Underwater noise, its impacts on marine species and the main mitigation measures

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Underwater sound affects the whole ecosystem

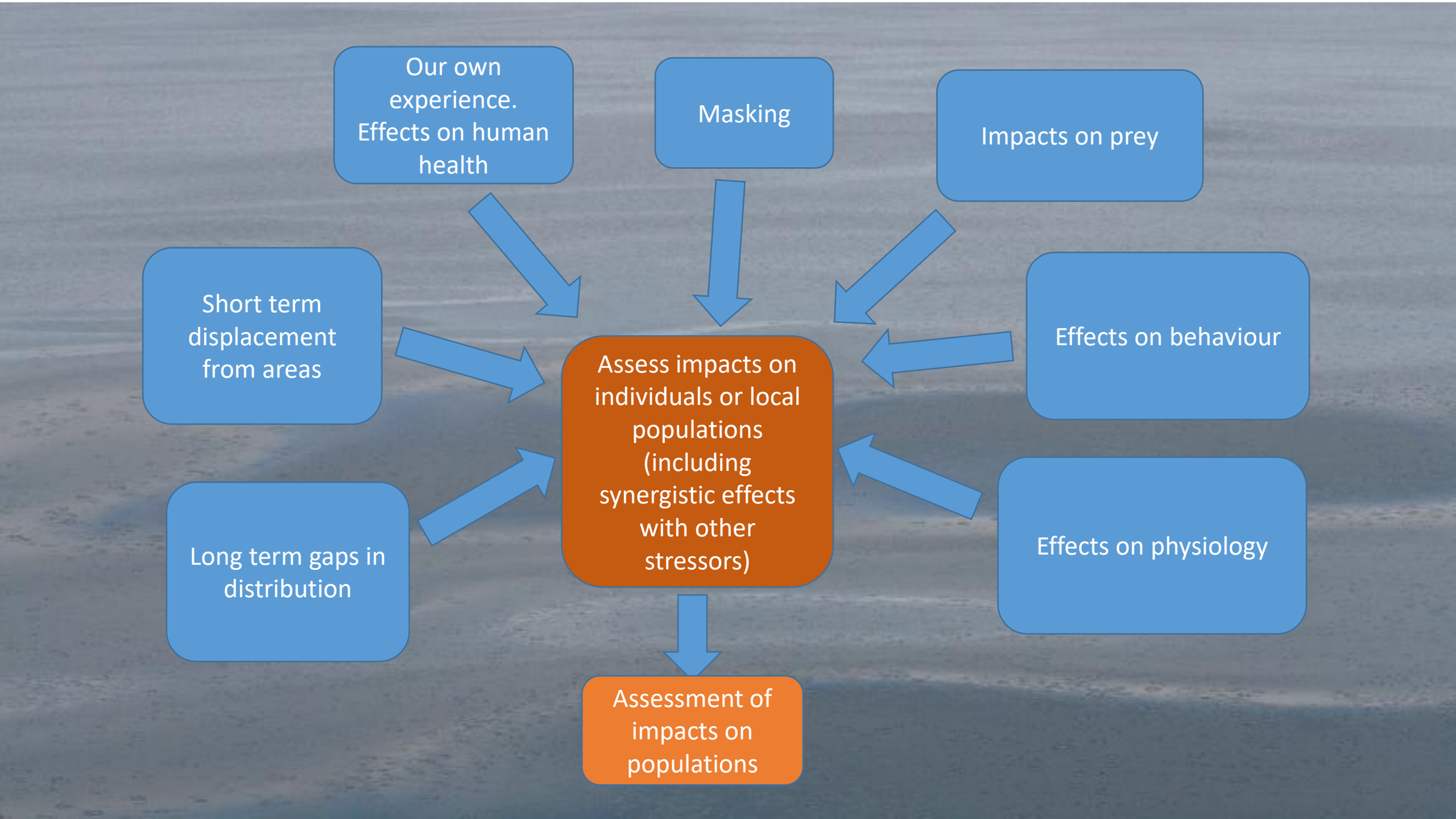
Man-made sources of underwater sound

‘Continuous’	‘Impulsive’
Raises ambient noise levels	Short duration sounds, often very intense
Shipping	Seismic
(Distant seismic)	Pile driving
	Sonar
	Explosions
	Acoustic deterrents

What are we trying to avoid?

