Water Buffalo Commons:
Wetland conservation through pastoralist practices in the outskirts of Istanbul

Baseline Report / November 2023

CLIMAVORE × Jameel at RCA

Contents

Cover photo: Deniz Sabuncu / Aposto

Executive Summary

On the outskirts of Istanbul, wetlands are home to water buffalo, their herders, and a host of species that depend on them. These wetlands are a unique case of a post-industrial landscape transformed into a thriving ecosystem through the alliance of water buffalo and their herders. The study area, located in the narrow stretch of land that connects Europe with Asia, is approximately 70 sq.km, stretching from Lake Terkos to Çiftalan. It has been subjected to continuous cycles of extraction, beginning with coal mining in the 1910s that has since expanded to include clay mining, stone quarrying, sand dredging and coastal reclamation. Whilst some of these activities continue, mines that were abandoned flooded with water forming the lakes and pools that can be seen across the landscape today. These pools provide a unique habitat for buffalo to wallow after rainy periods, as well as migratory birds and other keystone species.

Since 2013, the region has been encroached upon by hyper-scale constructions, threatening to once again transform the rich ecologies stretching between the Black Sea and the Sea of Marmara. Located in the lands of the buffalo, these megaprojects have rezoned the area from rural to urban, draining the Istanbul wetlands and fragmenting the grazing commons as a side-effect.

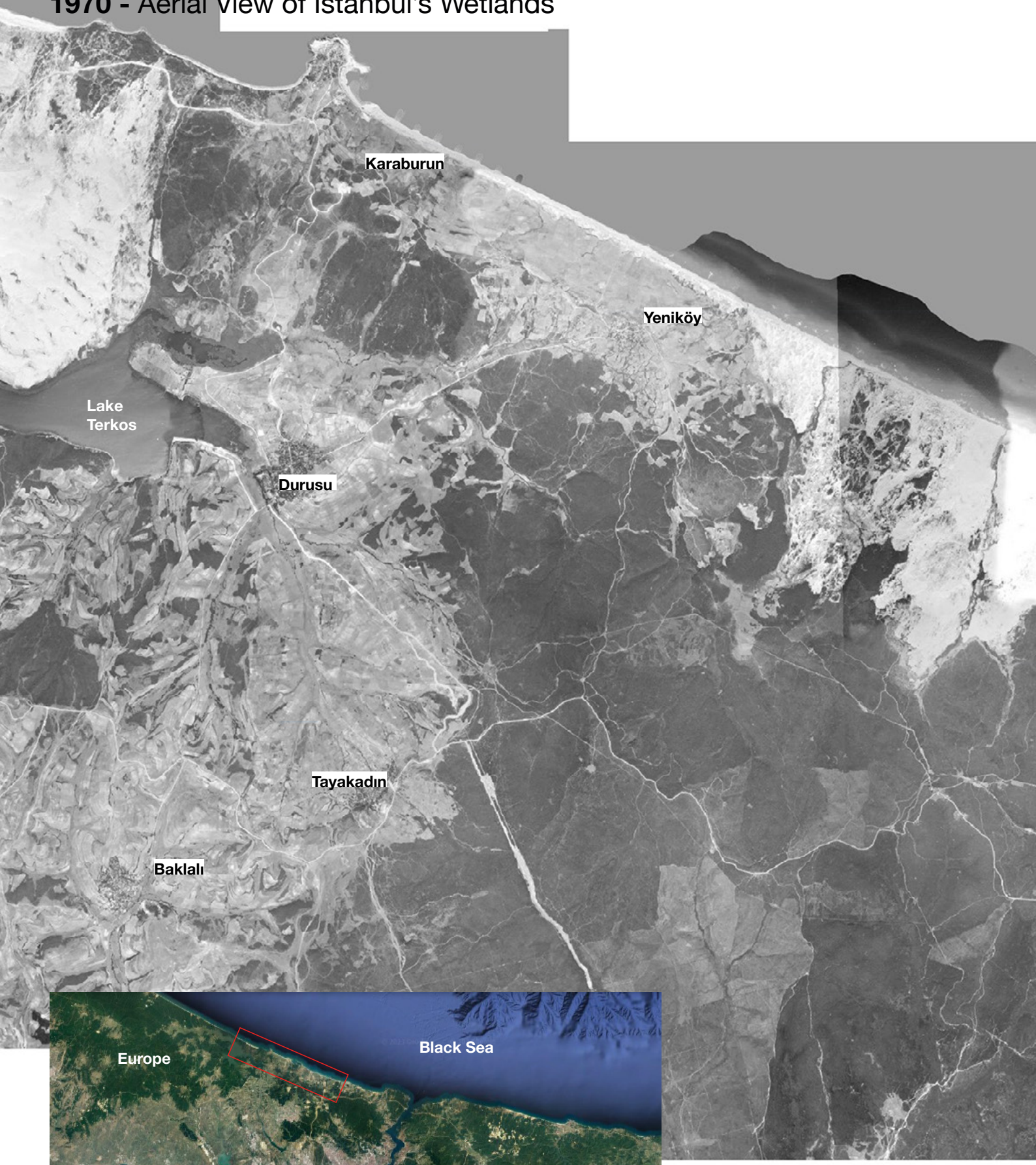
Wetlands are landscapes critical to preserve within the climate crisis, providing resilience to urban ecologies through acting as crucial migratory bird stopovers, useful filtering zones, carbon sinks and buffers against flooding. Half of Türkiye's wetlands have been lost over the past century, drained in order to make the land "useful" for agriculture or development. Whilst there are 14 protected Ramsar sites in Türkiye, other wetland landscapes await the necessary protection.

Istanbul used to be home to the country's third largest water buffalo population. However due to the draining and fragmentation of the wetlands there are just under 4,000 buffalo remaining today in the northern wetlands. The herds are spread out across 8 villages in Arnavutkoy and Eyupsultan municipalities where herding practices continue. Water buffalo milk is a key ingredient within Istanbul's culinary heritage, used in the production of yoghurt, kaymak, and traditional desserts. The combined daily milk production across the 8 villages is estimated to be c. 7,000 - 8,000 litres. This productive landscape is disconnected with most consumers. There is no direct supply chain to the city for the milk, with each herder struggling to sell their milk to seperate wholesalers. Besides, limited grazing areas make herders supplement their buffalo's diet with fodder, especially in winter. More grazing areas year-round could reduce dependency on fodder to reduce costs.

This baseline report documents the current status of Istanbul's wetlands and the cultural heritage of the remaining pastoralist practices through a through a qualitative study including ongoing site-visits, mapping workshops, individual interviews and group conversations held between 2019-2023. The maps have been prepared with herders and village residents, through ongoing fieldwork, conversations, and a mapping workshop held in September 2023. They describe the spatial distribution of herders and water buffalo, as well as remaining grazing commons, local shops selling water buffalo products, and historical sites that relate to the water infrastructures and cultural heritage of Istanbul's surrounding food belt. This area has economic potential for local and international tourism through the ecological and culinary value of this unique productive landscape.

Water Buffalo Commons aims to develop different strategies for the preservation of Istanbul's wetland ecologies. The first is through the promotion of water buffalo milk and other high value dairy products, both in order to provide economic viability for the herding communities as well as to create an awareness campaign through its connection to a disappearing landscape. The second strategy is to bring protection to the wetland landscape with unique pastoralist heritage at a regional, national or international level. In line with the ambitions of Istanbul's Food Strategy, Istanbul's wetlands are productive food landscapes that exist in close proximity to the city and can enhance its local supply chain if collective grazing corridors and common areas are safeguarded for future generations.

