COMPATIBILITY STUDY AND SUPPORTING CAPACITY OF TOURISM AT PERERENAN BEACH BADUNG, BALI

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ABSTRACT

The challenge of developing Pererenan Beach is to determine the efficiency of resource utilization, so that it does not exceed its carrying capacity. The carrying capacity of Pererenan Beach tourism is carried out by analyzing the suitability of coastal tourism. Then calculate the capacity to measure the number of tourists that can be accommodated without damaging the ecosystem. This study aims to determine the suitability and carrying capacity of coastal tourism. The methods used are quantitative methods and descriptive analysis. The results show that the carrying capacity of the area on Pererenan Beach is classified as under carrying capacity and has the suitability criteria classified as very suitable (S1) with a percentage value of 96% suitable for use as beach recreation tourism. The Covid-19 pandemic provides lessons that the concept of carrying capacity is important to be applied to avoid mass tourism and reduce the number of tourists according to their capacity so that visitors get the convenience and satisfaction of traveling.

Keywords: carrying capacity; suitability; Beach tourism.

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INTRODUCTION

The sustainability of resource utilization is largely determined by the level of resource utilization, not exceeding its carrying capacity. A very important component in the conception of the use of natural resources for tourism purposes is the suitability of resources and the carrying capacity of the area that supports tourism activities (Hutabarat et al., 2009). Carrying capacity is defined as the maximum capacity or limit of a certain population density in a certain area and time (Braithwaite et al., 2012). This limit is determined by the amount of resources and needs (consumption). Sustainable tourism development is closely related to the consumption/needs of the community and the utilization of its resources.

The number of visits to a tourist attraction can affect the carrying capacity of the area. This is due to the increasing number of people and human activities. Pererenan Beach is one of the beach excursions that has a certain uniqueness, as a result, it is visited by many tourists. The Pererenan Beach area has resources in the form of physical potential and adequate tourist facilities so that it can support the development of tourist attractions as beach recreational tourism. The challenge of planning the development of Pererenan Beach is to ensure the efficient use of limited land resources, ensure the sustainability of resource use in a balanced use of resources. Then there are no criteria for the number of visits and the suitability of Pererenan Beach tourism as beach recreation and so far the manager only thinks about the level of visitors but does not pay attention to the carrying capacity of the area, so that the suitability and carrying capacity factor is very important to be taken into account for the Pererenan Beach area in order to maintain its existence and sustainability.

Research on the carrying capacity of coastal tourism areas has been carried out by Eka Putri et al. (2020) at Pandawa Beach, Bali, the results showed that visits to Pandawa Beach reached 9,907 people/day or 307,111 people/month, 3,685,327 people/year with an area of 23,041 m² utilized. These conditions indicate that the condition of tourists on Pandawa Beach during high season conditions is classified as meeting the carrying capacity of the area (under carrying capacity), while research conducted by Romadhon, et al in the Sapeken Island Cluster has an area suitable for coastal tourism with a carrying capacity of 199. person/day.

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In the current Covid-19 pandemic, it is a lesson that the application of the concept of carrying capacity of tourist areas is very important to take into account the problem of carrying capacity as a reference for an area so as to avoid mass tourism, suppress the number of tourists according to their capacity so that visitors get satisfaction and travel comfort. Based on the description that has been described, the purpose of this study is to determine the level of suitability of the area as coastal recreational tourism and the carrying capacity of the area on Pererenan Beach, so it is necessary to study the suitability and carrying capacity of the area on Pererenan Beach in supporting sustainable tourism.

RESEARCH METHODS

The method used in this research is quantitative with the analysis of Regional Suitability Indicators (IKW) and Regional Carrying Capacity (DDK) and by using descriptive techniques to describe some of the results from the data collected and then processed and concluded. The types of data used are primary data and secondary data. Primary data were obtained by direct observation, direct observation and in situ measurements according to the required environmental parameters, namely the length and width of the beach and collecting data by direct interviews and written interviews with respondents (domestic and international tourists) who visited Pererenan Beach. by using a questionnaire. The questionnaire used is a closed questionnaire by choosing the answers that have been provided and interviews are carried out using the random sampling method. Secondary data were obtained from literature, statistical data and information from tourism managers regarding data on tourist visits at Pererenan Beach.

