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KOCASU DELTA ARE ENDANGERED FROM EXTINCTION IN THE WILD WITH THE CREEK VITAL ELEMENTS AND SUSTAINABILITY

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ABSTRACT

River delta and the immediate surroundings of Kocasu, hosting the terms of the diversity of natural habitats has unique natural wealth with delta, dune plants, marsh, swamp natural forests and lagoons it host several life. Swamp forests consisting of ash, alder and willow; lilies, sea bean, tamarisk, hyacinths, onions lake, aquatic plants such as oak rabbit; black stork, Ferruginous, pochard, marsh swallow, Kentish Plover, little bittern, the night heron, pied herons, little egret, gray herons, swans, green head, garganey, Hungarian duck, apple head Duck, White-Tailed Eagle, coot, oystercatcher, the tern, little tern and the delta where several woodpecker species, bird species such as the pygmy cormorants and white pelicans are housed during migration. Examination field has earned the status of Important Bird Areas breeding bird populations such as black storks, marsh swallow, cut necklace rain bird. Soil frog, marsh frog, spotted turtle, striped turtles, water snakes, amphibians and reptiles such as the southern crested newt living in the area are other biosphere elements. These lagoons are home to extinct eel with pike, roach, carp, flounder, and fish such as rhodeus sericeus amarusich. The Tatars black chards on the field in terms of endemic species of vegetation are in the high risk category. Sand lilies, rhododendron protection priority; discrete sand, while the lake onion is located in the delicate protected category. The spleen herb is considered endemic in the low-risk group. Swamp forests, dune plants, aquatic vegetation, birds and lagoons of ecotourism and jeomorfoturizm poses potential appeal. Although natural sites in Dalyan, pollution in Poyraz and Arapçiftliği the lagoons, incorrect land use, chemical fertilizer use, Kocasu mixing the river water with the Bursa industrial waste, siltation, eutrophication, sand withdrawal, some wrong practices, such as cutting of trees in the swamp forests leads to compensation impossible degradation.

KEYWORDS: *Kocasu River Delta, Lagoon, Ecology, Flora, Vegetation, Degradation*

INTRODUCTION

Ecosystem problems are one of the major problems of our world, which is 4.6 billion years old. Disturbances in the ecosystem are generally influenced by human influence. People affect the living and non-living beings in the ecosystem they are in, causing the ecosystem to deteriorate. People who are part of the ecosystem have begun to play a major role in the changing world, especially after the industrial revolution. With the development of technology over time, this process has become dominant. We can give examples of incidents such as the creation of uncontrolled population gathering areas, wrong land use, unplanned and uneven urbanization, unconscious and unlimited use of natural resources, pollution of forest destruction and water resources, greenhouse gases released into the atmosphere. Thus, the atmosphere, lithosphere, hydrosphere and biosphere destruction lead to ecosystem problems. The harms of these negative living people are not only the human species but the other systems together with other biosphere elements. Degradation processes that live in one corner of the world thus lay the groundwork for problems on a global scale. From this point of view, the Kocasu Creek Delta biosphere habitat, a remarkable longevity (subasar forest) and Important Bird Area (IBA) of international importance and natural reserves, is a locality where ecological problems that need to be examined and that need to be taken in terms of sustainability come into play.

