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Evaluating the Management Effectiveness of the Marine Tourism Park in Eastern Bintan Island, Indonesia

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ABSTRACT

Marine Tourism Park in the Eastern Region of Bintan Island (Bintan MPA) is located in Bintan Regency, Riau Islands Province. This marine protected area (MPA) covers a total area of 1,385.61 km^2. In 2014, due to the implementation of a new government law, the management authority of this MPA changed, resulting in its institutional redesign. The process was completed in April 2022. As a new MPA, the management activities have not been carried out optimally because the management resources were still limited. Thus, this research aims to evaluate the management effectiveness of Bintan MPA. The research was conducted in the Bintan MPA and took place from October 2021 to October 2022. Informants involved in this research were selected using purposeful sampling and snowball sampling method. The data collection methods were interviews (structured and in-depth) and document verification. EVIKA assessment was used for data analysis. There were four criteria assessed: input, process, output, and outcome, each with several indicators. The percentage results of each criterion were 79.53%, 34.88%, 21.54%, and 27.20%, respectively. The final percentage of the EVIKA assessment was 41.56%, with an effectiveness status of "minimally managed" and a "bronze" label. This means that the conservation area design and management process had been carried out, but efforts were still needed to achieve the management goals.

Introduction

The Marine Tourism Park in the Eastern Region of Bintan Island (Bintan MPA) is a marine protected area (MPA) located on Bintan Island, Riau Islands Province, Indonesia [1]. This MPA was legally established in April 2022 by the Minister of Marine Affairs and Fisheries decree Number 18 Year 2022 [2]. According to the decree, the total area of this MPA is 1,385.61 km^2, with the total area of the no-take zone at 21.01 km^2, the total area of the limited utilization zone at 1,329.73 km^2, and the total area of the other zone in accordance with the zoning allotment at 34.86 km^2.

The Bintan MPA has three separate areas [3]. Area I cover waters around Teluk Sebong District with an area of 45.54 km^2, consisting of a no-take zone with an area of 1.67 km^2, a limited utilization zone with an area of 43.58 km^2, and another zone in accordance with the zoning allotment with an area of 0.28 km^2 as a shipping line zone. Area II covers waters around Gunung Kijang District with an area of 232.93 km^2, consisting of a no-take zone with an area of 1.37 km^2, a limited utilization zone with an area of 227.75 km^2, and another zone in accordance with the zoning allotment with an area of 3.82 km^2 as; a rehabilitation zone, marine building and installation zone, port/anchor zone, and zone according to the characteristics of the area. Area III covers waters around Bintan Pesisir District with an area of 1,107.14 km^2, consisting of a no-take zone with an area of 17.98 km^2, a limited utilization zone with an area of 1,058.41 km^2, and another zone in accordance with

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the zoning allotment with an area of 30.76 km^2 as; a marine building and installation zone, shipping line zone, and zone according to the characteristics of the area.

The Bintan MPA is currently managed by the SUOP (*Satuan Unit Organisasi Pengelola*) as manager board from the Department of Marine Affairs and Fisheries of Riau Islands Province (*Dinas Kelautan dan Perikanan Provinsi Kepulauan Riau*/DKP Kepri) [4]. Conservation efforts in this area have been carried out in collaboration with various partners, including the BPSPL (*Balai Pengelolaan Sumber Daya Pesisir Laut*) Padang from the Ministry of Marine Affairs and Fisheries, the Maritime University of Raja Ali Haji (*Universitas Maritim Raja Ali Haji*/UMRAH), various NGOs such as the Ecology Foundation, Konservasi Cakrawala Indonesia, Jord International, Seven Clean Seas, and international funding from the USAID [5]. Furthermore, the SUOP has partnered with village officials and the local community to support the conservation program, as the local community plays an important role in conservation through local wisdom and culture [6]. The conservation targets of the Bintan MPA are seagrass and coral reef ecosystems, which are both important ecosystems that are present in this area [7,8]. The seagrass ecosystem in this MPA covers an area of approximately 29.04 km^2 [9] and has a "medium" health status [10]. Meanwhile, the coral reef ecosystem in this MPA covers an area of about 61.21 km^2 and has a "good" lifeform coverage criterion [11].

