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







Management Plan for Karpaz SEPA

W. J. Fuller, J. Seffer, B. A. Cicek, O. Ozden, G. Eroglu, C. Kara, V. Sefferova, O. Dogan

Nicosia, February 2010

This project is funded by the European Union under the Aid Regulation for the economic development of the Turkish Cypriot community (Council Regulation (EC) No 389/2006)

Project EuropeAid/125695/C/SER/CY/7
Implemented by consortium NIRAS - NEPCon - GOPA – Oikon
Project office: No. 8, Sehit Zeki Alp Soley Sokak, Kermiya, Nicosia
Tel: +90 533 874 4618, E-mail: kemalmut@gmail.com

Contents

Executive Summary 4
I Background 5
1.1 Policy 5
1.2 Site Selection 5
II Site Description 6
2.1 Location and site boundaries 6
2.2 Legal status and rights 6
2.2.1 Ownership 6
2.2.2 Legal rights 6
2.2.3 Site Status 7
2.3 Management and infrastructure 7
2.3.1 Organisations 7
2.3.2 Facilities 8
2.3.3 Services 8
2.4 Climate 9
2.5. Geology, land forms 9
2.6 Soils and substrates 9
2.7 Hydrology 9
2.8 Habitats, vegetation and communities 10
2.9 Flora 15
2.10 Fauna 17
2.11 Human use inside and outside the site 23
2.11.1 Nature conservation 23
2.11.2 Agriculture 23
2.11.3 Forestry 24
2.11.4 Recreation and tourism 24
2.11.5 Hunting and fishing 24
2.11.6 Extraction 24
2.11.7 Water use 24
2.11.8 Mining and quarrying 25
2.11.9 Military activity 25
2.11.10 Education, demonstration and research 25
2.11.11 Other uses 25
2.12 Economic aspects and populations 25
2.13 Past human land use 26
2.14 Cultural heritage 26

III. Evaluation and Objectives 27
3.1 Ecological criteria 27
3.1.1 Evaluation of habitats 27
3.1.2 Evaluation of plant species 44
3.2 Management vision, ideal objectives for the site 45
3.2.1 Ideal Objectives 45
3.3 Socio-economic criteria 45
IV. Implementation – zoning and management strategies 48
4.1 Zoning 48
4.2 Management Strategies 52
4.2.1 Management Strategies for Strict Protection Zone: 52
4.2.2 Management Strategies for Active Conservation Zone: 52
4.2.3 Management Strategies for Use Zone: 53
4.2.4 Management Strategies for Buffer Zone: 53
4.3 Action plans 54
V. Monitoring 58
5.1 Monitoring of habitats 58
5.2 Monitoring of Plants 63
5.3 Monitoring of Animals 64
References 67
Figures 69

Executive Summary

This SEPA is situated at the tip of the Karpaz peninsula and covers a terrestrial and marine area of 9,645 and 9,485 ha, respectively. This provides a total protected area of 19,130 ha and a protected coastline of 72.2 km. The Karpaz SEPA received official legal protection as an important natural resource for the northern part of Cyprus and was declared a "Special Environmentally Protected Area" according to "Environment Law (21/97)" article 11, by the Environmental Protection Department of the TCc authorities. Additionally, according to "Forestry Law" it is accepted as "National Park" and "Archeologically SID Area" according to" Antiquities Law".

The site has been selected due to the presence of important habitats and species. One of the main reasons for its selection is the existence of internationally important sea turtle rookeries. Both green (*Chelonia mydas*) and loggerhead (*Caretta caretta*) turtles nest in large numbers on various beaches. Monk seals show both residential as well as wandering behaviour in the marine environment and their reproduction occurs in the coastal zone. There is also an important nesting colony of Audouin's Gulls (*Larus audouinii*). Additionally to the important faunal elements; the area is also holds some rare and endemic floral species.

The most common activities in the region carried out by the locals are agriculture and animal husbandry. In addition to agriculture, there are some B&B type accommodations and restaurants actively servicing the tourism industry, within the village as well as scattered throughout the SEPA.

During the surveying period of the project, 17 different habitat types were identified by for conservation under the Habitats Directive (Dir 92/43/EEC). Only one Annex II plant species (*Ophrys kotschyi*) was recorded in the site. However, 22 endemic plant species and five different plant species which are rare plant species for the island occur within the Karpaz SEPA *Euphorbia paralias* (Endangered), *Juncus maritimus* (Vulnerable), *Salsola soda* (Vulnerable), *Valantia muralis* (Endangered) and *Ophrys kotschyi* (Vulnerable). In addition to the important flora, there are also some internationally important faunal species found within the SEPA. These include both species of sea turtle (*Caretta caretta and Chelonia mydas*), Mediterranean Monk Seal (*Monachus monachus*), Audouins Gull (*Larus audouinii*). The site is host to hundreds of thousands of migratory birds during the spring and autumn migations. It is also holds breeding populations of Cyprus's two endemic bird species (*Oenanthe cypriaca and Sylvia melanthorax*) as well as important breeding populations of Shag (*Phalacrocorax aristotelis desmarestii*), Roller (*Coracius garrulus*), Masked Shrike (*Lanius nubicus*). The SEPA also has two annex listed bat species and two endemic butterfly species.

The data from these surveys were analysed in order to assess particular localities based on different biodiversity criteria (representativity, conservation status, level of endemism, quantity of protected animal species). Based on these results, which were further combined with socioeconomic factors, the proposal for zoning was developed. Four 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. It is followed by a series of action plans which describes in detail the actions required for the implementation of the management plan. The vision of protected area is to protect, preserve and enhance the natural values of the Karpaz SEPA and to raise awareness to those who reside in or visit the site. Additionally, the site should enable the local population to benefit from the numerous visitors who are attracted to the area for a variety of reasons. The long term objective in establishing a SEPA is to keep the favourable conservation status of Annex I habitats and Annex II species. Sea Turtles and their nesting habitats are already protected under the current environmental law. The target areas for this SEPA are the protection of Habitats Directive Annex I habitats and Annex II species, Birds Directive Annex I species

together with Cyprus endemic plant and animal species. Also any building developments should be restricted to the village area.

I Background

1.1 Policy

The Karpaz SEPA received official legal protection as an important natural resource for the northern part of Cyprus and was declared a "Special Environmentally Protected Area" according to "Environment Law (21/97)" article 11, by the Environmental Protection Department of the TCc authorities. Additionally, according to "Forestry Law" it is accepted as "National Park" and "Archeologically SID Area" according to" Antiquities Law".

1.2 Site Selection

The site has been selected as a potential Natura 2000 site 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).

One of the main reasons for its selection is the existence of both nationally and internationally important sea turtle rookeries. Both green (*Chelonia mydas*) and loggerhead (*Caretta caretta*) turtles nest in large numbers at various beaches. These were formerly named as Ronnas, Ayphilon, K 9, K 10, K 11, Golden Beach 1 and Golden Beach 2. Ronnas bay beaches are the 3rd most important nesting beaches for green turtles in the entire Mediterranean (Kasparek 2001). In addition to the sea turtles, the monk seal (*Monachus monachus*) have been recorded in the area. Monk seals show both residential as well as wandering behaviour in the marine environment and their reproduction occurs in the coastal zone. There is also an important nesting colony of Audouin's Gulls (*Larus audouinii*) In addition to the important faunal elements; the area is also inhabited by some rare and endemic floral species.

The natural habitats of Karpaz have remained relatively untouched by the negative developments experienced in other parts of the island (i.e. construction, industrialisation etc). However, there has been damage to some habitats as result of agricultural practices and some small scale touristic developments.

Furthermore, Karpaz SEPA has become a focal point for many environmental protection and conservation efforts. The discussions regarding the management structure and conservation – usage ratio are still on going. In addition to the human impact on the natural environment, there is also an uncontrolled feral donkey problem. The donkeys are considered to have an unquantified negative impact on natural habitats and agricultural crops and are therefore considered problematic among the farming community. The area is also under huge pressure from the construction and tourism industry who want the area opened up from development. Fortunately, to date this has not been allowed in the SEPA with the result of some of the best preserved Mediterranean habitats.

II Site Description

2.1 Location and site boundaries

This area is situated at the tip of the Karpaz peninsula, having coasts on both north and south sides of the peninsula, and covers a terrestrial total area of 9,645 ha (Fig 1). It consists of an extensive interior region with hill-like formations, plains with stream beds and has a total coastline of 72.2 km. The marine protected area of the SEPA is almost as large as the terrestrial area being 9,485 ha. This gives a total protected area of 19,130 ha.

The protected area starts on the north coast with Ronnas Beach, before reaching the Dipkarpaz village. This beach is the 3rd most important sites for the green turtle in the entire Mediterranean. The protected area continues along the north coast to Ayphilon Beach and also includes the interior terrain after the Ayphilon beach and extends all the way to the tip of the island. At the end of the road, which runs parallel to the Ronnas beach, you reach Dipkarpaz village. The borderline for the Karpaz protected area begins at the point where the Dipkarpaz village settlements end. The northern and southern parts as mentioned above come together and become one area after the village borders.

The entry points to the area are located in the southern and the northern parts of the Dipkarpaz village. These are the roads used both by locals and tourists. There are no other roads available apart from some tracks, which can only be used by FWD vehicles. The tracks are often used by the villagers for agricultural activities, by hunters, fishermen, and nature enthusiasts. Some of these roads are impassable to any kind of traffic after heavy rains or agricultural activities.

Dipkarpaz village, which is almost completely surrounded by the Karpaz SEPA, has 444 households (State Planning Organisation 2008). There are no distinct borders separating the SEPA from the village. Most of the agricultural, tourism and similar activities within the protected area are often conducted by the villagers from the Dipkarpaz village. The village population consists of Turkish Settlers, Turkish Cypriot and Greek Cypriot residents.

2.2 Legal status and rights

2.2.1 Ownership

In the Karpaz SEPA, the majority of the beach front land, maquis and forests are owned and managed by the “Forestry Department”; however, some access roads go through privately owned agricultural fields. The ownership of the land is made up of both privately and publicly owned land.

2.2.2 Legal rights

The area is also included in the Karpaz Ordinance, which regulates any development and activity in the area (Fig 2). However, the TC authorities are currently under pressure from construction firms, sub sectors of the construction business and local people to relax these rules.

According to the Environmental Law, a subject plan will be prepared by the Town Planning Department for Karpaz SEPA. Until this subject plan is prepared no building permission can be granted.

2.2.3 Site Status

The Karpaz Peninsula has always been at the forefront for any nature protection and conservation activity in the northern part of Cyprus. As mentioned above, the peninsula has been included in Karpaz Ordinance. The area is proposed as “Special Environment Protected Area” to the Council of Ministers by the Environment Protection Department and it was declared as a SEPA according to the Environment Law. Additionally, a subject plan is being prepared by the Town Planning Department. The conservation activities to date have mainly focused on sea turtles, as the area has important sea turtle nesting beaches. There has been clear progress and strict protection efforts, even by the villagers towards protection of the sea turtles in the area.

The most common activities in the region carried out by the locals are agriculture and animal husbandry. In addition to agriculture, there are some B&B type accommodations and restaurants actively servicing the tourism industry, within the village as well as scattered throughout the SEPA.

Within the SEPA there are fields which are not in use for animal husbandry or similar agricultural activities and have therefore resulted in the preservation of the natural habitats. However, these fields can only be reached through pathways and dirt tracks. Due to their inaccessibility, these areas are difficult to reach and therefore are only frequented by the locals, nature enthusiasts or hunters.

Nevertheless, if any of these activities should cause damage to the environment, species or habitats, it is possible to administer punishment or fines; however, these are rarely enforced, as a gentler and more cooperative approach is preferred.

In addition to the human impact on the natural environment, there is also an uncontrolled feral donkey problem. The donkeys are considered to have an unquantified negative impact on natural habitats and agricultural crops and are therefore considered problematic among the farming community.

2.3 Management and infrastructure

2.3.1 Organisations

Karpaz SEPA, including Ronnas Beach falls under the legal jurisdiction of the Dipkarpaz Municipality, which is responsible for all civilian and public matters in the area. Additionally, for smaller districts, mukhtars have been elected, of which there are three in the Dipkarpaz village. One of their responsibilities is to relay public issues to the relevant authorities.

İskele District office under Ministry of Interior is the main authority for the area.

The region consists of forest land and other governmental land which comes under the jurisdiction of the Forestry Department, “Agriculture and Natural resources Ministry”. Issues related to the environment in general and nature protection (i.e. sea turtle protection activities) belong to the Environmental Protection Department. The Antiquities Department has also some responsibilities in the area. Additionally, there are CSOs and NGOs operating in the region and even though these organizations do not have any legal jurisdiction over the area, they make themselves noticed through the projects they manage and they are often consulted on matters related to the area. Below is a list of the organisations, which are most active in the region:

Association of Friends of Karpaz

Biologists Association

Hunters Federation

Green Action Group

Ataturk's Way of Education Association

Women Association on Handicrafts (Supported by Ministry of Education)

Dipkarpaz Primary School, Parents Board

Dipkarpaz Secondary School, Parents Board

Dipkarpaz Mosque Support Association

Turkish Red Crescent Dipkarpaz Branch

2.3.2 Facilities

There are facilities available both for the villagers and the visitors in the Dipkarpaz village. There are four coffee houses, one of which is owned by a Greek Cypriot and is frequented both by TCs and GCs; ten grocery stores of various sizes; three restaurants; and eight bed-and-breakfast (B&B's) type accommodation facilities, which are generally open all year round. Most of these B&B's are being constructed at the time of writing and these establishments will also have restaurants to serve their customers.

In addition to the facilities available in the village, there are other restaurants, B&B's, and similar establishments scattered throughout the protected area. In the northern part of the region, near to Ronnas Beach, there is a public picnic area. At Ayphilon beach, there is a small B&B and restaurant available. Furthermore, along the southern coastal strip of the region, there are nine B&B's with restaurants and one independent restaurant available. Within the Monastery premises, there is a temporary bazaar, which mainly sells souvenirs, handicrafts and Lefkara lace.

There are two roads, one to the north (which ends at Efendiriga) and one to the south (which ends at St. Andreas Monastery). Additional to these, there are other roads which are less well maintained and paths reaching to the most extreme areas in the region. During the rainy season or after high agricultural activity, it is significantly more difficult to reach some of these areas. In general, the only vehicles which can travel along these routes are either tractors – owned by villagers for agricultural purposes; or four-wheel drives – usually owned by hunters or nature enthusiasts.

With in the proposed SEPA there is no tourist or publicity information centre, which could be responsible for distributing brochures, leaflets and provide information on the area to those interested parties. The closest tourist information centre is based in Yeni Erenkoy. There is a health centre and a police station in the Dipkarpaz village.

2.3.3 Services

There is mains electric and water to most of the buildings within the Dipkarpaz village which is completely inside the Karpaz SEPA. Additionally, a telephone line into the village of Dipkarpaz is available. Public transportation exists from the village to Famagusta and other villages on route. These services are limited to village and not available in the more rural areas within the SEPA, although there are restaurants and B&B type accommodation providers. These services (electric, water and transportation when needed) are provided by the owners of these premises. Furthermore, only mobile telephones are currently in use in this part of the SEPA. Refuse collection is carried out by Dipkarpaz municipality from the houses, business premises and beaches.

2.4 Climate

There is significant climatic variation among sub-locations due to the island's relief and the surrounding sea (Tsintides, *et. al.* 2002). The closest meteorological station in the region is located in the village of Yeni Erenkoy. Therefore, the most relevant climate data collected for the Karpaz SEPA is from this base in Yeni Erenkoy (Yorgancı, 2004, Meteorology Dept).

The weather throughout the year is always above 0 °C and the lowest recorded temperature occurs during the winter months, normally in February. The average temperature is 20 °C in the region and the highest recorded temperatures are in the months of July and August, with daily averages of c. 29°C. During the winter months, the average daily temperature is c. 12 °C.

The annual rainfall is approximately 700mm, however, it should be noted that climatic conditions will vary between years and during the months when during the summer months there is hardly any rain. This can result in drought and cause the failure of field crops. (Yorgancı, 2004, Meteorology Dept)

2.5. Geology, land forms

The island is composed of four east-west oriented geological features, where Karpaz SEPA falls in the zone known as the Kyrenia Mountain Range. It is a limestone range considered the southern most expression of the Tauro Dinaric orogenic belt of Greece, Crete, and Southern Turkey (Dev-Tech, 2006, Geology and Mines Dept).

The Kyrenia Range consists of a series of hills running in an East-West direction with a sedimentary origin. The Kyrenia Range contains a series of rocks formed during the Permian and early Tertiary periods, and is divided into an eastern and western section. The lower eastern Kyrenia Range contains the oldest rocks in Cyprus, consisting of Permian olistostromes along with the Kantara Limestone formation. Thrust sheets make up the higher western Kyrenia; made up of steeply dipping shallow water carbonates ranging from Triassic to mid-Cretaceous periods (Robertson and Xenophontos, 1997).

Karpaz is the furthest point on the eastern end of the Kyrenia Mountain Range. It consists of an extensive interior area with hill like formations, covered with maquis, pine forests, olive and carob plantations; plains containing arable lands, semi-dry (or seasonal) stream beds and a coastal zone all around the SEPA. The coastal zone has both "low coast" and "high coast" structures within the area, with sandy and rocky beaches.

2.6 Soils and substrates

The Kyrenia mountain range (including the Karpaz peninsula) is an elongated mountain range extending from Kormakitis in the west to St. Andreas in the east, consisting mainly of limestone enveloped on either side by chalks and flysch deposits. The limestone constitutes the major aquifer in this belt (Dev-Tech, 2006). Besides general characteristics of the range, the soils of Karpaz consists of, marls, sandstone, siltstones and basal conglomerate. The Alluvium-Colluvium formations consist of sands, silts, clays and gravels. The Terrace deposits consist of calcarenites, sands and gravels (MTA 1999; Constantinou 1995).

2.7 Hydrology

The hydrological characteristics of the Karpaz peninsula have been defined based on studies conducted between 1996 and 1999 (MTA 1999). Based on these studies, Dipkarpaz has

been identified as the area with the highest rainfall in the northern part of Cyprus. There are no permanently active rivers; however, during the rainy months, some rivers will flow. During the drought season all of the water collection areas become completely dry. There are many wells scattered throughout the region, however the water levels in these have dropped tremendously to a level, which makes the wells unusable. There are three independent aquifers located in the Karpaz region; these are Dipkarpaz, Yeni Erenkoy and Yesilkoy. Karpaz SEPA is mainly situated on the Dipkarpaz aquifer with a depth between 12-35 meters. Based on the sampling of the aquifer, the water quality is rated as low with 1315 micro siemens/cm electrical conductivity and 0.7% salinity (MTA, 1999).

