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Enhancing Environmental Sustainability in Barru Regency: Evaluating Law Implementation on Puteanging Island

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ABSTRACT

This study evaluates the implementation of Law Number 1 Of 2014 Concerning Management Of Coastal Areas And Small Islands on islands in Barru Regency, South Sulawesi, namely Puteanging Island. The research method used is a descriptive analytical method which involves collecting data through direct observation, interviews, documentation studies, as well as qualitative and quantitative analysis. The research results show the need for serious efforts in environmental protection, community empowerment and law enforcement to ensure the sustainability of the environment and natural resources on the three islands. Effective collaboration between local governments, related institutions and local communities is the key to success in implementing this Law. The results of this research provide valuable insights for sustainable environmental management and environmental protection policies in Indonesia. Thus, concrete steps need to be taken to preserve the environment and natural resources of the islands, including increasing beach patrols, plastic reduction campaigns, mangrove planting programs, as well as increasing environmental awareness in local communities.

Keywords: *Implementation, Environmental Law, Barru, Island, Environment.*

1.Introduction

As an archipelagic country located in Southeast Asia, Indonesia has abundant natural wealth. With various natural resources such as forests, agriculture, mining and fisheries, Indonesia has great potential to become a developed and prosperous country. Indonesia has abundant natural wealth because of its very strategic position in global geostrategy, with a diversity of natural resources and as strategic trade traffic routes (Indrawan, 2015) (Fatma, 2021) (Adi et al., 2023).

However, unfortunately, natural resource management in Indonesia is still not optimal, resulting in various environmental problems such as deforestation, water pollution, and Ecosystem damage continues to occur.

The management of natural resources in Indonesia is still not optimal, leading to various environmental issues such as deforestation, water pollution, and imbalance in resource utilization between large industries and local communities (Vera, 2023). Therefore, it is important to make protection efforts environment and sustainable management of natural resources so that Indonesia can continue to develop without destroying the environment. Efforts to protect the environment and sustainable management of natural resources are important so that Indonesia can continue to develop (Fahmi, 2011).

Conservation and sustainable management efforts must be a top priority for the Indonesian government and society. Concrete steps such as strict law enforcement against illegal logging perpetrators, reducing the use of dangerous chemicals in agriculture, and increasing awareness of the importance of protecting the environment must continue. Indonesia can preserve its natural wealth for future generations and achieve sustainable development goals evenly throughout the region by paying attention to its potential natural resources and managing them well (Farah, 2009) (Nasution,2023) (Anwar, 2022).

Environmental problems in Barru Regency cannot be ignored. This district faces various challenges related to natural resource management, such as deforestation, water pollution, and environmental damage due to industrial activities. Apart from that, rapid population growth is also a factor that worsens environmental conditions in this area. Environmental problems in Barru Regency include air pollution, water pollution, and land pollution, with the presence of industries in the region contributing to these issues (Aidah et al, 2023)

Therefore, there needs to be concrete steps to overcome the environmental problems faced by Barru Regency in order to maintain environmental sustainability for future generations. The environmental issues in Barru Regency include changes in the physical environment due to the impact of C quarry activities, which have led to physical changes in the surrounding environment (Safaruddin & Qamal, 2023)

Islands often experience environmental damage caused by various factors, such as coastal erosion, accumulation of rubbish, destruction of mangrove plants, and the use of coral as building materials. Coastal erosion results in soil erosion which threatens the sustainability of island habitats and the surrounding marine ecosystem. The accumulation of plastic and other waste also pollutes the island's environment and disturbs marine wildlife. The main causes of coastal erosion include factors such as sediment bypassing at dams and harbors, river bed quarrying suppression, hill slope stabilization/reduction, global reduction in sediment flux due to dams, and subsidence from oil and gas extraction. Local causes like dams, structures, and changes in agricultural practices are significant contributors to beach erosion ([Allan et al., 2018](#)).

Barru Regency is located in South Sulawesi Province, Indonesia, and has important islands, namely Puteanging Island. in Barru Regency experienced a decrease in mangrove ecosystem conditions from 2011 to 2016, with a shift in mangrove area to open land. The study by Asirwan (2017) focused on inventorying mangrove vegetation types and densities using Landsat-7 and Landsat-8 satellite imagery." (Ansyori et al., 2023), Puteanging Island experienced a decrease in the number of visitors from 2014 to 2017, with 4,000 visitors in 2014 and 2015, dropping to 2,700 visitors in 2017. This decline in visitors is also seen in Ujung Batu Beach, with a decrease from 15,000 visitors in 2014 to 9,750 visitors in 2017. The impact of tourism development on community empowerment was studied, showing a direct influence of 47% on community empowerment near Ujung Batu Beach (Rosmala et al., 2023), and Puteanging Island. The island in Barru Regency is Pute Anging Island ([Hasmawati, 2016](#)) (Isdrajad et al., 2020) (Amran & Mahatma, 2018). These islands have attractive natural beauty as well as the potential for diverse natural resources, marine biodiversity and ecosystems that support the lives of the surrounding community. Thus, the existence of these islands is an important asset in environmental and natural resource management in Barru Regency.

