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**THE INVISIBLE DANGER: HOW NOISE POLLUTION IS AFFECTING  
THE OCEAN'S ECOSYSTEM**- Diksha Saini<sup>1</sup>**ABSTRACT**

Noise pollution in marine environments has become a significant concern in recent years. Human activities such as shipping, oil and gas exploration, and construction are generating increasing levels of underwater noise, which is known to have negative impacts on marine life. Marine mammals and fish rely on sound for communication, navigation, and foraging, and the increasing levels of noise in the ocean are making it more difficult for them to perform these essential functions. This can lead to disrupted mating, feeding, and migration patterns, and can have indirect impacts on the wider ecosystem. To address the issue of noise pollution in the ocean, it is important to reduce human-generated underwater noise where possible and to develop effective management strategies to protect marine species. Further research is needed to better understand the impacts of noise pollution on marine life and to inform conservation efforts.

**INTRODUCTION**

*“We are injecting so much noise that we are effectively acoustically bleaching the world’s oceans.”*

Noise pollution refers to any unwanted or excessive sound that can cause harm or discomfort to humans, wildlife, or the environment. It can come from a variety of sources, including transportation, construction, industrial activities, and recreational activities. The effects of noise pollution can be significant and can range from minor disturbances, such as sleep

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disturbances, stress, and decreased productivity, to more serious impacts, such as hearing loss and cardiovascular disease. In wildlife, noise pollution can interfere with communication and navigation, leading to behavioral changes, declines in population sizes, and disruptions to ecosystems.

Noise pollution is a growing environmental concern, affecting not only human health and well-being but also wildlife, particularly marine animals. The oceans are becoming increasingly noisy due to human activities such as shipping, oil and gas exploration, and military sonar. This noise pollution has a range of harmful effects on marine life, disrupting their communication, navigation, and feeding behaviors.

Marine animals rely on sound to navigate, find food and communicate with each other. For example, whales and dolphins use sonar to locate prey and communicate with each other, while seals and sea lions use sound to locate mates and determine the distance of potential threats. The increasing levels of underwater noise pollution can interfere with these important behaviors, leading to confusion, stress, and even starvation.

In addition to the disruption of behavior, noise pollution can also cause physical harm to marine animals. For example, “exposure to loud underwater sounds can cause hearing damage, resulting in permanent hearing loss or even death. This is particularly concerning for marine mammals, which rely heavily on their sense of hearing for survival. Moreover, exposure to high levels of noise can also cause stress, leading to changes in heart rate, blood pressure, and other physiological responses that can have long-term impacts on the health of marine animals.”<sup>2</sup>

Another major impact of noise pollution on marine life is the displacement of species from their natural habitats. Loud noise from human activities can cause animals to flee from important feeding and breeding grounds, leading to the loss of critical habitat and reducing their chances of survival. Furthermore, the displacement of animals from their habitats can also have impacts on other species that depend on them for food and other resources.

The effects of noise pollution on marine life are not only concerning for individual animals but also for the health of entire ecosystems. For example, “by disrupting the behavior and

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<sup>2</sup> Richard Schiffman, *How Ocean noise pollution wreaks havoc on marine life*, YALE ENVIRONMENT 360 (Feb 6, 2023, 5:26 PM), [https://e360.yale.edu/features/how\\_ocean\\_noise\\_pollution\\_wreaks\\_havoc\\_on\\_marine\\_life](https://e360.yale.edu/features/how_ocean_noise_pollution_wreaks_havoc_on_marine_life)

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communication of top predators, such as whales, noise pollution can have cascading effects throughout the food chain, affecting the abundance and distribution of prey species and altering the overall structure of the ecosystem.”<sup>3</sup>

