

SUPPLEMENTARY INFORMATION TO THE REPORT OF THE INTERSESSIONAL EXPERT GROUP ON THE DEVELOPMENT OF ENVIRONMENTAL THRESHOLD VALUES

Overview of underwater noise regulatory frameworks, guidelines and thresholds across different industries and jurisdictions

This document provides a comparative overview of underwater noise regulatory frameworks, guidelines and thresholds across different industries and jurisdictions. Table 1 summarises the key regulations, guidelines, and management approaches relevant to underwater noise. It identifies the responsible regulatory bodies and indicates whether frameworks are source-based or receptor-based. Information is included on whether explicit acoustic thresholds are provided and applied per the regulation / framework.

It is important to note that in many jurisdictions, underwater noise regulation is closely linked to the protection of designated marine areas. Regulatory requirements are often strengthened where activities may affect protected species or habitats. As a result, underwater noise management is frequently implemented through Environmental Impact Assessments (EIAs) and project-specific consent conditions, with mitigation measures and monitoring requirements varying according to the sensitivity of the environment. Guidelines which solely consider underwater noise through EIAs are not included within this review as these are typically project-specific, where this review aims to compare regulatory frameworks across different jurisdictions. This approach avoids the risk of comparing project-specific conditions.

In addition, this review does not consider frameworks and/or guidelines which may protect species which are susceptible to underwater noise (e.g. marine mammals), except where underwater noise has been explicitly referred to within the framework or guidance. It is also worth noting that underwater noise is commonly grouped under “marine pollution”, or similar terminology. To avoid the inclusion of frameworks or guidance that is unrelated to underwater noise, documents that do not differentiate between types of pollution (e.g. noise/chemical) and thus do not explicitly mention underwater noise, are not included.

Table 1 provides information on regulatory frameworks and guidelines for underwater noise management in countries with maritime areas. It includes:

- The region or country where the framework is applicable;
- The regulatory body responsible for managing the framework;
- The title of the framework and the date it was published;
- The current status of the framework – whether it is a mandatory requirement, a voluntary requirement, or is considered as “best practice”. Frameworks are listed as best practice if, stand alone, they are voluntary, but they are accepted as standard and are commonly made mandatory as a stipulation in, for example, project specific licences;
- Key details highlighting specific underwater noise considerations of the framework, including details of specified thresholds;
- Whether the framework acts to reduce underwater noise at the source and/or the receptor. Where a framework or guidance does not clearly distinguish between measures or mitigations to reduce noise at the source or receptor, it has been noted as ‘source and receptor’.

This information may be used for a comparison of regulatory approaches across marine industry sectors including aggregates and dredging, commercial fishing, commercial shipping, renewable energy, oil and gas, and tourism and recreation. This list is correct at the time of drafting (July 2026).

TABLE 1 SUMMARY OF UNDERWATER NOISE POLICIES, REGULATIONS, AND GUIDELINES FOR DIFFERENT MARINE INDUSTRIES

Region / Country	Regulatory Body	Regulation / Framework	Status	Key Regulatory Details (including thresholds)	Source / Receptor
Overarching Policy / Regulation / Guidelines					
International	United Nations	Convention on the Conservation of Migratory Species of Wild Animals (1979)¹ Resolution 9.19 (2008)² Resolution 10.24 (2011)³ Resolution 12.14 (2017)⁴ CMS Family Guidelines on Environmental Impact Assessment for Marine Noise-Generating Activities (2017)⁵	Best Practice	Underwater noise is covered under Convention on Migratory Species (CMS) through Resolution 9.19, Resolution 10.24, and Resolution 12.14. These resolutions are specifically related to reducing the impacts of underwater noise on cetaceans and other biota. Resolution 12.14, which was adopted by the Conference of the Parties at its 12th Meeting in October 2017, officially endorses the implementation of the CMS Family Guidelines on Environmental Impact Assessment for Marine Noise-Generating Activities. These guidelines provide international best practice guidance for incorporating underwater noise into EIAs for marine developments, including shipping and vessel traffic, offshore and coastal construction, ports and harbours, seismic surveys, sonar, and offshore renewable energy projects. The guidelines promote early assessment of underwater noise impacts, consideration of cumulative effects, independent scientific review, and application of mitigation measures to protect migratory marine species. No specific underwater noise thresholds are prescribed.	Receptor
International	United Nations	Convention on Biological Diversity (1992)⁶ Conference of the Parties (COP) Decision XII/23 (2014)⁷ COP Decision XIII/10 (2016)⁸	Best Practice	The Convention on Biological Diversity (CBD) recognises anthropogenic underwater noise as a threat to marine and coastal biodiversity and, through COP Decisions XII/23 (2014) and XIII/10 (2016), encourages Parties to apply the precautionary approach and take measures to avoid, minimise and mitigate significant adverse impacts from underwater noise. The CBD promotes research, acoustic mapping, quieter technologies, best available practices, and international cooperation on underwater noise management. No thresholds are indicated.	Source and Receptor
International	International Whaling Commission	Resolution on Anthropogenic Underwater Noise (2018) ⁹	Best Practice	The Resolution recognises underwater noise as a significant and growing threat to cetaceans, noting that they depend on sound for survival and that noise from activities such as shipping, seismic surveys, drilling, and construction can cause physiological and behavioural impacts. It recommends that governments promote quieter technologies, establish noise monitoring programmes and registries, engage with industry to develop mitigation measures, utilise best-	Source and Receptor

Region / Country	Regulatory Body	Regulation / Framework	Status	Key Regulatory Details (including thresholds)	Source / Receptor
				practice guidance, and support the adoption of measures such as noise thresholds. The Resolution does not indicate any thresholds.	
International	United Nations	Part XII United Nations Convention on the Law of the Sea (UNCLOS) (1982) ¹⁰	Mandatory	Part XII (Protection and Preservation of the Marine Environment) establishes the international legal framework for the protection and preservation of the marine environment and requires States to take all necessary measures to prevent, reduce and control pollution from any source. Although underwater noise is not explicitly referenced, Article 1(4) defines marine pollution as the introduction of “substances or energy” into the marine environment that causes, or is likely to cause, harm to marine life, and the paper indicates that sound constitutes a form of energy and therefore falls within this definition. Part XII also requires the protection of rare or fragile ecosystems and habitats of threatened species (Article 194(5)), environmental impact assessment where activities may cause substantial pollution or significant environmental change (Article 206), and the regulation of pollution from seabed activities and vessels (Articles 208 and 211).	Source and Receptor
International	Convention on Biological Diversity (CBD)	COP15: Kunming-Montreal Global Biodiversity Framework (2022) ¹¹	Best Practice	Underwater noise pollution is listed as a complementary indicator under Target 7 of the framework, which aims to reduce pollution levels to a point where they are not harmful to biodiversity, though the primary concern of target 7 is pesticides and hazardous chemicals. No thresholds, mitigations, or management measures are noted for underwater noise.	Source
International	N/A	Sound Exposure Guidelines for Fishes and Sea Turtles ¹²	N/A	A technical report that provides a framework for assessing the effects of underwater noise on fish and turtles. Sound Exposure Guidelines are based on scientific research, widely accepted and used commonly in assessments and EIAs. Species are grouped based on their reception of sound; fish are split into four groups depending on the presence/absence of a swim bladder, and the function of the swim bladder in auditory reception. Groups are: • Fishes with no swim bladder or other gas; • Fishes with swim bladders in which hearing does not involve the swim bladder or other gas volume;	Receptor