Various studies have been carried out to evaluate the success of various environmental and natural resource management programs on the islands. The results of this research can provide valuable insight for local governments and communities in efforts to maintain environmental sustainability and "Sustainable use of natural resources is an effort to maintain ecosystem balance and ensure the preservation of natural resources for future generations. The concept of sustainable

development emphasizes the importance utilize natural resources wisely so as not to exhaust them excessively (Dini & Muhammad, 2022)

Environmental damage in several cities in Indonesia, including Makassar City, is caused by various natural factors such as abrasion, sedimentation, sea level rise, tsunamis and tidal waves. Apart from that, the behavior and activities of communities around coastal areas also contribute to environmental damage. Illegal logging, fish theft, robbery on sea, drug abuse, and illegal trespassing are some of the factors that contribute to environmental damage on islands (Siregar, 2008). Lack of community ability to resolve environmental problems, lack of capacity to provide input to parties involved. interested parties, as well as the failure of government policies to implement regulations are also factors causing environmental damage in coastal areas. (Chairul & Taufiqur, 2018). Damage to mangrove plants which function as abrasion barriers and protectors of coastal ecosystems is getting worse. Uncontrolled coral extraction also damages coral ecosystems and disrupts the marine ecological balance. Therefore, more serious environmental conservation and rehabilitation measures are needed to protect the island and its ecosystem from increasingly serious damage.

This research is to provide a deeper understanding of the implementation process of Law Number 1 Of 2014 Concerning Management Of Coastal Areas And Small Islands in the context of environmental and natural resource management in the island region. It is hoped that the results of this research can become a reference for local governments, related institutions and the community in taking policies and strategic steps to protect and preserve the environment on Puteanging Island. Apart from that, this research can also provide recommendations that can be used as guidelines in developing policies and action programs that are more effective in efforts to preserve the environment and natural resources in the region.

This research aims to analyze compliance and effectiveness of the implementation of this law in preserving the environment on these islands, as well as to evaluate the positive impacts resulting from the implementation of this law. The implementation of Law Number 1 Of 2014 Concerning Management Of Coastal Areas And Small Islands is related to the government's authority to control and protect the environment, as stated in the 1945 Constitution of the Republic of Indonesia. Environmental law experts recognize that most of the substance of environmental

law is administrative law, which includes the authority, procedures, and management institutions related to environmental management (Yasir Said, 2018).

2. Research methods

The research method used in this research is the analytical descriptive method. Descriptive research is a research method used to describe existing phenomena as accurately as possible. It involves collecting available data through instruments like tests, questionnaires, interviews, or observations to systematically describe the phenomena under study. Descriptive research covers subtypes such as survey, correlation study, qualitative study, or content analysis, differing in data collection and analysis procedures (Haryanto. et al., 2018). The descriptive method is used to describe and explain in detail the implementation of Law Number 1 Of 2014 Concerning Management Of Coastal Areas And Small Islands in managing the environment and natural resources on Puteang Island. Meanwhile, analytical methods are used to analyze in depth the data collected, including evaluating compliance with laws, effectiveness of implementation, and the resulting positive impacts. This research method is supported by data collection techniques in the form of direct observation, interviews with relevant stakeholders, documentation studies, and data analysis using qualitative and quantitative approaches.

In conducting this research paper, it is important to understand the background and significance of implementation of Law Number 1 Of 2014 Concerning Management Of Coastal Areas And Small Islands. This law plays a crucial role in regulating activities that may impact the environment and ensuring sustainable use of natural resources for future generations. By providing an overview of the key provisions, objectives, and scope of the law, we can gain a better understanding of its implications and effectiveness in environmental and natural resource management. By using tools such as Vosviewer, data can be visualized and analyzed deeply to address the research questions that have been posed.

3. Research Results

3.1. Description of Research Location

Barru Regency is located on the west coast of South Sulawesi Province, located between coordinates 40°5'49" - 40°47'35" south latitude and 119°35'00" - 119°49'16" east longitude with

an area of 1,174, 72 km². This district is located about 100 km north of Makassar City and 50 km south of Parepare City, with a coastline of 78 km. Barru Regency is traversed by the Trans Sulawesi route and is a tourist crossing area between Makassar City and Tana Toraja Regency, and is also part of the Parepare Integrated Economic Development Area (KAPET). Based on the 2009 Population Census, the population reached 162,985 people with an average density of 138.74 people/km². The per capita income of the population in 2009 reached Rp. 9,705,963,-. (Barrukab.go.id, 2022)

The trip from Makassar to Barru Regency takes around 1.5 hours, while from Parepare City to Barru Regency only takes around 45 minutes. Barru Regency borders Parepare City and Sidrap Regency to the north, Soppeng Regency and Bone Regency to the east, Pangkep Regency to the south, and the Makassar Strait to the west (Barrukab.go.id, 2022). Barru Regency is located in South Sulawesi Province, Indonesia, and has three important islands, namely Puteanging Island, Pannikiang Island, and Dutungeng Island. Puteanging Island is included in the Lasitae Village area, Tanete Rilau sub-district, Barru Regenc.

