Uluslararası İleri Doğa Bilimleri ve Mühendislik Araştırmaları Dergisi
Sayı 9, S. 304-313, 3, 2025

Araştırma Makalesi

IJANSER
https://as-proceeding.com/index.php/ijanser
ISSN:2980-0811

International Journal of Advanced Natural Sciences and Engineering Researches
Volume 9, pp. 304-313, 3, 2025

Research Article

Recreation Potential of Biga District in The Sub-Component of Ecological Planning

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(Received: 12 March 2025, Accepted: 16 March 2025)

(6th International Conference on Innovative Academic Studies ICIAS 2025, March 12-13, 2025)

ATIF/REFERENCE: Turan, A. Ç., Güneş, H. & Oglou, A. C. (2025). Recreation Potential of Biga District in The Sub-Component of Ecological Planning. *International Journal of Advanced Natural Sciences and Engineering Researches*, 9(3), 304-313.

Abstract – From the Industrial Revolution to the present day, cities have tried to find solutions to many problems due to increasing population density. One of these problems is recreational areas, which are defined as entertainment and rest areas that will meet the spiritual and physical needs of individuals. Recreational areas were needed as socializing areas, especially in suburbs with low quality of life around industrial zones. Along with developing urbanization models, ecological functionality has also been defined in the definition and potential of recreational areas. We see the best planning examples of this functionality in McHarg's overlapping method. In addition, McHarg's ecological planning approach aims to ensure the sustainability of a holistic city-nature development for the livability of cities. According to the ecological planning method used by McHarg; natural, cultural, social, aesthetic, political and historical inventories are each analyzed, interpreted and evaluated separately in terms of area use. In this article, the McHarg ecological planning method was used to determine the recreation potential of Biga District. Recreational potential areas of Biga District were determined according to the sub-criteria of transportation, forest, land use ability and proximity to water depending on land uses. The weight criterion was evaluated out of 5 points in areas divided into 1x1m^2 grids. In determining potential areas, green areas in the city center that are suitable in terms of areal size and functional areas were included in the analysis. As a result of the analysis, alternative areas were determined on the coastline for mountain camping, hiking routes of varying difficulty levels, horseback riding, horseback tours, horse racing, equestrian polo sports, alternative forest areas, tent and caravan camping areas, surfing, kite surfing, swimming, diving, snorkeling and water cycling sports.

Keywords – Ecological Planning, Threshold Analyses, Recreation, Landscape Planning, Biga.

I. INTRODUCTION

In today's world, with increasing cultural, economic, and social opportunities, the exhausting, intense, monotonous, and disciplined lifestyle has confronted individuals with various psychological and physical

problems. Seeking to escape from this negative environment, entertain themselves, and relax, individuals have expanded and diversified their leisure activities, influenced by changing artistic conditions. The pursuit of various entertainment and relaxation activities aimed at relieving the stress and intensity of work life and renewing oneself both mentally and physically has led to the emergence of the concept of recreation [1].

The concept of recreation, used as a means of utilizing leisure time, has various definitions in the literature. The word "recreation" is derived from the Latin word "Recreare," which means renewal and re-creation. However, over time, its meaning has evolved, and today it is expressed as "the revitalization of the soul or spiritual power, a rebirth" [2]. From a historical perspective, this concept has generally been used in the sense of improving individuals for work life. Studies in the field of recreation reveal that there is no universally accepted definition of the term. Some scholars define recreation by emphasizing its role in socialization and social acceptance, while others focus on its characteristic as an activity performed during leisure time [3].

In summary, recreation refers to entertaining and relaxing activities that individuals or social groups voluntarily engage in during their free time. In modern times, this concept continues to gain new meanings. Depending on individuals' participation in recreational activities for different reasons, and due to economic, social, environmental, and cultural conditions, the concept is defined in various ways [4].

The first stage of the planning process consists of base maps, satellite images, existing plans, zoning implementation and parceling maps, geoscientific studies, protected areas, conservation status areas, coastal boundary lines, property information, agricultural, forest, and pasture lands, water resources and protection zones, as well as thresholds that provide data for planning and institutional data related to investment areas. In field studies within the planning process, land use maps are updated, and surveys with social, economic, and spatial content are conducted [5].

