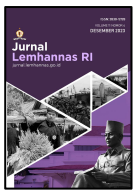

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National Policy on Particularly Sensitive Sea Ares: Step Towards Indonesian Marine Protection and Sustainable Shipping

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Abstract

Purpose: This study examines Indonesia's challenges in protecting its marine environment due to intensive shipping activities in high-traffic maritime routes. It evaluates the alignment of Indonesian regulations with international standards, focusing on the Particularly Sensitive Sea Areas (PSSA) framework under IMO Resolution A.982(24).

Study Design/Methodology/Approach: The research employs a qualitative legal-normative approach to analyze Indonesia's regulatory framework in comparison with international maritime conservation standards. It assesses national policies, including Law Number 32 of 2009 on Environmental Protection and Management and Law Number 17 of 2008 on Shipping, identifying regulatory gaps, institutional limitations, and coordination challenges that hinder effective PSSA implementation.

Findings: The study finds that Indonesia's existing regulations lack specific provisions to implement PSSA standards effectively, leading to weak enforcement and ineffective marine protection. Additionally, poor inter-agency coordination, limited institutional capacity, and low stakeholder awareness hinder sustainable maritime conservation efforts. The absence of advanced environmental monitoring technologies and public engagement strategies further reduces marine ecosystem resilience.

Originality/Value: This research provides a critical legal analysis of Indonesia's PSSA-related policies, offering practical recommendations for regulatory improvement. By proposing revisions to national laws, strengthening inter-agency coordination, integrating advanced maritime monitoring technologies, and increasing public awareness, this study contributes valuable insights for policymakers, maritime authorities, and environmental advocates. The findings support Indonesia's compliance with international obligations, ensuring long-term marine resource preservation and sustainable maritime development.

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INTRODUCTION

Harmonizing international and national issues regarding particularly sensitive sea areas (PSSA) is critical for environmental, sea, and shipping sustainability, especially in island countries such as Indonesia. PSSA, as defined by the International Maritime Organization (IMO), is a sea area that requires protection, primarily because of ecological, socio-economic, or significant scientific, which is vulnerable to impact by activity ship international (IMO Resolution A.982(24) Revised Guidelines for the Identification and Designation of Particularly Sensitive Sea Areas, 2006). The determination of PSSA is based on international guidelines, which aim to ensure that activity shipping in the area does not damage the environment or the sea. On the other hand, Indonesia, as an archipelagic country, the largest in the world with more than 17,000 islands, faces a unique challenge in integrating these guidelines and regulations nationally, considering the complexity of its geographical, economic, and socio-political conditions..

Indonesia is located on strategic international maritime routes, including the Malacca Strait, Sunda Strait, and Lombok Strait, which are high-density shipping lanes crucial for global trade and regional security. (Albert Mamahit, 2019). The Strait of Malacca is one of the world's busiest track ships, recording more than 80,000 ship movements annually, making it one of the world's busiest sea routes. However, this high volume of maritime traffic poses significant security and environmental threats, including oil spills, ship waste disposal, and ecosystem degradation due to ship collisions. In addition, illegal activities such as unregulated fishing, smuggling, and piracy remain a concern, highlighting the interconnection between environmental protection and maritime security.

Indonesia also has areas identified as ecologically significant, such as Bunaken National Park and Raja Ampat, both renowned for their rich marine biodiversity. However, the lack of effective regulations and enforcement mechanisms exacerbates threats to these areas. Uncontrolled vessel traffic, particularly from tourism and commercial activities, increases the risk of coral reef destruction, habitat loss, and marine pollution. The failure to integrate maritime security measures with environmental protection policies further weakens Indonesia’s ability to enforce sustainable shipping practices

The harmonization of regulations regarding PSSA with Indonesia’s national security and environmental policies is crucial. Based on IMO Resolution A.982(24), the identification and determination of PSSA require a comprehensive assessment of

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ecological, social, and economic attributes alongside their vulnerability to shipping activities. However, Indonesia lacks a dedicated legal framework that fully adopts these guidelines. One of the primary challenges is the fragmented inter-agency coordination between the Ministry of Maritime Affairs and Fisheries, the Ministry of Transportation, and the National Agency for Disaster Management. This lack of coordination results in overlapping regulations and inconsistent enforcement, ultimately undermining efforts to protect marine environments effectively.

Several maritime zones have successfully implemented PSSA designations internationally, including the Great Barrier Reef in Australia and the Wadden Sea in Europe. These cases illustrate how strong legal frameworks, political commitment, and well-funded institutions contribute to effective PSSA implementation. (Hillmer-Pegram & Robards, 2015). However, experience has shown that the success of PSSA designation depends on multi-stakeholder engagement, involving government agencies, private sector actors, local communities, and international organizations. The Lombok Strait, as part of the Coral Triangle Initiative, has potential to be designated as a PSSA due to its extraordinary marine biodiversity. However, this designation remains unlikely without strong regulatory support, transparent policies, and consistent enforcement.

Furthermore**,** harmonizing regulations must consider Indonesia's maritime security challenges**.** As a nation heavily reliant on maritime trade**,** Indonesia must balance the need for efficient shipping with environmental protection (Octavian et al., 2020). One example is the Traffic Separation Scheme (TSS) in the Malacca Strait, which has reduced ship collision risks but has not fully mitigated environmental threats such as water and noise pollution. Additionally, the adoption of environmentally friendly technologies, such as low-sulfur fuels and advanced ship waste processing systems, remains limited in Indonesia, further hindering the country's ability to implement sustainable maritime practices. These technological solutions could be integrated into a broader PSSA protection strategy to enhance maritime environmental security.

In the analysis regulation, Indonesia has several relevant laws supporting PSSA designation and management, including Law Number 32 of 2009 on Environmental Protection and Management and Law Number 17 of 2008 on Shipping. However, these laws lack specific provisions that align with international PSSA standards. For example, Law Number 32 of 2009 provides general environmental protection measures but does not explicitly address marine area conservation from shipping impacts. Similarly, Law Number 17 of 2008 focuses primarily on navigational safety without integrating PSSA guidelines comprehensively. These regulatory gaps create enforcement challenges, making it difficult to effectively safeguard sensitive marine areas.

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Therefore, a crucial step forward is to revise and harmonize national regulations with international PSSA guidelines. (Orlova, 2022). This revision should include specific provisions that regulate PSSA identification, designation, and management processes, ensuring that Indonesia's maritime policies align with global environmental and security standards. Additionally, institutional capacity-building measures are necessary to support PSSA enforcement efforts. These include specialized training programs for maritime authorities, investment in advanced environmental monitoring technologies, and adequate budget allocations. Strengthening human resources and technological infrastructure will be key to enhancing Indonesia's maritime governance framework.

