

# **Fourth National Report to the United Nations Convention on Biological Diversity**



## **CYPRUS**

**DEPARTMENT OF ENVIRONMENT  
MINISTRY OF AGRICULTURE, NATURAL RESOURCES AND ENVIRONMENT**

**NICOSIA, SEPTEMBER 2010**

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## **Executive Summary**

### **Introduction**

Cyprus, the third largest island in the Mediterranean is situated just 65 km south of Turkey and 105 km west of Syria. It has an area of 9.251 km<sup>2</sup> with its greatest length approximately 225 km and its greatest width approximately 96 km. It is endowed with a great variety of landscapes ranging from mountainous regions and plains to an extensive coastal line which is extremely irregular in outline.

Its insular character, the varied climate, geology and topography along with the long history of human activities dating back to 8200 AD, have shaped the landscape and created a wide variety of natural, semi-natural and anthropogenic habitats where a large number of plant and animal species prosper. In Cyprus, as in the rest of Europe, agriculture dominates much of the landscape, extending over half of the island's territory and comprises mainly rain fed but also irrigated, crops. Small fields with a diversity of arable land and tree crops, such as the traditional olive groves, carob trees and vineyards, create a mosaic of landscapes, ideal for many wildlife species, particularly birds and reptiles. Much of this agricultural land consists of areas of small holdings with a mixture of ploughed crops, vineyards and tree orchards, most farmed in a traditional (non-intensive) way. Very often agricultural land, especially on mountains, alternates with fallow or abandoned land, colonized by shrubby or phrygic vegetation, which further diversifies habitat conditions.

Natural vegetation is made up primarily of extensive, natural pine forests, evergreen, sclerophyllous shrubs (maquis) and phrygana, while other vegetation types occupy more specialized habitats like riverine vegetation along streams, hasmophytes on cliffs, hygrophilous vegetation in water flooded sites etc. In total, 48 habitat types are known to exist on the island providing refuge to a large number of endemic, rare and otherwise important species.

## Status, Trends and Threats to Biodiversity

Cyprus is considered as biodiversity “hotspot” area (Myers *et al.* 2000), as it is the only centre of birds endemism in Europe and the Middle East. Also six out of its 11 wild mammals are endemic and sub-endemic, whereas it is a centre of insects endemism and plant diversity. Consequently, the percentage of Cyprus endemism regarding plants, calculating all the taxonomical levels, is among the highest in Europe.

The natural wealth of the island, its ecosystems, habitats, flora and fauna, is the result of evolution, the influence of special climatic, geological and soil conditions, topography and morphology, the proximity to the three continents (Europe, Asia, Africa), its the long isolation as an island and the influence of man.

Considering the terrestrial ecosystem in total, 48 habitat types are known so far to exist on the island, 14 of which are priority habitat types, according the Habitats Directive of the European Union, including 4 endemic habitat types: Serpentinophilous grasslands of Cyprus (62B0\*), Peat grasslands of Troodos (6460\*), Scrub forest of *Quercus alnifolia* (9390\*) and *Cedrus brevifolia* forests (9590\*).

The flora of Cyprus comprises about 1738 indigenous taxa including 143 endemics. There are also hundreds of cultivated species many of which are adventives. About 238 indigenous plant taxa have been classified as threatened during a recently implemented project by a group of government departments and NGOs, based on the IUCN Red List criteria. About 32 mammal taxa (including 18 bats, 3 dolphins, and 1 seal) are known to exist, of which 2 are endemic (mice) and 2 endemic subspecies (mufflon and hedgehog). Birds include 385 species of which 2 are endemic and 4 subspecies. There are 22 reptiles, including 2 endemic species and 3 amphibian species. Marine fish species include more than 80 taxa. More than 5.000 insect species have been recorded so far, including many endemics. Mushrooms, bryophytes and lichens have not been adequately studied but there is evidence that numerous species exist.

The present trend in biodiversity shows signs of improvement, after a long period of decline during the 20<sup>th</sup> century. This positive trend is largely the result of coordinated efforts by the competent government departments, NGOs and the measures taken after Cyprus's accession into EU, mainly with the establishment of the Natura 2000 network, but also with the enactment and enforcement of relevant legislation.

The main threats to the biodiversity of the island are a result of human activities caused by urban and tourism (mainly by the coast) development, infrastructure, grazing, and rural area abandonment.

Costal habitats have suffered serious destruction and reduction, with consequence of biodiversity loss. The increase of land demand for the tourism development, the land use changes that led to fragmentation of habitats, as well as habitat loss, placed excessive pressure on biodiversity. Many coastal habitats, such as dune habitats and coastal marshes, have been compromised or destroyed.

The construction of dams, overexploitation of water and the diversion of water for irrigation has adverse impacts on the ecology of the rivers and riparian ecosystems.

Furthermore the abandonment of traditional subsistence and the development of intensive agriculture, the use of agrochemicals, along with land-use changes, influenced negatively the agroecosystems and the species that live there.

Illegal trapping of some species (with the use of nets and limesticks) is also a serious problem.

The main threats to biodiversity include the following:

- Rapidly expanding construction industry especially for the tourist industry along the coastline, as well as an extensive road network. (highways and rural roads)

- Rural abandonment leading to the loss of indigenous species which are dependent on traditional agriculture but also of local varieties of crop plants.
- Overexploitation of the scarce underground and surface water resources
- Climatic change which is reflected in the reduction of the average annual precipitation by 16% over the last century and increase in average annual temperatures by 1 °C.
- Forest and wild fires in general
- Invasive species both plant and animal.
- Non-sustainable agricultural practices locally, especially in irrigated crops
- Overgrazing, locally
- Overexploitation of fisheries stocks
- Pollution of soil, air and water caused by industrial, domestic and farming activities

### **National Strategies Related to Biodiversity**

Cyprus has not yet prepared a comprehensive Biodiversity Action Plan, however the related national policies (Sustainable Development Strategy, Forest Policy, Agriculture Policy, Water Policy and Fisheries Policy etc.), safeguard the biodiversity of the Island. Also National Action plans such as the Desertification Action Plan that are in the process of being implemented, include measures that will further guarantee the biodiversity protection.

The Rural Development Policy of the European Union has been applied across the European territory through the implementation of co-financed rural development programs prepared with the Member States and approved by European Commission.

Accordingly, Cyprus implements the Rural Development Programme (RDP) for the programming period 2007-2013, as well as the implementation of cross compliance.

A part of the RDP is focused on environmental protection measures, such as those



under pillar 2. The pillar 2 aims to maintain and further enhance the environment. Funding of the measures under this pillar include measures for the protection of forests from fires, reforestation of burned areas, conservation and improvement of social and ecological functions of forests. The agri-environment schemes provide economic assistance to meet specific agri-environmental commitments in Natura 2000 areas. The agri-environmental commitments concern the protection of the habitats and species in order to maintain wildlife and protect biodiversity.

Furthermore, along with the environmental measures, the program provides financial assistance to disadvantaged areas, promotes organic production of agricultural products, agrotourism etc.

In order to implement the obligations that arise by the Nature Directives of the EU (Habitats and Birds Directives), Cyprus has included in the European Network Natura 2000, 40 Sites of Community Importance and 29 Special Protected Areas. The Department of Environment and the Forestry Department aiming to achieve an adequate conservation status for the Natura 2000 sites are now in the procedure of preparing management plans for these areas, while for the marine Natura 2000 sites the Department of Fisheries and Marine Research has elaborated relevant management plans. The management plans address biodiversity conservation issues as well as monitoring of habitats and species in order to complete the ecological status of the sites.

Aiming at the protection of biodiversity, a governmental decision was taken for the restriction and prevention of invasive species in reforestations and plantings, and various actions are implemented to eliminate already established invasive plants.

Finally the Ministry of Education has elaborated a national strategy for environmental education that has been approved by the government and parliament and is now being implemented.

## **Mainstreaming Biodiversity**

The biodiversity concerns are being gradually addressed in the policies and programs of various sectors. The progress so far has been slow mainly because of lack of adequate capacity and partly because of the fact that many of the concepts are new. The Ministry of Education has incorporated biodiversity concepts in the curricula of all elementary school. The agriculture and livestock policies are adopting biodiversity concerns. The declared principal management goal of the state forests which form 21,5% of the area under control of the government, is biodiversity conservation, and to this direction the Forestry Department implements various programmes and actions such as the establishment of protected areas, restoration of habitats and deteriorated sites, fire protection, establishment of Botanical Gardens and gene banks etc.

## **Progress towards the 2010 Targets**

Cyprus has completed the catalogue of the protected areas of the Natura 2000 network. All major habitats and ecosystems are included in the protected area system, which covers 19 % of the area of the country. Cyprus is involved in LIFE projects for protected and non-protected areas. In addition, projects for conservation of species and ecosystems are currently under implementation.

Significant progress has been made towards the sustainable use of water, with the Water Framework Directive being the most significant tool. Cyprus is likely to be seriously affected by climate change and there is growing realization that adaptation and mitigation measures are essential. Undoubtedly there are areas of the country that the ecosystems are degrading fast and losing their capacity to deliver goods and services to support the local livelihoods.

## **Plant Conservation Strategy**

Systematic collection and documentation of the flora of Cyprus started in 1987. The flora of Cyprus has been well studied and a Red Data Book has been compiled in 2007, including a computer data base with the coordinates of all threatened and rare plant taxa. Monitoring plans have been prepared for more than 10 plant taxa of Annex II of the Habitats Directive. *Ex situ* conservation is implemented through the establishment of protected species in Botanical Gardens and storing of propagation material at low temperatures in seed banks at the Agricultural Research Institute of the Ministry of Agriculture, Natural Resources and Environment (MANRE). Even though no specific plant conservation strategy exists, the targets on plant conservation have been met through the efforts mentioned above.

## **Protected Areas**

Cyprus has designated 40 Sites of Community Interest under the Habitats Directive (SCIs – Natura 2000 Network) and 29 Special Protected Areas under the Birds Directive (SPAs – Natura 2000). Also in the island there are 10 National Parks, (15627 ha), 4 Nature Reserves (4788 ha) and 350 game reserves covering about 33% of the government controlled area of Cyprus.

Management plans of the protected areas are required in order to implement the principles of conservation most of which have already been prepared. Progress has been made in achieving partial targets such as filling ecological gaps, addressing policy and legislation. Management of national parks is being integrated into the broader landscape management and is progressively accepted by local communities. There has been no assessment of the protected areas so far to determine the status of biodiversity and effectiveness of the management

## **Conclusions**

The Convention on Biological Biodiversity is considered to be a significant tool that can assist on conservation and sustainable use of biodiversity in Cyprus. The impact of the Convention is hard to quantify, since many actions are a result of parallel legislation.

## **Analysis of Lessons Learnt**

The progress on implementation of the convention was much better in those thematic areas and cross cutting issues where the country had sufficient institutional and human resources, for example, forestry, wildlife and protected areas. The actions on new areas, for example, access and benefit sharing, bio-safety and invasive alien species still remains slow, as an enhancement of human resource capacity and scientific knowledge is needed.

