Cyprus National Report on the Strategic Action Plan for the Conservation of Marine and Coastal Biological Diversity in the Mediterranean (SAP-BIO)

(First Draft version)

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CONTENT

I. INTRODUCTION

Background information

A regional Strategic Action Programme (SAP) for dealing with land-based sources of pollution in the Mediterranean Sea was adopted in 1997 by the Contracting Parties to the Barcelona Convention. The SAP covers regional and national activities to address land-based pollution focusing on the urban environment, identifying sources of pollution, defining the strategies and measures needed, and outlining targets and deadlines for action, as well as the related costs. Major shifts in facing pollution issues sprung from the need to do something quickly and effectively about pollution in the Mediterranean. In 1995 and 1996 the Mediterranean Action Plan and the Barcelona legal system were rather radically revised for this purpose. The changes were also intended to align them with the principles of the Rio Summit. The LBS Protocol with its far-reaching provisions was amended in 1996, but has still to enter into force.

In order to speed up the implementation of a number of key activities, foreseen in the SAP, a project "Determination of Priority Actions for the further Elaboration and Implementation of the SAP for the Mediterranean Sea" (the SAP MED) was prepared and approved. It involves substantial funding from the Global Environment Facility (GEF) in addition to the commitment of MAP trust funds. It includes a number of activities both on the regional and the national level. In addition to activities aimed at the control of pollution, the project also aims at protecting biodiversity, focusing on the preparation of a Strategic Action Plan for the protection of marine and coastal biodiversity.

The GEF is a principal partner in global environment problem solving. It is an independent international financial entity, set up in 1991. The GEF has funded over 500 planned environmental programs, at a cost of more than $2 billion in 120 countries. In the area of biodiversity, the GEF helps to conserve biodiversity, improving forests, farmlands, coastal, mountain, marine, and wildlife management to secure a better livelihood for people who use these resources.

RAC/SPA, was designated as the lead Agency for the SAP BIO Project. RAC/SPA is located in Tunis, Tunisia, and is acting as the Mediterranean Action Plan (MAP) centre responsible for the elaboration and implementation of the SAP BIO Project. RAC/SPA was set up following a decision taken in the second meeting of the Contracting Parties to the Barcelona Convention. The centre was considered as a national institution that has a role to play within the Mediterranean region. The centre is similar in nature and function as the Regional Activity Centres, which were operating as a part of MAP (the Blue Plan in Sophia Antipolis, France, and the Priority Action Programmes in Split).

Of relevance to SAP BIO is the new protocol on Mediterranean Specially Protected Areas and Biological Diversity, which entered into force in 1999 and which is replacing the 1982 protocol concerning Mediterranean Specially Protected Areas. The main objective of SAP BIO Project is to establish a logical base for implementing the new Protocol, over a thirty-months period. It is foreseen that a Strategic Action Plan for the conservation of coastal and marine species and habitats (the SAP BIO) will be prepared to rank regional priorities and guide actions at the national level. This will be presented for approval at the thirteenth ordinary meeting of the Contracting Parties of Barcelona Convention. A number of priority actions are foreseen for this purpose at the national level (the preparation of national reports comes under this). All work is to be undertaken in harmony and complementarity with what some countries, at least, are doing under the Biodiversity Convention

The Earth Summit of 1992 in Rio de Janeiro, Brazil, on the Environment and Development approved the Convention on Biodiversity (CBD). The first meeting of Experts on Marine and

Coastal Biological Diversity within the CBD was held in Jakarta, 1997. In that meeting, five issues were identified:

- Integrated Marine and Coastal Management
- Marine and Coastal Protected Areas
- Sustainable use of Marine and Coastal Living Resources
- Mariculture
- Alien Species

Objectives of the National Report:

The present report has been prepared on the basis of contract 87/2001 and, subject to the provisions of this contract, aims to:

i. Identify problems affecting biodiversity and their proximate/ ultimate means.

ii. Assess their relative importance.

iii. Identify national conservation priorities.

iv. Identify remedial actions which may include:

   a. Preserving single endangered /threatened species/populations by special protection plans

   b. Conservation of threatened habitats, communities, ecosystems and landscapes by creating Marine/Coastal Protected Areas.

   c. Limiting some fishing activities by instituting Fishing Exclusion Zones for some gear and/or some periods of time.

   d. Other remedial actions.

Target users

This report is intended for target users of different groups. However, priority of use is given to national authorities and international organizations, which are expected to support the implementation and follow-up programmes. The main target users are:

i. National and local authorities responsible for decision making and providing a better understanding of the importance of marine biodiversity.

ii. Experts and institutions involved in marine and coastal areas biodiversity activities in the Mediterranean Region.

iii. Professional institutions, and decision-makers involved in the management, protection and conservation of marine and coastal resources along the Cyprus coastal zone.

iv. General public for a better understanding of the human roles on deterioration of marine and coastal biodiversity of the country.

II. BASIC INFORMATION ON STATUS IN CYPRUS

II.A Country Profile

In 1974, the Republic of Cyprus was invaded by the Turkish Army imposing a division of the island, with the northern 38% of the territory (including the whole of the Kyrenia District and the largest part of the Famagusta District), remaining since then inaccessible. This report is, in part at least, concerned with the territory under the control of the Government of Cyprus.

Area:	*total:* 9,251 sq km
Coastline:	772 km total length of the coastline
Maritime claims:	*continental shelf:* 200-m depth or to the depth of exploitation *territorial sea:* 12 NM
Terrain:	central plain with mountains to north and south; scattered but significant plains along southern coast
Elevation extremes:	*highest point:* Olympus (Troodos) 1,951 m
Natural resources:	copper, pyrites, asbestos, gypsum, timber, salt, marble, clay earth pigment
Land use:	*arable land:* 12% *permanent crops:* 5% *permanent pastures:* 0% *forests and woodland:* 13% (though 18% is state owned forest land) *other:* 70% (1993 est.)
Irrigated land:	390 sq km (1993 est.)
Natural hazards:	moderate earthquake activity; droughts
Environment - current issues:	water resource problems (no natural reservoir catchments, seasonal disparity in rainfall, sea water intrusion to island's largest aquifer, increased salination in some areas); water pollution mainly from industrial wastes and agriculture; coastal degradation; loss of wildlife habitats and landscape degradation from urbanization
Geography - note:	the third largest island in the Mediterranean Sea (after Sicily and Sardinia)
People	
Population:	762,887 (July 2001 est.)
Population growth rate:	0.59% (2001 est.)

Life expectancy at birth:	*total population:* 76.89 years *male:* 74.6 years *female:* 79.3 years (2001 est.)
Literacy:	*definition:* age 15 and over can read and write *total population:* 94% *male:* 98% *female:* 91% (1987 est.)

Government

Capital:	Nicosia
Administrative divisions:	6 districts; Famagusta, Kyrenia, Larnaca, Limassol, Nicosia, Paphos;
Independence:	16 August 1960 (from UK); note
Legal system:	based on common law, with civil law modifications
Suffrage:	18 years of age; universal
International organization participation:	Australia Group, C, CCC, CE, EBRD, ECE, EU (applicant), FAO, G-77, IAEA, IBRD, ICAO, ICC, ICFTU, IDA, IFAD, IFC, IFRCS (associate), IHO, ILO, IMF, IMO, Inmarsat, Intelsat, Interpol, IOC, IOM, ISO, ITU, NAM, NSG, OAS (observer), OPCW, OSCE, PCA, UN, UNCTAD, UNESCO, UNIDO, UPU, WCL, WFTU, WHO, WIPO, WMO, WToO, WTrO

Economy

GDP:	Purchasing power parity - $9.7 billion (2000 est.);
GDP - real growth rate:	4.2% (2000 est.);
GDP - per capita:	Purchasing power parity - $16,000 (2000 est.);
GDP - composition by sector:	Agriculture 6.3%, industry 22.4%, services 71.3% (1998);
Inflation rate:	4.2% (2000 est.);
Labour force:	291,000;
Labour force - by occupation:	Services 73%, industry 22%, agriculture 5% (2000);
Unemployment rate:	3.6% (2000 est.)