As in all the lagoons in the world, Dalyan, Poyraz and Arapçiftlik lagoons, which are located in the Koca Çay Delta, are also important natural ecosystems in wetlands. The Kocasu Creek delta and its immediate surroundings have a unique natural richness in terms of the diversity of the natural habitats it hosts. Delta hosts many natural habitats with dune plants, swamps, longevity forests and lagoons. Longoz forests consisting of ash, alder and willow; aquatic plants such as water lily, marine alpine, crazy, hyacinth, lake onion, rabbit alpine; green eagle, horned eagle, apple head eagle, eagle eagle, hare, ponytail, sumru, small sumru, and a small sumru the delta where several woodpeckers are found, and birds such as small cormorants and white pelicans during migration. The examination area has acquired the status of Important Bird Area with the growing populations of the dwarf, marsh fad, cut pendant rainbird. Amphibians and reptiles such as earth frog, plains frog, spotted tortoise, striped tortoise, water snake, and ragged salamander are other biosphere elements living on the field. Besides these, the lagoons host the endangered eels and fish such as crane, red-headed gull, carp streamer, rhodeus sericeus amarusic. In terms of vegetation, Tatar Karapazası is an endemic species that is located in the high risk category. Sand bamboo, primordial in the protection of the rhododendrons; sand separator, and Lake Bulb are in sensitive protection category. Again, the endemic species, the spleen, is evaluated in the low-risk group. The longevity forests, dune plants, aquatic vegetation, bird species and lagoons are attracting potential for ecotourism and geomorphotism. Some misapplications such as pollution in Dalyan, Poyraz and Arapçiftlik lagoons, use of chemical fertilizers, industrial wastes of Bursa mixed with Koçasu Stream, siltation, eutrophication, sand extraction and cutting of trees in forest are leading to undue reductions.

In terms of their characteristics, lagoons, which host many live species, are of great importance to humans because of wetlands in terms of space use. In recent years, the areas of lagoons that have suffered much destruction have been shrinking, and habitat and ecology living there have suffered from it. For this reason new plans and strategies for the protection and development of lagoons have been developed and some lagoons have been protected under the "Ramsar Convention"

OBJECTIVES

One of the most rational approaches to conservation of natural life is field protection. Living species can not exist without living spaces of appropriate quality and size. Field protection protects habitats from one side while allowing the different species of birds to protect together from the other side to the birds, thus preserving the biological diversity as a whole. The importance of the identification and proper protection of "Important Bird Areas" and "Important Nature Areas" is therefore not limited to birds and other species. The quality information provided by the increasingly popular birdwatcher and nature community allows us to rapidly change our understanding of important areas such as the Kocasu Creek Delta and to be aware of the threat more strikingly. Karacabey Longoz Forest, which has a rare ecosystem similar to it, is one of the most important places to be investigated and studied so that the natural life in the forest and surrounding area is not only local people but also natural heritage of the world.

It is seen that Kocasu Creek Delta Longoz which is an important subasar forest of our country, which is the most important suburb of our country, is a natural environment attracting attention with rich natural diversity with national and international preperation in terms of its natural richness, touristic attractions, flora and fauna diversity. However, it was understood that the studies about the region were very limited and it was predicted that the study should be done about the subject.

The Kocasu Creek Delta, which is formed by the Susurluk River, comes from the lakes, swamps, sand dunes and longoz forests. In the western half of the delta, Dalyan and Poyraz lagoons with a total area of 194 hectare and fed by Maliç Stream, reed beds covering 600 hectares, subasar forests consisting of ash, alder and willow, spread over a 730 hectare area, and a wide band of sand with a wide variety of flora, and is worthy of analysis.

Among these breeding species are the black-tailed species, the goat furrow, the marsh falconer, the maple claw, the small nettle, the night fisherman, the hatchlings, the small heron, the gray heron, the swan, the hornet, the hornet, the horned eagle, , small sumru and many species of woodpecker. In addition, there are a large number of water birds, including small cormorant, white pelican, and hibernation in winter during migration. The habitat characteristics of these birds and the necessities for their survival are among the aims to be determined again.

Due to the unplanned increase in population density and the rapid destruction and misuse of natural resources, the effects of erosion of the ecosystem are increasing day by day. Against these problems, which are the greatest influence of people in the formation of the damages, it is also aimed to determine the necessity for the people who live in or affected by the region and this region to fight against the problems and to reduce the damages. In summary, the main objective to be emphasized is to provide a sustainable management of species that are especially endangered by ecological examination of wildlife in this area, which has natural privileged features such as longevity, delta and lagoons.

