



Study on the decline of wildlife population in nature due to illegal breeding and hunting: Implications for biodiversity conservation

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ABSTRACT

Background: Poaching of wildlife, including protected species, is on the rise, partly due to increased demand in the world market. Therefore, this journal aims to examine the problems faced by Indonesia in dealing with wildlife trade crimes that still occur frequently, as well as the implementation of Law Number 5 of 1990 related to law enforcement for wildlife protection in Indonesia. **Methods:** The research method used is qualitative, by collecting data from books, articles, news, and journals. The analysis involved theories, concepts, legal principles, and regulations in the Act, as well as related case studies in Indonesia. **Findings:** The results show that although Indonesia has Law No. 5 of 1990, it is still lacking in effectiveness in reducing poaching and trade of wild and protected animals. Law enforcement officials and related agencies face various problems in the implementation of law enforcement. Community involvement in the endangered species trade is a key driver of the illegal keeping trend in Indonesia. **Conclusion:** The rate of prosecutions and convictions of illegal keepers remains low, creating inequalities in sentencing and giving the impression that the risks of this illegality are relatively low compared to the financial gains possible. **Novelty/Originality of this article:** This article highlights that collaboration between the government, communities and non-governmental organizations can provide additional support in conservation efforts and handling illegal cases.

KEYWORDS: law enforcement; illegal trade; wildlife.

1. Introduction

Indonesia is home to about 12% of mammals, 16% of reptiles and amphibians, 17% of birds, 10% of flowering plants, and about 25% of all fish species (Puspitasari et al., 2021). According to data from Profauna Indonesia, there are 515 species of mammals, 384 species of birds, and 173 species of amphibians in Indonesia. This biodiversity is spread across about 17,500 islands stretching across Indonesia, including 259 endemic species that can only be found on certain islands, such as anoa in Sulawesi, cendrawasih in Papua, and Sumatran tigers in Sumatra. This high level of endemism characterizes the unique amount of biological and non-biological diversity that inhabits the Indonesian archipelago (Cleary & DeVantier, 2011). Indonesia's biological and non-biological diversity is of great benefit, providing opportunities for the country to increase economic income, especially for communities living around these habitats (Samal & Dash, 2023). The uniqueness of this biodiversity has also led some to see it as an opportunity for trade, either in its entirety or by selling parts of the unique and rare animals (Hughes et al., 2023). Unfortunately,

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increased demand for wildlife, including protected species, has led to an increase in poaching activities. Increased global demand contributes to this phenomenon, as it fulfills the needs of the world market.

Although the law prohibits the keeping, possession, hunting and trade of protected wildlife, people often have difficulty distinguishing between protected and non-protected animals. The decline of endangered wildlife populations in Indonesia continues to occur due to various threats that lead to the extinction of these species. Factors such as over-exploitation of forests, burning of forests for settlement development, and poaching and trade of wildlife in various parts of Indonesia have exacerbated this situation. The high demand for wildlife creates conditions where poaching, trade and smuggling take place on a large scale, which in turn results in the depletion of endangered species. The desire for high prices for extremely rare species further fuels these activities (Hughes et al., 2023). Lack of monitoring and law enforcement on the exploitation of endangered species has led to further depletion of their populations, and ironically, people themselves are unwittingly contributing to their depletion.

According to Profauna, there are at least two factors that cause wildlife extinction in Indonesia. The first is habitat reduction and destruction, and the second is wildlife poaching and trade. The decline in forest area is a major factor in wildlife extinction. In the 1950s, Indonesia was reportedly 84 percent forested, around 162 million hectares, but the current government claims that Indonesia's forest area has decreased to around 138 million hectares. In addition, poaching is a serious threat to wildlife sustainability, apart from the wildlife trade itself. Based on monitoring and recapitulation data from the Wildlife Crime Unit (WCU) during 2012-2014, 80% of the wildlife trade in Indonesia came from illegal hunting in the wild. In fact, poaching is the biggest threat to wildlife survival, even more significant than habitat loss or destruction.

In response to the problem of illegal trade in endangered animals, an organization that aims to protect wildlife, both protected and unprotected, has been established and named the International Union for Conservation of Nature and Cultural Resources (IUCN). The establishment of IUCN aims to remind the public and policy makers of the importance of protecting the environment and the urgency of the conservation issues at hand. The organization encourages the improvement of the rarity status of animal species that must be conserved. Efforts to regulate international trade in wild plants and animals have been taken, including the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). One of the objectives of CITES is to establish a global trade control system for plants, wildlife and their products (harfoot et al., 2018).

Control over the trade is based on the reality that illegal exploitation of the animal trade can occur indefinitely, threatening the survival of plant and animal species. In Indonesia, regulations related to the conservation of biological natural resources and ecosystems are currently embodied in Law Number 5 of 1990 concerning the Conservation of Biological Natural Resources and Their Ecosystems (KSDAHE Law). The KSDAHE Law generally regulates the protection of life support systems, the maintenance of plant and animal species diversity in ecosystems, and the sustainable use of biological natural resources and ecosystems. However, in reality, the protection of animals in Indonesia still receives less attention and is considered a routine problem, and has not been optimal in dealing with the problem of illegal animal trade (Riyadi et al., 2023).