## **Future Priorities and Capacity Needs**

The country has made a lot of progress on 2010 biodiversity targets, through the establishment of the Natura 2000 Network and the efforts in managing these areas. Despite this, the need to identify future priorities and take measures to build institutional, financial and human resource capacity for implementation of the convention still exists.

# Chapter I

## Overview of Cyprus Biodiversity Status, Trends and Threats

### 1.1. Biodiversity Status

#### 1.1.1 Introduction

Cyprus's biodiversity is a result of its long isolation history, its geology and geomorphology and the Mediterranean climate, along with the effect of human intervention.

The Island lies in the north-eastern part of the Mediterranean Sea at a longitude of 33°20" east and a latitude of 35°12" north and is the third largest island in the Mediterranean basin region, with an area of 9,251Km<sup>2</sup>.

The geomorphology of the island, the great variation in temperature and rainfall, its location between the three continents (Europe, Africa and Asia), along with 10,000 years of history and civilization, yielded a flora and fauna of great diversity and richness. The island is divided into three geomorphological zones, the Troodos mountains, the Pentadaktylos Range and the Mesaoria plain, which separates the two upland areas and is divided into three geotectonic zones: a) Troodos including the Mesaoria plain, b) Mamonia and c) Keryneia zone. Its climate is typically Mediterranean with hot, dry summers and mild winters, with rainfall occurring predominantly between November and April. The island is characterized by bio-climate ranges from hot semi-desert in the central plain of Mesaoria, to wet and cool climate on the top of Troodos mountains. This creates a remarkable biological diversity, with a variety of plant communities, such as coniferous forests, maquis, garigue, while more localized communities occur around salt

marshes, sand dunes, stone walls and mountain streams, with a considerable number of endemic species.

The climate of Cyprus is characteristically Mediterranean, with relatively short, mild and humid winters, followed by long, hot and dry summers. The mean annual rainfall is roughly 480 mm, and varies from 300 mm in the central plain to 1100 mm at the top of Troodos (Olympus). The highest precipitation is between November and March. The rainfall during summer is very low, and falls mainly on the mountainous regions. Snowfall is frequent on the Troodos mountain range, mainly during December to March. Regarding the temperature fluctuations in summertime and particularly in July and August, the mean daily temperature varies between 29°C on the plain of Mesaoria to 22°C on the Troodos, while the mean highest temperatures during these months are 36 and 27°C respectively. The mean daily temperatures in winter (during January) is 10°C on the central plain and 3°C on Troodos, while the mean lowest are 5 and 0°C respectively.

Cyprus faces intense problem of water shortage and drought, which is expected to worsen as a result of climate changes. During the last decades a gradual reduction in rainfall has been observed, with simultaneous increase in temperature and incidents of long periods of drought. Base models of simulation, have indicated that the temperature is expected to be increased, proportionally with the seasons, from 1,3 until 1,9°C in a period of thirty years i.e. 2021-2050, accompanied by rainfall reduction and increase in the periods of drought. These drastic changes of climate obviously have negative effects on biodiversity.

The geographical position and the morphology of the island play an important role in the weather and micro-climatic conditions in the various areas and the creation of local effects, while the sea causes considerable local effects on the coastal areas.

Cyprus is geologically and biogeographically one of the most isolated Mediterranean islands (Hadjikyriakou, 2002). Due to this isolation, a large number of plants and

animals, which colonized the island, evolved into endemic species. Because of climatic variation and the variety of habitats present, the island hosts a considerable biodiversity and it is considered a biodiversity "hotspot" area (Hadjikyriakou, 2002). In relation to its size, Cyprus has one of the richest flora in the Mediterranean region (Tsintides, *et. al.* 2002) and in comparison to other Mediterranean countries, it is rich in endemics. This is due to its geological structure, climatic conditions, geographic location (at the boundary of three continents), its insular character, the surrounding sea, and the topographical configuration.

Approximately 18 percent of Cyprus' area is covered by forest and 47 percent is considered arable land, 21 percent of which is irrigated. The dominant types of woody plants are the extensive pine forests, the sclerophyllous evergreen, high and low maquis, and garigue ecosystems. Also more localized habitats are found, consisting of riparian vegetation, endemic cedar forest, cypress forests and Cyprus oak relic forests. Herbaceous plants consist mainly of grasslands, vegetation of sand dunes and cliffs, and perennial pond plants.

The coastal zone of Cyprus is characterized by rich wildlife of high ecological value. Along the 772 km of the Cyprus coastline, coasts are almost everywhere low and shelving. Sea cliffs of any magnitude are extremely rare. According to its substrate, the shoreline is rocky, mainly with pebble beaches (54%), sandy beaches and many small coves (46%). Sand dunes, salt flats, salt lakes, salt marshes as well as freshwater marshes occur in the Cyprus coastal belt although they are limited to few areas. As far as the sand dune ecosystems, these are confined to 22 sites (Hadjichambis *et al.*, 2003). Dunes, at many places, are low and beaches narrow, mostly because of a restricted sediment supply which is the result of dam construction over the last 20 years, as well as tourism activities and beach erosion.

The island is characterized by a distinct mosaic of landscapes, where the particular microclimatic and topographic characteristics, the diversity of vegetation, forested and agricultural land contribute to the creation of variable types of biotopes which satisfy the

requirements of many types of organisms. The flora and fauna of the island is adapted to the various natural biotopes and climatic conditions, resulting in a large number of endemic and rare species.

The great diversity of plant and animal species derives from a sharp altitudinal gradient of climatic conditions, extending from the warm and semi-arid environment of the central Mesaoria plain (average temperature 17-19°C, annual rainfall <300 mm) to wet and cool conditions on the mountains of the Troodos massif (average temperature 9-13°C, annual rainfall 1100 mm).

Species diversity has also developed due to the island's isolation from the mainland, as it was formed through compression and uplift of oceanic crust within the Mediterranean Sea that was never directly connected to the surrounding European continent.

The Cyprus flora includes in total 1910 taxa (species, subspecies, varieties, forms and hybrids) as native or naturalized, among which, 143 taxa are endemic. Consequently, the percentage of Cyprus endemism, calculating all the taxonomical levels, is 7.39% which is one of the highest in Europe. The percentage of endemics can reach over 20% within the Troodos massif, where large numbers of endemic plants such as the cedar (*Cedrus brevifolia*) and the golden oak (*Quercus alnifolia*) are found. The island's great variety of habitats, attributed to a varied microclimate and geology, is the main reason which contributed to this high number of endemics.

Since Cyprus has always been an island, the first arrivals were hippopotami and elephants, which are both excellent swimmers. The largest wild animal that can still be found on the island is the Cyprus moufflon (*Ovis orientalis ophion*), a rare type of wild sheep that can only be found in Cyprus. Cyprus is a very important migration route for birds during their migration from Europe to Africa and back. The Island is characterised by a variety of fauna species and includes among others 385 birds, 32 mammals, 22 reptiles (8 snakes and 11 lizards) and 3 amphibians.



Marine animals include seals and turtles. Two marine turtles, the Green turtle (*Chelonia mydas*) and the Loggerhead turtle (*Caretta caretta*), have been found to breed regularly on the island's sandy beaches of Akamas Peninsular, the last remaining wilderness area.

The biodiversity of the island is affected by the man-induced alterations, the invasion of alien species, forest fires, epidemics from livestock-borne diseases affecting wildlife, management practices etc. It is also vulnerable to the exponential increase in human population and the intense land overexploitation that is taking place on the island.

As mentioned in the Red Data Book of the flora of Cyprus (Tsindes et al., 2007), 328 plant species are characterized as threatened, whereas a number of endemic species show a decline in their numbers.

Total indigenous flora (pteridophyte and spermatophyte) is comprised of 1610 species (trees, shrubs, sub shrubs, herbs) or 1738 taxa in the level of variety, adventives flora is comprised of 238 taxa.

Very important areas of endemism is the National Forest Park of Troodos with 94 endemic taxa, the Pentadaktylos range with 56 endemic taxa, and the Akamas Peninsula with 44 endemic taxa.

## **1.1.2 Main Ecosystem types (Habitats)**

### **1.1.2.1 Freshwater**

#### **Wetlands**

Only a small percent of Cyprus is covered by wetlands, which include streambeds, salt lakes, marshes, and smaller riparian areas near natural springs, dams, and artificial lakes. Five endemic plants have been identified in Cyprus' wetlands.

Of Cyprus' wetlands, two are of significance and listed under the Ramsar Convention, namely the Salt Lakes of Akrotiri (located in one of the two British military bases that exist in the island) and Larnaka Salt Lake. These two salt lakes are habitats for hundreds of species of migratory birds, including flamingos. Other halophytic wetlands include marshes in Fasouri and the salt flats near Famagusta. In addition, isolated wetlands and riparian zones have developed as a result of the construction of over 100 dams throughout the island.

### **Rivers and streams**

Cyprus as described above has a dry Mediterranean climate with extensive droughts. The main rivers of the Island that have constant flow are few. However with the construction of dams there is only one or two that constantly flow to the sea. Rivers are very rich in the variety of species and their conservation status depends on the availability of water flow.

### **Dams**

The construction of dams used to be a crucial tool for the storage of water due the scarcity of water that the Island experiences. Dams provide habitats for a wide variety of wildlife, supporting a variety of fish and bankside vegetation which can include some rare plant species.

#### **1.1.2.2 Woodlands and scrub**

The distribution of vegetation on the island is affected by the outstanding topographical features, the Mediterranean climate and the diverse geology. Forest areas, both of state or private ownership, are classified either as forests or as other wooded land; the total cover of these two categories accounts for 41.95% (386,630 ha) of the total land area. The total forest cover is 18.75% (172,770 ha), of which 11.48% (105,800 ha) is state land and 7.27% (66,970) private and state land. The total other wooded land area

accounts to 23.20% (213,860 ha) of which, 5.5% (50,740 ha) is state land and 17.7% (163,120 ha) private and state land. Nearly all forests areas are either natural or semi-natural. Forest cover in Cyprus shows a trend of small and gradual increase for both state and private forests.

Mainly as a result of human influence over many centuries, systematically cultivating and modifying much of the land, little remains of the true Mediterranean forest that was once found on Cyprus. Forests occupy predominantly the mountain ranges and high elevation areas, unsuitable for agriculture, as well as land not developed for residences, tourism, and other industry. Most forested land is found on the Troodos and Paphos forest areas.

Originally, Cyprus' forests were dominated by *Quercus spp.*; however due to human disturbance over centuries, the dominant forest species today is *Pinus brutia*. It can be found across all the climatic range, from arid coastal to moist mountain sites, occupying altitudes from sea level up to 1200 meters (1400 meters on south facing slopes), and covers an area of 100,000 hectares, i.e. 11 percent of the island. The main areas where Brutia pine (*Pinus brutia*) forests are found, are the Akamas, Paphos, Troodos, Adelphi, Makheras, and Stavrovouni Forests, and, in the Pitsilia, Akrotiri areas.