The management authority of the Bintan MPA changed in 2015 due to the implementation of Government Law Number 23 Year 2014 [12]. This law mandated the transfer of the marine management area from 0 to 4 nautical miles, which was previously under city/regency government authority, to the provincial government and integrated it with the marine management area from 4 to 12 nautical miles, which was already under the provincial government authority [13]. As a result of this change, the Bintan MPA management, which was previously under the Bintan Regency Government authority [14], had to be transferred to the Riau Islands Province Government. The implication of this transfer was that the Coastal and Island Zoning Plan (*Rencana Zonasi Wilayah Pesisir dan Pulau-Pulau Kecil*/RZWP3K) for this area had to be redesigned so that the marine protected area could be re-established through a new decree and integrated into the Riau Islands Province Regional Spatial Plan (*Rencana Tata Ruang Wilayah*/RTRW) [15]. During the redesign process, the MPA management activity had to be halted due to a lack of legal basis, such as the management plan [16], and the bureaucracy also had to be redesigned. The process was completed, and the “new” MPA was re-established in April 2022.

As the MPA is relatively new, management activities have not been carried out optimally because management resources are still limited. Management performance needs to be assessed to measure its effectiveness and collect evidence to determine which actions lead to the set outcomes [17]. Therefore, the objective of this study was to assess the effectiveness of managing the Marine Tourism Park in the Eastern Region of Bintan Island. To achieve this objective, we used the EVIKA (*Evaluasi Efektivitas Pengelolaan Kawasan Konservasi*) tool from the Ministry of Marine Affairs and Fisheries Republic of Indonesia, which was designed to measure the management effectiveness of MPAs in Indonesia [18]. This is a new tool established in 2020 to update the previous E-KKP3K tool [19], and this research is the pioneer to use this tool in the Bintan MPA.

Materials and Methods

Study Area

This research was conducted in the Marine Tourism Park in the Eastern Region of Bintan Island (Bintan MPA), Bintan Regency, Riau Islands Province, Indonesia (Figure 1). The Bintan MPA covers waters around Teluk Sebong District, Gunung Kijang District, and Bintan Pesisir District. This MPA has latitude coordinate from 01°15'10.457" to 00°38'23.999", and longitude coordinate from 104°27'32.930" to 104°56'29.999". Then, this study was conducted from October 2021 to October 2022.

Data Collection

Primary and secondary data were used in this study. Primary data were obtained by conducting interviews with informants to gather information on the current condition of MPA management. Secondary data were obtained from documents related to MPA management, which were sourced from the Manager Organization Unit (SUOP), DKP Kepri, Ecology Foundation NGO and other stakeholders. The details of the types of data, sources, and analysis methods are presented in Table 1.

The informants in this research were selected using purposeful and snowball sampling methods [20]. Eleven participants participated in the study. The participants consisted of two individuals from the SUOP and DKP

Kepri, one person from the Ecology Foundation NGO, two individuals from Pengudang Village, and three individuals from Berakit Village and Malangrapat Village, which were village officials, local figures, and members of the community. Purposeful sampling was used to select informants based on the researcher's needs and the research strategy and objectives to obtain information-rich cases [21]. Snowball sampling was used to select additional informants based on the information and recommendations provided by a previous informant [22]. The purposeful sampling method was used to determine informants from SUOP, DKP Kepri, the Ecology Foundation NGO, village officials, and local figures, while the snowball sampling method was used to find informants from the local community.

