Noise Pollution in Marine Environment

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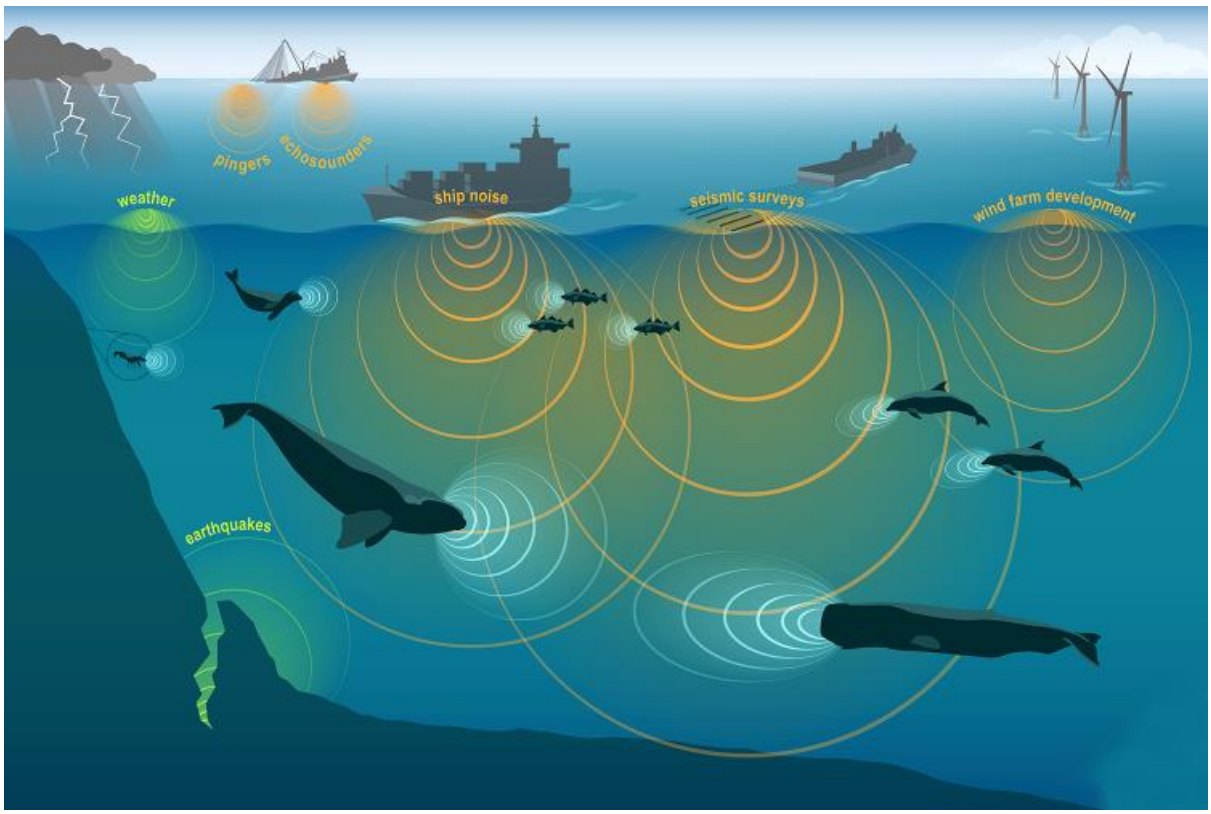

Introduction

Most of marine faunae highly rely on underwater sound. In the ocean, visibility is often low, but the sound is transmitted extremely well through water. As a result, it has become a significant sensory signal for marine wildlife, particularly for marine mammals such as whales, dolphins, and porpoises. They depend on sound to communicate, locate mates and prey, evade predators, navigate, and even protect their areas. However, over the last few decades, noise pollution in the marine environment has increased vividly and is threatening the usual soundscape of the marine environment. Ships, seismic surveys, explosions, underwater construction, and sonar devices have made the once peaceful environment into a chaotic area that is very harmful to marine wildlife. This type of pollution is frequently ignored compared to others, but its impacts are now being exposed across all marine ecosystems. Thus, it has compelled policymakers and stakeholders to take appropriate actions. For instance, in 2014, the International Maritime Organization (IMO) issued some guidelines to lessen noise pollution in oceans resulting from commercial shipping, commercial fishing, marine tourism, naval exercises, seismic surveys, oil and gas exploration, pile driving, offshore wind farms, etc.

Sources of Noise Pollution in the Ocean

Commercial Shipping: Commercial shipping is a key contributor to noise pollution in the oceans. Most of the underwater noise is produced by a ship's propeller cavitation. Another significant source of ocean noise pollution formed by ships is their hull vibrations and the vessel's diesel engines.

Construction Activities in the Ocean: These activities, such as dredging, drilling, and installing oil rigs, either along the shoreline or offshore, produce colossal noise. Continuous use of machinery and transports that emit loud noise at low frequencies end up disturbing the everyday life of the ocean's flora and fauna.

