

Addressing underwater noise to
achieve Good Environmental Status
for Descriptor 11.2
(continuous/ambient noise).

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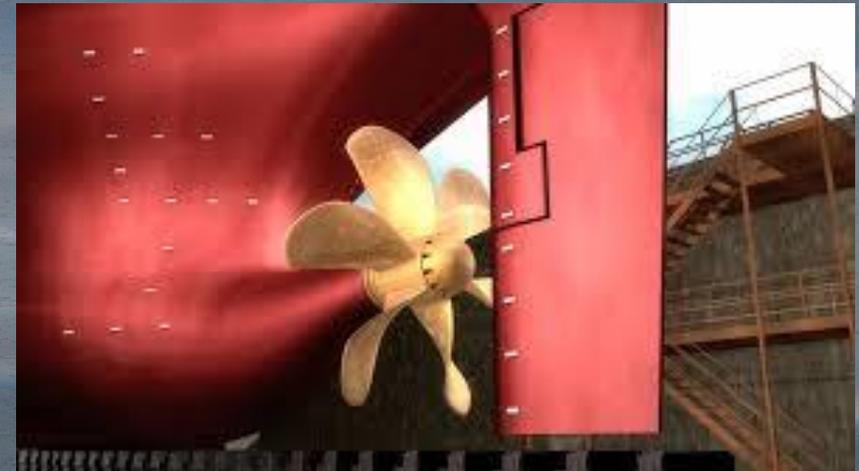
Underwater noise affects the whole ecosystem





Shipping noise is the major human activity causing raised ambient noise levels in the ocean (around 20 dB from pre-industrial conditions to the present day in the northern hemisphere)

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 modifications



One recent study (Gassmann et al. 2017) compared sound level measurements for five container vessels pre- and post-retrofits to improve energy efficiency. The modifications included replacing the bulbous bow and installing new propellers with boss cap fins to reduce cavitation.

Noise levels were reduced substantially. Based on these results, slow steaming combined with optimising the vessels for the new speeds reduces acoustic footprint by around 90%.

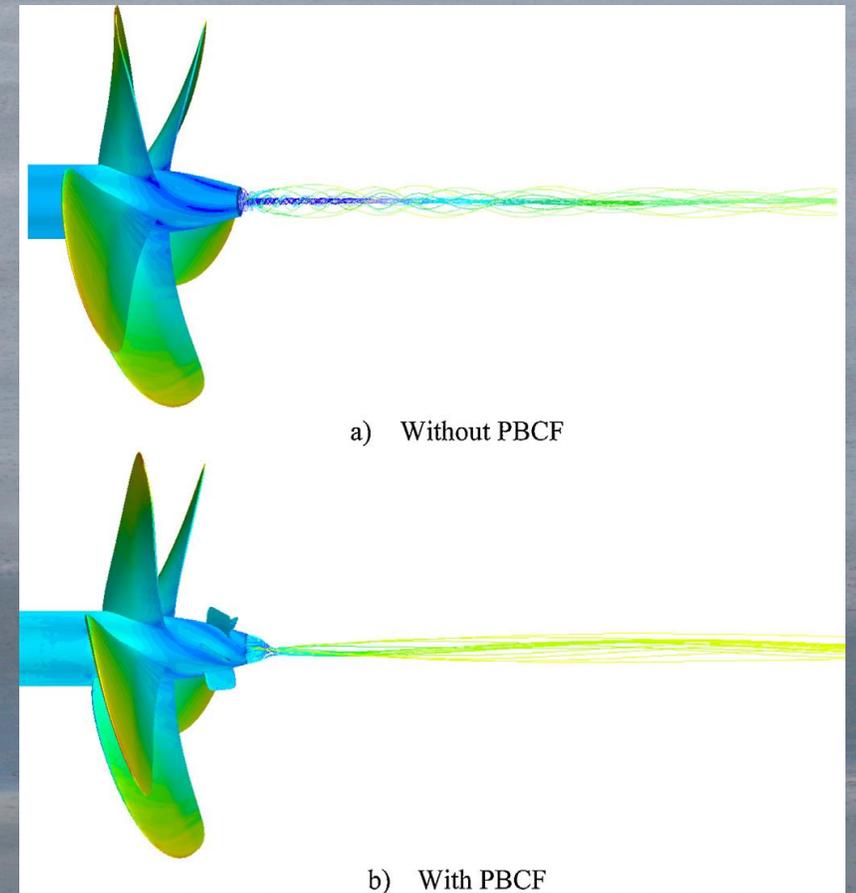


Figure from Mizzi et al. 2017

What are we trying to avoid in the context of MSFD?

