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DETERMINATION OF POTENTIAL ECOTURISM AREAS IN BOZCAADA THROUGH GIS

BOZCAADA'DA EKOTURİZME UYGUN POTANSİYEL ALANLARIN CBS ARACILIĞIYLA BELİRLENMESİ

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ABSTRACT

According to the International Union for Conservation of Nature (IUCN) "ecotourism is environmentally responsible travel and visitation to relatively undisturbed natural areas, in order to enjoy and appreciate nature that promotes conservation, has low visitor impact, and provides for beneficially active socio-economic involvement of local populations." The natural and cultural richnesses of Turkey provide a good potential for nature tourism types; however, unplanned development of ecotourism activities could disturb natural areas.

Therefore, spatial determination of potential areas where ecotourism activities can be carried out has been the subject of this research. The selected study area, Bozcaada, which is a grade 3rd natural site area, is located in Çanakkale Province. The onset of deterioration of natural areas on the island due to intensive uses in summer months underscores the necessity of planning ecotourism activities considering natural conservation. In this research, the potential areas where ecotourism activities can be carried out are spatially determined via overlaying analyses and evaluations of natural and cultural elements provided by GIS. Spatial recommendations are made for ecotourism activities in the research area.

Key Words: Ecotourism, GIS, recreation.

ÖZET

Ekoturizm Uluslararası Doğayı Koruma Birliği (IUCN)'ne göre doğayı ve kültürel kaynakları anlayarak korumayı destekleyen, düşük ziyaretçi etkisi olan ve yerel halka sosyo-ekonomik fayda sağlayan, bozulmamış doğal alanlara çevresel açıdan sorumlu seyahat ve ziyarettir. Ekoturizm genelde küçük gruplar halinde bölgenin geleneksel mimarisini ve doğal kaynakların kullanılmasını amaçlayan bir turizm türüdür. Ülkemizin zengin coğrafyası eko turizm türleri için

uygun bir potansiyeldir ancak yapılacak eko turizm faaliyetlerinin yoğun kullanımı sonucu plansız gelişimi, doğal alanların tahrip olmasına neden olabilir.

Bu nedenle ekoturizm faaliyetlerinin gerçekleştirilebileceği potansiyel alanların mekânsal olarak belirlenmesi araştırmaya konu olmuştur. Çalışma alanı olarak seçilen ve 3. derece doğal sit alanı olan Bozcaada, Çanakkale İlinde yer almaktadır. Ada'nın yaz aylarında yoğun kullanımı nedeniyle tahrip olmaya başlaması, doğanın korunması açısından ekoturizm faaliyetlerinin planlanması gerekliliğini ortaya koymuştur. Araştırmada CBS aracılığıyla doğal ve kültürel öğeler kullanılarak yapılan McHarg overlay (çakıştırma) yöntemi ve değerlendirmeler sonucu ekoturizm faaliyetlerinin gerçekleştirilebileceği potansiyel alanlar, mekânsal olarak belirlenmiştir. Araştırmada elde edilen bulguların yerel yönetimler tarafından uygulanması sonucunda, Bozcaada'nın korunan alanlarının sürdürülebilirliğine katkı sağlayacağı düşünülmektedir

Anahtar Kelimeler: Ekoturizm, CBS, rekreasyon.

1. INTRODUCTION

Given the rapidly growing population and the major problems of urbanization, it seems that people are increasingly turning to nature-based activities and natural areas. The concept of ecotourism emerges in order to minimize the negative effects of tourism activities on value of natural destinations where people travel to get away from the stress of daily life. According to Wood (2002), it is one of the rapidly growing tourism types.

There are many definitions of ecotourism by different researchers. In its simplest definition, ecotourism involves travel to pristine virgin areas. The other well-known definitions are nature tourism, sustainable tourism and non-consumptive tourism. Ecotourism provides important opportunities not only for tourism purposes but also for nature conservation and environmental education. Moreover, it can also be described as performing social and cultural activities, interaction with nature and rural life, exploration and visitation. According to WWF, ecosystem functions must be protected and effectively managed in order for natural landscapes to remain world-class ecotourism destination (URL 1).

