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# The Reconstruction of China's Land-Based Marine Pollution Governance under the Concept of "Rights of Nature"

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**ABSTRACT:** Under the concept of "Rights of Nature", the governance of land-based marine pollution in China faces unprecedented opportunities and challenges. Traditional governance paradigms are predominantly anthropocentric, treating the ocean as a resource to be utilized. From this perspective, governance measures for the prevention and control of land-based marine pollution primarily rely on administrative management and end-of-pipe treatments. Within this context, "Rights of Nature" provide a new pathway for marine ecological protection. However, promoting a shift in land-based marine pollution governance from the traditional anthropocentric view to an eco-centrism under the "Rights of Nature" concept is by no means an instantaneous process, and it must proceed gradually and systematically. Currently, China's institutional framework for preventing and controlling land-based marine pollution remains dominated by the anthropocentric paradigm. Furthermore, it encounters multiple difficulties across many key areas, including the legal system, law enforcement mechanisms, relief mechanisms, and public participation. Issues such as poor coordination within the legal framework, fragmented law enforcement, lagging legislation related to ecological restoration, and insufficient public participation significantly constrain the effectiveness of land-based marine pollution governance. Given the fundamental differences between anthropocentrism and "Rights of Nature", directly introducing this concept would likely have a substantial impact on China's existing legal framework. Therefore, at the current stage, China could first incorporate the proposition from the "Rights of Nature" concept that nature possesses "intrinsic value independent of human use or perception". This involves weakening the perception of the ocean as a mere appendage to human activities, recognizing and respecting the unique value of the ocean as a living entity and ecosystem at a conceptual level, and gradually forming a set of nature-friendly governance paradigms for land-based marine pollution that respect the intrinsic value of nature. This approach can ultimately drive transformative practices in China's land-based marine pollution governance.

**Keywords:** Rights of nature; Land-based marine pollution; Nature-friendly paradigm; Intrinsic value



## 1. Introduction

In recent years, confronted with the worsening ecological crisis, humanity has begun to rethink the relationship between humans and nature as well as the attitude humans ought to adopt towards nature. In order to guide humanity in adopting a proper attitude toward nature, contemporary ecological ethicists have proposed the concept of the "Rights of Nature" [1]. It advocates that natural entities such as rivers, mountains, and forests, as well as the entire ecosystem, should be regarded as subjects with intrinsic value, rather than merely being resource carriers or legal objects that serve human production and daily life [2].

The "Rights of Nature" concept was first proposed by American scholar Christopher D. Stone. Using a polluted river as an example, Stone argued that under traditional governance models, the true primary victims, namely the river itself and its aquatic life, remain unable to seek restoration or compensation through litigation. Consequently, he proposed granting independent legal status as subjects of rights to natural entities such as rivers, forests, and oceans. This would enable nature to assert claims against polluters, thereby securing compensation for ecological restoration and conservation projects, and ultimately achieving the systemic goal of providing direct legal recourse for damaged natural systems [3].

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As an emerging paradigm in the fields of law and philosophy, the "Rights of Nature" is a product of humanity's efforts to address the ecological crisis and re-examine the relationship between humans and nature [4]. Its objective lies in fundamentally reconstructing the legal and ethical relationship between humanity and the natural world [5]. The emergence of the "Rights of Nature" concept in the field of environmental protection reflects the international community's critical re-examination of traditional anthropocentrism [6]. As a significant innovation in the field of environmental protection [7], it stands in stark contrast to the anthropocentric perspective found in traditional environmental legal systems.

Specifically, the majority of traditional environmental legal systems take the functional value of nature to human welfare as the precondition for protection, essentially maintaining nature as an object to be dominated and exploited [8]. In contrast, the "Rights of Nature" concept further asserts that natural entities should possess inherent rights corresponding to human rights, including the rights to exist, reproduce, restore, and evolve, based on ecological principles [9]. These rights claim not only provide a theoretical foundation with greater ethical depth for the protection of nature, but also constitute a profound challenge to the anthropocentrism embedded in the current legal paradigm [10].

In terms of global practices, this concept has progressively evolved from a theoretical construct to an institutional implementation. For instance, Ecuador took the lead in 2008 by enshrining "Rights of Nature" in its constitution [11]. Article 71 of this constitution explicitly recognizes that nature "has the right to integral respect for its existence and for the maintenance and regeneration of its life cycles, structure, functions and evolutionary processes". Subsequently, countries such as Colombia, New Zealand, and Bangladesh have also granted legal personhood to ecosystems like rivers and forests [6].

The academic community has engaged in extensive discussion regarding the theoretical foundations and practical applications of the "Rights of Nature". Empirical research in this field primarily analyzes legislative and judicial practices to examine its application within various national legal systems and the challenges encountered in practice. For instance, studies indicate that in practice, the "Rights of Nature" face issues such as limited recognition of these rights [12], legal claims that deviate from the actual needs of nature [13], and a lack of relevant implementation mechanisms [11]. At the theoretical level, debates predominantly focus on the historical evolution of the "Rights of Nature", its core connotations, and the legitimacy of granting rights to nature. Among these, the question of "whether nature can hold rights" remains a subject of intense scholarly controversy.

Proponents of the "Rights of Nature" widely argue that anthropocentrism cannot fundamentally resolve the issues in the human-nature relationship [14]. They contend that the "Rights of Nature" breaks through the limitations of this traditional paradigm [15], offering an innovative approach to addressing the ecological crisis [11] and a more effective tool for environmental protection [16]. Furthermore, practices in countries like Ecuador have demonstrated the concept's operational feasibility. It not only enhances environmental outcomes but also opens up broader pathways for environmental justice within existing conservation measures [17].

