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LEGAL ANALYSIS OF MANGROVE DAMAGE COMPENSATION WITH ECONOMIC VALUATION IN BINTAN

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Abstract

One interesting and sustainable phenomenon on Bintan Island is that beach destruction is often found in the form of lumps of dirty oil (sludge oil) during the north wind season along the northern coast of Bintan Island, stretching from Lagoi beach to Berakit beach. This study discusses the legal analysis of mangrove damage compensation with the economic valuation in Bintan. This type of research is normative-empirical legal. To provide a deterrent effect and save the environment as well as economic losses to Mangroves. Based on Ministerial Regulation Number 7 of 2014 concerning Environmental Losses Due to Pollution and/or Environmental Damage, describes community losses due to environmental damage, namely those that have an impact on community losses. Economic valuation of compensation due to mangrove destruction. If this value is calculated on the income of fishermen as a whole for all fishermen who are in the mangrove area in Bintan, Economic valuation calculation The income of marginal fishermen who use mangroves in Bintan is Rp200,000 minus Rp70,000 (as operational costs) = Rp130,000,- per day. IDR 130,000 x 20 days (going to sea in a month) = IDR 2,600,000 (monthly income). So that the calculation of the loss of edge fishermen due to mangrove pollution is Rp2,600,000 per month because they cannot go to sea. This is with the consideration that the ship/sampan can be damaged as well as the fishing gear damaged due to being exposed to a large amount of black oil spill. As an ecotourism area in Bintan Regency, it can be calculated using the travel cost method, so that the action of the valuation in 1 month is as follows: Pengudang Village Tourism Rp20,000,000, Teluk Sebong Village Tourism Rp2,000,000, Penaga Village Tourism Rp29,040.000, Lagoi Tourism Rp834,000,000.

Keywords: Mangrove Damage, Compensation, Economic Valuation

A. Introduction

Environmental damage has become a threat to living things, including humans, although direct environmental damage is the result of human behavior to utilize environmental goods and services in or to meet to life. Constitutionally there are legal norms that protect the public to get a good and healthy getting one and this must be done by the state.

The calculation of environmental losses due to environmental destruction and/or damage can also be used as a reference in calculating the

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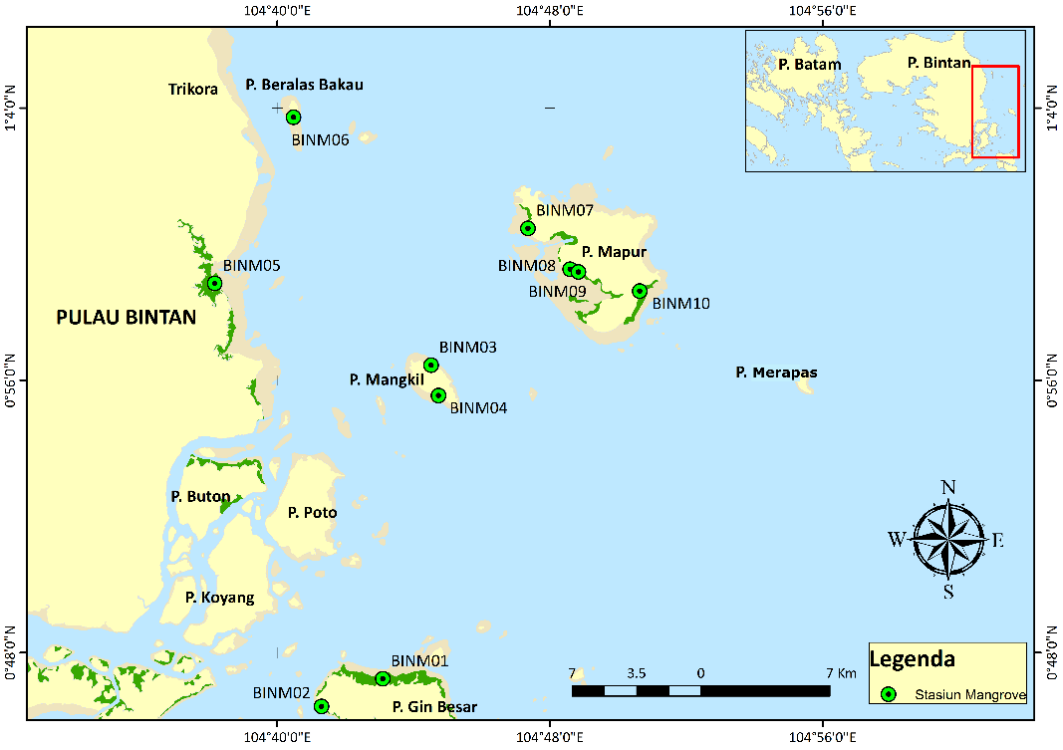
amount of environmental number in environmental cases as stipulated in the Decree of the Chief Justice of the Supreme Court of the Republic of Indonesia Number: 36/KMA/SK/II/2013 concerning Enforcement Guidelines for Handling Environmental Cases.