- The spatial distribution, temporal extent and levels of anthropogenic continuous low-frequency sound do not exceed levels that adversely affect populations of marine animals (D11 C2)
- We know that raised levels of ambient sound from human activities
 - Make it more difficult to find prey and avoid predators
 - Reduce communication space (e.g. finding mates)
 - Cause stress
- But how much is too much?

Thresholds and targets?

- Thresholds under consideration are often expressed in the form $x\%$ of habitat exposed for $y\%$ of the time to sound levels above z
- Selecting a threshold sound level (z) that applies generally across a range of species and habitats is unlikely to be realistic
- But threshold level is not critical if the area affected (x) can be substantially reduced
- Slow steaming and noise reduction techniques applied across the whole fleet could reduce x by 90%

Next steps?

- Set a target of a certain proportion of the fleet adopting noise reduction measures
- Targets can be ambitious but still practical, economic and achievable
- Provide incentives and regulations to ensure that quieting technologies are widely implemented
- Modelling studies to predict the new situation based on the monitoring programmes being conducted for MSFD

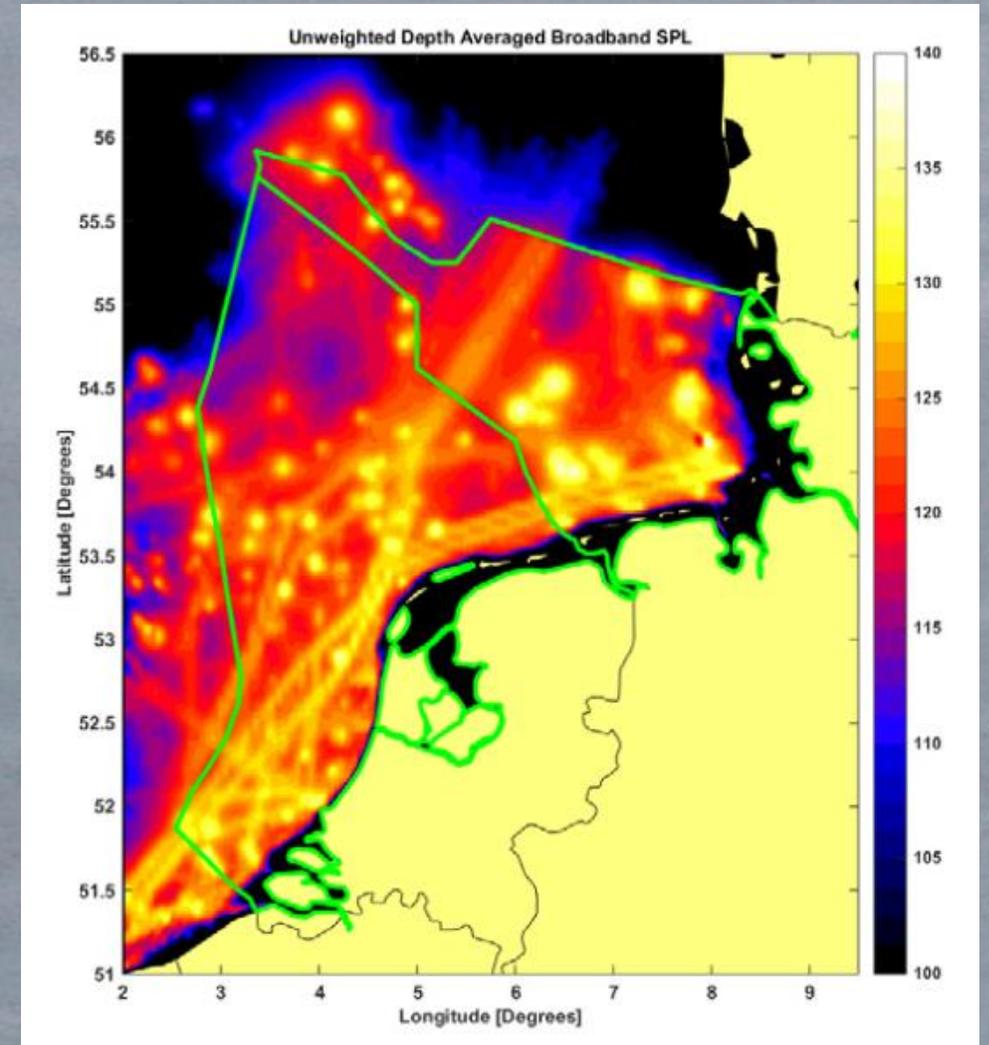


Figure from Prins et al., 2016