



Activity 4:

A4 – Support for and harmonisation of regional work on Descriptor 11 (underwater noise)



BLUES



Co-funded by the
European Union

HELCOM BLUES – Activity 4

Task A 4.1 - continuous noise

17 January 2023

Aleksander Klauson

TAL
TECH



HELCOM



Activity Consortium

Activity Partners

Abbreviation	Full name	
HELCOM	Helsinki Commission	-
TalTech	Tallinn University of Technology	EE

Expert support

Abbreviation	Full name
EG Noise	HELCOM Expert Group on Underwater Noise

Activity sub-contractors

Abbreviation	Full name
ICES	International Council for the Exploration of the Sea
QO	QuietOceans





Overview of Task A4.1 - continuous noise

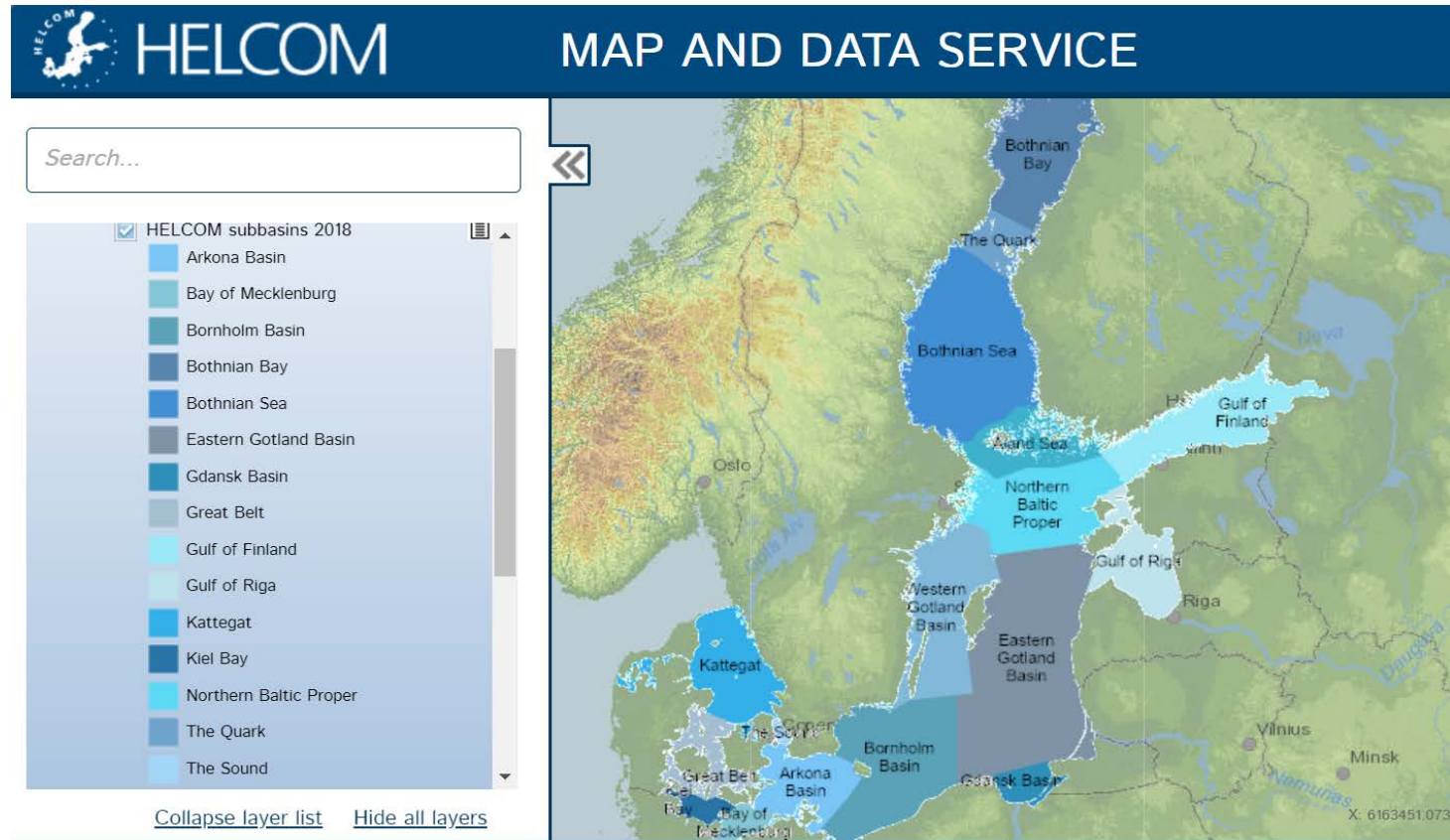
Task	Deliverable
Subtask 4.1.1	Production of new soundscape maps
Subtask 4.1.2	Develop and execute assessment on noise sensitive species
Subtask 4.1.3	Improve calibration standards for monitoring of continuous noise



