHG emissions of anything between 5 and 23%.

[*Free text:* ***Indicative length 300 words****. Summary of results of testing/implementing the measure and any quantitative information on its effectiveness. In the case of conservation measures; indicate which species, habitats, functions etc that the measure will contribute to preserving. Include if available estimations on the effect of implementing the measure on a region-wide scale*.]

Cost, cost-effectiveness of measure:

It is difficult to foresee the cost of implementing the measure proposed. However, for reference, the study conducted in New Zealand could be considered. Over 99% of Australia's trade by volume occurs via shipping, and annually close to 27,000 vessels enter Australian territory from 600 overseas ports. The estimated regulatory cost of implementing effective biofouling management practices on vessels arriving into Australian territory was $10,519,000 over 10 years. Vessels would be required to implement effective and vessel-specific biofouling management practices consistent with the direction set by the International Maritime Organization where most vessels would be required to provide some biofouling risk related information prior to arrival in Australian territory (Department of Agriculture and Water Resources, 2019).
As part of the COMPLETE project, it has been estimated that effective biofouling management would bring significant cost savings (ca. 10-20 %) through reduced fuel consumption of vessels and thereby reduction in external costs through decreased air emissions (oral communication).

[*Free text: indicate any known or likely sources of cost and/or effectiveness data of the measure*]

Feasibility:

Biofouling risk management is an on-going practice in different regions around the world. Australia and New Zealand developed the Anti-fouling and in-water cleaning guidelines (2015) based on the biosecurity risk assessment approach. New Zealand and Canada being countries with a tradition of success in the topic, proves the feasibility of the measure proposed. Moreover, as effective biofouling management brings significant cost savings to vessels, implementing the proposed measures is considered economically feasible.

[*Optional: provide views on feasibility of implementing the actions e.g. technical, economic, social*]

Follow-up of measure:

The follow-up of the measure would be connected to the HELCOM NIS indicator, which aims at zero new human-mediated introductions of NIS in the Baltic Sea.

[*Optional: indicate information potential or existing follow-up system for the measure, e.g. indicators, monitoring programme*]

Background material:

[*Free text: Clarify choice of background material for the synopses, e.g. does it represent a comprehensive overview of results with regard to the measure or a sub-selection*]

References

AquaNIS, 2019. Editorial Board. Information system on Aquatic Non-Indigenous and Cryptogenic Species. World Wide Web electronic publication. www.corpi.ku.lt/databases/aquanis. Version 2.36+. Accessed 2019-12-13

Department of Agriculture and Water Resources 2019, *Australian biofouling management requirements for international vessel arrivals—Consultation Regulation Impact Statement*, Canberra, March. CC BY 4.0. ISBN 9781760032036. Available at: https://haveyoursay.agriculture.gov.au/44531/documents/101822

ICES. 2019. ICES VIEWPOINT: Biofouling on vessels – what is the risk, and what might be done about it? In Report of the ICES Advisory Committee, 2019, vp.2019.01. https://doi.org/10.17895/ices.advice.4679

ICCT. 2011. Reducing Greenhouse Gas Emissions from Ships- Cost Effectiveness of Available Options. Available at: https://theicct.org/sites/default/files/publications/ICCT_GHGfromships_jun2011.pdf

New Zealand & Australia Department of the Environment and New Zealand Ministry for Primary Industries (2015), Anti-fouling and in-water cleaning guidelines, Department of Agriculture, Canberra. CC BY 3.0. ISBN 978-1-76003-009-4. Available at: https://www.agriculture.gov.au/sites/default/files/sitecollectiondocuments/animal-plant/pests-diseases/marine-pests/antifouling-consultation/antifouling-guidelines.pdf

[*As many references as needed to support the information summarized in the document*]

Title

12. Develop an adequate network of Port Reception Facilities (PRFs) in Baltic ports to recieve ship hold washing water

Submitted by:

Coalition Clean Baltic

Description of measure

The availability of PRFs in Baltic Ports receiving cargo residues, or hold washing water, is insufficient. This action is to develop a network of PRFs to handle all cargo hold washing residues, recalling also the EU Directive 2019/883 on improving PRFs. CCB suggests that planning begin by 2021 for the installation or upgrading of PRFs in all Baltic ports, and that Baltic ports reach full capacity to receive ship hold washing water by 2025.

