Document title	Draft HELCOM Regional Action Plan on Underwater Noise
Code	6-3
Category	DEC
Agenda Item	6 - Matters arising from the HELCOM Groups
Submission date	10.11.2020
Submitted by	Executive Secretary
Reference	Outcome of HOD 58-2020, para. 5.49-5.52

Background

The EN-Noise has been working on the improvement of the draft Action Plan on Underwater Noise since its first consideration by the Pressure Working Group back in 2019. Efforts have been made to involve relevant working groups in the process, and thus previous versions of the document presented to this Meeting were introduced at PRESSURE 10-2019, MARITIME 19-2019, STATE & CONSERVATION 11-2019, HOD 57-2019, PRESSURE 11-2020, STATE & CONSERVATION 12-2020 and HOD 58-2020. The EN-Noise has addressed the input provided at all these meetings, as well as written comments provided after them and further develop the document accordingly.

After discussion of the draft Action Plan at HOD 58-2020, Germany and Russia provided additional input to the document. Following HOD 58-2020 recommendation, the further developed draft Action Plan was submitted for consideration by the Maritime Working Group in October 2020 (Outcome of HOD 58-2020, para. 5.49-5.52). MARITIME 20-2020 took note of the draft Action Plan and welcomed the work of EN-Noise (document 12-2). The meeting provided the following comments:

- Denmark is not in a position to support voluntary action no. 16 in part 3.3. as currently drafted because it relates to regulating military exercises. Denmark is open to considering alternative wording for this action and may submit a proposal in that regard for consideration by PRESSURE 13-2020;
- A question was noted with regard to the pre-core indicator for continuous noise and whether this indicator is common for all sources of noise or if there are separate indicators and targets for different sources of noise. The Meeting noted that the indicator is not yet fully developed, and that e.g. in OSPAR noise indicators for different sources of noise are separated. The Meeting therefore noted that this could be done within HELCOM as well, also noting, however that for HOLAS purposes it would be simpler to use just one indicator. The Meeting further noted the HELCOM Work Plan for the development of indicators, which also includes indicators for underwater noise, as well as a proposed project that, if approved, intends to work further on the matter;
- The meeting noted the view by Russia that the work in the RAP is contradictory to the passage in the 2018 Ministerial Declaration referring to the development of the RAP to address adverse effects on "marine species identified as sensitive to noise".
- The meeting noted the view of Russia that underwater noise is a poorly studied problem and that it is expensive to address continuous underwater noise by changing shipping routes or lowering speeds, and that route changes would be in contradiction to UNCLOS. The meeting noted that the RAP does not intend to propose measures that are unreasonable or are counterproductive for safe navigation;

- The meeting noted the view of Russia that before taking measures, more studies are needed (no study-no measures). In this context the meeting noted that this is also the approach taken in the draft RAP when drafting the proposed actions;
- The meeting noted a comment related to voluntary action no. 7 in section 3.2 of the draft RAP, regarding a contradiction with SOLAS on mandating the use of AIS transponders on leisure boats. In this regard a clarification was noted that while commercial ships having AIS are easy to monitor, this is not the case for leisure boats that do not have AIS, which is why it is proposed that this could be required on a national level e.g. for boats with a particularly high engine power. The meeting agreed that appropriate reference to SOLAS should be made within this voluntary action; and
- The terminology should be unified as sometimes the term "underwater sound" is used, while the term "underwater noise" is more common.

Finally, MARITIME 20-2020 supported the draft Action Plan, taking into account the comments made and concerns expressed, and agreed to forward the input and comments made to PRESSURE 13-2020 (13-16 October 2020) for consideration before HOD 59-2020 (Outcome of MARITIME 20-2020, para. 12.4-12.6).

PRESSURE 12-2020 considered the draft Action Plan (document 5-1), took note of the comments to the draft RAP provided by MARITIME 20-2020 and contained in document 3-15, taking note that most of the comments were clarified already in the Maritime meeting, except for the need to make an appropriate reference to SOLAS in relation to voluntary action no. 7 in section 3.2 of the draft RAP; the consistent use of the term "underwater noise" instead of "underwater sound" and the Danish concerns in relation to voluntary action no. 16 in part 3.3. The meeting discussed and agreed on the rewording proposal by Denmark to the voluntary action no. 16 in section 3.3 to read as follows: "Discussion [with the relevant authorities] on how the use of military sonars during testing, training and exercises can be adapted to reduce the potential negative effects on noise sensitive species". The meeting invited the EN-Noise to finalise the draft Action Plan based on the input by the meeting and the remaining issues to be addressed from MARITIME 20-2020 (c.f. paragraph 5.3 above) and endorsed it for submission to HOD 59-2020 for adoption (Outcome of PRESSURE 13-2020, para. 5.1-5.5).

During the subsequent improvement of the document by the EN-Noise, Denmark informed that they can agree to include the additional text inserted in square brackets in voluntary action no. 16 ("[with the relevant authorities]").

Thus, this document contains a clean version of the revised draft Action Plan on Underwater Noise where the input by HOD 58-2020, Germany and Russia, MARITIME 20-2020 and PRESSURE 13-2020 have been addressed. Annex 1 contains the same revised draft with track changes and notes explaining how the comments have been addressed.

Action requested

The Meeting is invited to:

- consider and endorse the HELCOM Regional Action Plan (RAP) on Underwater Noise; and
- support the submission of the HELCOM Regional Action Plan (RAP) on Underwater Noise to HELCOM 42-20221 for adoption as HELCOM Recommendation.

Draft HELCOM Regional Action Plan on Underwater Noise

Preamble

In 2013 it was agreed in the HELCOM Copenhagen Ministerial Declaration that

- the level of ambient noise 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.

By this is meant that HELCOM should commit to monitoring and managing man-made (anthropogenic) underwater noise in the Baltic and actively assure that levels do not exceed targets established to secure that man-made noise does not prevent recovery of the Baltic Sea ecosystems.

This commitment resulted in the development and implementation of the Regional Baltic Underwater Noise Roadmap 2015-2017, which includes the establishment of a joint HELCOM/OSPAR registry of licenced impulsive noise events and development of a regional monitoring programme for continuous noise.

