

Improvement of Ecological Environment Management in Fishery Waters

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Abstract: With the deepening of the development concept of ecological priority, the ecological environment management of fishery waters has become the primary issue of modern fishery development. Starting with the concept of ecological environment of fishery waters and the benefits of protection law, this paper sums up the current legal situation of China's fishery waters. China's fishery legal system is a top-down management model, which mainly protects the ecological environment of fishery waters through administrative management. Based on the actual management, this paper summarizes the problems of fishery resource security, pollution control, biological resource conservation, and puts forward some legal suggestions. It is suggested to introduce welfare governance into the governance concept and pay attention to the livelihood of fishermen. In terms of system improvement, administrative departments should strengthen special law enforcement in key areas, improve joint law enforcement mechanisms, improve law enforcement capacity, and optimize supervision mechanisms. From the perspective of grassroots governance, this paper proposes that expanding the participation of the masses and social organizations is of positive significance to the management of ecological environment.

1. Introduction

Under the development concept of harmonious coexistence between man and nature, economic development and industrial development at the cost of ecological environment have run counter to the demands of the time. Protecting the ecological red line and solving prominent problems in the field of ecological environment of fishery waters have been important measures to comply with the modernization of fisheries. Under the guidance of the goal of fully realizing rural revitalization and building an agricultural power, promoting the high-quality development of fisheries and building a diversified food supply system are important parts of the overall work layout. Faced with the global food crisis, China is inevitably affected by the severe food security situation in the world. Reaching out to the sea for food is a feasible way to meet the national food supply and maintain the national food security. However, the consequent pressure on the ecological environment of fishery waters has become increasingly prominent. According to the monitoring report issued by the Marine

Ecological Environment Bulletin in 2022, the water monitoring results of China's important Marine natural fishery waters, important seawater aquaculture areas, and national aquatic germplasm resource reserves all show varying degrees of exceeding the standard. As far as the water quality of fishery waters is concerned, it is necessary to steadily improve the water quality at the existing level to achieve sustainable management and protection of the ecological environment of fishery waters. Making full use of the existing ecological environmental protection laws and regulations, focusing on improving the ecological environmental management system of fishery waters, and improving the ecological environmental management capacity of fishery waters are undoubtedly the top priority of the current development of the fishery industry and the protection of fishery waters.

2. The concept of ecological environment in fishery waters and the present legal system.

2.1 Definition and legal interests

The latest revision of the Marine Environmental Protection Law of the People's Republic of China defines the concept of fishery waters as "spawning grounds, feeding grounds, wintering grounds, migration channels and aquaculture grounds for fish, shrimp, crabs, shellfish and other aquatic animals and plants". The demarcation of fishery waters serves the realistic needs of fishery production, in order to achieve the purpose of fishery multiplication, fishery capture, and sustainable fishery production. China's fishery waters are mainly distributed into the Yellow and Bohai Sea areas, the East Sea area, the South Sea area and other Marine fishery areas, and some freshwater fishery areas. Marine fishery waters include natural Marine fishery waters, important seawater aquaculture areas, key protected aquatic habitats and aquatic germplasm resources reserves.

Ecological environment is an environment composed of ecological relations, which must be closely related to human activities. Therefore, the ecological environment of fishery waters is concerned with the impact of human production and life on the ecological relationship of fishery waters, and the legal interests of its protection mainly include three categories. The first category is the national fishery management system. The subject of fishery production activities that conduct illegal fishing and other fishery activities in violation of the State fishery management system should be punished according to law. The second category is biodiversity of fishery waters. The biological factors affected by fishery activities in the ecological environment of fishery waters include both fishery resources themselves and aquatic wild animals and plants inhabiting the fishery waters. It is of great importance to maintain the biodiversity of fishery waters. The third category is protection of the water environment in fishery waters. It is mainly reflected in the prevention and control of pollution in fishery waters. The most direct harm brought by human activities to the ecological environment of fishery waters is the pollution of fishery waters, which leads to the deterioration of the water quality of fishery waters and increases the pressure of water environment self-purification. Therefore, the water quality monitoring of fishery waters has become one of the important management measures for the protection of the ecological environment of fishery waters.