Conversely, scholarly critiques of the "Rights of Nature" are as follows. First, some scholars, grounded in rights theory, argue that the "Rights of Nature" concept is incompatible with the reasonable theoretical explanation of the function of rights [13]. Some further point out that the concept of rights originates from the normative framework of liberalism and is typically associated with individual, conscious subjects. As a non-conscious entity, nature can neither exercise its will to claim rights nor undertake corresponding obligations. Granting it rights, therefore, not only directly contradicts the fundamental legal principle of the correlation of rights and obligations but also exceeds the scope of the current legal adjustment for a subject of right [18]. Second, given the competitive relationships inherent within ecosystems, some scholars question how priority would be determined among the rights of different natural entities if nature were granted rights, positing this as an intractable dilemma [19]. A more stringent critique warns that granting rights to nature without being able to balance the group rights with individual human rights of human beings could ultimately lead to accusations of environmental fascism [18]. Additionally, some scholars note that the model of sustainable development is meant to be anthropocentric, arguing that ecological protection should be based on safeguarding human freedoms and common interests. They maintain that advocating for granting rights to nature for its protection lacks robust ethical and legal support, rendering the concept practically meaningless [19].

As critics point out, directly granting rights to nature still faces numerous practical obstacles and does not readily align with the current predominantly anthropocentric logic of legal systems. Nevertheless, it is undeniable that the "Rights of Nature" concept holds significant, non-negligible potential for driving innovation within the framework of environmental protection law [20]. Its proposition that nature possesses "intrinsic value independent of human use or perception" provides a theoretical reference for advancing the transformation of environmental protection systems from pollution prevention and control toward proactive protection of ecosystem integrity.

Although the "Rights of Nature" concept has seen some practical applications in water environment-related fields, particularly in freshwater ecosystems such as rivers [7], its research and application in marine ecosystems remain relatively insufficient. However, since the Industrial Revolution, marine ecosystems have been facing severe challenges. The ongoing expansion of human terrestrial activities has led to land-based pollution replacing traditional vessel emissions as the primary driver of marine degradation.

At present, many countries, including China, still generally adopt to the anthropocentric paradigm in the field of controlling land-based marine pollution. This paradigm centers on pollution control as its primary objective, yet fails to recognize the holistic characteristics of marine ecosystems, which results in the failure to effectively curb the cumulative damage inflicted by land-based pollution on marine ecosystems. Given this, the present study proposes to integrate the core assertion of "respecting nature's intrinsic value" embedded in the "Rights of Nature" concept into the governance of Land-Based Marine Pollution (hereinafter referred to as LBMP). It aims to explore and construct a novel governance paradigm for LBMP, that fully respects the unique value of the ocean as a living organism and an ecosystem, with the purpose of more effectively alleviating the adverse effects exerted by land-based pollution on the marine environment.

## 2. Current State and Challenges in Governing Land-Based Marine Pollution

### *2.1. The Definition and Current Situation of Land-Based Marine Pollution*

What constitutes LBMP? The United Nations Convention on the Law of the Sea (hereinafter referred to as UNCLOS) defines it as pollution of the marine environment from land-based sources, including that discharged via rivers, estuaries, pipelines, and outfall structures (Article 207(1)). Article 94 of the Marine Environmental Protection Law of the People's Republic of China (hereinafter referred to as Marine Environment Protection Law) offers a definition for land-based pollutants, describing them as "pollutants discharged from land-based sources". A more rigorous definition is provided by the Montreal Guidelines for the Protection of the Marine Environment Against Pollution from Land-Based Sources (hereinafter referred to as Montreal Guidelines), adopted in 1985. The Montreal Guidelines define land-based pollutants as those generated by stationary or mobile public facilities, industrial or agricultural activities on land, and entering the marine environment through pathways such as direct discharge, outfall structures, coastal runoff, rivers, canals, other waterways, or atmospheric deposition. Furthermore, they categorize pollution originating from operational activities of stationary or mobile offshore facilities within areas under national jurisdiction as falling within the scope of LBMP [21]. Based on the definitions above, LBMP refers to contamination arising from pollutants such as household waste, industrial effluent discharged from factories, and chemical agents applied in farmland. These pollutants are generated by all human activities on land or from stationary and mobile offshore facilities within areas under national jurisdiction. They enter the ocean either through direct discharge from the coastline or via indirect release into rivers, canals, and other watercourses that ultimately flow into the sea.

A 1990 study by the Group of Experts on the Scientific Aspects of Marine Environmental Protection (hereinafter referred to as GESAMP) revealed that among the six categories of pollution listed in UNCLOS, direct land-based discharges accounted for 44%, while pollution from or through the atmosphere contributed 33%. Vessel-sourced pollution represented 12%, ocean dumping 10%, and seabed activities within national jurisdiction 1% [22]. Since most atmospherically deposited pollutants originate on land, combining this category with direct land-based discharges shows that nearly 80% of marine pollution can be classified as land-based. In a 2021 report, GESAMP also highlighted the severity of marine pollution caused by oil, organic compounds, metals, and radioactive waste, noting that the vast majority of these pollutants are land-sourced [23]. Monitoring data from China indicates that approximately 80% of the country's marine pollutants originate from land. Estuarine areas, such as the Yangtze River Estuary, Pearl River Estuary, and Hangzhou Bay, have become severely polluted zones in terms of seawater quality [24].