Furthermore, in the HELCOM Brussels Ministerial Declaration in 2018 it was agreed to:

- Develop an action plan, preferably by 2021, and regionally coordinated actions on underwater noise, aiming, in the long-term, at addressing adverse effects of underwater noise on marine species identified as sensitive to noise, whilst safeguarding the potential of the Baltic Sea for sustainable human activities; and
- Continue fruitful cooperation between European Regional Seas Conventions, and in particular OSPAR, in order to exchange good practices and to fill knowledge gaps, and to continuing regional work in developing scientifically sound threshold values for underwater noise that are consistent with GES for species identified as sensitive to noise in the Baltic Sea, in close coordination with work undertaken by Contracting Parties in other relevant fora including UNEP Regional Seas Programme.

The present document lists current activities and proposed new ones directed at achieving these goals. These activities take their natural outset in the current work on developing and maturing indicators to be used in assessment of GES with respect to underwater noise and establishment of associated thresholds and management targets.

Types of actions

HELCOM Contracting Parties agreed to start implementation of actions to reduce the negative impacts of underwater noise[1] to be further developed jointly, assisted by the relevant HELCOM subsidiary bodies including lead countries. The actions on reduction of pressures of underwater noise are an inherent part of the RAP on Underwater Noise, having the scope to define and achieve good environmental status by member states towards 20XX[2].

The actions are divided into regional actions and voluntary national actions.

The regional actions are to be jointly implemented on a regional scale by the Contracting Parties to the Helsinki Convention. The national actions are actions to be implemented nationally on a voluntary basis.

[1] Noise and sound are often used interchangeably but can carry slightly different meanings. Sound is a neutral physical entity, whereas noise usually implies sound, which is potentially detrimental to someone or something. In this document 'noise' is used consistently in reference to sound generated by human activities and natural processes (wind, waves etc.), in opposition to sound made by the animals themselves. The only exception is in direct quotes from other documents, where any use of 'sound' has been retained.

[2] To be in agreement with the BSAP update.

Both types of actions (regional and national) are focused on reduction of pressures and impacts from underwater noise sources of different types. Actions are thus further subdivided into four subcategories, three addressing different source types and a fourth one addressing measures involving third parties.

The effectiveness of the suggested actions has not been formally evaluated, as effectiveness is related to the underwater noise indicators, which are not yet fully developed. Once the indicators are further developed (listed as actions below), it will become possible to describe how the remaining actions link to the indicators and thereby assess the effectiveness of the actions.

Actions addressing reduction of pressures and impacts from impulsive noise sources

These actions relate to impulsive[3] noise sources, such as those covered by the Joint HELCOM/OSPAR impulsive noise register, hosted by ICES. The relevant impacts from these noise sources are primarily disturbance of behaviour, leading to an effective habitat loss (temporary or permanent) and possible direct injury and/or damage to the auditory system of animals. The relevant sources include pile driving, air gun surveys, underwater explosions, sonars, acoustic deterrence devices and other impulsive sources with significant energy below 10 kHz and are currently addressed by the pre-core indicator "Distribution in time and space of loud low- and mid-frequency impulsive sounds". Suggested actions for this group of noise sources relate to improving the coverage and quality of the data supplied to the ICES impulsive noise register and to development of impact indicators, which will allow inclusion of information about relevant and sensitive ecosystem components (i.e. noise sensitive animals). Indicators can act as triggers for the implementation of actions/measures necessary to improve the state when Good Environmental Status is not reached with respect to the pressure. In such a case, technical and operational mitigation measures need to be implemented in the Baltic Sea. Several mitigation measures are already implemented nationally and have served as efficient incentives to the development of mitigation techniques and alternative technologies. These examples are to be evaluated as candidates for Best Environmental Practice and implemented at regional level, where appropriate. Specific actions to reduce the impact of impulsive noise include implementing the use of Best Available Technology (BAT) and Best Environmental Practice (BEP), as well as establishing common criteria for injury and disturbance.

Actions addressing reduction of pressures and impacts from continuous noise

These actions relate to sources emitting continuous low frequency noise, which means sources whose main impact on the environment relates to the increase of noise levels above natural ambient noise. The primary impact is believed to be through a temporary or permanent reduction in communication distances for animals, as well as other masking effects, such as reduced ability to detect prey, predators and obstacles (e.g. gill nets) acoustically. The primary sources are engine and propeller noise from ships and boats but may also be noise from towed bottom-touching fishing gear and offshore installations of various kinds, including offshore wind farms. These sources are currently addressed by the pre-core indicator "Continuous low-frequency anthropogenic sound". Suggested actions for this group of noise sources relate to maturing the pressure indicators and developing impact indicators, which, as noted above, will allow inclusion of information about relevant and sensitive ecosystem components (i.e. noise sensitive animals). Further actions relate to studying and quantifying the impact of continuous noise on noise sensitive species, followed up by adequate actions to reduce such impact. In order to mitigate the impact of these sources that produce a diffuse noise field, operational measures, such as re-routing and speed regulations, should be explored, aiming at short-term improvement. Longer-term measures comprise technical mitigation measures such as implementing ship-quieting technology in new ships or retrofitting old ships with this technology. While some of the relevant actions can be implemented through national legislation, all actions related to commercial

[3] There is no clear definition of impulsive sounds, but the sources included under this category all emit short pulses (not more than a few seconds in duration) and typically with a sharp onset. In addition, they are loud enough to potentially affect sensitive animals at distances of hundreds of meters to several kilometers. For further, see Dekeling et. al. (2014).

shipping must be executed by Contracting Parties acting through the International Maritime Organisation (see also para "Actions with third parties").

Actions addressing reduction of pressures and impact from other noise sources

These actions relate to pressures from sources not covered under the above categories, but with reason for concern regarding negative impact on the marine ecosystem. This includes sources such as echosounders, sonars and other surveying equipment, acoustic deterrence devices and other continuous or impulsive sources with primary energy above 10 kHz. Some of these sources are sufficiently loud to have effects at long range (such as seal scarers and sonars), whereas others raise concern primarily because of their ubiquitous abundance (such as echosounders). Relevant effects of these sources include both behavioural disturbance and masking of communication/passive hearing. Suggested actions for this group of sources relate to increasing the knowledge about abundance and impact of sources and, if relevant, develop specific indicators that can quantify the pressure from this group of sources and capture the impact on ecosystem components. Furthermore, actions include developing and implementing guidelines and regulation of the design and use of impulsive noise sources to reduce their impact.

