

Examination of the Design Competence of Superstructures and Outdoor Facilities in the Dilek Peninsula Büyük Menderes Delta National Park

Burhan EŞLİK^{1*} , Tendü Hilal GÖKTUĞ² 

ORCID 1: 0009-0001-1596-9821- ORCID 2: 0000-0001-7544-9943

¹Aydın Adnan Menderes University, Institute of Science and Technology, Department of Landscape Architecture, 09000, Aydın, Türkiye.

²Aydın Adnan Menderes University, Faculty of Agriculture, Department of Landscape Architecture, 09000, Aydın, Türkiye.

* e-mail: 2311600102@stu.adu.edu.tr

Abstract

The design proficiency of recreational areas, superstructures, and outdoor facilities in national parks is a crucial aspect in the context of the identity of the National Park and visitor satisfaction. This research endeavors to assess the adequacy of 20 frequently utilized superstructures and outdoor facilities within the Dilek Peninsula Büyük Menderes Delta National Park, focusing on 16 design criteria. Observations conducted for this purpose revealed that directional signs received the highest rating, while trash bins received the lowest. Among the observed locations, the main axis location achieved the highest success percentage, whereas Kavaklıburun Bay scored the lowest. Considering the average success percentage across all locations, it was concluded that the Dilek Peninsula Büyük Menderes Delta National Park attained a partial success rate of 65.76%. In light of the results, new designs are proposed to enhance the d of the superstructures and outdoor facilities in the national park.

Keywords: Protected area, national park, outdoor facilities, design, recreation.

Dilek Yarımadası Büyük Menderes Deltası Milli Parkı'nda Bulunan Üst Yapı Tesisleri ve Donatı Elemanlarının Tasarım Yeterliliğinin İncelenmesi

Öz

Milli parklarda rekreasyon alanlarının tasarımı, üst yapı tesisleri ve donatı elemanlarının tasarım yeterliliği milli parkın kimliği ve ziyaretçi memnuniyeti bağlamında önemli hususlardan biridir. Bu araştırma, Dilek Yarımadası Büyük Menderes Deltası Milli Parkı içerisinde sıklıkla kullanılan 20 üst yapı ve dış mekân tesisinin yeterliliğini 16 tasarım kriterine odaklanarak değerlendirmeyi amaçlamaktadır. Bu amaçla yapılan gözlemler ve değerlendirmeler sonucunda en yüksek puanı yön tabelaları, en düşük puanı ise çöp kutuları almıştır. Gözlemlenen lokasyonlar arasında en yüksek başarı yüzdesini ana aks lokasyonu elde ederken, en düşük başarı yüzdesini Kavaklıburun Koyu elde etmiştir. Tüm lokasyonlardaki ortalama başarı yüzdesi dikkate alındığında Dilek Yarımadası Büyük Menderes Deltası Milli Parkı'nın %65,76 oranında kısmi başarı oranına ulaştığı sonucuna varılmıştır. Sonuçlar ışığında milli parktaki üstyapı tesisleri ve donatı elemanlarının tasarım yeterliliğini artıracak yeni tasarımlar önerilmiştir.

Anahtar kelimeler: Korunan alan, milli park, donatı elemanları, tasarım, rekreasyon.

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1. Introduction

The continual impact of human intervention on the natural environment precipitates substantial disruption within the ecological life chain and the depletion of finite resources. The persistence of humanity is contingent upon the existence and sustainable management of natural resources (Yücel & Babuş, 2005). Globally, there is a concerted effort to address the negative impacts on the environment (Caner, 2007; Kılıç & Kervankıran, 2019). In this context, modern conservation approaches focusing on internationally protected areas have emerged since the 19th century (Yücel, 1995; Atmış, Günşen, & Yıldız, 2020). During the early 20th century, policies formulated for the enhancement and preservation of the natural environment facilitated the spread of national parks and other protection statuses. (Dearden, Bennett & Johnston, 2005). The national park idea presented by American artist George Catlin, inspired by natural areas after her trip to America in 1832, pioneered the establishment of national parks in America (Cırık, 2007). Yellowstone, designated as the inaugural national park in America in 1872, catalyzed global conservation initiatives. These measures propelled conservation efforts internationally, inspiring the creation of the initial national parks in Australia (1879) and Canada (1885). The first national park in Europe was declared in Sweden in 1909. Meanwhile, in Turkey, Yozgat Çamlığı National Park was officially designated as the country's first national park in 1958 (Gülgün, Sayman & Aktaş, 2008).

In the National Park Law No. 2873, enacted in 1983 in our country, National Parks are defined as "pieces of nature with scientific and aesthetic, national and international rare natural and cultural resource values and conservation, recreation and tourism areas" (Demirayak, 2006).

National parks provide significant benefits in maintaining biodiversity by contributing to the protection of endemic plant and animal species, preserving water reservoirs, and improving weather conditions within green areas. Additionally, they play a crucial role in safeguarding important archaeological and historical sites found within national park boundaries.

National parks serve as crucial resources for nature education and research, offering scientists, students, and visitors valuable opportunities to explore and understand the natural environment. Furthermore, these parks promote engagement with nature, providing diverse avenues for recreational activities. Direct exposure to the natural environment is known to positively impact individuals' psychological and physical well-being. National parks not only afford visitors the chance to alleviate stress, unwind, and appreciate the beauty of nature but also contribute to the development of ecotourism in the park and its vicinity. This, in turn, supports a sustainable tourism model, making significant economic contributions to the region. The establishment of recreational opportunities within national parks creates employment prospects for local residents and bolsters the local economy through tourism-generated revenues. Additionally, national parks play a pivotal role in reinforcing regional identity by highlighting local culture and natural features.

Numerous superstructures and outdoor facilities are essential for accommodating recreational activities within the confines of national parks. Also, the design of recreational areas within these parks plays a pivotal role in shaping their identity. The selection and placement of superstructures and outdoor facilities in natural environments necessitate a meticulous design process that considers factors such as aesthetics, functionality, and environmental harmony. In these regions, it is imperative to prefer superstructures and outdoor facilities that are visually congruent with the natural surroundings, seamlessly integrating with both natural and cultural elements. Such elements should reflect the unique identity of the national park and the broader region while presenting an aesthetically pleasing appearance. However, materials used in these natural areas must exhibit resistance to extreme climatic conditions. Equally significant is the visual coherence of all equipment and superstructure facilities, their balanced placement in appropriate locations, and their provision in quantities sufficient to meet demand without causing confusion. Additionally, functionality is paramount; the chosen superstructure and outdoor facilities should be practical, perceptible, and exhibit a balance of size and proportion to cater to users of all abilities. Attention should be directed towards designing areas accessible to disabled individuals and children, prioritizing safety, and ensuring regular maintenance (Aksu, 2015).

Dilek Peninsula Büyük Menderes Delta National Park, which was determined as the study area, is one of the most visited national parks in Turkey. It also offers different recreational opportunities to visitors due to its diverse ecosystems, floristic and faunistic richness and vibrant topography. In this study, it was aimed to investigate the design adequacy of the superstructure facilities and reinforcement elements in the Dilek Peninsula Büyük Menderes Delta National Park. In this regard, 20 superstructure and outdoor facilities with different functions in the national park were evaluated on a 5-point Likert scale using 16 determined design criteria, deficiencies were identified and solution suggestions were presented.