Budget:	*revenues:* $2.9 billion (2000 est.); *expenditures:* $3.2 billion, including capital expenditures of $324 million (2000 est.);
Industries:	food, beverages, textiles, chemicals, metal products, tourism, wood products
Industrial production growth rate:	2.2% (1999)
Electricity - production:	2.951 billion kWh (1999);
Electricity source:	*fossil fuel:* 100%
Electricity - consumption:	2.744 billion kWh (1999);
Agriculture - products:	potatoes, citrus, vegetables, barley, grapes, olives, vegetables
Exports:	$1 billion (f.o.b., 1999 est.);
Exports - commodities:	citrus, potatoes, grapes, wine, cement, clothing and shoes;
Imports:	$3.6 billion (f.o.b., 1999 est.);
Imports - commodities:	Consumer goods, petroleum and lubricants, food and feed grains, machinery;
Exchange rates:	Cypriot pounds per US dollar - 0.6146 (January 2001),
Fiscal year:	calendar year

The Republic of Cyprus was instituted as an independent sovereign country in 1960 with presidential system of government. There are 11 Ministries each headed by a Minister. The Ministries are: Foreign Affairs, Finance, Interior, Defence, Education and Culture, Communications and works, Commerce, Industry and Tourism, Agriculture Natural Resources and Environment, Justice and Public Order, labour and Social Insurance, and Health.

Cyprus has an open free-market economy, driven mainly by the **tourism and service sectors** as reflected in the contribution to the gross National Product (GDP). GDP in constant 1995 prices has reached in 2001 just over 5 billion Cyprus Pounds (about $7.5 billion). The broad Service sector accounts for 75% of the GDP. Cyprus main trading partner is the EU accounting for 55% of imports and 40% of exports. Cyprus has applied for accession to the EU and accession negotiations are well advanced.

II.B Information on the marine and coastal environment

a. State of the marine environment

Cyprus is in the middle of the Levantine basin. This basin, as a result of its relative isolation, is characterised by a higher degree of endemism. Its salinity and the temperature regime of its surface waters, which is higher than the rest of the Mediterranean and its highly oligotrophic nature, result in a relatively high species diversity and very low biomass. This is very apparent in its benthos, the study of which requires an unusually high number of grab samples to be statistically valid. In the sea around Cyprus *Posidonia oceanica* thrives in extensive meadows at depths of about 10-30 metres. 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.

The oligotrophic nature of the area enhances the clarity of its waters and photosynthesis is possible at considerable depths. Recent changes in this regime are discussed briefly lower down. The warm waters of the region and of the coastal zone in particular support turtle nesting on its beaches.

A fair number of studies have been carried out on the marine life of the coastal waters of the island (see Annex 1 for a list of these). The continental shelf is generally narrow, extending to about … kilometres in the main bays but can be very narrow (1-2 km) in other areas, especially the north coast. The seabed is generally of soft substrates, with sand giving way to muddy sand and mud in deeper waters, in the main bays and in much of the south and eastern coasts. Off the main capes, on the west coast and on much of the north coast the seabed is mainly rocky in shallow waters (down to about 50 metres) with patches of coarse sand in places. Invariably lower down this grades into mud.

Main forces affecting the marine biodiversity of Cyprus

The main forces that are acting on the ecological equilibrium of the Cyprus seas are:

a. Fishing and overfishing, in particular with trawlers but also with many other methods, in shallow waters

b. Urban and tourism development of the coastal zone, which impacts habitats and species dependent on this zone (turtles, monk seals, ghost crabs etc)

c. Pollution and especially increases in nutrients

d. The Lessepsian migration which is taking place through the Suez canal, which is having an impact not only on the biota of the Levantine basin but, sequentially, on the whole Mediterranean

b. The State of the Coastal Zone of Cyprus

Cyprus is the third largest island in the Mediterranean (after Sicily and Sardinia) with an area of 9,251 square km and 772 Km of shoreline of which 404 Km are in the occupied areas, 72 Km within the Sovereign British Base areas, and only 296 Km within the area controlled by the Government of Cyprus.

Description of the Cyprus coast

The Cyprus coastline is vary varied, ranging from steep inaccessible cliffs and ragged rocky shorelines with sea caves, to gentle sloping sandy beaches fringed with sand dunes. This

diverse nature of the shoreline, coupled to a variety of other factors (geology, wave exposure etc), has resulted in the creation of many diverse habitats each supporting different plant and animal communities.

Sandy beaches are predominant in the large bays of Cyprus, Famagusta, Larnaca, Limassol, Polis Chrysochou and Morphou. These long beaches often grade into shingle beaches at one end of the bay depending on the wave-generated littoral drift. There are also pocket beaches in many rocky shores, which can be extensive.

Some sandy beaches support populations of Ghost Crabs (*Ocypode cursor*), a crab that digs deep burrows in the sand on the beach. Only some beaches are suitable for such burrows and these crabs can only be found on them. This is mainly the result of the nature and size of the sand particles. Ghost Crabs are nocturnal scavengers. At night they may go on food-finding excursions at long distances (100 metres or so) from the sea, in the sand dunes, a terrain that during daylight hours is the hunting ground of the sand-dwelling Spiny-footed Lizard, *Acanthodactylus schreiberi.*

Sand dunes fringe some of the beaches. The Sand Daffodil, *Pancratium maritimum* can be found here. …. Add species

Sandy beaches on the island are of different kinds. They vary not only in the chemical and physical (grain size, etc) characteristics of the sand but also in their profile, depth and Astability@. Beaches on the west coast of the island are exposed to the pounding action of large waves. They have higher profiles and are constantly Aon the move@. More sheltered beaches, as in many of the east facing bays, have a lower profile and are more stable. As a result the living organisms that inhabit them or use them are different. Green turtle nest on high-energy beaches while loggerhead turtles nest on low profile beaches mainly. The main Loggerhead nesting beaches are in Chrysochou Bay and the Green turtle nesting beaches are in the Lara/Toxeftra area. In the occupied areas the Green turtles nest mainly on the north-eastern beaches of the Karpas peninsula (Eleousa area), in Alakati and in the northern part of Morphou Bay.

Shingle beaches are often the poorest of the shoreline habitats as practically nothing survives the grinding action of such beaches during periods of rough weather. They are extensive in Episkopi Bay and in parts of Morphou Bay as well as in stretches of the south coast between Limassol and Larnaca and between Petra tou Romiou and Paphos.

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 - much of the south-eastern part of the island, 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 narrow 1 metre or so or it may be several metres 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. *Stipopodium* fronts *Cystoseira* and other brown algae cover much of this area. In the cracks and crevices that traverse this shelf and in the sublittoral zone, just below it, lives an east Mediterranean Cowry, *Cypraea spurca,* - now under threat from too much collecting. 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. Barnacles (……) litter much of the rock surface in the tidal zone and just above it. *Littorina neritoides* can be found in the splash zone on rocky shores

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 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 mediterraneous*), which it seems to have replaced in some areas.

Ophiolite formations (pillow lavas etc) can be found mainly in a small stretch of the coastline in the Pomos- Pyrgos area and in parts of Akamas.

High cliffs with sea caves can be found in several areas, in Akamas, Akrotiri and elsewhere. Some of these caves were inhabited by the Monk Seal and some still are. A survey of these caves was undertaken in 1997. (Dendrinos and Demetropoulos 1998).

The terrestrial vegetation of the coastline is very varied, depending on many factors. The various coastal habitats of Cyprus have been described in detail in the Natura 2000 project (see below). A brief list follows:

……..

The coastal area of Cyprus is under pressures from economic/urban development particularly tourism, recreation, urban and infrastructure development and, to a lesser extend, agricultural and industrial development. Indeed, the rapid socio-economic growth of Cyprus, especially in the 1980s, beside its desired effects, has also caused strains on the natural fabric of the coastal area.

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.

[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 Paphos and have mostly been caused by the type and speed of development. From a survey of a coastal stretch of 181 Km., in 1973 development along the coastal zone was only 22 Km. urban, 9 Km. suburban/tourist and 150 Km. pristine. In 1991 it changed to 31 Km. urban, 48 Km. suburban/tourist and only 102 Km. pristine. Serious problems are also appearing in the coastal zone outside urban areas with the rapid encroachment of development of tourism facilities and holiday homes in natural/pristine areas.

