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Analysis of Terrain Usage in Kastamonu-Ilgaz Mountain Natural Park

Duran Aydinozu[1], Unal Ibret[1], Mirac Aydin*[2]

[1]Kastamonu University, Faculty of Education, Kastamonu - TURKEY

[2]Kastamonu University, Faculty of Forestry, Department of Watershed Management, Kastamonu - TURKEY

*Corresponding author: aydinmirac@hotmail.com

Abstract

Ilgaz Mountain National Park, the Black Sea region is located within the Department of Western Black Sea. Properties in order to protect its flora and fauna of this region was declared a national park, in recent years with growing winter tourism in our country has become one of the important winter tourism resorts. For this reason, Ilgaz Mountain National Park is to expose the status of land use, are likely to be done here will have an important role in planning. Geographic Information Systems (GIS) of Ilgaz Mountain National Park in the evaluation using the natural structure of the forest cover in terms of land use that have been identified.

Ilgaz Mountain National Park have been identified natural structure of forest cover in terms of land use that using Geographic Information Systems (GIS) of Ilgaz Mountain National Park in the evaluation. There have been especially with pure fir and pine forest stands with forest soil (FS) areas. The land use maps and tables were obtained by examining the spatial data base. The research area in terms of slope and aspect by analyzing the use of national park status was evaluated. There are existing facilities which pose a risk to the sustainability of the national park area. Also used in the areas of winter tourism in the area have been determined. This study was made with the Ilgaz Mountain, spatial analysis, so in the future are likely to be redirected to the data base is formed with human intervention.

Keywords: Ilgaz Mountain, GIS, Land Use, National Park, Winter Sports.

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INTRODUCTION

Pristine, natural beauty, tourism has the potential of our country places in Ilgaz Mountains, in the form of an island in northern Anatolia and Central Anatolia, Black Sea, extending from WSW-ENE direction of the mountain range that separates the most important. Ilgaz Mountains, pristine, natural beaty, has tourism potential of our country places, in the form of an island in northern Anatolia and the most important mountain range that separates the Black Sea to central Anatolia. Steppe regions of Central Anatolia with the change of climate in forests where elevation is introduced. In this here, it hase been the transition forest to steppe regions of Central Anatolia with the change of climate elevation. Indicating humid climatic conditions compared to around this mountains shows dense forest cover that lengths of fir and pine trees in some places is over 30 meters. Geomorphological landscape is also very interesting situation in terms of showing some of these mountains, these beauties will not get lost and preserved for future generations the National Parks Act No. 2873 in 1976 and is protected by Ilgaz Mountain National Park.

Çankırı province within the borders of Kastamonu-Ilgaz Mountain National Park was established in 1088 hectares of land. National park is located, north side of 751 hectares within the boundaries of the Kastamonu central district and southern side of 339 hectares within boundaries of the Çankırı Ilgaz district. Ilgaz Mountain National Park located Ankara-Kastamonu in the highway passes through the Ilgaz Mountain ski resort has established the highway was the hill about 2 km inside Karakeçilik. Here is the distance from Ankara, 200, while the distance of about 40 km to Kastamonu. Reaching out to the west of Turkey's eastern area of study followed by addition Devrez

groove binding E-80 near state highway about 25 km. For this reason, the region is quite advantageous in terms of road connectivity.

In a study of Ilgaz Mountain National Park, tourism and recreational potential of the area determined. As a result of this study, for use in the development of this area are to damage the natural structure. In addition, tourism and recreation potential of this area used to be low, and without room for the new tourism-recreation, said here should be taken for the protection measures (Erduran 2006).

Ilgaz Mountain, a study of winter tourism, this area of climate, soil, geomorphology, vegetation characteristics such as geography by years the development of tourism activities were examined and evaluated. In this study, Ilgaz Mountain National Park is visited by many for winter tourism and visitor numbers increased by years, it has been revealed as a result of the natural structure carries the risk of deterioration (İbret 2003).

According to Zhang; today the results of studies on the nature of great significance in the transfer maps. In this regard, by providing a large number of analytical solution methods so far impossible to form the basis of completed management of the forest spatial structure and nature of the spatial data base supplied by the core, defined as the operating system with GIS technology; we use to express our interest to do are a hybrid system that spatial data in making decisions that are effective as of the technical function to collect, store, analyze and evaluate a powerful "tool box" of their own knowledge.

