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A critical approach to Canakkale urban beaches: from the perspective of swimming water and landscape potential

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Abstract

Coasts are external spaces found in settlements in rural and urban areas around the world. The reduction in area per person with increasing population has made planning for use of these areas a sensitive topic. The potential for swimming and landscaping especially bring a significant dimension to coastal planning. The lack of research about this topic in the Çanakkale urban area means this study will both illuminate the vision for this concept in the city and similar studies, and results will contribute to the literature. The study investigated the use of beaches in the city in line with swimming water quality and landscape design and planning principles. Results obtained through statistical analysis (SPSS 15.0) of user trends determined with the conditional valuation method researched beaches in proximity to the urban texture of Çanakkale within the scope of swimming water and landscape principles and elements. The swimming water quality characteristics of these beaches were identified to be at very good and good levels. Within the scope of landscape design elements and planning principles, it was found that recreational facilities were insufficient and need to be developed. Within the scope of the conditional valuation method, linked to the provision of the determined criteria, the conceptualized beach model was predicted to have seasonal (July–August) income of nearly 2,000,000 TRY based on the desire to pay among users. This is significant in terms of making operations sustainable. Additionally, analysis results found the correlation between user desire to pay with beach criteria was significant, with high levels of correlation for the parameters of "shading and seating groups, care and maintenance, accessibility and planting". In conclusion, it is emphasized that preserving the quality of swimming water at these beaches, making them sustainable, and optimizing beaches with landscaping components will increase public health and quality of life.

Keywords Beach criteria · Landscape opportunities · Swimming water quality · Sustainability · Çanakkale · Turkey

Introduction

Environmental assets or services have a dynamic structure acting as beneficial elements without a market. The intensity of the benefit from the element may vary according to the satisfaction the individual feels (Alkan and Uslu 2016). The dimension of this intensity may be revealed to have economic value with some methods. One of these methods is the "conditional valuation method". The conditional valuation method may be defined as the benefit/satisfaction rates and the economic valuation based on the individual's willingness to pay for environmental assets (like residences, forest, rivers, seas, lakes, views) with heterogeneous qualities. In this study, environmental qualities directly affecting the use of beaches which can be optimized (like quality of swimming water and beach sand, artificial and natural landscape equipment, maintenance-care) were presented as a scenario/simulation with the conditional valuation method (Altunkasa and Uslu 2004).

Considering that structures develop intensely and without control linked to population, it appears unavoidable that beaches in Çanakkale will be threatened in the near future due to exposure to pollution and maintenance/care problems, commonly seen in beaches in cities with similar texture (Kelkit 2003; De Oliveira et al. 2016; Poeta et al. 2016). As a result, a price will be determined by clarifying the willingness, or ability to pay, linked to the satisfaction levels of individuals after sustainable planning incorporating environmental cleaning, sterile conditions, and care and

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maintenance facilities (Rangel-Buitrago et al. 2019). Within the scope of this or similar approaches or assumptions, the conditional valuation method is important in revealing the market value of environmental assets or services. A survey application was used to access data in the market environment of the scenario/simulation. Just as in many scientific studies with similar structure (Tsilimigkas et al. 2020, 2018; Tsilimigkas and Rempis 2018), this study aimed to reveal the price individuals are willing to pay in the market environment for satisfaction obtained if the swimming water quality, care and maintenance, security and artificial and natural landscaping characteristics were enhanced according to regulations and standards (Anonymous 2018a, b; 2019a; b). The economic value obtained from the survey application for beach use planned according to standards can be used to determine the annual economic valuation and ensure sustainability of the area providing significant unearned value. The necessity for the study is revealed in this way.

Additionally, the survey data were analyzed with the SPSS 15.0 statistical program and the regression model created with linear regression analysis was assessed. The significance and correlation levels between parameters which emerged between users' willingness to pay and beach planning in the survey results are discussed (Leone and Zoppi 2019). The Blue Flag criteria were taken as the basis to determine parameters. Blue Flag is an eco-labeling identity program maintained by the international Foundation for Environment Education with non-governmental organization status. Focusing on ensuring sustainable development of freshwater and sea areas, it targets environmental education and management, security and high standards (Anonymous 2018b). Coastlines have always been important for humanity in terms of elements like settlements, trade, agriculture, hunting, sports, views and nature (McNamara et al. 2020; Kelly 2020). This study reveals the need to consider the use of coastlines, which are important and functional from this aspect, in terms of potential uses of coastline/beach areas, quality of sea water and beach sand, stony features, waste management, and recreation dimensions (Morgan 1999). Within this scope, the current use criteria for 6 beach areas located in Çanakkale urban area were revealed and it was emphasized that undertaking the optimized approaches is unavoidable (Alkan and Uzun 2016).