2.2 The present legal system in fishery waters

The first part of the present legal system in fishery waters is legal provisions on the development of fishery industry. The relevant laws and regulations on the development of fishery industry are mainly to regulate the fishery production activities and the exploitation and utilization of fishery resources. China's fishery management focuses on the government control mode, and the fishery legal system tends to be a regulatory system.[1]The Fishery Law of the People's Republic of China provides for unified management of fishery activities, including administration of fishery

administration and port affairs, protection of the legitimate rights and interests of fishery producers, research on fishery science and technology, and investigation of fishery resources. Fishery activities are inseparable from fishery waters, and the management of fishery activities is bound to contain the management of ecological environment of fishery waters. Relevant ecological environmental protection laws include the Marine Environmental Protection Law, the Environmental Protection Law of the People's Republic of China, and the Water Law of the People's Republic of China. It is the functional characteristic of the supervisory system to exert powers of the administrative organs and realize the top-down management of the ecological environment of fishery waters. The Marine Environment Protection Law, amended in 2023, builds on the existing achievements of the reform of state institutions, and specifically implements the responsibilities of Marine environment management to various administrative bodies. The ecological environment department under The State Council is responsible for the management of the Marine environment throughout the country. The department in charge of natural resources under The State Council is responsible for the administration of Marine protection, development and utilization and the restoration of Marine ecology throughout the country. The competent department of fishery under The State Council is responsible for the protection of the ecological environment of fishery waters and the investigation and handling of some fishery pollution accidents. All administrative departments embody the concept of collaborative governance when dealing with cases involving the ecological environment of fishery waters, and exert their respective powers and responsibilities for the management of the Marine environment within the scope of responsibilities prescribed by law.

The second part of the present legal system in fishery waters is general water environmental management system applicable to fishery waters. As a sub-concept of water environment, the general water environment protection and management system is also applicable to the supervision and management of fishery water environment. The general water environmental protection and management system focuses on the management system of water environmental pollution, which mainly has the following three representative systems. First, the water pollutant discharge standard system. The administrative departments shall formulate the national standards for water environment quality in accordance with the Law of the People's Republic of China on the Prevention and Control of Water Pollution, and on this basis formulate the national standards for the discharge of water pollutants. By passing the record, the local administrative departments may formulate and implement the standards for the discharge of water pollutants not lower than the national standards on the basis of the filing and adoption. Second, the pollutant discharge charging system. Pollutant discharge charging system is to reduce pollutant discharge and protect the ecological environment by levying environmental protection tax on business entities who discharge pollutants into the environment. Third, the simultaneous system of water pollution control facilities. This system is aimed at the pollution prevention of engineering construction projects. Under the premise of passing the environmental impact assessment in accordance with the law, environmental protection facilities are required to be designed, constructed and put into operation at the same time as the main project, so as to ensure that the pollution problems that may or actually caused by the construction of the project can be prevented and controlled.

The third part of the present legal system in fishery waters is specialized legal system for ecological environment management of fishery waters. The frequent human activities in fishery waters make their ecological environment more fragile than the general water environment. While the terminal of the flow of fishery products is people's table. The importance of food safety and citizens' right to health has given birth to four types of legal systems with special characteristics in the ecological environment management of fishery waters, aiming to solve the ecological environment problems in fishery waters. First, the environmental monitoring and evaluation system of fishery waters. The Marine Environment Protection Law aims to build a comprehensive,

coordinated and normalized monitoring system for the environment of Marine fishery waters, and link the monitoring results with environmental assessment, so as to include the ecologically fragile waters into the key protection category and ensure regular ecological environmental assessment. Second, fisheries water quality standard system. The State has formulated fishery water quality standards for the purpose of preventing and controlling pollution in Marine and freshwater fishery waters, focusing on the supervision of pollutant discharge and the establishment of sewage outlets, so as to ensure that the water quality of fishery waters meets the standards and does not affect the production and reproduction of aquatic products. Third, the investigation and treatment of pollution accidents in fishery waters and the compensation system for pollution damage. In the case of pollution to the Marine ecological environment caused by non-military vessels and fishery vessels in fishery waters, the competent fishery department under The State Council exerts the power of supervision and administration over such pollution accidents according to law. Fourth, the legal liability for damage to the ecological environment of fishery waters. The main basis for investigating the administrative responsibility for ecological environmental damage in fishery waters is the Marine Environment Protection Law and the Water Pollution Prevention Law. If damage is caused to the rights and interests of others at the same time, it should be responsible for civil damages. If the damage to the ecological environment of fishery waters reaches the standard of constituting an environmental crime, criminal responsibility should be investigated according to law. In judicial practice, environmental civil public interest litigation cases have identified the ecological damage responsibility of the subject to liability responsible for the whole chain of fishing, trafficking and sales.[2]

