Visual quality assesment in recreational and touristic landscape

Elif Adıgüzel[1] ⬤ · **Zeynep Pirselimoglu Batman**[1] ⬤

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Abstract

Although the landscape quality parameter in rural areas, which is called landscape beauty, varies according to the way the individual perceives the landscape, being able to perceive and understand the landscape visually in rural and urban landscape areas, natural and cultural tourism and recreation areas is directly related to whether that recreational area is used actively or not. This study aims to examine the effect of perceptual landscape parameters in touristic and recreational landscape character. In this study, it was investigated how the recreational and touristic landscape character can be emphasized with visual quality value. For this purpose, Gölbaşı Pond and its surroundings in Bursa in Turkey, which has a rich landscape character selected as study area, by evaluating the area's visual landscape quality. The method of the study visual quality analysis was performed and the data obtained by visual quality analysis were compared. As a result, Gölbaşı Pond and its surroundings with its natural beauty and nature, as well as its landscape qualities suitable for recreational activities, provide opportunities for many recreational activities, and the study concluded that all landscape quality parameters support each other and create a potential for more.

Keywords Visual quality assesment · Landscape quality parameters · Recreational and touristic landscape · Recreation · Tourism

1 Introduction

People need nature-oriented recreational and touristic activities to maintain balance in themselves. Tourism and recreation activities carried out in rural areas are in a structure that integrates culture and environment with the natural and socio-cultural characteristics of

✉ Zeynep Pirselimoglu Batman
   zeynepbatman@uludag.edu.tr

   Elif Adıgüzel
   elifadiguzell@gmail.com

1   Faculty of Agriculture, Department of Landscape Architecture, Bursa Uludağ University, Bursa, Turkey

the areas (Akten, 2003; Soykan, 2003; Bingöl, 2011; Koyuncu, 2012; Pirselimoğlu Batman & Zencirkıran, 2016). In other words, natural and cultural landscape features are suitable environments for tourism activities. Natural and historical landscape values and economic, sociological and cultural factors constitute the initial and boundary conditions of tourism factors (Uslu, 1990; Zhong et al., 2011; Kiper et al., 2011; Pirselimoğlu Batman & Ender Altay, 2021).Within these boundaries, the fact that the landscape structures are visually interesting is the reason why they are preferred in terms of tourism and recreational activities. Areas developed on this basis support tourism and recreation landscapes.

Although visual beauty is a concept that can be perceived differently by each person, water element, forest existence, colorfulness, plant diversity, historical structures, geological formations, authentic structures and undisturbed natural parts, natural and cultural resources are visually important landscape resource values for tourism and recreation, (Irmak & Yilmaz 2010). While landscapes are a resource that directly affects the quality of life of people and societies, people and societies are also a resource that directly affects the quality of the landscape (Erdoğan, 2014; Pirselimoğlu Batman & Seyidoğlu Akdeniz, 2020). Landscape character, on the other hand, expresses the identity of the area by separating the landscapes from each other, reaching the judgment of whether the landscapes are good or bad, beautiful or ugly, defining that landscape and reflecting a distinctive feature (Şengür, 2017). In the context of significant landscape changes, understanding how local people perceive landscape quality is crucial for significant progress has been made in measuring physical landscape change, there are also social indicators that assess the quality of the visual landscape perceived by the public (Wartmann et al., 2021).

The most important part of visual quality assessment is that it is a perception-based phenomenon and emerges as a result of expert assessment (Daniel, 2001). This phenomenon, which can be called "visual quality" in urban areas and "landscape beauty" in rural areas, depends entirely on the perception of the person who will interpret it. As in all landscape areas, the visual perception of the landscape in tourism and recreation landscapes directly affects the active or passive use of that recreational area (Polat et al., 2012).

Visual landscape analysis aims to protect visually rich touristic and recreational landscapes and ensure sustainability. For this purpose, the studies of Bergen et al. (1995); Habron (1998); Clay and Daniel (2000); Tahvanainen et al. (2001); Arriaza et al. (2004); Clay and Smidt (2004); Meitner (2004); Acar and Kurdoğlu (2005); De Val et al. (2006); Bulut (2006); Tveit et al. (2006); Kıroğlu (2007); Garré et al. (2009); Roth and Gruehn (2012); Düzgüneş & Demirel, 2015a, b; Kiper et al. (2017); Martin et al. (2018), Güngör ve Polat (2018), Sowinska-Świerkosz and Michalik-Śnieżek (2020), and Kang and Liu (2022) are available. Although the necessary evaluations of the landscape visual quality criteria are made in the studies, there is a research gap concerning the relationships of these criteria with each other and determining their recreational values. For this reason, in the example of Gölbaşı Pond, located in the Kestel district of bursa province, and in our study, the potential of the pond and its surrounding existing recreation areas were revealed, classified according to landscape character types in line with the opinions of the users, and all the components that make up the landscape character of the area were analyzed comparatively within the framework of visual quality analysis. In light of this, the visual landscape quality of the area was revealed, its relationship with recreation and tourism activities was examined,

and approaches that would contribute to how it could be more effective and efficient were evaluated.