Materials and method

The research area was determined as 6 important beach areas located in the urban center and intensely used by Çanakkale residents. The names and geographic locations of these beaches are: Municipal Public Beach in front of Mega Beach (40°8′25.92"N- 26°24′0.76"E); New Shoreline Dabakoglu Beach (40°7′53.85"N- 26°24′22.43"E); Kepez Public Beach (40°6′12.48"N- 26°22′13.57"E); Dardanos Beach (40°5′6.10"N- 26°21′56.31"E); Güzelyalı Municipal Public Beach (40°2′16.39"N- 26°20′18.98"E); and İntepe Youth Camp (40°2′13.22"N- 26°20′18.35"E) (Fig. 1).

Users at these beaches were randomly met face-to-face and the conditional valuation method survey was applied to 50 users for each beach for a total of 300 users. The survey determined regulations and Blue Flag beach criteria as main headings based on literature scan and determined user perceptions according to the ***subheadings/parameters*** of A-environmental education and information (A1: information panels, A2: swimming water quality, A3: Blue Flag panel); B-swimming water quality (B1: industrial and sewage wastes, B2: microbiological parameters, B3: physical and chemical parameters); C-environmental management (C1: local and beach administration, C2: planning of beach area use, C3: visual pollution and waste containers, C4:



Fig. 1 Geographical location of the study area and Çanakkale urban area (Anonymous 2019b)

health equipment (WC, handbasins, first aid), C5: care and maintenance, C6: sustainable transport vehicles); D-safety and services (D1: life guards, D2: animal safety, D3: drinking water, D4: disabled equipment (ramp, elevator, health equipment)); and E-landscaping equipment (E1: sport activities, E2: planting, E3: children's playground, E4: shading and seating groups) with importance assessed according to percentage valuations.

The survey study aiming to determine the economic value of beach use identified the maximum amounts users were willing to pay if the beaches had beach criteria at full potential for all parameters and also identified the minimum amounts in the inverse situation in the absence of these criteria. For this, based on the scenario that the parameters determined within the scope of swimming water and landscape equipment in beach structure and Blue Flag criteria were all present in the beach area, the economic value users were willing to pay monthly for 3 individuals was calculated, with mean household size in Çanakkale taken as reference (2016 mean household numbers 2.7 individuals) (Anonymous 2017). The economic values for all parameters were revealed based on price differences and percentage importance levels. Later, the SPSS 15.0 statistical analysis program was used to assess minimum and maximum mean prices as dependent variable with all other parameters as independent variables to reveal the effect/correlation levels between variables and significance levels. The socioeconomic and demographic data for individuals who completed the survey were included in the study.

Results

The present swimming water and physical planning of the beach areas offering the opportunity for swimming, sunbathing and recreational activities to the public in Çanakkale were identified with literature research. According to swimming water quality criteria, the bacteriological parameters of indicator fecal coliform and fecal streptococci bacterial species should be 0–100 cfu in 100 mL water for swimming water to reach the desired standard (Good) (Table 1) (Anonymous 2019b).

As understood from Table 2, the beaches with longest and shortest coastal length were İntepe Youth Camp and Güzelyalı Municipal Public Beach, in terms of the technical features of city beaches. In terms of user potential, the top three were Municipal Public Beach in front of Mega Beach, İntepe Youth Camp and Güzelyalı Municipal Public Beach (Table 2).

For Blue Flag beach criteria, swimming water quality was examined in terms of analysis results for the previous 4 years. Accordingly, the quality levels are classified as follows: A-very clean/high quality; B-good quality, swimmable; and C-beach must not be used for swimming. The swimming water analysis results for 2019 for the 5th, 6th, 7th, 8th and 9th months for beach areas in the city center are shown in Table 3, with Kepez Municipal Public Beach and Dardanos Beach notable for "GOOD" classification. The measurement classes for the other beaches were all the same at "MODERATE" levels (Anonymous 2019b).

Table 1 Quality criteria for coastal and passing water

Quality criteria required for swimming and recreation in coastal and transit waters		
Classification	Fecal coliform/ Escherichia coli	Fecal streptococci/ Intestinal enterococci
	cfu/100 ml	cfu/100 ml
Good	≤ 100	≤ 100
Medium	> 100 and < 1000	> 100 and < 370
Bad	≥ 1000	≥ 370
cfu: colony forming unit		

According to 2019 data, Çanakkale was identified to have 13 Blue Flag beaches, with Kepez Public Beach, Güzelyalı Municipal Public Beach, New Shoreline Dabakoğlu Beach and Municipal Public Beach in front of Mega Beach gaining Blue Flag awards in 2019 (Anonymous 2019c). It is notable that all beaches in the study had insufficient lighted/unlighted panels about health, safety, ads and promotion, lack of lifeguard stations with towers and equipment, and an absence of features and uses like wooden piers for disabled use, cement platforms, beach sports, water sports, showers, changing rooms, sea elevator, disabled chaise longue and umbrellas, floating chaise longue and access to the sea for the visually disabled within the scope of Blue Flag criteria. This indicates the potential for development of all beaches (Fig. 2).

