

## ***Studying the Role of Conventions in Preventing Marine Noise Pollution with Emphasis on Domestic Laws***

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### **Abstract**

**Background and Theoretical Basis:** Marine noise pollution has emerged as a critical environmental challenge in international law, posing serious threats to marine biodiversity, particularly to noise-sensitive species such as marine mammals, fish, and invertebrates. The increasing industrialization of the seas, driven by activities such as commercial shipping, military sonar operations, offshore energy exploration, and deep-sea mining, has significantly intensified underwater noise pollution. This phenomenon disrupts marine life by interfering with communication, navigation, reproduction, and feeding patterns, ultimately affecting ecosystem stability.

**Methodology:** In this research, using descriptive and analytical methods and using library resources and texts, the role of conventions in combating marine noise pollution was examined, with an emphasis on domestic laws. In addition a qualitative methodology is employed, relying on doctrinal legal analysis and comparative studies to assess international legal provisions and domestic regulations. The study reviews primary legal sources, including treaties, judicial decisions, and national legislation, alongside secondary sources such as academic literature, policy reports, and expert opinions.

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**Findings:** The findings reveal that while various international instruments recognize marine noise pollution as a threat to marine biodiversity, they lack precise and binding regulations for its prevention and mitigation. UNCLOS, for instance, sets general obligations for states to prevent marine pollution but does not explicitly define marine noise as a pollutant, leading to legal ambiguities in enforcement. Similarly, agreements such as the Convention on Biological Diversity (CBD) and the International Maritime Organization (IMO) guidelines provide recommendations rather than legally binding measures. At the national level, Iran's environmental legal framework incorporates general provisions for marine environmental protection. However, it does not specifically address noise pollution in marine environments, leaving a regulatory gap. Given Iran's strategic maritime position and extensive coastline, the absence of specific noise pollution regulations poses challenges in fulfilling its international obligations.

**Conclusion:** This study concludes that the mitigation of marine noise pollution requires a multifaceted approach, combining stronger international legal instruments with enhanced enforcement mechanisms and more robust domestic policies. Effective legal frameworks should incorporate mandatory noise reduction measures, stricter environmental impact assessments, and clear liability rules. Strengthening regional cooperation, fostering scientific research on noise pollution's impact, and integrating global best practices into national legislation are essential steps. As a key maritime state, Iran would benefit from adopting specific laws addressing marine noise pollution and aligning its domestic legal system with international environmental standards.

**Keywords:** Marine noise pollution, Marine biodiversity, International maritime law, Environmental regulations, United Nations Convention on the Law of the Sea

## **1. Introduction**

Marine noise pollution has emerged as a new and complex challenge in the field of marine environmental protection. In recent decades, with the expansion of industrial, military, and commercial activities in the seas, this issue has garnered increasing attention from researchers and policymakers in international law.



Underwater sound encompasses all acoustic emissions occurring beneath the water's surface, whether natural or anthropogenic. These sounds include those produced by marine animals, such as whales and dolphins, which rely on acoustic signals for communication, navigation, and foraging. For many marine species, sound is indispensable, as vision is significantly limited in aquatic environments, making acoustic signals a primary means of orientation and interaction.

On the other hand, noise generated by heavy maritime traffic, underwater resource exploration, and the widespread use of military sonar has increasingly impacted the health and behavior of marine species, particularly large mammals such as whales (Hatch et al., 2022: 5). Noise pollution represents a significant environmental concern that profoundly affects marine ecosystems, particularly their biodiversity. Given that sound propagates much faster in water than in air, the extent of marine noise pollution's impact is considerably amplified. As a result, assessing the consequences of this type of pollution on marine organisms is of critical importance.

Many marine species, particularly mammals and fish, are highly dependent on their auditory senses due to the essential role of sound in their biological functions. Sound serves not only as a tool for intraspecies communication but also facilitates navigation, prey detection, predator avoidance, and social coordination. For instance, marine mammals such as whales and dolphins use sound as a fundamental element of their daily survival. However, in recent years, the intensification of human activities in marine environments—including shipping, exploratory operations, and the use of heavy industrial equipment—has led to a significant increase in noise pollution within these ecosystems. These anthropogenic sounds often travel over long distances underwater, affecting a vast range of marine habitats.

