Carrying capacity and tourism suitability of Ngurbloat Beach, Southeast Maluku Regency

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Abstract. The aim of this research is to know the suitable tourism for beach recreation, swimming, and sitting relaxed, measuring the carrying capacity of the Ngurbloat Beach and knowing the tourist perception of beauty and comfort. The research conducted from February to May 2019. Method of determining the station used a purposive sampling technique while the method of determining the respondent used an accidental sampling technique. Data analysis perform used a tourism suitability matrix, carrying capacity analysis and tourism perception analysis. This Research consisted of three observation stations. The results showed the suitability index of tourism for beach recreation at all stations is a highly suitable category is 100%. Swimming tours on all stations are in a category high suitable with 97% of index suitability and 90% of relaxing seat tourism is a highly suitable category. The results of data analysis of effective carrying capacity (ECC) showed Ngurbloat beach is able to accommodate tourist of 238 people/day. If the tourist visit exceeds the carrying capacity it will impact the coastal ecosystem. The interview showed 80% of tourists expressed comfort and 90% of the tourists stated that Ngurbloat Beach was beautiful.

1. Introduction

Southeast Maluku Tourism is currently experiencing a rapid development, through the promotion that has been done by the government, tourism actors and the people of Southeast Maluku district. Ngurbloat Beach is one of the top tourist destinations in southeast Maluku regency that has been growing and increasing tourists visit both domestically and internationally. The beach with white sand becomes the attraction of the tourist destination. The National Geography Magazine has once released that Ngurbloat Beach is known as the smoothest sand in Asia. Based on data from the staff of Ngurbloat beach area, every weekend tickets sold per week averages as much as 50 – 100 a ticket dominated by two-wheeled vehicles and the remaining 4 wheels. Religious holidays, National holidays, school holidays and events held on the Ngurbloat Beach cause tourists to rise high. Event of the Festival Meti Kei I in October 2017 held on Ngurbloat Beach attracts more than 2000 people. Improving the activity of high visitors can impact on the physical and ecological conditions of the tourist area. This is because the environmental support is closely related to the number of tourists who come to visit the tourist area. If the tourism support is exceeded then it can reduce the comfort and satisfaction of tourists [12]. Coastal areas are normally associated with mass tourism, large scale construction and infrastructure, intensive land development and extensive urbanization. Carrying capacity issues revolve around considerations about tourist density, the use of beaches and tourist infrastructure, congestion of facilities, sea pollution, etc.

The Carrying capacity of tourism refers to the sense of environmental support which is the concept used for the development of natural resource management activities and a sustainable environment. Its purpose is to prevent the degradation of natural resources, so that existence, sustainability, and function can be realized. At the same time, the user or community is still in a prosperous and or unharmed state.
The concept of tourism support is guided to the maximum number of people who can guests one tourism place at the same time without causing damage to physical, economic and socio-cultural environment and a loss of quality detrimental to the satisfaction of tourists [13] The same is said by [17] that tourism support consists of 2 (two) components, namely physical support, ecology, and social support, while according to [7], tourism support consists of 3 (three) components, namely ecological support, power Social support, and economic support, acquire different weight or importance in different destinations. These differences depend from the type (characteristics/particularities) of the place, the types of tourism present and the tourism or environment interface one of the important things in establishing a marine tourism area is ecological feasibility, so that it can become an attractive tourist attraction. On the establishment of the marine tourism area, one important factor is ecological feasibility, so it can be an interesting tourist attraction. There are oceanographic factors to be aware of in addition to ecological conditions. Therefore, determining the feasibility of the maritime tourism area need to do identification of coastal resources and other supporting conditions. The identification is the basis of determining the location that is worthy to be a tourist area, then calculated the capacity to provide comfortable nautical tourism, and can be preserved for the sustainability of the surrounding ecosystem [15].

