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Construction of Ecological Damage Assessment Method for Marine Oil Spill

Mengzhe Wu

Qingdao University of Science and Technology, Qingdao, 266000, China

Abstract

With the development of economic integration all over the world, the water and waterway transportation in China is getting busy day by day, and oil spill from ships, explosion of water service platform, leakage of deep-sea oil pipeline and other oil spill environmental pollution and production safety accidents often occur. This paper mainly aims at the technical problems of ecological damage assessment of marine oil spill in China, Integrating the development trend of laws, policies and regulations on marine ecological damage compensation and damage compensation in China, Referring to the new and updated achievements of marine oil spill ecological damage assessment technology in the world, the technical framework of rapid pre-assessment of marine oil spill ecological damage in China is clearly put forward and established, in order to provide new theoretical sources and service support for marine oil spill ecological environment protection and management methods.

Keywords

Oil spill safety production safety accident; Ecological damage assessment; Rapid pre-assessment system; Definition of damage.

1. Introduction

At 4:08 on November 23, 2002, a Turkish sea-going ship "Tasman Sea" carrying oil collided with "Shunkai No.1" in Dalian, China in the river on the east side of Dagu Port Basin in Tianjin, causing many oil spills, which caused the leading cadres of China Oceanic Administration and Tianjin Municipal Government to attach great importance to it. Tianjin Oceanic Administration authorized Qinzhou Monitoring Station of China Oceanic Administration to carry out follow-up inspection on rivers with production safety accidents, Responsible for technical evidence investigation, marine natural environment and ecological damage assessment, And filed a lawsuit with Tianjin Maritime Court, This represents Chinese regulations, The shipping company of Tasman Sea cargo ship, Freyring Shipping Company of Britain and London Cargo Shipping Company of Britain, will pay for the damage caused by oil seepage to marine natural environment and ecology, thus delaying the curtain of China's first civil legal relationship claim for ecological damage caused by offshore oil spill.

The case took two years from beginning to end. On December 30, 2004, Tianjin Maritime Court ruled in the first instance that Tianjin Oceanic Administration filed a lawsuit successfully, and the defendant paid the plaintiff more than 10 million yuan for marine natural environment and ecological damage. This case was selected as one of the top ten marine news reports in China in 2004, and the definition of marine ecological compensation was evaluated. The practical significance of this case is the first practical activity. Through this case, the right of claim for marine environmental pollution damage by the responsible unit of the department of marine administration was established for the first time, and it also gave practical activities for the judicial department to deal with marine oil stains cases.

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After this successful claim case, how to evaluate the specific amount of marine oil spill ecological damage has also entered the academic field of vision, and there are still many legal and technical problems of marine ecological damage compensation caused by this case that deserve attention. This paper will study and discuss the assessment method and damage determination of marine oil spill, in order to explore suitable legal and technical methods.

2. The Characteristics of Environmental snd Ecological Damage Caused By Marine Oil Spill

2.1. Increased Risk of Marine Oil Spill

Since 2003, the annual oil sales volume in China has exceeded 100 million tons, and the oil freight volume in coastal areas has exceeded 200 million tons. In 2010, China's social and economic demand for oil exceeded 300 million ~ 3.5 billion tons, and the oil sales volume was about 1.7 billion tons. At present, China's water oil transportation volume ranks third in the world, second only to Britain and Japan. Many Chinese seagoing ships have entered the oil transportation and sales market. In the future, China's waters may become multi-economic development zones and multi-economic zones for oil spill safety accidents. At the same time, since the eighties of the 20th century, oil spill accidents have shown a trend of continuous growth and development. Almost every year, oil spills are caused by a variety of causes, such as explosions, oil spills, crashes and flooding of oil-carrying vessels. The rapid development trend of marine economy will inevitably lead to the expansion of the risk of oil spill safety accidents. [26]

2.2. Marine Oil Spills Occur in Various Forms

There are many types of offshore oil spills, and there are many areas caused and damaged by offshore oil spills, including almost any marine species, such as estuaries, ports, marine nature reserves, seashores, aquatic products breeding areas in Binhai County and spawning grounds for marine life. In addition, under the influence of wind, waves and tidal current, oil spill has the characteristics of circulation. Most importantly, the time caused by oil spill on water is sudden, with great randomness and instantaneity. There is no clear method and detailed treatment for the reasons of oil spill accidents on water, which makes it very difficult to assess the damage of oil spill on water. [27]