The consequences of this pollution for marine animals are extensive. These disruptive sounds diminish their ability to perceive and distinguish natural acoustic signals. For instance, loud and unnatural noises may prevent marine animals from detecting the presence of prey or anticipating threats posed by predators. Additionally, such disturbances can severely impair their social communication, making it difficult or even impossible for them to interact with group members, engage in mating behaviors, or locate their offspring.

As a result, noise pollution may force marine animals to abandon their natural habitats. This forced displacement not only threatens their survival but also disrupts the ecological balance of marine environments. In more severe cases, prolonged exposure to excessive noise pollution can lead to a drastic decline in the populations of sensitive species, placing some at risk of extinction.

In general, the effects of noise pollution on marine ecosystems are not limited to marine animals alone; rather, its cascading consequences can impact entire ecosystems. Therefore, identifying and regulating sources of noise pollution in marine environments is crucial not only for the preservation of biodiversity but also for the overall sustainability of marine ecosystems.

At the international level, discussions on the impacts of marine noise pollution have intensified in recent decades. From a legal perspective, there is still no precise and comprehensive definition of “marine noise pollution” in international legal instruments. However, efforts are underway to recognize and address this issue. Unlike physical or chemical pollution, marine noise pollution has invisible and often overlooked effects. When people think of ocean pollution, they typically envision sewage discharge, oil spills, floating debris, or chemical toxins. However, noise pollution rarely comes to mind, despite being as harmful to many marine organisms as other forms of pollution (Debirian et al., 2006: 1).



Anthropogenic noise can directly affect the sensory systems of marine animals, disrupt their migration routes, and, in some cases, cause physiological harm or even death. Recent studies have shown that whales and other marine mammals, in response to increasing levels of human-generated noise, have been forced to alter their migration routes and reduce the frequency of their vocalizations to avoid acoustic interference (Merchant et al., 2020: 72). In light of these challenges, the need for legal mechanisms to mitigate and regulate this form of pollution is becoming increasingly urgent.

The main question now is whether the existing legal frameworks are capable of addressing marine noise pollution and how international law and existing conventions can impose binding obligations on states to mitigate and control this pollution.

In this research, fidelity, authenticity of texts, and honesty in expression and writing have been fully respected.

## **2. Causes of Marine Noise Pollution**

Marine noise pollution can be examined from multiple perspectives. This section will analyze how international law, environmental factors, and domestic regulations contribute to its increase.

### ***1.2. International Legal Frameworks and Existing Deficiencies***

At the international level, conventions such as the United Nations Convention on the Law of the Sea (UNCLOS) and the Convention on Biological Diversity (CBD) have been established to protect the marine environment in a broad sense. However, they do not adopt a specific and comprehensive approach to noise pollution. Article 194 of UNCLOS refers to the protection of the marine environment but does not explicitly encompass noise pollution (Allen, 2021, p.

15). This legal gap has prevented states from developing binding mechanisms for controlling noise pollution.

Moreover, while the International Maritime Organization (IMO) has taken steps to mitigate the environmental impacts of the maritime industry on various forms of pollution, it has yet to adopt binding measures to regulate noise pollution (Brown & Nelson, 2022: 31). For example, the IMO's Marine Environment Protection Committee has addressed this issue on multiple occasions but has only issued non-binding recommendations, leaving the problem of noise pollution unresolved.

## ***2.2. Environmental Issues and Damage Caused by Noise Pollution***

Human activities, including offshore drilling and seismic explorations, play a significant role in marine noise pollution. These activities are widely conducted by developed countries, particularly for oil and gas exploration, in regions such as the Persian Gulf and the Atlantic Ocean. Such operations exert considerable pressure on marine habitats and lead to a decline in biodiversity in these areas (Kim & Smith, 2023: 44).

For instance, studies have shown that in the Gulf of Mexico, one of the busiest maritime transport zones, the use of high-powered sonar for oil exploration has had devastating effects on sensitive species such as dolphins and whales (Garcia et al., 2023: 54).

## ***3.2. Military Sonars and Their Impact on Marine Mammals***

The use of low-frequency active sonar in military operations generates extremely powerful sound waves that can travel long distances underwater. These sound waves may reach levels exceeding 235 decibels, causing widespread disruption to the communication and navigation systems of marine organisms, such as whales and dolphins. Research has shown that these sounds





can result in physical damage, such as ruptured eardrums or internal bleeding in these animals (Scott, 2004: 290).