Ilgaz Mountain National Park GIS In the study has been carried out with the land use situation. For this purpose, Ilgaz Mountain National Park location, land use, digital elevation model, slope and aspect maps were determined using GIS techniques. Ilgaz Mountain National Park has a wide variety of natural and unspoilt flora and fauna of our country's major geographical features are among the venues. This place, although if taken in the winter tourism in protected areas as national parks are considered in terms of risk areas in the future of our country are among the human activities can be lose property. For this reason, Ilgaz Mountain National Park is to expose the status of land use for the adjustment of the phenomenon of great importance, especially where tourism is obvious.

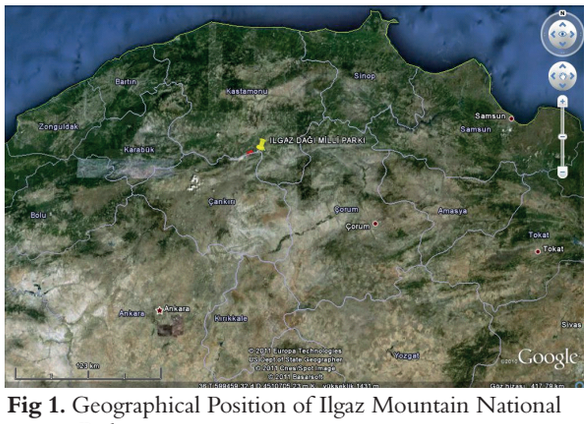

Fig 1. Geographical Position of Ilgaz Mountain National Park.

General Geographical Features

Ilgaz Mountains, the Black Sea Region is located in the western Black Sea Department (Fig. 1). These mountains in the north and south of Gokirmak Devrez River formed the boundary between the hydrographic. This section of water line that separates the two river on the passes through the hills of Ilgaz Mountains, 2000 meters of altitude. These are 2587 meters in height in the western Black Sea, reaching the highest point of Büyükhacettepe. Ilgaz Mountains are also on the peak line of hills, altitude 2546 meters in Küçükhacettepe, 2394 meters in Çeştepe and 2380 meters ends at Hill Karatas (İbret 2000).

Ilgaz Mountains high zones are ridge about 23 km long summit of a rocky pitches. Here is a limestone sequence located on a base of Crystalline schists. In this series, where it is due to the tectonic pattern and strength stayed with layers of the Tertiary syncline corresponds to a field. Yalınca Mountain, Küçükçatal, Çatalılgaz following the ridge tops of the highest place on the craggy rocks of schist and green and the oval shape with a peak Büyükhacettepe (Fig. 2) (Blumenthal 1948).

Major tributary of the Red River south of the river valley bounded by the River Devrez Ilgaz Mountains, Red River valley to the east from the west and extends east-west direction up to the Onion River valley. These mountains has remained auxin provens flora regions of the Euro-Siberian region and limited by the south of Iran-Turanian flora region (Avcı 1998).

Ilgaz Mountains National Park to determine the status of topographic, Digital Terrain Model is made. This model examined the structure of Ilgaz Mountain topographic changes observed over short

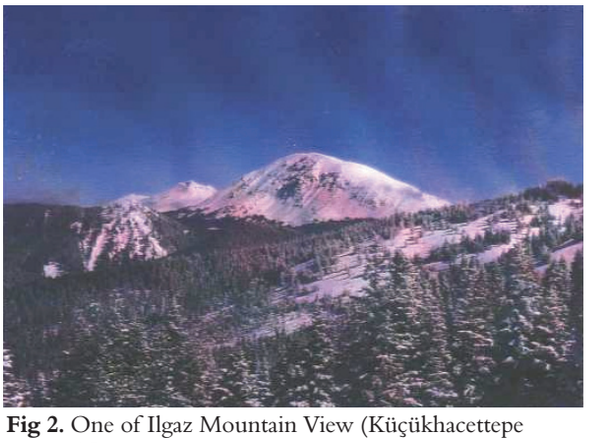

Fig 2. One of Ilgaz Mountain View (Küçükhacettepe 2546 m).