Place and time of research

The research site was conducted at Pererenan Beach, Mengwi, Badung, Bali. Data collection was carried out from 12 September to 25 September 2021, carried out once a week. Pererenan Beach has a land area of about 90,431 m². Can be seen in Figure 1 below is a map of the location and pattern of research study space.

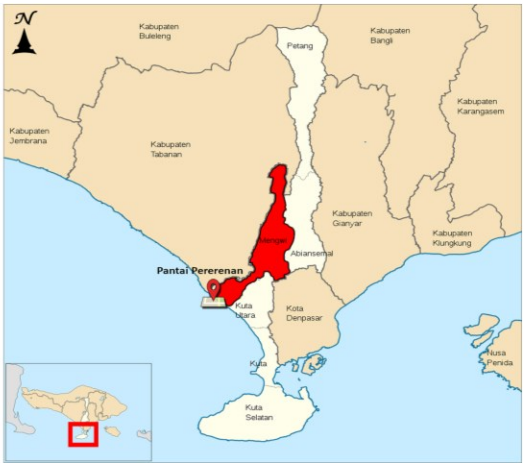

Figure 1. Pererenan Beach Location Map

The research location is divided into 3 coordinate points (segments), obtained by drawing a line through a digital map by drawing a length of 10-30m from the shoreline and the nearest point from the river flow, then each segment point is obtained in Figure 2 below.

a. Segment 1 (yellow), is to the west, bordering Munggu Beach, with coordinates 8º39'0541º S and 115º07'17.78º E.
b. Segment 2 (red color), is in the middle, with coordinates 8º39'0541º and 115º07'17.23º E.
   Segment 3 (blue), is in the east bordering Canggu Beach, with coordinates 8º39'13.03º and 115º07'25.82º E.

Figure 2. The Coordinate Points of Each Segment on Pererenan Beach

Tools and materials

It can be seen in Table 1 below, the information on the tools used in this research is a questionnaire as a recorded question and answer submitted to the respondent, a camera as an election, a roll meter to measure the length and breadth/width of the beach, Google Earth to identify the point of the section/segment and note-taking equipment. /stationary.

Table 1. Physical Data of Pererenan Beach

No	Beach Biophysical Data	Unit	Measuring instrument	Measurement Method
1	Beach Depth	m	Tongkat skala, field research	insitu
2	Beach Type		Visual, field research	insitu
3	Beach Width	m	Roll meter, google earth	insitu
4	Beach Slope	°	Tongkat skala, roll meter, google earth	insitu
5	Water Base Material		field research	insitu
6	Current Speed	m/dt	Layangan arus, field research	insitu
7	Water Brightness	m	Secchi disk, Google Earth, field research	insitu
8	Dangerous Biota		Visual, field research	insitu
9	Coastal Land Closure		Visual, field research	insitu
10	Freshwater Availability	distance/km	ORP meter	insitu

Source: Observation results (2021)

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While the material used is in the form of secondary data, namely data on the number of visits to Pererenan Beach as research supporting data. The following can be seen in Table 2 data on visits and activities carried out by tourists to Pererenan Beach.

Table 2. Data of Tourist Visits to Pererenan Beach

Activity	Number of respondents
Swim	36
Leisure Tourism	98
Sport	30
Surfing	40
Fishing	24
Horse riding	20
Foreign Tourist	162 person
Domestic Tourist	86 person
Total Respondents Overall	248 person

Source: Results of observations and interviews (2021)

This research was carried out in several stages of the process such as conducting a direct review of the object of study, identifying existing conditions, potential resources/ecosystems available at Pererenan Beach, then after obtaining existing data and non-physical data, an analysis of suitability and carrying capacity at Pererenan Beach was carried out.

Existing Condition of Pererenan Beach

Figure 3 below is the existing condition and facilities at Pererenan Beach.

