

The Marine Strategy Framework Directive and Underwater Noise



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“..a framework within which Member States shall take the necessary measures to achieve or maintain GES..”

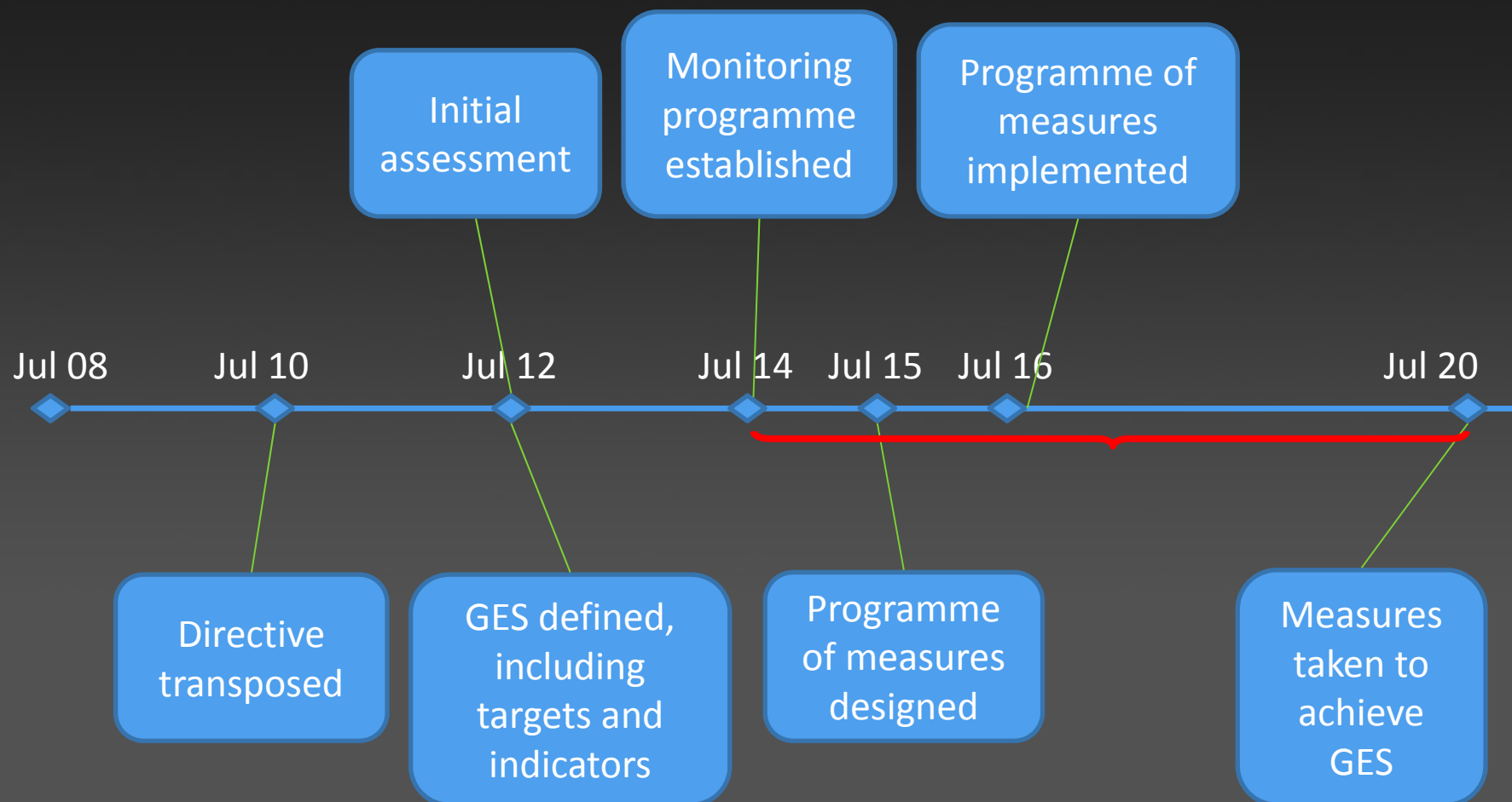
- This means that GES will be the outcome of national marine strategies.
- Directive requires;
 - regional coordination, accounting for existing activity under CFP and other Directives.
 - measures to be cost-effective, and gives Member States exemption from taking measures whose costs exceed their benefits (assuming no deterioration)
- GES thresholds still to be agreed, but will be based on principles of sustainable development