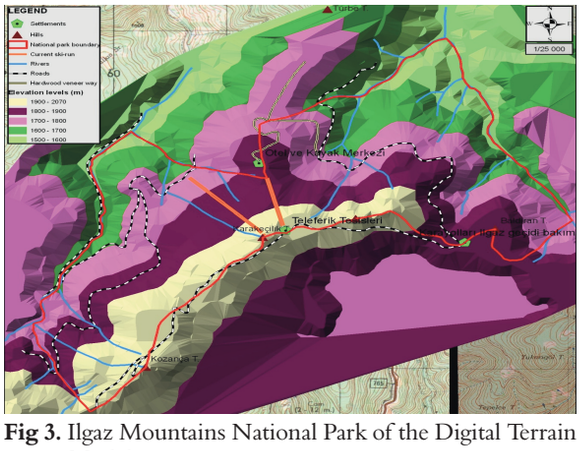

Fig 3. Ilgaz Mountains National Park of the Digital Terrain Model.

distances. The high points of the mountain, ranging from 1900 m to 2070 m altitude in the form of a ridge Extending Kozanca are in step with the Karakeçilik Hills (Fig. 3). This is close to the points of peak levels in some areas are slightly undulating plateau. Generally, between 1700-1900 meters in elevation zone feature, these segments show erosional surface. Kozanca and Karakeçilik hills are an elevation between about 250-300 meters across the erosional. Between the northern and southern slopes of Mount Ilgaz are observed an asymmetry. The degree of slope of the mountain to the south than the northern part of the low values.

Average annual temperature of Ilgaz Mountain National Park is of 9.8ºC. In July, the warmest month with average temperatures of 20ºC, the coldest month, the average temperature in January is -0.8ºC. According to the meteorological station of Kastamonu average annual rainfall is 486 mm. Ilgaz Mountain and around affecting rainfall distribution the most important factor are the world are forms.

Table 1. Values of Annual Mean Temperature and Precipitation Distribution by Months (1930-2010).

MONTHS	J	F	M	A	M	JN	JL	A	S	O	N	D	Ann.
Temperature ºC	-0.8	0.7	4.3	9.5	14.1	17.4	20.0	19.7	15.5	10.6	5.2	1.2	9.8
Rainfall (mm)	30.9	27.4	34.8	50.8	74.1	67.3	31.0	28.5	30.2	39.4	32.7	38.9	486

Table 2. Ilgaz Mountain National Park Land Use Values.

Terrain Usage	Area (ha)	Rate (%)
Forest	606.35	81.67
FS (Forest Soil)	136.03	18.33
Total	742.38	100.00

Table 3. Ilgaz Mountains National Park Area Values ??by Types of Stand.

Stand types	Area (ha)	Stand types	Area (ha)
GA2	15.20	GÇsC3	324.66
GB2	73.70	ÇBÇs	5.92
GB3	39.04	ÇBG	6.88
GC3	108.85	OT	136.03
GÇsB3	32.10		
Total			742.38

Rainfall ocur while low parts of the mountain especially valley floors about of 400 mm, in the peaks to 1200 mm of rainfall.

Precipitation is highest in spring and early summer. Ilgaz Mountain, especially in the high parts of the north facing slopes of the increase in the amount of rainfall, it is clear the effect of the mass is related to the north. South slopes for rain protection that is less than the amount of rainfall. Therefore, the request to the north facing slopes with more rainfall while the southern slopes of the more common water-wise species nemcil species begin to dominate the environment. Research area within the boundaries of the Black Sea region until all the influence of climate, although far from the sea. Temperature is closer to the field in terms of rainfall, the climate of Central Anatolia is seen in the form of snow covering the ground and snow cover has led to a longer period of time where to stay. Thus, in Ilgaz Mountains has occurred where both snow depth and duration of the abdomen and can be made in terms of a suitable environment for the sport of skiing.

Ilgaz Mountains has encountered 1500 meters erosional surfaces besides the high erosional surfaces. Uzunyazı Caybasi Peak (1738 meters) and Kurugol Hill (1755 meters) that north of the rising

Çeltikçi and Çaybaşı villages is located south of one of these erosional surfaces. In here, Menam, Çukurgüney and Seboğlu is settled plateaus.

MATERIALS AND METHODS

Geographic Information System

Geographic Information System (GIS), including integrated graphics and non-graphic information and a system configured to respond to various queries. Geographic Information System (GIS) that sub-system of Information systems has been developed in order to spatial data, large amounts of input, production and storage, generation, analysis and presentation (Köse and Başkent 1993).

Entering Computer Data

In this study, the data to be entered in geographic information systems to computer. Data has processed contour curves, rivers, hill points, roads, forest management map and facilities of forest national park.

Transferring Data to the Computer

ArcGIS 9.3 GIS environment to transfer data to a computer graphics program and data access is provided. Graphic data are provided access to a computer to transfer data using the ArcGIS 9.3 program. Contour curves of the transfer of the computer environment, the boundaries of the study area is located 1/25 000 scale topographic maps (Kastamonu H43-b4) were brought together, 50-m contour lines in a GIS environment to be digitized. Streams in the study area, land use patterns, streams, roads, national park peaks and structures in the ski resort also digitized in the same way.

