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COMPILATION OF SUBMISSIONS AND FURTHER INFORMATION ON UNDERWATER NOISE MITIGATION MEASURES

Note by the Executive Secretary

1. In decision XII/23, the Conference of the Parties encouraged Parties and other Governments, as well as indigenous and local communities and other relevant stakeholders, to take appropriate measures, as appropriate and within their competencies, and in accordance with national and international laws, to avoid, minimize and mitigate the potential significant adverse impacts of anthropogenic underwater noise on marine and coastal biodiversity. The Conference of the Parties, in the same decision, requested the Executive Secretary to compile and synthesize relevant scientific and technical information concerning these measures, as well as information on related measures taken by Parties, other Governments and competent organizations, and to make the compilation available as information for the Subsidiary Body on Scientific, Technical and Technological Advice at its twentieth meeting.

2. Pursuant to this request, the Executive Secretary issued notification 2015-066, dated 4 June 2015, requesting scientific and technical information concerning the elements specified in paragraph 3 of decision XII/23, as well as information on related measures taken by Parties, other Governments and competent organizations. This notification was issued in conjunction with notification 2015/14 issued by the Secretariat of the Convention on the Conservation of Migratory Species of Wild Animals (CMS), which requested information on the implementation of CMS Resolution 10.24 on further steps to abate underwater noise pollution for the protection of cetaceans and other biota.

3. The submissions received in response to the above-mentioned notifications were collated, compiled and synthesized in the attached table describing various activities undertaken by Parties and relevant organizations related to anthropogenic underwater noise.

* Reissued on 20 April 2016 for technical reasons.

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* Submitted in response to CBD notification 2015-066
** Submitted in response to CMS notification 2015/14
*** Submitted in response to both CBD notification 2015-066 and CMS notification 2015/14

Submitter	Legislation/Policies/Management Plans/Guidance	Scientific and Technical Research Activities
Australia*	• **Environmental Protection and Biodiversity Conservation Act 1999 (EPBC)** - Regulates actions that are likely to have a significant impact on Matters of National Environmental Significance (MNES), which include World Heritage Sites, migratory species, nationally threatened species and communities, and Commonwealth marine areas. Such actions are subject to a rigorous and transparent environmental assessment and approval process. The Act includes *Policy Statement 2.1*, which provides standards and framework to minimize risk from seismic survey and guidance for survey operators • **National Maritime Activities Environmental Management Plan** - Includes standard mitigation procedures to protect marine mammals and minimize the possibility of any adverse impact to wildlife when conducting training exercises at sea • **The Reef 2050 Plan** - A long-term plan for management of the Great Barrier Reef World Heritage Area to 2050. It includes an action to '*Develop a guideline specific to the Great Barrier Reef on assessing and managing impacts of underwater noise on species',* which is being led by the Great Barrier Reef Marine Park Authority and will be completed by 2020. • **The North-East Shipping Management Plan** - Contains an action for the Great Barrier Reef Marine Park Authority and the Australian Maritime Safety Authority to keep under review opportunities to conduct research into noise monitoring tools and methods and implications for ship noise mitigation strategies. • **Great Barrier Reef Marine Park Regulations 1983** - Requires the Great Barrier Reef Marine Park Authority to consider the potential impacts of an activity (including underwater noise) on the environment and on the social, cultural and heritage values of the Marine Park or a part of the Marine Park in deciding whether or not	• **National collation of pressure data to improve understanding the pressures on the marine environment** - The National Environmental Research Programme's Marine Biodiversity Hub project mapped environmental pressures in Commonwealth waters (such as fishing, shipping, seismic surveys and oil and gas infrastructure) on a national scale and identified the associated risks and impacts in relation to marine biodiversity. • **Potential noise impacts on fish in the Southern Ocean -** Commonwealth Scientific and Industrial Research Organisation (CSIRO), in conjunction with industry, investigate potential for noise impacts on fish associated with oil and gas exploration in the Great Australian Bight. • **Developing quieter technologies** – Australian Research Council funded a project, commencing in 2015, to develop quieter propellers. The project aims to explore the generation of noise by composite propellers and to use this understanding to tailor the composite properties to reduce underwater noise. • **Interactions between marine fauna and underwater noise, developing monitoring techniques for underwater operations and marine soundscape studies** - Curtin University leads and collaborates in several multi-institutional projects addressing underwater noise, including on issues such as: Assessing the potential impacts of anthropogenic sound on marine fauna; mapping distribution, abundance and