When land-based pollutants, particularly wastewater containing nutrients such as nitrogen, phosphorus, and potassium, as well as synthetic organic compounds, enter the ocean, they cause eutrophication and disrupt the balance of marine ecosystems. This pollution not only poses public health risks but also exerts multifaceted negative impacts on socioeconomic development. It can lead to direct economic losses through the decline of fisheries and damage to tourism, as well as the gradual erosion of associated marine cultural values [25]. Eutrophication stimulates abnormal proliferation of phytoplankton, leading to the settlement and decomposition of large quantities of oxygen-consuming organic matter. This process, in turn, causes marine hypoxia and can even create "dead zones". It not only disrupts the marine redox balance but also provides key conditions for red tides [26]. The combined effects of hypoxia and HABs

trigger large-scale fish mortality. Consequently, this leads to a significant decline in aquatic biodiversity [27], direct economic losses to fisheries, and long-term, irreversible damage to marine ecosystem services.

According to 2024 monitoring data from the Ministry of Natural Resources of the People's Republic of China, 66 red tides were recorded in Chinese coastal waters, covering a cumulative area of 11,731 square kilometers. Among these, 39 were harmful algal blooms (HABs), with a cumulative area of 5424 square kilometers. Compared to the average of the preceding decade, the frequency of red tides in 2024 increased by 15 events, and the cumulative area expanded by 5839 square kilometers [28]. If this trend continues, the expansion of marine hypoxic zones and red tides will no longer be occasional disasters but will become a recurrent and persistent feature of China's coastal environment.

Although current monitoring and research indicate that LBMP primarily affects the ecological environment of densely populated and industrialized coastal areas [29], the significant connectivity of marine ecosystems on a global scale means that ocean currents can transport pollutants such as nutrients, synthetic organic compounds, and heavy metals to the open sea and even polar regions within weeks to years. This transport leads to transregional ecological and environmental issues. Under the traditional governance paradigm, the ocean is treated as either an ownerless resource or an object of national jurisdiction. Constrained by this state-centrist dilemma, governance relies primarily on administrative prevention and control, as well as end-of-pipe treatment to manage LBMP. Within this context, the "Rights of Nature" concept, as an eco-centrism legal paradigm, offers a transformative alternative.

### *2.2. The Status of Land-Based Marine Pollution Prevention and Control in China*

At the central government level, China's 1974 Interim Regulations on the Prevention of Pollution in Coastal Waters of the People's Republic of China marked the first legal instrument addressing the prevention of coastal marine pollution. Following the reform and opening-up, the legal framework for marine environmental protection has been continuously improved. Among these laws, the Environmental Protection Law of the People's Republic of China is the fundamental law in China's environmental protection field. It establishes basic principles, institutions, and measures for pollution prevention, thereby laying the legal foundation for preventing and controlling LBMP. The Marine Environmental Protection Law, considering the unique and complex nature of marine ecosystems, provides specialized and detailed regulatory requirements for marine environmental protection. It serves as the pivotal legislation in this domain [30]. Chapter IV of this law is exclusively dedicated to the prevention and control of land-based pollutants. It stipulates specific regulations for managing coastal outfalls, controlling pollutant discharge, governing pollution in rivers that flow into the sea, and preventing marine litter pollution. This chapter not only provides direct legislative authority for controlling land-based pollution but also provides a legal framework for the formulation of supporting regulations, rules, and standards at both national and local levels. Moreover, the Water Pollution Prevention and Control Law of the People's Republic of China(hereinafter referred to as the Water Pollution Prevention and Control Law) primarily targets the prevention and control of water environmental pollution. However, some of its provisions also apply to the management of land-based pollutants entering the sea, establishing discharge standards and management measures for industrial wastewater, domestic sewage, and other effluents.

Simultaneously, to strengthen the guidance and regulation of LBMP prevention and control, the central government has formulated and issued a series of specific regulations, departmental rules, and normative documents. These include the Administrative Regulation on the Prevention and Control of Pollution Damages to the Marine Environment by Coastal Engineering Construction Projects of the People's Republic of China and the Administrative Regulation on the Prevention and Control of Pollution Damages to the Marine Environment by Land-based Pollutants (hereinafter referred to as the Land-based Pollutants Prevention and Control Regulations). These instruments provide more detailed provisions regarding the discharge, monitoring, management, and legal liability associated with land-based pollutants.

Regarding ecological codification, China is steadily advancing the process of codifying its ecological and environmental laws, having drafted the Draft Eco-environmental Code of the People's Republic of China(hereinafter referred to as Draft Eco-environmental Code). Part III of the Draft contains a dedicated chapter on water pollution prevention and control, while Chapter XII addresses the prevention and control of LBMP. However, the relevant provisions in these two parts show substantial overlap with articles in the Water Pollution Prevention and Control Law and Chapter IV of the Marine Environment Protection Law, with almost no substantive adjustments made.

At the local level, regional governments have introduced a series of local regulations, government rules, as well as supporting regulations based on the guidance and requirements of central laws and regulations, while also considering local conditions such as industrial characteristics and pollutant types. These regulatory instruments provide more

targeted and operational legal support for preventing and controlling land-based pollution entering the sea. For instance, to bridge the management gap between land and sea, strengthen the control of land-based pollution at its source, and achieve marine environmental governance goals, Shenzhen City has established an integrated land-sea approach to marine pollution governance and formulated detailed management plans based on zoning units [31].

Furthermore, China has established several institutional mechanisms to protect its marine ecological environment, including the pollutant discharge permit system, the total amount control system, the "Three Lines One Permit" system (hereinafter referred to as "TLOP" system), and the litigation relief mechanisms. The pollutant discharge permit system is a governance tool that manages dischargers through a licensing process to control the total quantity of pollutant emissions and ensure compliance with environmental protection standards [32]. It mandates that all entities discharging pollutants into the sea, such as enterprises, must obtain a discharge permit and adhere to the emission volumes and methods specified therein. Through this mechanism, the state can effectively control the total amount of pollutants entering the marine environment, thereby lessening the environmental impact.