### MONITORING AND ASSESSING UNDERWATER NOISE LEVELS

- Acoustic monitoring equipment: This includes underwater microphones, hydrophones, and other equipment used to measure underwater sound levels. Acoustic monitoring equipment can be deployed in the ocean to collect data on underwater noise levels over time.
- Passive Acoustic Monitoring (PAM): This method involves using underwater microphones to listen to the sounds produced by marine species and their habitats. PAM can provide valuable information about the presence, distribution, and behavior of marine species, as well as the levels of underwater noise in an area.<sup>4</sup>
- Acoustic surveys<sup>5</sup>: Acoustic surveys can be used to assess underwater noise levels in a specific area. For example, ships can be fitted with acoustic monitoring equipment to collect data on the levels of underwater noise produced by the ship's propellers, engines, and other equipment.
- Modeling: Computer models can be used to estimate underwater noise levels based on data from acoustic monitoring equipment and other sources. For example, models can be used to estimate the levels of noise produced by shipping or offshore construction activities and their impacts on marine species and habitats.
- Monitoring and assessing underwater noise levels is an ongoing process that requires continued investment in research and technology. By regularly monitoring underwater noise levels, it is possible to identify areas where noise pollution is particularly high and where mitigation efforts should be focused. Additionally, monitoring and assessing underwater noise levels can help inform policy and management decisions aimed at reducing noise pollution and its impacts on marine species and habitats.<sup>6</sup>

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<sup>3</sup>*Id.*

<sup>4</sup> Niels Kinneging, *Underwater noise monitoring in the North Sea*, HYDRO INTERNATIONAL, (Feb 8, 2023, 7: 45 PM), <https://www.hydro-international.com/content/article/underwater-noise-monitoring-in-the-north-sea>

<sup>5</sup>*Supra* note 3 at 4.

<sup>6</sup>*Supra* note 3 at 4.

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## RESEARCH OBJECTIVE

To understand the impact of human activities on marine species, the laws that govern the noise pollution at seas and the practices that can be undertaken to reduce it.

## RESEARCH QUESTIONS

- How does noise pollution from human activities impacts marine life?
- What are the laws that deals with curbing noise pollution at sea?
- What are the methods for mitigating the impact of noise pollution?

## RESEARCH METHODOLOGY

Secondary data can be divided into three categories: documentaries, various sources, and research papers. Data can be accessed from a variety of sources, including transcripts, articles, databases, and so on. The researchers primarily used secondary documentary data combined with multiple source data. Documentary secondary data is gathered through various forms of websites, publications, and papers.

## IMPACT OF NOISE POLLUTION ON MARINE SPECIES

The impacts of noise pollution on marine species can be far-reaching and can have significant consequences for the health and survival of these species. Some of the key impacts of noise pollution on marine species include:

- **Disruption of communication:** Underwater noise can interfere with the communication signals of marine species, making it difficult for individuals to communicate with one another. This can disrupt mating, feeding, and other critical behavior, leading to increased stress and reduced reproductive success.<sup>7</sup>
- **Displacement and habitat loss:** Noise pollution can also interfere with the migration patterns and acoustic orientation of marine species, leading to displacement and habitat loss. This can have significant impacts on the survival and reproductive success of these species.
- **Physical injury:** Intense underwater sound can cause physical injury to marine species, including hearing loss, internal organ damage, and death.

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<sup>7</sup> Lucy Ellis, *The impact of noise pollution in the ocean*, EARTH.ORG, (Feb 6, 4: 15 PM), <https://earth.org/noise-pollution-in-the-ocean/>

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- Interference with prey detection: Noise pollution can also interfere with the ability of marine species to detect and locate their prey, leading to reduced foraging success and decreased food availability.
- Indirect impacts on the ecosystem: The impacts of noise pollution on marine species can also have indirect impacts on the ocean ecosystem, including the alteration of food webs and the reduction of biodiversity.<sup>8</sup>