Activity:

Transport – shipping (incl. anchoring, mooring) Transport – shipping infrastructure (harbours, ports, ship-building) Waste waters (urban, industrial, and industrial animal farms)

Pressure:

Input of nitrogen Input of phosphorous Input of other substances (e.g. synthetic substances, non-synthetic substances, radionuclides) — diffuse sources, point sources, atmospheric deposition, acute events

State:

Nutrients Hazardous substances The measure contributes to reducing the amount and concentration of nutrients and other formally designated hazardous, or harmful, substances in the Baltic.

Extent of impact:

The impact is Baltic-wide, by capturing a key point source of nutrient and hazardous/harmful substance input.

Effectiveness of measure

The Baltic Sea is listed as a Special Area under MARPOL Annex V, which prohibits the overboard discharge of cargo residues, with one exception. If a PRF is unavailable, then MARPOL permits cargo residues containing substances that are not classified as harmful to the marine environment to be discharged overboard. However with so few PRFs, all cargo residues are possibly discharged into the Baltic.

According to the Global Integrated Shipping Information System, only seven Baltic ports are equipped to handle cargo residues; six in Denmark and one in Latvia. Given that hold washing is normal practice in dry bulk shipping, we can assume that discharge of cargo residues is occurring directly to the Baltic in unknown quantities. Potential risks across the board are great, from heavy metals pollution to eutrophication from nutrient-rich washing water (ex. dry bulk fertilizers).

Halting the discharge of all cargo residues into the Baltic requires investigation, enforcement, and port capacity to receive these residues. It also requires upgrades in shipping methods to prevent the need to wash cargo holds in the first place, namely a move away from dry bulk cargoes. For example, a shift to bagged or containerized fertilizer, already a practice in some ports.

Cost, cost-effectiveness of measure:

Costs will include the installation and operation of PRFs currently lacking in ports, and a mix of additional time and logistics for ships to use the PRFs as different from current discharge-at-sea practices. Costs for ports as well, in the eventual case that cargo washing is included in the no-special-fee system across the Baltic, will need consideration.

Improved monitoring and enforcement aboard ships in ports and at sea is also necessary.

According to the EPRS briefing on the new PRF Directive, the Commission expects costs “to be limited and counterbalanced by the positive environmental impact and reduced administrative burden.”

Feasibility: The technology exists to reach the vision of zero losses in this proposal from hold wash water. Barriers include the willingness of industry to implement the change and cost of installing or upgrading existing PRFs.
Follow-up of measure: A monitoring and enforcement programme will be required to ensure ship operators and ports transition to using PRFs.
Background material: EPRS Briefing on Port Reception Facilities EU PRF Directive 2019/883 Impact Assessment on PRF Directive
References Outcome of MARITIME 18-2018, paragraphs 6.3 – 6.7, Concept BAT document submitted to MARITIME 19-2019 Outcome of MARITIME 19-2019, paragraphs 7.3 – 7.6. Simplified overview of MARPOL Annex V MEPC.295(71) (MARPOL Annex V) MEPC 70/18/Add.1 Annex 2, page 4 (pdf pg 10, Appendix 1 to MARPOL Annex V)

Title:

13. Proposal to regulate sewage discharges from cargo ships to reduce nutrient input into the Baltic Sea

Submitted by:

Finland

Description of measure

The Baltic Sea was the first sea area in the world to receive the status as a special area in MARPOL Annex IV (sewage) in 2016. Set to come into effect 1 June 2019 for new passenger ships, 1 June 2021 for existing passenger ships and in June 2023 for passenger ships entering the Baltic Sea in direct passage to the Russian ports in the eastern Gulf of Finland passenger ships, including cruise ships, will have to discharge sewage into port reception facilities or alternatively at sea only after treatment with very advanced on-board sewage treatment plants able to reduce nutrient input into the sea. However, these regulations for sewage discharges still apply only for passenger ships.