Regarding the sustainability on the first place, the goal is to carry out ecotourism activities with minimal-to no- damage to nature. Ecotourism activities can be diversified by determining the source values of the area within the scope of ecotourism, such as, hiking, camping tourism, observation, eco-farming activities, and experiencing ecological village life.

In the literature, some of the researches explore the lack of planning and management for sustainability in ecotourism (Diamantis, 2010) while the others focus on determination of the areas suitable for ecotourism activities (Kubaş and Özkan, 2012; Akpınar Külekçi and Bulut 2013; Kasalak et al. 2018). More recently, some of these studies (Yazıcı and Şahin, 2013; Turoğlu and Özdemir, 2011; Topay and Parladr, 2015; Gökyer et al., 2016) examine the ecotourism types through GIS, creating a numerical database and making thematic maps. In this study, GIS technique is used to create spatial maps.

2. MATERIAL AND METHOD

2.1. Material

Bozcaada District is located in Çanakkale Province in western Turkey (Figure 1). The island's ancient name is Tenedos and the total surface area is approximately 38 km² dir. The distance to the mainland is 6 kilometers (URL 2). Located in the south of the Dardanelles, the island is of great importance in terms of geography and geopolitics. It is the 3rd largest island of Turkey, and is the only district with no villages.

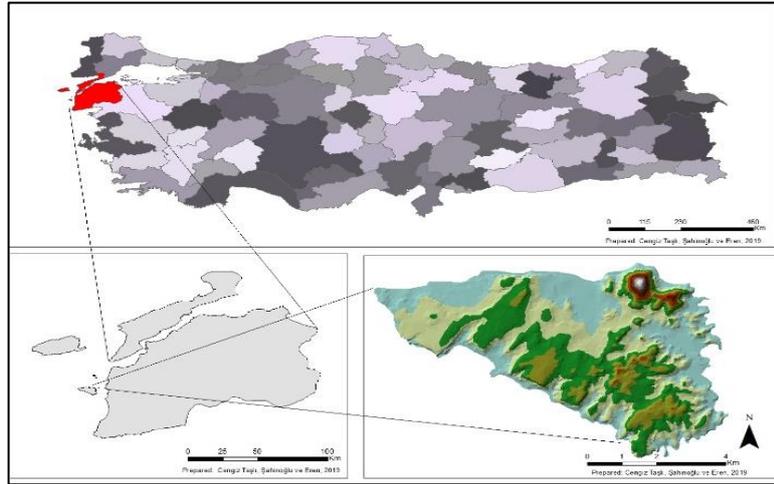


Figure 1. Location of Bozcaada

As for the characteristics of the island affecting ecotourism activities, Bozcaada has a slightly wavy topography which is not high. Morphologically low slopes and slight splits are observed (Figure 2).

