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ECONOMIC AND INTERNATIONAL LEGAL ASPECTS OF THE PROTECTION OF THE MARINE ENVIRONMENT FROM POLLUTION

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Abstract. The protection of the marine environment from pollution is a significant topic of research in the field of international law. Almost all states face problems in the field of environmental protection and strive to solve them at the national level. However, until environmental protection is ensured even in areas that do not fall under the sovereignty of any state, sustainable development goals and global environmental safety will not be achieved. Therefore, the protection of the marine environment from pollution requires appropriate international legal regulation. *The purpose* of this article is to carry out an analysis of international legal regulation of the protection of the marine environment from pollution, identify existing problems and propose ways to solve them. Statistical data on the state of the pollution of marine environment were analysed. *Methodology.* When writing the article, general theoretical methods were mainly used. Analysis and synthesis, theoretical generalization and systematic interpretation helped to assess the sufficiency of international legal regulation of the protection of the marine environment from pollution. *Results.* The article considered the content of the UN Convention on the Law of the Sea, Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, Convention for the Prevention of Pollution from Ships and identified its shortcomings. *Practical implications.* On the basis of doctrinal provisions, as well as the norms of the current international law the authors have identified the main range of problems existing in the sphere of international regal regulation of protection of the marine environment from pollution and proposed the possible ways of their resolving. *Value/originality.* It is determined that an important step in improving international legal regulation of the protection of the marine environment which is required is adoption of additional provisions which would regulate the protection of the marine environment from microplastics and provisions which will contain details of how should be established liability for damage caused to the marine environment by individual persons and details of collection of compensation for damage caused to the seas.

Keywords: international law, international environmental law, marine environment, environmental safety, economic impacts of marine pollution, economic effects of pollution.

JEL Classification: K00, K1, K3, K33

1. Introduction

The world's ocean absorbs about 30% of the carbon dioxide that is emitted into the Earth's atmosphere. As a result it helps to prevent climate change. In addition, it is an important source of water resources, as well as a home for half of the species that exist today. This highlights the need to protect marine waters from pollution. Therefore, it is relevant to study international legal regulation of protection of the marine environment from the pollution and evaluate its effectiveness.

Within our scholarly work, an attention was focused on the provisions of the UN Convention on the Law of the Sea, Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, Convention for the Prevention of Pollution from

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Ships. Proposals were made de lega ferenda. Writing our article, we partially relied on the scientific achievements of such scholars as M. Medvedeva, O. Zadorozhnyi, O. Gulac, T. Novak, K. Yemelianenko and others.

The purpose of our scholarly work is to analyse existing international documents aimed at the protection of the marine environment from the pollution, identify their shortcomings and make proposals how to improve them.

2. Pollution of the Marine Environment in Numbers

Protection of the marine environment is very important. It influences the state of the environment, helps to prevent climate change. Although the latest data prove that humanity is not doing enough to prevent climate change and the level of the world's oceans is rising. This is evidenced by the latest statistical data on climate change. 2023 was the warmest year on record at 1.45 ± 0.12 °C above the pre-industrial average. As a result the rate of sea-level rise in the past 10 years (from 2014 to 2023) has more than doubled compared to the data during the period from 1993 to 2002. The average level of see level rise is 4.77 millimeter per year over the period 2014 to 2023 (World Meteorological Organization. State of the global climate, 2023).

In 2023, ocean heat content reached its highest level in the 65-year observational record, exceeding the 2022 value by 13 ± 9 ZJ compared to the data published in 2024 (Cheng, 2024.). Low-lying coastal communities (the western Tropical Pacific, the South-west Pacific, the North Pacific, the South-west Indian Ocean and the South Atlantic) suffer most from climate change and sea level rise (IPCC. Sea Level Rise and Implications for Low-Lying Islands, Coasts and Communities, 2024). This threatens their existence and raises the question of the need to regulate at the international level the consequences of the rise of the global ocean level and the issue of the citizenship of the population whose settlements will be underwater.

Pollution of the marine environment also contributes to climate change. Ocean pollution statistics is shocking. In 2024, 220 million tons of plastic waste were generated, which constitute 28kg per person worldwide. 69.5 million tons of plastic waste were mismanaged and ended up in the natural environment (Marine & Ocean Pollution. Statistics & Facts, 2025). From 75 to 199 million tonnes of plastic appears in the ocean (Greenmatch, 2025). And this is a huge problem. Because it takes from 500 to 1000 years to degrade plastic (Plastic can take 500 years to biodegrade in the ocean, 2025) and it contributes to the reduction of biodiversity.

500 marine locations are now recorded as dead zones globally. Currently their surface is around 245,000 km^2 (Marine & Ocean Pollution. Statistics & Facts, 2025). 92% of microplastics have been found in 60% of fish that population is consuming each year and are linked to health risks such as cancer, infertility, and nervous system damage (Greenmatch, 2025).