Table 1 Geographical and Demographic Information for Barru Regency

Number	Information	Value/Percentage	Description
1	Location	Barru Regency	Location of Barru Regency
2	Province	South Sulawesi Province	Province where Barru Regency is located
3	Coordinates	40°5'49" - 40°47'35" S, 119°35'00" - 119°49'16" E	Geographic coordinates of Barru Regency
4	Area	1,174.72 km ²	Total area of Barru Regency (km ²)
5	Distance from Makassar	100 km	Distance between Barru and Makassar (km)
6	Distance from Parepare	50 km	Distance between Barru and Parepare (km)
7	Coastline Length	78 km	Length of coastline in Barru Regency (km)
8	Transportation Access	Trans Sulawesi route	Main transportation access available in Barru
9	Role as Tourist Area	Yes (Makassar-Tana Toraja)	Whether Barru plays an important role as a tourist area
10	Economic Development Zone	Parepare Integrated Economic Development Area (KAPET)	Whether Barru is part of a specific economic development zone
11	Population (2009)	162,985 people	Population of Barru Regency in 2009
12	Population Density	138.74 people/km ²	Average population density per km ² in Barru

12	Per Capita Income (2009)	Rp. 9,705,963,-	Per capita income of Barru's population in 2009 (in Indonesian Rupiah)
14	Travel Time from Makassar	Approximately 1.5 hours	Estimated travel time from Makassar to Barru (hours)
15	Travel Time from Parepare	Approximately 45 minutes	Estimated travel time from Parepare to Barru (minutes)
16	Northern Boundary	Parepare City, Sidrap Regency	Areas that form the northern boundary of Barru Regency
17	Eastern Boundary	Soppeng Regency, Bone Regency	Areas that form the eastern boundary of Barru Regency
18	Southern Boundary	Pangkep Regency	Area that forms the southern boundary of Barru Regency
19	Western Boundary	Makassar Strait	Area that forms the western boundary of Barru Regency
20	Important Islands	Puteanging Island, Pannikiang Island, Dutungeng Island	Names of important islands located in Barru Regency

Source: Barrukab.go.id, 2022

3.2. Analysis of the Environmental Situation on Putianging, Islands

The environment on Puteanging Island which is included in the Lasitae Village area, Tanete Rilau District, Barru Regency , shows worrying conditions related to environmental damage. Climate change and environmental damage can lead to various psychological responses, including anxiety and distress. The perception of environmental degradation, such as mining activities, has been linked to mental distress among affected populations. Exposure to particulate matter, a common environmental pollutant, has also been associated with symptoms of anxiety, suggesting a potential link between environmental factors and mental health (Clayton, 2020) (Melinda et al., 2015)

. Beach erosion has occurred significantly, threatening the sustainability of the island's habitat and the surrounding marine ecosystem. The accumulation of plastic and other waste is a serious problem that pollutes the island's environment and disturbs marine wildlife. Apart from that, the destruction of mangrove plants which play an important role as a buffer against abrasion has further worsened environmental conditions. Uncontrolled coral harvesting was also found, damaging the coral ecosystem and disrupting the marine ecological balance. This analysis is the basis for developing more serious environmental conservation and rehabilitation measures to protect Pannikiang Island and its ecosystem from further damage.

Puteanging Island are important parts of Barru Regency in South Sulawesi Province, Indonesia. However, currently the environmental conditions on the three islands are facing various challenges that need to be addressed immediately. Small islands face challenges such as lack of investment in climate and environmental monitoring frameworks, economic and social costs of climate change impacts, and coastal development leading to vulnerability. Climate change adds to existing vulnerabilities in small islands, especially in rural areas and outer islands. Tourism, a key sector, remains weather-sensitive. Migration and resettlement patterns may be influenced by climate change. Economic vulnerabilities in small island states stem from exposure to external economic conditions and dependence on limited exports and imports. (Leonard et al., 2014). The word coast is usually applied to indicate an environment or an area located not far from the beach. Even the word is used to describe special characteristics which characterize the area, as reflected in the terms coastal climate, coastal accent, coastal customs and etc (Muhammad, 2020).

The main factors that cause environmental damage on these islands include coral mining, dumping of rubbish in any place, destruction of mangrove forests on the islands and the lack of awareness of environmental conservation. Efforts to preserve the environment on Pannikiang Island, Dutungeng Island and Pulau Puteanging needs to be done immediately. Cooperation is needed between local governments, local communities and various related parties to implement environmental protection programs. Cooperation is essential between local governments, local communities, and various related parties to implement environmental protection programs. This collaboration can lead to the development of sustainable strategies and policies that benefit the entire population of an area. The involvement of stakeholders and the community in decision-making processes is crucial for long-lasting development solutions (Stefano et al., 2016).

Steps such as strict supervision of illegal coral mining, socializing the importance of disposing of waste in the right place, and educating the public about the importance of environmental conservation can be the first steps to overcome this problem. Hopefully, with joint efforts, the natural beauty and biodiversity of these three islands can be maintained for future generations.

In interview with Arham Azis, a resident of Puteanging Island, they revealed that the environmental conditions on Puteanging Island are currently worrying. The village head noted that

there was a serious problem related to increasing coastal erosion, threatening settlements and residential land around the coast. Apart from that, the accumulation of plastic waste is also a problem that disturbs the life of marine animals around these islands (Interview with Arham Azis, a resident of Puteanging Island, January 23 2024)

The results of these interviews show that the governments of Lasitae village are very concerned about environmental conditions in their respective areas. Expressions of concern about the problem of increasing coastal erosion and the accumulation of plastic waste which disturbs marine animals show awareness of the importance of environmental conservation. Awareness of the impacts of plastic pollution on marine animals and coastal erosion (Anurag et al., 2021)

This also reflects the need for concrete action in overcoming the environmental challenges faced, including the need for cooperation between the government, community and various related parties in maintaining the sustainability of the islands' ecosystem. The a resident of Puteanging Island also expressed his concern about the environmental conditions on the three islands. According to him, increasing coastal erosion is a serious threat to communities around the coast. He also highlighted the problem of the accumulation of plastic waste which is increasingly destroying the marine ecosystem around the islands. To overcome this problem, the head of Madello village said that steps for beach rehabilitation and community education had been taken to maintain environmental sustainability in the area (Interview with Sinar is a resident of Puteanging Island, January 23, 2024)

From the results of the three interviews above, it can be seen that the village heads of Lasitae both have a high awareness of environmental problems in their area. Their expressions of concern regarding the increase in coastal erosion, accumulation of plastic waste, and damage to mangrove plants reflect an understanding of the negative impacts that can have on marine ecosystems and the lives of local communities.