Actions with third parties

These actions require involvement and actions of third parties, which include international and national stakeholders (such as IMO, fisheries organisations, NGO's, OSPAR and the EU Technical Group on Underwater Noise). An important aim for these actions relates to coordination of work with indicators, thresholds and targets across regional seas conventions and with ongoing work at EU level. A similarly important aim relates to developing useful frameworks for regulating cross-border activities, in particular ship traffic, through close cooperation with IMO as the global standard-setting authority for the safety, security and environmental performance of international shipping.

Regional actions – HELCOM Collective Actions

The following tables contain preliminary lists of actions for the Contracting Parties to the Helsinki Convention for joint implementation on the regional scale. The lists are to be further elaborated and amended. Actions are grouped, but not prioritized.

2.1 Regional actions addressing impulsive noise sources

CODE	REGIONAL ACTION	FURTHER SPECIFICATION
Monitoring of pressure and collection of ecological data		
1	Improve the quality of data submitted to the HELCOM impulsive noise registry by updating and improving the common HELCOM guidelines for monitoring impulsive noise events in the Baltic Sea.	Based on the reporting to the registry already available. Main aim of action is to increase the completeness, spatio-temporal resolution and quality of submissions to the registry.
2	Improve assessment of impact of impulsive noise by identifying important habitats and biologically sensitive areas and periods in the Baltic Sea region, where the introduction of high-energy impulsive noise is likely to have negative impact.	Based on HELCOM identified noise sensitive marine animal species (HELCOM 2019), which are to be delineated based on biological data and science-based criteria and in cooperation with other HELCOM working and expert groups (such as EG-MAMA)
Measures to improve assessment of impact from impulsive noise		
3	Establish common methodology for the assessment of negative impact from impulsive noise	Development and description of best practice for assessing potential injury and behavioural disturbance (habitat loss) in relation to for example environmental

		impact assessments (EIAs) and strategic impact assessments (SIAs).
4	Further develop the HELCOM impulsive noise pre-core indicator towards an operational core indicator	This includes development of methods to assess environmental status based on the indicator as well as definition of thresholds and targets.
5	Develop and implement one or more HELCOM impact indicators for impulsive noise	Based on the current pressure indicator, but with the inclusion of information about distribution of sensitive species and habitats. This work is a continuation of the work described in the noise sensitivity report (HELCOM 2019) and should preferably be along the same lines as the impact indicator currently under development in OSPAR and in accordance with the recommendations by EU TG-NOISE.
Measures to reduce impact of impulsive noise		
6	Identify Best Available Technologies (BAT) in mitigation of impact from impulsive noise by assessing the effectivity of existing and potential mitigation measures, to form basis for HELCOM best practice guidelines.	Including noise abatement systems, alternative methods and spatio-temporal exclusion of UXO clearing, commercial sonars and test/training/exercise of military sonars, alternative seismic sources, and sub-bottom profilers
7	Increase the use of Best Environmental Practice (BEP) and Best Available Technology (BAT) in mitigation of impact from impulsive noise by establishing common HELCOM best practice guidelines in methods for mitigation of impact from impulsive noise	Implementation of the knowledge gained from action 6.
8	Improve regional and cross-border coordination of the spatio-temporal planning and permitting by establishing a common reporting system for planned activities likely to produce impulsive noise.	This constitutes an extension of the impulsive noise registry to include future activities that are currently only recorded after they occurred.
9	Improve protection of areas, which have already been defined as important or critical habitat for noise sensitive species, by obligating the adoption of adequate operational and technical noise mitigation measures.	HELCOM (2019) already identified a number of important areas which are important for noise sensitive species (such as the core habitat of the critically endangered harbour porpoise population of the Baltic proper or spawning areas of fishes using sound for communication). If the area is already protected as an MPA, this can be included as part of the management. This does not imply that measures (such as those identified in action 6) are not required in other areas not specifically protected.
10	Reduce injury and behavioural disturbance from impulsive noise by establishing common HELCOM criteria for injury and disturbance, as well as common exposure limits.	These criteria and exposure limits are not identical to the GES-thresholds to be established under point 4, but are operational criteria that can be applied to

		individual activities generating impulsive noise.

2.2 Regional actions addressing continuous low frequency noise

CODE	REGIONAL ACTION	FURTHER SPECIFICATION
Monitoring of pressure and collection of ecological data		
11	Improving accessibility and sharing of monitoring data by operationalisation of the common database for monitoring data on continuous underwater noise	As decided by HOD 55-2019 and implemented by database hosted by ICES.
12	Development of common guidelines for reporting of continuous noise levels in the Baltic Sea.	Linked to and in progress in connection to establishment of common database hosted by ICES.
13	Increase regional coordination and management of continuous noise sources by establishing a common framework for modelling past, present and future noise levels in the Baltic.	Continuation of the Soundscape planning tool developed under the BIAS project, as decided by HOD 55-2019. Such modelling is based on AIS and other relevant information about sources, such as source levels and frequency spectra. Includes developing methods to include noise from leisure boats without AIS transmitters as well as natural ambient noise.
14	Improve assessment of impact of continuous noise by identifying important habitats and biologically sensitive areas and periods in the Baltic Sea region, vulnerable to elevated levels of continuous noise.	Some information available (HELCOM 2019). To be amended based on biological data and science-based criteria and in cooperation with other HELCOM working and expert groups (such as EG-MAMA).
Measures to improve assessment of impact from continuous noise		
15	Establishment of a common methodology for assessment of impact of activities generating continuous noise.	Applies to for example shipping, offshore installations, construction works (other than pile driving and similar impulsive sources) and offshore infrastructure, etc.
16	Further develop the HELCOM continuous low-frequency noise pre-core indicator towards an operational core indicator.	This includes development of methods to assess environmental status based on the indicator (action 15) as well as definition of thresholds and targets.
17	Increase the knowledge on impact of noise by supporting research on effects of continuous noise on marine biota.	As detailed in the HELCOM science agenda
18	Develop and implement one or more HELCOM impact indicators for continuous low-frequency noise.	Based on the current pressure indicator (action 16), but with the inclusion of information about distribution of sensitive species and habitats (action 14).
19	Expand and improve the existing and potential operational and technical measures to reduce the impact of continuous noise to form a basis for common guidelines on management. Suitable technical measures to reduce ship noise should	Collection of experience from HELCOM members and abroad and collection of new information through research and development, as detailed in the HELCOM science agenda

	be identified (BAT/BEP), in particular with respect to commercial shipping.	