Based on field studies, there are many small streams, which become active on a seasonal basis. There have been wells recorded in the stream beds, dating back to the 1950's and 60's. These wells are still being used in animal husbandry and agriculture today. In addition to these water sources there, are also natural springs found throughout the SEPA

2.8 Habitats, vegetation and communities

The vegetation structure of the site is of typically coastal Mediterranean nature, with a sandy and rocky shoreline. There are mostly natural areas which still persist, such as mattoral and sand dune systems, which are unique and very valuable. The persisting natural areas, especially the dune ecosystems should be strictly protected.

There were 17 different habitat types identified by the project team for conservation under the Habitats Directive (Dir 92/43/EEC) and 6 EUNIS habitats within the area. The identified habitats and their coverage are shown in Table 1.

Table 1. 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. Only terrestrial area of SEPA was calculated.

No	Code_Name	Importance	No localities	Area in ha	% of site
1	1120 Posidonia beds	HD I*		1322.45	13.9
2	1170 Reefs	HD I		284.70	3.0
3	1140 Mudflats and sandflats not covered by seawater at low tide	HD I	1	3.88	0.0
4	1150 Coastal lagoons	HD I*	1	7.31	0.1
5	1210 Annual vegetation of drift lines	HD I	21	48.20	0.5
6	1240 Vegetated sea cliffs of the Mediterranean coasts with endemic *Limonium* spp.	HD I	31	290.67	3.0
7	2110 Embryonic shifting dunes	HD I	12	52.75	0.5
8	2250 Coastal dunes with Juniperus spp.	HD I*	15	70.06	0.7
9	2260 Cisto-Lavendulatalia dune sclerophyllous scrubs	HD I	26	418.25	4.3
10	5210 Arborescent matorral with Juniperus spp.	HD I	198	4928.89	50.2
11	5330 Thermo-Mediterranean and pre-desert scrub	HD I	96	943.82	9.6
12	5420 Sarcopoterium spinosum phryganas	HD I	73	331.30	3.4
13	8310 Caves not open to public	HD I	2		0.0
14	9290 Cupressus forests (Acero-Cupression)	HD I	20	170.37	1.7
15	92D0 Southern riparian galleries and thickets	HD I	4	8.48	0.1
16	9320 Olea and Ceratonia forests	HD I	35	513.78	5.2
17	9540 Mediterranean pine forests with endemic Mesogean pines	HD I	13	221.77	2.3
18	C 2 Surface running waters	EUNIS	36	132.04	1.3
19	E1. C Dry Mediterranean lands with unpalatable non-vernal herbaceous vegetation	EUNIS	24	113.28	1.2
20	E2. 6 Agriculturally improved, re-seeded and heavily fertilised grassland	EUNIS	21	1367.02	13.9
21	F 6.2. Eastern garrigues	EUNIS	4	16.35	0.2
22	J2 Low density buildings	EUNIS	2	78.08	0.8
23	A5 Sublittoral sediments - sand	EUNIS		3369.85	35.5

***1120 Posidonia beds (*Posidonia oceanica*)**

Beds of *Posidonia oceanica* are characteristic for the infra-littoral zone of the Mediterranean (depth: ranging from a few dozen centimetres to 40 metres). On hard or soft substrate, these beds constitute one of the main climax communities. They can withstand relatively large variations in temperature and water movement, but are sensitive to desalination, generally requiring a salinity of between 36 and 39‰ (EC 2007). *P. oceanica* is an endemic species to the Mediterranean Sea that forms dense and extensive green meadows whose leaves can attain 1 meter in height. These underwater meadows provide important ecological functions and services. They require transparent, nutrient-poor waters and sediments devoid of labile organic matter (Díaz-Almela and Duarte 2008).

1170 Reefs

Submarine, or exposed at low tide, rocky substrates and biogenic concretions, which arise from the sea floor in the sublittoral zone but may extend into the littoral zone where there is an uninterrupted zonation of plant and animal communities. These reefs generally support a zonation of benthic communities of algae and animals species including concretions, encrustations and corallogenic concretions (EC 2007).

1140 Mudflats and sandflats not covered by seawater at low tide

Sands and muds of the coast of the oceans, their connected seas and associated lagoons, not covered by sea water at low tide, devoid of vascular plants, usually coated by blue algae and diatoms (EC 2007).

***1150 Coastal lagoons**

Lagoons are expanses of shallow coastal salt water, of varying salinity and water volume, wholly or partially separated from the sea by sand banks or shingle, or less frequently, by rocks. Salinity may vary from brackish water to hypersalinity depending on rainfall, evaporation and through the addition of fresh seawater from storms, temporary flooding of the sea in winter or tidal exchange. With or without vegetation from Ruppietea maritimae, Potametea, Zosteretea or Charetea (EC 2007). Vegetation was not recorded during mapping of Karpaz, but it may occur there.

1210 Annual vegetation of drift lines

This habitat consists of shingle beaches mixed with sandy substrates. Formations of annuals and perennials, occupying accumulations of drift material and gravel rich in nitrogenous organic matter. This unique natural habitat type was recorded within the Karpaz site. The typical vegetation was covered by *Cakile maritima, Salsola kali*, and *Eryngium maritimum* (Olsson 1974, EC 2007).

1240 Vegetated sea cliffs of the Mediterranean coasts, with endemic Limonium spp.

Vegetated sea cliffs are formations of rocky shores along the coastal zone in Mediterranean area (EC 2007). This habitat type was recorded near to the Golden Beach, Ayios Philon, Blue Sea hotel and Apostolos Andreas Monastery areas. The typical plant species for this habitat in Karpaz SEPA consist of *Limonium virgatum, Limonium albidum ssp. cyprium, Cichorium spinosum, Frankenia hirsuta, Andrachne telephoides* and *Cirthmum maritimum*.

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). The essential criterion for the delimitation of this habitat type is the presence of the relevant plant species and clearly raised sand surfaces of normally between a few centimetres and >30 cm above the surrounding beach.

Embryonic shifting dunes are very well developed on Karpaz beaches. The dunes are dominated by *Eryngium maritimum*. Typical plant species composition is from following species: *Euphorbia peplis*, *Medicago marina*, *Pancratium maritimum*, *Echium angustifolium*. There were also high numbers of *Alhagi maurorum* species recorded within this type of habitats.

*** 2250 Coastal dunes with Juniperus spp.**

This habitat type is associated with Juniper formations of dunes in Mediterranean region and in thermo – Atlantic coastal dune slacks and slopes. This habitat type is very well distributed along the Karpaz coasts. The typical plant species for this type of habitat within the SEPA are *Juniperus phoenicea*. *Juniperus phoenicea* formations are almost covering all of the Karpaz SEPA coastal beaches.

2260 Cisto – Lavenduletalia dune sclerophyllous scrubs

This habitat type is described by the presence of sclerophyllous or lauriphyllus scrubs established on dune ecosystems in Mediterranean and warm temperate humid regions. In Cyprus, this habitat type (2260) includes two types of communities. a) Phryanic communities (Cisto-Micromerietea) and b) Low or medium height of mattoral (Pistacio-Rhamnetalia) (EC, 2007). Both types of communities were recorded in the Karpaz SEPA. This habitat type can be seen at Ronnas Bay and Ayios Philon beaches. Typical species are: *Thymus capitatus*, *Teucrium micropodioides, Echium angustifolium, Pistacia lentiscus, Helianthemum obtusifolium, Genista sphacelata, Calycotome villosa, Helichrysum conglobatum, Phagnalon rupestre.*

5210 Arborescent mattoral with *Juniperus* spp.

Mediterranean and sub-Mediterranean evergreen sclerophyllous scrub organized around arborescent junipers. Mixed dominance can be indicated by combination of codes. There are also sub-types of this habitat. For example Sub-types 32.132 - *Juniperus phoenicea* arborescent mattoral dominated by *Juniperus phoenicea* (EC 2007). This sub-type was abundant all over Karpaz region, identified both at low and high elevations in the Karpaz SEPA. Typical species are: *Juniperus phoenicea, Pistacia lentiscus, Calycotome villosa, Cistus creticus, Olea europaea and Phagnalon rupestre*.

5330 Thermo – Mediterranean and pre-desert scrub

These are scrub formations for the most part indifferent to the siliceous or calcareous nature of the substrate that reaches their greatest extension or optimal development in the thermo-Mediterranean zone (EC 2007). There are also sub-types of this habitat. Subtype 32.21G - *Genista fasselata* brush was recorded at Karpaz. It represents bushes dominated by the tall, spiny *Genista fasselata* of very restricted distribution in the eastern Mediterranean basin. Species as *Cistus spp., Thymus capitatus, Lithodora hispidula, Calycotome villosa, Noaea mucronata, Asparagus stipularis, and Helianthemum obtusifolium* are typical for this habitat

type http://cdr.eionet.europa.eu/Converters/convertDocument?file=cy/eu/art17/envruy_3a/habitattype-5330.xml&conv=rem_23.

5420 Sarcopoterium spinosum phryganas

Low, thorny formations of hemispherical shrubs of the coastal thermo-Mediterranean zone of Aegean islands, of mainland Greece and the Ionian islands, of coastal Anatolia, much more widespread and diverse than the western Mediterranean formations (EC 2007). *Sarcopoterium spinosum* phrygana are abundant all over the island. They form the "climax" vegetation at the drier sites or on poorer soils; however, they often develop as phases of degradation or regeneration of maquis or forest vegetation after fire, cultivation, grazing or other disturbance. It often occurs as a successional stage of other vegetation types (http://cdr.eionet.europa.eu/cy/eu/art17/envruy_3a/habitattype-5420.xml/manage_document).

This habitat type was recorded at Karpaz. Some endemic species *Helianthemum obtusifolium* and *Teucrium micropodioides* were found in this habitat type. Typical species are: *Sarcopoterium spinosum, Thymus capitatus, Pistacia lentiscus, Helianthemum obtusifolium, Cistus creticus, Cistus salvifolius, Cistus parviflorus, Genista sphacelata, Calycotome villosa, Helichrysum conglobatum, Phagnalon rupestre, and Teucrium micropodioides.*

8310 Caves not open to the public

Caves not open to the public, including their water bodies and streams, hosting specialised or high endemic species, or that are paramount importance for the conservation of Annex II species (e.g. bats, amphibians) (EC, 2007). There are many caves occurring in Karpaz SEPA, but it needs further investigation for endemic species occurring within these caves.

9290 Cupressus forests (Acero-Cupression)

This habitat is montane forests of the Mediterranean basin, dominated by Cupressus *sempervirens* (EC 2007). In Karpaz SEPA, there were some fragmented *Cupressus* forest areas, mostly along the river or stream sites.

92D0 Southern riparian galleries and thickets (Nerio-Tamaricetea and Securinegion tinctoriae)

This habitat consist of tamarisk, oleander and chaste tree galleries and thickets. It is similar low ligneous formations of permanent or temporary streams and wetlands of the thermo-Mediterranean zone and South western Iberia (EC 2007). In north Cyprus, this habitat type usually includes *Nerium oleander, Tamarix tetragyna, Rubus sanctus* and *Myrtus communis*. This habitat type occurs in the Karpaz SEPA.

9320 Olea and Ceratonia forests

This habitat describes the woodland ecosystems containing arborescent *Olea europaea ssp. sylvestris*, *Ceratonia siliqua*, *Pistacia lentiscus*, *Myrtus communis* in Thermo-Mediterranean regions (EC, 2007). There are two types of Olea and Ceratonia forest habitat: a) Wild olive woodlands b) Carob woodlands. Wild olive woodlands are dominated by *Olea europaea* ssp. *sylvestris* formations. It is a climax olive forest with *C. siliqua* and *P. lentiscus*. Carob woodlands are dominated with Ceratonia siliqua, together with *Olea europaea* and *Pistacia lentiscus*. We recorded both forest habitat types in the Karpaz SEPA.

9540 Mediterranean pine forests with endemic Mesogean pines

This habitat consist of Mediterranean and thermo–atlantic woods of thermophilous pines, mostly appearing as substitution or paraclimatic stages of forests of the Quercetalia ilicis or Ceratonio-Rhamnetalia. Long established plantations of these pines within their natural area of occurance, and with an undergrowth basically similar to that of paralimatic formations, are included. This habitat includes many sub-types according to the pine species and different regions in Mediterranean (EC 2007). In Karpaz SEPA, there are mainly old naturalised *Pinus brutia* plantations with *Teucrium micropodioides, Teucrium divaricatum, Teucrium karpasiticum, Thymus capitatus, Genista fasselata, Rhamnus oleoides, Pistacia lentiscus* and *Calycotome villosa* (Viney, 1994 and Hadjikyriakou & Hand, 2008).

2.9 Flora

It is known that Karpaz SEPA is harbouring many endemic and rare plant species forming its own unique special habitat. It is known that there are 22 endemic plant species occurring within the Karpaz SEPA. Only one Annex II plant species (*Ophrys kotschyi*) was recorded in the site. The description of the recorded important plant species are shown in Table 2.

The Red Data Book of the Flora of Cyprus (Tsintides et. al 2007) listed five different plant species which are rare plant species for the island. *Euphorbia paralias* (Endangered), *Juncus maritimus* (Vulnerable), *Salsola soda* (Vulnerable), *Valantia muralis* (Endangered) and *Ophrys kotschyi* (Vulnerable). There are also many endemic plant species of which some are IUCN red listed Annex II species or listed under Bern Convention. The endemic plant species are listed below:

ANNEX II Plant Species

Ophrys kotschyi: Is an endemic species of Cyprus (Viney 1994). It grows in grassy, shady places under pine and cypress trees; it sometimes also grows on sand dunes. (Pantelas et al 1993). This species has been red listed in Red Data Book of Cyprus as a vulnerable species. Although it has been red listed by Tsintides et al., it is common along the northern range (Tsintides et al 2007). It is also priority Annex II plant species. It is red listed by IUCN and protected under Bern Convention.

Endemic plant species within the Karpaz SEPA:

Allium autumnale: It is endemic to Cyprus. Occurs in Ronnas area.

Anthemis tricolor: It is endemic to Cyprus. It is recorded at Karpaz SEPA (Gücel, S. pers obs.). Its` habitat is dry, rocky or stony ground, usually on chalk or limestone, common in lowlands (Pantelas et al. 1993).

Asperula cypria: It is endemic to Cyprus. It grows on rocky areas and is common especially in lowlands. Recorded at Karpaz SEPA (Viney, 1994; Pantelas et. al 1993).

***Astragalus cyprius*:** It is endemic to Cyprus and grows on dry limestone and sandstone hillsides. It is commonly found in the Karpaz SEPA (Viney, 1994).

***Bupleurum sintenisii*:** It is endemic to Cyprus. Occurs in Ronnas area.

Bosea cypria: It is endemic species of Cyprus (Viney 1994). It grows on dry rocky ground and on cliffs at 0-600 m. It is locally abundant in lowlands (Pantelas et al 1993). It was recorded in arborescent mattoral with Juniperus spp. habitat type in Karpaz, it is threatened by grazing.

Dianthus cyprius: It is endemic to north Cyprus and grows on cliffs and rocks. It can be seen in Karpaz area from 300 to 1000 m. It is IUCN red listed species (Viney, 1994; Yildiz et al. 2006).

Gladiolus triphyllus: It is endemic to Cyprus. It grows in open pine forest or in garrigue or maquis. It also grows on dry, rocky limestone at 0-1200 m. It is common species. Recorded at Karpaz SEPA (Pantelas et al 1993). The endemic *Gladiolus tripyllus* was observed in the calcareous formations with shallow soil cover by Doga Koruma Merkezi research team in 2006.

Helianthemum obtusifolium: Endemic to Cyprus and is common on rocky grounds and in open garrigue habitats (Viney, 1994).

Hedysarum cyprium: It is endemic to northern Cyprus and grows on dry, eroded limestone-clay or sandstone slopes from 200-600 m. It is found in the Karpaz SEPA (Viney, 1994; Yildiz et al. 2006).

Limonium albidum ssp. cyprium: It is endemic to northern Cyprus and grows on calcareous maritime rocks near sea level. It is common especially around the Apostolos Andreas Monastery area (Viney, 1994; Pantelas et al 1993, Yildiz et al, 2006).

Onosma fruticosum: It is endemic to Cyprus. It grows on dry, stony hillsides in garrigue habitats. It is common all over the island. Recorded at Karpaz SEPA (Viney, 1994; Pantelas et al 1993, Yildiz et al, 2006).

Onopordum cyprium**:** It is endemic to Cyprus. Occurs in Ap. Andreas region.

Onosma fructicosum: Cyprus endemic. Occurs in Ronnas region.

Origanum majoranona tenuifolium: It is endemic subspecies to Cyprus. It grows in garrigue habitats on dry limestone hillsides, or in open pine forests at 0-900m. It is locally abundant in the northern part of the island (Pantelas et al. 1993).

Scutellaria sibthorpii: It is endemic to northern Cyprus and grows on rocky calcareous hillsides, sometimes in coastal garrigue at 0-600 m. Locally common in northern range and in Karpaz (Pantelas et al 1993, Yildiz et al 2006).

Sedum porphyreum: It is endemic to Cyprus. It grows on limestone outcrops in Karpaz SEPA (Viney, 1994).

Senecio glaucus ssp. cyprium: Cyprus endemic. Occurs in Ap. Andreas region.

Teucrium divaricatum ssp. canescens: It is an aromatic plant. Endemic to Cyprus and grows in garrigue habitats on dry, rocky grounds or on limestone. It is locally common, recorded in Karpaz SEPA (Pantelas et al 1993).

Teucrium micropoidoides: It is an aromatic plant. endemic species of Cyprus island. It grows in garrigue on dry, rocky ground. Sometimes it grows in open pine forest or in maquis, sometimes on rocky ground by the sea. Locally abundant at low and mid altitudes (Pantelas et al. 1993)

Teucrium karpasiticum: It is North Cyprus endemic plant and micro-endemic to Karpaz peninsula. It is recently described as new to science. It is first recorded at extreme end of Karpaz peninsula, about 4 km NE of Apostolos Andreas monastery. Further investigations by Hadjikyriakou showed that it also occurs at western edge of Ronnas bay sand dunes. Generally its` habitat types are: 2250 Coastal dune juniper thickets with Juniperus phoenicea, 2260 dune sclerophyllous scrubs, 5210 Juniperus phoenicea arborescent mattoral, 5330 Thermo-Mediterranean and pre-desert scrub, 5420 Sarcopoterium spinosum phrygana, 6220 pseudo-steppe with grasses and annuals and 9560 endemic Mediterranean forests with Juniperus phoenicea (Hadjikyriakou and Hand, 2008).