Steps taken by the Lasitae village government, such as beach rehabilitation and community education. Community coastal rehabilitation work at Turners Beach, Tasmania has been evaluated for its long-term success in reducing erosion. Various methods such as beach profile monitoring, sediment analysis, historical photos, and community surveys are used to determine the effectiveness of rehabilitation efforts. Overall, rehabilitation activities have been largely successful

in managing beach erosion at Turners Beach (Joanna, 2014). Demonstrate commitment to preserving the environment and overcoming the problems faced. Meanwhile, the Village Heads of Cilellang and Lasitae emphasized the importance of government and community cooperation in protecting the environment, this reflects the need for synergy between various parties to achieve common goals in environmental preservation. This awareness and commitment from the village head is a strong foundation for joint efforts to protect the environment on Pannikiang Island, Dutungeng Island and Puteanging Island. Hopefully the steps taken and the cooperation established can bring positive changes in environmental conditions in the region. The steps taken and cooperation established can bring positive changes in environmental conditions in the region, especially through the concept of ecological civilization that focuses on sustainable development and reducing environmental impacts (Hanson, 2019)

The results of interviews with village heads show high awareness of environmental conditions on Puteanging Island. Recognition of the existence of serious problems related to coastal erosion, accumulation of rubbish and destruction of mangrove plants indicates a deep understanding of the environmental challenges faced. The concrete steps that have been taken, such as beach rehabilitation. Coastal development, aquaculture expansion, and pollution are major threats to mangrove ecosystems, leading to issues like soil erosion, pollution, and habitat degradation. Mangrove plants are affected by oil pollution, trace metals, and other pollutants, impacting their physiological processes and biodiversity. Challenges in mangrove management include land-use conflicts, inadequate policies, and lack of community awareness (Shoaib et al., 2023), public education and reducing destructive activities, are positive actions in maintaining the sustainability of the islands' ecosystem.

Awareness of the importance of environmental conservation has encouraged concrete steps to protect and restore environmental conditions on Pannikiang Island, Dutungeng Island and Puteanging Island. Collaboration between village heads, communities and other related parties is the key to achieving the goal of sustainable environmental conservation on these islands. Collaboration between village heads, communities, and other related parties is crucial for achieving sustainable environmental conservation goals in tourism villages like Alamendah. Local champions, such as Wendi, play a significant role in implementing environmentally friendly policies, organizing conservation programs, and collaborating with various stakeholders, including

the government, NGOs, and the local community, to promote environmental conservation and cultural heritage preservation (Ahmad et al., 2023)

The Lasitae village government has also implemented various environmental protection programs on Puteanging Island. This program involves active community participation in beach cleaning, waste management, and replanting coastal vegetation. Apart from that, we also carry out outreach about the importance of keeping the environment clean and building public awareness of the importance of preserving coastal ecosystems on our islands (interview with Arham Asis and Sinar is a resident of Puteanging Island, January 23, 2024)

Based on the results of interviews with the people on the three islands, it can be seen that the community's response to environmental problems on these islands is quite positive. They are increasingly aware of the importance of environmental conservation and are actively involved in activities that support these efforts. Yes, individuals are increasingly aware of the importance of environmental conservation and are actively involved in activities that support these efforts (Siregar, 2021) (Chapman, 2015) (Heidi et al., 2017). Apart from that, we are also working to reduce the use of coral as building material on our islands. This step was taken by enforcing strict regulations and educating the public about the negative impacts of this activity on the marine ecosystem. In this way, the hope is to minimize environmental damage caused by uncontrolled coral harvesting practices. To minimize environmental damage caused by uncontrolled coral harvesting practices, efforts are being made to restore coral populations through initiatives like the Coral Restoration Foundation and SECORE International. These organizations transplant coral fragments onto natural reefs and produce millions of coral offspring for restoration purposes. Additionally, policies like the Coral Reef Conservation Act of 2000 and the Environmental Protection Agency's Clean Water Act programs aim to protect coral reefs from further damage (Andrea et al., 2020).

Observation methods have a long history in the social sciences and can be adapted for health researchers' unique needs. Health research observations should be feasible, well-defined, and piloted to enhance rigor. Interdisciplinary teams, data collection tools, and detailed protocols are essential for successful direct observation studies in healthcare research (Gemmae et al., 2022), see that the role of village heads and communities in environmental conservation efforts is

related to the implementation of Law Number 1 Of 2014 Concerning Management Of Coastal Areas And Small Islands. It also shows that they consider it important to communicate and collaborate with other stakeholders, such as heads of Lasitae villages. This reflects a proactive attitude in finding joint solutions and building mutual awareness of the need for action to protect the environment in their region. Hopefully this research observation will be a good first step in joint efforts to improve environmental conditions on Puteanging Island. This research observation can be a good first step in joint efforts to improve environmental conditions on Pannikiang Island and Dutungeng Island. Bakki Island has potential as a tourist destination with the existence of a honeymoon resort that attracts new couples. Gangga Island also offers natural beauty that is still preserved and pristine, with snorkeling, diving and fishing activities that are attractive to tourists (Syahdani, 2022)

Through collaborative efforts and increased awareness, it is hoped that these communities can take concrete steps towards environmental sustainability. By enhancing patrols, reducing plastic usage through campaigns, planting mangroves, and fostering environmental education, the communities of Puteanging Island can work together to preserve their natural resources and create a healthier environment for future generations.