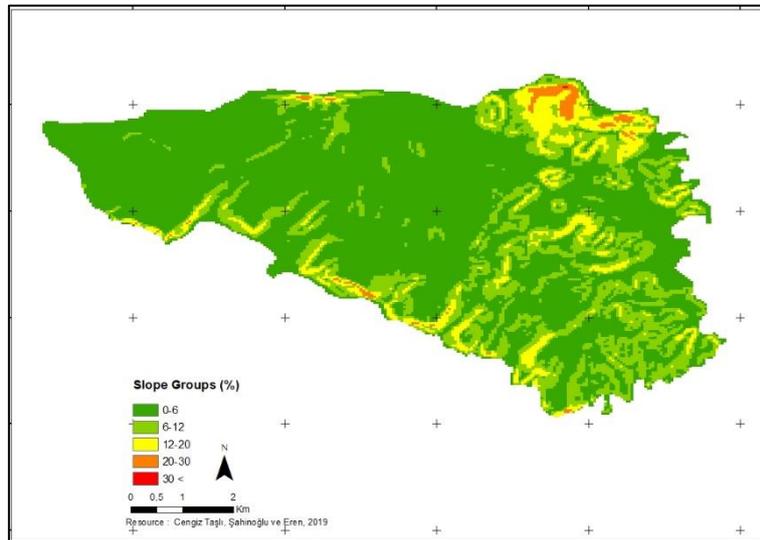


Figure 2. Topography of Bozcaada

The inner parts of the island are generally composed of plains. The island's elevation increases from west to east. And in some areas there is a slight elevation from north to south. The island generally has a slope of 0-6%. From north to south areas with a slope of 6-12% can be observed (Figure 3).

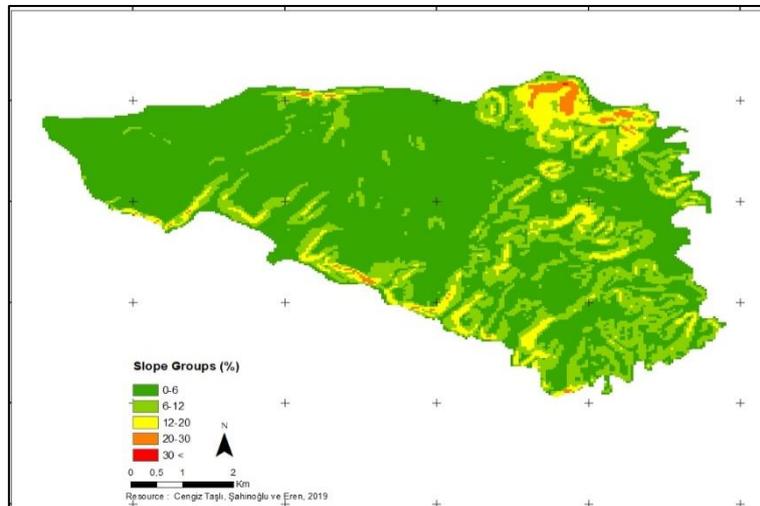


Figure 3. Slope Groups in Bozcaada

There are many bays and headlands on the island. There are no watercourse other than small streams flowing in winter. Although the island has typical Mediterranean climate, it is seriously affected by the northern winds due to its location at the exit of the Dardanelles Strait.

Natural vegetation is composed of maquis and garrigues. In addition to the vineyards that make up a large part of the island, dune vegetation and plants in the forest area to the west of the island constitute the rest of the flora in the study area. Shortage of both the aquatic (digestive organs floating on the water or submerged) and the paludal (the root of the plants extends into mud under the bottom of the water in a swamp or marshland) plants on the island is a result of lack of fresh water (Seçmen ve Leblebici, 1978; Erdinç, 2008).

In addition to its rich potential with historical, archaeological and archaeological sites, the island has an important place in ancient times and in Greek mythology. Due to its location, it has hosted many civilizations and has been invaded many times. Regarding the excavations and studies on the island, the history of the island dates back to 3000 BC. Pelasgians, Greeks, Persians, Genoese and Ottomans had sovereignty over the island, which is finally made part of the Republic of Turkey in accordance with the Lausanne Treaty on September 20, 1923 (URL 3).

The island's economy is generally based on viticulture, winery, fishing and tourism. According to a study by Kaptan Ayhan (2007), throughout the history of economic development of the district, viticulture, winemaking and fishing have remained as means of living up today since the old periods, while sponge fishing it is no longer exist today, which was previously a source of livelihood.