The total amount control system is another key legal institution for preventing land-based pollution in China's maritime areas. It operates by setting a cap on total emissions, thereby controlling the overall amount of pollutants discharged from land into the sea and prompting local governments and enterprises to take measures to reduce emissions [33]. The "TLOP" system emphasizes an integrated land-sea approach to marine spatial planning. It establishes an ecological red line, an environmental quality baseline, a resource utilization upper limit, and an Environmental Access List [34]. This framework aims to achieve refined management and protection of the marine environment and enhance marine spatial governance.

Regarding the litigation relief mechanisms, China has established systems for ecological damage compensation litigation and environmental public interest litigation. In accordance with Article 58 of the Civil Procedure Law of the People's Republic of China, Article 25 of the Administrative Litigation Law of the People's Republic of China, and Article 114 of the Marine Environment Protection Law, the interested departments that conduct marine environment supervision and control are empowered to initiate marine ecological and environmental damage compensation lawsuits. Eligible social organizations and procuratorial organs are entitled to bring environmental civil public interest lawsuits, while procuratorial organs have the authority to initiate environmental administrative public interest lawsuits. These legal avenues aim to protect the marine ecological environment and maintain the health and sustainable development of marine ecosystems.

### *2.3. Challenges in China's Prevention and Control of Land-Based Marine Pollution*

Currently, China's efforts to prevent and control LBMP face multiple challenges within its legal framework, enforcement and penalty mechanisms, institutional coordination, and public participation.

First, the legal framework for preventing and controlling land-based pollution in China's maritime areas remains underdeveloped. Research on marine environmental protection and ecological issues in China began relatively late, leading to a lag in the development of supporting laws and regulations. Existing legal provisions are often overly general and lack specific implementing rules and regulations [35], creating difficulties in both law enforcement and compliance. The lower-level law, Land-based Pollutants Prevention and Control Regulations, has not been revised for nearly three decades. As a result, the core clauses defining pollutant categories, setting discharge standards, and outlining supervisory procedures now significantly deviate from the updated requirements of the higher-level law, the Marine Environment Protection Law [36]. They are also inconsistent with the provisions of the Draft Eco-environmental Code. This has created a structural contradiction where lower-level laws lag behind higher-level laws, making it difficult to coordinate and implement the relevant norms in practice.

Several pressing issues persist in the implementation of key systems, including the pollutant discharge permit system, the total amount control system, the "TLOP" system, and the litigation relief mechanisms. In the implementation of the pollutant discharge permit system, some enterprises lack sufficient attention to the content stipulated in the permits, failing to fulfill their obligations for licensed pollutant discharge. Concurrently, environmental authorities lack coordinated and thorough post-issuance oversight. As a result, some violations escape timely detection and correction by regulators [37]. In implementing the total amount control system, the absence of a comprehensive mechanism for calculating and allocating total pollutant discharge volumes for key sea areas in China has led to significant discrepancies between reported emission statistics and verified data in some regions [38]. These discrepancies make it difficult to establish definitive total emission ceilings for each maritime area, thereby undermining the scientific basis and rationality of the control targets [33]. Furthermore, the weak integration between

the total amount control system and the sewage permit system, coupled with the failure to effectively translate total amount control requirements to the enterprise level, hinders the system's practical effectiveness [39]. Regarding the "TLOP" system, implementation faces dual challenges. On the one hand, the enforcement of ecological-environmental zoning controls is weak in some areas, causing management requirements to be inadequately applied to specific projects and locations. Ambiguities in delineating and managing the ecological red line in certain regions have also left some ecologically sensitive areas and critical ecological function zones insufficiently protected. On the other hand, governmental management of resource utilization has upper limits lacks sufficient flexibility. This inflexibility makes it difficult to precisely align with the resource needs of diverse regions at different stages of development, potentially leading to either resource waste or impediments to development [40]. Regarding the litigation relief mechanisms, relevant litigation systems remain underdeveloped. In judicial practice, this underdevelopment has led to conflicts between the application of special laws and general laws, as well as jurisdictional disputes. These issues create significant obstacles for accepting and hearing cases, particularly those involving complex land-sea interactions [41].

Second, the enforcement mechanism for preventing and controlling land-based pollution in China's maritime areas is fragmented, and the deterrent effect of legal liability and penalty mechanisms is somewhat insufficient. Although the primary responsibility for coordinating land-based pollution control rests with the competent department of ecology and environment, other bodies, including departments for natural resources, fisheries, the military ecological and environmental protection, maritime management agencies, and the coast guard, also bear statutory responsibilities. In theory, this multi-agency governance model could form a comprehensive oversight network. In practice, however, the absence of efficient inter-departmental communication and collaboration mechanisms results in poor operational coordination. This failure to forge a unified enforcement front ultimately undermines the overall effectiveness of land-based pollution control [30]. Moreover, discrepancies in the legal bases and enforcement measures employed by different maritime law enforcement agencies further exacerbate inconsistencies in China's approach to marine environmental enforcement [35]. This issue, where multiple agencies hold legal mandates but lack effective coordination, not only reduces enforcement efficiency but can also lead to jurisdictional conflicts, thereby damaging the authority of the rule of law and public trust in the government.

