

Site Selection For Different Recreational Sport Activities

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Abstract: Sport tourism is an important economic activity in our country as it is all around the world. It is also defined as an industry which is related to other economical sectors. Therefore, governments need to manage, develop and market the tourism facilities so that tourism industry can help economical growth effectively.

Planning means to manage large amount of data. Therefore, it is desirable to integrate Geographic Information Systems to planning for recreational sport facilities. The aim of this study is to define how to increase the contributions of GIS for site selection purposes for sport types. The case study is chosen as Bodrum Peninsula that is the hearth of Turkey in tourism sector. The fast and unplanned tourism development is causing some problems in nature, transportation, social and technical infrastructure of Bodrum. In this study, recreational sport types, which are camping, grass-skiing, site-parachuting and biking activities, are suggested in Bodrum Peninsula. Site selection process for these types is performed according to the requirements defined by the Ministry of Youth and Sport. Slope, aspect, and proximity analyses are performed in order to find the suitable areas for each sport type. Finally, it is obvious that Bodrum Peninsula has suitable areas for different kinds of sport activities. In the plan decisions those suggested areas should be considered in order to develop sport tourism in our country.

Keywords: Sport tourism, GIS, sport management, site-selection

I. Introduction

Sport is the most comprehensive and attractive activity of recreation. Sport and recreation effect each other. As the sport activities supply an important area for human's recreational needs; recreation has significant roles on social proliferation and achievement of sport [1].

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Tourism and Leisure Committee described tourism as a composite of activities, facilities, services and industries that deliver a travel experience, that is, transportation, accommodation, eating and drinking establishments, entertainment, recreation, historical and cultural experiences destination attractions, shopping and other services available to travelers away from home, in 1997. As it is understood from the definition, tourism involves multiple parameters itself.

As far as the recreation is an important component of tourism, it should be evaluated as an opportunity for different tourism types.

This research has aimed to define the proper areas for different kinds of recreational activities in the case study of Bodrum Peninsula where is selected as a case study place is one the significant tourism centers of Turkey, and has an international value in tourism sector. This fertile peninsula has a great potential for sea, natural and cultural tourism. Sport tourism can be a good choice for preventing the nature.

II. Methods

The Ministry of Youth and Sport is responsible from all the sport activities in Turkey. The specialists are working on different kinds of sports in detail, according to 65 federations (skiing, camping, biking, etc.). This organization defines the parameters for suitable areas for these sports activities including the ones studies in this study as camping, grass skiing, mountain biking and site parachuting according to their requirements. Slope is one of the important variables, and proximity to the urban areas is another one. Camping areas should be in the forest, however the condition of the forest, whether it is dense or sparse is also important for this case. For example, grass skiing and site parachuting can be performed in sparse forest or open land.

In order to perform the slope analysis contour lines of 1/25.000 scale map sheets are used in shape format. Those contour lines are created in CAD based programs not in GIS based. Because, in CAD based programs visuality is important, and colors, line weights, marks can be used. However in GIS based programs those types of data are stored in the database and color does not define any elevation information by itself. For example the highest point of a hill can be digitized as a cross in a CAD program. However it should be defined as a point in order to be used while creating a surface in GIS based programs. Those kind of problematic lines

and points are cleaned and deleted before the digital elevation model is created. "Create Surface" tool in Erdas Imagine 9.3 is used for the creation of DEM. The column which stores the elevation information is given as an input to the model. Finally DEM is created in five meters pixel size and img data format.

A primary objective of a site selection process is to assure that new facilities are located at intrinsically superior sites that, by virtue of their natural features and land use setting, provide a high degree of protection to natural resources and environment" [2]. Different types of parameters should be analyzed like slope, aspect land use, proximity, etc. in order to define the suitable areas for new activities. Site selection results are defined with the help of GIS tools.

III. Results

Camping

In recent years, attention has increasingly been focused on the meaning of camping as one form of outdoor recreation [3]. Camping is frequently thought of as a relatively unregulated form of recreation carried out in the isolation of natural environment. However, most camping takes place in large, intensively developed campgrounds which are highly organized and supervised. Such camp ground reflect complex social systems involving interaction of several groups, with one of the most important between campers and recreation managers [4].