2 Material and method

2.1 Material

The main material of the study is Gölbaşı Pond located in Kestel district of Bursa province and its close surroundings. Gölbaşı Pond, located between 40 12 42 – 40 13 28 northern latitudes and 29 19 05–29 20 09 east (Anonymous, 2016) (Fig. 1). Gölbaşı Pond Basin consists of sclerophyllous vegetation, coniferous forests, plant transition areas, and mixed forests (Anonymous, 2017). Brown forest soils are the most widely distributed ones around Gölbaşı Pond. There are lime-free brown forest soils in the area where the settlement is located. On the left of the pond, there is an alluvial soil group. The main settlement in the Gölbaşı Pond Basin is the Gölbaşı village settlement. Dudaklı, Turanköy and Narlıdere are other settlements close to the pond (Anonymous, 2019). Agriculture, fruit growing, and animal husbandry are the main economic activities in the region, Especially fruit trees and olive trees occupy an important place in the area. Chicken farms, freshwater fishing, and beekeeping are carried out, although there is no animal husbandry in a very large scale. Gölbaşı Pond is 23 km away from the city center (Anonymous, 2015).
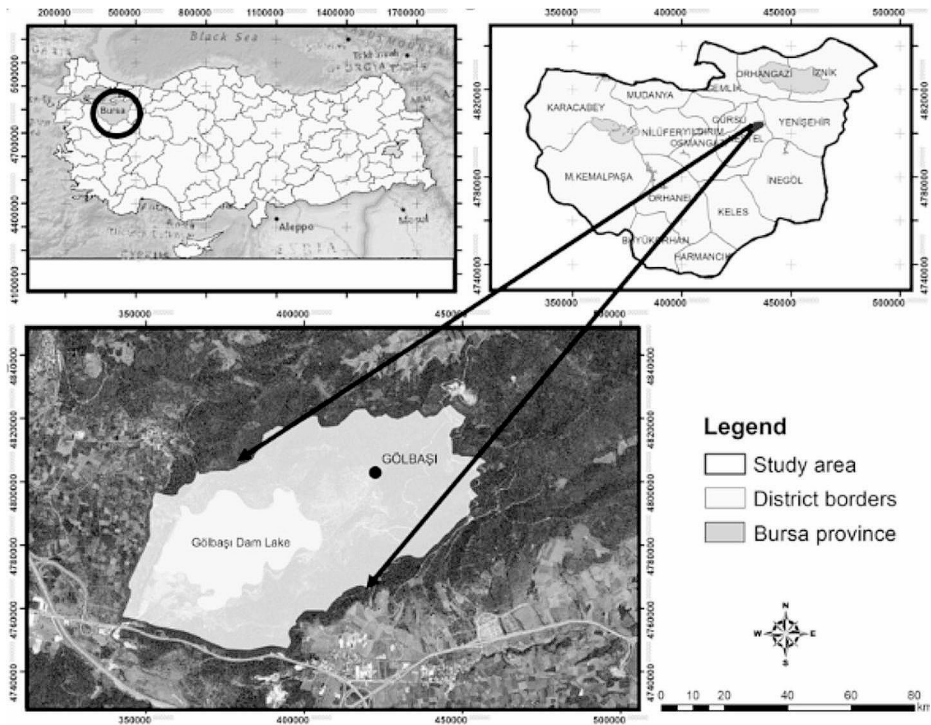

Fig. 1 Study area

2.2 Method

The visual quality analysis method was used in the study. Based on the scenic beauty estimation Method developed by Daniel and Boster (1976) for visual quality assessment, Bergen et al.(1995), Clay and Smidt (2004), De La Fuante et al.(2006) Acar and Kurdoğlu (2005); Clay and Daniel (2000); Clay and Smidt (2004); Tahvanainen et al. (2001); Arriaza et al. (2004); Habron (1998); Meitner (2004); Bulut (2006); Kıroğlu (2007); Düzgüneş & Demirel, 2015a, b; Kiper et al. (2017) were used to analyze the landscape visual quality of the area. The basic approach with the scenic beauty estimation method is to consider the inventory of the area, landscape aesthetic value and landscape quality. As a method in which the area is evaluated based on human perception and physical properties, it is applied by taking field inventory, photographing it, scoring it, and evaluating it within the framework of objective-subjective definitions (Elinç 2011; Özvan & Bostan, 2019). In our study in which the scenic beauty estimation method was used, to get effective results in the recreational and touristic use of landscapes, the relationships between landscape character parameters, landscape types, and landscape qualities were revealed, the workability of the method was increased and an original method idea was developed.

Accordingly, in the first stage, within the scope of survey studies in our study area, a total of 400 visual materials were obtained through photo shoots carried out in the area throughout the year and in all four seasons. The study area was divided into 7 landscape characters: general silhouette, semi-natural landscape, lake landscape, rural road landscape, mountain landscape, cultural landscape, and agricultural landscape, and the most appropriate 4 photographs were selected for each landscape character. In the second stage, every 4 photographs, separated by Landscape character types, were submitted to an expert group from different professional disciplines (out of 40 people; 5 Landscape Master Architects, 5 Landscape Architects, 5 Architects, 5 Engineers, 5 Economists, 5 Photographers, 10 Landscape Architecture Academic Members). A two-part photo survey was conducted interactively with the help of the "Google Survey" program. The participants chose the photographs that best reflect each landscape character type, in line with the visual quality components (naturalness, diversity, harmony, openness, perspective, care, order, trust, scenic beauty, and recreation value) that represent the landscape characters, and on a 5-point Likert scale -2 They were asked to score in the range of -2 to +2 (the lowest being -2, the highest being $+2$) (Table 1).

