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Marine Tourism Suitability Index in the Padang Beach Tourism Area, West Sumatra

Ishlahul Fikri[1*], Etty Riani[2], Syahril Nedi[3]

[1] Post Graduate Student at Department, Natural Resources and Environmental Management Science, Graduate School, IPB University, Bogor, Indonesian.
[2] Department of Aquatic Resources Management, Faculty of Fisheries and Marine Science, IPB University, Bogor, Indonesian.
[3] Department of Marine Science, Faculty of Fisheries and Marine, Riau University, Pekanbaru, Indonesian.

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Corresponding Author:
Ishlahul Fikri
i.fikri2703@gmail.com

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Abstract: This research was conducted to determine the suitability of marine tourism conditions for the beach recreation category in order to ensure the sustainability of marine tourism, as Kawasan Wisata Pantai Padang is frequently visited by both domestic and international tourists. This can increase anthropogenic activities in the area and lead to a significant amount of marine debris, especially plastic waste, thus potentially compromising the aesthetic value of the tourist beach and even causing environmental pollution and negative impacts on humans. The collection of IKW data employs the purposive sampling method. The observation stations are divided into 8, each observation station consists of an area with different characteristics related to human activities such as densely populated areas, river estuaries, tourist areas, and sparsely populated areas. The determination of the suitability index for beach recreational marine tourism is carried out using a suitability matrix analysis, considering 10 parameters such as Beach Type, Substrate Material, Water Depth, Water Clarity, Current Velocity, Beach Slope, Coastal Land Cover, Hazardous Biota, and Freshwater Availability. The condition of the suitability index parameters for recreational beaches in the Padang Beach Tourism Area at stations 2, 3, 4, and 5 obtains a value of 2.56, indicating that they fall into the category of highly suitable (total score greater than 2.5). Furthermore, at stations 1 and 6, the obtained values are 2.095, classifying them as suitable (total score slightly less than 2.5), and stations 7 and 8 achieve a value of 1.89, categorizing them as not suitable (total score less than 2.0).The results indicate that overall, the Padang Beach Tourism Area falls within the category of highly suitable for beach recreational tourism and can be further developed in its management.

Keywords: Beach Recreation; Marine tourism; Padang Beach; Suitability for Tourism; Tourism Suitability Index

Introduction

Padang City is the capital and an educational hub. Additionally, the city is known for its friendly community and well-preserved cultural traditions (Kelana et al., 2019). It also serves as an icon for West Sumatra, which is a strategically located tourism region with diverse natural resources and various tourist attractions that visitors can enjoy for vacation purposes (Ashar et al., 2018). This can increase the income of the community and local government, as the tourism sector contributes 5% to the national economy (Rahma, 2020), as well as globally, and has been able to improve the quality of life of the people (Abdillah et al., 2020). There are numerous tourist beaches in Padang City, such as Air Manis Beach, Carolina Beach, Nirwana Beach, and Padang Beach (Rahman & Muktialie, 2014).

Padang Beach Tourism Area is a tourism icon of Padang City due to its highly strategic location within the city (Nurmailis & Suyuthie, 2020). This is reflected in the Mayor's Decision Number 253 of 2014 regarding Padang Beach as a Tourism Area. Padang Beach

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Tourism Area is also referred to as a culinary tourism destination beach as there are various culinary establishments along the coastline, including restaurants and various snacks that can be enjoyed while relaxing and watching the sunset (Amelia & Wardi, 2020). According to Irwandi & Putri (2022), this beach is also extensively utilized for recreational activities such as morning jogging, futsal, surfing, cycling, beach volleyball, and other sports. The Tourism Office of Padang City noted a total of 1,002,270 tourists in 2021 and 2,855,135 tourists in 2022, comprising both domestic and international visitors.

