



GEOGRAPHICAL OBSERVATIONS IN EFTENİ LAKE (DÜZCE - TURKEY) WETLANDS AND ITS VICINITY

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ГЕОГРАФСКИ НАБЛЮДЕНИЯ В МОЧУРЛИВИТЕ ОБЛАСТИ EFTENİ LAKE (DÜZCE - ТУРЦИЯ)

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ABSTRACT: *Efteni Lake is situated in southwest of Düzce Plain with 10 km distance to Düzce city center. The lake of 814 hectare area which could be used for boat fishing and transporting round timbers 50 years ago was dried and reduced down to 25 hectares area as a result of the demands from the local public and the administrators for purposes of agriculture and animal breeding. Efteni Lake which was once an important accommodation and nourishment spot on the route of migration hosting about 129 migratory bird types has lost this characteristic to a great extent. As a result of these negative developments, Efteni Lake and its vicinity was declared as Wildlife Development and Wetland Area in 2005. The lake area and its vicinity is a candidate to become a center of attraction for ecotourists with its natural features, location and ease of transportation.*

The fundamental purpose of this study is to present the natural environmental properties and biogeographical characteristics of Efteni Lake Wetlands and to provide suggestions to the problems identified in the study. With this aim, document reviews, field trips and interviews with the local public and authorities were undertaken and problems regarding pollution, landscape and publicity were identified. The results section of the study presents some suggestions regarding the solution of the identified problems.

Key Words: Wetlands, Efteni Lake, Geography

Introduction

Ramsar Convention on Wetlands (1971) accepted by Turkey in 1994 focuses on Wetlands of International Importance that host waterfowls and declares the areas with depth less than 6 m as wetlands such as areas (including the areas with sea water) containing large or little quantities of salt or fresh water, areas with stagnant or running water, temporary or permanent water sources, natural or manmade water holes, grasslands or peatlands, meadows and marshlands (Güney 2004 p.90, Güney 1997). Wetland which consist of high level biological diversity and dynamic structures play an important role in preventing the relative humidity in the environment, the movements of the groundwater, erosion and flood management, improving water quality, producing economic income from water and food provision, increasing productivity in agriculture, recreational uses and transportation and providing climate stabilization (Environmental Problems of Turkey-95 1995; citations; Yazıcı & Şahin 1999, p.20).

Wetlands have an important place in terms of their features and the richness of the flora and fauna they host (Güney 1995, Arı & Derinöz 2011) hence they are ecosystems that need to be protected well. However, the importance of these wetlands was realized rather late in Turkey. 1.300.000 hectare area of wetlands in Turkey has lost its function due to processes of drying out in order to gain agricultural and to pollution (World Wildlife Fund, 2008, p.4; Magnin & Yazar 1997). The ecological balance has been destroyed in most of the wetlands of Turkey and one of these places is the Efteni (Melen) Lake Wetland Area in the southwest of Düzce Plain. Efteni Lake had been dried out in the '70s to be used in agriculture and animal husbandry and its size has been reduced to 25 hectare area from its vast size of 814 hectare (Uzun et al. 2011, p.55). This wetland area home to 129 bird types which was once an important accommodation and nutrition area on migration routes for many migrating birds has substantially lost this characteristic. As a result of these negative developments, Efteni Lake and its immediate vicinity has been declared Wildlife Development

Area and Wetlands in 2005. The ownership of the wetlands belongs to the treasury and the surface area of the wildlife development area is 764 hectare.

This study aims to present the geographical properties of Efteni Lake Wetland Area (Photo 1) and its immediate vicinity. Data needed for the research was obtained through document review, field trips and interviews. Interviews were held with authorities of Düzce Forestry and

Waterworks Directorate, Düzce Provincial Tourism Directorate and Gölyaka Municipality, academicians from Düzce University, village headmen of the area and local public. In this manner, natural environment characteristics and bio-geographical features of the research field were identified and suggestions were provided to solve the problems born as a result of misuse of the research area.