Land suitability is the match of land for a specific purpose, through the determination of the land value (class) and the pattern of land use associated with the potential of the land, so that can be cultivated the following more directional use Its sustainability efforts [11]. Based on scientific study, it is necessary to know the appropriate tourism and carrying capacity of the Ngurbloat beach area. There are various tourist activities on the beach tourism Ngurbloat but the research is only focused on beach recreation, swimming and sitting relaxed.

Through scientific study to know the suitability of tourism and the support of Ngurbloat Beach, then sustainable development can be achieved. The purpose of this research is to know the suitability of the tourism on Beach recreation, swimming and sitting and carrying capacity of Ngurbloat Beach.

2. Methodology

2.1. Time and Location

The research was conducted from February to April 2019. The research site was conducted at Ngurbloat Beach, Ngilngof Village, Southeast Maluku Regency, Maluku Province. The Ngurbloat Coast coordinates are at the point 132 ° 38'10.50" E and 5 ° 39'42.32" S.

![Figure 1. Map of study site](image_url)

2.2. Tools and Material

The tools used in this research are Global Positioning System (GPS), stationery, roll meters, refractometer, water passing, guess board, guess bottle, secchi disk, dropper, thermometer, pH meter,
simple current meter, camera, DO meter. The material used in the study is questionnaire distributed to respondents including the managers and tourists.

2.3. Data Collection

Data obtained qualitatively derived from social variables that are quantized in order to be analyzed. The sample is selected by the accidental sampling method. The questionnaire contains questions about the perception of travelers and managers with respondents as many as 50 people. The respondent determination is calculated with the formula [1]. Quantitative data collection in the form of abiotic component data such as temperature, flow, brightness, DO and salinity obtained from field sampling at all three observation stations. Likewise, with beach slope measurements. Determination of observation stations using a purposive sampling method. Coastal vegetation Data collected based on transect line and bird fauna observations are carried out at each station. Secondary Data is obtained from interviews with management and meteorological, climatology and Geophysics agencies (BMKG).

2.4. Data Analysis

Data analysis in this study uses: a). tourism suitability analysis to determine the suitability level of a land for tourism purposes in each tourist attraction. b). carrying capacity analysis to find out how much the maximum value of the area that can accommodate tourists without causing environmental damage. c) analysis of people’s perceptions of beauty and comfort.

2.4.1. Analysis of tourism suitability.

Tourism suitability analysis is obtained from the value of tourism suitability matrix refers to [16]. The tourist suitability matrix contains weights and scores for the assessment of each supporting component of tourist activities. At the matrix of attractions [16] The Beach Recreation category contains six measurement parameters, namely the beach type, beach width, the basic material of harvest, slope of the beach, closure of coastal land and availability freshwater. The parameters of swimming tourism fit consist of beach type, beach width, the basic material of harvest, the slope of the beach, closure of coastal land and availability of freshwater, current velocity, wave height, and hazardous biota [16]. The parameters of relaxed seating tourism are made up of the beach width, view, living vegetation, expanse of plains, bird and dangerous biota. The suitable for relaxed seating is a modification of [16] with the addition of bird fauna. The results of the suitability matrix will be analyzed for the travel appropriateness based on [16] using the following equation:

\[ IKW = \frac{Ni}{N_{max}} \times 100\% \]

Information:
- IKW : Tourism Suitability Index
- Ni : parameter value (weight x score)
- Nmax : The maximum value of a travel category

The result of the calculation of tourist suitability analysis is based on the results of weight multiplication and score for each parameter. The result of the calculation is then categorized by a classification of 4 conformity classes [15] as follows:

| Category               | Value        |
|------------------------|--------------|
| Very Suitable (S1)     | 83 - 100 %   |
| Appropriate (S2)       | 50 - <83 %   |
2.4.2. Carrying capacity.

