



Ponderful
PONDS FOR CLIMATE

TÜRKIYE 

PONDSCAPE : IMRAHOR RIVER VALLEY



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 Imrahor River Valley, located southeast of Türkiye's capital city Ankara, and close to the city center and is home to a diverse and significant ecological heritage. Despite its location within the Ankara metropolitan area, it plays a crucial role in balancing urban and rural areas. The İmrahor River Valley starts at the outflow of Lake Eymir and ends at Incesu Creek, and it includes approximately one-third of the 3,300 km² drainage area of Ankara Creek. The river follows an irregular pattern through the valley and reaches Incesu Water Detention Pond. Following that, there is a closed conduit at the exit of Incesu Water Detention Pond. Both infrastructures were built following a deadly flooding incident in Ankara city center in 1961. The valley is hydrologically connected to the upstream Lake Mogan and Lake Eymir and forms a significant sub-basin.

There are 12 ponds in Imrahor River Valley pondscape, some of which are temporary. Many of the ponds in the Valley were created for human use, primarily for water retention to prevent flooding in the downstream city centre, but also because of clay excavations for brick factories. In time, these ponds have not only served as water sources for industrial use but have also become vital habitats for biodiversity and recreation.

However, significant deterioration of the Imrahor River Valley over the years has occurred due to several factors including real estate development, road and canal constructions. This has resulted in changes to the character of the catchment and surface water availability. The process of heavy urbanisation led to some canalisation of surface water and a loss of the rural-natural character of the area. Construction projects initiated at the valley's base and towards the slopes have dramatically altered the land's morphology. The areas that used to collect surface runoff on the east-facing slopes of the valley have been replaced by high-density settlements and impermeable surfaces. This transformation has had a profound impact on the valley's hydrological dynamics, affecting its ability to sustain natural surface run off. In addition, skyscraper buildings already standing in the Imrahor Valley are in the way of migrating birds, decreasing the Valley's capacity to provide habitats for biodiversity and recreation.



Name of the pondscape : Imrahor River Valley

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

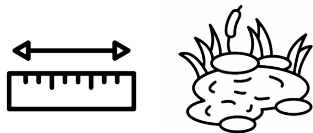
Bala, Haymana, Mamak, Çankaya and Gölbaşı (1.826.672 habitants)

Bioclimatic zone : Central-Anatolian cold arid steppe climate

Dominant land use :

pondscape - agriculture

surrounding environment - industry, heavy urbanization, unmanaged recreational use



Pondscape area : 2.07 km²

Pond : number: 12 (Sampled Pond Number: 9)