Regarding penalties, although current Chinese regulations stipulate measures such as fines and daily penalties, the severity of punishment is significantly lighter compared to countries like the United States and Japan. Moreover, since the cost of non-compliance is substantially lower than the economic benefits gained by enterprises, it fails to effectively deter polluting entities, particularly large corporations. A case in point is the 2011 oil spill at the Penglai 19-3 oilfield in the Bohai Sea. The State Oceanic Administration (then the relevant regulatory body) imposed an administrative penalty of 200,000 RMB on the operator, ConocoPhillips China, pursuant to Article 85 of the Marine Environment Protection Law [42]. Compared to the oilfield's daily production revenue, this penalty was negligible and proved insufficient to deter the company. This problem of inadequate penalty severity not only undermines the deterrent effect of the law but may also encourage enterprises to neglect their environmental protection obligations and risk violating discharge regulations for potential high profits.

Third, the coordination mechanism between land-based and marine legal regimes remains inadequate. The prevention and control of pollution in surface water bodies such as rivers and canals in China are primarily governed by the Water Pollution Prevention and Control Law. However, discrepancies exist between the pollutant discharge stipulations in this law and those in the dedicated chapter on land-based pollutant control in the Marine Environment Protection Law. For instance, regarding standards for the discharge of radioactive materials, the Water Pollution Prevention and Control Law permits the discharge of wastewater containing low-level radioactive materials into surface water bodies, provided that national regulations and standards on radioactive pollution prevention are met [43]. In contrast, the Marine Environment Protection Law does not differentiate based on radioactivity levels but imposes a comprehensive prohibition on discharging any radioactive wastewater that may pollute the marine environment or damage marine ecosystems into sea areas [44].

Scientific research indicates that radioactive materials have a cumulative effect. Even if each discharge of low-level radioactive materials complies with national prevention regulations and standards, the continuous release of such substances into the environment leads to their gradual accumulation in specific areas. This accumulation causes the overall radioactivity level in these areas to persistently increase, eventually exceeding national standards [45]. In other words, when water bodies containing low-level radioactive materials are discharged in compliance with the Water Pollution Prevention and Control Law and converge into the sea via rivers, they may gradually elevate radioactive material concentrations in the marine environment, thereby posing a potential threat to marine ecosystems.

Furthermore, a unified pollution prevention coordination mechanism has not been established among the provinces and municipalities along China's river basins. LBMP control remains confined to jurisdictional management at points of entry into the sea. Since most land-based pollutants enter the marine environment through rivers, this current governance approach greatly weakens the overall effectiveness of land-based pollution prevention and control [46].

Fourth, public participation in the prevention and control of LBMP faces a dual dilemma of being both symbolic and marginalized. Firstly, existing laws and supporting regulations merely enunciate general principles regarding public participation, without establishing operational institutional rules regarding their scope, procedural pathways, or feedback mechanisms. This lack of procedural support prevents the substantive implementation of public participation. Secondly, at the practical level, although relevant government departments and enterprises widely adopt participation methods such as hearings and public notices, issues including inadequate information disclosure and high professional barriers remain. These problems tend to reduce public participation to a procedural formality [47], with limited substantive impact on decision-making. Thirdly, China's development of the marine environmental rule of law started relatively late, and limited resources have been allocated for public legal education on marine environmental protection. This has resulted in low public awareness of the risks associated with LBMP. Simultaneously, the absence of incentive mechanisms and safeguard measures to enhance public enthusiasm and effectiveness in participation has led to generally low levels of public engagement in marine environmental protection.

## 3. Reconstruction of Land-Based Marine Pollution Governance under the "Rights of Nature" Concept

### *3.1. A Nature-Friendly Paradigm for Land-Based Marine Pollution Governance*

The natural law school regarded the ocean as *res nullius* (ownerless property) or a co-owned property, emphasizing its role as a resource for human utilization. It posited the ocean as the common property of all humanity, from which people derived usufructuary rights such as freedom of navigation, fishing, and seabed mineral extraction [48]. After the Industrial Revolution, however, human activities escalated, drastically increasing the pollutant load on oceans and pushing the marine self-purification capacity beyond its threshold, thereby compromising the ecosystem's inherent self-restorative capabilities. This has triggered severe ecological degradation, including impaired marine ecological functions and resource depletion.

Confronted with this growing marine ecological crisis, the international community has begun to re-examine the relationship between humanity and the ocean. Within this context, the proposition of "Rights of Nature" has prompted profound reflection on how humans utilize and protect marine resources. From this perspective, the ocean is transitioning from a traditional object of resource exploitation to a subject of right with legal personhood. In other words, the ocean is being redefined as a subject of right, an entity with intrinsic worth, holding rights such as the right to subsistence, reproduction, and maintenance of ecological balance. It is no longer merely an object for human exploitation but an indivisible living whole, comprising physical and ecological components like the water body, seabed, submarine topography, plankton, and benthic communities. This complex entity possesses intrinsic value independent of human needs.

Currently, China's existing institutional framework for preventing and controlling LBMP remains dominated by the anthropocentric paradigm. Its core logic is to protect the marine environment by regulating human behavior. When confronting pollution incidents, the system tends to prioritize compensation for damages over ecological restoration. In other words, it largely focuses on avoiding and mitigating new environmental impacts rather than remediating past ones. Consequently, the anthropocentrism embedded within China's current system is fundamentally distinct from the "Rights of Nature" concept, which emphasizes the independent value and rights of nature itself. Directly introducing "Rights of Nature" into China's existing framework would likely cause significant disruption to its legal and managerial structures, potentially leading to operational chaos and implementation difficulties. In light of this, China could, in the process of developing its LBMP governance paradigm, begin by integrating the core ethical proposition from the "Rights of Nature" concept: that nature possesses intrinsic value independent of human use or perception [49]. The aim is to leverage this concept to diminish the perception of the ocean as a mere appendage to human activities. By recognizing and respecting the distinctive value of the ocean as a living entity and ecosystem on a conceptual level, China can progressively shape a more eco-friendly LBMP governance paradigm that is fundamentally guided by respect for nature's intrinsic worth.