Results 4.1.1 Production of new soundscape maps

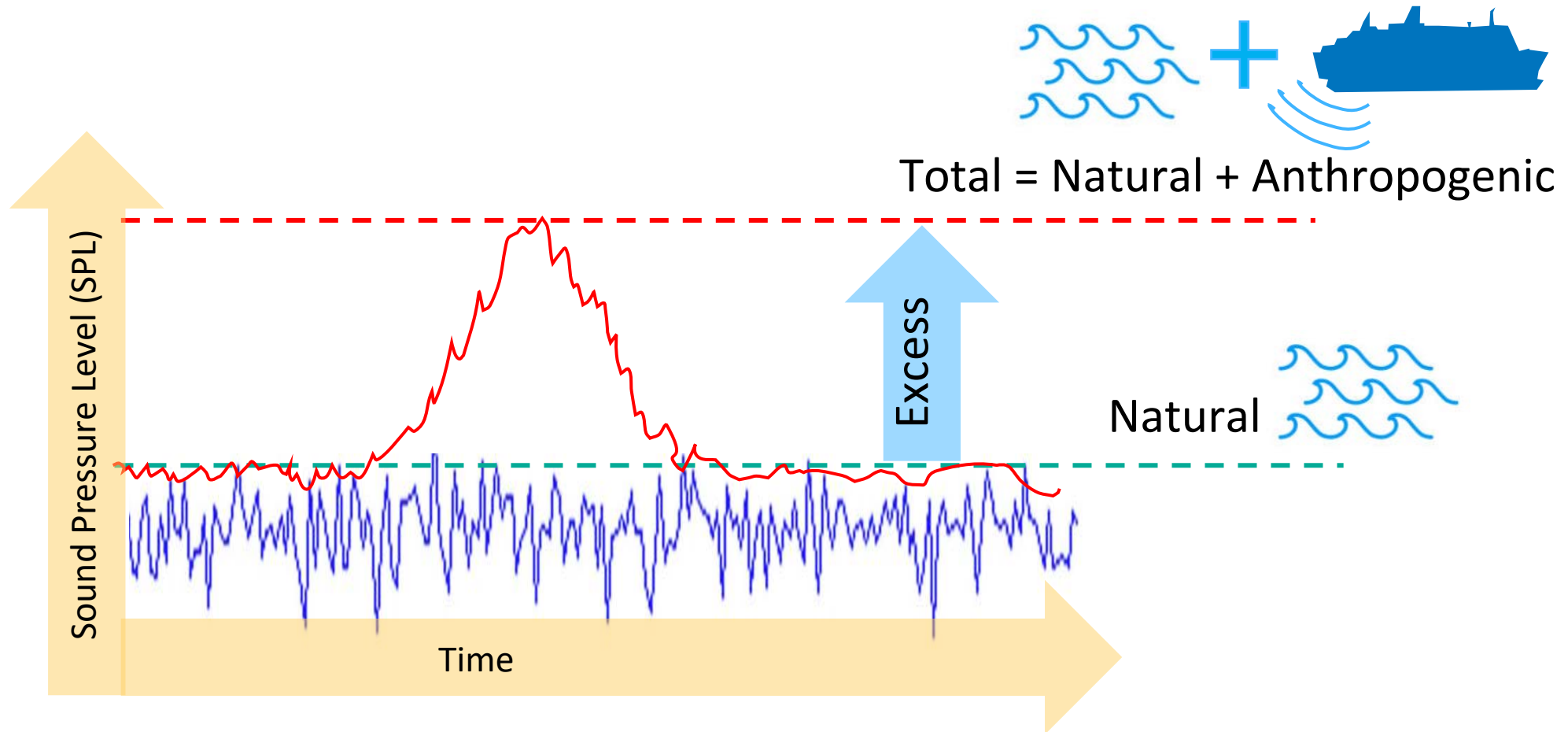


- Assessment by HELCOM subbasins;
- Modelling year 2018.



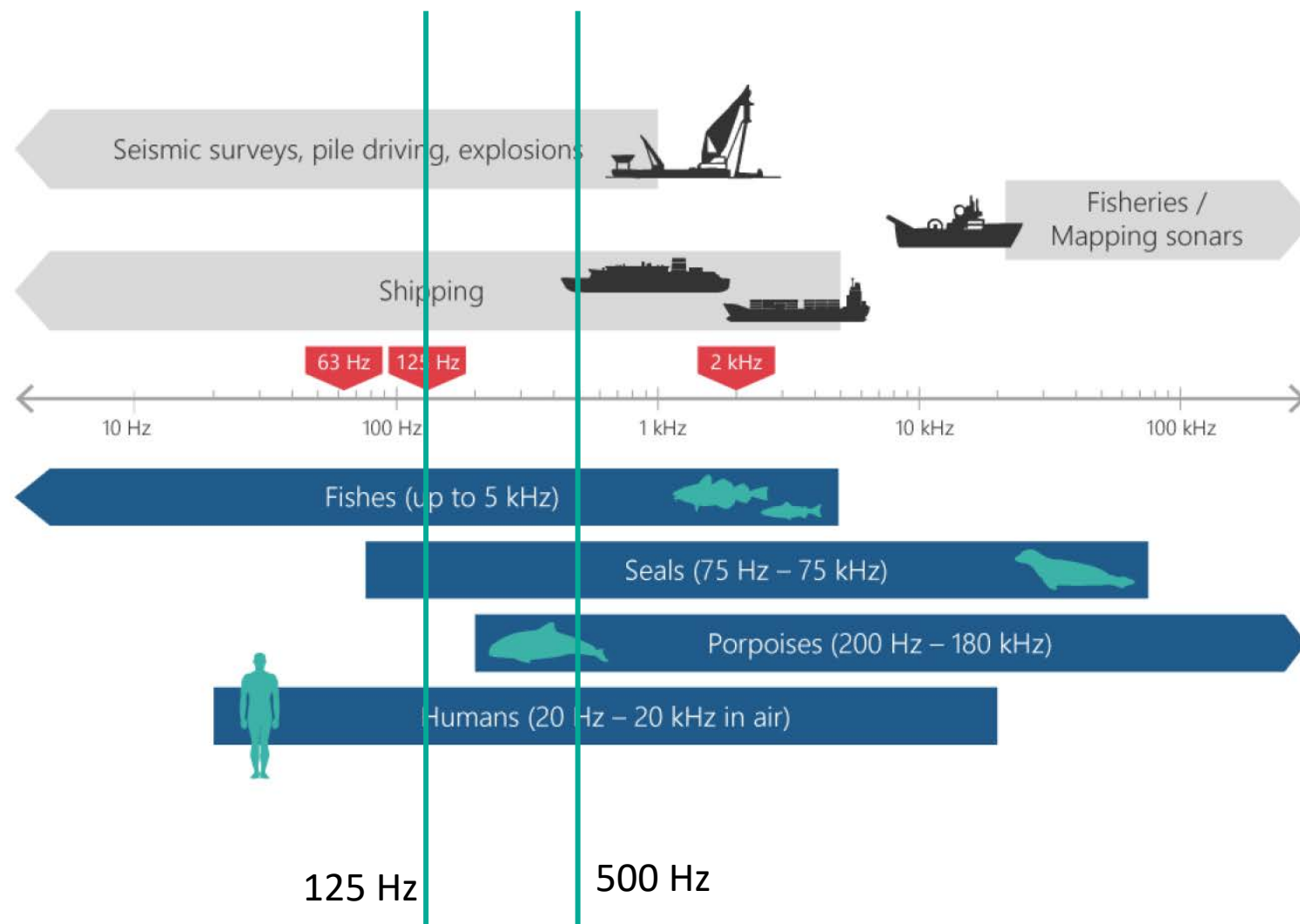


Soundscape map metrics

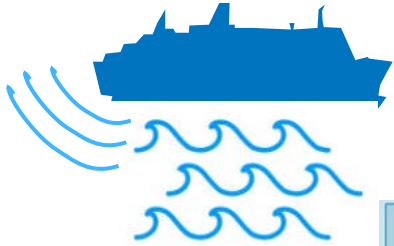




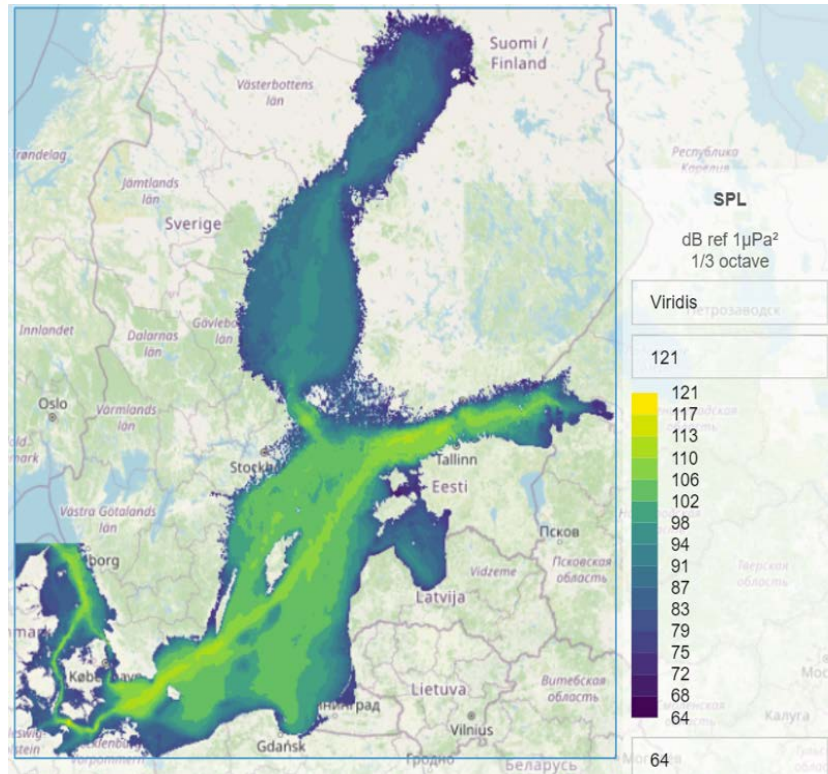
Auditory range of some marine species present in the Baltic Sea and sound frequencies generated by human activities