Tourism on the island has started to develop and become an important economic activity since the 1990s. Bozcaada's distinctive historical and architectural texture, different cultural structure, festivals, undisturbed bays, sea, vineyards, delicious wines and food culture ensure the development of the tourism sector. Although the tourism season is short (2-3 months), the most important source of income is tourism (URL 4). Having a rich history, the island has a significant potential for natural and cultural assets. There are many protected areas in different statuses on the island, most of which is generally grade 3 natural sites. However, due to mass tourism in recent years, Bozcaada's assets have been faced with intense cultural exploitation pressure. The onset of the deterioration of the island due to intensive use in summer months, have revealed the necessity to plan ecotourism activities regarding nature conservation.

Therefore, the spatial determination of potential areas where ecotourism activities can be carried out has been the subject of this research.

2.2. Method

In this research, overlay analysis is performed by using natural and cultural elements via GIS. As a result of the evaluations, the potential areas where ecotourism activities can be realized are determined spatially.

In the first stage; Data are prepared numerically by GIS and a thematic database is produced. 2012 Corine land classification is updated with the help of 2019 Google Earth Pro program and the existing land cover is determined. In addition, important resource values for ecotourism activities have been digitized.

In the second stage, potential areas suitable for ecotourism are determined spatially using ArcMap 10.5 via GIS. In the study, the criteria developed by Gökyer and Dönmez (2014) by using various sources (Topay, 2003) is used. However, potential areas and resource values have been changed according to the characteristics of Bozcaada (Table 1).

Table 1. Potential Resource Values for Ecotourism Activities

Potential Areas	Ecotourism Resource Value	Ecotourism Activities
Hilly Areas	Geomorphological Formations Flora and Fauna	Observation Areas • Wild life observation • Flora observation • Landscape observation Camping Hiking
Coastal Areas	Bird Species Marine Ecosystem Geomorphological Formations	Fishery Blue Tour Free Walking/hiking Bird Watching
Historical, Archaeological and Natural Site Areas	Historical, Archaeological areas Cultural sites	Science activities (Historical Values Review) Visits
Vineyard, Field Farming	Farming areas Vineyard areas	Eco-agricultural activities, Experiencing rural life and experiencing ecological village life
Maquis Areas	Flora	Free Walking/hiking camping
Forest Areas	Flora Fauna	Free Walking/hiking camping Wildlife Observation Flora observation

In the third stage; for each ecotourism activity, overlays are made by determining eligibility criteria for ecotourism activities (Table 2).

Table 2. Eligibility Criteria for Ecotourism Activities (benefited from Topay 2003, Gökyer ve Dönmez 2014, Dönmez ve Gökyer 2014)

Ecotourism Activity	Eligibility-Assessment Criteria
Free Walking/hiking	Slope: % 0-20 Forest, maquis, meadow and pasture areas Coastal areas
Tent Camping	Slope: % 0-6 Forest areas
Eco-farming activities	Agricultural fields and vineyard areas Fruit Gardens
Experiencing rural life and experiencing ecological village life	Settlement areas Agricultural Areas and Vineyard Areas Fruit Gardens
Scientific Activities (Historical Value Assessment)	Historical and Archaeological Sites Grade 1 st site areas Grade 3 rd site areas
Bird watching	Bird Watching Mountainous and Coastal Areas with Bird Presence
Fishery	Coastal areas
Observation areas	Hilly areas GIS Visibility Analysis

3. RESULTS

Potential Areas for Ecotourism Activities: The potential areas in the study area are: maquis areas, forest areas, vineyard areas and fruit gardens, the hills, the coastal areas, sandy areas and coves (Figure 4).

