



OWNERSHIP OF INVASIVE FISH UNDER POSITIVE LAW IN INDONESIA

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ABSTRACT

This research focuses on analyzing the legal provisions for the ownership and import of invasive fish species in Indonesia, as well as the effectiveness of their implementation in protecting aquatic ecosystems from ecological threats. This research uses a juridical-normative approach with a qualitative analysis of applicable laws and regulations, a study of court decisions, and a review of scientific literature related to cases of the spread of invasive alien species (AIS). The results show that Indonesia has a fairly strong legal framework through Law Number 21 of 2019 concerning Quarantine and Law Number 31 of 2004 concerning Fisheries (as amended by Law Number 45 of 2009). However, weaknesses in implementation aspects, such as minimal supervision at water entry points, weak public legal literacy, and suboptimal coordination between institutions, remain major obstacles. This research implies the need to strengthen the quarantine system, implement multidimensional legal accountability (criminal, civil, and administrative), and develop a National Action Plan for Invasive Species Control based on scientific data as a long-term strategic step.

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1. INTRODUCTION

Over the past decade, the spread of invasive aquatic species has escalated significantly, posing a serious threat to local ecosystems, including those in Indonesian waters (Akbar & Rahayu, 2023). This issue not only represents an ecological crisis but also has complex socio-economic repercussions (Kaunang, 2022). According to the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES, 2023), invasive species are identified as one of the five key factors driving global biodiversity loss (Schmeller & Bridgewater, 2021).

Indonesia, as an archipelagic nation with rich freshwater biodiversity, faces mounting ecological threats from the introduction of alien species like Arapaima gigas and Alligator gar. These species, with their high reproductive rates, opportunistic predatory behavior, and lack of natural enemies in the new environment, are capable of disrupting the delicate balance of ecosystems. The rapid spread of such species reflects the urgent need for action to protect the sustainability of fisheries and long-term ecological resilience. Despite the growing threat, research on the regulation of invasive species, particularly within Indonesia's legal framework, remains limited. Although there is considerable literature discussing the broader environmental impacts of invasive fish, few studies have specifically focused on Indonesia's fisheries law, especially regarding the ownership and distribution of invasive fish species under Law Number 45 of 2009.

For instance, Aisyah (2022) highlighted the need for a robust legal framework to curb the spread of alien species, attributing the failure of many control measures to weak enforcement. Similarly, Daneshmandi et al.

(2022) stressed the importance of community involvement and legal education in preventing the spread of non-native species. However, these studies rarely address the specific legal instruments in Indonesia, such as the enforcement of regulations under the 2009 Fisheries Law, which remains crucial in managing the ownership and distribution of invasive species.

This research aims to bridge this gap, focusing on the implementation of Law Number 45 of 2009 in controlling invasive fish. Few studies have explored how Indonesian legal norms interact with field practices, particularly concerning sanctions and the monitoring of community-based conservation efforts. Given the increasing threats from invasive species and the ineffective enforcement of existing laws, there is a pressing need for research that addresses how legal frameworks can be more effectively implemented. The urgency of this research is underscored by empirical findings that invasive fish species are no longer confined to private ponds but have migrated to public waters, including rivers, lakes, and conservation areas. The widespread release of these species, often driven by overpopulation in private ponds or a lack of ecological awareness, has become a primary means by which these species enter local ecosystems. However, this issue is exacerbated by the lack of a functioning legal sanction system, as massive trade in invasive species continues through digital platforms with minimal oversight. This has contributed to ecosystem degradation, the extinction of endemic species, and long-term declines in aquatic productivity, threatening the sustainability of fisheries. Concrete data points to declining fish yields and the extinction of native species, highlighting the economic consequences of unchecked invasive species. For example, in several regions, the spread of invasive species has led to the collapse of local fisheries, resulting in decreased income for communities dependent on fishing. The inefficacy of current legal frameworks, coupled with the absence of strong enforcement mechanisms, exacerbates these issues, emphasizing the need for comprehensive and integrated policies that can mitigate these impacts.