Evaluation of Data

Transferred to a computer to store the graphic and non graphic data, processing, analyzing, and the results obtained from the use of ARC / INFO 9.3 and software used. The necessary correction on digitized topographic maps were completed and Forest Management, the maps created topologies. Digital terrain model were made by using the map of contour lines. In addition, the study area map and aspect map of digital elevation model, slope classes have been obtained. Obtained the same way, with maps, current land use map have been revealed.

Form of Terrain Usage

Land use classification of national park were made over the inquiry forest management maps. The research area of land use patterns in the GIS maps based on topographic maps and completed management plan, respectively.

Aspect Status

Aspect of the research area map, obtained from digitization of topographic maps in the GIS map were obtained using digital elevation model.

Slope Status

Slope of the research area map, obtained from digitization of topographic maps in the GIS map were obtained using digital elevation model.

RESULTS

Terrain Usage Status

Ilgaz Mountain National Park in terms of land use is seen as the natural structure of the forest cover (Fig. 4). The majority of the land area are characteristic of forest area. Most of the terrain shows the characteristics of a forest area. Here especially pure abies and scotch pine stands and intra-forest soil (FS) areas are found. Agricultural and residence areas have not been detected in the area. Terrain usage situation in this area have been examined with maps and tables and special data base has been obtained.

Research in the field over the land use map in GIS environment to calculate; was determined 81.67% forest and 18:33%' FS (forest soil) of area. In particular the opening of the ski facilities in the national park was established as part of the FS is considered (forest soil) are fields.

Assessment is made in terms of tree species in national park; were found particular species of pure fir with fir and pine mixed stands. It have been identified fir and pine stands of mixed field 48.05%, pure fir stands 31.89% of area. To the contrary, a very bad area stands represents only a small part have been 1.72% of area. Also, composed of Forest Soil (FS) areas 18.32%. There are no agricultural or residential area within the area.

Slope Status

Ilgaz Mountain National Park area with a copy of the GIS environment make use of digital terrain model, slope map was constructed. Compliance with the ski slope were taken into consideration when classifying, because Ilgaz Mountain National Park Slope creation of classes of bears, especially important for winter tourism (Gürer et. al. 2004, Öcal 2006).

National park area are evaluated in terms of slope; it has been revealed 88.35% area used for the creation of such a large part of the ski slopes (Fig. 5). In addition, the area is also suitable for other sports

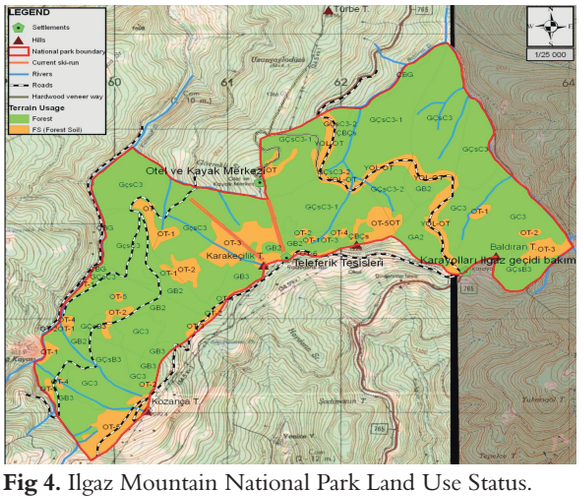

Fig 4. Ilgaz Mountain National Park Land Use Status.

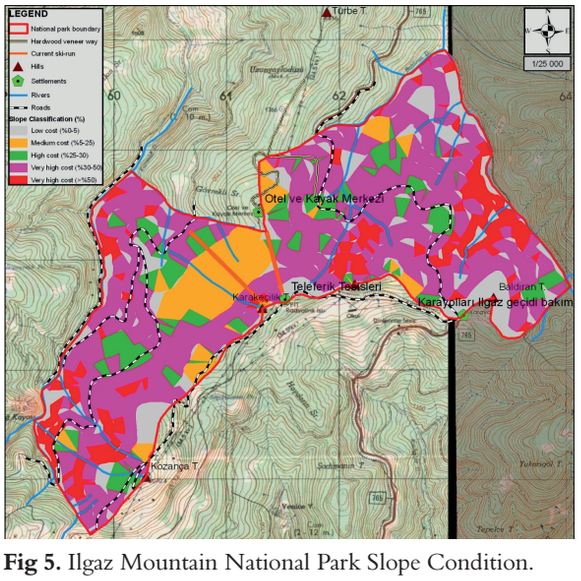

Fig 5. Ilgaz Mountain National Park Slope Condition.

activities are (Table 4).