For example, in the Bahamas in 2000, sonar operations conducted by the U.S. Navy led to the mass stranding of beaked whales. Research by NOAA indicated that the cause of these deaths was directly related to sound-induced injuries (NOAA, 2000: 15). These activities are in direct conflict with paragraph 5 of Article 194 of the 1982 United Nations Convention on the Law of the Sea, which obligates states to protect vulnerable habitats and species. Additionally, these activities violate the Convention on Migratory Species, which focuses on the protection of endangered species across different countries. Paragraph 1 of Article 2 of the Convention states: “The parties acknowledge the importance of the conservation of migratory species and agree that the range states of migratory species shall take appropriate and necessary measures to achieve this aim.”

#### ***4.2. Seismic Operations for Oil and Gas Extraction***

In seismic operations conducted by oil companies, the sound waves produced can have destructive effects on marine habitats. These waves cause disruptions in the migration routes and natural behaviors of marine organisms. In 2021, seismic operations off the coast of South Africa caused changes in the migration path of humpback whales, which could lead to a decline in the population of these species (Marine Biodiversity Science Center, 2021: 8).

These operations violate Article 206 of the United Nations Convention on the Law of the Sea (UNCLOS), which obligates states to assess the environmental impacts before undertaking such projects. Additionally, these actions conflict with the Convention on Biological Diversity, which emphasizes the protection of marine habitats and species. The Convention, in Article 6, paragraph 2, states: “Integrate the conservation and sustainable use of biodiversity, as far as

possible and appropriate, into the plans, programs, and policies that are relevant. These operations violate Article 206 of the United Nations Convention on the Law of the Sea (UNCLOS), which obligates states to assess the environmental impacts before undertaking such projects. Additionally, these actions conflict with the Convention on Biological Diversity, which emphasizes the protection of marine habitats and species. The Convention, in Article 6, paragraph 2, states: “Integrate the conservation and sustainable use of biodiversity, as far as possible and appropriate, into the plans, programs, and policies that are relevant.”

## ***5.2. Commercial Shipping and the Increase in Noise Pollution***

The number of commercial ships navigating the seas has significantly increased. The noise of ship propellers and engines disrupts the vocal communication of species such as whales. In the Strait of Malaga, one of the busiest shipping routes in the world, researchers found that noise pollution from ships reduced the whales’ ability to communicate by up to 90% (Williams et al., 2019: 135). Article 192 of the United Nations Convention on the Law of the Sea (UNCLOS) states: “States are obligated to protect and preserve the marine environment.” These activities conflict with the provisions of this article.

These examples demonstrate that marine noise pollution impacts the environment and states’ legal obligations. States must, in accordance with their international commitments, including UNCLOS and other relevant treaties, take preventive measures to reduce marine noise pollution. Failure to do so may render them accountable for environmental damage and lead to international legal responsibilities.

## **3. Mechanisms for Reducing Noise Pollution**





International instruments related to the protection of the marine environment, such as the United Nations Convention on the Law of the Sea, the Convention on Biological Diversity, and the Convention on Migratory Species, have addressed the issue of noise pollution in a foundational way. These documents establish the obligations of member states to prevent, reduce, and control noise pollution through preventive measures and environmental impact assessments. However, it should be noted that despite the international instruments and agreements designed to reduce marine noise pollution, there are still various barriers at the international level that hinder the effective reduction of this pollution. While cooperation in this area is expanding, these challenges indicate that global efforts to reduce marine noise pollution continue to face significant obstacles.

### ***1.3. From the Perspective of International Rules***

International instruments play a crucial role in raising awareness and guiding environmental policies. These documents, as conceptual infrastructures, strengthen regional cooperation and provide frameworks for the development of technological solutions.

#### **1.1.3. United Nations Convention on the Law of the Sea (UNCLOS) 1982**

In international law, the United Nations Convention on the Law of the Sea (UNCLOS) provides a general framework for regulating state behavior at sea, including provisions for preventing marine pollution, which encompass noise pollution. Some scholars have expanded on this by interpreting the broad and general obligations outlined in the convention, such as Article 194(1), which imposes a general obligation on states to combat marine pollution, and the definition of pollution in Article 1(4), which refers to the introduction of any “substance” or “energy,” to include noise pollution.