Mangroves are very important in the management of coastal resources, the most important function of mangroves for coastal areas is to be a liaison between land and sea.[1] The importance of pro teprotectingoves is reflected in various regulations, both at the central and regional levels, for example, based on Presidential Decree No. 73 of 2012 concerning the National Strategy for Mangrove Ecosystem Management, which defines the Mangrove Ecosystem as a unity between the mangrove vegetation community associated with fauna and micro-organisms so that they can grow and develop in the area. along the coast, especially in tidal areas, lagoons, river mouths that are and rounded protected or sandy mud substrates in forming a sustainable environmental balance."

The Bintan area is designated as a Regional Water Conservation Area (KKPD). Bintan as the only conservation area at the district level was established through the Regent's Decree No. 58/II/2009 has an area of 472,905 ha, the basis for determining the area to be a conservation area is the high diversity of coral reefs but faced with high anthropogenic disturbances to the condition of the corals. In addition to corals, this area has a fairly high area of mangroves and seagrass beds, especially in the southern region of Bintan Island.

Bintan Regency has 7,654 Ha of Mangroves. one of the efforts for mangrove conservation through ecotourism activities, and tourism activities theand e one hand can increase the economy of environmental improvement but also have the potential to damage nature if not managed properly.

[1] Muhamad Erwin, *Hukum Lingkungan Dalam Sistem Kebijaksanaan Pembangunan Lingkungan Hidup* (Bandung: Refika Aditama, 2019).



Mangrove monitoring locations in Bintan Regency in 20 One interesting thinking sustainable phenomenon on Bintan Island is that beach destruction is often found in the form of lumps of dirty oil (sludge oil) during the north wind season along the northern coast of Bintan Island, stretching from Lagoi beach to Berakit beach. Destruction of the sea has an impact on mangrove damage which has an impact on ecotourism.[2]

Based on "Article 2 of the Minister of Tourism and Creative Economy of the Republic of Indonesia No. 9 of 2021 concerning sustainable tourism guidelines, namely (1) The scope of guidelines for sustainable tourism destinations includes: a. sustainable management; b. social and economic sustainability; c. cultural sustainability; and d. environmental sustainability." So it is important to assess the economic valuation of losses in the event of mangrove destruction.

From interdiscipliner perspective, the authors took samples of two previous studies that had the similar problem with the research conducted by the authors for comparison as mentioned: First, the north coast of Batam Island and Bintan Island are vulnerable to environmental pollution caused by the activities of these commercial vessels, One of the things that attracts awareness and continues to happen is sea pollution, and always occurred in

[2] Gembong Satria Negara, "Dampak Lingkungan Terhadap Pencemaran Laut Di Pesisir Utara Pulau Bintan Selama Musim Angin Utara," *Jurnal Sains Dan Teknologi Maritim* 20, no. 2 (2020): 137–44, https://doi.org/http://dx.doi.org/10.33556/jstm.v20i2.226.

Noerth East Monsoon.[3] So this research would become a new reference to local government to solve the matter of magroves destruction.

B. Identified Problems

Various impacts will manifest as a result of the contamination and/or destruction of the ecosystem when the environment is harmed or polluted. The public (government) environment is affected by environmental pollution and/or damage. To assess the total environmental loss value, all effects of environmental destruction and/or damage must be valued economically. The next effect is damage to coral reefs, mangrove forests, or seagrass beds, which lowers the productivity of all ecosystem types in terms of fish production. The ability of mangrove forests to protect the coast from waves is also reduced, the capacity of the forest as a place for spawning and rearing fish has decreased, carbon uptake by mangrove forests and has also decreased. Likewise, if natural forests are damaged or cut down, various environmental impacts will arise in the form of loss of forest capacity to hold water and provide water management, loss of ability to withstand erosion and flooding, loss of forest capacity to prevent sedimentation, loss of forest capacity to absorb carbon, loss of habitat. for biodiversity, and even forests that are logged by burning techniques can increase greenhouse gas (CO2) emissions. Associated with environmental losses, the community individually or in groups can demand the restoration of the quality of the environment.