1970 - Aerial View of Istanbul's Wetlands



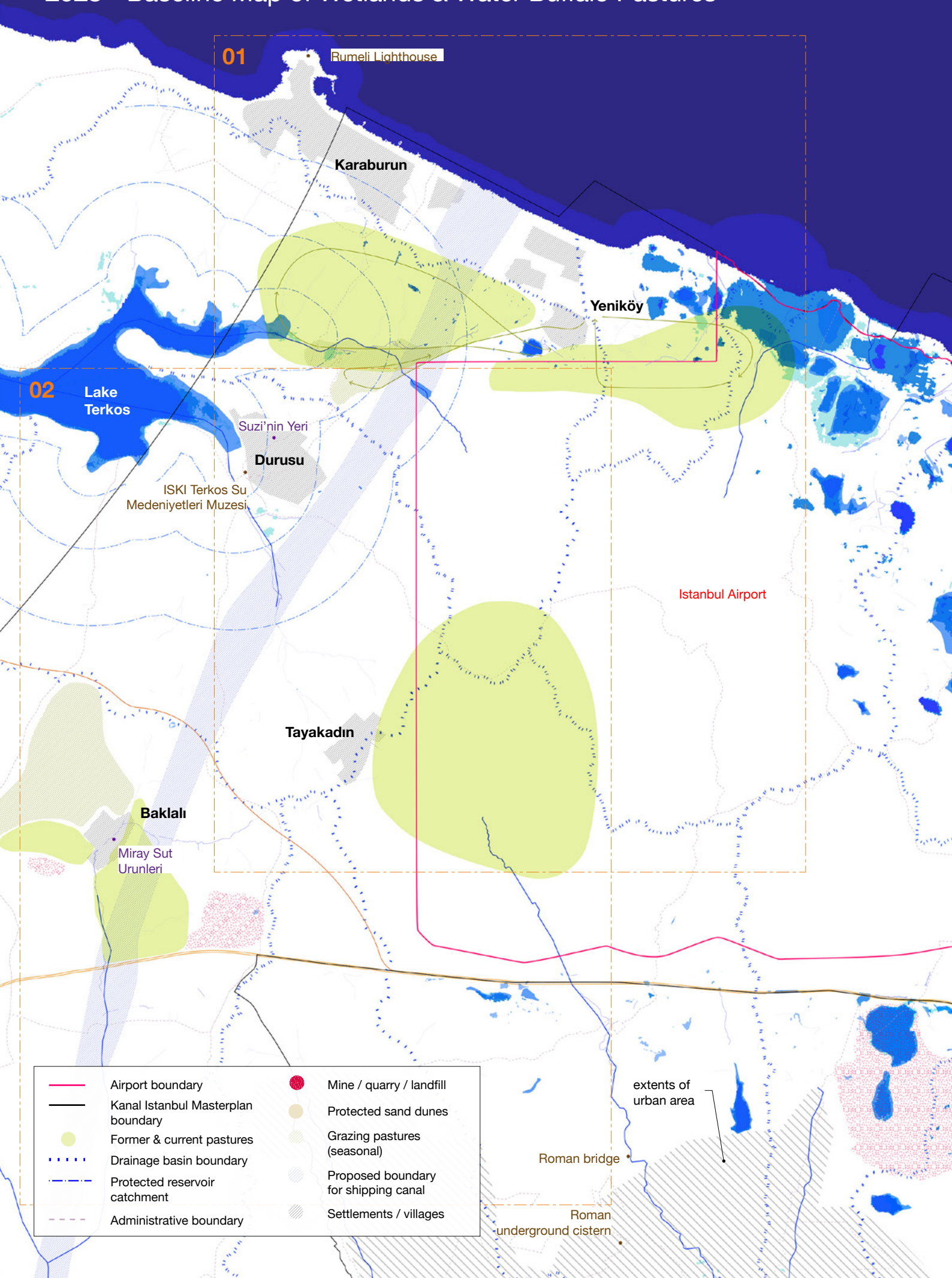
Aerial view of Istanbul, 2023

1970 - Aerial View of Istanbul's Wetlands

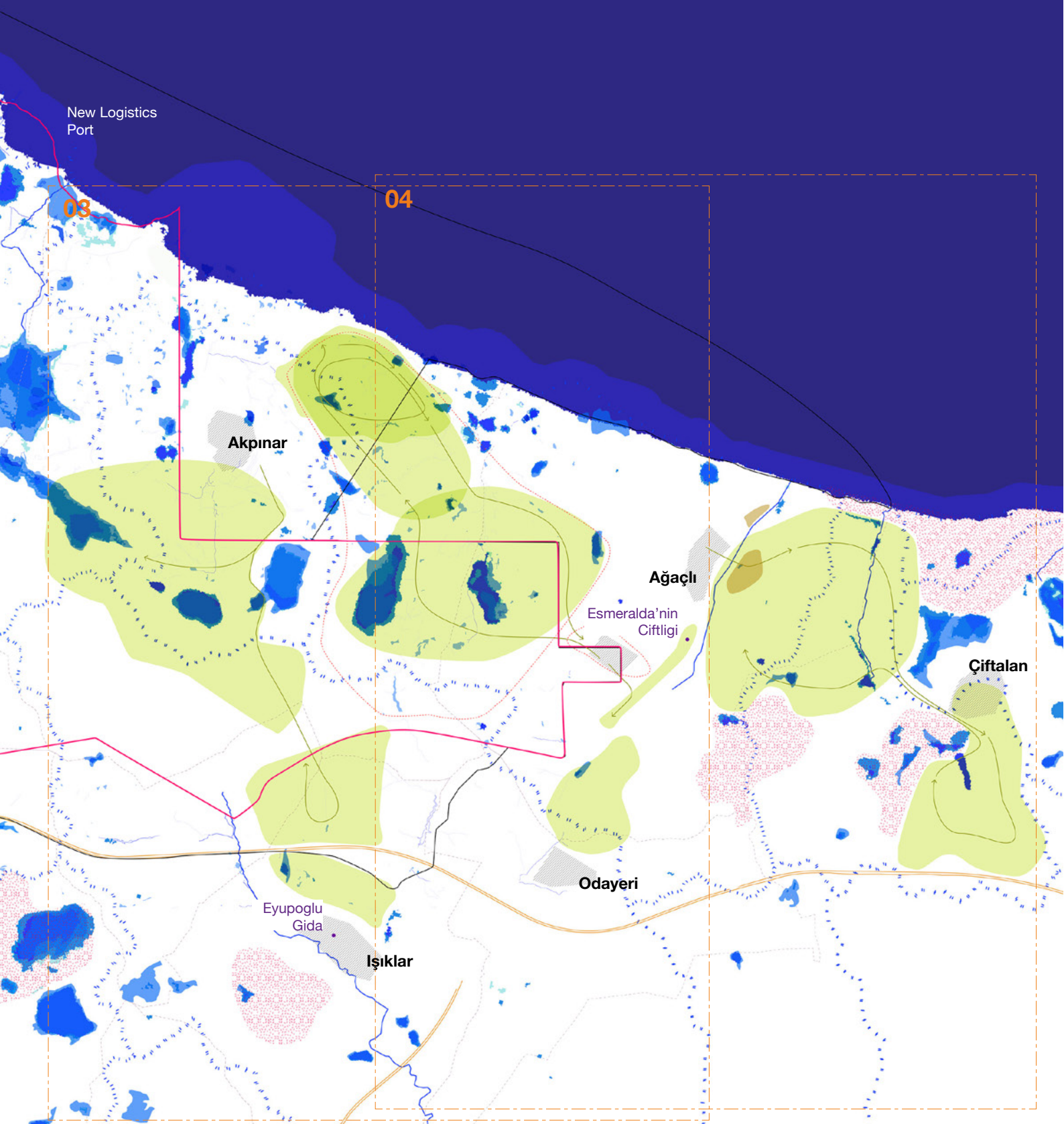
The aerial view of northern Istanbul shows the area of the present-day wetlands that extends from Lake Terkos to the east to Çiftalan village to the west. The large white areas close to the coast of the Black Sea are the sand dunes that the area used to be famous for - very little of these remain. Also noticeable is the uniformity of the coastline, which has since been heavily altered due to sand dredging and coastal reclamation operations.

This map also highlights the 10 main villages in the area. Today, water buffalo herding is present in 8 of them.