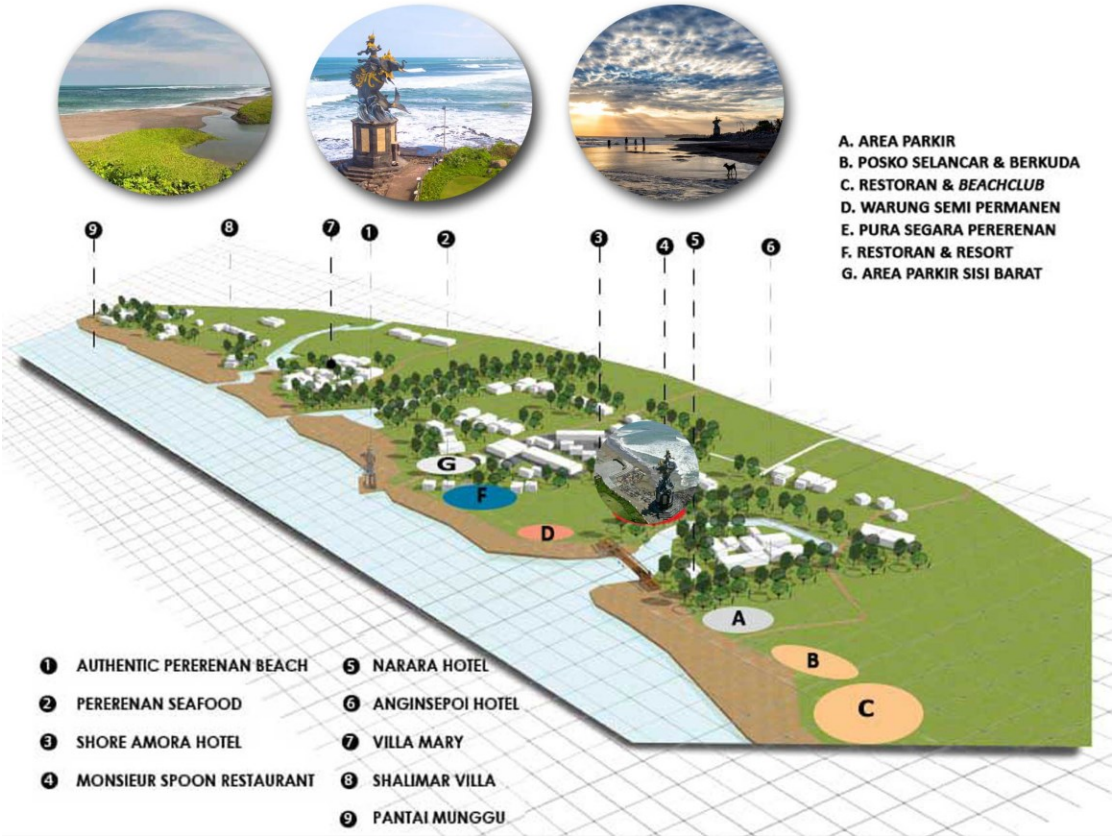

Figure 3. Existing Condition of Pererenan Beach

The picture above shows that the existing state of Pererenan Beach has facilities such as accommodation and food and beverage facilities. In Table 3, the following is a description of the facilities available at Pererenan Beach.

Table 3. Data of Tourist Visits to Pererenan Beach

Type of Infrastructure	Physique	Description
Tourist facilities		
Parking area	2 area	Good condition
Bathroom, rinse area	4 units	Still not well maintained for cleanliness on certain days, for example Friday, Saturday and Sunday
Lodging/Villa	6 units	Good condition
Restaurant & Beachclub	15 units	Good condition
Semi permanent shop	2 units	Pretty good condition
Horse riding post	1 unit	It is necessary to maintain cleanliness, a special area for horses is made so that cleanliness is maintained
Place/meeting point	1 unit	Not yet available
A place to take pictures at the authentic Pererenan Gajah Mina	1 unit	Good condition
Surf post	1 unit	It is necessary to arrange the pattern of the space so that it is neat and clean
Worship place	1 unit	Good condition
Supporting facilities		
Road to beach/accessibility	2 area	The road to Pererenan Beach is 10 meters from the parking area. Bounded by villas/resorts, gardens, restaurants and open land areas. However, the conditions to the beach are not good because there are no pedestrian/pedestrian facilities.

Source: Observation results (2021)

Regional Conformity Index (IKW) Analysis Method

The material for the Regional Conformity Index (IKW) refers to Yulianda (2010) using the following equation.

$$IKW = \sum (NI/Nmaks) \text{ X } 100\%$$

Description:

IKW : Tourism Suitability Index (%)
Ni : I-th parameter value (weight x score)
Nmaks : Maximum value of a tourism category (81 points)

The study of the suitability of the coastal tourism area considers a parameter or indicator as a standard in determining the level of IKW at Pererenan Beach as described in Table 4 below.