Indonesia is a country with the greatest biodiversity in the world. However, excessive exploitation and the illegal wildlife trade that threatens extinction are rapidly increasing. According to the report by Pereira & Linkie (2015), illegal hunting of wildlife, including protected species, continues to rise due to global market demand. This phenomenon contributes to the decline of rare species populations and can trigger mass extinction. Therefore, the objective of this paper is to analyze the specific issues that Indonesia faces in enforcing laws related to protected wildlife. A thorough examination of the implementation of regulations concerning protected wildlife and the challenges in law enforcement is the focus of the study. Consequently, concrete steps are expected to be proposed to strengthen conservation efforts for rare wildlife in Indonesia.

2. Methods

The research method employed in this study is a qualitative method. According to Creswell (2017), qualitative method is an approach to explore and understand meanings that individuals or groups attribute to social or human problems. Data collection was conducted through literature sources such as reports, journals, books, and official publications from institutions related to the topic of the illegal trade of rare wildlife in Indonesia. The acquired data was then analyzed by describing findings associated with relevant theories and concepts. The data analysis process utilized an inductive approach where patterns, themes, and categories of data were identified to construct a comprehensive explanation of the studied issue. As Creswell (2017) suggests, qualitative data analysis is iterative and continually evolves until definitive findings are obtained. The interpretation of data and constructed meanings were then presented in the form of a narrative description supported by empirical data and arguments based on literature reviews.

Descriptive analysis is conducted with the aim of presenting data findings systematically so that they can be easily understood. According to Lambert & Lambert (2012), descriptive analysis aims to depict the nature of a condition that is temporarily occurring at the time the research is conducted and examines the cause-and-effect of a specific phenomenon. In this study, descriptive analysis is used to explain the situation of the illegal trade of rare wildlife in Indonesia based on data and facts obtained from reliable sources. Data is categorized based on major themes such as the types of traded wildlife, the actors involved, and the patterns and trends of the illegal wildlife trade activities. These data categories are then interpreted and explained in detail, supported by arguments from relevant literature. Data interpretation also involves cause-and-effect analysis to examine various triggering factors and impacts of the rampant illegal wildlife trade in Indonesia. The relationships between variables are analyzed and explained comprehensively to obtain a thorough understanding of the researched phenomenon. Findings from the descriptive analysis are then summarized and presented in a systematic, logical, and coherent narrative for easy comprehension.

3. Results and Discussion

3.1 Community involvement in the animal trade

Community involvement in wildlife trade is a central element that reinforces the sustainability of the illegal breeding trend in Indonesia. Descriptively, the participation and interest of the community in acquiring or owning rare wildlife create significant pressure on the survival of these populations. Cultural factors, beliefs, and the desire to demonstrate social status can encourage people to engage in the trade of rare wildlife. For example, traditional beliefs or the view that keeping rare animals can bring luck play a crucial role in community involvement. Survey data from Conservation International (CI) in 2021 indicates that some communities still have a limited understanding of the negative impacts of the trade in rare wildlife. Up to 30% of respondents stated their ignorance regarding the contribution of buying or owning rare wildlife to population decline and ecosystem fragility. Adams (2018) emphasizes that economic aspects play a key role in community involvement, where the existence of black markets and high demand creates financial incentives for people to engage in such illegal activities. Psychological analysis indicating that the desire to own or showcase rare wildlife as a symbol of social status can be a strong factor driving community involvement. Emotional factors and the desire for exclusivity also shape the community's perception of rare wildlife conservation. In this context, there is an urgent need to adopt educational approaches and awareness campaigns that can enhance public awareness. These efforts are aimed not only at highlighting the negative consequences of

wildlife trade but also at presenting alternatives that meet the cultural and economic needs of the community without compromising the sustainability of rare wildlife.

In responding to the continued high involvement of the community in the illegal trade of rare wildlife, a holistic approach is needed. Education and awareness campaigns must be designed to change perceptions and motivate the community to shift towards sustainable alternatives. Furthermore, there is a need for collaboration between the government, non-governmental organizations (NGOs), and the private sector to create resilient conservation initiatives. Strengthening regulations and law enforcement is crucial, including imposing strict sanctions on offenders. In developing solutions, it is important to actively involve the community and understand the cultural context that underlies their involvement in the trade of rare wildlife.

3.2 Protected animal husbandry case handling

Based on a study by the Environmental Investigation Agency (EIA) in 2021, the handling of illegal endangered animal keeping cases is still faced with significant challenges. Lack of resources, technological limitations and weaknesses in law enforcement networks are often the main obstacles in investigating and prosecuting perpetrators of illegal wildlife trade. Based on the recent research by Forest Watch Indonesia (2022), it was found that limited human and financial resources pose the main challenges for law enforcement agencies in addressing cases of illegal breeding of rare wildlife. The limited number of investigators affects the difficulty of conducting investigations and routine monitoring of places suspected to be involved in illegal wildlife breeding. Additionally, a lack of budget hampers efforts in patrolling and investigating cases of illegal wildlife trade (Forest Watch Indonesia, 2022). The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) states that harmonization between national and international regulations needs to be strengthened. In some cases, differences in local and national regulations can provide loopholes for perpetrators to evade law enforcement. According to research by the Wildlife Conservation Society (2022), the weak coordination among government agencies and law enforcement authorities poses a significant obstacle in efforts to enforce cases of illegally breeding protected wildlife. Often, there is sectoral ego and a lack of clear task distribution among the police, prosecutor's office, and other relevant agencies.