2023 - Baseline Map of Wetlands & Water Buffalo Pastures



2023 - Baseline Map of Wetlands & Water Buffalo Pastures



Istanbul's Wetlands -
Type & History

The wetlands of northern Istanbul were formed following the expansion of coal, sand and clay mining, and stone quarrying in the villages stretching from Lake Terkos to Çiftalan village. Early maps of the region pre-mining show a dense network of rivers and streams flowing throughout the landscape, most of which can no longer be observed on site. Lake Terkos was recognised as a wetland habitat in 1967 during the "Technical Meeting on Wetland Conservation", the first national conference on wetlands held in Türkiye. It was also included in the "Provisional Checklist of Turkish Wetlands", the first national inventory of wetland landscapes compiled for the conference.

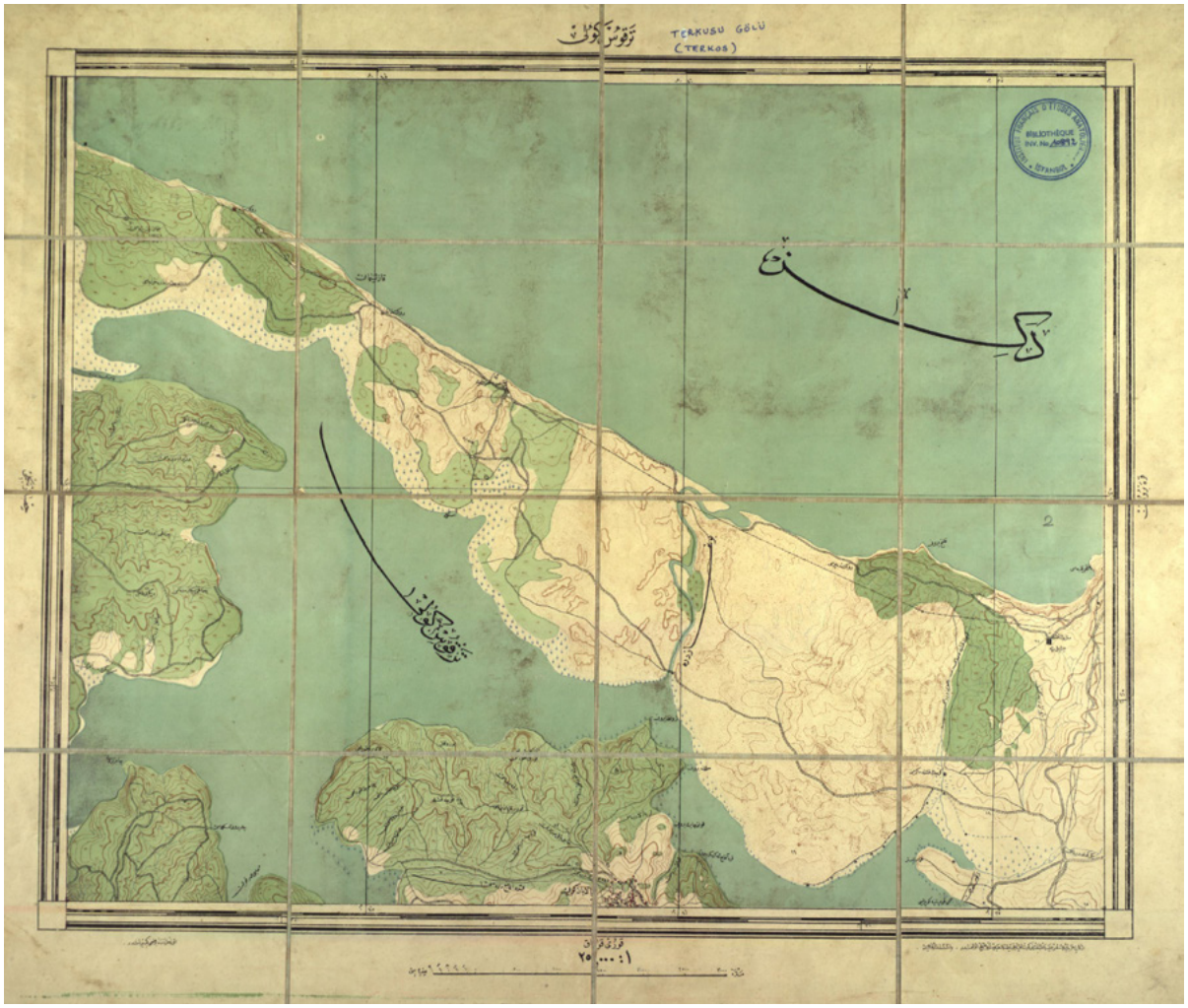
Lake Terkos is also included in the 2003 Directory of Azov-Black Sea Coastal Wetlands prepared by the Black Sea Program of Wetlands International. The report classifies Lake Terkos and its surroundings as a coastal freshwater lagoon (type K from the Ramsar classification), comprised of coastal sand dunes and reed-beds. The lake was formed through the combined inflow of four streams, seperated from the Black Sea behind a natural embankment of sand dunes. By the late 19th century, Lake Terkos had become one of the main sources of drinking water for Istanbul. Terkos water pumping station and an underground system of tunnels were built in 1883 - some of these Ottoman water infrastructures can still be seen in Arnavutkoy's villages. The lake and it's surroundings were never granted environmental protection status as a wetland.

With the introduction of open-pit coal mining in the area from the 1910's onwards, the rivers and aquifers were drained as digging pushed the level of the water table deeper into the ground. As mines and quarries became defunct or abandoned, the pits started to fill up with water through a combination of flows resurfacing from underground aquifers and rain, forming the lakes and pools present today.

As a result, the natural wetland area of Lake Terkos expanded eastward to form a post-industrial wetland landscape that extends as far east as Çiftalan village. This area has not been recognised formally as a wetland ecosystem and never granted protected status. Today, large swathes of the wetlands have been lost or risk disappearing, as they are being drained for development projects. The maps in this report record the extent of this landscape highlighting pastoralist practices as they remains today.

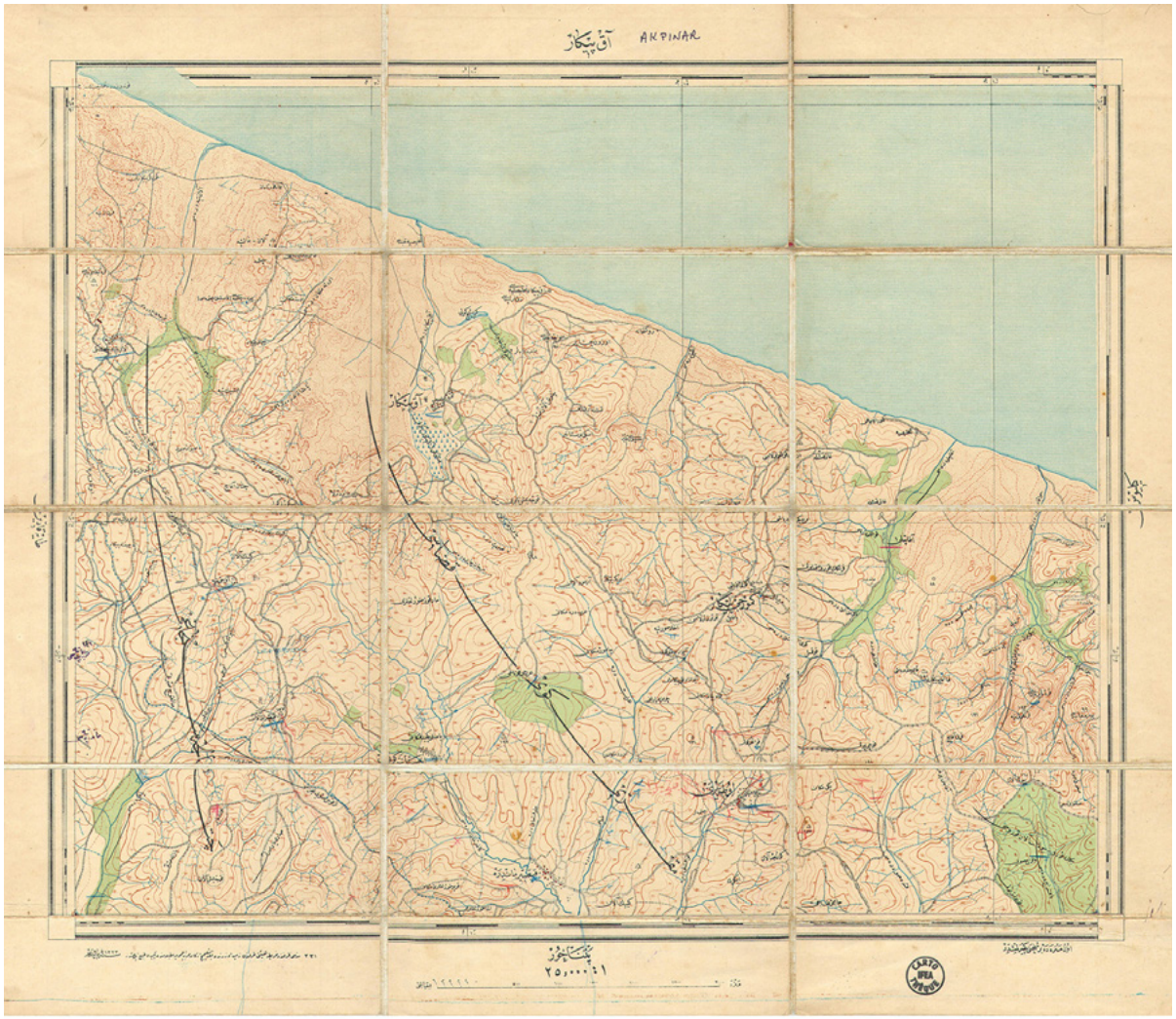
These pools act as wallows for the area's water buffalo, who submerge themselves in cool water to regulate their body temperature in warm and humid climates. Water buffalo also help to enlarge wetlands as their movements through the mud create channels joining seperate pools of water together, creating passages for fish, frogs, and other species that live in the muddy landscape, which the rich abundance of migratory birds feed on.