	to grant a permission in relation to an application, and whether or not to impose any conditions on the permission,	behaviour of marine fauna species and their associated marine habitats as a baseline; quantifying underwater noise emission from marine operations; cataloguing sound repertoires of marine species (mammals and fish) and mapping their calling patterns to identify essential habitat and to better understand their responses to environmental drivers and anthropogenic activity; development of monitoring techniques (hardware and software) for marine fauna and underwater anthropogenic operations; and marine soundscape studies (monitoring, characterizing and quantifying).
Argentina**	• **Regulations for hydrocarbon exploration and exploitation -** The Undersecretariat of Fuels Energy Secretariat of the Ministry of Federal Planning, Public Investment and Services, is the enforcement authority of Law 26,197, which regulates exploration and oil exploitation. Companies that perform such activities are required to comply with Resolution 25/2004 "Rules for Submission of Environmental Studies Relating to Permits Exploration and Exploitation of Hydrocarbons Concessions" and present an "Environmental Assessment" by identifying potential impacts associated with their projects and outline measures for prevention, minimization and mitigation measures.	
Cape Verde**	• **Mitigating impacts on humpback whales *(Megaptera novaeangliae)*** - Coastal activities that may impact the reproductive season of *Megaptera novaeangliae* are not permitted.	
Canada*	• **Marine Protected Areas (MPAs) established under the Oceans Act** - Generally prohibits any activity that disturbs, damages, destroys or removes any living marine organism or any part of its habitat or is likely to do so. The spatial design and management of the MPA take into account the risk of human induced pressures on the conservation objectives of the MPA. Activities found to be inconsistent with the conservation objectives would be prohibited. • Example: Gully MPA—Noise impacts northern bottlenose and sperm whales were assessed in the process to establish the MPA.	• **SPERA Research projects on underwater noise** Strategic Program for Ecosystem-Based Research and Advice (*SPERA*) in Canada's Department of Fisheries and Oceans (DFO) has funded projects on: - Probability of shipping sound exposure levels along Northern Marine Transportation Corridors; - Evaluation of the potential for seismic surveys to impact Northern Shrimp (Pandalus borealis); - Standardized, Risk-based Framework for Assessing

	These issues have been incorporated into the Gully MPA Plan. There are proposals for Passive acoustic monitoring of cetaceans and ocean noise in the MPA and surrounding areas. • **Statement of Canadian Practice (SOCP) (2008) with respect to the Mitigation of Seismic Sound in the Marine Environment** - Specifies the minimum mitigation requirements to be met during the planning and conduct of marine seismic surveys in in all non-ice covered marine waters in Canada. • **Science Advisory Report SAR 2009/71 -** Aquaculture Management group has developed risk assessment and risk management tools based on sound science to mitigate impacts of operations related to aquaculture activities.	Cumulative lmpacts of Marine Development Projects, lncluding Arctic Shipping and Seismic, on Marine Mammals and Sea Turtles in Canada; - Assessing and monitoring of underwater baseline noise levels along BC's South Coast and in parts of the Canadian Arctic; - Ecological Risk Assessment for Ecosystem-Based Ocean Management Risk Assessment for Shipping in the Arctic; - Effects of maritime navigation in the Arctic on the underwater sound environment of the ecosystem of marine mammals; and - Passive acoustic monitoring of cetaceans and ocean noise in the Gully Marine Protected Area (MPA) and adjacent areas of the Scotian Slope The DFO *Canadian Science Advisory Secretariat (CSAS)* provides relevant scientific advice on noise-related issues. Some selected examples include: • DFO. 2015. Advice regarding of Mitigation and Monitoring Measures for Seismic Survey Activities in and near the Habitat of Cetacean Species at Risk. DFO Can. Sci. Adv. Sec Sci. Adv. Rep. 2015/005. • DFO. 2015. Pathways of Effects for Shipping: An Overview. DFO Can. Sci. Adv. Sec. Sci. Adv. Rep. 2O74/O59. DFO.2074. Assessment and lnterpretation of lnformation on Underwater Noise Provided for the Marine Terminal Construction Project in Port-Daniel-Gascons, in Chaleur Bay, QC. DFO Can. Sci. Adv. Sec. Sci. Resp. 2015/050. • DFO.2014. lmpacts of Geophysical Surveys in the port of Cacouna on the St. Lawrence Beluga. DFO Can. Sci. Adv. Sec. Sci. Adv. Rep. 2014/020. • DFO.2012. A draft framework to quantify and cumulate risks of impacts from large development projects for marine mammal populations: A case study using

