

Protection and Progress of the Marine Environment

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Abstract. The marine environment is an important part of the earth's ecosystem and is of great significance to maintaining the earth's ecological balance and the sustainable development of human beings. However, due to undue interference and pollution from human activities, the marine environment is facing serious threats. The aim is to explore the importance of protecting the marine environment and propose some feasible measures to reduce marine pollution and protect marine biodiversity. In a word, the research on marine environmental protection is of great significance for maintaining ecological balance, protecting endangered species, regulating climate, rationally utilizing resources and reducing environmental pollution. Through scientific research and reasonable management, we can protect and make good use of marine resources and create good conditions for future sustainable development. In recent years, various countries and the United Nations government have formulated many laws and policies on ocean protection, but these laws are still flawed and need to be improved and supplemented.

Keywords: Oceans, environment, pollution, protection.

1. Introduction

The goal of contemporary marine environmental preservation is to safeguard marine ecosystems and resources, lessen marine pollution and harm, and encourage sustainable marine exploitation. Governments and the international community have made a number of significant steps in recent decades to support the growth of marine environmental protection due to the growing awareness of marine environmental challenges. In terms of international cooperation, a legal framework, environmental protection zones, marine pollution control, scientific research, and public awareness, this article will go into depth about the development of contemporary marine environmental protection.

Protection of the marine environment requires international cooperation. Countries must cooperate to address maritime environmental challenges because they are global and transnational in character. The international community has improved collaboration and coordination in the protection of the maritime environment during the past few decades and has made significant progress in this area. The United Nations Convention on the Law of the Sea (UNCLOS), which established the rights and obligations of nations in regard to resource management, environmental protection, and marine scientific research, is the cornerstone of international law of the sea. The Convention encourages international collaboration and coordination while defining each nation's duties with regard to protecting the marine environment. The International Maritime Organization (IMO) has two main responsibilities: preventing pollution from ships and establishing rules and standards for international commerce. The International Maritime Organization (IMO) has created a number of international agreements, such as the International Convention on Ship Waste Management and the International Convention on the Prevention of Pollution from Ships, which regulate trash disposal and ship discharge to safeguard the marine environment. the creation of mechanisms for international cooperation. International marine research collaboration, marine scientific and technology collaboration, and marine environmental monitoring and assessment collaboration are only a few of the international cooperation methods that nations have built to protect the maritime environment. For instance, a significant UNESCO organization devoted to advancing marine scientific research and cooperation is the International Organization for Ocean Research Cooperation [1-2].

For the marine environment to be protected, a legislative framework is required. By creating international treaties, rules and regulations, etc., the global community has created a number of legal structures to safeguard the maritime environment. The UNCLOS provisions outline the rights and responsibilities of nations with regard to the management of maritime resources, marine scientific research, marine environmental protection, etc. The Convention lays out the steps that nations must follow, including reducing marine pollution, preserving marine biodiversity, and preserving the ecosystem's health. In order to protect the maritime environment, the international community has created and put into effect a number of international conventions. The New York Convention on Marine Biological Diversity, for instance, tries to safeguard marine biodiversity, and the Convention for the Prevention of Marine Pollution regulates ship discharge and trash disposal, among other things. Countries have met their international commitments to safeguard the maritime environment by ratifying and putting these treaties into practice. A number of laws and regulations to safeguard the marine environment have been created by governments of various nations as a result of improved domestic legislation. Examples include the Marine Environmental conservation Law and the Marine Resources Management Law, among others, which outline the duties and precautions for marine environmental conservation [3-5].

2. Conservation and Management of Australia's Great Barrier Reef

One of the world's largest coral reef systems and a popular tourist destination, the Great Barrier Reef is located in Australia. The Australian government has implemented a number of steps to safeguard and preserve this priceless natural treasure.

To manage and safeguard the Great Barrier Reef, the Australian government first established the Great Barrier Reef Marine Park Authority. The organization is in charge of creating and carrying out policy, organizing and controlling the use of the Great Barrier Reef, and keeping track of and evaluating its ecological health. Various methods are utilized, such as habitat-focused proxies, such as coral reefs or seagrass beds, species-focused proxies, and proxy species that are process-focused.