The black pine, *Pinus nigra*, occupies the highest elevations of Troodos Forest (1200-1900 meters), and covers only 6000 hectares, which includes critically important habitats. These forests are the main habitats for 50 endemic plant taxa (over 40 percent of Cyprus' endemics).

Of national and international significance is the Cedar Valley on the western Troodos Range, where stands of the relict endemic Cyprus cedar (*Cedrus brevifolia*) are found. Its distribution is highly restricted and the species is particularly sensitive to habitat disturbance.

Other forest species of significance include the endemic golden oak (*Quercus alnifolia*), Cyprus oak (*Quercus infectoria*), the strawberry tree (*Arbutus andrachne*), the Mediterranean cypress (*Cupressus sempervirens*), and the Phoenician juniper (*Juniperus phoenicea*). Wild and cultivated groves of wild olive (*Olea europaea*), and carob (*Ceratonia siliqua*) are found at lower altitudes. Ancient groves of olive trees, some over 1,000 years old, are now a focus of conservation efforts.

### **Maquis, Garigue and Phrygana**

These ecosystem types cover significant areas of Cyprus' land and result largely from man-made activities such as forest destruction with subsequent periodic burning and overgrazing, followed by soil erosion. Where soil is not seriously eroded and ecological factors are favorable (slope, aspect, moisture), succession follows from garigue to maquis to pine forest, and the forest eventually re-establishes.

Where the soil is highly eroded, garigue and maquis may be the climax community. Garigue and maquis cover the entire altitudinal ranges of Cyprus and are divided into sub-groups: garigue on dry, eroded soils; garigue on moderately eroded soils; and evergreen sclerophyllous shrubs (maquis).

The evergreen sclerophyllous shrub (maquis) habitat is dominated by evergreen sclerophyllous shrubs of varied heights, herbs, and isolated trees. It usually occurs near the coast; however medium and high elevation maquis are common on the broader Troodos Range. In the maquis ecosystem type, about 43 endemic species are found (Tsintides, 1998).

#### **1.1.2.3 Rocks and caves**

Exposed rock includes all natural or artificial exposures of bedrock and loose rock including rocky shores. Limestone scree and rocky slopes are habitats for many organisms, where the limestone scree of the south part of the Island provides a nesting

site of the biggest bird of prey (*Gyps fulvus*). The landscape, flora and associated fauna have evolved in response to geomorphological and climatologically conditions. Reduced agriculture and farming activities is causing the spread of shrubs (phrygana), resulting in the succession of varied types of flora.

**Caves** in the Island have not yet been extensively surveyed but it is known that they host important numbers of species, such as bats. These particular caves have been assessed as having a 'good' conservation status.

**Rocky shores** in Cyprus are also of many different kinds. The most notable and ecologically interesting are the hard limestone shores, which predominate. There are several areas with such a coastline. All the way from Cape Pyla to Paralimni, is of such rock (with several pocket beaches) - as is part of Akamas - and most of the Kyrenia coastline, from Cape Kormakiti to Cape Andreas (again with many sandy pocket beaches). What is most interesting in such areas, from an ecological point of view, is the occurrence of what is known as the **Vermetus reef** or shelf. The shelf can be one meter narrow or it may be several meters wide, in exposed coasts. Extensive shallow rock pools are created between the reef and the shore, with some deeper rock pools eroded into the shelf.

The vertical wall, that often drops off the shelf into deeper waters, is only partly exposed to the air and then only during low spring tides. *Styopodium* and *Padina* fronts *Cystoseira* and other brown algae cover much of this area. In the cracks and crevices that traverse this shelf and in the sub-littoral zone, just below, lives an east Mediterranean Cowry, *Cypraea spurca*, - now under threat from too much collection. Limpets (*Patella coerulea* and *P. lusitanica*), winkles and top shells of different species (*Monodonta turbinata* and *M. articulata* are the commonest here), and many other species of gastropods and hermit crabs characterise the littoral zone.

Encrusting sea weeds (*Lithothamnion* and *Lithophylum* species) and other seaweeds with calcareous skeletons are often found in such pools and in crevices. Several

species of crab can be found in this interface between land and sea. In the more sheltered rocky shores and in harbours *Pachygrapsus marmoratus*, is very common (Demetropoulos, 2003).

A newcomer to the Cyprus coastline can now be found on this *Vermetus* shelf and lower down on shallow rocky substrates practically anywhere on the island. This is a Stromb shell, *Strombus persicus* (= *S. decorada*), a Red Sea immigrant, which has colonised the shallow waters of the island during the last decade or so. It seems to be competing with the Mediterranean Cone Shell (*Conus mediterraneus*), which it seems to have replaced in some areas.

#### **1.1.2.4 Cultivated and Abandoned Cultivated Land**

The agriculture habitats in Cyprus are important biotopes for many species for fauna and flora, where significant areas of the Island are occupied by cultivated land. There are small fields with traditional arable cropping, tree crops such as citrus and olives, vineyards etc, where along with agriculture practices, can support rich biodiversity. Abandoned agricultural land in rural areas increased dramatically the last 20-30 years, where succession of woodland started to take place along with decrease of typical plants that used to flourish in those habitats. Stone walls support a diverse flora (with abundant lichens, mosses and ferns) and invertebrate fauna.

#### **1.1.2.5 Coastal ecosystems**

The coastal zone is characterized by rich wildlife, long and small beaches, open areas, cliffs, capes, harbors, sand dunes, accumulations of pebbles, and, in general, marine and shore areas of prime ecological and scientific value. The portion of the coastal area that is protected covers approximately 14 percent of the islands coastline. Coastal vegetation is mostly low and sparse, and five endemic plants are found in this belt. Saltlakes, sand dune and sea cliff habitats are included in this broad habitat category.

**Salt lakes** are distributed around the east and south coasts. They are currently threatened by drainage and nutrient enrichment from agriculture and domestic effluents. Salt lakes are stands of vegetation consisting of a small number of specialist species that can tolerate the salt content of the substrate, occurring along sheltered coasts, mainly on sand or mud, and which are flooded periodically by the sea. The main pressures on saltlakes are the expansion of urban development, along with dumping of solid waste and in the case of halophilous scrub, from uncontrolled access to the sites.

The Salt lakes of Cyprus are internationally important for wildfowl and waders and they have been designated as Special Protection Areas under the EU Birds Directive. Over twenty nine SPAs include lakes which are used by significant concentrations of wildfowl and waders; Larnaka Salt lake and Akrotiri Salt are two of the most important SCIs and SPAs sites.

**Sand dunes** are hills of wind blown sand that have become progressively stabilized by a cover of vegetation. Sand dunes are species-rich habitats for plants and invertebrates and can be described as coastal hills formed at the back of a beach by deposits of materials, varying on their origin, amount, type and size. These hills are classified further in several dune types, according to their shape and development, which are then synthesized in various biogeomorphic types of dune systems. Between sea and land, these complex geomorphotopographic ecosystems, show a notable variation of several factors such as nutrient availability, soil salinity, aerial salt deposition, water conditions, organic compound, soil texture and pH. Such factors constitute a variety of microenvironments and influence the presence of the species and the vegetation type and lead to the great biodiversity on the species level of the sand dune ecosystems. Plants established on coastal sand dunes are subject to several environmental fluctuations, affecting their growth, survival and community structure. Geomorphology seems to play an important role for the species presence.

Coastal sand dunes are among the most vulnerable habitats of Cyprus, and are subject to high-intensity recreational and other uses. Numerous types of anthropogenic pressures and impacts take place on the sand dune ecosystems of Cyprus. The majority of these are local activities influencing each site (e.g. trampling, driving and grazing). Although others are external, occurring at some distance from the dune site, they can affect the structure and function of the systems by reducing the delivery of sediment e.g. by dam construction (Hadjichambis et al., 2003b). In a very small area of few square Kilometres on the south coast, where sand dune ecosystems exist, about 20% of the national flora including many endemic, rare, threatened and protected elements, exists. Their high species diversity can significantly add to the conservation value of the ecosystems.

Dune systems are in a constant state of change, and maintaining their natural dynamism is essential to ensure a favourable conservation status. Impacts on sand dune habitats include:

- removal of beach material, which exacerbates the process of natural erosion;
- motorized recreational activities and high visitor pressure on some sites;
- recreational activities and pressure for development;

**Sea cliffs** are distributed in a limited extent in coastline. A number of sea cliffs are very important bird-of-prey colonies, as well as seabird colonies. Despite their relative inaccessibility, pressures and threats to the habitat include recreation, tourist visit and housing and dumping. In some cases, coastal protection works interfere with the natural functioning of sea cliffs, particularly soft cliffs prone to erosion.

#### **1.1.2.6 Marine environment**

The coastal marine environment is home to a variety of marine habitats and a consequent biological diversity of marine plants and animals. Cyprus being in the middle of the Levantine basin is characterized by higher salinity and temperature of its



surface waters from the rest of the Mediterranean and its highly oligotrophic in nature, which results in a relatively high species diversity and very low biomass.

The sea around Cyprus is characterized by a diverse array of important habitats and hosts a considerable number of endangered species. The angiosperm *Posidonia oceanica*, which is endemic to the Mediterranean, forms extensive meadows along the coasts of Cyprus usually from 5 to 40 m depth, both on sandy and rocky bottoms. The habitat of *P. oceanica* is a priority habitat according to the EU Habitat Directive (92/43/EEC).

In shallower waters - usually between 3-10 metres - on soft substrates, *Cymodocea nodosa* predominates, while in deeper waters *Caulerpa prolifera* and *Halophyla stipulacea* abound. *Pinna nobilis* thrives here, in these deeper waters. Several endangered marine species are accommodated in the coastal waters of Cyprus: the monk seal *Monachus monachus*, the marine turtles *Chelonia mydas* and *Caretta caretta*, the Triton trumpet shell *Charonia tritonis*, the pen shell *Pinna nobilis* and many others.

The occurrence of endangered species and the presence of well-preserved important habitats along the coastal waters of Cyprus are evidence that the marine environment of Cyprus is still in a good state with minor environmental impacts.

**Estuaries** are described as a river delta, however in Cyprus due to the extensive dam construction have not any estuaries.

**Reefs** are deep-water outcrops and are found below 25 meters depth. The outcrops are often completely covered with animals and plants of various colors and forms. Coral knobs house the tubes of peacock fans; in crevices and caves, colonies of white and red fan-worms compete for space with brilliant red slime-sponges; bright, almost luminous, sponges are found; the orange *Axinella*, the finger sponges, may reach a height of one meter; feathery, pink *Aeolid* sea slugs feed on plant-like colonial hydroids; and crevices and caves house red soldier fish and the black-eyed, red-bodied anthias. Reefs can be either biogenic concretions or of geogenic origin. They are hard compact substrata on solid and soft bottoms, which arise from the sea floor in the sublittoral and

littoral zone. Reefs may support a zonation of benthic communities of algae and animal species as well as concretions and corallogenic concretions.