Linked to on-site observations and investigations, care, repair and environmental cleaning of beach areas were not at sufficient levels. There were insufficient amounts of shading and seating groups, water sources and waste containers for different waste types within the scope of landscaping/recreational equipment (Fig. 3).

Within the scope of the conditional valuation method based on the survey; in the simulated market environment, the maximum prices that users were willing to pay for benefits that would be obtained if the beaches had all parameters A1, A2, A3, B1, B2, B3, C2, C3, C4, C5, C6, D1, D2, D3, D4, E1, E2, E3, and E4 based on environmental education and information, swimming water quality, environmental management, safety and services, and landscaping (mentioned in the material and method section) were identified. This procedure also determined the minimum pricing for beaches without these parameters. Pricing determination was based on volunteer participation.

Table 2 Technical features of Çanakkale beaches within the research area

Technical features of Canakkale city beaches (Anonymous 2018b, 2019b)						
TECHNICAL INFORMATION	A	B	C	D	E	F
Disabled—WC—ramp—handrail	Existent	Existent	Existent	Existent	Existent	Existent
Marine Ground Structure	Sand	Sand	Sand	Sand	Sand	Sand
Beach Ground Structure	Sand	Sand	Sand	Sand	Sand	Sand
Maximum Number of Swimmers	500	85	50	70	150	200
Beach Width	10 m	25 m	25 m	25 m	50 m	25 m
Beach Length	400 m	1800 m	1000 m	1500 m	150 m	2000 m
Maximum Depth in Safety Strip	1.7 m	2 m	2 m	2 m	1.7 m	2 m
A. Mega Beach Front Municipal Public Beach—B. New Shoreline Dabakoğlu Beach—C. Kepez Public Beach						
D. Dardanos Beach—E. Güzelyalı Municipal Public Beach—F. İntepe Youth Camp						

Table 3 Swimming water quality values for Çanakkale beaches within the research area

2019 Canakkale city beaches quality class					
A	B	C	D	E	F
MODERATE	MODERATE	GOOD	GOOD	MODERATE	MODERATE
A. Mega Beach Front Municipal Public Beach—B. New Shoreline Dabakoğlu Beach—C. Kepez Public Beach.-					
D. Dardanos Beach—E. Güzelyalı Municipal Public Beach—F. İntepe Youth Camp					



Fig. 2 İntepe Youth Camp (I1,2); Dardanos Beach (D1,2) Kepez Public Beach (K1) (Anonymous 2019b)



Fig. 3 New Shoreline Dabakoğlu Beach (Db1, 2); Municipal Public Beach in Front of Mega Beach (M1, 2); Güzelyalı Municipal Public Beach (G1) (Anonymous 2019b)

Based on the difference between the two prices, the economic value of each parameter was identified according to the percentage importance levels stated by users. When obtaining prices, monthly assessment was performed for 3 people based on mean household numbers. As a result, according to Fig. 4, the economic value that a mean 3-person family was willing to pay per month if all parameters were provided on the beaches was calculated as 1000 TRY (Anonymous 2017). For the 6 beaches, mean maximum number of swimmers was 176 (Anonymous 2019b; Table 5). Here, if daily mean 100 people used the beaches, with 3000 people monthly, the operator should plan to gain 1,000,000 TRY/month income. In situations with seasonal conditions lasting at least 2 months, this income will double (Fig. 4).

The socioeconomic and demographic structure of users who completed the survey, within the scope of the conditional valuation method, are given in Fig. 5. In terms of socioeconomic status, individuals had income between 3000–5000 TRY. Most were married. At the same time, the

