Study on the Application of Punitive Damages for Public Harm in Environmental Public Interest Litigation

Yanyu Su

School of Law, Anhui University of Fiance and Economics, Bengbu, Anhui 233030, China

Abstract

Article 98 of the Rules for Handling Public Interest Litigation by People's Procuratorates in 2021 affirms the application of punitive damages for public harm in public interest litigation. In the judicial practice of environmental public interest litigation, it is found that the virtual cost of treatment method is widely used as a way to calculate ecological and environmental damage, and the amount of calculation is high, which leads to the divergence of understanding between punitive damages for public harm and virtual cost of treatment in academic circles. The lack of explanation of the specific composition of punitive damages for public hazards has also led to the problem of different judgments in the same case in judicial practice. The virtual cost of treatment is not punitive and cannot replace the value of punitive damages in environmental civil public interest litigation. The proposed rule for determining punitive damages is "multiplier distance", which is based on ecological damage compensation and ranges from 10% to 100%.

Keywords

Ecological Damage Compensation; Public Interest Litigation; Punitive Damages; Virtual Governance Costs; Multiplier Distance Formula.

1. Introduction

Adhering to the harmonious coexistence of man and nature is the thought and basic strategy of socialism with Chinese characteristics in the new era of the 19th National Congress. Article 1232 of the Civil Code of the People's Republic of China (hereinafter referred to as the "Civil Code") provides that in environmental tort cases, the tortfeasor may request punitive damages. Later, the People's Procuratorate of Fuliang County, Jiangxi Province, v. Zhejiang Hailan Chemical Group Co., Ltd. (hereinafter referred to as the "Hailan case") (Jiangxi Province Fuliang County People's Court (2020) Gan0222 Civil No. 796.) set a precedent for the application of punitive damages for public harm in environmental public interest litigation. There was a lot of discussion in the academia about whether punitive damages should be applied in environmental public interest litigation. On June 29, 2021, the Supreme People's Procuratorate promulgated Article 98, Paragraph 2, Item 1 of the Rules for Handling Public Interest Litigation by People's Procuratorates (hereinafter referred to as the "Rules for Handling Public Interest Litigation"), which affirms that the People's Procuratorate may request punitive damages when the conditions are met. On October 9 of the same year, the Supreme People's Procuratorate issued the case of Qingdao People's Procuratorate v. A Space Art Appreciation Center in Laoshan District, Qingdao (hereinafter referred to as the "Art Space case")(Qingdao Intermediate People's Court, Shandong Province (2021) Lu 02 Min Chu No. 69), which also affirmed the application of punitive damages in environmental civil public interest litigation. Article 12 of the Interpretation of the Supreme People's Court on the Application of Punitive Damages in the Trial of Ecological and Environmental Torts (hereinafter referred to as "Punitive Damages Interpretation") only stipulates the calculation base of public interest litigation, but not the specific multiplier and payment method. Although punitive damages for

ISSN: 2688-8653

public hazards have been changed from "not enforceable" to "enforceable by law", there are still questions about how to apply them.

In terms of punitive damages in environmental public interest litigation, most studies have focused on whether they should be applied. For example, Prof. Yang Lixin [1] and Prof. Wang Shuvi [2] believe that punitive damages should be used only for private interests; Prof. Wang Liming [3] also recognizes that Article 1232 of the Civil Code is only about tort liability for infringement of private interests; however, Li Huaqi [4] and Wu Satellite [5] advocate that, from the perspective of the dual protection mechanism of environmental private interests and public interests established by the Civil Code, it is necessary to introduce punitive damages in environmental civil public interest litigation. The introduction of punitive damages in environmental civil public interest litigation is indeed necessary. After the promulgation of the "Rules for Handling Cases", the discussion has shifted to the application of punitive damages for public harm, but there is little research literature on its composition. Some scholars believe that the essence of "virtual governance costs" is punitive damages, [6] which is actually a misunderstanding of virtual governance costs and punitive damages for public harm. As for the composition of punitive damages for public hazards, some scholars insist on the traditional model of punitive damages.[7] There are also scholars who innovate punitive damages below double in order to achieve the purpose of controlling the excessive amount of punishment, [8, 9] but do not prove its reasonableness with judicial practice. In the aspect of punitive damages payment, the actual situation also differs greatly from the academic viewpoint, mainly for whether the "technical transformation offsetting the judgment amount" should be supported. For this reason, this paper tries to sort out the main problems of the application of punitive damages for public harm in practice, and make suggestions to improve the rules of determining punitive damages for public harm and its payment methods.