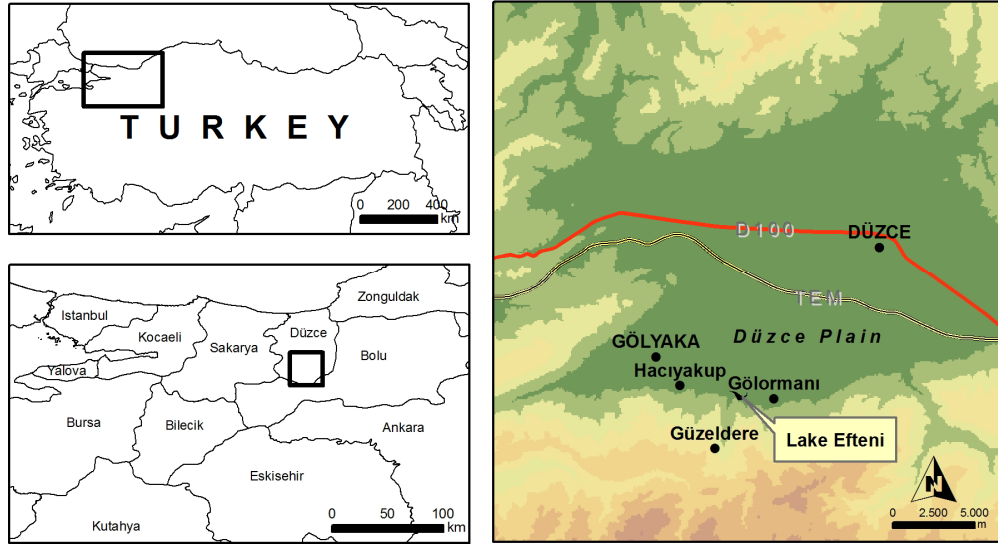


Fig. 1: The location map of the research area



Photo 1. View of Efteni Lake Wetland Area from Elmacık Mountain in the South

Locational Characteristics

Efteni Lake Wetland Area is situated in Gölyaka and Central district borders of Düzce Province in the Western Black Sea Part of the Black Sea Region (Figure 1). Efteni Lake surrounded by Elmacık Mountain in the south is located in the southwestern part of Düzce Plain. Efteni Lake Wetland Area is 10 km to Düzce provincial center and 2 km to Gölyaka District. The Lake is 16 km away from the TEM highway

(Trans European Motor Way) Düzce exit and 27 km from TEM Kaynaşlı exit. It is also 10 km away from the D-100 highway. TEM and D-100 highways, two of the busiest highways that connect the largest two cities in Turkey (Istanbul-Ankara) are very close to the lake area.

Efteni Lake and its vicinity have a high potential in terms of recreation as a result of its natural beauties. There are thermal springs and facilities on the shores of the lake. Güzeldere Waterfall Nature Park on Elmacık Mountain is located 11 km south of the lake and there are plateaus 20 km south of the lake. Efteni Lake and its vicinity is an area where eco-tourists can undertake daily recreational activities due to its natural beauties, location and ease of transportation.

Natural Environment and Bio-geographical Properties

Düzce Plain is a roughly circular depression surrounded by mountains. Efteni Lake is situated in the southwestern part of Düzce Plain (Figure 2). Elmacık Mountain lies on the immediate

south of the plain and the lake with beech and fir trees on its northern slopes (Pekcan 2000, p.3). In his work, İnandık (1965, p.81) mentions the only lake of Düzce Plain, Melen (Efteni), to have 5 km² area in the 1950s. İnandık describes Efteni Lake and its vicinity in this work with the following statements: “A marshland forms around the lake in the seasons when the waters ebb. The Lake with a few meters depth is like a

reservoir that hosts the water that belongs to the plain. The extra water is sent to Black Sea with an outlet in the northwest. The bottom of the lake is laid with slime and clay and there is a spring in the southern part. The marshlands are in the north, southeast and western parts of the lake. The source of the water in the southern part of the lake that follows a fault line relatively shows the effect of the fault.