Given these challenges, this study aims to evaluate how Indonesia's fisheries law, specifically Law Number 45 of 2009, regulates the ownership and distribution of invasive fish, identifies sanctions for violators, and assesses the effectiveness of these legal measures in practice. By analyzing the gaps in implementation and offering recommendations for policy improvements, this research seeks to contribute to more responsive and evidence-based management of invasive species. The novelty of this research lies in its focus on the national legal framework and its critical analysis of the effectiveness of sanctions under the 2009 law and its derivatives. This study is expected to make significant contributions to the development of environmental law and biodiversity conservation in Indonesia, providing both academic insight and practical input to help formulate more effective policies for managing invasive fish species. The findings will offer an in-depth understanding of the legal and enforcement mechanisms necessary to combat the spread of invasive species and safeguard Indonesia's aquatic ecosystems for future generations.

2. RESEARCH METHODS

This research adopts a normative juridical method, which emphasizes the study of legal norms contained in statutory regulations (Zainuddin & Karina, 2023). This approach is deemed appropriate because it aligns with the research objective namely, to analyze the regulation of ownership and distribution of invasive fish species within Indonesia's positive legal system. The normative juridical approach views law as a coherent system of norms and is therefore doctrinal in nature, treating legal rules as autonomous and systematic elements requiring interpretation within the context of existing legislation.

The selection of this approach is grounded in the aim to provide a comprehensive understanding of how current legal provisions govern invasive species and the extent to which these regulations are enforced. Additionally, it allows the researcher to identify gaps or inconsistencies in legal norms without relying on empirical field data.

This study relies on secondary data obtained through library research, with primary legal sources including Law Number 45 of 2009 concerning amendments to Law Number 31 of 2004 on Fisheries, as well as implementing regulations such as ministerial decrees from the Ministry of Maritime Affairs and Fisheries related to invasive species control. Secondary legal materials encompass legal literature, journal articles, previous research findings, and official reports from government institutions. Furthermore, credible non-legal sources such as media reports, policy briefs, and institutional documents are used to enrich the legal context.

Data collection involved systematic searching, selection, and documentation of relevant legal texts and scholarly materials. Each source was verified for authenticity and relevance to ensure accuracy and reliability. To maintain the validity and reliability of the study, only authoritative publications and regulations officially issued by state institutions or peer-reviewed academic sources were considered.

The data analysis was conducted qualitatively using legal interpretation methods, including grammatical, systematic, and teleological interpretations. These techniques were used to derive the normative meaning of legal provisions and assess their relevance and implementation in actual situations. While the study does not involve primary empirical data such as interviews or surveys, it incorporates descriptive analysis of selected case studies

involving the release or possession of invasive fish in Indonesia. These case studies serve to illustrate the application of existing regulations and to identify potential legal or enforcement challenges.

3. RESULT AND ANALYSIS

Legal Provisions for Ownership and Import of Invasive Fish in Indonesia

The spread of invasive alien species (AIS) is a major threat to the sustainability of aquatic ecosystems in various regions of the world, including Indonesia (A. N. Putri & Adepio, 2025). The presence of non-endemic species, particularly non-native fish species, has been shown to trigger environmental degradation, decline in native species populations, and disrupt the balance of trophic chains in aquatic ecosystems. In response to this potential damage, the Indonesian government has formulated legal instruments as a preventive and repressive response (Agus Putra et al., 2024). One important legal basis in this context is Law Number 21 of 2019 concerning Animal, Fish, and Plant Quarantine. This regulation not only regulates the procedures for the importation of foreign organisms into Indonesian territory but also mandates the implementation of a quarantine system as a strategic instrument to protect national biological resources and ward off the risk of disease and pests from abroad (Cuthbert et al., 2022).

