Level of Suitability and Carrying Capacity of Tanjung Setumu Beach Tourism Area Tanjungpinang City

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Abstract. Tanjung Setumu Beach is a coastal tourism area that has high ecological potential, because it is located on small islands that have a distinctive coastal ecosystem character. To maintain high ecological potential, it is necessary to calculate the level of suitability and carrying capacity of the Tanjung Setumu Beach tourist area. The purpose of this study was to determine the ecological potential, level of suitability and carrying capacity of the area on Tanjung Setumu Beach. The research was conducted at Tanjung Setumu Beach in November 2021-January 2022. This research method used purposive sampling and accidental sampling at 3 sampling stations. This study uses an analysis of the level of suitability of coastal tourism using the Tourism Suitability Index and analysis of Regional Carrying Capacity (DDK). The results of this study indicate that the ecological potential of coastal tourism at Tanjung Setumu Beach shows a category from quite suitable to very suitable for each station. Based on the calculation of the value of the Tourism Suitability Index (TSI) at each station, the level of suitability of coastal tourism at stations 1, 2 and 3 is 84%, 94%, and 85%, respectively. show very fit. category (S1). Regional Carrying Capacity (RCC) at each station on Tanjung Setumu Beach shows sampling station 1 with a capacity of 81 people, sampling station 2 with a capacity of 1,268 people, and sampling station 3 with a capacity of 238 people within a certain period of 3 hours/day/personThe abstract needs to summarize the content of the paper. The abstract should contain at least 70 and at most 150 words. Font size should be set in 9-point and should be inset 1.0 cm from the right and left margins. A blank (20-points) line should be inserted before and after the abstract.

Keywords : Coastal Tourism, Level of Suitability, Regional Carrying Capacity, Tanjung Setumu Beach.

1 Introduction

As an archipelagic country, Indonesia has great potential in its nautical sector. Optimal and sustainable utilization of small islands is very necessary in every region in Indonesia. One of the regions in Indonesia that has great potential in the marine sector is the Riau Islands Province. Based on the LKJIP of the Marine and Fisheries Service (DKP) of Riau Islands Province in 2019, the water area reached 96%, and the number of islands was 2,408, making the status of Riau Islands Province as an area that has high potential in the marine sector and a large area of Riau Islands Province dominated by small islands. According to Rajab et al. (2013), small islands have great development potential supported by their strategic location from economic,

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defense, and security aspects as well as a distinctive ecosystem character with high biological productivity. This is certainly a support for improving the welfare of the community in the Riau Islands Province if utilized optimally. One of the forms of processing the territory on small islands is coastal tourism.

Beach tourism is a form of utilization of coastal areas that have great potential supported by the beauty of their scenery and distinctive ecosystems from Rif'an (2018). One of the beaches that has great potential to be used as a beach tourism is Tanjung Setumu Beach. As a beach located on a small island, Tanjung Setumu Beach has great ecological potential, one of which is a rocky coastal area covered with mangrove vegetation such as coconut trees, becoming an attraction for people to visit. Managed by the Dompak Tourism Awareness Group (POKDARWIS), or local community groups since 2019, of course the existence of Tanjung Setumu Beach Tourism has increased the economy of the surrounding community, because beach tourism is a sector that is able to encourage and increase development activities, create jobs, increase community income as well as local income from Rauf et al, (2020). Tanjung Setumu Beach is a favorite destination for people on weekends. The location that is not too far from the urban center, and the treat of charming beach beauty, are the main reasons why people prioritize a vacation to Tanjung Setumu Beach. The increase in the number of visitors every week, has a good impact on the community's economy, but causes many problems. Excessive tourist activities can reduce the potential of existing natural resources from Simbolon (2017). Beach tourism must be managed in a sustainable, planned, and responsible manner in order to maintain environmental values, and can be utilized in the long term. Management efforts will be realized if supported by the community, in this case visitors. The perception and participation of visitors is one of the supports to get views and opinions about the existence of Tanjung Setumu Beach Tourism. Management efforts will also be realized supported by local government policies. So, with great ecological potential, of course, it must be supported by a management strategy aimed at preserving the nature of Tanjung Setumu Beach Tourism. Therefore, it is necessary to make an effort towards Tanjung Setumu Beach so that its natural sustainability is maintained. One of the efforts that can be done is to find out the level of suitability and carrying capacity of the Tanjung Setumu Beach tourist area, in order to get a sustainable management strategy in the form of preserving natural resources, and sustainable management.