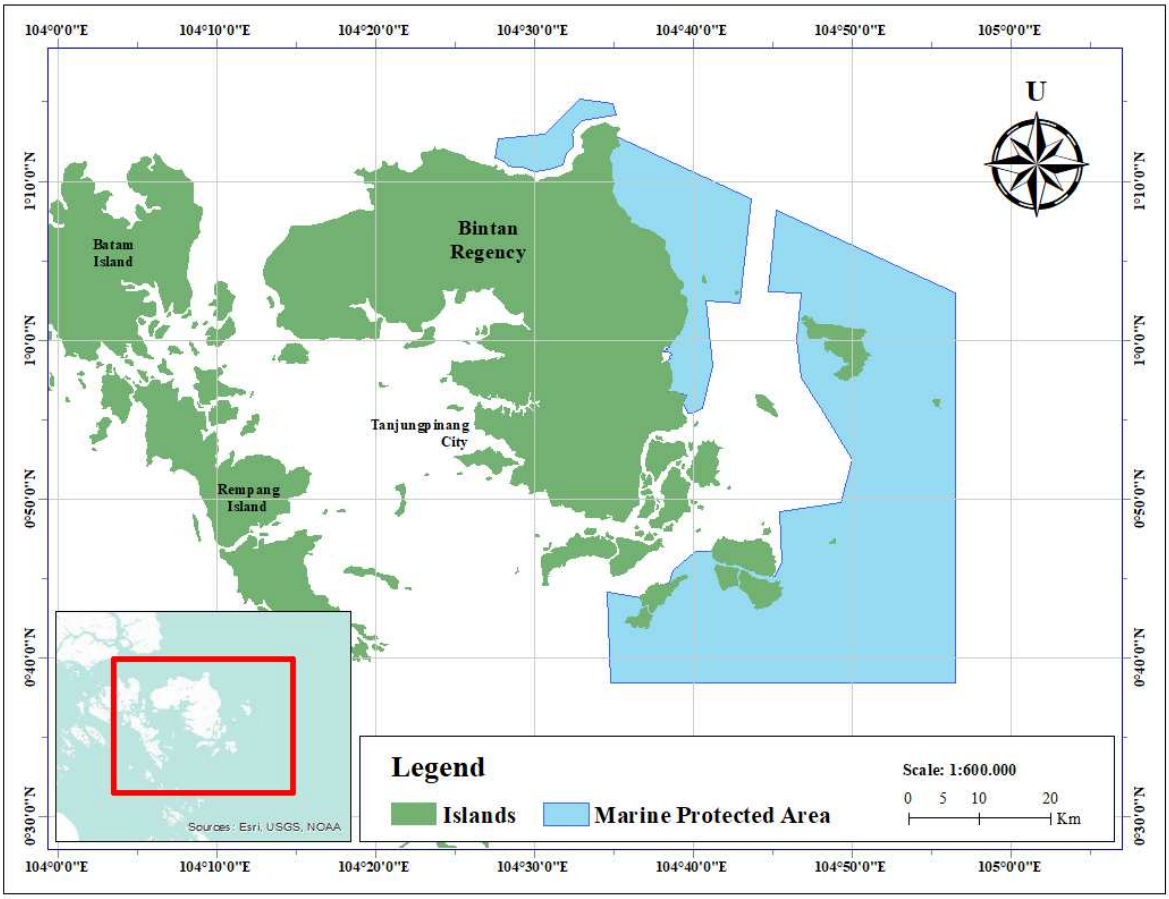

Figure 1. Research location map.

Table 1. Type and source of research data.

Research objective	Type of data	Source of data	Analysis method
Assess the effectiveness of management of the Marine Tourism Park in the Eastern Region of Bintan Island.	Management administration status	RZWP3K document MPA establishment document Management plan (*Rencana Pengelolaan*/RP) document	EVIKA analysis
	Management performance	Interview with management Interview with Department of Marine Affairs and Fisheries Riau Islands Province Interview with Ecology Foundation NGO	
	Community knowledge and empowerment	Interview with village officials Interview with local community	
	Conservation target condition	MPA establishment document Interview with local community	

The data collection methods used to assess the effectiveness of MPA management involve key informant interviews [23] and document verification [24]. This study used structured and in-depth interviews. Structured interviews were conducted using an interview guide based on the General Directory of Marine Spatial Management Decree Number 28/KEP-DJPRL/2020 [25], which provides technical guidelines for evaluating the effectiveness of MPA management. This technique was used to elicit responses to exactly the same phrasing [26]. Structured interviews were conducted with informants from the SUOP, DKP Kepri, and the Ecology Foundation NGO. On the other hand, in-depth interviews were conducted by personally collecting information from informants to obtain more insights and experiences of the informants [27]. In-depth interviews were conducted with informants from the village officials and local communities.