Article 1 paragraph (1) of Law Number 21 of 2019 emphasizes that the quarantine system is a preventive instrument to prevent the spread of disease and the entry of invasive foreign species that could threaten the balance of local ecosystems. This provision implies that all activities involving the import of foreign fish into Indonesian territory must be subject to strict inspection and monitoring procedures. However, a study conducted by Linasta (2024) revealed that supervision at several entry points, such as small ports and regional airports, remains weak, thus opening up opportunities for the entry of invasive species without going through the official quarantine process. This finding indicates a gap between existing normative regulations and technical implementation in the field, particularly regarding infrastructure readiness and the quality of human resources responsible for supervision.

Furthermore, Article 7 of Law Number 21 of 2019 emphasizes that the implementation of the quarantine system is not only aimed at preventing the entry and spread of pests and diseases, but also aims to ensure the sustainability of the ecosystem and maintain national food security. Quarantine procedures are designed in stages as stipulated in Article 16 paragraph (1), which includes a series of actions ranging from physical examination, isolation, observation, special treatment, detention, and even destruction if deemed necessary. However, according to findings by Maemuna & Utani (2024), not all quarantine technical implementation units have adequate facilities to optimally implement all these stages. This situation has resulted in a number of foreign species, such as *Arapaima gigas* and *Piaractus brachypomus*, escaping the quarantine process and entering public waters, ultimately threatening the sustainability of local fish in their natural habitat.

The administrative aspects of the quarantine system play a strategic role in reducing the risk of the entry of dangerous aquatic species. To import live fish from abroad, complete official documents are required, such as a Health Certificate from the country of origin, a Certificate of Origin (CoO), and a Live Fish Import Permit. However, a study conducted by Achmad et al. (2024) revealed that compliance with these administrative provisions remains relatively low, especially in the ornamental fish trade sector, which is widely conducted through digital platforms. Many small-scale businesses import fish informally without legal documentation, and when they can no longer afford to keep them, they often release them into the wild. This practice exacerbates challenges in mitigation and monitoring efforts and increases the potential for the spread of invasive alien species in Indonesian waters.

As an additional preventative measure, the Indonesian government has adopted the Invasive Alien Species Risk Analysis (ISA) mechanism, as stipulated in Decree of the Head of the Fish Quarantine Agency Number 107/KEP-BKIPM/2017. This system aims to assess a species' potential for invasiveness through a series of scientific indicators, including aggressiveness, reproductive ability, adaptability to new environments, and its impact on native species. The results of this analysis are categorized into three risk levels: low, medium, and high, which then serve as the basis for formulating mitigation policies. Faizah et al. (2024) noted that this risk-based approach has been effectively implemented in several developed countries such as Australia and Japan. However, in Indonesia, its implementation still faces various obstacles, such as limited integration of comprehensive species data and the lack of national reference laboratories that meet scientific standards.

Table 1. Parameter Classification

Risk Parameter	Description
High Reproductive Capacity	Accelerates the spread of invasive populations
Predatory or Dominant Nature	Disrupts native species in the food chain
Broad Environmental Adaptability	Capable of surviving in various aquatic conditions
Absence of Natural Predators	Population remains uncontrolled in the wild

Potential to Transmit DiseasesHarmful to local species and humans

A research report from the Fisheries Research Center (2023) shows that only a small portion of fish entry points are equipped with adequate quarantine facilities. Furthermore, weak inter-agency coordination and limitations in the reporting system for the presence of invasive species hamper a rapid response to the introduction of non-endemic fish into open waters (Susilowati et al., 2024). This situation is exacerbated by low public awareness of the ecological impacts of releasing non-endemic fish into the environment, such as rivers, lakes, and public ponds. Many residents are unaware that such an action constitutes a legal violation that carries sanctions. Therefore, increasing human resource capacity and developing community-based public literacy programs are strategic recommendations for strengthening the effectiveness of quarantine policy implementation in the field.