Water buffalo herding is a traditional livelihood for people living within the landscape. The herding communities are composed predominantly of migrant families from Greece and the Balkans. The herders learned techniques from their ancestors in the Balkans and transferred this knowledge to the region, first after Bulgarian herders migrated to the area in Ottoman times, and then through the Population Exchange between Greece and Türkiye in 1923.



1915 - Lake Terkos & surroundings

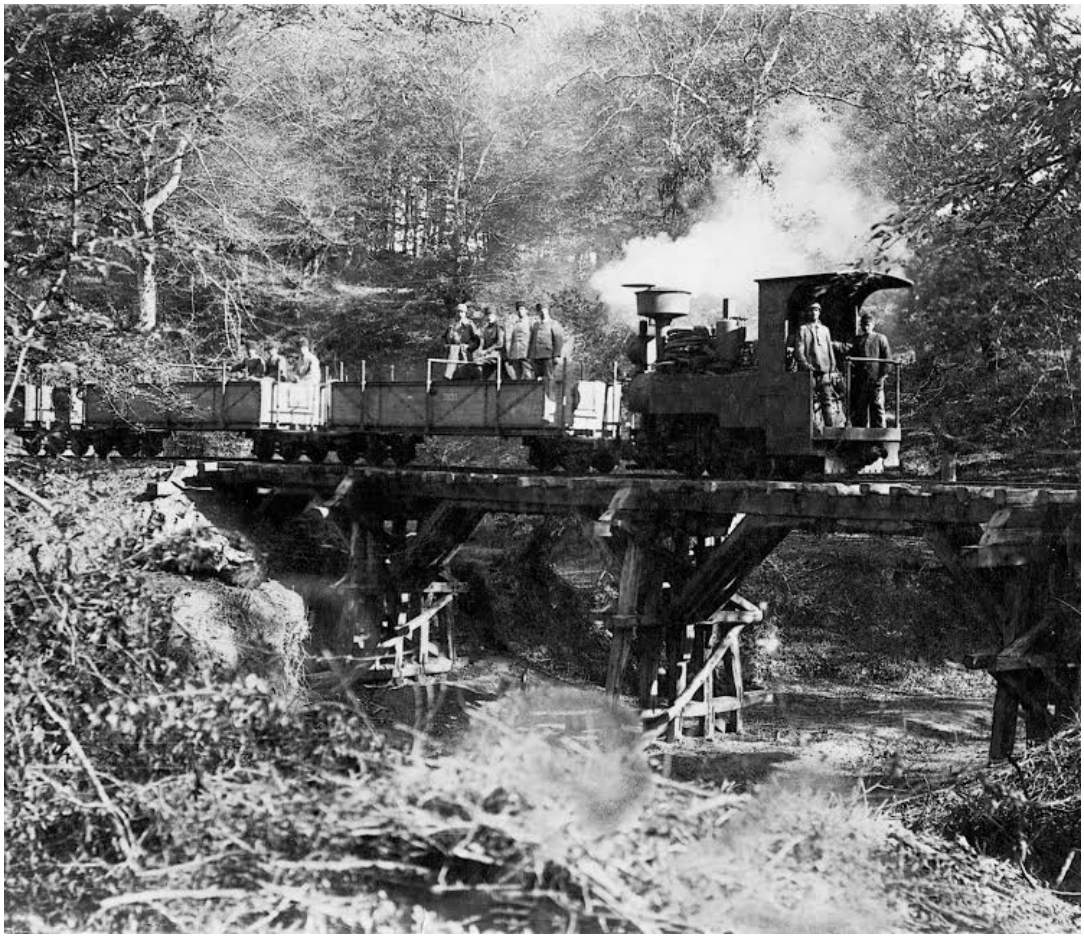
Salt Archives, Erkan-ı Harbiye collections



1917 - Ağaçlı village & surroundings

Salt Archives, Erkan-ı Harbiye collections

Istanbul's Wetlands -
Coal, Clay & Sand Mining



1915 - Silahtarağa - Ağaçlı Coal Railway

The earliest sources on mining in the area date back to 1914 when coal mining began in Ağaçlı village. The Silahtarağa-Ağaçlı coal railway was built in 1915 to transport the coal into powerplants the city.

Photo: Kağıthane Municipality

1954 - Expansion of Lignite & Coal Mines

The mining industry expanded as surveys revealed large coal and lignite deposits in the area. The majority of mineral extracted was supplied to the Turkish military. Mining initially began at a small scale as individual license owners mined their own plots. Eventually, the Kutman Mining company became the main operator in the area.

Photo: Kutman Archive

1980s and 1990s

Expansion of the mining industry by Kutman to the adjacent villages, including Çiftalan, Akpınar and Ihsaniye. It also extended from coal to encompass clay and sand mining.

Photo: Kutman Archive

Rehabilitation

Whilst coal, sand and clay mining continues in the area, some of the mines that have been depleted or are now defunct have either been filled with water and become lakes or wallows, or have been planted with trees as a means of rehabilitating the landscape. Kutorman is a large private forest, the afforestation project of the Kutman Mining company, that is situated between Ağaçlı and Çiftalan.

Photo: Kutman Archive

Istanbul's Wetlands -
A Post-Industrial Landscape

This photo taken from Yeniköy looking out to the Black Sea shows remnants of the mining infrastructure as well as pools formed by abandoned coal mines close to the shoreline.

Photo: CLIMAVORE

Water buffalo submerge themselves in wallows to help regulate their body temperatures in hot climates.

Photo: Deniz Sabuncu / Aposto

The landscape between Akpınar and Çiftalan villages has been terraformed by decades of mining activity - in the background of this photograph it is possible to see the depth of excavation that once took place within this rehabilitated mine.

Photo: CLIMAVORE

The wallows have different depths - whilst some are formed in the deep pits left over from the mines, others are much smaller and shallower, and their wetness changes with the seasons.

Photo: CLIMAVORE

Istanbul's Wetlands -
Water Buffalo & Herding Communities

The water buffalo herding communities there are around Arnavutköy and Eyüpsultan municipalities exist spread out amongst the 8 villages of Yeniköy, Baklalı, Tayakadın, Akpınar, Ağaçlı, Çiftalan, Odayeri and Işıklar. It is estimated that there around 41 herders and c. 3,900 water buffalo. The predominant type is the Anatolian Water Buffalo which on average produces around 5 litres of milk a day. The combined daily milk production across the 8 villages is estimated to be c. 7,000 - 8,000 litres.