Measurement of carrying capacity includes area carrying capacity (ACC), real carrying capacity (RCC), and effective carrying capacity (ECC). The method of analysis used to measure the capacity of the tourist area of Ngurbloat Beach is the area carrying capacity (ACC). The area carrying capacity is the maximum number of visitors that can be physically accommodated in an area provided at any given time without causing interference with nature and humans. The calculation of the ACC in the formula is as follows [15]:

\[
DDK = K \frac{L_p}{L_t} \frac{W_p}{W_t}
\]

Information:
- **DDK**: Area Carrying Capacity
- **K**: Ecological potential of visitors per unit of area
- **Lp**: Area or length of the area utilized
- **Lt**: Unit area for certain categories
- **Wt**: Time provided by the region for tourism activities in a day
- **Wp**: Time spent by visitors for each particular activity

Table 2. Ecological Potential Endpoints and Area of Activities

| No. | Activities Type | K (Σ Visitor) | Unit Area (Lt) | Information |
|-----|----------------|-------------|----------------|-------------|
| 1   | Sitting Relax  | 1           | 5 m²           | 1 person need 5 m of space 1 person every 10 m x 5 m beach length |
| 2   | Swimming       | 1           | 50 m²          |             |
| 3   | Beach Recreation| 1           | 50 m²          | 1 person every 10 m x 5 m beach length |

Table 3. Prediction of Time Required for Each Tourism Activity

| No. | Activities         | Time Required (Wp) (person/hours) | Total Time a day (Wt) (hours) |
|-----|--------------------|-----------------------------------|-------------------------------|
| 1   | Beach Recreation   | 4                                 | 10                            |
| 2   | Swimming           | 2                                 | 10                            |
| 3   | Sitting Relax      | 8                                 | 10                            |

Real carrying capacity (RCC) is the maximum number of visits that can be supported on a particular site, calculated by multiplying PCC with a set of correction factors (CF) on each specific site. The correction factor is calculated by the following formulas [8]:

- **Cf1**: 1 - (Number of hours of rain: number of hours a location is opened each year) (3)
- **Cf2**: 1 - (Month of high wave events each year: 12 months) (4)
- **Cf3**: 1 - (Diversity Index) (5)
- **Cf4**: 1 - (Diversity Index) (6)

If all the correction factors have been obtained, then the calculation of the real carrying capacity is as follows [8]:

\[
RCC = PCC \cdot (Cf1 \cdot Cf2 \cdot Cf3 \cdot Cf4)
\]
Information:
- RCC: Real carrying capacity,
- PCC: Physical carrying capacity,
- Cf: Correction factor

Effective carrying capacity (ECC) is the maximum number of visits where the area remains sustainable, taking into account its management capacity (MC).

\[ ECC = RCC \times MC \] (8)

Information:
- ECC: Effective carrying capacity
- MC: Number of tour management officers
- RCC: Real carrying capacity

2.4.3. Tourist perceptions of the beauty and comfort of Ngurbloat Beach.

Assessment of the beauty and comfort of the area is done by making a list of questions through the questionnaire intended to the visitors. The beauty that is judged is a natural beauty, not including man-made. The quantification of Responden data can be calculated by the formula:

\[ Ka = \frac{ERs}{ERo} \times 100\% \] (9)

Information:
- ERs: Number of respondents who said it was beautiful
- ERo: Total number of respondents
- Ka: Value of natural beauty (%)

Criteria / value of natural beauty:
- Ka ≥ 75%: Beautiful
- Ka 40% - ≤ 75%: Pretty Beautiful
- Ka <40%: Not Beautiful

The assessment of the area's comfort based on a questionnaire can be calculated using the following formula:

\[ Na = \frac{ERs}{ERo} \times 100\% \] (10)

Information:
- ERs: Number of respondents who said they were comfortable
- ERo: Total number of respondents is
- Na: Value of natural comfort (%)

Criteria for the value of natural comfort:
- Na ≥ 75%: Comfortable
- 40% - 75%: Comfortable enough
- Na <40%: Uncomfortable

3. Results and Discussion

Measurement of water quality in the waters of Ngurbloat Beach is held at three stations. The result of water quality measurement refers to the water quality book based on [5] about the threshold of seawater for marine tourism. Quality parameter measurement results are presented in Table 4.