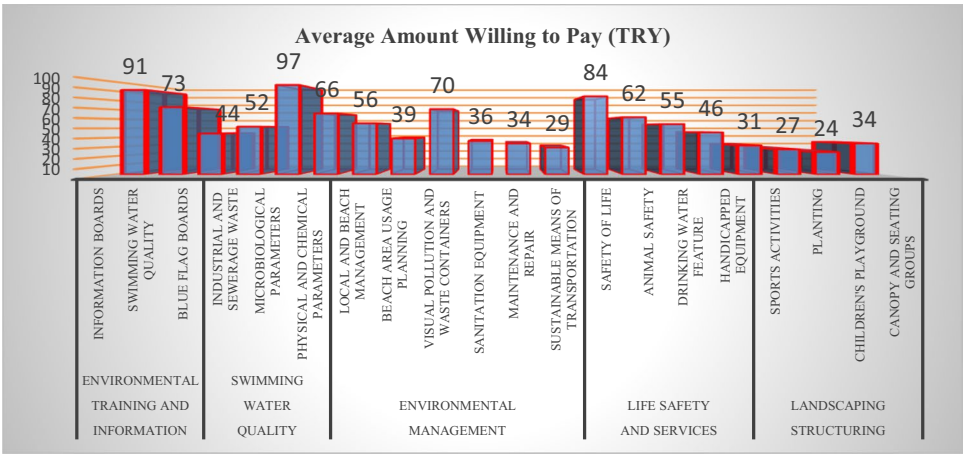


Fig. 4 The amount users were willing to pay in the event of Blue Flag beach criteria being met by beaches in Canakkale

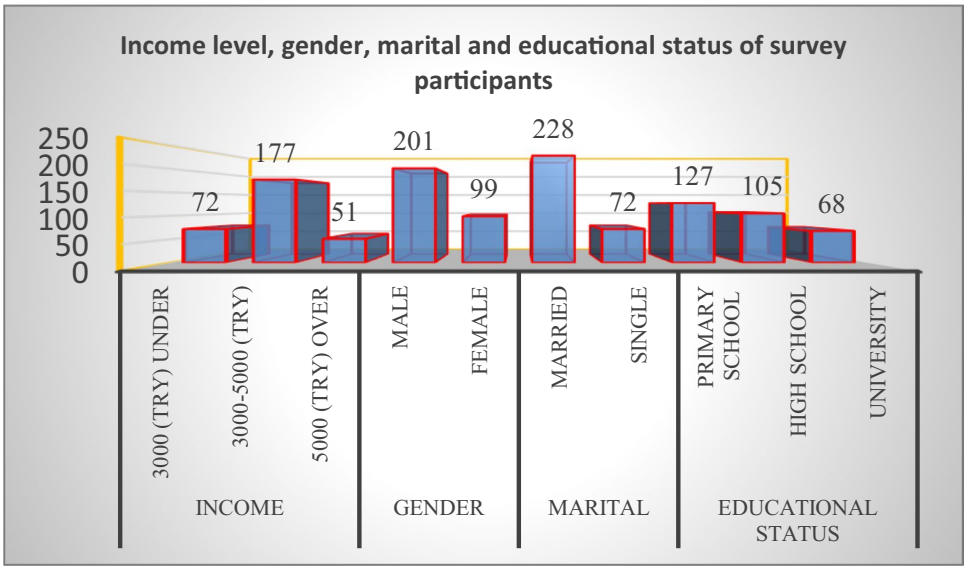


Fig. 5 Distribution of gender, marital status, education and income level for survey participants

educational level of individuals participating in the survey was primary school graduate (Fig. 5).

Linear regression analysis with the SPSS 15.0 statistical program for data obtained from the survey took the mean minimum and maximum price chosen by users as dependent variables, with the beach criteria as independent variables. The coefficients for the regression model created with this analysis, VIF values and significant relationships between fixed numbers in the model and coefficients are given in Table 4. Accordingly, in the mathematical regression model, the coefficient for E1 "sport activities" was negative and may be associated with being distant from the main theme of the beaches, disturbing beachgoers and being problematic for children. Based on the assumption that the E3 "children's playground" parameter may negatively affect beach routines, no significant correlation was identified with the dependent variable. All other independent variables were found to have significant correlations with the dependent variable. The correlation levels may be listed from highest to lowest as E4-C5-C6-E2-D1-D2. From the model, in general users were willing to pay for monthly use of beaches which were at or below the Blue Flag standard. The mean amounts users were willing to pay linked to benefits was the dependent variable, while the parameters in order to reach the standards were independent variables. Tower planning on the beach (C2) was not significantly associated with beach standards. This situation may be due to the beach areas not being very big (Table 4). The correlation intensity from large to small was in the order: E4 (1.130), C5 (0.829), C6 (0.726), E2 (0.671), D1 (0.569), D2 (0.563), B1 (0.499), C3 (0.454), A2 (0.453), A3 (0.452), A1 (0.410).