2.3. The Objects of Ecological Damage Caused By Marine Oil Spill Are Extensive

After the casualty accident of oil spill in seawater, the damage target is objective. Not only the water level quality, the natural environment of marine deposits, the natural environment of tidal flats (ecological parks) and the areas where different marine organisms settle (such as spawning grounds, food hunting grounds, etc.) will suffer oil spill damage, Moreover, marine organisms (ephemera, animals and plants, benthos, swinging organisms, birds, etc.) will also be damaged by oil leakage, and people's mental and physical health may also be damaged. Generally speaking, the damage object is not aimed at specific victims, but based on the damage caused by marine environmental factors to people's daily life interests or other reasonable and legal theme activities in a certain area. Therefore, the behavior subject of ecological damage caused by marine oil spill has the characteristics of transitivity and polymorphism.

2.4. Sea Oil Spill Is Harmful

Offshore oil spill is sudden, that is, many harmful substances are suddenly released into marine ecosystem software, resulting in higher destructive effect than general environmental pollution. The most significant harm of marine oil pollution to marine life is that it can change or destroy marine ecosystem software. When a lot of floating oil floats on the horizontal surface, the solar radiation intensity at sea level will decrease, which will lead to a decrease in the total number

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of ephemera green plants that depend on plant photosynthesis. Ephemera green plants are located at the bottom of marine ecosystem, and their primary and secondary production efficiency accounts for about 90% of the total production efficiency of marine life. The decrease in the total number of ephemera greens will undoubtedly lead to a corresponding decrease in the total number of organisms in other higher stages of the ecosystem, which will lead to the decline of all marine biological ecosystems. Because ephemera green plants are the main suppliers of O2 in the ocean and even the whole earth (about 70%), the share of dissolved oxygen in the horizontal plane will also decrease. Some anaerobic fermented alien species breed, while aerobic organisms are consumed. Eventually, the balance of marine ecology will be out of balance. Scientific research has also found that in the natural geographical environment, many growth habits of marine organisms, such as finding food materials, avoiding nemesis, dual-use animal selection, breeding and species migration, are controlled by some chemicals with very low concentrations on the horizontal plane. When the marine natural environment is polluted by petroleum and other chemicals, the concentration of these compounds will change, and the above growth habits of organisms may be damaged. Some alien species sensitive to oil pollution decreased, while other alien species increased accordingly, thus changing the original structure of biological ecosystem. [28]

2.5. The Ecological Assessment of Sea Oil Spill Is Uncertain

Marine oil spill is cross, persistent and slow. Most of the damage is usually hidden in the whole process of relatively slow mass exchange basic law. It usually appears slowly after a period of time and a mixture of various factors. The relationship between sea oil spill, damage knot fruit, content and basis is usually uncertain. Therefore, it is difficult to clarify the logical relationship between them. The manifestation of poor influence caused by oil spill safety production accidents on water is unclear. Because of the passage of time or the genetic variation of marine natural environment, the adverse effects of damage may be covered or swallowed, which will improve the difficulty coefficient of scientific and reasonable evaluation. [26]

At present, there is a lack of more reasonable, scientific and reasonable technology and methods for the treatment and treatment of oil spill safety accidents on water. Therefore, it has great extensibility in the selection of repair preventive measures and the conduct of repair tests, which improves the difficulty coefficient of comments.

3. Research Status of Environmental snd Ecological Damage Assessment Caused By Marine Oil Spill

3.1. Sorting Out Laws, Regulations and Technical Specifications

At present, although there are no professional laws, policies and regulations on the identification and assessment of marine ecological and natural environment damage in China, it is not impossible to use them. In other words, the relevant evaluation and comment basis is decentralized in the standardized text documents of relevant international treaties, policies and regulations, laws and regulations, policies and regulations, standards and norms, etc.

According to international treaties and regulations. According to the requirements of Article 96 of the Marine Environmental Protection Law, the international treaties, policies and regulations related to the rules and regulations for the identification and assessment of marine ecological and natural environmental damage that China has signed or participated in are equally applicable in China; But outside the reservation. Although this document does not require the identification and assessment of marine ecological and natural environment damage at the same time, it provides a basis for dealing with relevant cases of Shandong Maritime Safety Administration and carrying out scientific research on the rules and regulations of identification and assessment of marine ecological and natural environment damage. According

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to the relevant standards and provisions of international treaties and regulations, environmental pollution damage includes not only the damage to the personal safety and assets of Chinese workers, the damage to Chinese resources, the consumption of control and prevention measures, but also the damage to the natural environment itself and the intermittent damage to social and economic development.