The harmonization of PSSA regulations with Indonesia's national policies is fundamental in protecting marine ecosystems from shipping-related threats. As an archipelagic country situated along major international shipping routes, Indonesia must ensure that its marine governance framework not only facilitates global trade but also preserves marine biodiversity and supports national security objectives. (Toan et al., 2018). By integrating guidelines into the framework of national law (Orlova, 2022), Indonesia has the opportunity to emerge as a regional leader in sustainable maritime management, setting an example for balancing economic interests with environmental conservation and maritime security.

Literature Review

The designation and implementation of Particularly Sensitive Sea Areas (PSSA) have been extensively studied as an effective mechanism to protect sensitive marine environments from shipping-related risks. This literature review synthesizes five key studies that explore various dimensions of PSSA, ranging from environmental protection and maritime security to governance and social change, with a particular focus on the Lombok Strait and other international contexts.

Hillmer-Pegram and Robards (2015) provide a broader, resilience-based governance perspective by analyzing the relevance of PSSA to the Bering Strait region. Their research demonstrates how resilience principles can inform the designation and management of PSSA by emphasizing adaptability to environmental and socio-economic changes. The authors argue that resilience-based governance approaches offer valuable insights for addressing complex, interconnected challenges in maritime environments. While the study focuses on the Bering Strait, its findings apply to other regions, including Indonesia, as they highlight the importance of holistic, adaptive management strategies for marine conservation.

(Albert Mamahit, 2019)) examines the Traffic Separation Scheme (TSS) and PSSA in the Lombok Strait, emphasizing their roles as international policies for managing

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coastal and marine environments in Indonesia. The study highlights how these mechanisms can mitigate the risks posed by increasing shipping activities, including pollution and habitat destruction, in one of Indonesia's busiest maritime corridors. However, the research identifies significant gaps in Indonesia's legal and institutional frameworks, which are not yet fully harmonized with international maritime guidelines such as those set by the International Maritime Organization (IMO). Mamahit underscores the urgency of aligning national regulations with global standards to ensure the effectiveness of PSSA and TSS in enhancing marine safety and environmental protection.

In a complementary study, (Albert Mamahit et al., 2020) Expand on the earlier research by analyzing the social and institutional dimensions of implementing IMO regulations in the Lombok Strait. The study identifies key challenges, including low stakeholder awareness, limited inter-agency coordination, and inadequate institutional capacity, which hinder the effective enforcement of TSS and PSSA measures. The authors propose fostering multi-stakeholder engagement and enhancing public education to address these challenges. Their research also highlights the importance of integrating technological solutions, such as advanced monitoring systems, to support sustainable maritime practices.

(Octavian et al., 2020) Take a maritime security perspective, examining the strategic importance of designating the Lombok Strait as a PSSA. Their research highlights the region’s vulnerability to various threats, including pollution, illegal fishing, and potential geopolitical tensions. By establishing the Lombok Strait as a PSSA, the authors argue, Indonesia can strengthen its maritime security, protect its marine resources, and assert its sovereignty in the region. The study also underscores the importance of international collaboration and compliance with IMO standards in achieving these objectives.

(Ashri et al., 2021) Contribute to the discourse by presenting an ideal framework for PSSA implementation aimed at protecting marine environments. The study emphasizes three critical components: legal harmonization, environmental sustainability, and technological integration. The authors argue that Indonesia must establish a comprehensive legal framework tailored to its unique maritime context to address regulatory gaps and ensure effective enforcement. Additionally, the study underscores the need for adopting advanced technologies, such as automated monitoring and data collection systems, to support evidence-based decision-making and improve the efficiency of marine conservation efforts.

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Collectively, these studies reveal the multifaceted benefits of PSSA designation, including enhanced environmental protection, improved maritime security, and the promotion of sustainable shipping practices. However, they also identify persistent challenges, such as regulatory gaps, weak institutional frameworks, and insufficient stakeholder engagement, which must be addressed to maximize the effectiveness of PSSA implementation. The insights from these studies provide a strong foundation for policymakers and stakeholders to develop strategies that align national efforts with international standards, foster collaboration across sectors, and leverage technological advancements for better governance. By addressing these challenges, Indonesia can enhance its marine conservation efforts, ensure the sustainability of its maritime activities, and fulfil its international obligations.

METHODS

This research employs an explanatory qualitative approach with a legal normative method. (Liber Sonata, 2014) to analyze the harmonization of international and national regulations (S, 2021) Related to Particularly Sensitive Sea Areas (PSSA). The study is designed to assess the alignment between international frameworks, such as IMO Resolution A.982(24) and the United Nations Convention on the Law of the Sea (UNCLOS), and Indonesian national laws, including Law Number 32 of 2009 on Environmental Protection and Management and Law Number 17 of 2008 on Shipping.

he research relies on library research (literature review) as the primary data collection technique, involving a detailed analysis of primary legal documents, including international treaties, national legislation, government regulations, and maritime policies. Supporting secondary materials such as journal articles, policy briefs, and legal reports are also examined to provide broader contextual insights. The study aims to assess regulatory consistency and compatibility between international and national legal frameworks to ensure a coherent legal system for managing PSSA designation and implementation in Indonesia.

The data analysis is conducted using the theory of harmonization law, which emphasizes the importance of achieving conformity and integration among various legal instruments. The study employs content analysis to systematically examine legal texts and their interpretations to identify regulatory gaps, overlaps, and potential conflicts between international maritime policies and Indonesian legal frameworks.

To enhance the validity and reliability of findings, this research applies triangulation methods, including:

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1. Cross-referencing multiple legal sources (UNCLOS, IMO Resolutions, Indonesian maritime laws) to ensure comprehensive legal interpretation.
2. Comparative analysis with international best practices, particularly from countries that have successfully implemented PSSA frameworks, such as Australia (Great Barrier Reef) and Europe (Wadden Sea).
3. Expert consultation, where insights from legal scholars, maritime policymakers, and environmental specialists are integrated to validate findings and policy recommendations.

Additionally, this study incorporates a comparative legal analysis to assess how other countries have successfully aligned their domestic regulations with international PSSA standards. By evaluating case studies from different jurisdictions, the research identifies best practices and challenges that may be relevant for Indonesia's regulatory framework. By integrating legal normative analysis, comparative legal studies, and regulatory harmonization approaches, this research aims to provide concrete recommendations for strengthening Indonesia's maritime governance in protecting sensitive sea areas

RESULT AND DISCUSSION

The concept and importance of PSSA in the Protection of Marine Environment

In particular, sensitive sea areas (PSSA) are a concept adopted by the International Maritime Organization (IMO) to protect sea areas that have significant ecological, socioeconomic, or vulnerable scientific impacts from the activity of international ships. According to IMO Resolution A.982(24), PSSA is a sea area requiring protection special through action taken by IMO. During PSSA determination, IMO must approve or adopt appropriate protection steps to prevent, reduce, or remove threats or identified vulnerabilities. Protection measures can cover restrictions on route ships, shipping zones that must be avoided, or arrangements for waste disposal from ships in the area. (Ashri et al., 2021). This draft reflects the international commitment to protecting the environment from the threat of humans, particularly activity and potential shipping damage.