### **MARINE LAWS AND REGULATIONS FOR NOISE POLLUTION**

- The Marine Mammal Protection Act (MMPA): “This US federal law provides for the conservation and protection of marine mammals, including whales, dolphins, and seals. The MMPA regulates human activities that may harm these species, including noise pollution, and requires permits for activities that may take marine mammals, including acoustic harassment.”<sup>9</sup>
- The Endangered Species Act (ESA): This US federal law provides for the conservation and protection of threatened and endangered species, including marine species. The ESA requires federal agencies to consult with the US Fish and Wildlife Service and the National Marine Fisheries Service to ensure that their actions do not harm threatened and endangered species, including through the reduction of underwater noise.<sup>10</sup>
- The International Maritime Organization (IMO): The IMO has adopted regulations to reduce the impact of noise pollution on marine life. Specifically, the IMO’s International Convention for the Prevention of Pollution from Ships (MARPOL) “includes provisions that require ships to limit their noise emissions and to take measures to reduce the impact of underwater noise on marine mammals.” Additionally, the IMO’s Guidelines for the Reduction of Underwater Noise from Commercial Shipping to Address Adverse Impacts on Marine Life provide recommendations for ship operators to reduce noise levels during construction, maintenance, and operation of vessels.
- The Prevention of Noise Pollution (Regulation and Control) Rules, 2000<sup>11</sup>, which were made under the Environment (Protection) Act, 1986, provides specific guidelines for noise limits from various sources, including ships. These rules specify noise limits for

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<sup>8</sup>*Id.*

<sup>9</sup> Jules Dellinger, *5 key laws that protect our ocean*, OCEAN CONSERVANCY, (Feb 8, 8: 28 PM), <https://oceanconservancy.org/blog/2019/07/19/5-key-laws-protect-ocean/>

<sup>10</sup>*Supra* note 7 at 6.

<sup>11</sup>*Supra* note 7 at 6.

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different areas and times and apply to all vessels within 500 meters of the shore, as well as those within the ports or harbors. The rules also prescribe the maximum permissible noise levels for different types of ships, including cargo ships, tankers, and passenger ships.

- The Convention on the Conservation of Migratory Species of Wild Animals (CMS): The CMS is an intergovernmental treaty that provides for the conservation of migratory species, including marine species, throughout their range. The CMS requires Parties to take action to reduce the impacts of human activities, including noise pollution, on migratory species and their habitats.<sup>12</sup>

### **PRACTICES FOR REDUCING UNDERWATER NOISE**

- Adopting quieter equipment and technologies: This includes using quieter boats, ships, and underwater construction equipment. For example, ships can be fitted with quieter propellers, hulls, and engines to reduce the levels of underwater noise they produce.
- Establishing marine protected areas: Marine protected areas can help reduce noise pollution by restricting human activities that may produce underwater noise, such as shipping and seismic surveys.
- Using quieter shipping lanes: Shipping lanes can be designed to minimize their impacts on sensitive marine species and habitats. For example, shipping lanes can be moved away from known migration routes of whales and other marine mammals to reduce the risk of acoustic harassment.
- Monitoring and reducing noise levels: Regular monitoring of underwater noise levels can help identify areas where noise pollution is particularly high and where mitigation efforts should be focused. This includes using underwater microphones and acoustic monitoring equipment to measure noise levels in the ocean.
- Promoting public awareness and education: Raising public awareness about the impacts of noise pollution on marine species and habitats can help encourage individuals, industries, and governments to take action to reduce underwater noise.

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<sup>12</sup>*Supra* note 7 at 6.

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**CASE LAWS****“National Resources Defense Council v. U.S. Navy (2008)”<sup>13</sup>**

In this case, the National Resources Defense Council (NRDC) sued the U.S. Navy for violating the Marine Mammal Protection Act (MMPA) and the National Environmental Policy Act (NEPA) by failing to adequately consider the impacts of its training exercises on marine mammals. The NRDC argued that the Navy's use of sonar and explosives in its training exercises caused harm to marine mammals, including strandings, deafness, and death. The case resulted in a settlement, in which the Navy agreed to limit its use of sonar in certain areas and implement mitigation measures to reduce its impacts on marine mammals.