Thus, Law Number 21 of 2019 has provided a solid legal foundation for preventing the spread of invasive alien species through the implementation of a structured and comprehensive quarantine system. However, the effectiveness of this regulation's implementation is largely determined by synergy between sectors, strengthening monitoring facilities and infrastructure, and improving public ecological literacy. The findings of this study confirm that the primary problem lies not in a lack of legal norms, but rather in weak implementation in the technical and social spheres. Therefore, reforms to the quarantine system's governance are needed, making it more responsive, inclusive, and supported by the use of information technology to ensure the continued protection of Indonesia's aquatic ecosystems from the threat of invasive alien species.

Legal Responsibility for Ownership of Invasive Fish

Protecting aquatic ecosystems from the threat of invasive fish species is now understood not only as an ecological issue but has also been recognized as part of positive legal norms in Indonesia (Ramadian & Muthmainnah, 2023). Regulations regarding the ownership and distribution of non-endemic fish that have the potential to damage the environment are explicitly stated in Article 16 paragraph (1) in conjunction with Article 88 of Law Number 31 of 2004 concerning Fisheries, as amended by Law Number 45 of 2009. These regulations prohibit any individual from importing, trading, keeping, or releasing fish species that risk causing ecological impacts, disrupting cultivation activities, polluting waters, and damaging local fish populations. Violations of these provisions are punishable by a maximum prison sentence of six years and a maximum fine of IDR 1.5 billion. These criminal provisions reflect the state's position that considers the threat of invasive fish a serious issue that directly impacts the resilience of the fisheries sector and the sustainability of the national aquatic ecosystem (Hidayat et al., 2024).

However, in practice, law enforcement regarding the possession of invasive fish species in Indonesia still tends to focus on a repressive approach through criminal instruments. Civil and administrative legal accountability mechanisms, particularly those related to ecological restoration efforts resulting from the release of invasive fish into aquatic environments, have not received proportional attention in law enforcement practices. This situation reflects an imbalance in legal protection for the environment. In fact, in accordance with the principles of environmental justice, environmental protection should not only focus on punishing perpetrators but also prioritize comprehensive restoration of ecological damage (Purwanto, 2024). Therefore, a strengthened environmental law paradigm is needed, encompassing the integrated application of criminal, civil, and administrative sanctions to achieve sustainable ecological justice.

One example of the application of criminal provisions in fisheries cases related to invasive species can be found in the decision of case No. 286/Pid.Sus/2024/PN Mlg. In this case, the defendant, Piyono, was sentenced for possessing five alligator gar fish kept in his fishing pond in Malang, East Java. These fish are categorized as a dangerous species and their presence is prohibited in Indonesia under Regulation of the Minister of Maritime Affairs and Fisheries of the Republic of Indonesia No. 19/PERMEN-KP/2020. This prohibition policy was based on the results of a biological and ecological risk analysis, which stated that alligator gar are invasive predators that can disrupt the balance of local aquatic ecosystems and threaten the survival of endemic species.

The law enforcement process in this case reflects concrete action by law enforcement officials in responding to violations of fisheries regulations. The Malang Police's Specific Crimes Unit (Tipidter) successfully discovered the presence of the invasive species in the defendant's pond, which was then followed up through the judicial process. In its verdict, the panel of judges sentenced the suspects to five months in prison and a fine of IDR 5 million, with the possibility of alternative imprisonment if the fines are not paid. Furthermore, the five fish used as evidence were ordered to be destroyed by the relevant authorities. This ruling constitutes important jurisprudence, confirming that the provisions of the Fisheries Law have concrete force and can be effectively applied to actual violations of the illegal possession of invasive fish species (Puspoayu et al., 2021).