**Sea caves**, some of which are completely under water, have not yet been identified. Based on the limited available information, sea caves support a wide variety of species and the communities.

### **1.1.3 SPECIES: STATUS, TRENDS AND THREATS**

The following sections provide an overview of Cyprus's floristic and faunal biodiversity, and status and threats. The overview draws on a number of key sources, including current national inventories; the national report in accordance with Article 17 of the EU Habitats Directive: *The Status of EU Protected Habitats and Species in Cyprus* and national Red Lists.

Information on status, trends and threats to those species listed in the annexes to the EU Habitats Directive is taken from *The Status of EU Protected Habitats and Species in Cyprus* under the Article 17 (Reporting). Four parameters are used to assess the conservation status of species: range, population, area of suitable habitat and future prospects.

#### **1.1.3.1 FLORA**

The flora of Cyprus comprises about 1738 indigenous taxa including 143 endemics. There are also hundreds of cultivated species many of which are adventives. About 238 indigenous plant taxa have been classified as threatened based on the IUCN Red List criteria. Most of the endemic plants of Cyprus are located in the two mountain ranges of island: 94 endemic plants developed in the mountain range of Troodos and 56 in the mountain range of Pentadaktylos. The National Forest Park Troodos, hosts a total 786 plant taxa and it is characterized as the most important region of island.

Mushrooms, bryophytes and lichens are inadequately studied but there is evidence that numerous species exist.

The main current threats to vascular plants in Cyprus arise from the trend away from traditional to intensive farming, housing and infrastructural development, and land use changes. The most widespread and serious impacts arise from land use change, infrastructure and changing agriculture practices such as conversion of traditional practices, and heavy applications of nitrogen fertilisers. Climate change poses a serious potential threat to the flora, however the trends have not been assessed.

According to the Red Book of Flora of Cyprus, 3% of endemic plants of Cyprus are characterized as Critically Endangered (CR), 6% Endangered (EN), 22% as Vulnerable (VU), 1 as Close Threatened (NT), 1 as Low Danger (LC) and 67% as Not Threatened based on the preliminary evaluation (Non Threatened- preliminary evaluation).

### **1.1.3.2 FAUNA**

Cyprus has a rich and diverse fauna due to the wide range of habitats and due to its position at the crossway of three continents. The fauna of the island is considered an important component to biodiversity.

The fauna of Cyprus includes endemic species, such as *Ovis orientalis ophion* that is often characterized as the “national animal of Cyprus”, and which is the largest wild mammal of Cyprus and has been studied to a great degree. Furthermore there are also various species of mammals, snakes, birds etc. Cyprus is classified as important bird species as Endemic Region for Birds in the world, while it constitutes one from the 8 most important migratory routes for the birds in Europe.

#### **1.1.3.2.1 Mammals**

Of the mammals in Cyprus 32 species of which 21 types of bats and 4 species of marine mammals have been recorded. Nine species are included in the Annex of II Directive 92/43 and in particular 1 as priority. The Mediterranean seal *Monachus monachus* that used to be abundant in the sea of Cyprus, has today been reduced to only few pairs. Two mammals are included in the Annex I of the Habitat Directive i.e. the Cyprus muflon (*Ovis orientalis ophion*) and *Rousettus aegyptiacus*. As it was mentioned before, particularly important is also the presence of endemic types and subspecies.

#### **1.1.3.2.2 Birds**

Cyprus is particularly rich with records of more than 385 species of birds. From them, 53 are permanent residents, while the rest are migratory. Of course, the number of visitors and mainly wintery varies from year to year and depends on the climatic conditions in Northern and Eastern Europe, but also the rainfall on the Island.

#### **1.1.3.2.3 Reptiles**

In Cyprus there are 24 species of reptiles and 3 species of amphibians. Particularly important in Cyprus is the presence of endemic species of reptiles. Four endemic subspecies of lizards and two endemic species of snake, are reported, as well as two endemic subspecies. The Cypriot snake *Coluber cypriensis* and the grass snake *Natrix natrix cypriaca* are both endemic species of reptiles in Cyprus. However recently, another endemic species of lizard was found in the mountain range of Troodos, namely *Phoenicolacerta troodica*. The Cyprus snake *Coluber cypriensis* was added in Annexes II and IV of Directive 92/43/EEC, as priority species. It has been characterized endangered (EN) by IUCN because the threats of the species are increase.

Of exceptional importance it is also the presence of two marine turtles: the green turtle *Chelonia mydas* and the loggerhead *Caretta caretta*, priority species of Directive 92/43/EEC, which visit the sandy beaches of island in order lay their eggs. There are 13 species of reptiles (11 terrestrial and 2 marine) and 1 amphibian of Annex II of Habitat Directive 92/43/EEC.

#### **1.1.2.3.4 Invertebrates**

There are at least 3 species of fish that are included in the Annex II of the Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean (SPA Protocol) of the Barcelona Convention, namely the *Aphanius fasciatus*, the *Hippocampus ramulosus* and the *Mobula mobular*. With regards to the ecosystems of internal waters of Cyprus there are exceptionally poor in indigenous fish, with the exception of the eels (*Anguilla anguilla*).

#### **1.1.2.3.5 Fish**

There are at least 4 species of fish that are included in the Annex II of the Barcelona Convention, namely the *Aphanius fasciatus*, the *Hippocampus hippocampus*, the *Hippocampus ramulosus* and the *Mobula mobular*. With regards to the ecosystems of internal waters of Cyprus there are exceptionally poor in indigenous fish, with the exception of the eels (*Anguilla anguilla*).

### **1.2 Trends and Threads to Biodiversity**

One of the main threats to biodiversity is the development currently taking place in Cyprus, with hotels, luxury apartment complexes, villas and golf courses that are being built in natural areas, destroying and/or altering important habitats mainly by the coastal areas. The urbanization trend is adding to this problem, as cities are continuously expanding into previously undeveloped lands. Serious threats to the biodiversity of the Island can be considered the effects of climate change, land use change, invasive species, illegal hunting, and forest fires.

Water shortage and long droughts have always characterised Cyprus. Sediments from rivers no longer reached the coast due to the numerous dams, with consequence the decreased rate of the sediment deposition to result in the loss of beachfront.

Recent studies have shown that desertification is a serious threat to the environment of Cyprus, with 57% of the area of the island to be threatened to desertification. These scenarios show that in the case that climate change occurs, with a reduction of the mean annual rainfall by 15% and an increase of mean temperature by 1,3°C, the percentage of 57% will increase to 70,4%. This is obvious one of the most important threats to biodiversity and this is why the Government Departments take measures to combat desertification and its negative effects.

### **1.2.1 Development: land use changes, tourism development and urbanization**

Tourism and urbanization which have largely taken place especially near the coastal areas, along with development of infrastructure, resulted in the loss of habitats and the destruction of species

Habitat loss and fragmentation are of the primary threats to biological diversity threatening the stability and persistence of wild populations, thus increasing the probability of extinction. Effects of habitat loss and is taking place in a certain extent and cause destruction of both biotopes and species.

Habitat fragmentation can be described as the splitting of natural habitats and ecosystems into smaller, more isolated patches. The process of fragmentation is connected to many different factors, of which the direct loss and isolation of natural habitat are the most important. Transportation, agriculture and urbanisation are three main causes of fragmentation.

Transport infrastructure is one of the major causes for habitat fragmentation and has been recognized as one of the most significant factors contributing to the decline of biodiversity in Europe. With rise of spatial demands for transportation infrastructure and the predicted continued growth in traffic flows, fragmentation is unavoidable, resulting in habitat loss and/or deterioration of valuable habitat, due to the destruction of prime habitats, and hence the adverse effect of many wildlife species.

Also the policy for the development of scattered and isolated houses in rural landscapes is considered to have a serious impact on biodiversity.

The main threat to biodiversity, especially along the coastal areas, is the tourism development (housing apartments and leisure activities). As development continues, demand for limited resources, raw materials, and municipal services also increases. Many coastal habitats, such as dune systems and coastal marshes, have been destructed or destroyed with consequence of species loss. The coastal ecosystem is very fragile and organisms are in direct danger due to infrastructure and development. Recreation also caused a threat to numerous species and habitats.

Conflicting and competitive demands for coastal space have also become one of the country's primary environmental problems. Many problems are a direct reflection of pressure on scarce land resources in the areas adjoining the coast. Massive construction of hotels and tourist accommodation has transformed some of the largely pristine coastal areas into tourist development zones.

The land width of the coastal zone, established at 2 Km from the coastline, covers 23% of the total area of the country. About 40% of the population lives and works in this zone. The most serious coastal planning problems today relate to the sudden expansion of the main coastal urban centres of Limassol, Larnaka and Pafos and have mostly been caused by the type and speed of development.

### **1.2.2 Pollution**

The Ministry of Agriculture, Natural Resources and Agriculture is responsible for the control of the pollution of water and soil, which is a result of human activities.

In the past, many industries disposed the raw waste to water bodies or soil, causing pollution risk to ground and surface water, as well as soil. Over the last decade the enforcement on environmental legislation has led to the licensing and close monitoring of all discharges from industry and agricultural activities. At the same time environmental infrastructure projects such as central sewerage systems and proper solid waste management have been initiated and within the next 3 years is expected that sewage and solid wastes will be managed according to the EU legislation.

In particular, the prevention of pollution from livestock activities and agricultural practices such as nitrates are ensured with the use of the Code of Good Agriculture Practice and other relevant laws.

The management of solid and hazardous waste is a necessity and a priority for Cyprus, firstly to protect the environment and public health and, secondly, to implement the environmental legislation which based on the EU Environmental Aquis.

The Solid and Hazardous Waste Law (No. 215 (I) / 2002) and other relevant legislation are the main legal tools for the proper management of wastes. A Waste Management Strategy is implemented which entails all aspects of waste management including recycling, waste management plants and organic waste handling.

Studies are being undertaken on the impact of pollution on marine ecology, as well as of the impact of aquaculture on marine biodiversity. Moreover, for the assessment of ecological status of coastal waters a relevant monitoring is being implemented within the Water Framework Directive (2000/60/EC), while within the MED POL Program a monitoring on the quality of the coastal waters, including the assessment of pollutants (heavy metals etc.) in fish is carried out.



However excessive use of fertilizers has resulted in high nitrate levels in the aquifer in some areas, leading in some cases to increased nutrient concentration at few beaches which resulted, combined with other synergistic factors, to the occasional occurrence of the ephemeral macroalgae *Cladophora spp.* Furthermore excessive pumping of underground water for agriculture has resulted in a drastic reduction of the level of the aquifer and in seawater intrusion in some coastal areas.

The location of Cyprus, at the east of the Mediterranean near very important maritime routes renders it vulnerable to marine pollution incidents. Furthermore the northeastern shores of Cyprus receive large amounts of “floating trash” originating from other countries as well as ships. Of particular concern to biodiversity are items such as plastic, that often consumed by endangered sea turtles.