Herding practices are supported by the Istanbul Herders' Association, and the Istanbul District Office of the Ministry for Agriculture and Forestry. The Ministry provides annual fodder support - this is calculated as 1,500 kg of fodder for each registered herder with 5 or more water buffalo. This is a fixed amount that does not change depending on herd size. The fodder is distributed through the Herder's Association. Herders have to register with the association, who provide certification of their buffalo's breed.

The table below shows the distribution of water buffalo across the villages:

Village	**No. of Herders (approx.)**	**No. of Water Buffalo (approx.)**
Yeniköy	6	600
Baklalı	4	400
Tayakadın	5	300
Akpınar	6	600
Ağaçlı	14	1400
Çiftalan	4	400
Odayeri	1	100
Işıklar	1	100
Total	**41**	**3900**

‘Manda Sohbetleri’ Mapping Workshop

16 September 2023

Photo: Kaltfil

‘Manda Sohbetleri’ Mapping Workshop

16 September 2023

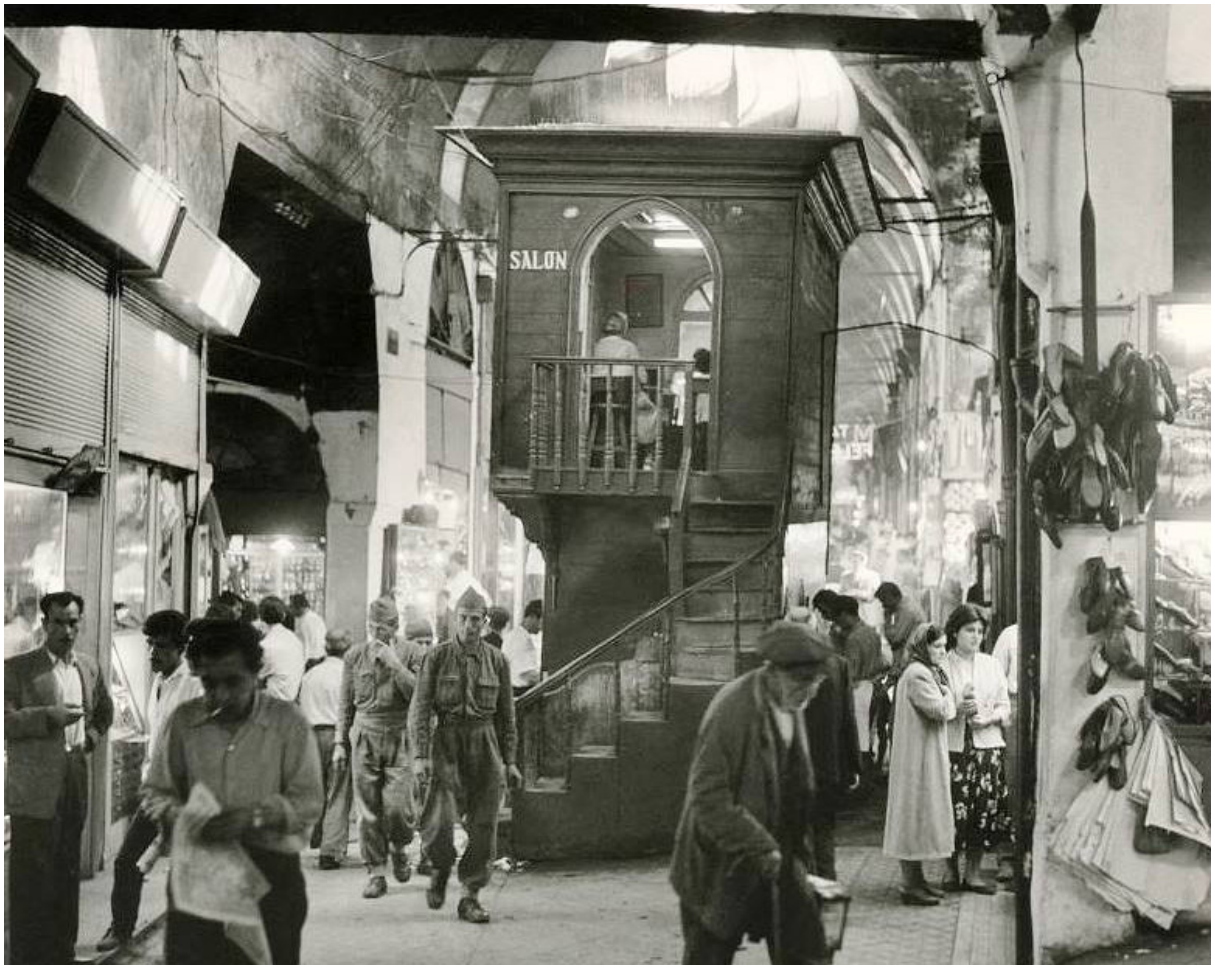
Photo: Kaltfil

Istanbul's Culinary Heritage -
Water Buffalo Milk & Muhallebici

Muhallebicis are traditional Ottoman dessert shops that used to be found all across Istanbul, serving *muhallebi* (a speciality of shredded chicken thickened with rice water, sprinkled in sugar and rose water), *sütlaç* (rice pudding), and *kaymak* (clotted cream). Muhallebi was cooked initially only during special occasions such as eid, but found its way to the general public initially through street vendors and then muhallebicis. Sütlaç, on the other hand, is considered one of the oldest Turkish desserts dating back to the 1400's. It's recipe is included in the earliest printed Ottoman cookbook. Made of rice and milk, it is thought that sütlaç was invented during nomadic travels along the Silk Road, where rice from the East would have been cooked with the dairy produced from the Turkic merchant's animals. Over time, with sugar considered a luxury, it became a favourite of Istanbul's palace kitchens.

These desserts were all traditionally made with water buffalo milk - a key ingredient within the country's culinary heritage, but one that is becoming increasingly expensive and harder to find as water buffalo herding practices in the city decline. Many of the city's traditional muhallebicis are also closing and with them an important element of Turkish culinary heritage risks getting lost.

Camuralem Muhallebicisi in Kurtulus is a interpretation of a traditional muhallebici shop, that aims to support pastoralist practices by providing a point of direct sale of the water buffalo milk produced in Istanbul's wetlands. It also functions as an exhibition space, bringing the wetland ecology into the metropolis. Water Buffalo Commons aims at developing an expanded network of chefs and restaurants in Istanbul to continue to promote and support Arnavutkoy and Eyupsultan's herders.



The Historic Grand Bazaar Çukur Muhallebicisi operated as a dessert shop from the 1850s to the 1970s.

Photo: unknown

Çamuralem Muhallebicisi in Kurtuluş

Photo: CLIMAVORE

Detail Map 01: Yeniköy

Herders, Water Buffalos & Pastures

- The majority of the pastures used communally are to the east of the village or along the road that leads to Durusu.

- Agricultural fields owned by the villagers are also used seasonally as water buffalo pastures (after the harvest).

- Prior to the airport construction, the pastures to the west of Yeniköy were the main water buffalo grazing areas. This area is the beginning of the wetland landscape and where the majority of the former mining pits that have transformed into wallows are located.

- The herders sell only the milk daily to wholesale suppliers coming from Istanbul.

Key Challenges

- Loss of pastures due to the airport construction. Diminishing pastures means there is an increase in fodder dependency, but with fodder prices becoming too expensive there is greater need for further governmental support. Fodder prices are hindering economic viability of herding.

- The construction ban affecting the entire village means that existing homes or agricultural / herding infrastructure can not be maintained, nor new homes built. The ban is causing the younger generations to migrate from Yeniköy.