In this research, legal issues will be investigated, namely:

1. How is the legal analysis of compensation due to the destruction of mangroves?
2. How is the economic valuation calculated due to the destruction of mangroves in Bintan Regency?

C. Research Methods

This type of research is normative-empirical legal. Normative-empirical legal is one understanding the law in the sense of norms (rules) and implementing the rule of law in actual behavior such as the result of the application of the legal norm. In the study of normative-empirical law always there is a combination of two research phases which are Phase First, study the legal (regulatory law), or the applicable contract, and the second stage is empirical legal research in the form of apply (make) to the facts of this law specifically to achieve the set goals.[4]

The research method used is the statutory and sociological approach to the law. Type of data used for research this legal research, namely: secondary data and primary data. Secondary data sources were obtained through literature review and literature review. Learn directory include; magazine books, legal document, or other written legal documents. In

[3] Negara, Gembong Satria. "Dampak Linkungan Terhadap Pencemaran Laut Di Pesisir Utara Pulau Bintan Selama Musim Angin Utara." *Jurnal Saintek Maritime* 20, no. 2 (2020): 137-144.
[4] Muhaimin, *Metode Penelitian Hukum* (Mataram: Mataram University Press, 2020).

addition to literature research, document research is also available to include; statutory or hierarchical regulations, such as Environmental Law No. 32 of 2009 relating to Environmental Protection and Management, Ministerial Regulation no. July 2014 regarding Environmental Loss due to Environmental Pollution and/or Damage, legislation, and other documents. Primary data is data that is inferred from data fields obtained from respondents and informants. The Primary data source is data obtained from the main source. Reference primary data sources can obtain from respondents and informants as well as information providers Sember, specifically the Bintan people who live around the mangrove area and use the mangroves both directly and indirectly.

The method used in this study is the mixed method. This study is a research step with combines two pre-existing forms of research, that is, research qualitative and quantitative research. According to mixed research, Creswell is a research method that combines research qualitative with quantitative research. In the opinion of stated Sugiyono that a combination of research methods (mixed methods) is one method The study between based quantitative method and the qualitative method will be used together in the research activity, to get data more comprehensive, valid, reliable, and objective.

This study uses a type of empirical juridical research with qualitative and quantitative data types, in terms of qualitative analysis of statutory arrangements on the protection of mangrove ecosystems and analysis of quantitative data to measure the level of damage to mangroves in the Bintan area. This study seeks to check the data on mangrove damage in Bintan Regency by looking at the relevant laws and regulations to obtain an approximate valuation that is useful for the restoration of the mangrove environment. Incorporation of different methods, including field assessment, participatory resource mapping, semi-structured interviews, questionnaire-based interviews, and literature review to gather the quantitative and qualitative information needed for assessment.

D. Research Findings and Discussions

1. Legal Analysis of Compensation Due to Mangrove Destruction

The Big Indonesian Dictionary (KBBI) defines "loss" as a condition in which a person does not benefit from what they have spent. While "compensation" is money given as compensation for losses; or extortion.[5] According to the term itself, "compensation" is also called legal remedy which is a way of fulfilling or compensating rights based on a court basis for different decisions and losses due to the actions of other parties committed due to negligence error, or intentional.[6]

[5] W. J. S. Poerwadarminta, *Kamus Umum Bahasa Indonesia* (Jakarta: Balai Pustaka, 2005).
[6] J. C. T. Simorangkir, Rudy T. Erwin, and J. T. Prasetyo, *Kamus Hukum* (Jakarta: Aksara Baru, 1980).

Elucidation "Article 90 paragraph (1) of Law Number 32 of 2009 concerning Environmental Protection and Management: What is meant by environmental losses are losses arising from destruction and/or damage to the environment which are not private property rights. Certain actions are measures to prevent and overcome the destruction and/or damage as well as the restoration of environmental functions to ensure that thereto occurrence or recurrence of negative impacts on the environment."