2. Material and Method

2.1. Study Area: Dilek Peninsula Büyük Menderes Delta National Park is situated within the confines of Aydın province, encompassing an expansive area of 27,675 hectares. The park is a confluence of two distinct geographical formations, namely the Dilek Peninsula and the Menderes Delta. The Dilek Peninsula segment of the National Park was designated protected status in 1966, followed by the inclusion of the Büyük Menderes Delta in 1994. The highest elevation within the National Park is Dilek Tepe, boasting an average altitude of 650 meters and towering at 1237 meters, from which the park derives its name. Accessibility to the National Park is facilitated by the İzmir-Söke-Milas-Muğla state highway, with distances of 16 km from Söke, 24 km from Kuşadası, 41 km from Selçuk, 87 km from Aydın, 138 km from Çeşme, and 174 km from İzmir (Figure 1). Situated opposite the Greek island of Samos, this National Park marks the terminus of the Samsun Mountains extending towards the Aegean Sea. The northeastern region of the Dilek Peninsula section is bordered by the Güzelçamlı settlements, while the southeastern part is adjacent to Tuzburgazı settlements. Similarly, in the eastern expanse of the Menderes Delta section, residential areas such as Batıköy, Balat, and Akköy are present (Anonymous, 2016; Bingöl, 2011).

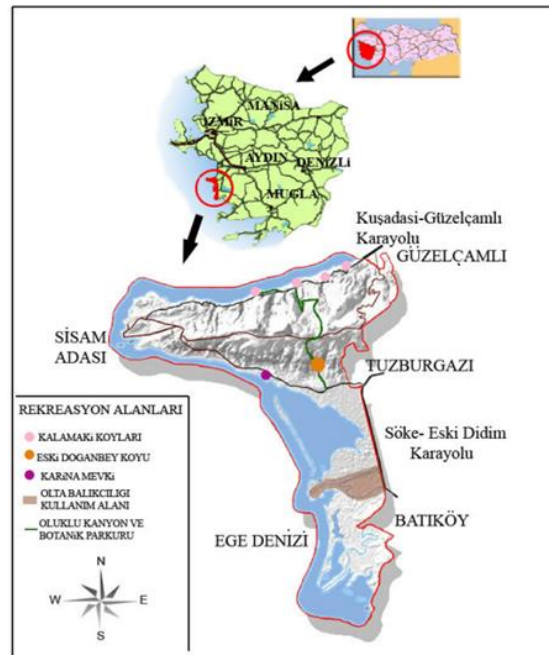


Figure 1. Geographical location of the National Park (Göktuğ, 2011)

The National Park stands as a preferred destination for residents of surrounding provinces and districts, particularly for daily recreational pursuits. The park comprises four designated daily-use areas, collectively known as Kalamaki Bays, strategically allocated to address the daily needs of visitors. These bays, namely İçmeler Bay, Aydınlık Bay, Kavaklıburun Bay, and Karasu Bay, serve as daily-use zones commencing from the national park's entrance. İçmeler Bay is situated 800 meters away from the National Park entrance, while the farthest bay, Karasu Bay, is located at a distance of 11 kilometers from the entrance gate. Among the various activities available, swimming, sunbathing, and picnicking are the most favored by visitors. Additionally, the park accommodates other recreational pursuits such

as trekking, cycling, botanical tours, photography, bird watching, and angling activities within its premises (Figure 2).

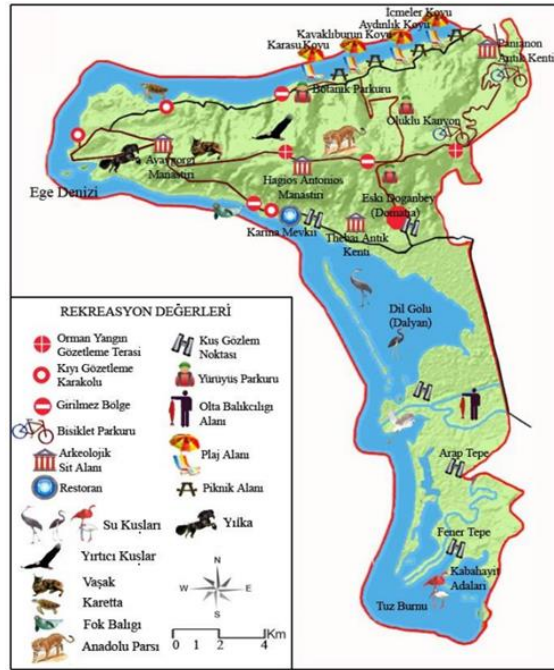


Figure 2. Dilek Peninsula Büyük Menderes Delta recreational map (Göktuğ, 2011)

In this study, an examination was conducted on the superstructures and outdoor facilities situated along the Kalamaki Bays and the primary road axis connecting these bays to the entrance gate of the National Park (Figure 3). The overall physical attributes of the locations, as well as the superstructures and outdoor facilities scrutinized, along with their respective quantities, are detailed in Table 1.

Table 1. Working locations and features

	İcmeler Bay	Aydınlık Bay	Kavaklıburun Bay	Karasu Bay
Area sizes/lengths	45.000 m ²	62.100 m ²	80.600 m ²	40.400 m ²
Distance to entrance	800 m	5 km	7 km	11 km
Superstructures and OutdoorFacilities and Along with Their Quantities				
Informative and warning signs	22	28	34	26
Restaurants	2	1	2	1
Product sales points / Kiosks	4	5	3	3
Trash cans	12	10	13	10
Toilets	2 (12 kabin)	3 (18 kabin)	4 (24 kabin)	3 (18 kabin)
Picnic tables	202	320	334	130
Benches and covered picnic tables	15	9	0	1
Fountains	12	12	11	5
Stairs	4	0	0	0
Parking lots	100 araçlık	145 m ²	2000 m ²	305 m ²
Directional signs	2	6	3	4
Showers	4	7	6	5
Dressing cabins	4 (12 kabin)	4 (12 kabin)	4 (12 kabin)	4 (12 kabin)
Children's playgrounds	2	0	2	0
Main Road Axle				
Area sizes/lengths	13 km			
Superstructures and OutdoorFacilities and Along with Their Quantities				
Entrance unit/Box Office	1			
Walking path length	1 km			
Landscape viewing terraces	3			
Bus stops	5			



Figure 3. Kalamaki Bays

2.2. Method

The methodology comprises four distinct stages. Initially, an extensive literature review pertaining to the subject and field of study was conducted in the first stage. Following this, observation forms encompassing superstructures and outdoor facilities, and design criteria were developed in the second stage. Subsequently, the study team completed these forms during on-site field monitoring and observation studies conducted within the National Park. In the third stage, the data collected in the observation forms were transcribed into the Microsoft Excel program, and average scores were computed. In consideration of these points: 1-An examination was conducted on the scores and total scores assigned to each superstructure and outdoor facility at each location based on every success criterion. 2-The total score and success percentage achieved by each superstructure and outdoor facility in each operational location were scrutinized, and a comparison was made across all locations. 3-The total score and success percentage attained by each superstructure and outdoor facility, concerning design criteria throughout the entire national park, were computed and analyzed. 4-A comprehensive integration of all data encompassing the National Park was undertaken, culminating in the revelation of the overall success rate. In the final stage of the methodology, diverse design suggestions were researched, developed, and presented to address the identified deficiencies in the design of superstructures and outdoor facilities.

In the study, 20 different superstructures and outdoor facilities within the National Park were examined using 16 design criteria (Tables 2 and 3).

Table 2. Superstructures and outdoor facilities

Code	Superstructure and Outdoor Facilities	Code	Superstructure and Outdoor Facilities
A	Informative and warning signs	K	Parking lots
B	Restaurants	L	Directional signs
C	Product sales points/Buffets	M	Vehicle roads
D	Trash cans	N	Showers
E	Toilets	O	Dressing cabins
F	Picnic tables	P	Children's playgrounds
G	Bench and other rest elements	R	Entrance unit/Box office
H	Fountains	S	Walking path and limiting elements
I	Footpaths	T	Landscape viewing terraces
J	Stairs	U	Bus stops

Table 3. Design Criteria

No	Design Criteria	No	Design Criteria
1	Use of natural materials	9	Material compatibility
2	Being in harmony with nature	10	Good location
3	Use of durable materials	11	Compatibility with the identity of the national park and the region
4	Being well-groomed/clean	12	Be detectable
5	being functional	13	Being aesthetic
6	To be safe	14	Compatibility with other equipment
7	Being ergonomic	15	Uses for disabled people
8	Size/ratio balance	16	Adequacy - meeting the need

The study leveraged the work of Atabeyoğlu & Bulut (2007) and Aksu (1998) for the formulation of design criteria, while the research conducted by Karakaya & Kiper (2011) and Aksu (2014) was utilized to assess these criteria. Each location, superstructure, and outdoor facility's adequacy concerning each design criterion was appraised using a 5-point Likert scale (0 = none, 1 = very inadequate, 2 = inadequate, 3 = partially sufficient, 4 = sufficient, 5 = very adequate). The resulting scores were then averaged.