Table 4. Framework of the Index of Suitability of Coastal Tourism Areas

No	Parameter	B	Category S1	S	Category S2	S	Category S3	S	Category Sn	S
1	Depth (m)	5	0 - 3	3	> 3 - 6	2	> 6 - 10	1	> 10	0
2	Beach width (m)	5	> 15	3	10 - 15	2	3 - < 10	1	< 3	0
3	beach type	5	Black sand	3	Black sand, little coral	2	Black sand, rocky, a little steep	1	Muddy, rocky, coral, steep	0
4	Basic materials	3	Sand	3	sandy coral	2	Muddy sand	1	Mud	0

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No	Parameter	B	Category S1	S	Category S2	S	Category S3	S	Category Sn	S
5	Beach slope	3	< 10	3	10 - 25	2	> 25 - 45	1	> 45	0
6	Current speed (m/s)	3	0 - 0.17	3	0.17 - 0.34	2	0.34 - 0.51	1	> 0.51	0
7	Water brightness (m)	3	> 10	3	> 5 - 10	2	3 - 5	1	< 2	0
8	Beach land closure	3	Coconut, open land	3	Bush, low, savanna	2	High Scrub	1	Mangroves, settlements, ports	0
9	Dangerous biota	3	There is no	3	Sea urchins	2	Sea urchin, stingray	1	Sea urchins, stingrays, lions, sharks	0
10	Fresh water availability (distance/km)	3	< 0.5	3	> 0.5 - 1	2	> 1 – 2	1	> 2	0

Source: Mizan (2018) Laura modification (2021)

Table 5 below is the scale used in filling in the column as a determinant of the weight of the index of suitability for coastal tourism areas.

Table 5. Weight Scale Criteria in the Index of Suitability of Coastal Tourism Areas

Weight	Description
5	Indispensable/important indicators/parameters
3	Indicators/parameters required

Source: Iswaty, et al (2017)

Table 6 below is the scoring criteria used in the index of suitability for coastal tourism areas.

Table 6. Scoring Score Criteria in the Regional Suitability Index for Coastal

Value	Description
3	Description
2	Very Suitable, Category S1
1	Appropriate, Category S2
0	Marginal Appropriate, Category S3

Source: Mizan (2018) Laura modification (2021)

The following table 7 is the standard of the percentage result criteria used in the index of suitability for coastal tourism areas.

Table 7. Criteria for Results of Percentage of Area Suitability Index as Beach Tourism Recreation

No	Conformity Class	Description
1	S1 (Very Suitable)	It is very suitable as a beach tourism, does not have a heavy limiting aspect, only a little input is needed in its development.
2	(80-100%)	Quite suitable as a beach tourism, it takes a certain effort in the management of coastal tourism.
3	S2 (Sufficiently Appropriate / Appropriate)	In accordance with the conditions, having many limiting factors in its fulfillment, the limiting factors are considered so that they can be maintained.
4	(60-<80%)	It is not suitable, has high damage, does not have physical advantages, so it must be repaired and managed comprehensively and continuously.

Source: Mizan (2018) Laura modification (2021)

Regional Carrying Capacity Analysis Method (DDK)
The following is a formula in the DDK calculation technique referring to Yulianda (2010).

$$DDK = K \times Lp/Lt \times Wt/Wp$$

Description:
DDK : Regional Carrying Capacity (person/day)
K : Visitors' ecological potential per unit area (person)
Lp : The area or length of the area that can be used (m^2)
Lt : Unit area for a certain category (m^2)
Wt : Time provided by the manager in a day (hours)
Wp : Time spent by visitors per day (hours)

Tables 8 and 9 below are the standards for the ecological potential of visitors and the estimated time required for each beach tourism activity.

Table 8. Standards of Ecological Potential (K) and Area (Lt) of Coastal Tourism

Type of activity	**K (ΣVisitors)**	**Unit Area (Lt)**	Description
Beach Recreation	1	50 m	1 person per 50 m Beach length
Sport	1	50 m	1 person per 50 m Beach length
Swim	1	50 m	1 person per 50 m Beach length
Sunbathe	1	50 m	1 person per 50 m Beach length
Fishing	1	50 m	1 person per 50 m Beach length

Source: Yulianda (2010) Mizan modification (2018)

Table 9. Standard Estimated Time Required for Each Beach Tourism Activity

Activity	**Time required Wp (hours)**	**Total time 1 day Wt (hours)**
Swim	2	4
Surfing	2	4
Sunbathe	2	4
Beach Recreation	3	6
Beach Sports	2	5
Fishing	2	4

Source: Yulianda (2010) Mizan modification (2018)

RESULTS AND DISCUSSION

Description of Results and Discussion of the Analysis of the Regional Suitability Index (IKW) of Pererenan Beach Tourism

In the analysis of the measurement of the Pererenan Beach IKW indicator, Yulianda (2007) used the suitability parameter for coastal tourism, consisting of ten parameters. The following can be seen in Table 10 which is the result of the analysis of the Pererenan Beach IKW Segment 1, Segment 2 and Segment 3.