2 Research Methods

2.1 Date and time

This research was conducted from November 2021 to January 2022 at Setumu Beach, Dompak Village, Bukit Bestari District, Tanjungpinang City, Riau Islands Province. The location of the study can be seen on the map presented in **Figure 1.**

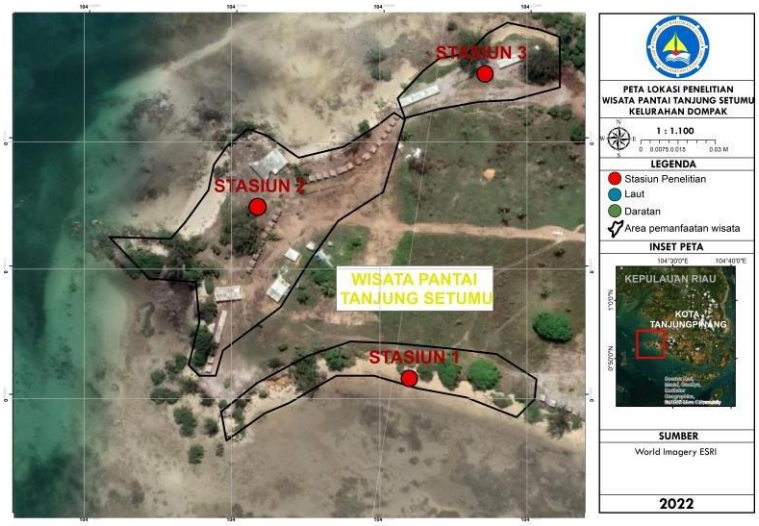

Fig. 1. Research location map

2.2 Tools and materials

The tools and materials used in this study include: (1) stationery, to record the results of observations in the field, (2) meters, to measure depth, (3) current rush modifications, to increase current speed, (4) stopwatches, to calculate the time of current speed, (5) roll meters, to measure the width of the beach, (6) water passes, to measure the slope of the beach, (7) secchi disks, to measure brightness, (8) GPS, to determine coordinate points, (9) laptops, for data processing tools, (10) cameras, for documentation, (11) questionnaires, for interview materials, and (12) literature, to support the study.

2.3 Research prosedurs

a. Depth of waters

utilizing a scale pole instrument to measure the water depth. To get depth data, depth measurements were taken 10 meters from the coast (Kamah et al. 2013). To obtain more precise findings, measurements were carried out three times at each location.

b. Beach type

According to Maizuwardi (2020), visual observations of the kind and color of the sand are used to determine the type of beach. The three different types of beaches—rocky, muddy, and sandy—were used as the basis for the observations. Every designated station is visited to conduct observations.

c. Width of beach

Applying a roll meter to measure the breadth of the beach. From the highest tide to the edge of the coastal tourism area use area, in this instance facilities, the width of the beach is measured in meters (m) from Maizuwardi (2020). Each station takes measurements of the breadth of the shore.

d. Brightness of waters

Brightness measurements are carried out at each station, by performing 3 repetitions. The formula for calculating the brightness is as follows:

$$\text{Brigthness} = \frac{\text{Missing Distance (m)} + \text{Visible Distance (m)}}{2}$$

$$\text{Brigthness percent} = \frac{\text{Brigthness}}{\text{Visible Distance}} \text{ x } 100\%$$

e. Slope of the beach

The slope of the shore was measured using a roll meter and a stick that was 2 meters long. A roll meter was used to determine the height of the stick, which was laid out horizontally on the sand and fastened precisely to the top beach's edge. in order to determine the beach's slope by calculating the angle created by the acquired horizontal and vertical lines. Each predefined station performs measurements of the coast's slope. The following formula can be used to determine the beach's slope:

$$\alpha = \text{arc tan } \frac{Y}{X}$$

Desc :

α : Formed angles (°)
Y : the separation between the parallel lines that horizontal wood creates and the sand's surface below
X : Wood length (2 m)

f. Current speed

Plastic bottles and ropes are used in a modified current rush to measure current speed. The bottle is linked with a rope measuring 1 meter and contains water that can fill up to 1/3 of its content. This gadget works by placing the bottle and rope end in a fixed location on the water's surface, releasing them both at the same time, and then timing the computation using a timer while still holding the rope end until it is taut by one meter. Each research station performs calculations. With the following formula, find the current's speed:

$$V = \frac{S}{t}$$

Desc :