		shipping associated with the Mary River lron Mine Project. DFO Can. Sci. Advis. Sec. Res. Doc. 2012/154.
Denmark***	• **Activities that generate underwater noise are regulated through approvals and permits** - Larger projects are, in general, covered by environmental impact assessment (EIA) requirements. A permit for a project is based on this assessment and there may be conditions requiring the use of preventive measures such as sound reducing techniques, "soft start" techniques or to avoid construction work in vulnerable areas or periods. In general Best Available Techniques (BAT)[1] are contained in Denmark's legislation • **For larger projects, the overall level of anthropogenic noise and the related effects are assessed on the background of an impact assessment and environmental impact study** - The project conditions will then be based on preventive measures and the use of Best Environmental Practice (BEP)[2] and an assessment of whether there is a need for the ban on construction work in a given period, for example in mating and breeding periods. • **There may also be required monitoring relating to the specific project** - This monitoring can be aimed at both pre-construction, during construction and on the operation phase. • **In the approval for a specific project, there may also be a requirement for clarification of sound propagation in the area** – This would include the use of sound propagation models, and requirements for review of possible alternative technologies. • **The conditions for a specific activity is based on the activities impact on the local species and ecosystems as well as the duration of the activity, the equipment used, time of year and distance to the habitat areas** - If a construction project may affect designated international nature protection areas significantly, an impact assessment is made. The assessment is made taking into account the site's conservation objectives, including the direct or indirect effect	

[1] In Resolution 10.24 adopted in 2011, the Conference of the Parties to the Convention on Migratory Species, recommended that Parties apply Best Available Techniques (BAT) and Best Environmental Practice (BEP) including, where appropriate, clean technology, in their efforts to reduce or mitigate marine noise pollution.

[2] See above footnote.

	on the conservation area and its designated protection basis - both in construction and operation phases.	
Ecuador*	• **Legislation related to underwater noise** – In the Ministry of Environment, the Undersecretary of Marine and Coastal Management, the Unified Text of Secondary Legislation of the Environment Ministry, Book VI (annex 5) addresses allowable limits of ambient noise levels for fixed, mobile sources and vibration sources. The Environmental Management Act contains provisions for the EIA, which also address noise-related issues.	
EU***	• **EU Habitats Directive—**Under Article 6(3) and the corresponding Birds and Natural Habitats Regulations 2011 (i.e., S.I. 477 of 2011), Plan- or project-related activities within designated conservation sites must be assessed with regard to their implications for the site and its conservation objectives. Article 12 of the Habitats Directive requires the strict protection (prohibiting all forms of deliberate capture or killing, disturbances, destruction or taking of eggs from the wild; and deterioration or destruction of breeding sites or resting places) of all species referred to in the directive (including all cetaceans). • **Environmental Impact Assessment Directive**—Sets the framework for assessing (and where necessary reducing) the impact of maritime activities. • **Marine Strategy Framework Directive (MSFD)**—Requires Member States to establish monitoring programmes (by July 2014) and develop a programme of measures (by end 2015) to reach good environmental status on the basis of 11 GES descriptors. One of these 11 descriptors, as defined in Annex I of the MSFD, is the "Introduction of energy, including underwater noise, is at levels that do not adversely affect the marine environment". There are two indicators further defined in the Commission Decision on criteria and methodological standards on good environmental status of marine waters (2010/477/EU), addressing the main concerns related to this descriptor: • loud, low and mid frequency impulsive sounds - e.g. seismic surveys, piling, sonars, explosions; and • continuous low frequency sound from anthropogenic sources,-	• **LIFE+ BIAS (Baltic Sea Information in the Acoustic Soundscape) project (September 2012 – October 2016)**—Aims to: - Raise awareness among authorities and managers; - Establish regional implementation; - Assess the level of underwater noise and present the results as soundscape maps; - Establish regional standards and methodologies that will allow for cross-border handling of data and results; and - Implement regional tools for handling of underwater sound. • **MarVEN Project**—Aims to review the available scientific evidence and significance of the environmental impacts of noise, vibrations and electromagnetic emissions from marine renewable energy, and provide recommendations on solutions to reduce or mitigate any identified negative impacts.