Measures to reduce impact from continuous noise		
20	Reduction of elevated continuous noise levels in noise sensitive and biologically important areas in the Baltic Sea by adoption of guidelines on management, based on the "HELCOM input to the establishment of environmental targets for underwater noise" (2018). The environmental targets for underwater noise should be in line with the target values set by TG Noise at European level.	Implementation of knowledge gained under action 19. Guidelines may encompass rerouting and speed limiting of heavy shipping traffic passing biologically important areas in the Baltic Sea.
21	Inciting voluntary actions by ship and boat operators by raising awareness of and cooperation with shipping companies and boat owners on speed management for their vessels including different aspects of adjusting and planning for vessel speed and engine load optimised for the reduction of underwater noise.	This can include installing monitoring systems at strategic locations (for example at outer approaches to ports) with real-time feedback to the ship's crew, to raise awareness and to aid in optimizing vessel and engine operations for reduced underwater noise radiation.
22	Enhance Baltic Sea wide cooperation of port authorities to introduce novel initiatives, such as harbour fee systems, in order to set incentives for voluntary quiet vessel operation.	See Port of Vancouver (2017), ECHO Program

2.3 Regional actions addressing other noise sources

CODE	**REGIONAL ACTION**	**FURTHER SPECIFICATION**
Monitoring and collection of ecological data		
23	Identification of other noise sources with significant impact on the marine ecosystems but not covered by the measures targeting impulsive and continuous noise	This includes, but is not limited to, sources with main energy above 10 kHz: echosounders, military and non-military sonars, sub-bottom profilers, net pingers, and hydroacoustic instruments.
24	Identification of important habitats and biologically sensitive areas and periods in the Baltic Sea region, vulnerable to elevated levels of noise from other sources than those covered by existing pressure indicators.	Based on biological data and science-based criteria and in cooperation with other HELCOM working and expert groups (such as EG-MAMA)
Measures to improve assessment of impact from other noise sources		
25	Compile and assess available information about potential impact caused by noise from leisure boats	As detailed in the HELCOM science agenda
26	Development of HELCOM indicators suitable for monitoring noise sources identified under measure 23.	Existing indicators cover impulsive noise under 10 kHz and continuous low-frequency noise, but does not include echosounders, most sonars and sub-bottom profilers, net pingers, etc.
27	Development of common guidelines for assessing impact from echosounders, sonars and other sources not covered by 2.1 and 2.2	Such as to apply to environmental impact assessments (EIAs) and assessment of environmental status (GES).

28	Support for research on pressure and impact from echosounders and other low-level, but abundant noise sources.	As detailed in the HELCOM science agenda
Measures to reduce impact from other noise sources		
29	Reduce the impact from acoustic deterrent devices by developing and agreeing on common guidelines and regulation of the design and use of deterrent devices	Action proposed for BSAP update

2.4 Regional actions involving third parties

CODE	REGIONAL ACTION	FURTHER SPECIFICATION
30	Strengthen cooperation with IMO on development of common actions to reduce underwater noise from commercial shipping in general and in the Baltic Sea in particular.	Includes, but is not limited to, discussions on vessel quieting technologies, speed and routing regulation. Initiate discussions on feasibility of reducing or otherwise regulate the emissions from echosounders (in general or restricted to sensitive areas) without compromising navigational safety. Discuss feasibility of systems providing real-time feedback to bridge about noise emissions from the ship.
31	Establish platforms to share best practices on policy options within member states and between authorities, the private sector and NGO's. Improve public awareness, so that political decision makers, local administrations and civil society are adequately informed about the underwater noise challenges.	For example, issuing a bulletin on best practices and policy options in the region and in the world.
32	Strengthen the cooperation with OSPAR on development of common and/or compatible indicators, databases and assessment methodologies	As agreed on an overall level in the 2018 HELCOM Brussels declaration
33	Maintain and strengthen cooperation with the European Union expert group TG-Noise on issues of mutual interest	In particular to assure consistency in development of indicators and criteria and methods for establishing thresholds and targets
34	Reduce the impact from leisure boats by establishing a discussion with producers of echosounders and fishfinders with the goal of introducing standards for noise emission from echosounders, fishfinders and engines of leisure boats.	This aims for example at installing on/relates to the ability to turn off and adjust source level and frequency of echosounders and fish-finders, as well as developing industry standards for underwater noise emissions for boat engines.
35	Reduce the impact from underwater explosions in connection to munition clearance, by developing international guidelines for the safe removal and detonation of ammunition. The guidelines should be established through consultation with the Ministry of Defence of the	Initiate discussions on the use of noise mitigation measures, as well as informing nature protection institutions about planned detonations and mitigation methods.

	Russian Federation and NATO and lead to binding requirements and voluntary actions for use of noise mitigation technologies and operating practices in the Baltic Sea.	Including, but not limited to, discussions on deterrent measures, abatement technologies, spatio-temporal planning of clearance operations in relation to ecosystem sensitivity. Initiate discussions on feasibility of reducing the impact on biota without compromising navigational safety.

Voluntary national actions

The following tables provide preliminary lists of proposed actions for the Contracting Parties to the Helsinki Convention for voluntary implementation. These actions aim at information exchange and coordination but are primarily of national concern and in the responsibility of the Contracting Parties.

3.1 Voluntary national actions addressing impulsive noise sources

CODE	PROPOSED NATIONAL ACTIONS
1	Propose national legislation to reduce impact of impulsive noise from activities such as: • Pile driving • Underwater explosions • Sonars and surveying equipment
2	Increase awareness, knowledge transfer and coordination through the creation of a national forum for stakeholders on issues related to underwater noise
3	Increase regional cooperation and coordination by sharing national experiences on the implementation of national legislation to reduce impact of impulsive noise
4	Conduct research into new solutions to reduce impulsive noise, including alternatives to pile driving, seismic sources, sonars and, explosions
5	Conduct research on impact of impulsive noise on marine life and provide qualitative and quantitative information to assist in prioritizing and optimizing measures
6	Reduce impact of underwater explosions by development and implementation of national regulation on permitting of underwater explosions and implementation of mitigation measures

3.2 Voluntary national actions addressing continuous noise sources

CODE	PROPOSED NATIONAL ACTIONS
7	Improve monitoring of boat noise by developing a proposal to establish national regulation for mandatory use of AIS transmitters on flag state leisure boats likely to emit high levels of underwater noise, in accordance with SOLAS regulation V/19 and taking into account both technical and socioeconomic aspects. Could be as a requirement based on engine power or equivalent.
8	Propose national legislation regulating the use of leisure boats with the objective of reducing impact from underwater noise on noise sensitive and biologically important areas and species This would include certification of engines and operational measures such as speed limits to engine driven leisure boats in MPAs designated for noise sensitive species as identified in HELCOM 2019 and regional actions 2, 14 and 24.
9	Participation in and active contribution to common platforms for sharing best practices on policy options within HELCOM countries (gaps in national legislation etc.)