As a result, the investigation and prosecution processes of these illegal cases proceed slowly and suboptimally (Wildlife Conservation Society, 2022). There is a need for improvement in coordination mechanisms among relevant institutions to enhance the effectiveness of law enforcement. Forensic Working Group (2018) underlined that the handling of illegal keeping cases is also closely related to political and social aspects. There are cases where the involvement of politicians or individuals with great power can hinder the law enforcement process and reduce its effectiveness. According to research by TRAFFIC Southeast Asia (2023), the involvement of officials or politicians often acts as a hindrance in the enforcement efforts against cases of illegal breeding of rare wildlife. The power and influence held by these officials or politicians are sometimes used to protect perpetrators of illegal wildlife trade from legal consequences. Strong political will from the government is required to ensure that law enforcement is carried out impartially. Additionally, bureaucratic reform is necessary to prevent political intervention in the legal processes related to the conservation of rare wildlife (TRAFFIC Southeast Asia, 2023). In such situations, structural reforms and strengthening of law enforcement agencies are crucial. The National Geographic Society (2019) noted that the rate of prosecutions and convictions of illegal wildlife keepers remains low. This factor can create inequalities in sentencing and give the impression that the risks of illegality are relatively low compared to the financial gains possible. In the future, international cooperation in handling illegal wildlife keeping cases is crucial. Collaboration between countries, international agencies and non-governmental organizations can strengthen law enforcement efforts and mitigate animal trafficking more effectively. Efforts to improve the handling of illegal wildlife

keeping cases should involve improving legal infrastructure, allocating adequate resources, and enhancing cross-sectoral and international cooperation.

Problems in Case Handling are as follow. First, inequality of punishment factor. One of the main problems in handling protected wildlife keeping cases in Indonesia is the inequality in punishment. The sanctions applied are often not proportional to the level of crime committed. This creates a loophole for illegal offenders to avoid serious consequences. Second, namely law factors. Although Law No. 5 of 1990 on the Conservation of Natural Resources and Ecosystems imposes quite severe criminal sanctions, its implementation in the field has not proven effective. In fact, law enforcement is carried out with lighter prison sentences than those stipulated in the law, thus not providing sufficient deterrent effect on the perpetrators, allowing them to repeat the illegal acts. This also applies to protected animals, such as Sumatran tigers, which are clearly regulated in the law. Although efforts to conserve and protect protected wildlife and biodiversity continue to be championed, in reality, such efforts are limited to rhetoric and are inadequate without the full support of the authorities to enact and enforce the law in earnest.

Third, lack of Resources. Law enforcement can only be effective if it is supported by adequate facilities, including educated and skilled human resources, sufficient equipment, and adequate finances. However, to date, the reality is that these needs have not been adequately met. This is a major factor in the obstacles faced by field officers, such as the lack of officers who can provide counseling. In conducting counseling, officers must visit a significant number of homes, but personnel shortages, budget constraints, and limited infrastructure are major obstacles. In addition, in conducting investigations, officers must wait for a request from the Gakkum Center to participate, creating a slower and more delayed process.

Fourth, political and Social Aspects. Protected animal keeping cases are also closely related to political and social aspects. The involvement of politicians or high-powered individuals is often an obstacle in the law enforcement process. This creates a situation where political or social interests take precedence over protected animal protection. Fifth, community factors: The lack of public understanding of protected animals creates a situation where many people do not realize the urgency of conserving species protected by law. Lack of knowledge about the types of animals that receive protection is also a problem. Although some individuals are aware of the serious consequences and severe penalties faced by perpetrators of illegal wildlife trade, there are still many who are recalcitrant and stubborn, not realizing the importance of protecting these wildlife for the balance of the ecosystem.

Handling and Law Enforcement Efforts are as follow. First, strengthening National and International Regulations. The importance of harmonization between national and international regulations in handling protected wildlife keeping cases cannot be ignored. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is a crucial framework to address the international trade of protected animals. Second, structural Reform. To address sentencing inequality and law enforcement incompetence, structural reforms in Indonesia's legal system are needed. This involves refining existing laws, improvements in enforcement mechanisms, and increased inter-agency cooperation. Third, public education and Awareness Campaigns. Raising public awareness about the negative impacts of keeping protected animals can help minimize market demand. Education programs and awareness campaigns need to be scaled up to change public perceptions of illegal keeping. Addressing protected wildlife keeping in Indonesia requires a holistic approach involving improved regulations, strengthened law enforcement, and public awareness campaigns. Structural reforms, international collaboration and public education are key to turning the trend of illegal keeping into sustainable conservation efforts.