Table 4. Water Quality of Ngurbloat Beach Waters
The results of observations of water quality at Ngurbloat Beach show that all the chemical and physical components of the waters at the three data collection stations do not exceed the water quality standard. This shows that the waters of Ngurbloat Beach are in healthy condition. Some physical parameters are related to biological and geomorphological conditions to be a reference parameter for the suitability of the coastal tourism land [2].

3.1. Analysis of tourism suitability for Ngurbloat Beach

Analysis of travel suitability using the suitability matrix [16] which is based on the supporting parameters of tourist activities on Ngurbloat Beach. The results of the analysis of tourism suitability for Ngurbloat Beach is presented in table 5.

| Parameters | Quality Standards | Station 1 | Station 2 | Station 3 |
|------------|-------------------|-----------|-----------|-----------|
| Temperatur (°C) | Natural 3(°C) | 30.0 | 29.8 | 30.4 |
| Salinity (‰) | 33.2 | 33.0 | 33.5 |
| pH | 7 - 8.5 | 7.13 | 7.5 | 6.9 |
| Current (m/detik) | 0.008 | 0.017 | 0.012 |
| DO (mg/l) | >5 | 5.3 | 5.0 | 5.5 |
| Brithness (m) | >6 | 7 | 7.5 | 8 |
| Smell | - | - | - | - |
| Oil | - | - | - | - |
| Waste | - | - | - | - |

Table 5. Suitability Parameters Analysis of beach recreation at Ngurbloat Beach

| No | Parameters | Stations | Weight | Score | Weight x Score |
|----|------------|---------|--------|-------|----------------|
| 1  | Beach type | White sand | White sand | White sand | 5 | 4 | 20 |
| 2  | Beach width (m) | 33.8 | 34.6 | 42.1 | 5 | 4 | 20 |
| 3  | Marine substrate | sand | sand | sand | 4 | 4 | 16 |
| 4  | Slope of the beach (°) | 3.576 | 3.434 | 4.289 | 4 | 4 | 16 |
| 5  | Closure f coastal land | Coconut tree, open land | Coconut tree, open land | Coconut tree, open land | 3 | 4 | 12 |
| 6  | Fresh water availability(m) | 20 | 30 | 25 | 3 | 4 | 12 |

Beach Recreation is in a category very suitable based on the analysis of suitability data. The measured parameters meet the highest weight of the conformity matrix for coastal recreation. The sandy beach and coast width is more than 15 meters, get the weight and highest value. The sandy beach is the most ideal beach type for beach tourism activities [10]. Tourists can carry out beach recreational activities such as sunbathing, exercising, taking pictures, relaxing walks and relaxing play. Measuring beach width relates to tourist activities to know how spacious the beach area can be used for various tourist activities. The coast width is measured from the last vegetation end on the mainland to the lowest receding [2]. The measurement results on the 1 to 3 station, indicating a tourism suitability index of 100%, which means that it is very suitable for coastal recreational activities. The suitability index measured for swimming tours includes nine measured parameters. The results of the analysis of swimming tourism suitability on Ngurbloat Beach presented in table 6.
Table 6. Results of Measurement and Analysis of Suitability Parameters of Swimming tourism of Ngurbloat Beach

| No | Parameters                          | Stasiun | Kategori | Bobot | Skor | Bobot x Score |
|----|------------------------------------|---------|----------|-------|------|---------------|
| 1  | Water depth (m)                    | 1.8     | 1.5      | 1.5   | 0-3  | 5             | 4              | 20             |
| 2  | Marine substrate                   | Sand    | Sand     | Sand  |      | 5             | 4              | 20             |
| 3  | Current speed (m/sec)              | 0.008   | 0.017    | 0.012 | 0-0.17| 5             | 4              | 20             |
| 4  | Wave height (m)                    | 0.4     | 0-0.5    | 0.3   | 0-0.5| 5             | 4              | 20             |
| 5  | Beach type                         | White sand | White sand | White sand |      | 3             | 4              | 12             |
| 6  | The width of the beach (m)         | 33.8    | >15      | 34.6  | >15  | 3             | 4              | 12             |
| 7  | Water brightness (m)               | 10.83   | >10      | 12.56 | >10  | 3             | 4              | 12             |
| 8  | Dangerous of biota                 | -       | -        | -     |      | 3             | 4              | 12             |
| 9  | Fresh water availability (km)      | 0.05    | <0.5     | 0.08  | <0.5 | 3             | 4              | 12             |
|    | Amount                             |         |          |       |      |               | 140            |                |

