



Ponderful
PONDS FOR CLIMATE

TÜRKIYE 

PONDSCAPE : GÖLBAŞI DÜZLÜĞÜ



Pond Ecosystems for Resilient Future Landscapes in a Changing Climate

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WHAT IS A PONDSCAPE ?

DEFINITION

A pondscape is a network of ponds with spatial proximity (“connectedness”) and the surrounding landscape matrix.

The boundaries of a pondscape may be determined by physical or ecological settings (a valley, a catchment, a set of ponds in a nature reserve) or even determined by societal or political criteria (urban ponds, provincial or national boundaries).

PRESSURE/THREATS ON PONDS AND PONDSCAPES

50-90% of pond losses in European countries over the past century. Furthermore, ponds are largely neglected in water- and nature-related national and EU policies and strategies, including the EU-WFD.

WHY IS IT IMPORTANT TO PROMOTE THEM ?



BIODIVERSITY ENHANCEMENT

Largely neglected and generally undervalued, ponds are remarkably important for biodiversity conservation. Pondscapes represent biodiversity hotspots.



DISASTER RISK REDUCTION

Ponds and pondscapes play a fundamental role in mitigating flooding and also constitute a water reserve to fight fires.



HUMAN HEALTH

Ponds and pondscapes provide a wide range of co-benefits for human societies such as support for human health and quality of life, spaces for physical activities, or social interaction, but also aesthetic experiences and educational and recreational activities.



CLIMATE CHANGE MITIGATION AND ADAPTATION

Given their abundance and their high productivity, ponds influence markedly the carbon cycle by acting as both carbon sinks and sources.



WATER MANAGEMENT

Pondscapes provide a water reserve that is particularly important in the context of water scarcity. It is particularly useful for watering animals and for irrigation.

CONTEXT

The Gölbaşı Düzlüğü pondscape covers approximately 35 hectares with a length of about 1,300 meters and an average width of 280 meters. It lies between Lakes Mogan and Eymir and is characterised by dense reedbeds that also define the boundaries of the approximately 30 ponds found in this region. Along with Lakes Mogan and Eymir, the pondscape is also part of the Special Environmental Protection Area (SEPA). Historic maps from 1944 to the present show that this pondscape used be part of both lakes when water level was very high but during low water periods extensive wetlands with numerous ponds were revealed. However, due to several road construction works, the growth of Gölbaşı town, waste disposal and excessive water use in the catchment the pondscape reduced to its current size (see the figure below).

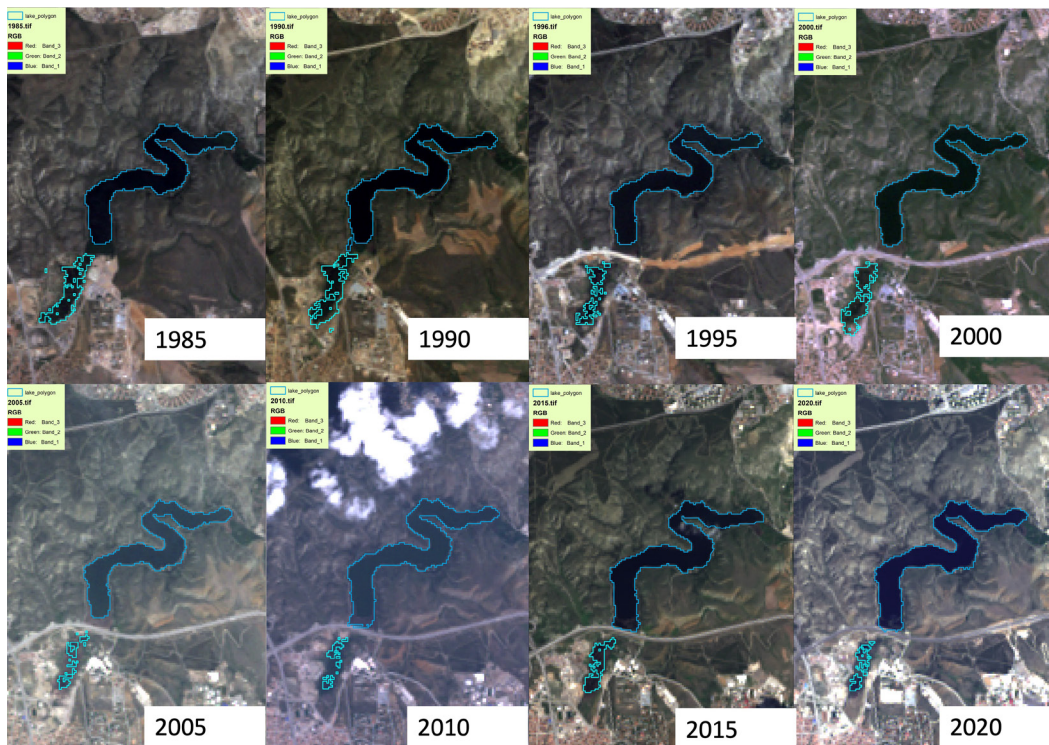
The water from upstream Lake Mogan goes through a concrete-lined channel between the two lakes, crosses the Gölbaşı Düzlüğü pondscape, and finally enters Lake Eymir. Gölbaşı Düzlüğü basin is the major water supplier of Lake Eymir (See Success Story) and contributes to the lake's water quality because water passes through reedbeds before reaching the lake.