In the third stage, the photograph with good landscape character is determined and the main components that make up the landscape character are given to the expert group again (type of water source, water rate, area covered with vegetation, type of vegetation, type of topography, degree of naturalness, positive man-made elements, negative man-made elements). The effective components of the selected image (Table 2) were determined according to landscape character types and landscape features were evaluated by scoring between 1 and 4 within the scope of elements, color diversity, dominant appearance, texture, and mass-void ratio.

In the last stage, the obtained data were evaluated using the "IBM SPSS 22" statistical package program. Frequency analysis was used to evaluate the ratings obtained from the surveys. Sperman's correlation analysis was performed to determine the relationships between landscape types, landscape character parameters, and landscape qualities. In the correlation analysis, landscape qualities of each landscape character (water source type, water ratio,

Table 1 Landscape character parameters determined for the area and corresponding questions and scoring (Kıroğlu, 2007)

Parameters	Questions and scoring
Naturalness	Please give a low score if there are artificial elements that will distract the image from the natural landscape features,
Diversity	Please give a high score if you perceive the image to have many dissimilar elements and a low score if it has few dissimilar elements,
Harmony	If there are unknown elements in the image that are not integrated with the rest of the landscape elements, please give a low score,
Clarity	If you think the image is confusing or difficult while interpreting, please give it a low score,
Perspective	Please give a high score if you perceive that the image is a wide or panoramic perspective,
Care	If you think the image is neglected, please give a low score,
Order	If you think the landscape elements in the image (water, flora, fauna, fittings, etc.,) have a regular shape or the image has regular elements and/or clear arrangements, please give it a high score,
Trust	Please give a low score if you perceive components of the image to suggest risks or dangers, and a high score if it presents a welcoming, safe, and confident image,
Scenic Beauty	Please rate the image according to the beauty of the landscape,
Recreational Value	If you perceive that the place in the image is suitable for any recreational use, please give a high score,

area covered with vegetation, vegetation type, topography type, naturality degree, positive human-made elements, negative human-made elements, color. Diversity, dominant appearance, texture, the relationship between mass-vacity ratio and scenery beauty, and the landscape qualities and recreational values of each landscape character were compared.

3 Findings

3.1 Visual landscape quality analysis of Gölbaşı Pond and its surroundings

The visual landscape quality assessment phase of the study consists of 3 main parts and 5 separate analyses. The visual quality criteria and character components of the area were questioned separately with the photo-surveys made by a group of experts from different professional disciplines, and then the visual quality value of Gölbaşı Pond and its surroundings was examined by associating them to each other. In the first stage, the area was separated according to character types (general silhouette, semi-natural landscape, lake landscape, rural road landscape, mountain landscape, cultural landscape, agricultural landscape) by making use of its existing physical features, four photographs representing the area were selected in a way that would be appropriate for each landscape character type, and the expert group were asked to choose the photograph that they thought best reflected the characteristics of the specified landscape character type. In line with the choices made, the

Table 2 The main components that make up the landscape character and scoreboard (Kıroğlu, 2007)

Landscape attributes	Scorboard			
	1	2	3	4
Water				
Water source type	No water	River	Lake	Dam
Water ratio	%0–25	%25–50	%50–75	%75–100
Vegatation				
Area with vegetation component	%0–25	%25–50	%50–75	%75–100
Type of Vegetation	Bare land	Herbaceous&shrub	Tree&shrub	Forest
Topography				
Type of Topography	Flat	Rugged	Highland	Very highland
Naturalness				
Degree of Naturalness	Artificial	Semi-natural	Natural-like	Natural
Cultural elements				
Presence of Positive Man-Made Elements	%0–25	%25–50	%50–75	%75–100
Presence of Negative Man-Made Elements	%0–25	%25–50	%50–75	%75–100
Color				
Color Diversity	1 color	2 color	3–5 color	Multicolor
Composition				
Dominant Appearance	Absence of dominant element			The presence of the dominant element
Texture	Light	Medium	Rough	Very densely
Mass-void Ratio	Very low	Low	Medium	Net

photographs with the highest percentage were used as representative photographs of the landscape character type in the other parts of the study. In general silhouette character type GS-2 45%, semi-natural landscape type SNL-2 42%, lake landscape type LL-2 35%, rural road landscape type RRL-1 37%, mountain landscape type ML-1 50%, cultural landscape CL-1, and AL-1 40% in agricultural landscape type became the photographs representing the landscape character type (Fig. 2).

