

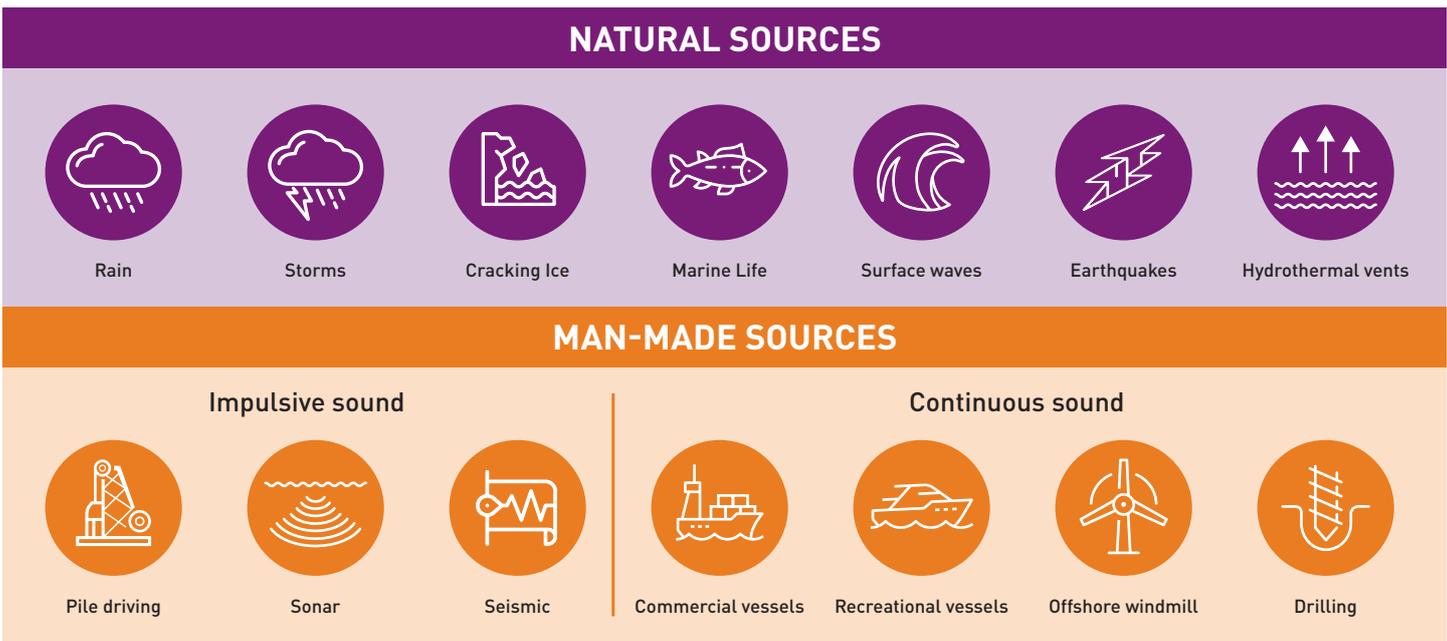
Underwater sound

Perspective from the oil and gas offshore industry in Europe

Underwater sound in a nutshell

- Underwater sound comes from various natural and man-made sources. Potential impacts, if any, of a specific sound depends on its characteristics, the marine species receiving the sound and other characteristics of the marine environment.
- The EU Marine Strategy Framework Directive (MSFD Descriptor 11) and Regional Sea Conventions (OSPAR, HELCOM and Barcelona Convention) aim to ensure that levels of anthropogenic sound do not exceed levels that may potentially adversely affect populations of marine species.
- Quantifying potential adverse effects on marine mammal populations and other marine species is an element of the Good Environmental Status Decision¹. Identifying population level effects is an area of active scientific research. However existing and available analysis methods such as Population Consequence of Disturbance (PCoD) are being implemented for various species in some areas of the world, including in the North Sea, although further data is required for some European species.
- Conservative restrictions on activities decided without scientifically based assessment of potential impacts on marine species populations could have unintended economic consequences without providing any environmental benefit.

Natural and man-made sources of sound in the marine environment



Based on source: Clear Seas, Primary Sources of Underwater Sound²

¹ Commission Decision (EU) 2017/848 of 17 May 2017 laying down criteria and methodological standards on good environmental status of marine waters and specifications and standardised methods for monitoring and assessment.

² <https://clearseas.org/en/infographics/primary-sources-underwater-sound>

What is the oil and gas industry doing to manage underwater sound?

A range of mitigation measures are typically implemented during offshore oil and gas industry activities (examples are shown below). These are often combined with data collection methods that are carefully designed and implemented to address potential site-specific safety and environmental impacts identified during project planning. Such measures are typically reflected in a project specific Environment Management Plan (EMP) or similar project level plan.