2. The Main Problems in the Application of Punitive Damages for Public Hazards

Differences in the Understanding of Punitive Damages for Public Harm and 2.1. **Virtual Governance Costs**

Whether virtual governance costs are equivalent to punitive damages is controversial. Some scholars believe that in judicial practice, virtual remediation costs are often applied in conjunction with Article 23 of the Interpretation of the Supreme People's Court on the Trial of Environmental Civil Public Interest Litigation, which can lead to the conclusion that the court considers the fault of the victim in its judgment, so virtual remediation costs are punitive in nature, and there is no need to apply punitive damages in public interest litigation. [6] Other scholars argue that in judicial practice, the virtual cost of treatment is calculated by multiplier, and the degree of fault of the polluter has been taken into consideration as one of the multiplier factors. [2] The above arguments lack case and theoretical support, and the discussed virtual governance costs and punitive identical points are not developed, and the arguments are not sufficient. Considering that Article 98 of the Rules of Procedure has clearly stated that punitive damages can be applied in public interest litigation, if the two are confused, it will be difficult to unify judicial practice and the role of punitive damages for public harm will be hollowed out. Therefore, there is still room for research on the difference between virtual governance costs and punitive damages for public harm.

2.2. The Rules for Determining Punitive Damages for Public Harms are Controversial

Punitive damages under our legislative system can be set in the "fixed amount model" (Article 55, paragraph 1 of the Consumer Protection Law.), "interval value model" (Article 54(2) of the

ISSN: 2688-8653

Copyright Law and Article 17(4) of the Anti-Unfair Competition Law) and "multiplier model" (divided into The "multiplier cap" (Article 55(2) of the Consumer Rights and Interests Protection Law, Article 23 of the Judicial Interpretation of Medical Damage Liability Dispute Cases) and "multiplier spacing" (Article 63(1) of the Trademark Law, Article 17(3) of the Anti-Unfair Competition Law.)). Due to the low flexibility of "fixed amount", it is usually mixed with "multiplier" in our current law. From the perspective of our legislative practice, in the field of consumer goods and services, the calculation of damages suffered or illegal income is used as the base for the convenience of calculation. The interval value formula and the fixed amount are usually used as a supplement to the multiplier distance formula, as a posterior paragraph of the law, to be applied under the circumstances when the actual loss or illegal income is difficult to prove.

Article 1232 of the Civil Code provides that victims of environmental torts may request punitive damages "as appropriate," but no corresponding judicial interpretation has been issued to regulate what constitutes punitive damages; Article 98, paragraph 2, Item 1 of the Rules of Procedure is also silent on what constitutes punitive damages, i.e., the rules for determining them. The Interpretation of Punitive Damages also does not elaborate on the composition of punitive damages for public harm. There are also controversies in the academic circles, which can be divided into the following three views: (1) Fixed ratio. Some scholars advocate that if the intentional implementation of ecological and environmental torts meets the elements of punitive damages, the punitive damages shall be two times the actual loss, and the gross negligence shall be double the actual loss. [1](2) Fixed amount and multiplier type. Some scholars suggest to refer to the model of the Food Safety Law of the People's Republic of China and the Law of the People's Republic of China on the Protection of Consumer Rights and Interests, and adopt "fixed amount + multiplier" based on the amount of damages that can be proved. [7](3) Multiplier distance formula. Some scholars propose to use 10% to 100% of the cost of ecological damage as the multiplier to achieve the purpose of controlling the high amount of punishment, i.e., the "multiplier distance formula".