According to a survey conducted by the Indonesia Wildlife Trade Monitoring Network (2022), the sanctions imposed on perpetrators of illegal breeding of rare wildlife often do not correspond to the level of violations committed. For instance, cases of Sumatran tiger breeding are only punished with 1-2 years of imprisonment, even though the Sumatran tiger

is classified as a critically endangered species protected by law. This has the potential to not deter illegal breeding and may even encourage it, as the perceived legal risk is considered low (Indonesia Wildlife Trade Monitoring Network, 2022). The government needs to review the existing legal framework to impose stricter and more proportional sanctions. The case reflects the challenges and efforts in handling protected animal husbandry in Indonesia. The house had long been under scrutiny by authorities as it was suspected of harboring illegal Sumatran tigers. Information from the local community and intelligence suggested that the tigers were being illegally traded and kept for commercial purposes. The rescue operation involved a joint team from the North Sumatra BKSDA, police, and conservation organizations. After obtaining a search permit from the court, the team conducted a raid at the location. As a result, two Sumatran tigers were found in very poor condition. Evidence of illegal trade such as tiger skins, bones and other products were also found. Although the owner of the house was involved in illegal trade and tiger keeping, the punishment was relatively light. This creates an inequality in sentencing that often does not have a deterrent effect on perpetrators. During the judicial process, it was revealed that the house owner had connections with powerful parties at the local level. This created obstacles to further investigation and put pressure on the legal process. After being rescued, the two tigers were taken to the Wildlife Recovery Center (WRC) for medical treatment and rehabilitation. PPS worked closely with researchers and conservationists to ensure the tigers received optimal care. The owner of the house was prosecuted and convicted in accordance with the Natural Resources and Ecosystem Conservation Act No. 5 of 1990. Although the punishment was not as severe as expected, the case brought media and public attention to the urgency of law enforcement in protecting Sumatran tigers.

3.3 Ecological and economic impacts of illegal rare animal husbandry trends

The trend of illegally keeping endangered animals has serious impacts not only on ecological aspects but also in an economic context. Illegal breeding of rare wildlife has a significant impact on the decline of population and genetic diversity of the species. Wild hunting and trading result in a reduction in the number of individuals and the loss of genetic variation, which can threaten the long-term sustainability of a species. For example, a study on the Javan rhinoceros population found low genetic diversity due to hunting for its horn, making it challenging to recover even through conservation programs. The illegal keeping of endangered animals puts heavy pressure on ecosystems. Illegal trade can cause significant population declines, affect the balance of nature, and threaten the sustainability of the species. For example, when key predators such as tigers and rhinos are in decline, it can lead to population explosions of prey animals, disrupting food chains and ecosystem structure. And ecological impacts according to a study by Dasgupta (2021), revealed that the loss of biodiversity due to illegal maintenance has long-term impacts on ecosystem services. Such services include climate regulation, clean water provision, and soil fertilization.

The loss of key species such as tigers and orangutans can disrupt crucial ecological processes such as pollination, seed dispersal, and food chains. For example, the scarcity of pollinators due to hunting has the potential to threaten plant productivity. Similarly, the reduction of top predators can lead to an explosion in the population of their prey, which can then damage ecosystems. The ecological impacts of illegal wildlife breeding are complex and extensive. Therefore, a decline in endangered wildlife populations can directly harm humans through the disruption of essential natural resources. The illegal keeping of endangered animals creates substantial negative impacts. These losses involve the tourism sector and potentially reduce state revenues. Endangered animals are often the main attraction for ecotourism, and population declines can reduce tourist visits and associated investments. Illegal wildlife trade has the potential to reduce tourist visits and national revenue from the tourism sector. Rare wildlife often serves as the primary attraction for ecotourism destinations. However, hunting and trafficking of wildlife can decrease the populations of these iconic species, negatively affecting tourist interest. Economically, this

trend can lead to significant financial losses for the tourism sector. Adams (2018) highlights that the trade in endangered animals also creates a large black market, which can cause immeasurable economic losses. Illegal keeping involves complex supply chains and multiple actors, creating widespread negative economic impacts, including the loss of legal jobs in the conservation sector. In addition, Dasgupta (2021) points out that the loss of ecosystems and biodiversity can reduce long-term economic resilience. Healthy ecosystems provide ecosystem services that support agriculture, food and other industries. With the loss of these services, communities that depend on these natural resources can face serious economic challenges.

The sustainability of these endangered species is severely threatened by these illegal activities. Population decline and ecosystem damage are serious impacts that require concrete actions to reverse the trend. It is important to change the mindset of illegal maintenance into sustainable conservation efforts to protect the country's biodiversity. The need to improve and strengthen conservation policies is a key step. The government also needs to ensure that existing regulations are not only in line with international standards, as mandated by CITES, but also able to provide effective protection for endangered animals. Policy revisions and improvements can mitigate legal loopholes that are exploited by illegal actors. Efforts to handle illegal keeping cases must be improved through enhanced law enforcement. Improved training and technology provision for law enforcement officers can strengthen enforcement efforts. In addition, measures are needed to ensure strict and effective punishment for illegal offenders, including owners of illegal rearing facilities. Close collaboration between the government, communities and non-governmental organizations is key in turning the trend of illegal rearing into sustainable conservation efforts. The government needs to actively involve communities in conservation efforts by providing an understanding of the negative impacts of illegal rearing. In addition, cooperation with non-governmental organizations (NGOs) can be enhanced to utilize additional resources and expertise in conservation efforts. Increasing the level of public education and awareness on the importance of endangered species conservation is also crucial. Educational programs can help change people's perceptions of illegal keeping and encourage them to take part in environmental conservation efforts. The government and NGOs can collaborate in developing effective outreach campaigns. By implementing these measures, it is hoped that Indonesia can strengthen its role as a conservation nation committed to protecting the sustainability of biodiversity, combating illegal keeping, and providing a valuable legacy for future generations.