About ten kilometres of coastline were declared into a reserve in 1989 (for turtle conservation purposes), in the Lara/Toxeftra area, on the west of the island and the management regulations for this were passed into the legislation under the Fisheries Law. State owned coastal forest areas are also protected (Cape Greco, Akamas forest. etc) under the Forest Law (see below).

Information and documentation available

There is a fair amount of information on the marine and coastal biodiversity in Cyprus - See ANNEX 1 for a list of the main publications/references. The Natura 2000 Life project has also

catalysed the collection and compilation of information in 38 sites. Maps are available in several scales, depending on the area.

National bodies dealing with the conservation of marine and coastal biodiversity

Marine/coastal biodiversity:

a. Environment Service (MANRE)

b. Department of Fisheries and Marine Research (MANRE)

c. Forestry Department (MANRE)

d. Game Fund (Ministry of Interior) - Waterfowl

***Fisheries*:** Department of Fisheries and Marine Research (MANRE)

Protection of the Sea (Pollution control/combating): Department of Fisheries and Marine Research; Environment Service, Merchant Shipping Department (Min. of Communications and Works).

Protection of the coastal zone:

Department of Town and Country Planning (Ministry of Interior)

District Officers (Ministry of Interior)

Environment Service (MANRE)

Fisheries Department (MANRE)

Forestry Department (MANRE)

Central Committee for the Beaches

Local Authorities.

Protected areas:

Marine/Coastal Areas – Department of Fisheries and Marine Research

Wetlands – Ministry of Agriculture Natural Resources and Environment

Forestry Department in protected areas in coastal forest areas

National Institutional and Coordinating Structures for the Environment

The overall responsibility for the environment in Cyprus is vested in the Council of Ministers. The Minister of Agriculture Natural Resources and Environment is responsible for the control and coordination of the policies for the protection and preservation of the environment (excluding town and country planning which is the responsibility of the Minister of Interior).

The Environment Service of the MANRE, placed at the Permanent Secretary's office, is mandated to advise on environmental policy and secure its implementation, coordinate the process for the adoption of the EU's environmental policy and legislation, coordinate programs for the protection of the environment, head the technical committee on environmental impact assessments, oversees the enforcement of the larger part of the Law on the Control of Water Pollution, promote environmental awareness and training, as well as to gather and disseminate information on the environment. The Service is also the administrative arm of the Environment Committee and the Council for the Environment. In addition, it is the National Focal Point for

the CSD, INFOTERRA, UNEP, CITES and the Bern, Basle, Vienna, Biological Diversity, Climate Change, Ramsar and CMS Conventions.

Through its various Departments, (i.e. Water Development, Agriculture, Geological Survey, Mines and Quarries, Fisheries, Forestry, Agricultural Research, Veterinary Services, Meteorology, as well as the Natural Resources Information and Remote Sensing Center), the MANRE has a wide range of executive functions on environment specific or related issues, such as the protection of the quality of surface and underground waters and the sea, management of water resources, aquaculture, climatology, genetic stock, protected areas, soil conservation, fertilizers and pesticides, reuse of treated effluent, hazardous waste management, mines and quarries, geomorphology, control/monitoring/ combating marine pollution, marine ecology and aquatic species and habitats, management of forests and public parks, herbaria and gene banks, water use, organic farming, monitoring water quality, protection of flora and fauna, genetic resources, agricultural and animal husbandry waste, industrial and domestic waste treatment, rehabilitation of sites, health and welfare of animals, etc.

Council for the Environment

This Council is chaired by the Minister of Agriculture, Natural Resources and Environment, its members being representatives from governmental and quasi-governmental agencies, NGOs, the business and technical sectors and local government. The Council advises the Minister and, through him, the Council of Ministers, on issues relating to the environment, such as serious environmental problems or proposals for environmental legislation. It also makes recommendations on environmental policy and its mandate has been expanded to also act as a forum on sustainable development.

Environment Committee

The Committee is chaired by the Permanent Secretary of the MANRE, and its members are representatives from the Ministries of Interior, Labour and Social Insurance, Commerce, Industry and Tourism, Communications and Works, Health, and Education and Culture, the Planning Bureau, the Cyprus Tourism Organization and the Department of Town Planning and Housing. The Committee reviews environmental programmes, further refines the objectives of environmental policy approved by the Council of Ministers and acts as a broader environmental policy coordinator among Ministries.

Planning Bureau

lt is the economic and administrative arm of the Government and its main responsibility is the achievement of economic and social development. The Bureau is in charge of the preparation of five-year Development Plans for the national, regional, sectoral and balanced development of the island's economy and the Annual Development Budget and supervises their implementation and coordination. It has the broader responsibility for the internal co-ordination of Cyprus -EU negotiations.

Gaps identified

There is no competent body for the conservation of the terrestrial fauna and flora and habitats outside forest areas. In some cases … there are also no clear delegation of responsibility to institutions and overlaps exist, which may lead to ineffective action. Enforcement also needs to be strengthened in some areas of conservation. There is wide fragmentation of responsibilities in the overall environment field, which levies additional burdens on coordination mechanisms. Staffing needs, upgrading in certain fields and refocusing of duties may, in part, help in solving this problem. Gaps include effective enforcement of legislation and dispersal of responsibilities in a wide spectrum of Departments and Ministries with a relatively weak, though improving,

coordinating mechanism. Staffing of the various agencies is in some cases adequate but there is a need to focus or to redirect the main efforts towards biodiversity conservation – in others it clearly inadequate.

Relevant Activities at the National Level

1. An EU-Life funded project "Special Areas of Conservation" aimed at aligning Cyprus with the EU Acquis Communitaire in view of Cyprus' accession to the European Union was carried out in 1998-2001. This project aimed basically at identifying, mapping and describing potential Natura 2000 sites. The project was coordinated by the Environment Service (MANRE). Through this project, which ended at the end of 2001, 38 potential Natura sites were identified. Of these, 13 have coastal and marine components (two are marine sites only) and another three are coastal only (a total of 16).
2. An ecological charter for Cyprus was initiated in the mid-nineties but has fallen behind schedule due to other pressures of work and the commencement of the Natura project.
3. A marine turtle conservation project has been ongoing since 1978, covering both Green and Loggerhead turtles. Specific habitat protection legislation was introduced in 1989 for the Lara/Toxeftra area.
4. A management plan for the Larnaca Salt Lake was approved by the Council of Ministers in 1997 and is currently being implemented. A Management Committee has been set up and the site has since become a Ramsar site. It includes extensive land acquisitions on the periphery of the lake (estimated at about $12million), the construction of footpaths, bird watching facilities, etc.
5. A CAMP project in cooperation with PAP/RAC was launched in 2002
6. The first stage of a coastal erosion/management project has been completed and is now in its second phase. It is carried out under the aegis of the Marine works Unit of the Ministry of Communications and Works
7. **add**

National Capacity

The technical/scientific capacity of government departments is generally very high. Funding and the infrastructural and human resources allocated to conservation vary. Generally government departments are understaffed in these fields. Though the size of the country implies constrains on the size of the civil service, such staffing clearly needs to be upgraded. Infrastructure (computers, etc) is being upgraded and is generally high. Funding varies, depending on the subject/project and temporal priorities. The foreseen entry of Cyprus to the EU is catalyzing the upgrading of conservation priorities and the means of effectively achieving results. See the chapter on NGOs on their capacity to get involved in the conservation process.

NGOs

The capacity of NGOs to get involved in conservation is still low as these are small and usually under-funded and working, with a very small number of exceptions, on a voluntary basis. Some progress is being made in this field through access to EU and UNOPS funded projects, which is also the case with government departments. NGOs are nonetheless well informed on

environmental issues. Their main role so far has been to lobby the Government, the House of Representatives and supranational bodies (European Commission, Convention secretariats etc) on environmental and nature issues. A modest support is given to the main NGOs by government (<$1000 each). There is a Federation of Environmental and Ecological Organizations, which, represents NGOs in the Council for the Environment, the Technical Committee for EIA and usually in the House of Representatives Environment Sub-committee. It receives a somewhat bigger grant than the NGOs.