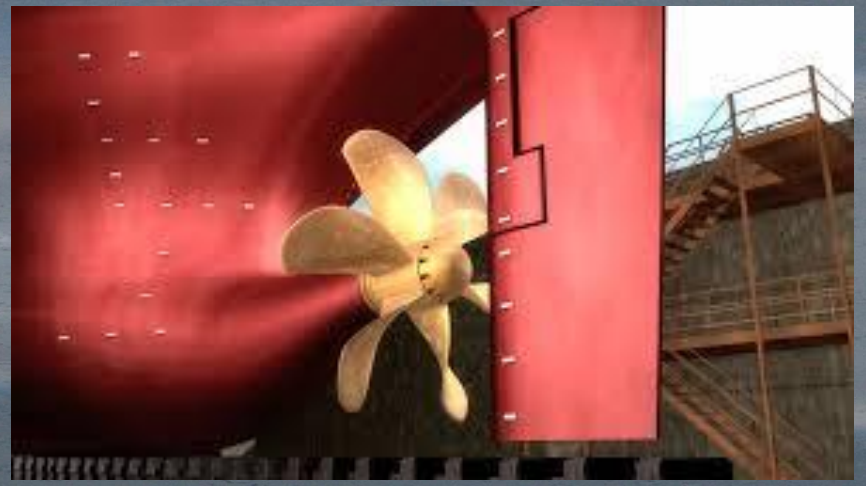
- In the context of the MSFD ‘The spatial distribution, temporal extent and levels of anthropogenic *impulsive sound sources/continuous low-frequency sound* do not exceed levels that adversely affect populations of marine animals (D11)’

But what are the impacts and how much is too much?


Our own experience. Effects on human health
Masking
Impacts on prey
Short term displacement from areas
Effects on behaviour
Assess impacts on individuals or local populations (including synergistic effects with other stressors)
Long term gaps in distribution
Effects on physiology
Assessment of impacts on populations

Shipping noise is the major human activity causing raised ambient noise levels across ocean basins (although seismic comes close in terms of total energy)

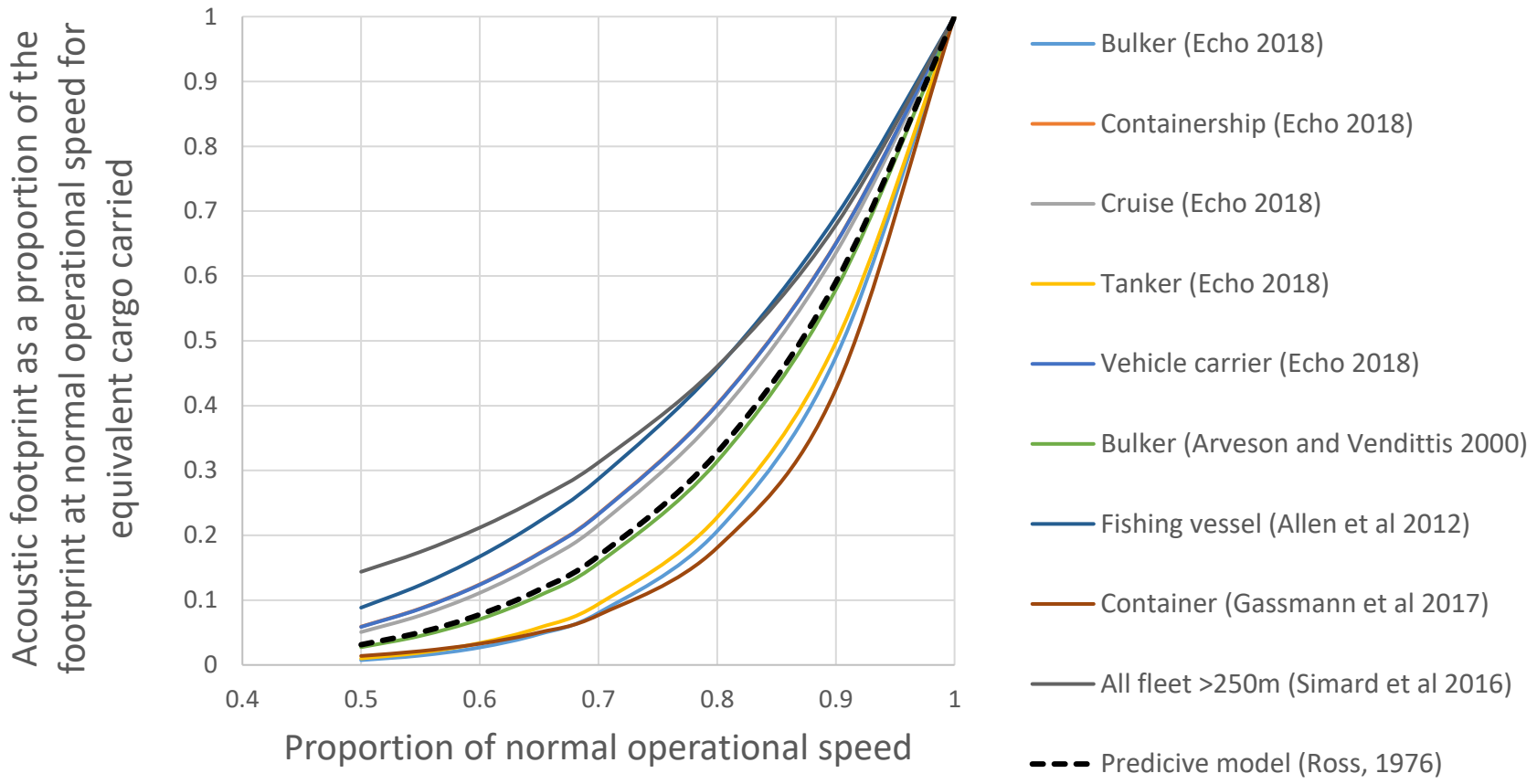
The propeller is the dominant source of noise