The Ministry of Youth and Sport defines three parameters for suitable camping areas. One of those parameters, is the requirement that camping areas should be 500 meters away from the buildup areas like city, district and village. Because camping activity should be performed in quite natural places away from the noisy locations. Another parameter is about land use. They should be in the forest area and there should be big and high trees in order to benefit from the tree shadows and clean air. This type of forest is called dense forest. The last parameter is the slope, and it should be under 20 percent so that tents can be settled up easily.

Firstly, slope data are created in "img" format by using "Spatial Analyst" tool in Arc Map 9.0. Slope analysis is performed to determine the areas with 5 percent intervals and among them the areas which have less than 20 percent slope are selected.

Secondly, the dense forest areas and build up areas are digitized by using the ortho rectified Ikonos image (acquisition date: 2006). Up-to-date data are very important in decision making level, since there can be changes in urban area or forest boundaries in time. New houses, factories, commercial buildings can be settled up so the boundaries of the urban areas may change in time. In the forest area, a lot of trees may be lost because of the fires or they can be cut for different reasons. So forest area boundaries can also change in time. In order to update those boundaries a field survey must be done and the changes should be detected with the coordinate information. Afterwards they must be converted to digital format. However with the help of a current satellite image, change detection can be performed at the office easily and more precisely. GIS and remote sensing are effectively used for this level of planning as an example of updating the forest and build up areas that is mentioned above.

Proximity to the city, districts, and villages is the last parameter for suitable camping areas. The 500 meters buffers around the buildup areas are created as a polygon shape file. However camping areas should not be inside of those regions. In order to define the regions which are outside of these buffers but inside of Bodrum Peninsula, another polygon layer which is defining the whole study area is created. Afterwards, the buffer regions are erased from the whole area in order to create the polygon which defines the outside of buffers.

The buffering process is performed with the help of "Buffer" tool under the Proximity part in Analysis Tool of Arc Toolbox. The erasing is also performed with the help of "Erase" tool under the Extract part in Analysis Tool of Arc Toolbox.

Possible camping areas can be defined by finding the intersection of those regions which are selected according to three parameters. So the intersection process of three different layers is performed with the help of "Intersection" tool under the Overlay part in Analysis Tool of Arc Toolbox. Finally, areas which are suitable places for camping purposes are selected, and they have 6 km² size.

In the environmental plan there are six proposed camping areas which are denoted with points. However the suggested points and analysis results do not overlap with each other. Four of those points are not inside the areas that are defined in the analysis results. The result of site selection processes shows that there are 6 km² areas that are suitable for camping (Fig. 1). However those regions are not denoted in the environmental plan. That difference may indicate the importance and necessity of geographical information systems for any site selection case.

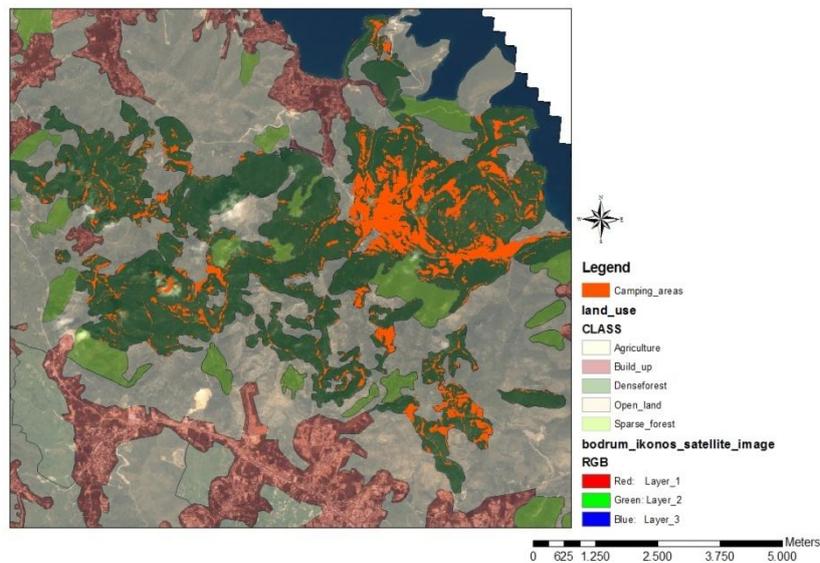


Figure 1. Possible Camping Areas

Site-Parachuting

Site-Parachuting is rapidly developing in our country. Our country has a favorable spot for site – parachuting flight. Convenient flight zones can be found in every city. Site- Parachuting includes the latest technology after the delta wing, amateur aviation flights in the area of non-motorized vehicles, balloons and gliders [5].