V : Current rush (m/s)
S : Distance (m)
t : Required time (s)

g. Basic material waters

The base material is determined directly through observations made directly in the field by dredging the bottom of the shoreline from Kamah et al.,(2013). The basic material is taken and then classified by observation based on several types of substrates, namely sand, rocky sand, muddy sand, rock, sandy stone, muddy stone, muddy, sandy mud, and rocky mud from Modification of Yulisa et al., (2016). Observations of waterbed materials were carried out at each research station

h. Dangerous biota

Direct observation at each study station and conversations with guests and representatives of the tourism industry are used to identify potentially dangerous biota from Eriawati et al.,(2019). Shellfish, stingrays, and jellyfish are some of the harmful biota that were seen. Direct observation of each research station in accordance with the appropriateness of the preset depth of the waters, observed at a distance of 10 meters from the highest tide border from Yulianda, (2007)

i. Facilites and infrastructure

Infrastructure and amenities are directly observed at the study site. The observation was made in accordance with the Operational Assistance for the Management of Physical Special Allocation Funds in the Tourism Sector Regulation of the Minister of Tourism of the Republic of Indonesia Number 3 of 2018. 3 criteria—public amenities, dining establishments, and tourist information centers—were used to evaluate the infrastructure and facilities. Restrooms, gazebos or cottages, and houses of worship are examples of public amenities from Eriawati et al., (2019).

j. Accessibility

At each research station, access to tourist attractions is observed visually. Documentation is utilized to carry out observations, and the documentation's findings are then taken into consideration and evaluated in accordance with specified guidelines. Several rules are followed in this instance, including those relating to access to destinations, transit options, and road signs from Eriawati et al., (2019).

k. Closure of coastal land

The determination of coastal land cover is carried out by 2 observation processes, first, namely by visually observing the land cover around the sampling station, precisely in the coastal interdal zone, whether it is open land, coconuts, shrubs, tall thickets, settlements etc. From Maizuwardi (2020). Second, observations are carried out by documenting each vegetation encountered, and then identifying the type.

l. Freshwater availability

The availability of fresh water is carried out based on visual observations by measuring the distance of the availability of freshwater sources to coastal locations from Maizuwardi (2020). Measurements are carried out by measuring the distance of each research sampling station to the location of the nearest freshwater source using between coordinate points. Measurements are made using the help of mapping applications or ArcGis

2.4 Data analysis

a. Beach tourism suitability analysis

An examination of tourism suitability is descriptive. The weight value and suitability score of beach tourism, the suitability matrix of beach tourism, and the suitability category of beach tourism are all observed ecological parameters of tourist suitability in the form of the Tourism Suitability Index (IKW). The formula for calculating IKW is as follows.

$$IKW = \sum \frac{Ni}{Nmaks} \text{ x } 100\%$$

IKW :Tourism Suitability Index
Ni :Parameter values number.. (bobot x skor)
Nmaks :Maximum value of a tourism category
I :Suitbailty parameter
n :Number of parameter types

Below are presented the scoring of the suitability of the beach tourism suitability in Table 1, the scoring of the beach tourism suitability score in Table 2, and the beach tourism suitability matrix in Table 3.

Table 1. Weighting of beach tourism suitability

No	Provosion of	Information
1	Weight 5	On the basis of very necessary
2	Weight 3	On the basis of required
3	Weight 1	Considering that the action would still continue without it dan that it is not actually necessary

Source : Modification form Yulianda (2007)

Table 2. Scoring of beach tourism suitability

No	Provosion of	Information
1	Score 3	Parameter condicituon is very good
2	Score 2	Parameter conditio is quite good
3	Score 1	Parameter condition is conitionalyy good
4	Score 0	Parameter condition is poor

Source : Modification form Yulianda (2007)

Table 3. Matrix of beach tourism suitability

NO	P	W	S1	S	S2	S	S3	S	N	S
1	Depth of water (m)	5	0-3	3	>3-6	2	>6-10	1	>10	0
2	Type of beach	5	White sand	3	White sand, littlecoral	2	Black sand, rocky, slightly steep	1	Mud, rocky, steep	0
3	Width of beach (m)	5	>15	3	10-15	2	3-<10	1	<3	0
4	Water brightnes s (%)	3	>80	3	50-80	2	20-<50	1	<20	0
5	Coastal slope (^{o})	3	<10	3	10-25	2	>25-45	1	>45	0
6	Current velocity (m/s)	3	0-0,17	3	0,17-0,34	2	0,34-0,51	1	>0,51	0
7	Basic material water	3	Sand	3	Sandy coral	2	Muddy sand	1	Mud	0
8	Dangero us biota	3	None	3	Shell fish/ 1 species	2	Shell fish, stingrays/ 2 species	1	Shell fish, stingrays, jellyfish/ > 2 species	0