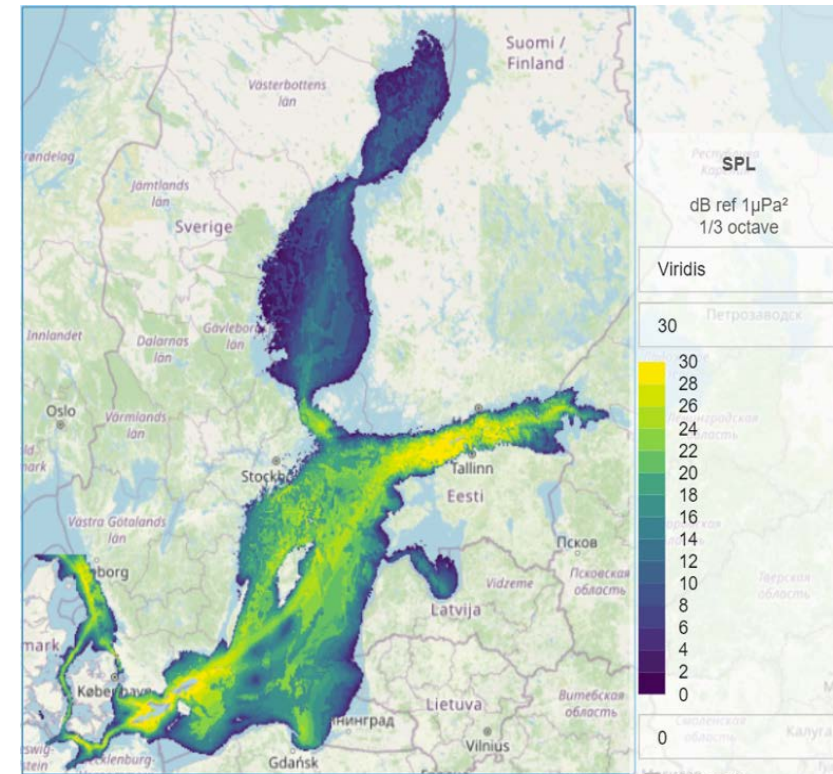
New soundscape maps



Decidecade 125 Hz, March 2018



Median SPL

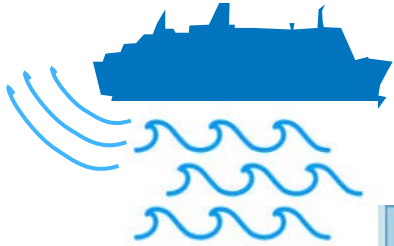


Median excess level (dominance)

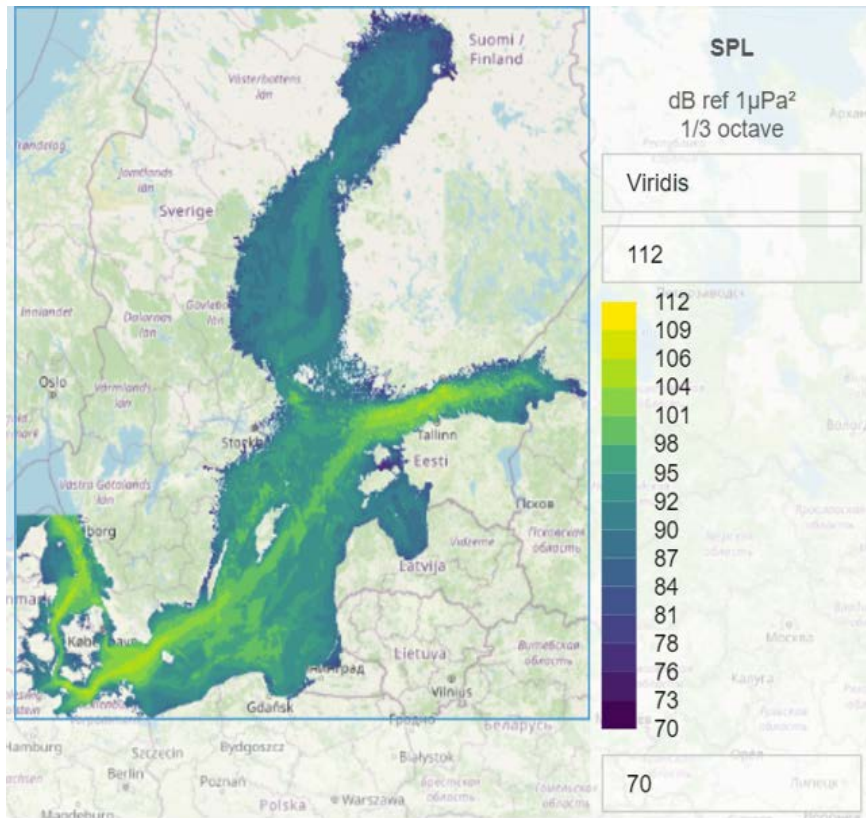
A4



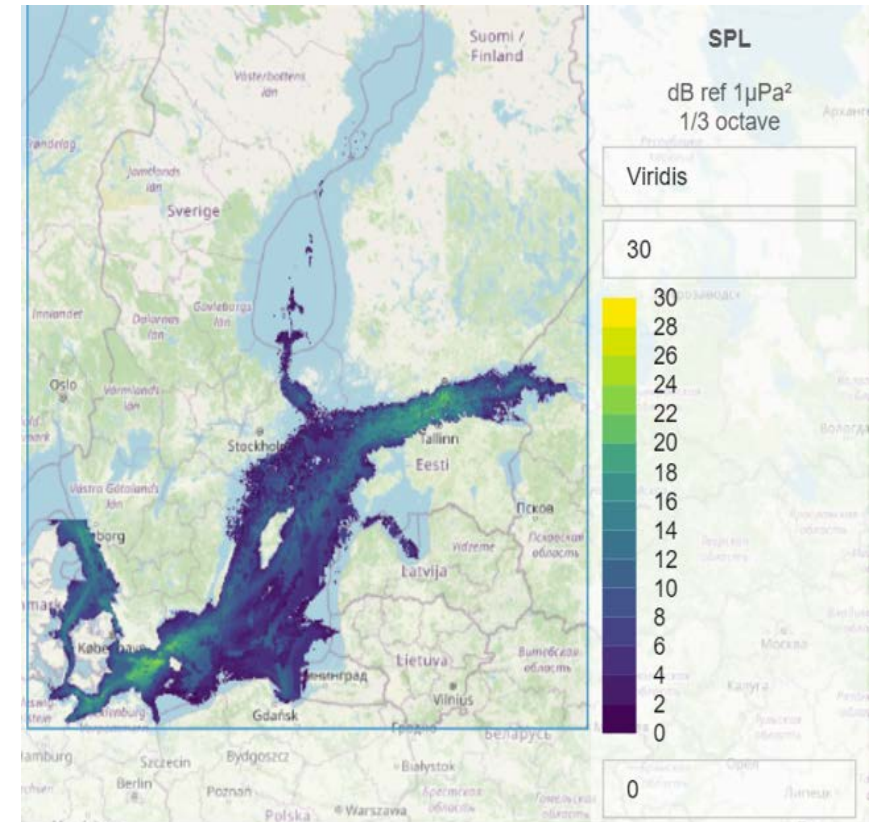
New soundscape maps



Decidecade 500 Hz, March 2018



Median SPL



Median excess level (dominance)