### **1.2.3 Abandonment of subsistence and development of intensive farming**

Low-intensity farmland is often abandoned for economic reasons or is adapted to high intensity farming. Both changes have a significant impact on the environment, in general and on the biodiversity, in particular. Abandoned rural land is naturally succeeded by pines and shrubby vegetation as in all Mediterranean ecosystems. This natural ecosystem does not always provide a suitable habitat for many species especially birds and plants, as the low-intensity farming habitat does.

The impact of agricultural intensification on the biodiversity and especially on farmland birds and plants has been recorded over Europe and lately in Cyprus as well. The numbers of farmland birds and native plants have declined. The shift to intensive farming has been less of a problem in Cyprus than most other European countries, but nevertheless even to the degree that occurs, negative effects have been observed on habitats and species.

Intensive farming and monocultures, along with the extensive use of fertilizers and biocides resulted in simplified communities and a reduction in quantity and range of

invertebrate and seed food. The net effect of intensification has been the change of farmland from a bird-rich habitat to a habitat where bird conservation is urgently needed. Mosaic, landscapes of low-intensity agriculture maintain the highest diversity of priority species.

#### **1.2.4 Illegal Trapping**

The illegal trapping of wild birds and animals threatens the biodiversity of species of Cyprus, in general, as well as of migratory species. Significant progress has been made over the last few years and about 250 cases of illegal trapping are reported every year by the competent authority and violators are taken to Court.

#### **1.2.5 Forest Fires**

The biodiversity of forested regions today is the result of complex historical interactions between physical, biological, and social forces, often heavily influenced by cycles of various parameters. Fire, agriculture, technology and trade have been particularly powerful human influences on forests. Fires are the most serious danger that threatens the existence of the Cyprus forests. There is a wide variety of factors that contribute to increased risk of forest fires such as prolonged dry and hot summers, strong winds, large gradients of forest land and shrubby flammable vegetation, as well as human activities.

Furthermore the problem of forest fires is due to the abandonment of the rural areas and the recreation used of the forest parks. The negative effects of the fires are the degradation of the environment, destruction of the services of the ecosystems, erosion, creation of torrents and floods, effects on the microclimate, destruction of flora and fauna, damage of the landscape etc. Statistics from the Forestry Department concluded that the majority of forest fires in Cyprus, particularly the most destructive, have been due to human negligence and lack of attention.

### **1.2.6 Invasive Species**

Studies have identified sixteen of the 152 known adventive terrestrial plant species to be considered invasive. Of those only two, *Acacia saligna* and *Robinia pseudoacacia* pose considerable risk to the natural species and ecosystems and thus, an eradication project of *A. saligna* has been initiated in two Natura 2000 sites by the Government of Cyprus.

Several hundred Indo-Pacific marine species, flora and fauna, have become established in the Eastern Mediterranean Basin following the opening of the Suez Canal. A recent immigrant from the Red Sea for example, the *Caulerpa racemosa*, has been colonized large areas in both the western and eastern Mediterranean and has been undergoing proliferative growth in the coastal waters of Cyprus. This species can be found all around the island forming extensive dense beds, in a wide range of habitats, from very shallow waters down to depth of 70 m. Considering its spread kinetics and its well-developed adaptation mechanisms, it is likely to cause ecological problems, such as habitat alteration, replacement of native species and changes of food web dynamics.

There are also other examples of terrestrial invasive species that cause serious problems to the biodiversity of the island and this is the reason why the Government of Cyprus is trying to take the appropriate measures to control their spread into the nature environment.

### **1.2.7 Overgrazing**

Grazing by domestic herbivores has a long history in the Mediterranean basin. It has acted as a major force in modifying and shaping Mediterranean ecosystems and very often resulted in the destruction of Mediterranean forests. In Cyprus, in the past, herbivores used to graze in the forest areas and this caused deterioration on certain species, such as the junipers and others. Overgrazing caused negative affects on plant diversity in grasslands, as well as erosion in certain areas of the island.

### **1.2.8 Climate Change**

Climate change is a major concern, since certain tree species are particularly sensitive to temperature change. A decrease in the fertility of Black Pine has been documented and attributed to changes in the seasonal temperature variation. Annual precipitation in Cyprus has been decreasing at an average of one mm per year over the past century, while temperatures have increased by 0.5<sup>o</sup>C over the same period. The combination of these factors has contributed to a severe reduction of the precipitation/evapotranspiration ratio and hence, to a reduction of the water resources available on the island, and an increasing incidence of droughts.

The primary impact to date of climate change in Cyprus has been the reduced availability of adequate water supply, as a result of a decrease in precipitation over the Mediterranean Sea region.

Climate change have been found to affect hatchling survival and significantly correlated with incubation temperature. For example, in Loggerhead Turtle nesting sites in Cyprus, nests experiencing very high temperatures exhibit low hatchling success (Godley *et al.* 2001). Climate warming may also increase the incidence of disease in sea turtles.

### **1.2.9. Deserfication**

Desertification is an increasing threat on the soil resources in southern Europe and the Mediterranean led by the land use and the climate change. This threat increases at the presence of irrational human activities. In Cyprus, this phenomenon is ongoing since the antiquity. It evolves gradually in a creeping fashion, presenting both temporal and spatial discontinuities, and until made clearly obvious it might already have affected irreversibly certain areas.

Cyprus has recognized for some time the pressing need for the management and control of desertification and its complicated dynamics that are affected both by physical phenomena, as well as human activities, and its short and long term implications on the physical environment and the society.

Recent studies have shown that 57% of the island's land is critically threatened by desertification, 42,3% is sensitive to desertification and only 0,7% is considered as potentially sensitive. These data change dramatically in the case of the climate change scenario, whereas the 57% rises to 70,4%.

#### **1.2.10 Over-exploitation and contamination of surface and ground water**

Water resources are scarce. Earlier policy decisions concurrent with years of drought have resulted in limited surface and ground water supplies, while the demand for agriculture and tourism is increasing. Contamination and saltwater intrusion of aquifers further affect the suitability of the available water resources. Conservation measures are being applied today in order to restore aquifers and ecosystems through management plans.

With the dam construction, downstream flow was reduced and controlled, which led to the deterioration of the river ecosystems and the species that depend on the water. Nowadays due to the implementation of the Water Framework Directive and the Habitats and Birds Directives, measures have been adopted for dam downstream water and conservation of the protected areas and species.

## CHAPTER 2

# IMPLEMENTATION OF NATIONAL BIODIVERSITY STRATEGIES AND ACTIONS PLANS

### 2.1 Introduction

Cyprus has not yet prepared a National Biodiversity Strategic Action Plan. However the related strategies that are being summarized below, demonstrate the implementation and goals achieved for biodiversity protection in the country.

The objectives that are being included in the several policies and action plans in the relevant sectors can be summarised as follows:

- Halt the loss of biodiversity and continue through targeted actions for protection of species and habitats.
- Increase awareness leading to better understanding of the significance of biodiversity and engage more people in its conservation and improvement.
- Restore and enhance biodiversity in urban, rural and marine environments through better planning, design and practice.
- Develop an effective management framework that ensures biodiversity is taken into account in wider decision making.
- Ensure knowledge on biodiversity is available to all policy makers and practitioners.
- Identify processes and activities that may have negative effects on biological diversity.
- Finalizing the catalogue of protected areas such as the Natura 2000
- Management of protected areas
- Control or eradicate non-native (alien) species that threaten ecosystems, habitats and other species.

## **2.2 Legislation**

The legislation on biodiversity conservation has been significantly strengthened with the adoption of national and European legislation into a wide range of environmental issues, including biodiversity conservation. The EU Habitats and Birds Directive was transposed into Cyprus law in 2003 (153(I)/2003 and 152(I)/2003) and comprise the principal national legislation for the protection of habitats and wildlife in Cyprus. The Laws provide for the designation and management of protected areas for both habitats and species.

Other legislations in sectors such as forest and water management, agriculture, and land use planning, as well as the EIA and SEA Laws, also play an important role in the field of biodiversity protection. Important legislations that contribute in the efforts on biodiversity protections are the Laws on the Control and Protection of Waters and Soils, as well as the Solid Waste Management Law.

Cyprus is also a signatory party to international conventions that influence national biodiversity policy and legislation, including:

- Biological Diversity Convention
- Ramsar Convention on Wetlands
- Convention on Migratory Species (CMS or Bonn Convention)
- Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention)
- Convention for the Protection of the Marine Environment of the Mediterranean Sea (Barcelona Convention)
- Convention on Combating Desertification.

## 2.3 Forest Policy and Strategy

The management and conservation of forests adopted by the Forest Policy and Strategy, aims at the rural development on the principle of multiple targets and goals by placing more emphasis on biodiversity, as well as the ecotourism and recreation. More specifically, the forest strategy aims at:

- the sustainable development, protection and conservation of natural resources
- the expansion of green areas, the preservation and improvement of the natural environment and natural heritage
- the expansion and upgrading of infrastructure for tourism and recreation
- the development and revitalization of forest villages and the environmental education of citizens

Moreover, the national strategy aims at sustainable management and enhancement of the multiple roles of forests and seeks to protect forests from fires, enhancing the social role of forests and afforestation for environmental purposes. A National Forest Program is being enforced since 2001 and covers the decade from 2001 to 2010.

The forest strategy aiming to fulfill its targets, is taking into account the importance of forests in the quality of life and health, the alleviation of climate change and desertification, the quality of the landscape, the importance of biodiversity and production of forest products and prevention of erosion.

Additionally afforestation programs have an important role for the ecosystem's structure and value and this is why the competent Department prepared a document with guidelines for afforestation use in order to enhance and protect biodiversity. **The forestry Department prepared a document with guidelines for afforestation use in order to enhance and protect biodiversity. The guidelines regard species that could be use as well as guidance to which habitats and in what extent will be planted.**



## 2.4 Agriculture Policy and Strategy

The Rural Development Plan (2007 – 2013) is the main instrument for the implementation of the Agricultural Policy of the European Union in Cyprus. Among the main objectives of the plan, which have to do with the enhancement of agriculture, are to protect and maintain the natural environment and socio-economics of rural areas, the protection, development and sustainable management of natural resources and to protect agro- ecosystems (biodiversity) in countryside. A key priority of the strategy is to protect the natural environment and conserve agricultural land and rural landscape, especially in mountainous and hilly areas, in order to protect biodiversity through targeted agri-environmental measures (e.g. preservation of traditional vineyards, crop rotation and integrated management), qualitative improvement of soils, better use of water resources and reduction of the impacts of climate change.

The Plan addresses serious environmental problems such as abandonment of agriculture, disadvantaged areas, excessive use of nitrates and pesticides etc., with emphasis on the rational management of natural resources, and activities for the conservation and restoration of protected areas.