Given the fact that sewage from all ships contains nutrients, such as phosphorus and nitrogen, which aggravate algal blooms and other symptoms of eutrophication, one of the main environmental concerns in the Baltic Sea area, such regulations should be applied also to cargo ships with regard to discharges of sewage.

The following action is proposed:

- Action: To widen the scope of the Baltic Sea Special Area regulations under MARPOL Annex IV to cover also sewage discharges from cargo ships.

Activity:

Transport – shipping (incl. anchoring, mooring)

Pressure:

Input of organic matter — diffuse sources and point sources

State:

Nutrients

Extent of impact:

Compared to other sea areas, the Baltic Sea is unusually prone to eutrophication caused by input of phosphorus and nitrogen compounds. This is mainly due to its shallow water depth, large catchment area with a population of 85 million people and the slow rate of water exchange. The nutrient input stems partly from natural atmospheric and riverine input, but mostly from agriculture, municipal waste waters, fish-farms and atmospheric emissions from traffic and combustion of fossil fuels, *i.e.* nutrients from anthropogenic sources. To estimate the amount of nutrients discharged into the Baltic Sea from ships' sewage, a theoretical study was conducted in 2006 and updated in 2009 (Hänninen & Sassi 2009, see "References" below).

The results show that the annual amount of sewage from ships in the Baltic Sea area could contain in total a maximum 356 tonnes of N and 119 tonnes of P. Nitrogen content of sewage produced on ferries was estimated to be 113 t, on cruise ships 113 t and on cargo ships 131 t. Phosphorous content of sewage produced on ferries was estimated to be 38 t, on cruise ships 38 t and on cargo ships 44 t. Consequently, the ship-borne nutrient load of sewage from cargo ships exceeds that of ferries and cruise ships, respectively.

Although seemingly small compared to the total nutrient load into the Baltic Sea from all sources, this amount is far from negligible and one that can be reduced effectively. The nutrients from sewage are directly available for uptake by algae. Especially the growth of blue-green algae, which is limited by the amount of phosphorus in the water, is stimulated by sewage. One must also take into account that the discharges are concentrated spatially along the shipping routes, causing serious effects locally. Temporally the sewage discharges are concentrated in the summer season when algae normally have used up most of the nitrogen and phosphorus dissolved in the water. Therefore, the nutrients in sewage have far greater negative effects on the environment than the amount mentioned above would suggest.

Effectiveness of measure

According to the 2012 Guidelines on implementation of effluent standards and performance tests for sewage treatments plants (resolution MEPC.227(64)), the geometric mean of the total nitrogen and phosphorus content of the samples of effluent (discharged into the sea) taken during the test period should not exceed:

.1 total nitrogen1: 20 Qi/Qe mg/l or at least 70 per cent reduction;
.2 total phosphorus: 1.0 Qi/Qe mg/l or at least 80 per cent reduction.

These requirements indicate that, if the regulations currently only imposed on passenger ships would be implemented also for cargo ships, at least 70% reduction of nitrogen input and at least 80% reduction of phosphorous input would be achieved, if a cargo ship would use a sewage treatment plant on board and discharges treated sewage into the sea. Since we are lacking the data concerning nutrient loading from cargo ships through sewage discharges, i.e. amount of discharges, this kind of data should be collected.

If the ship does not use its sewage treatment plant or does not have such a plant on board, all sewage shall be discharged into port reception facilities. In this case all nutrient input from sewage into the sea from the ship would be eliminated.

Cost, cost-effectiveness of measure:

A ship can either use a sewage treatment plant, which fulfils the requirements given in resolution MEPC.227(64) for the Baltic Sea area, or discharge all sewage into port reception facilities.

Installation of a sewage treatment plant, which fulfils the requirements given in resolution MEPC.227(64) for the Baltic Sea area, causes some additional cost compared to a sewage treatment plant, which does not reduce nutrient input from sewage into the sea.

According to the information received from the Baltic Sea States, port reception facilities for sewage from passenger ships are already available in passenger ports. The number of crew members in cargo ships range from about 10 to 30 persons. Thus, the amount of sewage from a cargo ship is much smaller than the amount of sewage from a passenger ship, which may have 1000 to 3000, even up to 5000 passengers and additional crew members on board. Consequently, tank trucks can be used as port reception facilities in all ports in the Baltic Sea area. Such tank trucks are already available and delivery of sewage is included in the NSF-system in the Baltic ports meaning that there will be no extra costs for cargo ships.