density: 5.8/km²

surface areas : 20 to 25'400 m²

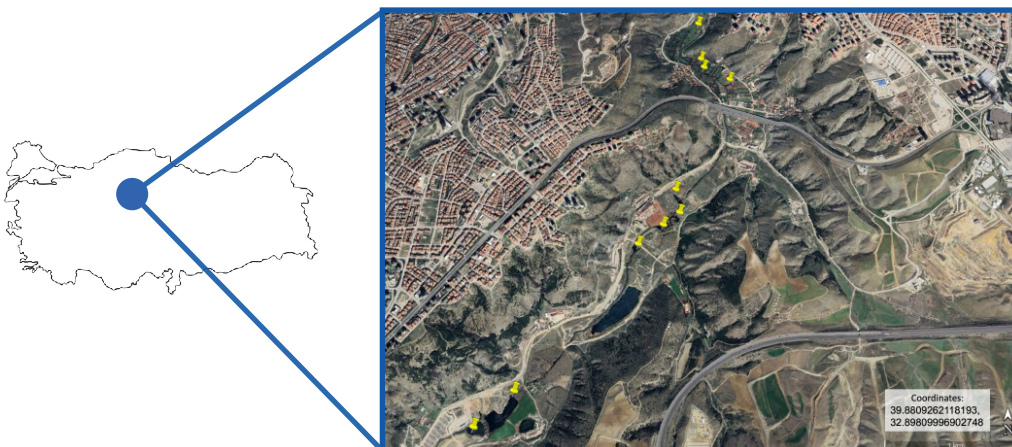
depths : 2 to 16.5 cm

Land owner : Ankara Metropolitan Municipality, privately owned

Land manager : Ankara Metropolitan Municipality

Public access : 100 % of the area is accessible

Public amenities : several foot paths, picnicking areas

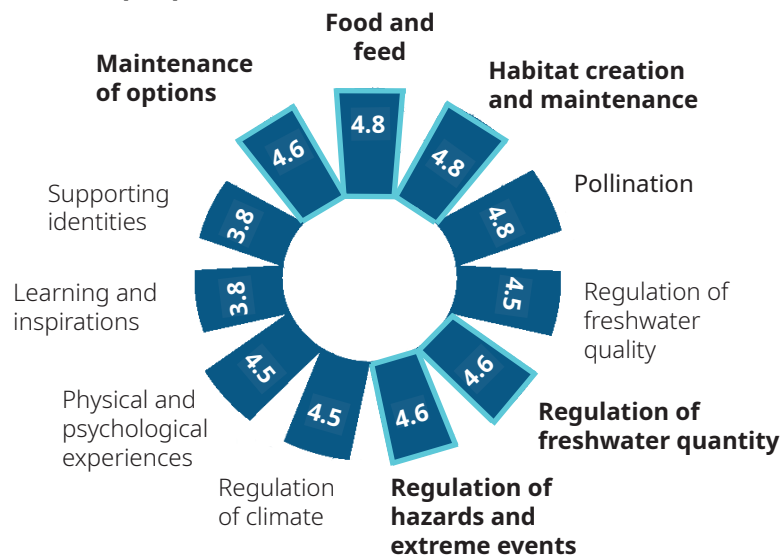


LOCAL COMMUNITY EXPECTATIONS

The 11 Nature-contribution to people (NCPs)

Scale : scores from 1 to 5

■ Stakeholders (n=6)



The expectations of the stakeholders rely mainly on (i) the provision of habitats for biodiversity, (ii) pollination, (iii) food and feed, (iv) the regulation of freshwater quantity, (v) regulation of hazards and extreme events and (vi) maintenance of options.

LOCAL POLICIES

The three nearby pondscaapes that include Lake Mogan, Gölbaşı Düzlüğü, and Imrahor River Valley are hydrologically connected though they are under the rules of different policies (see the Figure EXTRA1). Lake Mogan pondscape is located upstream and is a part of a larger Special Environmental Protection Area (SEPA) together with Gölbaşı Düzlüğü pondscape. Imrahor River Valley pondscape is situated outside the protected area and closer to the city centre of Ankara and thus falls under the jurisdiction of the Greater Ankara Municipality. While there is potential for Imrahor River Valley to become a green and blue corridor for Ankara, the absence of protective/conservative or managerial legislation currently renders these areas vulnerable. Recently, alterations to the governmental land zoning plans, transitioning from village to the creation of new real estate development area, has accelerated urbanization around the valley. As a result of these changes, numerous skyscrapers were built and are continued to be built in the Imrahor River Valley pondscape (See the Figure EXTRA 2). These skyscrapers currently obstruct prevailing winds and the migratory paths of birds, and may cause soil erosion that may fill in the ponds. In addition, some solid and water wastes from housing are discharged to ponds and in general to the pondscape.

With the amendments to the zoning plan, a canal project was designed to transform Imrahor River Valley into an amusement park, with a consequent impact on the pondscape. The project entails channeling the stream underground, creating an extensive concrete canal, and directing outflow of Lake Eymir into the canal. Luckily, the project was not completed because of opposition.

