Technical assistance for management and protection of potential Natura 2000 sites in the northern part of Cyprus

Management plan for Famagusta Wetlands SEPA

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Executive summary

Famagusta Wetlands are located north, west and south-west of Famagusta walled city which is located on the east coast of Cyprus. The wetland area has been divided into four sections by roads. These divisions are called Ayluga, Tuzla-Glapsides, Glapsides 2 and Gülseren-Yenişehir.

The Famagusta Wetlands has received official legal protection as an important natural resource for the northern part of Cyprus and in 2008 was declared as a "Special Environmentally Protected Area" by the TCc authorities.

The main reasons for the area's selection as SEPA are the existence of both nationally and internationally important flora and fauna. The site important habitats which are listed in Annex I of the Habitats Directive (Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora) and due to the presence of a diverse range of migrating and resident bird species. A bi-communal survey carried out during 2007/08 showed that SEPA is visited by 40 different water birds species.

Flamingos and diverse migrant birds are visiting the area in large numbers during all four seasons of the year. In addition to the birds, fish species have been seen in the area. In Additional to the important faunal elements, the area is also inhabited by some rare and endemic floral species. During the surveying of this site a total of 8 different EU habitat types were recorded, two of them being priority habitats.

The Famagusta Wetlands SEPA has always been under threat from construction activities. The development of Famagusta city is mainly focused towards the northern part of the city. During the late 1980's the city experienced a construction boom after the founding of Eastern Mediterranean University. The university campus has been founded as a single site closer to Gülseren Lake. Building demand resulted from an increasing university student population and the development of the university campus has put an uncontrolled construction threat to the SEPA. The development of university has always been on the boundaries of wetland and due to university, the development of city always been close to the wetland area. All kinds of businesses have been established at boundaries of wetland, this has led to a significant amount of disturbance to the SEPA.

The biggest threat to wetland is the development of Famagusta city. There are multi storey buildings built on the dry wetland bed. Besides the development of university around the boundary, the industrial zone and the Central Hospital of city have been built on the boundary of SEPA.

Based on these results, which were further combined with socioeconomic factors, the proposal for zoning was developed. Three zones, which were further divided into different sub-zones, describe the different conditions for management, conservation and/or use of the SEPA through operational objectives. This was followed by a series of action plans which describe in detail the actions required for implementation of the management plan.

The vision of the protected area is to protect, preserve and enhance the natural values of the Famagusta wetlands SEPA and to raise awareness to those who work, reside in or visit the site. Additionally the site should enable the local population to benefit from the visitors who are attracted to the area for a wide variety of reasons.

I Background

1.1 Policy

Famagusta Wetlands are located north, west and south-west of Famagusta walled city which is located on the east coast of Cyprus. The wetland area has been divided into four sections by roads. The divisions of area have been called as Ayluga, Tuzla-Glapsides, Glapsides 2 and Gülseren-Yenişehir.

The Famagusta Wetlands has received official legal protection as an important natural resource for the northern part of Cyprus and in 2008 was declared as a "Special Environmentally Protected Area" by the TCc authorities.

Under the "Environment Law" the **"**Wetlands Protection Regulation" was established in 1998 by the TCc authorities and the Famagusta Wetlands was listed as one of a total 35 wetlands in the northern part of Cyprus which were declared as "protected wetlands". By referring to the content of 21/97 Environment Law- Item 11 the associated ministry made a motion (884/2008) to the Parliament Council. On 9th April 2008, Parliament decision no S(K-II)860-2008 declared the area as a Special Environmentally Protected Area (SEPA) for nature. Its aim was to preserve the habitats found within the site together with minimising the disturbance to the flora and fauna of the area.

Only Famagusta Municipality has municipal control in the Famagusta Wetlands SEPA. It is surrounded by new developments of Famagusta and Tuzla.

The management of the site mainly falls under the control of the Water Works Department of Environmental Protection, Department of Forestry and Department of Town Planning.

1.2 Site Selection

Main reasons for the area's selection as SEPA are the existence of both nationally and internationally important flora and fauna. The site has been selected due to the presence of important habitats which are listed in Annex I of the Habitats Directive (Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora) and due to the visiting numbers of migrant bird species. A bi-communal survey carried out in 2007/08 showed that the SEPA was visited by 40 different water birds species.

Flamingos and other migrant birds visit the area in large numbers during all four seasons of the year. In addition to the birds, fish species have been seen in the area. In addition to the important faunal elements, the area is also inhabited by some rare and endemic floral species.

The natural habitats of Famagusta Wetlands SEPA have been destroyed by the industrial and construction industry developments experienced in various parts of it. However, there have been some minor damages to some habitats as result of agricultural and animal husbandry activities around the Ayluga region of SEPA. Furthermore, Famagusta Wetlands SEPA has always been focal point for birds' protection and conservation efforts of NGO's.

II Site Description

2.1 Location and site boundaries

This area is situated at the north and north-east of Famagusta district, having a coastline on the eastern side and covers an area of 4.46 sq km (Annex 1). It consists of flat interior area surrounded with dwelling, industrial, university, military and agricultural areas and the coastal zone.

The Famagusta Wetlands SEPA starts on the east coast from north of Famagusta city and continues along the south of Tuzla village up to Karakol region of city. The wetland has been divided into four main areas. The divisions of area have been called as Ayluga, Tuzla-Glapsides, Glapsides 2 and Gülseren-Yenişehir.

There are several entry points to the wetlands areas. The northern entry is at Tuzla-Glapsides through an asphalt road and at Glapsides 2 through an asphalt road with a car park. The southern boundary has two approach points. The Gülseren-Yenişehir entry is via developed in situ area of Famagusta city. The Ayluga area entry is via developed in situ area of Famagusta city which extends towards the agricultural area. All these entry roads are asphalt roads, which are used both by locals, military and tourists.

2.2 Legal status and rights

2.2.1 Ownership

The land ownerships within the SEPA are private and public ownership.

Private lands are two types in the area. These are pre-74 Turkish Cypriot owned title deeds and pre-74 Greek Cypriot owned title deeds. At the moment pre-74 Greek Cypriot owned lands are in use of Turkish Cypriots who has moved to North part of island from South during 1974 and Turkish settlers that immigrated to the island in 1975.

Turkish Community (TC) authorities are in the area as owners, and/or proprietors. Majority of forest lands are public “forest land” and managed by the “Forestry Department”. In addition to this, there are “hali” public lands in the area, which authority is belonging to Interior Affairs Department. Also there are military controlled areas.

In the Famagusta Wetlands SEPA, the beach front land are owned and managed by TC authorities.

There are dirt tracks and asphalt roads running within the SEPA, which are owned by the TC authorities. Some of roads have been constructed by the TC authorities after 1974.

The ownership can be analyzed through the residential breakdown of the Famagusta Wetlands SEPA of which some are semi – enclosed by the protected area and some are totally located within the SEPA.

However, after 1974 to date, the area around the Famagusta Wetlands SEPA has been re-populated by Turkish Cypriots who moved from South Cyprus and Turkish mainland immigrants and EU citizens.

2.2.2 Legal rights

The Famagusta Wetlands SEPA received official legal status as “special environmentally protected area” as an important natural resource for the northern part of Cyprus and was declared an ecologically important area by law. Especially due to the visiting of migrant bird species, the area is very important for the biodiversity of the northern part of Cyprus.

The "Wetlands Protection Regulation" prohibits the following activities within the boundaries of wetlands:

- To construct any touristic, industrial and agricultural building within 100mt distance from wetlands boundary,
- To construct any animal shelter within 100m distance from wetlands boundary
- To put animals for grazing around the wetland,
- To discharge any solid waste, soil, debris, and wastewater to the area,
- To make activities which can make noise that can have disturbance on nature,
- To fish in the area,
- To use chemical fertilizers within 100m distance from wetlands boundary,
- To hunt any animal within 500m distance from wetlands boundary,
- To afforest the surrounding area is forbidden unless a permit obtained from EPD (Environment Protection Department) and FD (Forestry Department)
- To use water from wetlands is subject a permit of WWD (Water Works Department) and EPD
- To cut cane and reeds is forbidden unless a permit obtained from EPD
- To cut other plant species is strictly forbidden

However, the TC authorities are currently under pressure from land owners, construction firms and sub sectors of the construction industry which are constructing in and around the wetlands.

2.2.3 Site Status

The Famagusta Wetlands SEPA has always been under the threat of construction activities. The recent development of Famagusta city is towards the northern part of the city. The city experienced a construction boom after the founding of Eastern Mediterranean University in the early 1980's. The university campus has been founded on a single site near to Gülseren Lake. The demand for new development came from the regularly increasing university student population and development of the university campus is a continual construction threat to SEPA. The development of university has always been along the boundaries of wetland and as a result of the university, the development of city has always been towards the wetland. All kinds businesses have been established at boundaries of wetland, which has resulted in a significant disturbance to the SEPA.

The biggest threat to wetland is the development of Famagusta city. There are multi storey buildings which have been built on the dry wetland bed. Besides the development of university around the boundary, the industrial zone and Central Hospital of city have been built along the boundary of SEPA.

- Tuzla-Glapsides Region

The status of this region is poor and a big portion of its boundary is covered with buildings. The high elevated areas opened for construction by local authorities and there is a "Go-Carting Area" built at the northern boundary of region. This business is operational throughout the year. The area has been divided into two by the new road built after new City Central Hospital. Also a supermarket is located at southern boundary of SEPA.

- Glapsides 2 Region

The status of this region varies . In parallel to poor status, there are also well preserved parts.

The area is bounded by the sea to the north and by Gülseren Lake in the south. At the northern and north-eastern part there are lagoons. The biggest part of wetland is falling inside of the military controlled area. At the northern part of region there is a large asphalt covered car park and beach restaurant of Glapsides Public Beach. This beach is the most crowded beach of Famagusta and is very busy during the summer period both day and night. Both the car park and restaurant have been built within the SEPA. In parallel to the heavy

use of the beach, the public also fish in the lagoon. The interviewed fishing people has informed that, they have observed baby turtles in the lagoon in past.

The south-western part of SEPA is an residential area with high multi storey buildings while south-eastern part is a military camp.

- Gülseren Region

The status of region is good.

The western boundary of region of SEPA is a residential area with high multi storey buildings while south-eastern part is the military camp. The Gülseren Lake is well known due to the visit of many flamingos.

- Ayluga Region

The Ayluga region of SEPA extends towards the remote end of city and its status is good compared to other parts of the SEPA. The region is divided into two by the new Nicosia - Famagusta main road. The status of southern part is better than northern part. Regarding the construction threat, it is in better condition than other regions. But the Famagusta city has started spreading towards the SEPA from the Sakarya, Baykal and Çanakkale areas.

On the other hand the agriculture and animal husbandry going on its boundaries is both a potential threat and attraction to some species SEPA. The farms are discharging there and the use of fertilisers is uncontrolled. Even though there is no consensus between government departments, local authorities and stakeholders on how to protect the SEPA, there are risky activities towards nature ongoing in the area. The use of fertilisers and pesticides in agriculture is uncontrolled and causing severe damage to flora.

Additionally, there are forest areas in the Ayluga region of Famagusta Wetlands SEPA, which are not allowed to be used for animal husbandry or similar agricultural activities and therefore have resulted in well preserved natural habitats.

2.3 Management and infrastructure

2.3.1 Organizations

The Famagusta Wetlands SEPA falls under the legal jurisdiction of the Famagusta Municipality. The SEPA falls in the physical boundaries of the Tuzla and Karakol regions of Famagusta.

The Municipality is responsible for all civil and public matters for the area. Garbage collection, pest control, environment cleaning, water supply, issuing building permits, etc are some of the main areas of responsibilities of municipality. In addition to the mayor, for each region, mukhtar's have been elected. Their main responsibility is to relay public issues to the relevant authorities.