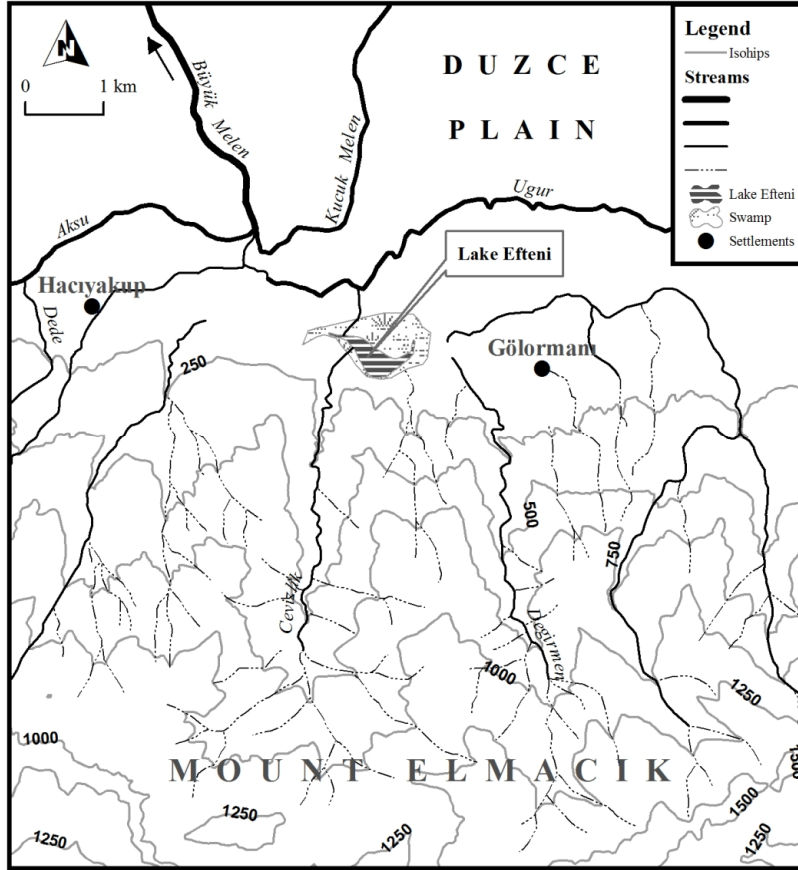


Fig. 2. Topography Map of Efteni Lake and its vicinity

General Directorate of State Hydraulic Works (DSİ) undertook the drying up of Efteni Lake in the ‘60s and ‘70s with the demands and support of the local public and administrators in order to facilitate the land for use in agriculture and animal husbandry in the area. While the lake was supplied in the past with water coming from Küçük Melen, Aksu, Uğursuyu, Değirmendere, Sakuçdere, Karadere and Cevizlik rivers, it was connected to Aksu, Küçük Melen and Uğursuyu Büyükmelen with the channels that were opened and water in the rest of the small rivers was directed out of the lake with the new channels which resulted in the drying up of the lake in 1976 (Hasbenli et al. 2011). Hence, although the lake was an important stopover for migratory

birds for accommodation and nutrition, it ended up losing most of this characteristic and the number of waterfowls in the area substantially decreased. After the importance of wetlands has been grasped better, Efteni Lake was given the status of “Waterfowl Protection and Reproduction Area” in 1992 and hunting was prohibited. Banks were built in the lake to expand the areas that hold water. The outlet of the lake is in the north and is connected to Büyük Melen River which is 500 m away. The shoreline of the lake is 7504 m and the part that holds water is calculated as 170,2 ha. The water level is the highest in March with an average depth of 130, 7 cm. The lowest water levels is seen in September with an average depth of 89, 9 cm

(Uzun et al. 2011, p.55; Keten 2009). Efteni Lake is surrounded by new alluviums (Pekcan 2000, p.6). According to İnandık (1965) Efteni Lake lays on epirogenic fault zone. The name of the lake whose altitude above sea level is 117 m is believed to come from The Byzantium Queen Eftelya who used to wash up in the lake to heal.

The area which includes Efteni Lake is dominantly under the effect of Black Sea climate however it is also affected from the continental climate features. According to data obtained from Düzce Meteorology Station (<http://www.mgm.gov.tr>) the winters in Düzce Plain and around the lake is cold (with the average temperatures 3,9° C in January and 5,2° C in February) and snowy, and the summers are hot (the average temperatures of July and August are 22,6° C and 22,3° C respectively) and relatively rainy. The annual average temperature is 12,9° C. Annual rainfall is 818,4 mm and rainfall is divided into seasons in this manner: 30,9% in the winter, 26,9% in fall, 23,3% in spring and 18,9% in the summer. The lake area expands in the spring as a result of abundant water from the springs and it substantially narrows at the end of summer and beginning of fall due to evaporation and insufficient water intake. Also, lake water may sometimes freeze since winters are rather cold.

Mansuroğlu and Kesim (1997) state that Efteni Lake Wetland area which is important in ornithological terms plays a major role in accommodating various types of migratory birds including the types that do not fly further south, the types that are almost extinct or very rare in Turkey. With this characteristic, Efteni Lake Wetland area has the features of a bird sanctuary.