Evaluates an ecosystem's capacity to withstand exogenous shocks and intrusions. They also place a lot of emphasis on biodiversity, which is what drives natural ecosystems most of all. Through a variety of dynamic and interrelated hierarchies, ranging from genes through people, populations, species, communities, and ecosystems, they interact with their abiotic environment [6-7].

Second, the Great Barrier Reef Park Service collaborates with a range of parties, including regional groups, researchers, the tourism industry, and the fishing industry. Together, they have created a number of management strategies to guarantee the Great Barrier Reef's continued development. To safeguard the Great Barrier Reef's biodiversity, for instance, fishing and capturing methods could be scaled back.

The Australian government also invests a lot of money in scientific study and monitoring to learn more about the Great Barrier Reef's ecological situation and potential dangers. These studies offer information to enhance decision-making and aid in the development of more efficient conservation and management policies. The Great Barrier Reef is threatened by factors including climate change, water pollution, and an overabundance of tourism, thus the Australian government has also taken a number of actions to address these issues. To minimize climate change and ease environmental pressure, for instance, improve water quality, limit the number of tourists, and cut greenhouse gas emissions.

3. Function and Values of Marine Ecosystem

The Marine ecosystem is rich in functions and values and has an important impact on the Earth's ecosystem and human society. The valuation of marine ecosystems can be based on either a functional analysis or a value analysis. The former includes provision (food, raw materials, genetic resources, biological refuge, recreation), regulation (climate, atmosphere, biodiversity, biological control,

material circulation), culture (scientific research, physical and mental health, others); the latter includes use value (direct use value, indirect use value) and non-use [8].

Marine ecosystems are one of the largest reservoirs of biodiversity on Earth, supporting the proliferation and survival of many living species. The ocean consists of a large number of plants, animals and their surrounding ecosystems of all sizes forming a complex food chain and ecological network that maintains ecological balance. The ocean plays an important role in carbon storage and regulation by absorbing large quantities of groundwater. Plants in the ocean convert groundwater into organic matter through photosynthesis and die and are deposited on the seafloor to form carbonate deposits. The ocean absorbs and releases large amounts of heat, and has a greater heat capacity than the land. Ocean circulation systems such as ocean currents and air-sea exchange play an important role in regulating the global climate. Evaporation and evaporative precipitation processes regulate the water vapor content and temperature distribution in the atmosphere. In short, the functions and roles of marine ecosystems are multifaceted, ranging from maintaining biodiversity to oxygen production, carbon storage, climate regulation, food supply and economic value, all of which have important impacts on the earth's ecosystem and society. Protecting and maintaining the health of marine ecosystems is our shared responsibility as human beings.

4. Threats to the Marine Environment

4.1. Types and Hazards of Marine Pollution

When a substance is present in a habitat or an organism at a concentration that is greater than usual or background, it is considered to be a pollutant. According to the definition of pollution given by the World Health Organization (WHO), any type of pollution that has a negative impact on the health, comfort, or value of real estate or that alters the development and reproduction rates of plant or animal species is considered to be a form of pollution in an ecosystem [9].

There are many types of pollution in the marine environment such as chemical pollution, industrial material pollution, and noise pollution. Chemicals such as heavy metals, pesticides, fertilizers and pharmaceuticals are introduced into the marine environment by industrial activities, agricultural runoff and improper waste disposal. These substances can accumulate in the food chain causing toxicity thereby damaging the reproductive and immune systems of marine organisms. Plastics, including single-use plastics, plastics from derelict fishing gear (tiny plastic particles), microplastics and plastic trash are major sources of marine pollution. Plastic can entangle marine animals, causing injury or death, and can be ingested, causing internal damage. Microplastics are often consumed by smaller marine organisms and have the potential to enter the human food chain. Sewage, agricultural runoff and aquaculture operations that are not properly treated or are inadequately treated can introduce excess nutrients (e.g., nitrogen and phosphorus) into marine ecosystems, and this nutrient pollution can lead to harmful algal blooms, oxygen depletion and dead zones resulting in the death of marine organisms and ecosystem destruction. Marine debris in addition to plastic, various types of debris, including glass, metal, rubber and wood, can accumulate in the ocean. This debris can harm marine life through entanglement, ingestion or physical damage. It can also damage sensitive habitats such as coral reefs and seagrass beds. Noise pollution, underwater noise pollution from shipping, seismic surveys, sonar systems and offshore construction activities can disrupt the communication, feeding and migration patterns of marine animals. Such disturbances can have major impacts on marine mammals, fish and other species. Thermal pollution is caused by the discharge of hot water from power plants and industrial processes into the ocean. Sudden increases in water temperature can harm marine life, especially those that are sensitive to temperature changes and can damage ecosystems. The accidental or deliberate release of radioactive material, such as a nuclear power plant or nuclear accident, can contaminate the marine environment. Radioactive pollution can have long-term effects on marine life, causing genetic mutations, reproductive abnormalities, and ecosystem disruption. All the above pollution methods will bring great damage and irreversible loss to the marine environment.