The interview guide contained evaluation indicators that were categorized into four criteria: input, process, output, and outcome (Table 2). The interview guide was followed systematically and consecutively because all criteria reflect an adaptive and sustainable MPA management process. Each question in the guide needed to be answered using the available choices according to the real management conditions. If there were no suitable answers, the response was left blank. Document verification was conducted to confirm the accuracy of the information provided by informants and to evaluate the legal aspects of the MPA management bureaucracy. Every policy implemented in MPAs in terms of legal aspects should refer to these documents. The availability of these documents can also indicate the effectiveness of MPA management. Additionally, these documents could serve as a basis for suggesting effective management policies.

Table 2. Criteria and Indicators for the effectiveness analysis of marine protected area management.

Criteria	Indicator	Question	Weight
Input	Area Status (and area category)	2	15
	Zoning plan	1	10
	Management plan	1	20
	Human resources	3	25
	Budget	1	20
	Facilities and infrastructure	1	10
Process	Management sops	2	10
	Surveillance	3	10–15
	Outeach	1	15
	Partnership	2	10
	Regional resources monitoring	1	15
	Facilities and infrastructure management	1	10
	Permission	1	10
	Community empowerment	1	15
Output	Controlled utilization	3	20
	Threat	1	15
	Compliance level	1	15
	Community knowledge	4	15
	Community empowerment	1	20
	Data and information	3	15
Outcome	Conservation target condition	1	30
	No-take zone condition	2	25
	Social-economy condition	4	25
	Community participation	1	20

Source: [25].

Data Analysis

Data analysis for this research was conducted using the EVIKA analysis tool [25], which assesses the effectiveness of MPA management in Indonesia. The data used in this analysis included informant interviews and management documents. The steps to perform the EVIKA analysis were question value counting, indicator value counting, criterion value counting, final criteria value counting, final evaluation value counting, and EVIKA status determination. Question Value counting involves determining the question score by selecting an answer from the EVIKA questionnaire. Each question had several answer choices and only one answer was chosen according to the real conditions. The chosen answer was scored between 0 and 4, with the maximum score varying depending on the question type. The question value was then determined by multiplying the question score by its weight. The weight represents the contribution of each indicator to one criterion, ranging from 10 to 30, depending on each indicator (Table 2). The equation to determine the

question value is presented in equation (1). Next, Indicator Value counting was conducted by summing all question values in one criterion. The equation to determine the indicator value is presented in equation (2).

$$N_p = Score \times Weight \quad (1)$$

$$N_i = \sum N_p \quad (2)$$

Information:

N_i : Indicator value

N_p : Question value

The criterion value is represented as the percentage of the indicator value to the maximum value. The maximum value was the potential value if all questions in each criterion received the best answers (the highest score). The maximum values for each criterion are presented in Table 3. The equation used to determine the criterion value is shown in equation (3). The criteria value is then used to calculate the final criteria value, which is the result of multiplying the criteria value with the criterion weight. the criterion weight was the proportion of each criterion in the overall EVIKA assessment (Table 4). The calculation of the final criterion value is given by equation (4). Finally, the final evaluation score was calculated by summing all final criteria values for each criterion. The calculation of the final evaluation score is presented in equation (5).

$$N_k = \frac{N_i}{N_{max}} \times 100\% \quad (3)$$

Information:

N_k : Critera value

N_i : Indicator value

N_{max} : Maximum value

Table 3. Maximum value on each criterion.

Criteria	Maximum value
Input	1,075
Process	430
Output	650
Outcome	625

Source: [25].

$$N_{ak} = N_k \times B_k \quad (4)$$

Information:

N_{ak}: Final critera value

N_k : Criteria value

B_k : Criterion weight

Table 4. The criterion weight for each criterion.

Criteria	Criterion weight
Input	0.25
Process	0.35
Output	0.25
Outcome	0.15

Source: [25].

$$Final\ Evaluation\ Score = \sum N_{ak} \quad (5)$$

The EVIKA Status was determined by categorizing the conservation area based on the final evaluation score obtained. There are three conservation area status categories: minimally managed (bronze labels), optimally managed (silver labels), and sustainably managed (gold labels). Table 5 presents the EVIKA status for each evaluation score.