With regards to nature conservation within the SEPA, although there are at present enough laws, legislations, regulations and ordinances in place, there is a very complicated and confusing situation related to the sharing of responsibilities. This confusion has led to a lack of implementation of laws and legislations which creates a loose nature conservation management in the area by the local authorities. In parallel to the above, the responsible authorities cannot fully work towards proper nature conservation or protection due to lack of infrastructure, equipment, resources and qualified personnel. This fact has resulted in some illegal activities and uncontrolled development in the area.

In parallel to local authorities, there are different active responsible organisations in the area. The forest area of SEPA comes under the jurisdiction of the Forestry Department of "Ministry of Agriculture and Natural Resources". Foresters have got a patrol network within the area, in

liaison with fire fighters, for management purposes. Issues related to the environment and nature, in general, is the responsibility of the Environment Protection Department.

Additionally, there are NGOs operating in the SEPA. Below is a list of the organisations, which are most active in the region.

MASDER

This association has been founded for promotion of Community Based Tourism in the walled city. The members of this association are business person of Famagusta. They are really devoted their time and effort for promotion and protection of cultural, historical and natural heritage of region. The association is working on various donor projects concerning various environmental issues. All members of the association work on voluntary basis.

MAGEM

This association has been set up to promote the cultural activities in the city. The association is working on EU donor projects concerning various cultural issues.

YEMAD

This association has been set up to promote the nature protection in the city.

EMU SPORTS CLUBS

These clubs are university's initiative for promoting social relationships of students via sport activities.

EMU SAILING CLUB

This club is university's initiative for promoting social relationships of students via marine sports activities.

2.3.2 Facilities

The Famagusta city is a well developed and crowded city. The Famagusta Wetlands SEPA is located in the middle of well developed and crowded residential areas of city.

The road network of the SEPA is mixture of asphalt and dirt roads. The majority of roads are asphalt whose condition in general, is good. The main roads have recently been resurfaced. But the condition of dirt roads located in the agricultural areas is poor. During the wet winter season, travel along these roads becomes difficult. There is no regular maintenance on these routes.

Residential building development has been in and adjacent to the boundaries of SEPA. The Central Hospital, the Industrial Region and university campus are sites around the SEPA.

All the SEPA areas are equipped with power supply, telephone network and water supply network to each house. The farms located at the west part of Ayluga region are not connected to power and drinking water supplies. But, like in all other areas of northern part of Cyprus, drainage system of residential buildings is septic tanks. After septic tank, the waste water is diverted to a drainage well system. This system pollutes the underground water reservoir. Recently, some areas of the city have been connected to a central sewage system.

In addition to a not very environmentally friendly drainage system, there is no waste management similar every other area of northern part of Cyprus. Although municipality is collecting rubbish from each region of the SEPA, there is scattered rubbish around the wetland.

There are not any specific visitor's information centre which provides information about the area. The existing tourism information centres are also aware of the SEPA. The SEPA is surrounded by very important historical sites which attract large numbers of tourists.

Famagusta city has several sports fields for public use. These sports fields are run by local sport clubs or private companies. Football is the main sport for the youth of the city. But there are many other sports facilities scattered throughout the city.

Additionally, there are several cultural and art centres in the vicinity of the SEPA. These are used by both males and females of the population of the city. This contributes to the social life of inhabitants and students of the city. Famagusta has many mosques for religious services and also there is an active church for the Christian inhabitants of the city.

The founding of the Eastern Mediterranean University at Famagusta has been a major attraction for investment, to the inhabitants of city. After the foundation of university, several private dormitories were built. In parallel to dormitories, number of restaurants, cafés, pizza houses and kebab houses of the city has increased. Also, after an increase in demand by university students, markets and other personal need shops have increased their capacity.

Famagusta Municipality has its own public transport service within the city in parallel to Universities student transport. Also there is public transport to Kyrenia and Nicosia provided by private companies.

Inhabitants of city use the health services of the Central Hospital, private hospitals and private clinics.

2.4 Climate

In general, Cyprus experiences mild wet winters and dry hot summers. The island has warm and rather dry Mediterranean climate with rainfall mainly between November and March. Hot, dry summers from mid-May to mid-September and rainy, rather changeable winters, from November to mid-March are separated by very short autumn and spring seasons. Variations in temperature and rainfall are governed by altitude and, to a lesser extent, distance from the coast. The average rainfall in winter, from December to February being about 60% of the average annual total precipitation, for the island as a whole is 500 mm.

In summer the island is mainly under the influence of a shallow trough of low pressure extending from the great continental depression centred over southwest Asia. It is a season of high temperatures with almost cloudless skies. In winter Cyprus is near the track of fairly frequent small depressions which cross the Mediterranean Sea from west to east between the continental anticyclone of Eurasia and the generally low pressure belt of North Africa. These depressions give periods of disturbed weather usually lasting for a day or so and produce most of the annual precipitation.

Due to coastal areas in the Famagusta Wetlands SEPA, the climate is cooler and moister than the rest of the island. Area receives heavier annual rainfall. Variability in annual rainfall is characteristic for the island, however, and droughts are frequent and sometimes severe. Statistical analysis of rainfall in Cyprus reveals a decreasing trend of rainfall amounts in the last 30 years. Rainfall in the warmer months contributes little or nothing to water resources and agriculture.

Summer temperatures are high in the lowlands, even near the sea. But in Famagusta Wetlands SEPA the mean daily temperature in July and August ranges between 29 °C, while the average maximum temperature for these months ranges between 36 °C and 27 °C respectively in other areas of island.

The amount of sunshine of the island enhances the tourism industry. During the four summer months, there is an average of eleven and half hours of sunshine each day, and in the cloudiest winter months there is an average of five and half hours per day. Winters are mild with a mean January temperature of 10 °C on the lowlands and 3 °C on the higher parts of the area and with an average minimum temperature of 5 °C and 0 °C respectively.

Relative humidity of the air in Famagusta Wetlands SEPA is on average between 60% and 80% in winter and between 40% and 60% in summer with even lower values around midday. Fog is infrequent and visibility is generally very good. Sunshine is abundant during the whole year and particularly from April to September when the average duration of bright sunshine exceeds 11 hours per day.

Winds are generally light to moderate and variable in direction. But dominant wind in Famagusta SEPA is mostly from north-east towards land. Strong winds may occur sometimes, but gales are infrequent over Famagusta Wetlands SEPA and are mainly confined to exposed coastal areas.

2.5. Geology, land forms, soils and substrates

2.5.1 Geology and land forms

The Mesaoria plain ("the land between the mountains"), an alluvial valley, extends between the Troodos and Kyrenia mountain ranges. It is the largest section of lowland on the island, covering approximately one-third of the surface area, and measuring about 1200 square miles. The altitude ranges from 0 to 300 meters. Within this broad east - west belt are nearly horizontal sediments of Pliocene to recent age. These consist of marl, calcarenites, calcareous sandstones and conglomerates interspersed with finer sediments. These coarser sediments form the only noteworthy aquifer at the western part of this particular region. Other significant alluvial plains on Cyprus are the Ammochostos, Larnaka, and Akrotiri. The latter two comprise salt lakes that are a crucial habitat for migratory birds.

2.6 Hydrology

It is important to realize that the hydrologic boundary of a wetland is different from the hydrologic boundary of the watershed that contains it. The wetland is that locus of points in which the water balance produces enough saturation to maintain substrate and biota that are characteristic of wetlands. In contrast, the watershed that contains the wetland typically includes upland areas that share a common drainage pathway with the wetland. The wetland boundary might change over time as a complex function of factors that control the balance of terms in the water budget for the entire watershed. Climate change would be the most basic natural cause of change in the boundary of a wetland, but other factors—for example, sedimentation in channels and land management practices—can alter hydrology and change the size of a wetland.

Typical of Famagusta wetland, drainage ditches, dams, and channel modifications might alter the hydrology to the extent that the conditions that are necessary to sustain wetland vegetation or soils no longer exist. The opposite also can occur. For example, natural or anthropogenic modifications can create wetland hydrology on sites where the soils cannot be classified as hydric. In some cases, evidence from soils and vegetation is so unclear that a direct evaluation of hydrology is necessary.

2.6.1 Rivers

Most rivers originate in the Troodos area. The seasonal distribution of surface runoff follows the seasonal distribution of precipitation, with minimum values during the summer months and maximum values during the winter months. As a result of the Eastern Mediterranean climate with long hot summers and a low mean annual precipitation, there are no rivers with perennial flow along their entire length. Most rivers flow 3 to 4 months a year and are dry during the rest of the year. Only parts of some rivers upstream in the Troodos areas have a continuous flow (rivers of Xeros, Diarizos, Kargotis, Marathasa, Kouris and Germasogeia). Most rivers have a rather steep slope except for the rivers in the lowland areas along the southern coast. Most part of the rivers is, however, at mid-altitude.

Famagusta wetland system is primarily fed by Kanlı River and Çakıllı River. Çakıllı River is one of the sub-sheds of Kanlı River. Kanlı River, originates from the central part of the island, passes through Nicosia (Lefkose), passes the Mesaoria (Meserya) plain from one end to the other and discharges into the Farmagusta Gulf. According to "Draft Water Resource Management Study" the catchment area and annual surface runoff figures for these streams are as follows (Table 1):

Table 1. Characteristics of River Systems (vicinity of Famagusta Wetland)

Catchment Name	Catchment area (km2)	Annual Average Surface Runoff (hm3)
Kanlı (Pedaios)	886.9	11.44
Çakıllı (Yialias)	586.4	5.06

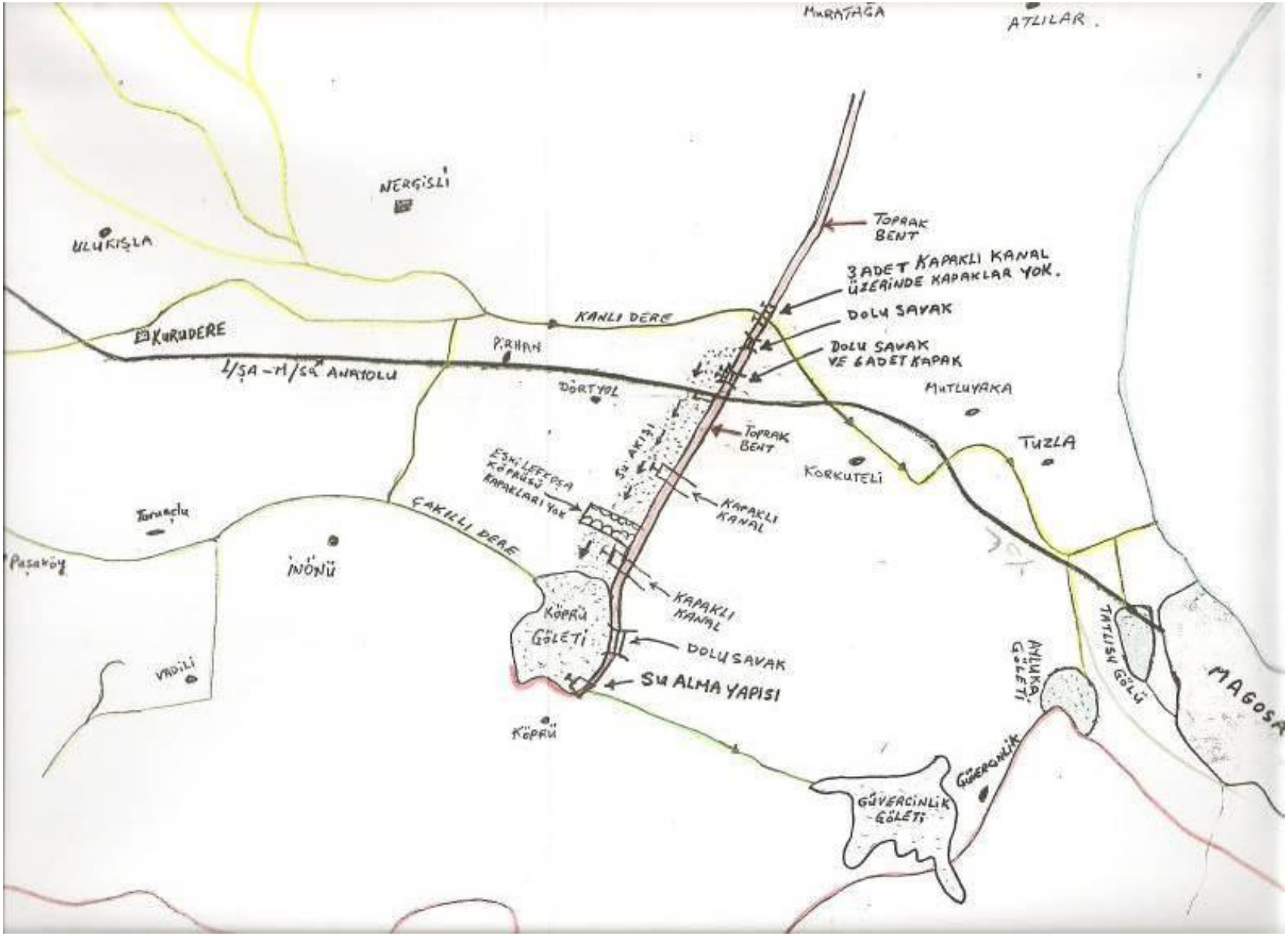
The river network flowing into the Famagusta wetlands operates as per the flow diagram provided in Figure 1. The natural river conveyance and man-made storage/infrastructure facilities play key role to allow surface water inflow to the Famagusta Wetland system. The primary components can be summarized as follows:

- Treated waters from the Gunyeli Wastewater Treatment Plant plays a key role in feeding Kurudere/Kanlidere river system, which is one of the two river systems feeding surface water into the Famagusta Wetlands. This river system is then diverted to Kopru Lake, using a gated levee system (to build required head for flow to the South) and a channel system (to allow effective conveyance along the levee system).
- Surface waters stored in Akhna reservoir also reaches to Kopru Lake, but unlike Gunyeli, which is a continous operation, Akhna reservoir system releases flood waters to downstream, which is then conveyed along Cakilli river system, the second river system in the vicinity of Famagusta Wetlands, into Kopru Lake.
- As such Kopru Lake is the main storage facility, but has been informed to store polluted water, which might result in significant health and environmental problems. Because this storage is mainly used for irrigation purposes.
- The spillway structure is typically controlled to minimize release of stored water from Kopru Lake, but as of June 2010 spillway Gates were operated in an uncontrolled manner and excessive surface water flooded the area in between Kopru Lake and Guvercinlik Lake. As such it is very critical to have a systematic control feature in-place to avoid uncontrolled surface waters flood the area, which will result in significant economic and environmental losses.
- There used to be a channel connection between Guvercinlik Lake and Ayluga Lake, which is not active any longer.
- Moving closer into the Famagusta wetlands is the Freshwater Lake and Ayluga Lake sytems in place. As shown in Figure 4.8, the two lake systems are connected via Weir and Pump combination. Since Ayluga Lake receives waters mainly from Freshwater Lake, the positive flow direction is typically from Freshwater Lake to Ayluga Lake. As such surface waters are first conveyed as gravity flow through the weir system. Once the water surface elevation is balanced between the two lake systems, gate structures

are closed and additional water is pumped from Freshwater Lake into Ayluga Lake. This transfer of surface water is mainly performed to minimize storage in the Freshwater Lake system, which is believed to result in higher losses through evaporation and leakage into the aquifer.

- Salt Marshes to the North-east of Freshwater Lake are fed by sewater intrusion and rainfall in the area. Due to the recent infrastucture developments, sustainability of this important inland water is at risk.

Figure 1. River Network in the vicinity of Famagusta Wetlands



2.6.2 Lakes

As a result of the dry Mediterranean climate, there are only 5 natural lakes which are brackish or salt. The other water bodies are created by human as a result of damming of a river or the creation of storage basins. All the lakes in Cyprus can be characterized as dynamic systems. The natural salt and brackish lakes dry up regularly, but not every year. Both the salt and brackish lakes contain typical species for these conditions. The amount of water in the reservoirs and storage basins is depending on the rainfall and use. The reservoirs are also mainly filled by the inflow of water from rivers. During winter they fill up but in summer most of the water is used and the water level declines. Consequently, the water level and size of these lakes is variable. As all reservoirs and storage basins are structured with the objective to provide water for drinking or irrigation, all these lakes have the possibility to dry out, which they often do in reality.

The major lake systems are documented in Table 2.

Table 2 Lake Systems (Vicinity of Famagusta Wetland)

NO	Name	Capacity	Available Storage (January 2010)	Percent Full	Available Storage (March 2010)	Percent Full
1	YILMAZKÖY POLATDERE	517,167	431,164	83.3	517,167	100.0
2	GEÇİTKÖY DAĞDERE	1,820,150	982,820	53.9	1,820,150	100.0
3	ARAPKÖY UZUNDERE	444,150	310,905	70.0	444,150	100.0
4	ARAPKÖY AYANİDERE	608,881	323,811	53.1	608,881	100.0
5	BEŞPARMAK ALAGADİ ÇİFTLİKDERE	774,575	321,611	41.5	774,575	100.0
6	HAMİTKÖY BAŞTANLIKDERE	529,125	386,840	73.1	529,125	100.0
7	DEĞİRMENLİK ÇATALDERE	296,814	296,814	100.0	296,814	100.0
8	SERDARLI AĞILLIDERE	391,880	112,277	28.6	261,527	66.7
9	GEÇİTKALE EĞRİDERE	1,360,510	229,409	16.8	476,010	34.9
10	ERGAZİ SAYADERE	405,025	113,495	28.5	136,097	33.6
11	MERSİNLİK AZGANLIDERE	1,145,065	309,661	27.0	433,004	37.8
12	DAĞYOLU ÜÇPARMAKDERE	392,250	376,212	95.9	392,250	100.0

NO	Name	Capacity	Available Storage (January 2010)	Percent Full	Available Storage (March 2010)	Percent Full
13	GEMİKONAĞI MADENDERE	4,121,205	1,102,778	38.4	4,121,205	100.0
14	GÖNYELİ	453,857	388,804	85.6	453,857	100.0
15	KANLIKÖY	730,294	461,538	63.1	730,294	100.0
16	HASPOLAT	117,390	59,582	50.7	117,390	100.0
17	GÖNENDERE	938,666	519,877	55.3	802,920	85.5
18	AKDENİZ	1,468,157	1,468,157	100.0	1,468,157	100.0
	TOTAL	**16,515,161**	**8,195,755**	**49.63**	**14,383,573**	**87.1**

2.6.3 Groundwater

Groundwater resources in Cyprus are overexploited by about forty percent of sustainable extraction. During the last 10 - 15 years many of the aquifer's water balance elements have been permanently altered. Most of the aquifers in the Island are phreatic aquifers developed in river or coastal alluvial deposits. These are the biggest and the most dynamic aquifers mainly replenished from river flows and rainfall. During the last decade almost all aquifers, exhibit depleting trends. Some of the coastal aquifers show water levels below sea level. This is the result from frequent and long lasting droughts over the last decades.

Droughts have reduced the direct and indirect groundwater recharge. The problem of reduced recharge to the aquifers has been exacerbated by the construction of a great number of dams on the major rivers of the country, which before were recharging the downstream aquifers. The dam construction resulted to great reductions and in many cases almost complete elimination of the natural riverbed recharge of the aquifers downstream of these dams. At the same time farmers, in their effort to maintain agricultural production levels, have continued extracting the same quantities of groundwater and in most cases have even greatly increased the extraction. All these adverse conditions resulted in saline water intrusion and hence quality deterioration of coastal aquifers and the depletion of inland aquifers.

The overpumping of the coastal aquifers and the fall of the groundwater level below a critical level, lead to seawater intrusion. In order to rehabilitate these aquifers and restore their good condition in terms of quantity and quality, a lot of years of very careful management are required. During this period we will be expected to decrease the pumping and recharge the aquifer with good quantity water in order to enrich the aquifer and remove the saline water. It is important to note that in order to clean an aquifer form seawater, much more years are needed than to just replenish the aquifer. There are many examples of overpumping and seawater intrusion in coastal aquifers. Typical ones are; the aquifers of Morfou, Kokkinohoria, Kiti-Pervolia, and Akrotiri.

Despite of the measures taken through use of reservoir systems, water was still not enough to satisfy the increasing water demand, while the depletion of water resources became

more evident. Due to the limited supply of surface runoff, groundwater has traditionally provided the resource needed for domestic use and irrigation. Throughout the years, the groundwater resources of the island have been heavily overpumped, especially during periods of drought. It is estimated that groundwater resources are overexploited by about 40% of the sustainable extraction level.

The existing conditions have resulted in saline water intrusion and consequent quality deterioration in coastal aquifers and depletion of inland aquifers. Seawater intrusion in aquifers has also resulted in spoiling valuable underground water storage room. Furthermore, intensive agriculture and excessive use of fertilizers have resulted in nitrate pollution of many aquifers. Similar nitrate pollution problems appear in aquifers in inhabited areas because of direct sewage disposal in adsorption pits.

2.7 Habitats, vegetation and communities

SALTMARSHES

A salt marsh is an environment in the upper coastal intertidal zone between land and salty or brackish water, is dominated by dense stands of halophytic (salt-tolerant) plants such as herbs, grasses, or low shrubs. These plants are terrestrial in origin and are essential to the stability of the salt marsh in trapping and binding sediments.

The vegetation of a salt marsh is differentiated into levels according to the plants' individual tolerance of salinity and water table levels. Vegetation found at the water must be able to survive high salt concentrations, periodical submersion, and a certain amount of water movement, while plants further inland in the marsh can sometimes experience dry, low-nutrient conditions (http://en.wikipedia.org/wiki/Salt_marsh).

1310 Salicornia and other annuals colonizing mud and sand

Formations composed mostly or predominantly of annuals, in particular *Chenopodiaceae* of the genus *Salicornia* or grasses, colonising periodically inundated muds and sands of marine or interior salt marshes. In Cyprus, the communities of the habitat type 1310 are of two types: the *Thero-Salicornietea* communities (*Salicornia europaea* and *Halopeplis amplexicaulis*) which develop at the lower parts of salt basins and the *Saginetea maritimi* (annual species dominated by *Spergularia* in combination with other species) communities which develop at higher parts of salt basins and also at sandy or muddy depressions of some coastal and inland sites. The communities of *Thero-Salicornietea* are rather rarer. The habitat occurs both in inland and coastal sites in Cyprus. It usually forms small patches, sometimes in mosaics with habitat 1420. The habitat suffered degradation in the past and is still threatened by various activities (http://cdr.eionet.europa.eu/cy/eu/art17/envruy_3a/habitattype-1310.xml/manage_document).

Typical species are: *Salicornia europaea, Halopeplis amplexicaulis*, *Sphenopus divaricatus, Hordeum marinum, Parapholis incurve, Mesembryanthemum nodiflorum, Polygonum maritimum, Spergularia marina, Spergularia bocconii, Plantago maritimus, Crypsis factorovskyi*

Rare species*: Crypsis factorowskii* is rare and vulnerable species of Cyprus (Tsintides et al. 2007). Species is growing on the bare bottom of freshwater lake in the autumn.

Halopeplis amplexicaulis is very rare species of Northern Cyprus (Viney 1944) and was found only on few small patches

It was recorded also *Plantago maritimus* is rather rare species (Viney 1944) found on few patches in our area.

1410 Mediterranean salt meadows (*Juncetalia maritimi*)

The salt pastures of habitat 1410 usually form small patches, sometimes in mosaics with habitat 1420. Most of the typical species are widespread and locally abundant in the

wetlands of Cyprus (http://cdr.eionet.europa.eu/cy/eu/art17/envruy_3a/habitattype-1410.xml/manage_document) .