PSSA determination is based on specific ecological, socio-economic, and scientific criteria. Criteria ecological covers several factors, such as uniqueness or scarcity of areas, critical habitat for species rare or threatened extinct, dependency ecological, regional representation, diversity life, productivity, place spawning or breeding, natural conditions, integrity ecology, fragility, and importance in a way biogeographic. For example, areas with unique habitats for endangered species or their ecosystem that is only

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in the area can fulfil criteria of uniqueness or scarcity. In addition, areas with high levels of diversity or place-spawning species of sea creatures are also considered significant ecologically. Socioeconomic criteria cover dependence on social or economic factors in the region, such as activity fisheries, recreation, or tourism, as well as the area's importance for the public, including protection sources of culture. The area that becomes a place depending on eye livelihood public coast through activity fishery traditional can fulfil this criterion. The criteria cover the area's importance for research, as a baseline for monitoring studies, or as a place for an educational environment. Regions that provide essential data for scientific research or become the locations for education about the diverse biological sea mark significant scientific in context PSSA determination.

The relevance of PSSA in tracking international ships is significant, especially for an island nation like Indonesia, which is located on the route ship the busiest in the world. Indonesia has four track ship main straits, namely the Malacca Strait, Sunda Strait, Makassar Strait, and Lombok Strait, which are routes important for global trade. The Strait of Malacca records more than 80,000 movement ships annually, making it one of the most tracked ships in the world. Activities of this ship bring various potential threats to the environment sea, like pollution consequence, oil spills, disposal of ship waste, and damage to the ecosystem consequences of ship activity physique, such as grounding and collisions. In addition, voice pollution underwater from big ships can also bother life sea mammals that use sonar to communicate and navigate. PSSA is designed to protect vulnerable areas from this threat and make sure that shipping activity on the routes is done in a way that minimizes negative environmental impact.

In the Indonesian context, PSSA can become an effective tool for protecting marine areas with significant ecological and high socio-economic impact. As the largest archipelagic country in the world, Indonesia has many sea areas that meet the criteria for PSSA determination. For example, the famous Raja Ampat area, with its diversity and extraordinary life, can be considered to fulfil ecological and scientific criteria. This area has become a house for thousands of species and a critical research and tourism centre. However, without special existence step protection, this area is prone to threats from shipping activity, such as damaged reef coral due to anchor ship tours or pollution from ships passing by.

PSSA is also relevant in context management to track more voyages in safe and friendly environments. Lombok Strait is part of the Coral Triangle Initiative, one of the centres of diversity of biological ocean worlds. However, the shipping activity in this area has increased along with the economy's growth and international trade. Determination of PSSA in this region can cover steps of protection like restrictions on route ships to avoid the most vulnerable areas, setting ship speeds to reduce the risk of collision with sea

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mammals, and application-friendly technology for an environment like management waste system. This step protects the environment and supports the sustainability activity of shipping. This can become a mutually beneficial solution for interested countries. It is a flag state and a coastal state. (Albert Mamahit et al., 2020).

Understanding the concept and importance of PSSA, Indonesia can take strategic steps to integrate international guidelines into national policy. Harmonization regulation between IMO guidelines and national regulations is essential to ensure that vulnerable marine areas get adequate protection (Reyad, 2023). Indonesia can learn from the experiences of other countries successfully implementing PSSA, such as Australia with the Great Barrier Reef and European countries with the Wadden Sea. Comparing and case studies showed that success in PSSA determination is highly dependent on political commitment, coordination inter-agency, and support from the local public. Therefore, Indonesia needs to develop a framework of comprehensive law to support the establishment and management of PSSA, including strengthening institutional capacity and improving awareness of stakeholder interest about the importance of protecting the sea environment.

In a global context, PSSA is not only a tool for protecting the sea environment but also does not have enough answers to safeguard the sustainability of sea resources. As part of global efforts to reduce the negative impact of activity on the sea ecosystem, PSSA provides a clear framework for involving various stakeholder interests, including government, local community, and the private sector. In this case, Indonesia has a significant opportunity for active role-play in this global initiative and to ensure that sea resources can continue to benefit the upcoming generations.

Review International regulations about PSSA.

A study on international regulation on Particularly Sensitive Sea Areas (PSSA) provides a profound outlook on how international law instruments work to protect marine areas. One of the primary documents that defines and regulates PSSA is IMO Resolution A.982(24), which contains guidelines revision for identifying and determining this area. This resolution gives a framework for identifying sea areas needing special protection from threats to international shipping activity. Resolution A.982(24) establishes that PSSA is a region that meets the requirements of at least one of the ecological, socio-economic, or scientific criteria and shows vulnerability to negative shipping impact. The process of determining it needs official application from member countries to the IMO Marine Environment Protection Committee (MEPC), accompanied by proof of regional vulnerability, steps of proposed protection, and analysis of impact from steps to the safety

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and efficiency of shipping (IMO Resolution A.982(24) Revised Guidelines for the Identification and Designation of Particularly Sensitive Sea Areas, 2006).

This resolution also underlines the importance of action-appropriate protection as an integral part of PSSA determination. Steps protection, known as associated protective measures (APM), must be adopted or approved by IMO and can cover the arrangement of ship routes, a system of reporting, restrictions on the speed of ships, or prohibition of disposal waste in designated areas. Resolution A.982(24) also establishes that the determination of PSSA and implementation of APM must be in harmony with international law, including the terms and conditions stated in the United Nations Convention on the Law of the Sea (UNCLOS) 1982. Thus, the resolution gives guidelines that are not only naturally technical but also pay attention to principles of international law to ensure that protection steps do not violate the right of navigation of international ships.

UNCLOS 1982 is the primary law framework in marine global management, including PSSA protection. This convention provides runway solid law for various aspects of sea management, like maritime jurisdiction, protection of sea environment, rights, and obligations of coastal states and users of the sea, among others. Articles 192 to 196 of UNCLOS affirm the state's commitment to protect and preserve the environment sea from various threats, including pollution from ships (United Nations Convention on the Law of the Sea, 82 C.E.). Article 211, in particular, aims to prevent, reduce, and control pollution from ships by adopting international rules and regional standards or relevant national regulations (United Nations Convention on the Law of the Sea, 82 C.E.). In the context of the PSSA, the provisions give base law for member countries to submit step protection appropriate additions explicitly needed for their region. On the other hand, the PSSA appointment process also requires politicization, requiring flag states to submit strong PSSA proposals internationally (Kim, 2021).