Feasibility:

It would be feasible to have the same sewage discharge requirements for all ships sailing in the Baltic Sea area.

Follow-up of measure:

To be agreed later.

Background material:

MEPC 60/6/2, Proposal to amend MARPOL Annex IV to include the possibility to establish Special Areas for the prevention of pollution by sewage and to designate the Baltic Sea as a Special Area under Annex IV, submitted by Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, the Russian Federation and Sweden

MEPC 60/INF.4, Information on the proposal to designate the Baltic Sea as a Special Area under MARPOL Annex IV, submitted by Denmark, Estonia, Finland, Germany, Lithuania, Latvia, Poland, the Russian Federation and Sweden

References

HELCOM Maritime 19 document 3-6, Proposal for amendments to the BSAP, submitted by Finland.

HELCOM Maritime 19 document 13-4, Discharges to the sea from Baltic Sea shipping in 2006 – 2018, submitted by Finland.

Hänninen, S. and Sassi, J. 2009. Estimated nutrient load from waste waters originating from ships in the Baltic Sea area – updated 2009. VTT Research Report VTT-R-07396-08, see http://www.vtt.fi/inf/julkaisut/muut/2009/VTT_R_07396_08.pdf

Title
Develop a HELCOM joint submission to IMO with the intention to recognize nutrients in cargo hold washing water as Harmful for the Marine Environment in the Baltic Sea.

Submitted by:
Coalition Clean Baltic

Description of measure
This measure is to develop a HELCOM joint submission to IMO, related primarily to capturing nutrients in cargo hold washing water. The joint submission should invite IMO to elaborate relevant new regulations for ships covered by the existing Annex V to MARPOL. This will include designating nutrients in cargo washing water as harmful for the marine environment, with the aim to eliminate the discharge of nutrients from ships. CCB suggests that all discussion is complete for a joint submission to IMO by 2023.

Activity:
Transport – shipping (incl. anchoring, mooring) Transport – shipping infrastructure (harbours, ports, ship-building) Waste waters (urban, industrial, and industrial animal farms)

Pressure:
Input of nitrogen Input of phosphorous Input of organic matter — diffuse sources and point sources

State:
Nutrients Hazardous substances The measure contributes to reducing the amount and concentration of nutrients and other formally designated hazardous, or harmful, substances in the Baltic.

Extent of impact:
The impact is Baltic-wide, by capturing a key point source of nutrient and hazardous/harmful substance input.

Effectiveness of measure

The objective of this measure is to create a situation where discharge of nutrients from hold washing water to the Baltic Sea is prohibited, as is the situation for cargo residues classified as harmful to the marine environment. In turn this supports improvements to the Baltic Sea's network of Port Reception Facilities (PRFs), which is currently insufficient.

Developing this joint submission with language appropriate to the most relevant instruments will require legal counsel and discussion with maritime authorities. Some of the instruments to consider among others will likely include MARPOL Annex V, Appendix 1 of Annex V, the IMSBC Code under SOLAS including individual schedules of cargoes, and the Code of Practice for the Safe Loading and Unloading of Bulk Carriers (BLU Code), especially considering environmental protection procedures.

Shipboard practices in bulk cargo shipment include washing ship holds of cargo residues between shipments. Given the listing of the Baltic Sea as a MARPOL Special Area, ALL cargo residues from this washing are meant to be discharged at PRFs according to MARPOL Annex V. However, if PRFs are absent or inadequate, cargo residues not containing substances classified as harmful to the marine environment are exempted from this regulation. If nutrient flows from ships were identified as harmful, or otherwise recognized specifically in legislation, then the mandatory nature of pumping hold washing water ashore would support the development of the currently insufficient PRF network.