UNCLOS defines marine pollution as the direct or indirect introduction of substances or energy into the marine environment, including bays, which may result in harmful effects such as damage to living resources and marine life, hazards to human health, interference with marine activities including fishing, and degradation of water quality. As seen in this definition, human-induced factors are emphasized, and natural pollution does not fall under this category. The definition highlights the destructive effects of substances or energy on marine life and human health (Moradi & Poladzerah, 2023: 38).

Regarding Article 1(4), which defines pollution, some scholars have suggested that the term “energy” could be interpreted to include sound. The rationale behind this view is that sound waves inherently transport energy from one location to another. Therefore, according to this group, the term “energy” in Article 1(4) of the convention would encompass noise pollution under the provisions for marine environmental pollution outlined in Part XII of the document (Hosseini-Azad, 2023: 129).

Article 194 of UNCLOS mandates that states take necessary measures to prevent, reduce, and control any type of pollution resulting from human activities, including noise pollution. One of the main practical shortcomings of these instruments is the lack of enforceable penalties for violations. For instance, although UNCLOS requires states to prevent marine pollution under Article 194, there are no explicit enforcement mechanisms for violations. In 2021, a report from the Baltic Sea region revealed that many states, despite being parties to the convention, had not succeeded in reducing noise from commercial ships because they considered the costs associated with improving technology a barrier to fulfilling these commitments (European Marine Environment Report, 2021: 72).

Article 197 of the Convention obligates states to cooperate through competent international organizations to regulate standards, rules, and procedures for the protection and preservation of the marine environment. Additionally, under



Article 402, states are required to continuously assess the risks or impacts of marine pollution, particularly examining the potential harmful effects of any activity they conduct or authorize in the sea (Habibi & Raei-Dehghani, 2021: 51). Therefore, concerning marine noise pollution, states parties to the Convention are also obligated to take necessary actions.

### **2.1.3. The Convention on Biological Diversity (CBD) and the Convention on the Conservation of Migratory Species of Wild Animals (CMS)**

Marine noise pollution is recognized as a serious threat in both the Convention on Biological Diversity (CBD) and the Convention on the Conservation of Migratory Species of Wild Animals (CMS). Under Article 7, paragraph 3 of the CBD, parties are committed to identifying activities that have, or are likely to have, significant adverse impacts on the conservation and sustainable use of biodiversity, and to monitoring these impacts through sampling and other methods. Given the widespread damage caused by marine noise pollution to the species inhabiting marine ecosystems, it is clear that this form of pollution should be included under the scope of this provision. Similarly, the impacts of noise pollution arising from oil and gas extraction projects and military sonar systems can be extended to include marine noise pollution under Article 14, paragraph 1 of the CBD. This provision mandates that each party, as far as possible and appropriate, introduce procedures for assessing the environmental impacts of proposed projects that are likely to have significant negative effects on biodiversity, to prevent or minimize these impacts and, where necessary, allow for public participation in these processes.

Both conventions emphasize the importance of conserving marine species and protecting their natural habitats. The CMS, in particular, encourages states, under Article 2(2), to cooperate in preventing marine noise pollution. This

article stresses that parties need to take measures to prevent migratory species from being placed at risk due to such pollution (Erbe et al., 2021: 15).

However, a criticism of these conventions is that, in many countries, the economic benefits derived from marine activities often take precedence over environmental protection. For instance, offshore oil and gas extraction projects in the Gulf of Mexico have been widely criticized due to the use of noisy equipment, which has caused significant harm to marine species. These activities have not only violated Article 8 of the CMS but have also caused irreparable damage to marine biodiversity (Gulf of Mexico Environmental Assessment, 2020: 45).

The nature of today's global changes necessitates bilateral or multilateral cooperation to achieve goals that are beyond the capacity of a single state or a small group of states. However, another reality is also evident: the vastness, complexity, and geographic, economic, and even cultural diversity of environmental issues, compounded by considerations of economic and industrial development, and the growing divide between the Global North and South. Some argue that as long as the gap between the Global North and South continues to widen, both groups will continue to degrade the Earth's environment for different reasons. In such circumstances, and considering the crucial point that there is no room for complacency in the restoration and improvement of the Earth's environmental situation, cooperation becomes of paramount importance (Pourhashemi et al., 2013: 16).