The results of our analysis of the main topics in the article paragraphs show a number of important findings. As can be seen in Table 1 and diagram 1, there is a significant percentage distribution between observation methods, the role of village heads in environmental conservation efforts, and tourism potential on certain islands.

Table 2 Percentage of Main Topics in Article Paragraphs

No.	Primary Topics	Percentage
1	Observation Methods	14%
2	Health Research Observations	22%
3	Interdisciplinary Teams	7%
4	Data Collection Tools	6%
5	Detailed Protocols	5%
6	Role of Village Heads	10%
7	Implementation of Law	6%
8	Communication and Collaboration	7%
9	Environmental Conservation Efforts	9%
10	Proactive Attitude	6%

11	Joint Solutions	3%
12	Building Mutual Awareness	4%
13	Tourism Opportunities	5%
14	Honeymoon Resort	3%
15	Natural Beauty	5%
16	Tourist Activities	3%

Source: based on main topic analysis of this research paragraph

Figure 2 Grafik Percentage of Main Topics in Article Paragraphs



Source: based on main topic analysis of this research paragraph

3.3. Implementation of Law Number 1 of 2014 Concerning Management of Coastal Areas and Small Islands

Law Number 27 of 2007 concerning Management of Coastal Areas and Small Islands has been changed to Law Number 1 of 2014 to adapt to current developments. This law has several implementing regulations such as Government Regulation Number 62 of 2010 concerning the Utilization of Outermost Small Islands (Kbal et al 2021). Norms for monitoring environmental permits in preventing pollution and environmental damage in the exploitation of natural resources

are also regulated by the Law. Law Number 32 of 2009 concerning Environmental Protection and Management (Muzahid & Subianta, 2018) (Atiandagho Febrianto Gabriello Owen, 2020)

Based on the results of interviews with three village heads who oversee the three islands, it was said that the implementation of Law Number 1 of 2014 Concerning Management of Coastal Areas and Small Islands has experienced challenges and problems. One of the challenges faced is the increase in coastal erosion which threatens settlements and agricultural land around the coast. Apart from that, there is also the problem of accumulation of plastic waste which disturbs marine wildlife, as well as damage to mangrove plants which has an impact on marine ecosystems which are increasingly threatened. (Interview with Arham Asis and Sinar is a resident of Puteanging Island, January 23 2024).

Based on the results of interviews with three village heads who oversee the three islands, the implementation of Law Number 1 Of 2014 Concerning Management Of Coastal Areas And Small Islands. One of the challenges expressed is the increase in coastal erosion which threatens settlements and agricultural land around the coast. This causes concerns about material and economic losses for local communities. Apart from that, there are also serious problems related to the accumulation of plastic waste which disturbs marine wildlife and damage to mangrove plants which has an impact on marine ecosystems which are increasingly threatened. This condition shows the need for concrete action in managing the environment and natural resources in the region to overcome increasingly pressing problems.

Table 3: Analysis of Legal Actions and Implementation in Coastal and Small Islands Management along with Challenges Faced

No.	Legal Action	Implementation	Challenges and Issues
1	Law Number 27 of 2007 concerning Management of Coastal Areas and Small Islands	-	-
2	Law Number 1 of 2014	Implemented	1. Increase in coastal erosion, 2. Accumulation of plastic waste, 3. Damage to mangrove plants
3	Government Regulation Number 62 of 2010 concerning the Utilization of Outermost Small Islands	Implemented	-
4	Law Number 32 of 2009 concerning Environmental Protection and Management	-	1. Norms for monitoring environmental permits in preventing pollution and environmental damage in natural resource exploitation

5 Interviews with village heads	Implemented	1. Increase in coastal erosion, 2. Accumulation of plastic waste, 3. Damage to mangrove plants
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Source of Information: Research Results

The implementation of legal rules involves considering the impact of public interest nature on the enforcement process, diversification of implementation processes, and coordination of legal regimes that may conflict with each other (Komori, 2016). Sebagian besar tantangan dan masalah dalam implementasi Law Number 1 Of 2014 Concerning Management Of Coastal Areas And Small Islands di Pulau Pannikiang, Pulau Dutungeng, dan Pulau Puteanging. Law Number 1 Of 2014 Concerning Management Of Coastal Areas And Small Islands applies throughout Indonesia, especially in the General Guidelines for Integrated Coastal Management Planning. This law regulates the planning, utilization, supervision and control of Coastal Resources and Small Islands to improve community welfare (Urkhotimah Nurkhotimah, 2010). Including increasing coastal erosion which threatens settlements and agricultural land, Coastal erosion is a worldwide phenomenon that is exacerbated by anthropogenic pressures. Standard defense techniques include hard/soft protection measures, accommodation, managed retreat, and sacrifice. Recently, a new strategy called 'intervention on the causes' has been added to combat erosion. Managed retreat and sacrifice areas are becoming more popular options, involving community input. Coastal erosion management policies and decisions are crucial for addressing this issue globally. (Nelson et al., 2018) (Allan et al., 2018)

The accumulation of plastic waste is disturbing marine wildlife, and damage to mangrove plants is impacting marine ecosystems which are increasingly threatened. Apart from that, the lack of coordination between institutions and related stakeholders as well as the lack of public awareness of the importance of environmental conservation are also the main challenges in implementing this Law.