Results 4.1.2 Develop and execute assessment on noise sensitive species

Indicator species for the Baltic Sea



Baltic herring



Grey seal

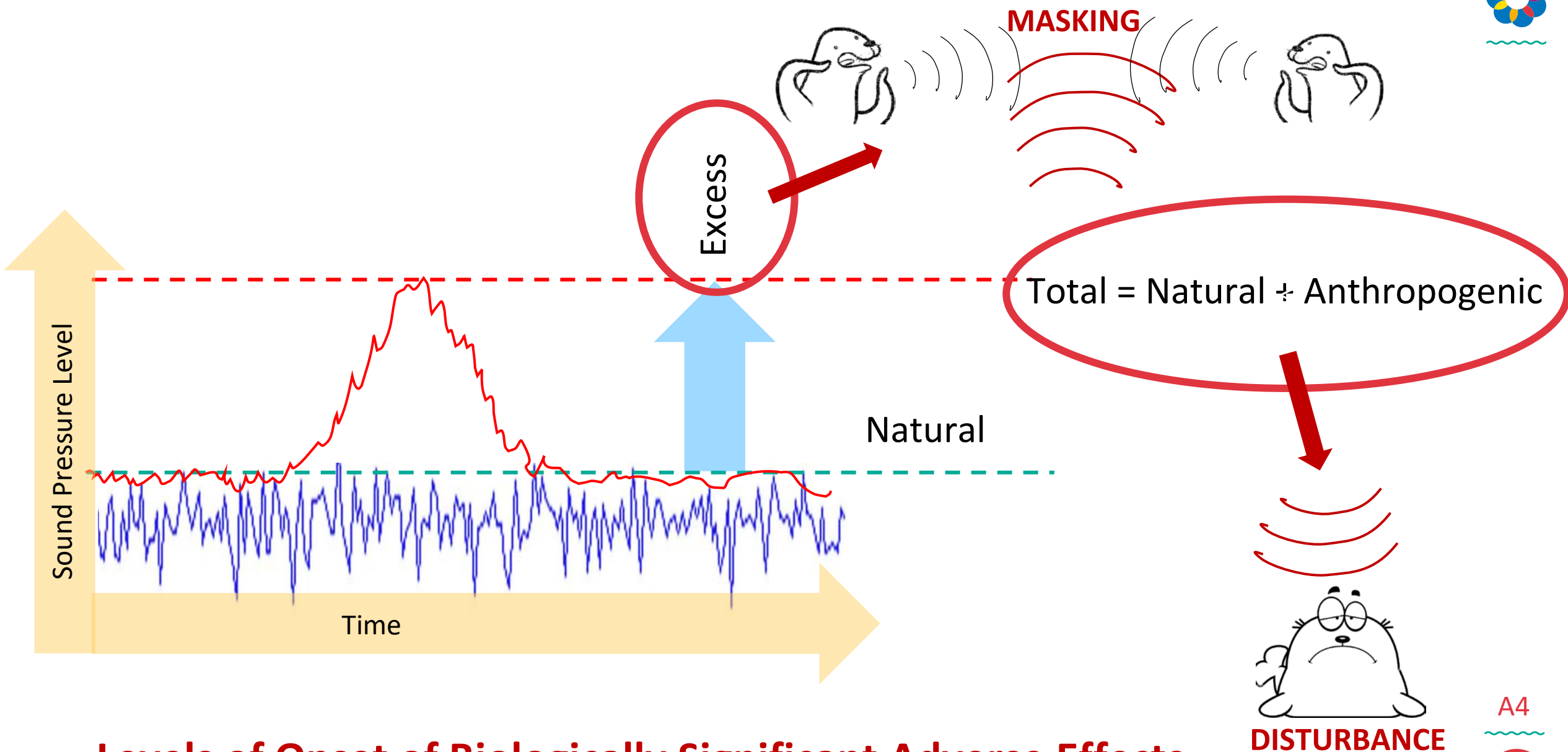


Cod



Harbour porpoise





Levels of Onset of Biologically Significant Adverse Effects





Levels of Onset of Biologically Significant Adverse Effects (LOBE)

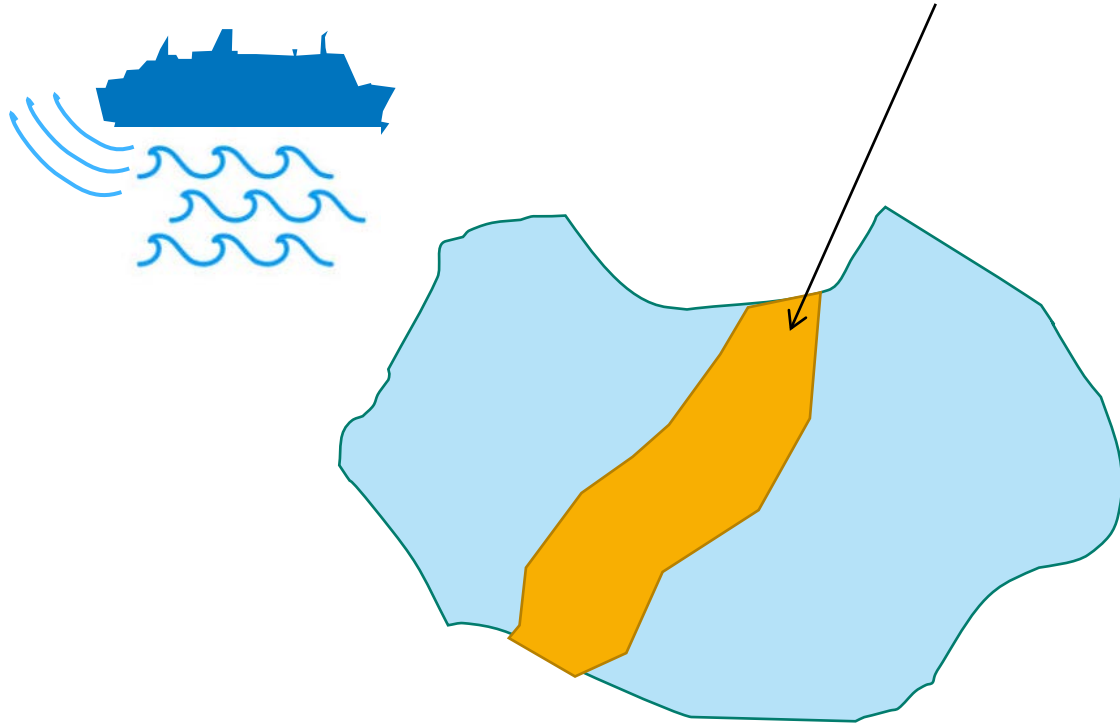
Marine species	Decidecade	Disturbance level	Masking	References and comments
	Hz	dB re 1μPa		
		SPL	dominance	
Seals	500	110	20	[Kastelein et al. , 2006]
Porpoise	500	109		EN Noise advise
Fish (Herring)	125	110	20 (disturbance)	[Olsen, 1971] [Kastelein et al. 2008]