Implementation Process



- Commission decision in Sep 2010 on criteria and methodological standards (i.e. units of measurement, not levels of ambition)
- Member States must then define GES and set targets and indicators by 2012 – monitoring programmes follow, then programmes of measures by 2015
- Detailed Annexes specify Initial Assessment

Directive Timeline



GES descriptors

1. Biodiversity
2. Non-indigenous species
3. Fish and Shellfish
4. Marine Food Webs
5. Eutrophication
6. Sea Floor integrity
7. Hydrographical conditions
8. Contaminants
9. Contaminants in fish and shellfish
10. Marine Litter
11. Energy (noise)

Descriptor 11



Introduction of energy, including underwater noise, is at levels that do not adversely affect the marine environment



Marine sound sources

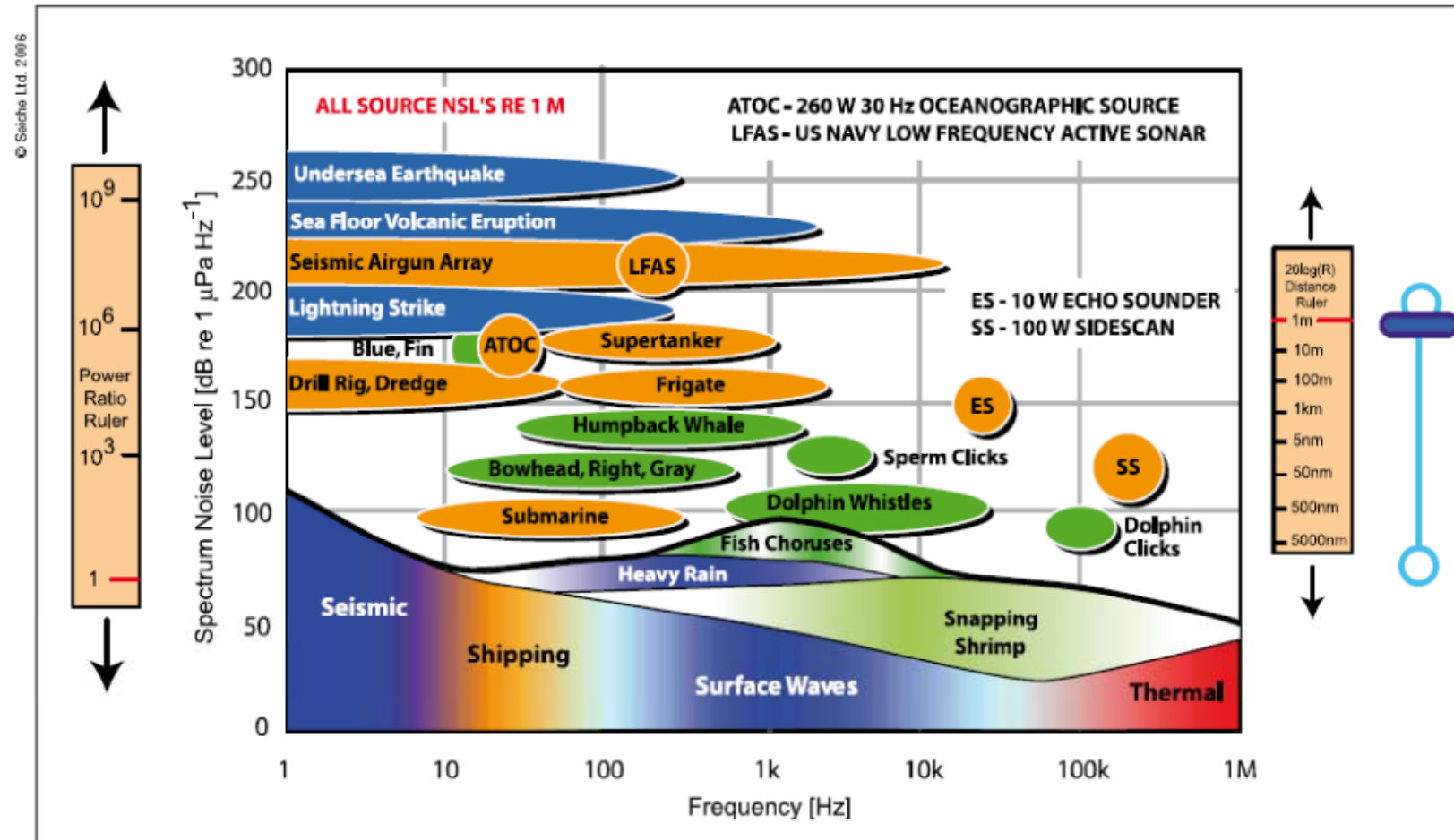


Figure 4. Noise levels and frequencies of anthropogenic and naturally occurring sound sources in the marine environment

Boyd *et al.* 2008

Detection

Masking

Response

Hearing loss,