Local Shops - Water Buffalo products

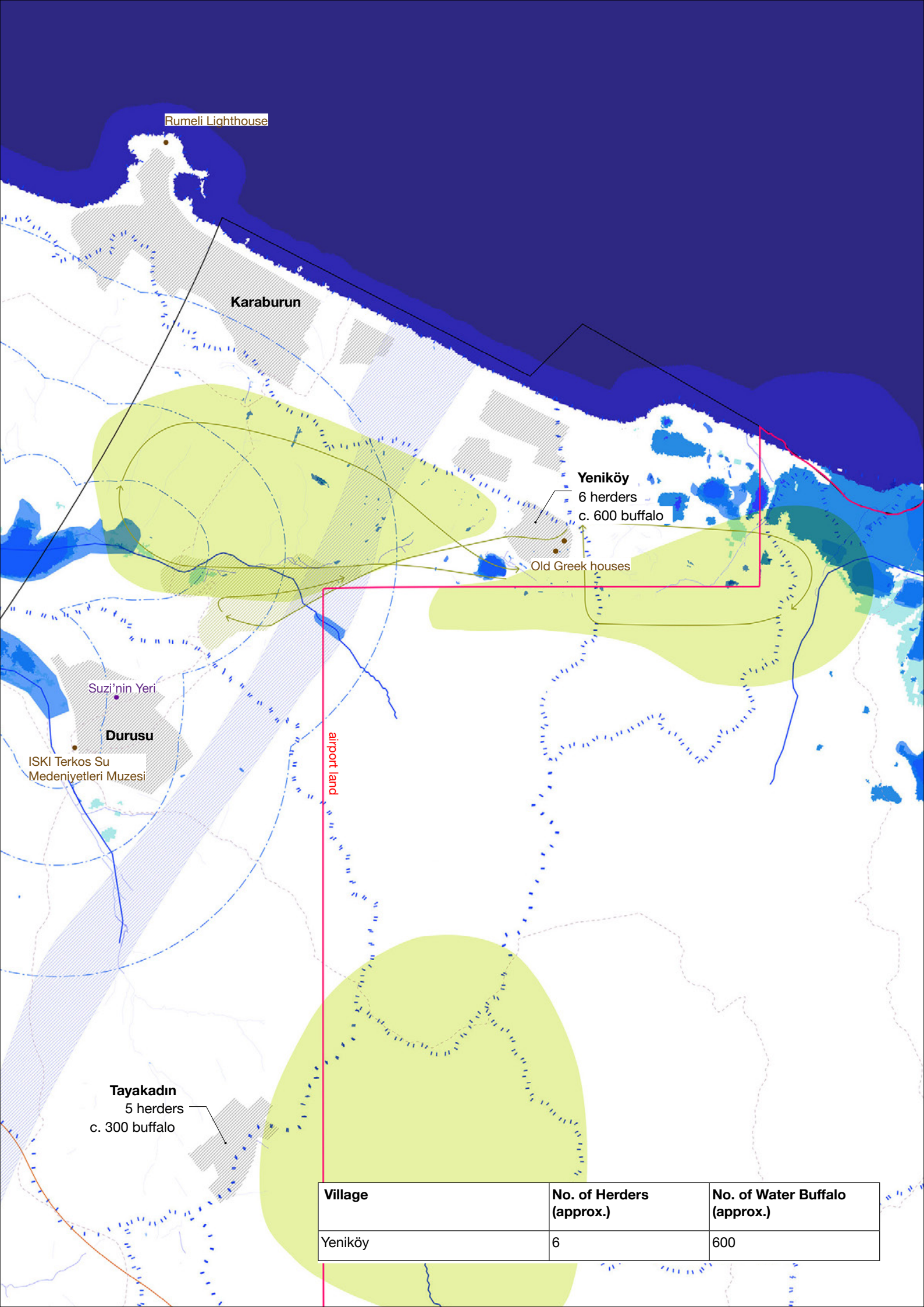
- Suzi'nin Yeri is a local restaurant which serves water buffalo milk products.

Local Heritage - Opportunities for Eco-Cultural Tourism

- There are between 4-7 architecturally distinct old Greek houses remaining in Yeniköy which date back to the former communities living there before the population exchange.

- The ISKI Terkos Su Medeniyetleri Muzesi *(Terkos Water Civilizations Museum)* is located in the former Terkos Pumping Station built by the French in 1883. It brought drinking water from Lake Terkos into central Istanbul. It is currently not open to the public.

- Rumeli Lighthouse in Karaburun was erected by French engineers in 1860 following the Crimean war, for safe navigation from the Black Sea into the Bosphorus. It is still in use, and open to the public for visits.



Village	No. of Herders (approx.)	No. of Water Buffalo (approx.)
Yeniköy	6	600

Detail Map 02: Baklalı - Tayakadın

Herders, Water Buffalos & Pastures

- Baklalı has two main grazing areas surrounding the village, as well as agricultural land which is used seasonally as pastures.

- Tayakadın have no present active pastures. There is land to the east of Tayakadın village before the airport enclosure that could potentially be used as pastures - currently designated as forest.

Key Challenges

- Tayakadın is heavily affected by the airport construction, with all of their former pastures which were in the airport enclosure lost. The buffalo are kept inside barns, and sprinkler systems used to wet them.

- The highway infrastructure surrounding the two villages isolates them from another and is a barrier for the roaming water buffalo.

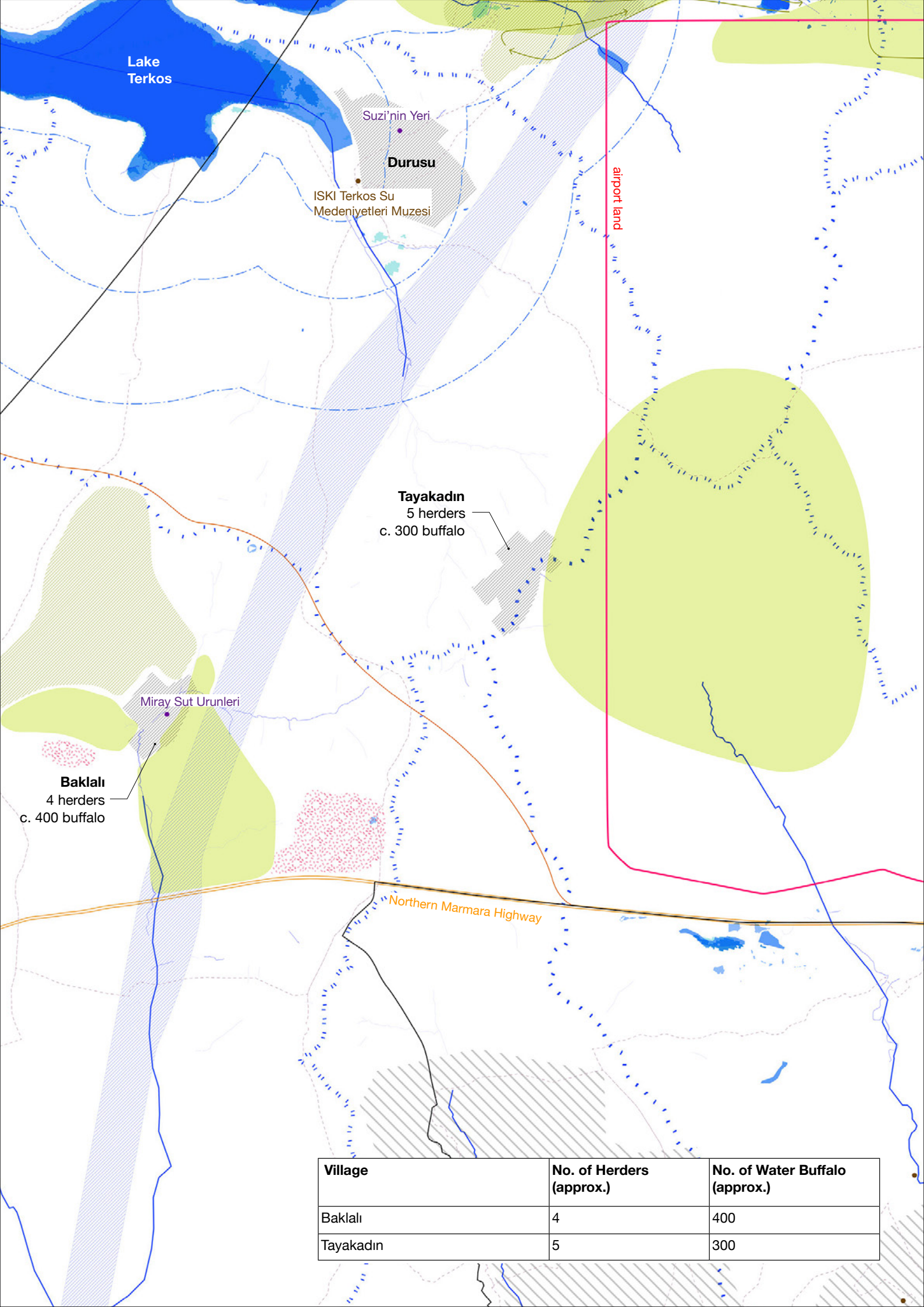
Local Shops - Water Buffalo products

- Miray Sut Urunleri sells water buffalo milk products.