10	Increase the accuracy of soundscape modelling tools by establishing national databases of source information about ships, to serve as input for spatiotemporal modelling of continuous noise. Enable the use of such national data for HELCOM noise mapping.
11	Enable voluntary actions to reduce underwater noise by improving awareness among ship owners and the public of the actual noise level radiated by ships, for example by means of real time in-situ measurements close to ports.
12	Introduce mandatory requirements for impact assessment prior to permitting noisy activities not regulated by other legislation, such as power boat races.

3.3 Voluntary national actions addressing other noise sources

CODE	PROPOSED NATIONAL ACTIONS
13	Reduce impact from acoustic deterrent devices (including seal scarers) by developing and implementing national regulations on their use.
14	Development and implementation of national regulations for the use of echosounders and fishfinders on leisure boats, in particular in sensitive areas
15	Development and implementation of national regulation and permitting procedures for use of sub-bottom profiling and similar instruments
16	Discussion with the relevant authorities on how the use of military sonars during testing, training and exercises can be adapted to reduce the potential negative effects on noise sensitive species

3.4 Voluntary national actions involving third parties

CODE	PROPOSED NATIONAL ACTIONS
17	Establish national stakeholder fora for issues involving underwater noise

Reporting on effectiveness of actions by member states & analysis of the feedback

Report on the implementation of actions for the first time by 20XX through HELCOM Pressure Working Group and thereafter on a regularly basis.

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Annex 1 Draft HELCOM Regional Action Plan (RAP) on Underwater Noise with track changes

Preamble

In 2013 it was agreed in the HELCOM Copenhagen Ministerial Declaration that

- the level of ambient noise 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.

By this is meant that HELCOM should commit to monitoring and manage~~e~~ing man-made (anthropogenic) underwater noise in the Baltic and actively assure that levels do not exceed targets established to secure that man-made noise does not prevent recovery of the Baltic Sea ecosystems.

This commitment resulted in the development and implementation of the Regional Baltic Underwater Noise Roadmap 2015-2017, which includes the establishment of a joint HELCOM/OSPAR registry of licenced impulsive ~~sound~~noise events and development of a regional monitoring programme for continuous noise.

Furthermore, in the HELCOM Brussels Ministerial Declaration in 2018 it was agreed to:

- D~~d~~evelop an action plan, preferably by 2021, and regionally coordinated actions on underwater noise, aiming, in the long-term, at addressing adverse effects of underwater noise on marine species identified as sensitive to noise, whilst safeguarding the potential of the Baltic Sea for sustainable human activities; and
- C~~c~~ontin~~e~~u~~ing~~ fruitful cooperation between European Regional Seas Conventions, and in particular OSPAR, in order to exchange good practices and to fill knowledge gaps, and to continuing regional work in developing scientifically sound threshold values for underwater noise that are consistent with GES for species identified as sensitive to noise in the Baltic Sea, in close coordination with work undertaken by Contracting Parties in other relevant fora including UNEP Regional Seas Programme.

The present document lists current activities and proposed new ones directed at achieving these goals. These activities take their natural outset in the current work on developing and maturing indicators to be used in assessment of GES with respect to underwater noise and establishment of associated thresholds and management targets.

Types of actions

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The actions are divided into regional actions and voluntary national actions.

Commented [JT1]: Editorial change

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[2] To be in agreement with the BSAP update.

The regional actions are to be jointly implemented on a regional scale by the Contracting Parties to the Helsinki Convention. The national actions are actions to be implemented nationally on a voluntary basis.

Both types of actions (regional and national) are focused on reduction of pressures and impacts from underwater noise sources of different types. Actions are thus further subdivided into four subcategories, three addressing different source types and a fourth one addressing measures involving third parties.

The effectiveness of the suggested actions has not been formally evaluated, as effectiveness is related to the underwater noise indicators, which are not yet fully developed. Once the indicators are further developed (listed as actions below), it will become possible to describe how the remaining actions link to the indicators and thereby assess the effectiveness of the actions.

Actions addressing reduction of pressures and impacts from impulsive noise sources

These actions relate to impulsive[3] noise sources, such as those covered by the Joint HELCOM/OSPAR impulsive noise register, hosted by ICES. The relevant impacts from these ~~sounds~~ noise sources are primarily disturbance of behaviour, leading to an effective habitat loss (temporary or permanent) and possible direct injury and/or damage to the auditory system of animals. The relevant sources include pile driving, air gun surveys, underwater explosions, sonars, acoustic deterrence devices and other impulsive sources with significant energy below 10 kHz and are currently addressed by the pre-core indicator "Distribution in time and space of loud low- and mid-frequency impulsive sounds". Suggested actions for this group of ~~sound~~noise sources relate to improving the coverage and quality of the data supplied to the ICES impulsive noise register and to development of impact indicators, which will allow inclusion of information about relevant and sensitive ecosystem components (i.e. noise sensitive animals). Indicators can act as triggers for the implementation of actions/measures necessary to improve the state when Good Environmental Status is not reached with respect to the pressure. In such a case, technical and operational mitigation measures need to be implemented in the Baltic Sea. Several mitigation measures are already implemented nationally and have served as efficient incentives to the development of mitigation techniques and alternative technologies. These examples are to be evaluated as candidates for Best Environmental Practice and implemented at regional level, where appropriate. Specific actions to reduce the impact of impulsive noise include implementing the use of Best Available ~~Practice and~~ Technology (BAT) and Best Environmental Practice (BEP), as well as establishing common criteria for injury and disturbance.