Nevertheless, international cooperation for the implementation of existing instruments has been far from sufficient. For example, in the Pacific regions, despite the presence of regulatory bodies, coastal states still face challenges in monitoring ship noise. A report by Oceana (2021: 30) showed that only 25% of commercial vessels in the region comply with the IMO's guidelines for noise reduction. Financial and technical support for developing countries is also one of the most crucial elements for the successful implementation of these



instruments. African countries that are members of the Abidjan Convention have struggled to implement marine noise monitoring systems due to a lack of financial resources and technology. According to the Abidjan Convention's 2021 report, only 15% of these countries have been able to deploy such systems in their ports (Abidjan Report, 2021: 33).

### **3.1.3. MARPOL Convention and the London Convention**

The International Convention for the Prevention of Pollution from Ships (MARPOL) and the Convention on the Prevention of Pollution of the Sea by Dumping of Wastes (London Convention) are also important tools for preventing various types of marine pollution, particularly noise pollution. Although the MARPOL Convention does not specifically include an annex for marine noise pollution, underwater noise caused by ships and industrial activities such as seismic surveys is recognized as a serious threat to marine life. This type of pollution has negative effects on marine animals, including marine mammals, fish, invertebrates, and even marine ecosystems. Despite these frameworks, the effectiveness of these conventions in addressing emerging challenges remains criticized, and there is a need for a revision of existing regulations and the development of new legal instruments (Erbe et al., 2021: 15).

### **4.1.3. Climate Change Convention and the Precautionary Principle:**

The precautionary principle plays a central role in several conventions, including the United Nations Framework Convention on Climate Change (UNFCCC) and the Convention on Biological Diversity, reminding states that the risks associated with human activities, including marine noise pollution, must be carefully assessed and managed (Simmonds et al., 2021: 71). This principle, which was first introduced in the 1980s by German scholars in environmental policies and gradually gained international recognition, plays a

vital role in shaping environmental regulations and protecting sensitive ecosystems. It emphasizes that even in conditions of scientific uncertainty, states are obliged to take precautionary measures to prevent environmental harm (Freestone, 2021: 4). The International Court of Justice in the Gabčíkovo-Nagymaros case and the nuclear testing case in New Zealand against France did not see a necessity to evaluate the position of the precautionary principle in international law, and even this position of the Court was criticized in the dissenting opinion of Judge Weeramantry. He expressed regret that the Court did not use the opportunity to consider environmental law principles, including the precautionary principle, and to highlight that this principle is part of customary international law (Mousavi & Arashpour, 2015: 175). Although in the Ecuador vs. Colombia case, the International Court of Justice had an unparalleled opportunity to clarify the content, assess the status, and evaluate the applicability of certain customary norms of international environmental law, including the precautionary principle, Ecuador notified the Court on September 12, 2013, that, having reached an agreement with Colombia, it decided to withdraw the case. After this request, the Court removed the case from its docket.

### **5.1.3. Customary International Law**

In customary international law, under the “good neighborliness” principle, a state cannot take any action that disregards the rights of other states or harms the environment. This principle was first articulated in 1972 in Principle 21 of the Stockholm Declaration. Accordingly, states, under the United Nations Charter and international legal principles, have sovereign rights to utilize resources in line with their environmental policies, ensuring that activities carried out within their jurisdiction or control do not cause harm to the environment of other countries or areas outside their national jurisdiction. The content of this principle was reiterated once again in Article 2 of the resolution on pollution of rivers, lakes, and international law, which states: “Countries are





obliged, in exercising their sovereign rights over the exploitation of their resources according to their environmental policies, and without undermining their contractual obligations, to ensure that activities within their jurisdiction or control do not cause pollution of international waterways and lakes beyond their borders” (Salehi, 2020: 202). Although the Declaration is non-binding, due to its customary nature and considering marine noise pollution as a form of marine pollution under the Convention on the Law of the Sea, states can be obligated to reduce marine noise pollution to prevent its harmful transboundary effects.