	Name	*Import ance*	*Endem ism*	*No of localiti es*	*Population*	*Habitat type*	*Specific management*
1	*Helianthemum obtusifolium* *(Kibris Gunesgulu)*	*NI*	*B*	*5*	*Common*	*5210, 5420, 92D0*	*-*
2	*Teucrium karpasiticum* *(Kume Kurtluca)*	*NI*	*A*	*2*	*Rare*	*2250, 2260, 5330, 5420*	*-*
3	*Ophrys kotschyi* *(Kibris Ofrisi)*	*HD II**	*B*	*6*	*Rare*	*5210, 5330, 5420, 9540*	*-*
4	*Bosea cypria* *(Kibris Boseasi)*	*NI*	*B*	*3*	*Common*	*5210, 5330*	*-*
5	*Gladiolus triphyllus* *(Uc yaprakli bugday cicegi)*	*NI*	*B*	*2*	*Rare*	*2260, 5210, 5420*	*-*
6	*Bupleurum sintenisii*	*NI*	*B*	*1*	*Rare*	*2260, 5210, 5420*	

Table 2. Description of recorded important plant species during Natura 2000 project. 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.

2.10 Fauna

From the list of Annex II species found in the Habitat Directive, Karpaz SEPA principally contains important areas for two species of marine turtle nesting, monk seals, bird nesting and bird migration. Two species of marine turtle nest on the beaches (Fig. 3) – they are numbered 40-56 (Godley & Broderick 1992) found within the SEPA. There are seventeen beaches within the SEPA which support a regionally important nesting numbers of green turtles, but are less important in terms of the nesting numbers for loggerhead turtles. Ronnas Bay and Ayios Philon beaches are the 3rd most important nesting beaches for green turtles in the entire Mediterranean Basin (Kasparek et al 2001). Using the number of nests laid on these beaches each summer and dividing it by a factor of three (average number of nest per female) equates to between 5-24 female loggerhead turtles and 35-71 green turtles nesting annually (MTCP reports 1993-2008, EPD Reports).

Fig. 3. Turtle nesting beaches in Karpaz SEPA. The numbers refer to the report Godley B., Broderick AC. 1992. Glasgow University Turtle Conservation Expedition To Northern Cyprus 1992, Expedition Report and Beach Maps.



Globally the loggerhead turtle is categorised as endangered on the 2000 IUCN Red List (Hilton-Taylor 2000). Until recently the green turtle in the Mediterranean was considered a sub-population and was therefore classified by the IUCN as critically endangered. This however, has been re-classified to endangered, as it was felt that there was not enough evidence to support its sub-population status. As a result the green turtles found within the Mediterranean Sea are considered, for the time being, as the same population as those found in the entire Atlantic Ocean. Both species are also protected under the Annex II of the Bern Convention (1979).

Also seen at this site from the Annex II list of the Habitats Directive (Table 3) is the Egyptian Fruit Bat (*Rousettus aegiptiacus*) and the extremely rare Mediterranean Monk Seal (*Monachus monachus*). This SEPA contains caves which provide important resting and pupping sites for the monk seal (Haigh 2004, Gücü 2007).

Another annex listed bat species present includes the Greater Horseshoe Bat (*Rhinolophus ferrumequinum*) (Benda et al 2007). In addition, there is also Appendix I species from the Birds Directive found within the Karpaz SEPA. The Karpaz SEPA is on the fly path for hundreds of thousands of migratory birds during the spring and summer migrations. It is

inhabited by both of Cyprus endemic birds; the Cyprus Wheatear (*Oenanthe cypriaca*) and Cyprus Warbler (*Sylvia melanothorax*) and probably nests in reasonable numbers. This is particularly the case with the Cyprus Warbler, who prefers areas of low open maquis which includes *Calycotome villosa* and *Genista sphacelata* species, in which to feed, rest and nest.

Other species seen during either spring or autumn migrations are Common Cranes (*Grus grus*) Honey Buzzards (*Pernis apivorus*) and Marsh Harrier (*Circus aeruginosus*). Probably the single most important location for bird species is the Kleidhes Islands; these islands are located directly off of the eastern tip of the Karpaz peninsula and are the nesting sites for two species from the EU Birds Directive, these are the Shag (*Phalacrocorax aristotelis desmarestii*) and the Audouin's Gull (*Larus audouinii*). The Audouins Gull is found only in the Mediterranean region and the western coast of Saharan Africa. It breeds on small islands either colonially or alone, laying 2-3 eggs in nest on the ground. During the late 1960's its global population fell to approximately 1000 pairs, making it one of the rarest gull species in the world. Since this time it has established new breeding colonies, but still remains relatively rare with an estimated population of around 10,000 pairs. For the complete list of Annex I birds (Table 4).

For invertebrates, so far there are two endemic species of butterfly found within the boundaries of the SEPA these are the Cyprus Meadow Brown (*Maniola cypricola*) and Paphos Blue (*Glaucopsyche paphos*). In addition to these endemics, there are also three nationally rare species Two-tailed Pasha (*Charaxes jasius*), Pigmy Skipper *Gegenes pumilio,* Lang's Short-tailed Blue *Leptotes pirithous* (Ozden 2006) found within the boundaries of the Karpaz SEPA.

No	Name	Zoological group	Importance	No localities	Population	Specific management
1	*Monachus monachus*	M	HD II*		Extremely rare	No disturbance
2	*Caretta caretta*	R	HD II*	4	10-30	No disturbance during nesting
3	*Chelonia mydas*	R	HD II*	4	3-40	No disturbance during nesting
4	*Rousettus aegiptiacus*	M	HD II		Common	Protection breeding and roosting sites
5	*Rhinolophus ferrumequinum*	M	HD II	1	Common	Protection breeding and roosting sites

Table 3. Contains a list of Annex II faunistic species from the EC Habitats Directive (92/43/EEC) previously recorded within the boundaries of the Karpaz SEPA. (*) Denotes that the species is a priority species under the terms of the Habitats Directive (92/43/EEC)(MTCP reports 1993-2008, EPD Reports, Benda et al 2007, Haigh 2004, Gucu 2007).

No	Name	Zoological Group	EU Directive	Status	Specific Management
1	*Larus audounii*	B	BD I	rb (SPEC-1)	Restricted Access to Breeding Island
2	*Recurvirostra avosetta*	B	BD I	PM	
3	*Milvus migrans*	B	BD I	PM (SPEC-3)	
4	*Ciconia nigra*	B	BD I	pm	
5	*Hieraaetus pennatus*	B	BD I	pm	
6	*Ficedula albicollis*	B	BD I	PM (SPEC-4)	
7	*Grus grus*	B	BD I	PM (SPEC-3)	
8	*Calonectris diomeda*	B	BD I	PM (SPEC-2)	
9	*Emberiza caesia*	B	BD I	MB, PM	Protect Breeding Habitats
10	*Sylvia melanothorax*	B	BD I	RB, MB (SPEC-2)	Protect Breeding Habitats
11	*Oenanthe cypriaca*	B	BD I	MB (SPEC-2)	Protect Breeding Habitats
12	*Charadrius morinellus*	B	BD I	pm	
13	*Falco eleonorae*	B	BD I	MB, pm (SPEC-2)	
14	*Plegadis falcinellus*	B	BD I	PM	
15	*Pluvialis apricaria*	B	BD I	WV	
16	*Gallinago gallinago*	B	BD I	pm (SPEC-2)	
17	*Egretta alba*	B	BD I	pm, wv	
18	*Phoenicopterus ruber*	B	BD I	PM, WV	
19	*Sterna nilotica*	B	BD I	PM	
20	*Circus cyaneus*	B	BD I	pm, wv (SPEC-3)	
21	*Pernis apivorus*	B	BD I	PM (SPEC-4)	
22	*Alcedo atthis*	B	BD I	pm, wv (SPEC-3)	
23	*Lanius minor*	B	BD I	PM (SPEC-2)	
24	*Falco naumani*	B	BD I	PM, FB (SPEC-1)	
25	*Egretta garzetta*	B	BD I	PM, wv	
26	*Buteo rufinus*	B	BD I	rb, pm, wv	
27	*Circus aeruginosus*	B	BD I	PM, wv	
28	*Lanius nubicus*	B	BD I	MB, pm (SPEC-2)	
29	*Circus pygargus*	B	BD I	PM (SPEC-4)	

30	*Nycticorax nycticorax*	B	BD I	PM	
31	*Caprimulgus europaeus*	B	BD I	PM, MB (SPEC-2)	
32	*Emberiza hortulana*	B	BD I	PM	
33	*Pandion haliaetus*	B	BD I	pm (SPEC-3)	
34	*Circus macrourus*	B	BD I	PM (SPEC-3)	
35	*Falco peregrinus*	B	BD I	rb, pm, wv (SPEC-3)	Protect Breeding Sites
36	*Ardea purpurea*	B	BD I	PM	
37	*Lanius collurio*	B	BD I	PM, OB (SPEC-3)	
38	*Falco vespertinus*	B	BD I	PM (SPEC-3)	
39	*Coracias garrulus*	B	BD I	PM, MB (SPEC-2)	
40	*Sylvia rueppelli*	B	BD I	PM	
41	*Falco cherrug*	B	BD I	pm	
42	*Ficedula semitorquata*	B	BD I	pm	
43	*Phalacrocorax aristotelis desmarestii*	B	BD I	RB	Restricted Access to Breeding Island
44	*Calandrella brachydactyla*	B	BD I	PM, MB (SPEC-3)	
45	*Larus genei*	B	BD I	PM, wv	
46	*Ardeola ralloides*	B	BD I	PM	
47	*Burhinus oedicnemus*	B	BD I	PM, WV, RB (SPEC-3)	Protect Breeding Habitats
48	*Anthus campestris*	B	BD I	PM (SPEC-3)	
49	*Bucanetes githagineus*	B	BD I	pm	
50	*Pelecanus onocrotalus*	B	BD I	pm	
51	*Ciconia ciconia*	B	BD I	pm	
52	*Lullula arborea*	B	BD I	WV, RB ?? (SPEC-2)	

Table 4. Contains a list of Annex I species from the EC Birds Directive (79/409/EEC) previously recorded within the Karpaz 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.

2.11 Human use inside and outside the site

2.11.1 Nature conservation

The nature conservation activities have been limited to sea turtle protection projects in the Karpaz SEPA coastal area. The turtle protection activities were initiated by the Society for the Protection of Turtles (SPOT) and Glasgow University in 1992 and in the following years, "Tourism and Environment Ministry" and then the "Environment and Natural Resources Ministry" carried on the conservation efforts. (Kusetoğulları, 2007; Şenol, 2003). It has also been noted the number of nests do fluctuate throughout the years (Kusetoğulları, 2007; Şenol, 2003; Şenol, 2001).The beaches in the region rank among the most important ones on the entire island. Additionally, there is a research conducted by Cicek in 2008, shows an evaluation of the principles of management plan in general towards protection of the sea turtle population and nesting habitats.

2.11.2 Agriculture

Agriculture is the single most important activity carried out in entire Karpaz peninsula – including the protected areas. All agricultural seen throughout the northern part of Cyprus can also be seen in this area (KKTC Tarim ve Orman Bakanligi-CU Ziraat Fakultesi Toprak Bolumu 2000). The local residents earn an income from the olive and carob trees planted in their own fields on an annual basis. Additionally, wheat, barley and oats are planted in the fields. In the past, there has been water based agricultural activity (and is still being carried out, where water is available), however, due to a shortage in water resources the planting of cereal type crops has replaced this, as they require less irrigation. Additionally, there is also a plant nursery in the area.

Second to agricultural activities is the keeping and raising of livestock (sheep, goats, cattle etc). Turkish Cypriots have been breeding sheep and the population stands at approximately 15 – 20,000. There are also more than 3,000 goats in the region. Additionally, cattle breeding also exists in the region, however, this activity is loosing its economic feasibility and currently the numbers have been reduced to only 300 cows (Pers comm. Dipkarpaz Municipality Officers 2009).

Based on the information gathered from the locals, in the past, when there was more water available, this enabled water-based agricultural activities, such as tomatoes, pepper and eggplant, etc. However, today, the same activities are only carried out in the gardens and fields in close proximity to wells. The produce gathered is firstly consumed by grower, and any excess is sold.

Another income generator for the locals is carob and olive. Carob can be collected once a year. Based on interviews with the locals, there are about 20-25 carob trees per acre, covering a total area of 10-15 000 acres. Same figures were also collected for olive trees. There are about 25-35 trees per acres in 10-15 000 acres of land (Pers comm. Dipkarpaz Municipality Officers 2009).

In the past Donkeys were widely used in the area. Until the last quarter of the 20th century, they were required in agricultural rural life. The role of the donkey changed by the 1970s, as the living conditions in Cyprus underwent social and economic changes. The donkeys were left on Karpaz Peninsula to fend for themselves. Later however, donkeys in the Karpaz became an issue for discussion in the press, because over the years, the population of donkeys has grown in number and their requirements for food have bought them into conflict with some villagers. They often found their crops damaged by donkeys. Today, there are around approximately 800 donkeys remaining on the remotest part of the Island (J. Carrol pers. com.). Feral donkeys are an important issue because they are damage cultivated fields.

2.11.3 Forestry

A substantial part of the area is forestry land and is controlled by Forestry Department. Areas which have not been impacted on by agricultural activities principally contain *Pinus* species and shrub type bushes such as Juniper; provide an indication of the region's original vegetation type. Furthermore, it is known that the Forestry Department has carried out some reforestation in various parts of the region. Most of these plantations generally consist of *Pinus, Acacia and Eucalyptus* species.

2.11.4 Recreation and tourism

The most important income generator after agriculture and animal husbandry in the protected area is tourism. The bed capacity is limited and currently new establishments, which are visually more pleasing and have a stronger infrastructure, are being introduced by entrepreneurs. The existing establishments are scattered around the coastal area of the protected area as well as in the village centre. The overall tourism activities can be classified under "eco-tourism" or Pansion tourism and the businesses actually do their best to follow the general principles of sustainable tourism.

Even though limited, some of the establishments in the village are providing services for alternative tourism activities such as nature walks, agro-tourism, and scuba diving. However, it should be noted that these are few in number and their capacity is limited.

St. Andreas Monastery attracts the highest visitor numbers in the region. The stalls surrounding the Monastery are generally operated by the village women and who sell souvenirs, handicrafts such as Lefkara lace.

2.11.5 Hunting and fishing

Hunting, of permitted species during the official hunting season, does occur within the protected area. 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 a few semi-professional fishermen in the area and they use the beaches for laying the nets and sheltering occasionally.

Based on the field studies, there are 19 professional fishermen in Dipkarpaz village. Additionally, there are 58 fishermen from Yeni Erenkoy, 4 from Balalan, 2 from Taslica, and 26 from Kumyali who frequent waters around Karpaz and South Karpaz SEPAs. These fishermen usually fish in the northern coastal waters, however on occasions they will choose to fish along the southern shores.

2.11.6 Extraction

Occasional sand extracting has been detected during field surveys in the past, although this is not permitted by law.

2.11.7 Water use

There is a water supply pipe-line infrastructure available (Dipkarpaz village) which brings freshwater from Yesilkoy. The current agricultural and husbandry activities that are being carried in the region use water drawn from wells, existing streams and natural resources. The water from the coastal zone wells is slightly saline.

There are stream beds throughout the SEPA and these only flow after heavy rains. There are also wells dating back to the 50's and 60's scattered along or near the river beds.

2.11.8 Mining and quarrying

See part 2.11.6 Extraction

2.11.9 Military activity

There is no military activity at the area.

2.11.10 Education, demonstration and research

Some education and awareness raising actions has been carried out by the Environment and Natural Resources Ministry in the area. Research and publications directly related with the area mainly depends on sea turtles conservation program. There are two primary and two secondary schools in the area. One of each of these schools caters for the Greek Cypriot community in the area

2.11.11 Other uses

No other noteworthy uses have been encountered at the area.

2.12 Economic aspects and populations

The area is generally frequented and managed by the residents of the Dipkarpaz village and it is therefore their economic and social aspects on which these facts have been based. Based on the population count in 2006, there are 1935 – 968 male/ 967 female - permanent residents in the Dipkarpaz village. (State Planning Organisation, 2008). Based on the field studies, there are 150 Greek Cypriots living in the Dipkarpaz village (Pers comm. Dipkarpaz Municipality Officers 2009).

The employment and unemployment rates are based on the 2007 statistics, the unemployment rate for Iskele district is 13.3 percent and based on young population (aged 15-24) is 28.8 percent.

As mentioned in the other parts of the report, the main two income generator for the people living in Dipkarpaz village are agriculture and animal husbandry. Agricultural activities mainly focus on cereal products as there is a shortage of water supply. The crops and the end produce received from any year's activity are directly linked with the amount of rain fall in any year. In the cases of no or nearly no rainfall, the government pays for further incentives for the losses incurred.

Additionally, the Rural Development project, which is sponsored by the EUPSO, has started capacity building and information dissemination projects on agriculture in the region. Based on the report, there is draught, sallination, erosion are among the serious problems faced in the region. (Rural Development Plan, 2008). According to another study, in the Karpaz area, there are 3rd and 4th grade fields available, which could feasibly be used for cereal based agriculture. (Yorgancı, 2004).

Another income generator for the villagers is the making of "Lefkara lace" produced by the women of the village, which has reached its current level under the guidance of the "Education Ministry". These products are generally sold near the monastery, at bazaars or sold in bulk to other retailers.

In conclusion, the income (agriculture, animal husbandry, B&B, service sector, and civil servants) actually provides a basic living standard. Nevertheless, there are very limited resources for satisfying the social needs of the people in the area.

2.13 Past human land use

The large proportion of the past human land use, involved either agriculture and/or husbandry practices or forestry similar to those mentioned in section 2.11.2 and 2.11.3. In the past, there have been some sand mining activities from the beach and dune areas for use in the local construction industry; which has not been totally abandoned, but minimized.

2.14 Cultural heritage

Within the Karpaz SEPA many human ancient settlements have been identified from various historical periods. Some of these ancient sites include the Ancient city of Karpasia, Ancient Karpasia Harbour, Tsambres Necropolis, Anavrysia Necropolis, Latsia Necropolis, Ancient stone querries, Urania Ancient City, Agridia Ancient City, Khelones Ancient City and Kastros Settlement. In terms of cultural heritage, Apostolos Andreas Church and the Monastry (middle age) remain important sites of worship for many people of the Christian faith. Other sites include Ayios Philon Church and the Monastery (early – middle Byzantine), Ayios Yeorgios (middle Byzantine), Panaya Asomataos (early – middle Byzantine), Panaya Chrissiotissa (early-middle Byzantine) and Afrodit Akraia Temple (Helenistic and Roman Periods) (Öztek, 2005).