Public awareness

Environmental awareness has been increasing rapidly in recent years and the spectrum of subjects this covers is also increasing. Though it is difficult to quantify the level of this awareness in the general public the public debates going on, usually through the press and other media are signs of this increase. Several laws, basically the ones that are transferring the EU Environmental Acquis, provide for keeping the public informed, for its participation and for getting feedback on issues that may affect the environment. The main focus of public awareness varies but often it focuses on issues that relate to public health and the loss of potential for development. Interest in biodiversity issues is improving in recent years. The proliferation of environmental NGOs in the last decade or so and their fact that their voice is heard are signs of increasing awareness. There is pressure for the ratification of the Aarhus convention, which regulates to a large degree the relations between governments and the public on issues of access to information, public participation etc. Increasing access to the Internet and its resources is also catalysing communications and interest in environmental issues.

Awareness in government and local authorities

Awareness is also increasing in government and local authority circles. This is especially true on issues and subjects in which environmental health is of benefit to sectors of the economy eg keeping the seas clean of pollution, which coincides with tourism or health concerns. Biodiversity issues are often secondary, unless again they can provide some economic interest (eg wetland conservation) and do not conflict with development – which they sometimes do. Much needs to be done in briefing local authorities on environmental issues.

Legislation

a. Conventions, Protocols etc ratified

Barcelona Convention (R – 1979) Amendments (Acc. 2001)
- SPA Protocol (R - 1988)
- Protocol on Specially Protected Areas and Biological Diversity (R - 2001)
- LBS Protocol (R - 1988) Amendments (Acc. 2001)
- Emergency Protocol (R -1979)
- Dumping Protocol (R – 1979) Amendments (Acc. 2001)
- Offshore Protocol (??)
- Hazardous Wastes protocol (??)

Bern Convention(R - 1988))
Convention on Migratory Species (R - 2001)
- ACCOBAMS (S)

RAMSAR (R - 2001)
Desertification (R – 2001)

Convention on Biological Diversity (Biodiversity Convention)(R - 1996)
Convention Concerning the Protection of the World Cultural and Natural Heritage (R - 1975)
CITES (R - 1974)
GFCM Agreement (FAO)
Aarhus Convention (S – 1999)
Note:

S – signed

R- Ratified

Other international agreements on the environment, that Cyprus is party to: Air Pollution, Climate Change, Climate Change-Kyoto Protocol, Environmental Modification, Hazardous Wastes, Law of the Sea, Marine Dumping, Nuclear Test Ban, Ozone Layer Protection, Ship Pollution

signed, but not ratified: Air Pollution-Persistent Organic Pollutants

b. National Legislation

In addition to the existing national legislation, which is listed below, Cyprus is in the European Union accession process and most of the EU Directives on the environment have been transcribed into national law or are in the final stages of their adoption. These include: Habitat Directive, Bird Directive, EIA Directive, Access to Information Directive etc**.**

Environment:

Fisheries Law (CAP 135), Fisheries Regulations (273/90) – and amendments

Law Concerning the Control of Water Pollution (No. 69/91).

Environmental Impact Assessment Law (No 57(1)/2001)

The Town and Country Planning Law (No. 90/72, Amending Laws 56/82, 7/90, 28/91, 91(I)92, 55(I)/93).

The Foreshore Protection Law (CAP 59 and No. 22/61, and Amending Laws)

The Piers Law (No. 39/73, 36(I)/94).

The Forest law

The Game and Wild Birds Protection and Management Law (39/1974) and Regulations (266/1996)

Protected areas:

Marine/coastal: Fisheries Law (CAP 135) and Regulations (273/90,94/1994)(All marine waters and coastal to the extent the coastal area is a habitat for marine species e.g., turtle nesting beaches).

Coastal in forest areas: The Forest Law (No14/1967)

In the rest of the coastal area: The Town and Country Planning Law (No. 90/72, Amending Laws 56/82, 7/90, 28/91, 91(I) 92, 55(I)/93) and its Policy for the Countryside

The Foreshore Protection Law (No. 22/61, and Amending Laws)

Fisheries:

Fisheries Law (CAP 135), including amendments of this law, and the Consolidated Fisheries Regulations of 1990 (No. 273/90) adopted on the basis of Article 6 of the Fisheries Law.

Sponge Fisheries Law

Aquaculture Law (1999)

Protected Areas and Species

Aquatic species

The following aquatic species are specifically protected by the Fisheries legislation:

(This mentions that the killing, possession, selling or attempts at these, or the possession or selling of any parts or derivatives from these species is prohibited)

All species of marine turtles

The terrapin *Mauremys caspica*

All dolphin species

The Mediterranean Monk seal

Ocypode cursor and *Potamon potamios*

The collection of *Artemia salina* cysts is prohibited

No species from inland waters (including the salt lakes) may be killed without a permit in writing.

The importation of live aquatic animals is controlled by the Fisheries legislation.

In addition Cyprus implements the provisions of international Conventions that have been ratified (Bern, Barcelona (including its Protocol on SPA and Biodiversity), CITES, CBD) for the conservation of species and habitats and the species etc listed in these Conventions/protocols are also protected.

The Lara/Toxeftra coastal area has been declared a protected area in 1989. It is the only protected area that has a marine component. It covers a 10 km stretch of coastline and extends 95 meters inland and out to sea to the 20 metre isobath.

Birds

Add

III. ANALYSIS OF THE PRESENT SITUATION

III. A. Factors that affect marine/coastal biodiversity

Tourism and Urban development

The coastal area of Cyprus is under pressures from economic development particularly tourism, recreation, urban and infrastructural development and, to a lesser extend, agricultural and industrial development. Indeed, the rapid socio-economic growth of Cyprus, especially in the 1980s, beside its desired effects, has also caused strains on the natural fabric of the coastal area.

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.

Cyprus is the third largest island in the Mediterranean (after Sicily and Sardinia) with an area of 9,251 square Km and 772 Km of shoreline of which 404 Km are in the occupied areas, 72 Km within the Sovereign British Base areas, and only 296 Km within the area controlled by the Government of Cyprus.

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. From a survey of a coastal stretch of 181 Km., in 1973 development along the coastal zone was only 22 Km. urban, 9 Km. suburban/tourist and 150 Km. pristine. In 1991 it changed to 31 Km. urban, 48 Km. suburban/tourist and only 102 Km. pristine.

Massive construction of hotels and tourist accommodation has transformed some of the largely pristine coastal areas into tourist development zones. Coastal villages have grown practically overnight into major tourist centres, notably Ayia Napa and Paralimni, on the south-east coast of the island.

The following table speaks by itself:

	Total No. of beds	Coastal Area		Inland	
		No of beds	%	No of beds	%
30.6 1974 (before Turkish invasion)	19,192	15,006	78.19	4,186	21.81
31.12. 75	5,445	1,919	35.08	3,535	64.92
31.12. 80	12.524	8,622	68.84	3,902	31.16
31.12. 85	30,375	26,191	86,23	4,184	13,77
31.12. 90	59,271	55,012	92.82	4,712	7,18
31.12. 95	78,427	73,715	94.00	4,712	6
30.06. 97	84,259	79,778	94.68	4,481	5.32

Negative coastal impacts have, inter alia, taken the form of loss of vistas and reduction of public access to the beach, as stretches of the coastline in the denser urban and tourist areas have been blocked over by buildings located very close to the water, thus also contributing to the deterioration of the aesthetic quality of the coastal environment.

Another negative impact that could directly be attributed to tourism and second homes has been that, mostly due to the shortage of suitable sandy beaches, many small-scale groynes (approx. 110) and breakwaters (approx. 50) have been constructed haphazardly and, many of them, illegally and without due consideration to their longer-term environmental impacts.

The most important manifestations from such rapid land use changes, arising from coastal transformation, have been the shrinking of agricultural land in favour of residential land; fragmented settlements and isolated buildings in the countryside; unconsolidated growth; spatial pattern of land use in the fringe areas that is heterogeneous and unstable; rising land

values; labour shortages; and habitat destruction. The last of these directly relates to the provisions and the implementation of the Protocol on Specially Protected Areas and Biological Diversity and in particular to the protection of turtle nesting beaches as well as the protection of Monk Seal caves. Primarily of course conflicts arise over development near the sandy beaches, which are much in demand for tourism development purposes.

Some of the other problems identified, mostly due to a synergism of causes, have also been on water resources, marine pollution, wildlife habitats, erosion etc.