	e.g. from commercial shipping, windfarms, underwater pipelines carrying gas and liquid. EU Members States, often in coordination with the regional sea conventions covering European marine waters, are now preparing their programmes of measures, including on underwater noise issues, to be notified to the European Commission by March 2016 • **Technical Group on underwater noise measurement, monitoring, standardisation and effect assessment**—Advises EU Member States and has developed guidelines on these issues. In relation to the first indicator (above), in 2010, the Technical Group recommended that Member States develop an underwater noise register, linked to the licensing of activities. In relation to the second indicator, a coordinated regional sea monitoring programme was recommended.	
Estonia**	• **EIA requirement for noise-related impacts -** In Estonian EIA law, there is a requirement that the EIA report should assess the impact of the planned activities, including possible impacts of noise and the report should include noise modelling and noise monitoring near construction site.	• **Pilot surveys have been conducted underwater noise** but regular monitoring data is not taking place in Estonian waters. There have been evaluations in the context of EIAs of various large-scale development projects on how the building noise will have an effect on the surrounding environment, but no real measurements have been taken. • **LIFE+ BIAS (Baltic Sea Information in the Acoustic Soundscape) project (September 2012 – October 2016)** – A monitoring programme for underwater noise is currently being developed in the context of this project. • **Good Environmental Status through Regional Coordination and Capacity Building (GES-REG) –** This regional project is developing guidance on methodologies that can be used to develop further the science base for good environmental status descriptors, criteria and indicators focusing on food webs, non-indigenous species, marine litter, and underwater noise among other objectives.
Finland***	• **EU Marine Strategy Framework Directive -** Finland is working to	• **Monitoring and mapping underwater sound**

	implement the EU MFSD, through decree 980/2011, regarding underwater noise in the Baltic Sea. Management tools will be prepared by 2016. • **Environmental Impact Assessments (**Act 10.6.1994 and the decree 17.8.2006/713) - EIA guidelines relating to construction of wind power plants and other construction. • **Noise from leisure boat motors and ships at harbours** - There are requirements concerning airborne noise induced by leisure boat motors and ships at harbours. There are no regulations concerning underwater noise caused by shipping or boating.	**through the** EU LIFE+ BIAS project - Finland began monitoring underwater sounds in 2014 and are analyzing the results. Finland plans to create the first sound maps of their waters through the EU LIFE+ BIAS project.
France***	• **Conditions for good ecological status** - Underwater noise is considered one type of marine pollution in the code of the French environment (5th paragraph of Article L219-8 of the Environmental Code). The National Order of 17 December 2012 concerning the definition of good ecological status marine waters stipulates that good ecological status for Descriptor 11 - which requires that "the introduction of energy, including underwater sound sources, is at levels that do not harm the marine environment," is achieved when the following conditions are cumulatively met: - Detection capabilities and acoustic communication of large whales are - not altered by anthropogenic noise disturbances; - Ecological functional zones used by sensitive species are protected from noise disturbance; - Direct or indirect accidental mortality due to noise disturbance is marginal. • **Sub-regional environmental targets under the MFSD** - > Western Mediterranean marine - Maintain or restore populations of marine mammals - Organize research and development in the Mediterranean to meet the objectives of the MSFD - Strengthen legal tools for the supervision of maritime activities that may impact the environment - Strengthen international cooperation tools for the implementation of the MSFD	