UNCLOS also provides a mechanism for balancing interests between protecting the sea environment and international navigation rights. Article 194 of UNCLOS states that steps to protect the environment and sea must be designed to not obstruct the correct ship foreign ships, especially on the international ship route. (United Nations Convention on the Law of the Sea, 82 C.E.). This is relevant in the PSSA context, as the proposed area is often on the track of busy shipping. Resolution A.982(24) guides member states about methods to ensure the proposed protection of no harm efficiency international ships, such as ensuring that the system arrangement route ship designed to minimize disturbance to cross ship.

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Implementation Resolution A.982(24) in the UNCLOS 1982 framework also emphasizes the importance of international cooperation. The PSSA determination process requires consultation with countries interested in the proposed territory, including flag states frequent ships across the territory. UNCLOS 1982 and Resolution A.982(24) encourage transparency and dialogue to ensure that the proposed protection is accepted broadly by the international maritime community (IMO Resolution A.982(24) Revised Guidelines for the Identification and Designation of Particularly Sensitive Sea Areas, 2006). For example, in the designation of the Great Barrier Reef as a PSSA, Australia works with IMO and user countries to track ships to ensure that step protection applied, such as the route arrangement, is accepted and obeyed by all parties.

In addition, UNCLOS allows member countries to adopt protection steps outside the provisions stipulated in the convention, provided that the step does not contradict international law. Article 211(6) of UNCLOS allows coastal states to enforce additional protection in their jurisdiction area, including in the economic exclusive zone (EEZ), if they can prove that step is required to overcome threats specific to the sea environment. (United Nations Convention on the Law of the Sea, 82 C.E.). In the context of the PSSA, the provisions give base law for countries to propose stricter step protection in the compliant region.

The framework of laws and international regulations shows the international community's commitment to protecting the sea environment from threat activity voyages. However, the successful implementation of PSSA is highly dependent on the capabilities of member countries. To integrate international guidelines into the framework of their national law (Sakib et al., 2021). In many cases, as seen in the designation of the Wadden Sea in Europe as a PSSA, collaboration between bordering coastal states directly with the area is very important for ensuring adequate step protection. These countries work together to develop an integrated management system, which includes the arranging of ship routes, prohibited disposal of waste, and sustainable environment monitoring programs.

The Resolution A.982(24) and UNCLOS provide clear guidance for countries to establish and manage PSSA. However, success needs political commitment, institutional capacity, and adequate resources. (IMO Resolution A.982(24) Revised Guidelines for the Identification and Designation of Particularly Sensitive Sea Areas, 2006). Developing countries often face challenges in adopting sufficient protection because of the limitations of source power, humans, and technology. In the case of such an issue, support from international organizations, such as IMO, and work with developed countries become very important to ensure that the sea area is vulnerable and gets proper protection. Therefore, UNCLOS and Resolution A.982(24) do not only function as a framework of

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Work law but also as a tool for pushing Work. The same international protects the environment of the sea sustainably. (IMO Resolution A.982(24) Revised Guidelines for the Identification and Designation of Particularly Sensitive Sea Areas, 2006).

Analysis of Indonesian National Regulations Regarding PSSA

Analysis regulation Indonesia's national policy regarding Particularly Sensitive Sea Areas (PSSA) shows that there are relevant laws to support efforts to protect the sea's environment, even though there is still a gap in matter implementation and harmonization with standard international. One of the instruments of law that became the runway for the management of the environment in Indonesia was Law Number 32 of 2009 concerning the Protection and Management of the Environment. This law covers various provisions that can be applied to support the determination and management of PSSA. Article 15 regulates the obligation to do an Analysis of the Impact Environment (AMDAL) for every potential activity that causes a significant impact on the environment. (Undang-Undang Nomor 32 Tahun 2009 Tentang Perlindungan Dan Pengelolaan Lingkungan Hidup, 2009). This is very relevant in the PSSA context because it can be used to evaluate risks posed by activities shipped towards the sea area that have significant ecological high. In addition, Article 42 regulates supervision and enforcement law to activities that violate the provision of protection environment. (Undang-Undang Nomor 32 Tahun 2009 Tentang Perlindungan Dan Pengelolaan Lingkungan Hidup, 2009). Provisions This can be applied to ensure that ships passing through the PSSA area comply with the protection steps that have been set.

Thus, Law Number 32 of 2009 has limitations in that it accommodates steps and specific requirements as required by IMO Resolution A.982(24) for PSSA. Even though this law protects ecosystems, specifically mangroves, and coral reefs, some provisions are explicitly arranged for mandatory arranging route ships or system reporting, which is an integral part of step PSSA protection. This shows that although this law provides a broad framework, it requires revision to enter more provisions specific to marine area protection from impact activity shipping. In addition, implementing this law often faces constraints in coordination inter-agency, capacity technical, and source power allocation, which can hinder the effectiveness step of the protection environment sea.

In addition to Law Number 32 of 2009, Law Number 32 of 2009 and Law Number 17 of 2008 concerning the ship also have significant relevance in the context management of PSSA. This law covers various provisions supporting efforts to protect the environment and sea from impacting shipping activities. Article 227, for example, regulates obligation ships for managing waste by applicable regulation.(Undang-Undang Republik Indonesia Nomor 17 Tahun 2008 Tentang Pelayaran, 2008). Provision This can prevent pollution

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in the PSSA area, especially from waste liquid or solids produced by passing ships. In addition, Article 228 and Article 229 regulate the supervision of vessels operating in Indonesian waters, including the obligation to comply with related regulations regarding safe shipping and the protection of the environment. (Undang-Undang Republik Indonesia Nomor 17 Tahun 2008 Tentang Pelayaran, 2008). Terms This gives base law for the government to ensure that ships passing through the PSSA area comply with the steps of protection set.

However, Like Law Number 32 of 2009, Law Number 17 of 2008 also has limitations in accommodating international guidelines related to PSSA in a particular comprehensive. Even though this law arranges arrangement route ships (Article 21), arrangements focus more on safety navigation rather than protecting the environment sea. (Undang-Undang Republik Indonesia Nomor 17 Tahun 2008 Tentang Pelayaran, 2008). No provisions are explicitly arranged to determine areas needing protection, primarily based on ecological, socio-economic, or scientific criteria, as regulated in IMO Resolution A.982(24). This shows that although the regulation national Already covers several relevant aspects, it still requires harmonization with international guidelines to ensure that steps protection in the PSSA area can be implemented effectively.