Pollution of the marine environment also influences economy, first of all fisheries sector and tourism. Estimated cost of marine litter is between 259 and 695 million euro (Problems caused by plastic waste in the ocean, 2025). Only 3% of the ocean is not influenced by human activities and at least 66% of the ocean area is experiencing multiple, cumulative impacts from human interference (Ocean 52. Threats on Marine Biodiversity, 2025). Armed conflicts also contribute to the pollution of the seas (Yemelianenko, 2024). The above statistical data indicate the need for proper international legal regulation of the protection of the marine environment from pollution.

3. Economic Impacts of Marine Pollution

Marine pollution not only has a detrimental effect on climate change and the global state of the environment, but also has significant economic consequences. First of all, we are talking about the damage that occurs in the field of fishing and aquaculture, tourism, etc.

According to the data provided by the United Nations during the conference aimed at the support of the implementation of sustainable development goal 14: conserve and sustainably use the oceans, seas and marine resources for sustainable development, which was conducted in Nice, France, 9–13 June 2025, the global ocean economy doubled from $1.3 trillion in 1995 to $2.6 trillion in 2020 in gross value added, growing at an average of approximately 2.9 per cent each year. Despite positive economic impacts, this growth can have negative consequences for the environment, including increased marine pollution, carbon emissions and other pressures, all of which will prevent the ocean economy from expanding as it has for the past 25 years (United Nations Conference, 2025). Cumulative impacts of pollution, along with overfishing and the unsustainable management of stocks, could lead to the continued decline of global fishery resources (Organisation for Economic Co-operation and Development, 2025).

The study investigating the decline in fishing because of the pollution of the marine waters was conducted by the International Union for Conservation of Nature and Natural Resources in the Caribbean Sea. Decline in fishing was estimated as 0.1 % annually (Raes, 2022).

The coastal populations in the Middle East and North Africa (MENA) and Sub-Saharan Africa are expected to grow by 18 percent and 42 percent

respectively between 2020 and 2035 (The World Bank, 2022). Because of the marine pollution and climate change the decrease in fishing is expected. This decrease in may be as much of a drop as 26 percent in some parts of West Africa, and could be even higher for in other parts of West Africa countries closer to the equator: a 53 percent drop in fish in Nigeria, 56 percent in Cote d'Ivoire, and 60 percent in Ghana (The World Bank, 2017).

NOAA Marine Debris Program funded a study to investigate the influence of marine pollution on tourism. The study was conducted on four different coasts of the USA. It showed that elimination of waste on Lake Erie beaches generated approximately 2.8 million additional visits. In Orange County, California the public was most responsive to a doubling of marine waste. The study estimated 4.6 million fewer visits because of debris. In Ohio reducing marine waste to almost zero resulted in additional $217 million tourism dollars spent in communities and creation of 3,700 jobs (Marine Debris Program, 2025). Thus, a direct connection between pollution of marine waters and the coast and economic profit from tourism can be observed. An increase in the number of tourists also has a positive effect on the number of jobs created.

Given the fact that the economies of some regions, especially in Africa, are heavily dependent on fishing and tourism, in order to preserve this sector of the economy, it is necessary to ensure the protection of the seas from pollution. International law can play an important role in this process. Therefore, we will analyze international legal norms in the field of marine environment protection from pollution in order to identify possible shortcomings and gaps.

4. International Legal Regulation of the Protection of the Marine Environment from Pollution

At the World Summit held in New York on 25 September 2015, the UN General Assembly adopted Resolution 70/1, entitled "Transforming our world: The 2030 Agenda for Sustainable Development". This document sets out 17 Sustainable Development Goals, which aim to end poverty and hunger, protect human rights and human dignity, protect the planet from degradation and promote peace. Goal 14 obliges states to "conserve and sustainably use the oceans, seas and marine resources for sustainable development" (Resolution, 2015).

The United Nations Convention on the Law of the Sea (UNCLOS), which has been in force since 1994 is generally accepted as a codification of customary international maritime law, but also has provisions aimed at environmental protection. The Convention has separate Part XII which specifically addresses the protection of the marine environment, which is entitled "Protection and conservation of the marine environment". According to article 192 states have the obligation to protect and preserve the marine environment. Article 194 obliges states to take all necessary measures to prevent, reduce or control pollution, to minimize the pollution of the marine environment to the most possible extent and to cooperate between each other.

Articles 207-208 require the adoption of an appropriate regulatory framework that would require the prevention of marine pollution, as well as the control of pollution from various sources. It also requires regional cooperation in this direction and harmonization of policies. It should be mentioned that the details of this cooperation as well as components of the regional policies are not specified.