IOGP develops international recommended practices and good practice guidelines to help inform assessment processes and provide recommendations for monitoring and mitigation activities. IOGP and its members also actively engage in research programmes to further advance scientific understanding of potential impacts and improve mitigation and monitoring methods (further references are available at the end of this document).

Industry toolbox to manage underwater sound and potential impacts on marine life



COMPLIANCE FRAMEWORK

- National and regional regulations (permit requirements, EIA)
- International standards (ISO14001)
- Measures recommended by industry organizations
- Company internal EIA and practices
- Site-specific measures to mitigate risks identified during project planning



PROJECT PLANNING MEASURES

- Scheduling and pre-programme planning
- Sound modelling at impact assessment phase
- Sound source reduction through design, for example:
 - Seismic survey source selection
 - Acoustic barrier technology during piling



OPERATIONAL MEASURES

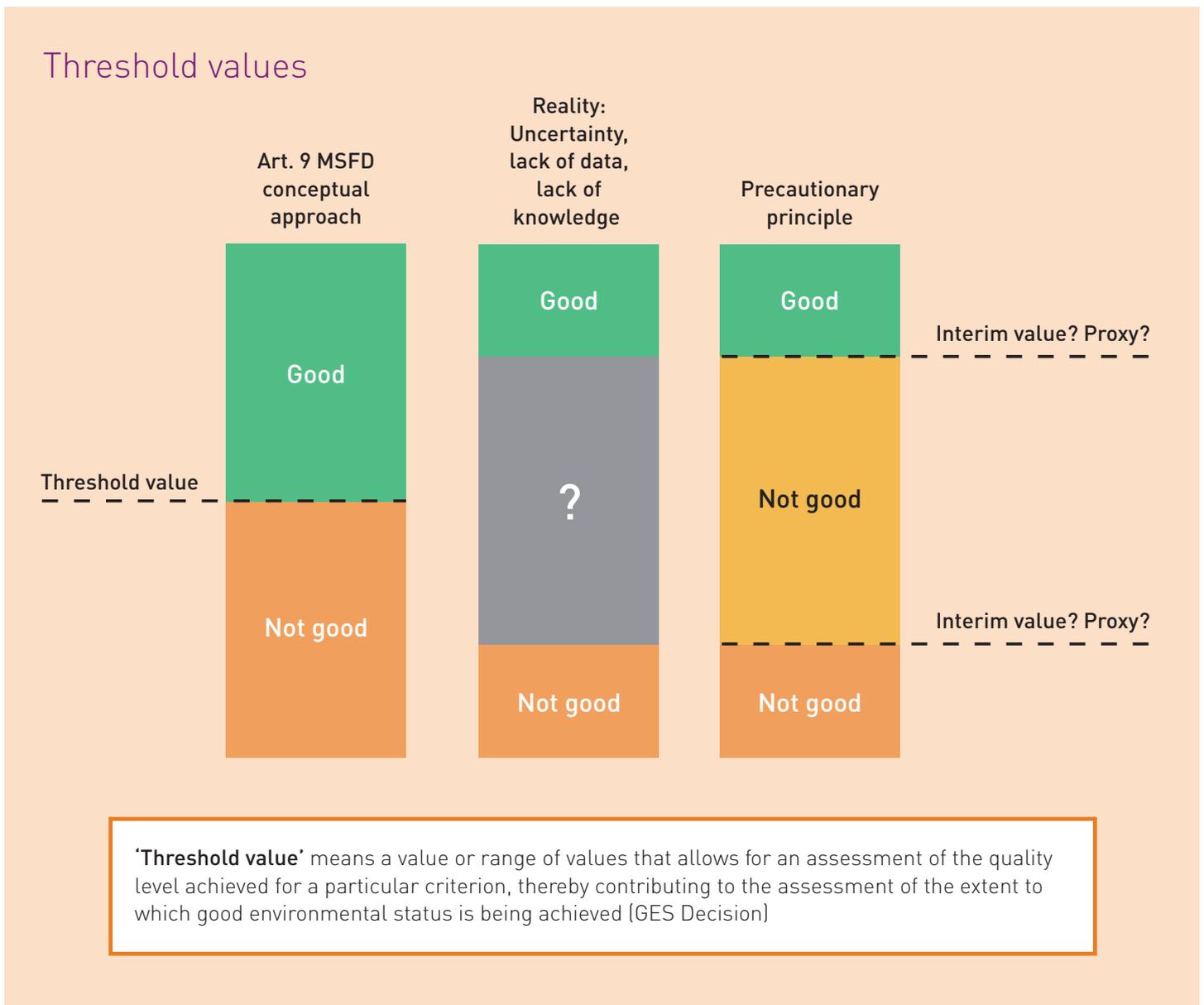
- Source soft-start
- Exclusion zones
- Visual and/or Towed Passive Acoustic monitoring
- Delaying the start or pausing operations when sensitive animals are detected (as per the agreed mitigation plan)

How is underwater sound managed in the EU?