Region / Country	Regulatory Body	Regulation / Framework	Status	Key Regulatory Details (including thresholds)	Source / Receptor
				- Fishes in which hearing involves a swim bladder or other gas volume; - Sea turtles; - Fish eggs and larvae. Thresholds for mortality, impairment, and behavioural impacts have been developed for explosions, pile driving, seismic, low and mid frequency naval sonar and shipping/continuous noise.	
International	N/A	Marine Mammal Noise Exposure Criteria: Updated Scientific Recommendations for Residual Hearing Effects ¹³	N/A	Not a regulation or framework, but widely accepted noise thresholds for predicting the onset of Permanent Threshold Shift (PTS) and Temporary Threshold Shift (TTS) in marine mammals. It provides an update to Southall <i>et al.</i>, 2007²⁶ and thresholds are based on scientific research. The criteria split marine mammals into six hearing groups based on phylogenetic relationships and known hearing sensitivities and applies auditory weighting (M-weighting). Noise is categorised into impulsive and non-impulsive noise. Impulsive thresholds (sound Exposure Level (SEL) dB re 1 µPa2s): - Low frequency: 168 (TTS) 183 (PTS); - High frequency: 170 (TTS) 185 (PTS); - Very high frequency: 140 (TTS) 155 (PTS); - Sirenians: 175 (TTS) 190 (PTS); - Phocid carnivores in water: 170 (TTS) 185 (PTS); - Other marine carnivores in water: 188 (TTS) 203 (PTS). Non-impulsive thresholds (SEL dB re 1 µPa2s): - Low frequency: 179 (TTS) 199 (PTS); - High frequency: 178 (TTS) 198 (PTS); - Very high frequency: 153 (TTS) 173 (PTS); - Sirenians: 186 (TTS) 206 (PTS); - Phocid carnivores in water: 181 (TTS) 201 (PTS); - Other marine carnivores in water: 199 (TTS) 219 (PTS).	Receptor
European Union member states	European Union	Marine Strategy Framework Directive (2008) ¹⁴	Best Practice	The Marine Strategy Framework Directive (MSFD) establishes a framework for achieving or maintaining Good Environmental Status (GES) in European marine waters. Under the MSFD, underwater noise is incorporated as Descriptor 11 (Introduction of energy, including underwater noise) within the GES framework. The Directive requires member states to monitor and manage anthropogenic underwater noise and its impacts on marine ecosystems, but the	Source and Receptor

Region / Country	Regulatory Body	Regulation / Framework	Status	Key Regulatory Details (including thresholds)	Source / Receptor
				Directive itself does not prescribe specific underwater noise thresholds, leaving the development of technical criteria, indicators and assessment methodologies to relevant competent authorities.	
European Union member states	European Union	Setting EU Threshold Values for impulsive underwater sound (2023) ¹⁵	Best Practice	The MSFD Technical Group on Underwater Noise (TG Noise) guidance provides the basis for assessing underwater noise under MSFD Descriptor 11, introducing the concept of the Level of Onset of Biologically Adverse Effects (LOBE). LOBE is the noise level above which an adverse effect is expected to occur in a species. The guidance suggests that, based on the proportion of habitat exposed above LOBE, no more than 20% of a habitat or assessment area should be exposed above LOBE in a single day. No more than 10% of the habitat should be exposed on average across a year.	Source and Receptor
Antarctica	Antarctic and Southern Ocean Coalition (ASOC) Commission for the Conservation of Antarctic Marine Living Resource (CCMALR)	Marine Noise Pollution – Mitigation and the Need for Wider Protection (2005) ¹⁶	Best Practice	The Information Paper indicates the known adverse effects on cetaceans, particularly beaked whale, from anthropogenic activities (vessel noise, sonar, surveying). It encourages wider protection as a management option, promoting standardisation of on-board mitigation measures. Marine Protection Areas (MPAs) should be created to better protect species in the Southern Ocean from adverse noise effects. No specific thresholds are identified, but the Information Paper encourages proactivity and change to mitigation methods.	Source and Receptor
Australia; Fiji; France; Kiribati; Marshall Islands; Nauru; New Zealand; Palau; Papua New Guinea; Samoa; Soloman Islands; Tonga; Tuvalu; Vanuatu; Cook Islands; Federated States of Micronesia; United Kingdom;	States and Territories of the Pacific Islands Region	Memorandum of Understanding (MoU) for the Conservation of Cetaceans and their Habitats in the Pacific Islands Region (2006) ¹⁷	Best Practice	The MoU is an agreement concluded under the CMS that seeks to conserve cetaceans and their habitats through regional cooperation, threat reduction, research, monitoring, habitat protection and management of human activities in the Pacific Islands region. The accompanying Whale and Dolphin Action Plan explicitly identifies noise pollution as a threat to cetaceans and notes that high-energy, low-frequency military sonar can cause acoustic trauma, strandings and mortality, particularly in beaked whales. The Action Plan also recognises the effects of vessel noise on cetaceans and encourages the development of regulations and management measures governing vessel behaviour around whales and dolphins to minimise disturbance and harassment. The MoU and Action Plan do not establish any underwater noise specific thresholds.	Source and Receptor

Region / Country	Regulatory Body	Regulation / Framework	Status	Key Regulatory Details (including thresholds)	Source / Receptor
Niue; New Caledonia; Tokelau.					
Belgium; Denmark; Finland; France; Germany; Iceland; Ireland; Luxembourg; Netherlands; Norway; Portugal; Spain; Sweden; Switzerland; United Kingdom	OSPAR Commission	The Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) (1992) ¹⁸	Mandatory	OSPAR is a regional agreement requiring Contracting Parties to take all possible steps to prevent and eliminate pollution and protect the maritime area against the adverse effects of human activities. The Convention defines pollution as the introduction by humans of substances or energy into the marine environment that results, or is likely to result, in harm to living resources, marine ecosystems, human health, or legitimate uses of the sea. This definition provides a legal basis for considering underwater noise as a pollutant, although noise is not explicitly regulated in the Convention text.	Source and Receptor
Belgium	Federal Public Service Public Health, Food Chain Safety and Environment	Protection of the Marine Environment and the Organisation of Marine Spatial Planning (2022) ¹⁹	Best Practice	Underwater noise is included under Article 3 under the definition for pollution. No further thresholds or specifics on underwater noise are referenced. The impulsive noise registry records noise levels from impulsive activities, such as piling, to aid in cumulative assessments for the region.	Source and Receptor
Bulgaria	Министерство на околната среда и водите (Ministry of Environment and Water)	Marine Strategy of Republic of Bulgaria (2016) ²⁰	Best Practice	Drafted to provide implementation of the MSFD Descriptor 11. There is minimal inclusion of underwater noise in the program of measures.	Source and Receptor
Bulgaria; Georgia; Romania; Russian Federation; Republic of Turkey; Ukraine	Black Sea Commission	The Convention on the Protection of the Black Sea Against Pollution - Bucharest Convention (1992) ²¹	Best Practice	The Bucharest Convention is the primary legally binding regional agreement for the protection of the Black Sea marine environment. The Convention defines marine pollution as the introduction of substances or energy into the marine environment that causes, or is likely to cause, harm to marine life, living resources, human health, marine activities, or water quality. This provides a basis for considering anthropogenic underwater noise as a form of pollution. It also requires Parties to adopt laws and regulations governing offshore activities, protect marine living resources, cooperate on pollution prevention and emergency response, and develop additional protocols and measures where necessary.	Source and Receptor
Canada	Fisheries and Oceans Canada	Canada's Ocean Noise Strategy (2024) ²²	Best Practice	The strategy recognises ocean noise from sources such as vessels, construction, industrial activities, sonar, and seismic surveys. It acknowledges that underwater noise can cause masking, behavioural disturbance,	Source and Receptor