Therefore, concrete steps are needed to overcome this problem. One step that can be taken is to increase outreach and education to the public about the importance of environmental conservation and protecting marine ecosystems. Apart from that, there needs to be closer cooperation between local governments, related institutions and the community in efforts to preserve the environment on Puteanging Island. In this way, it is hoped that the implementation of

Law Number 1 of 2014 can run more effectively and have a positive impact on the environment and local communities.

Nevertheless, there are concrete efforts that have been made to implement the Law. One way is through a beach rehabilitation program by replanting coastal vegetation such as mangroves and sea grass. Apart from that, the community is also actively involved in environmental protection programs by carrying out beach cleaning and waste management. This program also includes outreach about the importance of keeping the environment clean and the negative impacts of activities that damage coastal ecosystems. (Interview with Arham Asis and Nahru is a resident of Puteanging Island, , February 10 2024).

From interviews with village heads in charge of the three islands, it was clear that there were significant problems related to coastal erosion, accumulation of plastic waste and damage to mangrove plants. This condition illustrates the complexity of the environmental challenges faced by the region, which not only impact human life but also the marine ecosystem.

However, on the positive side, there are concrete efforts that have been made to deal with this problem, such as beach rehabilitation programs and environmental protection programs that involve active community participation. These steps demonstrate awareness and commitment to maintaining environmental sustainability and strengthening community involvement in environmental conservation efforts.

Comments from the interviews highlight the importance of collaboration between government, society and related institutions in overcoming complex environmental challenges. Concrete and sustainable steps are needed to protect coastal ecosystems and reduce the negative impact of human activities on the environment.

Overall, the implementation of Law Number 1 of 2014 on Puteanging Island still requires further efforts in terms of coordination between institutions and related stakeholders, as well as increasing public awareness of the importance of environmental conservation. With more concrete and collaborative steps, it is hoped that the implementation of this Law can have a more positive impact on the management of the environment and natural resources in the region. (Interview with Arham Asis ,Nahru and Sinar is resident of Puteanging Island, January 23 2024).

From the results of the interview above, it can be seen that there is a realistic picture of the challenges faced in implementing Law Number 1 of 2014 on Puteanging Island. Issues such as coordination between institutions and stakeholders, as well as public awareness of the importance of environmental conservation, are the main focus. Public awareness of the importance of environmental preservation is the main focus in implementing population administration policies in Tasikmalaya Regency. The community environment plays a role in implementing these policies, with social, cultural and economic factors in society influencing the level of community participation and compliance with population administration policies. Adaptation efforts, environmental awareness, and information system updates are the keys to maintaining the successful implementation of effective and efficient population administration policies (Didin & Agus, 2024). Public awareness of disaster risks is also important in mitigating disasters in Indonesia, by reducing vulnerability and the impact of disasters. Active community participation in planning, implementing and monitoring disaster management programs is an important step in minimizing risk and vulnerability to disasters (Akhmad & Andriansyah, 2024).

3.4. Research and publication trends: limited contribution to the Implementation of Law Number 1 Of 2014 Concerning Management Of Coastal Areas And Small Islands

Through these steps, it is hoped that a more secure and legally fair environment can be created for all parties involved. Thus, the legal aspect in implementing these programs is one of the crucial points for maintaining the sustainability of the environment and natural resources in the region. Research trends and related publications Since the enactment of Law Number 1 Of 2014 Concerning Management Of Coastal Areas And Small Islands, there have been significant changes in research and publication trends in the field of environmental and natural resource management. This law provides a strong legal basis for protecting and preserving the environment and managing natural resources sustainably. In recent years, research trends have tended to focus on evaluating the implementation of these laws, both in terms of success in preserving the environment and in promoting the sustainable use of natural resources. Researchers and academics have been active in producing in-depth publications regarding the impact of implementing Law Number 1 Of 2014 Concerning Management Of Coastal Areas And Small Islands on environmental policy, the role of government, community participation, and technological innovation that contribute to more efficient and effective management .

Academic studies related to the implementation of Law Number 1 Of 2014 Concerning Management Of Coastal Areas And Small Islands have provided valuable contributions to our understanding of the complexity of environmental and natural resource management. These publications not only describe progress and challenges faced, but also offer innovative solutions and critical thinking in improving existing policies and practices. Thus, this research and publication trend not only reflects academics' commitment to global environmental issues, but also becomes an important guide for policy makers, practitioners and the general public in facing increasingly complex environmental challenges in this era.

In the context of implementing Law Number 1 Of 2014 Concerning Management Of Coastal Areas And Small Islands in Environmental and Natural Resources Management, research and scientific publications have a very important role in identifying best practices. The research conducted can provide an in-depth understanding of the strategies, successes and challenges faced in implementing this law. Through this research process, we can identify best practices that have been proven effective in maintaining the sustainability of the environment and natural resources. The results of this research are a very valuable reference for formulating policies and next steps in order to protect the environment.

Not only that, research results can also be a basis for designing more effective tools or methods in environmental management. The information and findings resulting from this research can be used to develop instruments, frameworks or technology that support the implementation of laws more efficiently and effectively. Thus, research not only provides in-depth understanding, but also produces concrete solutions that can be implemented practically.