3.2 Visual quality scores of landscape character types

In the image representing the general silhouette type, the naturalness parameter had the highest average. While recreational value and layout parameters were the values that followed, observations revealed that the complexity parameter received the lowest score. In the image representing the semi-natural landscape type, the landscape beauty had the highest average, followed by the parameters of harmony and naturalness. Perspective and trust parameters, on the other hand, got the lowest average. In the image representing the lake landscape type, the naturalness parameter had the highest average. Trust parameter had the lowest mean. In the image representing the rural road landscape type, the harmony parameter had the highest mean. The lowest mean was taken by the diversity parameter. In the image representing the mountain landscape type, the naturalness parameter had the highest average. The lowest mean was taken by the care parameter. In the image representing the cultural landscape type, the harmony parameter had the highest mean. The lowest mean was
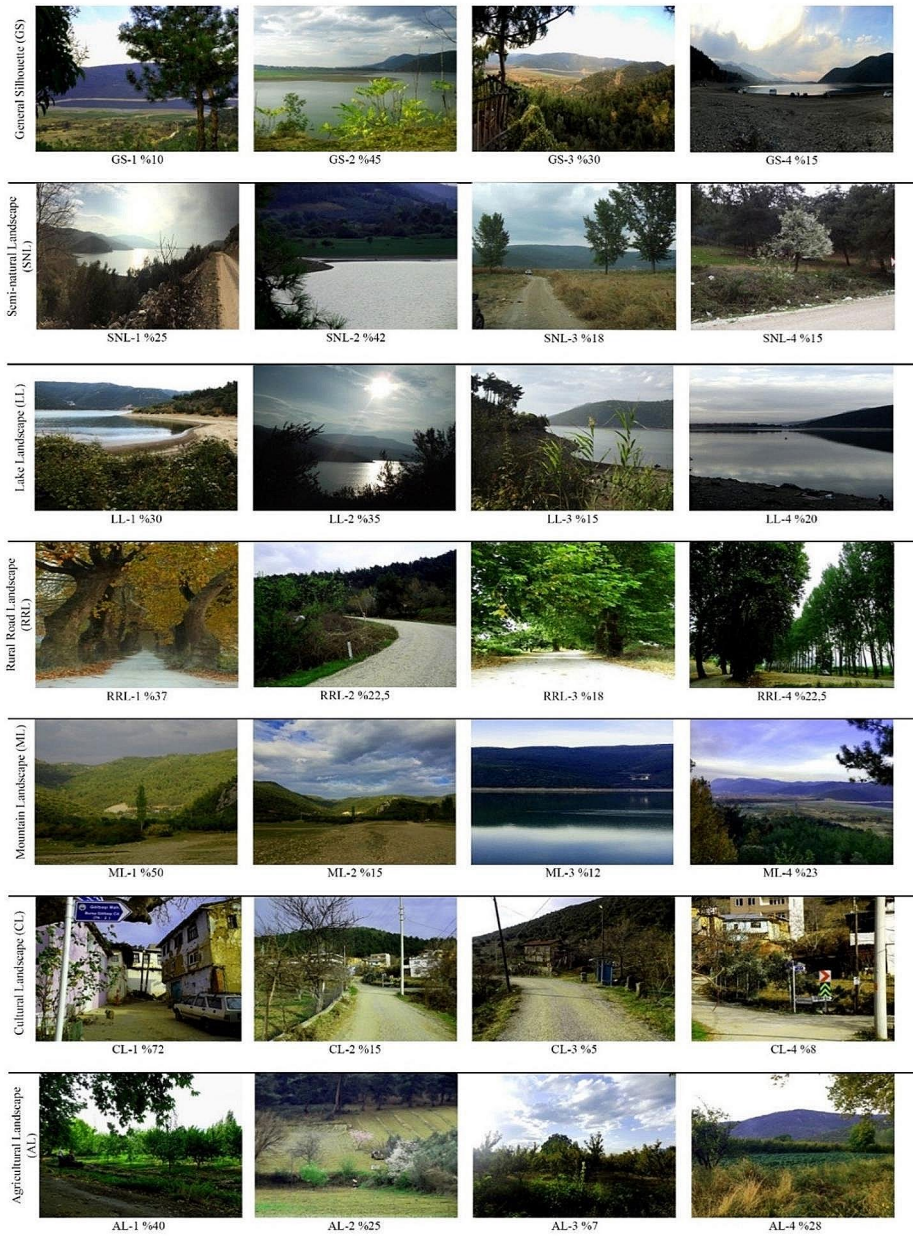
Fig. 2 Selected photos and percentages

taken by the care parameter. All parameters are negative. Cultural landscape type has the lowest visual quality. In the image representing the agricultural landscape type, the naturalness parameter had the highest average. The scenic beauty parameter had the lowest average (Table 3).

Table 3 The average visual quality score of landscape character types

Parameters	GS	SNL	LL	RRL	ML	CL	AL
Naturalness	1,7	1,425	1,875	0,75	0,95	-0,375	0,575
Driversity	0,275	1	0,8	-0,2	0,475	-0,425	0,5
Harmony	0,9	1,475	1,25	1,025	0,5	-0,125	0,525
Clarity	1,2	0,925	0,35	0,475	0,45	-0,6	0,175
Perspective	1,05	0,875	0,575	0,825	0,525	-0,325	-0,125
Care	0,025	1,275	0,5	0,25	-0,075	-1,6	0,3
Order	0,15	1,3	0,6	0,875	0,075	-1,075	0,175
Trust	0,075	0,875	0,125	0,5	-0,025	-0,55	0,4
Scenic beauty	0,85	1,675	1,325	0,9	0,525	-0,9	-0,25
Recreational value	0,55	1,35	0,7	0,225	0,3	-0,325	0,075

3.3 The relationship of visual landscape quality parameters with scenic beauty and each other

In the visual quality analysis, Spearman's correlation test was applied between the landscape quality parameters and the scenic beauty parameter on the images representing the landscape character type.