The lack of rules for determining punitive damages for public hazards has led to the lack of uniformity in judicial practice. In the Hailan case and the Art Space case, for example, the specific composition of punitive damages for public hazards was not agreed upon, given the generally high amount of compensation for ecological and environmental damages. "The Hailan case was calculated at 300% of the functional environmental loss, while the Art Space case was calculated at 10% of the sum of the loss of wildlife and functional environmental loss, with a significant difference in the multiplier between the two.

3. Clarify the Main Difference between Punitive Damages for Public Hazards and Virtual Governance Costs

To clarify the application of punitive damages for public hazards and virtual governance costs, it is necessary to clarify the difference between virtual governance costs and punitive damages first, otherwise it is suspected of stacking the deck. This part will explore the differences between virtual governance costs and punitive damages from three aspects: evaluation elements, application methods, and functional characteristics.

3.1. **Different Evaluation Elements**

Ecological damage assessment methods include alternative equivalence analysis methods (including resource equivalence analysis method, service equivalence analysis method, valuevalue method, and value-cost method) and environmental value assessment methods. The alternative equivalence analysis method should be given priority when determining ecological damage assessment, and if the alternative equivalence analysis method cannot meet the restoration needs, then the virtual cost governance method should be applied.

The calculation is publicized as follows.

$D=E \cdot C \cdot \gamma$

Note: (Basic Methodology of Technical Guide for Ecological Damage Identification and Assessment GB/T 39793.2-2020)

D - amount of ecological damage to surface water, yuan.

E-Emission quantity (depending on the actual choice of excess emissions or total emissions, either in volume or mass units), t or m³;

C-unit treatment cost of wastewater (or characteristic pollutants in wastewater) or solid waste, yuan/t or yuan/m³;

γ - adjustment factor.

From the above formula, the total virtual cost is the product of pollutant emissions and the virtual treatment cost per unit of pollutant, and then multiplied by multiples of 1.5-10 as the upper and lower limits of the environmental damage amount according to the sensitivity of the environmental function of the polluted area, respectively. The determination of the multiplier depends on the type of environmental functional area, and the correspondence between the type of environmental function and the ecological damage multiplier can be summarized as follows: water, air and soil with a wider range of functions and higher quality standards suffer from pollution and require a higher ecological damage multiplier. This is due to the greater loss of functional value, the difficulty of restoration, and the greater investment in restoration when high-quality ecosystems are polluted.[10] In the newly released Assessment Technical Guideline, the calculation of adjustment coefficient γ is further refined, based on α hazard coefficient, τ exceedance coefficient, and ω environmental function coefficient for comprehensive calculation, and each coefficient has a strict range of values. ($\gamma = \alpha \times \tau \times \omega$) It can be seen that the essence of virtual treatment cost is only an assessment method, which contains objective factors such as environmental function elements, environmental quality elements, and restoration difficulty, and the calculation is related to specific indicators of ecological environment. Even if the court adjusts the virtual treatment cost multiplier, it is also based on the specific ecological environment and behavioral facts of the case, such as whether there are residents living in the surrounding area and whether the ecological environment can be easily restored. It should not be confused with the concept of punitive damages because of the high amount of virtual treatment cost calculation, or the use of multiplier distance formula.

The amount of punitive damages should not only be based on the actual damage, but should especially consider various factors such as the subjective fault, subjective motive, and compensation capacity of the aggrieved person. [11] Prof. Chou Primran, on the basis of summarizing the research results of Taiwanese scholar Dai Zhiwei, proposed three aspects that punitive damages should consider: (1) the factor of reprehensibility of the wrongful act; (2) the factor of evaluating the degree of deterrence of the defendant; and (3) the factor of evaluating the link between punitive damages and damages. The virtual cost of governance of [12] includes at most the third point, that is, "to consider the degree of matching between the objective damage from the objective damage situation, in order to ensure that the amount of compensation is appropriate to the objective damage caused by the violation", and does not include the most important difference between punitive and compensatory compensation - the value evaluation. In summary, the components of virtual governance costs and punitive damages are not equivalent.