Moreover, it should be noted that most land in the Valley is privately owned and also some of the ponds are being used for industrial or commercial purposes. For example, the brick factory pumps water from the ponds for its operations and discharges the wastewater back into the pond. These kind of commercial interest in the pondscaapes may impede the implementation of protective and managerial measures for the Valley and the pondscape.



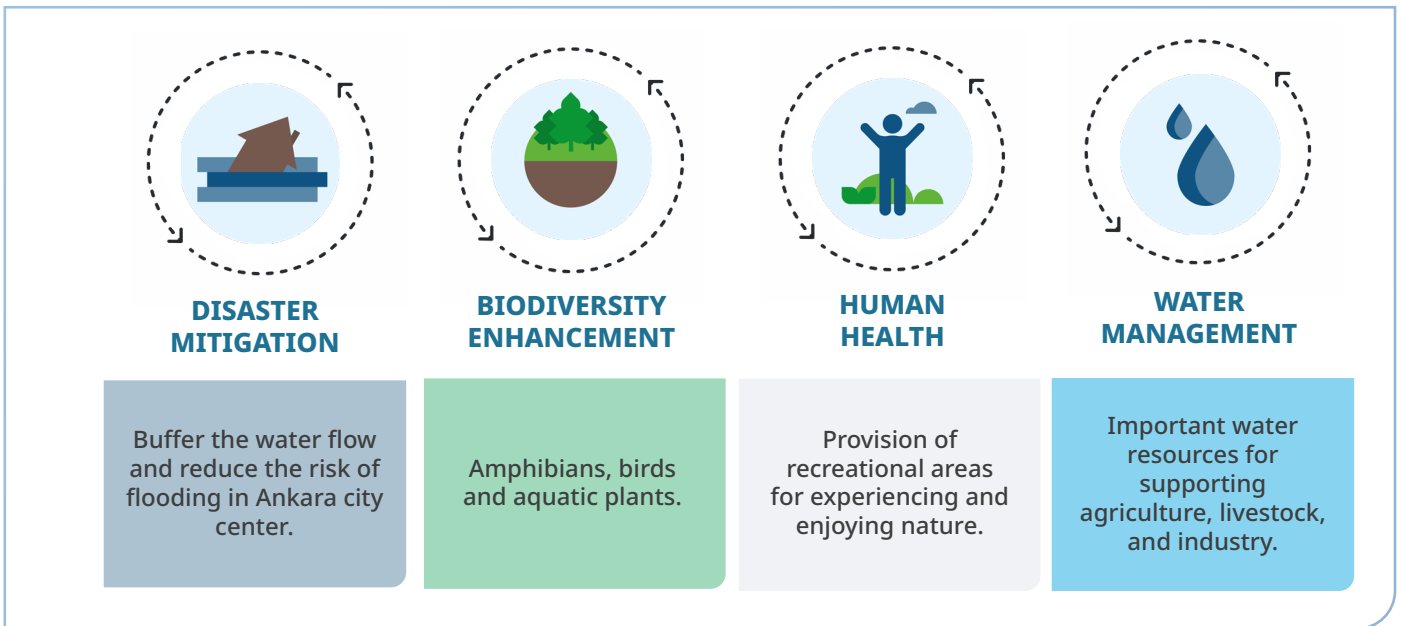
-180% increase in constructed areas in the Valley (city structure, commercial area, highway, construction and mining sites) between the years, 2000 and 2018 (from 644 ha to 1162 ha), which has a direct impact on the pondscape.

-Around 86,000 m3 capacity of volume of water that can be stocked during a severe flood event

- Out of the 387 identified taxa in Imrahor Valley, **30 of them are unique to the region, resulting in an endemism rate of 8.8%.**

180%
86'000m³
8.8%




MAIN CHALLENGES AND OBJECTIVES



NATURE BASED SOLUTIONS (NBS)

Pond restoration and their management are the Nature-based Solutions that has been put in practice to address the four identified societal challenges.