4.2. Danger of Overfishing in the Ocean

As everyone is aware, fishery resources are not an exception to the rule that each resource has a normal use process and that its rate of utilization cannot be artificially enhanced indefinitely. Fishery resources are renewable and have a shorter regeneration cycle than non-renewable resources like coal and oil, but if their fishing intensity and volume are unchecked beyond the resources' carrying capacity, they will eventually run out and pose a threat to extinction. The number and overall power of Chinese motorized fishing vessels have increased significantly since the 1980s. China currently has more than 280,000 marine fishing vessels with a combined displacement of 597.2×10 GT and a power output of 1297.7×10 kW. Fishing output in 2001 was 14.406 million tons, or about twice as much as is thought to be catchable in China's four oceans. The offshore fishery's biological resources, in particular, have suffered harm as a result of the fishing intensity's stark contradiction [10].

Overfishing of marine resources has brought much harm to the ecosystem and human society. Ecosystem damage and overfishing have disrupted the balance of the marine ecosystem. When a certain type of fish or other marine life is overfished, their numbers can drastically decrease and they may even become extinct. This will lead to the breakdown of the food chain, affect the survival and reproduction of other species, and destabilize the marine ecosystem. Economic impacts Overfishing has enormous economic impacts on fisheries and related industries. When fishermen are unable to catch enough fish, their income suffers, which can lead to unemployment and poverty. In addition, a fishery is an important source of income for many countries, and overfishing may lead to the depletion of fishery resources, which in turn affects the entire economic system. Biodiversity loss overfishing can lead to the extinction of certain fish and other marine life, reducing marine biodiversity. Biodiversity is crucial to maintaining ecological balance and ecosystem stability, therefore, overfishing poses a threat to the diversity and stability of the entire ecosystem.

5. Convenient, easures to Protect the Marine Environment

5.1. Measures to Reduce Pollution

With the continuous development of society, the economies of various countries are also improving rapidly, and the marine economy is also continuously improving. The corresponding marine resources have produced great waste and destruction, especially the reduction of some non-renewable resources, resulting in the ecological sustainability of the ocean. load gradually weakens. With the rapid development of the marine economy, how to control marine environmental pollution has become the focus, and marine environmental problems need to be dealt with as soon as possible. Reducing marine pollution is an important and complex issue that requires comprehensive consideration of multiple aspects [11].

Some countries with complete and well-developed marine laws and regulations, such as the United States, and the United Kingdom, etc., the United Kingdom establishes laws and regulations on marine environmental protection based on the British law of the sea, consisting of 11 parts, 325 articles and 22 appendices, covering marine management Organizations, Exclusive Economic Zones, Other Marine Areas and Welsh Fisheries Areas, Marine Planning, Marine Licensing, Marine Nature Reserves, Offshore and Freshwater Fisheries Management, Marine Law Enforcement Systems, Coastal Access, etc. To a certain extent, the pollution of the ocean and the damage to the marine ecosystem are reduced [12].

Enhanced wastewater treatment ensures that industrial and municipal wastewater is properly treated to prevent harmful substances from entering the ocean. Pollutants can be effectively removed using advanced wastewater treatment technologies such as biological treatment and membrane filtration. Controlling Agricultural Pollution Agricultural activities are one of the important sources of marine pollution. Reducing the use of chemical fertilizers and pesticides in agriculture, and adopting sustainable agricultural practices such as organic farming and precision fertilization can

reduce the entry of agricultural pollutants into water bodies. Manage marine litter Strengthen the management and cleanup of marine litter, including strengthening waste disposal facilities in ports and ships, promoting waste sorting and recycling, and reducing the use of plastic and other degradable materials.