3.2. Different Application Methods

In order to "implement the strictest damage compensation system and accountability system" and to meet the social demand for environmental damage appraisal and assessment, the Ministry of Environmental Protection (MEP) issued the "List of Recommended Environmental Damage Appraisal and Assessment Agencies", in which the virtual cost of treatment is made by the appraisal and assessment agencies recommended by the MEP. In particular, after the refinement of specific coefficients in the Technical Guidelines, judges basically lost their "discretion" in the determination of the amount of ecological damage repair. In fact, a survey by scholars of nearly 1,000 environmental justice cases concluded that "appraisal findings play a decisive role in determining the facts of a case, and the use of other evidence is clearly inadequate.[13] Virtual costing as part of the appraisal is not yet an escape from this judicial dilemma.

Guiding Case No. 130 Case (Chongqing First Intermediate People's Court (2017) Yu 01 Min Chu No. 773) The gist of the ruling mentions that "if the cost of ecological environment restoration is difficult to calculate, the damage consequences can be quantified using the virtual cost of treatment method according to the relevant provisions of the environmental protection department on ecological environment damage appraisal and assessment." In the case, the Chongging Institute of Environmental Science issued the Appraisal and Assessment Report, which calculated the virtual treatment cost to be 3,237,280,000 yuan and selected 4.5 times the virtual cost to determine the quantified amount of ecological and environmental pollution damage to be 14,416,776,000 yuan. Guidance Case No. 131 Case (Shandong Province, Texas District (City) Intermediate People's Court (2015) De Zhong Huan Civic First Word No. 1) also makes clear in the judgment that the virtual damage compensation does not include punitive factors, and the defendant's proactive behavior of putting in pollution prevention and control operation equipment does not affect the calculation of virtual costs. In contrast, punitive damages for public harm are awarded by the court as the main body to compensate for the amount exceeding the actual damage. Although some scholars believe that ecological restoration costs are somewhat punitive, they agree that it is a logical paradox to allow restoration costs to replace punitive damages. [2]

Unlike the virtual cost of governance, which relies excessively on the appraisal report, punitive damages, as a separate claim, need to be raised by the plaintiff first, and then affirmed by the court after investigation and cross-examination. In contrast to the above-mentioned case, the judgment of the "Hailan case" considered the defendant Hailan's degree of negligence, compensation attitude, damage consequences, financial ability to take responsibility, and administrative punishment, and selected the ecological and environmental function damage as the basis for calculation, and made triple punishment, fully reflecting the court's The court's discretionary power was fully reflected. Similarly, in the "Art Space case", the court determined that a 10% punitive damages ratio should be applied, taking into account the infringer's repentance and initiative to undertake public welfare work such as ecological and environmental protection law promotion.

3.3. Different Functional Characteristics

The Virtual Cost of Treatment Note lists the situations in which the method is applicable: (1) where the fact of discharging pollutants exists and the fact of damage is unclear or the ecological environment has been naturally restored due to untimely ecological damage observation or emergency monitoring, etc.; (2) ecological damage that cannot be fully restored by restoration works; and (3) situations where the cost of implementing restoration works is much greater than its benefit. That is, in the case where ecological damage or environmental restoration programs can be determined, the virtual treatment cost method is not applicable. As an alternative method of calculation, the virtual cost of treatment is still essentially a "filling

function" under civil law, which is to fill in the human and material resources needed to restore the ecological environment. The function of punitive damages can be divided into two types depending on the type of litigation, namely, in private environmental litigation to play its function of timely and low-cost discovery of violations, and in public interest litigation to play a punitive and deterrent function. [14]

In summary, the components, application methods and functional characteristics of virtual remediation costs and punitive damages are different, and cannot replace the judicial effect of punitive damages. Firstly, the virtual treatment cost method, as an important standard for the calculation of the amount of ecological restoration, provides for a calculation process that does not take into account the subjective malice and degree of fault of the tortfeasor. Secondly, combining with judicial practice and the current status of legislation, no factual or jurisprudential basis for the punitive nature of virtual treatment costs has been found. If you follow the "checklist" your paper will conform to the requirements of the publisher and facilitate a problem-free publication process.