NO	P	W	S1	S	S2	S	S3	S	N	S
9	Facitilites and infrastructure (Modification)	3	3 Provosions	3	2 provosions	2	1 provosions	1	none	0
10	Accessibility (Modification)	3	3 provosions	3	2 Provosions	2	1 provosions	1	none	0
11	Coastal land cover	3	Coconut, open land	3	Low shrub	2	High shrub	1	Mangrove forest, settlement, harbor	**0**
12	Freshwater availability (km)	1	<0,5	3	0,5-1	2	>1-2	1	> 2	0

Source : Modification of Yulianda (2007)

Category S1 (very suitable or highly suitable) is a suitability class that does not have a severe limiting factor for a certain sustainable use, or only has a limit that is less meaningful and has no real effect. Category S1 has a tourism suitability index value of 75% - 100%

Category S2 (quite suitable or quite suitable) is a suitability class that has a rather severe limiting factor for the sustainable use of certain activities. These limiting factors will affect satisfaction in tourism activities and the benefits obtained as well as increase inputs for undertaking the tourism. The S2 category has a tourism suitability index value of 50% - 75%.The S3 category (conditionally compliant) is a suitability class that has more limiting factors to fulfill. These limiting factors will reduce satisfaction so that to carry out tourism activities these limiting factors must really be paid more attention so that ecosystem stability can be maintained. The S3 category has a tourism suitability index value of 25% - 50%.

Category N (not suitable or not suitable) is a suitability class that has a severe or permanent limiting factor, making it impossible to develop sustainable types of tourism activities. Category N has a tourism suitability index value of < 25%.

b. Carrying capacity of the area

The carrying capacity of the area (DDK) is the maximum number of visitors who can physically be accommodated in the area provided at a certain time without causing disturbance to nature and humans. DDK calculation in the form of a formula as follows from Yulianda (2007)

$$DDK = K \times \frac{Lp}{Lt} x \frac{Wt}{Wp}$$

Desc :

DDK : The carrying capacity of the area
K : The ecological potential of visitors per unit area
Lp : The area or visitor area that can be utilized
Lt : The unit area that can be used for certain activities
Wt : The time provided by the area for tourism activities in 1 day
Wp : The time visitors spend on each particular activity

Theecological potential of the area's carrying capacity and area in carrying out a tourism activity is calculated to determine the ability of the area to accommodate tourists as shown in Table 4.

Table 4. Ecological potential of visitors (K) and Area of Activity (Lt) and the predicted time required for each tourism activity

No	Type of Activity	Visitors (K)	Unit Area (Lt)	Time Required (Wp)	Total time one day (Wt)
1	Beach tour	1 person	50 m^2	3 hours	10 hours

Source : Yulianda *et al*, (2010)

c. Analysis of community perception and participation

The outcomes of the data collected from the questionnaire and the community interviews will then be descriptively evaluated using a Likert scale. The goal of descriptive statistical analysis is to identify the causes of specified variables from Lindaan et al., (2016). It is simpler to obtain the answers of a closed questionnaire on public perception and involvement when calculations are made using a Likert scale from Pranatawijaya et al., (2019). Four questions were created to gauge visitors' perceptions, including:

1. Pleasant impression after visiting Tanjung Setumu Beach Tour,
2. The existence of Tanjung Setumu Beach Tourism is very suitable as a beach tourism activity,
3. Access to Tanjung Setumu Beach Tourism is very adequate,
4. Facilities and infrastructure at Tanjung Setumu Beach Tourism are very adequate

Visitor participation was analyzed descriptively based on open questionnaires or interviews with each visitor. Perceptions and participation of tourism business actors and local governments were analyzed descriptively in the form of descriptions and narratives of the results of the interviews.

3. Result and Discussion

3.1 General condition research location

Tanjung Setumu Beach Tourism is a coastal tourism area located on Dompak Island, Bukit Bestari District, Tanjungpinang City. Tanjung Setumu Beach Tourism is located in the eastern part of Dompak Island. Geographically, Tanjung Setumu Beach Tourism is flanked by:

North side : Penyengat Island
East side : Bintan Island
South side : Basing Island
West side : Rempang Island

Tanjung Setumu Beach offers typical coastal features such mangrove regions, rocky and white sand parts, same like other coastal tourist locations. One of the beaches on Dompak Island is Tanjung Setumu Beach. According to observations made in the field, Tanjung Setumu Beach's infrastructure and services have the potential to be more valuable as a tourist destination than natural landscapes with rocky beaches.