Gölbaşı Düzlüğü pondscape has the capacity to store approximately 1,000,000 cubic meters of water during severe flooding events, thus contributing to the prevention of major floodings in low lying areas of Ankara municipality.

Since the ponds are surrounded by dense reeds, they provide high-quality shelter and breeding areas for birds. Almost all species that breed in the ponds of Lake Mogan pondscape also breed here.

Gölbaşı Düzlüğü is an important and valuable resource in terms of the natural landscape, but over time, a portion has been filled in by marble processing wastes. Unfortunately, a part of the filled area has been opened up for construction, despite environmental concerns. Furthermore, part of the area has also been used as garbage disposal sites, scrap yards, and small industrial sites. Gölbaşı Düzlüğü was once a neglected and unused area. However, in recent years, efforts have been made to restore and conserve the pondscape with a People's Park project. Rubbish has been cleared from the ponds and their surroundings and restoration work has turn the area into a promising urban pondscape. As a result of this work, there is increased expectation that the site can also deliver increased nature's contributions to people in the short term.

In summary, Gölbaşı Düzlüğü plays a vital role in preserving the habitat and maintaining the water regime and quality of Lake Eymir as well as contributing to prevention of major flooding in the low lying part of Ankara metropole. Therefore, it is essential to protect these areas from any activities that could disrupt the ecological balance of the region.



CONTEXT (CONTINUED)



Name of the pondscape : Gölbaşı Düzlüğü

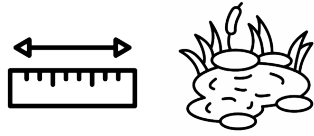
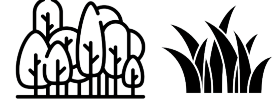
Name of neighboring large town (in a 30 km radius):

Bala, Haymana, Mamak, Çankaya and Gölbaşı (1'826'672 habitants)

Bioclimatic zone : Central-Anatolian cold arid steppe climate

Dominant land use :

pondscape - nature reserve
surrounding environment - urban



Pondscape area : 0.35 km²

Pond : number: ~ 30 (Sampled Pond Number: 3)

density: 143/km²

surface areas : 3'200 to 10'000 m²

depths : 2.2 to 5.9 m

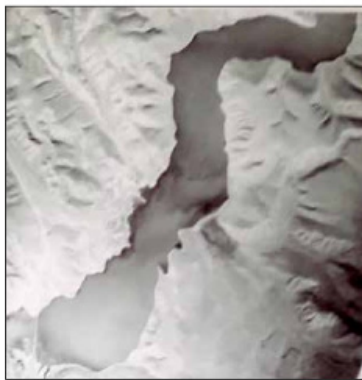
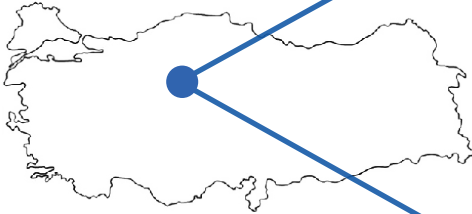
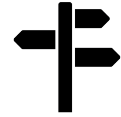
ages : > 40 years

Land owner : General Directorate for the Protection of Natural Assets

Land manager : Gölbaşı District Municipality

Public access : 100 % of the area is accessible

Public amenities : There will be several footpaths and other amenities when the People's Park Project is finished



Lake Eymir (1944)



Lake Eymir (1991)



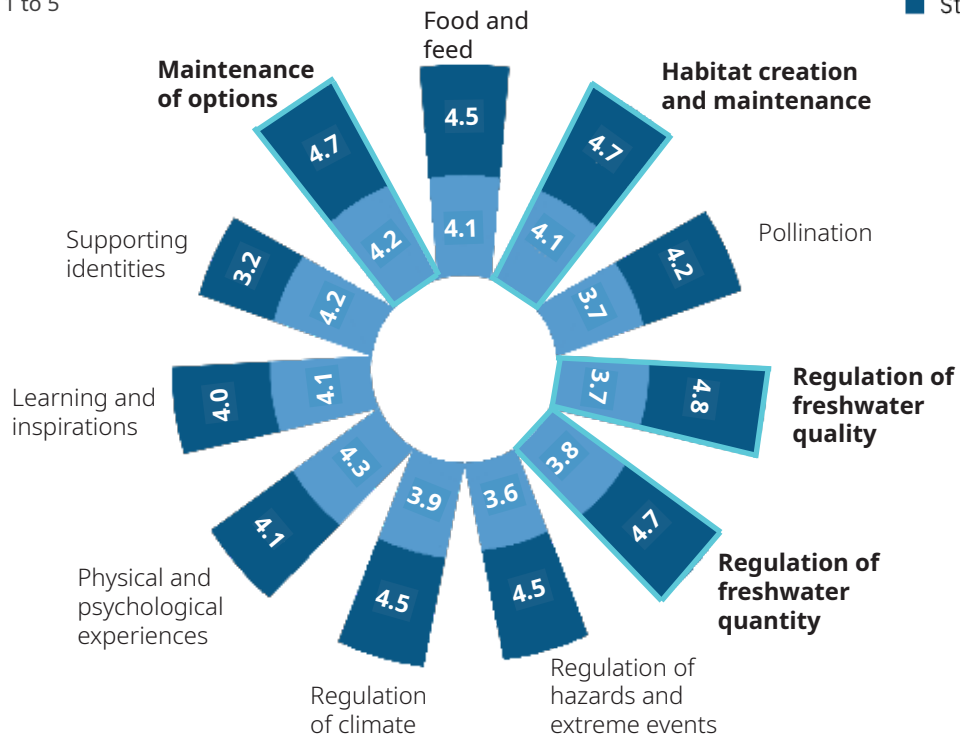
Lake Eymir (2015)