For each observation area, the design scores for all superstructures and outdoor facilities were calculated, and the overall design success of the observation areas was expressed as a percentage by comparing the total obtained score to the maximum achievable total score. Additionally, the design success of each superstructure and outdoor facility throughout the study area was determined as a percentage. The success categories were classified as follows: the 0-30% range denoted unsuccessful, the 31-45% range denoted inadequate, the 46-60% range denoted partially successful, the 61-85% range denoted successful, and the 86-100% range denoted very successful.

3. Findings and Discussion

The photographs of the outdoor facilities observed in Dilek Peninsula Büyük Menderes Delta National Park are provided in Figure 4.





Figure 4. Some outdoor facilities in the National Park (Eşlik & Göktuğ, 2023a)

The scores assigned to the superstructures and outdoor facilities in Kalamaki Bays, as evaluated on a 5-point Likert scale, are presented in Table 4. Within the table, the respective Design Criteria are denoted by their corresponding numbers.

Analysis of Table 4 reveals that the superstructures and outdoor facilities in İcmeler Bay exhibit a generally ergonomic design (mean: 4.41) and appropriate positioning (mean: 4.41). However, shortcomings were identified in the use of natural materials (mean: 2.76) and overall harmony with the natural surroundings (mean: 2.94).

Similarly, in Aydınlık Bay, the superstructures and outdoor facilities are generally deemed adequate in number (mean: 4.60) and appropriately situated (mean: 4.40). Nonetheless, shortcomings were noted in the maintenance and cleaning of these facilities and equipment (mean: 2.87).

In Kavaklıburun Bay, it was determined that the superstructures and outdoor facilities are generally available in sufficient numbers (mean: 4.25) and appropriately positioned (mean: 4.00). However, considerations for disabled individuals (mean: 1.63) and aesthetic design (mean: 2.50) were found to be lacking.

Lastly, in Karasu Bay, it was observed that the superstructures and outdoor facilities are generally present in adequate numbers (mean: 4.07) and properly situated (mean: 3.93). However, deficiencies were identified in the consideration of the needs of disabled individuals (mean: 1.93) and the aesthetic appearance of the designs (mean: 2.71).

Table 4. The evaluation of the superstructure and outdoor facilities in Kalamaki Bays according to the design criteria on a 5-point Likert scale.

(0 = none, 1 = very inadequate, 2 = inadequate, 3 = partially sufficient, 4 = sufficient, 5 = very sufficient)
 (1-Use of natural materials, 2-Being compatible with nature, 3-Use of durable materials, 4-Being well-maintained/clean, 5-Being functional, 6-Balance of size/proportion, 9 -Material compatibility, 10-Good location, 11-Compatibility with the identity of the national park and the region, 12-Being perceptible, 13-Aesthetic, 14-Compatible with other equipment, 15-Use for the disabled, 16-Adequacy - meeting the needs)

Design Criterion No.	Aydınlık Bay																Mean Score																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16																				
Informative and warning signs	3	3	3	3	3	4	4	3	3	3	3	3	4	2	5	3	3	3	3	3	3	4	3	4	2	4	1	4								
Restaurants	2	1	3	5	5	4	5	4	5	1	3	4	2	3	1	3	2	4	3	5	5	4	3	2	3	1	2	3	1	5						
Product sales points/Bufets	4	4	4	5	5	4	5	1	4	5	3	5	4	3	4	1	3	2	5	5	5	5	2	2	5	2	5	3	2	4	2					
Trash cans	1	1	4	2	4	3	3	4	1	3	1	3	2	1	2	3	3	3	2	4	3	4	4	2	3	1	2	2	2	2	2					
Toilets	3	3	3	3	4	3	3	2	3	2	2	2	2	2	2	4	2	3	3	3	4	3	3	4	3	3	2	3	3	2	4					
Picnic tables	4	4	4	3	4	5	4	5	4	5	4	4	3	5	3	2	5	5	3	1	4	3	5	5	4	5	4	3	5	4	2					
Bench and other rest elements	4	4	4	5	4	4	5	5	4	5	5	4	4	5	3	4	4	4	4	4	4	4	5	5	4	5	4	5	4	4	4					
Fountains	1	2	5	4	4	5	5	5	4	1	4	4	2	4	4	2	4	3	2	1	1	3	3	2	3	3	1	4	3	2	1	4	2	4		
Footpaths	1	2	2	3	3	3	2	2	4	2	2	2	3	1	3	4	3	3	3	3	3	2	3	3	3	4	3	3	2	1	3	0	0	0	0	
Stairs	5	5	4	4	5	4	5	5	5	5	4	5	5	1	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Parking lots	3	3	2	3	3	3	3	3	3	3	2	2	5	1	2	2	2	3	2	3	2	3	2	2	3	1	1	2	2	1	2	2	1	5		
Directional signs	5	5	4	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	5	4	5	5	5	5	5	5	5	4	5	5	4	5	4	5	
Vehicle roads	2	2	5	4	4	5	5	4	4	5	2	4	3	2	1	5	2	2	5	4	5	5	5	4	4	5	2	4	3	2	1	5	0	0	0	
Showers	1	2	5	4	4	5	5	5	4	1	4	4	2	4	4	3	3	2	1	1	3	3	3	1	4	3	2	1	4	2	1	4	2	4	2	4
Dressing cabins	3	3	3	3	4	3	3	2	3	2	2	2	2	2	2	4	5	5	3	1	3	2	3	3	5	4	3	3	5	4	3	3	5	1	4	
Children's playgrounds	4	4	3	4	5	4	5	5	3	3	4	3	4	1	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean Score	2,76	2,98	3,59	3,76	4,24	4,12	4,41	4,00	3,76	4,41	3,18	3,94	3,82	3,88	3,12	4,29	3,13	3,27	3,33	2,87	3,67	3,73	3,93	3,80	3,47	4,40	3,47	3,73	3,33	4,13	3,00	4,60	0	0	0	
Kavaklıburun Bay																																				
Informative and warning signs	3	3	3	4	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	3	3	4	4	4	3	4	4	3	4	4	3	3	4	1	4	
Restaurants	3	2	4	3	5	5	4	3	2	3	1	2	2	3	1	5	2	2	4	3	5	5	4	3	2	3	1	2	2	3	1	5	0	0	0	
Product sales points/Bufets	3	3	5	5	5	5	2	2	5	2	5	3	2	4	2	2	2	4	3	5	5	4	3	2	3	1	2	2	3	1	5	0	0	0	0	
Trash cans	2	2	3	2	3	3	3	2	3	3	2	3	3	3	1	3	2	2	3	2	4	3	4	4	2	3	2	2	2	2	2	2	2	2	3	
Toilets	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4
Picnic tables	5	5	3	2	4	4	5	5	5	5	5	4	3	5	4	2	5	5	3	2	4	4	5	5	5	5	5	5	4	3	5	4	3	5	4	2
Bench and other rest elements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	4	4	4	4	4	5	4	5	4	5	4	4	5	4	4	5	4	4
Fountains	3	3	2	2	1	3	3	3	1	4	3	2	1	4	2	4	3	3	2	2	1	3	3	3	1	4	3	2	1	4	2	1	4	2	4	
Footpaths	3	3	3	3	3	3	2	3	3	3	3	3	3	3	2	1	2	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3	3	2	1	3
Stairs	2	2	3	3	3	3	2	2	3	4	1	1	2	2	1	5	2	2	3	3	3	3	2	2	3	2	2	2	2	2	2	2	2	2	1	5
Parking lots	5	5	4	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	
Directional signs	2	2	2	2	1	2	3	3	1	4	2	2	1	3	1	4	2	2	2	1	2	3	3	1	4	2	2	2	1	3	1	4	2	2	1	5
Vehicle roads	2	2	2	2	1	2	3	3	1	4	2	2	2	2	2	4	5	5	3	4	4	3	3	3	1	4	2	2	1	3	1	4	2	2	1	4
Showers	3	3	3	3	4	3	3	2	3	2	2	2	2	2	2	4	5	5	3	4	4	4	3	4	3	5	4	4	4	4	5	1	4	5	1	4
Dressing cabins	4	4	3	4	5	4	5	5	3	4	3	4	3	4	1	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Children's playgrounds	4	4	3	4	5	4	5	5	3	4	3	4	3	4	1	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean Score	3,07	3,00	3,29	3,25	3,38	3,50	3,50	3,50	3,75	4,00	2,63	2,88	2,50	3,00	1,63	4,25	3,14	3,14	3,36	3,07	3,57	3,71	3,71	3,57	3,07	3,93	3,00	3,00	2,71	3,43	1,93	4,07	0	0	0	