Apart from the substantive limitations in matter provision, implementation of the second Law Number also faces challenges in matter coordination inter-agency. For example, the Ministry of Transportation is responsible for safe shipping, while the Ministry of Maritime Affairs and Fisheries is mandated to manage sources. Lack of coordination between the second ministries This often causes overlapped policies and lack of effectiveness in the implementation step protecting the environment sea. In some cases, overlap overlaps. This can even hinder effort enforcement law on ships that violate the provision protection environment. In addition, the capacity technical and resources Power limited humans also become constraint significant in supervising and enforcing compliance to existing regulations. In this context, a more integrated approach is required to integrate guidelines about PSSA into the framework law and ensure that steps protection can be applied in a way that is effective in the field.

To overcome the gap, this required revision to the second Law Number. The For enter provisions that are specially arranged for PSSA. Revision This can cover additional articles that regulate the process of identifying and determining PSSA, the criteria that must be met fulfilled, and steps of protection that must be applied. Article 15 of Law Number 32 of 2009 can expanded; it covers the obligation to study unique related impact activity ship towards sea areas with significant ecological high (Undang-Undang Nomor 32 Tahun 2009 Tentang Perlindungan Dan Pengelolaan Lingkungan Hidup, 2009). Likewise, Article 21 of Law Number 17 of 2008 can revised for entering the provision

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about the arrangement of route ships in the PSSA area with objective protection of the environment sea (Undang-Undang Republik Indonesia Nomor 17 Tahun 2008 Tentang Pelayaran, 2008). In addition, it is necessary to strengthen the capacity to support implementation regulation, including training for apparatus supervisors, improving technology monitoring maritime, and allocating adequate budget. Steps This will not only help the effort to protect the environment of the sea but also will increase Indonesia's reputation in the world as a committed country to protect the maritime environment.

In conclusion, the analysis of Law Number 32 of 2009 and Law Number 17 of 2008 shows that although the second regulation provides a framework of relevant laws for protecting the environment sea, it still needs to be overcome to support PSSA implementation effectively. Harmonization regulation with international guidelines, improvement coordination inter-agency, and strengthening capacity institutional are necessary to ensure that vulnerable marine areas in Indonesia receive adequate protection. (Sahri et al., 2020). By integrating guidelines into framework law, Indonesia can utilize PSSA's potential to protect the environment. The sea is rich at the same time, which supports sustainable shipping activities.

The gap between Regulation International and National

The gap between international and national regulations related to particularly sensitive sea areas (PSSA) in Indonesia reflects complex challenges in harmonizing global standards with the framework of domestic law. (Harasymiv, 2023). International guidelines such as IMO Resolution A.982(24) provide a comprehensive guide about identifying, determining, and managing PSSA, including criteria ecological, socioeconomic, and scientific aspects that must be fulfilled. The resolution also emphasizes the importance of appropriate protection, such as the arrangement of route ships, system reporting, and restrictions on disposal waste, designed to reduce the impact of damaging activity ships against vulnerable sea areas. Meanwhile, the framework law Indonesian national, represented by Law Number 32 of 2009 concerning the Protection and Management Environment and Law Number 17 of 2008 concerning Shipping, does not fully accommodate steps expressly set in international guidelines. For example, although Law Number 32 of 2009 regulates the Analysis of Impact Environment (AMDAL) and protection of ecosystems, like reef coral and mangroves, no It is a provision that governs the arrangement of route ships or system reporting mandatory in the PSSA area. The same applies to Law Number 17 of 2008, which focuses more on safety navigation than protecting the sea environment.

Analysis gap shows that one of the issues in harmonization regulation is the lack of harmony between the objective protection of environment-regulated sea in guidelines and

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the priorities reflected in the framework law. For example, IMO Resolution A.982(24) requires member states to submit step protection to overcome threats specific to vulnerable sea areas. Still, Indonesia does not yet own a mechanism or clear law for accommodating steps. In addition, identifying and determining PSSA requires close coordination between various stakeholders' interests, including government centres, government areas, and local communities. However, in Indonesia, the lack of coordination between inter-agency often becomes an obstacle in implementing policies protecting the environment sea. The Ministry of Maritime Affairs and Fisheries, which is responsible for managing source power sea, and the Ministry of Transportation, which oversees safety shipping, often have different approaches to handling issues related to PSSA. Overlapping authority causes ineffective implementation policy and creates uncertainty among stakeholders' interests, such as ship operators and coastal communities.

Another contributing factor to the gap is capacity limited institutional capacity. Implementation of PSSA requires support technical and resources Power adequate human resources, including the ability to monitor maritime, enforcement law, and analysis of scientific impact activity shipping. However, in Indonesia, the limitations of budget and resources Power Man often hinder the government's ability to supervise and enforce step protection in vulnerable marine areas. For example, although there is a provision in Law Number 17 of 2008 that regulates the supervision of ships passing through Indonesian waters, the lack of facilities monitoring maritime, such as radar systems and ships patrol, makes supervision. This complex is done effectively. In addition, the lack of training for apparatus enforcer law and staff technical others also complicates ensuring that steps adopted protection by international guidelines.

The lack of awareness and participation from the local community and private sector also compounds the Gap. Guidelines internationally, such as IMO Resolution A.982(24), emphasize the importance of involving all stakeholders in establishing and managing PSSA, including communities that depend on sources of power for livelihood. However, in many coastal areas of Indonesia, local communities are often not involved in making decisions actively, which can cause a lack of support for steps proposed for protection. Likewise, private sectors, such as company shipping and industry fisheries, often see steps for protection. This is an obstacle to operation rather than an effort to protect source power that supports sustainability in business. The lack of incentive economy for compliance step protection is also why PSSA implementation is often effective.

In context, this requires more effort to harmonize regulation with international guidelines related to PSSA. One of the steps that can be taken is revising Law Number

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32 of 2009 and Law Number 17 of 2008 to enter more provisions specific to the identification, determination, and management of PSSA. Revision This can cover articles that regulate the application process step protection addition to IMO, the criteria that must be filled by the proposed sea area as PSSA, and the mechanism monitoring as well as enforcement of the necessary laws to ensure compliance to steps this. In addition, it is essential to strengthen coordination inter-agency by forming a coordinating body with unique, responsible answers on the management of PSSA, with a clear mandate and adequate resources and power. This body can function as a forum for ending conflict inter-agency and ensure that all stakeholders' interests are involved in a way that is active in the PSSA management process.

In addition, the increased capacity of institutions has also become a priority. The government needs to allocate an adequate budget for supporting the development of maritime infrastructure monitoring, such as radar and ship patrol, and training for apparatus enforcer law and staff technical others. The same international organizations, such as the IMO, and donor countries can also help overcome limitations in source Power. For example, a training program facilitated by IMO can help increase the capacity of technical Indonesian authorities to manage PSSA internationally.

In conclusion, the gap between international and national regulations related to PSSA reflects complex challenges. However, it is not impossible to overcome. By revising the framework law, strengthening coordination, and enhancing capacity, Indonesia can harmonize the regulation with guidelines and ensure that the sea area is vulnerable and gets adequate protection. In addition, it involves the local community and private sector in an active way in this process, which will also become key to ensuring sustainable efforts to protect the environment and sea in Indonesia.