3.2 The ecologigal potential

a. Tanjung Setumu Beach Waters Depth

The water depth of Tanjung Setumu Beach Tourism comprises coastline tourism, which has shallow seas with an average depth of 0.78 meters, according to the measurement findings in Table 5 of the three stations. According to the tourism suitability matrix, Tanjung Setumu Beach Tourism is suitable for usage as a swimming tourist location since the depth is not greater than 3 meters. Tanjung Setumu Beach Tourism is awarded a score of 3 for its excellent conditions. When choosing a location for a beach tourism destination, especially for bathing and swimming, the water depth is considered since it has a significant impact on the safety of swimmers from Loventia (2019). Very good conditions at the depths of the waters at Tanjung Setumu Beach Tourism are an important factor for tourists to be able to carry out water play activities with names from Chasanah, et al., (2017).

Table 5. Results of calculation of the depth of the waters of Tanjung Setumu Beach

No	Station	Depth Value (m)
1	Station 1	0,76
2	Station 2	0,68
3	Station 3	0,92

Source : Primary data (2022)

b, Tanjung Setumu beach type

Based on the observation of Tanjung Setumu Beach type see **Figure 2**, that the beach type of Tanjung Setumu Beach is dominated by white sand beach types and rocky sand. The results of the observations of the three stations, station 1 and station 2 have a white sand beach type, which

means they are included in the S1 category or very suitable, and station 3 has a rocky/rocky sand beach type, which means it is included in the S2 category or quite suitable. In general, beaches that have a sandy type have aesthetic value and the sand-based material itself is preferred by visitors to coral or mud-based materials from Chasanah et al., (2017). This shows that the three stations show suitable conditions to be categorized as beach tourism

Station 1 Station 2 Station 3

Fig. 2. Tanjung Setumu Beach Type

c. Tanjung Setumu Beach Width

Based on the measurements made at Tanjung Setumu Beach in Table 6, it can be seen that the three stations' measurements of the beach's width range from 22 to 67 meters. With beach widths of 22 meters, 67 meters, and 41 meters, respectively, station 1, 2, and 3 are ideal. Each sample station's beach width condition shows a type of beach tourist activities that is extremely suited. Inversely, greater tourist activities are associated with broader beaches, whereas visitor comfort is negatively impacted by narrower beaches from Wunani et al., (2013).

Table 6. Calculation of the width of Tanjung Setumu Beach

No	Station	Value of Beach Width (m)
1	Station 1	22 m
2	Station 2	67 m
3	Station 3	41 m

Source : Primary data (2022)

d. Brightness of Tanjung Setumu Beach Waters

Based on the results of measurements of the brightness of the waters at Tanjung Setumu Beach in Table 7 , indicating that the brightness level has varied values. At station 1, it shows a brightness value of 65.83% and at station 2 it shows a brightness value of 50.67%, which means that both stations have quite appropriate categories for coastal tourism. While at station 3, it shows a value of 43.67%, which means that it has a conditionally appropriate category or further considerations need to be made to be used as beach tourism. Overall, the level of brightness of the waters on Tanjung Setumu Beach shows conditions that are quite suitable and it is necessary

to conduct a deeper study of the management of coastal ecosystems. This is because the clarity of the waters is a supporting factor for comfort and safety in swimming activities from Loventia, (2019).

Table 7. Calculation of the brightness of Tanjung Setumu Beach Waters

No	Station	Brightness Value (%)
1	Station 1	65,83 %
2	Station 2	50,67 %
3	Station 3	43,67 %

Source : Primary data (2022)

e. Slope of Tanjung Setumu Beach

Based on the measurement results of coastal slope at Tanjung Setumu Beach in Table 8, the three stations have different slope values. At station 1, it shows a slope value of 33.02^{o}, which means that it is conditional or needs to be considered as a coastal tourism area. Meanwhile, at stations 2 and 3, it has a slope value of 14.84^{o} and 12.13^{o}, which means that it is quite suitable as a coastal tourism area. Overall, the condition of the beach slope at Tanjung Setumu Beach is considered quite suitable. This is because the beach slope is a factor that affects the safety and comfort of visitors in carrying out tourism activities, so that a flat or sloping beach slope is very suitable for tourism activities from Sunarto (2006).

Table 8. Calculation of the slope of Tanjung Setumu Beach

No	Station	Slope Value (^{o})
1	Station 1	33,02^{o}
2	Station 2	14,84^{o}
3	Station 3	12,13^{o}

Source : Primary data (2022)

f. Current velocity of Tanjung Setumu Beach

Based on the measurement results of current velocity at Tanjung Setumu Beach in Table 9, it is shown that the current velocity value of the three stations ranges from 0.03-0.09 m/s. If we look at the suitability matrix for coastal tourism, according to Yulianda (2007), it is said that it is very suitable to be used as beach tourism if a beach has a current speed of 0-0.17 m/s. So, the current speed at Tanjung Setumu Beach is very suitable for beach tourism activities, one of which is swimming. The slower the current, the better for swimming, and vice versa, the faster the

current, it will be dangerous for visitors, because it has the potential to drag people while swimming or bathing on the beach from Yulisa et al., (2016).