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				physiological stress, physical injury, and in extreme cases mortality, affecting marine mammals, fish, sea turtles, invertebrates and seabirds. The strategy sets out recommendations focused on improving ocean noise science, monitoring, assessment methodologies, mitigation measures, inter-agency coordination, and stakeholder engagement. However, the strategy is a non-regulatory framework and defines no thresholds.	
Denmark; Estonia; Finland; Germany; Latvia; Lithuania; Poland; Russia; Sweden	Helsinki Commission	Convention on the Protection of the Marine Environment of the Baltic Sea Area (HELCOM) (1992 – original Convention signed in 1974) ²³ HELCOM Recommendation 42-43/1 (2021) ²⁴	Best Practice	Underwater noise was first recognised in 2013 when the HELCOM Copenhagen Ministerial Declaration agreed that levels of impulsive noise within the Baltic should not harm marine life. The Helsinki Convention recognises underwater noise under the HELCOM Regional Action Plan on Underwater Noise, which was adopted in 2021 following the implementation of the Regional Baltic Underwater Noise Roadmap 2015-2017. The Action Plan includes measures to improve monitoring, measurement, and recording of underwater noise. A registry of impulsive events has also been developed that records impulsive noise activities for use in cumulative assessments. It discusses the use of Best Available Techniques (BAT) such as noise abatement systems to reduce noise levels and impact, and mitigation measures. No thresholds are included though the Plan makes reference to developing scientifically sound thresholds for underwater noise.	Source and Receptor
Ireland	National Parks and Wildlife Service (NPWS)	Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters (2014) ²⁵	Best Practice	The guidance applies to activities such as seismic surveys, pile driving, dredging, drilling, and blasting. It requires a risk-based assessment of the likelihood of injury, disturbance, habitat displacement, and auditory masking, as well as project-specific mitigation measures including Marine Mammal Observers (MMOs) and Passive Acoustic Monitoring (PAM). While the guidance does not establish regulatory thresholds, it adopts the marine mammal noise exposure criteria proposed by Southall <i>et al.</i> (2007) ²⁶ as reference values for assessing risk. These include estimated PTS-onset criteria of 230 dB re 1 µPa (peak SPL) and 198 dB SEL for cetaceans exposed to impulsive sounds, and 218 dB re 1 µPa (peak SPL) and 186 dB SEL for pinnipeds in water, alongside TTS and behavioural response criteria that vary by hearing group and sound type.	Source and Receptor

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Ireland	Department of Housing, Local Government and Heritage	Ireland's Marine Strategy Part 1, Article 8, 9 and 10 report (2024) ²⁷ Ireland's Marine Strategy Part 1, Article 8, 9 and 10 report, Annex III (2024) ²⁸	Best Practice	Underwater noise is assessed under MSFD Descriptor 11 following LOBE guidance. For impulsive noise, a LOBE of 176 dB has been selected as a threshold value (based on bottlenose dolphin <i>Tursiops truncatus</i>). For continuous noise, the assessment considers GES to be achieved when noise levels above LOBE do not exceed 20% of the maritime area, based on monthly mean sound pressure levels (based on harbour porpoise <i>Phocoena phocoena</i>).	Source and Receptor
United Kingdom	Joint Nature Conservation Committee (JNCC)	Marine Noise Registry (originally established in 2015; revised iteration released in 2023) ²⁹	Best Practice	The UK Marine Noise Registry (MNR) is a UK-wide database developed and maintained by JNCC on behalf of Department for Environment, Food and Rural Affairs (DEFRA) and devolved administrations to record the spatial and temporal distribution of impulsive underwater noise generated by human activities in UK seas. The registry was established as a commitment under the UK Marine Strategy and is used to support assessment of Good Environmental Status and improve understanding of cumulative underwater noise pressures. Activities recorded include impact pile driving, seismic surveys, sub-bottom profiler surveys, multibeam echosounders (≤ 12 kHz), explosives/UXO clearance, military sonar, and some acoustic deterrent devices. Although the registry itself is not a regulatory threshold-setting instrument and contains no underwater noise exposure limits or management thresholds, it acts as guidance on the harbour porpoise Special Area of Conservation (SAC) noise thresholds for disturbance, which is based on underwater noise exposure.	Source and Receptor
United States of America	National Marine Fisheries Service; Fish and Wildlife Service	The Marine Mammal Protection Act (MMPA) (1972) ³⁰	Best Practice	The MMPA is a legally binding U.S. federal law that prohibits the harassment, hunting, capture, killing, or attempted take of marine mammals. Noise-generating activities, such as offshore construction, seismic surveys, military sonar, and scientific research, may constitute Level A harassment (potential injury, including auditory injury) or Level B harassment (behavioural disturbance) and therefore require authorisation from National Oceanic and Atmospheric Administration (NOAA) Fisheries or the US Fish and Wildlife Service. The Act does not establish statutory underwater noise thresholds, and noise exposure criteria used in permitting decisions are developed	

Region / Country	Regulatory Body	Regulation / Framework	Status	Key Regulatory Details (including thresholds)	Source / Receptor
				through separate NOAA technical guidance and regulatory processes.	
United States of America	National Oceanic and Atmospheric Administration; National Marine Fisheries Service	Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 3.0) Underwater and In-Air Criteria for Onset of Auditory Injury and Temporary Threshold Shifts (2024) ³¹	Best Practice	The guidance provides the current scientific criteria used by NOAA to assess the onset of auditory injury (Level A harassment) and Temporary Threshold Shift (TTS) in marine mammals exposed to anthropogenic sound. The guidance replaces the historical 180/190 dB rms injury thresholds with hearing group specific SELcum and SPLpeak criteria for impulsive and non-impulsive sound sources. It is used to support Marine Mammal Protection Act (MMPA) authorisations and Endangered Species Act (ESA) consultations but is not itself a regulation. Key Level A harassment (auditory injury onset) thresholds for impulsive noise are: - Low-frequency cetaceans: SELcum = 183 dB re 1 $\mu\text{Pa}^2\cdot\text{s}$; SPLpeak = 219 dB re 1 μPa. - Mid-frequency cetaceans: SELcum = 185 dB re 1 $\mu\text{Pa}^2\cdot\text{s}$; SPLpeak = 230 dB re 1 μPa. - High-frequency cetaceans: SELcum = 155 dB re 1 $\mu\text{Pa}^2\cdot\text{s}$; SPLpeak = 202 dB re 1 μPa. - Phocid pinnipeds in water: SELcum = 185 dB re 1 $\mu\text{Pa}^2\cdot\text{s}$; SPLpeak = 218 dB re 1 μPa. - Otariid pinnipeds in water: SELcum = 203 dB re 1 $\mu\text{Pa}^2\cdot\text{s}$; SPLpeak = 232 dB re 1 μPa. For non-impulsive noise, the injury thresholds are: - Low-frequency cetaceans: 199 dB SELcum. - Mid-frequency cetaceans: 198 dB SELcum. - High-frequency cetaceans: 173 dB SELcum. - Phocid pinnipeds: 201 dB SELcum. - Otariid pinnipeds: 219 dB SELcum. For Level B harassment (behavioural disturbance): 160 dB re 1 μPa rms for impulsive sources; 120 dB re 1 μPa rms for continuous/non-impulsive sources.	Receptor

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United States of America	National Marine Fisheries Service (NMFS)	Summary of Endangered Species Act Acoustic Thresholds (Fishes and Sea Turtles) (2025) ³²	Best Practice	Thresholds of auditory damage and disturbance for marine mammals, sea turtles and fish. Used within ESA-assessments. The guidance does not distinguish between fish species. For fish receptors, under impulsive noise the onset of physical injury is: - Fish >2 kg: $L_{E,P,12h}$: 187 dB re 1 $\mu\text{Pa}^2\text{s}$ - Fish <2 kg: $L_{E,P,12h}$: 183 dB dB re 1 $\mu\text{Pa}^2\text{s}$ The onset of behavioural disturbance is: LP, RMS: 150 dB re 1 μPa For sea turtle receptors, the onset of physical injury is: - Impulsive: $L_{E,P, TU, 24h}$: 184 dB re 1 $\mu\text{Pa}^2\text{s}$ - Non-impulsive: $L_{E,P, TU, 24h}$: 198 dB re 1 $\mu\text{Pa}^2\text{s}$	Receptor
Western Africa and Macaronesia	States of Western Africa and Macaronesia	Memorandum of Understanding (MoU) Concerning the Conservation of the Manatee and Small Cetaceans of Western Africa and Macaronesia (2008) ³³	Best Practice	The MoU is an agreement concluded under the CMS to improve the conservation of West African manatees and small cetaceans. The MoU explicitly identifies acoustic pollution as a threat to small cetacean populations, alongside bycatch, habitat degradation, chemical pollution, climate change, fisheries interactions, ship strikes, and extractive industries including oil, gas and mining activities. Signatories commit to enacting or updating conservation legislation, implementing Action Plans, exchanging scientific information, and coordinating conservation measures across the region. Although underwater noise is specifically recognised as a conservation concern, the MoU contains no underwater noise thresholds.	Source and Receptor
Baltic and North Seas and contiguous area of the North East Atlantic	Meeting of the Parties, Advisory Committee, UNEP/CMS Secretariat	The Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas (ASCOBANS)³⁴ Resolution 5.4 (2006)³⁵ Resolution 7.1 (2012)³⁶ Resolution 8.6 (2016)³⁷ Resolution 8.9 (2016)³⁸ Resolution 8.11 (2020)³⁹ Resolution 6.2 (2024)⁴⁰ Resolution 10.6 (2024)⁴¹ Resolution 10.7 (2024)⁴²	Best Practice	Underwater noise is addressed through several resolutions concerned with various industries, noise sources, and species. No specific thresholds are mentioned. Through the Resolutions, ASCOBANS encourage research to increase the understanding of underwater noise and its potential impacts, and the use of mitigation and management measures to reduce effects. ASCOBANS contributed to the production of the CMS Family Guidelines on Environmental Impact Assessment for Marine Noise-Generating Activities (2017).	Source and Receptor