III. Evaluation and Objectives

3.1 Ecological criteria

3.1.1 Evaluation of habitats

The first step in evaluating the habitats is the preparation of a habitat map, which is the basis for all the other steps in the evaluation process. The situation in the field is that we have to deal with a mosaic habitat structure within particular localities. For simplification, visualisation and depicting the map legend we analysed habitat structure and selected only dominant and subdominant habitats occurring in the particular locality (Fig. 4).

Evaluation of habitats 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 in each table.

In order to assess habitat type importance in each locality (polygon), we calculate the value of Habitat importance (HI)

$HI = C * (R + CS)$

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

The overall assessment of the area based on summary values for particular habitat types occurring in the 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 percents of locali 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 map is shown in Fig. 5. The map provide the most important information for the delineation of zones within the SEPA. The Karpaz SEPA is composed of 219 seperate polygons.

Evaluation of marine and coastal habitats was based on two methodological approaches "Semi-automated estimated depth mapping of shallow marine environments using multispectral imagery" (details see in Smith, F. 2009) and "Survey using a combination of in-water census, i.e. surface snorkeling and SCUBA" (details see in Witt, M. 2009). The map of coastal and marine habitat distribution is combination of these two approaches (Fig. 4).

1140 Mudflats and sandflats not covered by seawater at low tide

Table 5a. Evaluation of habitat 1210 based on relative surface area (C), representativity (R) and conservation status (CS), num – numerical values for categories, HI – Habitat importance

locName	C	R	R_num	CS	CS_num	HI
Ka112	5	excellent	4	good	2	30

1150 Coastal lagoons

Table 5b. Evaluation of habitat 1210 based on relative surface area (C), representativity (R) and conservation status (CS), num – numerical values for categories, HI – Habitat importance

locName	C	R	R_num	CS	CS_num	HI
Ka40	10	significant	2	average or reduced	1	30

1210 Annual vegetation of drift lines

Table 5c. Evaluation of habitat 1210 based on relative surface area (C), representativity (R) and conservation status (CS), num – numerical values for categories, HI – Habitat importance

locName	C	R	R_num	CS	CS_num	HI
Ka90	20	good	3	excellent	3	120
Ka50	20	good	3	excellent	3	120
Ka40	30	good	3	average or reduced	1	120
Ka94	10	good	3	good	2	50
Ka91	10	good	3	good	2	50
Ka170	10	good	3	good	2	50
Ka163	10	good	3	good	2	50
Ka191	5	excellent	4	excellent	3	35
Ka190	5	excellent	4	excellent	3	35
Ka206	5	excellent	4	good	2	30
Ka205	5	excellent	4	good	2	30
Ka1	5	excellent	4	good	2	30
Ka0	5	excellent	4	good	2	30
Ka23	5	good	3	good	2	25
Ka22	5	good	3	good	2	25
Ka156	5	good	3	good	2	25
Ka152	5	good	3	good	2	25
Ka150	5	good	3	good	2	25
Ka198	2	excellent	4	good	2	12
Ka195	2	excellent	4	good	2	12
Ka194	2	excellent	4	good	2	12

1240 Vegetated sea cliffs of the Mediterranean coasts with endemic Limonium spp.

Table 5d Evaluation of habitat 1240 based on relative surface area (C), representativity (R) and conservation status (CS), num – numerical values for categories, HI – Habitat importance

locName	C	R	R_num	CS	CS_num	HI
Ka20	100	good	3	excellent	3	600
Ka207	80	good	3	good	2	400
Ka212	80	good	3	good	2	400
Ka0	75	excellent	4	average or reduced	1	375
Ka1	75	excellent	4	average or reduced	1	375
Ka214	80	good	3	average or reduced	1	320
Ka68	60	excellent	4	average or reduced	1	300
Ka69	60	excellent	4	average or reduced	1	300
Ka83	40	excellent	4	excellent	3	280
Ka205	20	excellent	4	excellent	3	140
Ka206	20	excellent	4	excellent	3	140
Ka50	30	significant	2	good	2	120
Ka90	30	significant	2	good	2	120
Ka81	35	significant	2	average or reduced	1	105
Ka22	20	good	3	average or reduced	1	80
Ka23	20	good	3	average or reduced	1	80
Ka194	10	excellent	4	good	2	60
Ka195	10	excellent	4	good	2	60
Ka198	10	excellent	4	good	2	60
Ka7	10	good	3	excellent	3	60
Ka8	10	good	3	excellent	3	60
Ka126	10	good	3	good	2	50
Ka128	10	good	3	good	2	50
Ka184	10	good	3	good	2	50
Ka200	7	good	3	excellent	3	42
Ka202	7	good	3	excellent	3	42
Ka204	7	good	3	excellent	3	42
Ka44	5	excellent	4	excellent	3	35
Ka48	5	excellent	4	excellent	3	35
Ka49	5	excellent	4	excellent	3	35
Ka40	5	significant	2	good	2	20

2110 Embryonic shifting dunes

Table 5e Evaluation of habitat 2110 based on relative surface area (C), representativity (R) and conservation status (CS), num – numerical values for categories, HI – Habitat importance

locName	C	R	R_num	CS	CS_num	HI
Ka205	20	excellent	4	good	2	120
Ka206	20	excellent	4	good	2	120
Ka40	10	excellent	4	average or reduced	1	50
Ka0	5	excellent	4	excellent	3	35
Ka1	5	excellent	4	excellent	3	35
Ka7	5	good	3	excellent	3	30
Ka8	5	good	3	excellent	3	30
Ka50	5	significant	2	excellent	3	25
Ka90	5	significant	2	excellent	3	25
Ka126	2	good	3	good	2	10
Ka128	2	good	3	good	2	10
Ka184	2	good	3	good	2	10

* 2250 Coastal dunes with Juniperus spp.

Table 5f Evaluation of habitat 2250 based on relative surface area (C), representativity (R) and conservation status (CS), num – numerical values for categories, HI – Habitat importance

locName	C	R	R_num	CS	CS_num	HI
Ka38	30	excellent	4	average or reduced	1	150
Ka112	10	excellent	4	excellent	3	70
Ka50	10	excellent	4	excellent	3	70
Ka90	10	excellent	4	excellent	3	70
Ka52	10	good	3	excellent	3	60
Ka53	10	good	3	excellent	3	60
Ka200	8	excellent	4	excellent	3	56
Ka202	8	excellent	4	excellent	3	56
Ka204	8	excellent	4	excellent	3	56
Ka40	10	excellent	4	average or reduced	1	50
Ka0	5	excellent	4	excellent	3	35
Ka1	5	excellent	4	excellent	3	35
Ka22	2	good	3	good	2	10
Ka23	2	good	3	good	2	10

2260 Cisto – Lavenduletalia dune sclerophyllous scrubs

Table 5g Evaluation of habitat 2260 based on relative surface area (C), representativity (R) and conservation status (CS), num – numerical values for categories, HI – Habitat importance

locName	C	R	R_num	CS	CS_num	HI
Ka112	75	good	3	good	2	375
Ka200	45	excellent	4	excellent	3	315
Ka202	45	excellent	4	excellent	3	315
Ka204	45	excellent	4	excellent	3	315
Ka77	50	good	3	good	2	250
Ka80	40	good	3	good	2	200
Ka84	25	excellent	4	excellent	3	175
Ka81	30	good	3	good	2	150
Ka40	20	excellent	4	good	2	120
Ka82	20	good	3	good	2	100
Ka101	10	good	3	excellent	3	60
Ka118	10	good	3	excellent	3	60
Ka194	10	excellent	4	good	2	60
Ka195	10	excellent	4	good	2	60
Ka196	10	good	3	excellent	3	60
Ka198	10	excellent	4	good	2	60
Ka50	10	good	3	excellent	3	60
Ka52	10	good	3	excellent	3	60
Ka53	10	good	3	excellent	3	60
Ka90	10	good	3	excellent	3	60
Ka190	5	excellent	4	excellent	3	35
Ka191	5	excellent	4	excellent	3	35
Ka130	5	good	3	excellent	3	30
Ka131	5	good	3	excellent	3	30
Ka79	10	significant	2	average or reduced	1	30

5210 Arborescent mattoral with Juniperus spp.

Table 5h Evaluation of habitat 5210 based on relative surface area (C), representativity (R) and conservation status (CS), num – numerical values for categories, HI – Habitat importance

locName	C	R	R_num	CS	CS_num	HI
Ka11	100	excellent	4	good	2	600
Ka18	100	excellent	4	good	2	600
Ka182	100	excellent	4	good	2	600
Ka19	100	excellent	4	good	2	600
Ka215	100	excellent	4	good	2	600
Ka216	100	excellent	4	good	2	600
Ka217	100	excellent	4	good	2	600
Ka218	100	excellent	4	good	2	600
Ka28	100	excellent	4	good	2	600
Ka29	100	excellent	4	good	2	600
Ka30	100	excellent	4	good	2	600
Ka42	100	excellent	4	good	2	600
Ka43	100	excellent	4	good	2	600
Ka46	100	excellent	4	good	2	600
Ka47	100	excellent	4	good	2	600
Ka54	100	excellent	4	good	2	600
Ka58	100	excellent	4	good	2	600
Ka6	100	excellent	4	good	2	600
Ka62	100	excellent	4	good	2	600
Ka63	100	excellent	4	good	2	600
Ka64	100	excellent	4	good	2	600
Ka65	100	excellent	4	good	2	600
Ka66	100	excellent	4	good	2	600
Ka75	100	excellent	4	good	2	600
Ka89	100	excellent	4	good	2	600
Ka213	85	excellent	4	excellent	3	595
Ka4	99	excellent	4	good	2	594
Ka5	99	excellent	4	good	2	594
Ka15	95	excellent	4	good	2	570
Ka16	95	excellent	4	good	2	570
Ka41	95	excellent	4	good	2	570
Ka17	90	excellent	4	good	2	540
Ka197	90	excellent	4	good	2	540
Ka2	90	excellent	4	good	2	540
Ka219	90	excellent	4	good	2	540
Ka24	90	excellent	4	good	2	540
Ka3	90	excellent	4	good	2	540
Ka183	85	excellent	4	good	2	510
Ka186	85	excellent	4	good	2	510
Ka7	85	excellent	4	good	2	510
Ka8	85	excellent	4	good	2	510
Ka70	100	excellent	4	average or reduced	1	500
Ka120	70	excellent	4	excellent	3	490

locName	C	R	R_num	CS	CS_num	HI
Ka125	70	excellent	4	excellent	3	490
Ka137	70	excellent	4	excellent	3	490
Ka145	70	excellent	4	excellent	3	490
Ka159	70	excellent	4	excellent	3	490
Ka161	70	excellent	4	excellent	3	490
Ka168	70	excellent	4	excellent	3	490
Ka172	70	excellent	4	excellent	3	490
Ka176	70	excellent	4	excellent	3	490
Ka208	70	excellent	4	excellent	3	490
Ka210	70	excellent	4	excellent	3	490
Ka31	80	excellent	4	good	2	480
Ka35	80	excellent	4	good	2	480
Ka36	80	excellent	4	good	2	480
Ka37	80	excellent	4	good	2	480
Ka59	80	excellent	4	good	2	480
Ka60	80	excellent	4	good	2	480
Ka209	95	excellent	4	average or reduced	1	475
Ka211	95	excellent	4	average or reduced	1	475
Ka10	70	excellent	4	good	2	420
Ka117	60	excellent	4	excellent	3	420
Ka124	60	excellent	4	excellent	3	420
Ka130	60	excellent	4	excellent	3	420
Ka131	60	excellent	4	excellent	3	420
Ka174	60	excellent	4	excellent	3	420
Ka177	60	excellent	4	excellent	3	420
Ka178	60	excellent	4	excellent	3	420
Ka192	60	excellent	4	excellent	3	420
Ka193	60	excellent	4	excellent	3	420
Ka52	70	excellent	4	good	2	420
Ka53	70	excellent	4	good	2	420
Ka9	70	excellent	4	good	2	420
Ka12	80	excellent	4	average or reduced	1	400
Ka13	80	excellent	4	average or reduced	1	400
Ka26	80	excellent	4	average or reduced	1	400
Ka27	80	excellent	4	average or reduced	1	400
Ka38	65	excellent	4	good	2	390
Ka44	65	excellent	4	good	2	390
Ka48	65	excellent	4	good	2	390
Ka49	65	excellent	4	good	2	390
Ka108	60	excellent	4	good	2	360
Ka109	60	excellent	4	good	2	360
Ka114	60	excellent	4	good	2	360
Ka154	60	excellent	4	good	2	360
Ka155	60	excellent	4	good	2	360
Ka166	60	excellent	4	good	2	360
Ka169	60	excellent	4	good	2	360
Ka173	60	excellent	4	good	2	360
Ka175	60	excellent	4	good	2	360

locName	C	R	R_num	CS	CS_num	HI
Ka101	50	excellent	4	excellent	3	350
Ka103	70	good	3	good	2	350
Ka105	70	good	3	good	2	350
Ka118	50	excellent	4	excellent	3	350
Ka141	70	good	3	good	2	350
Ka143	70	good	3	good	2	350
Ka150	70	good	3	good	2	350
Ka151	70	good	3	good	2	350
Ka152	70	good	3	good	2	350
Ka153	70	good	3	good	2	350
Ka156	70	good	3	good	2	350
Ka157	70	good	3	good	2	350
Ka196	50	excellent	4	excellent	3	350
Ka57	70	good	3	good	2	350
Ka92	70	good	3	good	2	350
Ka96	70	good	3	good	2	350
Ka97	70	good	3	good	2	350
Ka99	70	good	3	good	2	350
Ka171	65	good	3	good	2	325
Ka179	65	good	3	good	2	325
Ka163	60	good	3	good	2	300
Ka164	60	good	3	good	2	300
Ka170	60	good	3	good	2	300
Ka32	50	excellent	4	good	2	300
Ka33	50	excellent	4	good	2	300
Ka45	60	excellent	4	average or reduced	1	300
Ka67	60	excellent	4	average or reduced	1	300
Ka85	60	good	3	good	2	300
Ka86	60	good	3	good	2	300
Ka87	60	good	3	good	2	300
Ka88	60	good	3	good	2	300
Ka93	60	good	3	good	2	300
Ka95	60	good	3	good	2	300
Ka82	40	excellent	4	excellent	3	280
Ka74	50	excellent	4	average or reduced	1	250
Ka76	50	excellent	4	average or reduced	1	250
Ka91	50	good	3	good	2	250
Ka94	50	good	3	good	2	250
Ka102	60	good	3	average or reduced	1	240
Ka104	60	good	3	average or reduced	1	240
Ka115	60	good	3	average or reduced	1	240
Ka119	60	good	3	average or reduced	1	240
Ka132	60	good	3	average or reduced	1	240
Ka135	40	excellent	4	good	2	240
Ka136	40	excellent	4	good	2	240
Ka140	60	good	3	average or reduced	1	240
Ka142	60	good	3	average or reduced	1	240
Ka144	60	good	3	average or reduced	1	240

locName	C	R	R_num	CS	CS_num	HI
Ka149	60	good	3	average or reduced	1	240
Ka158	60	good	3	average or reduced	1	240
Ka160	60	good	3	average or reduced	1	240
Ka162	60	good	3	average or reduced	1	240
Ka22	40	excellent	4	good	2	240
Ka23	40	excellent	4	good	2	240
Ka98	60	good	3	average or reduced	1	240
Ka139	70	significant	2	average or reduced	1	210
Ka181	40	good	3	good	2	200
Ka107	60	significant	2	average or reduced	1	180
Ka110	60	significant	2	average or reduced	1	180
Ka116	60	significant	2	average or reduced	1	180
Ka121	60	significant	2	average or reduced	1	180
Ka122	60	significant	2	average or reduced	1	180
Ka123	60	significant	2	average or reduced	1	180
Ka129	60	significant	2	average or reduced	1	180
Ka133	60	significant	2	average or reduced	1	180
Ka138	60	significant	2	average or reduced	1	180
Ka146	60	significant	2	average or reduced	1	180
Ka147	60	significant	2	average or reduced	1	180
Ka148	60	significant	2	average or reduced	1	180
Ka165	60	significant	2	average or reduced	1	180
Ka167	60	significant	2	average or reduced	1	180
Ka71	30	excellent	4	good	2	180
Ka72	30	excellent	4	good	2	180
Ka73	30	excellent	4	good	2	180
Ka68	35	excellent	4	average or reduced	1	175
Ka69	35	excellent	4	average or reduced	1	175
Ka190	24	excellent	4	excellent	3	168
Ka191	24	excellent	4	excellent	3	168
Ka194	23	excellent	4	excellent	3	161
Ka195	23	excellent	4	excellent	3	161
Ka198	23	excellent	4	excellent	3	161
Ka126	20	excellent	4	good	2	120
Ka128	20	excellent	4	good	2	120
Ka184	20	excellent	4	good	2	120
Ka200	20	excellent	4	good	2	120
Ka201	20	excellent	4	good	2	120
Ka202	20	excellent	4	good	2	120
Ka203	20	excellent	4	good	2	120
Ka204	20	excellent	4	good	2	120
Ka50	20	excellent	4	good	2	120
Ka90	20	excellent	4	good	2	120
Ka188	15	excellent	4	excellent	3	105
Ka189	15	excellent	4	excellent	3	105
Ka21	20	excellent	4	average or reduced	1	100
Ka25	20	excellent	4	average or reduced	1	100
Ka0	10	excellent	4	good	2	60

locName	C	R	R_num	CS	CS_num	HI
Ka1	10	excellent	4	good	2	60
Ka34	10	excellent	4	good	2	60
Ka39	10	excellent	4	good	2	60
Ka61	10	excellent	4	good	2	60
Ka98	10	excellent	4	good	2	60
Ka40	10	excellent	4	average or reduced	1	50