The existence of the Ministry of Transportation as a responsible institution for managing shipping in Indonesia is indeed one of the elements essential in the management of the sea, including in the context of management of Particularly Sensitive Sea Areas (PSSA). However, institutions cannot harmonize PSSA regulations with international guidelines, especially IMO Resolution A.982(24). Challenges primarily lie in coordinating inter-agency and division roles that often overlap. In addition to the Ministry of Transportation, there is the Ministry of Maritime Affairs and Fisheries, which has a mandate for protecting sources, and the Ministry of Environment and Forestry, which is responsible for managing environmental life in a general way. Third ministry This is not quite enough mutually answerable related, but lack of mechanism coordination cross-institutional often causes policies taken to become No in harmony and even overlap. For example, in the area of determination sea, the study of ecology becomes the authority of the Ministry of Maritime Affairs and Fisheries, while steps of protection, such as the

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arrangement of route ships, are under the authority of the Ministry of Transportation. Lack of coordination slows down the retrieval process decision and reduces the effectiveness of implementing the resulting policies.

Challenge coordination: This show needs to form a coordinating body or forum with a special function as a connector inter-agency related to the management of PSSA. This body does not need to replace the role of existing ministries but can act as a platform for aligning planning and implementation steps for protection in the PSSA area. With a coordinating body, the roles and responsibilities of each institution's commitment can be integrated more effectively, reducing risk overlap policies and ensuring that guidelines take steps. In addition, this body can also become a centre for coordinating dialogue with stakeholders' interests, such as the community, local, and private sector, to ensure that all parties involved understand the importance of PSSA and the steps necessary for protection.

On the other hand, another challenge faced is capacity limited institutional capacity. Implementation of PSSA requires support technical and resources Power adequate human resources, including the ability to monitor maritime, enforcement law, and analysis of scientific impact activity shipping. However, the limitations of budget and resources Power men often hinder the ability of institutions related to carrying out tasks. This, in a way, is effective. For example, even though the Ministry of Transportation has the authority to supervise route ships and ensure compliance with steps protection environment, the lack of infrastructure monitoring maritime, such as radar and ship patrol, makes supervision difficult optimally. Likewise, the Ministry of Maritime Affairs and Fisheries often faces constraints in doing profound ecological consequence limitations power experts and facilities research. Overcoming this problem requires improving capacity by allocating more budget, training for apparatus, and investment in sophisticated technology monitoring. Work: The same with organizations like IMO, which can also help overcome limitations, for example, through training programs together or helping technical development capacity locally.

Apart from coordination and institutional capacity, involving the community's local and sector private sectors also becomes a challenge that must be overcome. In many cases, community locals are often not engaged in a way that is active in the PSSA management process. However, they are the parties most affected by the policies taken. Lack of participation This can cause resistance to steps the proposed protection, which ultimately reduces the effectiveness of the implementation policy. The private sector, such as company shipping, also often sees step protection as an obstacle rather than an effort to protect the source of power in the sea, supporting sustainability business. To overcome this, it is necessary to take a more inclusive approach involving all stakeholder's interests

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in making decisions. The government can also give incentive economy to the private sector that complies with steps protection, for example, through subtraction cost harbour for ships that use technology-friendly environment.

In conclusion, although the Ministry of Transportation plays a vital role in PSSA management, the existence of this institution is not enough to overcome existing challenges. More coordination, good inter-agency, strengthening institutional capacity, and involvement in an active community, both local and private sector, must ensure that steps for protection in the PSSA area can be implemented effectively. With these steps, Indonesia not only fulfils its obligation to protect the environment of the sea but also ensures sustainable sources. Power the sea for a generation.

Impact Ship to Indonesian Marine Environment

Impact ships on the environment Indonesia's seas are significant, especially in strategic areas such as the Malacca Strait, Lombok Strait, and Raja Ampat, which are the centre of the diverse biological sea. As one of the busiest track ships in the world, the Strait of Malacca records more than 80,000 movements ship annually. The high volume then crosses the vessel. This negatively impacts the sea environment, causing oil spills, waste liquid disposal, and air pollution from emission ships. Spill oil, both a consequence of accidents and disposal, can damage the ecosystems of coastal and marine areas, including mangroves and reefs. Corals are an essential habitat for various species of sea. In addition, the disposal of waste liquid, like ballast water, which is not processed, can make species invasive to the ecosystem, threatening the sustainability and diversity of life in this area. Pollution of air from the emission of sulfur oxide (SOx) and nitrogen oxide (NOx) produced by ships also contributes to the declining quality of air and seawater around track shipping. (Zhang et al., 2021). Disposing of ballast or ballast water on ships not processed with goods can threaten the ecosystem, sea, and human health with high-level metals such as mercury, lead, and cadmium. (Onyena & Nwaogbe, 2024).

Lombok Strait, which is part of the Coral Triangle and is known as a region with diverse biological characteristics of the Great Sea, is also facing similar challenges (Gillespie, 2016). Although the past volume of cross ships in the Lombok Strait is not as high as in the Strait of Malacca, the environmental impact is still significant. Activities shipping in the Lombok Strait are often disrupted by marine animals, such as whales and dolphins, that use this area to track migration. Pollution voice from ships can bother communication and navigation mammals in the sea, which, in the end, can influence the population. In addition, the damage to reef coral due to anchor ship tourism and ship cargo has also become a serious issue. Reef coral in the Lombok Strait not only functions as a habitat for species of the sea but also as a natural fortress that protects the Coast from

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erosion and waves considerably (Toan et al., 2018). Damage to the ecosystem This can impact the long-term sustainability of the region's ecology and economy.

Raja Ampat, often called heaven, lowers the world's oceans and does not escape the impact of harmful shipping activity. As one of the prominent nautical destinations, Raja Ampat is a fascinating ship tour worldwide. Although tourists contribute to the significant economy of the public, voyages that are not under control can damage sensitive ecosystems.(Gillespie, 2016). Reefs of coral in Raja Ampat, which house more than 1,500 fish and 500 species of coral, are often damaged due to anchor ships. In addition, the disposal of waste from ship tourism that is not processed can pollute sea water and disturb the balanced ecosystem. The other challenge is that ship cargo that passes through this area risks spilling oil and pollution. Conditions This shows the need for more management to ensure that activity sailing in Raja Ampat does not damage life's beauty and diversity, which mainly becomes a Power pull. (Octavian et al., 2020).