Based on Ministerial Regulation No. 7 of 2014 concerning Environmental Losses Due to Pollution and/or Environmental Damage, describes community losses on mental damage, namely those that cause community losses due to damage to assets such as fishing equipment, damage to plantations and agriculture, damage to fishponds, and loss of community income, and so on.

As a result of the destruction of the mangrove area in Bintan Regency, both the surrounding community who work as fishermen and business actors engaged in ecotourism suffered losses. Ecotourism activities integrate tourism, conservation, and local community empowerment activities, so that local communities canparticcan participate benefits of these tourism activities through the development of their local potentials. And vice versa if thpotentialtruction of mangroves, there wthe will be a negative effect on the mangrove environment itself, and the local community will experience economic losses.

Based on an interview with the Environment and Forestry Service of the Riau Islands Province, the destruction of the sea which also pollutes several mangrove areas in Bintan Regency occurs during the north monsoon, namely January from April and October to Dfrom ecember. December of damage that occurred in the mangrove area is a black oil spill.

Acts that are contrary to unwritten legal provisions, such as the principles of prudence, thoroughness, and propriety. Historically, we have known unlawful acts since humans have known the law, namely the law of the Code of Hammurabi (Code of Hammurabi) which prevailed in Babylonian society in 1780 BC where this law was the first written law in the world that regulates the legal consequences of someone who commits an unlawful act.[7] In theory, Lex Aquilia determines that losses are the result of someone's mistakes and negligence, both intentional and unintentional, so legally they must be compensated.[8] According to civil law, the damage that occurred in the mangrove forest area of Bintan Island is an unlawful act that can be used as the basis for filing a civil lawsuit in the district court.[9] For

[7] Ahmadi Miru, *Hukum Perdata Materiil Dan Formil* (Jakarta: United States Agency for International Development & The Asia Foundation, 2013).
[8] John G. Fleming, *The Law of Torts*, 5th Ed (Sydney: Law Book Company, 1977).
[9] Sudikno Mertokusumo, *Hukum Acara Perdata Indonesia* (Yogyakarta: Liberty, 1993).

unlawful acts, co mpensatiocompensationn be demanded, as is the theory of responsibility for unlawful acts of mangrove destruction, namely the strict liability theory, which obliges the perpetrators of destruction to pay compensation due to their actions either intentionally or by negligence and the burden of proof must be proven by the perpetrators themselves.

Compensation justice states that business actors who make mistakes/negligence in their business activities, causing losses to other parties, have a moral obligation and responsibility to pay compensation to the party who suffers the loss based on the principle of justice. is as much as possible to restore the victim's condition as before the loss occurred. Justice is essentially giving everyone what is their due.

Based on the results of an interview with Mr. Rahmat as PPNS Syahbandar Office and Port Authority (KSOP), stated that it is difficult to find the perpetrators of mangrove destruction, mangrove destruction is the result of marine destruction in Bintan, namely black oil spills and sludge oil. In September 2021, there was an arrest case against a foreign ship, namely the Singapore Ship which disposed of waste in the Batam Sea area which is currently still in the litigation process at the Batam District Court, but it is still being investigated whether the impact of the disposal by the Singapore ship also pollutes the Bintan waters because of adjacent water areas.

According to compensatory justice, business actors who commit errors or exhibit negligence in the course of their business dealings and cause losses to third parties have a moral duty and responsibility to compensate the victim of the lobbyist principle of justice. is intended to make the victim as much as they were before the tragedy occurred. Giving everyone their just compensation is what justice is all about.[10]

Law Number 32 of 2009 concerning Environmental Protection and Management also utilizes various legal provisions, both administrative law, civil law, and criminal law. Civil law provisions include the settlement of environmental disputes outside the court and inside the court. Settlement of environmental disputes in court includes group representative claims, environmental organizations' rights to sue, or government lawsuits.[11] Through this method, it method that in addition to creating a deterrent effect, it will also increase the awareness of all stakeholders about the importance of protecting and managing the environment for the lives of present and future generations.

[10] Sri Laksmi Anindita, "Perkembangan Ganti Kerugian Dalam Sengketa Lingkungan Hidup," *ADHAPER: Jurnal Hukum Acara Perdata* 3, no. 2 (2017): 331–50, https://doi.org/https://doi.org/10.36913/jhaper.v3i2.59.