The scores received by the superstructures and outdoor facilities located on the main axis, providing access to all bays of the National Park, are presented in Table 5 using a 5-point Likert scale. It was found that the superstructure and outdoor facilities on the main axis were positioned very well (mean: 5.00), and there was great attention to size/ratio balance (mean: 5.00) in the designs. Nevertheless, it was observed that the designs lacked consideration for individuals with disabilities (mean: 1.75).

Table 5. Evaluation of the superstructure and outdoor facilities on the main axis on a 5-point Likert scale according to design criteria

	Main Axle															
	Design Criterion NO															
Outdoor facilities	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Entrance unit/Box Office	3	3	5	5	5	5	5	5	4	5	2	5	4	3	4	5
Walking Path and Limiting Elements	5	5	4	4	3	3	3	5	5	5	4	3	4	4	1	3
Landscape viewing terraces	4	4	4	4	5	3	5	5	4	5	2	5	4	4	1	5
Bus stops	5	5	4	4	5	5	5	5	5	5	4	4	4	5	1	4
Mean Score	4,25	4,25	4,25	4,25	4,50	4,00	4,50	5,00	4,50	5,00	3,00	4,25	4,00	4,00	1,75	4,25

(0=not at all, 1=very inadequate, 2=insufficient, 3=partially sufficient, 4=sufficient, 5=very sufficient)

(1- Use of natural materials, 2- Being in harmony with nature, 3- Use of durable materials, 4- Being well-groomed/clean, 5- Being functional, 6- To be safe, 7- Being ergonomic, 8- Size/ratio balance, 9- Material compatibility 10- Good location, 11- Compatibility with the identity of the national park and the region, 12- Be detectable., 13- Being aesthetic, 14- Compatibility with other equipment, 15- Uses for disabled people, 16- Adequacy - meeting the need)

The total score and success percentage received by each superstructures and outdoor facilities in each working location are presented in Table 6. Additionally, in Table 6, the total score and success percentage received by each superstructures and outdoor facilities in terms of design criteria throughout the National Park, and the total score and success percentage received from all outdoor facilities in each bay are presented.

Table 6. Score distributions of superstructure and outdoor facilities

Facilities (Code)	IÇMELER BAY		AYDINLIK BAY		KAVAKLIBURUN BAY		KARASU BAY		MAIN AXLE		ALL LOCATIONS	
	T.S.	S.P.	T.S.	S.P.	T.S.	S.P.	T.S.	S.P.	T.S.	S.P.	T.S.	S.P.
A	52	%65	50	%62,5	50	%62,5	56	%70	-	-	208	%65
B	49	%61,25	48	%60	48	%60	47	%58,75	-	-	192	%60
C	61	%76,25	58	%72,5	58	%72,5	47	%58,75	-	-	224	%70
D	38	%47,5	42	%52,5	42	%52,5	42	%52,5	-	-	164	%51,25
E	44	%55	48	%60	50	%62,5	49	%61,25	-	-	191	%59,68
F	63	%78,75	63	%78,75	66	%82,5	66	%82,5	-	-	258	%80,625
G	69	%86,25	69	%86,25	-	0	69	%86,25	-	-	207	%86,25
H	59	%73,75	40	%50	41	%51,25	41	%51,25	-	-	181	%56,56
I	38	%47,5	46	%57,5	43	%53,75	44	%55	-	-	171	%53,43
J	72	%90	0	0	0	0	0	0	-	-	72	%90
K	44	%55	37	%46,25	39	%48,75	40	%50	-	-	160	%50
L	78	%97,5	78	%97,5	78	%97,5	78	%97,5	-	-	312	%97,5
M	58	%72,5	58	%72,5	58	%72,5	58	%72,5	-	-	232	%72,5
N	59	%73,75	40	%50	35	%43,75	35	%43,75	-	-	169	%52,81
O	44	%55	55	%68,75	44	%55	62	%77,5	-	-	205	%64,06
P	60	%75	50	%62,5	61	%76,25	-	-	-	-	121	%71,25
R	-	-	-	-	-	-	-	-	68	%85	36	%85
S	-	-	-	-	-	-	-	-	61	%76,25	31	%76,25
T	-	-	-	-	-	-	-	-	64	%80	36	%80
U	-	-	-	-	-	-	-	-	70	%87,5	31	%87,5
%	888	%55,5	732	%50,8	713	%49,5	734	%50,9	263	%82,1	3330	%57,76

(0-30% unsuccessful, 31-45% inadequate, 46-60% partially successful, 61-85% successful, 86-100% very successful) (T.P. Total Score, B.Y. Success Percentage)

(A-Informative and warning signs, B-Restaurants, C-Product sales points/Buffets, D-Trash cans, E-Toilets, F-Picnic tables, G-Banks and other recreational elements, H-Fountains, I-Pathways roads, J-Stairs, K-Car parks, L-Directional signs, M-Vehicle roads, N-Showers, O-Dressing cabins, P-Children's Playgrounds, R-Entrance unit/Tollbooth, S-Walking Path and Limiting Elements, T-View observation terraces, U-Bus Stops)

In accordance with the assessments, the initial three superstructures and outdoor facilities, exhibiting highly successful designs (86-100%) throughout the National Park, comprise directional signs (97.5%), stairs (90%), and bus stops (87.5%). Conversely, the concluding three superstructures and outdoor

facilities, identified as partially successful across the National Park, encompass car parks (50%), garbage bins (51.25%), and footpaths (53.43%). Notably, based on the evaluations, superstructures and outdoor facilities in the National Park were deemed unsuccessful (0-30% unsuccessful) or inadequate (31-45% inadequate) in terms of design criteria.

Upon scrutinizing the success percentages of the study locations, it is evident that the total success percentage of superstructures and outdoor facilities along the main axis, providing access to all bays of the National Park, is the highest at 82.1%, while Kavaklıburun Bay registers the lowest total success percentage at 49.5%.

Summing up all location success percentages, the superstructures and outdoor facilities within the Dilek Peninsula Büyük Menderes Delta National Park were noted to be partially successful, achieving an overall success rate of 57.76%

4. Conclusion and Suggestions

National parks are among the most important natural areas that are protected due to their natural and cultural values and also meet the recreational needs of the public. One of the most important purposes of recreational activities carried out in national parks is for visitors to get away from the cultural landscape and get to know natural areas, understand nature, and feel the integrity of nature. In this context, decisions on activities to be carried out in national parks and recreation area plans should be made based on scientific foundations.

In addition, the designs of superstructures and outdoor facilities in recreation areas in national parks should be compatible with the cultural identity and natural structure of the national park, durable, in sufficient numbers, and have aesthetic and functional functions. In this context, the designs of superstructures and outdoor facilities in national parks cannot be expected to have the same design features as other superstructures and outdoor facilities used in open and green areas in cities. The main concern in terms of design in national parks should be to prevent the natural landscape image from evolving into a cultural landscape.