3.4 The role of government in conservation policy and the involvement of non-governmental organizations in the trend of illegal rare animal keeping

Indonesia's natural wealth is spread across all the islands in the country. Various species of animals are endemic, meaning that they only exist in Indonesian habitats and are characteristic of the island where they are located. In Indonesia, these animals are becoming more and more endangered as time goes by. They have become rare and extremely rare in their own native habitats. The population of these animals is decreasing, making it increasingly difficult to identify them in their natural habitat. In addition, by conserving wildlife, the government emphasizes the importance of cooperation with industry, government, organizations, or the private sector in addressing the threat of extinction and illegal trade. Supervision of the circulation of animals that are the object of trade, in accordance with the allocation of capture and collection in their natural habitat, is carried out through the issuance of Animal Transport Letters, both within and outside the country. This is clearly regulated in Minister of Forestry Decree No. 447/Kpt-II/2003. Many endangered animals kept and traded in animal markets are often categorized as protected or endangered. In essence, conservation is an effort to protect, maintain, and utilize biological natural resources and their ecosystems in a sustainable manner. Effective conservation policies and regulations are a crucial foundation for efforts to protect rare

wildlife from the threats of illegal trade. The Indonesian government needs to refine and enforce laws related to the protection of wildlife and its habitat, as well as enhance the capacity of conservation institutions. For instance, the revision of the Conservation of Natural Resources Law No. 5 of 1990 could strengthen the legal framework for the conservation of rare wildlife in Indonesia.

Governments play a central role in maintaining the sustainability of endangered species through the creation of effective conservation policies. A study by the Ministry of Environment and Forestry (2019) illustrates that national policies, such as the National Tiger Recovery Plan, are important instruments in the government's efforts to protect endangered species. However, descriptive analysis shows that the implementation of such policies is often faced with implementation challenges, including limited resources and lack of inter-agency coordination. The importance of the government's role in handling illegal wildlife keeping cases is also reflected in legal policies. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) provides an international framework that guides countries, including Indonesia, to establish rules and sanctions related to the illegal trade of endangered animals (CITES, 2022). However, the analysis notes that law enforcement is often ineffective and needs to be improved.

Non-governmental organizations (NGOs) play an important role in addressing the trend of illegal keeping of protected animals. The Wildlife Conservation Society (WCS) and Traffic, for example, have been active in conservation efforts and engaging communities in natural resource management (WCS, 2020; Traffic, 2021). NGOs can provide technical knowledge, financial resources and critical policy support. NGO involvement is not only about handling illegal cases, but also about preventive approaches. NGOs are often involved in community education, training law enforcement officers, and developing policies that support endangered species conservation. NGOs can also provide a voice and advocacy to strengthen conservation policies at the national and international levels. However, NGO involvement does not always align with government policies. Sometimes, differences in approach and priorities can cause tension between the government and NGOs. Therefore, collaborative efforts and continuous dialog are needed to achieve more effective outcomes. The coordination challenges between NGOs and the government due to differing visions and approaches. For example, NGOs tend to prioritize habitat protection, while the government often focuses on sustainable utilization. Dialogues and strategic partnerships are needed to bridge these differences for the conservation goals of rare wildlife. The government also needs to empower local NGOs with direct access to communities in conservation locations. Recent research by WWF Indonesia (2022) recommends improving coordination between the central government, local authorities, and NGOs in formulating policies for the conservation of rare wildlife. For example, through regular multi-stakeholder forums. Moreover, clear role delineation between the government and NGOs, according to their respective capacities, is essential. Therefore, conservation efforts for rare wildlife can be conducted in an integrated and sustainable manner (WWF Indonesia, 2022). Thus, the government's role through effective conservation policies and the involvement of NGOs through research, education, and advocacy are crucial to protect Indonesia's rare wildlife from the threats of illegal trade.

3.5 Rare animals that are often kept illegally in Indonesia

Indonesia, with its incredible biodiversity, is home to many endangered animal species. Unfortunately, a large number of these animals continue to be illegally kept, threatening their survival and damaging the ecosystems in which they live. Some examples of endangered animals that are often kept illegally in Indonesia include primates, reptiles, birds and mammals. Primates such as orangutans and tarsiers are targeted for illegal keeping due to their aesthetic appeal and unique behavior. Rare reptiles such as maned tortoises and pythons are also sought after, often for the international pet trade. Data from the Ministry of Environment and Forestry shows that the rate of illegal keeping of

endangered animals continues to rise. A recent survey recorded a significant increase in illegal rare animal seizures at various entry and exit points in Indonesia. This increase reflects the challenges faced by authorities in tackling this illegal trade. Some examples of animals that are often kept illegally in Indonesia include Sumatran tigers, Javan rhinos, orangutans, and many endemic bird species.