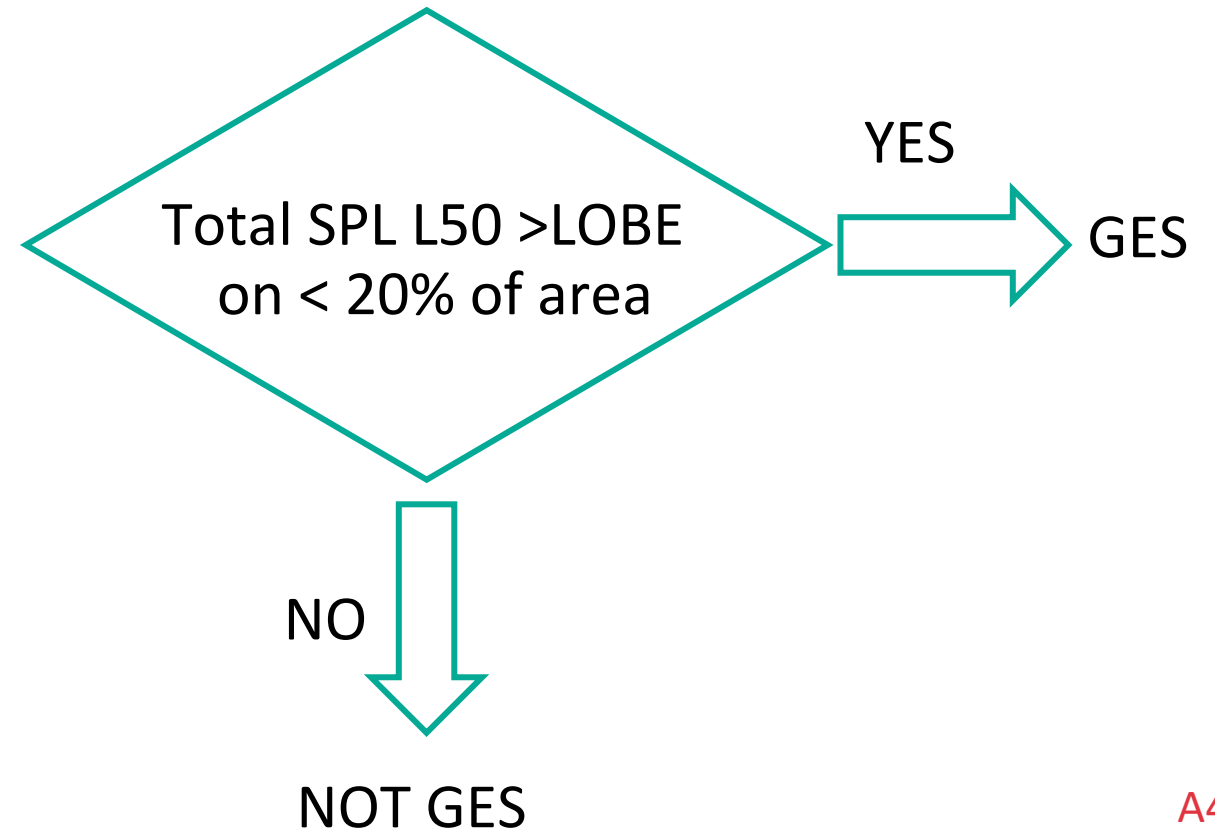
GES CRITERIUM 1 (DISTURBANCE)