In his research, Keten (2009) identified a total of 156 types including 129 birds (Aves), 10 fish from the vertebrates (Actinopterygii), 2 amphibians (Amphibia), 6 reptilians (reptilia) and 9 mammals in the wetland area. The common bird types in and around the lake are storks, wild ducks, crested white egrets and swans. The most common fish types in the lake are carp bream (*Abramis brama*), goatfish (*Barbus escherichi*), carp (*Cyprinus carpio*), roach (*Rutilus rutilus*), chub (*Squalius cephalus*), tinca tinca or green carp (*Tinca tinca*), pike (*Esox lucius*), perch (*Perca fluviatilis*), monkey goby (*Neogobius fluviatilis*) and sheat fish (*Silurus glanis*) (Keten 2009).

In their doctorate studies, Aksoy (2006) and Keten (2009) identified 105 flora types consisting of herbaceous and ligneous aquatic,

semi aquatic and terrestrious plants. Among these, *Lythrum anatolicum*, *Verbascum bithynicum* and *Campanula lyrata* are the identified endemic types in the area. Water lilies, irises, buttercups, reeds, mints and duck weeds can be found along with aquatic trees such as willows, ash trees and sycamores (www.duzcekulturturizm.gov.tr).

The Degree of Use

According to Saraçoğlu's research (1990) and the interviews held with the local public the degree of use from the wetlands in the '50s can be described in these statements: Half of the wetlands in these years was reedy and marshy. The marshlands were used as pastures for animals. Local public used to make wickerwork. The birds were hunted. The deepest part of the lake was about 8 m. Boats were sailed in the lake to carry lumbers. The lake was very rich in fish and sometimes you could catch fish that weighed 30-40 kg. The most commonly caught fish were cod, carp and sheatfish. You could go fishing with boats in every season. The fish resources of the lake were put on market by way of tenders. The individuals who got the tender sold these rights to the villagers piecemeal. The buyers were mostly the villagers from the neighboring villagers.



Photo 2. View of Efteni Lake Observation Tower and Jetty

Today, the area that is reintegrated to land through drying up of the lake is generally used for agriculture and animal husbandry. The lake is surrounded by agricultural and pasture areas that

belong to private persons. Some parts that have been dried out are used for planting poplar trees. Since the vicinity of the lake is rich in forest products, reeds and nutgrass are not valorized efficiently. While lumber was carried on the lake in the past, now lorries undertake this job.

Commercial fishing is not available in the lake anymore. Fishing or sailing by boat is prohibited. The wooden port of 100 m on Efteni Lake is used for sportive line fishing for a fee of four euro (Anadolu News, 2010). Carps are among the most common fish that is caught. Bird hunting is prohibited in and around the lake.

Efteni Lake has a very serious potential in terms of eco-tourism. It provides an ideal environment for visitors with the diversity in fauna and flora along with the natural beauties it offers. The most common recreational activities that can be undertaken in the wetlands are: scenic views, picnics, fishing, bird observations, walking, jogging and photography.

Since the wetland hosts a large number of birds, it is also a bird sanctuary. It is possible to observe and take photos of wild birds with the help of the wooden jetty and the observation tower without creating distress in the natural environment (Photo 2, 3, 4).

Problems and Suggestions

Undoubtedly, the most important problem in Efteni Lake is the destruction of the natural balance. The awareness to conserve wetland ecosystems in their natural forms was introduced to Turkey rather late (Yazıcı & Şahin 1999) and as was the case in many other wetlands; problems ensued in Efteni Lake as well. Problems identified as a result of document reviews regarding the area, interviews with the related parties and field trips and suggestions to solve them are provided below:

✓ Initiatives have been started to bring Efteni Lake to the size it had in 1960 as seen in topography map sections of that year. However, since the formation of wildlife protection area will result in the decrease of agricultural and pasture lands that belong to neighboring villages (especially Gölormanı and Hacıyakup Villages), the villagers are discrediting the efforts and are not very comfortable with the whole idea. The socioeconomic structure of the area should be taken into account when the management plans are created and local conditions and opportunities should be assessed and

valorized. Models that respect local life styles and traditional resource uses in which local public can take part in the decision making process should be given priority. Decision makes must take the wishes and needs of the locals into consideration in the planning process.



Photo 3. Scenes from Efteni Lake Wetland Area

✓ Projects and actions plans developed for the restoration and rehabilitation of Efteni Lake Wetland Area whose ecological character has been destroyed need to be out into effect immediately.