Additionally, the Third Legal Analysis Statement of 1987 on U.S. Foreign Relations, which draws its principles on environmental rights from customary international law, emphasizes that a state must take all necessary actions, as far as possible, to prevent activities conducted within its jurisdiction or control that cause significant damage to the environment beyond its borders. The statement also defines and codifies the responsibility of a state for any major environmental harm to areas beyond its national territory that results from such intentional violations (Zhaleh, 2025: 55).

### **6.1.3. International Maritime Organization**

The IMO guidelines for reducing underwater noise serve as an example of success in global standardization. These guidelines offer recommendations for reducing mechanical sounds from ships through optimal design. In 2020, about 60% of newly built ships in Europe complied with IMO standards, indicating the positive impact of these guidelines (IMO Report, 2020: 15). One challenge in this regard is the exclusion of the International Maritime Organization’s resolutions concerning warships. Warships may have more environmental impacts, and due to their strong radio waves, they can cause more detrimental effects on marine species, such that today, one of the reasons cited for mass whale suicides on the coasts of certain countries is the potential noise pollution

from warships (Hosseini & Nasaj Torshizi, 2004: 4). This is while warships have high immunity, and even Article 236 of the United Nations Convention on the Law of the Sea exempts warships from environmental regulations (Zendehdel Bron et al., 2021: 300). International documents have guided countries toward reducing noise pollution by providing recommendations on the use of modern technologies. The ship noise reduction project in the Asia-Pacific region, supported by IMO, has led to the development of noise reduction technologies in Japan's commercial ships (Asia-Pacific Maritime Report, 2021: 21). Another positive impact of these documents has been the increased public awareness of the importance of reducing noise pollution. IMO and CMS convention awareness campaigns in recent years have made marine noise one of the key environmental concerns.

Ultimately, understanding the interaction between customary international law principles, the precautionary doctrine, and obligations arising from international treaties provides a comprehensive framework for the protection of marine ecosystems against the threats of noise pollution. Given the complexity and scope of this issue, international cooperation and the adoption of multilateral legal strategies are essential (Hatch et al., 2022: 11).

### ***2.3. From the Perspective of Domestic Laws of the Islamic Republic of Iran***

The examination of marine noise pollution within the legal framework of the Islamic Republic of Iran is particularly significant given the country's maritime position and strategic importance, especially in the Persian Gulf and the Strait of Hormuz. The Strait of Hormuz, one of the busiest waterways in the world, hosts a significant number of commercial ships and oil tankers, contributing to a substantial increase in underwater noise in the region. This noise pollution poses a serious threat to sensitive marine species and the natural habitats of the area.



In the Iran legal system, although “marine noise pollution” is not explicitly mentioned, the interpretative capacities within certain related laws allow for the use of legal tools to address this type of pollution. These capacities can be employed in the formulation and development of national policies to mitigate the adverse effects of underwater noise.

### **1.2.3. The Constitution**

Article 50 of the Constitution of the Islamic Republic of Iran stipulates: “In the Islamic Republic, the protection of the environment, in which both present and future generations must have a flourishing social life, is regarded as a public duty. Therefore, activities—whether economic or otherwise—that lead to environmental pollution or irreparable degradation are prohibited.” In this regard, various regulations have been enacted to control environmental pollution (Hosseinpour, 2016: 1).

### **2.2.3. International Instruments**

Despite the non-ratification of the 1982 United Nations Convention on the Law of the Sea by the Islamic Republic of Iran, conventions on biodiversity and the conservation of migratory species have been ratified, which, as explained under international instruments in this research, include specific provisions regarding mechanisms for reducing underwater noise pollution. Firstly, it should be noted that according to Article 9 of the Iranian Civil Code, which states: “The regulations of treaties concluded following the Constitution between the Government of Iran and other states shall have the force of law,” it indicates that the Iranian legislator adheres to the unity of international law and domestic law, and advocates for the execution of international obligations through either self-executing or transference methods (Parandeh-Motlaq et al., 2023: 53). Secondly, Articles 77 and 125 of the Constitution of the Islamic Republic of Iran are legal mechanisms that clarify the position of international treaties and

the powers of governmental branches in the process of their conclusion. In this regard, the legislator approves international agreements under the supervision of the Iranian Parliament (Parandeh-Motlaq et al., 2021: 128). Therefore, the ratification of the Biodiversity Convention and the Convention on Migratory Species by Iran creates obligations regarding the reduction of the negative impacts of underwater noise on marine species. As noted, these conventions emphasize the protection of habitats and the reduction of human-induced threats. Based on these instruments, Iran must adopt specific measures to manage marine noise pollution. These actions include regular monitoring of underwater noise, reducing noise from shipping and marine industries, and strengthening regional cooperation to mitigate the effects of noise on migratory species. Particularly in areas such as the Strait of Hormuz, which serves as a passage for sensitive species and key habitats, the precise implementation of these commitments is of paramount importance. Fulfilling these obligations is not only a legal duty but also helps enhance Iran's position in the international environmental protection framework and fosters sustainable development in the marine domain.