In the multiple regression model, a strong correlation was observed between the dependent and independent variables. Additionally, the variance inflation factor (VIF) was below 3, showing there was no multicollinearity between the estimated variables. All independent variables included

Table 4 Economic value which participants are willing to pay monthly if all beach criteria are met

Model		Coefficients(a)											
		Unstandardized Coefficients		Standardized Coefficients	t	Sig	95% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF	B	Std. Error
1	(Constant)	323.510	17.074		18.947	0.000	289.900	357.121					
	A1	0.410	0.071	0.227	5.750	0.000	0.269	0.550	0.257	0.326	0.172	0.577	1.734
	A2	0.453	0.099	0.202	4.585	0.000	0.259	0.648	0.192	0.265	0.138	0.465	2.149
	A3	0.452	0.097	0.164	4.664	0.000	0.261	0.643	0.237	0.269	0.140	0.730	1.370
	B1	0.499	0.085	0.198	5.842	0.000	0.331	0.667	0.308	0.330	0.175	0.784	1.276
	B2	0.399	0.073	0.186	5.460	0.000	0.255	0.542	0.328	0.311	0.164	0.772	1.295
	B3	0.254	0.083	0.103	3.065	0.002	0.091	0.417	0.176	0.180	0.092	0.801	1.249
	C1	0.320	0.110	0.108	2.910	0.004	0.104	0.537	0.264	0.172	0.087	0.647	1.544
	C2	0.187	0.131	0.049	1.427	0.155	-0.071	0.445	0.124	0.085	0.043	0.771	1.298
	C3	0.454	0.097	0.179	4.665	0.000	0.263	0.646	0.352	0.269	0.140	0.613	1.631
	C4	0.365	0.190	0.071	1.927	0.055	-0.008	0.738	0.229	0.115	0.058	0.659	1.517
	C5	**0.829**	**0.206**	**0.145**	**4.017**	**0.000**	**0.423**	**1.236**	**0.258**	**0.234**	**0.120**	**0.690**	**1.450**
	C6	**0.726**	**0.211**	**0.125**	**3.443**	**0.001**	**0.311**	**1.142**	**0.291**	**0.202**	**0.103**	**0.680**	**1.470**
	D1	0.569	0.105	0.218	5.435	0.000	0.363	0.775	0.389	0.309	0.163	0.558	1.792
	D2	0.563	0.154	0.152	3.666	0.000	0.261	0.865	0.326	0.214	0.110	0.524	1.909
	D3	0.319	0.185	0.079	1.723	0.086	-0.045	0.684	0.345	0.103	0.052	0.427	2.343
	D4	0.167	0.177	0.037	0.946	0.345	-0.181	0.516	0.312	0.057	0.028	0.599	1.670
	E1	-0.188	0.410	-0.027	-0.459	0.646	-0.995	0.618	0.327	-0.027	-0.014	0.260	3.846
	E2	**0.671**	**0.301**	**0.110**	**2.227**	**0.027**	**0.078**	**1.265**	**0.291**	**0.132**	**0.067**	**0.371**	**2.696**
	E3	0.196	0.411	0.027	0.478	0.633	-0.612	1.004	0.296	0.029	0.014	0.285	3.514
	E4	**1.130**	**0.233**	**0.220**	**4.844**	**0.000**	**0.671**	**1.590**	**0.367**	**0.279**	**0.145**	**0.437**	**2.289**
	a	Predictors: (Constant), A1:Information Boards; A2:Swimming Water Quality; A3:Blue Flag Boards; B1:Industrial and Sewerage Waste; B2:Microbiological parameters; B3:Physical and Chemical Parameters; C1:Local and Beach Management; C2:Beach area usage planning; C3:Visual pollution and waste containers; C4:Sanitation equipment (WC..); C5:Maintenance and Repair; C6:Sustainable Vehicles of Transportation; D1:Safety of Life; D2:Animal safety; D3:Drinking water feature; D4:Handicapped equipment (Ramp, elevator, sanitary equipment); E1:Sports activities; E2:Planting; E3:Children's Playground; E4:Canopy and seating groups												
	b	Dependent Variable: Average Amount Willing to Pay											

in the model appear to explain 73% of the variation in the dependent variable (Adjusted $R^2 = 0.731$) (Table 5). The ANOVA test results found the F value was 41.626 and the significance value was 0.000 ($P < 0.05$). Thus, the regression model was found to be statistically significant. The Durbin-Watson coefficient had a value close to 2 indicating there is no correlation between error terms, which means the model is significant (Table 5).

