

DOI No.: <http://doi.org/10.53550/EEC.2024.v30i01s.051>

Undersea Noise Outflow by Ships Pose Threat to Indian Marine Species: An Analysis

Rajat Tiwari

Department of Law, Aligarh Muslim University, Aligarh 202 002, Uttar Pradesh, India

(Received 27 June, 2023; Accepted 30 August, 2023)

ABSTRACT

The undersea noise pollutions are one of the main problems today, and over-utilization of vessels and other transportation cargos are major factor contributing to this international issue. Appropriate measures shall be taken so that the flow can have a positive impact on dilution of noise pollution, and consequently on marine population and their living. The purpose of this study is to analyze the specific problem of undersea noise pollution and through case studies, and then formulate some measures to be followed to curb such undersea noise pollution. To meet the requirements of undersea noise pollution and improving the present level of noise pollution, undersea, the countries must come along to apply different measures, as a single country cannot modify the present situation. The collective approach is necessary to curb such heinous issue, as it is in direct conflict with our marine ecosystem (planktons and marine animal life).

Key words: *Marine noise pollution, Indian Ocean, UNCLOS, International Whaling Commission, IUCN, Precautionary principle, Green Ports, Ocean Noise, Shipping Lanes*

Introduction

Ocean becomes a very noisy place when people make loud noises due to anthropogenic activities in oceans (underwater). This has deadly consequences for marine organisms that rely on hearing to locate, communicate, or locate prey. Waves, earthquakes, and calving icebergs all make up the underwater sound (noise). Anthropogenic activities increases this noise by many times, which is a problem to marine life as it can affect their physical, behavioral, reproductive and even for survival. This ability of marine organisms to produce and perceive sound in such environment, where light penetrates only several meters is essential for marine life. Massive whales create low-frequency communication sounds, which will travel thousands of miles. While the snapping shrimp, native to western oceans, it

can produce a loud sound which is sufficient to kills its prey.

Marine noise pollution

As ocean use and deepened, human noise (anthropogenic noise) increased and a new type of pollution was created, i.e., Marine Noise Pollution.

“Ocean noise refers to sounds made by anthropogenic activities that can harm or create interference with the power (ability) of aquatic life to hear natural and needed sound in ocean”.

Impact of Marine Noise Pollution

Many sea creatures rely on their voices to survive. Sound is an effective form of underwater communication and is the primary way for most of the marine species to come together and to learn about their environment. This noise can have a negative impact

on marine life and ecosystems. Louder sounds reduce the animal's ability to communicate with potential mates, other members of the group, offspring, or feeding mates. Noise also reduces marine animals' ability to hear environmental messages important to survival, including those important to avoid predators, find food, and walk to their favorite place. Noise pollution not only reduces the communication of marine animals, but also causes them to change their vocal habits. Populations of cetaceans (whales and dolphins) have declined in areas subject to ship noise.

Causes of Marine Noise Pollution

For this purpose an inclusive definition can be set out, i.e., Marine noise pollution includes everything from shipping and onshore powerboat traffic, to the low-frequency sonar "sound" commonly used in submarine exploration for oil and petroleum, and even seismic gun noise in industry. Research shows that while these "sounds" don't affect humans, they can be dangerous to marine life.

Methodology

This study is descriptive to show the current problems faced by marine life due to Marine noise pollution. This study also aims to understand different laws and regulation already enacted by different countries and grouping of the nations (world) and their effective implementation. Additionally this study focuses on the main cause and the effective redressal of the causes to protect marine life. This work also provides different approaches to be followed to curb the undersea noise pollution.

Results and Discussions

UNCLOS (United Nations Conventions on the Law of the Sea), 1982

Article 1(4) defines "marine pollution" as follows: Marine pollution means materials or energy that are transported or indirectly from humans to the sea (including estuaries) which impacts in causing harm human health or may cause damage to habitats and marine life, etc.

The fundamental obligation to protect the marine environment, Part XII of the United Nations Convention on the Law of the Sea (UNCLOS), it is embodied in **Article 194(1)** requires Parties to take all necessary measures "to prevent, reduce and control

pollution of the marine environment from all sources". Sound is not physically defined as the flow of sound energy. Essentially, "sound waves transfer energy from one region of space to another." Thus, textually, the word "energy" in UNCLOS should be used as clearly for sound as it is used for thermal energy.

