



Ocean Noise and the Sustainable Development Goals

What is ocean noise?

Levels of anthropogenic (human generated) noise in the ocean are increasing at an alarming rate. In some ocean and inshore regions these noise levels have doubled every decade for the past 70 years¹²³⁴⁵. According to the European Maritime Transport Environmental report, released in September 2021, ocean noise levels have doubled in EU waters between 2014 and 2019⁶.

Ocean noise pollution is generated by many human activities. While shipping generates a constant drone in the ocean, activities such as hydrocarbon exploration (e.g., airguns used for seismic surveys), coastal and offshore construction work and naval activities, including the deployment of active sonar systems, emit intense impulsive sound over long distances. Ocean noise is a form of transboundary pollution and impulsive and continuous noise sources pose a significant threat to marine ecosystems, marine animals, and the future sustainability of our ocean.

In 2018, OceanCare commissioned a Report⁷ which reviewed the findings of 115 primary studies discussing the impacts of ocean noise on fish and invertebrates. Impacts documented range from body malformations, higher egg or immature mortality, involving internal injuries, causing disorientation and even death, causing damage to hearing structures which can worsen over time, temporary hearing loss that can last for months, or even permanent hearing loss, stress. This may have negative consequences on the immune system and reproductive rates, behavioural changes, including

aggression, reduced communication and foraging, DNA integrity and physiology. Additional concerns have been raised over high mortality of zooplankton⁸ and the decrease in fish catch rates when exposed to seismic airguns^{9 10 11 12 13 14 15 16 17 18}. The effects of ocean noise on marine mammals are of equal concern and can result in masking communication, habitat displacement, behavioural and physiological changes, including death.

UNCLOS (Article 1 (4) recognises noise as a marine pollutant²⁰. Numerous Multi-Environmental Agreements (MEAs), UN organisations and treaties have recognised the growing concerns over the negative impacts of ocean noise on marine species and marine ecosystems. In recognition of the overwhelming science, such entities have adopted resolutions and decisions that urge their respective parties to act, predominantly by avoiding, reducing, and mitigating ocean noise. These include the Convention on Biological Diversity (CBD), the Convention on Migratory Species (CMS), the Food and Agriculture Organization (FAO)/General Fisheries Commission for the Mediterranean (GFCM), the International Maritime Organization (IMO), the International Whaling Commission (IWC) and others²¹.

Despite the recognition of ocean noise as a pollutant by UNCLOS and as a severe threat to marine biodiversity, which includes the adoption and endorsement of numerous conservation measures, provisions and policy guidance, implementation of these instruments is lacking. In addition, little has been done to react towards the potential socio-economic impacts caused by ocean noise on fisheries and the threat this may pose to food security.

Reducing Ocean noise is critical in tackling the climate and environmental crisis

For years, the United Nations' Intergovernmental Panel on Climate Change (IPCC), the foremost scientific body and international authority on climate change, warned that urgent and decisive action is needed to curb global warming. In one of its most recent reports, published in 2021, the IPCC worryingly noted that global warming will exceed 1.5°C and 2°C "unless deep reductions in carbon dioxide (CO₂) and other greenhouse gas emissions occur in the coming decades".

Fossil fuels account for more than 75% of global greenhouse gas emissions and almost 90% of all carbon dioxide emissions. Unfortunately, the fossil fuel industry will produce approximately 50% more fossil fuels in 2030 than would be consistent with limiting warming to 2°C and 120% more than would be consistent with limiting warming to 1.5°C. There is, consequently, an urgent need to cut Greenhouse Gas (GHG) emissions. Two sectors that provide great potential to reduce both underwater noise pollution and help the world move towards addressing the stern warnings by the IPCC are the shipping and oil and gas sector.

Maritime transport is the backbone of international trade and, therefore, the global economy, but it is also leaving a significant and increasingly worrying environmental footprint that includes noise emissions. While there is a need to develop technological advances, there is equally a need to explore operational measures that can be implemented without further delay, including slow steaming. Indeed, a modest ship speed reduction of 10% of the global shipping fleet is estimated to reduce underwater noise from shipping by 40% and greenhouse gas emissions by 13%, simultaneously also reducing the risk of ship collisions with whales by approximately 50%.