	- Inform public stakeholders about the condition of the marine ecosystems of the marine sub-region and the objectives of the > North Sea Marine channel: - Limiting impulsive emissions to a level not having a significant impact on species - Limiting continuous emissions to a level not having a significant impact on species - Improve the integration of marine environment protection issues into training for supervisors - Improve awareness of users of the marine environment - Improving the integration of marine environmental protection issues in information and public awareness.	
Germany**	• **Measures related to offshore wind farm construction -** Dual threshold values for underwater noise emission during pile driving are mandatory for the approval process. During pile driving, underwater noise emissions must not exceed 160 dB (single event sound pressure level, SEL) or 190 dB (peak-to-peak2) at 750 m from the source. In the course of approval process, a sound protection concept is mandatory regarding suitable measures to be taken to ensure the compliance of the threshold values. Measures include deterrence or noise mitigation measures are regarded as "proven technology". The German Federal Maritime Responsibilities Act requires that a wind farm not be detrimental to the marine environment. An environmental impact assessment is mandatory, as is a Strategic Environmental Assessment. This work was further supported by a study providing technical guidance on noise mitigation measures to be applied during pile driving of offshore wind turbines as well as alternative low-noise foundation concepts and analyse of their applicability, as well as two technical conferences. • **Protection of Harbour Porpoises from Sound Exposures -** The "Concept for the Protection of Harbour Porpoises from Sound Exposures during the Construction of Offshore Wind Farms in the German North Sea (Sound Protection Concept)" provides guidelines for mitigating sound impacts, and best available technologies are to	

	be used in order to implement the most ecologically appropriate option, and therefore minimize sound exposures and other negative impacts on the marine environment as far as possible overall. The Sound Protection Concept and the research activities funded by the Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) are intended to incentivize and support the development and rapid deployment of innovative, low-noise technologies. Several stakeholder exchange processes have been set up as part of this process.	
Ireland*	• **Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources –** Ireland's *Department of Arts, Heritage* and the Gaeltacht developed "Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters" in January 2014. This addresses the potential or described direct effects on marine mammals (e.g., physical harm, detrimental changes to or interference with natural behaviour) of man-made sound arising from licensable plans or projects and aims (i) to give an understanding of selected sound sources introduced into the environment by specific human activities, which may impact detrimentally on protected marine mammal populations or individuals of those species, (ii) to describe a structured, staged process for the informed assessment of risk and decision-making with regard to such sources, and (iii) to outline practical risk avoidance and/or risk reduction measures which in the Department's view must be considered in order to minimize the potential effects of sound sources on the natural ecology of marine mammal species whether in Ireland's extensive and diverse coastal/marine waters or in designated conservation sites therein. The document outlines technical guidance related to Marine Mammal Observers (MMOs), plan/project-specific guidance, and geophysical acoustic surveys, among others. • **Code of Practice for the Protection of Marine Mammals during Acoustic Seafloor Surveys -** Due to concerns regarding the potential risk to and detrimental effect on marine mammals from certain types of geophysical acoustic survey equipment, the Department of the Environment, Heritage and Local Government, through review and	