LOCAL COMMUNITY EXPECTATIONS

The 11 Nature-contribution to people (NCPs)

Scale : scores from 1 to 5

Public (n=41)
Stakeholders (n=9)



The expectations rely mainly on (i) freshwater quality, (ii) regulation of freshwater quantity, (iii) habitat creation and maintenance and (iv) maintenance of options.

LOCAL POLICIES

Along with Lakes Mogan and Eymir, Gölbaşı Düzlüğü pondscape is part of a Special Environmental Protection Area (SEPA) designated in 1992 and managed by the General Directorate for the Protection of Natural Assets. Though day-to-day management of the pondscape has been delegated to the Gölbaşı District Municipality. Gölbaşı SEPA was established to curb urbanisation in the peri-urban area of Ankara and preserve the area's high biodiversity as well as NCPs (e.g. flood mitigation, protection of quality and quantity of water).

The most recent management plan for SEPA specifically prioritises the protection of bird nesting sites of Gölbaşı Düzlüğü and the ponds at the west and south of Lake Mogan (Lake Mogan Pondscape). SEPA requires the conservation of ecological character in the important bird breeding and shelter areas, and prohibits dumping of rubbish and rubble. Furthermore, it also mandates that any activity that may disrupt the local hydrology or result in drying out are strictly prohibited. Gölbaşı Düzlüğü is defined as one of the «Large Urban Green Areas» in the Current Environmental Plan of Ankara and together with the lakes, they have been designated as protected wetlands and sensitive areas under the Gölbaşı SEPA Management Plan (2015-2019).

The Gölbaşı SEPA Management Plan (2015-2019) was created as part of the «Determining Sensitive Areas and Water Quality Targets on Basin Basis in Türkiye Project». The region is divided into two areas: Sensitive A and Sensitive B. The reeds and the ponds of the pondscape are protected as part of Sensitive A areas, and the areas that have been filled in the past are Sensitive B areas. According to the management plan, Sensitive A areas must be protected. Wildlife monitoring and scientific research require permission from relevant institutions and various restrictions apply to construction.

LOCAL POLICIES

It appears that there may be some challenges in the area in terms of the effective implementation of either SEPA or the management plan. For example, the western, eastern and northern ends of the pondscape has been used for rubbish and rubble dumping. While activities disturbing the SEPA are prohibited, the area is surrounded by infrastructure (the Ankara ring road to the north, another main road to the south, and proto-industrial and artisanal activities to the east and west). It is practically an open-access area and has been used as a waste disposal for years. As a result, ponds have been filled with refuse from construction material (largely in the eastern part) and garbage from car repair and welding activities (in the western part).

For several years now, a People's Park project has been underway to conserve and restore the Gölbaşı Düzlüğü pondscape. The project was designed by landscape architects and financed by the central government. As part of this project, waste was removed from the ponds and the surrounding environment, and some industrial areas were displaced to make way for an urban park. This project aims to support biodiversity in the SEPA while raising awareness among citizens with the creation of a learning center nearby.

As a People's Park, pedestrian traffic is expected to increase, which may impact biodiversity and especially bird populations. Therefore, mitigating these impacts is a concern that needs to be addressed. On the other hand, it is also expected this will help protect the area's potential to mitigate floods and provide high-quality water downstream to Lake Eymir, thereby serving as a model for green infrastructure in the region. As a result, this urban pondscape is expected to provide more Nature's Contributions to People in the near future.