A visually appealing tourist area might not necessarily be ecologically sound and suitable; hence, it is essential to consider and evaluate various physical and biological parameters. Thus, the Tourism Suitability Index (IKW) is required as supporting data for the sustainable development of a tourist area. To assess a tourist area, the Tourism Suitability Index (IKW) evaluation is necessary (Yulianda, 2020). The IKW value is crucial for the development and management of tourist areas, as it aids in controlling, limiting management, and estimating environmental impacts to align with tourism objectives. Based on the results of field observations and literature studies, there has been no research related to tourism management strategies at Padang Beach, therefore the researchers decided to carry out this research. The research objectives are to determine the limiting factors of the tourism suitability index (IKW), calculate the tourism suitability index (IKW), and identify tourism utilization zones in the Padang Beach Tourism Area, West Sumatra.

Method

Time and Location of the Research

This research was conducted in the Padang Beach Tourism Area, West Sumatra. The research was carried out in the month of May 2023. The location map of the research can be seen in Figure 1.

Figure 1. Map of Research Locations

Tools and Materials

The tools and materials used in this research were a measuring wheel, waterpass level, Ekman grab, stopwatch, GPS, current meter, Secchi disk, and stationery.

Research Methodology

Data Sources

The data sources in this research consist of primary data and secondary data. Primary data is obtained directly at the research location through observations and interviews with tourists and relevant parties. Secondary data is collected from literature studies and relevant institutions related to the research issue.

Table 1. Matrix of the suitability index for beach tourism for the recreation category

Parameter	Weight	S1	Score	S2	Score	S3	Score	N	Score
Beach Type	0.200	White sand	3	White sand. broken coral	2	Black sand. slightly steep	1	Mud. rocky steep	0
Beach Width (m)	0.200	>15	3	10 - <15	2	3 - <10	1	<3	0
Water Base Materials	0.170	Sand	3	Sandy coral	2	Muddy sand	1	Mud. sandy mud	0
Depth (m)	0.125	0-3	3	>3 - 6	2	>6 - 10	1	>10	0
Water Clarity	0.125	>80	3	>50 - 80	2	20 - 50	1	<20	0
Current Velocity (m/dt)	0.080	0-17	3	17 - 34	2	34 - 51	1	>51	0
Beach slope (°)	0.080	<10	3	10 - 25	2	>25 - 45	1	>45	0
Coastal Land Closure	0.010	Coconut, open land	3	Shrubs. savanna	2	High thicket	1	Mangroves. settlements. harbours	0
Biota Harmful	0.005	There isn't any	3	Sea urchins	2	Sea urchins, stingrays	1	Sea urchins. stingrays. sharks	0
Freshwater Availability (km)	0.005	<0.5	3	>0.5 - 1	2	>1 - 2	1	>2	0

Method of Data Collection

Data collection in the Padang Beach Tourism Area was carried out using purposive sampling, which was divided into 8 stations. Purposive sampling is a random sampling technique that represents the research locations. Data was collected for ten parameters, including beach type, beach width, water depth, beach slope, seabed substrate, current velocity, water clarity, coastal land cover, harmful biota, and freshwater availability.

Beach Type

Beach type measurement was conducted through direct visual observations, observing the type and color of sand (Renjaan & Susanty, 2020), and then classified according to categories (Yulianda, 2020).

Beach Width

Beach width measurement was carried out using a measuring wheel, with the distance between the lowest tide boundary and the furthest land-based vegetation at the research station (Chasanah et al., 2017).

Seabed Substrate

Seabed substrate measurement was conducted by taking samples using an Ekman grab, followed by visual observations at the research station (Rifardi, 2010).

Water Depth (m)

Water depth measurement was carried out using a measuring rod and a measuring wheel, where the value indicated on the scale pole represented the water depth at the research station (Sari et al., 2022).

Water Clarity (m)

Water clarity measurement was conducted using a Secchi disk attached to a line, which was slowly lowered into the water at the research station. Sampling was done at a distance of 10 meters from the shoreline during high tide data collection. The visible and disappearance depths of the Secchi disk were recorded, and water clarity was calculated (Chasanah et al., 2017). Water clarity is calculated using the equation 1.

$$K = \frac{di + d2}{2} \quad (1)$$

Description:
K = Water Clarity
d1 = Visible Secchi Disk Depth
d2 = Secchi Disk Depth

Current Velocity (cm/sec)

Current velocity measurements were conducted using a current meter at a distance of 2 meters, while the time taken was measured using a stopwatch. The sampling distance was set at 10 meters from the shoreline during high tide data collection (Rifardi et al., 2020). Current velocity was calculated using the equation 2.

$$v = \frac{s}{t} \quad (2)$$

Description:
V=Velocity (m/s)
s = Distance (m)
t = Time (s)

Beach Slope

Beach slope measurement was performed using a waterpass level, which was accurately positioned at the uppermost shoreline boundary. Once the horizontal position was ensured, calculations were then conducted (Pamungkas et al., 2021).