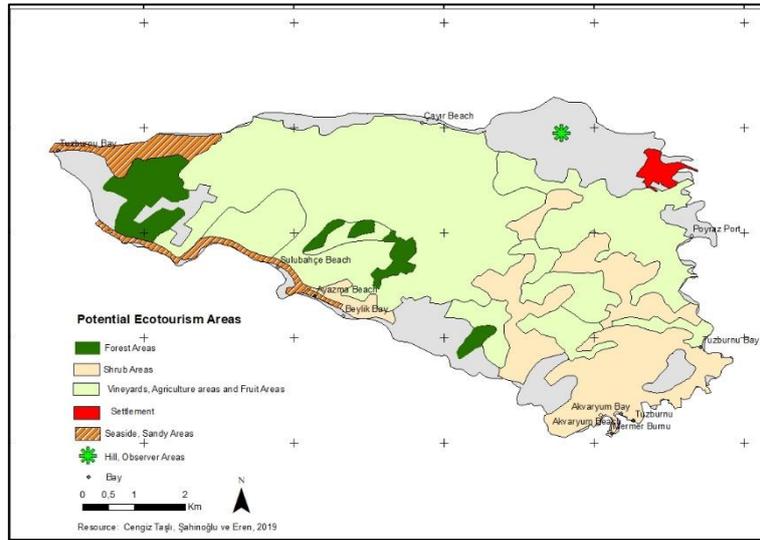


Figure 4. Potential Areas for Ecotourism Activities

Appropriate Areas for Ecotourism Activities: The ecotourism activities that can be carried out in each potential area are matched by overlaying analyses of the determined resource values through eligibility assessment criteria. Activities that can be done in the study area are;

Free Walking/Hiking: The areas that are appropriate for this activities are forest areas, maquis areas, meadows and coastal areas within the range of %0-20 slope, which is shown in Figure 5.

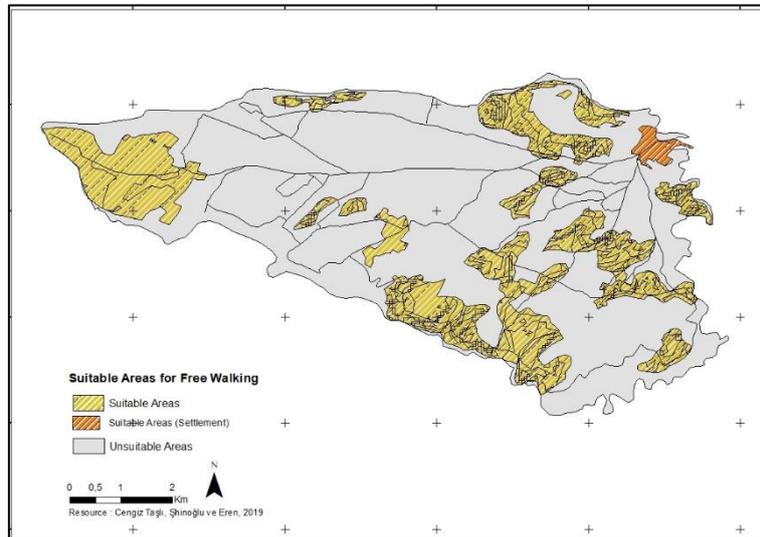


Figure 5. Areas appropriate for free walking/hiking

• **Tent Camping:** The areas that are appropriate for camping are forest areas with a slope of %0-6, as shown in Figure 6.

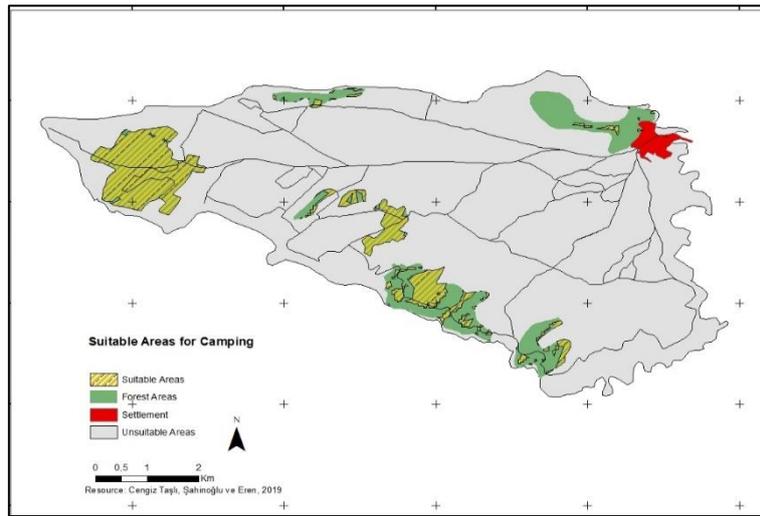


Figure 6. Areas appropriate for tent camping

- **Eco –farming and Experiencing Rural Life Activities:** For this activity, agricultural areas, vineyards, fruit gardens, and settlement areas are appropriate places as shown in Figure 7.