Region / Country	Regulatory Body	Regulation / Framework	Status	Key Regulatory Details (including thresholds)	Source / Receptor
Mediterranean Sea and Contiguous Atlantic Area	Meeting of the Parties, Scientific Committee, ACCOBAMS Secretariat	The Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS) (1996)⁴³ Resolution 2.16 (2004)⁴⁴ Resolution 3.10 (2007)⁴⁵ Resolution 4.17 (2010)⁴⁶ Resolution 5.15 (2013)⁴⁷ Resolution 6.17 (2016)⁴⁸ Resolution 7.13 (2019)⁴⁹ Resolution 8.17 (2022)⁵⁰ Guidelines to Address the Impact of Anthropogenic Noise on Cetaceans in the ACCOBAMS Area (2020)⁵¹	Best Practice	Underwater noise is addressed through several resolutions. Resolution 2.16 recognises underwater noise as a form of pollution and acknowledges that marine mammals are particularly vulnerable. Resolution 3.10 encourages parties to use the best available technique and to utilise quieter acoustic technologies and mitigation measures. The Guidelines to Address the Impact of Anthropogenic Noise on Marine Mammals in the ACCOBAMS Area include use of modelling and establishing exclusion zones based on evidence. No specific thresholds are mentioned. ACCOBAMS contributed to the production of the CMS Family Guidelines on Environmental Impact Assessment for Marine Noise-Generating Activities (2017).	Source and Receptor
Albania; Algeria; Bosnia and Herzegovina; Croatia; Cyprus; Egypt; France; Greece; Israel; Italy; Lebanon; Libya; Malta; Monaco; Montenegro; Morocco; Slovenia; Spain; Syrian; Arab Republic; Tunisia; Türkiye; European Union	United Nations Environment Programme Mediterranean Action Plan (UNEP/MAP)	The Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (The Barcelona Convention) (1995)⁵² Decision IG 17/6 (2008)⁵³ Decision IG 20/4 (2012)⁵⁴ Decision IG22/7 (2016)⁵⁵	Best Practice	Underwater noise is managed through the Ecosystem Approach Framework (EcAp). Under the EcAp, Ecological Objective 11 (EO11): “Energy, including underwater noise” recognises that underwater noise is a pollutant and states that it must not occur at levels that may harm marine life. EO11 is put into practice under Decision IG22/7: Integrated Monitoring and Assessment Programme (IMAP) of the Mediterranean Sea and Coast and Related Assessment Criteria, which was adopted at the 19th Meeting of the Contracting Parties to the Barcelona Convention (COP19) in Athens in February 2016. The IMAP establishes indicators to environmental health as well as monitoring and assessment requirements. Two Candidate Indicators are concerned with underwater noise. Candidate Indicator 26 assesses the location and proportion of days where impulsive noise exceeds levels likely to cause an impact to marine life. Candidate Indicator 27 is the levels of continuous noise. Decision IG22/7 states a requirement for three ecological thresholds to assess EO11, a spatial and temporal threshold for Indicator 26 and noise threshold for Indicator 27. No specific thresholds are included.	Receptor

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Aggregates and Dredging					
International	World Organisation of Dredging Associations (WODA)	WODA Technical Guidance on Underwater Sound (2016) ⁵⁶	Voluntary	No thresholds but a guidance document focused on how to assess, monitor, and mitigate underwater noise from dredging. One of the key mitigation measures is regular maintenance as well-maintained dredgers are quieter.	Source
Australia	Department for Infrastructure and Transport	Underwater Piling and Dredging Noise Guidelines (2023) ⁵⁷	Best practice	Requires projects to complete an underwater noise impact assessment with modelling and prepare an Underwater Noise Framework/Plan. There are no thresholds set.	Receptor
Commercial Fishing					
No underwater noise regulations or guidance available for commercial fishing.					
Commercial Shipping					
International	International Maritime Organization	IMO Guidelines for the Reduction of Underwater Noise from Commercial Shipping to Address Adverse Impacts on Marine Life (2024) ⁵⁸	Voluntary	Guidance for reducing underwater radiated noise (URN) from commercial vessels through ship design, maintenance, propeller optimisation, and operational measures. This applies to both new and existing ships as far as reasonably practical. No thresholds are identified.	Source
Barbados	Barbados Maritime Transport Administration	Merchant shipping (underwater noise reduction) Regulations (2025) ⁵⁹	Mandatory	Vessels are required to implement noise-reducing systems and practices. The Regulations also establish a framework whereby larger ships must undergo surveys and obtain certification confirming compliance with underwater noise reduction measures, aligned with IMO guidance and future mandatory standards.	Source
Canada	Port of Vancouver	Enhancing Cetacean Habitat and Observation (ECHO) Program (commenced in 2014) ⁶⁰	Voluntary	The ECHO program aims to better understand and reduce the impacts of commercial shipping on at-risk whales, particularly Southern Resident killer whales, in the Salish Sea. The program implements voluntary vessel slowdowns, route modifications, and incentives for quieter ship design and operation. Operational targets used in recent slowdown initiatives include vessel speeds of ≤11 knots for bulk carriers, tankers and government vessels and ≤14.5 knots for container ships, car carriers and cruise ships in designated areas.	Source
Canada	Transports Canada	Understanding Anthropogenic Underwater Noise (2017) ⁶¹	Voluntary	No specific noise reduction requirements. Indicates support for vessel quieting initiatives and IMO guidelines, including vessel speed reductions in sensitive areas.	Source

Region / Country	Regulatory Body	Regulation / Framework	Status	Key Regulatory Details (including thresholds)	Source / Receptor
China	China Classification Society (CCS)	Guidelines for underwater radiated noise of ships (2025) ⁶²	Voluntary	The purpose of the guidelines is to provide classification requirements for underwater radiated noise of ships, and procedures and technical requirements for measurement. The Guidelines are applicable to ships applying for CCS class notation, with underwater noise limits outlined for different vessel types and operating conditions. Guidance states that compliance with the guidelines must be demonstrated through noise modelling. To received notation, vessels are required to reduce the impact of underwater radiated noise on the environment through vessel modifications and maintenance.	Source
Denmark	Danish Shipping	Underwater Radiated Noise Policy Paper (2024) ⁶³	Best Practice	The paper supports the IMO's 2023 voluntary guidelines on reducing underwater radiated noise from ships and encourages vessel-specific Underwater Noise Management Plans. It identifies propeller cavitation as the main source of shipping noise and highlights impacts on marine mammals and other marine life. No specific underwater noise thresholds are provided.	Source
India	Indian Register of Shipping	IRS Guidelines on underwater radiated noise and measurements (2023) ⁶⁴	Voluntary	The guidelines provide a standardised framework for assessing, measuring, and managing underwater radiated noise (URN) from vessels, including voluntary URN class notations for quieter ship operation. URN assessments must cover 10 Hz–50 kHz for commercial vessels and 10 Hz–100 kHz for research vessels, with noise levels assessed in one-third octave bands referenced to 1 µPa at 1 m. A maximum exceedance of 3 dB in a single one-third octave band is permitted, provided the vessel continues to meet the overall URN criteria. The guidance also supports vessel classification according to noise performance and encourages shipbuilders and operators to monitor and reduce vessel noise.	Source
Inuit Nunaat and the Arctic	International Maritime Organization (IMO)	Guidelines For Underwater Radiated Noise Reduction In Inuit Nunaat and the Arctic (2023) ⁶⁵	Best Practice	Supplementary guidelines, disseminated by the IMO, provide Arctic-specific recommendations to reduce URN from shipping in Inuit Nunaat and the Arctic, with a strong emphasis on incorporating Indigenous Knowledge into voyage planning and noise management. The guidance recommends operational measures such as ship speed reductions, propeller and engine modifications, and monitoring of vessel noise and cavitation, particularly in protected areas, wildlife concentration areas, and locations important to	Source