In the second stage of planning, analysis and synthesis are conducted. This stage includes studies such as development potential assessment, problem analysis, threshold synthesis, population forecasting, and sectoral development projections. Additionally, urban risk analyses are carried out for settlements and/or built urban environments with high disaster hazards and risks [5].

The third stage involves the development scenario. At this stage, studies are conducted on defining a vision for the future, setting goals and policies, generating and evaluating alternatives, and developing macro policies and spatial development scenarios [5].

The fourth stage consists of planning decisions based on social, economic, spatial, and environmental components. Within this scope, strategies related to development, conservation, renewal, and transformation are determined, along with planning conditions, planning implementation tools, action plans, and programs [5].

The final and fifth stage involves implementation, monitoring, and feedback. At this stage, projects that will serve as models are developed and implemented. Zoning and construction applications, projects, and infrastructure implementations are monitored. Through feedback studies, the continuity and internal auditing of the planning process are ensured [5].

A key figure in ecological planning, which is a subcomponent of planning, is McHarg from the Philadelphia school. According to McHarg, ecological planning is not merely a physical planning approach but rather a planning process aimed at ensuring the sustainability of holistic urban-nature development. In the ecological planning method used by McHarg, natural, cultural, social, aesthetic, political, and historical inventories are individually analyzed, interpreted, and evaluated for each specific land use [6].

McHarg, in general, established four fundamental values that represent natural processes and divided the planning process into four main stages (Table 1). Based on the analysis of each inventory's constraints and positive attributes, he developed a synthesis of suitable areas for different uses [6].

Table 1. McHarg's Ecological Planning Processes [6]

NATURAL PROCESSES IN PLANNING	MAIN STAGES OF PLANNING
1.Natural qualities and characteristics (landscape and value)	1. Inventory
2. Production process (agriculture, forestry, recreation, etc.)	2. Analysis
3. Maintenance of ecological balance	3. Interpretation
4. Potential hazards arising from the misuse of natural resources	4. Evaluation

In the landscape assessment method developed by McHarg (1967), the study area and its sub-areas were first sketched based on physiographic principles. Data were collected in the following eight categories, which are of primary importance for planning: climate, geology, physiography, hydrology, soil, plant communities, wildlife, and land use [6].

Additionally, other factors that need to be evaluated in McHarg's method in terms of their suitability for land use activities include economic minerals, rare and unique features (such as endemic species), water resources, slope, and accessibility [6].

After the data collection phase, the suitability of the data for potential land use is interpreted, and the positive, negative, and neutral impacts of land uses in the datasets are assessed. With the production of suitability maps, maps of the same scale displaying the values of each resource are overlaid on transparent sheets to measure their significance. By classifying and coloring the maps accordingly, a composite map is created [7].

The resulting map is used to generate a matrix within a grid system, categorizing potential land uses into suitable and unsuitable areas. This matrix allows for the measurement of how well a given land use aligns with all other land uses.

In the final stage, the previous data is synthesized and interpreted to create a comprehensive suitability map [7]. The goal of the synthesis is to determine the maximum combination of compatible land uses across the entire study area. Potential land uses are classified into four main categories: agriculture, forestry, recreation, and urban settlement [7].

II. MATERIALS AND METHOD

MATERIALS:

Biga is a district located on the peninsula bearing the name of the city of Çanakkale, situated 90 km away from the city canter. It is bordered by Gönen to the east, Lapseki to the west, Çan to the south, and the Sea of Marmara to the north (Figure 1).

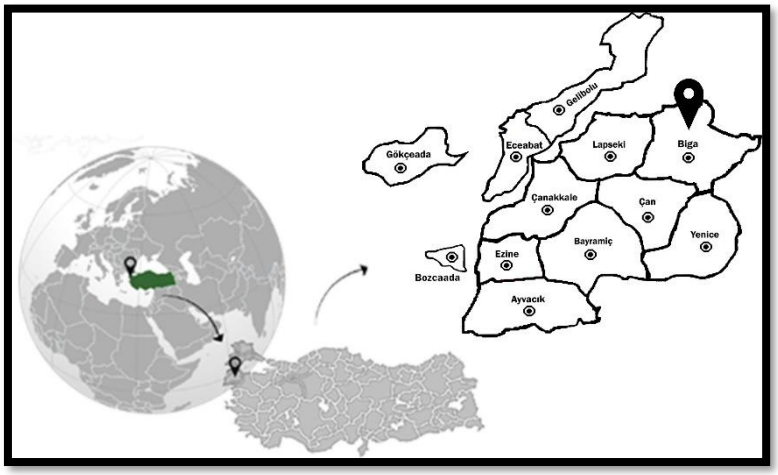


Figure 1. Location of Biga.