Discussion and conclusion

Coastal planning displays differences according to the aim of use (Agamuthu et al. 2019; Fernando and Claudio 2020). It is possible to see themes like culture parks, city parks, sport, music, and swimming. This study focused on examining beach use within the scope of swimming water, Blue Flag and landscape structures (Nácio and Umgiesser 2019). Many scientific studies examined beach use from the perspective of individual satisfaction and increased welfare with optimization of standards making it necessary to assess city beaches in Çanakkale with similar approaches (Rangel-Buitrago et al. 2019). In fact, with rational swimming water and beach policies, criteria directly affecting beach use may be determined, and protection of swimming water and landscape qualities in urban beach areas and balance of use will contribute to sustainable urban development (Masoud 2020; Magarotto et al. 2016). As a result, provision of benefit was planned by developing and managing Çanakkale urban beach strategies. Within this scope, surveys were applied to beach users and economic values were identified in line with importance levels of the determined criteria and the conditional valuation method. In terms of outcomes of the study, firstly access to beaches with vehicles like dominantly public transport, bicycles and phaetons should be provided to save fuel and this was found to be significant in terms of ensuring a fall in carbon footprint (Bülbül et al. 2020). The beach environment is important for control of agricultural and domestic water resources fed from coastal aquifers and affected by anthropogenic effects (Jayathunga et al. 2020; Abd-Elhamid et al. 2020). A study by Dirin and Madry (2019) focused on determining methodology in line with priorities in recreational area planning and appears to have similar features to our study. Within this scope, criteria emerging and with common qualities were landscape-esthetic and functional planting, and physical equipment like seating and shading. Similar to this study in terms of 'methodology' and 'theme', the study by Cristiano et al. (2018) noted the need to display sensitive approaches to coastal planning within the scope of human, landscape, protected use and beach features (Tõnisson et al. 2018). Based on the conclusions reached in this research and associated literature studies, the following recommendations are made to develop the optimization of the available beach areas.

- Within the scope of care-maintenance, it is important to integrate with local and central administrations, rather than leave environmental responsibility to the individual and society.
- It is necessary to develop management linked to effects and interactions dealing with all components assessed to have anthropologic effects (Leone and Zoppi 2019; Jenks and Fren 2001).
- Within the scope of Blue Flag criteria, beach areas should have sufficient amounts of artificial/natural shading, seating elements and waste containers according to type, while the attention of users should be drawn to sensitivity aboutprotected use (Agamuthu et al. 2019; Fernando and Claudio 2020).
- No compromises should be made about cleaning and hygiene.
- The place and importance of recycling boxes for organic and inorganic waste types, promotion, warning, notices and information panels and billboards etc.; health cabin, first aid bags, cabinets with first aid elements; lifeguard stations supported by equipment like life buoys, jackets,

Table 5 Analysis results for survey data within the scope of conditional valuation method

Model Summary(b)						
Model	R	R Square	Adjusted R Square	ANOVA(b)		Durbin-Watson
				F	Sig	
1	**0.865**	**0.749**	**0.731**	**41.626**	**0.000**	**2.304**

CVM: Conditional Valuation Method;

a Predictors: (Constant), A1:Information Boards; A2:Swimming Water Quality; A3:Blue Flag Boards; B1:Industrial and Sewerage Waste; B2:Microbiological parameters; B3:Physical and Chemical Parameters; C1:Local and Beach Management; C2:Beach area usage planning; C3:Visual pollution and waste containers; C4:Sanitation equipment (WC..); C5:Maintenance and Repair; C6:Sustainable Vehicles of Transportation; D1:Safety of Life; D2:Animal safety; D3:Drinking water feature; D4:Handicapped equipment (Ramp, elevator, sanitary equipment); E1:Sports activities; E2:Planting; E3:Children's Playground; E4:Canopy and seating groups

b Dependent Variable: Average Amount Willing to Pay

snorkel, first aid kit, recovery tube, life-saving material and towers; and disabled facilities like umbrellas, chaise longue and elevators should be accepted. Rational solutions should be sought through multiparticipant administration with cooperation between local people and the administration and protected use strategies should be developed (Anonymous 2018b; Støttrup et al. 2019).

- Beach area equipment, and facilities should be included on a Blue Flag panel to inform users. These panels should include natural and cultural environmental information.
- Swimming water should have microbiological, physical and chemical parameters at or above the determined standards (Anonymous 2019a).
- Entrances-exits and security elements should be provided for beach users and domestic animals.
- Care, repair and cleaning of all beach facilities should be sustainable (Dalton et al. 2010).
- Beaches should have sustainable vehicle or pedestrian transport facilities.
- Within the scope of public safety, first aid and life-saving elements should be present at the determined standards (Anonymous 2019a).
- Facilities should include the necessary equipment and accessories with maximum sensitivity for disabled users.
- Within the scope of environmental education and management, meetings should be held, targeting approaches involving equal sharing of duties and responsibilities and high sanction power (Nava and Ramirez-Herrera 2011).
- Economic lighting, planting and appropriate sports facilities and comprehensive landscaping equipment should be provided.
- Rainwater should be assessed to ensure rational use.
- Beach management should encourage multiple participants and individual responsibility (Anonymous 2019a; Munro et al. 2019; Hou 2020; Støttrup et al. 2019; Schernewski et al. 2017).
- The use of seasonal beach income is important to provide for sustainable use and optimization of these areas.

Data availability The datasets generated during the current study are available from the corresponding author on reasonable request.