4. Clarify the Rules for Constituting Punitive Damages for Public Harm

4.1. Choice of a Model for the Composition of Punitive Damages for Public Hazards

In the academic discussion on the constitutive model of punitive damages, the author favors the "ratio distance type" for the following reasons.

First, the flexibility of "fixed ratio" is low. There are many factors that need to be considered in ecological damage compensation cases, and the adoption of a fixed multipieris not conducive to judicial flexibility. And the fixed multipieris high, for the "sky-high case" such as ecological damage repair money is already very high, it will directly cause the punishment is heavy, leading to enterprise bankruptcy and other punitive compensation is difficult to achieve the situation, not only can not achieve the purpose of punishment, and will cause social production incentives to reduce the negative impact.

Second, the "fixed amount" is inconsistent with the function of punitive damages for public harm. The fixed amount is usually used to protect the rights and interests of the tortfeasor, and in judicial practice, it mostly plays the role of underwriting, the purpose of which is to ensure that citizens are motivated to defend their rights, and it is an economic incentive for private law enforcement. As the compensation amount in environmental public interest litigation needs to be paid to the state treasury or a specific fund account, there is no incentive for punitive damages in public interest litigation. From the perspective of judicial practice, the verdict of ecological and environmental damage cases is large, the amount of the verdict, the economic strength of enterprises is far apart, prone to a fixed amount for enterprise A as a mantle, for enterprise B as a tarzan, there is a suspicion of hanging warts attached to the superfluous.

Third, the "multiplier distance" has strong advantages in the prevention purpose and discretionary regulation, and its rationality is as follows: the composition of ecological damage compensation cases is complex, and it is necessary to consider not only the degree of fault of the perpetrator, the severity of ecological damage, but also the amount of ecological damage compensation, the tortfeasor's profitability, financial ability, criminal or administrative punishment, the average living standard of the location of the court, and the social impact of the case. or administrative punishment, the average standard of living in the location of the court under appeal, and the social impact of the case. Based on the above factors, the multiplier formula can give judges limited but sufficient discretion to meet the needs of individual cases while conforming to the judicial requirement of the same case and the same judgment. Secondly, the adoption of the multiplier distance formula also leaves sufficient room for refinement of the multiplier range under different circumstances. For example, a higher multiplier range may be

applied in cases where the infringer is a repeat offender or knowingly commits a crime, while a lower multiplier range may be applied in cases where the infringer actively pays administrative fines and actively participates in governance.

4.2. Specific Components of Punitive Damages for Public Harm

4.2.1. Specific Base Selection of Ecological Damage Compensation

The two main elements of the multiplier formula are "specific base" and "multiple". Whether the multiplier formula can be properly applied depends on the proper choice of the specific base, otherwise it will deviate from the principle of equal punishment. For the specific base, the two main elements in the current legislation are the actual loss and the illegal income. In environmental infringement cases, except for the killing of wild animals, ecological damage and environmental pollution do not have a profitable nature, and usually the purpose of the act is to reduce the cost of production, there is no "price", and it is difficult to calculate the illegal income, so the ecological loss should be used as the specific base.

The so-called loss of ecological environment, according to Article 12 of the Punitive Compensation Interpretation shall include: (1) the loss caused by the loss of service function between the damage to ecological environment and the completion of restoration; (2) the loss caused by permanent damage to ecological environment function. In this regard, judicial practice also has a positive response. In the "Hailan case" and the "Art Space case", for example, the punitive compensation base in the "Hailan case" was 57,135.45 yuan for the loss of environmental functionality. In the "Art Space" case, the punitive damages were \$83,000 for the loss of wildlife and \$907,500 for the loss of ecological services, totaling \$991,500. In the case of applying virtual treatment cost, some decisions treat it as the same as ecological damage due to the difficulty of determining ecological damage cost (e.g., Guiding Case No. 131 (Shandong Province, Texas District (City) Intermediate People's Court (2015) De Zhong Huan Civic First Word No. 1), in which the "damage caused by excessive emission of pollutants" is the "virtual treatment cost" in the reasoning of the decision). "(e.g., Guiding Case No. 131). Some decisions include both virtual costs of treatment and functional damage to the ecological environment (Supreme People's Court (2015) Min Shen Zi No. 1366; Kunming Intermediate People's Court, Yunnan Province (2018) Yun 01 Min Chu No. 32).