Land Cover

Land cover was assessed through visual observations of the surrounding areas near the beach (Yulianda, 2007).

Harmful Biota

Observations of harmful biota were conducted through direct field observations using basic scuba diving equipment (ADS) with a distance of approximately ±20 meters to the left and right at each station (Budiasti et al., 2022).

Freshwater Availability (km)

The measurement of freshwater availability was conducted using GPS by recording the coordinates of the nearest freshwater source location to the beach and the coordinates of the research stations. The distance between the stations and the freshwater source was calculated using the Google Earth Pro application (Nugroho et al., 2022).

Data Analysis

Beach Tourism Suitability Analysis

The suitability analysis conducted in this research solely focuses on the beach recreational tourism category, examining ten parameters including beach type, beach width, water depth, beach slope, seabed substrate, current velocity, water clarity, coastal land cover, harmful biota, and freshwater availability, as presented in Table 1, referring to the suitability matrix (Yulianda, 2020). This matrix serves to determine

suitability indicators through weighting and scoring. Weighting for each parameter is based on its dominant influence on the beach tourism area (Fauzi et al., 2020). Scoring is assigned to assess various constraining factors for a suitability evaluation. According to (Yulianda, 2020). The equation 3, used for the IKW value is as follows:

$$IKW = \sum_{i=1}^{n} (Bi \times Si) \quad (3)$$

Description:
IKW : Tourism Suitability Index
n : number of suitability parameters
Bi : weight of the i-th parameter
Si : score of the i-th parameter

Subsequently, the IKW values are categorized into four suitability classes: Highly suitable for IKW ≥ 2.5, Suitable for 2.0 ≤ IKW < 2.5, Not suitable for 1 ≤ IKW < 2.0, and highly unsuitable for IKW < 1. The parameters of the tourism suitability index (IKW) for the beach recreation category can be seen in Table 1.

Determination of Observation Stations

Each observation station consists of an area with distinct characteristics related to human activities, such as densely populated areas, river estuaries, tourist zones, and sparsely populated regions (Nedi & Mulyadi, 2022). Station demarcations were established through GPS-coordinated data collection.

Result and Discussion

The tourism suitability index is a scientific method that indicates the value of suitability or feasibility of a certain area as a tourism object, enabling controlled or restricted management in its development to align with tourism objectives (Shokri & Mohammadi, 2021). The calculation of the beach recreation category suitability index refers to Yulianda (2020) encompassing 10 parameters as constraining factors for beach recreational tourism suitability. These parameters include beach type, beach width, water depth, seabed substrate, current velocity, water clarity, beach slope, coastal land cover, harmful biota, and freshwater availability. The measurement results for each parameter are as follows:

Beach Type

Based on direct visual field observations, the obtained beach type results are presented in Table 2. The beach type observations at all stations indicated a sandy brown type with a score of 2, falling within the suitability category appropriate for beach recreational activities. When comparing the beach type in the Padang Beach Tourism Area to other beaches in Indonesia, such as Pantai Indah Segang Laut on Singkep Island (Domo et al., 2017) and on an international level, beaches in Taiwan (Tsai et al., 2021) they all fall within the highly suitable category due to their white sandy beaches. However, there are also beach types categorized as S3 (not suitable), such as Pantai Jodo in Batang Regency (Chasanah et al., 2017). Therefore, the Padang Beach Tourism Area is more suitable compared to the type of Pantai Jodo, as the type and color of the beach sand contribute to its aesthetic value for tourists (Prihadi et al., 2024).