In the EU, potential impacts of underwater sound are already managed by a variety of measures on an international, EU, national, and regional basis.

The Marine Strategy Framework Directive (MSFD)³, Good Environmental Status Decision (GES) and some Regional Sea Conventions aim to establish threshold values to ensure that levels of sound from man-made activities do not exceed levels that may potentially adversely affect populations of marine species.

Challenges associated with establishing threshold values under the GES Decision, as expressed in the Commission Expert Group on MSFD workshop briefing paper, include: uncertainty, lack of data, and lack of knowledge.



Source: European Commission (MSCG) briefing paper prepared for MSFD Workshop Horizontal Issues - Threshold Values on 30th September 2020

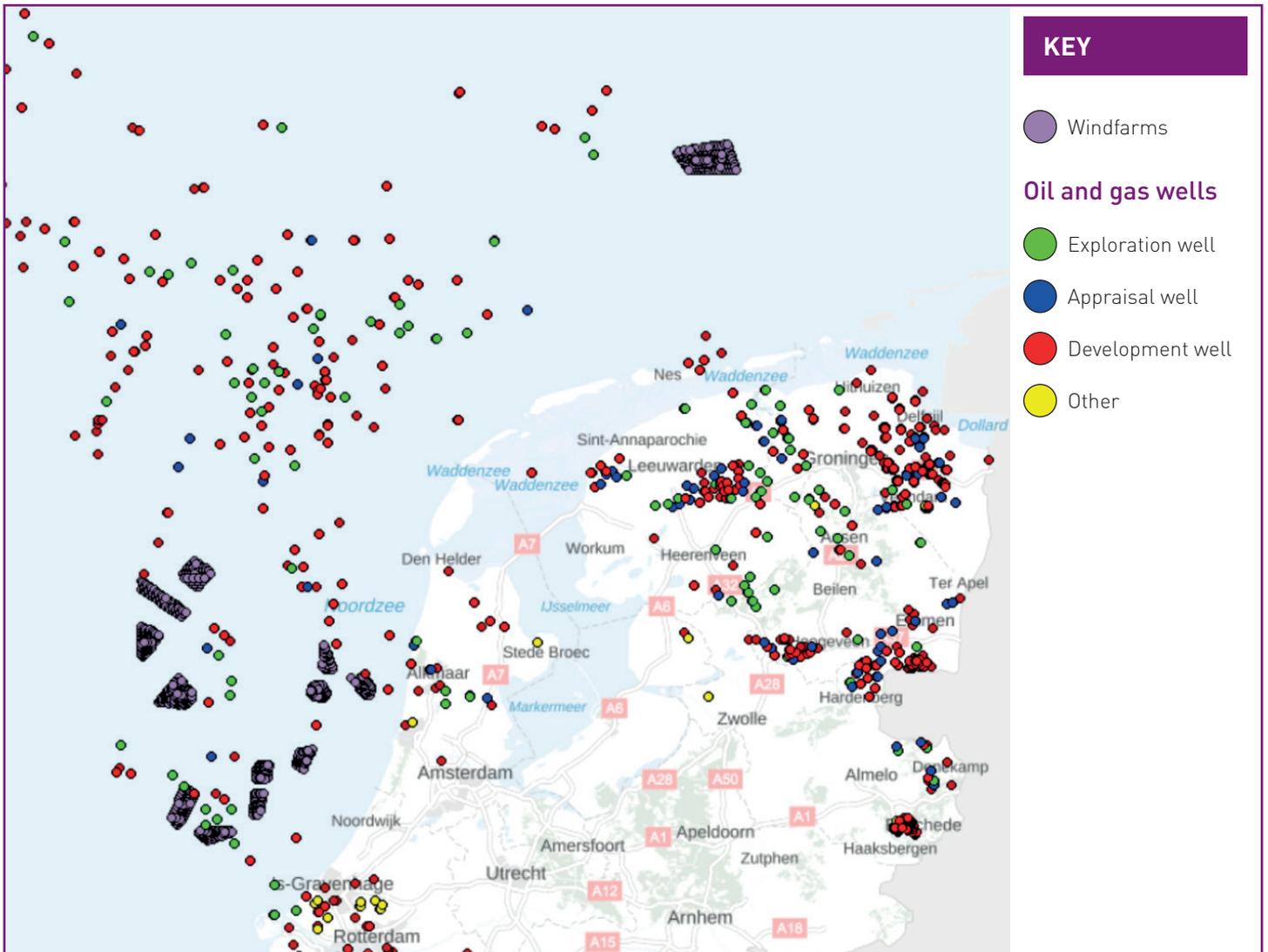
³ Directive 2008/56/EC

What might be the outstanding issues?