Site Parachuting is another tourism activity which is suggested to be developed in the environmental plan decisions. However there are not any suggested areas for this activity in the plan. Slope, land use, and wind direction are requirements for selecting the suitable areas for this activity (The Ministry of Youth and Sport, 2015).

For site parachuting, the slope should be over 30 percent. So the slope layer which is a raster data is created from DEM in five meter pixel size. It is used to define the areas which are over 30 percent with the help of raster calculator tool in Arc Map.

The wind direction is generally south-west in Bodrum Peninsula. It is important to take the wind from the back of the person to be able to fly away from the cliff surface. So it is needed to find the north-east sides of the mountain areas. Therefore, aspect analysis is performed in order to define those areas. The aspect layer is created from the Surface Analysis tool in Arc Map.

Land use should be open land type or sparse forest in order to be suitable for site parachuting. So open land and sparse forest areas are selected from the land use raster data. Finally, the three raster layers are multiplied in raster calculator in order to define the areas which are over 30 percent slope, at the north-east side of the mountains, and also open land or sparse forest. The raster layer is then converted to vector layer in order to define the suitable areas for site parachuting in polygons. As a result, it is found that there are areas with approximately 20 km2 size which are suitable for site parachuting activity in the region (Fig. 2).

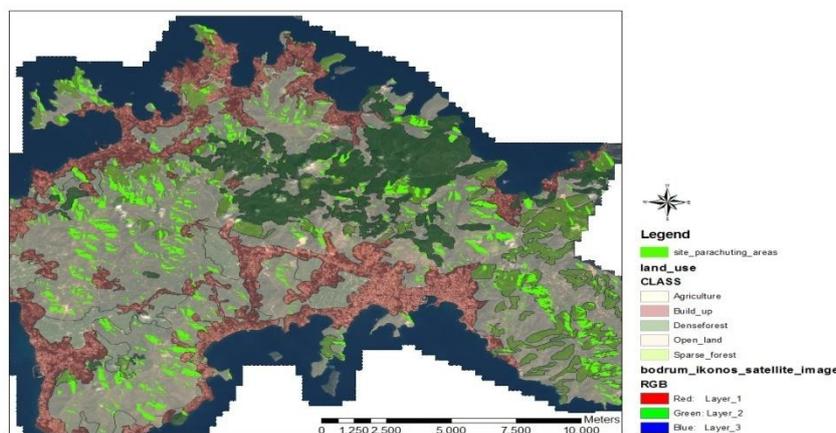


Figure 2. Possible Site-Parachuting Areas

Grass-Skiing

Many tourism activities are heavily dependent on suitable weather conditions, and climate overall is a key factor in attracting visitors to various types of destination), especially snow ski resorts [6]. Such resorts cannot survive without favourable weather and reliable snow coverage for skiing; overly warm summers and snow-deficient winters create challenges for stakeholders and frustrate successful business operations and long-term sustainability. Unusual conditions that result in extreme fluctuations in precipitation can thus be a serious threat for small-scale ski resorts reliant on winter tourism. Grass skiing, skiing on grass, is a method for training for alpine skiing. Both grass skiing and alpine skiing have become established as sports in their own right. The skis used for grass skiing are short with rolling treads or wheels. These skis are attached to the skiers' boots. Depending on the skill of the grass skier, high speeds and jumps can be navigated[7].

Grass skiing can be suggested as one of the new tourism types in Bodrum Peninsula. Slope, land use, and proximity to the urban areas are the requirements for selecting the suitable areas for this activity (The Ministry of Youth and Sport). Slope is an important requirement for the skiers to be accelerated. So, slope should be between 15 and 20 percent. Slope analysis is performed to determine the areas with 5 percent intervals, and the areas which have less than 20 percent and more than 15 percent slope are selected.