Commented [JT2]: Editorial change to make terminology consistent with other HELCOM documents, including BSAP

Actions addressing reduction of pressures and impacts from continuous noise

These actions relate to sources emitting continuous low frequency ~~sound~~noise, which means sources, whose main impact on the environment relates to the increase of noise levels above natural ambient noise. The p~~P~~rimary impact is believed to be through a temporary or permanent reduction in communication distances for animals, as well as other masking effects, such as reduced ability to detect prey, predators and obstacles (e.g. gill nets) acoustically. The primary sources are engine and propeller noise from ships and boats but may also be noise from towed bottom-touching fishing gear and offshore installations of various kinds, including offshore wind farms. These sources are currently addressed by the pre-core indicator "Continuous low-frequency anthropogenic sound". Suggested actions for this group of ~~sound~~noise sources relate to maturing the pressure indicators and developing impact indicators, which, as noted above, will allow inclusion of information about relevant and sensitive ecosystem components (i.e. noise sensitive animals). Further actions relate to studying and quantifying the impact of continuous noise on noise sensitive species, followed up by adequate actions to reduce such impact. In order to mitigate the impact of these sources that produce a diffuse noise field, operational measures, such as re-routing and speed regulations, should ~~can~~ be explored~~implemented~~ , aiming at short-term improvement. Longer-term measures comprise ~~of~~ technical

Commented [JT3]: Wording changed in response to comments by MARITIME, to clarify that actions must be based on empirical evidence of imapct on noise sensitive species.

[3] There is no clear definition of impulsive sounds, but the sources included under this category all emit short pulses (not more than a few seconds in duration) and typically with a sharp onset. In addition, they are loud enough to potentially affect sensitive animals at distances of hundreds of meters to several kilometers. For further, see Dekeling et. al. (2014).

mitigation measures such as implementing ship-quieting technologyiques in new ships, or retrofitting old ships with this theseis techniquestechnology. While sSome of the relevant actions can be implemented through national legislation, all actions related to commercial shipping must be executed by Contracting Parties acting through the other need agreement in relevant international bodies, most importantly the International Maritime Organisation (see also para "Actions with third parties").

Commented [JT4]: Emphasizing that HELCOM has no mandate in relation to IMO and can only serve in a role supporting IMO-processes. Change in accordance with comments by MARITIME.

Actions addressing reduction of pressures and impact from other noise sources

These actions relate to pressures from sources not covered under the above categories, but with reason for concern regarding negative impact on the marine ecosystem. This includes sources such as echosounders, sonars and other surveying equipment, acoustic deterrence devices and other continuous or impulsive sources with primary energy above 10 kHz. Some of these sources are sufficiently loud to have effects at long range (such as seal scarers and sonars), whereas others raise concern primarily because of their ubiquitous abundance (such as echosounders). Relevant effects of these sources include both behavioural disturbance and masking of communication/passive hearing. Suggested actions for this group of sources relate to increasing the knowledge about abundance and impact of sources and, if relevant, develop specific indicators that can quantify the pressure from this group of sources and capture the impact on ecosystem components. Furthermore, actions include developing and implementing guidelines and regulation of the design and use of impulsive noise sources to reduce their impact.

Actions with third parties

These actions require involvement and actions of third parties, which include international and national stakeholders (such as IMO, fisheries organisations, NGO's, OSPAR and the EU Technical Group on Underwater Noise). An important aim for these actions relates to coordination of work with indicators, thresholds and targets across regional seas conventions and with ongoing work at EU level. A similarly important aim relates to developing useful frameworks for regulating cross-border activities, in particular ship traffic, through close cooperation with IMO as the global standard-setting authority for the safety, security and environmental performance of international shipping.

Regional actions – HELCOM Collective Actions

The following tables contain preliminary lists of actions for the Contracting Parties to the Helsinki Convention for joint implementation on the regional scale. The lists are to be further elaborated and amended. Actions are grouped, but not prioritized.

2.1 Regional actions addressing impulsive noise sources

CODE	REGIONAL ACTION	FURTHER SPECIFICATION
Monitoring of pressure and collection of ecological data		
1	Improve the quality of data submitted to the HELCOM impulsive noise register registry by updating and improving the common HELCOM guidelines for monitoring impulsive noise events in the Baltic Sea.	Based on the reporting to the register registry already available. Main aim of action is to increase the completeness, spatio-temporal resolution and quality of submissions to the registerregistry.
2	Improve assessment of impact of impulsive noise by identifying important habitats and biologically sensitive areas and periods in the Baltic Sea region, where the introduction of high-energy impulsive noise is likely to have negative impact.	Based on HELCOM identified noise sensitive marine animal species (HELCOM 2019), which are to be delineated based on biological data and science-based criteria and in cooperation with other HELCOM working and expert groups (such as EG-MAMA)
Measures to improve assessment of impact from impulsive noise		

3	Establish common methodology for the assessment of negative impact from impulsive noise	Development and description of best practice for assessing potential injury and behavioural disturbance (habitat loss) in relation to for example environmental impact assessments (EIAs) and strategic impact assessments (SIAs).
4	Further develop the HELCOM impulsive noise pre-core indicator towards an operational core indicator	This includes development of methods to assess environmental status based on the indicator as well as definition of thresholds and targets.
5	Develop and implement one or more HELCOM impact indicators for impulsive noise	Based on the current pressure indicator, but with the inclusion of information about distribution of sensitive species and habitats. This work is a continuation of the work described in the noise sensitivity report (HELCOM 2019) and should preferably be along the same lines as the impact indicator currently under development in OSPAR and in accordance with the recommendations by EU TG-NOISE.
Measures to reduce impact of impulsive noise		
6	Identify Best Available ~~Practice and~~ Technologies (BAT)- in mitigation of impact from impulsive noise by assessing the effectivity of existing and potential mitigation measures, to form basis for HELCOM best practice guidelines.	Including noise abatement systems, alternative methods and spatio-temporal exclusion of UXO clearing, commercial sonars and test/training/exercise of military sonars, alternative seismic sources, and sub-bottom profilers
7	Increase the use of Best ~~Available~~ Environmental Practice (BEP) and Best Available Technology (BAT) ~~Practice and Technologies~~ in mitigation of impact from impulsive noise by establishing common HELCOM best practice guidelines in methods for mitigation of impact from impulsive noise	Implementation of the knowledge gained from action 6.
8	Improve regional and cross-border coordination of the spatio-temporal planning and permitting by establishing a common reporting system for planned activities likely to produce impulsive noise.	This constitutes an extension of the impulsive noise ~~register~~ registry to include future activities that are currently only recorded after they occurred.
9	Improve protection of areas, which have already been defined as important or critical habitat for noise sensitive species, by obligating the adoption of adequate operational and technical noise mitigation measures.	HELCOM (2019) already identified a number of important areas which are important for noise sensitive species (such as the core habitat of the critically endangered harbour porpoise population of the Baltic proper or spawning areas of fishes using sound for communication). If the area is already protected as an MPA, this can be included as part of the management. This does not imply that measures (such as those identified in action 6) are not required in other areas not specifically protected.