The results of research that have gone through a verification and trial process can be very valuable guidance for various stakeholders, including the government, non-governmental organizations and the private sector, in applying this law. Recommendations and guidelines resulting from research can provide clear and measurable direction in implementing environmental policies, so that environmental conservation efforts can be carried out more effectively and in a targeted manner.

Visualization of research trends based on studied and interrelated topics can provide a deeper understanding of scientific developments in environmental and natural resource management. By using tools like VOSviewer, we can identify connections between various

research topics, thereby guiding future research directions and strengthening collaboration between researchers and other stakeholders.

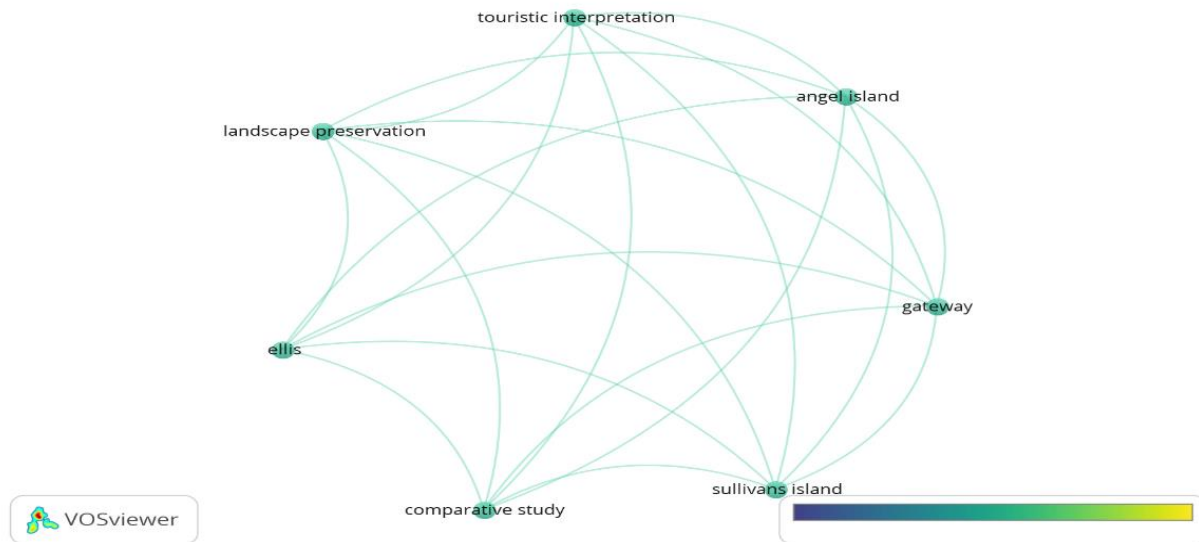


Figure 2. Trends based on the topics discussed in the publication document.

Some interrelated research topics include: Waste Management and Recycling, Use of Renewable Energy and Energy Efficiency, Soil, Water and Biodiversity Conservation, Pollution Control and Waste Water Management, Green Technology and Environmental Innovation, Ecosystem Rehabilitation and Natural Resource Conservation, Education Environment and Community Awareness, Environmental Policy and Law Implementation, Environmental Impact Analysis and Environmental Performance Evaluation," Sustainable Development Strategy and Spatial Planning. Several interrelated research results in the context of implementing Law Number 1 Of 2014 Concerning Management Of Coastal Areas And Small Islands in Environmental and Natural Resource Management includes: Waste Management and Recycling: Research related to effective and environmentally friendly waste management strategies, as well as the development of sustainable recycling technologies (Paul, & Helmut. 2015). Does education increase pro-environmental behavior? Evidence from Europe (Meyer. 2015).

This research presents significant novelty value in several relevant and valuable aspects. First, this research emphasizes the local context which is often less highlighted in previous

literature and research. With a special focus on the islands in Barru Regency, this research is able to reveal the unique dynamics and challenges associated with the implementation of Law Number 1 Of 2014 Concerning Management Of Coastal Areas And Small Islands in the area, which may be different from experiences in other locations.

Second, this research has the potential to produce new findings or data that have not previously been disclosed regarding the impact of the implementation of this Law on the islands of Barru Regency. This includes information regarding the success of environmental programs, challenges faced in managing natural resources in the island environment, or the active role of local communities in maintaining environmental sustainability. Thus, this research provides an important contribution to a deeper understanding of how Law Number 1 Of 2014 Concerning Management Of Coastal Areas And Small Islands is applied at the local level, especially in specific geographical contexts such as the islands in Barru Regency. This has the potential to help in formulating more appropriate and effective policies in maintaining the sustainability of the environment and natural resources.

3.5. Challenges and policy recommendations needed to support the implementation of the Environmental and Natural Resources Management Law

The challenges in supporting the implementation of the Environmental and Natural Resources Management Law involve complex aspects such as building successful stakeholder organizations and overcoming barriers to implementing co-management in fisheries (John, 2004) One of them is coordination between institutions and related stakeholders which is often not optimal. "Non-governmental organizations, also known as NGOs, play a crucial role in promoting sustainable development and addressing complex environmental issues. They work closely with businesses, including small and medium-sized enterprises, to improve corporate environmental behavior through cooperative strategies. The stakeholder theory of the firm is used to understand and enhance relationships between NGOs and businesses (Nazneen & Nuno,2020) (Gyula, 2015).