Table 2. Observation Results for Beach Types

Stations	Beach Type	Score	Category
1	Brown sandy ramps	2	Suitable
2	Flat brown sand	2	Suitable
3	Flat brown sand	2	Suitable
4	Flat brown sand	2	Suitable
5	Flat brown sand	2	Suitable
6	Brown sandy ramps	2	Suitable
7	Brown sandy ramps	2	Suitable
8	Brown sandy ramps	2	Suitable

Beach Width

Based on the direct field analysis, the results of the calculation of beach width, n, at each station are provided in Table 3. The beach width calculations at each station revealed that the beach width at stations 1 to 6 ranged from 19.43 to 36.95 meters, with each station scoring 3. This indicates that the beach width at these stations falls within the highly suitable category for beach recreational tourism. Meanwhile, at stations 7 and 8, the beach width was measured at 11.02 meters and 9.37 meters respectively, with each station scoring 2. This signifies that the beach width at these stations is in the suitable category for beach recreational tourism. The beach width in the Padang Beach Tourism Area is relatively wide when compared to other beaches in Indonesia, such as southern region of West Java province, which has an average beach width of only 11.6 meters (Rizal et al., 2020) and Pantai Ungapan in Malang Regency with a width of 18 meters (Insani et al., 2019).

Table 3. Beach Width Measurement Results

Stations	Beach Width (m)	Score	Category
1	19.43	3	Perfect fit
2	36.07	3	Perfect fit
3	33.52	3	Perfect fit
4	36.95	3	Perfect fit
5	31.39	3	Perfect fit
6	15.34	3	Perfect fit
7	11.02	2	Suitable
8	9.37	2	Suitable

Seabed Substrate

Based on direct visual field observations, the results of observations regarding the seabed substrate at each station are presented in Table 4. The observations of seabed substrate at each station indicated that at stations 1 and 6, the seabed substrate consists of sandy mud, with a score of 1. At stations 6 and 7, it comprises sandy coral, while at stations 2, 3, 4, and 5, it is composed of sand. Sandy substrate, whether black, grey, or white sand, is suitable for supporting beach tourism activities (Koroy et al., 2017).

Table 4. Observation Results of Water Base Materials

Stations	Basic Materials	Score	Category
1	Sandy mud	1	Suitable
2	Sand	3	Suitable
3	Sand	3	Perfect fit
4	Sand	3	Perfect fit
5	Sand	3	Perfect fit
6	Sandy mud	1	Suitable
7	Sandy coral	2	Suitable
8	Sandy coral	2	Suitable

Water Depth

Based on direct field calculations, the results of water depth calculations were obtained for each station, as shown in Table 5. The water depth calculations at each station revealed that the water depth at stations 1 to 6 ranged from 2 to 3 meters, indicating that the water depth at each of these stations is relatively shallow and falls within the highly suitable category. On the other hand, at stations 7 and 8, with depths of 3.2 to 3.3 meters, the water depth falls within the moderate range and is categorized as suitable. According to Fikri et al. (2023), water depth is a crucial parameter to consider when designating an area as a beach tourism destination, especially for swimming and bathing activities, as it significantly impacts the safety of tourists. This is because water depth greatly influences current conditions, wave patterns, and sediment transport in the water (Suteja et al., 2021).

Table 5. Results of Water Depth Measurements

Stations	Water Depth (m)	Score	Category
1	2	3	Perfect fit
2	2.4	3	Perfect fit
3	2.7	3	Perfect fit
4	3	3	Perfect fit
5	2.9	3	Perfect fit
6	2.4	3	Perfect fit
7	3.3	2	Suitable
8	3.2	2	Suitable

Water Clarity

Based on direct field calculations, the water clarity values were obtained for each station, as shown in Table 6. The water clarity calculations at each station revealed that water clarity at stations 2, 3, 4, 5, 7, and 8 was 100%, corresponding to a score of 3, indicating that water clarity at these stations falls within the highly suitable category. Meanwhile, at stations 1 and 6, the water clarity was measured at 67%, indicating a suitability level in line with the category. Yudhistira et al. (2021) explained that optimal water clarity for beach tourism is > 80%.