[11] Justitia E. C. Rawung, "Ganti Kerugian Dan Pemulihan Lingkungan Akibat Pencemaran Dan Perusakan Lingkungan Hidup," *Lex Crimen* 2, no. 5 (2013): 80–90.

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In this regard, it is necessary to develop a legal system for environmental protection and management that is clear, firm, and comprehensive in order to try as the basis pointy protection and management of natural resources and other development activities.[12]

If it is known who the perpetrators of the destruction of Mangroves in Bintan Regency are, legal remedies can be carried out either through non-litigation or litigation. The person in charge of the business and/or activity that violates the law in the form of destruction and/or damage to the environment that causes harm to other people or the community and/or the environment or the state is obligated to: a. perform certain actions; and/or b. to pay compensation. The determination of the loss of mangrove destruction through non-litigation is reached by agreement by the disputing parties, while through litigation it is reached by a court decision with permanent legal force. However, until now there has been no claim for compensation either by the community directly affected by mangrove pollution or by ecotourism business actors who have filed a claim for compensation. As the results of interviews with the Department of Environment and Forestry of the Riau Islands Province.

Several claims for compensation in a lawsuit against the law, the plaintiffs are demanding material and immaterial compensation. The legal principle in claiming compensation is that there is a direct loss suffered by the Plaintiff as a result of Defendant's mistake, so the value of the compensation requested by the plaintiff must be detailed and the value of the loss can be proven. The purpose of the request for compensation is to restore the plaintiff's condition as before the defendmitted an act (mistake) that harmed the plaintiff. The application of the "polluter pays" principle in Law Number 32 of 2009 concerning Environmental Protection and Management, assessment of losses in environmental cases, defendants in environmental cases are not only charged with paying compensation for the environmental damage they have done but can also be given compensation. other sanctions in the form of orders to take some action to rehabilitate environmental damage.

Various efforts have been made by the management of tourist attractions to obtain legal certainty by attending hearings both at the regional and central levels regarding environmental pollution because ecotourism business actors have experienced a decrease in visitors due to mangrove pollution.

2. Calculation of Economic Valuation Due to Mangrove Destruction as an Ecotourism Area in Bintan Regency

Economic valuation of natural resources and the environment (SDAL) is an effort to impose monetary value on part or all of the potential of natural resources and the environment in accordance with

[12] Ibid.

the paralyzation is in the form of total economic value, the value of damage/destruction recovery, and the value of prevention of damage/damage. from environmental damage is the disruption of environmental functions as a result of actions such as destruction or excessive extraction and/or destruction of natural resources and the environment that cause direct or indirect changes to their physical and/or biological properties which result in the environment not functioning in supporting sustainable development. Economic valuation of natural resources can help provide information on the potential economic value of a resource. In the basic concept of natural resource economic assessment, the value of mangrove forest natural resources is determined by the function of the resource itself.

The regulation regarding compensation and recovery costs for environmental destruction and/or destruction, especially the Bintan Island mangrove forest tourism area, can refer to "Article 87 of Law Number 32 of 2009 concerning Environmental Protection and Management, hereinafter referred to as UUPLH". The UUPLH determines environmental responsibility which includes the issue of compensation to individuals (private compensation) as well as the cost of environmental restoration. Thus, environmental responsibility is private and public, so if the perpetrators of environmental destruction and/or destruction have fulfilled their responsibilities to individuals who are victims of environmental destruction and/or destruction.[13]

Regulation of the State Minister for the Environment of the Republic of Indonesia Number 7 of 2014 concerning Environmental Losses Due to Environmental Destruction and/or Damage, which contains several provisions, namely, the first regarding the concept of environmental economic valuation and natural resources. Second, regarding the available methods and approaches to calculating the total economic value of calculatingronment using the market price method, non-use value, travel cost, hedonic price, benefits transfer, and contingent valuation methods. Third, the procedure for measuring the economic value of the environment, including requirements for appraisers. Fourth, this PerMen provides an overview and example of the use of economic valuation of certain natural resources in a particular site.[14] This Ministerial Regulation also regulates the obligation of those in charge of businesses for activities that commit acts that violate the law in the form of destruction and/or environmental damage to take certain actions and/or pay compensation.[15]

[13] N. H. T. Siahaan, *Hukum Lingkungan Dan Ekologi Pembangunan* (Jakarta: Erlangga, 2004).
[14] Andri G. Wibisana and Thomas A. Dewaranu, "Environmental Damage and Liability in Indonesia: Fancy Words under Conventional Wisdom," in *Law and Justice in a Globalized World*, ed. Harkristuti Harkrisnowo, Hikmahanto Juwana, and Yu Un Oppusunggu (London: Taylor & Francis Group, 2018).
[15] Ibid.