According to China's laws, policies, regulations, standards and norms. Although there are few professional laws, policies and regulations related to the identification and assessment of marine ecological and natural environment damage, there may be some laws, policies and regulations related to identification institutions. In addition, in November 2017, the People's Court of the People's Republic of China of the Chinese nation passed the Standard according to the Requirements on Several Issues Concerning the Trial of Disputes over Compensation for Damage to Marine Natural Resources and Ecological Natural Environment, and put forward requirements for the assessment of damage targets and the scope of compensation for damage. The key to the identification and assessment of damage to marine ecology and natural environment in daily life is the standard text document formulated by the Judicial Department, the former Oceanic Administration, the Ministry of Environmental Protection and the Ministry of Finance. From this kind of administrative policies and regulations, it can be seen that the standardized text documents formulated by each unit in the early stage are mainly to better carry out damage assessment and service projects for administrative work units; In the second half of the year, in order to better deal with the problem of responsibility assessment and responsibility pursuit in prosecution disputes, there are relevant requirements for the judicial department to assess the damage to the natural environment. In addition, in order to better punish some actors who damage the marine ecology and natural environment, so that relevant departments have rules to follow and evidence to follow, they have successively implemented their own laws, policies, regulations or management systems in various regions, especially coastal provinces. [18]

3.2. Current Situation of Compensation for Ecological Damage Caused By Oil Spill in China

Marine oil spill pollution is one of the main marine ecological and natural environmental disasters in China. There is a basis for scientific and standardized compensation for ecological damage caused by marine oil spill pollution. Different from the characteristics of marine ecological damage caused by the overall planning of R&D and construction of marine engineering projects, the damage of marine ecological pollution caused by oil spill usually has the characteristics of long time lag, wide coverage, large restoration difficulty coefficient and inability to evaluate the damage level. Relevant laws, policies and regulations on ecological damage assessment of marine oil spill have been formulated internationally for a long time. Britain, Australia and other capitalist countries have formulated relatively sound laws, policies and regulations, which can effectively apply the compensation for ecological damage caused by marine oil spill. Although China has already established laws, policies and regulations on oil spill environmental pollution, the damage compensation system is still not perfect, which is mainly reflected in three levels: ① China's laws, policies and regulations are outdated; Unreasonable operation of oil spill emergency management system; Thirdly, it lacks the assessment method of compensation for oil spill environmental pollution damage recognized by laws, policies and regulations. Because of the relative backwardness of laws, policies and regulations, technical and scientific research and evaluation, oil spill safety accidents in China are usually unable to obtain effective compensation.

According to preliminary statistics, 19 accidents of seagoing ship safety in coastal areas of China have been paid, accounting for 51%, including 27 accidents of seagoing ship safety in production of nationality. There were 9 compensation cases, accounting for 33%; Eleven

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accidents of ocean-going ships were paid for safety in production, accounting for 48%. Among them, there were 11 accidents and 4 compensation cases of ocean-going ships in China, accounting for 36% of the compensation.

The compensation for environmental pollution safety accidents of ships not only accounts for a low proportion, but also lacks compensation, and the compensation amount only accounts for 30% of the damage amount. According to the investigation and analysis of coastal provinces, there were 63 safety accidents caused by environmental pollution in marine aquatic products breeding in 2002, and the estimated damage to economic development exceeded 232.6 million RMB. 10 Safety Accidents Caused by Environmental Pollution in Aquatic Products Breeding [30], economic development damage of more than 1 million yuan. Among them, there were 4 production safety accidents caused by environmental pollution in aquatic products breeding, and the economic development damaged more than 10 million yuan. Through the harmonious arrangement of the responsible units of aquatic products breeding, the compensation paid by the personnel engaged in aquatic products breeding exceeded 27.22 million yuan, which was less than 12% of the compensation. Relevant data analysis also shows that in the past 20 years, only 17 oil spill accidents of over 50 tons in coastal cities of China have been paid, accounting for only 39%, and the oil spill compensation is about 25 yuan/liter, while the average compensation for 55 oil spill accidents handled by the International Crude Oil Tracking Equity Fund is about 31.7 yuan/liter, which is 13 times that of China. [33]