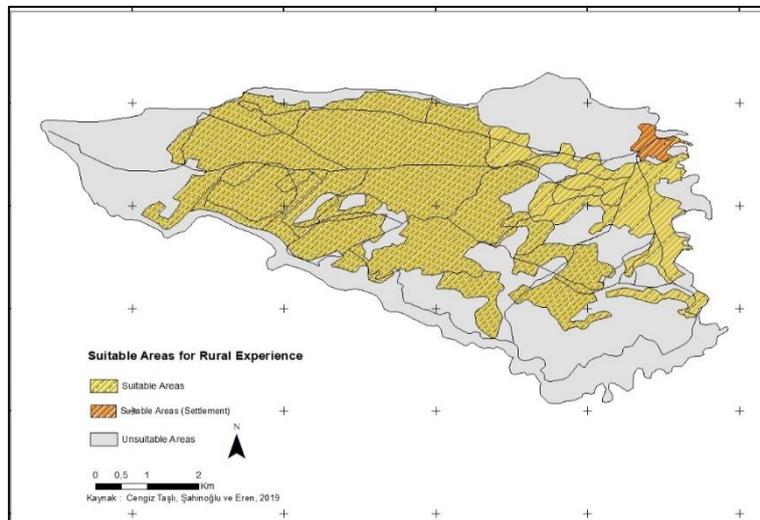


Figure 7. Appropriate Areas for Eco-farming and Experiencing Rural Life Activities

- **Scientific Activities (Historical Value Assessment):** Historical and archeological areas, grade 1st and grade 3rd heritage sites are appropriate for this activity as shown in Figure 8.

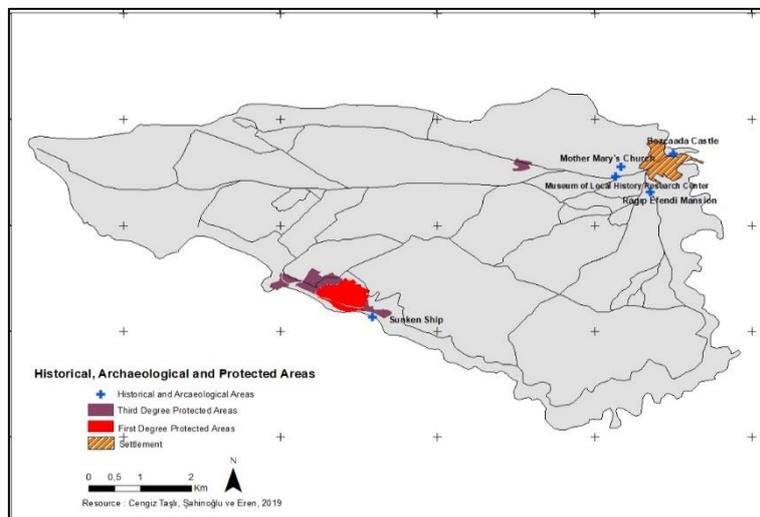


Figure 8. Appropriate areas for Scientific Activities (Historical Value Assessment)

- **Observation Areas:** Hilly areas are determined by taking 2 different reference points and utilizing GIS Visibility Analysis. The areas Tepelik alanlar tespit edilip 2 farklı nokta alınıp CBS Görünürlük Analizi kullanılarak The areas that meet the criteria are shown in Figure 9 and Figure 10.