METHOD:

In this study, the McHarg Ecological Threshold Analysis method was used to determine the potential recreation areas of Biga District. The weight criterion was evaluated on a scale of 5 points. The criteria for recreation areas were considered as follows: accessibility (criterion weight 34%), slope (criterion weight 26%), forest (criterion weight 16%), land use capability (criterion weight 13%), and proximity to water (criterion weight 11%).

For accessibility, the sub-criteria were as follows: wet stream (1 point), soft surface (2 points), stabilized road (3 points), forest road (4 points), and asphalt road (4 points). Slope sub-criteria were: 0-2% (1 point), 2-6% (4 points), 6-12% (5 points), 12-20% (3 points), and over 20% (2 points). For forest areas, sub-criteria were: olive and vineyard fields (1 point), planted fruit (2 points), coniferous forest (3 points), mixed forest (4 points), and broadleaf forest (5 points). According to land use capability, class I, II, and III lands were assigned 1 point, class IV and V lands 2 points, class VI land 3 points, class VII land 4 points, and class VIII land 5 points. For proximity to water, areas more than 3000 meters away were assigned 1 point, areas between 2000 m - 3000 m were 2 points, areas between 1000 m - 2000 m were 3 points, areas between 500 m - 1000 m were 4 points, and areas within 0-50 meters were 5 points (Table 1).

1. In the study, Arc-GIS 10.8 and Microsoft Excel software were used to transfer and analyse the data and maps into the computer environment.

2. The maps prepared in the Arc-GIS program are at a scale of 1/350.000 (check the scale). The grid system is set to 2x2 km².

3. The created maps were identified and scored with 3 different colour scales. The scores were transferred to the Excel program.

Table 2. Criteria and criterion weights according to Biga land use.

Criteria		Transportation network				Slope					Forest areas					LCC					Proximity to water				
criterion weight	%	34				26					16					13					11				
Sub-criterion		Stream	Soft Ground	Stabilized Road	Forest Road and Asphalt Road	0-2	20+	12-20	2-6	6-12	Olive and Vineyards	Fruit Trees	Coniferous Forest	Mixed Forest	Deciduous Forest	I-II-III	IV-V	VI	VII	VIII	3000m+	2000m-3000m	1000m-2000m	500m-1000m	0-500m
Function values		1	2	3	4	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Result	1st Degree Potential Area					2nd Degree Potential Area										3rd Degree Potential Area									

Describe in detail the materials and methods used when conducting the study. The citations you make from different sources must be given and referenced in references.

III. RESULTS

The land cover of Biga district consists of vineyards and orchards (2 km²), shrubland (234 km²), dry farming areas (453 km²), pasture (38 km²), residential areas (334 km²), and water surfaces (23 km²) (Figure 2).