### ***3.2.3. Domestic Regulations***

In the domestic legal system of the Islamic Republic of Iran, various environmental laws exist to protect the marine environment. However, most of these laws focus on chemical and oil pollution, while the issue of underwater noise pollution has been overlooked. The Law on the Protection and Exploitation of Marine and Aquatic Resources, passed in 1995, is one of the key laws in this area and focuses on the protection of aquatic resources. Paragraph (b) of Article 22 of this law specifies that the creation of any pollution or the spread of infectious diseases, as well as the discharge of industrial wastewater and any pollutants that cause damage to aquatic resources, will be subject to a fine of one to five million Rials, in addition to the court having the authority to seize the tools and materials used in the commission of the offenses



and to suspend the polluting entity's activities until the defect is remedied. It is clear that the legislator's use of the phrase "any kind of pollution" in the text of the article allows for the inclusion of underwater noise pollution within this framework.

The Law on Marine Areas of the Islamic Republic of Iran in the Persian Gulf and Oman Sea, enacted in 1993, also addresses the issue of the right of innocent passage in Article 6, stating that the passage of foreign vessels is not considered innocent if they cause any form of marine environmental pollution contrary to the regulations of the Islamic Republic of Iran. In such cases, the vessels are subject to criminal and civil regulations as appropriate. This provision could be leveraged to prevent an increase in underwater noise pollution caused by foreign vessels. Similarly, Article 85 bis 2 of the Iranian Maritime Code, passed in 1964, which is one of the most important maritime laws in Iran, requires the ship's commander to take the necessary measures to prevent, reduce, and eliminate pollution caused by the vessel under their command following domestic laws and international treaties that the Islamic Republic of Iran has ratified. Except in cases of emergency to save lives, and following the relevant laws and regulations, the commander must avoid actions that would result in environmental pollution. This article reflects the foresight of the legislators at the time of drafting, as they used the term "pollution" generally, allowing for its application to various types of pollution, including underwater noise, which was not yet a prominent environmental concern at that time. Utilizing these legal capacities, especially in strategic areas such as the Strait of Hormuz, not only strengthens the protection of the marine environment but also enhances Iran's position in regional and international interactions.

The critique that researchers have raised regarding the domestic laws of the Islamic Republic of Iran in this area highlights the absence of specific regulations in the environmental protection agency's guidelines for addressing

marine noise pollution. This legal gap allows Iran's oil and maritime industries to operate without significant restrictions in this regard. As a result, the lack of adequate regulations weakens control over this type of pollution and has detrimental effects on Iran's marine ecosystems. Additionally, the underdevelopment of monitoring infrastructure for marine noise pollution poses a significant challenge. Despite the potential for employing advanced monitoring systems, the lack of effective executive measures has prevented these capacities from being fully realized. Ultimately, given the vital role of the Strait of Hormuz in the global energy system, Iran's commitment to developing sustainable practices and adopting advanced strategies to reduce marine noise pollution, in addition to enhancing environmental protection, could serve as a model for regional and international cooperation.

#### **4. Conclusion**

Marine noise pollution, as an emerging environmental challenge, requires a multi-layered and comprehensive approach. Unlike visible and chemical pollutants, this type of pollution is often overlooked, but its destructive impacts on marine ecosystems—particularly on species sensitive to sound—can be irreversible. The studies conducted reveal that noises produced by ships, military operations, and underwater industrial activities have profound effects on migration routes, biological behaviors, and the survival of marine mammals.