It may also be helpful to recall that in 2015 the world met in Paris to agree on a framework to take steps towards lowering greenhouse gas emissions, reaffirming the goal of limiting global temperatures to 1.5°C. The search for new fossil fuels using seismic airgun exploration – a common method used to detect oil and gas deposits under the sea floor and one of the loudest human-caused underwater noise-generating activities – poses not only a threat to marine life but moreover runs counter to the IPCC's warnings and the commitments adopted by the Paris Agreement. The implementation of a clear ban on new hydrocarbon exploration, as already adopted by Denmark, France, New Zealand and Spain for example, and a legally binding phase out existing concessions will reduce GHG and average temperatures.

Ocean noise and the Global 2030 Agenda for Sustainable Development

Central to the United Nations' 2030 Agenda for Sustainable Development are the 17 Sustainable Development Goals (SDGs)²² which are meant to shape national development plans until 2030.

The United Nations' Sustainable Development Goals (SDGs) are designed to achieve a more sustainable future for our planet. There are several SDGs that relate to ocean noise, including 1 (End poverty), 2 (End hunger), 7 (Ensuring access to affordable, reliable, sustainable, and modern energy for all), 9 (Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation), 13 (Take urgent action to combat climate change and its impacts) and 14 (Conserve and sustainably use the oceans, seas and marine resources for sustainable development). For example, considering the negative impacts of ocean noise on fish and fish stocks and respective livelihoods (SDG 1), the goal of ending hunger and achieving food security (SDG 2) will increasingly be difficult to reach, if ocean noise is not addressed and reduced without further delay. Similarly, the continued exploration and subsequent exploitation for new oil and gas deposits – using seismic survey airguns, one of the loudest man-made noises ever – not only contributes to increased noise levels and devastating impacts on marine life but moreover runs counter to the urgent need to drastically reduce greenhouse gas emissions and to combat climate change, as envisioned in SDG 13.

SDG 1: End poverty in all its forms everywhere

The commitment to eradicate poverty is an overarching objective of the SDG agenda²³ and fisheries are critical if this ambitious goal is to be achieved. An estimated 56.6 million people around the world depend on the fisheries and aquaculture sector as a full or part time source of income and livelihood²⁴. Small-scale fisheries play a critical role in supporting livelihoods and reducing poverty for millions of people living in coastal communities²⁵. However, the world's marine fisheries have been on a trend of decline since 1996²⁶, creating a threat to both food and income security for millions of people.

The impacts of ocean noise on fish are adding to this problem. Research demonstrates that fish are displaced by impulsive noise events, and their migration, schooling, and other movement patterns, as well as reproductive factors, are also disrupted^{27 28}. Studies have also demonstrated negative impacts on invertebrates including shrimps, crabs and lobsters^{29 30}.

SDG 2: End hunger, achieve food security and improve nutrition and promote sustainable agriculture

As noise levels in the ocean increase, so too will the negative impacts on marine resources that humans depend on for food. Some studies have shown catch rates of certain species of fish to drop by 40–80 per cent near seismic surveys^{31 32 33}. By 2050 the global population will close in on 10 billion³⁴. With fisheries already exposed to a decline, threatening the sustainability of global food production, the added adverse effects caused by ocean noise must be systematically addressed.

The UN General Assembly has recognised this potential threat to marine resources in Sustainable Fisheries Resolution (A/RES/76/71) which encourages the Food and Agriculture Organization of the United Nations (FAO) to conduct studies on the impacts of ocean noise on fish stocks and fish catch rates, as well as associated socioeconomic effects³⁵.

SDG 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

As fish continues to be one of the most traded food commodities worldwide, with more than half of fish exports by value originating in developing countries³⁶, the potential threat that ocean noise poses to the sustainability of marine resources should not be ignored.