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Table 10. Results of Pererenan Beach IKW Analysis

No	Parameter	Result			B	S	Value
		Segment 1	Segment 2	Segment 3			
1	Water depth (m)	23	20	16	5	0	0
2	Beach width (m)	70, >15	20, >15	75, >15	5	3	15
3	beach type	Black sand	Black Sand, Back, Slightly Steep	Black sand	5	3	15
4	Basic materials	Muddy sand	sandy coral	Muddy sand	3	1	3
5	Beach slope	0.01	0.02	0.01	3	3	9
6	Current speed (m/s)	1.27	0.9	1.27	3	0	0
7	Water brightness (m)	15	10	13	3	3	9
8	Beach land closure	High Scrub	Open field	Open field	3	3	9
9	Dangerous biota	There is not any	There is not any	There is not any	3	3	9
10	Fresh water availability (distance/km)	0.4	1	0.3	3	3	9
					Total ∑ (Ni)		**78**
					Tourism Suitability Index (%)		**96**
					Criteria		**S1**

Source: The results of primary data analysis are processed (2021)
Information:
Description:
S1 = Very Suitable With The Value Of 80-100%
S2 = According To The Value 60-<80%
S3 = Subject To Conditional Score 40-<60%
SN = Not In Accordance With The Value <40%

The following is an explanation of the table above.

a. Water depth
   The results of the measurement of water depth are important to be taken into account as aspects of security and safety in swimming activities, where Segment 3 has the lowest depth compared to the other two segments. The beach area can be considered very suitable if it has a depth between 0-3m (Yulianda, 2007). Pererenan Beach is included in the category that is not suitable for swimming activities, therefore this beach is most suitable for use as beach surfing tourism. Although this beach is not suitable for swimming activities, there are still tourists who do swimming activities.
b. Beach width
   The measurement of the width of the beach is studied to identify how large an area can accommodate coastal tourism activities. Pererenan Beach has a width of >15m so it is included in the very appropriate category because it exceeds the standard limit that has been determined as beach tourism, which is >15m. The width of the beach greatly affects the activities carried out by tourists, so the wider the beach, the more flexible, satisfied and comfortable in carrying out beach tourism activities.
c. Beach type
   There are two types of beaches, where segments 1 and 3 have the same type of beach, namely black sand, while segment 2 has a sandy type, rocky and slightly steep. So Pererenan Beach is included in the appropriate criteria. The rocky/muddy conditions are less favored by tourists, as according to Widiatmika (2007) in Armos (2013) says that the most suitable type of beach is a sandy beach.
d. Basic materials
   According to Margomgom (2013) the basic material of waters that is very suitable for beach tourism is sand because it is used for swimming and bathing to provide visitor comfort. Segments 1 and 3 are muddy sand base material and segment 2 is sandy coral. In segments 1 and 3 there is muddy sand because as a result of tidal sediment there is a river estuary that carries sediment. So

that Perenan Beach is categorized as inappropriate when viewed from the basic material parameters. This aspect also supports the aspect of water depth which proves that Pererenan Beach is not suitable for swimming activities.

e. Beach slope
According to Subandi (2018), flat to sloping beaches are very good for swimming tourism activities, because visitors can play in the sand, play in the waves and swim. Based on the results of observations at Pererenan Beach, the results of measurements of beach slopes show that the three segments on Pererenan Beach have a sloping topography with a slope of 0.01 -0.02 degrees, so it is included in the very appropriate criteria (S1), which is >10 degrees. .

f. Current speed
The results of current measurements are very suitable for swimming activities with speeds between 0-0.17 according to Yulianda (2007). Current speed is closely related to the safety of tourists in swimming. The results of the current velocity value at Pererenan Beach are relatively large and fast currents. This shows that the current speed at Pererenan Beach is in the unsuitable category (SN) for swimming activities, but in other aspects Pererenan Beach is very suitable for use in beach tourism as surfing activities.