The main parameters in swimming tourism get the highest weight: depth, water base material, current velocity, and wave height are the highest weight parameters. Another parameter is supporting. The ideal depth for swimming activities is 0-5 meters [9]. In general, during the observation the swimming activities of tourists less than 3 meters. Security in swimming activities is also reviewed in terms of water depth. Swimming activities in shallow waters as Ngurbloat Beach does not have a beach supervisor. (11) states that visitors usually swim at depths of less than 1.5 meters of anticipation of safety in swimming.

The measurement of the current speed at each station is 0.008, 0.017, and 0.012 m/sec. The result indicates small current velocity is suitable for swimming activities. The speed of flow is related to travel safety and comfort. A strong current speed will harm the visitor, given the absence of restrictions on the area allowed to swim. Then this parameter is very important to measure its appropriateness. The slope of the beach is also an important factor. The comfort of the tourist activities depends on the beach. The sloping beach is very good compared to the steep beach. Based on the results of the coastline measurements obtained 3.5760 for station 1, 3.430 for stations 2 and 4.2890 for station 3. The slope result is still carried by the beach slope criteria of < 10° [2]. Beach slope measurements are carried out using measuring sticks, metered and waterpassing.

Sandy Marine substrates will provide comfort if it is a footrest compared to a coral beach. Assessment of substrates for swimming pleasure. The fine white sand is also owned by Ngurbloat Beach so it is suitable for swimming tours. The availability of fresh water available at tourist sites is also important to measure. According to [2] water is an important element in the tourist area for cleanliness after doing activities on the beach. The closer the distance between the coastline and the availability of freshwater, the better an area becomes the tourism place of the beach. The analysis results on the 1 to 3 stations, indicating that the freshwater distances can be used by tourists. The freshwater source distance from the seashore is 45m, 50m, and 52 meters. Freshwater availability gains high weights and scores due to less than 1 kilometer. The tourism index for swimming activities gets a score of 97% or a category is suitable.

The conformity indices measured for relaxed seating include beach widths, landscapes, coastal vegetation, birds, plain expanses and dangerous biota. The results of the analysis of the suitability of the casual seating Ngurbloat beach are presented in table 7.

Table 7. Relaxes sitting Tour of Ngurbloat Beach

| No | Parameters                        | Stasiun | Kategori | Bobot | Skor | Bobot x Score |
|----|-----------------------------------|---------|----------|-------|------|---------------|
| 1  | Water depth (m)                   | 1.8     | 1.5      | 1.5   | 0-3  | 5             | 4              | 20             |
| 2  | Marine substrate                  | Sand    | Sand     | Sand  |      | 5             | 4              | 20             |
| 3  | Current speed (m/sec)             | 0.008   | 0.017    | 0.012 | 0-0.17| 5             | 4              | 20             |
| 4  | Wave height (m)                   | 0.4     | 0-0.5    | 0.3   | 0-0.5| 5             | 4              | 20             |
| 5  | Beach type                        | White sand | White sand | White sand |      | 3             | 4              | 12             |
| 6  | The width of the beach (m)        | 33.8    | >15      | 34.6  | >15  | 3             | 4              | 12             |
| 7  | Water brightness (m)              | 10.83   | >10      | 12.56 | >10  | 3             | 4              | 12             |
| 8  | Dangerous of biota                | -       | -        | -     |      | 3             | 4              | 12             |
| 9  | Fresh water availability (km)     | 0.05    | <0.5     | 0.08  | <0.5 | 3             | 4              | 12             |
|    | Amount                            |         |          |       |      |               | 140            |                |
The results of observations of the suitability of Ngurbloat Beach tourism for relaxed seating activities have a percentage value of 90% which is included in the very appropriate category (S1). The width of the beach which is suitable for tourists to sit relaxed, has a view of the beach and forest. The beach on one side and the forest on the other. In this tourist area, there are more than 4 types of beach vegetation trees as well as the number and types of birds that exist. Dangerous biota was not found in this area during the observation, so it was concluded that the Ngurbloat Beach area supports relaxing tourism activities.