In this study, the design success of of superstructures and outdoor facilities within the recreation areas of Dilek Peninsula Büyük Menderes Delta National Park was assessed through the examination of 16 design criteria. Upon evaluating the findings derived from field studies, it was determined that the designs of of superstructures and outdoor facilities utilized in the National Park achieved a partial success rate of 57.76%.

It has been observed that most of the parking areas situated at the entrance of each bay in the National Park lack regularity, suffer from poor visibility, and are not in harmony with the natural surroundings. The influx of heavy vehicle traffic at the National Park causes insufficient parking space. As a consequence, vehicles often resort to parking along the roadsides and even encroach into the picnic areas. Additionally, in designing parking lots within protected areas, it is essential to prioritize ecological and conservation-oriented approaches over accommodating visitor numbers. The size of parking areas should be determined exclusively by taking into account public transportation and emergency vehicle entrances (ambulance, fire brigade, etc.). Additionally, parking solutions for visitors outside the National Park area should be implemented.

Four bays, designated as Kalamaki Bays, situated in the Dilek Peninsula section of the National Park, experience high levels of utilization, particularly in the summer season. Within the National Park, where the recreational carrying capacity is disregarded, and no visitor management tools are employed, the National Park gates are closed, and visitor reception is suspended on weekends, coinciding with the unavailability of parking areas and roadsides. Confronted with intensified usage, in addition to the inherent physical characteristics of the area, the superstructure facilities and equipment elements suffer from inadequacy in terms of quantity, making the control, maintenance, and cleaning of the area challenging.

One of the primary challenges arising from the dense visitor masses is the issue of solid waste. On crowded days, garbage is indiscriminately discarded as bins reach full capacity. Leaking water from

these waste containers not only contaminates the ground but also attracts wild animals to the vicinity. While foraging through garbage cans to meet their nutritional needs, garbage bins may inadvertently topple or wild animals become trapped inside the bins, resulting in potential injury or even fatality.

A design proposal for garbage bins has been developed and illustrated in Figure 5. In this design suggestion, the trash can lid is opened by pulling it forward and the garbage is placed inside this lid. In this way, wild animals cannot enter the trash can. The accumulated garbage can be emptied by unlocking the discharge door located on the side of the trash can. Impregnated pine was selected as the primary material for the main body in this design.

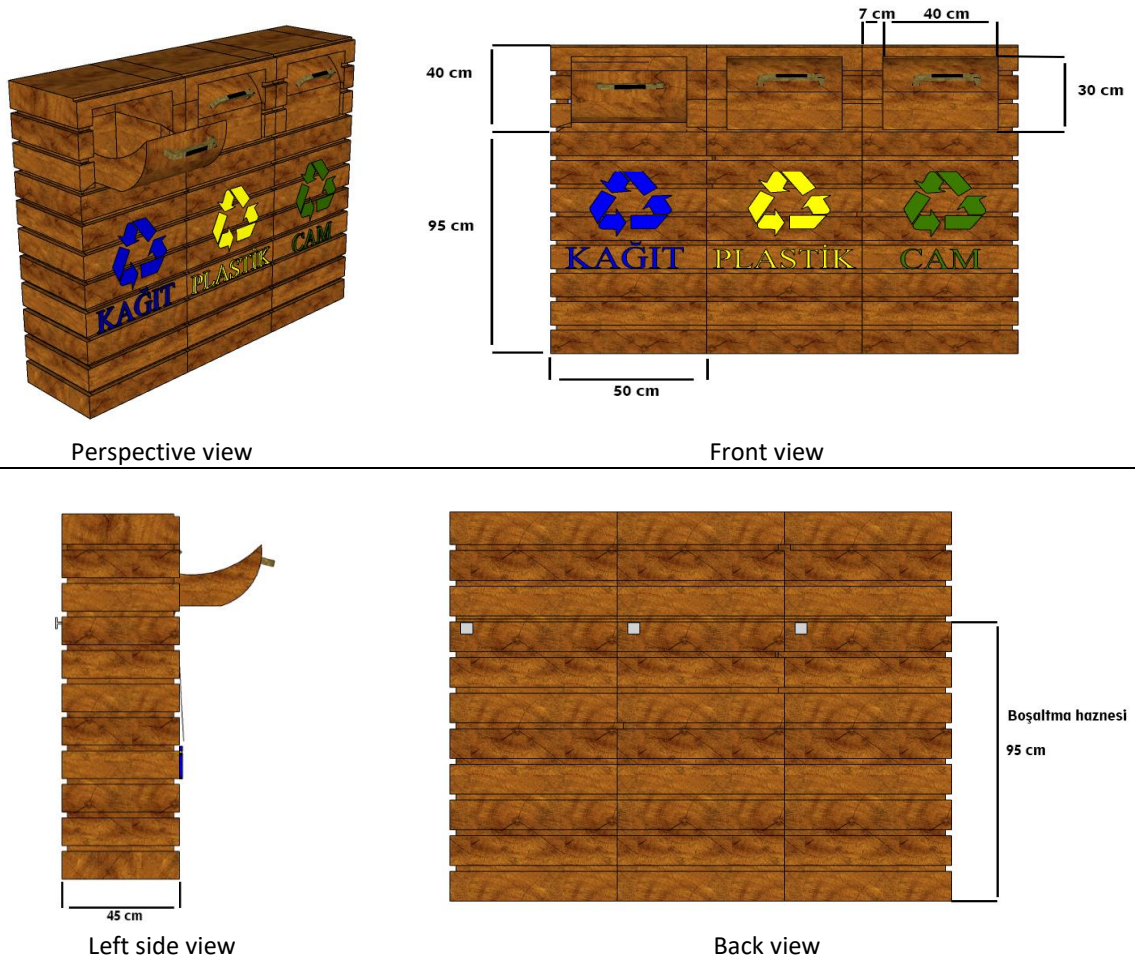


Figure 5. Trash can design (Eşlik & Göktuğ, 2023b)

The most preferred bay among the Kalamaki Bays is İçmeler Bay, due to its proximity to the entrance gate and possession of the only beach and shallow sea among the bays. İçmeler Bay has recently undergone reorganization through landscaping projects, resulting in the renewal of the majority of superstructure facilities and equipment elements. The newly installed picnic tables, restaurants, and buffets have been identified as well-maintained and functional. However, an observation reveals a lack of integration with the natural landscape image, and the quantities and numbers exceed those stipulated in the long-term development plan of the National Park and the technical specifications of the recreation areas. Similarly, it has been determined that too many pedestrian paths have been created in the area beyond the needs, and sand and gravel brought from outside in designing these paths have damaged the lower vegetation and natural texture. Floral designs were incorporated around these paths with exotic plants that are not part of the natural vegetation of the national park. This situation has been observed to negatively impact the natural landscape image of İçmeler Bay. Furthermore, an excessive number of picnic tables has compromised the wild and untouched appearance of the area, making it resemble an ordinary recreation space. In national parks protected

for their natural qualities, the design of superstructure facilities and equipment elements should not compromise the natural texture, flora, and fauna, and should prioritize aesthetic concerns.

It is crucial to acknowledge that the perception of aesthetic appearance in national parks significantly differs from that in open and green urban areas. Therefore, the chosen materials for designs must be durable and harmonize with nature. Although the fountains designed in İcmeler Bay are constructed from metal, a durable material, they appear incongruent with nature. The fountains in other bays exhibit partial compatibility with nature but suffer from poor maintenance, low functionality, and aesthetic appeal. As an alternative to these fountains, a design utilizing natural wood material is presented in Figure 6. In this fountain design, the interior of an impregnated pine tree is carved, housing a clean water pipe that allows water to flow into the fountain. The reservoir, through which the water flows, retains water up to a certain level. When the water reaches the discharge pipe's level, it is released. This designed fountain effectively caters to wildlife's water needs by accumulating water in its reservoir up to a specified level.