It can be seen from the compensation examples of oil spill safety accidents in China that the key centralization of oil spill damage assessment lies in many aspects, such as the cost of decontamination machine, the damage to the economic development of aquatic products breeding, economic losses and so on. Among them, the consumption expenditure of the theme activities of decontamination machine is the key part, which usually accounts for 80% ~ 95% of the total compensation for safety accidents in production safety. Since 1996, the Ministry of Finance published the Provisions on the Calculation Method of Fishery Loss in Water Pollution Accidents, and the compensation for aquatic product breeding damage has been gradually implemented. At the level of compensation for damage to natural geographical environment, in China, apart from the "Tasman Sea" oil spill safety production accident and the "ConocoPhillips" oil spill case, nearly 10 million compensation for damage to marine ecology and natural environment has been clearly put forward, and the assessment and treatment of damage caused by oil spill to marine natural environment are usually vacant. [32]

3.3. Present Situation of Ecological Damage Assessment Technology of Marine Oil Spill in China

From the 20s to the 1990s, authoritative experts and scholars in China have gradually analyzed various calculation methods and solid models of oil spill damage assessment. At present, the assessment methods of oil spill damage that can be paid by judicial departments mainly include the Provisions on Calculation Methods of Huai Industry Loss in Water Pollution Accidents implemented by the Ministry of Finance in 1996 and the Technical Guidelines for Assessment of Cattle Damage in Sea Oil Spill issued by the State Oceanic Administration in 2007.

4. Analysis of the Problems Existing in the Assessment Technology of Ecological Damage Caused by Marine Oil Spill

According to the discussion and development trend for many years, China has made a crucial development trend in the technical level of ecological damage assessment of marine oil spill, but there are still some shortcomings in scientific research and application level. The key issues are as follows.

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4.1. The Construction of the Basic Database of Marine Ecological Environment Is Not Perfect

The theory of compensation assessment of ecological environment pollution damage caused by marine oil spill is very strong, and data information plays a key role. The system software carries out continuous and extensive monitoring of marine ecological and natural environment data, which is conducive to quickly defining the damage types and levels of oil spill environmental pollution and obtaining effective damage compensation. At present, many concrete examples in China usually need a long time to deal with because of the lack of basic raw materials. Because marine ecosystem software has the main characteristics of temporal and indoor spatial changes, Technical information that can be obtained and processed by using excellent total data of indoor space (such as natural geographic information system, marine geographic information system, worldwide mobile positioning system, etc.), The data information design scheme of integrating historical time detection and research materials, and creating a spatial database for marine ecological and natural environment damage assessment, which is suitable for the application of oil spill prevention management mode and damage compensation.

4.2. Poor Timeliness Of Ecological Damage Assessment of Marine Oil Spill

In the current standard oil spill assessment method in China, it usually takes many years or at least several months to assess the scope and level of ecological damage caused by oil spill, which is unfavorable to the assessment regulations of judicial departments. Therefore, how to make full use of the existing data and information, choose a simpler way to carry out rapid assessment and analysis, and analyze the scope and level of marine ecological damage, so as to give more rapid scientific and technological innovation application for marine oil spill ecological damage cases, is an urgent problem to be solved.

4.3. Inadequate Assessment of Ecological Damage in Oil Spill Prevention and Control

The prevention, correction and compensation of oil spill are the key preventive measures for marine ecological environment protection. As everyone knows, in the process of preventing and correcting all oil spills, it is impossible to comprehensively assess marine ecological damage. The key is:

(1) The risk assessment before production safety accidents focuses on the scale of oil spill production safety accidents and the trajectory of oil spill transportation under different climatic, hydrological and meteorological standards. As for the damage evaluation of ecological environment and natural environment, quantitative analysis is usually used to care about the ecological damage caused by crude oil environmental pollution, and it is impossible to care about the scope and level of marine ecological environment and natural environment damage through judgment analysis and predictability.

(2) When an accident occurs, the guiding management decision-making in the process of oil spill emergency decontamination machine focuses on the dynamic model of pollutant spread and transportation and its harm to sensitive resources, but the decision-making application from the direction of marine green ecological harm caused by oil spill is too little. For example, although the use of decontaminants in large-scale oil spill accidents is beneficial to eliminate drifting oil, many melted oil spills may cause harm to many marine organisms, reduce the quality of water level, repair improper protection of ecological environment, and then greatly reduce various services provided by ecosystems for people.

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5. Reconstruction of Ecological Damage Assessment Method of Marine Oil Spill

5.1. Technical Framework for Ecological Damage Assessment of Marine Oil Spill

Because of the multi-dimensional nature of marine ecological environment protection and the dynamic transformation characteristics of oil spill in the ocean, it is necessary to comprehensively apply various technical methods to comment on the types and levels of marine green ecological hazards caused by oil spill environmental pollution. In order to carry out rapid pre-assessment of marine green ecological hazards caused by different kinds of oil spill accidents, this scientific research has formulated a technical framework for rapid pre-assessment of marine oil spill green ecological hazards, and introduced the system software in detail to reasonably meet various application requirements of marine oil spill green ecological exposure review.