3.2. Carrying capacity of Ngurbloat Beach
3.2.1. Area carrying capacity (ACC).

The carrying capacity of the area is the maximum number of visitors that can be physically accommodated in the area provided at a certain time without causing disturbance to nature and humans. Measurement of the carrying capacity of the area for the categories of beach recreation, swimming and relaxing sitting refers to the formula established by [15], where there are several assessment criteria namely, the area or length of the area that can be utilized (Lp), unit area for a certain category (Lt), the time provided by the region for tourism activities in one day (Wt), and the time spent by visitors for each particular activity (Wp). Based on these criteria, the results of measuring the carrying capacity of the area are obtained as shown in Table 8.

| No | Parameters | Weight | category | Score | Weight x Score |
|----|------------|--------|----------|-------|----------------|
| 1  | The width of the beach (m) | 1      | x ≥ 8    | 3     | 3              |
| 2  | Views      | 5      | 2 to 3 of 4 view | 2     | 10             |
| 3  | Vegetation that lives on the shore | 5      | Number of tree types ≥ 4 | 3     | 15             |
| 4  | Fauna (Bird) | 3      | Number of birds ≥ 4 | 3     | 9              |
| 5  | Land expanse | 3      | grass / sand | 3     | 9              |
| 6  | Dangerous of biota | 3      | No       | 3     | 9              |

Amount 55

The area is measured for each tourist activity by measuring the length and area of the tourist area tracks.

3.2.2. Real carrying capacity (RCC).

Area carrying capacity or physical carrying capacity is the maximum number of tourists physically satisfied by the space provided at a certain time. So physically the condition of Ngurbloat Beach can accommodate the number of tourists in one day as many as 681 people for beach recreation, then as many as 155 people / day for swimming tourism and 4908 people / day for relaxing sitting activities. The area is measured for each tourist activity by measuring the length and area of the tourist area tracks. Area carrying capacity is used to determine the level of congestion or density acceptable in the main area/Spatial unit. The number allows tourists to feel comfortable physically-nature to travel.
The number of tourists visiting Ngurbloat Beach can be limited based on a particular site that is calculated by multiplying the physical carrying capacity and the correction factor [8]. This means there are limiting factors that limit the number of visitors. These factors are rainfall, high wave months each year, diversity of coastal vegetation and diversity of bird fauna. Tourism Carrying Capacity is based on the analysis of key factors limiting for tourism development for different types of tourist destinations. This real carrying capacity shows the number of tourists that can be accommodated by a tourist area with various tourist activities without damaging the environment or those around the tourist area. The limiting factors in this study are rainfall, wave height, disturbance to coastal vegetation and disturbance to bird fauna. The diversity of coastal vegetation is presented in Table 9.

Table 9. Vegetation Diversity of Ngurbloat Beach Based on Simpson Index

| Name                              | ni | ni(ni-1) | N   | N(n-1) | ID       | Correction Value |
|-----------------------------------|----|----------|-----|--------|----------|------------------|
| Barringtonia sp                   | 40 | 1560     |     |        |          |                  |
| Ketapang* (Terminalia catappa)    | 35 | 1190     |     |        |          |                  |
| Fir tree (C. equestifolia)        | 28 | 756      |     |        |          |                  |
| Waru Laut* (Hibiscus tiliaceus L) | 25 | 600      |     |        |          |                  |
| Coconut (C. nucifera)             | 60 | 3540     |     |        |          |                  |
| Nyamplung* (C. inophyllum)        | 22 | 462      |     |        |          |                  |
| Amount                            | 210| 8108     | 210 | 1702470| 0.0048   | 0.9952           |