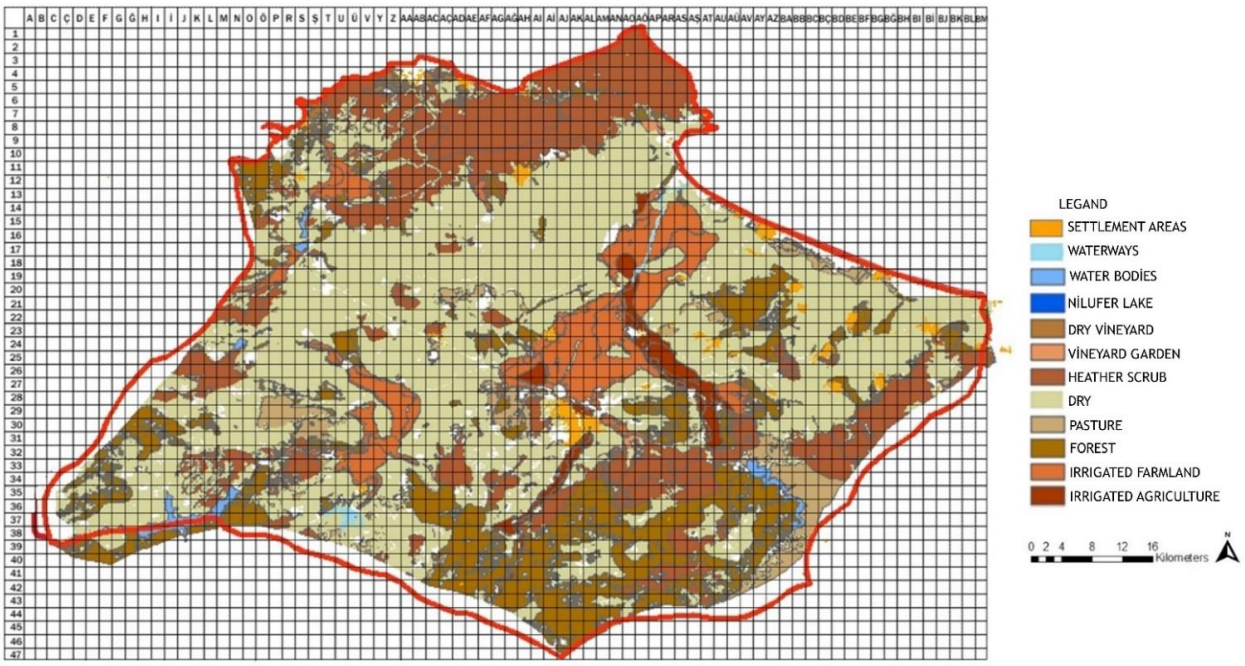


Figure 2. Land Cover of Biga District

The criteria used in the analysis of potential recreation areas in Biga's land use are accessibility, forest, land use capability, and proximity to water distances. Within the study area boundaries, the forest area covers 165 km². The lowest elevation is at the Marmara Sea coast in the north of the district, while the highest point reaches 1,700 meters. These different elevations increase the recreational potential.

In the sub-criteria scoring, grids were evaluated, and 5 points were assigned to the most suitable areas, 4 points to suitable areas, 3 points to less suitable areas, 2 points to unsuitable areas, and 1 point to completely unsuitable areas. These classifications were mapped accordingly (Figure 2).

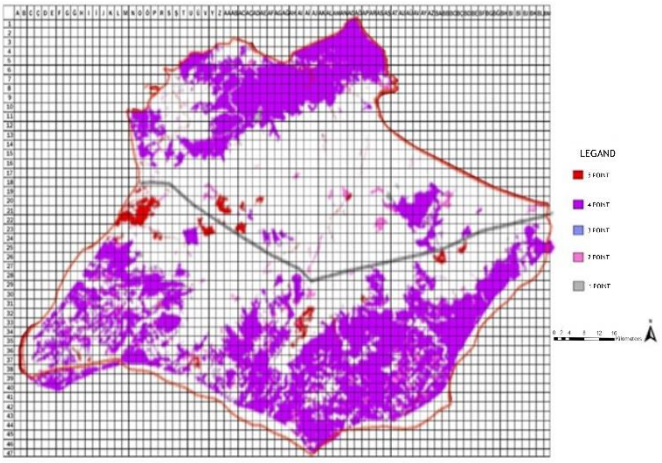
In the criteria for forested areas, broadleaf stands, which are ideal for recreational areas due to their natural beauty, plant diversity, shade, and cooling effects, have been given 5 points. Additionally, tree communities consisting of poplar and chestnut have also been assigned 5 points. While fruit-bearing trees can be used for tasting purposes, other trees provide shade, cooling, and harmony, so mixed forests have been given 4 points. Needle-leaved trees can produce pollen, which, when dispersed, may cause allergies in humans or create difficulties for drivers. For this reason, needle-leaved stands have been given 3 points. Planted orchards, due to intensive use, can suffer damage, contract diseases, face insect infestations, and experience pollution, so they have been assigned 2 points. Vineyards and olive groves hold cultural and economic significance for local communities. Therefore, they should not be damaged or altered, and as a result, they have been given 1 point (Figure 2c). According to the sub-criteria values, the highest recreational potential for forested areas is found in the grid combinations of coastal strip-forest areas.