injury

Two main issues

Acute exposure to loud, low and mid frequency impulsive sounds

- Gaps in distribution due to behavioural alterations



Chronic exposure to continuous low frequency sound

- Communication difficulties caused by low frequency noise



(OSPAR 2009; Tasker et al. 2010)

High amplitude sounds



Effects

- Studies at wind-farm installation (pile driving) indicating that harbour porpoise move away from the area
- Studies from seismic vessels indicating behavioural change and reduction in densities of several marine mammal and fish species
- Strandings of beaked whales most likely caused by behavioural change



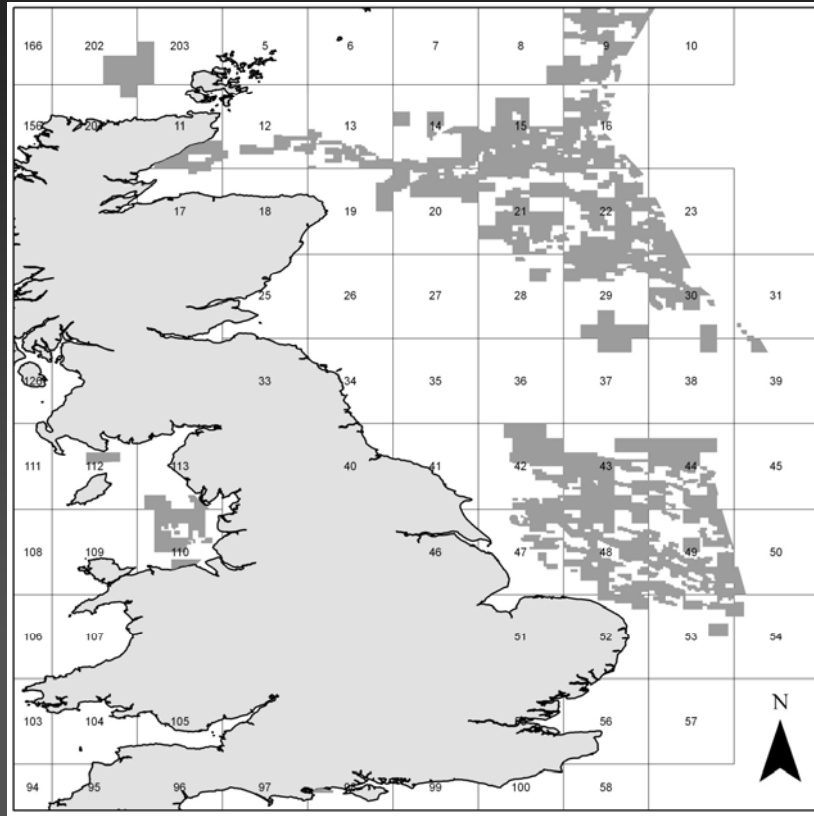
Commission decision



- Attribute 1: **Distribution in time and place of loud, low and mid frequency impulsive sounds**

Indicator 1: 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 1 $\mu\text{Pa}^2\cdot\text{s}$), or as peak sound pressure level (in dB re 1 μPa peak) at one metre, measured over the frequency band 10 Hz to 10 kHz.