Table 9. Result of calculation of current velocity at Tanjung Setumu Beach

No	Station	Current velocity value (m/s)
1	Station 1	0,03 m/s
2	Station 2	0,07 m/s
3	Station 3	0,09 m/s

Source : Primary data (2022)

g. Basic materials of Tanjung Setumu Beach

Based on observations in the field,see **Figure 3**, the types of basic water materials in Tanjung Setumu Beach are sand and sandstone. Overall, the water base material on Tanjung Setumu Beach is classified as suitable for coastal tourism activities. A coastal tourism area which is dominated by sandy substrate, is very easy to use for various beach tourism activities, rather than a coastal tourism area which is dominated by coral fragments, rocks, and mud, because it will make visitors uncomfortable when doing beach tourism activities from Hardjowigeno (2007)

Station 1 Station 2 Station 3

Fig. 3. Basic Materials for Tanjung Setumu Beach

h. Identification of dangerous biota of Tanjung Setumu Beach

Based on the findings of interviews with representatives of the tourism industry and the local government in Table 10, in this case the head of RT 03 Tanjung Siambang, and on firsthand observations in the field, it has been determined that Tanjung Setumu Beach has dangerous biota at least 10 meters from the highest high tide line toward the sea. These species include jellyfish and lepu fish or reef fish. In terms of detecting hazardous biota, Tanjung Setumu Beach is generally in good shape for coastal tourist locations from Yulianda (2007).

Table 10. Results of identification of hazardous biota at Tanjung Setumu Beach

No	Station	Identiciation
1	Station 1	1 spesies
2	Station 2	1 spesies
3	Station 3	1 spesies

Source : Primary data (2022)

i. Tanjung Setumu Beach facilities and infrastructure

Based on the results of direct observations in the field in Table 11, the existing facilities and infrastructure at Tanjung Setumu Beach are classified as S1 or appropriate to support the existence of beach tourism. In accordance with the provisions of the assessment of coastal tourism facilities and infrastructure from Eriawati et al., (2019), at sampling station 1 only has 1 provision, namely having a gazebo, while at sampling stations 2 and 3 it has 3 provisions, namely places to eat such as seafood restaurants, center tourist information such as tourist signboards, and public facilities such as gazebos, bathrooms, places of worship, and parking lots. Adequate facilities and infrastructure affect the tourism potential of coastal areas in terms of the community's economy and the sustainability of coastal tourism from Wardana et al., (2018).

Table 11. Facilities and inftrastructure at Tanjung Setumu Beach

No	Station	Facilites and inftrastructure	Description
1	Station 1	1 provosions	Gazebo
2	Station 2	3 provosions	for places to eat, tourist information center, and public facilities (gazebos, bathrooms, places of worship).
3	Station 3	3 provosions	for places to eat, tourist information center, and public facilities (gazebos, bathrooms, places of worship).

Source : Primary data (2022)

j. Accessibility of Tanjung Setumu Beach

According to the findings of firsthand observations, see **Figure 4**, Tanjung Setumu Beach's accessibility is either very acceptable or requires evaluation. Tanjung Setumu Beach doesn't have many transit options, including terminals or tourist cars that can take visitors to the beach. This is a result of both the beach's geographical separation from Dompak Island's main road and its ongoing construction. The viability and quality of a seaside tourism region are undoubtedly supported by good accessibility. A tourist destination has to be supported by outside factors, not only accommodations and natural beauty from Sumarabawa, et al.,(2015).

Station 1 Station 2 Station 3

Fig. 4. Accessibility of Tanjung Setumu Beach

k. Tanjung Setumu Beach Land Cover

Based on direct observation, see **Figure 5**, the land cover types of the three stations on Tanjung Setumu Beach are dominated by open land. The dominance of coconut trees on Tanjung Setumu Beach gave aesthetic value to visitors who attended from Loventia (2019). Land cover on a beach needs to be managed regularly in order to increase tourist attraction data and preserve natural areas from Maizuwardi (2020). Identified plant species in Table 12 at Tanjung Setumu Beach. Species of Cemara (Casuarinaceae), Ketapang (Terminalia catappa), and Coconut (Cocos nucifera) trees are always found on Tanjung Setumu Beach