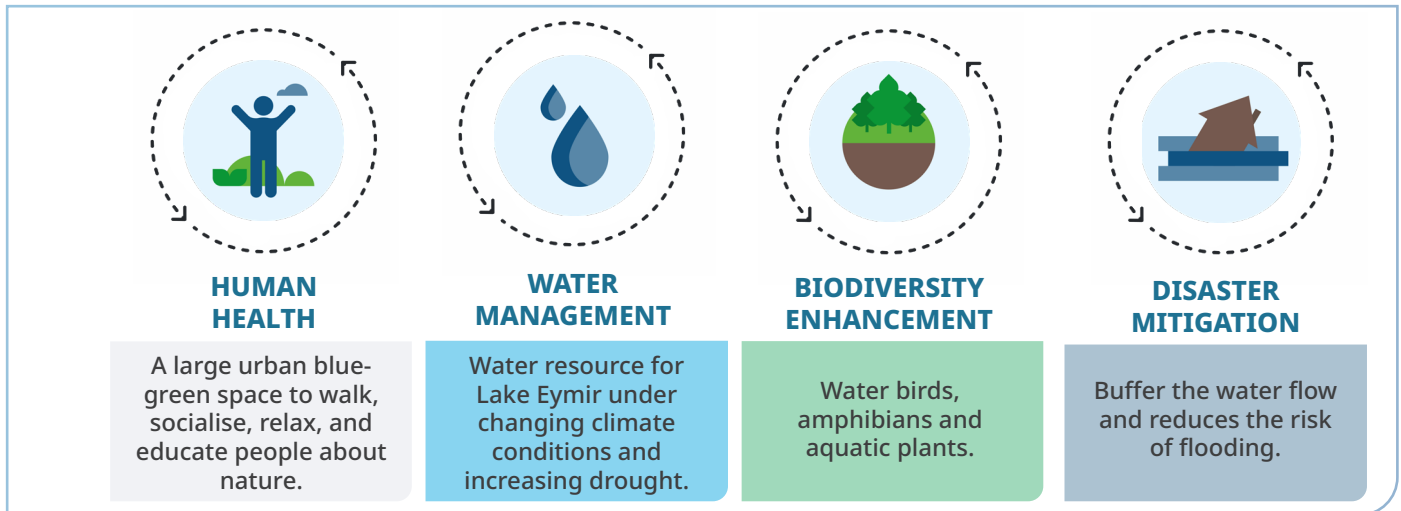
-100% of the pondscape is protected by SEPA, Special Environment Protection Area, which aims to protect sensitive areas and their surroundings, both above and underwater, for future generations.

- The pondscape holds **special importance in terms of biodiversity and preserving the water regime and water quality** of Lake Eymir as well as contributing to flood mitigation in the low-lying Ankara city centre.

- **Bird Breeding Area of National Importance:** a habitat for diverse wild-life, including waterbirds, for feeding, shelter, and breeding.