Indicator 1 Implementation



- Large scale registration of low frequency impulsive sound in each member state ('Noise register')
- Assessment of 'status-quo'
- Assessment of future scenarios
- Can be used in MSP

Continuous sound



- Mainly shipping
- Frequencies < 1 kHz
- **Increasing trend** in some areas
- Response documented (Southall 2008)
- Potential for masking (see Janik 2005 and Southall 2008)
- Long-term changes of acoustic habitat

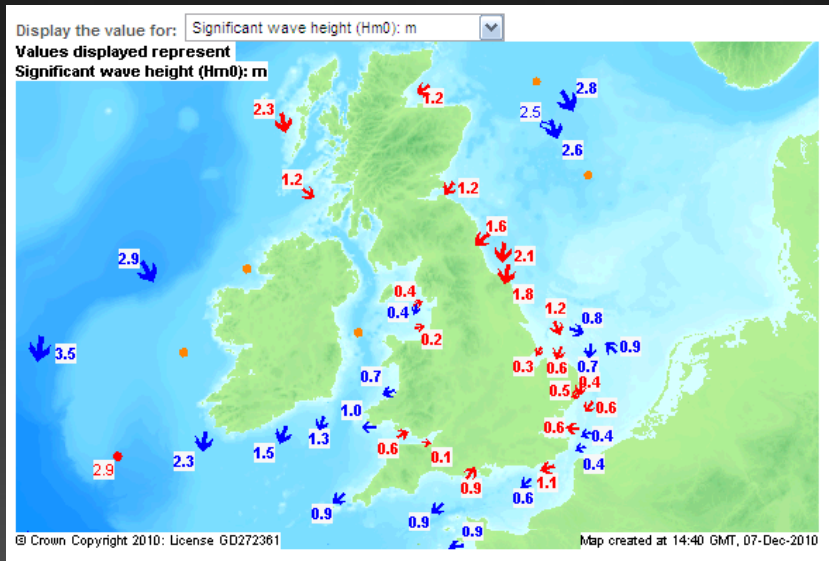
Commission decision



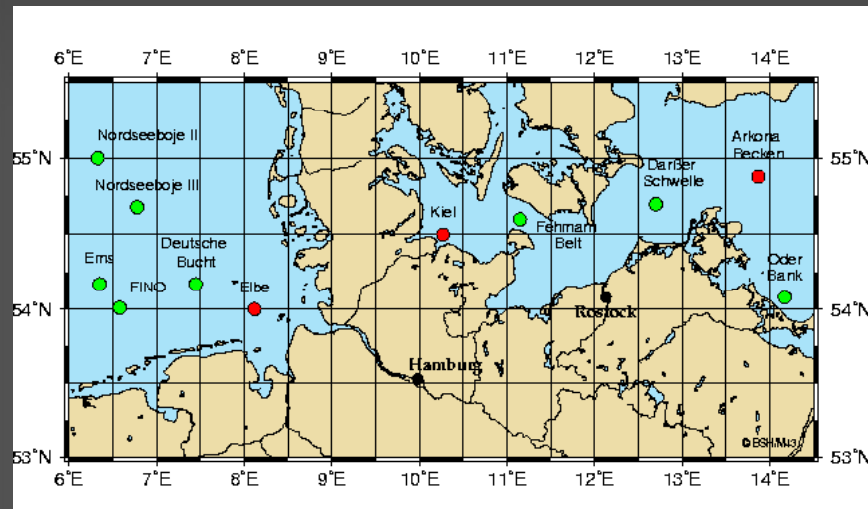
- **Attribute 2: Continuous low frequency sound**

Indicator 2: Trends in the ambient noise level within the 1/3 octave bands 63 and 125 Hz (centre frequency) (re 1 μ Pa RMS; average noise level in these octave bands over a year) measured by observation stations and/or with the use of models if appropriate.

Indicator 2 Implementation



- Monitoring of ambient noise at exemplary / representative sites
- Results should indicate trends
- Targets based on trend analysis



Next steps



- Initial Assessment and target suggestions in some EU member states
- Advice on implementation and monitoring in TSGN 2012-2013





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