Article 235 regulates the questions of responsibility and liability. According to it states are responsible for the fulfilment of their international obligations concerning the protection and preservation of the marine environment and also have to ensure that "recourse is available in accordance with their legal systems for prompt and adequate compensation or other relief in respect of damage caused by pollution of the marine environment by natural or juridical persons under their jurisdiction" (Convention on the Law of the Sea, 1982). Unfortunately, the details of how compensation for environmental damage caused to the marine environment should be collected are not spelled out in the UNCLOS.

As we can see provisions of the UNCLOS are formulated too generally, which allow states to interpretate them in their own way. We understand why international treaties aimed at environmental protection are formulated so broadly. States do not want to take on large obligations, although they can bring a positive result for themselves. Nevertheless, such formulation of the environmental component in the treaty is not sufficient. Such general provisions also do not contribute to the achievement of sustainable development goals (Novak, 2024; Gulac, 2022) and environmental human rights protection (Vashchenko, 2021).

It is necessary to add to the UNCLOS additional provisions aimed at the protection of the marine environment. It should include a provision on the prevention of the the marine environment from the pollution from microplastics, as statistical data indicate that it contributes significantly to the pollution of the seas.

The Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (1972) (London Convention) is a special treaty which prohibits the disposal of wastes and other substances listed in Annex I to this Convention (e.g. mercury, cadmium, persistent plastics and other persistent synthetic materials, high-level radio-active wastes,

fuel oil) at sea and, for substances listed in Annex II (e.g. arsenic, lead, zinc, organosilicon compounds, cyanides, fluorides, pesticides) restricts their disposal by special permit. London Convention covers the deliberate disposal at sea of wastes or other matter from vessels, aircraft, and platforms. The shortcoming of the convention is that it does not cover discharges from land-based sources such as pipes and outfalls, wastes generated incidental to normal operation of vessels, or placement of materials for purposes other than mere disposal, providing such disposal is not contrary to aims of the treaty. Another disadvantage is that although the London Convention explicitly prohibits the disposal of certain hazardous substances listed in Annex I to the Convention into the sea, a significant amount of types of waste can be disposed of at sea provided that the applicant obtains the appropriate permit. This also significantly limits the scope of application of the convention.

The main objective of the Convention for the Prevention of Pollution from Ships (MARPOL) is to prevent and minimize pollution of the marine environment by ships, whether during normal operations or in the event of accidents. It was adoptedin 1973 and has two protocols adopted in 1978 and in 1997.

The International Supplementary Fund for Compensation for Oil Pollution Damage was established, which shall pay compensation to the injured party if he has not received full and adequate compensation in accordance with the provisions of the Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage. If the oil pollution of the sea has occurred as a result of the activities of a State vessel, the State shall bear international legal responsibility under the provisions of the United Nations Convention on the Law of the Sea of 1982 and the International Convention for the Prevention of Pollution from Ships of 1973, as amended by the Protocol of 17 February 1978, and also in accordance with the above-mentioned conventions on civil liability – in the form of liability arising from the failure to observe the duty of due diligence (Medvedeva, 2010).

The provision regulating the way of determining compensation for damage caused by oil pollution from ships is a significant positive moment. However, it is somewhat offset by the fact that in some countries there are no effective means of control to ensure compliance. It concerns the states with lower environmental standards.

5. Conclusions

Statistical data indicate significant pollution of the marine environment, which negatively affects climate change, the state of biodiversity, as well as the economic sector. This requires increased attention from the international community to the prevention of marine pollution and to the improvement of international law.

International legal regulation of the protection of the marine environment from pollution is not sufficient. Provisions of the UNCLOS are too general, which weakens the implementation of its provisions. Additional provisions which would regulate the protection of the marine environment from microplastics are necessary. Details of how should be established liability for damage caused to the marine environment by individual persons and details of collection of compensation for damage caused to the seas should also be spelled out in the UNCLOS. This necessity is determined by the fact that article 235 which regulates this question gives too much room for interpretation by states and is not implemented properly in practice.

The Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter also has limited scope. It prohibits the disposal of certain hazardous substances listed in Annex I to the Convention into the sea, which is the strong point of the Convention, but at the same time a significant number of types of waste can be disposed of at sea provided that the applicant obtains the appropriate permit, which is a disadvantage. London Convention also does not cover discharges from land-based sources.

International legal regulation of compensation for damage caused by oil pollution from ships is a significant positive advantage. However, it is somewhat neutralised by the fact that in some states with low environmental standards there are no effective means of control to ensure compliance. Protection of the marine environment from pollution remains an international concern. Strengthening existing international legal regulation is necessary especially in the sphere of monitoring compliance and collecting compensation.

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