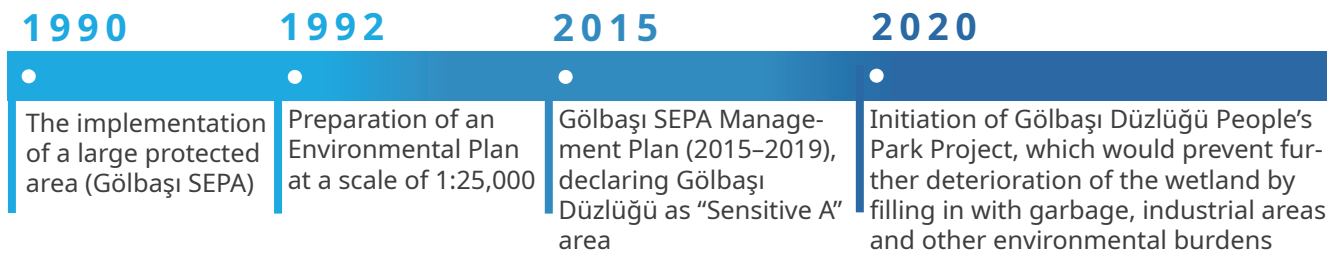
100%

MAIN CHALLENGES AND OBJECTIVES

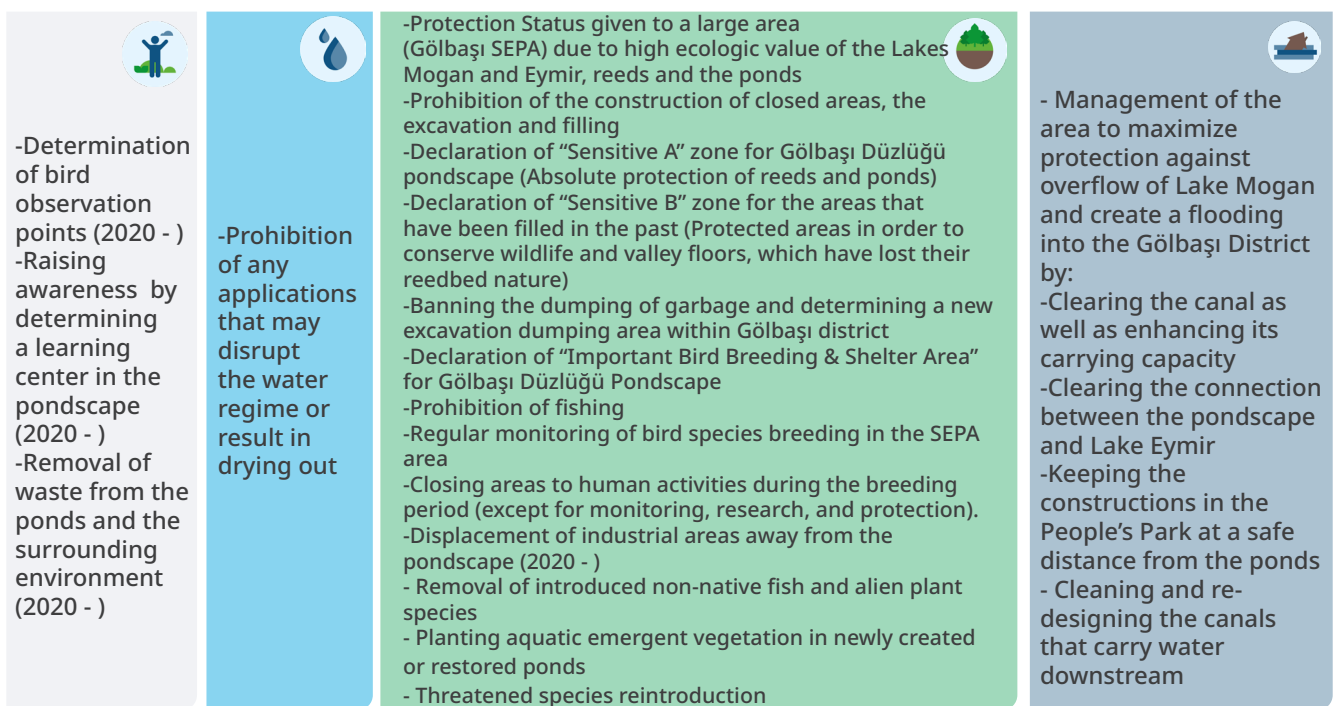


NATURE BASED SOLUTIONS (NBS)

Pondscape scale land use and management actions are the Nature-based Solutions put in practice to address the four identified societal challenges.



PONDS AND PONDSCAPE MANAGEMENT



NATURE CONTRIBUTIONS TO PEOPLE AND MEASURED INDICATORS



AQUATIC BIODIVERSITY

SPECIES RICHNESS

Aquatic plants (SEPA Area, including Lake Mogan and Eymir) : **51**

Waterbirds (Lake Eymir Region) : **67**

Dragonflies (Genus) (SEPA Area, including Lake Mogan and Eymir) : **13**

Families of invertebrates (SEPA Area, including Lake Mogan and Eymir): **14**

AMOUNT OF

Species in Global IUCN (2022) Red List (Categories CR, EN, VU, NT) (Lake Mogan and the environment): **3** (*Centaurea tchihatcheffii* (CR), *Oxyura leucocephala* (EN), *Aythya nyroca* (NT))

Conservation priority species for Türkiye (Rare and endangered) (Lake Eymir and the environment): **7** (*Centaurea tchihatcheffii* (CR), *Oxyura leucocephala* (EN), *Aythya nyroca* (NT), *Chroicocephalus genei* (LC), *Microcarbo pygmaeus* (LC), *Botaurus stellaris* (LC), *Ixobrychus minutus* (LC))

FLAGSHIP SPECIES :



Centaurea tchihatcheffii (CR)



Oxyura leucocephala (EN)

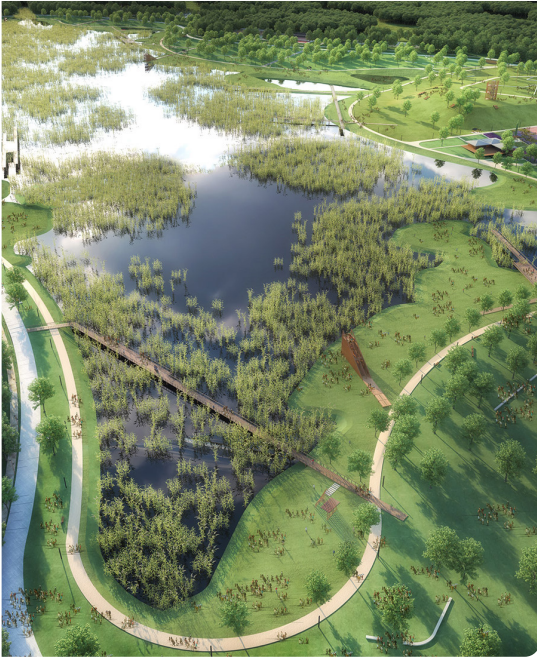


Aythya nyroca (NT)



Orthetrum cancellatum

NATURE CONTRIBUTIONS TO PEOPLE AND MEASURED INDICATORS



PHYSICAL AND PSYCHOLOGICAL EXPERIENCE

Expected number of people visiting the pondscape (after the completion of the People's Park Project) (nb/year). Before the People's Park project, no one visited the area for recreation.