Typical species are: *Juncus heldreichianus, Juncus acutus, Juncus rigidus*

1420 Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*)

Perennial vegetation of marine saline muds mainly composed of scrub, essentially with a Mediterranean-Atlantic distribution and belonging to the *Sarcocornetea fruticosi* class (EC 2007). .The halophytic shrubs of habitat 1420 occur in the area. They usually form patches, mostly in mosaics with habitats 1310. The habitat suffered degradation in the past and is still threatened by various activities.

Typical species are: *Salicornia macrostachya*, *Salicornia fruticosa (syn. Sarcocornia fruticosa), Halocnemum strobilaceum, Limonium mayerii, Inula crithmoides*

1430 Halo-nitrophilous scrubs (*Pegano-Salsoletea*)

Halo-nitrophilous scrubs (matorrals) belonging to *the Pegano-Salsoletea* class, typical of dry soils under arid climates, sometimes including taller, denser bushes (EC 2007).

Typical species are: *Halimone portulacoides*, *Lycium ferocissimum, Atriplex halimus,*

Atriplex portulacoides

FRESHWATER HABITATS

***3170 Mediterranean temporary ponds**

Very shallow temporary ponds (a few centimetres deep) which exist only in winter or late spring, with a flora mainly composed of Mediterranean therophytic and geophytic species (EC 2007). This habitat is typical and very vulnerable in Famagusta freshwater lakes. If there is water, following species are growing in: *Chara sp., Ranunculus peltatus* ssp. *sphaerospermus* and *Potamogeton sp*. When the water is dropping down, other species of bare bottom growth are starting to appear in late summer and in autumn. There is clear zonation of the vegetation, depending on gradual drying off the lake during the year. Zones with *Bolboschoenus maritimus, Juncus* sp. and reed (*Phragmites communis*) can be found on the edges of the lake.

Typical species are:

Centaurium spicatum , Damasonium alisma, Juncus bufonius, Lythrum hyssopifolia, Lythrum tribracteatum, Ranunculus peltatus, Coronopus squamatus, Beta vulgaris, Melilotus messanensis, Plantago maritima, Parapholis incurve, Frankenia pulverulenta, Tamarisk tetragina

Rare species*:*

Ranunculus peltatus ssp. sphaerospermus is a small aquatic plant species with white flowers. It is flowering in April in the Freshwater Lake. It is probably the only locality in Northern Cyprus. *Ranunculus peltatus* communities develop in waters with low levels of conductivity/salinity, alkalinity and concentration of nutrients (Lumbreras et al. 2009).

This habitat is very threatened by eutrophication, discharge of construction waste and building elevated places which make barrier for the water depending on gradual drying off the lake during the year.

OTHER Annex I HABITATS

2110 Embryonic shifting dunes

Embryonic shifting dunes are formations of the coast representing the first stages of dune construction constituted by ripples or raised sand surfaces of the upper beach or by a seaward fringe at the foot of the tall dunes (EC 2007).

9290 Cupressus forests (*Acero-Cupression*)

This habitat is montane forests dominated by *Cupressus sempervirens* (EC 2007). It is only marginal habitat for Famagusta SEPA.

EUNIS HABITATS

G5.1 Lines of trees - plantations of Eucalyptus gomocephala

C3.2 Water-fringing reedbeds and tall helophytes other than canes - water-fringing stands of tall vegetation by lakes (including brackish lakes), rivers and brooks, usually species poor and often dominated by one species - reed growths of *Phragmites australis* and *Bolboschoenus maritimus* growth.

J2 Low density buildings, J4.2 Road networks

J6 Waste deposits – eg. on Famagusta lakes they are overgrowing by ruderal and dry vegetation.

Table 3. Description of habitats – Code Name: Included in Annex I of Directive 92/43/EEC. Importance: HD I - included in Annex I, HD I* - priority habitat of Annex I. No localities: States the number of different localities where each habitat type occurred. % of site: the percentage of the site covered by the habitat. For marine habitats it is % of marine area of SEPA.

No	Code Name	Importance	No localities	Area in ha	% of site
1	1150 Coastal lagoons	HD I*	7	12.17	2.7
2	1310 Salicornia and other annuals colonizing mud and sand	HD I	23	54.53	12.2
3	1410 Mediterranean salt meadows (Juncetalia maritimi)	HD I	19	12.55	2.8
4	1420 Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)	HD I	14	47.54	10.7
5	1430 Halo-nitrophilous scrubs (Pegano-Salsoletea)	HD I	3	2.11	0.5
6	2110 Embryonic shifting dunes	HD I	6	3.05	0.7
7	3170 Mediterranean temporary ponds	HD I*	7	66.06	14.8
8	9290 Cupressus forests (Acero-Cupression)	HD I	6	3.17	0.7

Total area Annex I habitats is 201.18 ha, which cover 45.1% of SEPA.

2.8 Flora

Endemic plant species within the Famagusta Fresh Lake SEPA:

Anthemis tricolor: It is endemic to Cyprus. Its' habitat is dry, rocky or stony ground, sometimes on chalk or limestone. Flowering period is February to March (Meikle, 1985). A few number of individuals has been recorded (during this project) from three different locations around the lake.

Centaurea calcitrapa ssp. ***angusticeps***: It is considered endemic subspecies to Cyprus by Viney (Viney, 1994). It can be seen in open fields, its flowering period is June-July (Viney, 1994). A few number of individuals has been recorded (during this project) from two different locations around the lake.

Helianthemum obtusifolium: It is endemic to Cyprus. It usually occurs on rocky ground and in open garrique habitat. Flowering period is February – May.). A few number of individuals has been recorded (during this project) from four different locations around the lake.

Onobrychis venosa: It is endemic to Cyprus, common in dry, stony or sandy ground. Flowering period is February – May. It was commonly distributed around the lake in different locations.

Onopordum cyprium: It is endemic to Cyprus, common on roadsides. Flowering period is April-July. . It was commonly distributed around the lake in different locations.

Important plant species specific for Famagusta Fresh Lake:

Ranunculus peltatus ssp. ***sphaerospermus***: *Ranunculus peltatus* is a small aquatic plant species*. Ranunculus peltatus* ssp*. sphaerospermus* is a aquatic subspecies with stiff submerged leaves, no floating ones, it has larger flowers when we compare it with *Ranunculus peltatus.* It is abundant after wet winters within the lake.

Crypsis factorovskyi: It has been classified as vulnerable plant species of Cyprus (Tsintides et al. 2007). It is annual grass species occupying bare bottom of salt lakes and salt marshes, flowering in autumn. It is the only known population of Northern Cyprus.

Table 4. Description of important plant species

No	Name	Importance	Endemism	No of localities	Population	Habitat type	Specific manag.
1	*Anthemis tricolor* *(no local name)*	NI	B	-	rare	E2.6, I1, J2, J4	-
2	*Centaurea calcitrapa ssp. angusticeps* *(no local name)*	NI	B	-	rare	E2.6, I1, J2, J4	
3	*Helianthemum obtusifolium* (Kıbrıs Güneşgülü)	NI	B	-	rare	E2.6, I1, J2, J4	
4	*Onobrychis venosa* (Damarlı Korunga)	NI	B	-	common	E2.6, I1, J2, J4	
12	*Onopordum cyprium* (Eşek Dikeni)	NI	B	82	common	E2.6, I1, J2, J4	

Name: The scientific name of the species (in brackets in Turkish if there is also a local name). Importance: HD II - included in Annex II, HD II* - priority species of Annex II, HD IV - included in Annex IV, HD V - included in Annex V, NI – national important species
Endemism: A: Local endemic (North Cyprus endemic), B: Endemic to Cyprus, C: Endemic to Eastern Mediterranean
No localities: Set number of localities with the species occurrence.
Population: State the size of the population and assess relative abundance.
Habitat type: State the codes of habitat types where the species occurs.
Specific management: requirements which differ from regular management of habitat.

2.9 Fauna

From the list of Annex I species found in the Birds Directive, Famagusta SEPA is principally an important bird breeding, wintering and stopping over location in a Mediterranean and European context. Annex I species which have bred at this site include Glossy Ibis (*Plegadis falcinellus*), Kentish Plover (*Charadrius alexandrines*). It is the only site in Cyprus where Glossy Ibis have bred. In addition to these species there is relatively large Cattle Egret (*Bulbulcus ibis*) nesting rookery. Although this species is not an Annex listed species it could be considered nationally important as it is the only site in Cyprus where this species is known to breed. Other Annex I species which either visit or overwinter this SEPA in large numbers include Black-winged Stilt (*Himantopus himantopus*), Golden Plover (*Pluvialis apricaria*), Greater Flamingo (*Phoenicopterus ruber*) and Spur-winged Plover (*Hoplopterus* (*Vanellus*) *spinosus*). For a complete list of Birds Directive Annex I species see Table 5). Also within the SEPA are a number of amphibians and reptiles, these include five important endemic subspecies of reptile present in the SEPA for details see Table 6.

Table 5. Contains a list of Annex I species from the EC Birds Directive (79/409/EEC) previously recorded within the Famagusta SEPA (Kuskor reports 1998-2001, pers obs). RB = Resident Breeder, PM = Passage Migrant, MB = Migrant Breeder, OB = Occasional Breeder, WV = Winter Visitor, FB = Former Breeder. Upper case letters signify commonly occurring species where as lower case letters indicate rarely occurring species.

No	Name	Zoological Group	EU	Status	Specific Management
1	*Larus audounii*	B	BD I	rb (SPEC-1)	
2	*Larus melanocephalus*	B	BDI		
3	*Larus minutes*	B	BDI		
4	*Vanellus spinosus*	B	BD I	mb	Protect breeding areas
5	*Grus grus*	B	BD I	PM (SPEC-3)	
6	*Himantopus himantopus*	B	BD I	mb	Protect breeding areas
7	*Plegadis falcinellus*	B	BD I	PM	
8	*Pluvialis apricaria*	B	BD I	WV	
9	*Egretta alba*	B	BD I	pm, wv	
10	*Alcedo atthis*	B	BD I	pm, wv (SPEC-3)	
11	*Lanius minor*	B	BD I	PM (SPEC-2)	
12	*Egretta garzetta*	B	BD I	PM, wv	
13	*Circus aeruginosus*	B	BD I	PM, wv	
14	*Nycticorax nycticorax*	B	BD I	PM	
15	*Ardea purpurea*	B	BD I	PM	
16	*Lanius collurio*	B	BD I	PM, OB (SPEC-3)	
17	*Coracias garrulus*	B	BD I	PM, MB (SPEC-2)	
18	*Calandrella brachydactyla*	B	BD I	PM, MB (SPEC-3)	
19	*Larus genei*	B	BD I	PM, wv	
20	*Ardeola ralloides*	B	BD I	PM	
21	*Burhinus oedicnemus*	B	BD I	PM, WV, RB (SPEC-3)	Protect Breeding Habitats
22	*Pelecanus onocrotalus*	B	BD I	pm	
23	*Lullula arborea*	B	BD I	WV, RB ?? (SPEC-2)	
24	*Melanocorypha calandra*	B	BD I	RB, pm (SPEC-3)	
25	*Pelecanus onocrotalus*	B	BD I	pm (SPEC-3)	
26	*Philomachus pugnax*	B	BD I	PM (SPEC-4)	

No	Name	Zoologic	EU	Status	Specific Management
27	*Phoenicopterus ruber*	B	BD I	PM (SPEC-3)	
28	*Calandrella brachydactyla*	B	BD I	PM, MB (SPEC-3)	
29	*Charadrius alexandrinus*	B	BD I	RB, MB (SPEC-3)	
30	*Chlidonias hybridus*	B	BD I	pm (SPEC-3)	
31	*Glareola pratincola*	B	BD I	PM, FB (SPEC-3)	
32	*Recurvirostra avosetta*	B	BD I	PM, wv (SPEC-3/4)	
33	*Sterna sandvicensis*	B	BD I	wv, pm (SPEC-2)	
34	*Tringa glareola*	B	BD I	PM (SPEC-3)	

Table 6. Contains a list of faunal species found inhabiting the Famagusta ESS= Endemic Subspecies

No	Name	Zoological group	Importance	No localities	Population
1	*Telecopus fallax cypriaca*	R	ESS		Common
2	*Laudakia stellio cypriaca*	R	ESS		Common
3	*Ophisops elegans schlueteri*	R	ESS		Common
4	*Dolicophis jugularis cypriacus*	R	ESS		Common
5	*Macrovipera lebetina lebetina*	R	ESS		Common

2.10 Human use inside and outside the site

2.10.1 Nature conservation

The nature conservation activities have been limited to environment cleaning and to improve forest areas by plantation of trees like in all SEPA's of northern part of Cyprus.