In the transportation criteria, the highest score of 5 has been given to grids with asphalt roads. These provide excellent access for pedestrians, vehicles and transportation are easy due to the very smooth surface. Forest roads, which are important for access to recreational areas with low cost and labor, have been given 5 points. Stabilized roads, which provide comfortable access for pedestrians, have been given 4 points. The sea route has been given 3 points. Due to the presence of ports, transportation can be provided in case of an emergency. Dry stream circulation has been given 2 points. It has a soft surface and creates difficulty even for pedestrians. Wet stream circulation has been given 1 point. It is valuable because it may contain a water source. This scoring has been proposed considering the possibility of disruption of its natural structure (Figure 2d). According to the transportation sub-criteria, the areas with the highest recreational potential are found in the grids that combine asphalt roads-water-forest.

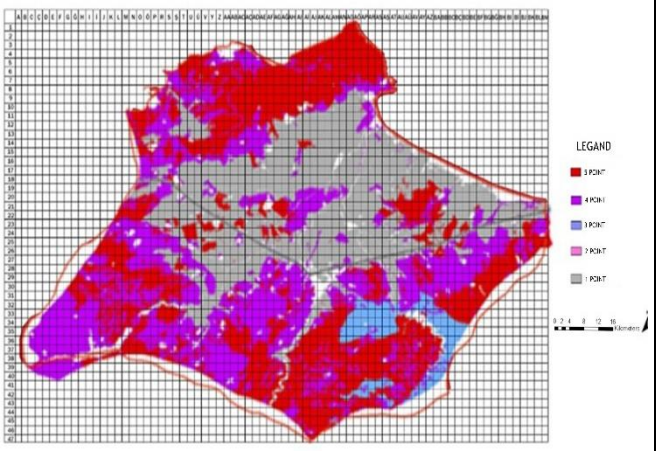
In land capability, Class I-II-III lands, which are suitable for agriculture and need to be preserved, have been given 1 point. Class IV and V lands, which are suitable for agriculture if improved, have been given 2 points. Class VIII-VII-VI lands, which are not suitable for agriculture, have been given 5, 4, and 3 points, respectively (Figure 3b). In terms of land capability, the areas with the highest recreational potential are found in the combination of non-agricultural land-sea-forest.

Areas with a slope of 6-12% suitable for sporting activities have been given 5 points. Areas with a slope of 2-6%, which are suitable for activities requiring picnic, accommodation, and flatter land, have been given 4 points. A slope of 12-20%, suitable for hiking activities, has been given 3 points. Areas with a slope of over 20%, suitable for extreme activities such as climbing, have been given 2 points. Areas with a slope of 0-2%, suitable for agricultural activities, have been given 1 point (Figure 3a).

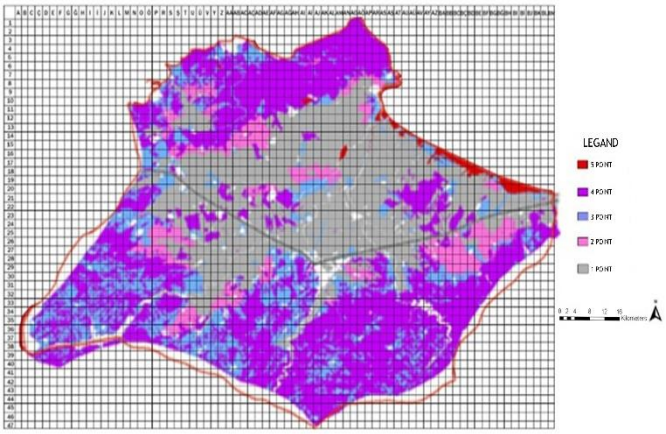
In the Biga potential recreation area analysis, the following have been included due to their high impact value in terms of area size and functional areas: Ada Park (17.822 m^2), Biga City Park (31.100 m^2), İlyas Bayram Stadium (13.881 m^2), and Abdiağa Picnic Area (5 km^2) (Figure 3).