The technical framework of rapid pre-assessment of green ecological hazards of marine oil spill adopts a three-tier structure of "oil spill accident-data application scope-rapid pre-assessment". The "oil spill accident" layer is applicable to all kinds of oil spill accidents such as explosion of water oil platform, leakage of deep-sea oil pipeline, accidental oil spill of ships, shore-based oil spill and marine environmental pollution; The "data application scope" layer technically selects database management mode, reasonable management mode for marine ecological environment protection, use value of marine green ecological service projects, social and economic development and other data. The "rapid pre-assessment" layer is in the "data collection and processing" stage, integrated oil spill monitoring and inspection, oil spill identification, natural geographic information system, Excellent technologies such as finite element (including simulation of driving force of marine natural environment and simulation of personal behavior of oil spill in water and water), In the stage of "rapid assessment and calculation", the evaluation index value management system is selected, and the key points of "combination analysis and application" include risk control before accident, green ecological compensation, analysis during accident period, prediction analysis and early warning information, emergency management decision, multi-directional damage assessment after accident, implementation of ecological environment remediation plan, etc.

5.2. Main Contents of Rapid Pre-assessment of Ecological Damage Caused By Oil Spill in the Sea

In order to better apply the technology of rapid pre-assessment of ecological damage caused by marine oil spill to specific applications, Everyone divides the key assessment contents into three parts, namely, rapid pre-assessment of marine ecological damage for risk control before oil spill safety accident, rapid pre-assessment of marine ecological damage for emergency management decision during oil spill safety accident, and rapid pre-assessment of marine ecological damage for damage assessment after oil spill safety accident.

5.2.1. Rapid Pre-assessment of Marine Ecological Damage for Risk Management Before Oil Spill Accident

For rivers with frequent oil spill safety accidents caused by economic activities such as urban public transportation safety accidents of water vessels and marine crude oil exploration, development and design, the data information is analyzed according to the data of oil spill safety accidents in historical time. Analyze the types of oil spill safety accidents, business scale and frequent occurrence rate, and predict the future oil spill risk. According to the standard data information of hydrometeorology, climate and other natural geographical environment analyzed by data for many years, According to the oil spill entity model, the environmental pollution damage range of different business scales and different kinds of refined oil wholesale

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under different safety accident scenario standards is simulated. Possible damage categories and standards of marine environmental factors, marine organisms, marine ecological service procedures, etc., as well as their economic value damage, give key scientific discussions for marine oil spill risk management and control.

According to the basic procedure steps of rapid pre-assessment of marine ecological damage caused by oil spill, the rapid pre-assessment of marine ecological damage caused by risk control before oil spill safety accident is divided into three stages, namely, the stage of sufficient preparation of data information in advance, the stage of assessment and calculation and the stage of result analysis.

(1) The stage of sufficient preparation of data information in advance. Collect hydrometeorological and climatic raw materials for scientific research on rivers in historical time and raw materials for oil spill safety accidents in historical time to

And the monitoring data information of marine ecological environment protection in the past. According to the identification and prediction analysis of oil spill risk sources, establish the oil spill

Therefore, the business scale, causing probability and other risk characteristics of the enterprise.

(2) Evaluation and calculation stage. According to different natural environment standards, different detailed addresses and different business scale oil spill safety accident scenarios, The oil spill solid model is used to simulate and analyze the time dynamics of spill pollutants in plane, water, deep sea and seaport, and the damage scope and level of marine ecological natural environment are calculated by using the rapid pre-assessment method of oil spill ecological damage.

(3) Result analysis stage. According to the results of finite element analysis, the use value damage of marine environmental factors, marine organisms and ecological service projects is accurately reviewed, and scientific and reasonable statistical analysis data are applied for oil spill risk management and control, ecological compensation for marine development and design theme activities, etc.

5.2.2. Rapid Pre-assessment of Marine Ecological Damage for Emergency Decision-Making in Case Of Oil Spill Accident

When a marine oil spill safety accident is caused, Based on data monitoring such as hydrometeorological and climate data information of evaluation and weather reality, communication satellite/space remote sensing and on-the-spot investigation, According to the simulation analysis and prediction of oil spill solid model, the essential plane of oil pollutants in the future and the years in water quality are all over, Accurate damage scope and standard of possible pollutants to marine environmental factors, marine organisms and ecological service procedures and their economic value damage, so as to provide key basis for oil spill emergency command staff, so as to adopt more scientific and standardized cleaning machine actions and more reasonable ecological and ecological environment protection and prevention measures.