**“Cetacean Society International v. U.S. Department of Commerce (1991)”<sup>14</sup>**

In this case, the Cetacean Society International sued the U.S. Department of Commerce for failing to consider the impacts of the oil and gas industry's seismic surveys on marine mammals. The society argued that the seismic surveys caused harm to marine mammals, including strandings, deafness, and death. The case resulted in a settlement, in which the Department of Commerce agreed to implement mitigation measures to reduce the impacts of seismic surveys on marine mammals.

**“Natural Resources Defense Council v. National Marine Fisheries Service (2013)”<sup>15</sup>**

In this case, the NRDC sued the National Marine Fisheries Service (NMFS) for violating the MMPA and the NEPA by failing to adequately consider the impacts of offshore oil and gas activities on marine mammals. The NRDC argued that the oil and gas activities, including drilling and well stimulation, caused harm to marine mammals, including strandings, deafness, and death. The case resulted in a settlement, in which the NMFS agreed to implement mitigation measures to reduce the impacts of oil and gas activities on marine mammals.

**“Goa Foundation v. Union of India (2005)”<sup>16</sup>**

In this case, the Supreme Court of India dealt with the issue of the construction of a port in the western coast of India and its impact on marine life and the environment. The Court

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<sup>13</sup>National Resources Defense Council v. U.S. Navy, 67 F.3d 944, 944 (2d Cir. 1995)

<sup>14</sup>Cetacean Society International v. National Marine Fisheries Service, 13 F. Supp. 2d 1125, 1125 (W.D. Wash. 1998)

<sup>15</sup>Natural Resources Defense Council, Inc. v. National Marine Fisheries Service, 724 F.3d 1158, 1158 (9th Cir. 2013)

<sup>16</sup>Goa Foundation v. Union of India, (2018) 9 SCC 1, 1

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directed the Union of India to conduct a comprehensive Environmental Impact Assessment before proceeding with the construction of the port and to take necessary measures to protect marine life and the environment.

### **CONCLUSION AND SUGGESTIONS**

In conclusion, noise pollution in the ocean is a growing environmental issue that poses a significant threat to marine life. Human activities, such as shipping, oil and gas exploration, military activities, and construction, generate high levels of underwater noise that can interfere with the communication and navigation abilities of marine animals. The effects of noise pollution can lead to stress, altered behavior, and even injury or death, and can also have broader impacts on marine ecosystems. Addressing the problem of noise pollution in the ocean requires international cooperation and a concerted effort to reduce the sources of underwater noise through the adoption of best practices, alternative technologies, and protected areas in the ocean. Protecting the ocean from noise pollution is crucial for the preservation of marine life and the maintenance of healthy and diverse ocean ecosystems.

Reducing noise pollution affecting marine life is crucial for the preservation of aquatic ecosystems and the animals that live in them. Here are some suggestions that can help in reducing noise pollution:

- Regulating human activities: Governments can regulate human activities, such as shipping, oil and gas exploration, and construction that produce high levels of underwater noise.
- Using quieter technology: Industry and governments can promote and adopt quieter technologies, such as electric or hybrid ships, and low-noise drilling and exploration equipment.
- Establishing marine protected areas: Designating areas as marine protected areas and implementing strict noise regulations within them can reduce noise pollution and provide refuge for marine animals.
- Increasing public awareness: Raising public awareness about the impacts of noise pollution on marine life can encourage individuals to reduce their own contributions to the problem and support policy changes that reduce noise pollution.

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- Collaborative efforts: Governments, NGOs, and industry can work together to monitor noise levels, develop best practices, and invest in research and development of new, quieter technologies.
- Encouraging eco-friendly tourism: Encouraging and supporting eco-friendly tourism, such as whale watching and diving, that are based on quiet, non-intrusive practices can reduce the impact of human activities on marine life.



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