	consultation with key stakeholders, developed a "Code of Practice for the Protection of Marine Mammals during Acoustic Seafloor Surveys in Irish Waters" (2007).	
Japan*		• **A collaborative research project on the effects of underwater noise from commercial shipping on aquatic life –** This project, led by the Ministry of Land, Infrastructure, Transport and Tourism of Japan, includes the development of a methodology to predict underwater noise and the observation of whales' behavioural response to underwater noise. It aims to develop a method for estimating underwater noise from commercial shipping, to identify underwater noise acoustic profiles from commercial shipping and to quantify the impact on marine mammals.
Latvia*	• **Latvia`s Marine Environment Protection and Management Law of 2010** - Defines human-induced underwater noise as a kind of marine pollution. The Cabinet Regulation No. 1071 of 2010 further prescribes underwater noise as one of the pressures to be used to assess status of and impacts on marine environment. • **National Programme of Measures for the Marine Strategy Framework Directive** - Latvia is in the process of developing the National Programme of Measures for the Marine Strategy Framework Directive to reach good environmental status on the basis of good environmental status descriptors of the Directive. This will include scientific research, scientific capacity building, regional cooperation and implementation of international legislation and guidelines for shipping. Also Latvia`s Environmental Policy Strategy 2014-2020 foresees support for an applied research for the horizontal environmental issues (including noise).	
Madagascar*	• **Regulations for petroleum exploitation** – Under (Decree No. 99954 of December 15, 1999 on the Implementation of Investment Compatibility with the Environment (MECIE), as amended by Decree No. 2004-167 3 February 2004, petroleum companies are required to carry out an EIA in the context of an environmental management plan. Requirements also include the following:	

	- Seismic operations are not allowed outside the "target areas of the seismic program," even technical testing or calibration of equipment. - The seismic vessel activity must be continuously accompanied by an escort vessel. - "Soft start" of seismic emissions for 20-30 minutes - Presence of Marine Mammals Observers (MMO) / Passive Acoustic Monitoring Operators, a fishing adviser and a government observer - Implementation of zoning procedures regarding the use of airguns ('observation zone', 'low power zone' and 'stop area') - Monitoring before, during and at the end of seismic operations - Where applicable, damage to marine mammals that are directly attributable to the seismic emission are the responsibility of the company	
New Zealand*	• **New Zealand's Exclusive Economic Zone (EEZ) and Continental Shelf (Environmental Effects) Act 2012 (EEZ Act)** –This legislation aims to protect the EEZ from the potential environmental risks of a range of activities such as underwater noise, petroleum exploration activities, seabed mining, marine energy generation, and carbon capture developments. It also restricts the causing of vibrations (other than vibrations caused by the normal operation of a ship) in a manner that is likely to have an adverse effect on marine life. The EEZ Act does not specifically mention underwater noise. However, specific activities – such as seismic testing – are regulated. • **Code of Conduct for Minimising Acoustic Disturbance to Marine Mammals from Seismic Survey Operations -** Seismic testing is only permitted if the survey complies with New Zealand's Department of Conservation 2013 Code of Conduct for Minimising Acoustic Disturbance to Marine Mammals from Seismic Survey Operations (the Code). Although voluntary, the Code was brought into regulatory effect in 2013 through the EEZ Act. • **Marine Mammal Impact Assessment (MMIA) -** The purpose of the Marine Mammal Impact Assessment (MMIA) process is to ensure that the proponent has (i) Identified all potential effects of	• **Mapping marine mammal sensitivity** - To assist with effective consideration of such sensitivities during pre-survey planning, DOC has developed a map that highlights particular sensitivities for marine mammal species. This map is updated on a regular basis as new data becomes available.