Despite its partial degradation, the quality of the coastal environment in Cyprus remains of very good quality on the whole, particularly when compared with other parts of the Mediterranean. However, rapid economic development and urban and tourism pressures are posing a serious threat to natural and cultural resources.

Invasive species - the Lessepsian migration

The opening of the Suez Canal last century (1869) has led to the connection of the Mediterranean with the Red Sea. For the first time the Mediterranean´s pure Atlantic-origin fauna faced competition from invading Indopacific animals and plants that established themselves first in the Canal and later in the Mediterranean Sea near its entrance into the Mediterranean. Several hundred species have since established themselves in the Eastern Mediterranean and the number is growing fast. These Indopacific species now form over 12% of the marine fauna of the East Mediterranean and 5% of the entire Mediterranean marine fauna (FREDJ *et al*., 1990;BELLAN-SANTINI, 1992; FREDJ *et al.,* 1992). Many species, some well known, such as the Red Soldier Fish and two Siganids (Rabbit fish) are now common in the commercial fish catches of Cypriot fishermen. Recent immigrants from the Red Sea that have established themselves in the coastal waters of Cyprus include *Caulerpa racemosa* and *Stypopodium shimperi*. Both, but especially *Caulerpa racemosa*, have spread in a very explosive fashion since about 1990, to cover very large areas of seabed, in many areas around the island (Hadjichristophorou *et al* 1997). This *Caulerpa* covers the seabed and especially soft substrates, in a mat a few centimetres thick competing very successfully with species such as *C. prolifera* and *Cymodocea nodosa,* which it replaces. Apparently this species has as yet no enemies in the Mediterranean and if its proliferation continues it is likely to revolutionise the whole East Mediterranean shallow water ecosystem, with far reaching effects not only on the native marine flora but also, sequentially on the marine fauna of the area. However, in recent years (1998 –2002) it seems to have lost some " vigour" and is no longer so apparent.

b. Fishing

Fishing in the fashion that this is currently taking place in Cyprus, in addition to its direct impact on fish, has many other ecological effects some of which are complex and difficult to measure. Effects from trawling in particular include changes in benthic community structure and degradation of *Posidonia oceanica* meadows. Though trawling is prohibited in waters shallower than 55 metres, where the *Posidonia* meadows flourish, contraventions are frequent. Surface long-lining has effects on non-target species.

In Cyprus 8 bottom trawlers fish in the territorial waters of Cyprus from the 1 June to the 8 November of each year. It is illegal to fish in waters shallower than 55 metres but this is difficult to enforce and contraventions are frequent. About 500 inshore boats (mainly 7-12 m) are licensed to fish in the same area. They fish mainly with bottom set trammel nets and bottom set long lines. Monofilament trammel nets are banned but monofilament gill nets of 16-18mm bar measure can be used. A small swordfish fishery with …. boats fishes about …. tons

of swordfish mainly. Catches are in the range of ….. tons p.a. Over 1000 "sport" fishermen also fish with the same kind of fishing gear but with restrictions on the quantity of gear that can be used. Spear fishing with aqualungs and fishing at night with lights were licensed and restrictions in the number of days existed. In 2002 no licences and these fishing methods were banned in spite of strong reactions .

[The implementation of the FAO Code of Practice for Responsible Fishing, will no doubt help as will the current efforts of the EU and the GFCM towards better fisheries management.]

c. Pollution

In Cyprus no untreated or treated sewage flows into the sea and industrial pollution is limited mainly to four wine factories and a brewery that pollute Limassol bay with organic matter. Nutrients also originate from marine aquaculture (mainly offshore cage farms) and agriculture. Thermal effluents affect the areas around the three power stations (Moni, Vasilikos and Dhekelia) while Dhekelia Bay and Cape Kiti also receive the brine from two desalination plants. The two plants produce 80,000 m3 of drinking water per day.

Within the framework of the Mediterranean Action Plan, sea pollution in Cyprus is monitored, including the quantities of pollutants that enter the sea and the concentration of various substances in water, fish, and sediments.

As far as microbial pollution is concerned, the quality of coastal waters, in practically all monitoring stations, conforms to the WHO/UNEP standards. Studies have been and are being undertaken on the impact of pollution on marine ecology. Some have already been completed, for example on the ecological effects of pollution from the wine factories in Limassol, the fertilizer plant at Vassilikos (now closed) as well as on the effects of thermal effluents from power plants. The impact of aquaculture has also been and is being thoroughly studied.

Steps are being taken to ensure the better planning of new projects, such as the central sewage systems and the new power plant. Steps regarding pollution have also been and are being taken with the introduction of new legislative measures and stricter law enforcement. Effluent and ambient standards for different substances have been adopted, in line with the international obligations of Cyprus as defined in international conventions such as the Barcelona Convention. Central sewage systems will, to a large degree, solve the existing marine pollution problems, especially in Limassol, where it is planned that the central sewage system will accept under some conditions the wine factory effluents. These are mostly under construction and some (e.g., Limassol and Larnaca) are already operational. Coastal hotels often have (or had) individual sewage treatment plants and some problems were being faced with the disposal of the treated water which, to a degree and in some cases, found its way to the sea through seepages from over-watering gardens on the seafront.

Cyprus on the other hand, is vulnerable to marine pollution incidents owing to the position of the country near oil transport routes. In order to combat pollution by petroleum hydrocarbons, the Department of Fisheries and Marine Research, as the Department responsible for the prevention and control the marine pollution, has acquired anti-pollution equipment, which is continually being upgraded. The Department has its own boats. The Department´s pollution combating personnel is properly trained and the unit constantly strengthened. A Contingency Plan has been elaborated.

The highly oligotrophic nature of the seas around Cyprus, render it very sensitive to pollution inputs. Substances that are cumulative will accumulate in the sparse biomass of the area at relatively higher rates than in the richer seas where they are distributed in lower concentration in a bigger biomass. In this sense it is fortunate that the area is not an industrial one. Pollution inputs into the Cyprus seas are mainly of agrochemicals and nutrients.

The sensitivity of the Cyprus seas to nutrients is very high, as the background levels of these substances (nitrates and phosphorus) are very low. Their introduction, therefore, into the marine environment has an impact that is comparatively more significant than in other, richer areas, like the West Mediterranean. Nutrient enrichment of an area will no doubt increase the productivity of the area in terms of biomass but the form this will take effect in, is difficult to predict. Increased macroalgal growth (Ulva, Enteromorpha, Cladophora spp) in coastal waters and on the shore is the first step and this is not often welcomed. The special nature of the seas of Cyprus has, therefore, to be taken into consideration, as the effects of pollution on its ecological balance will not be the same as those in the western Mediterranean or other seas.

Nuisance macroalgal eutrophication phenomena have been noted, for example the problem caused by filamentous algae *Chadophora* spp in 1990 and in 1998 and 1999, near Ayia Napa and elsewhere.

Excessive use of fertilizers has resulted in high nitrate levels in the aquifer in some areas. The heavy utilization of underground water (over-pumping) for agriculture has resulted in the overexploitation of this water a drastic reduction of the level of the aquifer and in seawater intrusion in some coastal areas.

Erosion

Cyprus, along with many other Mediterranean countries, faces erosion problems, which in some cases are severe. This erosion is due mainly to human impacts (direct or indirect) on the coastal environment, such as constructions along the coast, sand and gravel quarrying (prohibited by law after the 1970´s), the construction of breakwaters, as well as other human and natural causes.

Cyprus Government signed an agreement with the EU for co-funding an integrated study regarding Coastal Protection in Cyprus. This was a MEDSPA project. The study, which started in 1993 and lasted for three years, was carried out by the Department of Public Works (Marine Works Unit), of the Ministry of Communications and Works, in co-operation with the Dutch firm "Delft Hydraulics" and other governmental services.

The primary aim of the study was the establishment of criteria and methods for the protection and improvement of the beaches and of the coastal zone as a whole, minimizing at the same time any environmental impacts.

Within this study, the coastline was divided into 12 more or less homogeneous areas, in geomorphological and hydrodynamic characteristics. For the first time in Cyprus, the observation of the physical characteristics of the coastal zone was put on a systematic basis. Within this study, General Plans for the protection and improvement of three coastal areas in Cyprus were drawn up, for Limassol Bay, Larnaca Bay, and the southern shore of Paphos. These General Plans are the first step in the effort to follow European standards for the protection of the coastal environment.