*local name

Table 10. Bird Diversity of Ngurbloat Beach Based on the Simpson Index

| Name                              | ni | ni(ni-1) | N   | N(n-1) | ID       | Correction Value |
|-----------------------------------|----|----------|-----|--------|----------|------------------|
| Kutilang* (Picnonotus aurigaster) | 4  | 12       |     |        |          |                  |
| Pombo* Ducula bicolor             | 3  | 6        |     |        |          |                  |
| Fur* (Philemon subcorniculatus)   | 5  | 20       |     |        |          |                  |
| Green Parot                      | 1  | 0        |     |        |          |                  |
| Purple Perling (Apolonaris metallica) | 2 | 2       |     |        |          |                  |
| Amount                            | 15 | 40       | 15  | 585    | 0.086    | 0.914            |

*local name

Based on the Simpson Diversity Index calculation results, the index calculation results obtained for coastal vegetation with a value of 0.0048. The correction value of disturbance to coastal vegetation is 0.995. The diversity of birds occupying trees along the coast is also included as a correction factor. Birds are an indicator of the sustainability of coastal ecosystems. Based on the results of interviews with the local community, the number of birds in the tourist area of Ngurbloat Beach decreased in number when compared to previous years. During bird watching in the tourist area of Ngurbloat Beach there were 15 birds consisting of 5 species including 4 kutilang, 3 of Pombo bird, 5 of fur bird, 1 of green parrot and 2 of purple perling. Calculation of bird diversity using the Simpson Index results 0.086, the value of the correction factor for bird diversity is 0.914.

High rainfall affects the number of visitors. Based on rainfall data from BMKG for 1 year from May 2018 to May 2019 it can be seen the wet and dry months. Dry month is the month with rainfall < 60 mm. The number of dry months is 5 months while the wet months are months with rainfall > 100mm, the number of wet months is 7 months. The assessment of rainfall index is a comparison of the number of dry months to the number of wet months [6] so that a correction factor is obtained for tourism activities by 0.17. The final limiting factor is high waves. Based on wave data in last year, waves on Ngurbloat Beach occur in December to February. The correction value for the wave factor is 0.75. Overall correction values in Table 11.

Table 11. Correction Values

| Name               | Value |
|--------------------|-------|
|                    |       |

9
Correction factors will be used for beach recreational activities, swimming tours, and relaxing seating. Rainfall and waves as a swimming tourism barrier factor, while the beach recreational tourism uses only rainfall limiter factor and for relaxed seating tourism, the limiting factors used are rainfall, disruption of coastal vegetation and birds. The level of diversity of coastal vegetation and birds is used to measure disorders [3] in Table 12.

| Value Correction Factor Nilai (Cfn) | Correction Factor | Value |
|-------------------------------------|-------------------|-------|
| Cf1 Vegetation Diversity            | 0.995             |       |
| Cf2 Bird Diversity                  | 0.914             |       |
| Cf3 Rainfall                        | 0.17              |       |
| Cf4 Wave Height                     | 0.75              |       |

Table 12. Real Carrying Capacity

| Activities     | Real Carrying Capacity (RCC) (person/day) |
|----------------|------------------------------------------|
| Beach Recreation| 105                                      |
| Swimming        | 19                                       |
| Sitting relax   | 759                                      |
| Total RCC       | 883                                      |

Analysis of the physic or area carrying capacity, different from the real carrying capacity. Phase analysis of real carrying capacity have used correction factors as consideration in conducting analysis. The value of the real carrying power analysis acquired value of 105 people/day for Beach Recreation, 19 people/day for swimming, and 759 people/day for a sitting relaxes. The number of visitors indicates that the capacity of the tourists has been considering the physical and ecological factors. The research results recommended the number of visitors on the Ngurbloat beach only able to accommodate tourists for the beach recreation as much as 38,325 people, 6,935 people for swimming tours and 277,035 people for a relaxing sit tour. Restrictions on the number of visitors affecting bio-physical environmental conditions thus degrade. Setting capacity limits for sustaining tourism activity in a place involves a vision about local development and decisions about managing tourism. Tourism Carrying Capacity needs to be considered as a process within a planning process for tourism development. Planning and implementation.