Nature conservation activities are not enough and well organised all around northern part of Cyprus. Especially flora conservation in the protected area is very weak. The use of pesticides and fertilisers in agricultural areas are not controlled and side effects of this combined with drought is obvious.

The nature conservation activities in the Famagusta Wetlands SEPA are nearly none except some bird survey activity taking place in the area.

2.10.2 Agriculture

Agriculture and animal grazing are the least important economical activities in Famagusta Wetlands SEPA. The agriculture income is from water-based agriculture, fruit trees planted in their own fields on an annual basis in the remote areas of city. Although, due to high water

consumption in the area, there is a decrease in the water based agricultural activities, still Famagusta-Maraş Area is one of the most productive water-based agricultural areas of Northern part of Cyprus.

2.10.4 Recreation and tourism

The Famagusta Wetlands SEPA has significant development in tourism. There are several recreation and tourism facilities in the area and at the vicinity of SEPA.

The infrastructure for tourism well developed in the SEPA. But existing recreation has no nature based character at the moment. Although, city is receiving tourists, the Famagusta Wetlands SEPA has no enough nature based tourism visitors.

Most important recreational areas of SEPA are Glapsides beach, restaurants, bars, sports halls which are heavily used by students of university and public.

At the moment, there are only a few “nature lovers” who would want to explore the area on a daily basis. This could be for walks in the nature, small scale hiking, and bird watching. Even though there is no any organised nature tour in the area, there are nature enthusiast visitors to area, especially to Glapsides 2 and Gülseren. These activities have no significant negative effect on nature.

2.10.5 Hunting and fishing

Hunting, during the permitted season, is forbidden within the protected area; however, it is said that the locals do hunt during off seasons.

Additionally, some rod-fishing does take place mainly from the rocks which border the beach areas. However, there are only a small group of people, who frequent the protected area for rod-fishing. There are no professional fishing activities in the SEPA. But locals, just for fun, are involved in amateur fishing along the seashore and at lagoons.

2.10.6 Extraction

Currently there is not known extraction happening in the area.

2.10.7 Water use

Direct recharge (from rainfall) of the island’s aquifers is of the order of 270 hm³. An additional recharge of 140 hm³ corresponds to surface runoff, which infiltrates into riverbed aquifers and coastal alluvial fans. Part of this replenishment is extracted through wells and boreholes, and the remainder goes to the sea. 8 % or 40 hm³ of surface runoff is diverted for irrigation in late winter or early spring, and especially during the wet season. Where pumping exceeds recharge, a deficit of 10% or 40 hm³, is created in certain aquifers. The result of the long-term over-pumping has been the sea intrusion in certain major coastal aquifers. A brief summary of the recharge, use and deficit conditions, for each one of the hydrologic basins described previously, are documented in Table 7.

The present level of abstractions from all aquifers is estimated at 130 hm³/yr, of which 10 hm³/yr are available through artificial recharge. The average yield of abstractions for domestic water supply during the period of 1991 – 2000 was approximately 25 hm³/year, for irrigation about 102 hm3/yr and for industrial use around 2.5-3.0 hm³/yr (Fig 2). During the last years, annual abstraction for domestic water supply decreased to a level of 18-20 hm³.

Table 7. Groundwater replenishment (surface runoff and directly from rainfall) and use

Region		Groundwater Recharge (hm3)			Use by (hm3)		
No.	Name	Streams	Direct	Total	Pumping	To the Sea	Deficit (hm3)
1	Pafos	20	46	66	18	47	0
2	Tylliria	7	23	30	11	20	0
3	Morfou	42	30	72	89	11	29
4	Kyrenia	9	19	28	11	17	0
5	Karpasia	3	26	29	2	27	0
6	Mesaoria	41	47	88	28	60	0
7	S.E. Mesaoria	0	11	11	35	1	25
8	Larnaka	10	34	44	14	31	0
9	Lemesos	9	37	47	35	15	3
Total		141	273	415	243	229	57

The total recommended abstraction from all groundwater bodies is estimated to be 80 hm³/yr, This estimate is based on the water balance of each aquifer and the annual replenishment rate. During the last decade, almost all groundwater bodies with the exception of the riverbed coastal ones are being overexploited. Of the 19 groundwater bodies in Cyprus, 17 have significant abstractions, which can be considered as “over-pumping”. The total “over-pumping” is approximately 33 hm³/yr, and is encountered in all major aquifers of the island. In general, the groundwater resources in Cyprus are overexploited by 40% of their sustainable extraction.

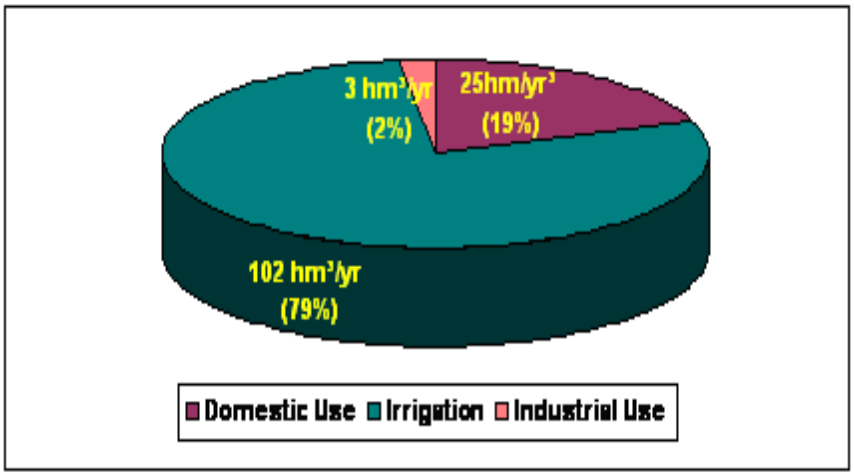


Figure 2. Groundwater abstractions per use (1991 – 2000)

2.10.9 Military activity

There is an active military camp in the east of the SEPA. The headquarters of Cyprus Turkish Army Training Unit is located at Gülseren. The biggest part of SEPA is falling in the forbidden area of camp. Ranges of camp, assault courses and several active departments are spread

in this area all along the east coastal area of SEPA. The division was located in this area prior to 1974.

2.10.10 Education, demonstration and research

The Ministry of Tourism and Environment, Nature Protection Department has carried out several researches about the SEPA's of northern part of Cyprus. As outcome of these there are several publications prepared directly related with the areas mainly depending on sea turtles conservation program, tulipa cypria conservation program and promotion of nature trail routes. But there is limited research on the wetlands.

The EMU has been carried out various economy and environment related research and study about Famagusta City. The university clubs and NGO's have been leading organisations for environment cleaning and tree planting activities in the area. Also military division has always been contributed in these kinds of activities together with the local people.

There is no nature based demonstration in the SEPA. Even though there is no demonstration, the "Unit of Environmental Studies, Cyprus Centre of European and International Affairs; Bibliographic Index on Flora, Fauna, Biodiversity and Nature Conservation in Cyprus (www.cyef.net)" shows extend of research on flora, fauna, biodiversity and nature conservation in Cyprus.

2.10.11 Other uses

There is a large concrete plant at northern boundary of SEPA. This plant causes air and environment pollution all along the road and wetland boundary. This also poses a possible pollution threat in the form of cement spillage to ground which leads pollution of underground reservoir. Unfortunately, this is occurring every day while plants are in operation.

2.11 Economic aspects and populations

The economy of Famagusta city is largely dependent on Eastern Mediterranean University. The opening of the university led to a development boom in the city. The inhabitants of the city have invested in the city according to student demand. Second economic aspect of city is tourism. The investment in tourism also developed after having active student movements in the city. The third economic aspect of city is trade because of the port.

Based on the population census in 2006, there are total 35453 (19373 male/ 16080 female) - permanent residents in Famagusta (State Planning Organisation, 2008). Famagusta is the second largest city in the northern part of Cyprus.

In addition to permanent residences of the city, there are university students and temporary residents of SEPA. The temporary residents are employees of industrial zone businesses present along the boundary of SEPA. Also employees of touristic premises present in area are also temporary residents of the area.

The EMU has a population of more than 14,000 students and more than 1,000 teaching staff who use the Famagusta city for services.

Majority of the permanent population in Famagusta Wetlands SEPA is formed from Turkish Cypriots who has moved from South to North of Cyprus in 1974 and the population who was living in the Famagusta prior to 1974. Before 1974, Famagusta city was a mixed (TC-GC) city and it was the honey pot of mass tourism of the island. After 1974, TC and Turkish immigrants moved into the area which was formerly occupied by GC. The biggest part of touristic area is still closed.

2.12 Past human land use

Famagusta - Greek ‘Ammókhostos’, Turkish ‘Gazimağusa’ - is a major port in the Turkish Cypriot-administered area of Cyprus. It lies on the east coast in a bay between Capes Greco and Eloea, east of Nicosia, and possesses the deepest harbour in Cyprus. Famagusta is a Frankish corruption of its Greek name, which means “buried in the sand,” descriptive of the silted mouth of the Pedieos River north of the town.

It was founded as Arsinoe by the Macedonian Egyptian King Ptolemy II (308–246 BC). An influx of Christian refugees fleeing the downfall of Acre (1291) in Palestine transformed it from a tiny village into one of the richest cities in Christendom. In 1372 the port was seized by Genoa and in 1489 by Venice.

2.13 Cultural heritage

Famagusta has an extremely rich cultural heritage. It is located in between ancient site Salamis and ancient walled city. The Famagusta Wetlands SEPA is in the middle of this valuable historical site.

The ancient walled Famagusta is tucked into a modern city of 35,000 people. It was the setting for Shakespeare's Othello. Some 200 buildings—reflecting Byzantine, French Gothic and Italian Renaissance architectural styles—are in a state of disrepair in the ancient walled city.

The city has cultural heritage from each historical period of Cyprus. Some very important cultural heritage is as follows;

- Venetian walls
- Saint Nicholas Cathedral
- Othello Castle
- Venetian Palace
- Saint Peter & Paul Church
- Saint George Church
- Karmeliter Church
- Nestorian Church
- Armenian Church
- Saint Symeon Church
- Saint Zoni Church
- Saint Nicholas Church
- Two entrance gates of Venetian walls (Port Gate, South Gate)
- Saint Anthony Hospital

III. Evaluation and Objectives

3.1 Ecological criteria

3.1.1 Evaluation of habitats

First step to evaluate the habitats is preparation of habitat map, which is base for other steps of evaluation. The situation in the field is that we have to deal with mosaic habitat structure within particular localities. For simplification and visualisation we analysed habitat structure and selected only dominant and subdominant habitats occurring in the particular locality for depicting in legend of the map (Annex 2).

Evaluation of habitat importance is based on the criteria which are presented in the Standard Data Form for habitats. For each habitat these criteria are: relative surface area, representativeness and conservation status (degree of conservation of structure, functions and rehabilitation potential). The values for particular habitat types are shown each table.