Table 6. Water Brightness Measurement Results

Stations	Water Brightness (%)	Score	Category
1	67	2	Suitable
2	100	3	Perfect fit
3	100	3	Perfect fit
4	100	3	Perfect fit
5	100	3	Perfect fit
6	67	2	Suitable
7	100	3	Perfect fit
8	100	3	Perfect fit

Current Velocity

Based on direct field measurements, the results of the current velocity calculation at each station are presented in Table 7. The current velocity calculations at each station revealed current velocities of 1.5 - 2.2 m/s across all stations, with a score of 0. This value exceeds 0.5 m, indicating that the current velocity at all stations falls within the highly unsuitable category and has the potential to endanger tourists.

Beach Slope

Based on direct field measurements, the results of the beach slope calculation at each station are shown in Table 8. The beach slope calculations at each station revealed that the beach slope at stations 1-6 ranges from 7.6° to 8.9°, with each station scoring 3. This indicates that the beach slope at each station falls within the highly suitable category for beach recreational tourism. However, at station 7 with a value of 30.3° and station 8 with a value of 29.7°, the beach slope falls into the not

suitable category. Beach slopes that are highly suitable are within the range of <10° (Yulianda, 2020).

Table 7. Current Velocity Measurement Results

Stations	Current Velocity (m/s)	Score	Category
1	1.5	0	Very Inappropriate
2	1.8	0	Very Inappropriate
3	2.2	0	Very Inappropriate
4	2.1	0	Very Inappropriate
5	2.1	0	Very Inappropriate
6	1.6	0	Very Inappropriate
7	2.2	0	Very Inappropriate
8	2.2	0	Very Inappropriate

Table 8. Result of Coastal Slope Measurement

Stations	Coastal Slope (°)	Score	Category
1	8.4 (declivous)	3	Perfect fit
2	7.8 (Flat)	3	Perfect fit
3	7.6 (Flat)	3	Perfect fit
4	6.8 (Flat)	3	Perfect fit
5	7.6 (Flat)	3	Perfect fit
6	8.9 (declivous)	3	Perfect fit
7	30.3 (A little steep)	1	Not in accordance
8	29.7 (A little steep)	1	Not in accordance

Coastal Land Cover

Based on direct visual observations in the field, the results of observations regarding coastal land cover at each station are presented in Table 9. The observations of coastal land cover at each station revealed that coastal land cover was present at all stations with a score of 3, indicating that coastal land cover at each station falls within the highly suitable category. The most suitable coastal land cover for beach recreational activities is coconut trees and open land (Yulianda, 2020).

Table 9. Results of Coastal Land Cover Measurements

Stations	Coastal Land Cover	Score	Category
1	Open land. Trees	3	Perfect fit
2	Open Land. Bush	3	Perfect fit
3	Open land. Trees	3	Perfect fit
4	Open land. Trees	3	Perfect fit
5	Open land. Trees	3	Perfect fit
6	Open land. Trees	3	Perfect fit
7	Trees. shrubs	3	Perfect fit
8	Trees. shrubs	3	Perfect fit

Harmful Biota

Based on direct visual observations in the field, the results of observations of harmful biota at each station are presented in Table 10. The observations of harmful biota at each station indicated the absence of harmful biota at stations 1-6, indicating a score of 3 in the highly suitable category for harmful biota in those stations. However, at stations 7 and 8, harmful biota were found, including sea urchins and jellyfish, revealing a score of 1 in the not suitable category for harmful biota at these stations. Therefore, in the Padang Beach Tourism Area, stations 1-6 are classified as highly suitable. This result aligns with the perspective presented by (Yulianda, 2020) stating that the absence of harmful biota represents the highest suitability for beach recreational tourism, as the presence of harmful biota can jeopardize the safety of visiting tourists (Nedi et al., 2023).