3.5.1 Sumatran tiger

The Sumatran tiger (*Panthera tigris sumatrae*) is a tiger subspecies found exclusively on the island of Sumatra, Indonesia. Figure 1 depicts the Sumatran tiger, an endemic species of Sumatra that is endangered due to hunting and habitat loss. Intensive conservation efforts and multi-stakeholder collaboration are required to protect this species. Its population continues to decline due to habitat loss, poaching, and illegal breeding. The illegal keeping of Sumatran tigers in Indonesia poses a serious threat to the survival of this species, which has been listed as critically endangered by the International Union for Conservation of Nature (IUCN). In recent decades, the Sumatran tiger population has continued to dwindle, and recent data from the World Wildlife Fund (WWF, 2018) notes that the Sumatran tiger population is currently estimated to be less than 400 individuals (WWF, 2022). Key factors facing Sumatran tigers include loss of natural habitat, conflict with humans, and illegal hunting. The importance of Sumatran rainforests as a natural habitat for Sumatran tigers cannot be overlooked. Deforestation and land conversion in the Sumatran rainforest pose a major threat to the natural habitat of the Sumatran tiger. Between 1990-2010, approximately 28% of the tiger habitat in Sumatra was lost due to these land-use changes. Continuous deforestation risks eliminating wildlife corridors that connect fragmented tiger populations. Continued deforestation as a result of land use change for agriculture and infrastructure development has led to the loss of much of the Sumatran tiger's habitat. This not only reduces their breeding area but also increases the risk of conflict with humans, as tigers are driven to seek food in areas closer to human settlements.

The study by Ripple et al. (2016) in *Biological Conservation* found that human-tiger conflicts sharply increased as the Sumatran tiger habitat diminished. Tigers are forced to search for prey in plantations and human settlements, triggering conflicts. Between 1978-1997, approximately 34% of tiger deaths in Sumatra were attributed to conflicts with humans (Ripple et al., 2016). This conflict poses risks to both parties involved. Conflicts between Sumatran tigers and humans are increasingly common as both parties compete for increasingly limited resources. Tigers seek prey in areas close to human settlements, increasing the risk of direct encounters and conflict. In conflict situations, humans sometimes feel threatened and respond in ways that can harm Sumatran tigers. Illegal poaching poses a serious threat to Sumatran tigers. High demand for tiger products, such as skins, bones and organs, encourages unsustainable hunting practices. The illegal trade in Sumatran tigers involves a complex wildlife trade network, facilitating the movement of tigers from their natural habitat to the black market. This is exacerbated by a lack of effective law enforcement and low levels of public awareness of the impact of poaching on the sustainability of the species.

The illegal keeping of Sumatran tigers creates an alarming environment for the survival of the species. Despite conservation efforts, high levels of illegal keeping continue to pose a serious challenge. Based on the study by Dinerstein et al. (2020) in *Conservation Letters*, conservation efforts such as establishing protected areas, tiger reintroduction, and population monitoring need to be continuously improved. However, the trend of illegal tiger breeding remains a serious challenge (Dinerstein et al., 2020). There is a need for synergy between law enforcement, habitat protection, and public education. There is a need for improved law enforcement and monitoring of the wildlife trade as well as protection of the Sumatran tiger's natural habitat. Public education and awareness are also important elements in conservation efforts. Effective education programs can help change public

perceptions of the Sumatran tiger and create support for conservation. Governments, non-governmental organizations and communities need to work together to raise awareness of the importance of maintaining ecosystem balance by protecting Sumatran tigers.



Fig. 1. Sumatran tiger
(<https://bbc.com/indonesia/51797233>)

3.5.2 Javan rhino

The Javan rhino (*Rhinoceros sondaicus*) is one of the rare rhino species that can only be found in a few areas in Indonesia. Figure 2 shows the Javan rhinoceros, an endangered endemic species in Indonesia, threatened by illegal hunting for its horn. Collaborative and comprehensive conservation efforts are needed to protect it. Despite its critically endangered status, the Javan rhino still faces serious threats, especially in terms of illegal keeping. The Javan rhino population has experienced a drastic decline over the past few decades. The latest data from the International Union for Conservation of Nature (IUCN) shows that the Javan rhino population is estimated to be only around 70 to 80 individuals (IUCN, 2022). The main threats to the Javan rhino involve loss of natural habitat due to land conversion, as well as illegal poaching for rhino horns, which have a high value on the international market. According to the IUCN report (2020), illegal hunting for rhino horn trade still persists despite being globally banned. Rhino horns are highly valued in the black market due to perceived medicinal properties. Weak law enforcement also contributes to the continuation of these hunting practices (IUCN, 2020). Javan rhinos inhabit tropical rainforests and humid areas that are shrinking due to land conversion to agriculture and infrastructure development. According to the study by Ripple et al. (2016) in *Biological Conservation*, the conversion of forests into plantations and settlements in Java and Sumatra has led to the loss of approximately 70% of the Javan rhinoceros habitat over the last 40 years.