In order to assess habitat type importance in each locality (see polygons Annex 1), we calculated the value of Index of Habitat Importance (IHI)

IHI = C * (R + CS)

C – cover of habitat in percentage of locality area
R – representativity of habitat type (values 4 – 1)
CS – conservation status of habitat type (values 3 – 1)

Overall assessment of the area based on summary values for particular habitat types occurring on localities (polygons) - Index of Locality Importance (ILI) we used following formula:

$ILI = \sum C_i * (R_i + CS_i)$

C_i – coverage of habitat in percentage of local area
R_i – representativity of habitat type (values 4 – 1)
CS_i – conservation status of habitat type (values 3 – 1)

Maximum value is 700 and minimum 2 points. The range of values can be split into five categories of habitat importance:

2 – 140	very low
141 – 280	low
281 – 420	average
421 – 560	high
561 – 700	very high

The evaluation is shown in map Annex 3. The map is one of the most important information for delineation of zones in the SEPA.

1150* Coastal lagoons

Table 8a. Evaluation of habitat 1150* based on relative surface area (C), representativity (R) and conservation status (CS), num – numerical values for categories, IHI – Habitat importance

locName	C	R	R_num	CS	CS_num	HI
F23	80	significant	2	average or reduced	1	240
F35	10	good	3	good	2	50
F40	10	good	3	good	2	50
F46	10	good	3	good	2	50
F47	10	good	3	good	2	50
F48	10	good	3	good	2	50
F49	10	good	3	good	2	50

1310 Salicornia and other annuals colonising mud and sand

Table 8b. Evaluation of habitat 1310 based on relative surface area (C), representativity (R) and conservation status (CS), num – numerical values for categories, IHI – Habitat importance

locName	C	R	R_num	CS	CS_num	HI
F35	60	excellent	4	good	2	360
F48	60	excellent	4	good	2	360
F49	60	excellent	4	good	2	360
F46	60	excellent	4	good	2	360
F40	60	excellent	4	good	2	360
F47	60	excellent	4	good	2	360
F9	30	good	3	good	2	150
F11	30	good	3	good	2	150
F12	30	good	3	good	2	150
F13	20	good	3	average or reduced	1	80
F16	20	good	3	average or reduced	1	80
F14	20	good	3	average or reduced	1	80
F20	20	good	3	average or reduced	1	80
F19	20	good	3	average or reduced	1	80
F42	25	significant	2	average or reduced	1	75
F43	25	significant	2	average or reduced	1	75
F36	10	good	3	good	2	50
F33	10	good	3	good	2	50
F18	10	good	3	average or reduced	1	40
F7	10	good	3	average or reduced	1	40

locName	C	R	R_num	CS	CS_num	HI
F37	10	significant	2	average or reduced	1	30
F38	10	significant	2	average or reduced	1	30
F41	10	significant	2	average or reduced	1	30

1410 *Mediterranean salt meadows (Juncetalia maritimi)*

Table 8c. Evaluation of habitat 1410 based on relative surface area (C), representativity (R) and conservation status (CS), num – numerical values for categories, IHI – Habitat importance

locName	C	R	R_num	CS	CS_num	HI
F49	20	good	3	good	2	100
F35	20	good	3	good	2	100
F47	20	good	3	good	2	100
F40	20	good	3	good	2	100
F46	20	good	3	good	2	100
F48	20	good	3	good	2	100
F38	30	significant	2	average or reduced	1	90
F37	30	significant	2	average or reduced	1	90
F41	30	significant	2	average or reduced	1	90
F11	10	good	3	good	2	50
F9	10	good	3	good	2	50
F12	10	good	3	good	2	50
F18	10	good	3	average or reduced	1	40
F7	10	good	3	average or reduced	1	40
F1	10	significant	2	average or reduced	1	30
F4	10	significant	2	average or reduced	1	30
F2	10	significant	2	average or reduced	1	30
F6	10	significant	2	average or reduced	1	30
F3	10	significant	2	average or reduced	1	30
F43	5	significant	2	average or reduced	1	15
F42	5	significant	2	average or reduced	1	15

1420 Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)

Table 8d. Evaluation of habitat 1420 based on relative surface area (C), representativity (R) and conservation status (CS), num – numerical values for categories, IHI – Habitat importance

locName	C	R	R_num	CS	CS_num	HI
F18	10	good	3	average or reduced	1	40

locName	C	R	R_num	CS	CS_num	HI
F19	20	good	3	average or reduced	1	80
F20	20	good	3	average or reduced	1	80
F21	5	good	3	average or reduced	1	20
F27	5	good	3	average or reduced	1	20
F3	10	significant	2	average or reduced	1	30
F33	40	good	3	good	2	200
F36	40	good	3	good	2	200
F37	60	good	3	average or reduced	1	240
F38	60	good	3	average or reduced	1	240
F4	10	significant	2	average or reduced	1	30
F41	60	good	3	average or reduced	1	240
F42	70	significant	2	average or reduced	1	210
F43	70	significant	2	average or reduced	1	210
F6	10	significant	2	average or reduced	1	30
F7	10	good	3	average or reduced	1	40

1430 Halo-nitrophilous scrubs (Pegano-Salsoletea)

Table 8e. Evaluation of habitat 1430 based on relative surface area (C), representativity (R) and conservation status (CS), num – numerical values for categories, IHI – Habitat importance

locName	C	R	R_num	CS	CS_num	HI
F9	10	good	3	good	2	50
F12	10	good	3	good	2	50
F11	10	good	3	good	2	50

2110 Embryonic shifting dunes

Table 8f. Evaluation of habitat 2110 based on relative surface area (C), representativity (R) and conservation status (CS), num – numerical values for categories, IHI – Habitat importance

locName	C	R	R_num	CS	CS_num	HI
F35	10	non-significant	1	average or reduced	1	20
F40	10	non-significant	1	average or reduced	1	20
F46	10	non-significant	1	average or reduced	1	20
F47	10	non-significant	1	average or reduced	1	20

locName	C	R	R_num	CS	CS_num	HI
F48	10	non-significant	1	average or reduced	1	20
F49	10	non-significant	1	average or reduced	1	20

3170* Mediterranean temporary ponds

Table 8g. Evaluation of habitat 3170* based on relative surface area (C), representativity (R) and conservation status (CS), num – numerical values for categories, IHI – Habitat importance

locName	C	R	R_num	CS	CS_num	HI
F50	90	good	3	good	2	450
F5	90	good	3	good	2	450
F13	20	good	3	average or reduced	1	80
F14	20	good	3	average or reduced	1	80
F16	20	good	3	average or reduced	1	80
F19	20	good	3	average or reduced	1	80
F20	20	good	3	average or reduced	1	80

9290 Cupressus forests (Acero-Cupression)

Table 8h. Evaluation of habitat 9290 based on relative surface area (C), representativity (R) and conservation status (CS), num – numerical values for categories, IHI – Habitat importance

locName	C	R	R_num	CS	CS_num	HI
F11	10	good	3	good	2	50
F12	10	good	3	good	2	50
F4	10	excellent	4	average or reduced	1	50
F6	10	excellent	4	average or reduced	1	50
F3	10	excellent	4	average or reduced	1	50
F9	10	good	3	good	2	50

3.1.3 Evaluation of Animal Species

The evaluation of animal species incorporated detailed information found in previous studies (Kuskor reports 1998-2001, Environment Protection department Reports) and results from recent project surveys. During surveys the numbers of individuals were recorded as Individuals, Pairs or as a population range (i.e. 1-5, 6 -10).

Many animal species have been recorded within the site. These include five endemic sub species of terrestrial reptiles and 34 Bird Directive Annex I species.

By far the largest group of Annex listed animals were the bird species; this proves how important the Famagusta region is in terms of bird numbers and diversity. The total number of individuals of all Annex listed species was calculated for each polygon. These were then categorised into areas of high, medium or low importance (See Annex 4 for details). Areas with little or no information should not be considered as less important, as this is probably an artefact of observer bias.

3.2 Management vision, ideal objectives for the site

The vision of the protected area is to protect, preserve and enhance the natural values of the Famagusta Wetlands SEPA and to raise awareness to those who work, reside in or visit the site. Additionally, the site should enable the local population to benefit from visitors who are attracted to the area for a variety of reasons.

3.2.1 Ideal Objectives

The long term objective in establishing a SEPA, is to keep the favourable conservation status of Annex I habitats and Annex II species.

The target areas for this SEPA are the protection of Habitats Directive Annex I habitats and Annex II species, Birds Directive Annex I species. The priority animal species include five endemic sub species of terrestrial reptiles and 34 Bird Directive Annex I species.

The Famagusta Wetlands SEPA is also an extremely important migratory corridor for hundreds of thousands of birds each spring and autumn. The protection of the dominant habitat types within the SEPA should protect the preferred nesting habitats and resting sites for both migrant and breeding bird species. Greater protection the SEPAs wetlands should also help protect the breeding, resting and over-wintering birds from disturbance and illegal hunting.

3.3 Socio-economic criteria

Surface Water and Groundwater

It is important to recognize that earlier policy decisions concurrent with years of drought have resulted in limited surface and ground water supplies while agriculture and tourism are increasing in demand. Contamination and saltwater intrusion of aquifers further affect the utility of available water resources.

Almost all the aquifers are over pumped and for many of them their water quality has deteriorated due to seawater intrusion. Drastic action is required for reducing aquifer extraction to a level, which will allow the aquifers to recover. Unless groundwater is left to recover to a reasonable level, the resource will be of limited help to mitigate future water shortages.

It is critical that integrated river basin management plans are developed, which will ensure rehabilitation of aquifers as well as their protection. This can be achieved with very careful

management that is focused mainly in two methods; first with the drastic reduction of pumping to sustainable levels and second with the increase of their recharge with natural and artificial methods. Also, is important to remember that the best economic way for supplying water is to save water though better water management.

In addition to measures stated above some of the priority actions might include: promotion of sound water policy, water conservation measures, alternative sources (cisterns), and measures to address limited water availability as well as projections for future water need and uses.

Water Quality

The two most important needs are in relation to wastewater treatment plants and solid waste facilities.

Present wastewater treatment capacity is insufficient and in some cases no longer functioning. The environmental consequences range from odour (negatively effecting locals and tourists), discharge of untreated waste directly into the environment and/or sea, as well as septic systems polluting aquifers. It is extremely critical to take following actions: training for operation and maintenance of wastewater treatment; repair, expansion, or creation of new wastewater treatment infrastructure; and promotion of legislation requiring developers to contribute to the waste water infrastructure.

Inadequate solid waste management is complicated by landfills without liners or leachate collection systems, no capacity to handle hazardous waste, ineffective separation and recycling of reusable waste, and inappropriate disposal of slaughterhouse and farm waste. Critical actions include encouraging improved solid waste management, separation, and recycling through facilitation of Green Line Regulations to promote partnerships with waste management industries; and promotion of alternatives to landfilling organics such as biogas facilities, incineration of slaughterhouse waste at cement facilities, and municipal composting faculties.

Wetlands

Wetlands and associated terrestrial ecosystems are also interdependent, but alterations in terrestrial ecosystems usually affect wetlands more than the reverse. Watersheds and water bodies associated with wetlands control the quantity and quality of water reaching wetlands, and thus affect wetland functions.

For this reason, regulation of activities within a wetland boundary is not always sufficient to maintain all wetland functions. Not all functions occur in all wetlands, nor are wetlands structurally uniform. It is important to recognize that if and when Famagusta wetlands are removed/damaged, their collective functions are likely to decrease faster than the rate of reduction in surface area. As such some of the key functions as defined by the principles of Integrated River Basin Management (IRBM) and Integrated Coastal Zone Management (ICZM) have to be carefully evaluated and then selected for implementation. A list and description of the main dynamic processes which occur within the ecosystem or the landscape, together with their spatial, temporal dimensions and impacts on the conservation objectives.