5330 Thermo – Mediterranean and pre-desert scrub

Table 5i Evaluation of habitat 5330 based on relative surface area (C), representativity (R) and conservation status (CS), num – numerical values for categories, HI – Habitat importance

locName	C	R	R_num	CS	CS_num	HI
Ka130	35	excellent	4	excellent	3	245
Ka131	35	excellent	4	excellent	3	245
Ka154	35	excellent	4	good	2	210
Ka155	35	excellent	4	good	2	210
Ka166	35	excellent	4	good	2	210
Ka169	35	excellent	4	good	2	210
Ka173	35	excellent	4	good	2	210
Ka174	35	excellent	4	good	2	210
Ka175	35	excellent	4	good	2	210
Ka177	35	excellent	4	good	2	210
Ka178	35	excellent	4	good	2	210
Ka192	35	excellent	4	good	2	210
Ka193	35	excellent	4	good	2	210
Ka164	40	good	3	good	2	200
Ka181	40	good	3	good	2	200
Ka91	40	good	3	good	2	200
Ka93	40	good	3	good	2	200
Ka94	40	good	3	good	2	200
Ka95	40	good	3	good	2	200
Ka120	25	excellent	4	excellent	3	175
Ka137	25	excellent	4	excellent	3	175
Ka145	25	excellent	4	excellent	3	175
Ka159	25	excellent	4	excellent	3	175
Ka161	25	excellent	4	excellent	3	175
Ka168	25	excellent	4	excellent	3	175
Ka176	25	excellent	4	excellent	3	175
Ka102	40	good	3	average or reduced	1	160
Ka140	40	good	3	average or reduced	1	160
Ka142	40	good	3	average or reduced	1	160
Ka103	30	good	3	good	2	150
Ka105	30	good	3	good	2	150
Ka141	30	good	3	good	2	150
Ka143	30	good	3	good	2	150
Ka151	30	good	3	good	2	150
Ka153	30	good	3	good	2	150
Ka157	30	good	3	good	2	150

locName	C	R	R_num	CS	CS_num	HI
Ka163	30	good	3	good	2	150
Ka170	30	good	3	good	2	150
Ka171	30	good	3	good	2	150
Ka179	30	good	3	good	2	150
Ka57	30	good	3	good	2	150
Ka85	30	good	3	good	2	150
Ka86	30	good	3	good	2	150
Ka87	30	good	3	good	2	150
Ka88	30	good	3	good	2	150
Ka92	30	good	3	good	2	150
Ka96	30	good	3	good	2	150
Ka97	30	good	3	good	2	150
Ka99	30	good	3	good	2	150
Ka101	20	excellent	4	excellent	3	140
Ka117	20	excellent	4	excellent	3	140
Ka118	20	excellent	4	excellent	3	140
Ka124	20	excellent	4	excellent	3	140
Ka125	20	excellent	4	excellent	3	140
Ka196	20	excellent	4	excellent	3	140
Ka83	20	excellent	4	excellent	3	140
Ka150	25	good	3	good	2	125
Ka152	25	good	3	good	2	125
Ka156	25	good	3	good	2	125
Ka104	30	good	3	average or reduced	1	120
Ka172	20	good	3	excellent	3	120
Ka98	30	good	3	average or reduced	1	120
Ka138	35	significant	2	average or reduced	1	105
Ka144	35	significant	2	average or reduced	1	105
Ka147	35	significant	2	average or reduced	1	105
Ka148	35	significant	2	average or reduced	1	105
Ka149	35	significant	2	average or reduced	1	105
Ka158	35	significant	2	average or reduced	1	105
Ka160	35	significant	2	average or reduced	1	105
Ka165	35	significant	2	average or reduced	1	105
Ka167	35	significant	2	average or reduced	1	105
Ka108	20	good	3	good	2	100
Ka109	20	good	3	good	2	100
Ka114	20	good	3	good	2	100
Ka82	20	good	3	good	2	100
Ka107	20	good	3	average or reduced	1	80
Ka110	20	good	3	average or reduced	1	80
Ka115	20	good	3	average or reduced	1	80
Ka116	20	good	3	average or reduced	1	80
Ka119	20	good	3	average or reduced	1	80
Ka132	20	good	3	average or reduced	1	80
Ka146	20	good	3	average or reduced	1	80
Ka139	25	significant	2	average or reduced	1	75
Ka111	10	excellent	4	good	2	60

locName	C	R	R_num	CS	CS_num	HI
Ka121	20	significant	2	average or reduced	1	60
Ka122	20	significant	2	average or reduced	1	60
Ka123	20	significant	2	average or reduced	1	60
Ka129	20	significant	2	average or reduced	1	60
Ka133	20	significant	2	average or reduced	1	60
Ka162	20	significant	2	average or reduced	1	60

5420 Sarcopoterium spinosum phryganas

Table 5j Evaluation of habitat 5420 based on relative surface area (C), representativity (R) and conservation status (CS), num – numerical values for categories, HI – Habitat importance

locName	C	R	R_num	CS	CS_num	HI
Ka205	45	excellent	4	excellent	3	315
Ka206	45	excellent	4	excellent	3	315
Ka83	20	excellent	4	excellent	3	140
Ka22	20	good	3	excellent	3	120
Ka23	20	good	3	excellent	3	120
Ka181	20	good	3	good	2	100
Ka31	20	good	3	good	2	100
Ka59	20	good	3	good	2	100
Ka81	20	good	3	good	2	100
Ka82	20	good	3	good	2	100
Ka21	30	significant	2	average or reduced	1	90
Ka25	30	significant	2	average or reduced	1	90
Ka34	10	significant	2	excellent	3	50
Ka35	10	good	3	good	2	50
Ka36	10	good	3	good	2	50
Ka37	10	good	3	good	2	50
Ka39	10	significant	2	excellent	3	50
Ka60	10	good	3	good	2	50
Ka61	10	significant	2	excellent	3	50
Ka77	10	good	3	good	2	50
Ka85	10	good	3	good	2	50
Ka86	10	good	3	good	2	50
Ka87	10	good	3	good	2	50
Ka88	10	good	3	good	2	50
Ka98	10	significant	2	excellent	3	50
Ka104	10	significant	2	average or reduced	1	30
Ka154	5	excellent	4	good	2	30
Ka155	5	excellent	4	good	2	30
Ka166	5	excellent	4	good	2	30
Ka169	5	excellent	4	good	2	30
Ka17	5	good	3	excellent	3	30
Ka173	5	excellent	4	good	2	30
Ka175	5	excellent	4	good	2	30
Ka2	5	good	3	excellent	3	30
Ka24	5	good	3	excellent	3	30
Ka3	5	good	3	excellent	3	30
Ka52	5	good	3	excellent	3	30
Ka53	5	good	3	excellent	3	30
Ka98	10	significant	2	average or reduced	1	30
Ka120	5	good	3	good	2	25
Ka159	5	good	3	good	2	25
Ka161	5	good	3	good	2	25
Ka168	5	good	3	good	2	25

locName	C	R	R_num	CS	CS_num	HI
Ka171	5	good	3	good	2	25
Ka174	5	good	3	good	2	25
Ka176	5	good	3	good	2	25
Ka177	5	good	3	good	2	25
Ka178	5	good	3	good	2	25
Ka179	5	good	3	good	2	25
Ka192	5	good	3	good	2	25
Ka193	5	good	3	good	2	25
Ka40	5	good	3	good	2	25
Ka50	5	significant	2	excellent	3	25
Ka90	5	significant	2	excellent	3	25
Ka126	3	good	3	excellent	3	18
Ka128	3	good	3	excellent	3	18
Ka184	3	good	3	excellent	3	18
Ka137	5	significant	2	average or reduced	1	15
Ka138	5	significant	2	average or reduced	1	15
Ka139	5	significant	2	average or reduced	1	15
Ka144	5	significant	2	average or reduced	1	15
Ka145	5	significant	2	average or reduced	1	15
Ka147	5	significant	2	average or reduced	1	15
Ka148	5	significant	2	average or reduced	1	15
Ka149	5	significant	2	average or reduced	1	15
Ka158	5	significant	2	average or reduced	1	15
Ka160	5	significant	2	average or reduced	1	15
Ka165	5	significant	2	average or reduced	1	15
Ka167	5	significant	2	average or reduced	1	15

8310 Caves not open to the public

They were evaluated as habitats for the species.

9290 Cupressus forests (Acero-Cupression)

Table 5k Evaluation of habitat 9290 based on relative surface area (C), representativity (R) and conservation status (CS), num – numerical values for categories, HI – Habitat importance

locName	C	R	R_num	CS	CS_num	HI
Ka71	30	excellent	4	good	2	180
Ka72	30	excellent	4	good	2	180
Ka73	30	excellent	4	good	2	180
Ka135	20	excellent	4	good	2	120
Ka136	20	excellent	4	good	2	120
Ka126	10	excellent	4	excellent	3	70
Ka128	10	excellent	4	excellent	3	70
Ka184	10	excellent	4	excellent	3	70
Ka188	10	excellent	4	excellent	3	70
Ka189	10	excellent	4	excellent	3	70
Ka200	10	good	3	excellent	3	60
Ka202	10	good	3	excellent	3	60
Ka204	10	good	3	excellent	3	60
Ka106	5	excellent	4	excellent	3	35
Ka183	5	excellent	4	excellent	3	35
Ka186	5	excellent	4	excellent	3	35
Ka201	5	excellent	4	excellent	3	35
Ka203	5	excellent	4	excellent	3	35
Ka213	5	excellent	4	excellent	3	35
Ka197	5	excellent	4	good	2	30
Ka219	5	excellent	4	good	2	30

92D0 Southern riparian galleries and thickets (Nerio-Tamaricetea and Securinegion tinctoriae)

Table 5l Evaluation of habitat 92D0 based on relative surface area (C), representativity (R) and conservation status (CS), num – numerical values for categories, HI – Habitat importance

locName	C	R	R_num	CS	CS_num	HI
Ka207	10	excellent	4	excellent	3	70
Ka212	10	excellent	4	excellent	3	70
Ka214	10	excellent	4	excellent	3	70
Ka209	5	excellent	4	excellent	3	35
Ka211	5	excellent	4	excellent	3	35

9320 Olea and Ceratonia forests

Table 5m Evaluation of habitat 9320 based on relative surface area (C), representativity (R) and conservation status (CS), and num – numerical values for categories, HI – Habitat importance

locName	C	R	R_num	CS	CS_num	HI
Ka111	90	excellent	4	good	2	540
Ka84	75	excellent	4	excellent	3	525
Ka106	30	good	3	good	2	150
Ka77	30	good	3	good	2	150
Ka101	20	excellent	4	excellent	3	140
Ka118	20	excellent	4	excellent	3	140
Ka196	20	excellent	4	excellent	3	140
Ka83	20	excellent	4	excellent	3	140
Ka108	20	excellent	4	good	2	120
Ka109	20	excellent	4	good	2	120
Ka114	20	excellent	4	good	2	120
Ka117	20	good	3	excellent	3	120
Ka124	20	good	3	excellent	3	120
Ka78	20	good	3	good	2	100
Ka80	20	good	3	good	2	100
Ka107	20	good	3	average or reduced	1	80
Ka110	20	good	3	average or reduced	1	80
Ka115	20	good	3	average or reduced	1	80
Ka116	20	good	3	average or reduced	1	80
Ka119	20	good	3	average or reduced	1	80
Ka132	20	good	3	average or reduced	1	80
Ka146	20	good	3	average or reduced	1	80
Ka121	20	significant	2	average or reduced	1	60
Ka122	20	significant	2	average or reduced	1	60
Ka123	20	significant	2	average or reduced	1	60
Ka129	20	significant	2	average or reduced	1	60
Ka133	20	significant	2	average or reduced	1	60
Ka162	20	significant	2	average or reduced	1	60
Ka79	20	significant	2	average or reduced	1	60
Ka125	10	significant	2	excellent	3	50
Ka134	10	significant	2	excellent	3	50
Ka172	10	significant	2	excellent	3	50
Ka81	10	good	3	good	2	50

9540 Mediterranean pine forests with endemic Mesogean pines

Table 5n Evaluation of habitat 9540 based on relative surface area (C), representativity (R) and conservation status (CS), num – numerical values for categories, HI – Habitat importance

locName	C	R	R_num	CS	CS_num	HI
Ka201	70	excellent	4	good	2	420
Ka203	70	excellent	4	good	2	420
Ka135	40	excellent	4	good	2	240
Ka136	40	excellent	4	good	2	240
Ka208	30	excellent	4	excellent	3	210
Ka210	30	excellent	4	excellent	3	210
Ka200	10	excellent	4	excellent	3	70
Ka202	10	excellent	4	excellent	3	70
Ka300	10	excellent	4	excellent	3	70
Ka204	10	excellent	4	excellent	3	70
Ka205	10	excellent	4	excellent	3	70
Ka206	10	excellent	4	excellent	3	70
Ka213	5	excellent	4	excellent	3	35
Ka197	5	good	3	good	2	25
Ka219	5	good	3	good	2	25

3.1.2 Evaluation of plant species

The evaluation of plant species was based on previous studies carried out in the region (Viney 1994, Tsintides et al 2007) and current survey results. A total number of 22 endemic plant species were recorded, five of which are endemic to the northern part of the island (*Dianthus cyprius*, *Hedysarum cyprium, Limonium albidum ssp. cyprium*, *Scutellaria sibthorpii*, *Teucrium karpasiticum*). Additionally, six plant species were evaluated as nationally important during the surveys of the Natura 2000 project, these include: *Helianthemum obtusifolium, Teucrium karpasiticum, Ophrys kotschyi, Bosea cypria, Gladiolus triphyllus* and *Bupleurum sintenisii*.

Only one priority Annex II plant species (*Ophrys kotschyi*) was recorded within the site and was recorded in habitats 5210 (Arborescent mattoral with Juniperus spp.), 5330 (Thermo-Mediterranean and pre-desert scrub), 5420 (Sarcopoterium spinosum phryganas) and 9540 (Mediterranean pine forests with endemic Mesogean pines. These habitats should be kept in favourable conservation status and monitored annually for the presence of *Ophrys kotschyi*.

According to the EU Habitats Directive, endemic species require particular attention by reason of the specific nature of their habitat and /or the potential impact of their exploitation on their conservation status. Therefore, the natural range of the endemic plant species in Karpaz needs to be monitored and kept in favourable condition. Also documented in the literature there are 16 other endemic plant species which should also be surveyed for and mapped.

3.1.3 Evaluation of Animal Species

The evaluation of animal species incorporated detailed information found in previous studies (MTCP reports 1993-2008, Kuskor reports 1998-2001, Environment protection department Reports) and results from carried out by the Natura 2000 team. During these surveys the numbers of individuals were either recorded as Individuals, Pairs or as a population range (i.e. 1-5, 6 -10). The number of nesting female turtles was calculated by taking the total number of nests for each species and dividing it by three (the average number of nests laid by a female turtle in a season). A total of 57 Annex listed animal species have been recorded within the site. These include three priority species green turtle, loggerhead turtle and Mediterranean monk seal. But by far the largest group of Annex listed animals were the bird species; this again proves how important the Karpaz 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 Fig 6 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 protected area is to protect, preserve and enhance the natural values of the Karpaz SEPA and to raise awareness to those who reside in or visit the site. Additionally, the site should enable the local population to benefit from the numerous 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. Sea Turtles and their nesting habitats are already protected under the current environmental law. The target areas for this SEPA are the protection of Habitats Directive Annex I habitats and Annex II species, Birds Directive Annex I species together with Cyprus endemic plant and animal species. The priority animal species are two species of sea turtle (Green turtle *Chelonia mydas* and Loggerhead turtle C*aretta caretta*), the critically endangered Mediterranean Monk Seal (*Monachus monachus*), the globally threatened Audouin's Gull (*Larus* audouinii), two endemic breeding bird species (Cyprus Warbler *Sylvia melanothorax* and Cyprus Wheatear *Oenanthe cypriaca*) together with other migrant Annex I breeders such as the Shag (*Phalacrocorax aristotelis desmarestii*), Masked Shrike (*Lanius nubicus*) and others. The Karpaz SEPA is also and 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.

3.3 Socio-economic criteria

Here is listed and described are the main dynamic ecosystem and landscape processes, their spatial and temporal dimensions, together with their impact on the conservation objectives?

- Succession is a natural process where one habitat community is replaced by another, with the plant community eventually becoming a stable climax community. However continuous disturbance to habitats could alter the natural course of succession preventing the establishment of this stable climax community.
- Habitat fragmentation usually occurs when man-made activities divide a habitat into two or more parts. Also, the reduction in the size of the habitat area together with its fragmentation is another threat, thus development practices should be strictly controlled in and around the SEPA. Habitat fragments are also more prone to disturbance and elimination since they are smaller in size and bare more edges compared to the original habitat area.
- Intensification of agriculture: Intensive agriculture has several negative impacts on natural state of habitats, such as the opening up of more land for agricultural purposes and use of large quantities of fertilizers, pesticides, herbicides and insecticides. Opening of more land means destruction of habitats leading to habitat fragmentation and possible increased erosion. Use of large amounts of pesticides, herbicides and insecticides as well as fertilizers can additionally lead to the loss of natural species; alter the species composition, and decrease soil quality through salination. Pesticide pollution in the long term can result in bio-magnification in some species; this can be particularly harmful to top predators. Another long term impact of intensive agriculture could be the enrichment of the soil by nutrients, this in turn could leach into the sea surface waters causing eutrophication of coastal waters or increasing the soil fertility of dune systems. Leaching of nutrients into coastal waters could lead to algal blooms which could be particularly

harmful to Posidonia beds, which require oligotrophic conditions in order to survive. The damage to Posidonia beds could be a long term side effect of intensive agriculture or any other type of marine input which will lead to higher levels of nutrients. Increased nutrients in dune systems could lead to the introduction of atypical dune flora at the expense of natural dune species.

- Introduction of alien/exotic species can alter the population dynamics of native species and may lead to the invasion of natural habitats. This effect can be magnified on islands which can have fragile habitats and unique endemic species.
- Erosion of soils and substrates can lead to the degradation of fragile habitats such as dune systems, where the washing of silts and clays onto sandy areas reduce their quality and change plant communities.
- Increasing human traffic to use beach areas could result in increased damage to fragile dune systems.
- Unregulated hunting and fishing activities could have a detrimental effect on local species of flora and fauna. Trawling in coastal waters could result in harming sea turtles and valuable marine habitats such as Posidonia beds.

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

Zone 1a: This is a strict protection area in order to protect fragile dune habitats (1210, 2110) also, Juniperus mattorals, phrygana habitats, Olea and Ceratonia forests, pine tree habitats (5210, 5420, 9540, 9320). Access 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 for awareness raising purposes.

Zone 1b: This is strict protection zone in order to protect priority habitat of Posidonia beds (*1120). This zone includes the coastal zone to a depth of 30 m, and to a maximum distance from the shore of 1.5 km. In this zone fishing activities (using nets, trawling) and anchoring by boat users are forbidden. Also any motor craft (i.e. boats, Jet Ski) is not allowed.

Zone 1c: This is also strict protection zone in order to protect important nesting bird species on and around Kleidhes islands. This zone includes the Kleidhes Islands which also includes a 200 m exclusion zone surrounding the islands. It is also important to put regulations regarding the access to the Kleidhes islands during the nesting season of both the Audouin's Gull and Shag.