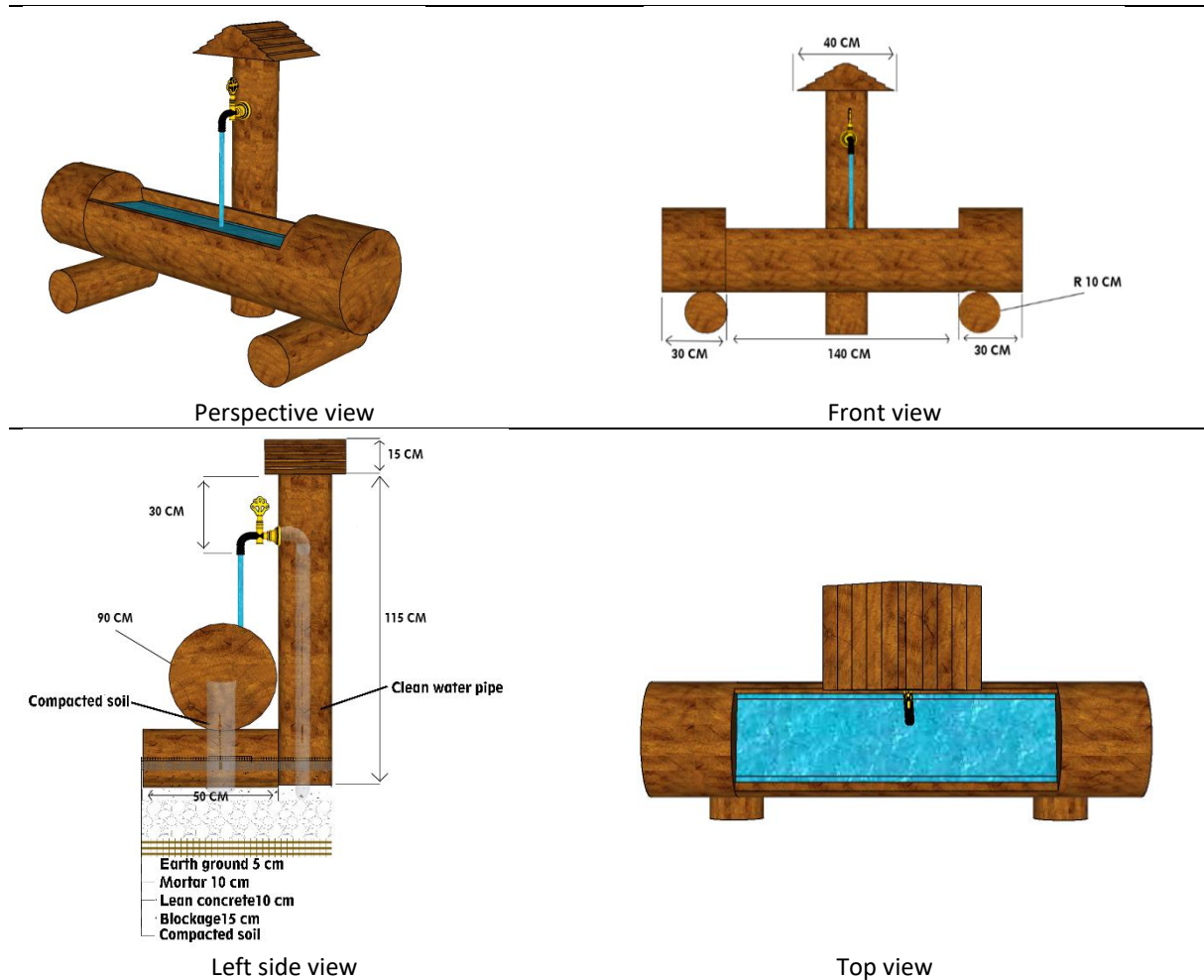


Figure 6. Fountain design (Eşlik & Göktuğ, 2023b)

During the observations, two distinct picnic table designs were identified in İcmeler Bay. However, these designs lack visual coherence with each other, and it was observed that the newly added picnic tables obstruct the view and do not aesthetically adhere to principles such as balance, form, and ratio/proportion. Conversely, picnic table designs in other bays were found to be conventional, exhibiting signs of neglect and damage. As an alternative to these benches, a bench design utilizing natural wood material is presented in Figure 7.

Solid fir material with its natural form intact was employed for the legs, seat, and upper part of the bench. During the assembly of this bench, grooves were created in the areas where components were fixed together, ensuring a seamless fit without the use of any screws.

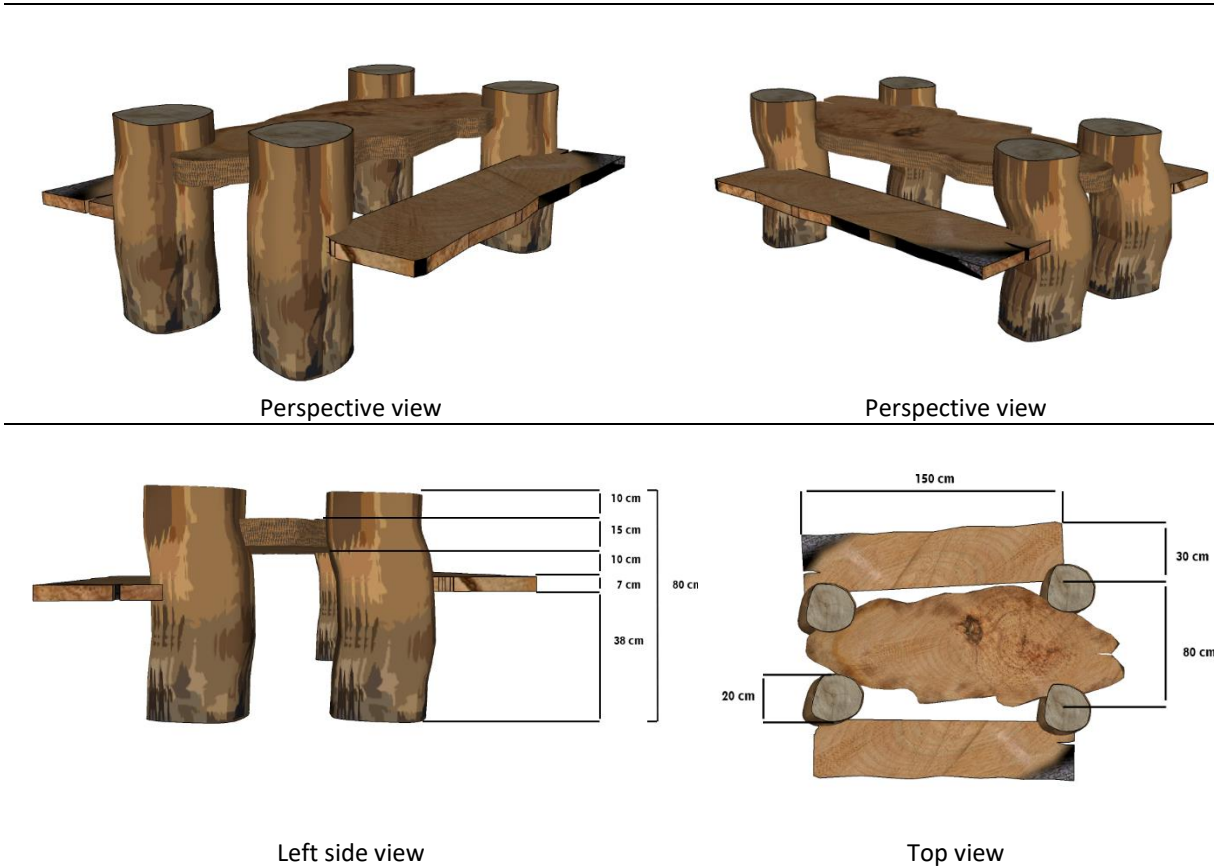


Figure 7. Picnic table design (Eşlik & Göktuğ, 2023b)

One of the essential elements in national parks includes information boards and warning signs. Information boards play a crucial role in explaining the natural and cultural wealth of the National Park, offering insights into recreational activities, and thereby providing visitors with valuable information. Warning signs are pivotal for visually communicating visitor rules, designated areas, and behaviors, emphasizing situations that require visitor sensitivity. Therefore, it is imperative that these panels and signs are visually striking, appropriately positioned, and easily readable. During the inspections, it was observed that many of these elements had lost their functionality due to faded and unreadable inscriptions. An alternative design has been developed, incorporating a roof system to mitigate the impact of adverse weather conditions on informative and warning signs used in the National Park, as presented in Figure 8. The design utilizes impregnated pine for the construction of the sign's poles and roof, with mica serving as the protective material for the written content on the sign.