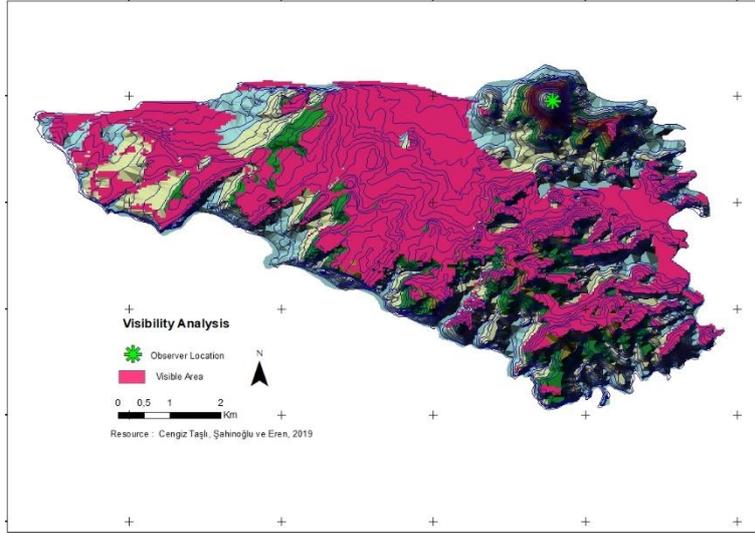


Figure 9. Visibility Analysis for Observation Area Point 1

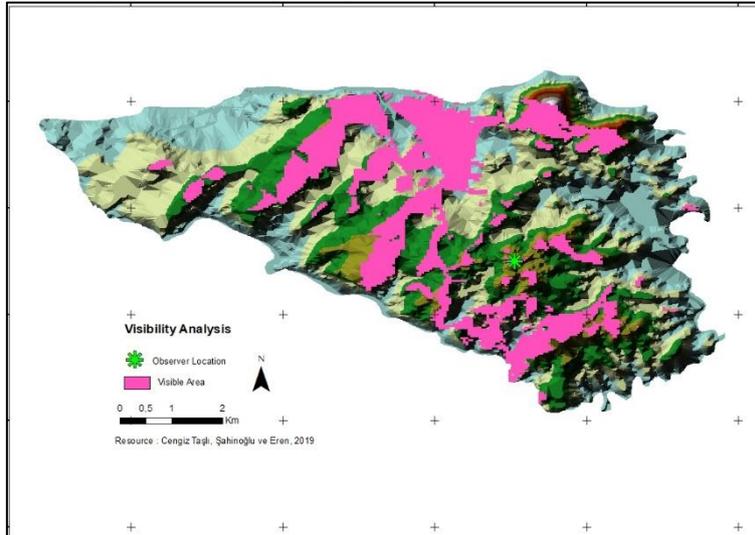


Figure 10. Visibility Analysis for Observation Area Point 2

4. CONCLUSIONS AND RECOMMENDATIONS

Bozcaada has significant potential in tourism at both national and international level. But, in the summer, the population on the island dramatically increases. The fact that the mass tourism is above the carrying capacity causes deterioration of the island's assets. As one of the alternative solutions, ecotourism activities are relatively implemented. However, not being part of a sound and sustainable planning, ecotourism activities are not fully benefited.

Therefore, in order to contribute to the sustainability of the island ecosystem, this research contributes to planning of ecotourism activities by spatially determining appropriate areas. Thematic maps are generated by creating a digital database. However, due to the inability to reach some databases related to the island, the spatial determination of ecotourism activities was limited. For this reason, it is considered that at the planning and design scale, a more detailed and comprehensive study should be beneficial. Additionally, this study illustrates that GIS is an effective method that in preparation of digital data, using the existing data for analyses and updating and monitoring of data in the future planning.

It is regarded that the results of this study is taken into consideration by the local authorities will be beneficial for the sustainability of the island's ecotourism activities.

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