Table 5. EVIKA status according to final evaluation score.

Final evaluation score	Color label	Status	Information
< 50%	Bronze	Minimally managed	The conservation area design and management process have been carried out, but efforts are still needed to achieve the management goals.
> 50–85%	Silver	Optimally managed	Management functions have been running adaptively and some management goals have been achieved.
> 85%	Gold	Sustainably managed	The community enjoys management benefits with protected and sustainable conservation values.

Source: [25].

Results and Discussion

Results

The input criteria depict the formation and establishment step of MPA. The percentage of input criteria in the EVIKA assessment on the Bintan MPA was 79.53%, with a score of 855 obtained from a maximum score of 1,075 (Table 6). The indicators in this criterion ranked from the highest to the lowest percentage was area status (100%), management plan (100%), human resources (87%), zoning plan (50%), budget (50%), and facilities and infrastructure (33%). The documents assessed for this criterion was zoning plan (RZWP3K) document, minister decree, RP document, Indonesian notices to mariners document, and local governor decrees.

Table 6. EVIKA score for Input criteria.

Indicators	Score	Maximum value	Indicator percentage (%)	Verified documents
Area status	75	75	100	Zoning plan (RZWP3K) integration document draft.
Zoning plan	20	40	50	Minister of Marine Affairs and Fisheries decree No. 18 Year 2022.
Management plan	40	40	100	RP document.
Human resources	650	750	87	Indonesian Notices to Mariners No. 32 Year 2022.
Budget	40	80	50	Governor of Riau Islands decree No. 710 Year 2022.
Facilities and infrastructure	30	90	33	Governor of Riau Islands decree No. 1899 Year 2022.
Total	855	1,075	79.53	

The process criteria depict the conservation activities of MPA. The percentage of process criteria in the EVIKA assessment on Bintan MPA was 34.88%, with a score of 150 obtained from a maximum score of 430 (Table 7). The indicators in this criterion ranked from the highest to the lowest percentage was regional resources monitoring (67%), partnership (50%), outreach (33%), facilities and infrastructure management (33%), permission (33%), community empowerment (33%), surveillance (30%), and management SOPs (0%). The document assessed for this criterion was seagrass biophysical survey data.

Table 7. EVIKA score for process criteria.

Indikator	Score	Maximum value	Indicator percentage (%)	Verified documents
Management SOPs	0	40	0	
Surveillance	40	135	30	
Outreach	15	45	33	
Partnership	30	60	50	Seagrass biophysical survey data
Regional resources monitoring	30	45	67	
Facilities and infrastructure management	10	30	33	
Permission	10	30	33	
Community empowerment	15	45	33	
Total	150	430	34.88	

The output criteria depict the impact of conservation efforts conducted on MPA. The percentage of output criteria in the EVIKA assessment on the Bintan MPA was 21.54%, with a score of 140 obtained from a maximum score of 650 (Table 8). The indicators in this criterion ranked from the highest to the lowest percentage was community knowledge (36%), threat (33%), data and information (33%), controlled utilization (10%), compliance level (0%), and community empowerment (0%). The document assessed for this criterion was seagrass health monitoring report from the Coral Reef Rehabilitation and Management Program-Coral Triangle Initiative (COREMAP-CTI).

Table 8. EVIKA score for output criteria.

Indicator	Score	Maximum value	Indicator percentage (%)	Verified documents
Controlled utilization	20	200	10	COREMAP-CTI 2019 seagrass health monitoring report
Threat	15	45	33	
Compliance level	0	45	0	
Community knowledge	60	165	36	
Community empowerment	0	60	0	
Data and information	45	135	33	
Total	140	650	21.54	

The outcome criteria describe the implication of MPA for ecosystem and community socioeconomics. The percentage of outcome criteria in the EVIKA assessment on Bintan MPA was 27.20%, with a score of 170 obtained from a maximum score of 625 (Table 9). The indicators in this criterion ranked from the highest to the lowest percentage was social-economy condition (46%), community participation (33%), conservation target condition (0%), and no-take zone condition (0%). There was no document assessed in this criterion, since the time series data was not available due to the Bintan MPA was still less than one year since its establishment.