45'000-55'000

100% Area inside the pondscape accessible to the public

Self-reported satisfaction well-being (scale 1 to 5)

3.7

Most popular activities :

hiking (23%), biking (23%), landscape aesthetics (21%), relaxation (21%)



WATER QUANTITY

1'000'000 m³

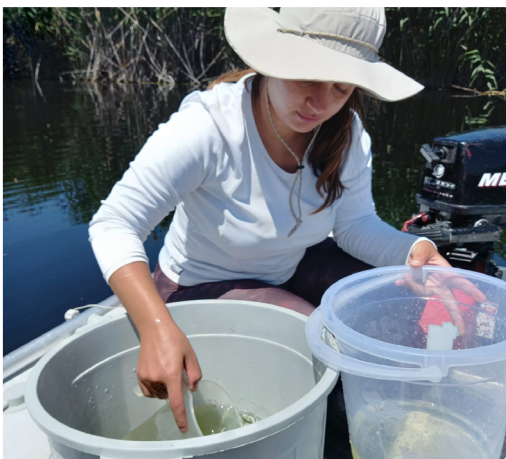
volume of water that can be stocked during a severe flood event in whole pondscape (m³)



WATER QUALITY

1 (BEFORE) / 2 (AFTER)

The water, as well as the environment around the pondscape were clear of rubbish as part of the People's Park project implementation. Unfortunately, there are still garbage and litter around and in the ponds. Due to dense reeds, some are not visited but the ponds sampled have low water quality compared to other ponds near by.

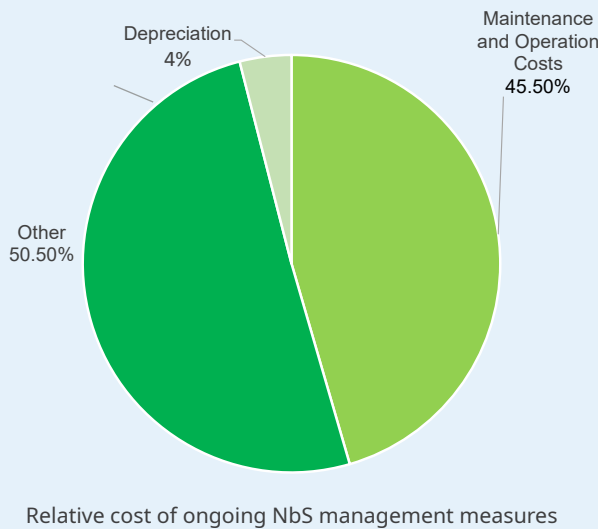
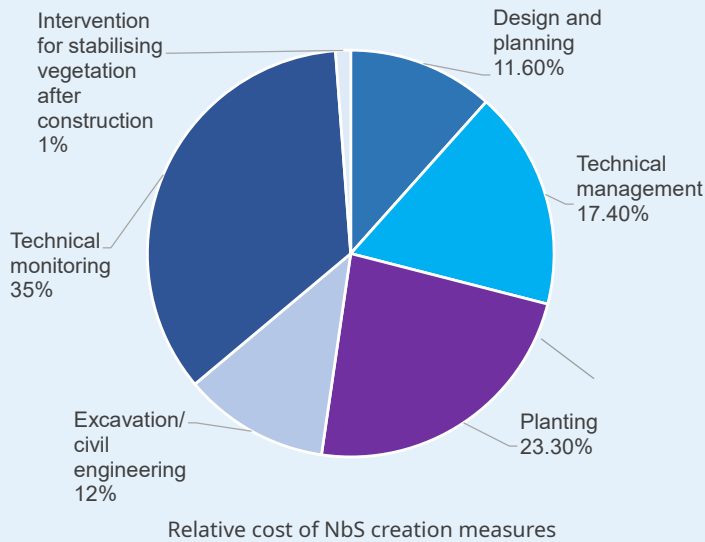


COSTS AND BENEFITS ANALYSIS

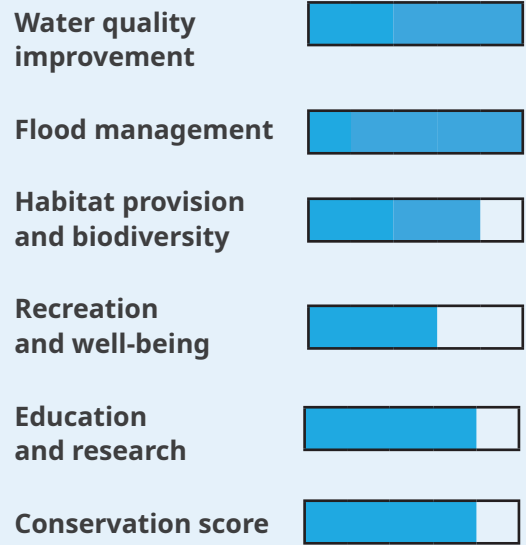
OVERALL COSTS ASSESSMENT



SHARE OF COSTS FOR NBS ACTION



BENEFITS ASSESSMENT



SUITABLE FINANCE INSTRUMENTS TO REDUCE THE GAP

- ✓ **1. Income instruments**
Development Rights and Leases
- ✓ **2. Voluntary contributions /donations**
Philanthropic contributions, Voluntary beneficiary contributions, Crowdfunding
- ✓ **3. Grants**

FUNDING GAP ASSESSMENT



REMAINING THREATS

Gölbaşı Düzlüğü is a vital habitat for waterbirds and plays a crucial role in flood mitigation around Gölbaşı District as well as conserving the water regime and quality of Lake Eymir.

The lack of adequate measures to protect the area and the People's Park project could also lead to increased urbanisation and human interaction, in turn affecting waterbirds populations and disrupting the ecological integrity of the whole ecosystem. If not managed properly, the flood mitigation role of the landscape can also deteriorate. As Lake Eymir is hydrologically highly dependant on Gölbaşı Düzlüğü, the multifunctionality of the pondscape should always be kept in mind while managing the area.