Fisheries are not the only area where ocean noise may impact economic growth and employment. SDG target 8.9 focuses on the need to promote sustainable tourism to create jobs and promote local culture and produce whale watching is now a huge and growing form of eco-tourism worldwide with over 13 million people a year taking a whale watching trip in an industry spanning 119 countries and overseas territories, generating \$2.1 billion in total revenues. An estimated 3,300 operators offer whale watching trips around the world, employing an estimated 13,200 people³⁷. When conducted responsibly and sustainably, whale watching presents an economic opportunity for many coastal communities around the world. As the whale watching industry depends on healthy populations of whales and dolphins and the reliability of their movements, the threat caused by the potential for ocean noise to displace cetaceans should be viewed as a socioeconomic, as well as biodiversity risk.

SDG 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

According to UNCTAD data, more than four fifths of world merchandise trade by volume is carried by sea³⁸. In particular, around 80% of global trade by volume and over 70% of global trade by value are carried by sea and are handled by ports worldwide.

With shipping being core to global trade, marine infrastructure and industrialization in context to the development of a blue economy, in particular in context to energy resources, such as offshore wind and other renewable sources, it is of utmost urgency to reduce the ecological footprint of shipping in line with the objectives set within SDG13 and 14. Increased industrialisation and globalisation have been key factors in the rising levels of ocean noise. Governments should stipulate the development and use of improved technologies and best environmental practices with the lowest possible noise emissions. Technology and innovation must be accompanied by policies and management measures based on the precautionary approach and increased focus on incorporating ocean noise into marine spatial planning and the management of marine protected areas. Environmental Impact Assessments (EIAs) are a crucial tool in assessing the sustainability of activities that generate noise. The recently adopted CMS EIA Guidelines for Marine-Noise generating Activities (CMS Guidelines)³⁹ have been developed to assist states in carrying out such assessments.

SDG 13: Take urgent action to combat climate change and its impacts

Climate change is now recognised as the biggest global threat to sustainable development and the 2015 Paris Agreement sets the stage for ambitious climate action to keep global temperatures from rising no more than 2 degrees Celsius above pre-industrial levels and to pursue further efforts to limit the rise to 1.5 degrees Celsius. It is recognised that a move towards cleaner energy sources is crucial if these targets are to be met.

The reduction of ocean noise emissions and their impacts requires a global effort through prevention, reduction and mitigation of activities that emit underwater noise. Focus shall be given on measures at source-level which result in multi-environmental benefits. To combat climate breakdown and make the ocean more resilient, there should be an immediate

ban of hydrocarbon exploration activities in the ocean which would also result in removing one of the loudest man-made sources of impulsive noise. Such a ban and a binding phase-out of existing hydrocarbon exploitation activities would be in line with the transformation of the energy sector and promote a holistic approach towards better and more sustainable resource management, including by forcing real change towards a circular economy by the petrochemical industry. Furthermore, slowing down vessels is one of the easiest and most cost-effective ways to make ships less polluting as it would lead to the reduction of GHG emissions, as well as emission of air pollutants and underwater noise. It is worth noting that the International Maritime Organization (IMO) is currently revising the 2014 agreed underwater noise guidelines. This process will conclude in 2023, and to ensure that shipping becomes quieter, such guidelines must become mandatory.

SDG 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development

SDG target 14.1 states: ***'By 2025, prevent and significantly reduce marine pollution of all kinds⁴⁰'***. The United Nations Convention on the Law of the Sea (UNCLOS) defines pollution of the marine environment as ***'...the introduction by man, directly or indirectly, of substances or energy into the marine environment including estuaries which results, or is likely to result in such deleterious effects as harm to living resources and marine life, hazards to human health, hindrance to marine activities including fishing and other legitimate uses of the sea, impairment of quality for use of sea water and reduction of amenities⁴¹'***. It is clear that ocean noise can and should fit into this definition as 'energy' and therefore be addressed as a form of marine pollution within the SDGs.

A failure to adequately address anthropogenic ocean noise would also be a failure to achieve SDG target 14.2 and 14.5. These targets relate to sustainably managing and protecting marine and coastal ecosystems to avoid significant adverse impacts, achieving healthy and productive oceans and strictly protecting at least 30 per cent of coastal and marine habitats⁴². Numerous calls have been made in intergovernmental fora

such as CMS and CBD to take ocean noise into account in management plans of marine protected areas. This should certainly also become a fundamental practice for MPAs being declared in the high-seas as measure mitigating transboundary pollutants.