Region / Country	Regulatory Body	Regulation / Framework	Status	Key Regulatory Details (including thresholds)	Source / Receptor
				Indigenous communities. No specific thresholds are provided.	
Kazakhstan	Government of the Republic of Kazakhstan	Environmental Code of the Republic of Kazakhstan (2021) ⁶⁶	Mandatory	The Environmental Code requires that noise and vibration from ships do not exceed applicable sanitary and hygienic standards and that special-purpose vessel construction equipment is fitted with noise and vibration reduction devices. The Code does not set specific noise thresholds. It is deemed as indirect regulation of underwater noise.	Source and Receptor
The Marshall Islands	Maritime Administrator	Marine Guideline No. 2-11-23 (2025) ⁶⁷	Voluntary	The guideline recommends that ship operators implement URN management planning, operational measures, maintenance practices, and vessel design modifications to reduce URN in line with the IMO's revised URN guidance. It also highlights the links between underwater noise reduction, energy efficiency and greenhouse gas emissions. No specific underwater noise thresholds are described.	Source
Spain	Cartagena Port Authority	LIFE PortSounds Project LIFE20 ENV/ES/000387 (2021-2027) ⁶⁸	Voluntary	EU LIFE-funded demonstration project supporting implementation of the Marine Strategy Framework Directive (MSFD) through underwater noise monitoring and mitigation in the Port of Cartagena. The project aims to reduce shipping noise by implementing management measures, including vessel speed reductions, and proposes reducing continuous noise in the 63 Hz and 125 Hz one-third octave bands to levels below 120 dB re 1 µPa for the protection of cetaceans. Expected outcomes include a 5–10 dB reduction in SPL through reducing large vessel speeds from 20 to 10 knots.	Source
South Korea	Korean Register (KR)	Guidance for Underwater Radiated Noise (2022) ⁶⁹	Voluntary	A class notation for underwater radiated noise and Guidance which are based on ISO 17208 (International standard of quantities and procedures for description and measurement of underwater sound from ships), normal operation (transit) and quiet operation (quiet).	Source
Military					
United States of America	US Navy	Criteria and Thresholds for U.S. Navy Acoustic and Explosive Effects Analysis (Phase 4) Revision 2025.1 (2025) ⁷⁰	Voluntary	Provides technical thresholds used in environmental assessments to predict auditory injury, TTS, and behavioural responses of marine mammals and sea turtles exposed to military acoustic sources. The criteria establish hearing group specific thresholds expressed as weighted SEL and SPL. Thresholds are used for U.S. Navy environmental compliance and	Receptor

Region / Country	Regulatory Body	Regulation / Framework	Status	Key Regulatory Details (including thresholds)	Source / Receptor
				impact assessments and are assessment criteria rather than regulatory limits. Thresholds are: • Very-low frequency cetaceans: TTS 177 dB SEL, Injury 197 dB SEL; • Low-frequency cetaceans: TTS 177 dB SEL, Injury 197 dB SEL; • High-frequency cetaceans: TTS 181 dB SEL, Injury 201 dB SEL; • Very-high frequency cetaceans: TTS 161 dB SEL, Injury 181 dB SEL; • Phocid seals in water: TTS 175 dB SEL, Injury 195 dB SEL; • Otariids in water: TTS 179 dB SEL, Injury 199 dB SEL.	
Member countries within Europe and North America	North Atlantic Treaty Organization	Code of Conduct for the Use of Active Sonar to ensure the protection of Marine Mammals within the framework of Alliance Maritime Activities (NATO Document MC0547) (2018) ⁷¹	Voluntary	Provides a non-binding framework for minimising the impacts of military sonar on marine mammals during Alliance maritime activities. The Code of Conduct includes mitigation guidelines such as pre-watch and the use of exclusion zones.	Receptor
Oil and Gas					
Mexico	Agencia de Seguridad, Energía y Ambiente (ASEA)	General Administrative Arrangements to Establish the Guidelines on Industrial Safety, Safety and Operating Environment Protection Activities for Surface Exploration, Oil Exploration and Extraction (2016) ⁷²	Mandatory	The guidelines regulate industrial safety, operational safety, and environmental protection for activities related to hydrocarbon exploration and extraction. The guidance outlines buffer areas and exclusion zones for activities and the use of Protected Species Observers (PSO). No specific thresholds are indicated.	Receptor
Peru	Government of Peru	Supreme Decree No. 039-2014-EM Regulation for Environmental Protection in Hydrocarbon Activities (2014) ⁷³	Mandatory	The decree establishes a framework for the management of hydrocarbon activities at all stages of the lifecycle from exploration to abandonment. It sets out requirements for Environmental Impact Assessment (EIA) and notes that operators are responsible for managing underwater noise emissions. No specific thresholds or mitigations are indicated.	Receptor
Protected Areas					
United Kingdom	Joint Nature Conservation Committee	JNCC Report 654. Guidance for assessing the significance of noise disturbance against Conservation Objectives of harbour porpoise SACs (England,	Mandatory	Provides a regulatory framework for assessing whether underwater noise could result in significant disturbance to SACs designated for harbour porpoise. Noise disturbance is considered significant where activities exclude harbour porpoises from more than	Receptor

Region / Country	Regulatory Body	Regulation / Framework	Status	Key Regulatory Details (including thresholds)	Source / Receptor
		Wales & Northern Ireland) (2020) ⁷⁴		20% of the relevant area on any given day, or from an average of more than 10% of the relevant SAC area over a season (summer: April to September; winter: October to March). To assess compliance with these thresholds, the guidance recommends the use of EDRs for different activities, also defined by JNCC (below). Exceeding the area and time thresholds may indicate a risk of AEIOI and could require mitigation measures such as activity scheduling, noise abatement systems, or alternative construction methods.	
United Kingdom	Joint Nature Conservation Committee	JNCC Report 803. Updated Effective Deterrent Ranges for assessing the significance of noise disturbance against Conservation Objectives of harbour porpoise Special Areas of Conservation (England, Wales & Northern Ireland) (2025) ⁷⁵	Mandatory	This report provides an update on the previously defined Effective Deterrence Ranges (EDRs) used to assess underwater noise disturbance within harbour porpoise SACs in England, Wales and Northern Ireland, based on updated evidence. It is designed to work in tandem with Report 654 (above). This report provides evidence-based EDRs to estimate disturbance footprints, including: • 20 km for monopile or pin-pile driving without noise abatement; • 11 km for monopile or pin-pile driving (with ≥ 10 dB noise reduction from noise abatement use); • 20 km for high-order UXO clearance without a bubble curtain; • 10 km for high-order UXO clearance with a bubble curtain; • 10 km for seismic airgun surveys; • 3 km for sub-bottom profilers; • 8-11 km for Lofitech Acoustic Deterrent Devices (ADDs) depending on deployment duration. These EDRs are intended for use in Habitat Regulations Assessments/Appraisals (HRAs) and Marine Noise Registry disturbance assessments to determine whether additional mitigation, scheduling constraints, or noise reduction measures are required to avoid Adverse Effect on Site Integrity (AEIOI).	Source and Receptor
Wales	Natural Resources Wales	NRW's Position on Assessing Behavioural Disturbance of Harbour Porpoise (<i>Phocoena phocoena</i>) from underwater noise (2023) ⁷⁶	Best Practice	The Position Statement sets out NRW's approach to assessing behavioural disturbance of harbour porpoise from underwater noise associated with offshore developments. For HRA, this is aligned with the JNCC (2020) guidance: disturbance is considered significant where activities exclude harbour porpoises from more than 20% of the relevant SAC area in a single day or an average of more than 10% of the SAC area over a season. However, NRW's preferred assessment	Source and Receptor