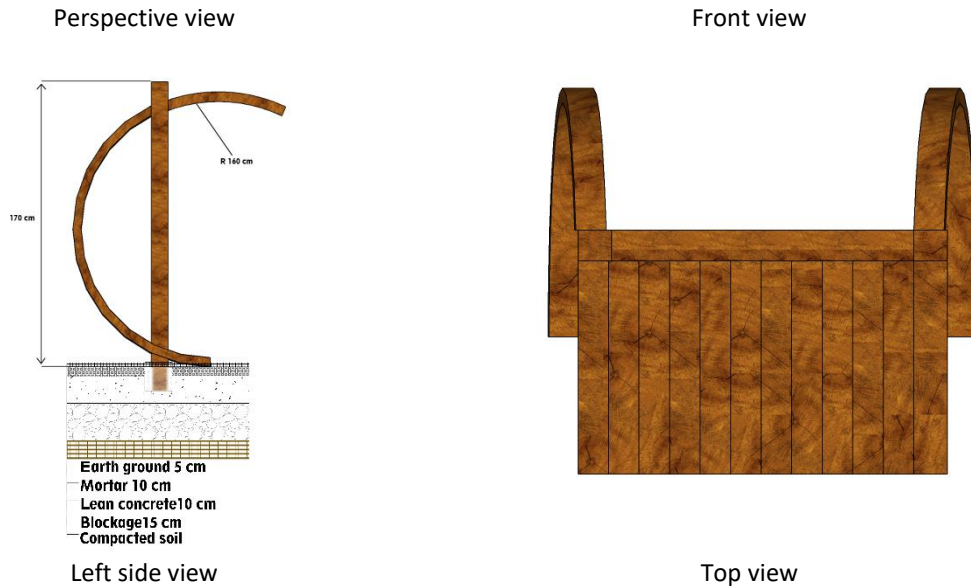


Figure 8. Informative sign sample design (Eşlik & Göktuğ, 2023b)

As a result of the evaluations conducted on the design criteria of the children's playgrounds in the National Park, it can be concluded that it achieved a success rate of 71.25%, indicating a commendable success. Nevertheless, children's play elements in the National Park exhibit similar features and functions as those found in urban areas. Instead of conventional children's play elements in national parks, there is an opportunity to incorporate educational designs where children can learn various aspects of the national park, such as flora and fauna, through play. To illustrate this concept, a game element was designed in which the image of a wild animal native to the National Park is completed when pieces are rotated and aligned, as depicted in Figure 9. The main frame and roof of the design utilize impregnated pine wood, circular PVC is employed in the rotation mechanism, and mica material serves as a protector on the informative game board.

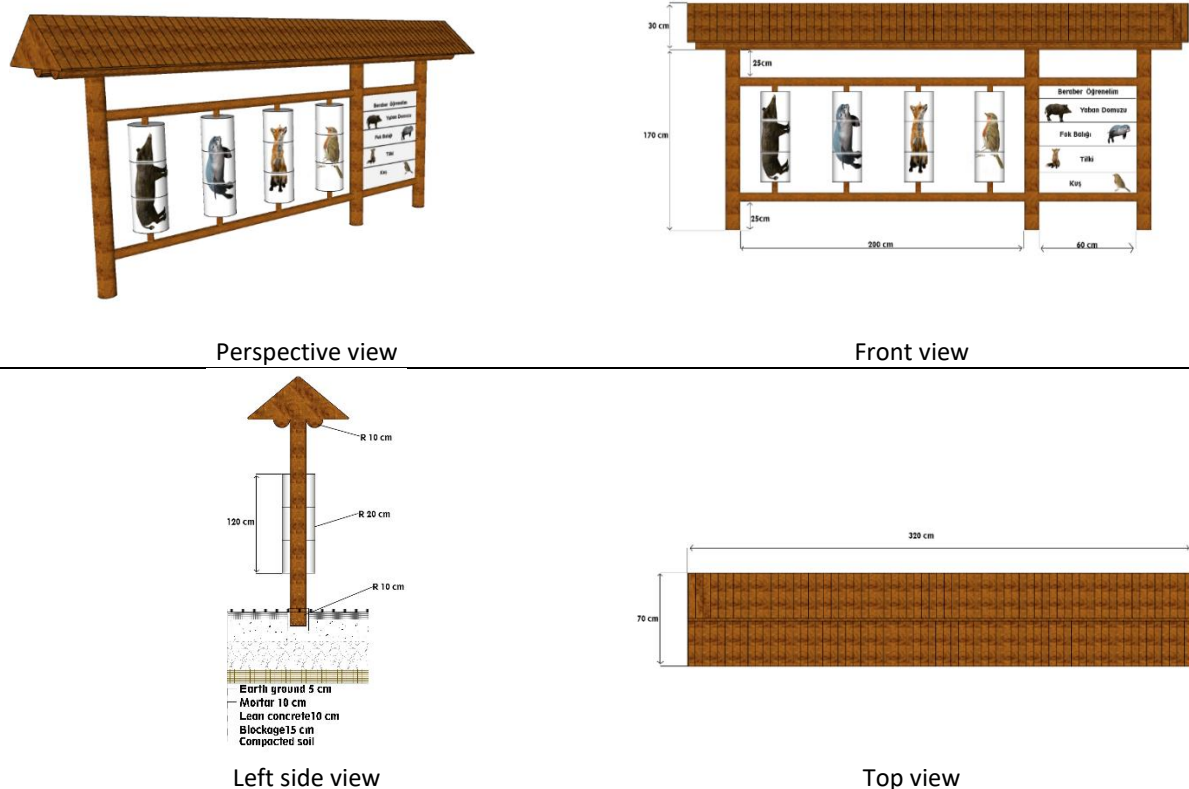


Figure 9. Design of a fauna activity game called "Beraber Öğrenelim" (Eşlik & Göktuğ, 2023b)

In the design depicted in Figure 10, panels featuring pictures and names of endemic species in the National Park are mounted on a rotating mechanism. The objective is to provide an enjoyable learning experience for children, allowing them to simultaneously have fun and gain knowledge about significant plant species in the National Park. The main frame of the design is constructed using untreated oak wood, ensuring durability. A sand membrane is employed for the roof due to its high resistance, and a steel material is used in the mechanism facilitating the rotation of the panels.