It is worth noting that the scope of application of the new version of the "Assessment Technical Guide" clearly states that "this standard does not apply to the appraisal and assessment of ecological and environmental damage that is clearly identified through investigation and assessment of the actual emergency disposal costs or treatment costs incurred in an environmental emergency." The significance of this is that, after the promulgation of the "Technical Guidelines for Assessment", the ecological damage costs and virtual governance costs will not be applied simultaneously in the judgment. In the formula for calculating the virtual treatment cost, the result of the virtual treatment cost calculation is also called "ecological damage amount", so the "actual loss" in the base for calculating punitive damages for public hazards should include the amount calculated by the virtual treatment cost method.

4.2.2. Multiplier Range Set to "10% to 100%"

In terms of multiple, the "Hailan case" and the "Art Space case" are very different. "The "Hailan case" was calculated with a 300% multiplier by reference to Article 55 of the Consumer Agreement Protection Act, while the "Art Space case" used a 10% multiplier and pioneered the provision that 25% of punitive damages are to be offset by labor services, avoiding the risk of excessive punitive damages. The "Art Space case" uses a 10% multiplier and provides that 25% of punitive damages are to be offset by labor, so factors are that 25% of punitive damages. The "Art Space case" uses a 10% multiplier and provides that 25% of punitive damages are to be offset by labor, avoiding the risk of excessive punitive damages. As one of the typical cases issued by the Supreme People's Procuratorate, it has guiding significance. From the viewpoint of the punitive damages system, the multiplier is mostly multiplied by 1 to 5 times, and the author believes that such multiplier is too heavy for

ISSN: 2688-8653

ecological and environmental damage liability, and the sky-high verdict of over 100 million is not an exception, and the use of traditional punitive damages multiplier on this basis is likely to cause most enterprises to go bankrupt and other adverse effects.

In fact, the multiplier of less than one times the administrative fine has been applied in the early. April 24, 2002, "the National People's Congress Law Committee on <the People's Republic of China Import and Export Commodity Inspection Law Amendment (Draft) > Report on the results of deliberations," said: "The Law Committee recommended that the draft article 18' and impose a fine of more than double or less than three times the amount of illegal income' to 'and impose a fine of more than five percent of the value of goods and less than twenty percent'." The review report firstly revised the specific base from the illegal income to the amount of the value of goods, and secondly adjusted the multiplier multiple, which is intended to express the following two views: (1) the specific base is different for different kinds of cases, and the base selected needs to meet the commonality of the type of cases in order to facilitate judicial application. (2) The selection of multiplier should meet the penalty over the equivalent, and a lower multiplier can be selected on the basis of the excessive base number of cases. The above two points are of reference for punitive damages for public harm. From the point of view of judicial practice, the multiplier rate of 10% to 100% is selected to ensure that the punitive damages are doubled when the compensation for ecological and environmental damage is low, and to prevent the phenomenon of abnormally high punitive damages in "sky-high cases".

In summary, referring to Article 1232 of the Civil Code, punitive damages for public harm should be expressed as follows: "If the tortfeasor intentionally pollutes the environment and damages the ecology in violation of the law causing serious consequences, the people's procuratorate has the right to request punitive damages of more than ten percent and less than double the amount of ecological and environmental damage."