The relationship between the scenic beauty score of the general silhouette and the visual quality parameters (harmony, clarity, perspective, care, order, recreational value) was found to be statistically very significant. As the score given to harmony, clarity, perspective, care, order, and recreational value increased, the scenic beauty score also increased. The study determined that as the naturalness score increased, the scenic beauty score also increased. No statistical relationship was found between diversity and trust parameters and scenic beauty. The relationship between care, order, and recreational value was found to be statistically very significant. As the score given to harmony, clarity, perspective, care, order, and recreational value increased, the scenic beauty score also increased. The study determined that as the naturalness score increased, the scenic beauty score increased.

The relationship between the scenic beauty score of the semi-natural landscape and the visual quality parameters (clarity, care, trust) was found to be statistically very significant. The higher the score was for clarity, care, and trust, the higher was the scenic beauty score. The increase in the parameters of order and recreational value also increased the scenic beauty.

The relationship between the scenic beauty score of the lake landscape and the visual quality parameters (harmony, clarity, perspective, care, order, trust, recreational value) was found to be statistically very significant ($p<0,01$). As the score given to harmony, clarity, perspective, care, order, trust, and recreational value increased, the score of scenic beauty also increased.

The relationship between the scenic beauty score of the rural road landscape and the visual quality parameters (naturalness, harmony, perspective, maintenance, order, recreational value) was found to be statistically very significant ($p<0,01$). As the score given to naturalness, harmony, perspective, care, order, and recreational value increased, the scenic beauty score also increased. The increase in diversity, clarity, and trust parameters also increased the scenic beauty score ($p<0,05$). All parameters are effective in the scenic beauty. The relationship between the recreational value score of the rural road landscape

and the visual quality parameters (naturalness, diversity, harmony, perspective, care, order, trust) was found to be statistically very significant ($p<0,01$).

The relationship between the scenic beauty score of the mountain landscape and the visual quality parameters (naturalness, diversity, harmony, clarity, perspective, care, order, recreational value) was found to be statistically very significant ($p<0,01$). As the score given to naturalness, diversity, harmony, clarity, perspective, care, order, and recreational value increased, the score of scenic beauty also increased. The increase in the trust parameter also increased the scenic beauty score ($p<0,05$). All parameters are effective in scenic beauty.

The relationship between the scenic beauty score of the cultural landscape and the visual quality parameters (naturalness, diversity, harmony, clarity, perspective, care, order) was found to be statistically very significant ($p<0,01$). As the score given to naturalness, diversity, harmony, clarity, perspective, care, and order increased, the score of scenic beauty also increased. The increase in the recreational value parameter also increased the scenic beauty score ($p<0,05$).

The relationship between the scenic beauty score of the agricultural landscape and the visual quality parameters (harmony, clarity, perspective, care, order) was found to be statistically very significant ($p<0,01$). As the score given to harmony, clarity, perspective, care, and order increased, the scenic beauty score also increased. The increase in the recreational value parameter also increased the scenic beauty score ($p<0,05$) (Table 4).

3.3.1 Average scenic beauty and recreational value scores of images

The average scores of the images for the landscape beauty parameter reveal that the highest average scenic beauty score belongs to the semi-natural landscape type, while the lowest average belongs to the cultural landscape type. The average scores of the images for the recreational value parameter exhibit that the recreational value score with the highest average belongs to the semi-natural landscape type, while the lowest average belongs to the cultural landscape type (Table 5).

3.4 The relationship of the main components of landscape characters with scenic beauty

In the visual quality analysis, Spearman correlation test was applied between the main component constituting the landscape character and the scenic beauty parameter on the images representing the landscape character type.

A strong positive correlation ($p<0,01$) was observed between the scenic beauty of the general silhouette (GS), the water ratio, and the mass-void ratio, It is possible to observe that the character of the semi-natural landscape (SNL) is not correlated with any landscape component. There is a partially significant correlation ($p<0,05$) between the scenic beauty of the lake landscape (LL) character and the texture and mass-void ratio. There is a strong positive correlation ($p<0,01$) with the area with vegetation component in the relationship between the rural road landscape (RRL) and the scenic beauty. Also, there is a partially significant correlation ($p<0,05$) between the degree of naturalness, positive human-made elements, and color diversity. There is only a partially significant positive correlation ($p<0,05$) between the scenic beauty of the mountain landscape (ML) character and the area with veg-

Table 4 Correlation analysis between scenic beauty score and visual landscape quality parameters

	Scenic beauty(SB) Recreational value(RV)	Naturalness	Diversity	Harmony	Clarity	Perspective	Care	Order	Trust	Scenic beauty
GS	SB	0,356*	0,302	0,684**	0,648**	0,506**	0,630**	0,568**	0,309	
	RV	0,067	0,204	0,620**	0,461**	0,437**	0,659**	0,496**	0,472**	0,612**
SNL	SB	-0,063	-0,003	-0,214	0,471**	0,166	0,435**	0,370*	0,471*	
	RV	-0,197	0,016	0,24	0,281	0,234	0,348*	0,351*	0,26	0,398*
LL	SB	0,091	0,294	0,691**	0,624**	0,657**	0,491**	0,490**	0,554**	
	RV	0,106	0,373*	0,426**	0,547**	0,676**	0,588**	0,680**	0,560**	0,556**
RRL	SB	0,521**	0,322*	0,564**	0,360*	0,455**	0,562**	0,484**	0,362*	
	RV	0,464**	0,507**	0,577**	0,389*	0,508**	0,530**	0,448**	0,522**	0,503**
ML	SB	0,651**	0,637**	0,553**	0,607**	0,642**	0,660**	0,616**	0,364**	
	RV	0,330*	0,408**	0,421**	0,542**	0,452**	0,532**	0,462**	0,565**	0,515**
CL	SB	0,611**	0,631**	0,482**	0,449**	0,497**	0,431**	0,481**	0,277	
	RV	0,308	0,204	0,359*	0,334*	0,157	0,268	0,225	0,175	0,367*
AL	SB	0,306	0,143	0,444**	0,554**	0,478**	0,617**	0,655**	0,084	
	RV	0,353*	0,26	0,358*	0,457**	0,388*	0,442**	0,382*	0,254	0,392*