Photo 4. Scenes from Efteni Lake Wetland Area

- ✓ Work should be started to make use of flood banks also in the borders of Efteni Lake Wildlife Development Area (Provincial Environment and Forestry Directorate, 2011b).

- ✓ Domestic wastes discharged into the lake and litter caused by settlements around the lake can be seen from a long distance on both the surface of the lake and around the shores. The facts that an important highway passes close by, many settlements are in close proximity and large areas of land used for agriculture have endangered the integrity of the wetlands (Hasbenli et al. 2011 pp.11-12).
- ✓ The use of chemical fertilizers and agrochemicals in agricultural areas that are directly related to the wetlands should be banned and biological methods which are more effective in fighting agricultural diseases and pests should be preferred.
- ✓ Dense and irresponsible water use from the lakes that feed the lake for irrigational, drinking and for general use by the villagers causes a high level of decrease in the lake water especially in summer months. In addition to using the water resources that feed the lake, villagers also pollute the lake with waste materials and litter. Clean ups should be organized in regular intervals around the lake to get rid of the collected litter. The authorities in the Provincial Environment and Forestry Directorate state that although the lake was been cleaned and regulated many times, it is still in this condition because the local public is insensitive to the issue and they do not feel ownership to a sufficient degree.
- ✓ Lumber depot located on the lake shore that since 1960 is causing pollution and it needs to be removed to another location
- ✓ Especially the bovine animals have negative effects on the wetland area. About three thousand cows and water buffalos live in the lake border line and cause more and more pollution as a result of their excrement (Hasbenli et al. 2011). All public organizations and institutions should start necessary procedures to prevent idle pasturing of bovines in the wetlands by warning the animal owners and the village headmen (Provincial Environment and Forestry Directorate, 2011b).
- ✓ Providing interventions against poachers and feeding the wild animals can be done more effectively by increasing the number of ATV motors and Hovercraft boats owned by Düzce Provincial Environment and Forestry Directorate. The locations that vehicles cannot access in Efteni Lake Wildlife Development Area can easily be accessed with ATV motors for feeding the animals. Distributing feed to

animals at times when the weather temperature is very low and when it is very snowy should be taken into consideration by Düzce Provincial Environment and Forestry Directorate.

- ✓ The endemic fauna in the wetland area should be taken under protection.
- ✓ The narrowing of the lake as a result of the drying has resulted in a decrease of the fish in the lake. The rules of sustainable line fishing should be followed.
- ✓ The natural, bio-geographical and recreational features of the wetlands should be presented with the help of media. Scientific organizations should be organized, introductory leaflets should be prepared and festivals should be organized.
- ✓ A regional presentation and visitor centre should be set up in a suitable area in the wetlands. A wooden structure should be built in which local food is served and village products and souvenirs are sold. In addition, a museum where photos related to flora and fauna in the wetlands and birds are displayed should be opened. Bulletin boards to present the lake and its vicinity should be prepared and placed in appropriate parts of the wetlands.
- ✓ Rides with buggies can be organized in the South side of the lake close to the highway.
- ✓ A jetty and an observation tower is built in order to observe the reproduction areas of the birds more closely. This jetty and the tower should be kept under constant maintenance. Binoculars should be kept in the observation tower to facilitate observation. Personnel should be ready at the observation tower at least at times when dense visitor flow is expected.
- ✓ A rehabilitation unit should be set up for wild life animals in Efteni Lake and its vicinity.
- ✓ The interviews held during the research have given the impression that the local public living in villages is not highly aware of the importance of the wetland areas. The awareness of local public should be increased and they need to be educated in these regards.
- ✓ Preparing a flora and fauna inventory of the ecosystem that hosts many living beings and observing especially the waterfowls is imperative.
- ✓ Efteni Lake Wetland Area has a potential that can attract large numbers of domestic and foreign eco-tourists since it provides a stunning landscape and ideal environments for

bird watching, fishing and walking among many other activities. Necessary arrangements and presentations to attract eco-tourists should be undertaken. In Turkey, there are many bird observation groups have been developed which consists of university students and voluntary individuals with a passion for bird watching. Necessary work should be developed to attract these groups to the area.

Efteni Lake Wetland Area should be brought back to its previous border size of 50 years ago swiftly, the area should be presented effectively, preventive measures against pollution should be taken and necessary infrastructure should be set up for eco-tourism urgently in order for the area to contribute to the local and domestic tourism.

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