5. Conclusion

Article 1232 of the Civil Code and related judicial interpretations have clarified the necessity of applying punitive damages in environmental public interest litigation, fully reflecting the response of the Civil Code to the public demand for environmental protection on the basis of private remedies. In terms of the difference between punitive damages and virtual costs, there are three essential differences in the evaluation elements, application methods and functional characteristics: the evaluation elements are different in that punitive damages need to consider various factors such as subjective fault, subjective motive and compensation ability of the perpetrator, while virtual costs have a statutory formula; the difference in application methods mainly lies in the discretionary power of judges. The application of punitive damages for public harm is more subjective, while the application of virtual governance costs basically excludes the discretion of judges due to the setting of standard coefficients and the detailed provisions of the Technical Guidance on Evaluation. In terms of functional characteristics, virtual costs of governance are essentially "filler functions" rather than "punitive" as reflected in punitive damages for public harm. In terms of specific composition, the punitive damages for public hazards should adopt a "multipierdistance", which is a multipierratio of 10% to 100% based on the ecological damage compensation or virtual treatment cost calculation under the punitive compensation system. This paper only discusses the difference between punitive damages and virtual treatment costs, the composition of punitive damages, and the payment method, in order to provide new ideas for the interpretation of punitive damages and new perspectives for the unification of judicial practice.

Acknowledgments

This paper is the research achievement of the graduate scientific research, supported by the Graduate Scientific Research and Innovation Fund of Anhui University of Finance and Economics (Name: Judicial Application Research on Punitive Compensation for Ecological and Environmental Tort No.: ACYC2021079).

References

- [1] Yang Lixin, The Construction of Punitive Liability for Ecological and Environmental Tort--the Legislative Significance and Improvement of Article 108 of the Second Review Draft of the Tort Liability Part of the Civil Code [J]. Journal of Henan University of Economics and Law, 2019, No.3, p. 15-24.
- [2] Wang Shuyi, Gong Xiongyan. Research on the Controversial Issue of Punitive Damages for Environmental tort [J]. Hebei Law, 2021, No.10, p.71-85.
- [3] Wang Liming, Highlights of Liability for Environmental Pollution and Ecological Damage in the Civil Code [J]. Guangdong Social Science,2021,No.1,p.216-225.
- [4] Li Huaqi,Pan Yunzhi:A study on the application of punitive damages in environmental civil public interest litigation[J]. Legal Application,2020,No.23,p.124-133.
- [5] Wu, Z., He, Y. L.: On the prudent application of punitive damages in ecological environmental damage litigation, Nanjing Social Science, 2021,No.9,p.91-100.
- [6] Li Dan. The limitation of the subject of punitive compensation claim for environmental damage[J]. Guangdong Social Science,2020,No.3,p.246-253.
- [7] Wang Chong. Review and regulation of the punitive damages system for environmental torts in the Civil Code [J/OL]. Journal of Chongqing University (Social Science Edition):1-15 [2022-01-04]. http://kns. cnki.net/kcms/detail/50.1023.C.20211020.1812.002.html.
- [8] Wu, Sat. On the prudent application of punitive damages in ecological environmental damage litigation [J]. Nanjing Social Science,2021,No.9,p.91-100.
- [9] Ji Linyun, Han Mei. Exploration of punitive compensation system for environmental damage[J]. Environmental Protection,2017,No,20,p.52-56.
- [10] Liu, Lun-Shan, Zhang, Shao-Kun. How to determine the damage multipierin virtual governance cost method [J]. China Environment,2017,No.7,p.52-54.
- [11] Wang Liming. Research on Punitive Damages [J]. China Social Science, 2000, No4, p.112-122.
- [12] Zhou Xiaoran. On the Construction of Punitive Damages System in Environmental Civil Public Interest Litigation [J]. Journal of Central South University (Social Science Edition),2018,No.2,p.52-62.
- [13] Lv Zhongmei, Zhang Zhongmin, Xiong Xiaoqing. A Survey on the Current Situation of Environmental Justice in China: A Sample of One Thousand Environmental Adjudication Documents[J]. Jurisprudence, 2011,No.4,p.82-93.
- [14] Yang Huixin. Study on Punitive Damages in Public Interest Litigation [J]. Comparative Study, 2021, No.4, p.115-127.