PONDS AND PONDSCAPE MANAGEMENT

 <ul style="list-style-type: none"> - The restoration of pond ecosystems to prevent and mitigate flooding events (i.e., floodplain restoration) - Management of the Valley and the ponds to maximize flood protection capacity by: <ol style="list-style-type: none"> Making the pondscape a network of green infrastructures for flood mitigation (i.e., enhancing pondscape connectivity) and also for multifunctionality Land use planning that keeps storage/discharge capacities intact and limits the expansion of grey infrastructure areas (through zoning changes and giving special status to the floodplain) 	 <ul style="list-style-type: none"> - Removal of introduced non-native fish - Removal of alien plant species - Planting aquatic emergent vegetation for restoration - Planting trees, shrubs and sowing grasslands seeds in the vicinity of ponds - Threatened species reintroduction especially in the hills to stop land erosion and land slides - Investigation of protection options, e.g. protection by the municipality 	 <ul style="list-style-type: none"> -Waste and litter removal (for water quality as well as aesthetics) -Wastewater management (for water quality as well as aesthetics)
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NATURE CONTRIBUTIONS TO PEOPLE AND MEASURED INDICATORS



AQUATIC BIODIVERSITY

SPECIES RICHNESS

Aquatic plants (Observed) : **24**

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

Dragonflies (Observed at Genus level) : **3**

Families of invertebrates (Observed) : **29**

AMOUNT OF

Species in Global IUCN (2022) Red List (Categories CR, EN, VU, NT) (Lake Eymir and the environment): **2**

(*Oxyura leucocephala* (EN), *Aythya nyroca* (NT))

Conservation priority species for Türkiye (Rare and endangered) (Lake Eymir and the environment): **6**

(*Oxyura leucocephala* (EN), *Aythya nyroca* (NT), *Chroicocephalus genei* (LC), *Microcarbo pygmaeus* (LC), *Botaurus stellaris* (LC), *Ixobrychus minutus* (LC))

Number of endemic taxa (Imrahor Valley Region): **30**

Invasive alien species (N): **1**

FLAGSHIP SPECIES :



Aythya nyroca



Sympetrum fonscolombii



Testudo graeca

NATURE CONTRIBUTIONS TO PEOPLE AND MEASURED INDICATORS



PHYSICAL AND PSYCHOLOGICAL EXPERIENCE

Number of people visiting the pondscape (leisure, tourism, fishing, nature watching etc.) (nb/year)

5'000-6'000

100% Area inside the pondscape accessible to the public

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

3.5

Most popular activities :

landscape aesthetics (21%), fishing, hunting, biking, art and wildlife observation (20%)



WATER QUANTITY

86'000m³

Volume of water stocked during a severe flood event (m³)

Total water volume (m³)