Zone 2: This is an active conservation zone in order to protect the nesting habitats of *Chelonia mydas* and *Caretta caretta*. This zone includes the beach parts of Ka 11, 40, 50, 118, 119, 127, 195, 206, 200, 126, 113 and Ka 83 from the high water line to the dune vegetation. This zone mainly covers Ayios Philon, Ronnas Bay, Golden Beach and other three beaches on the north coast of Karpaz SEPA. This zone is partially open to the public however, access should be restricted to escorted groups during the turtle nesting season. No building development should be allowed in this zone.

Zone 3a: This is a use zone in order to keep the current conservation status of habitats and species. This zone includes the village area, agricultural fields and is fully open access to the public. Some building can be allowed in this area, however, extreme care should be taken on

where and what type of building should be allowed in respect to the natural beauty of the area. It is necessary to promote restoration of old buildings and sympathetic development of agri or eco tourism practices around the village of Karpaz. On the other hand, it is necessary to strictly enforce certain activities during the turtle nesting season. During the turtle nesting season, the beach should be closed to public at night, vehicles should not be used along the beach, people should not make barbeque picnic on the beaches mentioned in zone 2.

Zone 3b: This is a use zone in order to keep the current conservation status of habitats and species. This zone includes the areas below the high water mark in polygons Ka 22, 40, 38, 50, 206, 200, 205, 202. This zone also covers restaurant, car parking areas, picnic areas at Golden Beach and Ayios Philon. Also it covers the car park and picnic areas at Ronnas Bay. This zone is open for beach users but it is necessary to enforce strictly certain activities during the turtle nesting season. During the turtle nesting season, the beach should be closed to public at night, vehicles should not be used along the beach, people should not make barbeque picnic on the beach. No building development should be allowed in this zone.

Zone 3c: This is also a use zone in order to keep the current conservation status of habitats. This zone includes little family run hotels, restaurants, Apostolos Andreas Monastery area, also includes marine area near Sea Birds restaurant in polygons Ka 0, 23, 170, 179, 191, 195. This zone is open to public use and some building can be allowed in this area (not more than one storey), however, extreme care should be taken on where and what type of building should be allowed in respect to the natural beauty of the area. It is necessary to promote restoration of old buildings and sympathetic development of agri or eco tourism practices.

Zone 4a and 4b: This zone is the buffer zone in order to conserve and enhance important EU habitats. This zone is distributed between strict protection zone 1a (east) and use zones 3a. It is also includes further deep sea with Posidonia beds throughout zone 1b. Please see the figure 7a for details. This zone is open to public but trawling by fishermen should be forbidden within the marine buffer zone.

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 four different types of zone (Fig 7a-d Zone Map):-

1. Strict Protection Zone
2. Active Conservation Zone
3. Use Zone
4. Buffer Zone

Additionally, some zones are divided into sub zones according to different conditions for management, conservation and/or use of localities (Tab. 6). 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 delineated based on presence of fragile dune habitats; mattoral, Juniperus, olive, carob and phrygana habitats with high and very high importance.
Zone 1b – was delineated based on presence of priority habitat 1120* Posidonia beds.
Zone 1c – was delineated based on presence of nesting bird species.
Zone 2 – was delineated based on presence of nesting of sea turtles.
Zone 3a – was delineated based on agricultural field areas
Zone 3b – areas below the high water mark to coastal line.
Zone 3c – includes little family run hotels, restaurants, Apostolos Andreas Monastery area, also includes marine area near Sea Birds restaurant

Zone 4 - is distributed between strict protection zone 1a (east) and use zones 3a, and also including further deep sea with Posidonia beds throughout zone 1b.

Table 6. Logical framework of operational objectives according to zones

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

Zone/ management unit	Operational objectives	Location of zone based on polygon codes	Objectives of interpretation and visitor management	Development objectives	Measures	Indicator of success	Assumptions and risks
Zone 1a Strict Protection zone	Protect/enhance fragile dune habitats, mattoral, juniper, olive, carob and phrygana habitats 2260, 5210, 5420, 1240, 9540, 9320	This zone is located in hilly part of the peninsula. Polygons excluded from this zone are agricultural areas. Ronnas, Ag Philon and Golden beach less the use and active conservation zones in these areas.	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.	Develop information pathway.	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. acacia) and encourage the use of native 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 1b Strict Protection zone	Protect priority habitat *1120 Posidonia beds	Coastal zone to a depth of 30 m to distance from the shore 1.5 km	Restricted access to boats such as trawling and anchoring	Provide information to the different stakeholder groups	Prevent fishing by nets and trawling, anchoring by all boat users	Keeping habitat in current area and condition	Appropriate information on location of zone, regular control.
Zone 1c Strict Protection zone	Protection of the nesting of birds	Kleidhes Islands including a 200m exclusion zone surrounding the	Access to the Kleidhes Islands should only be allowed under special permission during the	Provide information to the different stakeholder	Prevent disturbance to nesting Audouins Gull and Shag	Improved nesting successes and increased	Appropriate information on

		islands	nesting seasons of the Audouin's Gull and Shag.	groups and the placing of information boards and buoys	colonies	population	location of zone, regular control.
Zone 2 **Active Conservation zone**	Protect nesting habitats of *Caretta caretta* and *Chelonia mydas*	Beach parts of Ka 11, 40, 50, 118, 119, 127,195, 206, 200, 126, 113 and 83. from high water line to dune vegetation Ayios Philon, Ronnas Bay, Golden Beach and three other beaches on the north coast of the Karpaz SEPA	Partially open or zoned access, access would be restricted to escorted groups	Place information boards and raise awareness of all beach users during the nesting period?	Prevent disturbance to turtle nests, predation by dogs, access of cars, and any construction	Monitoring and conservation of sea turtle nests and increased nesting and hatching success	Appropriate information on the human impact, regular control, awareness raising of visitors
Zone 3a Use zone **Agriculture**	Keep current conservation status of habitat and species	Agriculture fields, recreational areas.	Fully open access, but the current code of conduct should be strictly enforced to restrict certain activities during the turtle nesting season (i.e. beach closed to public at night during the nesting season, no vehicles on the beach, no dogs, no barbeques etc)	Place information boards and work with local stakeholders	Prevent disturbance to habitats, promote restoration of old buildings and sympathetic development around the village of Dipkarpaz, prevent any further habitat fragmentation	Keeping monitoring habitats in the area at their current level and if possible improve some of them. Improved socio-economic situation of the local inhabitants	Appropriate information on the human impact, regular control, awareness raising of the visitors and local people
Zone 3b Use zone **Turtle beach**	Keep current conservation status of habitat and species	Areas below the High water mark in polygons Ka 22, 40, 38, 50, 206, 200, 205, 202.	Fully open access for beach users, but restrictions to be enforced as below. This will be a seasonal	Place information boards and raise awareness of	Prevent damage to contiguous zones	Keeping habitats in the area at their current level and improve	Appropriate information on the human

		Restaurant, car parking areas, picnic areas at Golden beach and Ayios Philon Car park and picnic areas at Ronnas Bay	zone, which will be closed to the general public from May-October during the hours 20:00-08:00	all beach users		the status of all contiguous zones	impact, regular control, awareness raising of the visitors and local people
Zone 3c Use zone **Recreation**	Prevent the disturbance or damage to contiguous habitats	This zone is mainly made up of tourist facilities (i.e. hotels and restaurants) and the site of Apostle St Andreas monastery. The zone also includes a marine area near Sea Birds restaurant. Polygons within the zone include Ka0, 23, 170,179 ,191 & 195.	Fully open access	Place information boards and raise awareness of all users	Prevent damage to contiguous zones	Keeping habitats in the area at their current level and improve the status of contiguous zones	Appropriate information on the human impact, regular control, awareness raising of the visitors and local people
Zone 4 Buffer zone	Conserve/enhance habitats of forest, mattoral, olea, carob, juniper, dunes and Posidonia	Distributed between zones 1a(east) and use zones 3a. Posidonia distributed throughout zone 1b	Fully open access, lighting of barbeques to be controlled to particular localities Access allowed to the marine part of the buffer zone, however, restrictions as to the type of activities allowed will be put into place	Place information boards Placing of buoys to delineate the marine buffer zone	Prevent intensive agriculture, ploughing intensive grazing, trawling by fishermen	Improvement of CS of habitat in each locality	Information to farmers, and incentives to adopt non intensive practices given.

4.2 Management Strategies

4.2.1 Management Strategies for Strict Protection Zone:

There are three sub zones under the Strict Protection Zone for the Karpaz SEPA: Zone 1a where the objective is the protection and enhancement of fragile dune, mattoral, juniper, olive, carob, forest, and phrygana (2260, 5210, 1240, 9540, 9320, and 5420) habitats; Zone 1b where the objective is protection of priority habitat 1120, Posidonia beds; and Zone 1c where the objective is protection of the nesting habitats of Audouin's Gull and Shag colonies.

In Strict Protection Zone 1a, the target habitats are the dune, mattoral, juniper, olive, carob, forest, and phrygana habitats. These habitats are fragile ecosystems, and are also prone to human impact. This zone is located in hilly part of the peninsula. Polygons excluded from this zone are agricultural areas. Also included in this zone are the dune areas of Golden Beach, Ayios Philon, and Ronnas Bay. The management strategies in this zone includes restricting access to current tracks and roads, the prevention of developing the area in order to maintain the area at its current level, placing information boards at the most prominent sites, and the development of an information pathway. Moreover the restoration of any degraded habitats and areas is another strategy and here it may require the removal of invasive exotic species such as *Acacia* spp., and replacing them using local native species.

For Strict Protection Zone 1b, where the objective is protection of the Posidonia beds, which constitute the coastal area to a depth of 30 m and to a distance of 1.5 km from the shore. In this zone the management strategy is to prevent disturbance to the Posidonia beds by prohibiting fishing by nets or trawling, and anchoring by all boat users. Therefore, different stakeholder groups should be provided with necessary information and buoys located to delineate the zone, and regular controls should be carried out to keep the Posidonia habitat in its current area and condition.

For Strict Protection Zone 1c, the target here is the nesting colonies of Audouin's Gulls and Shags, and for this purpose Zone1c covers Kleidhes Islands including a 200m exclusion zone surrounding the islands. The management strategy in this zone is the prevention of any disturbance to the nesting birds and their nests, through allowing access to the Kleidhes Islands only under special permission during the nesting seasons, providing information to the different stakeholder groups, and placing information boards for awareness raising. Indicators of success is the improved nesting success and increased population size, thus regular controls ad monitoring are required in order to gather the appropriate information.

4.2.2 Management Strategies for Active Conservation Zone:

The purpose of Active Conservation Zone is to prevent disturbance to nesting habitats of *Caretta caretta* and *Chelonia mydas* and to protect turtle nests and hatchlings. This zone covers the beach parts of polygons Ka11, Ka40, Ka50, Ka118, Ka119, Ka127, Ka195, Ka206, Ka200, Ka126, Ka113, and Ka83 from high water line to the dune vegetation. This Active conservation zone will be a seasonal zone; from May to October and will be closed to the general public during the hours 20:00-08:00 and access should be restricted to volunteers or Dept of Environment staff (who will carry out nightly beach patrols) and escorted groups only. Additionally, the management strategy includes the placing information boards in the area in order to raise awareness of all beach users. Prevention of several disturbing situations such as predation of nests by dogs, access of cars to the beach, construction in or near to the area, is also an important step for conservation of turtle nests and for achieving increased levels of turtle nesting. Moreover, appropriate information on the human impact within the site should be obtained in order to improve the management and nature protection strategies of the SEPA.

4.2.3 Management Strategies for Use Zone:

The objective in the Use Zone is to prevent any further damage to habitats and species and to keep the current conservation status of habitats and species. This zone is formed of three sub zones: Zone 3a which covers the agriculture fields, and recreational areas in polygons Ka21, Ka25, Ka32, Ka33, Ka34, Ka35, Ka36, Ka39, Ka61, Ka60, Ka78, Ka79, Ka106, Ka182, Ka183, Ka184, Ka186, Ka199, and Ka300; Zone 3b covering the areas below the high water line in polygons and the restaurants, car parking areas, picnic areas, Golden beach, Ronnas, and Ayios Philon in polygons Ka22, Ka40, Ka38, Ka50, Ka206, Ka200, Ka205, and Ka202; and Zone 3c which includes tourist facilities and Apostle St Andreas monastery in polygons Ka0, 23, 170,179 ,191 & 195. Part of zone 3c also includes a marine area near the Sea Birds Restaurant adjacent to polygons K0 & K23. All three zones in the Use Zone are fully open to the public use but the current code of conduct should be strictly enforced to restrict certain activities during the turtle nesting season (from May to October). The beach is closed to public at night during the nesting season and the use vehicles, dog walking barbeques on the beach is strictly forbidden. The management strategies for the Use Zone are to prevent damage to contiguous habitats and in that respect the promotion of restoration of old buildings and sympathetic development. 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 level and to improve the status of the contiguous zones. Through the placement of information boards, the awareness raising of the visitors and local stakeholders can be achieved.

4.2.4 Management Strategies for Buffer Zone:

The Buffer Zone's operational objective is to conserve and to enhance, wherever needed, the habitats in the zone. The target habitats in the Buffer Zone are forest, mattoral, olea, carob, juniper, and dunes habitats distributed in the east of Strict Protection zone 1a and in the use zone 3a. 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. To achieve this goal, the management strategy is to prevent intensive agricultural practices, ploughing and intensive grazing in the area. Additionally, informing farmers and providing incentives regarding the adoption of non intensive practices should be given and the placement of information boards are among the strategies for this zone. For both the marine buffer zone (which extends to a distance of 1.5 km from the shore) and its contiguous marine strictly protected area (Zone 1b), the aim is the protection of Posidonia beds. This zone will also require the placing of buoys and stakeholder awareness raising.

4.2.5 Feral Donkeys

The feral donkey problem (mentioned in section 2.11.2) has long been a delicate issue, with divided opinions as to what is the best solution. The proposal of this project is to have a fenced area in which all donkeys will be kept to the east of this fenced area. The issue to be solved is concerning the agriculture land present there. The optimal solution should be to stop agriculture activities in this core zone and so avoiding conflicts with the farmers. However, the farmers will need to be compensated for the loss of their land.

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 fragile dune habitats, mattoral, Juniper, olive, carob and phrygana habitats 2260, 5210, 5420, 1240, 9540, 9320				
Description of activities	**Time schedule**	**Implementing Body**	**Costs**	**Indicator of success**	**Who controls?**
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	Restoration and protection of fragile dune systems and the removal of planted exotics				
Where does it apply? Zone, management unit, location	Zone 1a				
Objectives	Protect/enhance fragile dune habitats 2260, 1210, 2110, 2250.				
Description of activities	**Time schedule**	**Implementing Body**	**Costs**	**Indicator of success**	**Who controls?**
Restoration of damaged dune areas by the erection of sand fences to encourage dune formation and the placing of walkways to allow access to beach areas and restrict access to sensitive dune areas	1-10 years	Natura 2000 project and Dept of Environment	**???**	Restored dune areas with natural habitats and species and the prevention of any future damage	Dept of Environment and Rangers
Removal of invasive exotics such as acacia	1-10 years	Forestry Department	**???**	No exotics	Rangers and Forestry Dept

Measure 3	Protection of the nesting of Audouin's Gull and Shag colonies.				
Where does it apply? Zone, management unit, location	Kleidhes Islands Zone 1c				
Objectives	Protecting the conservation status and nesting of Audouin's Gulls and Shags.				
Description of activities	**Time schedule**	**Implementing Body**	**Costs**	**Indicator of success**	**Who controls?**
Place information boards, buoys and inform local stakeholders	1 year	Natura 2000 project	**???**	Reduced use of Islands by local stakeholder	Rangers, Environment Dept

Measure 4	Prevent disturbance to turtle nests, predation by dogs, access of cars, construction				
Where does it apply? Zone, management unit, location	Nesting habitats of turtles (zone 2)				
Objectives	Protection of turtle nesting habitats				
Description of activities	**Time schedule**	**Implementing Body**	**Costs**	**Indicator of success**	**Who controls?**
Place information boards/markers and nest locations	1st year and continuing	Natura 2000 project and Dept of Environment	**???**	No damage to turtle nests	Rangers and Dept Environment
Place anti predator screens over turtle nests to prevent predation	Ongoing	Local turtle protection NGO or Dept of Environment	**???**	Reduction is nest predation	Dept of Environment
Stop access of any vehicles to the beach by preventing access to the beach from all car parks and access points	1st Year and continuing	Natura 2000 project, local NGO or Dept of Environment	**???**	No vehicular access to beach areas	Rangers and Dept Environment

Measure 5	Protect priority habitat Posidonia beds *1120				
Where does it apply? Zone, management unit, location	Areas offshore to a depth of 30m of all coastal polygons to a distance offshore of 1.5 km				
Objectives	Protecting the conservation status of this priority habitat				
Description of activities	**Time schedule**	**Implementing Body**	**Costs**	**Indicator of success**	**Who controls?**
Awareness raising among all possible stakeholder i.e. tour boats, scuba diving businesses, fishermen etc.	1st year and ongoing	Natura 2000 project, Governmental departments	**???**	Habitats remain in their current condition	Rangers, Tourism, Environment, Fisheries Depts
Placing of buoys to delineate the protected area of zones 1b and 4.	1st year and ongoing	Natura 2000 project	**???**	Reduce level of boat traffic	Rangers, Dept of Environment

Measure 6	Prevent disturbance of nesting turtles				
Where does it apply? Zone, management unit, location	Zone 3b				
Objectives	Protection of nesting turtles				
Description of activities	**Time schedule**	**Implementing Body**	**Costs**	**Indicator of success**	**Who controls?**
Maintain and improve the current system of lockable gates to prevent access to the beach area during the months of May-October, between the hours of 20:00-08:00	1st year and continuing	Natura 2000 project and Dept of Environment	**???**	Reduced access to beach area at night	Rangers and Dept Environment

Measure 7	Feral Donkey Research				
Where does it apply? Zone, management unit, location	Across Karpaz SEPA				
Objectives	Estimate population of feral donkeys and asses their impact on biodiversity and agriculture activity				
Description of activities	**Time schedule**	**Implementing Body**	**Costs**	**Indicator of success**	**Who controls?**
Research on impact of feral donkeys population on biodiversity	1st - 3rd years	Dept of Environment	**?**	Study	Dept of Environment

V. Monitoring

5.1 Monitoring of habitats

Monitoring of habitats will be focused on Annex I habitat types listed in Tab 1 and evaluated in chapter 3.1.1. Proposed methodology is a repetition of the inventory carried out during this project using "Habitat mapping manual" (Seffer et al. 2008). Data gathered will be stored in relational database developed by the project, which keep baseline data as starting point for the evaluation of monitoring results.