Article 211 of the United Nations Convention on the Law of the Sea

It aims to prevent, reduce and control the pollution of the coasts by ships. Likewise, there is nothing in text that would prevent it from applying to Noise Emissions from ship sources. Additionally, Article 211(1) allows states to use methods to protect the environment from pollution.

- Stockholm United Nations Conference on the Human Environment, 1972

Principle 07

"The State takes every precaution to prevent pollution of the sea by substances that cause biological hazards or that may endanger human health, and substances that cause seawater, destroy resources and marine life, to damage amenities, etc."

International Whaling Commission (IWC)

The scientific committee of the IWC affirms that presently the increase of the anthropogenic sound in marine biodiversity has a potential threat to marine mammals, and that this threat is manifested at both regional and ocean-scale levels that could hamper and obstructs population of marine organisms.

The World Conservation Union (IUCN), 2004

The IUCN adopted a resolution recognizing noise as a form of pollution and calling on member governments to apply the "**precautionary principle**" in assessing the impacts of noise generated by commercial, military and industrial activities.

India's Position

A recent study conducted in 2023 which is called as "**Measuring Underwater Noise Levels Radiated by Ships in Indian Waters**" has established that the increasing percentage of underwater (ocean) noise emissions (UNE) from the vessels in Indian Ocean waters is endangering the marine ecosystem. The research measured the high noise levels with the help of autonomous hydrophone mechanism approximately 30 nautical miles away from the coastline of Goa. (V. Kamalakara Rao, Underwater noise

emissions by ships pose threat to Indian Marine Species, (Feb, 2023), URL: <https://www.thehindu.com.>)

Highlights of the research

Increased UNE Levels

The UNE sound pressure level in Indian water is 102-115 decibels in relation to 1 micro-pascal (dB re 1 μ Pa). Researchers suggested using 1 μ Pa as the reference pressure for underwater sound. The water on the east coast is slightly higher than on the west coast. A significant increase of 20 dB at 1 μ Pa.

Significance

Continued movement is believed to be a major factor in increasing ocean noise worldwide. UNE poses a threat to the lives of animals (Indian Ocean marine life) such as bottlenose dolphins, manatee, pilot whales, seals and sperm whales. An important source of energy for many aspects of marine animal behavior, including socialization, feeding, mating and foraging, depends on sound.

Impact

Ships' underwater self-noise and mechanical vibration levels have a frequency overlapping with marine species' communication frequencies in the low frequency range below 500 Hz. This is called masking and can cause changes in the migration of marine animals to shallow waters and make it more difficult for them to return to deeper waters. However, sound from ships can affect ships over time, causing internal injuries, hearing loss, altered behavioral responses, masking, and anxiety.

Efforts to safeguard Marine Ecosystem in India

In India, the Wildlife Conservation Act 1972 provides legal protection to many marine species and 31 important protected areas in India have been declared under the Act. The Coastal Notice prohibits development activities and waste disposal in fragile coastal ecosystems. The Center for Marine Bio-resources and Ecology (CMLRE), a partner organization of the Earth Sciences Department, is also interested in developing strategies for managing marine bio-resources from the perspective of controlling ecosystem and structure.

Need to develop Green Ports

The government has received green investment in major ports to improve their environmental performance. Green port initiatives involve finding tools to

monitor environmental pollution, specifically in current respect marine noise pollution. This stress will only increase as the Covid-19 pandemic spreads, which is causing many problems in business and showing us how important it is to build resilience against everything we do.

Regulations to reduce Ocean Noise

Since ocean noise levels are increasing at 0.55 dB per year, regulations are needed to reduce it by at least 3 dB in the next coming years. Marine animals use sound to communicate, travel, migrate, hunt, avoid danger, etc. for activities that are important in sea waters for their survival. Therefore, increased underwater noise from all industries in the ocean poses a short-term and long-term threat to marine life. Maritime transport is of particular concern, as more than 90% of the world trade is carried by ships and vessels that create disturbing noise underwater. In addition, the constant noise of the ship can affect people's health as well. Due to this reason, all the international organisations related to maritime fields must create and implement a universal regulation, regulating noise in underwater.

Speed of ships must be less than a threshold limit

Slow boats reduce CO₂ emissions, emit underwater noise and other pollutants such as black carbon – these are the results of two studies by the Belgian Ministry of Environment and analysis by experts from IFAW and Ocean Care for a webinar on March 30, 2021. Research conducted by TNO, an independent research group, identified a number of scenarios based on actual shipping in the North Sea.