g. Water brightness
According to Yulianda (2007), this parameter should have water brightness >10m, where each segment on Pererenan Beach is 10 m (segment 2), then 15 m (segment 1) and 13 m (segment 3), so that in terms of water brightness, , Pererenan Beach is categorized as very suitable (S1) because it is worth more than 10m.

h. Beach land closure
The land cover on Pererenan Beach varies, namely there is open land and also high shrubs. Based on observations, segments 2 and 3 are open land, while segment 1 is high shrubs. Coastal land cover indicators can be considered appropriate if they have land cover in the form of open land and coconut (Yulianda, 2007), so Pererenan Beach is considered very suitable criteria (S1) for beach tourism.

i. Dangerous biota
Dangerous biota in the form of sea urchins and freshwater fish are dangerous categories (Yulianda, 2007). Pererenan Beach is considered very suitable (S1) to be used as a beach tourism destination because in segments 1,2 and 3 there are no dangerous biota.

j. Fresh water availability
Pererenan beach can be considered very suitable as a tourism activity for swimming because it has the availability of fresh water <0.5 km (Yulianda, 2007). If it is associated with beach tourism, this aspect is closely related to swimming activities.
Based on the results of the measurement of ten IKW parameters for the recreational beach tourism category, it shows that Pererenan Beach is suitable (S1) to be used as beach tourism, with the results of the IKW analysis value of 96%. When viewed from its function as a swimming tour, Pererenan Beach is not suitable when used as a swimming activity, due to several aspects of the parameters mentioned earlier. However, this is not an obstacle in the development of coastal tourism areas for recreation, because there are other parameters that make Pererenan Beach very suitable to be used as beach tourism recreation.

Description of Results and Discussion Analysis of Area and Time spent in Activities at Pererenan Beach

Every tourist area, especially beach tourism, has differences from one another. This difference is based on the area owned, the time provided. This is based on the comfort and satisfaction of every visitor. Based on the results of interview data with respondents at Pererenan Beach, the results show that the activities that are mostly carried out are described in Figure 4 below, namely recreational tourism activities (walking, enjoying sunset views, relaxing, clothesline) by 39.5%, this activity was chosen by 98 people out of a total of 248 respondents. Based on all respondents, swimming activities were chosen by 36 people (14.5%), sports 30 people (12.5%), fishing 24 people (9.7%), surfing 40 people (16..1%) and activities the least chosen is riding a number of 20 people (8.1%).

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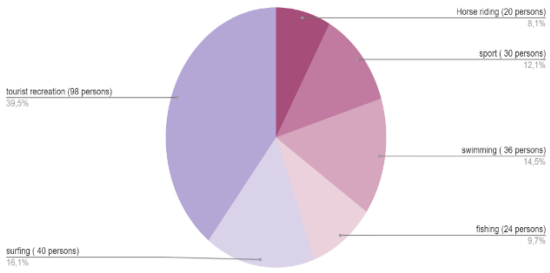

Figure 4. Number of Tourists and Activities at Pererenan Beach

Recreational tourism activities such as walking, relaxing, enjoying the scenery, enjoying the available supporting facilities, are the most popular activities or chosen by respondents (visitors) because most visitors want to be able to feel relaxed while enjoying the sunset and the waves. Equestrian activities are carried out at least because these facilities are not adequate.
The area required for beach tourism activities, both spent and provided on each beach is different. Table 11 below indicates that beach tourism activities require the highest time than other activities with an average Wp of 4.23 hours / day, with the highest Wp 6 hours and the lowest 2 hours, then horse tourism activities require the least time compared to other activities. another, namely an average of 1.26 hours with the highest Wp of 2 hours and the lowest of 0.5 hours (30 minutes).