The nature-friendly paradigm for LBMP governance emphasizes the integrity of the marine ecosystem. It aims to translate the principles of respecting nature's self-regulating mechanisms and intrinsic value into concrete and feasible institutions. Under this paradigm, human activities impacting the ocean should be measured and constrained by the

overall health and inherent laws of the ecosystem. Consequently, the governance system should focus on maintaining the intrinsic balance and self-restorative capacity of the marine ecosystem, compelling humans to consider not only their own interests but also respect the value of the ocean itself and its constituent elements [50]. Specifically, during policy formulation, marine development activities, and pollutant discharge, states, enterprises, social organizations, and even individuals must fully account for the ocean's self-restorative capacity and the complex interconnections among its functional components. This necessitates balancing the ocean's own needs for subsistence, reproduction, and ecological equilibrium, thereby shifting greater focus towards effectively restoring and protecting the structure and function of marine ecosystems to ensure their ability to self-sustain and self-evolve.

The absence of a comprehensive marine assessment has led to a failure to fully account for the long-term, multifaceted benefits of a healthy ocean and its significant contributions to human society, directly exacerbating marine pollution and severely threatening the health and sustainable development of marine ecosystems [51]. From the perspective of an environment-friendly governance paradigm for LBMP, measures should not focus solely on reducing the quantity or scale of pollutant discharges. Instead, they must systematically and comprehensively address the multidimensional impacts of land-based activities on the marine environment. This requires that all measures be grounded in an understanding of the marine ecosystem as an integral whole, vigorously safeguarding its integrity and continuity, and facilitating the restoration of ecosystem functions through initiatives such as ecological rehabilitation.

### *3.2. Proposals for Reconstructing China's Land-Based Marine Pollution Governance*

On one hand, the marine ecosystem requires systematic governance, for which ecological restoration represents the optimal approach [52]. Currently, however, China's management of LBMP remains predominantly focused on controlling pollution sources and implementing end-of-pipe treatment measures. This governance model often overlooks the intrinsic interconnections and interactions within the marine ecosystem as a complex and dynamic whole. On the other hand, as evidenced by the earlier analysis of challenges in China's LBMP control, the relevant institutional framework remains underdeveloped. Therefore, China could reconstruct its current governance paradigm by prioritizing the following aspects to uphold the integrity of the marine ecosystem.

First, a systematic institutional framework for preventing and controlling LBMP should be established. Significant deficiencies persist in China's current regulatory framework for marine environmental protection. Improvements should focus on optimizing the legal system, strengthening the intensity of marine environmental regulations, and enhancing provisions for ecological restoration and conservation.

To optimize the legal framework, China should revise the Land-based Pollutants Prevention and Control Regulations to ensure its clauses are fully aligned with the Marine Environment Protection Law, thereby eliminating legislative conflicts and guaranteeing internal consistency within the legal system. Concurrently, a thorough review should be conducted to reconcile differences in emission standards and regulatory measures for land-based pollutants between the Water Pollution Prevention and Control Law and the Marine Environment Protection Law. This will establish effective coordination mechanisms between different regulatory regimes to prevent legal conflicts and regulatory loopholes.

Regarding institutional strengthening, existing research indicates an inverted U-shaped relationship between environmental regulation and LBMP [53]. Specifically, once regulatory intensity surpasses a certain threshold, the extent of LBMP shows a sustained decline. For effectively governing LBMP, clearly defining pollutant categories, establishing scientifically sound emission standards, and implementing rigorous supervisory procedures remain crucial for ensuring the protection and preservation of marine ecosystems. Therefore, China should further refine its legal and regulatory framework for preventing and controlling LBMP. On one hand, more detailed implementing rules should be formulated to enhance the operability of relevant laws and regulations, providing a solid foundation for the implementation of higher-level laws and a legal basis for marine ecological protection. On the other hand, comprehensive provisions for ecological restoration should be established to achieve long-term and fundamental protection of the marine ecological environment.

Second, comprehensive treatment measures are urgently needed to address LBMP. The ocean is a continuous and indivisible whole, making an integrated land-sea governance strategy crucial for preventing and controlling such pollution [54]. Given that LBMP spans two distinct governance spheres—terrestrial and marine—it is of paramount practical importance and necessity to break away from the traditional fragmented governance approach that separates land and sea management. It is essential to establish a holistic, integrated land-sea mindset [55], strengthen inter-departmental collaboration, and enhance the intensity of enforcement and supervision. To tackle the pronounced

fragmentation within the enforcement mechanism, a key challenge in the current legal framework for controlling LBMP, China could establish a joint enforcement mechanism led by the competent department of ecology and environment. This mechanism should incorporate multiple stakeholders, including departments responsible for natural resources and fisheries, the military ecological and environmental protection department, maritime management agencies, and the coast guard. Their respective responsibilities should be clearly defined through regulations and the Official Document (with red header), improving communication and coordination among departments to form an efficient and cohesive supervisory force. This will provide robust institutional support for the protection of marine ecosystems.