METHODOLOGY

The field data were digitized on topographical maps of 1/25000 scales H 20 b1, b2, b3, b4, H21 a1, a2, a3, a4, where geomorphological and hydrographic maps were produced. In addition to the topography maps, the region was analyzed and classified using Landsat TM 2013-2014 satellite image and ASTERGDEM digital elevation model (DEM) with 15m resolution. ERDAS Imagine package programs were used to process satellite images.

A study on eliminating the deficiencies found in both topological and database terms in the stream data which is important for the formation of basins has been carried out and a new stream data layer containing important streams has been created. The settlement center data, which has been lost due to the change of provinces, towns and provinces of the municipalities within years, has been updated using the 2014 year address based population information obtained from the Turkish Statistical Institute. Later, the locations of settlement units in the map were determined and a current data layer was created. After the establishment of the new settlement centers, the provincial and district borders have been rearranged according to the district information that the settlement center belongs to in order to reach the correct results in the spatial queries and analyzes to be made on the provincial and district boundaries.

The supplied 1: 100.000 and 1: 25.000 scaled scanned raster maps were merged and transferred to the raster catalog database.

Numerous field studies were carried out in different seasons between 2011 and 2015 for the ecological evaluations and determinations of the Kocasu Creek Delta and nearby areas. Seasonal changes of vegetation and animal existence were observed during the field studies, interviews with the local people and photo and video images of the area were recorded.

The field excavations carried out in the field of investigation and the determination made on the map were thus made in the field. In addition to the collection of data, compilation and production of digital products, land studies can also be mentioned as an important method. This process involves collecting data with GPS support such as settlement centers, streams, peaks, wastewater treatment plants, solid waste disposal facilities, discharge points, plant species, bird species and their locations, to produce new data layers and integrate them into the GIS environment. Specified locations are collected in the desired locations.

Certain data were also provided by interview techniques used in qualitative research. This method is a very powerful method used to reveal the views, experiences and perceptions of the people on the field and has taken its place as an effective data collection method in many social sciences (Yıldırım and Şimşek, 2005). The type of interview used is also discussed by Karasar (1999) According to the number of participants from the genre, they enter into individual interviews. In this research, the method of interviewing as a data collection tool is primarily concerned with the research method. The interview method, which is the most common method in qualitative research, has become the preferred method in this research because it enables the interviewee to get an in-depth view of the subject.

The interview form used in the interview process consisted of the questionnaire that resulted from the screening of the literature on sustainability and ecotourism. The participants were asked about the current situation of the region and the sustainability of the Kocasu tea liquor. In addition, according to the situation of the people interviewed in the research process, questions were asked differently. This is how the interview form is applied. An important factor in determining the method of interviewing is the limited time at which the interviewees can discuss it. For this reason, it is assumed that the research data can be gathered in the fastest way, but only by the interview method.

In order to integrate aggregated data into the GIS environment, a data model is designed for ArcGIS GIS software in accordance with the collected data. Template Geodatabase was created in GIS environment in accordance with the subject data model showing the data layers to be created and relations between these data layers and the data gathered in the field study was integrated into the system.

GEOGRAPHICAL AREA

The northern boundary of the study area is the Sea of Marmara. In the south, east and west, the border extends to the hinterland of the delta. Kocasu Creek Delta, also called Kocasu Delta in some sources, is located on the southern coast of Marmara Sea within the borders of Bursa. It is about 30 kilometers from Karacabey.

With its wave-dominated and sandy lithology, arc-shaped geometry and Kocasu tea delta and its immediate surroundings (Photo 1) in Marmara Region in its geographical regions; In terms of Administrative Units, it is completely within the borders of Karacabey District of Bursa Province. The Kocasu Creek Delta is located between 40 ° 3983 - 40 ° 25 ° 00 north latitudes and 28 ° 37 07 - 28 ° 64 ° 50 east longitudes according to the Geographical Coordinate System. The area covered by the UTM 35 Zone is within the axes 44610 00-4472800 ordinate (y) and 516928-638201 apse (x) (Figure 1).