Impact ship to environment sea This also reflects the challenge in managing PSSA areas in Indonesia. One main challenge is the lack of specific regulations and effective implementation to protect vulnerable marine regions from impact activity shipping. Although Indonesia has national regulations, such as Law Number 32 of 2009 concerning Protection and Management Environment and Law Number 17 of 2008 concerning Shipping, regulations often do not cover the steps and specifics required to manage the PSSA region. For example, there is an arrangement special about routing ships in sensitive areas in an ecological way, such as Raja Ampat or the Lombok Strait, which can help reduce the risk of damage to the ecosystem. In addition, the lack of infrastructure monitoring maritime, such as radar and ship patrol, makes supervision of activity ships difficult. In many cases, violations of steps existing protection are often not detected, or adequate sanctions are not received.

The challenge is coordination inter-agency, which is still not practical enough. Management of the PSSA area requires work close to various institutions and governments, including the Ministry of Transportation, the Ministry of Maritime Affairs and Fisheries, and the Ministry of Environment and Forestry. However, overlapping authority and lack of communication often hinder the implementation of policies protecting the environment sea. For example, the setting route ships be under the Ministry of Transportation's authority, while the ecosystem sea protection is not quite enough, replied the Ministry of Maritime Affairs and Fisheries. Without explicit mechanism coordination, efforts to protect PSSA areas are often hampered by different priorities and approaches between institutions.

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In addition, stakeholders' interest in PSSA area management is still limited. Community locals often depend on local sources. Power seas are used for eye livelihood and are rarely involved in taking decision-related steps for protection. Participation can contribute significantly to ensuring local policies are taken according to needs and conditions. Likewise, the private sector, such as company shipping and tour operators, often realizes the importance of protecting the environment. Many of them see policy protection as an obstacle to the operation rather than an effort to preserve source power that supports sustainability business.

To overcome this challenge, steps are required to strengthen the management of PSSA areas in Indonesia. One of the steps that can be taken is to revise the regulation to enter more provisions specific to the identification, determination, and management of PSSA, including the arrangement of route ships and systems reporting mandatory. In addition, the government needs to invest more Power in developing infrastructure monitoring maritime and training for apparatus enforcer Law. The same international organizations, such as the IMO, and donor countries can also help overcome limitations in source Power. For example, training programs and technical help can increase Indonesia's capacity to manage the PSSA area according to international standards.

Impact Ship to Environment Indonesian Sea shows the need for a more integrated approach to managing the PSSA area. By overcoming existing challenges, including lack of regulation specific, coordination inter-agency, and engagement of stakeholders interest local, Indonesia can ensure that its marine regions are rich in diverse biological get adequate protection. Steps This will not only support the sustainability of the ecosystem sea but also provide significant economic and social benefits for the public, local, and state.

Strategy and Recommendations for Harmonization Regulation

Harmonization regulation with international standards in managing particularly sensitive sea areas (PSSA) in Indonesia requires a revision regulation, mechanism coordination inter-agency, implementation of a technology-friendly environment, and improvement awareness of stakeholders' interests. One important beginning is to revise regulations, such as Law Number 32 of 2009 concerning Protection and Management Environment and Law Number 17 of 2008 concerning Shipping, to harmonize with IMO Resolution A.982(24), which became guidelines international for PSSA. Revision This needs to enter more provisions specific to the identification, determination, and management of PSSA areas, including criteria that must be fulfilled and steps necessary for protection. For example, setting route ships passing through sensitive areas such as Raja Ampat or the Lombok Strait is essential to setting up a more straightforward way to

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reduce the risk of damage to the ecosystem. In addition, the system reporting must be applied for ships passing through the PSSA area to increase supervision and ensure compliance with the steps adopted for protection.

In addition to the revision regulation, harmonization is required for mechanism coordination to be more effective in inter-agency. Currently, marine area management in Indonesia involves various institutions, including the Ministry of Transportation, the Ministry of Maritime Affairs and Fisheries, and the Ministry of Environment and Forestry. However, the lack of coordination between inter-agency often becomes an obstacle in implementing policies protecting the environment sea. To overcome the problem, the government needs to form a coordinating body or forum with a remarkably responsible answer to the management of PSSA.

This body can function as a connector inter-agency, ensuring that all stakeholders' interests are involved in protecting the planning and implementation steps. This body can also coordinate dialogue with international organizations like IMO to ensure that steps are taken according to global standards. In addition, this body can monitor and evaluate the policy protection environment so that policies can be customized based on needs and conditions in the field.

Implementing a technology-friendly environment in the shipping sector also becomes essential in the harmonization strategy regulation. One technology that can be adopted is using low sulfur burn. To reduce the sulfur oxide (SOx) emission, which can pollute the air and sea. In addition, ships passing through the PSSA area need to be equipped with a system processing waste that meets international standards to prevent pollution from the disposal of liquid or dense. The government can also push technology to monitor sophisticated maritime, such as radar and satellite systems, to increase the supervision of activity shipping in the PSSA area. Use technology. This helps identify violations and makes decisions faster and more precise when facing incident environments, such as spill oil or a collision ship. To push the adoption of a technology-friendly climate, the government can give incentive economy to companies shipping investment in technology, like subtraction cost harbour or tax.

Improvement awareness of stakeholders' interests also becomes key to successful harmonization regulation. Community locals often depend on local sources of power sea. For eye livelihood, they need to be involved in a way that is active in the PSSA management process. Education and training can be given to the community to increase their understanding of the importance of protecting the environment and sea and their role in supporting steps of protection. In addition, the private sector, such as company shipping and tour operators, must be educated about the benefits of steps protecting the

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environment, exemplary aspects of sustainability business, and reputation. The government can Work with non-governmental organizations (NGOs) and the media to increase awareness among the public about the importance of PSSA, including the impact that can caused by activity on the voyage that is not under control. Campaign effective public can help build more support for policy protection environment sea so that all stakeholders are involved in a way active in implementation policy.

In conclusion, harmonizing national regulation with standard international PSSA management requires a comprehensive and collaborative approach. The revision of rules to accommodate provisions specific to PSSA, the formation of effective coordination mechanisms, the implementation of a technology-friendly environment, and the improvement of stakeholders' awareness of the steps of interest are vital. By implementing this strategy, Indonesia can ensure that its marine areas are diverse and that biological protection is adequate. At the same time, it fulfils the obligation of the international government to guard the sustainable environment sea.

CONCLUSION

Harmonization of Particularly Sensitive Sea Areas (PSSA) regulations with Indonesian national policies is a critical step in ensuring marine environmental protection while supporting sustainable maritime trade. Despite the existence of Law Number 32 of 2009 on Environmental Protection and Management and Law Number 17 of 2008 on Shipping, significant gaps remain in aligning these regulations with international standards, such as IMO Resolution A.982(24). Weak inter-agency coordination, limited institutional capacity, and low stakeholder awareness further exacerbate these challenges, making it difficult to effectively implement PSSA policies. Without comprehensive legal reforms and stronger enforcement mechanisms, Indonesia's marine biodiversity remains at risk from unregulated shipping activities.