Station 1 Station 2 Station 3

Fig. 5. Obervation of coastal and clousres of Tanjung Setumu beach

Table 12. Identification of vegetation cover on Tanjung Setumu Beach

No	Vegetation Type		Station		
	Scientific Name	**Local Name**	**1**	**2**	**3**
1	Scaevola taccada	Beach Naupaka	v	v	-
2	Casuarinaceae	Cemara	v	v	v
3	Terminalia catappa	Ketapang	v	v	v
4	Pandanus tectorius	Pandan Duri	v	-	-
5	Cocos nucifera	Pohon Kelapa	v	v	-

Source : Primary data (2022)

l. Freshwater Avalability of Tanjung Setumu Beach

Based on the results of observations and measurements in the field, see **Figure 6**, that the distance of freshwater availability to each sampling station location is very close. The distance from the fresh water source to sampling station 1 is 0.06 km, to sampling station 2 is 0.03 km, and to sampling station 3 it is 0.02 km. Each sampling station has its own fresh water source. Thus, this condition indicates that the availability of laughing water at Tanjung Setumu Beach is very suitable to be used as a coastal tourism area. The category of beach tourism is good if the distance of the availability of laughter water to the beach location is <0.5 km from Yulianda (2007). The availability of suitable fresh water conditions certainly makes it easier for visitors who are menstruating to clean according Loventia (2019). The availability of fresh water is also a support for management facilities and good tourism service parameters from Wabang, et al., (2017)

Station 1 Station 2 Station 3

Fig. 6. Distance of availability of fresh water on the coast Tanjung Setumu

3.3 Level of Perception and Community Participation

a. Visitor

Results of the perception level of visitors at Tanjung Setumu Beach Tourism will be presented in the form of a recapitulation of the 4 statements that have been given. The following is presented in Table 13. as a result of the recapitulation of 4 statements of visitor perceptions at Tanjung Setumu Beach Tourism.

Table 13. Recapitulation of visitor perceptions at Tanjung Setumu Beach Tourism

No	Statement	Total Score	Perception Index	Interpretation
1	Pleasant impression after visiting Tanjung Setumu Beach Tourism	86	95%	High
2	The existence of Tanjung Setumu Beach Tourism is very suitable as a beach tourism activity	75	83%	High
3	There is excellent access to Tanjung Setumu Beach tourism.	51	56%	Enough
4	The infrastructure and amenitiesof Tanjung Setumu Beach Tourism are excellent.	59	655	Enough

Source : Primary data (2022)

b. Tourism business

Actors Tanjung Setumu Beach is home to 3 tourist attractions. specifically Mr. Jumahad, Mr. Agus, and Mr. Ahmad. Tanjung Setumu Beach is a coastline region that Mr. Ahmad believes is suited for a contemporary beach tourism area in the heart of the provincial capital. In addition to opening a seafood restaurant on Tanjung Setumu Beach, Mr. Jumahad, the chairman of the youth setumu, said that Tanjung Setumu Beach had a favorable effect on all spheres of society, particularly the residents of Tanjungpinang City. Tanjung Setumu Beach is a source of revenue, said Mr. Agus.

c. Regional Government

According to Mr. Andi's findings from an interview with the Tanjungpinang City Culture and Tourism Office (DISBUDPAR), Tanjung Setumu Beach is one of the most popular tourist locations in the city. Tanjung Setumu Beach is particularly lovely at sunset, according to Mr. Andi. However, he considers that there are a number of issues with Tanjung Setumu Beach's tourist industry that need to be resolved, including difficult road access and narrow roads, an

unclear land use policy, and a lack of public amenities like prayer rooms and restrooms. Tanjung Setumu Beach is supported by the local administration of Tanjungpinang City DISBUDPAR, which works to promote it as one of the top beaches in the area.

3.4 Level of Suitability of Tanjung Setumu Beach Tourism

The Tourism Suitability Index (IKW) value is determined for each station based on the measurement findings of all stations in Table 13, with the S1 category or extremely appropriate value being assigned to each station. They have values of 84%, 94%, and 85%, respectively, at stations 1, 2, and 3, or are deemed to be extremely acceptable.

Table 13. The results of the calculation of the tourism suitability index of Tanjung Setumu Beach

No	Parameter	B	Station 1			Station 2			Station 3		
			Result	S	N	Result	S	N	Result	S	N
1	Depth of the beach (m)	5	0.76	3	15	0.68	3	15	0.92	3	15
2	Type of Beach	5	White Sand	3	15	White Sand	3	15	White sand, sligthly rocky	2	10
3	Beach Width (m)	5	22	3	15	67	3	15	41	3	15
4	Water Brigthness (%)	3	65.83	2	6	50.67	2	6	43.67	1	3
5	Costal Slope (o)	3	33.02	1	3	14.84	2	6	12.13	2	6
6	Current speed (m/s)	3	0.07	3	9	0.03	3	9	0.09	3	9
7	Basic Materials Water	3	Sand	3	9	Sand	3	9	Coral/sand stone	2	6
8	Dangerous Biota	3	1 species	2	6	1 species	2	6	1 species	2	6
9	Facilites and Infrastructure	3	1 provosions	1	3	3 provosions	3	9	3 provosions	3	9