Furthermore, given the integrity and continuity of marine ecosystems and the distinctive cross-jurisdictional nature of LBMP, which involves both land and sea, China should enhance its integrated land-sea ecological environment monitoring system and establish a unified coordination mechanism for pollution prevention across river basins and sea areas. This will better address the complexity and challenges of cross-jurisdictional governance of LBMP. At present, the governance of land-based pollutants in China still features the phenomenon that law enforcement and supervision rely solely on the marine authorities at the river estuaries [46]. Given that most river basins in China traverse multiple provincial-level administrative regions, the existing governance model often leads to insufficient implementation of LBMP prevention and control measures by provinces located away from the major points of entry into the sea. This makes it difficult to establish a comprehensive, end-to-end pollution prevention system, thereby limiting the overall effectiveness of LBMP control efforts.

In response, China should place a strengthened emphasis on the responsibility and obligation fulfillment of various river basin regions in preventing and controlling LBMP, constructing a comprehensive, full-process supervision system that tracks pollutants from their sources to their points of entry into the sea. Building upon this foundation, it is crucial to establish and improve relevant enforcement supervision mechanisms, strengthen routine oversight and inspection of enforcement activities, and ensure the fairness and legality of law enforcement actions. Simultaneously, a powerful deterrent for enterprises can be created by increasing the severity of penalties for illegal discharge activities and substantially raising the cost of non-compliance. This will effectively curb illegal discharge behavior and provide long-term protection for the marine ecological environment.

Third, a key distinction between environmental protection under the “Rights of Nature” perspective and that under traditional environmental law lies in the fact that, within the “Rights of Nature” framework, nature is granted independent legal status and litigant qualification. This theoretically enables it to autonomously defend its legitimate rights and interests through legal channels such as lawsuits [56]. However, in practical application, since nature inherently lacks the ability to directly exercise these rights, it necessitates the appointment of agents to act on its behalf. For instance, New Zealand’s Te Awa Tupua (Whanganui River Claims Settlement) Act, which grants legal personhood to the Whanganui River, explicitly stipulates in Article 14 that “the rights, powers, and duties of Te Awa Tupua (Whanganui River) must be exercised or performed by Te Pou Tupua (the legal guardians appointed to represent the interests of the River) on behalf of, and in the name of, Te Awa Tupua”. The guardians are required to act exclusively for the purpose of advancing the “health and well-being” of the River [57] and hold the right of veto or the right of conditional approval over any extraction of water, damming, discharge, dredging of navigation channels, or riparian development that could potentially affect the life force of the River [58]. This agency mechanism shares functional and purposive similarities with China’s existing environmental public interest litigation system, despite differences in their theoretical foundations and specific implementation modalities.

Under China’s current litigation system, when marine ecology is damaged, the interested departments that conduct marine environment supervision and control are entitled to file claims for marine ecological environment damage compensation in accordance with the law. Eligible social organizations and procuratorial organs are also entitled to initiate environmental public interest litigation to protect the marine ecological environment. However, in judicial practice, both marine ecological environment damage compensation litigation and environmental public interest litigation often encounter challenges in proving the status of ecological damage and the causal link with the polluting activities. This is due to the complex and variable nature of the marine environment and the current limitations of scientific technology [58]. Regarding ecological restoration, China faces the dual challenges of legislative delays and underdeveloped supporting systems. The legal provisions concerning ecological restoration in China’s current laws are relatively broad and vague. There is a lack of clear and specific stipulations on key aspects such as restoration standards, forms of liability fulfillment, the rights and obligations of various parties during the restoration process, and standards for evaluating restoration effectiveness [59]. Supporting mechanisms crucial to ecological restoration, such as the supervision and management system for assessment and identification, and the monitoring and evaluation system for restoration, remain inadequate and require further optimization [60].

To address this, China could further refine the evidence collection mechanisms in judicial practice and strengthen scientific and technological support. This would enhance the capacity to prove the status of ecological damage and its causal relationship with polluting activities. During specific case adjudication, reference could be made to the judicial criteria developed by Ecuadorian courts for adjudicating violations of the "Rights of Nature". This encompasses three criteria: acts that cause substantial harm to the integrity of the ecosystem, acts where the state or the actor fails to adequately fulfill their obligations of prevention and supervision, and acts that artificially alter the natural succession process of the ecosystem, thereby damaging its restorative capacity [61,62]. By considering these criteria in light of the unique characteristics of China's marine ecological environment, relevant existing legal provisions could be improved, or corresponding judicial interpretations could be formulated to promote the more effective functioning of litigation relief mechanisms. For instance, the criteria in China's existing judicial precedents are often targeted at specific acts of ecological damage, focusing on the identification and compensation for direct ecological damage [63]. In contrast, the criterion of "acts that cause substantial harm to the integrity of the ecosystem" places greater emphasis on holism. It considers not only the damage caused by pollution to individual ecological elements but also the interrelationships among various components within the ecosystem and their impact on its overall functions. This approach enables a more comprehensive coverage of diverse types of ecological damage.

In the aspect of ecological restoration, to facilitate the accurate implementation of restoration measures and enable the effective recovery of ecosystem functions, China could improve legislation related to ecological restoration. This includes clarifying restoration standards and forms of liability fulfillment, refining detailed implementation rules for ecological restoration, and developing robust supporting mechanisms, such as ecological restoration assessment, as well as restoration monitoring and evaluation.

Fourthly, enhancing public awareness of the importance of marine ecosystems and the need for their protection is a crucial link in strengthening marine environmental conservation and ensuring ecological restoration [64]. The public is not only a beneficiary of the development and utilization of marine resources but also a guardian of marine ecological rights. Moreover, as LBMP is closely connected to individual behavior, elevating public recognition and respect for the intrinsic value of marine ecosystems is key to advancing marine ecological and environmental protection.