Median Total SPL = Natural + Anthropogenic > LOBE



Marine Area



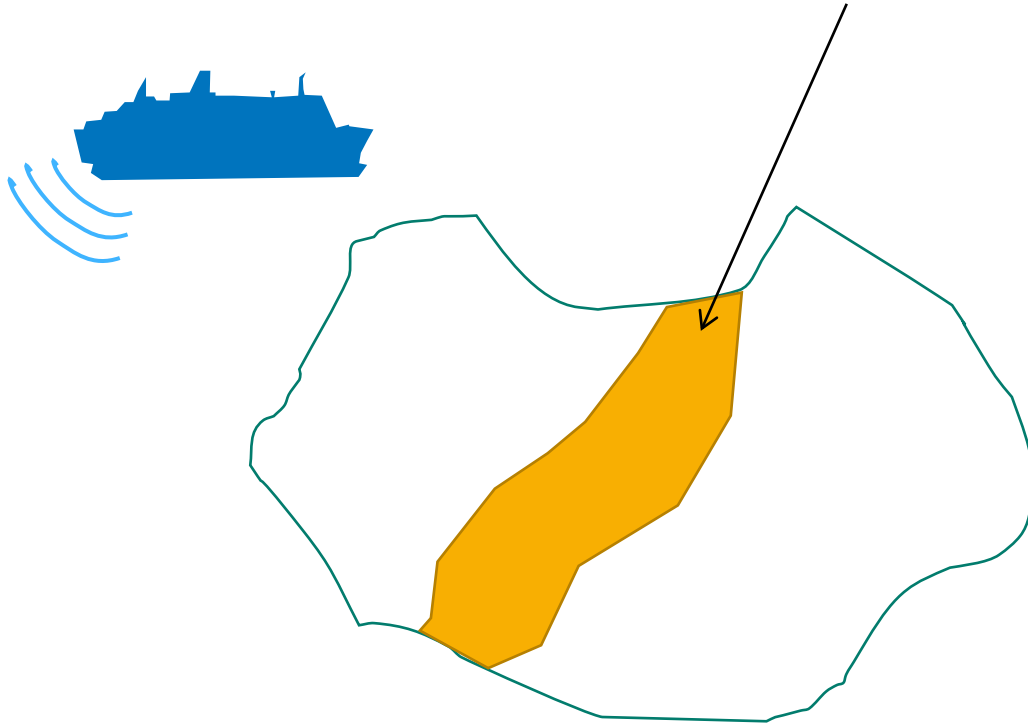
A4



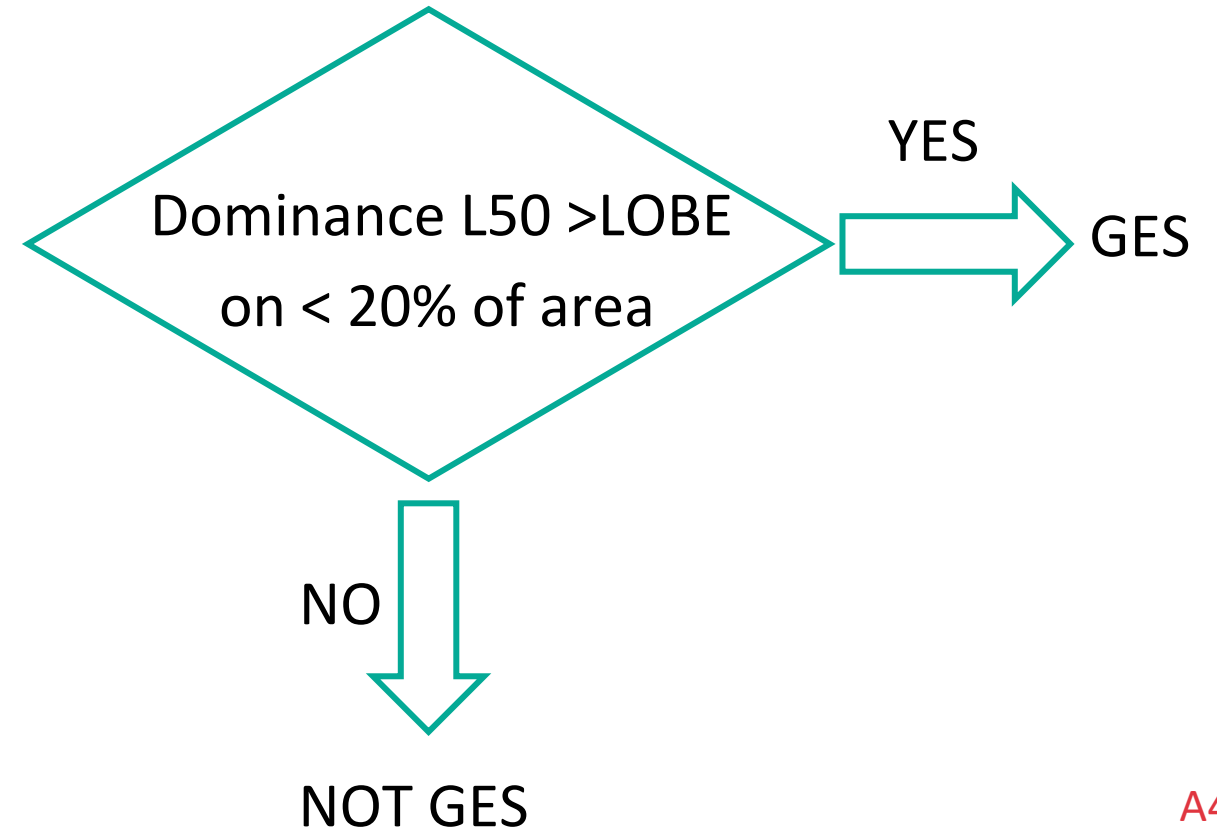
GES CRITERIUM 2 (MASKING)