Region / Country	Regulatory Body	Regulation / Framework	Status	Key Regulatory Details (including thresholds)	Source / Receptor
				approach is to use site-specific underwater noise modelling and fixed disturbance thresholds, rather than relying solely on EDRs. The recommended disturbance thresholds include: • 143 dB re 1 µPa SELss (or 103 dB re 1 µPa VHF-weighted SELss) for impulsive noise sources; • 160 dB re 1 µPa SPLrms for geophysical survey and sonar activities; • 120 dB re 1 µPa SPLrms for continuous noise sources such as dredging, drilling, vessel traffic and operational noise. For EIAs, NRW advises the use of dose-response approaches where available, particularly for pile driving, to estimate the number of animals disturbed.	
Renewable Energy					
Belgium	Ministerie van Economische Zaken	N/A	Mandatory	For pile driving in the Belgian offshore windfarm zone, a threshold of 185 dB SELss measured at 750 m has been applied to protect harbour porpoise, with noise mitigation measures required where predicted levels exceed this limit. These conditions are implemented through Belgium's marine permitting framework, including environmental authorisations and offshore wind consent decisions issued under marine environmental and spatial-planning legislation. Although this is considered project-specific with no formal legislation, it is included here as it a widely accepted value and provides an example of a repeatable threshold.	Source
England	Department for Food, Environment and Rural Affairs	Reducing marine noise (2025) ⁷⁷	Best practice	The policy paper sets out the UK Government's strategy for managing underwater noise impacts on marine wildlife and achieving Good Environmental Status under the UK Marine Strategy. The policy highlights underwater noise from activities such as offshore wind pile driving, seismic surveys, UXO clearance, and commercial shipping as a key pressure on marine mammals. The document commits to developing future UK-wide noise threshold values for impulsive and continuous noise sources and announces plans to consult on an offshore wind piling noise limit. The policy also confirms that, from January 2025, offshore wind developers in English waters are expected to demonstrate the use of noise reduction measures during pile driving, and that low-noise	Source and Receptor

Region / Country	Regulatory Body	Regulation / Framework	Status	Key Regulatory Details (including thresholds)	Source / Receptor
				methods should be the default approach for UXO clearance wherever practicable.	
Germany	Bundesamt für Seeschifffahrt und Hydrographie	N/A	Mandatory	The original offshore wind noise requirements for Germany were established through BSH approval conditions, rather than specific legislation, for offshore wind developments in the German EEZ, which from 2008 required pile-driving activities to comply with a dual noise limit of 160 dB SEL and 190 dB SPLpeak-peak, at 750 m. The thresholds were introduced to protect harbour porpoise from injury and significant disturbance associated with offshore wind farm construction and effectively mandated the use of noise mitigation techniques such as bubble curtains and other sound attenuation systems where necessary to achieve compliance. Although this is considered project-specific with no formal legislation, it is included here as it a widely accepted value and provides an example of a repeatable threshold.	Source
Germany	Bundesministerium für Umwelt, Klimaschutz, Naturschutz und nukleare Sicherheit	German Sound Protection Concept (2013) ⁷⁸	Mandatory	The document provides a regulatory framework for protecting harbour porpoise from underwater noise generated during offshore wind farm construction in the German North Sea. The guidance promotes the use of mitigation measures such as bubble curtains, hydro sound dampers and other noise abatement systems to reduce sound emissions. It also includes temporal restrictions on piling in sensitive harbour porpoise habitat areas, including restrictions during January to May for larger offshore wind developments. The guidance supports the earlier defined thresholds (see previous).	Source
Netherlands	Rijkswaterstaat (Dutch Ministry of Infrastructure and the Environment; now Ministry of Infrastructure and Water Management)	Framework for Assessing Ecological and Cumulative Effects of Offshore Wind Farms: Cumulative Effects of Impulsive Underwater Sound on Marine Mammals (KEC 1.1), also referred to as the Kader Ecologie en Cumulative (KEC). TNO Report R10335-A (2015) ⁷⁹	Mandatory	Framework for assessing the cumulative effects of impulsive underwater noise from offshore wind farm construction on marine mammals. A key disturbance threshold is 140 dB re 1 µPa²s SELss (unweighted). The framework also applies population-level protection objectives, requiring a 95% probability that the Dutch Continental Shelf harbour porpoise population will not decline by more than 5% as a result of offshore wind farm construction activities. The KEC is used to inform project-specific underwater noise standards and offshore wind consenting decisions in the Netherlands.	Source

Region / Country	Regulatory Body	Regulation / Framework	Status	Key Regulatory Details (including thresholds)	Source / Receptor
Sweden	Swedish Environmental Protection Agency	A framework for regulating underwater noise during pile driving (2017) ⁸⁰	Best Practice	The framework recommends underwater noise exposure criteria for fish, fish eggs and larvae, and harbour porpoise. It promotes the use of sound propagation modelling, species-specific impact thresholds, and mitigation measures such as bubble curtains to minimise significant effects. For harbour porpoise, the report recommends adopting the US NMFS auditory injury thresholds of 153 dB re 1 $\mu\text{Pa}^2\text{s}$ SELcum and 202 dB re 1 μPa SPLpeak to avoid PTS-onset. For behavioural disturbance, the report identifies a threshold of 140 dB SELss based on avoidance responses reported in European offshore wind studies. The framework also proposes injury criteria for fish and fish larvae, including peak pressure and cumulative SEL thresholds, and emphasises that noise management should be based on site-specific assessments rather than a single universal regulatory limit.	Source
United Kingdom	Joint Nature Conservation Committee	Statutory nature conservation agency protocol for minimising the risk of injury to marine mammals from piling noise (2010) ⁸¹	Best Practice	Provides best-practice mitigation measures to minimise the risk of injury or mortality to marine mammals from underwater noise generated during offshore piling. The protocol was developed to support compliance with the Conservation of Habitats and Species Regulations 2010 and the Offshore Marine Conservation Regulations 2007. It requires project-specific determination of an injury-based mitigation zone, with a minimum radius of 500 m around the piling location. Key measures include a minimum 30-minute pre-piling visual and/or PAM search, delaying piling if marine mammals are detected within the mitigation zone until 20 minutes after the last detection, and implementation of a soft-start (ramp-up) period of at least 20 minutes before full piling power is reached. The guidance may also require seasonal restrictions and additional mitigation measures where site-specific assessments indicate elevated risk.	Source
United States of America	Bureau of Ocean Energy Management (BOEM)	Nationwide Recommendations for Impact Pile Driving Sound Exposure Modeling and Sound Field Measurement for Offshore Wind Construction and Operations Plans (2023) ⁸²	Voluntary	All proposed offshore wind energy projects described in a Construction and Operations Plan (COP) that are submitted to the Bureau of Ocean Energy Management (BOEM) for review must include assessments of potential environmental impacts resulting from project construction. Specifically, two processes are typically performed:	Receptor