References

Abd-Elhamid HF, Abd-Elaty İ, Hussain MS (2020) Mitigation of seawater intrusion in coastal aquifers using coastal earth fill considering future sea level rise. Environ Sci Pollut Res. https://doi.org/10.1007/s11356-020-08891-1

Agamuthu P, Mehran SB, Norkhairah A, Norkhairiyah A (2019) Marine debris: A review of impacts and global initiatives. Waste Manage Res 37(10):987–1002. https://doi.org/10.1177/0734242X19845041

Alkan Y, Uslu C (2016) Investigation of the impact of active green areas on house prices: Example of Yenişehir district of Mersin province. Inonu University, Journal of Art and Design. 6 (13). Retrieved from. https://dergipark.org.tr/tr/pub/iujad/issue/45229/566459 (in Turkish)

Alkan Y, Uzun G (2016) A study on the use of ecological comprehensive space within the neighboring area of Erdemli city. J Acad Agric 5(1):35–50. Retrieved from https://dergipark.org.tr/tr/pub/azd/issue/32195/358169 (in Turkish)

Altunkasa MF, Uslu C (2004) The effects of urban green spaces on house prices in the upper nortfwest urban development area of Adana. (Turkey). Turk J Agric For 28:203–209

Anonymous (2017) Turkey Statistical Institute, News Bulletin. 10 May 2017 Date and No. 24646. https://www.gmka.gov.tr/dokumanlar/yayinlar/22-Baslikta-Istatistiklerle-TR22-Guney-Marmara.pdf (E.T. 30.05.2020)

Anonymous (2018a) Ministry of Environment and Urbanization, ÇED, General Directorate of Permission, and Audit. https://webdosya.csb.gov.tr/db/ced/menu/deniz_izleme_klavuzlari_2018a0516024237.pdf (E.T.:25.05.2020)

Anonymous (2018b) Blue Flag criteria for beaches. http://www.mavibayrak.org.tr/tr/icerikDetay.aspx?icerik_refno=14 (E.T.:25.05.2020)

Anonymous (2019a) Ministry of Health and Ministry of Environment and Urbanization. Regulation on The Management of Swimming Water Quality. 25 Eylül 2019a date and 30899 number Official Gazette. https://www.resmigazete.gov.tr/eskiler/2019a/09/20190925-2.htm (E.T.:25.05.2020)

Anonymous (2019b) Republic of Turkey, Ministry of Health, General Directorate of Public Health, Swimming Water Monitoring System. https://yuzme.saglik.gov.tr/ (E.T.:25.05.2020) (in Turkish)

Anonymous (2019c) Blue Flag awards for 2019c year within the scope of Turkey provinces. http://www.mavibayrak.org.tr/userfiles/file/2019c%20YILI%20MAV%C4%B0%20BAYRAK%20%C3%96D%C3%9CLLER%C4%B0%20L%C4%B0STES%C4%B0SON.pdf (E.T.: 25.05.2020) (in Turkish)

Bülbül H, Büyükkeklik A, Topal A, Özoğlu B (2020) The relationship between environmental awareness, environmental behavior and carbon footprint in Turkish households. Environ Sci Pollut Res. https://doi.org/10.1007/s11356-020-08813-1

Cristiano SD, Portz LC, Anfuso G, Rockett GC, Barboza EG (2018) Coastal scenic evaluation at Santa Catarina (Brazil): Implications for coastal management. Ocean Coast Manag 160:146–157. https://doi.org/10.1016/j.oceeoaman.2018.04.004

Dalton T, Thompson R, Jin D (2010) Mapping human dimensions in marine spatial planning and management: An example from Narragansett Bay. Rhode Island Marıne Polıcy 34(2):309–319. https://doi.org/10.1016/j.marpol.2009.08.001

De Oliveira TCR, Scherer MEG, Anfuso G, de Almeida FB, Diederichsen SD, Williams A (2016) Classification of coastal beach scenarios in Santa Catarina Island, Florianopolis – Brazil. Desenvolvımento E Meıo Ambıente 39:217–229. https://doi.org/10.5380/dma.v39i0.46171

Dirin DA, Madry C (2019) Assessment methods of recreational potential of water objects. IOP Konferans Serisi-Yer ve Çevre Bilimi 381. https://doi.org/10.1088/1755-1315/381/1/012019

Fernando MP, Claudio AV (2020) Considering environmental variables in the design of waste dumpsites. Environ Sci Pollut Res. https://doi.org/10.1007/s11356-020-08657-9

Hou J (2020) Guerrilla urbanism: urban design and the practices of resistance. Urban Des Int 25:117–125. https://doi.org/10.1057/s41289-020-00118-6