Period of monitoring depends on the dynamics and variation in species composition for particular habitat types. For more stabile habitat types such as forests, the period of five years is sufficient, however, for more dynamic habitat types (i.e. dune ecosystem) the period should be shorter and a one or two year period is proposed.

Evaluation of data will be based on 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 evaluation of species composition changes. Different techniques could be used taking into account variety of ordination and classification methods widely used in vegetation science (e.g. ter Braak et Smilauer 1998, Gauch 1982, Peet 1980).

Monitoring the distribution of Posidonia oceanica meadows should be realised using satellite remote sensing and/or aerial photography. Given the inherent interconnectivity of all habitats, remote sensing techniques should be used to map all meadows occurring along the northern part of Cyprus. Imagery should be purchased on a yearly basis so to quantify the change in Posidonia oceanica coverage through time.

<u>*1120 Posidonia beds (Posidonia oceanica)</u>

Common, in the coastal zone dominant habitat.

Period of monitoring: each year

Location of monitoring localities: coastal zone till depth 30 m

<u>1210 Annual vegetation of drift lines</u>

Rare habitat occurs in small area in number of localities.

Period of monitoring: each 2 years

Location of monitoring localities: polygons Ka20, Ka205, Ka190

<u>1240 Vegetated sea cliffs of the Mediterranean coasts with endemic Limonium spp.</u>

Rare and endangered habitat occurs in small area.

Period of monitoring: each year

Location of monitoring localities: polygons Ka90, Ka50, Ka195

2110 Embryonic shifting dunes

Rare, endangered and very sensitive habitat.

Period of monitoring: each year

Location of monitoring localities: polygons Ka205, Ka1, Ka40

* 2250 Coastal dunes with Juniperus spp.

Rare, endangered and very sensitive habitat.

Period of monitoring: each year

Location of monitoring localities: polygons Ka38, Ka112, Ka90

2260 Cisto – Lavenduletalia dune sclerophyllous scrubs

Rare, endangered and sensitive habitat.

Period of monitoring: each 2 years

Location of monitoring localities: polygons Ka200, Ka204, Ka84

5210 Arborescent mattoral with Juniperus spp.

Frequent, dominant habitat.

Period of monitoring: each 5 years

Location of monitoring localities: polygons Ka11, Ka182, Ka215, Ka54, Ka117

5330 Thermo – Mediterranean and pre-desert scrub

Frequent habitat covering large areas.

Period of monitoring: each 5 years

Location of monitoring localities: polygons Ka130, Ka175, Ka120, Ka193, Ka101

5420 Sarcopoterium spinosum phryganas

Frequent habitat covering large areas.

Period of monitoring: each 5 years

Location of monitoring localities: polygons Ka205, Ka22, Ka83

9290 Cupressus forests (Acero-Cupression)

Rare habitat.

Period of monitoring: each 5 years

Location of monitoring localities: polygons Ka71, Ka135, Ka189

92D0 Southern riparian galleries and thickets (Nerio-Tamaricetea and Securinegion tinctoriae)

Rare habitat.

Period of monitoring: each 5 years

Location of monitoring localities: polygons Ka207, Ka214, Ka211

9320 Olea and Ceratonia forests

Frequent habitat, very rare in excellent conservation status.

Period of monitoring: each 5 years

Location of monitoring localities: polygons Ka111, Ka83, Ka114

9540 Mediterranean pine forests with endemic Mesogean pines

Rare habitat in the site.

Period of monitoring: each 5 years

Location of monitoring localities: polygons Ka201, Ka135, Ka206

Tab 7 shows 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 more dynamic habitat.

Proposed time schedule for sampling (Tab 8) is based on previous analysis. It shows sampling plan of monitoring localities for 10 years period. No of polygons shows how many localities will be sampled in 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.

Tab. 7 Overview of habitat types, proposed localities for monitoring and period of sampling. Decisive period for sampling is the shortest one.

	Ka1	Ka11	Ka20	Ka22	Ka38	Ka40	Ka50	Ka54	Ka71	Ka83	Ka84	Ka90	Ka101	Ka111	Ka112	Ka114	Ka117	Ka120	Ka130	Ka135	Ka175	Ka182	Ka189	Ka191	Ka193	Ka195	Ka200	Ka201	Ka204	Ka205	Ka206	Ka207	Ka211	Ka214
1210 Annual vegetation of drift lines			2																					2						2				
1240 Vegetated sea cliffs							1					1														1								
2110 Embryonic shifting dunes	1					1																								1				
2250 Coastal dunes with Juniperus spp.					1							1			1																			
2260 Cisto-Lavendulatalia dune											2																2		2					
5210 Arborescent mattoral with Juniperus spp.		5						5									5					5												
5330 Thermo-Mediterranean and pre-desert scrub													5					5	5		5				5								
5420 Sarcopoterium spinosum phryganas				5						5																				5				
9290 Cupressus forests									5											5			5											
92D0 Southern riparian galleries																																5	5	5
9320 Olea and Ceratonia forests										5				5		5																		
9540 Mediterranean pine forests																				5								5			5			
Proposed period for monitoring	**1**	**5**	**2**	**5**	**1**	**1**	**1**	**5**	**5**	**5**	**2**	**1**	**5**	**5**	**1**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**2**	**5**	**1**	**2**	**5**	**2**	**1**	**5**	**5**	**5**	**5**

Tab. 8. Time schedule for sampling of monitoring localities for 10 years period. No of polygons shows how many localities will be sampled in particular year. B – means time of baseline sampling, which was done this year, S – means sampling of locality.

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Ka1	B	S	S	S	S	S	S	S	S	S	S
Ka11	B					S					S
Ka20	B		S		S		S		S		S
Ka22	B					S					S
Ka38	B	S	S	S	S	S	S	S	S	S	S
Ka40	B	S	S	S	S	S	S	S	S	S	S
Ka50	B	S	S	S	S	S	S	S	S	S	S
Ka54	B					S					S
Ka71	B					S					S
Ka83	B					S					S
Ka84	B		S		S		S		S		S
Ka90	B	S	S	S	S	S	S	S	S	S	S
Ka101	B					S					S
Ka111	B					S					S
Ka112	B					S					S
Ka114	B					S					S
Ka117	B					S					S
Ka120	B					S					S
Ka130	B					S					S
Ka135	B					S					S
Ka175	B					S					S
Ka182	B					S					S
Ka189	B					S					S
Ka191	B		S		S		S		S		S
Ka193	B					S					S
Ka195	B	S	S	S	S	S	S	S	S	S	S
Ka200	B		S		S		S		S		S
Ka201	B					S					S
Ka204	B		S		S		S		S		S
Ka205	B	S	S	S	S	S	S	S	S	S	S
Ka206	B					S					S
Ka207	B					S					S
Ka211	B					S					S
Ka214	B					S					S
No polygons		**7**	**12**	**7**	**12**	**29**	**12**	**7**	**12**	**7**	**34**

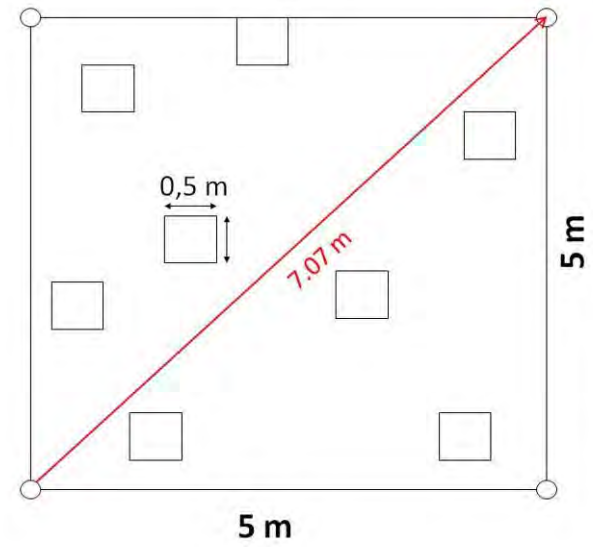
5.2 Monitoring of Plants

Monitoring of plant species will be focused on Annex II listed plant species, listed endemic plant species and other endemic plant species. The proposed methodology for monitoring is sampling of permanent plots (Fig 8).

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 8, permanent plot with size 5x5 m).

Fig 8.

Sampling design for plant species monitoring



5.2.1. Monitoring of Annex II species

Ophrys kotschyi(Kibris Ofrisi)

As it is Annex II listed priority plant species and endemic to Cyprus. The flowering period is during early March to early April. The population size of *O. kotschyi* should be monitored by using permanent plots. In addition to this, the number of individuals should be recorded and notes should be taken on the change of range (stable, increasing or decreasing, disappeared).

Period of monitoring: each year (during flowering period)

Monitoring localities: polygon Ka 98 and Ka 204.

5.2.2. Monitoring of listed endemic plant species

During this project ***Helianthemum obtusifolium, Teucrium karpasiticum, Bosea cypria, Gladiolus triphyllus*** and ***Bupleurum sintenisii*** recorded as important endemic plant species. The proposed methodology for monitoring is to monitor permanent plots as above.

Period of monitoring: each year (during flowering period)

Location of monitoring: to be identified.

5.2.3. Monitoring of other endemic plant species

There have been a further 16 endemic plant species reported in reviewed literature see under section 2.8. These plant species need to be surveyed and mapped using "Plant Inventory Manual" and should form part of future monitoring plans (i.e. each two years, during flowering period). Also notes should be taken on the change of range (stable, increasing or decreasing, disappeared).

Period of monitoring: each 2 years (during flowering period)

Location of monitoring: to be identified.

5.3 Monitoring of Animals

5.3.1 Marine turtles

The monitoring of marine turtles should be carried out annually and should begin during the second half of May and finish at the beginning of October (Table 9). This will allow for the complete coverage of the turtle nesting season in Cyprus which will include the laying of eggs to the hatching of nests. Ideally, the beach should be checked daily for signs of laying and hatching of eggs. Details of: clutch size, hatching success, live and dead hatchlings, reasons for non hatching of eggs; such as infertile, dead embryo, all should be recorded. Also, if the clutch totally fails the reasons for failure should be noted. This will enable the management team to thoroughly assess the protocols in place and if necessary adjust them accordingly.

5.3.2 Birds

Bird surveys ought to be performed on a monthly basis (Table 9) 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 sites or routes 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 to be comparable that the same routes and time is spent on each individual count.

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.

5.3.3 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 9). 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.

5.3.4Terrestrial Mammals (bats)

The quickest and easiest way to monitor bats is by using a bat detector, which can identify the different bat species by their different echolocation calls. It is best to carry out this during the summer months when bats are at their most active. Ideally it is best to survey bats 3 or 4 times during the summer months, walking the same route each time (Table 9). Also it is possible to use mist nets to capture bats, again proper training is needed if this method is to be used. Another way is to monitor the population sizes of know roosting sites, however, care should be taken not to disturb the roosting population.

5.3.5 Marine Mammals (Monk Seals)

For monk seal's due to their sensitivity to disturbance the least invasive technique to monitor their presence is the use of infra-red motion triggered cameras placed in their resting and pupping caves. The best time to do this is to install the cameras before the pupping season. The other way is to monitor the caves out of season to look for signs of seal use. However, both of these techniques will require the use of a boat and scuba equipment. Another technique is to carry out regular interviews with fishermen, scuba operators etc.

5.3.6 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 9). 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 9. Shows the number of days that surveys 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	4	1	1	4	4	4	1
Turtles					15	30	31	31	30			
Terrestrial Reptiles					1	1	1	1	1			
Bats					1	1	1	1	1			
Monk Seals	2	2								2	2	2
Invertebrates-Butterflies			1	1	1	1	1	1	1	1		

References

Benda P, Hanak V, Horacek I, Hulva P, Lucan R & Ruedi M 2007 Bats (Mammalia: Chiroptera) of the Eastern Mediterranean. Part 5. Bat fauna of Cyprus: review of records with confirmation of six species new for the island and description of a new subspecies Acta Soc, Zoology, Bohem Vol 71 71-130

Çiçek, B.A., 2008, Monitoring and Conservation of Sea Turtles Nesting at Karpaz Peninsula, Project No: BAP-A-07-09, Submitted to EMU Research Council, Famagusta, North Cyprus

Constantinou, G., 1995, Geological map of Cyprus.

Dev-Tech, 2006, FAA 119 Biodiversity Analysis, USAID, EPIQ II subcontract to PA Consulting. Contract # EPP-I-00-03-00015-00, subcontract # EPP3R015-4S-003.

Díaz-Almela E. & Duarte C.M. 2008. Management of Natura 2000 habitats. 1120 *Posidonia beds (Posidonia oceanica). European Commission. http://ec.europa.eu/environment/nature/natura2000/management/habitats/pdf/1120_Posidonia_beds.pdf

Doga Koruma Merkezi Raporu, 2006. BASELINE STUDY ON THE ENVIRONMENTAL CONDITIONS OF THE KARPAZ PENINSULA IN THE NORTHERN PART OF CYPRUS, March-October 2006, Funded by UNDP-PFF.

European Commission, 2004. Consolidated Text, produced by the Consleg system of the Office for official publications of the European Communities, Council Directive 92/43/EEc.

European Commission, 2007. Interpretation Manual of European Union Habitats - EUR27. DG Environment. July 2007.

Gauch, H. G., Jr. 1982. Multivariate Analysis and Community Structure. Cambridge University Press, Cambridge.

Godley, B.J., & Broderick, AC. 1992. Glasgow University Turtle Conservation Expedition to North Cyprus 1992, Expedition Report.

Gücü, A. 2007 North Cyprus Monk Seal Report.

Hadjikiyriakou, G. And Hand, R. (2008). Notes on Teucrium sect. Polium (Lamiaceae) in Cyprus. Willdenowia 38, 111-124.

Haigh, M. 2004 TRNC Mediterranean Monk Seal Project Report. Coastal Habitat Survey Oct 22-25th, In association with the Marine Turtle Conservation Project, 14 pp.

Hilton-Taylor, C. (Compiler) (2000) 2000 IUCN Red List of Threatened Species. IUCN, Gland, Switzerland.

Kasparek, M., Godley, B.J., Broderick, A.C., 2001. Nesting of the Green Turtle, Chelonia mydas, in the Mediterranean: a review of status and conservation needs. Zoology in the Middle East 24, 45-74.

Kusetoğulları, H., 2007, Kuzey Kıbrıs Türk Cumhuriyeti'nde deniz kaplumbağalarının korunması, II.Ulusal Deniz Kaplumbağaları Sempozyumu, 25-27 Ekim, Dalyan Muğla, 36-39.

Kuskor 1998 North Cyprus Bird Report, North Cyprus Society for the Protection of Birds and Nature. 56 pp.

Kuskor 1999 North Cyprus Bird Report, North Cyprus Society for the Protection of Birds and Nature. 62 pp.

Kuskor 2000 North Cyprus Bird Report, North Cyprus Society for the Protection of Birds and Nature. 46 pp.

Kuskor 2001 North Cyprus Bird Report, North Cyprus Society for the Protection of Birds and Nature. 47 pp.

MTA, 1999, Report on the Natural Resources of North Cyprus, Supported by TCAID

Marine Turtle Conservation Project Reports 1992-2008

Olsson H. 1974. Studies on South Swedish sand vegetation. Acta Phytogeogr.suec.60. Viney, 1994.

Ozden, O. 2006 Butterfly Diversity of the Karpaz Peninsula. UNDP PFF, Baseline study on the Environmental Condition of the Karpaz Peninsula in the northern part of Cyprus. 285 pp

Öztek, 2005, Karpaz Milli Parkı, Durum, Değerlendirme ve Öneriler, Report. Ministry of Environment and Natural Resources, Nicosia, 44p.

Pantelas, et al. 1993. Cyprus flora in colour. The Endemics. 104 pp.

Peet, R. K. 1980. Ordination as a tool for analyzing complex data sets. Vegetatio 42:171-4

Robertson, A. H. F. and C. Xenophontos ,1997. Cyprus. Encyclopedia of European and Asian regional geology. M. Moores Eldridge and W. Fairbridge Rhodes. London, United Kingdom, Chapman & Hall. 160-171.

Rural Development Plan, 2008, Provisional Rural Development Plan for the Northern Part of Cyprus 2008 – 2009, Supported by EUPSO.

Seffer, J, Lasak, R., Kara, C., Özden, Ö., Fuller, W., Mut, K. (2008). Habitat and Species Inventory Manual (Ms.). Technical assistance for management and protection of potential Natura 2000 sites in the northern part of Cyprus. Nicosia.

Şenol, A., 2001, Marine Turtle Protection and Research Project, Project Report., UNOPS, 13 p.

Şenol, A., 2003, Deniz Kaplumbağalarının İzlenmesi ve Korunması (Contract No: WSE-PS02-4164, UNOPS, UNDP,USAID) Proje Raporu, Turizm ve Çevre Bakanlığı, Lefkoşa, KKTC, 17 s.

Smith, F. 2009. Semi-automated estimated depth mapping of shallow marine environment s using multispectral imagery. Ms.

State Planning Organization, 2008, 2006 Population and Housing Unit Census, http://www.devplan.org/

ter Braak, C. J. F., and P. Šmilauer. 1998. CANOCO reference manual and User's guide to Canoco for Windows: Software for Canonical Community Ordination (version 4). Microcomputer Power, Ithaca.

Tsintides et al 2007. The Red Data Book of the Flora of Cyprus. Lefkosia, 466 pp.

Tsintides, Takis, et. al. 2002. Trees and Shrubs in Cyprus. Foundation: Anastasios G. Leventis - Cyprus Forest Association. Lefkosia 2002.

Viney, D. E., 1994. An Illustrated Flora of North Cyprus. Published by Koeltz Scientific Books, Koenigstein, Germany

Witt, M. 2009. Marine habitats and species of coastal waters adjacent to Special Environmentally Protected Areas in the northern part of Cyprus. Ms.

Yildiz et al. 2006. North Cyprus Endemics, Lefkosa, 38 pp.