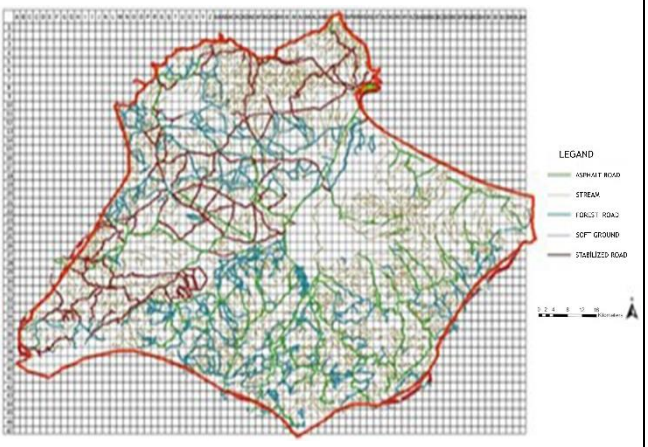
a. Slope sub-criterion scoring map.



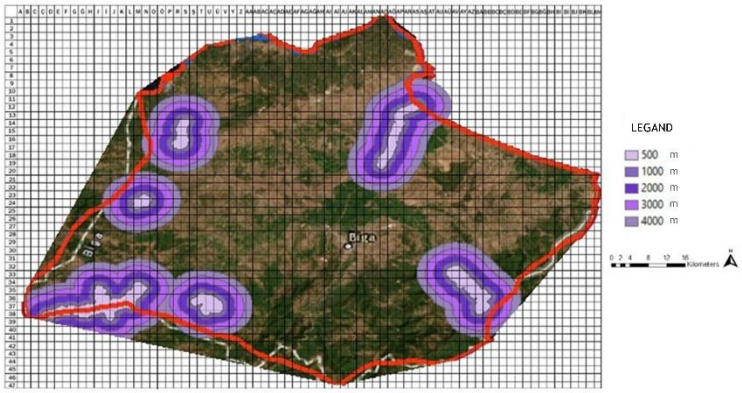
b. Land use suitability sub-criterion scoring map.



c. Forest areas sub-criterion scoring map.



d. Transportation network sub-criterion scoring map.



e. Proximity to water sub-criterion scoring map.

Figure 2. Slope, land use capability, forest areas, transportation network, and proximity to water maps according to the criteria weight scores.

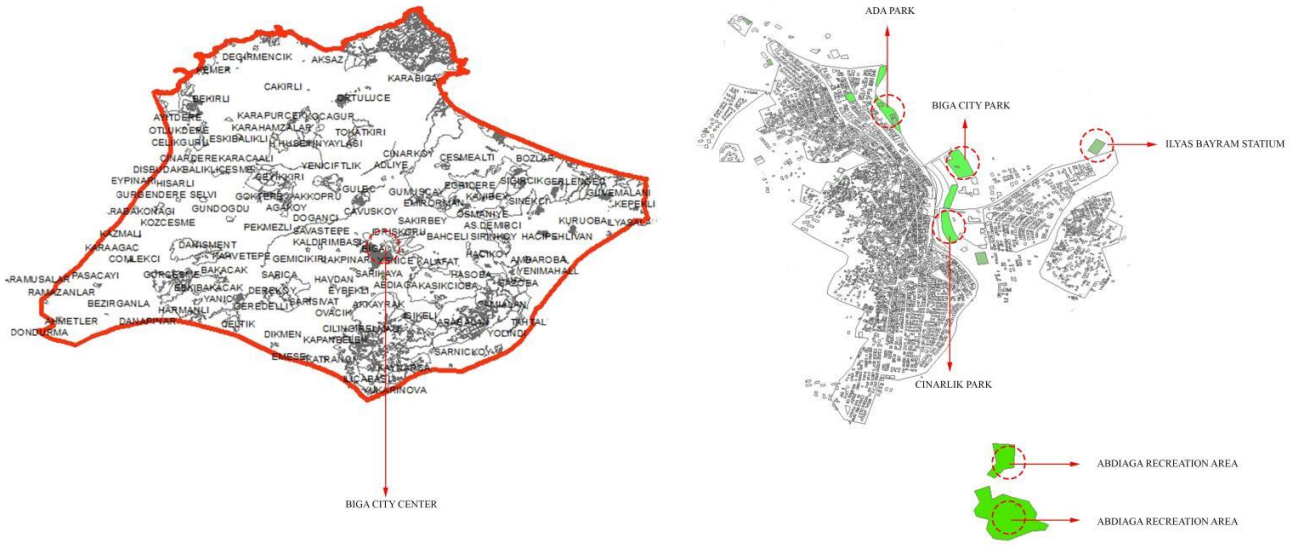


Figure 3. Existing recreation areas in Biga city canter.