3. Problems of the ecological environment of fishery waters

3.1 The security of fishery resources is threatened

China is a major producer of aquatic products. Under the guidance of the strategic goal of building a maritime power, fishery production, as a traditional industry, plays an important role in the development of Marine economy. Data from the China Fishery Statistical Yearbook in 2023 show that the output value of China's fishery industry, including aquaculture and fishing, reached 1526.7 billion yuan last year, and the national output of aquatic products reached 68.65 million tons. The increasing demand for aquatic products and modern fishing capacity correspond to the decline of fishery resources in fishery waters. Through the formulation and revision of fishery laws and regulations and policy adjustment, China has delimited fishing periods and prohibited zones, implemented fishing quota policies and summer fishing ban, and made certain achievements in shifting to a conservation-oriented fishery system and reducing the decline of fishery resources. For example, after the summer fishing moratorium was implemented in the northern continental fishery of the South China Sea in 2016, the fishery resources of the fishery fishery increased comprehensively, the fishery resource structure was further optimized, and the fishing production efficiency was effectively improved.[3] In this context, the problem of excessive fishing capacity gradually emerged. Driven by economic interests, illegal fishing has become a continuous threat to the security of fishery resources.

The regulations on the protection of fishery resources restrict the fishing time, fishing space, fishing tools and methods, etc. Illegal fishing is a violation of the relevant provisions on the protection of fishery resources, fishing in the forbidden period, prohibited fishing areas, or the use of prohibited tools and methods to catch aquatic products. In China's representative fishery waters, the state has adopted measures to protect fishery resources in key waters by means of legislation. The Yangtze River Protection Law of the People's Republic of China implements strict fishing management in the Yangtze River basin, and prohibits productive fishing in the aquatic life reserves

of the Yangtze River Basin. The Yellow River Protection Law of the People's Republic of China prohibits the productive fishing of natural fishery resources in the key waters of the Yellow River Basin. Even under the conditions of increased enforcement of the ban on fishing, illegal fishing cases are still repeatedly emerged. In 2023, the Supreme People's Procuratorate issued six typical cases of illegal fishing of aquatic products, including professional gangs, forming an illegal fishing industry chain, involving a maximum amount of more than 30 million yuan, resulting in serious losses of aquatic living resources. In the cases of offshore illegal fishing from 2018 to 2022, the study found that trawling and electric fishing have become the main operating methods of illegal fishing subjects due to their high returns, efficient and convenient, and easy operation, which will cause damage to the aquatic ecosystem in all aspects.[4] Fishermen's consciousness makes them lack of understanding of the cognition of illegal fishing. As long as there is a chain of interests between fishermen, buyers and sellers, illegal fishing will bring continuous threats to the security of fishery resources.

3.2 Difficulty in controlling the ecological environment pollution of fishery waters

There are many sources of pollution in fishery waters. The first type of fishery water pollution source is wastewater discharge. For a long time, the waste generated by human is finally dispelled by the independent purification of the natural environment. The domestic wastewater and industrial wastewater generated by human beings enter rivers and oceans through sewage outlets, and the chemicals, heavy metal elements and suspended solids in them cause serious pollution to fishery waters. Dumping is the source of pollution with the largest proportion in fishery waters and even the overall water environment. The second type of fishery water pollution source is the pollution produced by fishery production activities. As the aquaculture industry is concerned, the waste generated by the construction of aquaculture facilities, the metabolites of aquaculture itself, the feed required for aquaculture, and veterinary drugs and other chemicals will lead to the pollution of fishery waters. Although the ocean has a certain self-purification ability, when the pollution generated by large-scale aquaculture activities exceeds the environmental carrying capacity of the corresponding fishery water area, the ecosystem balance of this fishery water area will be broken. The third type of fishery water pollution source is the pollution generated by the accident. Common pollution accidents in fishery waters mainly include oil spill accidents, pollution accidents caused by engineering construction projects and pollution accidents caused by risky operations of ships, etc. Compared with the first two types of continuous pollution, accident pollution is sudden and explosive, and its pollution control requires higher timeliness.

It is difficult to take full control of the pollution of fishery waters. First of all, the extensive sources of pollution show the inevitability and persistence of pollution in fishery waters. As long as human beings are engaged in production and life, pollution control will inevitably become a long-term problem to be solved. Ecological environmental pollution is a process from quantitative change to qualitative change, and the accumulation of pollution in fishery waters may result in the destruction of local ecological environment and permanent function damage. Secondly, the fishery waters are not a closed space environment, and the flow of the waters will make the pollution of the fishery waters spread continuously with the water cycle. Monitoring and identification of real-time pollution in open waters is a heavy workload, high technical requirements and all-weather task for the ecological environment management department. Obtaining accurate environmental monitoring and assessment results can provide basic data for pollution control in fishery waters. Finally, pollution control should not only restore the ecological environment, but also strictly monitor human pollution activities. In order to evade the supervision of law enforcement departments, the implementation of illegal pollutant discharge is often concealed, which increases

the difficulty of law enforcement personnel in on-the-spot investigation and evidence collection.