The examination area is 66 km to Bursa city center, 309 km to Istanbul and 440 km to Ankara and 260 km to İzmir. Delta transportation is provided by road D 200. The Uluabat Stream coming from Lake Bird, the Uluabat Stream coming from Uluabat Lake and the Nilüfer Stream coming from Bursa form the Kocasu Stream (Susurluk River) and open to the Kocasu Creek Delta and the Sea of Marmara.

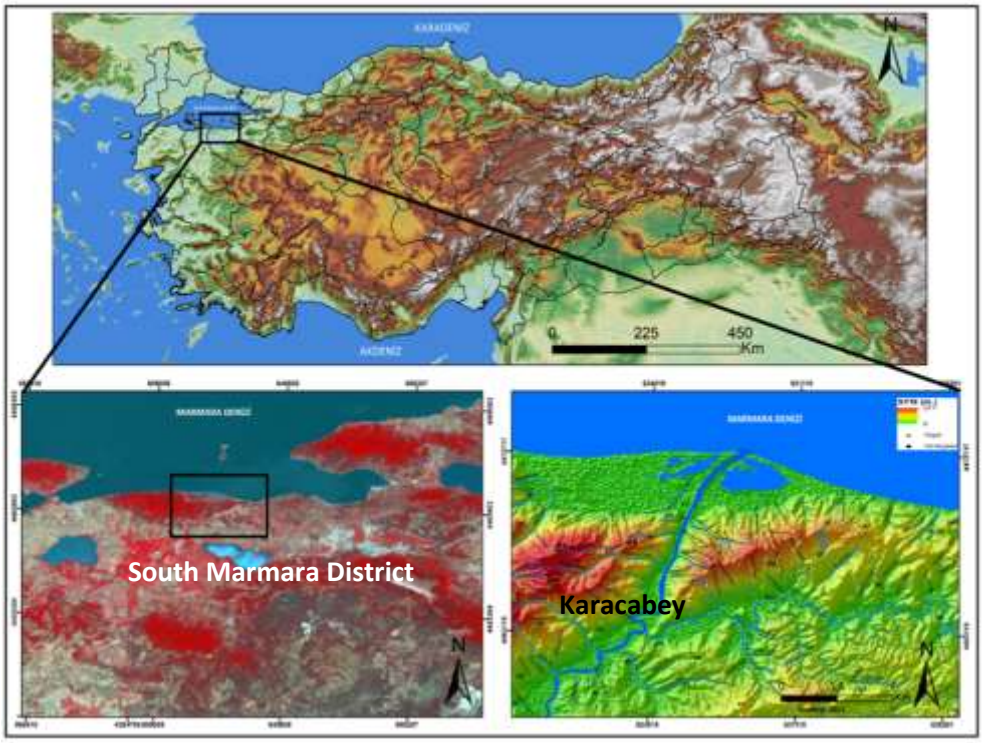


Figure 1: Location of Inspection Area

The Susurluk River meets the sea at Kocasu Creek Delta in the Karacabey district of Bursa. In the western half of the delta, there are subasar forests consisting of Dalyan and Poyraz lakes with a total area of 194 hectares, reedbeds with 600 hectares, dike ash covering 730 hectares, alder trees and willows. In the eastern part of the delta there is an arabic farming lake (391 hectares), agricultural areas, sand dunes, reeds, marine alpine and alpine plains covered with crabs (Saçın, 2010). Kocasu delta has a coastal length of 21 km. 3.5 km in the widest point and there is a geometry that narrows from west to east. The canal length on Kocasu's delta is 4, 5 km. The delta part of the western channel is larger than the east.