Seismic Surveys: Another critical source of underwater noise pollution is seismic surveys. In order to look for the areas that may contain gas or oil, the survey is carried out around the seafloor with the help of seismic air guns. These seismic air guns create low-frequency sounds that can sometimes travel up to 4,000 km, which may last from seconds to days up to months. The use of seismic air guns directly affects marine life. It can also have an impact on the sightings of these faunae and decrease fish catches as well.

Sonars: Sonars are also vital sources that contribute to underwater noise pollution. The active sonars are mainly used by the naval forces in exercises and routine activities such as finding underwater objects like enemy submarines. If not correctly monitored, sonar systems can end up severely disrupting the underwater beings' lives and behaviors, for example, causing hearing loss in fish and making whales lose their way as the unwanted noise interferes with their echolocation and can end up stranded ashore.

Effects on Marine Life

Fluctuations in Behaviors of Mammals Underwater: There is a substantial sign of a sound impact on marine mammals' behavior underwater, whether to a minor extent or significantly. Such behaviors include diving, surfacing, vocalizing, feeding, mating, etc.

Effects on Reproduction, Breeding, and Population: Acoustic communication frequently plays a critical role in the reproductive interactions of marine life. Over eight hundred species of fish have been found to communicate acoustically. A 2017 study described that noise affected acoustic communication and subsequent spawning success in fish. The study found evidence of less acoustic courtship in both species and reduced visual courtship in one species. Exposed species were also subject to less spawning.

Injury and Mortality: Ocean noise pollution has the potential to make a temporary hearing loss in underwater faunae if it is loud or long enough in duration. Research from a 2006 study found that temporary and permanent hearing loss in marine mammals resulted in a reduction in foraging efficiency, reproductive potential, social cohesion, and ability to detect predators.

Measures to Stop Noise Pollution in the Ocean

Awareness: Raising awareness of the problem will play a key role in its resolution. As more people learn about the issue of noise pollution in our oceans, more people will act in the interest of marine mammals to oppose ocean changes. Annex in MARPOL for Noise Pollution. Adding an annex for noise pollution to MARPOL will aid in preserving marine life. Recognizing noise pollution as a pressing threat will contribute to forthcoming endeavors to resolve it.

Sound Maps: This attempts to survey human-made noises in the ocean by collecting data to make large-scale sound maps. The objective is to better understand the nature of the problem and its influence on sea mammals as a way to find a solution. This mapping allows us to visualize the issue and accelerate efforts to address it through treaties, laws, and regulations.

Acoustic Standards: There is a United Nations body that is accountable for

reducing ship pollution and improving marine safety. Members of the organization have already started discussions about how to limit the amount of noise pollution in the oceans, but the issue requires greater attention to ensure better progress.

Restrictions on Sensitive Areas or Rerouting of Ships: Some 60,000 commercial ships occupy the ocean at any given time, creating an inescapable cacophony that threatens the planet's marine life in some places where animals breed, spawn, and feed. Regulatory authorities must restrict these biologically sensitive habitats by rerouting the ships and reduce the activities which cause harm to aquatic ecosystems.

Multi-Client Surveys: Concerned agencies in many countries do not often coordinate or collaborate amongst them when they carry out surveys off the coast; as such multiple surveys in the same area increase the problem of noise pollution. Whereas, coordinated surveys can reduce noise pollution drastically, as it is practiced in Norway. All countries should implement this wise policy to defend against noise pollution.

Refinement of Exploration Methods: Oil and gas exploration equipment like air guns is harmful to marine life. This technique and other systems that use sonar blasts have caused changes in the ocean environment and represent a continuous threat. As such, the concerned agencies should reassess and adapt their methods accordingly.

Redesign of Propellers: One of the most significant contributors to the problem is the standard propeller, which produces millions of collapsing voids and bubbles when it cuts through the seawater. To reduce this "cavitation," engineers have to shape propellers in a particular way, lessening noise and decreasing fuel consumption.

Quiet Technologies: In quieting measures for ship design, layers of sound-absorbing tiles for loud rooms may prove effective. Vibration isolators could also be a solution, and engineers can mount air compressors, pumps, engines, and other types of reciprocating machinery on these isolators to decrease noise.

Additional Studies on the Subject: We must understand the nature of noise pollution and its influence on marine mammals if we are to make a change. Although the subject has already received attention, researchers have to study more about the problem to reach conclusions on how best to manage it.

Conclusion

This ocean has its own lovely sounds, which are calm and harmonious. Research is being conducted to comprehend the impacts of noise pollution in the ocean and find reasonable mitigation methods. However, unlike smoke and oil spills, the noise completely disappears without a trace the moment we stop making it. With this in mind, we can feel confident as we continue our mission to restore ecological harmony. With the cooperative efforts of the concerned organizations around the world, we can return peace to the oceans and treat the creatures who live there with the respect they deserve.

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