	their activities on marine species and habitats in the receiving environment, (ii) provided an opportunity for appropriate expert technical advice to be considered, (iii) avoided, wherever possible, operating in sensitive, ecologically important areas or during key biological periods where Species of Concern are likely to be breeding, calving, resting, feeding or migrating, or where marine mammals are present in confined waters, and (iv) Implemented whatever measures may be necessary to minimise the identified impacts to acceptable levels. The 2013 Code of Conduct for MMIA from Seismic Survey Operations (the Code) has been endorsed as industry best practice by the Petroleum Exploration and Production Association of New Zealand (PEPANZ). • **Inclusion in Regional Coastal Plans** - Underwater noise in the Coastal Marine Area (out to 12 nautical miles) may also be regulated under by regional coastal plans and managed by relevant regional councils. In New Zealand, currently twelve regional coastal plans are operative and five are proposed. Three councils (Auckland Council, Horizons Council and West Coast Regional Council) have included provisions that specifically mention underwater noise, and two of these councils (Auckland and West Coast) have rules related to underwater noise.	
Norway***	• **Regulations for offshore petroleum activities** –Regulations for seismic surveys are in place to avoid or minimise such negative impacts. Under the Petroleum Act and Petroleum Regulations, there are requirements for an impact assessment to be undertaken prior to the opening of new areas, which may include impacts related to underwater noise. This process involves stakeholder hearings both in the scoping phase and on the actual impact assessment report. Impact assessments are required for exploration drilling in areas with high aggregation of sea mammals. No later than five weeks prior to the start-up of survey activities, the licensee shall submit details of the survey for feedback from relevant authorities. The Norwegian Marine Research Institute and the Directorate of Fisheries are responsible for notification of sensitive areas with respect to fish, marine mammals and fisheries. A "soft start" with weaker sound	• **Studies on the impact of underwater noise from seismic surveys on fish stocks -** Several studies on the impact of underwater noise from seismic surveys on fish stocks in Norwegian waters have been carried out in recent years for several species of fish. • **SONATE decision aid tool for planning of sonar operations in Norwegian waters -** SONATE integrates current knowledge on sensitivity of species, distribution and abundance of species in time and space, fishery activity and other commercial activity. • **Publication of reports on underwater noise impacts** Engås, A., Løkkeborg, S., Ona, E. and Soldal, A.V. 1993. Effects of seismic shooting on catch and catch-availability of cod and haddock. Fisken og Havet nr. 9 - 1993, (ISSN

	impulses is recommended in sensitive areas. Use of acoustic equipment and seismic is not permitted in protected areas. • **Guidelines for Seismic Surveys** - The Ministry of Fisheries and the Norwegian Ministry of Petroleum and Energy have published a common guideline for best behaviour when conducting seismic surveys, "Implementation of seismic surveys on the Norwegian Continental Shelf." • **Fisheries Liaison Officers on seismic vessels** - Vessels carrying out seismic surveys must have a fisheries liaison officer (FLO) on board when it is necessary due to fishing operations in the area. • **Sonar for naval operations** - Generic EIAs for naval sonar operations have been conducted since 2003. The Navy Implemented Guidelines for use of active sonar in 2006, which were upgraded to Regulations in 2009 and to Military Instructions in 2015. The Sonar Instructions defines restriction zones in areas of high abundance of marine mammals and safety distances from fishing activity and marine mammals. Operational procedures such as marine mammals observers, ramp–up, speed limitations and restrictions during operations in restricted waters with limited escape options are also implemented.	0071-5638). Bergen. 117 s. Hassel, A., Knutsen, T., Dalen, J., Løkkeborg, S., Skaar, K., Østensen, Ø., Haugland, E.K., Fonn, M., Høines, Å. and Misund, O.A. 2003. Reaction of sandeel to seismic shooting: A field experiment and fishery statistics study. Fisken og Havet, nr. 4 - 2003. 63 Dalen, J., Dragsund, E., Næss, A. and Sand, O. 2007. Effects of seismic surveys on fish, fish catches and sea mammals. Report for the Cooperation group – Fishery Industry and Petroleum Industry. Report no.: 2007-0512. Det Norske Veritas AS, 24.04.07. Høvik. 29 s. Dalen, J. 2009. Scaring effects in fish by offshore seismic explorations. Contr. International workshop on "Methods and technologies for studies of fish behavior", OGP JIP E&P Sound and Marine Life. The International Association of Oil and Gas Producers, Stavanger 19-20.04.09. Løkkeborg, S. 2009. Effects of seismic shooting on longline and gillnet fisheries. Contr. International workshop on "Methods and technologies for studies of fish behavior", OGP JIP E&P Sound and Marine Life. The International Association of Oil and Gas Producers, Stavanger 19-20.04.09. Løkkeborg, S., Ona, E. & Salthaug, A. 2012. Sounds from seismic air guns: gear- and species-specific effects on catch rates and fish distribution. Can.J.Fish.Aquat.Sci. 69:1278-1291.
Sweden*[3]		• **AQUO (Achieve Quieter Oceans by shipping noise footprint reduction)** - Objective is the "Assessment and mitigation of noise impacts of the maritime transport on the marine environment", coordinated topic