10	Reduce injury and behavioural disturbance from impulsive noise by establishing common HELCOM criteria for injury and disturbance, as well as common exposure limits.	These criteria and exposure limits are not identical to the GES-thresholds to be established under point 4, but are operational criteria that can be applied to individual activities generating impulsive noise.

2.2 Regional actions addressing continuous low frequency ~~sound~~noise

CODE	REGIONAL ACTION	FURTHER SPECIFICATION
Monitoring of pressure and collection of ecological data		
11	Improving accessibility and sharing of monitoring data by operationalisation of the common database for monitoring data on continuous underwater noise	As decided by HOD 55-2019 and implemented ~~currently under implementation~~ by database ~~through~~ hosted ~~ing of database~~ by ICES.
12	Development of common guidelines for reporting of continuous noise levels in the Baltic Sea.	Linked to and in progress in connection to establishment of common database hosted by ICES.
13	Increase regional coordination and management of continuous ~~sound~~noise sources by establishing a common framework for modelling past, present and future noise levels in the Baltic.	Continuation of the Soundscape planning tool developed under the BIAS project, as decided by HOD 55-2019. Such modelling is based on AIS and other relevant information about sources, such as source levels and frequency spectra. Includes developing methods to include noise from leisure boats without AIS transmitters as well as natural ambient noise.
14	Improve assessment of impact of continuous noise by identifying important habitats and biologically sensitive areas and periods in the Baltic Sea region, vulnerable to elevated levels of continuous noise.	Some information available ~~in~~ (HELCOM 2019). To be amended based on biological data and science-based criteria and in cooperation with other HELCOM working and expert groups (such as EG-MAMA).
Measures to improve assessment of impact from continuous noise		
15	Establishment of a common methodology for assessment of impact of activities generating continuous noise.	Applies to for example shipping, offshore installations, construction works (other than pile driving and similar impulsive sources) and offshore infrastructure, etc.
16	Further develop the HELCOM continuous low-frequency ~~sound~~noise pre-core indicator towards an operational core indicator.	This includes development of methods to assess environmental status based on the indicator (action 15) as well as definition of thresholds and targets.
17	Increase the knowledge on impact of noise by supporting research on effects of continuous noise on marine biota.	As detailed in the HELCOM science agenda
18	Develop and implement one or more HELCOM impact indicators for continuous low-frequency ~~sound~~noise.	Based on the current pressure indicator (action 16), but with the inclusion of information about distribution of sensitive species and habitats (action 14).

Commented [JT5]: Editorial change reflecting that the database is now operational

19	Expand and improve the existing and potential operational and technical measures to reduce the impact of continuous noise to form a basis for common guidelines on management. Suitable technical measures to reduce ship noise should be identified (BAT/BEP), in particular with respect to commercial shipping.	Collection of experience from HELCOM members and abroad and collection of new information through research and development, as detailed in the HELCOM science agenda

Measures to reduce impact from continuous noise		
20	Reduction of elevated continuous noise levels in noise sensitive and biologically important areas in the Baltic Sea by adoption of guidelines on management, based on the "HELCOM input to the establishment of environmental targets for underwater noise" (2018). The environmental targets for underwater noise should be in line with the target values set by TG Noise at European level.	Implementation of knowledge gained under action 19. Guidelines may encompass rerouting and speed limiting of heavy shipping traffic passing biologically important areas in the Baltic Sea.
21	Inciting voluntary actions by ship and boat operators by raising awareness of and cooperation with shipping companies and boat owners on speed management for their vessels including different aspects of adjusting and planning for vessel speed and engine load optimised for the reduction of underwater ~~sound~~noise.	This can include installing monitoring systems at strategic locations (for example at outer approaches to ports) with real-time feedback to the ship's crew, to raise awareness and to aid in optimizing vessel and engine operations for reduced underwater noise radiation.
22	Enhance Baltic Sea wide cooperation of port authorities to introduce novel initiatives, such as harbour fee systems, in order to set incentives for voluntary quiet vessel operations~~s~~.	See Port of Vancouver (2017), ECHO Program

Commented [MR6]: Editorial change to clarify previous misunderstandings.

Commented [JT7]: Explicitly specifying that the action relies on voluntary participation by ship owners and operators. Response to comments from MARITIME.

2.3 Regional actions addressing other noise sources

CODE	REGIONAL ACTION	FURTHER SPECIFICATION
Monitoring and collection of ecological data		
2~~3~~4	Identification of other noise sources with significant impact on the marine ecosystems but not covered by the measures targeting impulsive and continuous noise	This includes, but is not limited to, sources with main energy above 10 kHz: echosounders, military and non-military sonars, sub-bottom profilers, net pingers, and hydroacoustic instruments.
2~~4~~5	Identification of important habitats and biologically sensitive areas and periods in the Baltic Sea region, vulnerable to elevated levels of noise from other sources than those covered by existing pressure indicators.	Based on biological data and science-based criteria and in cooperation with other HELCOM working and expert groups (such as EG-MAMA)
Measures to improve assessment of impact from other noise sources		
2~~5~~6	Compile and assess available information about potential impact caused by noise from leisure boats	As detailed in the HELCOM science agenda

267	Development of HELCOM indicators suitable for monitoring noise sources identified under measure 2318.	Existing indicators cover impulsive noise under 10 kHz and continuous low-frequency noise, but does not include echosounders, most sonars and sub-bottom profilers, net pingers, etc.
278	Development of common guidelines for assessing impact from echosounders, sonars and other sources not covered by 2.1 and 2.2	Such as to apply to environmental impact assessments (EIAs) and assessment of environmental status (GES).
289	Support for research on pressure and impact from echosounders and other low-level, but abundant ~~sound~~noise sources.	As detailed in the HELCOM science agenda
Measures to reduce impact from other noise sources		
2930	Reduce the impact from acoustic deterrent devices by developing and agreeing on common guidelines and regulation of the design and use of deterrent devices	Action proposed for BSAP update