There are two lagoons of irregular geometry on either side of the stream discharge mouth, and their position can change over time. The places on the delta level between half a meter and one meter high occupy the widest area. The highest part of the eastern part leaning against the fault line is 2 meters. The Dalyan lagoon is separated from the sea by a coastal cord. During the winter month's sea waters enter the lake and lake waters also rise, expanding the area. The elevation from the sea is 2 m, the depth is 75 cm. Poyraz lagoon lies further west and extends into the forest. Arabicift lagoon has a maximum depth of 170 cm. The salinity of this lagoon carrying the bitter character varies seasonally, with the lowest value in February (0,5%) and the highest value in October (19,6%).

RESULTS

The main fauna elements of the study area are fish, amphibians and reptiles. (Cyprinus carpio), which prefer slow-flowing vegetation with muddy vegetation around its natural habitats, especially in the Poyraz Lagoon, Ewingo (Esox lucius), Scarlet (Scardinius erythropthalmus), Arabic Ciftlik Lagoon and Kocasu Stream and Snake Fish (Anguilla Anguilla) (Pleuronectes flesus luscus) is living (Altunel, 1990, Oğuz, 1991). Again the lagoon in the delta is an important habitat for bitter fish (Rhodeus

sericeus amarusic) (Eken vd 2006). The Anguilla Anguilla (Snake Fish) is in the Critical (CR) category according to the IUCN criteria. The Kocasu Creek Delta is a very important field for the life cycles of the snake fishes. During the breeding season, the eel fish, which depart from the Gulf of Mexico, cross the Atlantic Ocean, the Mediterranean, the Aegean and the Marmara Sea, then come to the shores of the Kocasu Creek Delta. The sand dunes between the lake and the sea crawl over and after returning to their habitat, the Gulf of Mexico, after leaving their eggs in the ponds of the region. However, deterioration in sand dunes threatens this cycle (Yaman, 2008).

Amphibian and reptile species such as Pelobates syriacus, Rana ridibunda, Emys orbicularis, Mauremys caspica and Natrix tessellata live in Ekinli village in Kocasu Creek Delta (Uğurtaş, 1989). The area is also found in Triturus karelini (Eken vd 2006) (Photo 1- 4). These include Pelobates syriacus, Rana ridiba low risk (LC), Emys orbicularis near threatened (NT), Mauremys caspica, Natrix tessellata low risk (LC) species have been identified. Triturus karelini and Vipera ammodytes are found near the Altar (NT).



Photo 1: Rana ridibunda



Photo 2: Mauremys caspica



Photo 3: Natrixtessellata



Photo 4: Scarabaeidae

114 birds belonging to 14 ordos and 44 families were identified in the Kocasu Creek Delta. Studies on the delta, it was determined that 38 of them were indigenous (breeding deltas), 22 were summer migrants, 11 were winter migrants and 16 were transit. 27 have not been able to decide on their statues because they have been observed 1 or 2 times in the field. Of 114 bird species, 46 are water birds and 12 of these water birds breed in the delta (Eken vd 2006). Hungarian eagle, elmabas cape, eagle eagle, hippopotamus, hippopotamus, sumru, small sumru and pekoe, small heron, small heron, small heron, gray heron, gray heron, swan, the delta where many woodpeckers are found, and birds such as small cormorants and white pelicans during migration (Eken et al., 2006), (Figure 2).