[3] Information is from the submission from HELCOM, which included information sent directly to HELCOM by some of its Parties for the purpose of responding to CBD notification 2015-066.

		within the framework of the "Ocean of Tomorrow". • **Impact of Naval sonars on Marina mammals –** A Swedish Defense Research Agency (FOI) project studying the impact of naval sonar on marine mammals (Harbour porpoise and seals). Research including scientific as well as technical information, a case study and best practices. A similar project regarding underwater explosions has begun but no results are available
United Kingdom**	• **Licensing requirements -** As part of the UK marine licensing system, developers must apply for consent for most marine construction or development activities. Prior to issuing a licence, the regulator must consider the potential impacts associated with the development, including levels and impacts of noise where relevant. The regulator(s) and statutory consultation bodies (e.g. statutory nature conservation agencies, Environment Agency etc.) will determine what, if any, mitigation measures are needed, including Marine Mammal Observers, soft start, seasonal restrictions or delays when vulnerable species are present, the use of noise dampening technologies to reduce source levels, or the use of alternative designs. Specific guidelines, that are part of relevant licensing procedures, are used for seismic surveys, explosive use and pile driving. • **Northern Ireland Offshore Renewable Energy Strategic Action Plan 2012-2020 Project Level Mitigation Strategy -** Sets out basic mitigation measures to avoid or minimize impacts of offshore renewable energy developments on the environment or other marine users. It is aimed as a reference guide for regulators, developers and stakeholders for the licensing and consenting process. • **Protected areas and protected species -** MPAs established under European legislation i.e. Special Areas of Conservation (SACs) are legally protected. This means that any activity within or outside the site that has the potential to negatively impact on site integrity will need to be appropriately mitigated. Whilst not all MPAs have specific management plans in place, where they do exist the impacts	

	of noise is integrated into them. Scotland has produced guidance on European Protected Species (EPS) legislation.	
HELCOM* (Baltic Marine Environment Protection Commission, or the Helsinki Commission)	• **2013 HELCOM Ministerial Meeting** - Agreed that: - the level of ambient and the distribution of impulsive sounds in the Baltic Sea should not have negative impact on marine life; - human activities that are assessed to result in negative impacts on marine life should be carried out only if relevant mitigation measures are in place. Accordingly, the Ministerial Meeting agreed that as soon as possible and by the end of 2016, using mainly already on-going activities, to: - establish a set of indicators including technical standards which may be used for monitoring ambient and impulsive underwater noise in the Baltic Sea; - encourage research on the cause and effects of underwater noise on biota; - map the levels of ambient underwater noise across the Baltic Sea; - set up a register of the occurrence of impulsive sounds; - consider regular monitoring on ambient and impulsive underwater noise as well as possible options for mitigation measures related to noise taking into account the ongoing work in IMO on non-mandatory draft guidelines for reducing underwater noise from commercial ships and in CBD context.	• **HELCOM CORESET II (2013-2015) -** two candidate indicators related to underwater noise have been developed in this project aiming at operationalizing HELCOM core indicators and pre-core indicators and further develop candidate and pressure indicators as needed. These indicators are: "Continuous low frequency anthropogenic sound" and "Distribution in time and place of loud low and mid frequency anthropogenic impulsive sounds". • **Work plan on preparing a roadmap to building a knowledge base on underwater noise -** A proposal for a work plan on preparing a roadmap to build a knowledge base on underwater noise was sent to the last meeting of the HELCOM Heads of Delegation for their consideration. The Meeting agreed on the work plan, but decided that it should be amended so the focus should be given first to the work on monitoring, review of existing knowledge and investigating the significance of different sources of noise as well as HELCOM indicators, while the work on mitigation options and environmental targets should be started with preparing an overview of measures in IMO, OSPAR and other relevant forums.

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