Jayathunga K, Diyabalanage S, Frank AH, Chandrajith R, Barth JAC (2020) Influences of seawater intrusion and anthropogenic activities on shallow coastal aquifers in Sri Lanka: evidence from hydrogeochemical and stable isotope data. Environ Sci Pollut Res. https://doi.org/10.1007/s11356-020-08759-4

Jenks GK, Fren LA (2001) Bay of plenty coast, Yeni Zelanda enhancing dune function and landscape integrity using active and passive bio-engineering, bay of plenty coast, New Zealand. J Coastal Res 34:528–534

Kelkit A (2003) Environmental problems of Canakkale city and solutions. Int J Environ Pollut 19(1):66–74. https://doi.org/10.1504/IJEP.2003.003305

Kelly C (2020) "I Need the Sea and the Sea Needs Me": Symbiotic coastal policy narratives for human wellbeing and sustainability in the UK. Marıne Polıcy 97:223–231. https://doi.org/10.1016/j.marpol.2018.03.023

Leone F, Zoppi C (2019) Local development and protection of nature in coastal zones: a planning study for the sulcis area (Sardinia, Italy). Sustaınabılıty 11(18). https://doi.org/10.3390/su11185095

Magarotto MG, da Costa MF, Tenedorio JA, Silva CP (2016) Vertical growth in a coastal city: an analysis of Boa Viagem (Recife, Brazil). J Coast. Conserv. 20(1):31–42. https://doi.org/10.1007/s11852-015-0415-7

Masoud AA (2020) Renewable energy and water sustainability: lessons learnt from TUISR19. Environ Sci Pollut Res. https://doi.org/10.1007/s11356-020-08504-x

McNamara M, Murphy A, Dowler F, Foley R (2020) Blue spaces as resources for health and wellbeing: survey comparisons of indoor and outdoor settings from Ireland. Revısta De Estudıos Andaluces 39:8–22. https://doi.org/10.12795/rea.2020.i39.01

Morgan R (1999) Preferences and priorities of recreational beach users in Wales. UK J Coast Res 15(3):653–667

Munro J, Kobryn H, Palmer D, Bayley S, Moore SA (2019) Charting the coast: spatial planning for tourism using public participation GIS. Curr Issues Tour 22(4):486–504. https://doi.org/10.1080/13683500.2017.1346589

Nácio M, Umgiesser G (2019) Kıyı yönetimi ve uygulamada uygulanması için bir sistem yaklaşımı çerçevesi. J Sahil Koruma 23:877–879. https://doi.org/10.1007/s11852-019-00709-8

Nava H, Ramirez-Herrera MT (2011) Government conservation policies on Mexican coastal areas: is "top-down" management working? Revısta De Bıologıa Tropıcal 59(4):148–1501

Poeta G, Conti L, Malavasi M, Battisti C, Acosta ATR (2016) Beach litter occurrence in sandy littorals: The potential role of urban areas, rivers and beach users in central Italy. Estuar Coast Shelf Sci 181:231–237. https://doi.org/10.1016/j.ecss.2016.08.041

Rangel-Buitrago N., Williams AT, Ergin A, Anfuso G, Micallef A, Pranzini E (2019) Coastal scenery: an ıntroduction. Coastal Scenery: Evaluatıon and Management. vol 26, pp 1–16. https://doi.org/10.1007/978-3-319-78878-4_1

Schernewski G, Baltranaitė E, Kataržytė M, Balčiūnas A, Čerkasova N, Mėžinė J (2017) Establishing new bathing sites at the Curonian lagoon coast: an ecological-social-economic assessment. J Coast Conserv. https://doi.org/10.1007/s11852-017-0587-4

Støttrup JG, Dinesen GE, Schumacher J, Gillgren C, Inácio M, Schernewski G (2019) The systems approach framework for collaborative, science-based management of complex systems. J Coast Conserv. https://doi.org/10.1007/s11852-018-00677-5

Tõnisson H, Kont A, Orviku K, Suursaar Ü, Rivis R, Palginõmm V (2018) Application of system approach framework for coastal zone management in Pärnu, SW Estonia. J Coast Conserv. https://doi.org/10.1007/s11852-018-0637-6

Tsilimigkas G, Rempis N (2018) Marine uses, synergies and conflicts. Evidence from Crete Island, Greece. J Coast Conserv 22:235–245. https://doi.org/10.1007/s11852-017-0568-7

Tsilimigkas G, Pafi M, Gourgiotis A (2018) Coastal landscape and the Greek spatial planning: evidence from windpower in the South Aegean islands. J Coast Conserv in Press 22:1129–1142. https://doi.org/10.1007/s11852-018-0620-2

Tsilimigkas G, Rempis N, Derdemezi E-T (2020) Marine zoning and landscape management on Crete Island, Greece. J Coast Conserv 24:43. https://doi.org/10.1007/s11852-020-00757-5

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