Another requirement is the land use. Sparse forest or open land areas where the grass can be grown are suitable for grass skiing. Beside, there should not be trees not to disturb the skiers. The boundary definitions of those areas are very important so these boundaries are digitized from the one meter resolution satellite Ikonos image. Updated land use data is converted to raster format to be used in raster format.

Proximity to the urban areas is the last one of the three requirements. Grass skiing areas should be 500 meters away from the city, district and village but inside 1000 meters zone in order to benefit from the electricity and water resources. This zone is created in shape file and then converted to raster format.

Finally, those three layers are multiplied in raster calculator in order to define the areas that meet the requirements for grass skiing areas. As a result, 8 km² possible areas are determined in the site selection result (Fig. 3).

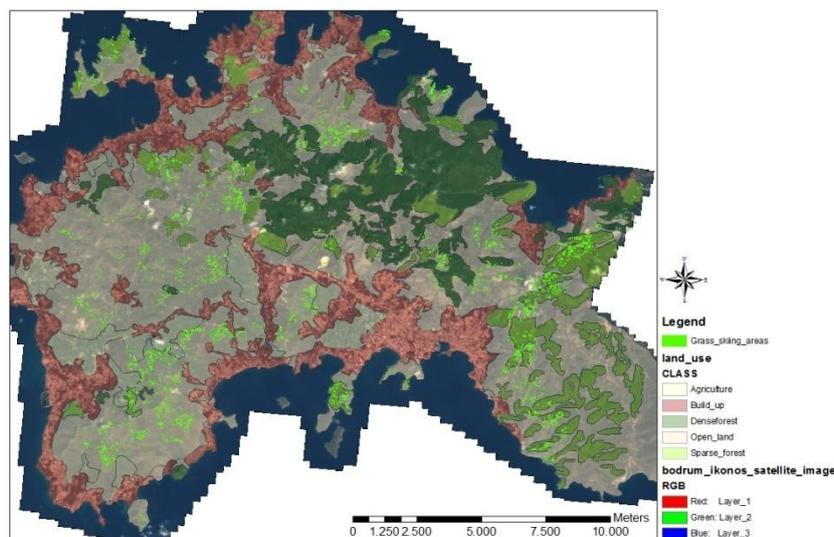


Figure 3. Possible Grass-Skiing Areas

Mountain Biking

Modern mountain biking started in the US in the 1970s and now one of the most popular outdoor recreational activities in the world and also it became an Olympic sport. The UCI (Union Cycliste Internationale) mountain bike event is identified as three types which are cross-country, downhill and stage races [8].

“A cross-country circuit race is a mass-start endurance competition that involves completing several laps of an off-road circuit. According to UCI rules, the course should include forest roads and tracks, and involve significant amounts of climbing and descending” [8].

Firstly, the paths in the forest and mountain areas are digitized with the help of Ikonos satellite image which is acquired in 2006. While digitizing the paths it is not possible to know the slope. However, the slope of the paths should be under 20 percent in order to be suitable for biking (The Ministry of Youth and Sport, 2015). So the slope layer is created from the DEM. This polygon layer shows different slope classes in 5 percent interval. The areas which are under 20 percent are selected. Afterwards, those selected areas are clipped from the paths in order to find the most suitable parts of the paths for biking activity.

Finally, it is seen that there are paths with a total of 56 km length in the mountainous area (Fig. 4). The slope of 20 km of those paths is under 20 percent which is most suitable and the slope of 36 km of them is between 20 and 30 percent which is acceptable.