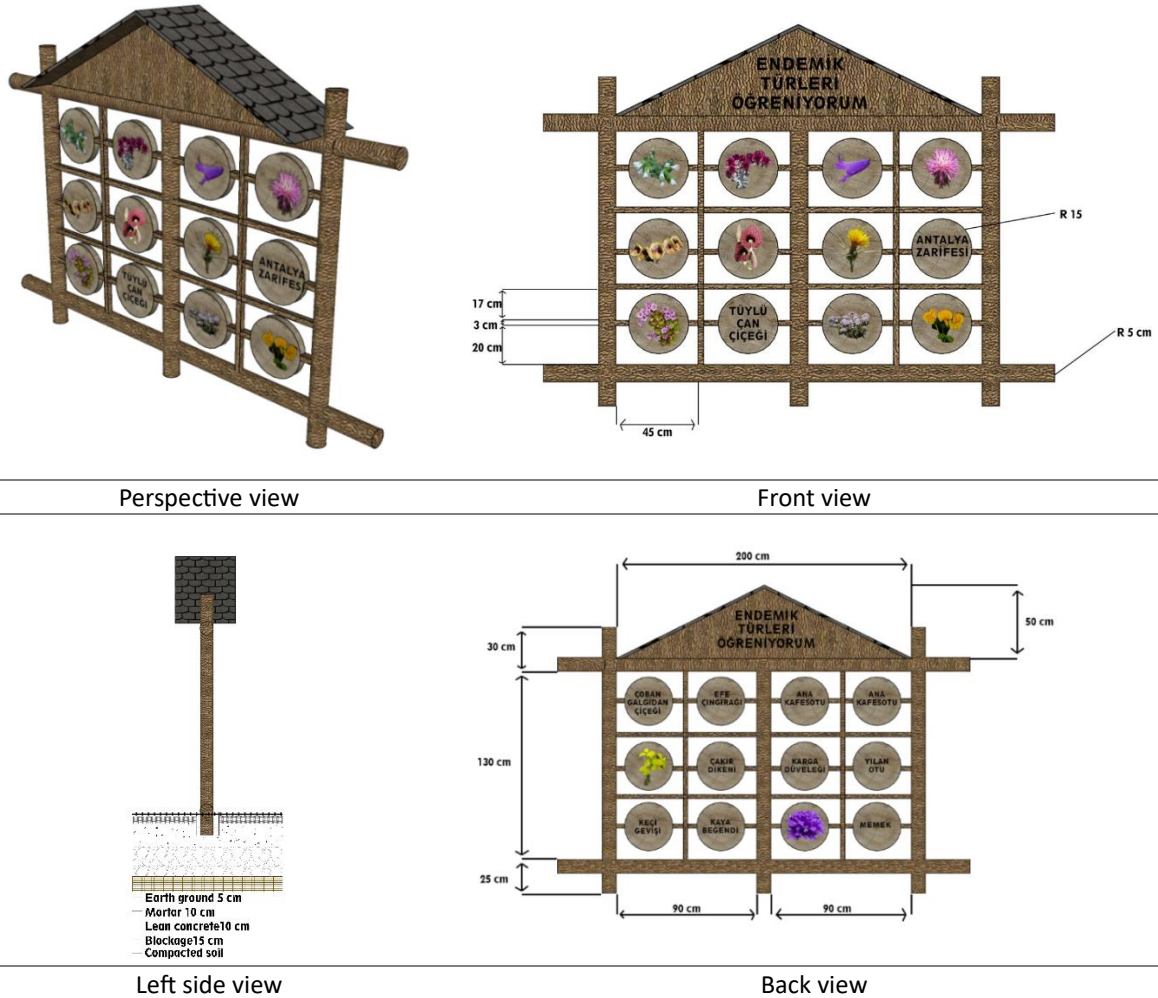
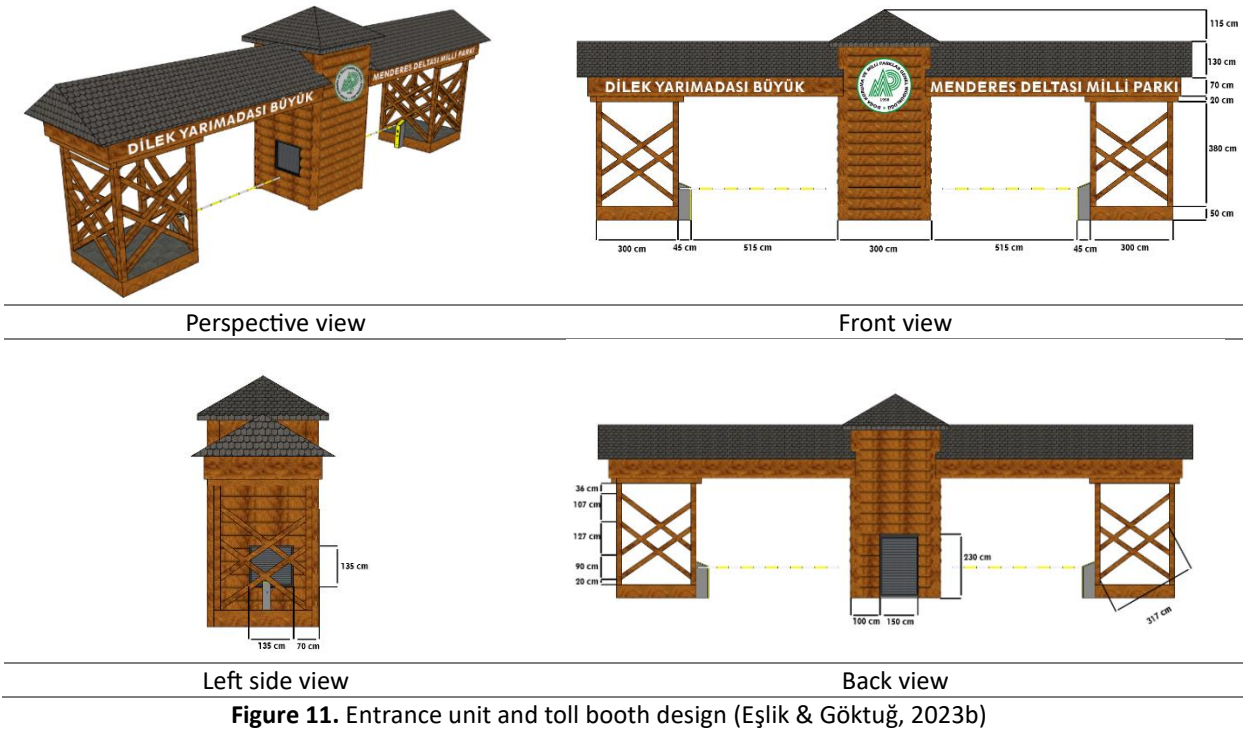


Figure 10. Plant activity game design called "Endemik Türleri Öğreniyorum" (Eşlik & Göktuğ, 2023b)

The entrance gates of national parks serve as crucial elements symbolizing the park, shaping visitors' initial impressions. Consequently, these gates are expected to feature natural or nature-inspired designs that effectively express the core values of the national park. In the conducted evaluations, the entrance gates and toll booths at the Dilek Peninsula were found to have an 85% success rate concerning design criteria, classifying them as 'successful.' However, they garnered average to below-average scores in terms of the design criteria related to the 'use of natural materials,' 'reflection of the national park's identity,' and 'harmony with nature.' As a response, an alternative design proposal has been developed for the entrance gate and toll booths (Figure 11). This design encompasses both entrance and exit directions, with the ticket booth strategically placed at the center. The toll booth and main frame are crafted from impregnated pine trees, while a highly durable sandy membrane material is employed for the roof.



The subsequent recommendations have been offered for the design of superstructure facilities and equipment within the National Park:

Firstly, the pedestrian path originating from the administrative building at the National Park's entrance, leading to İçmeler Bay, could be extended to Karasu Bay, the final bay designated for recreational activities, utilizing the space allocated for vehicular traffic.

Upon scrutiny, it was discerned that superstructure facilities and equipment in all bays lacked consideration for the utilization by individuals with disabilities. There is a pressing need for designs that prioritize accessibility for disabled individuals. Consequently, it is imperative to ensure that forthcoming designs adhere to universal design principles, accommodating the diverse needs of the entire societal spectrum (Belir, 2021).

In conclusion, when formulating designs for the superstructure facilities and equipment within the Dilek Peninsula Büyük Menderes Delta National Park, meticulous attention should be given to soliciting input from expert groups and users. The resultant designs should embody the National Park's identity, satisfying functional, aesthetic, and universal design criteria. It is anticipated that such an approach will elevate its standing, both nationally and internationally.

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The article adhered to national and international research and publication ethics. Ethics committee approval was not necessary for the study.

Author Contribution and Conflict of Interest Declaration Information

All authors contributed equally to the article.

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