172'000m³



WATER QUALITY

2

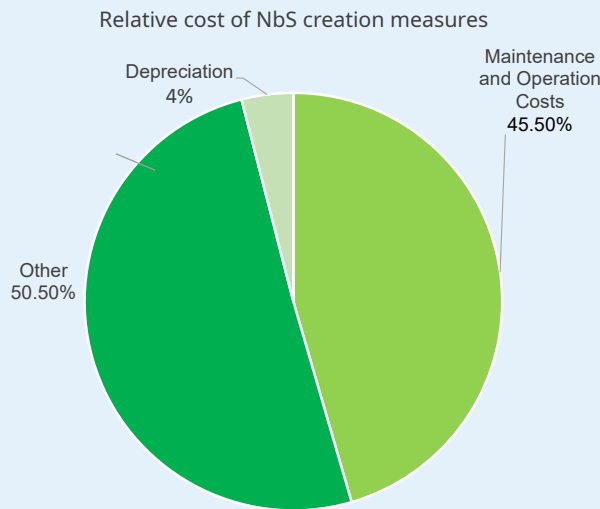
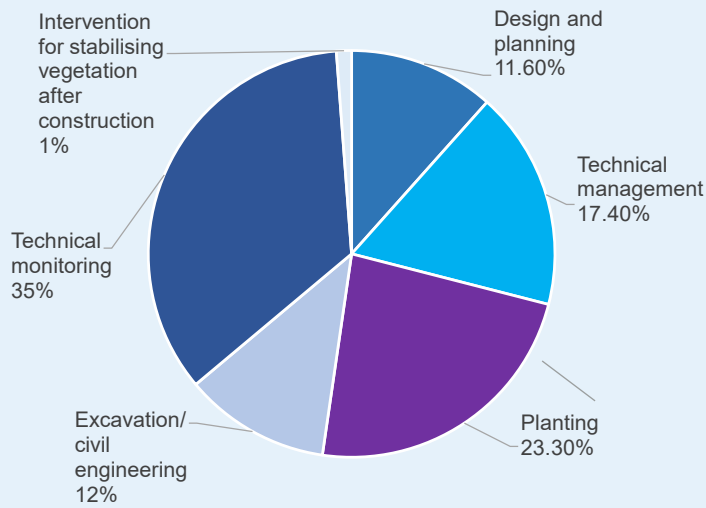
Wide range of pollution levels between ponds; some are pristine, and others are heavily eutrophicated owing to crop and animal farming, and wastewater discharge. Furthermore, there are also waste or litter disposals all around to the pondscape (from a scale 1 to 5).

COSTS AND BENEFITS ANALYSIS

OVERALL COSTS ASSESSMENT

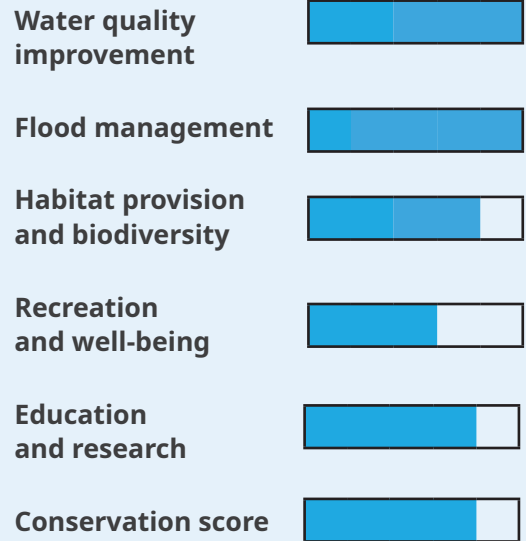


SHARE OF COSTS FOR NBS ACTION



Relative cost of ongoing NBS management measures

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

Increasing urbanisation is one of the main threats to the pondscape, impacting flood protection capacity as well as biodiversity, particularly due to deterioration of pond water quality. Furthermore, climate change-induced changes in hydrology, such as altered rainfall patterns, may cause smaller ponds to disappear, further impacting biodiversity. The ownership status of the ponds also limits restoration efforts and their potential as Nature-based Solutions. The Imrahor River Valley pondscape has the potential to be a valuable asset in protecting the Ankara city center from major floods. However, it is important to note that the pondscape is currently facing challenges related to poor management and a lack of ecological protection. To ensure the continued effectiveness of the Imrahor Valley's flood prevention function, it is necessary to address the issues of continuous degradation of the hydrological network within the basin due to urbanisation and grey infrastructure. There is a need for a policy framework that allows for effective and successful protection and promotion of pondscape for habitat creation and flood management, as well as biodiversity enhancement and protection and recreational use. In addition, coordination between the municipality, government, NGOs, environmental consultancies, and landowners is important to highlight the multifunctionality of the pondscape. By working collaboratively towards Nature-based Solutions, it is possible to preserve nature's contributions to people and other benefits the pondscape provides.



HANDBOOK :



APPENDIX :



PHOTOS CREDITS

Aythya nyroca p.5 © Gamze Kaya
Sympetrum fonscolombii p.5 © elisabraz
Testudo graeca p.5 © Paul Cools

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