Among the measures that are directly related to the protection of the environment and thus biodiversity protection are the following:

- Provision and support of environmentally friendly agricultural practices (e.g. organic farming).
- Obligations to achieve significant improvements in agri-environment by reducing the use of agrochemical.
- Management of natural resources,
- Environmental friendly practices in order to achieve environmental protection.
- Specific objectives to reduce pollution, sustainable management of mineral resources, protection of wild flora and fauna, protection of biodiversity of agricultural ecosystems and the rural landscape.

- Agri-environmental measures to conserve the natural value of the agricultural environment and landscape and historical features on agricultural land and saving of rare breeds and traditional wine grape varieties.
- Protection of traditional landscape elements and cultural heritage such as stonewalls, vineyards and hedges and bushy vegetation.
- Measure for restoration and conservation of traditional landscape and protection of biodiversity by maintaining traditional species of almond, carob, hazelnut, olives, etc., maintenance of shrubs and medicinal herbs, maintenance or reconstruction of fences and stonewalls.

Also the recently introduced cross-compliance measures that are integrated in the EU measures introduced to support agriculture, are intended to benefit biodiversity.

Cyprus started to implemented cross-compliance in order to effective comply the Commission's Good Agricultural and Environmental Condition. This includes campaigns and controls as well as checks for the implementation of the regulation. Under the implementation of cross compliance there was checks of overgrazing in natural areas, controls for protection of hedgerows and stonewalls, standards to improve the management of soils and reduce the risk of loss of sediment and pollutants to watercourses, and support to the farmers to change their farming methods to conserve biodiversity through agri-environment schemes.

Under the implementation of the Rural Development Plan there was a successive agro tourism scheme, protection of forest environment, application of organic farming, protection of country site landscape (stonewalls and hedgerows) and protection of country's important crop and animal genetic resource.

Additionally the Department of Agriculture in order to assess the progress related to the Rural Development Plan is evaluating the measures and actions taken by the program.

## **2.5 Water Policy and Strategy**

Cyprus has transposed the Water Framework Directive (2000/60/EC) in its Law aiming to set out the basic principles for a sustainable water policy and to protect the aquatic environment. The main objective of the Directive is to achieve good status of all water by 2015 and foresees for the protection of all rivers, lakes, coastal waters and groundwater, application of a management plan for the river basin in order to control the exploitation, to reduce and to control the pollution from all sources, including agriculture, urban areas, etc, to apply the requirements of water pricing policies and to ensure that the polluter pays and to balance the interests of water dependence.

The above objectives, through the several studies that are being carried out and the measures that are being taken, the issue of the protection of species and habitats found in aquatic environments are taken into serious consideration aiming to reach good ecological status of surface waters, including coastal waters.

Under the water policy and the implementation of the Water Framework Directive the government succeeds to complete the National Management Plan and campaigns and control its implemented for the good ecological status. Management plan regards actions that are going to be assessing with the strategic environmental assessment (SEA) and implementation will be enforce soon.

The Water Department started to implement Article 4 of the Water Framework Directive in order to reduce further deterioration of the water bodies.

## **2.6 Marine Policy and Strategy**

The marine and fisheries policy aims at the protection and conservation of marine biodiversity and the conservation of fishstock. Among the most important tools for the conservation of marine biodiversity and the sustainable development of marine resources is the creation of the marine protected areas. The marine protected areas

have been designated in order to protect fragile ecosystems, endangered species and generally the marine biodiversity.

In Cyprus there are six marine protected areas, along with the coastal protected area of Lara - Toxeftra, which includes the most important breeding biotope for the sea turtles, *Chelonia mydas* and *Caretta caretta*. The area is protected since 1989 by the Fisheries Law and related regulations. The areas are protected under the "Natura 2000" network.

In Cyprus, the protection of aquatic species, inland and marine waters, is implemented through the provisions of national law since 1971 and its related regulations, and through the provisions of EU Directive (92/43/EEC) for the Conservation of Natural Habitats and Wild Fauna and Flora, as well as the Barcelona Convention (Convention for the Protection of the Mediterranean Sea against Pollution) and in particular the Protocol concerning Specially Protected Areas and Biodiversity in the Mediterranean (SPA Protocol). Complementary to these are the Convention on Conservation of European Wildlife and Natural Habitats (Bern Convention), the Convention on the International Trade in Wild Fauna and Flora (CITES) and the Convention on Biological Diversity (CBD). In particular, protected marine species and habitats are those listed in the aforementioned Conventions and Agreements, as well as in the Fisheries Law and Regulations, including all species of sea turtles, dolphins, seals and a sand crab.

Generally the laws and regulations, mainly intent to regulate matters concerning the fishing sectors, to verify fishing intensity and aim to control marine pollution and the protection of marine habitats and species.

A number of research and monitoring programs focusing on areas, such as marine biodiversity, conservation and protection of endangered habitats and species (*Posidonia oceanica*, turtles etc.), development of Marine Protected Areas and assessment of ecological status of coastal waters are undertaken. Action plans are taking place in relation to the protection

Cyprus due to Mediterranean Action Plan (MAP) and the enforcement of its regulations and actions and in order to protect biodiversity and for the protection and development of coastal and marine areas (of species, habitats, and landscapes) integrated the special development strategies under the marine and coastal area management and

implement the program (CAMP) in a pilot area of the Island. The program serve a dynamic process for sustainably use and management of the coastal and marine areas and resources.

## **2.7 Designation of Sites of Community Importance and Special Protected Areas**

Substantial progress has been made in designating Sites of Community Importance (SCIs), with an approximate area of 226.753 ha. Terrestrial and Marine SCIs occupy approximately 152.688 and 5120,42 ha respectively. There are forty (40) SCIs and twenty nine (29) SPAs.

These areas have been selected to cover habitats and species of particular importance for the Mediterranean biogeographic region. To ensure sites are representative of the entire region, site selection is coordinated at a European level under the EU Habitats Directive. Monitoring habitats and species is carried out for the purpose of Reporting (Article 17 of the Habitat Directive). Cyprus prepared 25 draft Conservation Management Plans for SCIs areas and another 7 are under preparation covering more than half of Natura 2000 areas.

Following the designation that started in 1999, there is a considerable progress that has been made in monitoring of protected habitats and species (Life/Nature), and in the development of a comprehensive Biodiversity Database (BioCyprus). Monitoring schemes are taking place in main forested areas for both habitats and species as well as for priority species and habitats. For species such as sea turtle and muflon, monitoring is ongoing for decades.

## **Chapter III**

### **Sectoral and cross-sectoral integration or mainstreaming of biodiversity considerations**

#### **3.1 Introduction**

The implementation of related strategies for the biodiversity protection is a cross-government responsibility. Aiming to halt biodiversity loss, the strategies seek to involve all related issues to the mainstream of policies and incorporate the relevant biodiversity targets at country level.

This chapter provides information on how Cyprus is bringing biodiversity considerations into decision making and how the different Action Plans and Strategies implemented by the Government take into account the issues of the protection of the biodiversity.

#### **3.2 Country's Integration Strategies**

The integration of strategies to fulfil the targets to protect biodiversity is a responsibility of all Government Departments. To halt biodiversity loss, the strategies should seek to make biodiversity part of the mainstream of policies and incorporate the relevant biodiversity targets at country level. Many actions are being taken at a variety of levels, and often in a cross-cutting manner. The basis for much of this is a statutory requirement on public bodies to take account of biodiversity conservation, when undertaking their functions. The strategies emphasise that healthy, thriving and diverse ecosystems are essential to quality of life and well-being.

The biodiversity related strategies are divided into a number of workstreams to address sectoral and cross-sectoral issues: agriculture; forestry; water and wetlands; town planning; coastal management; marine policy; climate change adaptation; education and public awareness, etc. In addition, information is provided to local authorities and

other public bodies in order to implement the statutory duty to take account of biodiversity when undertaking their functions.

### **3.3 Addressing the threats to biodiversity**

It is important to ensure that biodiversity considerations are integrated into decision making, by all sectors, thereby making mainstreaming a reality. In some cases a sectoral approach is being used, in others a cross-cutting approach.

The primary threat to biodiversity is the growing demand for natural resources and ecosystem services. Anthropogenic changes in conjunction with natural impacts are causing major alteration on the biotopes. Residential development, infrastructure, tourism, invasive species and quarrying are among the most serious threats that ecosystems are facing today.

#### **3.3.1 Agriculture**

The reform of the Common Agricultural Policy (CAP), was a major breakthrough as it reduced the environmental impact of agriculture by removing an incentive to intensify production. The new CAP also requires farmers to comply with the environmental standards under the cross compliance Regulations in order to receive the subsidy payment (the Single Farm Payment).

The main aspects to cross compliance:

- Specific European legal requirements, known as Statutory Management Requirements (SMRs);
- Domestic legal requirements requiring the land to be kept in Good Agricultural and Environmental Condition (GAEC) which must be set out according to the framework drawn up by the Commission;

Cyprus is already implementing the cross-compliance guidelines and makes efforts for the effective use of the Commission's framework for Good Agricultural and

Environmental Condition. This includes standards to prevent overgrazing, control of invasive weeds, protection of hedgerows and watercourses including protection zones (buffer strips), standards to improve the management of soils and reduce the risk of loss of sediment and pollutants to watercourses, and support for a range of existing environmental legislation, such as the Environmental Impact Assessment.

Specifically the Rural Development Plan (RDP 2007-2013) includes measures relevant to biodiversity conservation and those are:

- Assistance in conserving and increasing diversity of wild plant species associated with protected habitats
- Measures to improve water quality by protecting river margins from livestock damage and protecting riparian habitats.
- Nature Corridors: protection and enhancement of field margins to increase plant and animal diversity.
- Hedgerow Maintenance: hedgerows retained and managed; cutting and burning prohibited during the bird nesting season.
- Traditional Orchards: restoration of tree orchards with native species (citrus, carobs, almond, olives) in order to protect the genetic resource.
- Conservation of Rare Breeds: Assisting farmers to rear animals of specific breeds native to Cyprus, which are in danger of being lost to farming.
- Planting small plots of cereals in open areas as a source of over wintering food for bird species and muflon.

### **3.3.2 Forest**

Forest is considered a diverse habitat in terms of species richness. Government policy in protecting and sustainably managing this habitat aims to prevent further loss, improve ecological condition and conserve rare and priority species.

The Government gives priority to managing forests for the benefit of biodiversity, and the relevant Department is closely involved in a range of projects to achieve that.



One of the significant negative pressures is fragmentation, disease, and fire. Over time many forest sites have become fragmented as land has been cleared for agriculture or lost to development.

The objectives for sustainable forest include conservation of the area and improve the quality of forests and other wooded land in general, systematic management of state forests on a sustainable basis, taking into account national priorities and needs, enforcement of the EU acquis and international conventions signed by the country, maintaining and enhancing biodiversity, maintaining and strengthening the social and protective functions of forests and sustainable timber and other forest products to maximize the overall social and economic benefits from forests, expansion of forests, Improving quality of life in communities, particularly in mountainous areas, and enhancing transparency and participation of interest parties on decisions and processes in forest management.