The main findings show that limiting speed to 75% of the ship's design speed reduces emissions of pollutants such as CO₂, SO_x, NO_x and black carbon by 10% and **reduces underwater noise**.

Re-routing Shipping Lanes

Rerouting is a way to reduce the impact of underwater noise on the marine environment. Until now, marine scientists had not learned how large differences would affect noise levels or marine life. The "T-line" entering Kattegat, which was used by 40,000 ships a year when Denmark and Sweden decided to change the main shipping line. The results of this research are valid. Initial results may be surprising because the dolphin population is unaffected by loading. Many large spinning boats make a sound that is too small for the fish to hear. But this

study shows that dolphins respond to a nearby person's boat because the animals can hear the frequency of the boat's noise. As a result, animals may be less affected than we think by simply looking at all the noise at each frequency. (<https://oceans-and-fisheries.ec.europa>)

Re-built Propellers

Marine Engineers claim the ship's silencer comes in handy when you use it during construction. One of the most important contributors to this problem is the fan structure, which creates millions of voids and air bubbles as it passes through the ocean. To reduce "cavitation", engineers need to design the fan in a special way that not only reduces noise but also reduces fuel consumption. Noise Technique regarding noise measurement in shipbuilding, it would be good to lay several layers of noise tiles in noisy rooms.

During Covid-19 Pandemic

During the Covid-19 pandemic, the world is in strict lockdown with restrictions placed on people's movement, and large numbers of wildlife are reportedly seen on the city's streets and roads. When wild animals enjoy their habitat without human intervention. The same goes for marine life. According to some studies, the sea sounds almost the same as it did 150 years ago, with fewer cargo and container ships crossing the body of water. The marine mammals have returned to their original habitats and some fish have grown due to the decline. Many coral populations are still recovering and marine pollution has decreased during this time. These two years taught us an important lesson. In trying to strike a balance between innovation, well-being and natural conservation, we can only get so far if people limit consumption, reduce needs and wants, and avoid waste.

Due to travel and movement restrictions during the global pandemic, there has been a reduction in road traffic, trains and air traffic, which are the sounds that often make sound popular in our daily lives. We hear the chirping of birds and chirping of other animals in the morning and throughout the day – a daily reminder of the diversity and distance of wildlife communication, but this exchange is often lost due to man-made noise. If we can now hear the sounds and songs of nature, it means that these animals can clearly hear each other from afar.

Conclusion

The ocean is full of sound. Ocean waves, earthquakes, and calving icebergs all create underwater soundscapes. But so are human activities, which can be a problem for marine life as it can affect their physical, behavioral, reproductive and even survival. The ability to produce and perceive sounds in environments where light can penetrate several hundred meters is essential for animals to communicate, feed, avoid predators, and navigate the vast ocean under their feet. Low-frequency communication calls by large whales can travel thousands of miles. Native to the western Atlantic Ocean, the rattlesnake makes a loud noise that can stun and kill animals. Human noise is changing the natural acoustic environment of our oceans and increasing our ability to generate noise. Noise is often an unintentional source of traffic, infrastructure and industry. However, noise can also be intentional. Many militaries use sonar to detect ships and submarines, while scientists use seismic weapons to search for oil and gas on the ocean floor. The noise produced by air pistols can exceed 200 decibels (louder than a pistol at one meter range).

Acknowledgements

The author would like to thank the Aligarh Muslim University (AMU), Aligarh, Department of Law, and the Newspaper "The Hindu" which help the author to gain different data and studies with regard to the topic of paper. I also wish to extend my special thanks to Prof. Md. Zafar Nomani for his guidance, which I have received in our Environmental Law lectures at Department of Law, Aligarh Muslim University.

References

- Drowning in Sound, A Growing International Consensus on Regulating Ocean Noise (2008).
- N. Scott, Karen, 2004. *International Regulation of Undersea Noise* 05, ICLQ Vol. 53 (2004).
- Weilgart, Linda S. 2008, *Impact of Ocean Noise Pollution* 02, International Ocean Noise Coalition, Canada (2008).
- Kamalakara Rao, V. 2023, Underwater noise emissions by ships pose threat to Indian Marine Species. Published in The Hindu (Feb, 2023).
- <https://oceans-and-fisheries.ec.europa>
- <https://oceanservice.noaa.gov>
- <https://www.thehindu.com>
- <https://www.ifaw.org>