Table 9. EVIKA score for outcome criteria.

Indicator	Score	Maximum value	Indicator percentage (%)
Conservation target condition	0	90	0
No-take zone condition	0	150	0
Social-economy condition	150	325	46
Community participation	20	60	33
Total	170	625	27.20

The percentages of all criteria are presented in Table 10. The criterion ranked from the highest to the lowest percentage was input criteria (79.53%), process criteria (34.88%), outcome criteria (27.20%), and output criteria (21.54%). The percentage values from all criteria resulted the final evaluation score of 41.56%. Based on the score obtained, the EVIKA status for Bintan MPA was “minimally managed”, which categorized as “bronze” label.

Table 10. Percentage value for all criteria, final evaluation score, and EVIKA status.

Criteria	Indicator value	Maximum value	Criteria value (%)	Criterion weight	Final criteria value (%)	Final evaluation score (%)	EVIKA status
Input	855	1,075	79.53	0.25	19.88	41.56	Minimally managed
Process	150	430	34.88	0.35	12.21		
Output	140	650	21.54	0.25	5.38		
Outcome	170	625	27.20	0.15	4.08		

Discussion

The input criteria received the highest percentage among all criteria for the EVIKA assessment. As a newly established MPA, the area status indicator received a percentage of 100% because this MPA already has fixed area boundaries and was published on the nautical map through Indonesian Notices to Mariners No. 32 Year 2022 [28]. Furthermore, this MPA already has a management board (SUOP) managed by the DKP Kepri, appointed by the Governor of the Riau Islands decree No. 710 Year 2022 [29]. The management plan indicator also received a percentage of 100% because this MPA management plan document (the RP document) has been legalized by the Governor of Riau Islands decree No. 1899 Year 2022 [30] and in accordance with the

Ministry of Marine Affairs and Fisheries regulations. The human resources indicator received 87% because the human resources formation to perform biophysical monitoring, socioeconomic monitoring, service and partnership, surveillance, community assistance, and office administration is already available with more than one staff member. However, only human resources for biophysical monitoring and surveillance have advanced competency, while other functions only have competency at a basic level.

The zoning plan indicator received a percentage of 50% because this MPA zoning plan document (the RZWP3K document) should be integrated with the regional spatial planning document (the RTRW document) of Riau Islands Province due to the implementation of new regulations of Government Law Number 11 Year 2020 on Job Creation [15], so the status of the RZWP3K document has been set back to the public consultation stage. The budget indicator received 50% because the budget allocation for MPA management has only been met to a small extent. Meanwhile, a lower percentage was achieved for the facilities and infrastructure indicator (33%) because the completeness of the management office facilities, information facilities, and ecosystem management facilities was still at a minimum level. The SUOP currently does not have its own office and still uses the PSDKP (*Pengawasan Sumber Daya Kelautan dan Perikanan*) office of DKP Kepri because the SUOP office is still under construction. Information facilities in the form of MPA boundary signs were installed at 10 locations, but this number was still small compared to the total area of the MPA. In addition, the facilities for ecosystem management were still minimal because the SUOP currently only has speedboats and monitoring equipment, while protection facilities such as buoys to mark the no-take zone are currently unavailable.

The overall process criteria received a lower percentage than the Input criteria because some conservation management functions could not be optimally performed. The outreach indicator received 33% because the outreach activity was still carried out on an ad hoc and limited basis. The outreach activity carried out by the SUOP was still a general topic and was currently limited to the latest MPA boundaries socialization, which had already been established by the Minister of Marine Affairs and Fisheries decree Number 18 Year 2022. The outreach activity has also not been carried out on the entire local community and is currently only aimed at village officials, sub-district officials, and local ethnic leaders. In addition to SUOP, outreach activity was also carried out by external parties, such as NGOs and university institutions. The outreach activity carried out by external parties was generally thematic, according to the program/project being carried out by that party. The facilities and infrastructure management indicator received 33% because existing facilities and infrastructure have not been fully used and maintained optimally. A limited budget means that the use and maintenance of the existing infrastructure must be compromised. In addition, this limited budget also affects the procurement of new facilities and infrastructure to replace old facilities, whose quality has decreased. The permission indicator received 33% because the MPA utilization permit services have begun to be carried out by SUOP. However, MPA utilization services are limited.