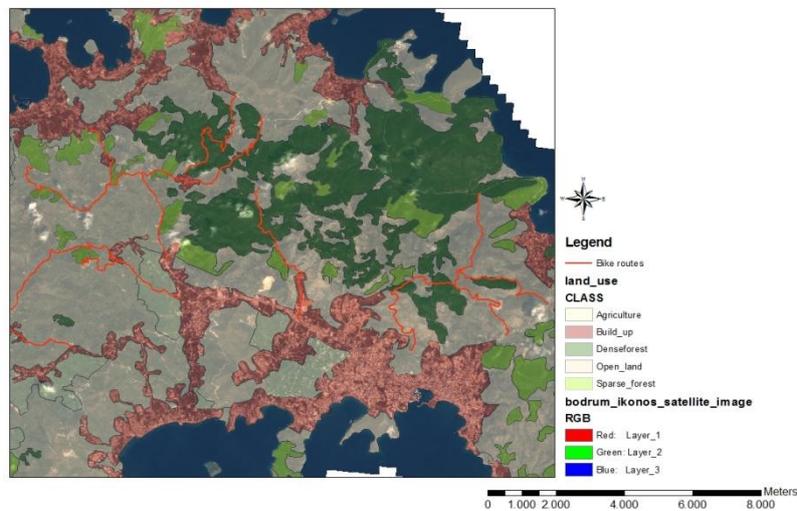


Figure 4. Possible Mountain Biking Routes

The vector data that are handled can be categorized in point, line and polygon shape data. The ones that were used during the environmental planning are also used for the analysis of this thesis after some adjustments. Point data: The planned camping areas in the Environmental Plan are shown as points in the plan. The camping points are marked in shape format by using the plan in “img” format which is coordinated.

Line data: The bike routes are digitized from the Ikonos Satellite image which is acquired in 2006.

Polygon data: Historical area boundaries (Archeological, Natural and Urban Site Boundaries) are gathered from the Tourism and Culture Ministry in “ncz” format that is created in NetCAD program. It is converted to shape format in order to use in Arc Map with the other data. Land use data, which is also in polygon form, is gathered from the Ministry of Tourism and Culture, however it is updated from the Ikonos satellite image.

Consequently, all the parameters coming from The Ministry of Youth and Sport are used in order to find the suitable areas for camping, site-parachuting, grass-skiing and biking purposes. In Bodrum Peninsula 6 km² area can be evaluated as possible camping facility. When the site-parachuting purpose is analyzed 20 km² area is defined as suitable for this sport type. The open space with 8 km² size can be used for grass-skiing purpose in the peninsula. Finally, if bike-riders would like to perform their sport in Bodrum Peninsula, there is a suitable route in 56 km² length. All those possible and suitable areas for recreational sports are defined by the help of geographic information system tools such a way that combining different sciences like Sport Management, Recreation and Geographical Information Technologies.

IV. Discussion

It becomes inevitable to build up comprehensive facilities as the sport facilities are spread out around the world and the needs are increased. When the human prefer both health and sport centers, facilities should fulfill personal and social needs. If those sport facilities become recreational and comprehensive places much more people will utilize from them.

Sport facilities as private or social sectors should be developed and have services within a wide range in terms of proliferation and consolidation of sport. In this case it will help to arise modern and high qualified facilities with high standards.

It is sure that The Olympic Games which is the biggest organization all over the world will contribute to the city where the games performed and also promote to the country in terms of sport facilities. Because of those reasons Turkey where is the candidate country for Olympic games should care of those investments [9].

The places where those recreational activities performed should be chosen analyzing the project and master plans and also the natural resources. It is useful that such kinds of recreational facilities and services are build up in coastal regions. Those recreational facilities can be used as tool for protecting environment and natural structure [10].

“More we spread out sport more generations we have” is our aim. So our sport politics are to have essential and permanent solutions for well-directed plans considering socio-economic and socio-cultural structures.

The number of athlete potential, sport branch that society get used to, demographic structure, geography and climate and economic conditions should be taken into consideration during the planning step of building the sport facilities [11]. The developed countries that obey those rules have significant success in sport [12].

It is obvious that in the feasibility studies for facility is so important that cannot be performed by one expert but a team. This team should involve civil engineers, sport managers, architectures, financial experts, city and regional planners[9].

V. Conclusion

In sport politics plans should be carried out according to geographic specifications and region characteristic to encourage and develop sport.

Site selection as a tool, is used to locate the new land use in the study area with an evaluation of the requirements. Evaluation of the requirement is an important factor for deciding the best location. Each requirement should be analyzed and the analysis results become the inputs for the final site selection result.

Bodrum Peninsula has suitable areas for different kinds of sport activities. In the plan decisions those suggested areas should be considered in order to develop sport tourism in our country.

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