Median Excess Level (dominance) > LOBE



Marine Area



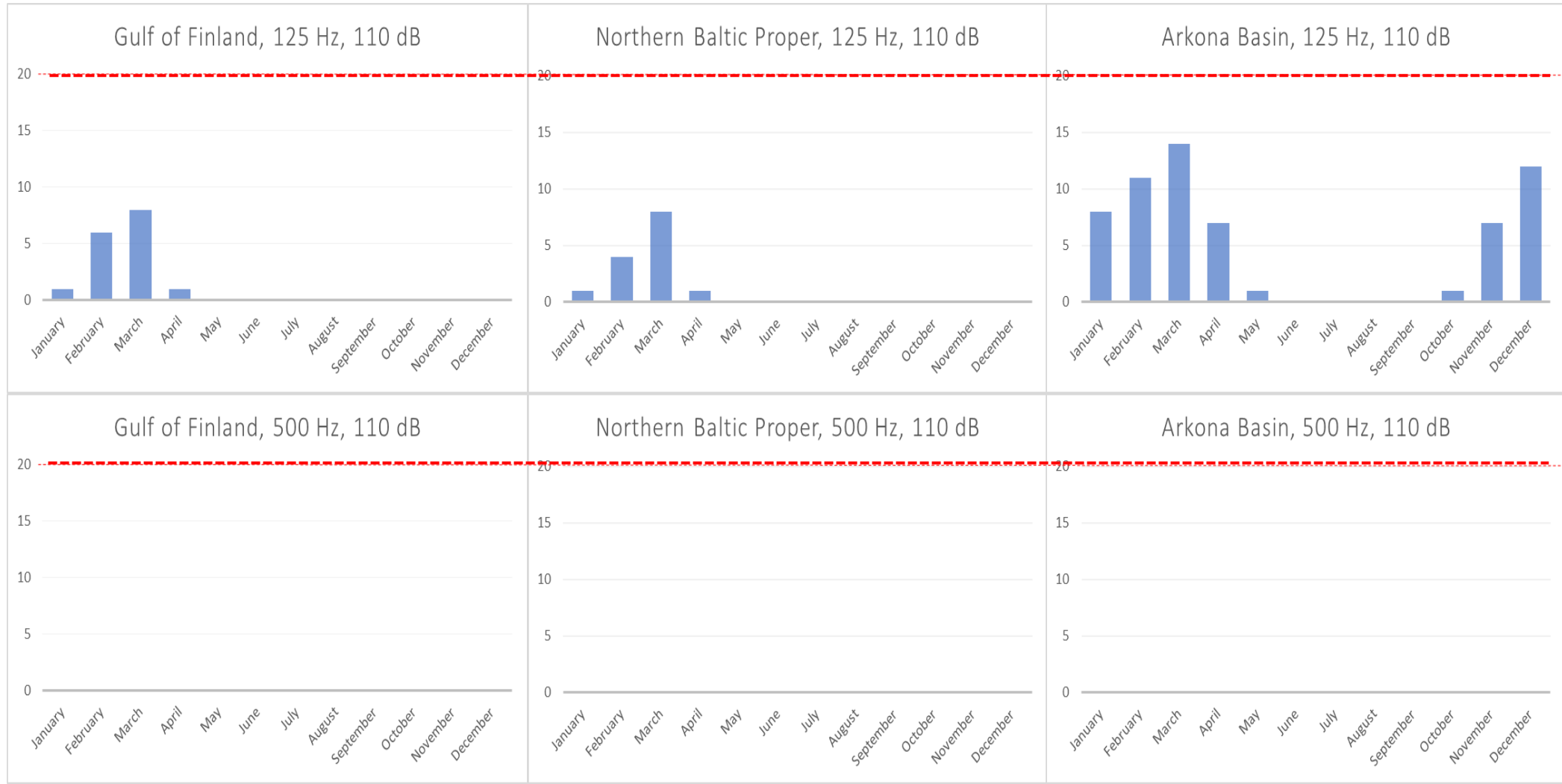
A4



Assessment results, LOBE = disturbance level 110 dB



Percentage of area



Percentage of area

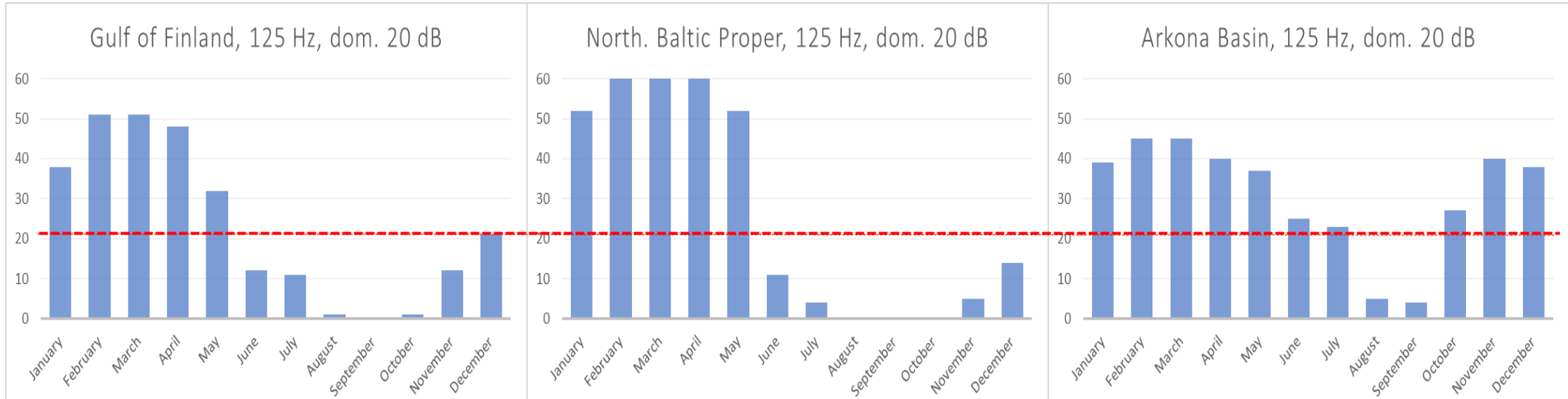
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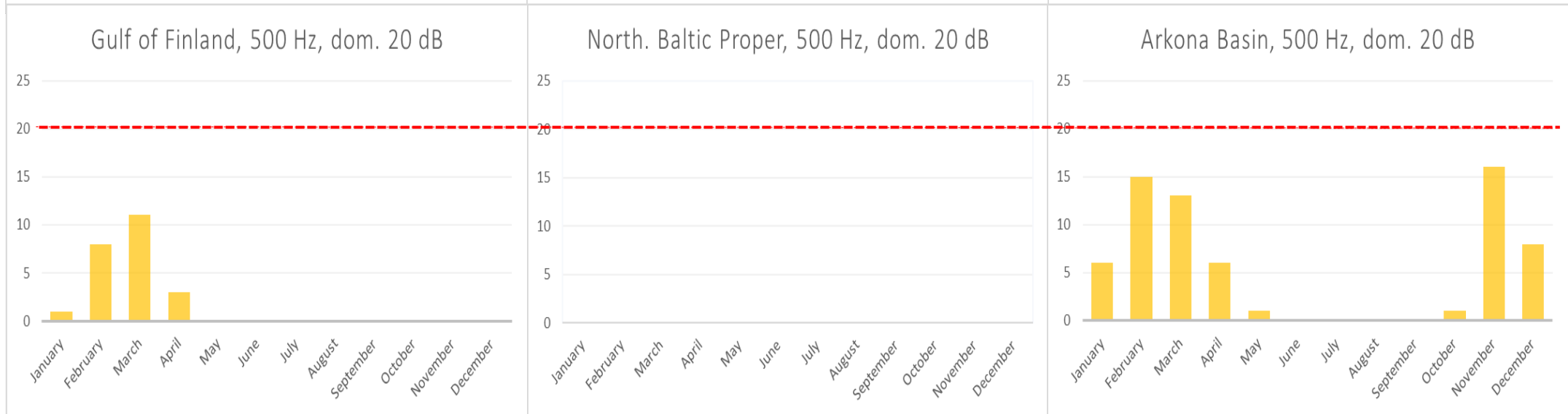
Assessment results, LOBE = dominance 20 dB



Percentage of area



Percentage of area

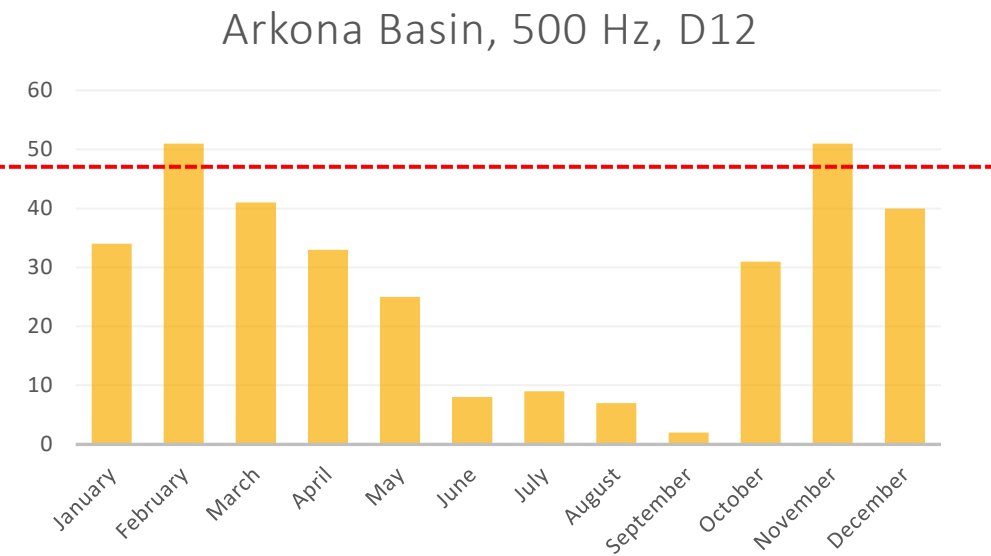
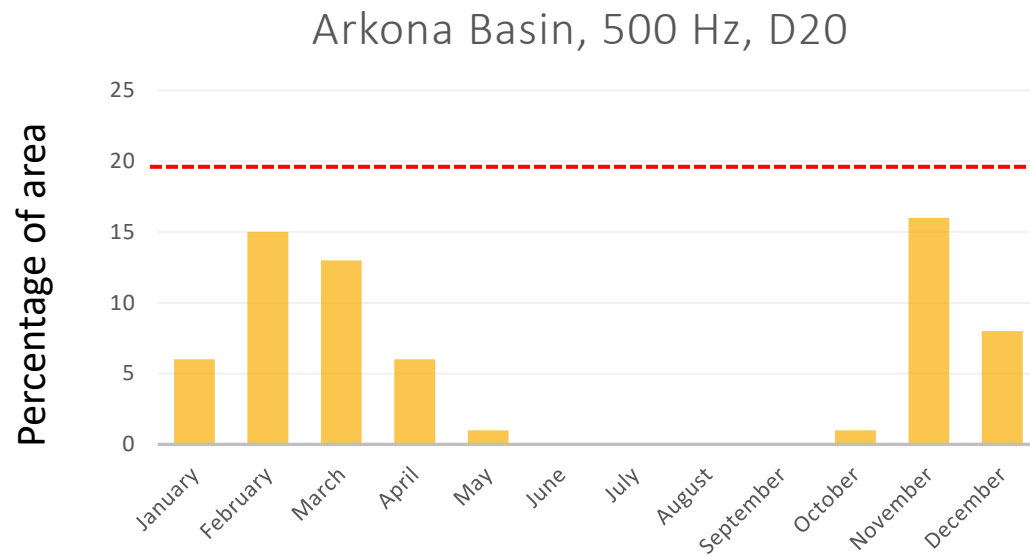