Region / Country	Regulatory Body	Regulation / Framework	Status	Key Regulatory Details (including thresholds)	Source / Receptor
				(1) noise impact and exposure assessments are conducted during the permitting phase, via modelling and analyses, and (2) ensonified areas are validated during the construction phase via sound field measurements. This guidance recommends sound exposure assessment for pile driving.	
Scientific Research					
International	International Council for the Exploration of the Sea (ICES)	ICES Standard CRR 209 - Research Vessel Standards: Underwater Radiated Noise (1995) ⁸³	Voluntary	The ICES standard includes recommendations for research vessels to reduce noise levels so that research on fish may be conducted with minimal potential for avoidance behaviour. Addresses both vessel modifications and mitigations such as speed restrictions and includes thresholds. To ensure no adverse effects on fish behaviour, maximum vessel noise is stated as 132 dB re 1 µPa (1 Hz band) at 1 m.	Source
Belgium; Denmark; Finland; France; Germany; Iceland; Ireland; Luxembourg; Netherlands; Norway; Portugal; Spain; Sweden; Switzerland; United Kingdom	OSPAR Commission	OSPAR Code of Conduct for Responsible Marine Research in the Deep Seas and High Seas of the OSPAR Marine Area (Agreement 2008-1) (2008) ⁸⁴	Voluntary	Code of Conduct that requires scientists to minimise environmental impacts during deep-sea research. The Code states that scientists must use appropriate and environmentally friendly research methods and notes that the level and duration of underwater noise should be the minimum required to achieve the required result. Mitigation measures, including soft starts and visual and acoustic monitoring are mentioned but without specifics. No thresholds are listed.	Receptor
International	International Research Ship Operators (IRSO)	Code of Conduct for Marine Scientific Research Vessels (2007) ⁸⁵	Voluntary	Code of Conduct that acknowledges the potential impact of research vessels and recognises the need to adopt precautionary and best practice mitigation measures. While noise emissions are mentioned, guidance is very general, stating that, for activities that emit noise, such as seismic surveys, the minimum acoustic source level and duration to achieve the desired results must be used. Mitigation measures, including soft starts and visual and acoustic monitoring are mentioned but without specifics. No thresholds are listed.	Receptor
Seismic Surveys					
International	International Association of Oil and Gas Producers (IOGP)	Recommended monitoring and mitigation measures for cetaceans	Voluntary	Guidelines for reducing impact of noise from seismic surveys that use compressed air source arrays. The	Receptor

Region / Country	Regulatory Body	Regulation / Framework	Status	Key Regulatory Details (including thresholds)	Source / Receptor
		during marine seismic survey geophysical operations (2017) ⁸⁶		guidelines include the use of visual (MMO) and acoustic (PAM) monitoring, exclusion zones, and soft starts. No specific thresholds are indicated.	
Australia	Department of Sustainability, Environment, Water, Population and Communities	Environment Protection and Biodiversity Conservation Act Policy Statement 2.1 - Interaction between offshore seismic exploration and whales (2008) ⁸⁷	Mandatory	Policy Statement that outlines the legal responsibilities of seismic operators under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). It sets out standards and a framework to minimise the risk of acoustic impacts to whales (baleen whales and large toothed whales) from marine seismic operations. Precaution zones are set based on characteristics of the seismic survey. If SEL is >160 dB re 1 µPa²s for 95% of the time, an observation zone of 3 km, a low-power zone of 2 km and a shut-down zone of 500 m are imposed. For all other surveys, these zones are 3 km, 1 km and 500 m respectively. Procedures for visual monitoring (MMO), soft starts, and shutdowns are outlined within the statement.	Receptor
Brazil	Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (IBAMA)	Biota Monitoring Guidelines for Marine Seismic Surveys (2018) ⁸⁸	Best Practice	Guidelines for reducing impact of noise from seismic surveys on marine mammals and turtles. Mitigations required as part of the guidance includes the use of exclusion zones, MMO and PAM, soft start / ramp-up procedures, and airgun shutdowns if an animal is identified within the exclusion zone. No specific thresholds are identified.	Receptor
Canada	Fisheries and Oceans Canada	Statement of Canadian Practice with respect to the Mitigation of Seismic Sound in the Marine Environment (2007) ⁸⁹	Best Practice	Guidelines for reducing the impact of noise from seismic surveys on marine mammals within non-ice-covered waters in Canada. Mitigations required as part of the guidance includes the use of safety zones, MMO and PAM, soft start / ramp-up procedures, and airgun shutdowns if an animal is identified within the exclusion zone. No specific thresholds are identified.	Receptor
Greenland	National Environmental Research Institute	Guidelines to Environmental Impact Assessment of Seismic Activities in Greenland Waters (2010) ⁹⁰	Best practice	Guidelines for reducing impact of noise from seismic surveys in non-ice-covered Greenland waters. Guidelines state that the airgun used must not be bigger than required for the purpose. Other mitigations include exclusion zones, visual (Marine Mammal and Seabird Observers (MMSO)) and acoustic (PAM) watches, soft starts and shutdowns. Protection zones with restrictions on activities are in place for certain species. The guidelines make reference to Southall <i>et al.</i> , (2019) TTS and PTS thresholds.	Receptor

Region / Country	Regulatory Body	Regulation / Framework	Status	Key Regulatory Details (including thresholds)	Source / Receptor
Israel	State of Israel Ministry of Energy Natural Resources Administration	Petroleum Commissioner Guidelines: Environmental Guidelines for Conducting Offshore Seismic Surveys (in effect since 2017) ⁹¹	Best Practice	Guidelines for reducing impact of noise from seismic surveys. Under the guidelines, seismic operators are required to prepare an environmental plan which includes assessment and reporting of acoustic metrics including SEL, SELcum, SPLrms and SPLpeak-peak, but does not prescribe specific underwater noise thresholds. A 500 m exclusion zone and a 3 km marine mammal observer monitoring zone are required around the airgun array. Other mitigation measures include soft-start procedures, visual and acoustic monitoring, and shutdowns when marine mammals or sea turtles enter the exclusion zone. Seismic surveys within 500 m of ports, docks or beaches require coordination with relevant authorities.	Receptor
Japan	Japan Agency for Marine-Earth Science and Technology (JAMSTEC)	Guidelines for Minimizing the Impact to Marine Mammals from Seismic Surveys (2013) ⁹²	Voluntary	Guidelines for reducing the impact of noise from seismic surveys on marine mammals. Mitigations required as part of the guidance includes the use of precaution zones, visual watches by MMOs, soft start / ramp-up procedures, and airgun shutdowns if an animal is identified within the exclusion zone. No specific thresholds are identified though the guidelines state that MMOs should undertake visual watches over predefined ranges, that are determined for each acoustic source based on passive sound pressure levels.	Receptor
New Zealand	Department of Conservation	2013 Code of Conduct for Minimising Acoustic Disturbance to Marine Mammals from Seismic Survey Operations (2013) ⁹³	Voluntary	A Code of Conduct that it is in place for any organisation engaged in seismic survey activities in New Zealand continental waters. It has been developed to ensure adherence to Section 3A of the Marine Mammals Protection Act 1978 (MMPA). The Code states that the smallest sound source possible must be used to achieve the desired outcome, and mitigation measures are dependent on the size of the sound source with three levels of survey outlined. Where surveys are taking place in ecologically important areas or marine mammal sanctuaries, the Code states that the MMIA must include sound propagation modelling. If sound levels are predicted to exceed either 171 dB re 1 µPa²-s at a specified radius (depends on airgun array size) or 186 dB re 1 µPa²-s at 200 m, mitigation zones may be extended, or the power source may be limited.	Receptor

Region / Country	Regulatory Body	Regulation / Framework	Status	Key Regulatory Details (including thresholds)	Source / Receptor
				Mitigation measures include the use of visual (MMO) and acoustic (PAM) monitoring.	
United Kingdom	Joint Nature Conservation Committee	JNCC guidelines for minimising the risk of injury to marine mammals from geophysical surveys (2017) ⁹⁴	Best Practice	Guidelines to minimise the impact of seismic surveys in UK continental shelf waters. Mitigations required as part of the guidance include a 500 m exclusion zone around the sound source, visual monitoring (MMO) during daylight and when weather allows and acoustic monitoring (PAM) during darkness or in rough sea states, soft start / ramp-up procedures, and airgun shutdowns if an animal is identified within the exclusion zone during pre-watch. No specific thresholds are identified.	Source
Uruguay	Ministerio de Vivienda Ordenamiento Territorial y Medio Ambiente (MVOTMA)	Environmental Impact Assessment Guide for Marine Seismic (2017) ⁹⁵	Best Practice	Guidelines to manage the environmental assessment and management of offshore seismic surveys in Uruguay's territorial waters, continental shelf, and Exclusive Economic Zone. The guidelines acknowledge that underwater noise is a key impact pathway for marine mammals and other fauna such as turtles and includes mitigation to minimise impacts including the use of Marine Fauna Observers (MFO) and PAM. Other mitigations include exclusion zones, soft starts, and shutdowns. No specific thresholds are indicated.	Receptor
Subsea Cables and Pipelines					
Belgium; Denmark; Finland; France; Germany; Iceland; Ireland; Luxembourg; Netherlands; Norway; Portugal; Spain; Sweden; Switzerland; United Kingdom	OSPAR	Guidelines on Best Environmental Practice in Cable Laying and Operation (Agreement 2012-02) (2012) ⁹⁶	Voluntary	Guidelines acknowledge that there is little information on potential noise impacts due to the installation (or removal) and operation of sub-sea cables. No thresholds are indicated but underwater noise mitigations are mentioned, including planning routes and construction timelines to avoid sensitive/key times and areas and opting for quieter burial techniques, e.g. avoiding blasting.	Source
Tourism and Recreation					
International	International Whaling Commission (IWC)	General Principles for Whale Watching (2022) ⁹⁷	Best Practice	Suggests operation of whale watching ships in areas of large densities of cetaceans must input minimal noise disturbance. Ships must be designed and constructed to minimise noise production.	Source