Control marine oil pollution Strengthen the supervision of offshore oil exploration and transportation to ensure the safety of equipment and the perfection of accident emergency plans. At the same time, promote the development of renewable energy and reduce dependence on fossil fuels to reduce the risk of marine oil pollution.

Protect marine ecosystems Establish marine protected areas and fisheries management measures to limit overfishing and destructive fishing practices in order to protect marine biodiversity and ecological balance.

The implementation of these methods requires the joint efforts of the government, enterprises, scientific research institutions and the public. By applying these measures in combination, we can reduce marine pollution and protect the health and sustainability of marine ecosystems.

5.2. Marine Ecological Compensation Mechanism

The ocean is a key strategic area for high-quality economic development, as well as a new source of energy for social and economic transformation and upgradation and sustainable development in the age of the new normal. The continued development and growth of the land economy is the core of the marine economy. With economic activities like the exploitation of marine resources, the growth of the marine industry, and the creation of marine economic zones, it is a comprehensive economic system and a sea-land integrated economic structure. The marine industry has experienced fundamental changes and made significant strides forward thanks to the social economy's quick expansion. Problems including overuse of marine resources, marine environmental degradation, and marine natural disasters have gotten much worse as maritime development has continued to accelerate. A technique to conserve and restore marine ecosystems impacted by human activity is the marine ecological compensation mechanism [13].

Formulate laws and policies Establish relevant legal and policy frameworks to clarify the objectives, principles and procedures of marine ecological compensation. These laws and policies can specify responsible parties, compensation mechanisms and sources of compensation funds, etc. Identify responsible parties for damage to marine ecosystems, including individuals, businesses, and governments. The responsible party should bear the corresponding economic responsibility for the restoration and protection of marine ecology. Establish a fund pool to establish a special fund pool for collecting and managing marine ecological compensation funds. These funds can come from fines from responsible parties, donations, environmental taxes, etc. Assessment and monitoring Establish a scientific assessment and monitoring mechanism to regularly assess the extent of damage to marine ecosystems and monitor the effects of compensation measures. This helps to ensure the effective use of compensation funds and the realization of compensation effects.

Formulate a compensation plan Based on the assessment results, formulate a specific compensation plan. Compensation plans should include specific restoration and protection measures, such as the reconstruction of marine ecosystems, species protection, pollution control, etc.

In short, the establishment of a marine ecological compensation mechanism needs to comprehensively consider factors such as laws, policies, funds, assessment, monitoring, planning, and public participation to ensure the sustainable development and protection of marine ecosystems.

6. Conclusion

Humanity must take active actions to protect the health and sustainability of marine ecosystems. Marine environmental protection requires comprehensive measures, including reducing pollution, protecting biodiversity, addressing climate change, promoting sustainable use and strengthening international cooperation. Only through global cooperation and joint efforts can we ensure the health

and sustainability of marine ecosystems. Marine environmental protection faces some limitations but also has some prospects for the future.

Insufficient international cooperation in the marine environment is a global issue, but the cooperation among countries in protecting the marine environment is not close enough. The lack of international cooperation means that it is impossible to comprehensively address marine environmental problems, especially transboundary marine pollution and overfishing. Funding and technical limitations Marine environmental protection require a lot of funds and advanced technical support, but many countries and regions still have limitations in this regard. Lack of financial and technical support will affect the effectiveness and sustainability of marine environmental protection. The legal framework and law enforcement mechanisms for marine environmental protection are not perfect in some countries and regions. The lack of effective legal and law enforcement means will lead to insufficient implementation of marine environmental protection and the inability to effectively deal with problems such as marine pollution and illegal fishing. Strengthen international cooperation to solve marine environmental problems, countries should strengthen cooperation and jointly formulate and implement international marine environmental protection policies and action plans. Through joint efforts, global goals for marine environmental protection can be achieved. Promoting sustainable development is key to protecting the marine environment. Countries should strengthen the rational use of marine resources, promote the development of a green economy, reduce pressure on the marine environment, and improve the resilience of marine ecosystems. Develop sound laws and enforcement mechanisms: states should strengthen the legal framework and enforcement mechanisms for marine environmental protection to ensure that laws are enforced and violations are punished. At the same time, strengthen monitoring and supervision capabilities, and improve early warning and response capabilities to marine environmental problems.

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