To this end, China can adopt effective measures from two dimensions to enhance public initiative in participating in LBMP prevention and control. First, China should intensify publicity and education on marine environmental protection. By leveraging diverse communication channels to disseminate marine ecological knowledge, public understanding of the hazards of LBMP can be heightened. Efforts should guide the public to abandon the narrow perception of the ocean as a mere accessory to human activities and instead recognize it as an integral and complex ecosystem with intrinsic value independent of human needs. Concurrently, the public should be encouraged to actively engage in LBMP prevention and control, aligning their cognitive awareness with practical actions to endorse and actively practice marine ecosystem protection. Second, China needs to establish and improve public participation mechanisms. This entails formulating specific implementation rules that clarify core elements, including the scope of public involvement in LBMP prevention and control, procedural pathways, and feedback mechanisms. These measures will provide a clear, standardized, and operable institutional framework for public engagement.

## 4. Conclusions

The traditional LBMP governance model has long been dominated by anthropocentrism. Influenced by this concept, China's approach has primarily relied on administrative regulation and the polluter pays principle. However, practice has demonstrated that this model struggles to fundamentally resolve LBMP issues, and marine ecosystems continue to face significant pressure. Against this backdrop, the concept of "Rights of Nature" offers a new perspective for marine ecological protection. Currently, more than 30 countries worldwide have introduced this concept through constitutional amendments, judicial rulings, treaties and agreements, local laws, or resolutions [51]. The concept of "Rights of Nature" emphasizes respect for the intrinsic value of marine ecosystems, prompting a re-evaluation of the relationship between humans and the ocean. It aims to fundamentally shift human perceptions and behavioral patterns towards the ocean, thereby advancing marine environmental protection from passive governance to proactive conservation. However, transitioning LBMP governance from the traditional anthropocentric approach to an ecocentrism perspective under the "Rights of Nature" framework is a gradual and protracted process.

China's current regulatory framework for preventing and controlling LBMP remains predominantly anthropocentric and faces substantial challenges across multiple critical areas, including its legal infrastructure, enforcement mechanisms, remedial schemes, and public engagement. Within the legal system, the framework lacks

seamless integration between different regulatory instruments, leading to conflicts across various laws and regulations. This inconsistency impedes the establishment of unified standards in practical governance, creates significant obstacles for enforcement authorities, and substantially undermines the authority of the law. Regarding enforcement mechanisms, fragmented oversight is a pronounced issue. The absence of effective inter-departmental coordination and collaboration hinders the formation of a strong, unified regulatory front, resulting in delayed and inadequate deterrence and penalties for certain polluting activities. Furthermore, insufficient public participation represents another pressing concern. Social forces remain underutilized, with low levels of public awareness and engagement in LBMP governance, accompanied by a lack of initiative and a sense of responsibility for active involvement. These factors significantly constrain the overall effectiveness of LBMP control efforts.

Therefore, guided by the concept of "Rights of Nature", China should progressively diminish the influence of anthropocentrism at this stage. At the conceptual level, there should be recognition of and respect for the distinctive value of the ocean as a living entity and ecosystem. The principles of respecting the inherent laws governing nature's autonomous functioning and its intrinsic value should be translated into concrete and feasible legal institutions, thereby establishing an eco-friendly governance paradigm for LBMP. Specifically, governance measures should not focus solely on reducing the volume or scale of pollutant discharges. Instead, they must regard the marine ecosystem as an integral whole, strengthen institutions related to ecological restoration, and facilitate the recovery of marine ecosystem functions, thereby safeguarding the integrity and continuity of the marine ecosystem.

First, China should establish and improve the institutional framework for preventing and controlling LBMP. This involves a systematic review and consolidation of existing laws and regulations to eliminate conflicts and inconsistencies among them. Furthermore, it is crucial to build a robust ecological restoration system to provide long-term and fundamental protection for the marine ecological environment. Second, China should break away from the traditional model of separate land-sea governance and adopt a holistic, integrated land-sea management approach. Concurrently, inter-departmental communication, coordination, and collaboration must be strengthened to form an efficient and unified regulatory force. Additionally, increasing the cost of violations will help deter illegal discharge activities, thereby achieving long-term protection of the marine ecological environment. Third, China should enhance judicial relief mechanisms. On the one hand, the capacity to prove the status of ecological damage and its causal link to polluting activities should be improved. On the other hand, detailed implementation rules concerning ecological restoration should be formulated, and supporting mechanisms, such as ecological restoration assessment, as well as restoration monitoring and evaluation, need to be strengthened. These measures are essential to facilitate the effective recovery of ecosystem functions. Fourth, public participation should be strengthened. Efforts must be made to raise public awareness of the hazards of LBMP and foster recognition of the ocean's intrinsic value, which exists independently of human needs. Ultimately, these efforts will enhance public environmental awareness and responsibility, paving the way for broad societal participation and co-governance.

## Statement of the Use of Generative AI and AI-Assisted Technologies in the Writing Process

During the preparation of this study, the author only used ChatGPT and DeepL in order to assist in translating sentences and improve language. After using this tool, the author reviewed and edited the content as needed and take full responsibility for the content of the publication.

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## Author Contributions

Writing–Original Draft Preparation, Writing–Review & Editing, K.W.; Supervision, Project Administration, Funding Acquisition, H.D. Both authors have read and agreed to the published version of the manuscript.

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Not applicable.

## Informed Consent Statement

Not applicable.

## Data Availability Statement

This study didn't generate any new datasets. All data analyzed are from publicly available sources, as cited in the manuscript.

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## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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