The economic valuation of the mangrove forest ecosystem is calculated from three typologies of value, first, the direct use value is the value of a natural resource as seen from the direct value that these natural resources can provide for humans. Second, use value which is the function and ecological value of an environment. Third, the option value is based on the choice to utilize natuis ral resources now or reserve them for future use.

In the context of the environment and resources in general, compensation includes two important aspects, namely the costs arising from the damage to biodiversity and the costs to restore the damage.[16] The method of calculating compensation based on the two aspects above is divided into three, namely, the first Hedonic Price Approach (HP) where the calculation method is to calculate the economic value of the environment which directly affects the market price. Second, is the Contingent Valuation Method (CVM), the Willing to Pay approach, where the calculation is based on how much someone is willing to pay to lose something.[17] Third, the Travel Cost Method (TCM), is the value of an environment and natural resources as shown by the costs that will be incurred by someone to enjoy these environmental assets.

The following will be the respondent's data which can be explained based on their age level, education level, and income.

a. Age Level

Table 1. Respondents Age Level

No	Age	Number of Respondents	Percentage
1	21-30	4	11%
2	31-40	12	32%
3	41-50	16	42%
4	>51	6	16%
Total		38	100%

Based on the observations in the table above, fishermen in Bintan are fishermen who are still in their productive age in utilizing mangrove areas as fishing grounds.

[16] European Comission Directorate General Environment, "Study on Valuation and Restoration of Biodiversity Damage for the Purpose of Environmental Liability," 2011.
[17] W. Michael Hanemann, "Willingness to Pay and Willingness to Accept: How Much Can They Differ?," *The American Economic Review* 81, no. 3 (1991): 635–47.

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b. Level of Education

Table 2. Education Level

No	Level of Education	Number of Respondents	Percentage
1	Elementary School (SD)	5	13%
2	Junior High School (SMP)	18	47%
3	Senior High School (SMA)	15	39%
Total		38	100%

Based on the table above, respondents classified by level of education showed the largest percentage, namely, 47%, were respondents with junior high school education (SMP). This shows that the level of education held by respondents who work as fishermen is included in the low category.

c. Total Income

Table 3. Income Level

No	Income Level	Number of Respondents	Percentage
1	500,000 to 1,000,000	2	5%
2	1,000,000 to 1,500,000	5	13%
3	1,500,000 to 2,000,000	4	11%
4	2,000,000 to 2,500,000	14	37%
5	> 2,500,000	13	34%
Total		38	100%

Based on the table above, the average income of fishermen in this area is > Rp. 2,000,000/ month. With a percentage of 37% and 34% of fishermen who earn an income range of Rp. 2,000,000 to > Rp. 2,500,000 / month. This can show that mangrove areas with good conditions can provide a livelihood for the people living in the area around the mangroves who work as fishermen by catching fish, shrimp, and crabs that live in the mangrove area.

The benefits of mangroves that have been obtained by the community so far are their fishery resources which are then marketed. The people who work as fishermen who are on the coast of Bintan are mostly edge fishermen. Using canoes and simple equipment such as fishing rods and nets, edge fishermen usually use the mangrove area as a catchment area for fish, shrimp, and crabs.

The amount of the cost of overcoming polln and/or environmental damage pollenmust be replaced depends on the amount of pollution and/or environmental damage that is currently occurring and in the form of real costs incurred. The calculation of the losses suffered by the community due to pollution and/or environmental

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damage does involve a very broad dimension. However, in the context of calculating the compensation for environmental damage, this calculation is based more on the component known as "compensable damage". Some of these components can be calculated directly through market mechanisms.

In Sungai Kecil Lagoi Village, there are approximately 150 families who work as fishermen. The fishermen take advantage of the area filled with mangroves in the bay of Teluk Sebong Lagoi for fish and other marine products. They call them edge fishermen because the fishing activity is only done by walking along the seafront which is filled with mangroves.