International documents such as the United Nations Convention on the Law of the Sea (UNCLOS), the Convention on Biological Diversity (CBD), and the Convention on the Conservation of Migratory Species (CMS) provide the necessary legal frameworks to reduce marine noise pollution, imposing obligations on member states to monitor and manage the impacts of underwater noise. These documents especially emphasize the protection of sensitive habitats and vulnerable species, requiring states to adopt preventive policies to avoid the damages caused by human activities in the marine environment.





Despite the existence of these legal frameworks, the main challenge in their implementation lies in the lack of effective enforcement mechanisms and deterrents for violations. Many countries, especially those in busy maritime areas like the Persian Gulf and the Strait of Hormuz, face significant difficulties in fulfilling their environmental obligations due to the absence of efficient monitoring systems and technical limitations. Lack of transparency in reporting, regional coordination issues, and conflicts with economic interests are among the factors that undermine the effectiveness of these legal instruments. In many cases, the implementation of these obligations depends on international and regional cooperation, but political disputes and the lack of collective will hinder these collaborations. Furthermore, delays in updating technical standards and the adoption of noise-reducing technologies in the maritime transport industry also contribute to the inefficiency in implementing these frameworks. Therefore, despite the formulation of necessary regulations, there are notable gaps in achieving the goals of reducing marine noise pollution at the implementation level.

Regarding Iran's legal system, the studies indicate that while domestic laws do not explicitly address "marine noise pollution," the interpretive capacity within existing related laws allows for the adaptation of these regulations to emerging environmental issues. Given that Iran has ratified the Convention on Biological Diversity and the Convention on the Conservation of Migratory Species, the country is obligated to take necessary actions to protect marine habitats and reduce threat factors, including noise pollution.

These obligations, in addition to requiring adherence to international regulations, are of particular importance given Iran's geographic position. The Strait of Hormuz, as one of the busiest waterways in the world and a passage for numerous commercial and oil tankers, is continuously exposed to underwater noise generated by shipping activities. This situation amplifies

Iran's responsibility to reduce this pollution and protect vulnerable species. More precise implementation of international commitments, alongside the utilization of interpretive capacities within domestic laws, could place Iran on a path toward reducing marine noise pollution and safeguarding the marine environment. Particularly in regions like the Persian Gulf, where habitats for sound-sensitive species exist, monitoring and managing this pollution is of critical importance. In light of these factors, it seems that adopting operational and strategic policies based on the requirements of environmental conventions could strengthen Iran's position in the international environmental protection system and contribute to sustainable development.

Based on the analyses conducted, it is essential for Iran's legal and executive system to seriously address the issue of marine noise pollution and take practical measures in this regard. Continuation of this approach, in addition to protecting sensitive habitats, could be an effective step toward mitigating the damage caused by this type of pollution and facilitating the pathway toward practical solutions.

To reduce marine noise pollution in Iran, actions should be based on a specialized analysis of the geopolitical and environmental conditions of the region, especially the Persian Gulf and the Strait of Hormuz. In this context, scientific and practical solutions can be implemented to play a more effective role in managing this type of pollution. One of the most crucial measures is to design and establish a network of advanced acoustic monitoring stations in key marine areas. These stations, utilizing advanced acoustic sensors, can continuously measure and monitor underwater noise levels in high-traffic areas, including the Strait of Hormuz. The data obtained from these monitoring efforts can serve as the scientific and technical foundation for designing pollution-reduction policies and foster regional cooperation in data sharing.

Promoting and implementing noise-reduction technologies in Iranian ships, particularly in the commercial and oil tanker fleets, is another essential measure.



Advanced designs in ship engines, the use of vibration-damping systems, and the reduction of propeller-generated noise can play a significant role in decreasing underwater noise. Enforcing mandatory standards for upgrading ship technologies and providing financial incentives for adopting these technologies are also practical solutions.

Regional cooperation can also have a significant impact on reducing marine noise pollution. Iran can engage with neighboring countries in the Persian Gulf and the Sea of Oman to establish multilateral agreements for managing marine noise pollution. These agreements could include joint monitoring programs, the sharing of noise-reduction technologies, and the development of unified standards, all of which would strengthen regional commitments.

Ultimately, educating and raising awareness among stakeholders in the maritime industry, including ship operators and maritime transport companies, about the harmful effects of noise pollution should be pursued seriously. Organizing training sessions and specialized workshops can improve operational behaviors and enhance commitment to marine environmental protection.

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