The twelve areas are listed in the table below:

District	Area
Paphos (includes Nicosia)	Kato Pyrgos Bay Tylliria area Khrysochou Bay Akamas Area North Paphos Area South Paphos Area
Limassol	Epikopi Bay Akrotiri area Limassol Bay Zygi- Kiti area
Larnaca	Larnaca Bay
Famagusta	Ayia Napa- Protaras area

III B. Protected Areas

Coastal/Marine Protected Areas

a. Lara/Toxeftra Turtle Reserve.
The Lara/Toxeftra, has been protected, since 1989, under the Fisheries Legislation as a coastal/marine reserve for turtle conservation. Both Green and Loggerhead turtles nest there. The management regulations for this area are spelled out in the Fisheries Regulations (273/90). It includes the foreshore (95m) and the adjacent sea area to the 20m isobath. The regulations prohibit boats and fishing in the area, the presence of the public on the beaches at night, driving on the beaches and umbrellas and sunbeds on the beach. The Foreshore Protection Law was also amended at the same time (1989) incorporating into it the notion of Ecologically Important areas. An Order was issued on the basis of the Foreshore Protection Law also declaring this area as Ecologically Important and giving effect to some of the provisions of the Fisheries law (prohibition of sunbeds, umbrellas etc on the beach). (see Annex … for information on the Cyprus Turtle Conservation project)

b. Larnaca Salt Lakes
The Larnaca salt Lakes have been protected since …. An the basis of a Council of Ministers decision which with the Decision also approved the Management Plan for these lakes. The plan includes inter alia the acquisition of land adjacent to the lake and acquisitions are under way. A sum of about $12m has been pledged for these acquisitions.
In 2001, the Main Larnaca Salt Lake has been declared as Cyprus' first Ramsar site, with the ratification of this convention. (see Map …..)

Coastal Protected Areas

The Policy Statement for the Countryside issued on the basis of The Town and Country Planning Law is also in place in the coastal zone and includes in the following categories and areas (in hierarchical order):
Nature Protection Shores and Areas: Cape Greco, Makronissos, Randi Forest, Akamas.
Protected Areas: Pomos cliffs, Liopetri Estuary, Cavo Greco cliffs, Pissouri cliffs.
Areas of Outstanding Beauty: Peyia, Kouklia, Pissouri, Maroni.

The NATURA 2000 Network
The study funded by the Life- Third Countries Programme has been completed and a large amount of data has been collected and evaluated by an inter-departmental committee made up or representatives/experts from the relevant Departments. These included the Environment Service, the Departments of Forests, Fisheries and Marine Research, Geological Survey, Game Fund, Town Planning etc. The prescribed EU Data Forms and instructions were followed. The study included all habitat areas and species for inclusion in the Annexes of Directive 92/43 (the Habitat Directive) and in the Annexes of Directive 79/409 (the Birds Directive).

The proposed list of Natura 2000 sites arrived at includes 38 sites.

No	Code	Name of Site	Category of Site	Area (ha)
1	1000001	Ayia Irini – Kormakiti	Coastal/Marine	27744
2	1000002	Pentadaktylos Mountain Range	Terrestrial	21033
3	1000003	Alakati	Coastal/Marine	856
4	2000001	Mammari- Dhenia Area	Terrestrial	219
5	2000002	Alykos River-Ayios Sozomenos	Terrestrial/Freshwater	434
6	2000003	Mitsero Area	Terrestrial	982
7	2000004	Makheras State Forest	Terrestrial	7797
8	2000005	Madari- Papoutsa	Terrestrial	6195
9	2000006	Paphos State Forest	Terrestrial	63556
10	3000001	Yiouti- Pacheammos	Coastal/Marine	6381
11	3000002	Cape Andreas-Klides Islands	Coastal/Marine	14672
12	3000003	Cape Elea – Limanouri	Coastal/Marine	10747
13	3000004	Salamina- Famagusta Lakes	Coastal	9724
14	3000005	Cape Greco	Coastal/Marine	2003
15	3000006	Nissia Marine Area	Marine	189
16	4000001	Polis –Yialia Area	Coastal/Marine	2772
17	4000002	Ha Potami Area	Terrestrial	3296
18	4000003	Diarizos Valley	Terrestrial/Freshwater	1724
19	4000004	Vouni Panayias Area	Terrestrial	1489
20	4000005	Episkopi Morou Waters	Terrestrial	914
21	4000006	Moulia Area	Marine	201
22	4000007	Xeros River	Terrestrial/Freshwater	8815
23	4000008	Mayrokolymbos	Terrestrial/Freshwater	1344
24	4000009	Skouli Area	Terrestrial/Freshwater	186
25	4000010	Akamas Peninsula	Coastal/Marine	25541
26	5000001	Limassol Forest-Kyparissia Area	Terrestrial	5209
27	5000002	Akrotiri Lake-Phasouri Marsh	CoastalMarine	12955
28	5000003	Episkopi Area (Limassol)	Coastal	1024
29	5000004	Troodos State Forest Park	Terrestrial	9033
30	5000005	Cape Aspro- Petra tou Romiou	Coastal/Marine	2761
31	5000006	Limnatis Valley	Terrestrial/Freshwater	470
32	5000007	Asgata Area	Terrestrial	428
33	6000001	Cape Pyla	Coastal/Marine	2769
34	6000002	Larnaca Salt Lakes	Coastal/Lagoons	1712
35	6000003	Lymbia- Ayia Anna Area	Terrestrial	518
36	6000004	Stavrovouni Forest	Terrestrial	2375
37	6000005	Lefkara Area	Terrestrial	255
38	6000006	Rizoelia Forest Park	Terrestrial	107

IV. Main issues of relevance to the country

Issue	Problems	Status	Trend
1. Coastal mass tourism/tourism infrastructure	**Destruction of coastal habitats (e.g., beaches, sand dunes, maquis) physical alteration of coastline, lights, trampling,**	**Affects most of the coast of the island. Of special significance to remaining natural areas (eg., Chrysochou Bay, Akamas)**	**Increasing rapidly**
2. Urbanisation and industrialization of coastal zone	**Destruction of habitats, physical alteration of coastline, pollution, landscape**	**Affects mainly the vicinity of coastal towns, but also natural areas, wetlands etc**	**Increasing**
3. Fishing on sensitive ecosystems/habitats	**Trawling on Posidonia meadows**	**Affects most of the south coast (Cape Pyla to Paphos) More serious in Episkopi Bay to Petra tou Romiou.**	**Stable**
4. Pollution mainly from organic pollutants and nutrients	**Destruction of habitats**	**Affects mainly Limassol Bay and Zygi - Moni area**	**Stable – some increase in nutrients**
5. Coastal works – mainly breakwaters	**Affects habitats/species in shallow waters and beaches**	**Apparent mainly but not exclusively in bays, Limassol, Larnaca. Potentially problem in Chrysochou Bay**	**Stable – Increasing threats in new areas/bays**
6. Fresh water availability	**Affects coastal wetlands and coastal salt lakes**	**Important for the functioning of wetlands and aquatic birds**	**Stable - Increasing**
7. Overfishing	**Affects species diversity/equilibria**	**More apparent in area between Larnaca and Paralimni**	**Stable – slight increases**
8. Invasive species	**Affects species diversity/equilibria**	**Widespread**	**Increasing**