2.4 Regional actions involving third parties

CODE	REGIONAL ACTION	FURTHER SPECIFICATION
301	Strengthen— cooperation —with –IMO on development of common actions to reduce underwater noise from commercial shipping in general and in the Baltic Sea in particular.	Includes, but is not limited to, discussions on vessel quieting technologies, speed and routing regulation. Initiate discussions on feasibility of reducing or otherwise regulate the emissions from echosounders (in general or restricted to sensitive areas) without compromising navigational safety. Discuss feasibility of systems providing real-time feedback to bridge about noise emissions from the ship.
312	Establish platforms to share best practices on policy options within member states and between authorities, the private sector and NGO's. Improve public awareness, so that political decision makers, local administrations and civil society are adequately informed about the underwater noise challenges.	For example, issuing a bulletin on best practices and policy options in the region and in the world.
323	Strengthen the cooperation with OSPAR on development of common and/or compatible indicators, databases and assessment methodologies	As agreed on an overall level in the 2018 HELCOM Brussels declaration
334	Maintain and strengthen cooperation with the European Union expert group TG-Noise on issues of mutual interest	In particular to assure consistency in development of indicators and criteria and methods for establishing thresholds and targets

3~~4~~5	Reduce the impact from leisure boats by establishing a discussion with producers of echosounders and fishfinders with the goal of introducing standards for ~~sound~~noise emission from echosounders, fishfinders and engines of leisure boats.	This aims for example at installing on/relates to the ability to turn off and adjust source level and frequency of echosounders and fish-finders, as well as developing industry standards for underwater noise emissions for boat engines.
3~~5~~6	Reduce the impact from underwater explosions in connection to munition clearance, by developing international guidelines for the safe removal and detonation of ammunition. The guidelines should be established through consultation with the Ministry of Defence of the Russian Federation and NATO and lead to binding requirements and voluntary actions for use of noise mitigation technologies and operating practices in the Baltic Sea.	Initiate discussions on the use of noise mitigation measures, as well as informing nature protection institutions about planned detonations and mitigation methods. Including, but not limited to, discussions on deterrent measures, abatement technologies, spatio-temporal planning of clearance operations in relation to ecosystem sensitivity. Initiate discussions on feasibility of reducing the impact on biota without compromising navigational safety.

Voluntary national actions

The following tables provide preliminary lists of proposed actions for the Contracting Parties to the Helsinki Convention for voluntary implementation. These actions aim at information exchange and coordination but are primarily of national concern and in the responsibility of the Contracting Parties.

3.1 Voluntary national actions addressing impulsive noise sources

CODE	PROPOSED NATIONAL ACTIONS
1	Propose national legislation to reduce impact of impulsive noise from activities such as: • Pile driving • Underwater explosions • Sonars and surveying equipment
2	Increase awareness, knowledge transfer and coordination through the creation of a national forum for stakeholders on issues related to underwater noise
3	Increase regional cooperation and coordination by sharing national experiences on the implementation of national legislation to reduce impact of impulsive noise
4	Conduct research into new solutions to reduce impulsive noise, including alternatives to pile driving, seismic sources, sonars and, explosions
5	Conduct research on impact of impulsive noise on marine life and provide qualitative and quantitative information to assist in prioritizing and optimizing measures
6	Reduce impact of underwater explosions by development and implementation of national regulation on permitting of underwater explosions and implementation of mitigation measures

3.2 Voluntary national actions addressing continuous noise sources

CODE	PROPOSED NATIONAL ACTIONS
7	Improve monitoring of boat noise by developing a proposal to establish national regulation for mandatory use of AIS transmitters on flag state leisure boats likely to emit high levels of underwater noise, in accordance with SOLAS regulation V/19 and -taking into account both technical and socioeconomic aspects. Could be as a requirement based on engine power or equivalent.
8	Propose national legislation regulating the use of leisure boats with the objective of reducing impact from underwater noise on noise sensitive and biologically important areas and species This would include certification of engines and operational measures such as speed limits to engine driven leisure boats in MPAs designated for ~~sound~~noise sensitive species as identified in HELCOM 2019 and regional actions 2, 14~~11~~ and 2~~14~~9.
9	Participation in and active contribution to common platforms for sharing best practices on policy options within HELCOM countries (gaps in national legislation etc.)
10	Increase the accuracy of soundscape modelling tools by establishing national databases of source information about ships, to serve as input for spatiotemporal modelling of continuous noise. Enable the use of such national data for HELCOM noise mapping.
11	Enable voluntary actions to reduce underwater noise by improving awareness among ship owners and the public of the actual noise level radiated by ships, for example by means of real time in-situ measurements close to ports.
12	Introduce mandatory requirements for impact assessment prior to permitting noisy activities not regulated by other legislation, such as power boat races.

Commented [JT8]: Changed in response to comments by MARITIME. Flag states can make AIS mandatory on their own ships/boats beyond the requirements of SOLAS, but cannot introduce such regulation for ships/boats from other flag states.

3.3 Voluntary national actions addressing other noise sources

CODE	PROPOSED NATIONAL ACTIONS
13	Reduce impact from acoustic deterrent devices (including seal scarers) by developing and implementing national regulations on their use.
14	Development and implementation of national regulations for the use of echosounders and fishfinders on leisure boats, in particular in sensitive areas
15	Development and implementation of national regulation and permitting procedures for use of sub-bottom profiling and similar instruments
16	Discussion with the relevant authorities on how the use of military sonars during testing, training and exercises can be adapted to reduce the potential negative effects on noise sensitive species~~Discussion of possible regulation of use of military sonars during testing, training and exercises~~

Commented [JT9]: Changed according to instructions from PRESSURE, and subsequently agreed by Denmark.

3.4 Voluntary national actions involving third parties

CODE	PROPOSED NATIONAL ACTIONS
17	Establish national stakeholder fora for issues involving underwater noise

Reporting on effectiveness of actions by member states & analysis of the feedback

Report on the implementation of actions for the first time by 20XX through HELCOM Pressure Working Group and thereafter on a regularly basis.

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