

Managing underwater noise in European waters

– implementing the Marine Strategy Framework Directive

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Introduction: The EU's Marine Strategy Framework Directive (2008/56/EC) requires the setting of objectives ensure that the "Introduction of energy, including underwater noise, is at levels that do not adversely affect the marine environment."

Indicator 1: low and mid-frequency impulsive sounds

High amplitude, low and mid-frequency impulsive sounds have caused the most public concern because of perceived negative effects on marine life.



Task Group recommendation: *The proportion of days within a calendar year, over areas of 15'N x 15'E/W in which anthropogenic sound sources exceed either of two levels, 183 dB re 1µPa².s (i.e. measured as Sound Exposure Level, SEL) or 224 dB re 1µPa peak (i.e. measured as peak sound pressure level) when extrapolated to one metre, measured over the frequency band 10 Hz to 10 kHz.*

Final European version: Proportion of days and their distribution within a calendar year over areas of a determined surface, as well as their spatial distribution, in which anthropogenic sound sources exceed levels that are likely to entail significant impact on marine animals measured as Sound Exposure Level (in dB re 1µPa².s) or as peak sound pressure level (in dB re 1µPa_{peak}) at one metre, measured over the frequency band 10 Hz to 10 kHz.

Indicator 2: high frequency impulsive sounds



High frequency impulsive sounds are used by sonars on many small vessels. At frequencies below 180 kHz, there is an overlap with those used by marine mammals

Task Group recommendation: *The total number of vessels that are equipped with sonar systems generating sonar pulses below 200 kHz should decrease by at least x% per year starting in [2012].*

Final European version: No indicator chosen.



A Task Group, consisting of the authors, was established to recommend indicators that might be used by Member States to define possible objectives. The Task Group focused on sounds that affect relatively broad areas of the marine environment and developed three possible indicators of underwater sound.

Indicator 3: low frequency, continuous sound



There have likely been increases in ambient noise levels in past years mostly due to increased shipping activity. This has likely resulted in the masking of biological relevant signals between marine animals.

Task Group recommendation: *The ambient noise level measured by statistically representative sets of observation stations in Regional Seas where noise within the 1/3 octave bands 63 and 125 Hz (centre frequency) should not exceed the baseline values of year [2012] or 100 dB (re 1µPa RMS; average noise level in these octave bands over a year).*

Final European version: Trends in the ambient noise level within the 1/3 octave bands 63 and 125 Hz (centre frequency) (re 1µPa RMS; average noise level in these octave bands over a year) measured by observation stations and/or with the use of models if appropriate.

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