According to the Global Integrated Shipping Information System, only seven Baltic ports are equipped to handle cargo residues; six in Denmark and one in Latvia. Four of those Danish ports also handle dry bulk fertilizer, one of the key sources for nutrients in cargo washing water. In 2013, data sources suggest over seventy ports handled dry bulk fertilizer. While we use dry bulk fertilizers as an example, this action intends to capture nutrients from all liquid and dry cargo types.

Published literature estimates 0.05% of dry bulk material is lost in the course of shipment and handling (Grote 2016), and the industry standard for allowed losses in dry bulk fertilizer handling is 0.5%. Actual loss estimates in shipment and handling, using 2013 data (see Concept BAT document submitted to MARITIME 19-2019) could be 16000 tons or up to an order of magnitude greater. Given that hold washing is normal practice in dry bulk shipping, we may assume that discharge of cargo residues is occurring directly to the Baltic in unknown quantities. The risks across the board are great, from heavy metals pollution to eutrophication.

Cost, cost-effectiveness of measure:

Costs will include development and operation of infrastructure currently lacking in ports, and a mix of additional time and logistics for ships to use the PRFs as different from current discharge-at-sea practices. Consideration may be given to expand the scope of the no-special-fee system, as exists for discharge of oily cargo residues under MARPOL Annex I.

Feasibility:

HELCOM develoing this joint submission is feasible. Challenges in followup include other issues with improvements in reporting, use of PRFs, and accountability on board ships. Developing a sound legislative context can only support improvements to other challenges in maritime shipping and use of PRFs.

Follow-up of measure:

Following the joint submission to ensure integration in relevant legislation, it will be necessary to inform industry of the joint submission and preparation for the accompanying increased demand for improvements to the insufficient network of PRFs.

Background material:

Simplified overview of MARPOL Annex V
MEPC.295(71) (MARPOL Annex V)
MEPC 70/18/Add.1 Annex 2, page 4 (pdf pg 10, Appendix 1 to MARPOL Annex V)
MSC 101/24/Add.3 Appendix 1 Individual schedules of solid bulk cargoes (begin pdf page 60)
Code of Practice for the Safe Loading and Unloading of Bulk Carriers (BLU Code)

References

Outcome of MARITIME 18-2018, paragraphs 6.3 – 6.7,
Concept BAT document submitted to MARITIME 19-2019
Outcome of MARITIME 19-2019, paragraphs 7.3 – 7.6.
Grote et al. 2016. Dry bulk cargo shipping — An overlooked threat to the marine environment? Marine Pollution Bulletin 110 pg 511–519

Title

14. Reduce nutrient losses to zero from dry bulk fertilizer storage and handling in Baltic ports

Submitted by:

Coalition Clean Baltic

Description of measure

We propose the introduction of best technologies, techniques and practices (BAT) to reach zero nutrient losses in fertilizer storage and handling, and encourage industry collaboration in an open innovation setting. CCB suggests that the initiation of HELCOM activities to coordinate development of BAT begin by 2021, and that BAT are being implemented in all Baltic ports by 2025.

Activity:

Transport – shipping (incl. anchoring, mooring) Transport – shipping infrastructure (harbours, ports, ship-building)

Pressure:

Input of nitrogen Input of phosphorous

State:

Nutrients Nitrogen and Phosphorous. The measure contributes to reducing the amount and concentration of these nutrients in the Baltic.

Extent of impact:

The impact is Baltic-wide, by capturing a key point source of nutrient input.

Effectiveness of measure

Nutrients lost in the storage and handling of dry bulk fertilizers in Baltic ports represents a major source of nutrient pollution and is insufficiently addressed. Given reports on contractually allowed losses well above earlier estimates, up from 0.05% to 0.5%, and variability in losses ranging up to 3%, the urgency to pursue solutions is clear. The need at this time is to decide which solutions are best on a case by case basis.
Published literature estimates 0.05% of dry bulk material is lost in the course of shipment and handling (Grote 2016), and the industry standard for allowed losses in dry bulk fertilizer handling is 0.5%. Actual loss estimates in shipment and handling, using 2013 data (see Concept BAT document submitted to MARITIME 19-2019) could be 16000 tons or up to an order of magnitude greater, approaching 167000 tons/yr. The estimate assumes potential losses do not exceed contractually allowed amounts, or 0.5% of fertilizer shipped in the Baltic region.
Any BAT implemented has the potential to reduce these losses and in turn reduce eutrophication. For example, a well designed stormwater management system can capture up to 80% of nutrients in the runoff water from a terminals space, including quay side and warehouses, as indicated in the proposed system for Yara's fertilizer terminal in Norrköping, Sweden. (Page 12 in Concept BAT document)
A shift to contained/bagged/containerized fertilizer handling, no longer permitting dry bulk shipping of fertilizers in the Baltic, would reduce losses toward zero. Achieving zero losses in this regard would represent extremely significant reduction the estimated losses to the Baltic.