3.3 Conservation of fishery waters living resources is urgent

Biological factors are innegligible part of ecological environment. Fishery aquatic products are not only human consumer goods, but also a part of the food chain in nature. Fishery aquatic products and aquatic animals and plants jointly maintain the ecological balance of fishery waters. Large-scale aquaculture in fishery production artificially promotes the reproduction of some aquatic species, which will squeeze the living space of other aquatic wildlife. The fishing industry catches a large amount of a certain aquatic species in a short period of time, which may lead to the imbalance of food supply and demand of aquatic organisms in the food chain adjacent to the water area, and bring about a crisis to the survival of the relevant biological populations. Frequent human activities in fishery waters will also worsen the living environment of fishery waters. Physical pollution such as thermal pollution, noise pollution and light pollution will destroy the original natural conditions of fishery waters, which is difficult for the vulnerable and sensitive biological populations to adapt to. Legislation on biodiversity protection in key waters still needs to be improved. The Criminal Law imposes penalties on intentional offenders who illegally hunt and kill precious and endangered wildlife, but lacks provisions on the circumstances of negligent harm.[5] For example, the navigation noise of medium and large ships in the Yangtze River will affect the positioning ability of the Yangtze River finless porpoise due to the damage of the sonar system, resulting in casualties and collisions with ships. The blasting operation in the construction of water conservancy project will accidentally injure aquatic organisms.[6] There are more than 400 species of fish in the Yangtze River basin, about a quarter of which are listed in the Red Book of Endangered Animals in China.[7] It can be seen that the conservation of aquatic living resources in key waters is imminent. The "Guiding Opinions on Strengthening the Conservation of Aquatic Living Resources" issued by the Ministry of Agriculture and Rural Affairs has taken the establishment of fishery resources conservation and management system as an important task and main goal of China's ecological civilization construction.

4. Suggestions on improving ecological environment management of fishery waters

4.1 Ensure the livelihood transformation of fishermen in prohibited fishing areas

The current mainstream development concept advocates the harmonious coexistence of man and nature, and the root of the contradiction in the management of fishery waters can also be traced to the contradiction between the development needs of human fishery activities and the balance of the ecological environment. If we want to solve the contradictions in a targeted way, we can start from the needs of interest body. The implementation of the policy of banning fishing in fishery waters has impacted the livelihood of fishermen, which is a major issue concerning the well-being of the people. In the face of the logical conflict between the government's administrative intervention and fishermen's interests, the introduction of welfare governance is an appropriate strategy choice for fishery management and ecological civilization construction.[8] Providing employment skills training for fishermen who have retired from fishing, providing resettlement guarantees for the conversion of production, and promoting the livelihood transformation of fishermen in prohibited fishing areas can reduce the occurrence of illegal fishing from the root cause, and have a positive impact on the conservation of fishery resources. At the same time, local fishermen are a strong support for grassroots governance. Retired fishermen are familiar with the water environment and have basic experience in fishery production. They are strong candidates for public welfare posts in the ecological environment. They can not only solve the employment problem, but also promote the

construction of the governance community, and realize the transformation from "catcher" to "protector".

4.2 Strengthen special law enforcement in key areas

In line with the trend of green and sustainable development of the fishery economy, China's fishery policy has been leaning towards a conservation-oriented fishery management system in practice. This requires strengthening special law enforcement in key areas in the management of fishery waters, strictly implementing the fishing moratorium system, and cracking down on illegal fishing. In accordance with the actual needs of China's aquatic living resources protection and fishery resources conservation, the system of closed fishing should be further improved, the trend of declining biological resources in fishery waters should be contained, and precious and endangered aquatic wildlife should be protected. According to the problem orientation of different river basins, the demarcation and management of closed fishing periods and closed fishing areas are implemented according to local conditions, which not only promotes common governance experience, but also takes into account the particularity of local ecological environment. Special law enforcement activities to crack down on illegal fishing have been implemented in all localities, and should continue to maintain law enforcement efforts, strictly punish illegal fishing activities, ban the production and sale of prohibited fishing tools, and track down people who buy and sell illegal fishing goods, so that everyone gaining interests from illegal fishing can receive due legal sanctions.