To address these issues, Indonesia must prioritize regulatory reforms, enhance inter-agency coordination, and strengthen technological capabilities. Establishing a dedicated maritime governance body is essential to integrate policies among key ministries and ensure effective enforcement of PSSA regulations. Additionally, investment in environmental monitoring technologies, such as radar surveillance and automated tracking systems, is crucial for improving maritime security and ecosystem protection. Indonesia can also learn from international best practices, such as the Great Barrier Reef PSSA in Australia and the Wadden Sea PSSA in Europe, where legal harmonization, institutional collaboration, and technological innovation have led to successful marine conservation.

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Furthermore, enhancing stakeholder engagement is vital for sustainable PSSA management. Local communities and private sector actors must be actively involved through public awareness campaigns, capacity-building initiatives, and economic incentives. Implementing eco-friendly maritime policies, such as low-emission fuels and mandatory waste management systems for shipping companies, will further support Indonesia's commitment to sustainable maritime governance. By integrating international best practices into national policies, Indonesia can strengthen its role in global maritime environmental protection while maintaining economic stability in the shipping industry.

REFERENCE

Albert Mamahit, D. (2019). Traffic Separation Scheme (TSS) and Particularly Sensitive Sea Area (PSSA) in Lombok Strait as an International Policy for National Coastal Country Management. *J Def Manag*, *10*(2), 185. https://doi.org/10.35248/2167-0374.20.10.185

Albert Mamahit, D., Aulia, R., Lestari, P., Hidayat Sutawidjaya, A., & Pantja Djati Postgraduate -Sekolah Tinggi Pariwisata Trisakti, S. (2020). A new decade for social changes Management for Lombok Strait with Traffic Separation Scheme (TSS) and Particularly Sensitive Sea Area (PSSA) to Implement the IMO Regulations. *Technium Social Sciences Journal*, *9*, 2668–7798. www.techniumscience.comwww.techniumscience.com

Ashri, M., Widayanti, T. F., Merdekawati Djafar, E., & Saddam Rivanie, S. (2021). The ideal concept of implementing the PSSA is the protection of the marine environment. *IOP Conference Series: Earth and Environmental Science*, *860*(1). https://doi.org/10.1088/1755-1315/860/1/012090

Gillespie, A. (2016). Vulnerability and response to the risk of international shipping: The case of the Salish Sea. *Review of European, Comparative and International Environmental Law*, *25*(3), 317–332. https://doi.org/10.1111/reel.12174

Harasymiv, T. (2023). Problems of harmonization of national legislation to international legal standards. *Visnik Nacional'nogo Universitetu «Lvivska Politehnika». Seria: Uridicni Nauki*, *10*(40), 12–19. https://doi.org/10.23939/law2023.40.012

Hillmer-Pegram, K., & Robards, M. D. (2015). Relevance of a particularly sensitive sea area to the Bering Strait region: A policy analysis using resilience-based governance principles. *Ecology and Society*, *20*(1). https://doi.org/10.5751/ES-07081-200126

IMO Resolution A.982(24) Revised Guidelines for the Identification and Designation of Particularly Sensitive Sea Areas, Pub. L. No. A.982(24), IMO (2006).

Kim, S. Y. (2021). Problems and processes of restricting navigation in particularly sensitive sea areas. In *International Journal of Marine and Coastal Law* (Vol. 36, Issue 3, pp. 438–463). Brill Nijhoff. https://doi.org/10.1163/15718085-bja10062

Liber Sonata, D. (2014). METODE PENELITIAN HUKUM NORMATIF DAN EMPIRIS: KARAKTERISTIK KHAS DARI METODE MENELITI HUKUM. *Fiat Justisia Jurnal Ilmu Hukum*, *8*(1).

Octavian, A., Trismadi, & Lestari, P. (2020). The Importance of Establishing Particularly Sensitive Sea Areas in Lombok Strait: Maritime Security Perspective. *IOP Conference Series: Earth and Environmental Science*, *557*(1). https://doi.org/10.1088/1755-1315/557/1/012013

Onyena, A. P., & Nwaogbe, O. R. (2024). Assessment of water quality and heavy metal contamination in ballast water: Implications for marine ecosystems and human health. *Maritime Technology and Research*, *6*(4). https://doi.org/10.33175/mtr.2024.270227

E-ISSN: 2830-5728

Orlova, E. (2022). The Role of Harmonization of Legal Regulation in the Process of Global and Regional Integration. *Journal of Foreign Legislation and Comparative Law*, *17*(6), 1–1. https://doi.org/10.12737/jflcl.2021.072

Reyad, S. (2023). Relationship between international and national law and issues of their harmonization. *Uzhhorod National University Herald. Series: Law*, *2*(78), 390–397. https://doi.org/10.24144/2307-3322.2023.78.2.63

S, U. C. (2021). TYPOLOGY OF LEGAL RESEARCH METHODS IN NORMATIVE AND SOCIOLOGICAL THINKING. *Fox Justi: Jurnal Ilmu Hukum*, *12*(01).

Sahri, A., Mustika, P. L. K., Dewanto, H. Y., & Murk, A. J. (2020). A critical review of marine mammal governance and protection in Indonesia. *Marine Policy*, *117*. https://doi.org/10.1016/j.marpol.2020.103893

Sakib, N., Gissi, E., & Backer, H. (2021). Addressing the pollution control potential of marine spatial planning for shipping activity. *Marine Policy*, *132*. https://doi.org/10.1016/j.marpol.2021.104648

Toan, D. Van, Dat, L. D., Ha, P. N. H., Anh, T. T. T., Anh, L. T., Tien, D. D., Khanh, L. V., Hieu, D. H., & Thuong, T. T. T. (2018). PSSA- INTERNATIONAL SOLUTION TO PROTECT THE BIODIVERSITY IN HA LONG BAY - CAT BA MARINE AREA. *Tạp Chí Khoa Học và Công Nghệ Biển*, *18*(3), 304–311. https://doi.org/10.15625/1859-3097/18/3/13241

Undang-Undang Nomor 32 Tahun 2009 Tentang Perlindungan Dan Pengelolaan Lingkungan Hidup, Pub. L. No. 32 (2009).

Undang-Undang Republik Indonesia Nomor 17 Tahun 2008 Tentang Pelayaran, Lembaran RI (2008).

United Nations Convention on the Law of the Sea (82 C.E.).

Zhang, C., Shi, Z., Zhao, J., Zhang, Y., Yu, Y., Mu, Y., Yao, X., Feng, L., Zhang, F., Chen, Y., Liu, X., Shi, J., & Gao, H. (2021). Impact of air emissions from shipping on marine phytoplankton growth. *Science of the Total Environment*, *769*. https://doi.org/10.1016/j.scitotenv.2021.145488.

DOI: 10.55960/jlri.v12i3.980