Table 11. Value of Time spent (Wp) of Each Tourism Activity at Pererenan Beach

Activity	Number of Respondents	Highest Wp Value (Hour/Day)	Lowest Wp Value (Hour/Day)	Average Value (Hour/Day)
Swim	36	4	0,5	2,76
Leisure Tourism	98	6	2	4,23
Sport	30	2	1	1,46
Surfing	40	5	2	3,32
Fishing	24	4	2	3,16
horse riding	20	2	0,5	1,26
			Total Time	**16,19**
			Average Time	**2,69**

Source: The results of primary data analysis are processed (2021)

This result is higher when compared to Eka Putri's research (2020) at Pandawa Beach, with Wp for 4 hours of swimming, 5 hours of surfing, 4 hours of sight seeing, 5 hours of sunbathing and 2 hours of exercise. In addition, research from Rahmawati (2009) at Teleng Ria Beach, with Wp values in surfing activities for 2 hours, swimming for 2 hours, sunbathing for 2 hours, sightseeing and seeing sights for 4 hours. This proves that the time provided by each region is different and the need for time is also different for each visitor/tourist.
The area required by tourists (Lt) in Table 12 is highest for equestrian tourism activities with an average of 320 m², with the highest Lt 500 m² and the lowest Lt 100 m², while activities with the lowest average are fishing activities with the highest Lt 3 m² and Lowest floor 1 m².

Table 12. Value of Area Unit (Lt) of Each Tourism Activity at Pererenan Beach

Activity	Highest Lt Value	Lowest Lt Value	Average Value (m²)
Swim	100	5	14,4
Leisure Tourism	50	5	28,36
Sport	100	20	56,67
Surfing	100	20	60,5
Fishing	3	1	1,75
horse riding	500	100	320
		Total Area	**481,68**

	Average Area	**80,28**

Source: The results of primary data analysis are processed (2021)

Based on the total area required to accommodate all existing activities, there are 481.68 m2 with an average area (Lt) required for each visitor of 80.28 m2 to provide comfort and satisfaction in carrying out tourist activities with an existing area of 90,431 m2. , with an average time spent by visitors of 2.69 hours/day for activities out of a total of 12 hours/day of time given by the manager of Pererenan Beach.

There is a study of similar facilities as a comparison conducted by Eka Putri (2020) at Pandawa Beach for all activities, an area of 95.09 m2 is required with an average area of 12.3 m2 from the existing 23,041 m2. Then the average time needed at Pandawa Beach to carry out activities is 2.08 hours/day on average from 11 hours/day provided by Pandawa Beach managers. when compared to the aspect of time, it is also different, where Pererenan Beach requires a longer time in activities when compared to Pandawa Beach.
So it can be concluded that the difference between Wp and Lp on each beach is different, this is caused by the available facilities, the time provided, the potential/conditions of the surrounding environment and the conditions of tourists visiting and activities carried out by tourists on the beach.

Description of Results and Discussion of Regional Carrying Capacity Analysis (DDK) Pererenan Beach Tourism

Carrying capacity is a conception in which the capacity of an environment/ecosystem to accommodate the maximum life of living things in a long period of time, gives life to inhabit an area. The analysis of the carrying capacity of the Pererenan Beach was carried out based on primary data which was processed according to the conditions of the Pererenan Beach. This is obtained from calculating so as to obtain the value of the area (Lt) and the desired time of visitors in tourism activities (Wp). The results of the calculation of the carrying capacity of Pererenan Beach according to the primary data processed, are presented in Table 13 below.

Table 13. Calculation of Carrying Capacity According to Pererenan Beach Conditions Based on Primary Data

Criteria	**Lp (m²)**	**Lt (m²)**	**Wt (hour/day)**	**Wp (hours/day)**	**DDK (person)**
	b	c	d	e	a x (b/c) x (d/e)
DDK/Day	90.431	80,28	12	2,69	1 x 1126 x 4,46 = **5.021**
DDK/Month					**150.630**
DDK/Year					**1.807.560**

Source: The results of primary data analysis are processed (2021)

It can be seen in Table 13 above, that Pererenan Beach has a carrying capacity of 5,021 people/day. At the same time between the total time given by the manager for 12 hours / day, during one day the time spent by visitors in activities at Pererenan Beach for 2.69 hours / day can accommodate 5,021 visitors. Table 14 below is the number of visitor arrivals in the high season month.

Table 14. Calculation of Carrying Capacity in High Season at Pererenan Beach

Month	Number of visitors (Person)	DDK/Month (Person)	Percentage	Description
a	b	c	d= b/c x 100%	
January	5.850	150.630	3,88	Under Carrying Capacity
July	6.659	150.630	4,42	Under Carrying Capacity
August	6.053	150.630	4,02	Under Carrying Capacity
December	12.116	150.630	8,04	Under Carrying Capacity
Average	**7.667**	**150.630**	**5,09**	**Under Carrying Capacity**

Source: The results of primary data analysis are processed (2021)

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From the results of the calculation table above, in high season conditions, the carrying capacity of Pererenan Beach is included in the under carrying capacity or in other words does not exceed the carrying capacity of the area. The average percentage of visits at Pererenan Beach during high season conditions reached 5.09%, this proves that the number of tourists at Pererenan Beach is still classified as under carrying capacity.