Major threats from the issues/problems listed above

Issue/Problem	Threats	Causes	Impacts	Significance
1. Coastal mass tourism/tourism infrastructure	**Degradation of littoral habitats – changes from natural to tourist resorts. Loss of biodiversity, disappearance of sand dunes, vegatation, loss of species (turtles, ghost crabs, plants – eg., Pancratium maritimum)**	**Coastal tourism development and in particular the infrastucture needed leads to physical alteration of coastal area – changes in sand movement dynamics, buildings, beach facilities, lights, trampling of beaches**	**Critical in some cases – disappearance of endangered species and habitats. Infrastructure physically impacts sand dunes and beaches. Lights affect turtles, trampling affects beaches and has impacts both on ghost crabs and turtles, dune vegetation is degraded.**	**Biodiversity losses - destruction of nesting habitats of turtles, living habitats of ghost crabs and many endangered plants/habitats**
2. Urbanisation and industrialization of coastal zone	**Degradation of coastal/marine habitats and wetlands. Loss of biodiversity, pollution of shallow waters**	**Physical alteration of coastal area – changes partly as above but also pollution**	**High - degradation of coastal (including wetland) and marine habitats**	**Biodiversity losses, destruction of habitats including wetlands and shallow waters**
3. Fishing on sensitive ecosystems/habitats	**Destruction of Posidonia meadows**	**Trawling illegally in shallow waters causes mechanical damage to Posidonia (trawling in waters less than 55 m depth, is prohibited according to law CAP 135 and its Regulations but this is difficult to enforce consistently).**	**High impacts - Reduction of Posidonia meadows leads to biodiversity losses. These beds are very important for many species - also for oxygen generation etc**	**Regenaration of the Posidonia beds is very slow and rehabilitation will take a long time. The impacts of the reduction of these beds can have many ramifications on the stability of marine equilibria.**
4. Pollution mainly from organic pollutants and nutrients	**Destruction of shallow water habitats and changes in species diversity and communities structure**	**Sources are mainly industry (e.g., wine factories in Limassol), agriculture, aquaculture and seepages form urban centres Pollutant impacts cause changes in sediments, nutrient balance, oxygen, light, etc which impact biota.**	**Locally (e.g., in Limassol Bay, Lipetri Bay) very significant especially in shallow waters with the disappearance of species and/or the appearance of nuisance algae and other species**	**Can be very significant – with impacts on both biodiversity and on tourism.**

5. Coastal works – mainly breakwaters	**Changes in coastal and marine habitats**	**Mainly breakwaters, marinas etc, which result in changes in sediments, both in the sea and on beaches and in water exchange.**	**Structures on the coast impact, inter alia, the long-shore transport of sediments and (in addition to the desired results) impact both natural habitats and the species dependant on them (e.g., turtles, ghost crabs, sea grasses etc). The impacts are very significant. There are also significant impacts on landscape and the clarity of waters.**	**There is very extensive construction in some areas (e.g., Limassol and Larnaca Bays) which aimed initially at counteracting erosion. The aims are however apparently subject to pressures for the creation of beaches for tourism and recreation purposes**
6. Fresh water availability	**Reduction of available freshwater for the functioning of wetlands leading to degradation of coastal wetlands/salt lakes**	**Partly man made – resulting from the construction of reservoirs and the disruption of catchment areas and partly "natural" resulting from a reduction of rainfall**	**Reduction of available freshwater has several impacts – ranging from the drying up of freshwater marshes (Phasouri marshes off Akrotiri Salt Lake) to insufficient water to reduce the salinity of the salt lakes to the degree needed for the hatching of *Artemia salina* and *Brancinella spinosa*. These, with unicellular algae, form the basis of the food chain of the salt lake ecosystems and he food of many birds (Flamingo etc)**	**The impacts are very significant and in some years Artemia salina has not hatched to fed on Dunaniella spinosa in Larnaca salt lake. As a result the lake was tinted red with the algae, while there were no flamingo overwintering in the lake those years. In Phasouri marsh *Hyla savignyi* could not bred in some years as there was not enough surface fresh water**
7. Overfishing	**Affects species diversity/equilibria**	**Comes from all fisheries sectors – in deeper waters it is mainly the result of trawling and the Inshore fishery in shallow waters it is largely the result of inshore and "sport" fishing.**	**In shallow waters more apparent in area between Larnaca and Paralimni - in deeper waters it is more widespread on the south coast between Cape Pyla and Petra tou Romiou**	**Stable, but with increases in shallow waters.**

Invasive species				

Priorities for Action

Priority Action 1	Adoption and implementation of the provisions of the EU Habitat and Bird Directives and especially completion of the NATURA 2000 network
Justification	There is a need to finalise the procedures for declaring the 38 proposed NATURA Sites already identified, as NATURA Sites so that management measures can be implemented
Description	Finalising the adoption of the Habitat Directive into national legislation
Targets	Protection and appropriate management of the 38 Sites
Responsibility	Environment Service (and others)
Prerequisites	Incorporation of the Sites in the Town and Country Planning Legislation, in Local Plans, the Policy for the Countryside etc
Support needed	

Investment portfolio

Many of the actions needed for implementation of the provisions of the Habitat Directive and in particular of the approval and declaration of the NATURA 2000 Sites do not require significant investments, as many sites are on State owned land or in the sea. In others significant investments are needed for compensation purposes e.g., in the Akamas where it was tentatively estimated that the funds needed for compensation would be in the range of $……..