Aspects Status

Research area with a copy of the GIS environment make use of digital terrain model, slope map was constructed. Compliance with the ski aspect were taken into consideration when classifying, because especially important for winter tourism (Öcal and Usul 2006).

Aspects, in terms of the study area were evaluated in the examination group dominated group in northern aspect (North, Northeast, Northwest, West) that has been revealed (Fig. 6).

The study area evaluated in terms of aspects; it has been revealed in northern aspect (North, Northeast, Northwest, West) in the examination group dominated group. Areas of 71.72% is within

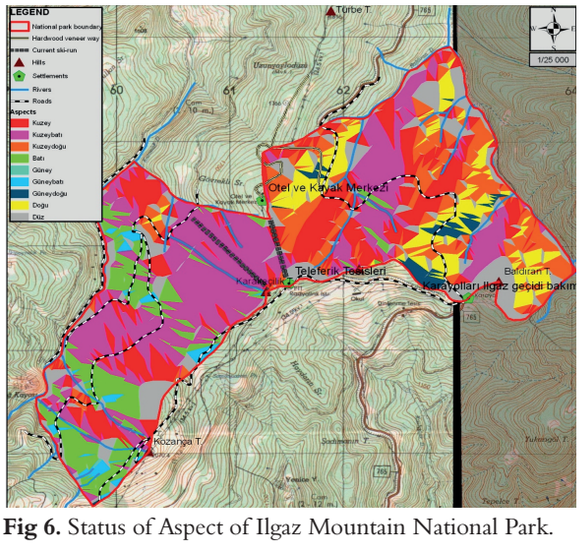

Fig 6. Status of Aspect of Ilgaz Mountain National Park.

Table 4. Values of Ilgaz Mountain National Park Slope.

Settlement Suitability	Ski Trail Suitability	Area (ha)
Low cost	(Suitable for all sports-%0-5)	118.63
Medium cost	(Suitable for all sports-%5-25)	76.50
High cost	(Suitable for all sports-%25-30)	83.49
Very high cost	(Suitable for ski trial-%30-50)	377.35
Very high cost	(Suitable for mountaineering and climbing ->%50)	86.42
Total		742.38

Table 5. Ilgaz Mountains National Park, Aspect Values.

Aspects	Area (ha)	Aspects	Area (ha)
Kuzey	135.31	Güney	0.37
Kuzeydoğu	94.02	Güneydoğu	13.62
Kuzeybatı	226.40	Güneybatı	13.93
Batı	76.85	Doğu	63.25
Düz	118.63		
Total		742.38	

the northern aspect group (Table 5). Winter tourism is evaluated appropriateness of the ski the; north, northeast and northwest aspects, such as a large proportion of 61.39% was found to be suitable for the construction of the ski-run.

DISCUSSION

Slope and exposure analysis of the study area has been conducted and evaluated in terms of natural park usage. Ski facilities and related roads for usage in tourism activities can be found within natural park area. Existing facilities pose risk in terms of sustainability of the national park area. Existing facilities have been processed on map layers and evaluated in GIS environment. In the area, the places used for winter tourism are also displayed. In

order to make sure that human intervention in the future can be directed so as not to degrade natural structure, Ilgaz mountain spatial analysis was displayed with this study and a database was created for this purpose.

Ilgaz Mountain National Park in the ski resort; appropriate trails, accommodation, entertainment and sports facilities in our country in recent years due to the advantage of easy access to ski resorts are among the fast-growing. Snow cover remains for approximately 6 months. Snow thickness in places emerging on a meter, the length of the slope and the slope is sufficient to perform the sport of skiing. As of the existing natural forests in the area is an area of remarkable.

National park in a GIS environment for land use, slope and aspect maps was developed. Evaluated in terms of land use; As both the natural beauty of the area is remarkable both for winter tourism in particular is seen that there is sufficient land potential.

Examined the state of slope and aspect; winter tourism and ski facilities, a large portion of the field, especially convenient for the carrying features were identified. Ski sports, as well as for other sports in the national park area were carried by the appropriate features. For this reason, the ski center in Ilgaz Mountain National Park for the new runway should be done away from the use of the remaining areas, current facilities, accommodation, offering a limited-purpose track, using the more far places, offering long and wide runway opened for skiing.

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