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High risk of masking vs moderate risk of masking





Assessment of the continuous noise indicator

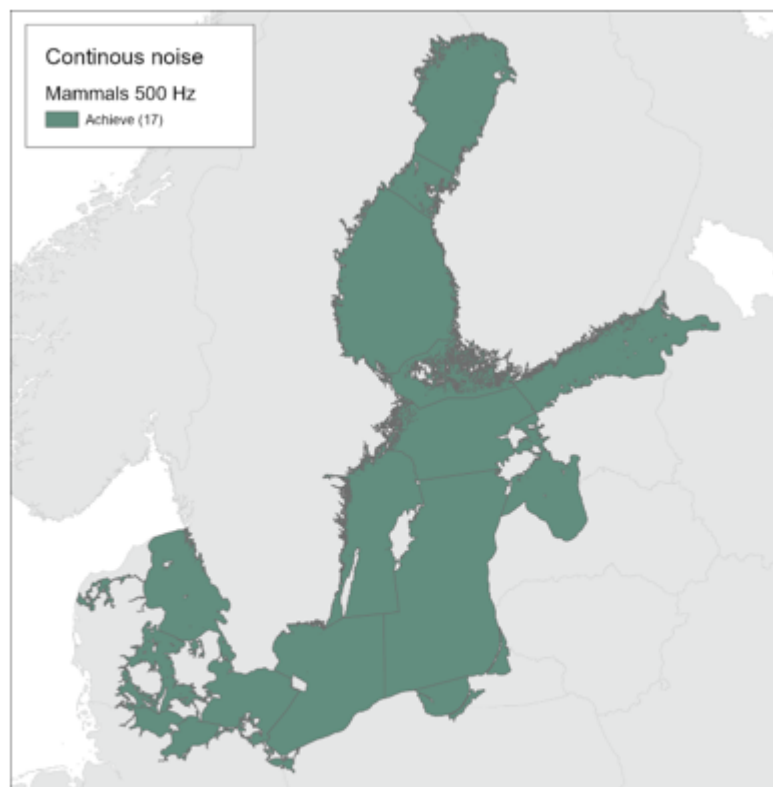
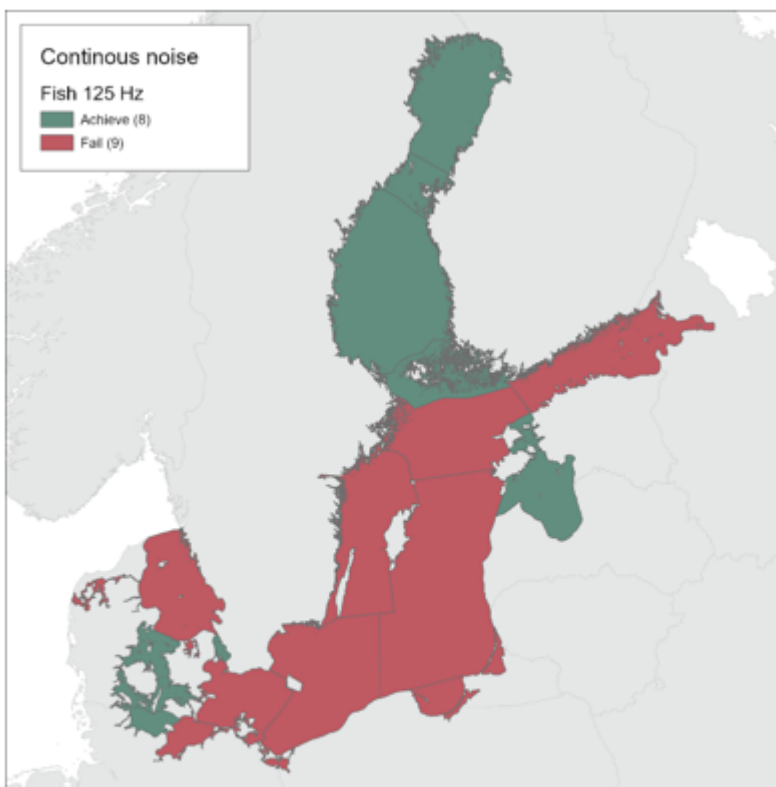
#	Subbasins	125 Hz		500 Hz	
		Fish*		Marine mammals*	
		110 dB	d 20 dB	110 dB	d 20 dB
1	Gulf of Finland				
2	Gulf of Riga				
3	Northern Baltic Proper				
4	Aland Sea				
5	Bothnian Sea				
6	The Quark				
7	Bothnian Bay				
8	Western Gotland Basin				
9	Eastern Gotland Basin				
10	Gdansk Basin				
11	Bornholm Basin				
12	Arkona Basin				
13	The Sound				
14	Bay of Meklenburg				
15	Kiel Bay				
16	Great Belt				
17	Kattegat				

*Fish: Baltic herring and cod

Marine mammals: all seals and harbor porpoise



Assessment of the continuous noise indicator



Key message figure 1. Continuous noise assessment. Fish (Baltic herring and cod) on the left side; marine mammals (all seals and harbour porpoise) on the right side. Green indicates that the indicator is below the 20% spatial threshold for all months in 2018, red indicates that the indicator was above the 20% spatial threshold in at least one month of 2018. The assessment has been carried out using Scale 2 HELCOM assessment units (defined in the HELCOM Monitoring and 24 Assessment strategy, 2013, Attachment 4). To access interactive maps at the HELCOM Map and Data Service: Continuous noise [Web link].





Results summary - continuous noise

Task	Deliverable	Results
Subtask 4.1.1	Production of new soundscape maps	New soundscape maps can be found on the ICES website
Subtask 4.1.2	Develop and execute assessment on noise sensitive species	Assessment was done
Subtask 4.1.3	Improve calibration standards for monitoring of continuous noise	Online workshop was held



Key messages



- Key message for **science**

- 1) We need to know more about the effects of continuous noise on marine species
- 2) Better GES criteria should be elaborated based on improved knowledge on the effects of continuous noise

- Key message for **policy makers**

- 1) Low-frequency ship traffic noise can have adverse effects on fish
- 2) Care should be taken to avoid disturbance on known spawning grounds





Use of results so far and in future

HELCOM

updated pre-core indicator reports and dedicated section on underwater noise as part of the pollution thematic assessment in HOLAS3

BSAP

contribution to action S62, S63 as well as the RAP Noise

MSFD

reporting on D11C2; art. 8; support for monitoring

EU

cooperation with TG Noise.





Activity 4:

A4 – Support for and harmonisation of regional work on Descriptor 11 (underwater noise)



Thank you!!

This work was possible due to support from

HELCOM Expert Group on
Underwater Noise

HELCOM EG Noise



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