Pak Sahwan A fisherman explained that the average fisherman in this place earns between 100,000 and 200,000 rupiahs per day, but this has not been deducted from expenses such as fuel for boats and consumption costs for fishermen while at sea. Accumulated travel costs, and consumption costs are around IDR 50,000 to IDR 70,000.

For fishermen, they only use canoes, the costs incurred can be less, but this is directly proportional to the catch obtained because the reach of fishermen is limited according to the ability of fishermen to pedal the canoe. The cwas atch obtained in the form of mullet, bruises, and bulus. In a month the average fisherman goes to sea for 20 days, so if you calculate the average income of fishermen in the area, it is IDR 2,600,000 to IDR 3,000,000 for 1 month. During the north wind season in the sea waters of Bintan, the fishermen in the mangrove area of Bintan do not go to sea, so there is no income for fishermen. Outer Fishermen switch professions into selling or working freelance.

Economic valuation calculation the income of marginal fishermen who use mangroves in Bintan is Rp. 200,000 minus Rp. 70,000 (as operational costs) = Rp130,000,- per day. IDR 130,000 x 20 days (going to sea in a month) = IDR 2,600,000 (monthly income). So that the calculation of the loss of edge fishermen due to mangrove pollution is Rp2,600,000 per month because they cannot go to sea. This is with the consideration that the ship/sampan can be damaged as well as the fishing gear damaged due to being exposed to a large amount of black oil spill.

Based on data collection on the number of fishermen in small rivers and Tanah Merah, 320 heads of families work as fishermen. By using 38 respondent data if the calculation is carried out the average income of fishermen every month is Rp1.800.000,-.

If this value is calculated on the income of fishermen as a whole for all fishermen who are in the mangrove area in Sungai Kecil and Tanah Merah villages, then the value of the benefits obtained from direct utilization of the mangrove area as a fishing area is Rp. 576,000,000/month. This explanation can be explained in the following table.

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Table 4. Direct Benefit Value

No	Information	Immediate Benefit Value
1	Average Income of Fishermen	Rp1,800,000
	Total Fishermen	320
Monthly Income		Rp576,000,000
Total Benefit Value/Year		Rp6,912,000,000

Based on the table above, the value of the direct benefits obtained by the community from the mangrove area as the value of the benefits of fishing shows that the total value of benefits per year is Rp6,912,000,000.

Fish, shrimp, and crabs whose ecosystems are located in mangrove areas are the search targets for fishermen in the area. Fishermen take advantage of the tides and focus on searching only around the mangroves. So the results they get are entirely the direct benefits felt by fishermen who use the mangrove area as a fishing ground for fish, shrimp, and crabs. If calculations are made based on the type of catch, this can be explained in the table below.

Table 5. Types of Fisherman's Catch Based on Average

No	Capture Type	The Average Number of Catches	The Total Value of Income/Month	The Total Value of Income per Year
1	Fish	52%	299,520,000	3,594,240,000
2	Shrimp	28%	161,280,000	1,935,360,000
3	Crab	20%	115,200,000	1,382,400,000

From the table above, the total annual fish catch is Rp3,594,240,000 or equivalent to 52% of the ecosystem in the mangrove area which is obtained by fishermen as a direct benefit, namely fish. Includes mullets, lais fish, etc. The next catch is the type of shrimp and crab, with a benefit value of Rp1,935,360,000 and Rp1,382,400,000,- per year. If the percentage is 28% for shrimp and 20% for crabs.

Almost every year there is an oil spill that pollutes the waters of Bintan which has an impact on ecotourism. The calculation of economic valuation losses due to mangrove damage in Bintan is calculated using the travel cost method, with the formula for the amount of loss each week = Number of visitors x (Cost of lodging + expenses during tourist locations) but Travel Costs on mangrove debt tourism have been combined into one Travel Cost package tourism, so that tourism actors Travel Costs Tour packages are accumulated in 1 (one) month, namely.

In the area of Bintan Regency, not all mangrove areas are affected by the destruction, but only certain areas which are ships

crossing between regions or countries. Mangrove areas that are used as ecotourism areas and affected by the destruction are Mangrove Forest Torism Location Pengudang Village, Mangrove Forest Tourism Location Teluk Sebong Village, Penaga Village and Lagoi., Here's a map of the area.