Pumping water to Ayluga lake

As important as the quality of water is the quantity of water maintained within surface water retention facilities along Famagusta wetland system. Two important facilities are Freshwater Lake and Ayluga Lake systems. The historical practice of pumping water from Freshwater Lake to Ayluga Lake is maintained to maximize amount of water retained in these facilities. Even though pumping water from one lake to the other is an economically costly practice (as of March 2009 the cost of electricity for commercial users was 16 Euro cents per Kilowatt hour) , it is determined by local officials that water retained in Freshwater Lake is lost at a much faster rate than Ayluga Lake, through evaporation and leakage. The higher rate of

evaporation is driven mainly by the larger surface area and shallow water retention characteristics within Freshwater Lake system.

In a recent island-wide waterbird monitoring programme performed by Cyprus Center of European and International Affairs in cooperation with Turkish-Cypriot Biologists Association in Cyprus from July 2007 to June 2008, total number of waterbird species recorded in Famagusta wetlands was estimated to be 40. A common species Common Kestrel is observed at Famagusta Lake in April and at Famagusta Wetlands in October, January, February and March. There are some other species which travel in and out of the Famagusta wetland system year round and make use of the water available in the Freshwater Lake. Therefore, it is important to abandon the practice of continuous pumping of available water from Freshwater Lake to Ayluga Lake to endanger livelihood of these migrating species. Because as important as the quantity of water is the location of water, which needs to be optimized in close coordination with existing and migrating species making use of available water in Freshwater Lake.

Therefore, a better practice is to establish an optimized water management policy in which available water is not pumped from Freshwater Lake to Ayluga Lake continuously, but an optimum amount of water is maintained within Freshwater Lake, specifically for migrating species, and an optimal amount of water is pumped to balance water requirements of species, flora and fauna based in the vicinity of Freshwater Lake and Ayluga Lake systems. In order to secure sustainable implementation of such a plan, it needs to be enacted by the Municipality of Famagusta and implemented in close coordination with local authorities and NGOs, specifically Turkish-Cypriot Biologists Association.

3.4. Operational objectives for particular zones (see table 6 for details)

Zone 1 a - This is a strict protection zone in order to protect fragile priority Mediterranean temporary ponds (3170*) and coastal lagoon habitats (1150*) and important localities of salt marsh habitats (1310, 1410, 1420 and 1430). Access is allowed in this zone but ONLY along the current tracks and roads. No building development should be allowed in this zone. In order to protect beautiful fragile habitats, information boards should be placed at the most prominent sites in order to raise awareness.

Zone 1c - This is also strict protection zone in order to protect priority habitats of Annex I species found in the Birds Directive. Famagusta Wetlands SEPA is principally an important bird breeding, wintering and stopping over location Glossy Ibis (*Plegadis falcinellus*), Kentish Plover (*Charadrius alexandrines*), Cattle Egret (*Bulbulcus ibis*), Black-winged Stilt (*Himantopus himantopus*), Golden Plover (*Pluvialis apricaria*), Greater Flamingo (*Phoenicopterus ruber*) and Spur-winged Plover (*Hoplopterus spinosus*).

Zone 3a - This is a use zone in order to keep the current conservation status of habitats and species. This zone includes the settlements, agricultural fields and is fully open access to the public. The only building that should be allowed in this area is the restoration or conversion of existing buildings and extreme care should be taken in order to protect the natural beauty of the site

Zone 4 - This is buffer zone in order to conserve and enhance wetland habitats and habitats of important fauna species. It is fully open to the public; however, there should be some restrictions, such as prohibiting the lighting of fires and limit building activities to those mention in 3d.

IV. *Implementation – zoning and management strategies*

4.1 Zoning

There are many different types of zoning systems based on various criteria such as zoning according to management intensity (e.g. maintenance versus restoration), level of acceptable change, public use or access (quiet zones) etc. Usually zoning is made on the level of protection required and follows a gradient from almost no human impact allowed to an intensive use zone where the area may be considerably modified.

Within each zone the management prescriptions will be reasonably uniform and will differ in terms of type and level of protection from the other zones in the plan. The zone system is not static and will change over time with zones changing or combining with adjacent zones.

Zoning is done in terms of the level of protection required by the natural habitats and animal communities, and the human activities allowed in an area. It follows a gradient from a wilderness zone with almost no human impact allowed to an intensive use zone where the natural site is considerably modified to accommodate facilities such as tourist accommodation. It is important to keep the zoning system as simple as possible. We chose to use three different types of zone (Annex 5 Zone Map):-

1. Strict Protection Zone
2. Use Zone
3. Buffer Zone

Additionally, zone 1 is divided into sub-zones according to different conditions for management, conservation and/or use of localities (Tab. 9). This table is result of logical framework analysis of operational objectives, which could serve – in long term perspective – to implement ideal objectives for the site.

Methodology for definition of zones:

Zone 1a – was define based on Index of Locality Importance (ILI). If value of index was higher than 420 (high importance) for habitats.

Zone 1c – was delineated based on areas of high importance for protection of fauna species.

Zone 3a – was delineated based on presence of farmland (arable land) and settlements.

Zone 4 – all other areas.

Table 9. Logical framework of operational objectives according to zones (Annex 5)

Operational objectives should be verifiably achieved during the implementation of the management plan.

Zone/ subzone	Operational objectives	Location of zone	Objectives of interpretation and visitor management	Development objectives	Measures	Indicator of success	Assumptions and risks
Zone 1a Strict Protection zone	Protect/enhance fragile priority Mediterranean temporary ponds (3170*) and coastal lagoon habitats (1150*) and important localities of salt marsh habitats (1310, 1410, 1420 and 1430).	This zone encompasses most of the polygons found along the eastern coastal area and fresh lakes in the western part of wetlands	Access and usage restricted to the current tracks and roads. The area should be maintained at its current level and information boards should be positioned at the most prominent sites.	Place information boards and raise awareness of all stakeholders	Access allowed but vehicles should keep to designated roads and tracks. No development should be allowed and area should be kept in its current condition. Restore any areas which have been degraded and remove any invasive exotic species (i.e. eucalyptus) and encourage the use of native plant species.	Improved CS of all habitats mentioned under operational objectives throughout the listed polygons	Appropriate information on boundary of zone, regular control, restoration of habitat
Zone 1c Strict Protection zone	Protect priority habitats of Annex I species found in the Birds Directive.	This zone covers water (temporary) bodies.	The area should be maintained at its current level and information boards should be positioned at the most prominent sites.	Provide information to the different stakeholder groups	Restore any areas which have been degraded and remove any invasive exotic species (i.e. eucalyptus) and encourage the use of native plant species.	Keeping habitat in current area and condition	Appropriate information on location of zone, regular control.
Zone 3a Use zone	Keep current conservation status of habitat and species	Settlements, agriculture fields.	Fully open access,	Place information boards and work with local stakeholders	Prevent disturbance to habitats, promote restoration of old buildings and sympathetic development of agri or eco tourism practices.	Keeping monitoring habitats in the area at their current level and if possible improve some of them.	Appropriate information on the human impact, regular control, awareness raising of the visitors and

						Improved socio-economic situation of the local inhabitants	local people
Zone 4 Buffer zone	Conserve/enhance wetland habitats and habitats of important fauna species	See zoning map	Fully open access, lighting of barbeques to be controlled to particular localities	Place information boards	Prevent intensive agriculture, ploughing and intensive grazing.	Improvement of CS of habitat in each locality	Information to farmers, and incentives to adopt non intensive practices given.

4.2 Management Strategies

There are two sub zones under the Strict Protection Zone in the Famagusta Wetland SEPA:

Zone 1a where the objective is protection and enhancement of fragile priority habitats Mediterranean temporary ponds (3170*) and coastal lagoon systems (1150*). Additionally, other annex listed habitats should also receive the appropriate protection and attention. These habitats include salt marsh habitats(1310, 1410, 1420 and 1430). The management strategies in this zone includes restricting access to current tracks and roads, preventing development in the area in order to maintain the area at its current level, placing information boards at the most prominent sites. Moreover, the restoration of any degraded habitats and areas is another strategy and here it may require removal of invasive exotic species such as Eucalyptus spp., and replace these by using local native species.

Zone 1c, the objective is the protection of bird species listed in Annex I of the birds directive, this zone is restricted to Gulseren lake, and attracts many bird species during the spring and autumn migration as well as over wintering species. The habitats found at this location, should be kept in a favourable condition and enhanced where appropriate. Therefore, different stakeholder groups should be provided with necessary information, and regular controls should be carried out to keep the habitat in its current location and condition.

4.2.2 Management Strategies for Use Zone:

The objective of **Use Zone 3c** is to prevent any further damage to habitats and species and to keep the current conservation status of habitats and species. Zone 3a covers the settlements and agriculture fields with lower nature value. The Use Zone is fully open to the public use and the management strategies for the Use Zone are the prevention of damage to contiguous habitats and in that respect promotion of restoration of old buildings and sympathetic development of agri or eco tourism practices. By the prevention of disturbance to habitats and prevention of any further habitat fragmentation, it is planned to keep the present habitats in the area at their current levels and to improve the status of contiguous zones. Through the placement of information boards, the raising of awareness of visitors and local stakeholders can be achieved.

4.2.3 Management Strategies for Buffer Zone:

The operational objective of the Buffer Zone is to conserve and to enhance, wherever needed, the wetland habitats within the zone. In the Buffer Zone, the access is fully open to public, but lighting of barbeques is to be controlled to particular localities. For this zone the indicator of success is the improved conservation status of each habitat in each locality and the protection of sensitive contiguous zones. To achieve this goal, the management strategy is to prevent further building development within the zone, stop the dumping of building materials and other wastes and to restrict intensive agricultural practices, ploughing and intensive grazing in the area. Additionally, information and incentives should be given to farmers and local stakeholders about adopting non intensive practices and the placement of information boards are among the strategies for this zone.

4.3 Action plans

Description of measures and budget

Measure 1	Restrict access of vehicles to designated tracks and roads				
Where does it apply? Zone, management unit, location	Zone 1a				
Objectives	Protect/enhance important habitats (3170*, 1150*, 1310, 1410, 1420 & 1430)				
Description of activities	**Time schedule**	**Implementing Body**	**Costs**	**Indicator of success**	**Who controls?**
The placing of information boards	1 year	Natura 2000 project, Dept of Environment	**???**	Improvement of conservation status of habitats stated in objectives above	Rangers

Measure 2	Removal of planted exotics				
Where does it apply? Zone, management unit, location	Zone 1a				
Objectives	Removal of exotics such as Acacia and Eucalyptus from polygons.				
Description of activities	**Time schedule**	**Implementing Body**	**Costs**	**Indicator of success**	**Who controls?**
Removal of invasive exotics such as acacia and the planting of non exotics	1-10 years	Forestry Department & EPD	**???**	No exotics and the successful introduction of non exotic species	Rangers and Forestry Dept

Measure 3	Protection of the nesting of important bird species				
Where does it apply? Zone, management unit, location	Zone 2b				
Objectives	Protect nesting areas of Spur-winged plovers, Cattle Egrets, Glossy Ibis, Kentish Plovers and Black-winged Stilts.				
Description of activities	**Time schedule**	**Implementing Body**	**Costs**	**Indicator of success**	**Who controls?**
Placing of information boards and interactions with local stakeholders	1 year	Natura 2000 project and Environment Dept	**???**	Increased nesting numbers	Rangers, Environment Dept

Measure 4	Removal of dumped rubbish from within the SEPA boundaries				
Where does it apply? Zone, management unit, location	Whole SEPA				
Objectives	Improve the aesthetic value of the site and allow natural habitats to replace these areas				
Description of activities	**Time schedule**	**Implementing Body**	**Costs**	**Indicator of success**	**Who controls?**
Removal of waste	1st year	Municipality & Dept of Environment	**???**	No Rubbish	Dept Environment

V. Monitoring

5.1 Monitoring of habitats

The monitoring of habitats will focus on Annex I habitat types listed in Table 3 and evaluated in chapter 3.1.1. The proposed methodology is to repeat the inventory previously carried out by this project using the "Habitat mapping manual" (Seffer et al. 2008). Data gathered are stored in a relational database developed by the project, which holds baseline data as the starting point for the evaluation of monitoring results.