Requires strong coordination to ensure that implemented policies are effective and sustainable. Apart from that, another challenge is public awareness which still needs to be increased regarding the importance of environmental conservation. Environmental education for

youth can be a formal process tied to in-classroom learning, involving environmental literacy standards like those developed by the North American Association for Environmental Education. Many countries have integrated these standards into school curricula to cultivate environmental responsibility among future generations (Erin et al., 2021) need to be improved so that people can actively participate in environmental conservation efforts.

To overcome these challenges, a number of policy recommendations can be proposed. First, it is necessary to establish effective coordination mechanisms between relevant institutions and stakeholders, such as cross-sector forums or coalitions, to ensure the alignment of integrated policies and actions. Increasing community involvement in the decision-making process and implementation of environmental programs is crucial for successful environmental management. Evidence suggests that involving stakeholders results in better quality decisions, and agencies should strive to incorporate evaluation into their public participation programs to improve them. Stakeholder participation can enhance the quality of environmental decisions by considering more comprehensive information inputs, but the process leading to these decisions is crucial (Bruce, 2005)(Reed, 2008). Environmental education must become an integral part of a reformed education at all levels, from schools to the general public. This can lead to efficient changes in teaching and learning, resulting in better environmental outcomes for all. The No Child Left Inside Act aimed to integrate environmental education into federal guidelines and provide funding for teacher training in environmental education outside the classroom. While some efforts for school reform exist, more innovations must be tried and evaluated to address the complex problems in public education (Daniel,2011)(Juha & Hanna, 2009)

This includes providing easily accessible information about the importance of environmental conservation and sustainable ways of using natural resources. Finally, strengthening supervision and law enforcement is also important to ensure compliance with the Environmental and Natural Resources Management Law involves decision-making triggers in adaptive management plans, as discussed by Courtney Schultz and Martin Nie in their article on Decision-Making Triggers, Adaptive Management, and Natural Resources Law and Planning (Martin, 2012). Policy instruments such as taxes, charges, permits, and labeling schemes are essential tools for managing environmental and natural resources, as outlined by Sterner (Robert, 2005) (Martin, 2012) (Jessica,

2011). Thus, the combination of these steps is expected to support the implementation of this law more effectively and sustainably.

Environmental and Natural Resources Management Law involves For example, in a coastal town facing overfishing issues, the implementation of quotas and permits can help regulate fishing activities and ensure sustainability of fish stocks. Additionally, labeling schemes can help consumers make informed choices about sustainable seafood options,The Sustainable Development Goals can give a further push in the right direction for the evolution of international water law towards a more sustainable development-oriented legal framework. This can be achieved by focusing on elements such as sustainable interpretation of principles, commitment to ecosystem approaches, and facilitating public participation in decision-making (Otto Spijkers,2016).

The challenges of implementing the Environmental and Natural Resources Management Law include the need to increase adaptive capacity to address the effects of climate change. Natural resources law must be reformed to promote active management and adapt to a dynamic world, moving away from a focus on historical preservation towards future-oriented goals. Existing regulatory institutions are not well-suited to foster effective natural resource adaptation due to a lack of systematic learning and uncertainty management (Andro, 2010) Further training and education for environmental officers, supervisors and other stakeholders will increase their understanding of sustainability principles and the latest technologies in environmental management. In this way, they can be more effective in carrying out their duties in supporting the implementation of laws and maintaining a balance between economic development and environmental preservation.Supplier-manufacturer relations can contribute to improved environmental performance through the implementation of innovative materials and processes. Closer relationships with suppliers can lead to better understanding of customer needs and improved environmental goals at the plant (Charlette & Sandra, 2000) and programs carried out by the government and related institutions.

By staying informed about the latest advancements in environmental science and technology, scientists can stay ahead of the curve in addressing pressing environmental issues. Additionally, collaboration with other experts in the field can lead to new insights and solutions for complex

environmental challenges. By sharing knowledge and resources, environmental scientists can work together towards a more sustainable future for all.

4. Conclusion

In conclusion, Law Number 1 Of 2014 Concerning Management Of Coastal Areas And Small Island provides an important framework and principles for managing the environment and natural resources in various regions, including islands. Although it does not specifically regulate management on certain islands, this law emphasizes the need for environmental protection, community empowerment, and the preparation of sustainable spatial plans. Therefore, the implementation of this law on islands such as Puteanging Island in Barru Regency, South Sulawesi Province, Indonesia, requires serious and comprehensive efforts from various parties, including local governments, related institutions, and local community. Concrete steps such as increasing beach patrols, plastic reduction campaigns, mangrove planting programs, and increasing environmental awareness in the community need to be actively implemented to protect the coastal environment and natural resources of the islands.

Apart from that, cooperation between regional governments, related institutions and local communities is very important in ensuring that the implementation of Law Number 27 of 2007 runs effectively. Good coordination is needed between various related agencies in monitoring and evaluating environmental management activities on these islands. Apart from that, active participation from the community in developing policies and implementing environmental programs is also the key to success in maintaining environmental sustainability on Puteanging Island.

Finally, law enforcement is also an important aspect of environmental management on these islands. The application of strict sanctions and regulations for environmental violations needs to be carried out to prevent practices that are detrimental to the island's ecosystem and threaten environmental sustainability in the region. With strong cooperation between all related parties, it is hoped that Puteanging Island can continue to be preserved as an important part of Indonesia's natural heritage.

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Interview:

Interview with Arham Asis and Sinar is a resident of Puteanging Island, January 23 2024.

Interview with Arham Asis and Nahru is a resident of Puteanging Island, February 10 2024



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