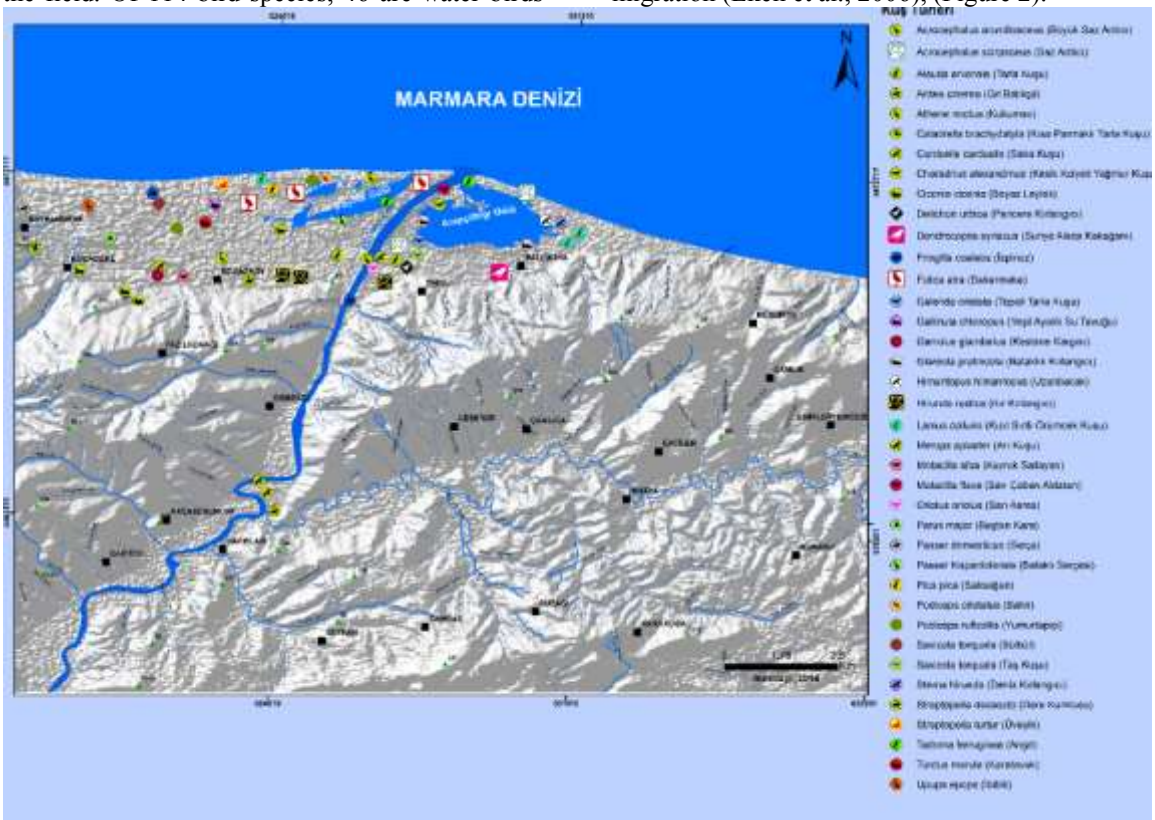


Figure 2: Bird Species Surveyed

Low Risk-LC ", 2" Sensitive-VU ", 1" Low Risk-LC ", and 1" Low Risk-LC "from 114 bird species detected in the delta according to the criteria of International Union for the Protection of Nature and Natural Resources i is in the category of "Near-NT". The species in the "Precision-VU" hazard class are Pelecanus crispus and Aquila clanga. Aythya nyroca (Pasbaş baskka) was evaluated as "Near-NT". Examination site Ciconia nigra, Glareola pratincola, Charadrius alexandrinus (Table 1) (Tübitak, 2009; Eken, et.al., 2006;) gained the status of Important Bird Area (ÖKA) with the breeding populations of cut pendant Rainbow Bird (Table 1).

Table 1: Animal Species Endangered in Investigation

Latin Name	Type group	Global Red List Categorie	National or Regional Red List Category
Capreolus capreolus	Mammals	LC	(VU)
Larus cachinnans	Bird	LC	EN
Aythya nyroca	Bird	NT	VU
Burhinus oedicnemus	Bird	LC	VU
Sterna nilotica	Bird	LC	VU

SUGGESTIONS

Until about 20 years ago, every year during the breeding season, the eels would crawl over the sea between the sea and the lake in the Kocasu Creek Delta and go to the shores of the Gulf of Mexico after the Marmara Sea, the Aegean, the Mediterranean and the Atlantic Ocean. The ecological system in the lagoon and Kocasu Creek Delta due to excessive pollution and chemical wastes that have lived in Susurluk River during this period, especially Nilüfer Creek, has undergone a considerable destruction. The Kocasu Creek Delta at the end of the Longoz forests was taken to the status of "Protected Wetland Area", but the excessive pollution in the river delta also destroyed the oxygen in the water, so that the reemergence and shelter of the living creatures could not reach the expected level here.