Table 10. Observation of Dangerous Biota

Stations	Hazardous Biota	Score	Category
1	There isn't any	3	Perfect fit
2	There isn't any	3	Perfect fit
3	There isn't any	3	Perfect fit
4	There isn't any	3	Perfect fit
5	There isn't any	3	Perfect fit
6	There isn't any	3	Perfect fit
7	Jellyfish	1	Not in accordance
8	Jellyfish	1	Not in accordance

Table 11. Results of Measurement of Fresh Water Availability Distance

Stations	Availability of Fresh Water (km)	Score	Category
1	0.09	3	Perfect fit
2	0.06	3	Perfect fit
3	0.05	3	Perfect fit
4	0.05	3	Perfect fit
5	0.04	3	Perfect fit
6	0.02	3	Perfect fit
7	0.6	2	Suitable
8	0.5	2	Suitable

Availability of Freshwater

Based on the calculation results, measurements of the distance to freshwater availability were obtained for each station, as shown in Table 11. The calculation results for freshwater availability at stations 1-6 revealed distances ranging from 0.02 to 0.09 km, indicating that the distance to freshwater availability for each station falls within the highly suitable category. Meanwhile, station 7 is situated at a distance of 0.6 km and station 8 at a distance of 0.5 km, both falling into the suitable suitability category. However, overall, the availability of clean, adequately close, and easily accessible freshwater is evident. Optimal freshwater availability significantly influences visitors in the coastal tourism area (Ikhwani et al., 2023).

Tourism Suitability Index (IKW)

The results of the calculation of the suitability index for beach recreation category (IKW) at each observation station in the Padang Beach Tourism Area

can be seen in Table 12 and Table 13. Based on the calculation results of the 10 parameters for suitability of beach recreation category, the suitability index values for the Padang Beach Tourism Area at stations 1 and 6 are 2.095, indicating inclusion in the suitable category (total score less than 2.5); stations 2, 3, 4, and 5 have a value of 2.56, indicating inclusion in the highly suitable category (total score greater than 2.5); and stations 7 and 8 have a value of 1.89, indicating inclusion in the not suitable category (total score less than 2.0). These results have significant implications for sustainable coastal tourism, such as environmental cleanliness, which can damage the aesthetic value of the beach due to the abundance of marine debris originating from river estuaries and ocean waves (Fikri et al., 2022; Riani & Cordova, 2022). However, economic advancement is also necessary to enhance the quality of tourism attractions, activities, and the environment (Adrianto et al., 2021). Sustainable tourism can be observed through seven key indicators: job creation, business continuity, quality of life, water quality, waste management, energy conservation, and community integrity maintenance (Nesticò & Maselli, 2020). These indicators are categorized into four dimensions: economic, social, environmental, and cultural (Kurniawan et al., 2019).

Table 12. Tourism Conformity Index Matrix for the Beach Recreation Category

Parameter	Weight	Station 1	Score	Station 2	Score	Station 3	Score	Station 4	Score
Beach Type	0.200	Brownish white sandy slopes	2	Flat brownish white sand	2	Flat brownish white sand	2	Flat brownish white sand	2
Beach Width (m)	0.200	19.43	3	36.07	3	33.52	3	36.95	3
Water Base Materials	0.170	Mud sandy	1	Sand	3	Sand	3	Sand	3
Depth (m)	0.125	2	3	2,4	3	2.7	3	3	3
Water Brightness (%)	0.125	67	2	100	3	100	3	100	3
Current Velocity (m/dt)	0.080	1.5	0	1.8	0	2.2	0	2.1	0
Coastal Slope (°)	0.080	8.4 (declivous)	3	7.8 (flat)	3	7.6 (flat)	3	6.8 (flat)	3
Coastal Land Closure	0.010	Open land. Trees	3	Open Land. Bush	3	Open land. Trees	3	Open land. Trees	3
Hazardous Biota	0.005	There isn't any	3	There isn't any	3	There isn't any	3	There isn't any	3
Availability of Fresh Water (km)	0.005	0.09	3	0.06	3	0.05	3	0.05	3
Total Score			2.095		2.56		2.56		2.56
Conformity Category			In accordance		Perfect fit		Perfect fit		Perfect fit