Precautionary restrictions of underwater sound will have many consequences, and there are still many questions to be answered:

- Would an activity need to be postponed to the next year once threshold value has been reached even if the sensitivity of the area is low at that time of the year?
- How will activities be prioritised (especially given differing permitting processes and timelines for activities in different member state offshore areas)?
- What notice will there be, bearing in mind contractual obligations for project/operation delivery?
- How will the necessary maintenance activities (planned or unplanned) be treated?

Map of oil and gas wells and windfarms in the Netherlands



Source: Dutch Ministry of Infrastructure and Water Management⁴

⁴ <https://geoservices.rijkswaterstaat.nl/apps/geonetwerk/srv/dut/catalog.search#/map>

FOCUS ON

Common language and harmonization among the EU and other Regional Sea Conventions

Clarity of definitions and key concepts is essential, so that all the relevant stakeholders have the same understanding what is referred to regarding “exposure” to sound and “impact” due to exposure to sound, “sound” and “noise”, “background level” or “reference level” etc.

Example: EXPOSURE ≠ IMPACT

EXPOSURE

Exposure to a given underwater sound level indicates detection of stimulus, and does not mean that adverse impact will always occur.

IMPACT

An effect (positive or negative) from human activities and/or natural events on living organisms and their non-living environment (OECD)

Activity vs population impact threshold values

Threshold values associated with duration and extent of maritime activities that generate underwater sound will not fully represent GES defined in terms of ‘adverse impacts to marine mammal populations.’

Establishing threshold values to avoid adverse impacts at a population level should be based on current scientific understanding and available data through evaluation of population consequences.

Implementing and funding research projects identifying and quantifying marine mammal population level impacts

Historically, research efforts have focused on potential effects to individual marine mammals, rather than marine mammal populations. It is essential and required by the GES Decision⁵ to have an understanding on how sound may affect marine mammal populations.

An area of ongoing research is the continued development of frameworks and methodologies to help determine and quantify potential long-term implications of underwater sound on marine mammal populations. The oil and gas industry can share their knowledge and experience in this field.

What can Europe do?

- Work with Regional Sea Conventions to ensure common definitions and assessment methodology, while taking into account international frameworks and regional ecological specificities.
- Adopt flexible and provisional threshold values, that could be revised and adjusted as science progresses and new data is available.
- Support research focused on identifying and quantifying impacts on marine mammal populations - not just individuals - in EU, national, and regional projects.

⁵ “The Commission Decision of May 2017 requires EU Member States to establish threshold values to ensure that levels of anthropogenic noise do not exceed levels that adversely affect populations of marine animals.”

About IOGP

The International Association of Oil & Gas Producers (IOGP) is the voice of the global upstream industry. Our members produce 40% of the world's oil and gas in regions around the world, and around 65% in Europe.

IOGP represents the upstream oil and gas industry before EU institutions and international organizations including the International Maritime Organization, the United Nations Environment Programme (UNEP), Regional Seas Conventions (OSPAR, HELCOM, Barcelona Convention), Mediterranean Sea and contiguous Atlantic area (ACCOBAMS) and other groups under the UN umbrella.

Equally important is IOGP's role as a uniquely upstream forum in which our members identify and share knowledge and good practices to achieve improvements in health, safety, the environment, security and social responsibility.



The Joint Industry Programme for Sound and Marine Life was set up in 2005 under the auspices of the IOGP to identify and conduct a research programme that improves understanding of the potential impact of Exploration and Production (E&P) sound on marine life. The Programme has supported development of a range of tools that are used to help understand the behaviour of marine mammals in their environment. These tools include animal tracking satellite tags, improved passive acoustic detection, classification tools methodologies for assessing subtle behavioural and physiological responses to anthropogenic sound, as well as potential long-term effects, should they exist.

Research funded by the SML JIP has resulted in the publication of more than 45 reports and over 145 peer-reviewed papers by independent scientists. All JIP materials including peer reviewed publications, project reports, factsheets, videos etc. can be found on the JIP website www.soundandmarinelife.org

IOGP publications:

- Fundamentals of Underwater Sound (2008)
- An overview of marine seismic operations (2011)
- Model based assessment of underwater noise from an airgun array soft-start operation (2011)
- A quick guide to Passive Acoustic Monitoring – PAMGuard (for researchers)
- A quick guide to Passive Acoustic Monitoring – PAMGuard (for regulators)
- Seismic Surveys & Marine Mammals – joint OGP/IAGC position paper (2017)
- Recommended monitoring and mitigation measures for cetaceans during marine seismic survey geophysical operations (2017)
- Resource tool to help inform (Underwater Sound) Environmental Impact Assessment studies associated with E&P marine activities (2020)

<https://www.iogp.org/sound-and-marine-life-jip>