However, law enforcement against the ownership of invasive fish species remains limited and uneven, particularly in reaching all regions and actors involved, particularly in the online ornamental fish trade. Many owners of these species are unaware that their actions constitute a violation of the law, thus the practice of ownership and distribution continues to be clandestine. A study by Sari et al. (2021) revealed that online platforms are the primary channel for the distribution of invasive fish, due to weak oversight systems and limited detection

by law enforcement. This situation is exacerbated by the lack of a national-scale digital-based tracking system to monitor the distribution of these species, particularly in remote areas with minimal oversight from central authorities.

Therefore, although Indonesia has a relatively robust legal framework, its effective implementation still requires strengthening through cross-sectoral collaboration. Integrated coordination is needed between the Ministry of Maritime Affairs and Fisheries, the Indonesian National Police, the Ministry of Environment and Forestry, and local governments to expand the scope of supervision and improve the effectiveness of law enforcement. On the other hand, public education efforts regarding the ecological risks posed by invasive species must also be intensified to discourage people from keeping or releasing dangerous fish into natural aquatic habitats. This approach aligns with the principles of participatory natural resource management, where communities are positioned not merely as subjects regulated by law but also as strategic actors in maintaining environmental sustainability (Putra et al., 2024).

As a follow-up, it is necessary to formulate complementary policies that open up space for the application of civil legal liability for ecological losses arising from the spread of invasive fish. Furthermore, the imposition of administrative sanctions on business actors, such as the suspension of operational activities or the revocation of licenses for distributors or sellers of invasive fish, is an urgent need that cannot be ignored. These measures not only serve as a deterrent but also represent the state's commitment to ensuring the sustainability of fishery resources and maintaining the integrity of aquatic ecosystems. Thus, a multidimensional legal approach serves as a strategic foundation for building a fair, integrated, and sustainable environmental protection system.

The Urgency of Harmonizing Laws and National Strategies for Controlling Invasive Fish

The issue of invasive fish ownership and distribution in Indonesia has become a significant concern within the national legal framework, given its significant impact on the stability of aquatic ecosystems and the survival of native species. One of the primary legal bases governing this issue is Law Number 31 of 2004 concerning Fisheries, which was later amended by Law Number 45 of 2009. Article 16 paragraph (1) in conjunction with Article 88 expressly prohibits any individual from importing, trading, keeping, or releasing fish species that could cause environmental damage or hinder fishing activities. Violations of this provision are punishable by a maximum of six years' imprisonment and a fine of up to IDR 1.5 billion. This regulation demonstrates the state's commitment to anticipating the ecological risks posed by invasive alien species and is part of a preventative strategy to maintain the sustainability and resilience of national fisheries resources.

However, the implementation of law enforcement regarding invasive fish ownership at the practical level remains limited and tends to be oriented solely toward criminal prosecution. This dominant repressive approach has failed to address the ecological restoration aspects resulting from the release of invasive species into the aquatic environment. In fact, according to the contemporary environmental law paradigm, law enforcement ideally encompasses two important dimensions: action against perpetrators (repressive) and restoration of environmental damage (restorative). This view is reinforced by (Sinaga, 2024), who emphasizes the urgency of implementing civil sanctions in the form of ecological compensation and habitat restoration as a form of sustainable accountability. Unfortunately, this restorative legal approach is still rarely implemented in handling invasive fish cases in Indonesia.

One concrete example of the application of criminal provisions in the case of invasive species ownership is reflected in criminal case number 286/Pid.Sus/2024/PN Mlg. In this case, a resident named Piyono was charged with keeping five alligator gars in his fishing pond in Malang, East Java. Alligator gar are categorized as a dangerous species according to the provisions of the Minister of Maritime Affairs and Fisheries Regulation Number 19/PERMEN-KP/2020. This species is known for its aggressive predatory characteristics, large size, and high adaptability, which, if released into the natural environment, could threaten the existence of native species. Therefore, keeping them is considered a violation of the law, potentially causing serious ecological impacts on the balance of the local aquatic ecosystem.