** correlation was significant at the 0,01 level

* correlation was significant at the 0,05 level

etation component. There appears to be a negative correlation between water ratio, positive human-made elements components and mountain landscape. However, they were not found to affect each other, Cultural landscape (CL) character has a strong positive correlation ($p<0{,}01$) between scenic beauty and degree of naturalness, positive human-made elements, and mass-void ratio. There is a negative correlation ($p<-0{,}05$) with negative human-made elements and positive partially significant correlation with color diversity. On the other hand, it is possible to observe that the agricultural landscape (AL) character has a strong positive correlation ($p<0{,}01$) with the dominant appearance and scenic beauty (Table 6).

3.5 The relationship of the main components of landscape characters with recreational value

In the visual quality analysis, Spearman's correlation test was run between the main component constituting the landscape character and the recreational value parameter on the images representing the landscape character type. Observations exhibit that there is only a partially significant correlation ($p<0{,}05$) between the general silhouette, recreational value, and the mass-void ratio. It is possible to see that there is a partially significant correlation between the semi-natural landscape and the recreational value with the type of topography and the mass-void ratio. No correlation was found between recreational value and landscape components in the lake landscape. There is a partially significant correlation ($p<0{,}05$) between recreational value, positive human-made elements, and mass-void ratio in rural road landscape. In this landscape type, the type of topography has a negative correlation with negative human-made elements and dominant scenic parameters, but it was determined not to have a correlation value. There is a partially significant correlation ($p<0{,}05$) between recreational value and dominant appearance in mountain landscape. There is a partially significant correlation ($p<0{,}05$) with the recreational value and positive human-made elements in the cultural landscape character. In the agricultural landscape character, no correlation was found between the recreational value and any landscape component. The main components characterizing the landscape are not directly related to the recreational value for the agricultural landscape (Table 7).

4 Discussion and conclusion

In order for an area to be rich in natural resource values and to be protected, determining the character of the landscape in the planning and management studies of the area and making the conservation plan accordingly are among the priorities (Şengür, 2017). The visual impact of a landscape, the good or bad perception of its environment, and as a result, whether the users of that landscape enjoy the area or not are phenomena that are directly related to each other. For this reason, making analyses to determine the visual quality of the area and its surroundings at the decision and idea stage is the most important step for the protection of resources. The study of determining the visual quality is the most accurate method that ensures the preservation of the visual and ecological structure of the environment (Özgeriş, 2014).

According to Daniel (2001), the systematic assessment of visual landscape quality emerged and developed in the second half of the 20th century. Then it became an important

Table 5 Average scores

	Average scenic beauty scores of landscape character types	Average recreational value scores of landscape character types
GS	0,85	0,55
SNL	1,675	1,35
LL	1,325	0,7
RRL	0,9	0,225
ML	0,525	0,3
CL	-0,9	-0,325
AL	-0,25	0,075

Table 6 Correlation between landscape qualities and scenic beauty

	Scenic beauty						
Landscape attributes	GS	SNL	LL	RRL	ML	CL	AL
Water source type	-0,01	-0,009	0,011	0,162	-0,04	0,147	-0,122
Water ratio	0,456**	-0,178	0,143	0,162	-0,031	0,147	-0,122
Area with vegetation component	0,155	0,034	0,12	0,431**	0,331*	-0,016	0,149
Type of vegetation	0,258	0,15	0,21	0,27	0,086	0,147	0,244
Type of topography	0,322	0,276	0,239	-0,121	0,15	0,208	-0,212
Degree of naturalness	-0,059	0,17	0,223	0,358*	0,146	0,435**	0,039
Presence of positive man-made elements	0,04	0,115	0,099	0,327*	-0,176	0,522**	0,204
Presence of negative man-made elements	0,005	-0,163	0,02	-0,129	0,053	-0,344 *	-0,233
Color diversity	0,104	-0,204	0,136	0,327*	0,011	0,325	0,14
Dominant appearance	0,251	0,014	-0,135	0,105	0,161	0,112	0,405**
Texture	0,115	-0,085	0,326*	0,172	0,175	0,246	0,095
Mass-void ratio	0,506**	0,153	0,381*	0,245	0,171	0,441**	0,182

** correlation was significant at the 0.01 level

* correlation was significant at the 0.05 level

system in environmental management and policy and became a scientific study accepted as an important source of literature (Kıroğlu, 2007). Based on this approach, it has been used in various studies. Kang and Liu (2022) Bulut (2006) Bulut (2006) Kaplan (2002) Polat and Önder (2006) in their studies, they emphasized that landscape character analyzes should be handled on the basis of conservation-use principles of natural and cultural resource values, together with expert opinions. They evaluated their relationship with the activities that can be done on tourism and recreation landscapes.