The ponds should be restored according to the CLIMA ponds principles, for which biodiversity enhancement is the primary focus but climate as well as society-related benefits are considered simultaneously.

SUCCESS STORY AND TRANSFERABILITY



GÖLBAŞI DÜZLÜĞÜ PEOPLE'S PARK PROJECT

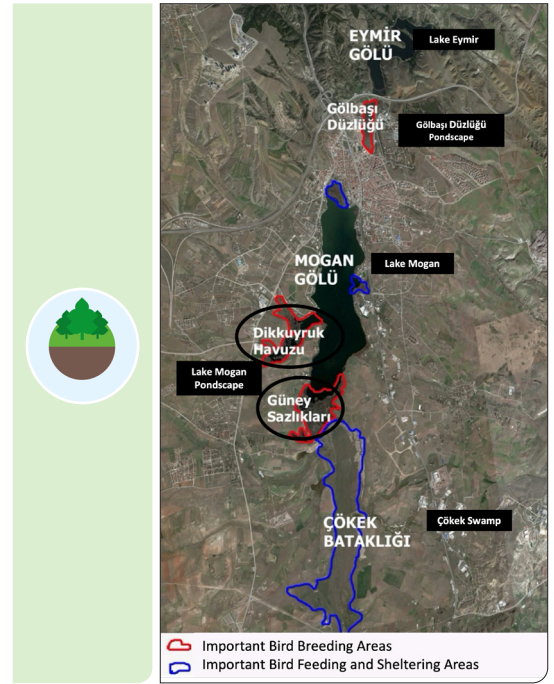
Gölbaşı Düzlüğü consists of nearly 50 ponds, surrounded by urban infrastructure and separated from each other by dense reedbeds. Currently, a People's Park Project, including the restoration of the ponds and the environment, is being implemented in an area of approximately 60 hectares (landscape and surrounding area). This project aims to restore the ponds to protect and support the biodiversity of the region, increase the public's benefit and awareness of the importance of the region, and serve as an exemplary model for green infrastructure that, if supported by scientific approaches, also provides flood mitigation for the Gölbaşı District.

So far, the ponds and their surroundings have been cleared of waste without cutting the reeds. Several footpaths and bicycle roads have been built for public amenities; and according to the urban plan, there will be a learning center for visitors.

HIGH BIOLOGICAL DIVERSITY IN SEPA REGION: CASE OF GÖLBAŞI DÜZLÜĞÜ

Lake Mogan and Eymir and the ponds (both Lake Mogan and Gölbaşı Düzlüğü) areas within the Gölbaşı SEPA Region allow thousands of birds of different species to feed, breed and shelter. As a result of the observations made so far, 249 bird species have been identified in the SEPA region.

The recent studies carried out on the birds of the Gölbaşı SEPA area locate four important regions for birds, one of which is Gölbaşı Düzlüğü (Figure 16). Since the ponds are surrounded by dense reeds, they provide high-quality shelter, breeding and feeding areas for birds. Almost all species that breed in the ponds of Lake Mogan also breed here. White-headed duck (*Oxyura leucocephala*), Great Bittern (*Botaurus stellaris*), Little Bittern (*Ixobrychus minutus*), Squacco Heron (*Ardeola ralloides*), Ferruginous Duck (*Aythya nyroca*), Red-crested Pochard (*Netta rufina*) are the main bird species breeding in the area. Due to dense reeds, the ponds cannot be observed easily and as a result, there is little monitoring or data on the status or biodiversity of the pondscape.



The Gölbaşı Special Environmental Protection Area "Habitat and Species Protection Monitoring Project" was one of the important projects carried out in SEPA region. During the project, the main aim was to identify, track, and safeguard delicate habitats and to find protection measures for *Centaurea tchihatceffii*, considered «Critically Endangered» (CR) according to the IUCN criteria. The project also aimed to identify areas and species that are threatened or endangered, as well as sensitive areas and potential threats to protected areas. During the field research, all over the SEPA region, a total of 494 plant species were listed. The research also revealed the presence of 3 species of amphibians, 12 species of reptiles, 83 species of birds, and 25 species of mammals within the Gölbaşı SEPA.



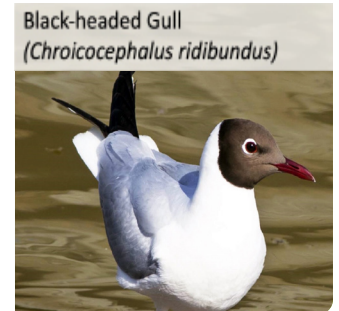
Common Pochard
(*Aythya ferina*)



Mallard
(*Anas platyrhynchos*)



White-headed duck
(*Oxyura leucocephala*)