### **3.3.3 Water and Wetlands**

The main pressures on Water Resources include the continued growth in demand for water for all uses and the deficits found in water balance, thus increasing the gap between supply and demand, the pressures on water bodies by human activities such as point or diffuse source pollution from agriculture, industry, wastewater etc, the demand for potable water supply, the quality objectives for water and the protection of groundwater against pollution and degradation and the reducing the impact of climate change in relation to drought, in particular.

The Water Framework Directive (WFD) of the EU requires the establishment of environmental objectives for 'water bodies' aiming to achieve good status. The WFD also requires actions to be taken, against diffuse pollution from agriculture and urban development, improvement of habitats and ecosystems, by applying the measures and management plans, so there will be wider biodiversity dividends for river catchments.

Significant pressure caused on biodiversity is the construction of dams and the prevention of water flow downstream. Riparian areas have been destroyed due to the water loss and the same time sediment never reaches the coastal area, with consequence of habitat loss. Cyprus by implementing the Water Framework Directive has to manage to downstream water in order to restore protected areas and riparian habitats.

Following the requirements of the Water Framework Directive, Cyprus prepared management plans for drought, for water quality and quantity, for protected areas, for the river basin management and their implementation will be commence soon. Indicators are used in order to assess the quality of the water (BOD, COD, heavy metals etc.).

The strategic objectives for integrated water resources management are based on the principles of sustainability, the management of drought, the achievement of good ecological and chemical status, the treatment of wastewater and effluent reuse for irrigation and to improve water quality in areas vulnerable to nitrates.

### **3.3.4 Coastal and Marine Environment**

The coastal area of the island is subject to changes in land use which adversely affect the landscape and cause deterioration of biodiversity. The rapid development of the tourist industry has left its toll mainly on the coastal zone, with the construction of hotels and tourist complexes. There is an increasing use of natural resources, waste generation, and build-up areas, affecting nature. The threat of climate change, mainly due to extreme weather events and rising sea levels, the development of marinas along the coast in conjunction with tourist villages, are changing the urban fabric with a consequent of negative impact on the environment.

Considering the above it is important that the protection and development of coastal and marine areas (species, habitats, landscapes and seascapes) are integrated into special development strategies for larger areas, under the umbrella of an Integrated Marine and Coastal Area Management (IMCAM).

### **3.3.5 Climate change**

The policy of the Republic of Cyprus in dealing with the Climate Change negotiations with regards to the UN Framework on Climate Change (UNFCCC) will continue in 2010 with the objective in the coming months to develop the necessary conditions so that the Copenhagen Accord is transformed into a binding agreement to be adopted by all Members of the Convention at its next meeting in November in Mexico.

Cyprus is fully in line with the positions of the European Union and hopes for a binding agreement to be adopted by all members of UNFCCC, during the negotiations that will take place in Mexico in November, 2010. European Union notes that it is ready to lead the world to mitigate climate change and to deal with the challenge of ensuring safe, sustainable and competitive energy.

To deal with the important issue of adaptation to climate change a study is under preparation that will evaluate the impact of climate change in the different sectors including nature and biodiversity and the financial implications with regards to adaptation measures.

### **3.4 Environmental Impact Assessment, Strategic Environmental Assessment and Appropriate Assessment**

The Law on EIA, which has transposed the provisions of the relevant EU Directive (85/337/ECC), is implemented since 2001. In 2005, this Law was replaced by a new one in order to comply with the new requirements of the European Union on public participation and access to justice and also to incorporate some necessary changes for

the better implementation of the Law. The EIA law foresees for an environmental study to be carried out for the projects included in its 2 appendices, before a permission is given by the planning authority. The issues of nature and biodiversity protection are being taken into consideration during the decision making and in the case whereas a planning permit is being granted for a specific plan, special terms and conditions are being included aiming the biodiversity protection.

The same applies with the SEA Law, that transposed the relevant EU Directive (2001/42/EC), where the competent authority to promote a plan or a program, needs to proceed with an environmental study which is being evaluated by the environmental authority. The issues on nature protection play an important role during the decision making.

Also the Habitats Directive, sets the framework for the Appropriate Assessment, concerning the projects/ plans/ programmes that are being proposed to be implemented in a Natura 2000 site, or might have a negative impact on the species and habitats of a Natura 2000 site. This procedure that is included in the Nature Protection Law (that transposed the Habitats Directive), ensures the protection of the important species and habitats of the Natura 2000 sites.

All plans include biodiversity (or related issues such as impacts on habitats and species) as a matter for consideration in Environmental Impact Assessment (EIA). These considerations apply through development of control regulations associated with land use planning, infrastructure development, and natural resource management laws.

Similarly Strategic Environmental Assessment (SEA) is carried out for all those plans or programs as required by the law, through constraints analyses as a precursor to statutory regional and local land use or resource management planning. SEA may also apply to non-statutory instruments that execute policies at a broad scale and design criteria at the local scale. Application of SEA is through planning regulations, Ministerial directions, state policies and administrative.

The Habitats Directive of the EU foresees the evaluation of the possible negative impacts of a project, plan or program to the sites included in the Natura 2000 Network through a procedure known as appropriate assessment. This procedure ensures that the final decision for the promotion of a project, plan or program takes as a determinant factor the protection of species and habitats of the Natura 2000 site.

## Chapter IV

### **Conclusions: Progress towards the 2010 Target and Implementation of the Strategic Plan**

#### **4.1 Introduction**

The ratification of CBD by Cyprus, has acted as a catalyst towards the implementation of concerted efforts for the protection of biodiversity. The biodiversity that characterises Cyprus deserves special attention especially due to its endemism, and every effort is been made, within the financial and social limits, to protect the valuable ecosystem.

In this chapter, concluding issues have been drawn together, to assess how actions are taken in order to implement the Convention in Cyprus and how these have contributed in achieving progress towards the 2010 target and the goals and objectives of the Strategic Plan of the Convention.

#### **4.1 Progress towards the 2010 Target**

Over the last few years substantial steps have been made towards the 2010 target, which can only be assessed when compared to policies and attitudes that previously prevailed. Furthermore the entry of Cyprus in the European Union has given further impetus to the efforts for the protection of biodiversity, since additional legislation has entered into force.

The efforts towards the protection and conservation of biodiversity have started gradually to be yielding results. The increase and conservation of the forested areas, the declaration of a substantial part of the area of the island as Natura 2000 sites, the preparation of management plans for most of these areas, the substantial progress

been made for the treatment of wastewater and the management of solid wastes, are not just but a few examples of the progress that has been made towards achieving the goal of eliminating biodiversity loss.

No doubt that there is a significant amount of work and effort that needs to be done. The efforts carried out until now, have not been strategically planned , and most of them are the outcome of sectarian policies.

Taking into consideration the above and the fact that the biodiversity is under serious pressure, there is no doubt that the preparation of a strategic plan for the protection of biodiversity, in order to take measures and actions to achieve the targets and goals set, is a necessity.

Progress in the implementation of the biodiversity related strategies has been described in Chapter II and key areas where progress has been made include:


- Designation of protected areas;
- Monitoring and research;
- Conservation planning; and
- Maintenance and improvement of water quality.


One of the main reasons for the progress made in these areas has been the need to meet the legal requirements of the EU Habitats and Birds Directives and other relevant directives. Therefore target and goals for measures and actions concerning biodiversity conservation can be implemented with sufficient knowledge of conservation status and the nature, scale and frequency of occurrence of threats.


The following table provides an assessment of the Country's progress towards the 2010 target, using the CBD framework of goals, targets and indicators for measuring progress (CBD Decision VIII/15). As far as the national contribution to achieving the goals and targets of the conservation of biodiversity, these can be summarized in the following table:

Key to indicator assessment of change over time:




 = Improving




 = little or no overall change

 = Unknown or deterioration





 = insufficient data















Goals and targets	<i>Progress towards the Target (highlighting national targets, key actions, outcomes and overall assessment of progress)</i>			
<b>Protect the components of biodiversity</b>				
<i>Goal 1. Promote the conservation of the biological diversity of ecosystems, habitats and biomes</i>				
	National targets	National actions 	Outcomes achieved 	Overall assessment 
Target 1.1: At least 10% of each of the world's ecological regions effectively conserved.	<p>Cyprus fully implements both the Habitat and Bird Directives in order to protect biodiversity of the island with a substantial size of protected areas.</p> <p>These areas have been selected to cover habitats and species of particular importance for the Mediterranean biogeographic region.</p>	<p>Monitoring scheme initiated in some protected areas for both habitats and species. Sites are designated with the aim of conserving specific biological or geomorphological features.</p>	<p>Protected areas increased from 11.8% to 19.% (2006-2010) and the PA coverage expected to exceed in the next two to three years due to the establishment of marine areas</p> <p>The status of some priority species are well know however much more monitoring needed</p>	<p>There is a need of an overall assessment on a survey basis for the status and conservation issues of biodiversity.</p> <p>Under the obligation for the Habitats Directive carried out an assessment of both habitats and species, which resulted in the status of biodiversity of the Island.</p>









Goals and targets	Progress towards the Target (highlighting national targets, key actions, outcomes and overall assessment of progress)			
	National targets 	National action 	Outcomes achieved	Overall assessment 
Target 1.2: Areas of particular importance to biodiversity protected	<ul style="list-style-type: none"> <li>- Important Birds Areas and Special Protected Areas designated during 2006-2010</li> <li>- 25 management plans have been prepared for Natura 2000 sites, aiming at the protection of habitat and flora and fauna species of EU importance. Additionally 7 management plans are being prepared for the forest areas included in the protected areas.</li> <li>- Projects implemented in Cyprus for the protection and conservation of mammals (<i>Ovis gmelini ophion</i>) and birds of prey (<i>Gyps fulvus</i>)</li> <li>- Natura sites that include river basins, fall into the 1<sup>st</sup> River Base Management Plan (proposed in June 2010) in the context of Water Framework Directive - 2000/60/EC</li> <li>- Protected coastal areas are designated as marine park for conserved for more than 20 years for the protection of sea turtle</li> </ul>	<p>Designation of the most important sites for the protection of the biodiversity of the Island.</p> <p>The catalogue of the Natura 2000 areas was updated with the designation of new protected areas (SCIs and SPAs) in 2010.</p> <p>A guidance has been prepared for the identification and surveying of habitats and is implementation has been initiated.</p>		Management plans for 25 sites have been completed and will be enforced in order to substantially protect the Natura 2000 sites (habitats and species)





<i>Goals and targets</i>	<i>Progress towards the Target (highlighting national targets, key actions, outcomes and overall assessment of progress)</i>
Goal 2. Promote the conservation of species diversity	