Anthropogenic ocean noise may interact cumulatively or synergistically with other pollutants and other threats facing marine life⁴³. Noise can cause effects over huge distances, and measures being taken to restore fish stocks in the shortest time feasible (SDG14.4) such as the implementation of 'no-fishing zones' may be undermined if simultaneous efforts are not made to address sources of ocean noise.

SDG 14.C on Implement and Enforce International Sea law is an urgent reminder that global governance gaps, such as on the high seas, need to be closed and provisions on transboundary forms of pollution, such as ocean noise, must be implemented. The currently negotiated agreement on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction is an implementing agreement of UNCLOS, and when adopted, offers a once-in-a-generation opportunity to improve global ocean governance and to enforce international sea law as reflected and intended in UNCLOS.

SDG 17: Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development

OceanCare holds partner and observer status with several Secretariats of regional and international multilateral agreements, including ACCOBAMS, CBD, CMS, FAO/GFCM, ISA, UNEP/MAP, UNEA and UNCLOS. We operate in work programmes laid out in MOUs with some of these agreements and contribute to numerous scientific as well as advisory bodies. This allows OceanCare to proactively contribute science-based proposals to progress conservation efforts and focus on solutions to support reaching the objectives described by the SDGs. In addition, we are in close dialogue with the private sector in promoting the adoption and alternation of business operations to become in line with the SDGs.

RECOMMENDATIONS

Ocean noise can be addressed through key actions. Government decision-makers should:

1. Explicit recognition of ocean noise as a **serious form of marine pollution under SDG14.1** which seeks to prevent and significantly reduce marine pollution of all kinds by 2025 so that actions to address and mitigate it can be taken.
2. Considering that **SDG14.4** demands that measures to restore fish stocks in the shortest time feasible, it is important to consider how ocean noise might weaken these efforts.
3. An immediate **ban on all new fossil fuel exploration and exploitation activities** and a binding phase-out plan for existing drilling operations.
4. **The ending of all harmful subsidies** for exploration and exploitation of fossil fuels, plastic production, and detrimental fishing practices.
5. Promotion of compulsory **speed reductions for shipping to reduce GHG emissions, air pollution, underwater noise, as well as ship strikes with marine megafauna**, setting a level playing field for the private sector.
6. Recognition that remedial policy **action on ocean noise pollution should not be delayed awaiting more science**, as there is already sufficient scientific documentation that ocean noise pollution can severely impact marine life. In the rare cases where scientific evidence remains incomplete, the precautionary principle should be applied.
7. Acknowledgment that the over-reliance on promises of new technology delays immediate action and that a **cultural, social, and political transformation is the most sustainable and precautionary response**.
8. Support the incorporation of measures to manage ocean noise into the new international legally binding instrument on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction under the UN Convention on the Law of the Sea.
9. Adopt a precautionary approach, by carefully assessing all future ocean noise-generating activities and legislating for **Best Available Technology and Best Environmental Practice** to be used for any activities given approval.
10. Making any new **Guidelines by the International Maritime Organization (IMO)** to reduce shipping noise, as well as the **Convention on Migratory Species Guidelines on Environmental Impact Assessments** for Marine Noise-generating Activities **compulsory for states and industries**.
11. **Establish 'quiet zones'**, using scientific advice contained in Areas of Interest for Important Marine Mammal Areas and Ecologically or Biologically Significant Marine Areas to assist with prioritising where to focus efforts.

Achieving protection of the oceans and marine life from the threat of anthropogenic ocean noise requires critical action from a range of stakeholders to drive and support progress on ocean noise as part of the 2030 Agenda for Sustainable Development

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Nicolas Entrup, nentrup@oceancare.org
Johannes Mueller, jmueller@oceancare.org
Carlos Bravo: cbravovilla@oceancare.org
Nadia Deckert: ndeckert@oceancare.org