A large eagle with eagle eagle, a black eagle, a gray eagle, a gray heron, a swan, a green goat, a hornet, a Hungarian eagle, an elmabas cape, an eagle claw, The Kocasu Creek Delta, where the hippopotamus, prairie bird, sumru, small sumru, and many woodpecker species are found, is also home to birds such as small cormorants and white pelicans during migration.

Some misapplications such as pollution in Dalyan, Poyraz and Arapçiftlik lagoons, use of chemical fertilizers, industrial wastes of Bursa mixed with Koçasu Stream, siltation, eutrophication, sand extraction and cutting of trees in forest are leading to undue reductions.

In the whole of the delta, bovine animals are wandering all the year round. These animals are disturbing the species of birds and their areas of life that are inhabited and likely to sleep in the field, such as Acrocephalus arundinaceuscrocephalus scirpaceus, Saxicola torquata, Himantopus himantopus, Charadrius alexandrinus, Galerida cristata, Alauda arvensis.

Kocasu Creek Delta, which is a valuable ecosystem with its natural SIT Area (protected area), is still the target of illegal applications for pollution and commercial purposes. Subasar forests and other natural structures in Delta are destructed to open agricultural land and arboretum area, illegal tree cuttings are done, and coastal sand dunes are taken by illegal roads in shallow waters if necessary.

In the delta dominant problem is that the pollution generated by mixing the wastewater of the industrial facilities and residential units near the Nilüfer River and the Susurluk River carrying the wastes of the Bursa Province into the Kocasuçayı Delta and its immediate surroundings threatens the delicate life in the delta. At the point where the Kocasu creek is pouring into the sea, the sea sometimes leaves the blue color and turns brown because of the extreme pollution of the river water.

The new wastewater treatment projects that will increase the capacity of the Eastern and Western Wastewater Treatment Plants, which purify 60% of the water discharged from the Nilüfer Creek to reduce the degree of this pollution, are awaited. Moreover, Marmara Sea is approximately 10 km away from Nilüfer Creek. If the treated waters of Eastern and Western wastewater treatment plants are discharged to Marmara Sea instead of Nilüfer Creek, this problem in Nilüfer Creek can be solved. Thus, farmers who deal with agriculture will water the fields with a cleaner water and the water birds will be able to cope with cleaner water. In addition, Yeniköy and nearby settlements and tourism activities of the resulting disposal of domestic waste in Yeniköy about 1 km. distance to the garbage collection area. These garbage piles create a very bad picture between the subasar forest and a habitat like coastal sand dunes. The pouch-type wastes that are scattered around this garbage pollute the delta considerably by being transported both by the subasar forest and by the wind along the shore. In Dalyan and Poyraz lakes, there may be enough water to meet all the birds' needs even if the water is drawn in the summer time. However, in the summer months of the Arabçiftlik Lagoon, the water is completely withdrawn. For this reason, the two small islands in the lagoon are not used by birds as much as their capacity. In order to avoid such problems, the field should be urgently taken into the scope of the Ramsar Convention.

In the field of review, each area should be given a history of sustainable management principles. For this, global partnerships should be established for the sharing of priorities with the NGOs focused on ecology, conservation, tourism, environmental issues, exchange of knowledge, talent and achievements, and so that they can grow with competence, competence and efficiency.