Noise from individual vessels can effectively be reduced

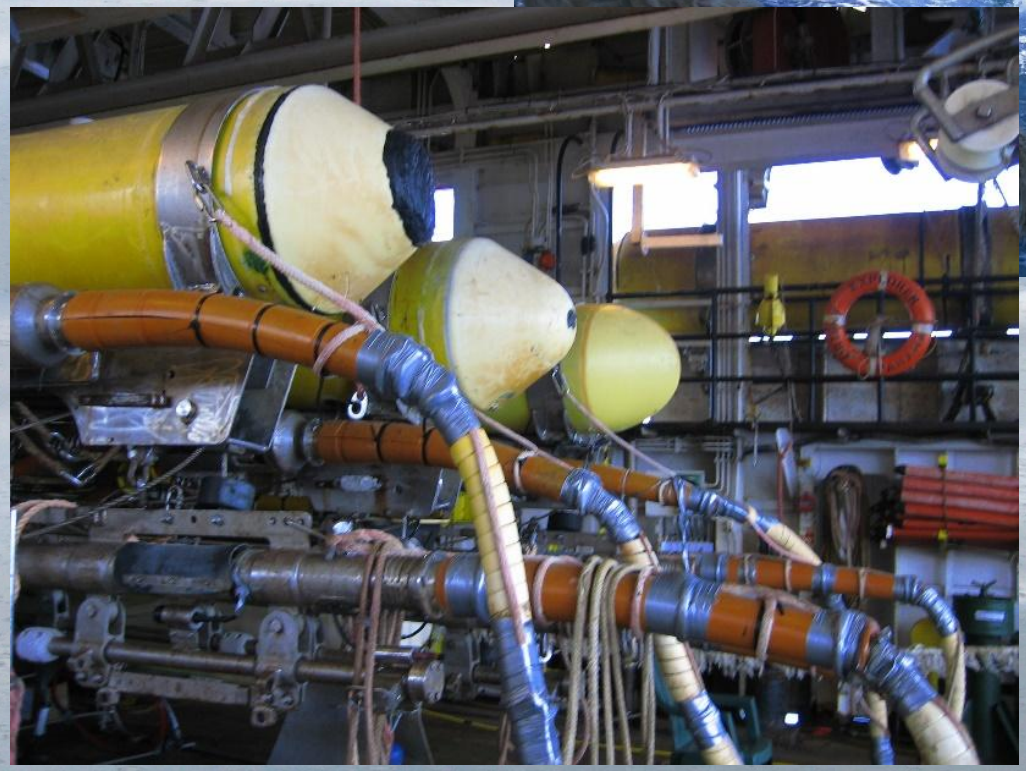
- IMO has recognized the need to take action and that uncertainty as to the effects of noise should not preclude efforts towards developing quieting technologies for commercial ships
- Measures to improve fuel efficiency can also reduce noise, so noise reduction can be economic
- The noisiest 15% of ships contribute more than 50% of the total noise energy
- Often the noisiest vessels are the ones that would benefit most from retrofit modifications
- In the short term operational measures such as reducing speed can be effective

Acoustic footprint associated with slowing down



Seismic surveys

Seismic airguns – now very old technology, difficult to control source levels, limited scope to reduce unwanted sound without new technology.