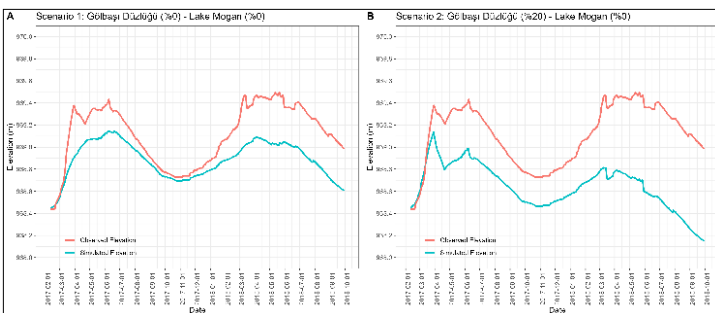
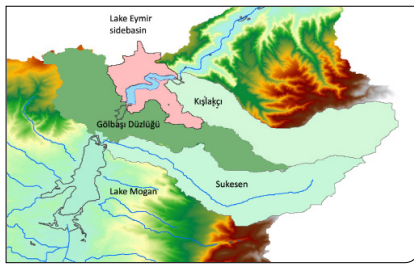
Black-headed Gull
(*Chroicocephalus ridibundus*)

GÖLBAŞI DÜZLÜĞÜ PONDSCAPE HAS A GREAT POTENTIAL TO MITIGATE FLOODS AND PROVIDE WATER TO LAKE EYMİR

Gölbaşı Düzlüğü pondscape has a storage capacity of approximately one million cubic metres of water in the event of severe flooding. This feature, which offers significant flood mitigation potential, makes it an excellent example of green infrastructure in an urban area.

According to data from the State Water Works, Lake Mogan overflows periodically due to heavy rain, particularly in the spring, damaging the surroundings. For example, during the heavy rains of 1969, the lake received 5.7 m³ of water per second, causing the water level to rise by approximately 4 m. Gölbaşı's built-up area was affected, resulting in property damage. In addition, the floods caused significant destruction in the surrounding areas of Lake Eymir and the İmrahor Valley. Following that event, the State Water Works constructed an overflow regulator at the outlets of Lakes Mogan and Eymir.

Nevertheless, flooding incidents still occurred around Lake Mogan in 2011 and 2012, causing severe damage to Gölbaşı district and its settlements (Photos from the 2012 flooding). During this period, a hydrological model of the Gölbaşı Düzlüğü Pondscape was produced, to investigate the causes of flooding and the flood prevention capacity of the area. (See image of the Gölbaşı Düzlüğü catchment). Preliminary research pointed towards the possibility of the area storing excess water from Lake Mogan, where flow regulation infrastructure had been implemented since 1974 (modified in 2015). However, data eventually showed that in the event of heavy rainfall and snow melt, this infrastructure would probably not be sufficient. This is because when the water level rose in Lake Mogan, the canal connecting it to Lake Eymir was unable to transfer sufficient water downstream due to both capacity and management issues. When the excess water from Lake Mogan's outflow combines with the water from the larger Sukesen Creek and its basin which is the main inflow of upstream Lake Mogan, it caused a major flooding in Gölbaşı Plain. According to the Ankara Basin Flood Management Plan published by the General Directorate of Water Management of the Ministry of Agriculture and Forestry, Flooding Hazard Maps (Q500) demonstrated the impact of flooding events (See the flooding hazard map). Based on that, Gölbaşı Düzlüğü is at high risk of experiencing severe flooding (occurring once every 500 years). Thankfully, Gölbaşı Düzlüğü Pondscape has the potential to retain the excess water, allowing for natural drainage over time.



Meanwhile, the existence of Lake Eymir is largely dependent on the water supply from Lake Mogan and Gölbaşı Düzlüğü Pondscape. The water released from Lake Mogan flows into the Gölbaşı Düzlüğü pondscape under control of regulator and then discharges into Lake Eymir.

Gölbaşı Düzlüğü pondscape (the green area in the Gölbaşı Düzlüğü catchment map) is composed of water from the Sukesen Creek and Lake Mogan. Additionally, Lake Eymir is supplied by the Lake Eymir's side catchment and Gölbaşı Düzlüğü Pondscape. The study evaluated water availability and quality to Lake Eymir through two scenarios. The initial scenario postulated that Lake Eymir received no water supply from Lake Mogan and Gölbaşı Düzlüğü Pondscape, and no water would be released from the regulator situated at the outlet of Lake Eymir to the İmrahor Valley. Consequently, as a result of this scenario, the salinity of Lake Eymir increased, there was also a major decrease in water level, and even Lake Eymir would dry out. In the second scenario, Lake Mogan released only 20% of the water which reached Lake Eymir and an equal amount flowed out to the İmrahor River Valley using the regulator at the outflow of Lake Eymir.



HANDBOOK :



APPENDIX :



PHOTOS CREDITS

Maps showing the emergence of the Gölbaşı Düzlüğü, p.3 © Özlem Uğurlu
Centaurea tchihatcheffii, p.7 © Prof.Dr. Ahmet Karataş
Oxyura leucocephala, p.7 © Metin Cenkçiler
Aythya nyroca p.7 © Gamze Kaya
Orthetrum cancellatum p.7 © Wikipedia
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Important Bird Breeding, Feeding and Sheltering Areas in Gölbaşı Sepa, p.10
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Flooding areas around Lake Mogan © Okan Çağrı Bozkurt

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