Coastal tourism is considered to be one of the fastest growing areas of present-day tourism with its central attributes of sand, sea and sun. In order to create safe, stable and attractive coastal environments with clean waters and healthy coastal habitats. Ngurbloat Beach is included in mass tourism that promotes its nature, by not noticing the environment in travel planning will lead to degradation. Its importance emphasizes on sustainable tourism. Management of natural resources owned for the economic needs, social and natural aesthetics so that the cultural integrity, essential ecological processes, biological diversity and life support systems can be maintained in continuation. Tourism professionals and operators recognise that environmental quality is essential for a competitive product.

3.2.3. Effective Carrying Capacity (ECC).
Management is an important factor beside the carrying capacity and real carrying capacity areas in managing sustainable Ngurbloat Beaches. The management aspect of this study is the personnel of staff’s tourist attractions. The preservation of a tourist spot is determined by the management. The number of staff is closely related to maximum service, comfort, safety, hygiene and environmental sustainability. According to [12] this effective carrying capacity will indicate the number of tourists who can be served optimally by human resources owned by the maintainers and tourist activities undertaken by tourists not degrades the ecosystem. An area can be well managed; hence the area must have at least 26 staffs including managers [12]. The value of Capacity management is 0.27 and the total value of Real Carrying Capacity of 883 visitors per day, the value of effective carrying capacity is 238 visitors/day. Based on interviews with staff of Ngurbloat beach, visitors on national holidays, religious holidays, school holidays and events held at
Ngurbloat Beach, increasing the number of visitors are high. On the regular day, the number of visitors is less than 50 while the weekend number of visitors can reach 500 people are counted based on the number of tickets sold. There is a need to increase tourist area personnel staffs. Tourism can provide alternative employment to development scenarios that may have greater environmental impacts. Sustainable Coastal Tourism can be recognized as clean water, air, and healthy coastal eco-systems like vegetation and birds, a safe and secure recreational environment through the management of coastal hazards, such as erosion, storms and floods. The provision of adequate levels of safety for recreation, swimmers and other water users.

3.3. Tourist perceptions of the beauty and comfort of the area of Ngurbloat Beach

Based on the results of a questionnaire of 50 respondents, as many as 80 percent of respondents said the Ngurbloat Beach area was comfortable and only 20% or 10 people stated that it was uncomfortable. Whereas those who stated beauty were 90% or only 10%, namely 5 people who stated Ngurbloat Beach was not beautiful. For the value of natural comfort (Na) Ngurbloat Beach included in the category of comfortable. Existing facilities and infrastructure on Ngurbloat Beach are sufficient and provide comfort. 20% said it was uncomfortable, noise is the causes. The value of natural beauty (Ka) Ngurbloat beach in the category of beautiful, panoramic beaches and white sand gives a beautiful impression on tourists. 10% stated it was not beautiful based on the arrangement of Ngurbloat Beach which was considered not neat.

4. Conclusions

Based on the Tourism Suitability Index, Ngurbloat beach is very suitable for beach recreational activities, swimming and Sitting Relaxed. The number of tourists visit Ngurbloat Beach based on the area carrying capacity is 681 visitors/day for recreational beach, 155 visitors/day to swimming and a 4908 visitors /day for sitting relaxed. The main constrain for the real carrying capacity (RCC) is diversity of vegetation and bird. This factor reduces the area carrying capacity to 105 visitors/day for beach recreation, for swimming tours it should be limited to 19 visitors/day and a 759 visitors/day for sitting relaxed. The effective carrying capacity (ECC) was estimated to be 238 visitors/day. The number of visitors ECC less than RCC. Based on the public perception showed 80% of tourists expressed comfort and 90% of the tourists stated that Ngurbloat Beach was beautiful.

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