In Ada Park, located in Biga district, there are various play equipment for children. There are children's climbing nets, slides, swings, as well as seating facilities and sports equipment for individuals who want to exercise. Biga City Park is located in a very large area. The park has a parking lot, cafeteria, gazebo, and benches. For children, there are swings, slides, climbing nets, rope bridges, and seesaw equipment. İlyas Bayram Stadium has a capacity of 4500 people. Abdiağa Picnic Area, located close to the city, has a large area. This area offers visitors the opportunity to barbecue and also has sufficient parking space. For families, there are playgrounds for children with swings, slides, and seating areas, which allow families with children to spend time together. Additionally, there is a trekking route that starts from the forest and extends to the waterfall; this route provides nature lovers the opportunity to walk. With bike paths, the management contributes to the implementation of various activities.

IV. DISCUSSION

In the Biga district, datasets used to determine potential recreation areas were analysed in the ArcGIS 10.8 software, and the areas were classified as first-degree potential areas, second-degree potential areas, and third-degree potential areas (Figure 3).

Within the study area, the highest density is observed in second-degree potential areas, with a total of 616 grid units. First-degree potential areas are identified within 496 grid units. The lowest density is observed in third-degree potential areas.

In the study area, the region located between rows 1-9 and columns U-AS (Figure 4) constitutes a first-degree potential area for water sports, camping activities, and equestrian activities. When examining the district as a whole, it is observed that the highest density of first-degree potential areas is also concentrated in this region. In the region between rows 23-45 and columns D-BK, the presence of first-degree potential areas is not very dense; however, compared to the inner parts of the district, the recreational potential is higher. In the region between rows 4-21 and columns K-AŞ, second-degree potential areas are located. Third-degree potential areas are predominantly distributed in the regions between rows 29-44 and columns AC-BD, as well as between rows 29-43 and columns AO-BD.

When examining the scanned form of the area with the grid system, the presence of second-degree potential areas is the densest with 616 squares (51.5%), the presence of first-degree potential areas is less dense

compared to second-degree potential areas with 496 squares (41.5%), and the presence of third-degree potential areas is the least dense with 83 squares (6.9%).