According to the basic procedure steps of rapid pre-assessment of marine ecological damage caused by oil spill, the rapid pre-assessment of marine ecological damage in emergency management decision-making of oil spill safety accident can be divided into three stages, namely, sufficient data information preparation stage, comment calculation stage and comprehensive analysis stage.

(1) Data and materials have been fully prepared in advance. According to the hydrodynamic field and climatic conditions (temperature, wind, etc.) or specific air temperature immediately detected by the river in safety accident, the data information of marine ecological environment protection monitoring raw materials in historical stage is quickly collected.

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(2) Evaluation and calculation. According to the oil spill model, the life of pollutants in marine natural environment is predicted and analyzed. Through on-the-spot or GIS data monitoring, authentication and analysis, the rapid pre-assessment method of oil spill ecological damage is selected to calculate the damage type and level of marine ecological natural environment.

(3) Knot analysis stage. According to the results of finite element analysis, the use value damage of marine environmental factors, marine life and ecological service projects is quantitatively evaluated, and then scientific and reasonable on-the-spot treatment and protective measures are selected for emergency commanders, giving more comprehensive management decisions.

5.2.3. Rapid Pre-assessment of Marine Ecological Damage for Post-oil Spill Damage Assessment

After the oil spill casualty accident, According to the decontamination maneuverability and different time stages of data collection, Master the historical raw materials of water ecological inspection and the newly updated raw materials for on-the-spot investigation. Communication satellite/space remote sensing image inspection, technical achievements of frequency conversion power supply, finite element analysis of the whole process of oil spill environmental pollution and other data information, Quickly assess and analyze the whole process of annual change of oil spill environmental pollution, and the types and levels of damage to marine environmental factors, marine organisms and ecological service procedures, so as to provide key basis for the next stage of damage assessment or ecological restoration actions.

According to the basic procedure of rapid pre-assessment of ecological damage caused by marine oil spill. The rapid pre-assessment of marine ecological damage in post-accident damage assessment of oil spill is divided into three stages: sufficient data information preparation in advance, assessment calculation and result analysis

(1) Data and materials have been fully prepared in advance. Collect the monitoring data information of marine ecological environment protection in the historical time of rivers with safety accidents, quickly process the data information of oil spill safety accidents on the spot, evaluate hydrometeorological and climatic data information, and obtain the analyzed communication satellite/aerospace remote sensing image data monitoring and related on-the-spot inspection raw materials and data information.

(2) Evaluation and calculation. According to GIS and on-the-spot investigation. Clear oil leakage and environmental pollution range. According to the oil spill finite element method, the whole process of pollutant destruction is reproduced. According to the monitoring of river historical ecological data and the monitoring of newly updated data on the spot, the destruction target and level of marine ecological natural environment (such as the change of alien species and the change of water level quality, etc.) are defined.

(3) Result analysis stage. According to the results of finite element analysis, the use value damage of marine environmental factors, marine life and ecological service projects is quantitatively evaluated, and then the management decision-making reference is given for the multidimensional assessment of ecological damage caused by marine oil spill and the construction of ecological restoration project in the next stage.

6. Conclusion

How to apply the basic theories and methods of basic science to the propaganda of marine oil spill disaster prevention and mitigation and improve the healthy and sustainable development trend of marine economic development is a major research topic in China. According to the contents of reading articles, graduation theses and thesis references, This paper combs and analyzes the current situation of scientific research in the world, summarizes the development trend of marine ecological and natural environment damage assessment and evaluation legal

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system through the analysis of existing basic assessment theories, and finds out the shortcomings in marine ecological and natural environment damage disputes. Referring to the new achievements of the assessment technology of marine oil spill ecological damage in the world, the technical framework of rapid pre-assessment of marine oil spill ecological damage in China is clearly put forward and established, which provides new theoretical sources and service support for the management mode of marine oil spill ecological environment protection. Different from the traditional design concept of ecological damage assessment after safety accidents, We think that marine ecological damage assessment can be more different from the whole process of risk control before oil spill safety accident, emergency management decision during safety accident period and damage assessment after safety accident, and clearly put forward different treatment systems and assessment methods for this problem.

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