Cost, cost-effectiveness of measure:

Costs will include the transition in fertilizer storage and handling methods, both as management practices and small (house-keeping) and large scale technology changes. Integration of these activities with developing Port Reception Facilities may also streamline improvements.
According to the EPRS briefing on the new PRF Directive, the Commission expects costs "to be limited and counterbalanced by the positive environmental impact and reduced administrative burden."

Feasibility:

The technology exists to reach the vision of zero losses in this proposal. Barriers include the willingness to transition into best available technologies and practices, as well as financial hindrances for investing into technological change.

Follow-up of measure: A monitoring programme will be required to evaluate the ongoing effectiveness of new technologies.
Background material: The reports referenced represent only a summary of the best available technologies, techniques, and practices to reach zero losses of nutrients from fertilizer handling in ports. Solutions will need to be developed specifically for each port with cooperation of industry. EPRS Briefing on Port Reception Facilities EU PRF Directive 2019/883 Impact Assessment on PRF Directive
References Draft Report on potential sources of nutrient inputs, submitted to HOD 52-2017 Outcome of MARITIME 18-2018, paragraphs 6.3 – 6.7 Concept BAT document submitted to MARITIME 19-2019 Outcome of MARITIME 19-2019, paragraphs 7.3 – 7.6 Grote et al. 2016. Dry bulk cargo shipping — An overlooked threat to the marine environment? Marine Pollution Bulletin 110 pg 511–519

Title

15. Ensure no-special-fee system for marine litter applies to all passive fished waste, as well as all other wastes captured or generated in the Baltic Sea.

Submitted by:

Coalition Clean Baltic

Description of measure

This measure is to ensure the no-special-fee system for marine litter applies to all passive fished waste.

Activity:

[Drop-down list: Activity that the measure is addressing. Additional drop-down lists can be copy/pasted as necessary.]

Fish and shellfish harvesting (bottom-touching towed gears, professional, recreational)

Pressure:

Input of litter (solid waste matter, including micro-sized litter)

State:

Litter, Seabed habitats, Hazardous substances

Extent of impact:

The measure will impact passively fished waste, offering an incentive for fishers to bring to shore any waste captured during fishing activities.

Effectiveness of measure

Current behaviour aboard fishing vessels, when it comes to passively fished waste, is to return the waste to the sea due to perceived and real barriers in costs to bring the waste to shore. Integrating this waste category into the no-special-fee system, a system recognized as effective in the recent EPRS Briefing on Port Reception Facilities, would support the capture and reduction of waste in the Baltic Sea.

Cost, cost-effectiveness of measure:

Costs will include the installation and operation of PRFs currently lacking in ports, and consideration for the disposal costs as integrated into the no-special-fee system across the Baltic.
According to the EPRS briefing on the new PRF Directive, the Commission expects costs "to be limited and counterbalanced by the positive environmental impact and reduced administrative burden."

Feasibility:

The measure should be a minor addition to existing or planned activities related to litter and fishing for litter approaches

Follow-up of measure:

Background material:

The Baltic Sea Advisory Council has recommended a general approach to passively fished waste similar to the no-special-fee approach common for other waste reception in the Baltic.
We also wish to recall guidance in the EU PRF Directive 2019/883, and the EPRS Briefing on Port Reception Facilities, which specifically recognize the need to incorporate passively fished waste into ongoing improvements to Port Reception Facilities.

References

EPRS Briefing on Port Reception Facilities
EU PRF Directive 2019/883
Impact Assessment on PRF Directive