No	Parameter	B	Station 1			Station 2			Station 3		
			Result	S	N	Result	S	N	Result	S	N
10	Accessibility	3	1 provosions	1	3	2 provosions	2	6	2 provosions	2	6
11	Coastal Land Cover	3	Coconut, open land	3	9	Coconut, open land	3	9	Coconut, open land	3	9
12	Freshwater Availability (km)	1	0.06	3	3	0.03	3	3	0.02	3	3
Ntotal					96			108			97
IKW (Ntotal/Nmaks x 100%)					84 %			94%			85%
Kategori kesesuaian					**S1**			**S1**			**S1**

Nmaks = 114

Source : Primary data (2022)

3.5 Analysis of the carrying capacity of the Tanjung Setumu Beach Tourism Area

Based on the findings of the analysis of the area of each station on Tanjung Setumu Beach, each of which has a unique coastline region, and the carrying capacity of that area. With a 1,222 m2 size, Station 1 in Table 14 has a Carrying Capacity of the Area (DDK) of 81 persons, meaning it can accommodate 81 visitors during a 3-hour visiting time each day. With a 19,025 m2 area, Station 2 in Table 15 has a Carrying Capacity of the Area (DDK) of 1,268 individuals. This means that Sampling Station 2 can accommodate 1,268 visitors during a 3-hour visiting time each day. While station 3 in Table 16 has an area of 3,575 m2, the Area Carrying Capacity (DDK) for Sampling Station 3 is 238 individuals, implying that the station can accommodate that number of visitors throughout a day's worth of three hours of visits. The region of the Sampling Station, which is used as a tourist destination, has an impact on the various duking power levels of each station. The value of its carrying capacity is more significantly impacted by how large the tourism area is.

Table 14. Calculation of the carrying capacity of the Station 1, Tanjung Setumu Beach

No	Variable	Unit	Value
1	Visitor (K)	People	1
2	Beach Area (lp)	m^2	1.222

No	Variable	Unit	Value
3	Unit Area (lt)	m^2	50
4	Time required (Wp)	Hours	3
5	Total time of day (Wt)	Hours	10
	Carrying capacitiy for the area (K x lp x Wt) / (lt x Wp)		**81 persons**

Source : Primary data (2022)

Table 15. Calculation of the carrying capacity of the Station 2, Tanjung Setumu Beach

No	Variable	Unit	Value
1	Visitor (K)	People	1
2	Beach Area (lp)	m^2	19.025
3	Unit Area (lt)	m^2	50
4	Time required (Wp)	Hours	3
5	Total time of day (Wt)	Hours	10
	Carrying capacitiy for the area (K x lp x Wt) / (lt x Wp)		**1.268 persons**

Source : Primary data (2022)

Table 16. Calculation of the carrying capacity of the Station 3, Tanjung Setumu Beach

No	Variable	Unit	Value
1	Visitor (K)	People	1
2	Beach Area (lp)	m^2	3.575
3	Unit Area (lt)	m^2	50
4	Time required (Wp)	Hours	3
5	Total time of day (Wt)	Hours	10
	Carrying capacitiy for the area (K x lp x Wt) / (lt x Wp)		**238 persons**

Source : Primary data (2022)

4 Conclusion

Based on the results of observations and conformity analyzes carried out, the following conclusions are obtained:

1. Based on the tourism suitability analysis, the ecological potential of Tanjung Setumu Beach Tourism shows that on average it is very suitable and quite suitable at each station.
2. Based on the results of the recapitulation of 4 statements of visitor perceptions at Tanjung Setumu Beach Tourism, the total score obtained is 271, meaning high, and the perception index obtained is 75%, meaning high. That is, the level of visitor perception of Tanjung Setumu Beach Tourism is very good. Based on the results of interviews, visitors said they were ready to support and play a role in maintaining the existence of Tanjung Setumu Beach Tourism.
3. Based on the calculation of the value of the Tourism Suitability Index (IKW) at each station, the level of suitability for beach tourism Station 1, 2 and 3 are 84%, 94%, and 85%, respectively, meaning that the category is very suitable (S1). Regional Carrying Capacity (DDK) at each station on Tanjung Setumu Beach, shows that Station 1 has a capacity of 81 people, Station 2 has a capacity of 1,268 people, and Station 3 has a capacity of 238 people every 3 hours per day.

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