Habitat fragmentation increases the exposure of rhinos to hunting threats (Ripple et al., 2016). This loss of natural habitat not only reduces the area where Javan rhinos can breed but also increases the risk of conflict with humans and illegal poaching in more open areas. Illegal poaching of Javan rhinos for their horns poses a serious threat to the survival of this species. Rhino horn has a high value on the international market, used in the manufacture of various products and considered a luxury item. Although international trade in rhino horn is prohibited by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the illegal trade continues and creates a complex trade network. The illegal keeping of Javan rhinos presents a significant threat to the survival of the species. This is exacerbated by the high market demand for rhino horn products. Illegal poaching is carried out by organized criminal syndicates, taking advantage of the vulnerability of endangered species such as the Javan rhino. The high financial returns from the illegal trade are a big draw for illegal actors, increasing the risk of poaching and keeping

Javan rhinos. Stronger law enforcement needs to be implemented to mitigate illegal poaching and trade in rhino horn. Tougher sanctions and effective preventive measures must be taken to break the chain of this illegal trade. In addition, protection of the Javan rhino's natural habitat and coordinated conservation efforts are crucial to restore the population and ensure the future sustainability of the species.



Fig. 2. Javan rhino
(DWNP, 2020)

3.5.3 Orangutans

Orangutans (*Pongo spp.*) are large primates found in the rainforests of Indonesia and Malaysia. Picture 3 depicts the orangutan, a primate endemic to the islands of Kalimantan and Sumatra, which is endangered due to habitat loss and hunting. However, orangutan populations continue to experience significant declines, mainly due to illegal captivity. Orangutans face serious threats, including loss of natural habitat, climate change, and illegal hunting. Data from the International Union for Conservation of Nature (IUCN) notes that two orangutan species, the Bornean orangutan (*Pongo pygmaeus*) and the Sumatran orangutan (*Pongo abelii*), are listed as critically endangered (IUCN, 2022). The greatest threats to orangutans in Indonesia involve the loss of rainforest as their natural habitat and illegal hunting for pets. Continued deforestation and land conversion for agriculture, oil palm plantations, and infrastructure have led to the loss of orangutans' natural habitat. According to the study by Meijaard et al. (2018) in *Current Biology*, deforestation for oil palm plantations poses a major threat to orangutan habitats in Kalimantan and Sumatra. It is estimated that over 100,000 orangutans have lost their natural habitats due to this forest conversion in the last 16 years (Meijaard et al., 2018). Without adequate habitat, orangutans are forced to seek food and shelter in increasingly restricted areas, increasing the risk of conflict with humans and facilitating illegal hunting.

The poaching of orangutans for illegal trade poses a real threat to the population. Orangutans are often targeted as pets or exploited in the live animal trade. In addition, the trade in orangutan body parts, such as skulls and teeth, also provides an impetus for illegal hunting. Based on LAPAN data (2021), forest fragmentation due to land clearing increases conflicts between orangutans and humans. Orangutans are forced to seek food in fields and villagers' plantations, triggering conflicts. From 2012-2020, there were recorded 128 cases of orangutan-human conflicts in Central Kalimantan (LAPAN, 2021). Furthermore, the trade of orangutan body parts, such as skulls and teeth, also provides incentives for illegal hunting. Illegally keeping orangutans creates a detrimental situation for the sustainability of this species. The high demand for orangutans as pets or personal collections encourages the practice of illegal keeping. This not only harms the individuals involved but also jeopardizes the sustainability of the species and the ecosystem as a whole. Strict law enforcement and crackdowns on illegal orangutan trade are crucial in conservation efforts.

Strong sanctions and effective preventive measures are needed to halt the practice of illegal keeping. Additionally, according to Meijaard et al. (2018), public education on orangutan conservation and alternative livelihoods needs to be enhanced.

Active participation of the local community is key to the long-term success of orangutan conservation efforts in their natural habitat. Public awareness of the negative impacts of orangutan keeping needs to be increased through education and informational campaigns. Protecting the natural habitat of orangutans and sustainable conservation efforts also become crucial focal points. The study by Wich et al. (2016) in *Biological Conservation* notes the need for stricter protection of orangutan forest areas and corridors. However, budget constraints in conservation hinder efforts to protect species and their habitats in Indonesia (Wich et al., 2016). The sustainability of the rainforest ecosystem, which is the home of orangutans, should be prioritized in conservation policies. Collaboration between the government, non-governmental organizations, and local communities is highly necessary to achieve these goals.



Fig. 3. Orangutans

(<https://www.internationalanimalrescue.or.id/mengenal-3-jenis-orangutan-dilindungi-di-indonesia/>)

3.5.4 Endemic birds

Indonesia, with its incredible biodiversity, is home to many unique and rare endemic bird species. Unfortunately, illegal captive breeding threatens the sustainability and survival of some of these endemic bird species. Some of Indonesia's endemic bird species are threatened by illegal breeding.



Fig. 4. Bali starling

(<https://www.greeners.co/flora-fauna/burung-jalak-bali/>)

The Bali Starling (*Leucopsar rothschildi*) is one of the endemic birds found only on the island of Bali. It is famous for its striking white plumage color and is a symbol of conservation in Indonesia (BirdLife International, 2022). The Bali Starling is one of the many birds threatened with extinction due to the rampant wildlife trade in Indonesia. Currently, the Bali Starling's existence is confined to the West Bali National Park and Nusa Penida. In the latest audit conducted, the government still found traps, hanging strings on trees, and holes in nests large enough for a human hand. Despite being protected, the Bali Starling's survival remains at risk. It is estimated that there are only around 70-100 individuals in the wild at present.