Current mitigation to try to reduce impacts

- Avoid times when sensitive species are present – unlikely to be possible for most seismic surveys in the Mediterranean
- Attempts to reduce the risk of injury to sensitive species through ramp up and shut down procedures based on sightings from Marine Mammal Observers or Passive Acoustic Monitoring
- Minimise sound levels

IMO Guidelines on underwater noise and requirements on energy efficiency (e.g. CII) apply to individual vessels



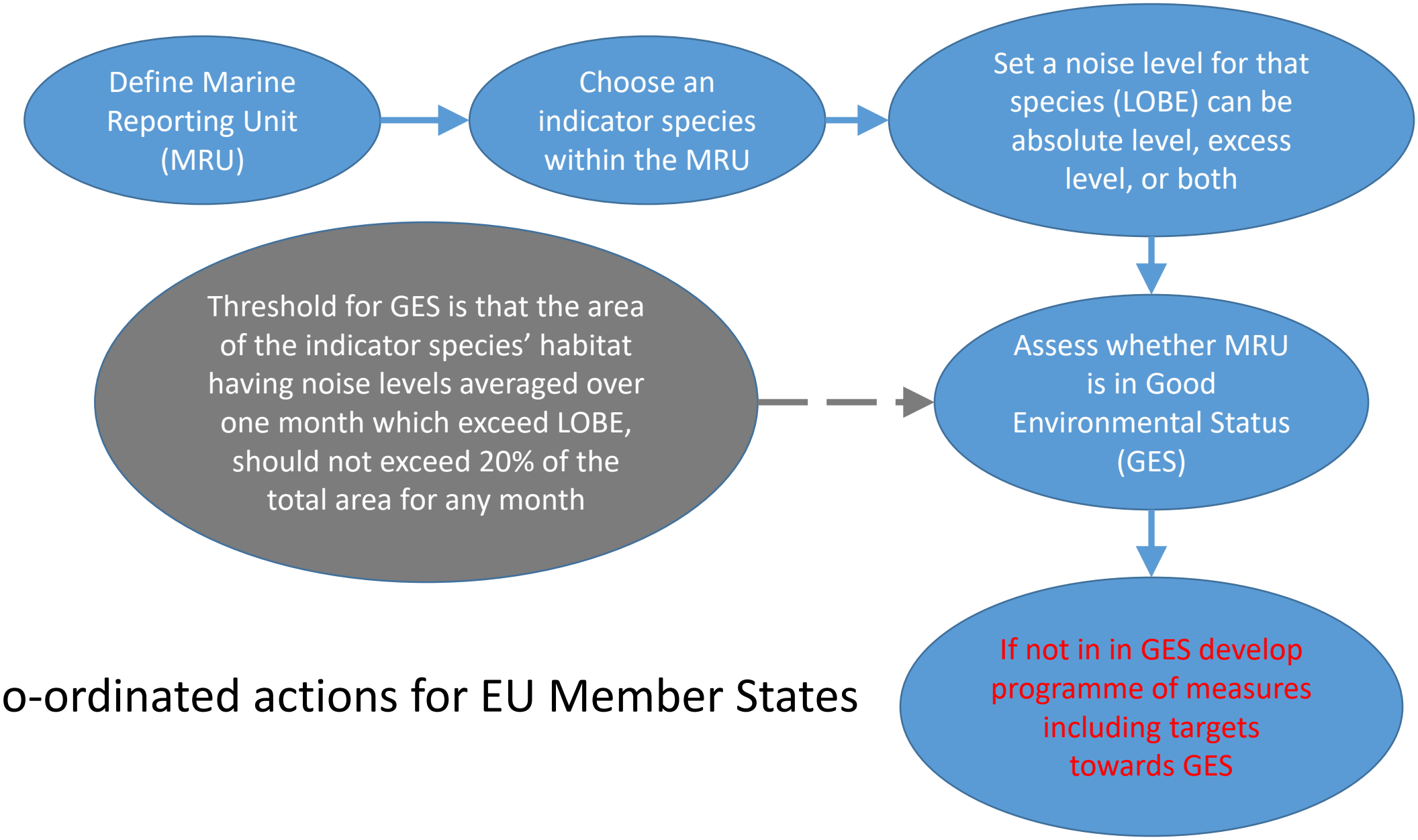


EU Marine Strategy Framework Directive Thresholds for Good Environmental Status and requirements under Regional Seas Conventions apply to habitats and areas



Actions by vessel owners and operators

Actions by Contracting parties/Member States



Co-ordinated actions for EU Member States

Challenges with implementing MSFD threshold values?

- Choosing indicator species
- Setting a value for LOBE
- Selecting the assessment area