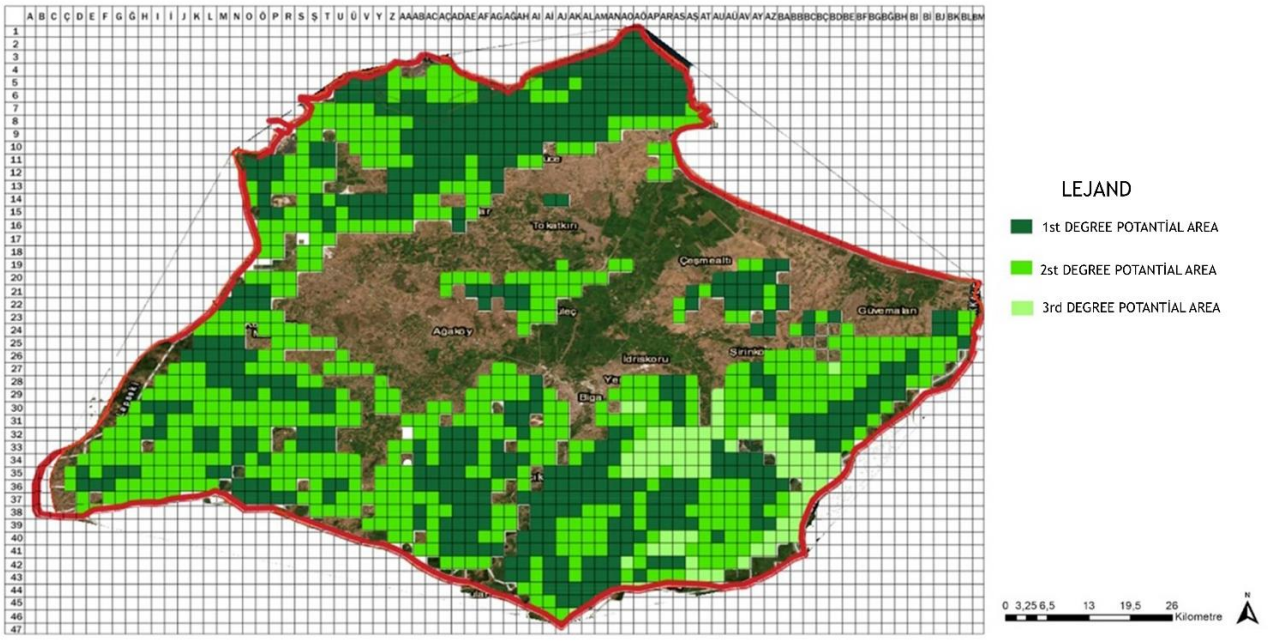


Figure 4. Recreation Potential Areas of Biga District

There are various alternatives for camping activities in the Biga district. As there are alternative forest areas for mountain camping, there are also unique beaches for coastal camping. For recreational activities in still waters, Nilüfer Lake stands out with fishing, strolling accompanied by bird sounds, or boat tours. Karabiga Bay is a canter of attraction for enthusiasts as it offers the opportunity for tent and caravan camping with its clean sea and long coastline. The Biga Mountains, with its highest point at 934 meters, consist of hills at different points with elevations of 400-450 meters. It is a small mountain range extending in the north-south direction. The presence of hiking routes with different difficulty levels in the region offers suitable options for both beginners and experienced mountaineers.

Karabiga Bay, with its clean and clear waters, long coastline, and wind, provides opportunities for many water sports activities. Surfing, kite surfing, swimming, diving, snorkeling, and water biking sports increase the recreational potential of the study area.

The most suitable potential area for bungalow houses is Karabiga Bay due to its sea view, proximity to water sports, and calm, peaceful environment. Additionally, the natural beauty and tranquil atmosphere of Nilüfer Lake make it a noteworthy area for bungalow houses as well.

Equestrian activities, which are quite popular in the Biga district, are carried out in several villages. These villages include Karabiga, Gökçeyazı, Çamıbel, Köklüce, Kızılcık, Yenice, and Çaltılar. In addition to equestrian activities, horseback tours, horse races, and polo sports are significant recreational activities.

Biga district is an area with high recreational potential. In the context of ecosystem services, these potentials should be addressed within the ecological, economic, and sustainability components. In line with this component, a Tourism Action Plan should be developed, and Landscape Management should be implemented.

REFERENCES

[1] Ömür, B. (2006). Rekreasyon yönetiminde rekreasyon programının yönetsel süreçlerinin değerlendirilmesi (Düzce-Akçakoca Festival Program Örneği),Yayınlanmamış yüksek lisans tezi, Abant İzzet Baysal Üniversitesi, Bolu.

[2] Gözen, E. (2019). Rekreasyon yönetimi bölümü lisans öğrencilerinin "rekreasyon" kavramına ilişkin metaforik algılar, Stratejik ve Sosyal Araştırmalar Dergisi, 3(3),397-416

[3] Boz, H. (2021). Su sporları kapsamında Türkiye'deki turizm işletmelerinde rekreasyon programlarının yönetimi: Ege bölgesi için bir durum analizi, Yayınlanmamış doktora tezi, Bolu Abant İzzet Baysal Üniversitesi, Bolu.

[4] Orhan, M. (2019). Rekreasyon Yönetiminde sürdürülebilirlik: 12 dev adam basketbol okullarına yönelik bir durum çalışması, Yayınlanmamış yüksek lisans tezi, Bolu Abant İzzet Baysal Üniversitesi, Bolu

[5] URL-1 The IEEE website. (2002) [Online]. Available: http://www.ieee.org/

[6] M. Shell. (2002) IEEE tran homepage on CTAN. [Online]. Available: http://www.ctan.org/tex-archive/macros/latex/contrib/supported/IEEEtran/