Local Heritage - Opportunities for Eco-Cultural Tourism

- Baklalı is estimated to be a 600 year old village that used to be predominantly vegetable gardens. The village gets it name from ‘bakla’ (okra), which is still grown there alongside corn, barley and sunflowers.

Note: Dursunkoy to the south of the highway also has active water buffalo herders. It hasn’t yet been visited as part of this study.



Village	No. of Herders (approx.)	No. of Water Buffalo (approx.)
Baklalı	4	400
Tayakadın	5	300

Detail Map 03: Akpınar - Ağaçlı - Işıklar

Herders, Water Buffalos & Pastures

- This area has the highest numbers of herders and water buffalo, and largest remaining wetland extents. Ağaçlı and Akpınar share communal pastures between the two villages.

Key Challenges

- Loss of pastures is the largest challenge for all three villages. Diminishing pastures means there is an increase in fodder dependency, but fodder prices are too expensive and herders would benefit from more subsidies or other forms of support. More grazing areas year-round could reduce dependency on fodder to reduce costs.

- Ağaçlı is surrounded by ongoing extraction. Whilst a large area to the west of the village has been reforested to rehabilitate former mining areas (Kutorman), stone quarrying and using pits and the sea as landfills / waste disposal continues. The quarries, at a lower level than the wallows, cause the wetlands to drain. As the wetlands are not legally recognised as 'natural' wetlands, they are not protected.

- The municipality have offered to buy the water buffalo waste from Ağaçlı village to burn as fuel.

- Ağaçlı brought protection to remaining sand dunes in their village via endemic species protection, incl. sea daffodils. The municipality also held a rural development workshop in Ağaçlı in 2019-2020.

- In Ağaçlı it is an issue for the barns to be kept inside the village. Ağaçlı would like to form a herders' collective with communal pastures, barns (for shepherds, for animals, and for fodder storage) and milking facilities outside the village (marked on map). This area is rich in reeds and a type of clover favoured by the water buffalo.

- Işıklar has been heavily affected by encroaching urbanisation, infrastructure projects, and is surrounded by multiple waste disposal / landfill sites. There is only one pasture remaining to the north of the village.

Local Shops - Water Buffalo products

- Esmeralda'nin Ciftligi in Ağaçlı is a local shop run by a former herder, selling water buffalo milk products. The owner was approached a couple of years ago to have the water buffalo yoghurt registered with a Geographic Indicator, but the current status of the application is uncertain.

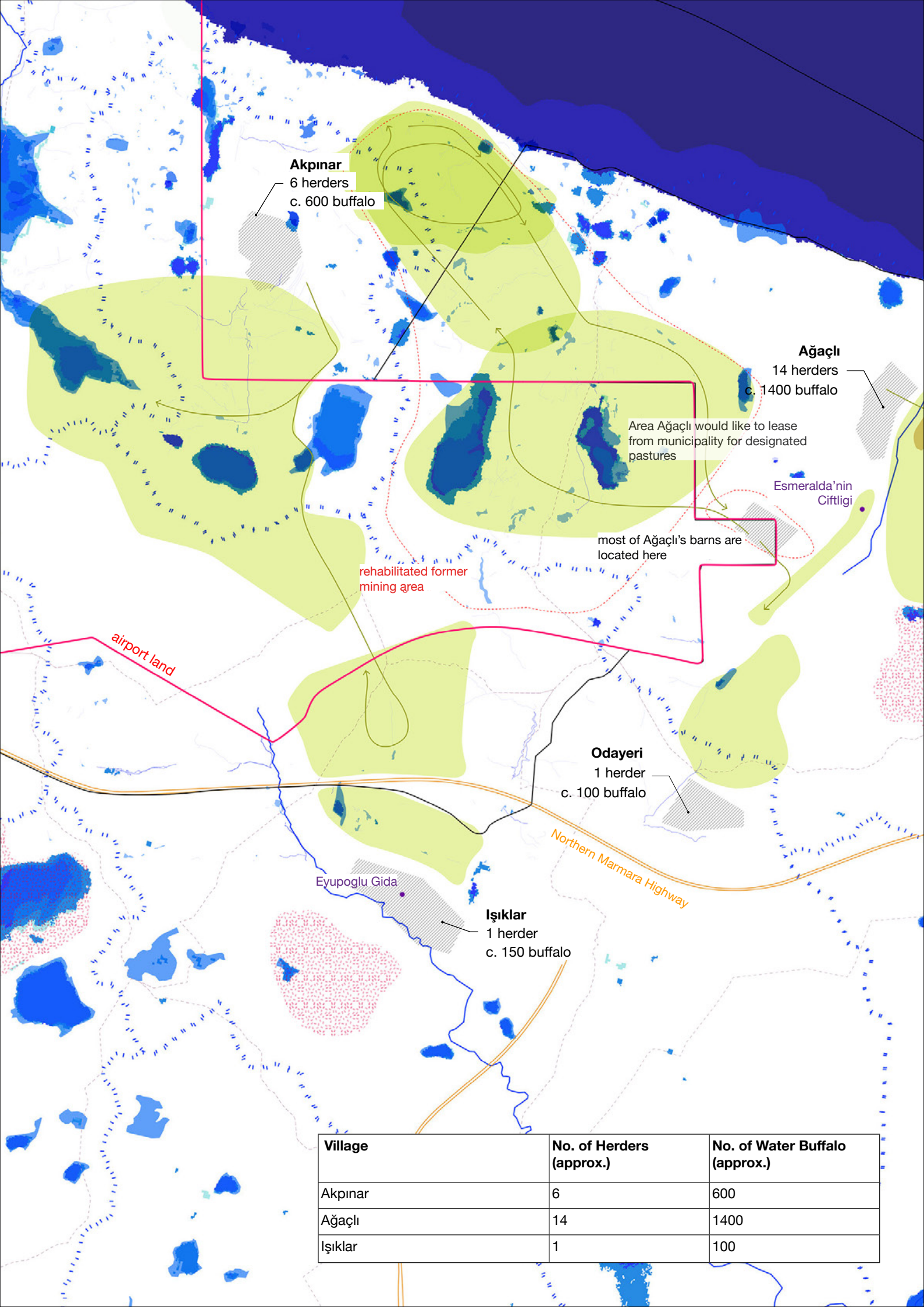
- Eyupoglu Gida in Işıklar sells water buffalo milk products from the remaining herder.

Local Heritage - Opportunities for Eco-Cultural Tourism

- Ağaçlı is one of the oldest and largest villages of Eyupsultan municipality. Archeological remains found during mining excavations are displayed within the village park - some of these are gravestones date back to 1200 AD.

Photo:
Sea Daffodil

- Airport boundary
- Kanal Masterplan boundary
- Drainage basin boundary
- Protected reservoir catchment
- Administrative boundary
- Mine / quarry / landfill
- Former and current grazing pastures
- Protected sand dunes
- Grazing pastures (seasonal)
- Kanal boundary
- Settlements / villages



Village	No. of Herders (approx.)	No. of Water Buffalo (approx.)
Akpınar	6	600
Ağaçlı	14	1400
Işıklar	1	100

Detail Map 04: Ağaçlı - Odayeri - Çiftalan

Herders, Water Buffalos & Pastures

- Çiftalan and Ağaçlı share communal pastures between the two villages.