Per day, the manager provides time for traveling for 12 hours / day, with an existing area of 90,431 m2. Table 14 above from the results of respondents proves that the highest carrying capacity on Pererenan Beach is fishing activities of 18,995 people/day and the lowest is on horse riding activities of 281 people/day. Fishing activities with an existing area of 9,771 m2 and based on the results of interview data, it only takes 1.75 m2 with a time required of 3.16 hours/day.

The following can be observed in Table 15 which is a summary result of the calculation of the carrying capacity of the coastal tourism area for each activity at Pererenan Beach.

Table 15. Calculation of the Carrying Capacity Value of the Pererenan Beach for Each Activity

Activity	K	Lp (m²)	Lt (m²)	Wt	Wp	DDK
Swim	1	13.112	14,4	12	2,76	3.950
Leisure Tourism	1	35.720	28,36	12	4,23	3.564
Sport	1	10.942	56,67	12	1,46	1.588
Surfing	1	14.559	60,5	12	3,32	870
Fishing	1	8.771	1,75	12	3,16	18.995
horse riding	1	7.324	320	12	1,26	218

Source: The results of primary data analysis are processed (2021)

Description:

DDK : Regional Carrying Capacity (person/day)
K : Visitors' ecological potential per unit area (person)
Lp : The area or length of the area that can be used (m²)
Lt : Unit area for a certain category (m²)
Wt : Time provided by the manager in a day (hours)
Wp : Time spent by visitors per day (hours)

Utilization carrying capacity / UCC is the utilization of carrying capacity with a maximum limit of tourists in accordance with the state of the natural ecosystem. In Table 16 below, it is known that the highest Utiliztion Carrying Capacity is in fishing activities, which is approximately 1,900 people/day due to a few respondents who choose this activity. Then swimming activities have an Utiliztion Carrying Capacity of 395 people/day, recreational activities for tourism are 356 people/day, sports activities are 159 people/day, equestrian activities have an Utiliztion Carrying Capacity of 22 people/day. So it is known that Pererenan Beach does not exceed the maximum limit of tourists in the utilization of its carrying capacity.

Table 16. Results of Analysis of Carrying Capacity Utilization for each activity on Pererenan Beach

Activity	Tourist activities					
	Swim	Leisure Tourism	Sport	Surfing	Fishing	Horse riding
RCC(person/day)	3.950	3.564	1.588	870	18.995	218
UCC(person/day)	395	356	159	87	1900	22

Source: The results of primary data analysis are processed (2021)

Information:

RCC : Real Carrying Capacity
UCC : Utiliztion Carrying Capacity

CONCLUSION

Based on the results of the analysis, it is concluded that Pererenan Beach has an index of regional suitability as a beach tourism in the category of very appropriate with a percentage value of 96% (ninety six percent). Then based on its carrying capacity, it was found that Pererenan Beach is included in the category of under carrying capacity (not exceeding its carrying capacity) with a description of the area needed at Pererenan Beach for all activities, namely 481.68 m2 (four hundred eighty one point sixty eight square meters) with an average area (Lt) of 80.28 m2 (eighty point twenty eight square meters) of 90,431 m2 (ninety thousand four hundred and thirty-one square meters) of the total area of Pererenan Beach. The time required for visitors to do activities (Wp) is 2.69 hours/day (two point sixty-nine hours per day) from 12 hours (twelve hours) of time provided by the manager in carrying out tourist activities at Pererenan Beach (Wt). Based on primary data calculations according to the existing Pererenan Beach, it is known that the carrying capacity of the area is 5,021 people/day (five thousand twenty-one people per day), 150,630 people/month (one hundred and fifty thousand six hundred and thirty people per month) and 1,807,560 people/year (one million eight hundred seven thousand five hundred and sixty people per year). With a daily capacity of 5,021 (five thousand twenty-one) people, it would be very good if the Utiliztion Carrying Capacity or utilization of the carrying capacity was around 3,000 (three thousand) people/day. During the high season, based on BPS data in 2019, the number of visitor arrivals at Pererenan Beach was still classified as under carrying capacity.

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