The periodicity of monitoring depends on the dynamics and variations in species composition of particular habitat types. For more stabile habitat types like forests, the period of five years is sufficient, for more dynamic habitat types such as dune ecosystem, the monitoring period should be shorter i.e. two years.

Evaluation of the data will be based on a rapid assessment of area, representativity and conservation status using IHI (Index of Habitat Importance) and ILI (Index of Locality Importance) indices (see chapter 3.1.1). Further evaluation of monitoring results should be based on the evaluation of species composition changes. Different techniques could be used taking into account variety of ordination and classification methods widely used in vegetation science (eg ter Braak et Smilauer 1998, Gauch 1982, Peet 1980).

Monitoring plan for habitats

1150* Coastal lagoons

A very rare and endangered habitat.

Period of monitoring: each year

Monitoring localities: polygons F23, F35, F49

1310 Salicornia and other annuals colonising mud and sand

A very rare and endangered habitat, which occurs in small area.

Period of monitoring: each year

Monitoring localities: polygons F11, F35, F47

1410 Mediterranean salt meadows (Juncetalia maritimi)s

Well distributed in Famagusta Wetlands SEPA, dynamic habitat type.

Period of monitoring: each 2 years

Monitoring localities: polygons F35, F40, F49

1420 Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)

This habitat type is stabile and is well distributed within the site.

Period of monitoring: each 2 years

Monitoring localities: polygons F33, F38, F41

1430 Halo-nitrophilous scrubs (Pegano-Salsoletea)

Habitat occurs only in 3 localities, his distribution in the site is marginal.

Period of monitoring: each 5 years

Location of monitoring localities: polygons F9, F11, F12

2110 Embryonic shifting dunes

Very dynamic habitat type, endangered.

Period of monitoring: each year

Monitoring localities: polygons F40, F47

3170* Mediterranean temporary ponds

Very rare, priority habitat. Best developed in northern part of Cyprus.

Period of monitoring: each year

Location of monitoring localities: polygons F5, F11, F50

Table 10 shows the list of habitat types to be monitored, proposed localities for monitoring and period of sampling. Decisive period for sampling of particular locality is the shortest one, which is needed for the more dynamic habitat types.

Proposed time schedule for sampling (Table 11) is based on previous analysis. It shows sampling plan of monitoring localities for a 10 year period. No of polygons shows how many localities will be sampled in each particular year. B – means time of baseline sampling, which was done this year, S – means sampling of locality.

Required capacity for sampling of 10 localities is 4 person-days for field work, 1 day for determination of plant species, 1 day for input to database.

Table 10 Overview of habitat types, proposed localities for monitoring and period of sampling (years). Decisive period for sampling is the shortest one.

Habitat types with proposed period for monitoring (years)	F5	F9	F11	F12	F14	F23	F33	F35	F38	F40	F41	F47	F49	F50
1150* Coastal lagoons						1		1					1	
1310 Salicornia and other annuals colonizing mud and sand			1					1				1		
1410 Mediterranean salt meadows (Juncetalia maritimi)								2		2			2	
1420 Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)							2		2		2			
1430 Halo-nitrophilous scrubs (Pegano-Salsoletea)		5	5	5										
2110 Embryonic shifting dunes										1		1		
3170* Mediterranean temporary ponds	1				1									1
Proposed period for monitoring of localities (polygons)	1	5	1	5	1	1	2	1	2	1	2	1	1	1

Table 11. Time schedule for sampling of monitoring localities over a 10 year period. The No of polygons shows how many localities will be sampled in each particular year. B – means time of baseline sampling, which was done this year, S – means sampling of locality.

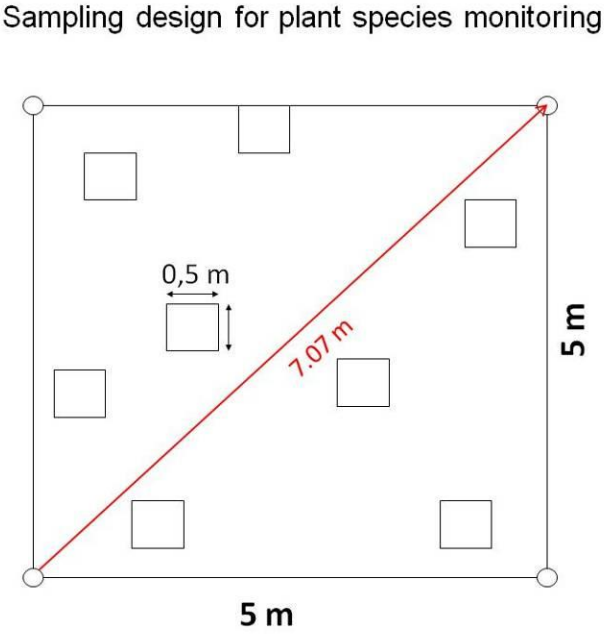
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
F5	B	S	S	S	S	S	S	S	S	S	S
F9	B					S					S
F11	B	S	S	S	S	S	S	S	S	S	S
F12	B					S					S
F14	B	S	S	S	S	S	S	S	S	S	S
F23	B	S	S	S	S	S	S	S	S	S	S
F33	B		S		S		S		S		S
F35	B	S	S	S	S	S	S	S	S	S	S
F38	B		S		S		S		S		S
F40	B	S	S	S	S	S	S	S	S	S	S
F41	B		S		S		S		S		S
F47	B	S	S	S	S	S	S	S	S	S	S
F49	B	S	S	S	S	S	S	S	S	S	S
F50	B	S	S	S	S	S	S	S	S	S	S
No polygons		**9**	**12**	**9**	**12**	**11**	**12**	**9**	**12**	**9**	**14**

5.2 Monitoring of Plants

Monitoring of plant species will be focused on endemic plant species and rare plant species. The proposed methodology for monitoring is sampling of permanent plots (Fig 3).

If the species occurs in more than one locality (polygon), two permanent plots will be monitored. In a case of abundant species – more than 20 specimens in permanent plot, species population will be counted in 6 randomly localised squares with size 0.5x0.5 m. Later the size of population will be estimated by statistical methods.

Figure 3. Permanent plot with size 5x5 m. In a case of abundant species – more than 20 specimens, species population will be counted in 6 randomly localised squares with size 0.5x0.5 m.



5.2.1. Monitoring of endemic plant species

Anthemis tricolor: It is endemic to Cyprus. Its' habitat is dry, rocky or stony ground, sometimes on chalk or limestone. Flowering period is February to March (Meikle, 1985). A few number of individuals has been recorded (during this project) from three different locations around the lake.

Period of monitoring: each two years during flowering period

Location of monitoring: F16, F17, F8

Centaurea calcitrapa ssp. angusticeps: It is considered endemic subspecies to Cyprus by Viney (Viney, 1994). It can be seen in open fields, its flowering period is June-July (Viney, 1994). A few number of individuals has been recorded (during this project) from two different locations around the lake.

Period of monitoring: each two years during flowering period.

Location of monitoring: F20, F14

Helianthemum obtusifolium: It is endemic to Cyprus. It usually occurs on rocky ground and in open garrique habitat. Flowering period is February – May.). A few number of individuals has been recorded (during this project) from four different locations around the lake.

Period of monitoring: each two years during flowering period

Location of monitoring: F9, F 11, F24

Onobrychis venosa: It is endemic to Cyprus, common in dry, stony or sandy ground. Flowering period is February – May. It was commonly distrubuted around the lake in different locations.

Period of monitoring: each two years during flowering period

Location of monitoring: F27, F36

Onopordum cyprium: It is endemic to Cyprus, common on roadsides. Flowering period is April-July. . It was commonly distrubuted around the lake in different locations.

Period of monitoring: each two years during flowering period

Location of monitoring: F17, F24

5.2.2. Monitoring of rare plant species

Ranunculus peltatus ssp. sphaerospermus: *Ranunculus peltatus* is a small aquatic plant species. *Ranunculus peltatus ssp. sphaerospermus* is a aquatic subspecies with stiff submerged leaves, no floating ones, it has larger flowers when we compare it with *Ranunculus peltatus.* It is abundant after wet winters within the lake.

Period of monitoring: each two years during flowering period.

Location of monitoring: Within the lake in several locations.

5.3 Monitoring of Animals

5.3.1 Birds

In terms of fauna the Famagusta Wetlands SEPA is principally important for its avian fauna. Therefore particular attention should be paid to the carrying out of regular bird surveys such surveys ought to be performed on a monthly basis (see Table 12) to assess both the species presence and their relative abundance. Probably the most economic way to survey birds is to carry out a series of point or transect counts at predefined locations for a certain period of time throughout the SEPA. These locations should be sited in the different habitat types and zones found within the boundaries of the SEPA. This will allow for comparison between the different habitats and zoning types. It would also be advantageous to perform more frequent counts (i.e. weekly) during the breeding season, autumn and spring migrations. Breeding bird counts would be better performed by walking stratified transects along tracks, which encompass most of the habitats found inside the SEPA. These stratified transect counts can also be used for general bird monitoring. It is imperative that for these counts, in order to be comparable, that the same routes and time is spent on each individual count. In addition to the breeding bird count, weekly checks should be made on the breeding of Kentish Plover, Spur-winged Plovers, Glossy Ibis, Cattle Egrets and Black-winged Stilts, in order to monitor their breeding success and threats.

Another method which requires a high level of training and may be something that can be put into practice at some time in the future is the establishment of Constant Effort Sites (CES). This scheme involves the use of mist nets and the ringing of captured individuals. Ringers set their nets in the same pattern, for the same time period at regular intervals through the breeding season at different locations. The scheme provides valuable key information on (1) changes in population size, (2) changes in breeding success and (3) adult survival rates. We need to monitor bird populations through time in order to conserve them effectively. Firstly, we need to know whether numbers are stable or changing, whether decreasing or increasing. If there is a change in numbers, particularly a decrease, we need to know why. Conservation action can then be targeted appropriately.

5.3.2 Terrestrial Reptiles

Terrestrial reptiles can be monitored in a similar way to birds by either point or transect counts. The best time to survey for reptiles is during the summer months (May-October, Table 12). For small lizards an efficient way to monitor, is by using pitfall traps. These can also be used to catch individuals so as to provide an estimate of population size using Mark and Recapture methods. However, when using this method the traps have to be checked regularly in order to prevent any suffering of the individuals captured. Monthly counts are probably sufficient for reptiles.

5.3.3 Butterflies

Butterfly surveys ought to be performed on a monthly basis during the spring and summer months to assess both the species presence and their relative abundance (Table 12). Probably the most economic way to survey butterfly is to carry out either a series of point counts or transects (pollard walk) at predefined sites for a certain period of time throughout the SEPA. These locations should be sited in the different habitat types and zones found within the boundaries of the SEPA. This will allow for comparison between the different habitats and zoning types.

Table 12. Shows the number of days surveying that should be performed in each month for different taxonomic groups.

Taxa	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Birds	1	1	4	4	4	1	1	4	4	4	4	1
Terrestrial Reptiles					1	1	1	1	1			
Invertebrates-Butterflies			1	1	1	1	1	1	1	1		

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Annexes

Annex 1. Satellite map showing the terrestrial boundaries of Famagusta Wetlands SEPA

Annex 2. Habitat map of Famagusta Wetlands SEPA

Annex 3. Evaluation of terrestrial localities based on quality and quantity of Annex I habitats of Famagusta Wetlands SEPA

Annex 4. Importance of localities based on quantities of Annex animal species of Famagusta Wetlands SEPA

Annex 5. Proposal for zoning of Famagusta Wetlands SEPA