Community empowerment received 33% because the SUOP started providing assistance to registered community groups, especially to the marine and fisheries surveillance community group (*Kelompok Masyarakat Pengawas*/Pokmaswas). However, the number of community groups assisted was still very small compared to the number of registered community groups. The surveillance indicator received 30% because the MPA surveillance activities by SUOP are currently carried out once every three months with limited coverage. Surveillance patrols were carried out by the DKP Kepri, the marine police (*Polisi Perairan*), and the navy (*TNI Angkatan Laut*). However, strict enforcement has only been implemented for serious violations, such as the use of bombs, poison, and destructive fishing gear. Minor violations, such as the no-take zone violation, were not dealt with firmly and were still being resolved. Surveillance of no-take zones is mostly carried out by local communities independently when they work as fishermen. The coverage of surveillance by fishermen was limited and only covered the village area of each fisherman group. The management SOPs had the lowest percentage of 0% because the SOPs for ecosystem management in this MPA were not currently available; therefore, the implementation was ineffective. SOPs for ecosystem management are very important for conservation activities. Without SOPs, ecosystem management would be less effective, and conservation activities would be less planned.

The output criteria describe the performance results achieved in the MPA. The community knowledge indicator received a percentage of 36% because the outreach activity occurs temporarily, which caused low exposure of outreach activity caused low exposure of outreach materials to the community population, and there was no change in the level of community knowledge. The number of available outreach materials was still less than that in the outreach plan. The outreach program by the SUOP was planned to increase gradually when management SOPs were prepared and ready to be socialized. The threat indicator received 33% because the number of threats occurring in the ecosystem was relatively constant. The main threats to the

ecosystem in this MPA were anthropogenic activities from coastal tourist areas and oil spill pollution, which was oil waste pollution from large ships that dumped sludge oil in international shipping lanes in the South China Sea and was carried by currents to the Bintan MPA. Oil spill pollution commonly occurs every year from November to February, when the northerly wind season occurs. However, the threat from destructive fishing was relatively minimal because the local community was already aware of protecting the MPA, and in case of any violation, the local fisherman group would immediately deal with the violation firmly by using the local consensus rule. The data and Information indicator received a percentage of 33% because the data and information regarding MPA management, biophysical conditions, and sociocultural conditions were already available, although they were still limited. The only information available was baseline data (T_0), and the data and information were not currently available regularly or updated. The data and information were also could not be accessed publicly because these data and information was still internal data of SUOP and the Ecology Foundation NGO.

The controlled utilization indicator received a percentage of 10% because there were still few parties who carried out utilization activities in Bintan MPA and processed their permits to SUOP. This means that reports on the utilization activities of these parties to the SUOP are still minimal. Some permits of area use were still served by other agencies, such as the Department of Investment and One-Stop Integrated Service and the Department of Marine Affairs and Fisheries Bintan Regency (*Dinas Kelautan dan Perikanan Kabupaten Bintan* /DKP Bintan). Apart from that, the carrying capacity analysis document for this MPA was not yet available, so the suitability of ecosystem utilization and it carrying capacity could not be assessed. The compliance level and community empowerment received the lowest percentage of 0% because both indicators could not be assessed in the current management condition. The number of violations in the MPA has not been well documented because of the lack of enforcement of MPA zoning violations; therefore, the number of violations could not be compared between periods. Apart from that, the community empowerment program has not yet begun because a work plan between the community groups and the SUOP was not established. However, the community has already been quite empowered because there was intensive community empowerment activity in this area when a program called Trismades was implemented in 2007 to 2010.