During the trial, police officers from the Specific Crimes Unit (Tipidter) successfully proved that the defendant intentionally violated the law by keeping a prohibited species. Based on the examination, the panel of judges sentenced him to five months in prison and a fine of Rp 5 million, with the provision of alternative imprisonment if the fine is not paid. Furthermore, five fish used as evidence were ordered to be destroyed by the competent authorities. This ruling demonstrates that the Fisheries Law can be effectively implemented if cases are reported and directly detected. However, this case-by-case approach to law enforcement has not yet established a structured and sustainable enforcement system.

On the other hand, the reality on the ground shows that invasive fish ownership in Indonesia is still prevalent and clandestine, particularly through online ornamental fish trade channels that are difficult to access through conventional oversight mechanisms. Research by A. K. Putri et al. (2023) noted that dangerous alien fish species such as Arapaima, Piranha, and Alligator gar are still widely circulated on various digital platforms, including

marketplaces and social media. This situation reflects not only the weak control system of authorized agencies but also the low legal and ecological literacy among the public regarding the risks of keeping invasive species. Without an integrated oversight system capable of reaching remote areas, the spread of invasive fish will remain a potential ongoing threat to the sustainability of Indonesia's aquatic ecosystems.

Therefore, strengthening oversight and law enforcement against the spread of invasive species requires more integrative cross-sectoral synergy. The Ministry of Maritime Affairs and Fisheries, the Indonesian National Police, the Ministry of Environment and Forestry, and local governments need to establish solid coordination to create an invasive species control system based on technological advances, increased public literacy, and progressive legal principles. Public education efforts through legal outreach and environmental awareness programs must be intensified to foster a collective understanding of the negative impacts of invasive alien species. Furthermore, strategic collaboration with local communities, environmental civil society organizations, and academics is crucial to ensure that every policy formulated is contextual, applicable, and aligned with the social realities on the ground.

As a strategic follow-up, a strengthened regulatory framework is needed to enable the implementation of civil and administrative legal accountability for environmental damage caused by the spread of invasive fish. The government also needs to initiate the development of a National Action Plan for Invasive Species Control that is cross-sectoral and based on scientific evidence. Through a holistic, integrative, and long-term approach, it is hoped that Indonesia can address the threat of invasive alien species more effectively, while strengthening the resilience of national fisheries resources and maintaining the sustainability of aquatic biodiversity as a whole.

4. CONCLUSION

This study confirms that although Indonesia has a comprehensive legal framework to regulate the ownership and import of invasive fish species through Law Number 21 of 2019 concerning Quarantine and the Fisheries Law, its implementation still faces significant challenges, particularly in aspects of oversight, technical infrastructure, and public legal literacy. These findings suggest that the root of the problem lies not in a lack of norms, but rather in weak inter-agency coordination and the ineffectiveness of legal implementation in the field. A key lesson learned from this study is the need for a paradigm shift from a merely repressive approach to a preventive and restorative approach focused on comprehensive ecosystem protection. From a theoretical perspective, this study emphasizes the urgency of integrating ecological justice principles into Indonesian environmental law, while from a practical perspective, it emphasizes the importance of public literacy and multi-sector synergy as the foundation for more adaptive and sustainable policies.

The primary contribution of this research lies in enriching the body of knowledge in the field of environmental law and biodiversity conservation, particularly in the context of aquatic invasive species control in Indonesia. This research not only reinforces the urgency of legal harmonization and strengthened oversight, but also opens a new discourse regarding the need for civil and administrative accountability as a complementary form of criminal sanctions. Furthermore, the proposal to develop a National Action Plan for Invasive Species Control based on scientific evidence is a strategic innovation worthy of further action by policymakers. However, the study's limitations lie in its scope, which still focuses on a normative legal approach and does not encompass variations in social contexts such as regional differences, gender, and age of perpetrators. Therefore, further research using a multidisciplinary approach, national-scale surveys, and the use of real-time species mapping technology is essential to obtain a more comprehensive picture and serve as a basis for formulating environmental policies that are more effective and responsive to the challenges of the times.

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