In this study, Gölbaşı Pond and its surroundings in Kestel district of Bursa province were evaluated in terms of visual landscape quality for touristic and recreational landscape potential. In the study, the landscape characters of the area were classified and how they could be associated with the landscape structure was revealed.

In this direction 7 landscape character types determined by considering the existing characteristics of the area. Among the 4 representing photos, the photos that best reflect the character type were selected. In line with this selection, the photographs with the highest ratio were those that represented the landscape character type in the analysis.

Table 7 Correlation between landscape qualities and recreational value

Landscape attributes	Recreational value						
	GS	SNL	LL	RRL	ML	CL	AL
Water source type	0,03	0,118	0,042	0,244	0,023	0,193	-0,196
Water ratio	0,131	0,154	0,208	0,244	0,031	0,193	-0,196
Area with vegetation component	0,269	0,231	0,175	0,187	-0,004	-0,026	0,072
Type of vegetation	0,081	-0,106	0,105	0,237	-0,154	0,193	0,185
Type of topography	0,296	0,350*	0,045	-0,065	-0,128	0,285	-0,105
Degree of naturalness	-0,053	0,028	0,082	0,116	-0,242	0,276	0,14
Presence of positive man-made elements	0,017	-0,117	0,062	0,376*	-0,132	0,384*	0,257
Presence of negative man-made elements	0,063	-0,205	0,023	-0,178	-0,105	-0,226	-0,184
Color diversity	0,108	-0,197	-0,006	0,292	0,062	0,071	-0,101
Dominant appearance	0,141	0,203	0,089	-0,02	0,355*	-0,03	0,089
Texture	0,098	-0,131	0,033	0,247	0,054	0,017	0,053
Mass-void ratio	0,328*	0,339*	0,259	0,397*	0,041	0,05	0,209

** correlation was significant at the 0,01 level

* correlation was significant at the 0,05 level

The determined landscape types were evaluated by conducting a second round of expert survey in the Likert scale between −2 and +2 in line with the landscape visual quality parameters (naturalness, diversity, harmony, clarity, perspective, care, order, trust, scenic beauty, and recreational value). Primarily, frequency analysis and bivariate correlation analyses were performed on the data obtained as a result of the survey study.

In general silhouette landscape character type, the highest visual quality parameter is naturalness and the lowest parameter is care. In semi-natural landscape character type, the parameter with the highest visual quality average is landscape beauty, the lowest parameter is perspective and trust. In the lake landscape character type, the parameter with the highest average is naturalness and the lowest parameter is care. In rural road landscape character type, the parameter with the highest visual quality average is scenic beauty and the lowest parameter is diversity. In the mountain landscape character type, the highest visual quality average is the naturalness parameter, and the lowest average is the care parameter. In the cultural landscape character type, the parameter with the highest mean is harmony and the parameter with the lowest mean is care. Finally, in the agricultural landscape character type, the parameter with the highest average is naturalness and the parameter with the lowest average is scenic beauty. Considering the average and total scores of the character types, the parameters of naturalness and scenic beauty have quite high scores except the cultural landscape character type and the study concluded that naturalness is quite effective in the recreation potential. However, the lack of care greatly reduces the visual quality of Gölbaşı Pond and its surroundings and causes it not to be preferred.

In their study, Kaplan, Taşkın & Önenç (2006) evaluated the visual quality of both urban and rural environments and the positive or negative effects of each feature on the scene with visual quality assessment. Düzgüneş and Demirel (2015a) evaluated the natural and cultural resource values in terms of visual landscape quality in their study in National Parks. The results revealed that it is necessary to improve the naturalness parameter and minimize human interventions at the points where naturalness is low. In another study in which they evaluated the landscape quality of a rural coastal area. Düzgüneş and Demirel (2015b) aimed to protect

rich landscapes and ensure their sustainability and emphasized the development of strategies in this direction. In their studies, they used a method in which they evaluated visual landscape qualities according to landscape types. The study of Kıroğlu (2007) examined the visual quality parameter scores of the images with the highest scores and determined that naturalness, clarity, order, harmony, perspective, and recreational value parameters. Our study, on the other hand, looked at the general averages of the landscape character types that make up Gölbaşı Pond and its surroundings and concluded that the parameters of naturalness, perspective, trust, scenic beauty, and harmony increase the visual quality value of rural areas in the same way.

The study determined that in all landscape character types, there is a statistical link between scenic beauty and naturalness. As the naturalness in the areas is preserved, the scenic beauty improves. The study also revealed that the parameters of care, perspective, and order positively affect the scenic beauty. The results exhibit the fact that all parameters were positively correlated with each other. The study concluded that an arrangement, care, and security work carried out in the area will increase the visual landscape quality of all landscape character types and therefore the landscape quality of the entire area.

It is possible to observe that the increase in the clarity and perspective parameters increases the recreational value of the area with a strong or not strong correlation in all landscape types.