Region / Country	Regulatory Body	Regulation / Framework	Status	Key Regulatory Details (including thresholds)	Source / Receptor
International	Whale and Dolphin Conservation	Guidelines for Whale Watching Activities (2016) ⁹⁸	Voluntary	Guidelines provided by a UK-based charity for whale watching tours. The guidelines focus on general behaviour of tour boats. Guidance includes minimising noise from vessels by going engine neutral and turning off any sonar/echo-sounder devices when close to feeding behaviour.	Source
Australia	Department of Environment and Energy	Australian National Guidelines for Whale and Dolphin Watching (2017) ⁹⁹	Voluntary	Guidelines for whale watching which provide information on how to minimise noise from vessels through design and use. Does not provide thresholds.	Source
France	Maritime Prefect of the Mediterranean	Decree 172/2021 (2021) ¹⁰⁰	Mandatory	An Order regulating activities within the territorial sea and French internal waters of the Mediterranean. The Order establishes measures that work to preserve the marine environment. No specific thresholds are noted for underwater noise, but noise is acknowledged and it is stated that noise should be kept to a level that does not cause harm to the marine environment	Receptor
Iceland	The Environment Agency of Iceland (Umhverfisstofnun)	Guidelines for masters of cruise and passenger ships arriving in Iceland (2022) ¹⁰¹	Best Practice	Guidelines to minimise the impact of vessels entering Iceland. In relation to underwater noise, the use of foghorns, whistles or any other unnecessary noise near bird cliffs is prohibited. This applies both to vessels as well as boats with outboard engines that accompany the vessels.	Receptor
Sri Lanka	Sri Lanka Tourism Development Authority (SLTDA)	Guideline For Whale and Dolphin Watching – Water Based Adventure Tourism Activities (2022) ¹⁰²	Voluntary	Guidelines to reduce impacts from whale and dolphin watching and other water-based tourism activities. Section 3.1a the guidelines acknowledge that animals may be sensitive to noise from vessels. Mitigations related to noise include regular hull maintenance to reduce noise at source and reducing noise levels by, for example, avoiding rapid and regular starting and stopping of vessel engines. No thresholds are identified.	Source
Tonga	Environmental Management Authority	Whale Watching and Swimming Regulations (originally published in 2013, revised in 2020) ¹⁰³	Voluntary	Under 10(i), the Regulations indicate “no person shall make any loud or disturbing noise near whales”. No thresholds or further guidance on underwater noise management are identified.	Source and Receptor
United Kingdom	Department for Environment, Food and Rural Affairs (DEFRA)	Marine and Coastal Wildlife Code (2023) ¹⁰⁴	Voluntary	A guidance document which aims to reduce disturbance to marine and coastal wildlife from recreational activities. For underwater noise, the Code recognises that boats, jet skis and other motorised watercraft create noise above and below the water that can disturb marine wildlife. It advises users to minimise disturbance by maintaining engines and propellers to reduce underwater noise, slowing down	Source and Receptor

Region / Country	Regulatory Body	Regulation / Framework	Status	Key Regulatory Details (including thresholds)	Source / Receptor
				near wildlife, remaining at a safe distance, and avoiding pursuit of marine mammals. The guidance recommends staying at least 100 m from marine wildlife, remaining below 6 knots (no-wake speed) around marine wildlife, and moving further away if animals show signs of disturbance.	
ACCOBAMS region	ACCOBAMS	Guidelines for Commercial Cetacean Watching in the ACCOBAMS Area (2010) ¹⁰⁵	Voluntary	The guidelines recognise vessel noise as a potential pressure on cetaceans and require impact assessments to evaluate the effects of cetacean-watching activities before authorisation. Permit applications must include information on vessel and aircraft noise levels above and below the water, and operators are required to avoid disturbing or harassing animals. Key management measures include a minimum approach distance of 100 m, a vessel speed limit of 5 knots within 300 m of cetaceans, and a minimum aircraft altitude of 183 m.	Source
Unexploded Ordnance					
Kazakhstan	Government of the Republic of Kazakhstan	Ecological Code of the Republic of Kazakhstan (2021) ¹⁰⁶	Mandatory	The Code is also referenced under Commercial Shipping. Unexploded ordnance, explosive and other works that are a source of increased noise shall be limited in animal breeding areas by the legislation of the Republic of Kazakhstan.	Receptor
United Kingdom	Department for Food, Environment and Rural Affairs; Department for Energy Security and Net Zero; Marine Management Organisation; Scottish Government; Welsh Government; Natural Resources Wales; Department of Agriculture, Environment and Rural Affairs; Joint Nature Conservation Committee; Natural England; NatureScot; Ministry of Defence.	Marine Environment: Unexploded ordnance clearance Joint Position Statement (2025) ¹⁰⁷	Mandatory	Low noise methods of unexploded ordnance (UXO) clearance should be the default method of clearance. High order UXO clearance methods should only be used as a last resort. A marine licence is required with justification of the clearance method, the number of UXOs required to be cleared, and a mitigation plan. Monitoring is also required. Military requirements are exempt from this statement. No thresholds are identified.	Source
United Kingdom	Joint Nature Conservation Committee	JNCC guidelines for minimising the risk of injury to marine	Best Practice	Outlines mitigation measures for explosive activities in UK waters to minimise the risk of injury to marine	Source and Receptor

Region / Country	Regulatory Body	Regulation / Framework	Status	Key Regulatory Details (including thresholds)	Source / Receptor
		mammals from explosive use in the marine environment (2025) ¹⁰⁸		mammals. The guidance requires a mitigation zone based on the predicted injury (PTS) range or a minimum radius of 1 km, whichever is greater. Mitigation includes a minimum 60-minute pre-detonation search, delays if marine mammals are detected within the mitigation zone (≥ 20 minutes after the last detection, or ≥ 30 minutes in waters > 200 m deep), and use of additional measures such as PAM, acoustic deterrents, or noise abatement where appropriate. No specific thresholds are identified.	
Membership					
International	International Marine Contractors Association (IMCA)	IMCA ES005 Guidance on mitigation of underwater noise (2025) ¹⁰⁹	Voluntary	Practical guidance to assist IMCA members in reducing the impacts of underwater noise. The guidance outlines best practice, and potential mitigation measures such noise reduction technologies, application of speed limits, implementation of exclusion zones and use of noise abatement systems including bubble curtains.	Source and Receptor
International	International Chamber of Shipping (ICS) and BIMCO	Underwater Radiated Noise Guide (2024) ¹¹⁰	Voluntary	Guidance that aligns with the IMO's 2023 Revised Guidelines for the Reduction of Underwater Noise from Commercial Shipping and is in place to increase awareness of underwater radiated noise and to encourage shipowners to reduce the impact of underwater radiated noise from ships. The guidance is mainly focused on reducing noise at source through optimal vessel design and regular maintenance. No specific thresholds are indicated.	Source

References

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- ² Convention on the Conservation of Migratory Species of Wild Animals (CMS). 2008. *Resolution 9.19: Adverse Anthropogenic Marine/Ocean Noise Impacts on Cetaceans and Other Biota*. Adopted at the Ninth Meeting of the Conference of the Parties, Rome, 1-5 December 2008. Bonn, Germany: UNEP/CMS. https://www.cms.int/sites/default/files/document/Res_9_19_ocean_noise_En.pdf.
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