Tabel 13. Tourism Conformity Index Matrix for the Beach Recreation Category

Parameter	Weight	Station 5	Score	Station 6	Score	Station 7	Score	Station 8	Score
Beach Type	0.200	Flat brownish white sand	2	Brownish white sandy slopes	2	Brownish white sandy slopes	2	Brownish white sandy slopes	2
Beach Width (m)	0.200	31.39	3	15.34	3	11.02	2	9.37	2
Water Base Materials	0.170	Sand	3	Mud sandy	1	Sandy Coral	2	Sandy Coral	2
Depth (m)	0.125	2.9	3	2.4	3	3.3	2	3.2	2
Water Brightness (%)	0.125	100	3	67	2	100	3	100	3
Current Velocity (m/dt)	0.080	2.1	0	1.6	0	2.3	0	2.3	0
Coastal Slope (°)	0.080	7.6 (flat)	3	8.9 (declivous)	3	30.3 (A little steep)	1	29.7 (A little steep)	1
Coastal Land Closure	0.010	Open	3	Open	3	Trees. shrubs	3	Trees.	3

Parameter	Weight	Station 5	Score	Station 6	Score	Station 7	Score	Station 8	Score
Hazardous Biota	0.005	land. Trees There isn't any	3	Land. Bush There isn't any	3	Sea urchins. Jellyfish	1	shrubs Sea urchins. Jellyfish	1
Availability of Fresh Water (km)	0.005	0.04	3	0.02	3	0.6	2	0.5	2
Total Score			2.56		2.095		1.89		1.89
Conformity Category			Perfect fit		In accordance		Not in accordance		Not in accordance

Table 14. Number of Domestic and International Tourists in Padang City year 2011-2021

Years	Domestic Travelers	International Tourists	Number of tourists
2011	2.252.336	47.609	2.229.945
2012	2.965.807	139.119	3.104.926
2013	3.001.306	53.057	3.054.363
2014	3.199.392	54.967	3.254.359
2015	3.298.454	57.318	3.355.772
2016	3.632.820	58.903	3.691.723
2017	4.368.375	67.286	4.435.661
2018	5.076.581	71.054	5.147.635
2019	5.384.236	88.351	5.472.587
2020	2.562.966	21.660	2.584.626
2021	1.000.732	1.538	1.002.270

The number of both domestic and international tourists visiting the city of Padang continues to increase each year. Table 14 also demonstrates the growth in the number of tourists from 2011 to 2019; however, due to the Covid-19 pandemic, visitor numbers declined throughout the years 2020 and 2021. Given the substantial influx of tourists, it is evident that this underscores the significant contribution of tourism to the economic growth of Padang City.

Table 15. Total PAD of the Padang City Tourism Sector in 2016-2019

Years	Total PAD
2016	Rp. 57.000.000.000
2017	Rp. 74.005.495.031
2018	Rp. 90.132.462.479
2019	Rp. 104.989.824.498

The total Regional Original Revenue (PAD) of Padang City has experienced a significant annual increase in the field of tourism. In Table 15, the increase in total PAD from the years 2016-2019 can be observed (Zumaida et al., 2022). According to Ma et al. (2018) there exists a correlation between economic growth in several countries and the expansion and enhancement of the tourism sector in those regions.

Conclusion

Based on this research, it is known that the condition of the suitability index parameters for coastal tourism in the beach recreation category at all stations in the Padang Beach Tourism Area, out of 8 stations, there are 4 stations (stations 2, 3, 4, 5) categorized as highly suitable. There are 2 stations (stations 1 and 6) categorized as suitable due to their proximity to river estuaries, while the other 2 stations (stations 7 and 8) are categorized as not suitable as they are situated in areas that are not yet managed and have relatively difficult access. Overall, the Value of Coastal Tourism Area IKW Padang Beach is highly appropriate. This can be observed from the continuously increasing number of tourists in the Padang Beach Tourism Area every year, except during the Covid-19 period. Additionally, the Regional Revenue from the tourism sector in the city of Padang has also been rising annually. However, environmental management needs to be considered due to the increased number of visitors that will escalate anthropogenic activities, potentially leading to a substantial generation of plastic waste. This waste could disrupt the aesthetic value of the tourist beach area, and plastics might even degrade into microplastics, posing significant risks to the environment and human health.

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The authors declare no conflict of interest.

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