Key Challenges

- Çiftalan is heavily affected by the mining and sand dredging still ongoing around the village, and rubble / waste disposal in the sea. The dust from the mining is affecting both the villagers and the water buffalo.

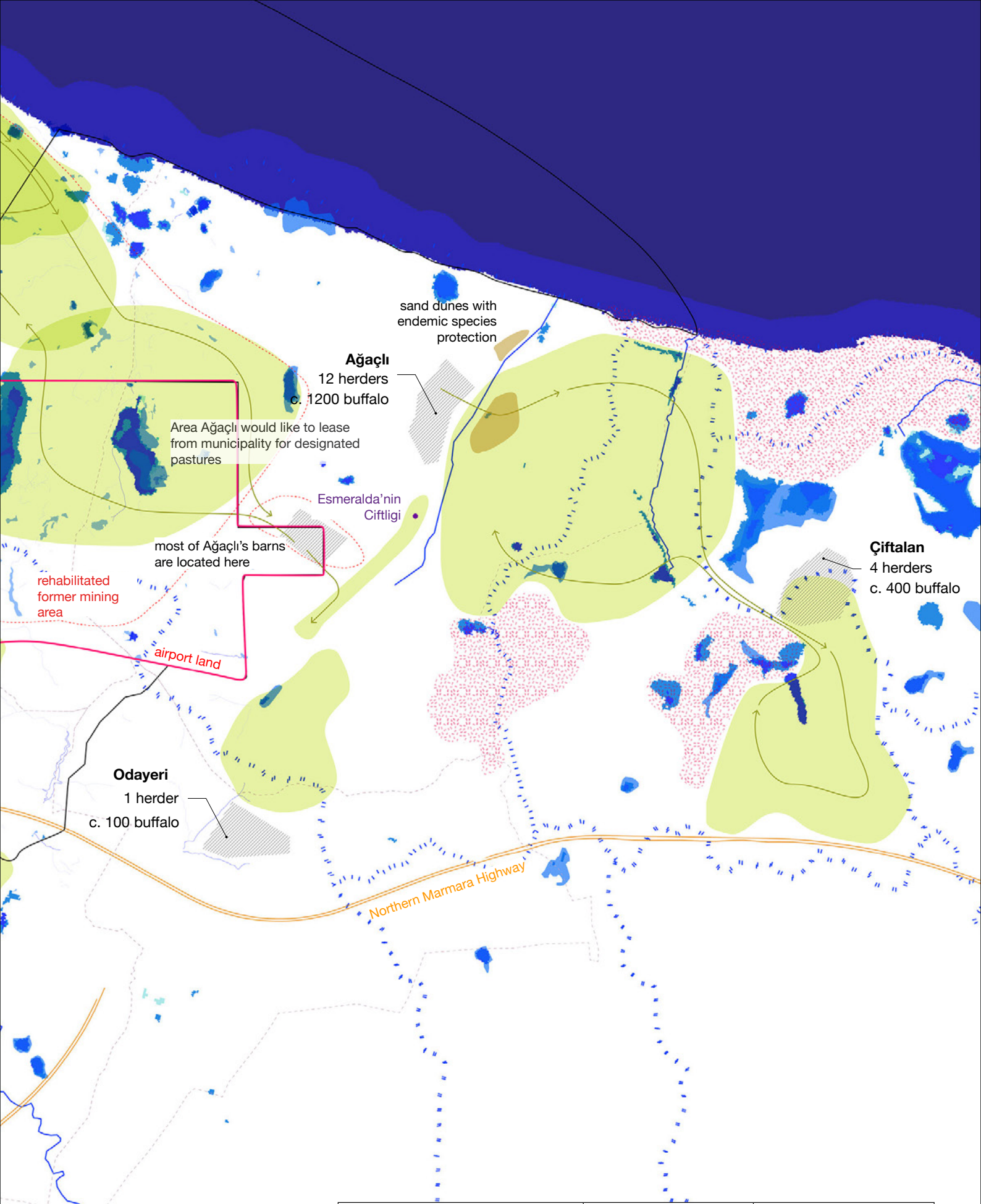
- Diminishing pastures means there is an increase in fodder dependency, but fodder prices are too expensive and government support is not sufficient. Fodder prices hinder economic viability of herding.

- Odayeri has an airport hotel and some residents are not supportive of having water buffalo in the village.

Local Heritage - Opportunities for Eco-Cultural Tourism

- Remains of the Ağaçlı-Silahtarağa coal railway can be seen in the area. There was an initiative around 2010 to restore the trainline as a heritage site but it does not appear to have been completed.

Note: Pirrinci village to the south of the highway also has active water buffalo herders. It hasn't yet been visited as part of this study.



Village	No. of Herders (approx.)	No. of Water Buffalo (approx.)
Ağaçlı	14	1400
Odayeri	1	100
Işıklar	1	100

Conclusion

This baseline report documents the current conditions as well as challenges faced by the wetland ecologies of Istanbul's periphery and it's food belt.

The area west of Istanbul Airport currently remains more intact as an agricultural landscape. Whilst it is less affected by the ongoing extractive industries, Arnavutkoy's villages face more significant pressure in terms of land being sold for development. The majority of these villages' former grazing pastures fell within the Airport's land. With the construction of the airport, the biggest challenge faced by herders today are the loss of grazing commons. To the east of the airport, the five villages in Eyupsultan municipality are surrounded by ongoing sand mining, stone quarrying and landfill sites, and these activities combined with the newly built infrastructure cause pollution and obstacles for the grazing buffalo. Similar to Arnavutkoy, the loss of pastures are the biggest concern for the herders.

In addition to herding, Arnavutkoy and Eyupsultan's villages were historically known for the wide variety of fruit and vegetables that used to be grown in the fields surrounding them, including watermelons, green beans, okra, corn, barley and sunflowers. The remaining agricultural fields face similair pressures as the pastures, but farming practices continue albeit at a smaller and fragmented scale. The wetlands and their surroundings are also home to a number of endemic and rare species, such as sea daffodils.

Only four local shops sell water buffalo milk products in the area, with the majority of herders preferring to sell their milk to wholesalers who distribute it to the city. Whilst water buffalo yoghurt and kaymak are produced in the villages, it is predominantly for domestic consumption. However the daily milk production of the villages highlights the potential for many more local facilities and venues to both sell the products on site as well as process the milk into yoghurt, kaymak and other desserts which have added commercial value.

Due to Lake Terkos' importance as one of the main freshwater sources for the the city, the wetlands are also host to historic water infrastructures, from the Roman underground cistern remains in southern Arnavutkoy to the former pumping station by the lake. These heritage sites, combined with old Greek village houses and the remnants of the former coal railway, provide opportunities for cultural tourism in the area.

The findings of the report highlight the potential for the wetlands of Arnavutkoy and Eyupsultan to be transformed once again into a productive food landscape for Istanbul. Keeping the wetlands as common grazing areas and corridors could be supported by plural economies, including culinary and cultural tourism, that could help safeguard this rich and resilient ecosystem for future generations.

Credits

This report is authored by Merve Anil and Kubilay Ercelep. It has been produced in November 2023 as part of Water Buffalo Commons, CLIMAVORE x Jameel at RCA, in collaboration with Istanbul Biennial. The project was first initiated for the 17th Istanbul Biennial in 2022.

Water Buffalo Commons is developed within CLIMAVORE x Jameel at RCA, and led by Daniel Fernández Pascual, Alon Schwabe, Dani Burrows, Merve Anil and Kubilay Ercelep.

Istanbul & London, 2023

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Fieldwork

Fieldwork ongoing since 2019, including site visits, surveys and conversations

18 conversations with 12 herders between May - September 2023 (Yeniköy, Baklalı, Tayakadın, Akpınar, Ağaçlı, Çiftalan, Odayeri and Işıklar villages)

16 September 'Manda Sohbetleri' mapping workshop