Fig. 5. Javan hawk-eagle

(<https://ksdae.menlhk.go.id/info/8131/mendokumentasikan-tahapan-perkembangan-elang-jawa.html>.)

The Javan Hawk-eagle (*Nisaetus bartelsi*) is a rare species found only on the island of Java. Population decline is due to habitat loss and illegal hunting (BirdLife International, 2022). According to the study by Setiawan et al. (2018) in Biological Conservation, deforestation and forest degradation in Java pose a significant threat to the Javan Hawk-Eagle. It is estimated that the population of the Javan Hawk-Eagle has declined by 30-50% over the last 30 years due to the decline in its habitat (Setiawan et al., 2018).



Fig. 6. Cendrawasih

(<https://jurnalpost.com/pesona-burung-cendrawasih/43116/>)

Cendrawasih (*Paradisaeidae*) includes several species of birds endemic to Papua and its surroundings. The colorful beauty and unique behavior of paradise make them highly

sought after by collectors (BirdLife International, 2022). Cendrawasih is a rare bird native to Papua, and its sustainability is critically threatened. The number of these birds is decreasing. Birds with exotic feather patterns are endangered due to habitat destruction, illegal hunting, illegal trade, and unauthorized breeding. This is evidenced by the research conducted by BKSDA Papua in March 2015, in one of the Cendrawasih habitat locations, which found only 2-3 individuals per 0.1 ha. Additionally, Raunsay's study (2014) reported that only 55 individuals were found with a density of 2.2 individuals per 1 ha in the Imbowari forest area, Yapen.

The illegal keeping of endemic birds poses a serious threat to population and ecosystem sustainability. The illegal trade continues due to the high demand for exotic birds as pets or collectibles. Some of the threats endemic birds face due to illegal keeping include Deforestation and land conversion are major threats to many endemic birds. Illegal keeping exacerbates this situation by introducing birds into unnatural environments, increasing pressure on native habitats. Population Decline, Illegal maintenance leads to the capture of wild birds, especially species of high aesthetic value. This results in population declines and can even bring some species to the brink of extinction. Ecosystem Loss as endemic birds play an important role in maintaining ecosystem balance. A decline in bird populations can result in imbalances in the food chain and negatively impact other plants and animals. Illegal keeping of endemic birds in Indonesia creates long-term detrimental impacts. Despite conservation efforts, the illegal trade continues, requiring a firmer response from the government, conservation agencies and communities. Law enforcement needs to be strengthened, with tougher sanctions for illegal keepers. Public awareness of the negative consequences of illegal keeping should also be raised through education campaigns. This approach can involve the active participation of local communities in efforts to conserve and protect endemic birds. Conservation Science and Practice, efforts to protect the habitat and populations of endemic birds are still hindered by the limitations of ecological data. Further ecological research is needed to support effective conservation. The study by Jepson & Ladle (2015) in Oryx highlights the need for increased regional partnerships to curb the illegal trade of endemic Indonesian birds to neighboring countries. Border law enforcement and regional security cooperation become crucial (Jepson & Ladle, 2015).

4. Conclusions

Community involvement in the wildlife trade is driven by cultural and belief factors. Some Indonesian communities still believe that possessing rare wildlife can bring good luck. Additionally, the desire to display social status also motivates people to engage in the trade of rare wildlife. A survey conducted by the Ministry of Environment and Forestry (KLHK) in 2022 indicates that 30% of respondents stated that they were unaware of the negative impacts of wildlife trade on species and ecosystem sustainability (KLHK, 2022).

Handling cases of illegal wildlife keeping still faces significant challenges. According to a report from the Forest Legality Initiative (FLI) in 2023, limited resources and weak coordination among law enforcement agencies hinder efforts to investigate and prosecute illegal cases (FLI, 2023). Data from the Supreme Court indicates that the conviction rate for illegal wildlife keeping offenders is relatively low, thus not providing sufficient deterrence (Supreme Court, 2022). Therefore, judicial system reform and the enhancement of law enforcement capacity are crucial.

The trend of illegally keeping rare wildlife has serious ecological and economic impacts. The loss of rare wildlife can disrupt ecosystem balance and food chains. For example, the reduction in the Sumatran tiger population will affect the population explosion of deer and wild boars as their prey. Economically, a study from the Central Statistics Agency (BPS) in 2023 indicates that illegal wildlife trade has the potential to reduce tourist visits and investments in the tourism sector that rely on attractions such as orangutans and Komodo dragons. The illegal trade of rare wildlife is estimated to cause economic losses of up to 15 trillion rupiahs per year (BPS, 2023).

Efforts to change the trend of illegal keeping of rare wildlife require strengthening conservation policies and law enforcement. The government needs to improve laws related to the conservation of biodiversity and sanctions for violations. Additionally, collaboration with non-governmental organizations is essential to leverage additional resources to support conservation efforts and handle illegal cases (WWF, 2022). Educational approaches and awareness campaigns are also necessary to enhance public awareness of the importance of protecting rare wildlife for ecosystem sustainability. With these measures, it is hoped that the trend of illegal keeping of rare wildlife can be reduced.

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Author Contribution

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