Goals and targets	Progress towards the Target (highlighting national targets, key actions, outcomes and overall assessment of progress)			
Target 2.1:	National target 	National Action 	Outcome achieve 	Overall assessment 
<p>Restore, maintain, or reduce the decline of populations of species of selected taxonomic groups.</p>	<p>The red data book of flora list more than 300 plan as threatened.</p> <p>The number of threatened species (higher plans), during 2002 was 1</p> <p>The number of threatened species, of birds during 2002 was 3</p> <p>The number of threatened species of mammals during 2002, was 3</p>	<p>A program of reintroduction of <i>Gyps fulvus</i> in Cyprus will be implemented for the reestablishment of the population.</p> <p>Sea turtle species (Loggerhead and Green), have been protected since 1971 under the Fisheries Legislation, while a Turtle Conservation Project is running for many years (since 1978) aiming at the protection of their nesting beach sites, including protection of eggs, hatchlings and adult turtles and education campaign. Areas have been designed as Natura 2000 areas.</p> <p>Establishment of micro reserve areas for the protection of specific habitats and species .</p> <p>Farmland birds are used as indicators for the status of agroecosystems.</p>	<p>Increase of the muflon population due to protected measures that applied, the monitoring and systematic control in the past 13 years as a result of conservation measures</p> <p>Restore and maintenance of Bonellis eagle.</p> <p>Increase in the population of nesting turtle in Cyprus.</p>	<p>Target indicators have to be set and assessed in the right bases in order to evaluate the status of biodiversity.</p>





<i>Goals and targets</i>	<i>Progress towards the Target (highlighting national targets, key actions, outcomes and overall assessment of progress)</i>			
	National Target 	National Action 	Outcome achieve 	Overall assessment 
Target 2.2: Status of threatened species improved.	Conservation project for the Bonelli eagle in order to maintain and restore its habitat and population size. The species is well conserve and a healthy population in maintained all over the island.  Conservation of sea turtles	Maintained species by ensuring food sources of the species and its nesting sites.  Monitoring project over the coastal nesting areas	Increase of population all over the island  Increase of population size	Action plan for threatened species are in place in order to ensure conservation.
<i>Goal 3. Promote the conservation of genetic diversity</i>				
	National target 	National Action 	Outcome achieve 	Overall assessment 
Target 3.1: Genetic diversity of crops, livestock, and of harvested species of trees, fish and wildlife and other valuable species conserved, and associated indigenous and local knowledge maintained.	A gene bank for cultivated crops and rare species has been established. Collection for genetic resources (cultivars) for conservation purpose and restoration of native the native species. Establishment of herbarium and flora genetic resources.	Establishment of gene bank of both livestock and crops Botanical gardens are established in several places of the island in order to conserved endemic and rare plans.	Improvement of gene diversity	A national action plan needed in order to ensure genetic diversity.




Goals and targets	Progress towards the Target (highlighting national targets, key actions, outcomes and overall assessment of progress)			
<b>Promote sustainable use</b>				
Goal 4. Promote sustainable use and consumption.				
	National target 	National action 	Outcome achieve 	Overall assessment 
Target 4.1: Biodiversity-based products derived from sources that are sustainably managed, and production areas managed consistent with the conservation of biodiversity.	Organic production has been established. So far no data on marketing of organic products in international and local markets has been available.  Establishments of experimental station for both crops and animals and botanical gardens	Gene bank are established for both forested plan and cultivate crops.  Ensure of plant conservation via botanical gardens and the experimental stations	Increase in areas of organic farming	Progress needed for increase of the genetic diversity
Target 4.2. Sustainable management of biological resources	Forest is managed in ecological way for conserving biodiversity Control of collection or harvesting of wild plants (herbs – medicinal plants) Establishment of microreserve and botanical gardens. Reestablishment of oak species and other species in Natura areas.	Management of forest resources in a sustainable way and afforestation of state land.	Increase of afforestation sites in a state land	Environmental impact assessment needed for afforestation

<i>Goals and targets</i>	<i>Progress towards the Target (highlighting national targets, key actions, outcomes and overall assessment of progress)</i>			
Target 4.3: Endangered species of wild flora or fauna caused by international trade	Six of the Cyprus' Flora species are included in the IUCN edition " <u>The Top 50 Plants of the Mediterranean Islands</u> " which presents fifty of the most threatened plant taxa of the Mediterranean islands (not endangered by international trade but other anthropogenic factors.)	Establishment of botanical gardens and microreserve sites.	Action of endangered species is taking place through national and EU project.	More research needed in order to ensure protection of both flora and fauna.
<b>Address threats to biodiversity</b>				
<i>Goal 5. Pressures from habitat loss, land use change and degradation, and unsustainable water use, reduced.</i>				
	National target 	National Action 	Outcome achieve 	Overall assessment 
Target 5.1. Rate of loss and degradation of natural habitats decreased.	Quantity and quality of forest increased Designation of protected areas increased.	Increased of afforestation in state land	Increase of woodland in abandoned agricultural land and state land as well as afforestation in burned forest sites.	Assessment for afforestation needed in order to improve conservation of the sites.
<i>Goal 6. Control threats from invasive alien species</i>				
	National target 	National Action 	Outcome achieve 	Overall assessment 
Target 6.1. Pathways for major potential alien invasive species controlled.	Control measures in place to control alien species Control for planting alien species Eradication of alien species in protected areas.	Control of acacia species in Natura sites	Control of planting alien species	Action plan needed for control and eradicate alien species

<i>Goals and targets</i>	<i>Progress towards the Target (highlighting national targets, key actions, outcomes and overall assessment of progress)</i>			
Target 6. 2. Management plans in place for major alien species that threaten ecosystems, habitats or species.	Action plan for the limitation of the impact of <i>Acacia</i> Control of species (fauna and flora) enters the island.	Eradication of acacia plan in Natura 2000 sites. CITES species control	More action needed for controlling alien species especially in gardens	National action need for all alien species.
<i>Goal 7. Address challenges to biodiversity from climate change, and pollution</i>				
Target 7.1. Maintain and enhance resilience of the components of biodiversity to adapt to climate change.	Research is going to assist the adaptation of biodiversity components to climate change.	Modeling is taking place in several institute in order to assist with measures to biodiversity conservation	Action needed for climate changes and biodiversity adaptation	
	National target 	National target 	Outcome achieve 	Overall assessment 
Target 7.2. Reduce pollution and its impacts on biodiversity.	Better water quality of river and wetlands improves the status of inland waters species 1 <sup>st</sup> River Base Management Plan (proposed in June 2010) in the context of Water Framework Directive 2000/60/EC Indicators are assessed for the ecological (biological and chemical) status of rivers and waters resources Control of chemicals, fertilizers and farm reduced, and its impact to biodiversity. New landfills and recycling is in place.	Action plan will put into place for good ecological status of water	Campaign started for water resources	Management Action Plan will be enforce



Goals and targets	Progress towards the Target (highlighting national targets, key actions, outcomes and overall assessment of progress)			
<b>I. Maintain goods and services from biodiversity to support human well-being</b>				
Goal 8. Maintain capacity of ecosystems to deliver goods and services and support livelihoods				
	National target 	National Action 	Outcome achieve 	Overall assessment 
Target 8.1. Capacity of ecosystems to deliver goods and services maintained.	The quality of forests is maintained (by keeping more tree species) so that forests could provide more timber and non timber products Prevention of erosion measures Water quality and air quality Maintain the capacity in order to get goods and services of ecosystems	Enhance of afforestation areas. Forest are maintain in an ecological way	A wealth forest ecosystem is managed over the last 20 years.	Good ecological status of the forested areas of the island.
Target 8.2. Biological resources that support sustainable livelihoods, local food security and health care, especially of poor people maintained.	Sustainable fishing Surface and ground water quality	Maintain fish stock		
<b>Protect traditional knowledge, innovations and practices</b>				
Goal 9 Maintain socio-cultural diversity of indigenous and local communities				
Target 9.1. Protect traditional knowledge, innovations and practices.	--			

<i>Goals and targets</i>	<i>Progress towards the Target (highlighting national targets, key actions, outcomes and overall assessment of progress)</i>			
Target 9.2. Protect the rights of indigenous and local communities over their traditional knowledge, innovations and practices, including their rights to benefit-sharing.	--			
<b>Ensure the fair and equitable sharing of benefits arising out of the use of genetic resources</b>				
<i>Goal 10. Ensure the fair and equitable sharing of benefits arising out of the use of genetic resources</i>				
	National target 	National action 	Outcome achieve 	Overall assessment
Target 10.1. All access to genetic resources is in line with the Convention on Biological Diversity and its relevant provisions.	Ratification of the International Treaty for Plant Genetic Resources on Food and Agriculture	Conserve genetic resources	Establishment of gene bank	
Target 10.2. Benefits arising from the commercial and other utilization of genetic resources shared in a fair and equitable way with the countries providing such resources in line with the Convention on Biological Diversity and its relevant provisions	--			

Goals and targets	<i>Progress towards the Target (highlighting national targets, key actions, outcomes and overall assessment of progress)</i>			
<b>Ensure provision of adequate resources</b>				
<i>Goal 11: Parties have improved financial, human, scientific, technical and technological capacity to implement the Convention</i>				
Target 11.1. New and additional financial resources are transferred to developing country Parties, to allow for the effective implementation of their commitments under the Convention, in accordance with Article 20.	--			
Target 11.2. Technology is transferred to developing country Parties, to allow for the effective implementation of their commitments under the Convention, in accordance with its Article 20, paragraph 4.	--			

### **4.3 CONCLUSIONS**

Considerable progress has been made regarding the designation of areas for protection of nature, in the knowledge base, and in awareness, particularly by Government ministries. The progress has been achieved for the implementation of the EU Birds and Habitats Directives. The designation of sites under the EU Habitats and Birds Directives and the designation of further areas under national law, represent a major effort and will have long-lasting benefits.

The status of species and habitats needs further research. Only a small percentage of EU annex species was assessed as having a 'bad' conservation status. There are still bird species on the red list (IUCN), Conservation measures the Bonellis eagle appear to have a success conservation.

The major pressures and threats to Cyprus's biodiversity are similar to those faced by many other Mediterranean countries. They comprise direct loss and destruction by land use change, development, over-grazing, unsustainable exploitation, pollution, and invasion by alien species. There is a deterioration of riparian ecosystems due the construction of dams which represents a major threat to biodiversity of the ecosystems, the coastal area and in freshwaters.

The land use changes and the expansion of development (infrastructure, housing etc.), cause a major impact in all habitats and species of the Island.

Climate change is an additional pressure on certain habitats, particularly in the coastal area and can exacerbate the problems arising from the spread of certain alien invasive species. Although a number of measures to control alien species are being implemented, wider application of such measures is necessary on an all-island basis, supported by strengthened legislation.

A substantial body of legislation on biodiversity has come into force and, among other things, this has facilitated a range of conservation measures. Cyprus is beginning to

adopt the 'mainstreaming' approach to biodiversity conservation but, much more needs to be done. Although priority has had to be given to the conservation of protected habitats and species, improved conservation measures for biodiversity in the wider countryside and marine environment need be put in place and implemented. Wider conservation measures are also needed to maintain the ecological structure and function of the ecosystems.