An examination in terms of recreational value reveals that GS has a very significant statistical relationship with scenic beauty, harmony, clarity, perspective, care, order, and trust. The study determined that SNL has a significant statistical relationship with scenic beauty, care, and order. It appears that LL has a very significant statistical relationship with scenic beauty, harmony, clarity, perspective, care, order, and trust, RRL appears to have a positive correlation with scenic beauty, naturalness, diversity, perspective, care, order and trust, ML appears to have a positive correlation with scenic beauty, diversity, harmony, clarity, care, order, and trust, CL seems to be partially positively correlated with scenic beauty, harmony, and clarity, AL is observed to have a positive correlation with clarity and care. These facts reveal that the landscape is a whole and that all parameters affect each other.

The character types of Gölbaşı Pond and its surroundings as a whole reveal that the touristic and recreational activities to be held and the facilities that will come with it – provided that the right planning is done and the naturalness of the area is preserved – will indirectly solve the problems of the area, which indicate the missing aspects of the area, such as neglect, disorder, insecurity, inadequacy of pedestrian roads, and inadequacy of parking lots.

According to the visual quality parameters of the area, to increase the scenic beauty and recreational value, and accordingly the visual quality in all landscape character types that make up Gölbaşı Pond and its surroundings, first of all, studies should be carried out to strengthen the care, order, and trust parameters of the area and increase their scores.

The scenic beauty parameters of the character types reveal that the highest average belongs to the semi-natural landscape character type. The lowest average is the cultural landscape, Looking at the semi-natural landscape image, it means that the area containing all the landscape elements does not have a uniform appearance. Looking at the photograph, which represents the cultural landscape character type, it is possible to see that the area is neglected and untidy and reduces the visual quality of the area.

An examination of the averages of the character types for the recreational value parameter exhibits that the semi-natural landscape character type has the highest average and the cultural landscape character type has the lowest average. The semi-natural landscape character type with a high average of scenic beauty is also most suitable for recreational activities.

As a result of their study in Shenyang China, Sun et al. (2021) stated that natural and formal features have a positive effect on visual quality, while man-made features have negative effects on visual quality. Similarly, Li et al. (2022) discussed the aesthetic value of the visual quality of the landscapes they created along the green axis by the river. In her study Kıroğlu (2007) applied Spearman correlation to these determined points and emphasized the connection between the scenic beauty and visual quality parameters.

As a result of the Spearman correlation between the scenic beauty and recreational value of the main components that make up the seven landscape character types representing Gölbaşı Pond, the connection between landscape components and visual quality parameters has been revealed.

Regarding general silhouette, it is possible to observe that there is a strong positive correlation between scenic beauty, water ratio, and mass-void ratio, and there is only a partially significant correlation between recreational value and mass-void ratio. It is clearly understood that the phenomenon of water is the most important factor that increases scenic beauty. Also, as perceptibility increases, it is possible to observe that both the beauty of the landscape and the recreational value will increase in direct proportion.

In semi-natural landscape, there is no correlation between scenic beauty and any landscape component, and it is possible to see that there is a partially significant correlation between recreational value and the type of topography and mass-void ratio. As the perceptibility increases, the recreational value is expected to increase proportionally.

Regarding lake landscape, there is a partially significant correlation between scenic beauty and texture and mass-void ratio.

In rural road landscape, there is a strong positive correlation between scenic beauty and the area with vegetation component. Also, there is a partially significant correlation between the degree of naturalness, positive man-made elements, and color diversity. There is a partially significant correlation between recreational value and positive man-made elements and mass-void ratio. The rural road landscape shows that with positive man-made elements, the area can be developed positively in terms of both recreational value and scenic beauty.

In mountain landscape, scenic beauty has a positive correlation only with the area with vegetation component. There is a partially significant correlation between recreational value and dominant appearance.

Considering cultural landscape, there is a strong positive correlation between the degree of naturalness of scenic beauty, positive man-made elements, and the mass-void ratio. It has a partially significant correlation negatively with negative man-made elements and positively with color diversity. There is a partially significant correlation with recreational value and positive human-made elements.

In agricultural landscape, it is possible to observe that there is a strong positive correlation between scenic beauty and dominant appearance.

According to the scoring given according to the photographs represented by the seven landscape character types and the Spearman correlation analysis made according to these scores, the character types other than the cultural landscape from the selected landscape character types were the characters reflecting the strengths, advantages, and potentials of Gölbaşı Pond and its surroundings. The study on the scenic beauty and recreational values reveals that the presence of water has a clear positive effect on the scenic beauty of the area. Also, perceptibility, vegetation, and mass-void ratio parameters seem to be the other main parameters that highlight scenic

beauty. The cultural landscape, on the other hand, was the point where the neglect and irregularity of the area stood out the most.

Perceptibility, positive man-made elements, and care parameters are found to be important for the recreational value of the area. This situation Bekdemir et al. (2010) emphasized in their study.

Consequently, the element that should not be ignored while planning recreational and touristic landscapes should be that the natural scenic beauty of Gölbaşı Pond and its surroundings and the mass-void ratio should be in such a way that they bring care, order, and a safe environment without any damages. Care should be taken that the landscape uses and the facilities to be built in the area do not disturb the natural structure of the area. All these data will express the touristic and recreational landscape character to planners. Also, the activities to be carried out with correct and protective planning in the area will make Gölbaşı more attractive without harming its natural structure. In general, the use of the area to be realized in accordance with the landscape character will allow long-term use of natural and cultural resources.

Data availability All data generated or analyzed during this study are included in this manuscript.

Declarations

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