The review should focus on the ecosystem in particular, the elements that most threaten biological diversity in the most dramatic way, and should be identified and improved. Action plans should be drawn up and lifted in order to stop the damage to the Sahara, to prevent further battering, to repair the damage and to protect the ecological, cultural and biological diversity of the site. Relations should be established and developed in order to improve the environmental impact of policy makers on the environment positively. Sustainable transportation, tourism should be studied and these must be passed on. Humanitarian education should be carried out in areas of sustainable development, tourism with environmental and social responsibility, sustainable regional development and effective environmental education, and awareness should be increased by considering democracy and equality for the sustainability of nature. Partnerships should be established between scientists, the public, educators and the business community on the sustainable use and protection of natural resources and cultural heritage.

Organizations should be organized to influence, encourage and help individuals, institutions and organizations in order to protect the integrity and diversity of nature and to ensure the distribution of natural resources in an equitable and ecologically sustainable manner, especially in terms of the impact on the field. The scientific data produced by the commissions of scientists must be presented to civil society organizations and policy-making institutions working on this issue. In order to be able to benefit from the buildings and vehicles for educational purposes, first of all, they must be taken out of the protected areas. For this purpose, the use of different types of tools in place of conventional and ordinary means will enable them to focus on and appeal to visitors of all ages, education, and gender and culture levels.

CONCLUSION

One area of biodiversity; the diversity of living creatures living in that area, the environment they live in and the relationships they have with each other. To be able to form this richness, it is necessary to pass very long periods and it is unfortunately not possible to repair it after it has been destroyed (Demir ve Çevirgenz, 2006). Biodiversity has provided many services throughout history that human societies are material, spiritual, cultural and aesthetically dependent. Biodiversity is the basis for the operation of the ecosystem (Harrop and Pritchard, 2011). Similarly, according to the Convention on Biological Diversity, biodiversity is of value both on its own and in ecological, genetic, social, economic, scientific, cultural, recreational and aesthetic aspects. Furthermore, biological diversity is important for the maintenance and development of life support systems in the biosphere (Demirayak, 2002: 4-5) for these reasons, the prevalence of biodiversity continues to increase day by day.

Among the species that breed in deltas are the black-tailed species, the flounder, the flounder, the flounder, the flounder, the small flounder, the night fisherman, the hawk, the small heron, the gray heron, the swan, the swallow, the hawk, the horned eagle, sumru and many species of woodpecker. In addition, large numbers of water birds during the migration, especially the small cormorant, white pelican and hibernation in winter constitute biodiversity reserves.

These fields play an important role not only in biology but also economically in human life. When examined in a multidimensional manner on a long-term and local, national and global scales, the economic values of the services and products provided by these areas are very high. Loss of these areas means not only the loss of biological diversity and cultures, but also the loss of the contribution of people living in these regions to the economy of the country.

The longevity forests, dune plants, aquatic vegetation, bird species and lagoons are attracting potential for ecotourism and geomorphotism. Because longevity is a unique ecosystem in terms of biodiversity and natural beauty that lagoons and deltas have, it is a natural heritage that must be left untouched by future generations.

Tourism around this area is an important economic activity and all indicators show that this activity will be in a growth trend. Along with growth in tourism, diversity in tourism products has increased along with the demand for nature-related tourism such as sustainable tourism and ecotourism. As nature-based tourism species develops rapidly all over the world, our country also develops tourism tendencies towards its unspoiled natural environments and rural areas. In addition to tourists' demands, comfortable travel and places to go, there are diverse tendencies such as learning about local cultural values, natural flora and fauna diversity, special ecosystems and interest in natural life. As a result, we see that demand for ecotourism species is increasing day by day. It is very important to develop a tourism understanding that enables the sustainable use of the riches of the regions with their unique attractiveness and qualities, the preservation and development of natural and cultural values, and at the same time the participation and development of local people in tourism activities. Ecotourism, which protects the environment and respects the prosperity of the local population and is sensitive to natural areas, should be developed through sustainable tourism policies.

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