Illustration 1. Mangrove Forest Map Pengudang Village Tourist Locations

Illustration 2. Map of Mangrove Forest Tourism Locations in Teluk Sebong Village

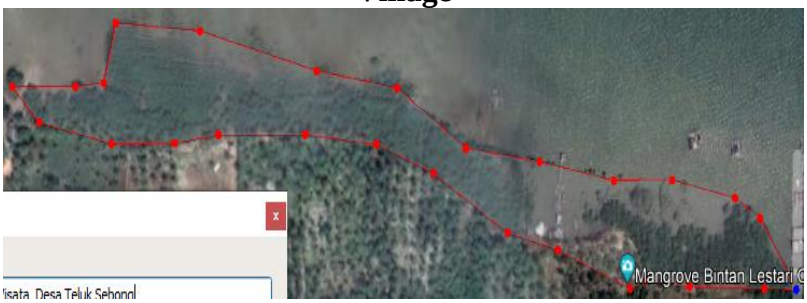

Illustration 3. Map of Mangrove Forest Tourism Locations in Penaga Village

Illustration 4. Map of Mangrove Forest Lagoi Tourism Locations

Table 6. Fees to Visit the Mangroves in Bintan

No	Mangrove Tourism Operators	BP/Month (Rp)
1	Pengudang Village Tour	20,000,000
2	Sebong Bay Village Tour	2,000,000
3	Penaga Village Tour	29,040,000
4	Lagoi Tourism	834,000,000

Economic valuation of compensation due to mangrove destruction. As an ecotourism area in Bintan Regency, it can be calculated using the travel cost method, so that the action of the valuation in 1 month is as follows: Pengudang Village Tourism Rp20,000,000, Teluk Sebong Village Tourism Rp2,000,000, Penaga Village Tourism Rp29,040.000, Lagoi Tourism Rp834,000,000.

E. Conclusions

The regulation regarding compensation and recovery costs for environmental destruction and/or destruction, especially the Bintan Island mangrove forest tourism area, can refer to "Article 87 of Law Number 32 of 2009 concerning Environmental Protection and Management, hereinafter referred to as UUPLH". The UUPLH determines environmental responsibility which includes the issue of compensation to individuals (private compensation) as well as the cost of environmental restoration. Thus, environmental responsibility is private and public, so if the perpetrators of environmental destruction and/or destruction have fulfilled their responsibilities to individuals who are victims of environmental destruction and/or destruction.

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Regulation of the State Minister for the Environment of the Republic of Indonesia Number 7 of 2014 concerning Environmental Losses Due to Environmental Destruction and/or Damage, which contains several provisions, namely, the first regarding the concept of environmental economic valuation and natural resources. Second, regarding the available methods and approaches to calculating the total economic value of calculatingronment using the market price method, non-use value, travel cost, hedonic price, benefits transfer, and contingent valuation methods. Third, the procedure for measuring the economic value of the environment, including requirements for appraisers. Fourth, this PerMen provides an overview and example of the use of economic valuation of certain natural resources in a particular site.[18] This Ministerial Regulation also regulates the obligation of those in charge of businesses for activities that commit acts that violate the law in the form of destruction and/or environmental damage to take certain actions and/or pay compensation.Economic valuation calculation The income of marginal fishermen who use mangroves in Bintan is Rp. 200,000 minus Rp70,000 (as operational costs) = Rp130,000,- per day. IDR 130,000 x 20 days (going to sea in a month) = IDR 2,600,000 (monthly income). So that the calculation of the loss of edge fishermen due to mangrove pollution is Rp. 2,600,000 per month because they cannot go to sea. This is with the consideration that the ship/sampan can be damaged as well as the fishing gear damaged due to being exposed to a large amount of black oil spill.

As a result of the destruction of the mangrove area in Bintan Regency, both the surrounding community who work as fishermen and business actors engaged in ecotourism experience losses. The economic valuation of compensation due to the destruction of mangroves as an ecotourism area in Bintan Regency can be calculated using the travel cost method so that the calculation of the valuation in 1 month is as follows: Pengudang Village Tour Rp20,000,000, Teluk Sebong Village Tour Rp2,000,000, Penaga Village Tour IDR 29,040,000, Lagoi Tourism IDR 834,000,000.

[18] Wibisana and Dewaranu, "Environmental Damage and Liability in Indonesia: Fancy Words under Conventional Wisdom."

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