4.3 Improve the joint law enforcement mechanism

The fishery waters are distributed in multiple administrative jurisdictions, and joint law enforcement is of positive significance to the ecological environment management of the vast watershed and the border waters. It has application value in the fields of combating illegal fishing, banning the three non-fishing vessels involved in fishing, and carrying out proliferation and release. Some scholars have proposed setting up regional fisheries coordination bodies. [9]This undoubtedly reflects the current concept of linkage and collaborative governance of fishery waters supervision areas, and it is imperative to establish and improve a joint law enforcement mechanism. First, we need to improve the cross-regional joint law enforcement mechanism. It is necessary to promote joint law enforcement by administrative law enforcement agencies in various coastal areas through joint prevention and control, cross-inspection and other forms, so as to achieve unified standards of administrative law enforcement in regional waters, balanced law enforcement intensity, and efficient law enforcement processes. Second, we need to improve the inter-departmental joint law enforcement mechanism. We should improve the exchange mechanism of fishery waters administrative law enforcement agencies, smooth communication channels between agencies and departments, and simplify procedures for carrying out cross-departmental joint law enforcement activities. In different joint law enforcement projects, the common superior department or the main authorities are responsible for the overall coordination. The reasonable allocation of tasks according to the functions and powers of each department can focus on the protection of regional fishery resources, water pollution control, biological resources conservation and other ecological and environmental problems. Third, we should establish a regional fishery waters management information sharing platform. Law enforcement personnel should uniformly record the results of daily inspections, strictly register the records of fishery administration law enforcement, and promote information sharing, experience sharing and resource sharing among regional fishery administration law enforcement teams.

4.4 Improve the enforcement level and the supervision mechanism

With the improvement of ecological environment legislation and the advancement of the reform of national institutions, the administrative departments of fishery waters management have rationally distributed their responsibilities and powers according to law through integration. In the face of more perfect law enforcement regulations and higher standards of law enforcement requirements, fishery law enforcement personnel should take the initiative to adapt to the reform results, regularly carry out the study of laws and regulations, grasp the latest policies and regulations, and improve the legal literacy of fishery law enforcement personnel. Law enforcement departments should carry out assessment of fishery law enforcement case files and exchange and training activities. Also, we encourage fishery law enforcement personnel in various regions to interpret the law according to the case, and experience on the main points and difficulties in the law enforcement process are exchanged, so as to promote the standardization of fishery law enforcement. In view of the irregular behavior in the law enforcement process, the law enforcement team should correct mistakes in time, deepen the learning of personality problems, and rectify common problems collectively. Law enforcement departments should open up supervision channels to the outside world, and provide diversified supervision methods such as telephone hotlines, online suggestions, and offline complaints, so that irregular law enforcement behaviors can be effectively supervised by the people.

4.5 Enhance public participation

Considering the dilemma management of large-scale public lands such as fisheries, community co-management is the mainstream way suitable for developing countries to govern offshore fishery resources. A multi-governance community is built by integrating multiple subjects such as government, social organizations, communities and fishermen.[10] The prerequisite for the people to participate in governance is to have the legal knowledge of fishery waters management. Law enforcement departments should regularly organize publicity activities to promote the law, guide the people to understand the new regulations and policies of fisheries, understand the patterns of illegal behavior, and change the fundamental consciousness from using the ecological environment to protecting the ecological environment. The people are both lawkeepers and supervisors. By connecting the channels for the people to report illegal act, there is no hiding behavior that destroys the ecological environment of fishery waters. The development of social organizations in a certain field reflects the importance of the whole society in this field. Social organizations play a very important role in promoting the awareness of fishery resources protection and ecological protection to the whole society. It is necessary to support and encourage public welfare organizations to participate in the conservation of organisms in fishery waters, actively expand the influence of biodiversity protection in fishery waters, cultivate the ecological and environmental awareness of the whole people, and lay a solid foundation for the ecological and environmental management of fishery waters.

5. Conclusion

In the field of ecological and environmental governance of fishery waters, China has established a fishery legal system, including administrative legislation and criminal legislation, according to different levels of violation. In particular, in the revision of administrative regulations, more precise provisions have been made on the terms of reference of various law enforcement departments, providing an institutional basis for cross-regional and cross-departmental joint law enforcement. In the future, the perfection of legal provisions should follow the legislative purpose and pay attention

to protecting the basic survival rights of fishermen. Thinking from the holistic, interconnected, integrated perspective, the government management and grassroots governance should be coordinated to promote the construction of fishery governance community.

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