Yorgancı, A., 2004, Analysis of Suitable Areas for Wheat Agriculture in North Cyprus, 3rd GIS Days In Turkey, 1-16p

Figures

Figure 1. Satellite map showing the boundaries of the Karpaz SEPA

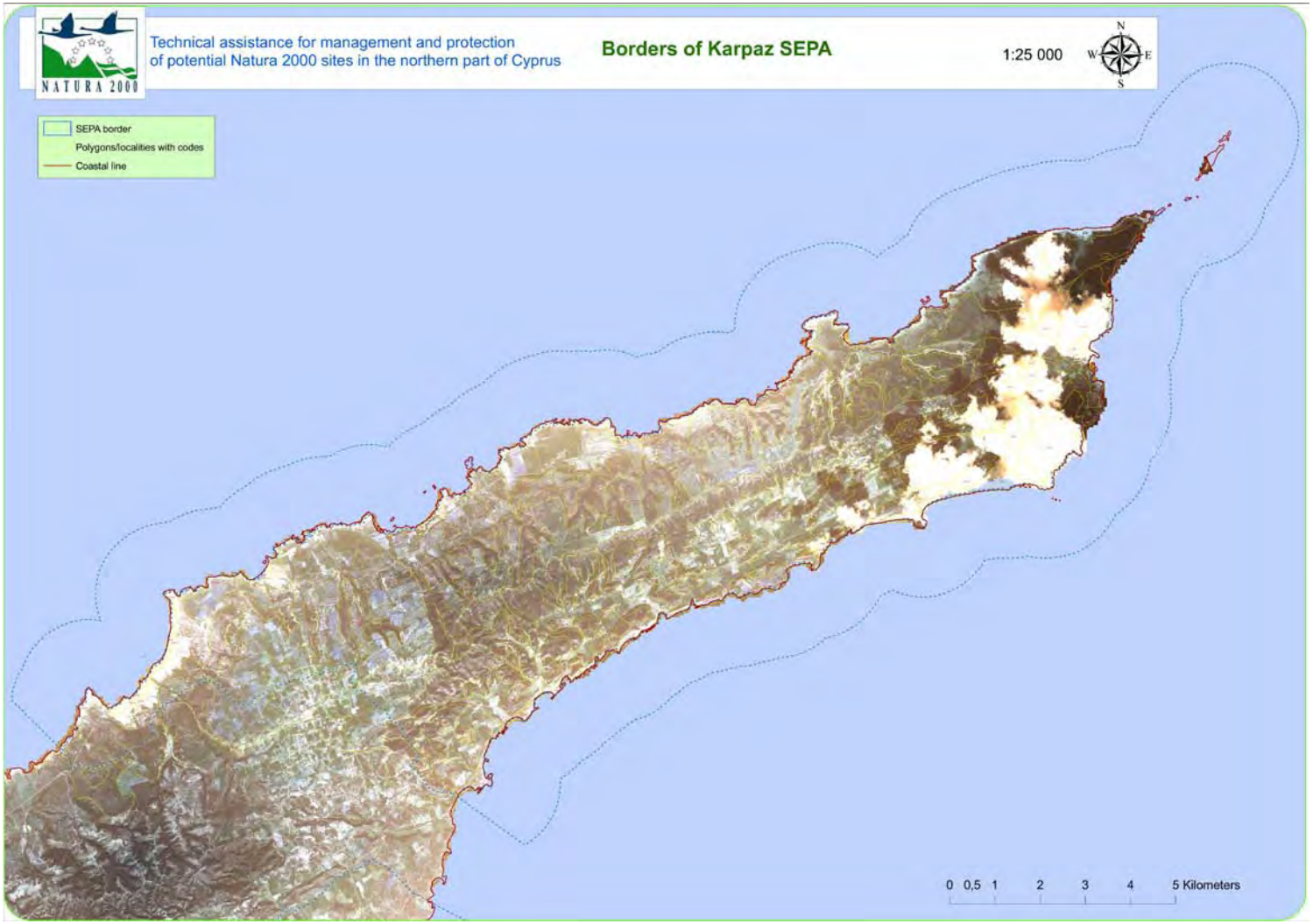


Figure 2. Ordinance map of the Karpaz SEPA/South Karpaz SEPA

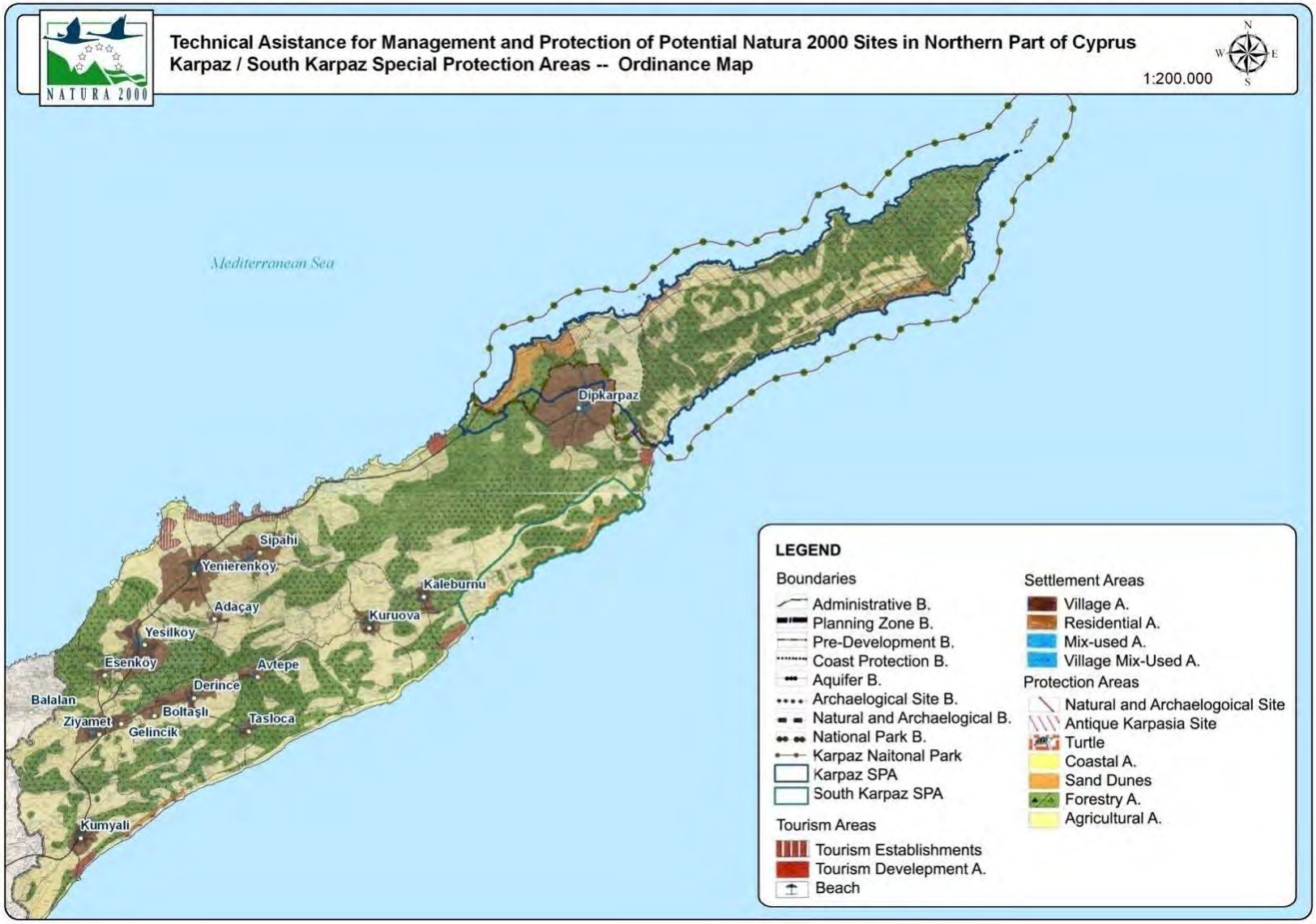


Figure 4. Habitat map of Karpaz SEPA

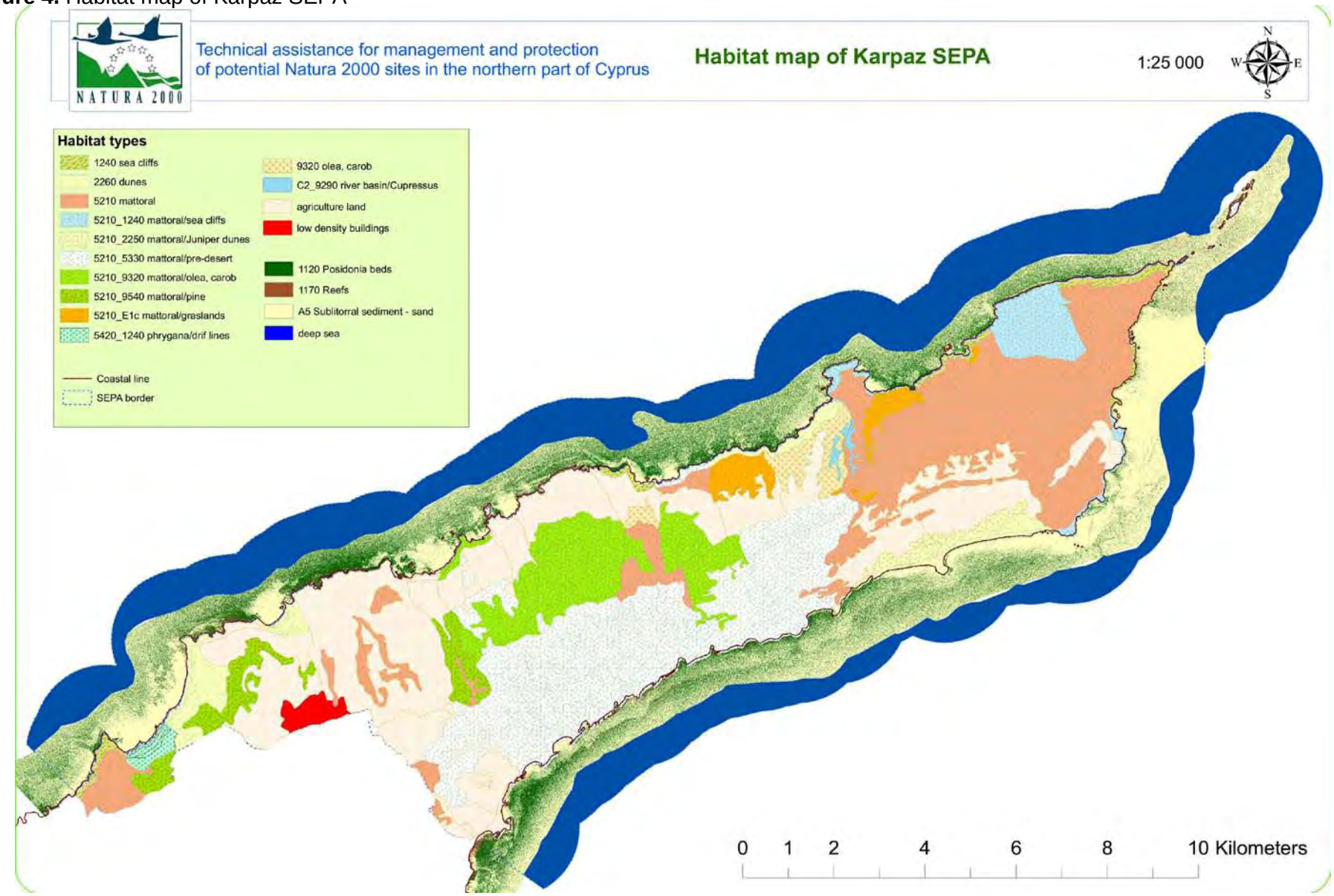


Figure 5. Evaluation of terrestrial localities based on quality and quantity of Annex I habitats

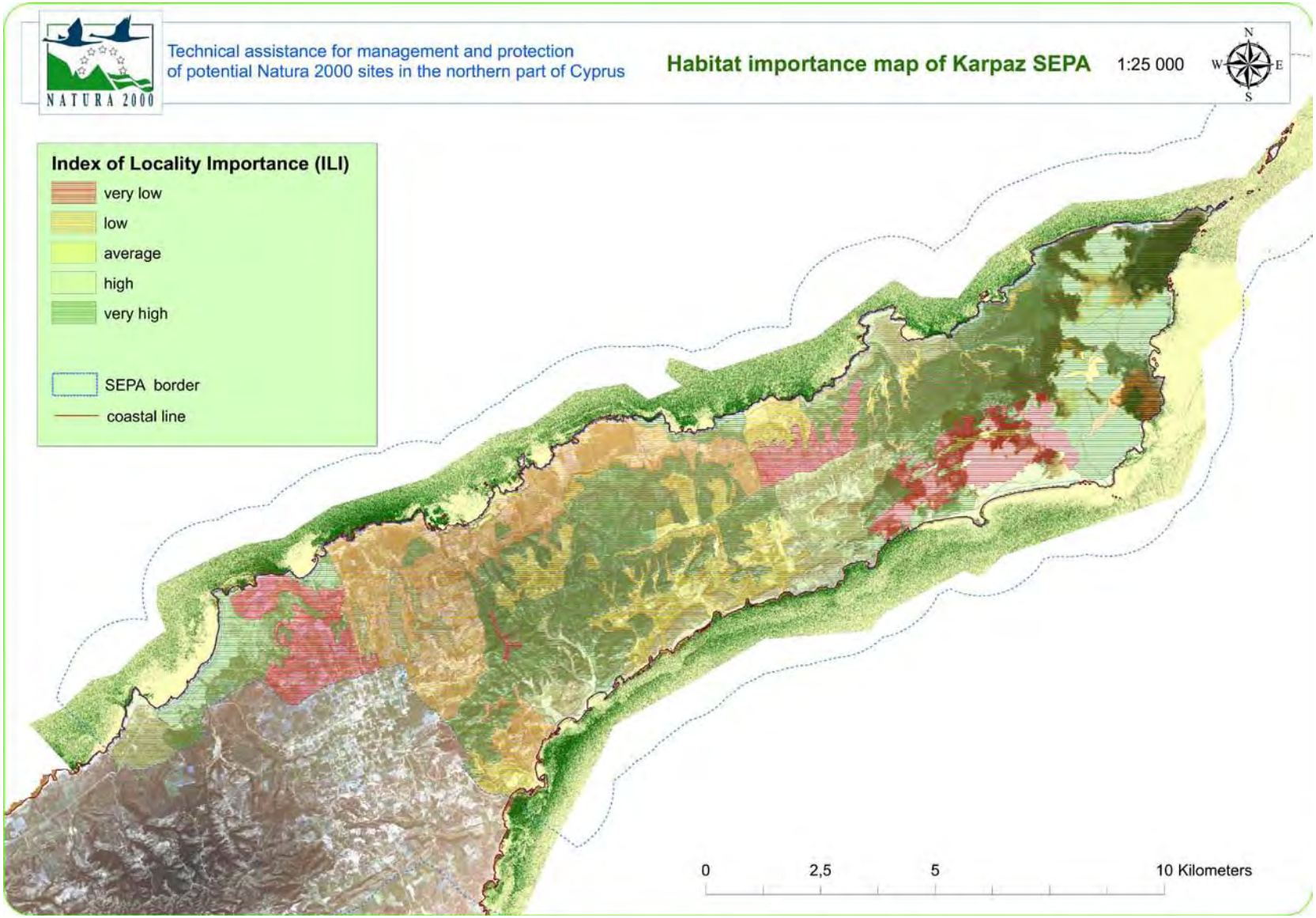


Figure 6. Importance of localities based on quantities of Annex animal species

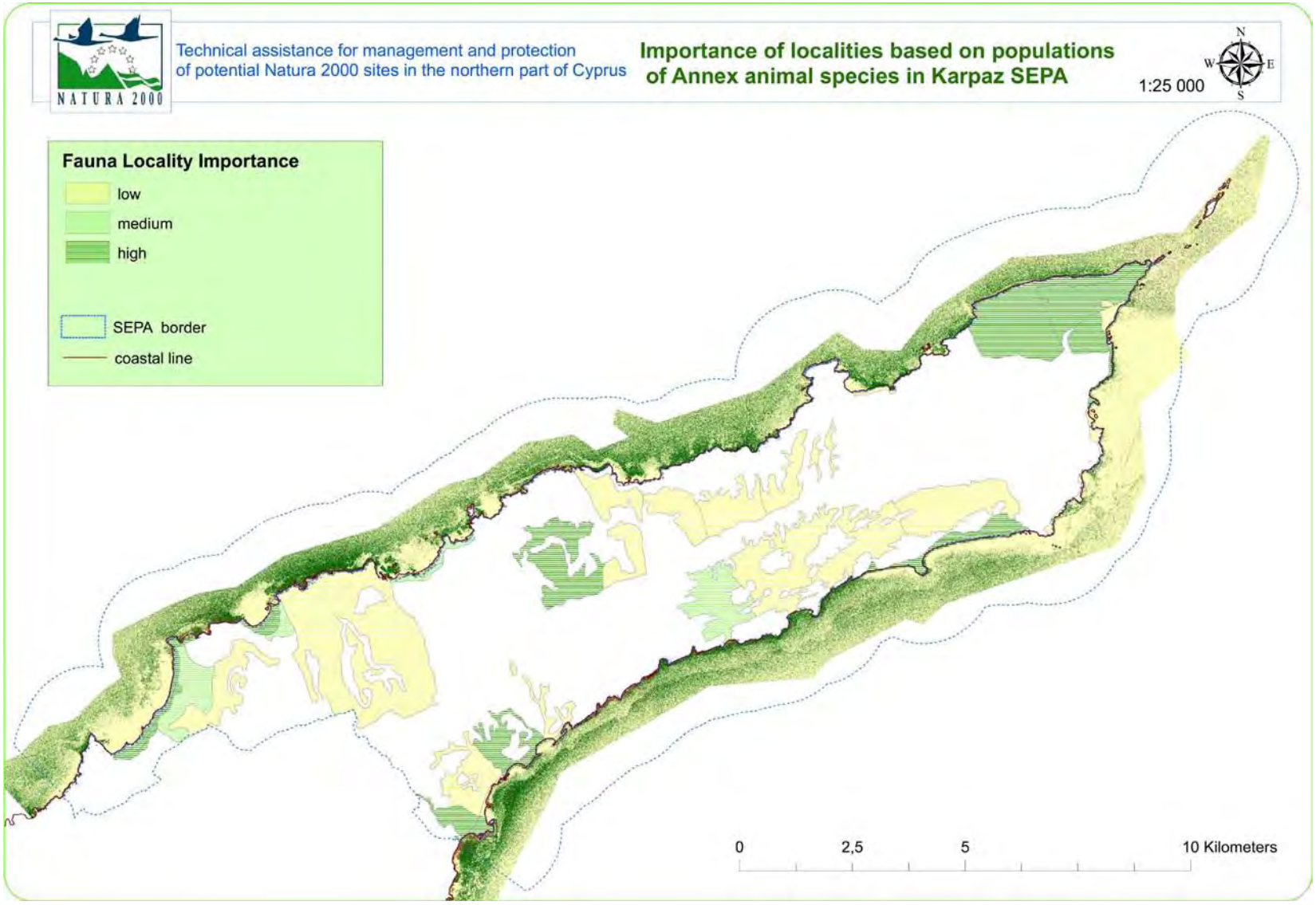


Figure 7. Proposal for zoning of the Karpaz SEPA.