The outcome criterion was the effect of MPA management activity that had already occurred. The socioeconomic condition indicator received 46%, showing that the MPA has benefited economic activities from the tourism and fisheries sectors. The number of jobs has increased with the number of opportunities in the tourism sector, such as beach recreation, mangrove tours, diving and snorkeling, tourist villages, homestays, and tour guides. The economic impact has also been felt in the micro-entrepreneur sector in the form of stalls in tourism areas and the unique local products of Bintan. Various folk festivals are held regularly every year and have become tourist attractions. Meanwhile, the COVID-19 pandemic from 2020 to early 2022 greatly affected the tourism sector in this MPA, resulting in a decline in economic activity from the tourism sector in that period. The benefits of this MPA to the fisheries sector were also felt by local fisherman communities. According to the interviews with the local fishermen, while there was no significant increase in the volume of catches, the fishermen said that the catch was always stable, so the fishermen always caught fish every time they went fishing. Some fishermen also admit that the quality of their catch has improved, although they did not feel any change in income from the fisheries sector. This evidence confirms the finding of Ban *et al.* [31] that MPA has a more positive outcome than a negative outcome of well-being. Apart from that, socioeconomic surveys had not been carried out regularly because inter-periodic income data were not available yet. However, with the further expansion of this MPA, there is a great opportunity to integrate fast-growing fisheries and tourism sectors into effective MPA management [32].

The community participation indicator received a 33% percentage because currently, there are few community members involved in the voluntary management of MPA. Voluntary management was still carried out by fisherman groups, but the scope was limited to activities related to fisheries only, such as the prohibition of descructive fishing gear. Further participation could not be carried out because community resources were still limited. The main factor causing this low level of community participation was a change in leadership at the village level, either in the fisherman group, the Pokmaswas, or the village leader. Changes in leadership lead to changes in community priorities in ecosystem management. Leader support is an asset in carrying out voluntary participation in MPA management, and the motivation to participate would be higher if local leaders provided support to MPA management. The conservation target and the no-take zone condition indicator both received the lowest percentage of 0% because the biophysical monitoring data were not yet completely and periodically available. The only available data were the baseline data (T_0) on several no-take zone locations, and periodic data on these locations and other zones were currently not available during this period.

The input, process, output, and outcome criteria describe the sustainable MPA management cycle. The input criteria depict the formation and establishment of marine protected areas and their management, so the higher percentage of this criterion shows that this MPA has a structure, context, and management plan to carry out conservation activities. The process criteria depict the conservation activities of marine protected areas, and the results indicate that there were some limitations in SUOP performance, mainly because of a lack of management of SOPs. The output criteria depict the impact of conservation efforts conducted on marine protected areas, and the result indicates that the MPA management activities had not been carried out optimally, thus influencing the conservation result achieved. Meanwhile, the outcome criteria describe the implication of MPA for ecosystem and community socioeconomics, and the results indicate that conservation activities provided benefits to the community but not to the ecosystem itself.

The "minimally managed" status was the lowest effectiveness status in the EVIKA assessment. This status showed that the conservation area design and management process had been carried out, but efforts were still needed to achieve the management goals. In the Bintan MPA, the achievement of this status was due to the limitation in SUOP ability to perform MPA conservation activities, so the conservation was still not optimal and affected the result achieved as well as the implication to the ecosystem itself.

Conclusions

The effectiveness of the management of the Marine Tourism Park in the Eastern Region of Bintan Island was "minimally managed" with a “bronze” label, and the final evaluation score was 41.56%. This effectiveness level indicated that the conservation area design and management process had been carried out, but efforts were still needed to achieve the management goals. This status was achieved because some legal bases for conservation management had not been finalized and set. Therefore, some management activities have not yet been performed, causing the conservation impact to be less optimal. Suggestions to improve the management effectiveness of this MPA include periodic monitoring of the ecosystems, legalization of management SOP, and further collaboration with the local community, university institutions, and environmental NGOs.

Author Contributions

BB: Conceptualization, Data Curation, Formal Analysis, Funding Acquisition, Investigation, Methodology, Project Administration, Resources, Visualization, Writing - Original Draft, Writing - Review & Editing; **EIKP:** Conceptualization, Supervision, Validation; **WAR:** Conceptualization, Supervision, Validation.

Conflicts of Interest

There are no conflicts to declare.

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