Suggested follow up
National level

Regional level
Invasive species

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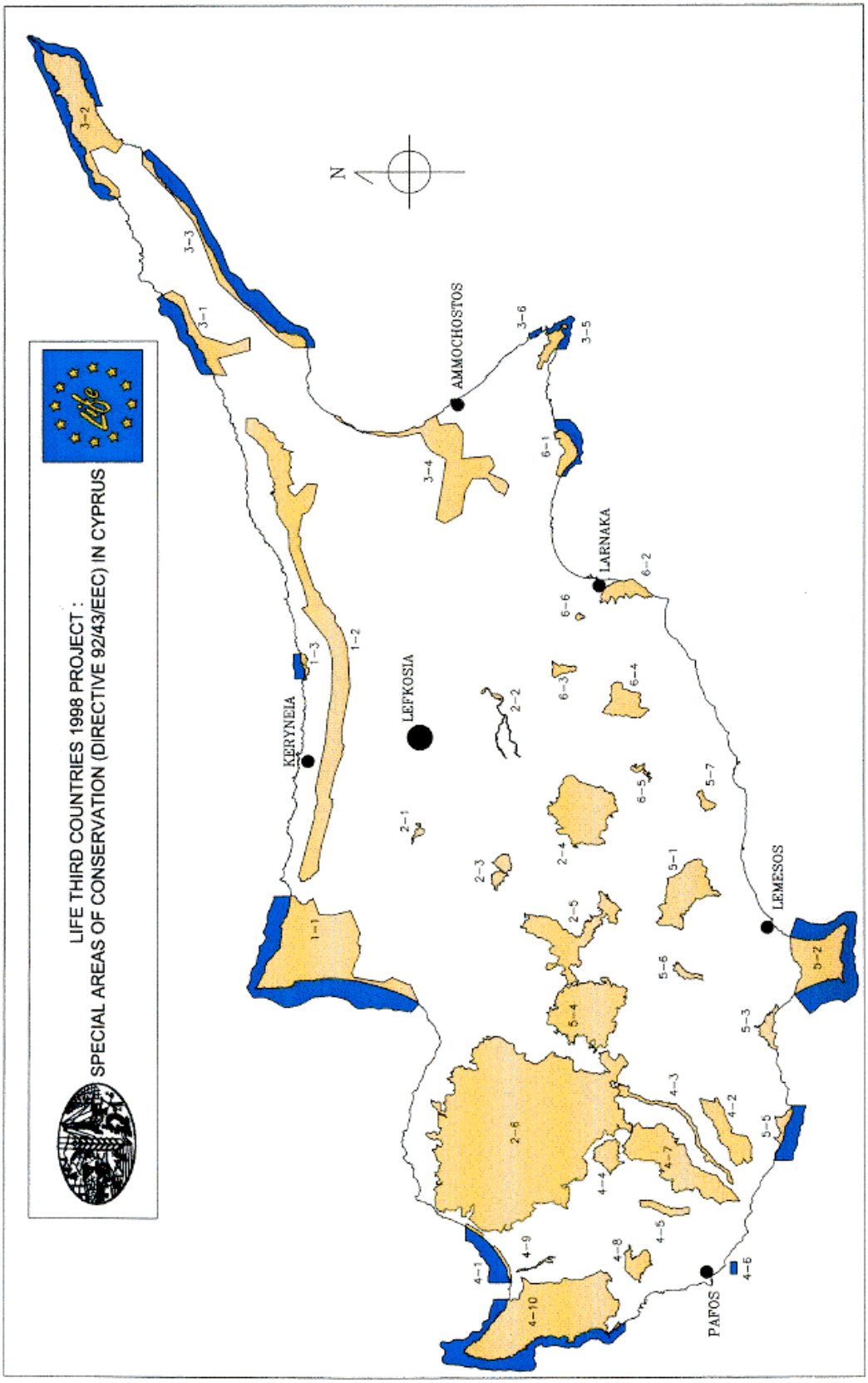
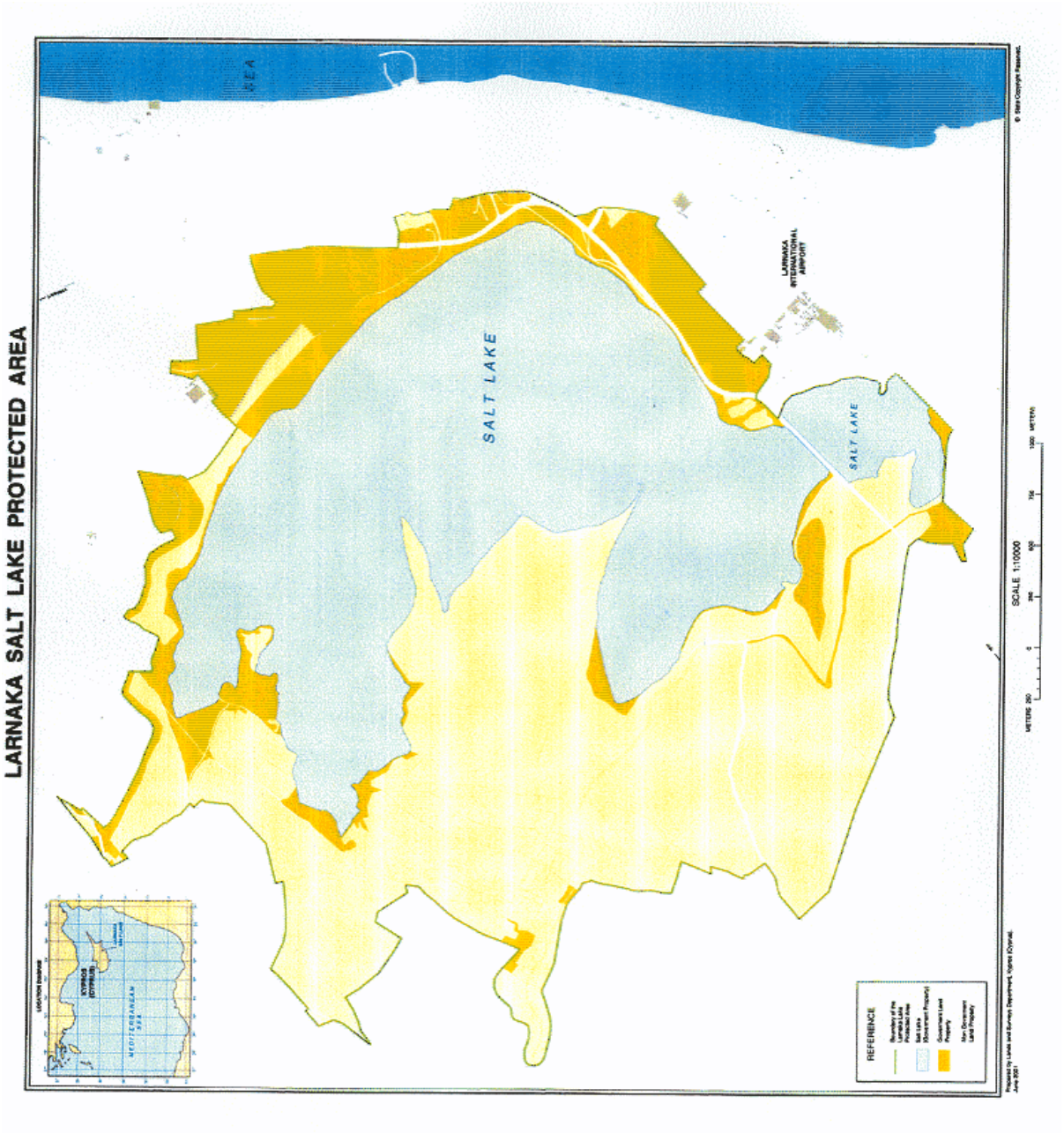
Add

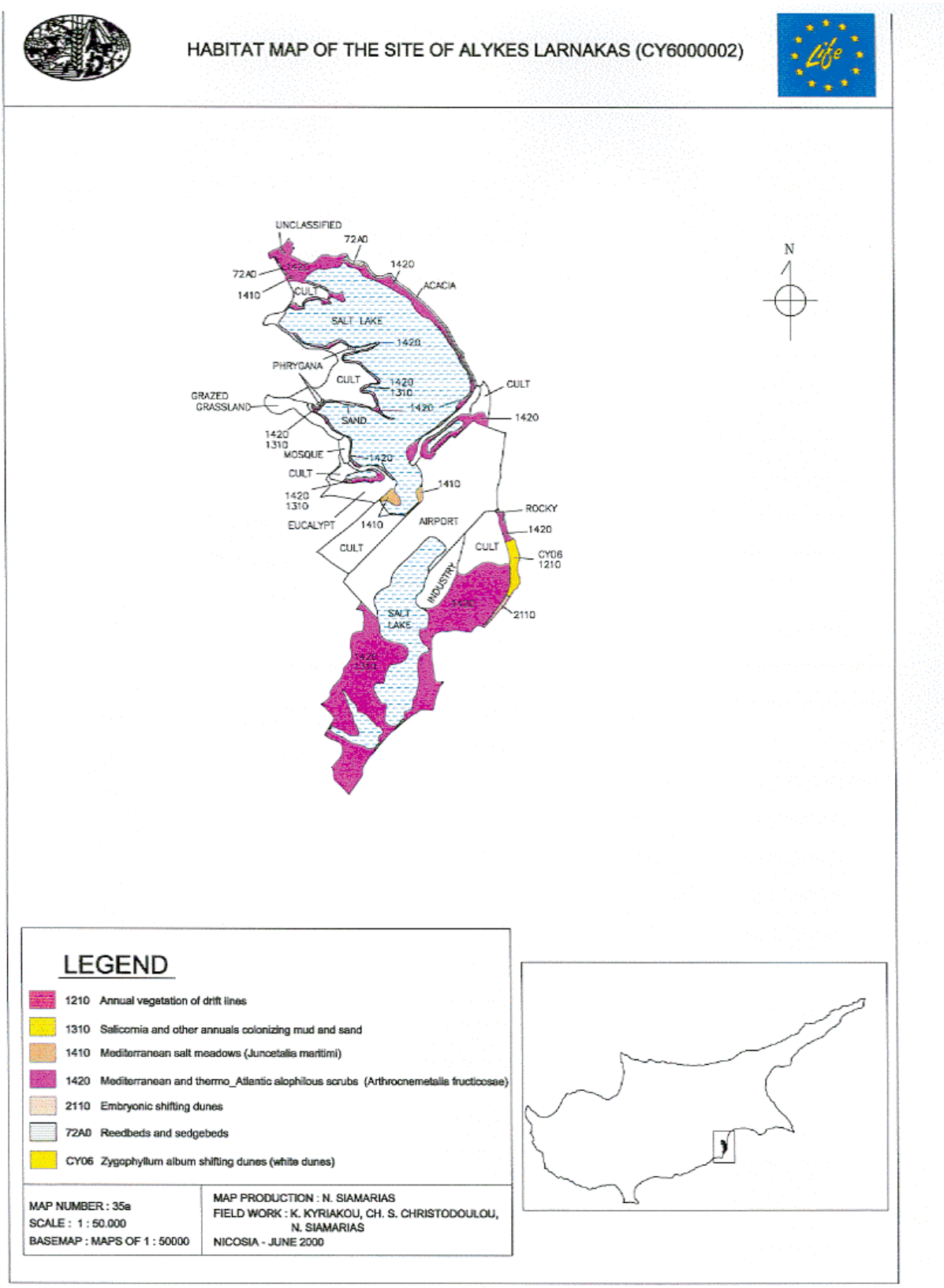
Map 1. Proposed NATURA Sites. Source: Life Project **ANNEX 2**



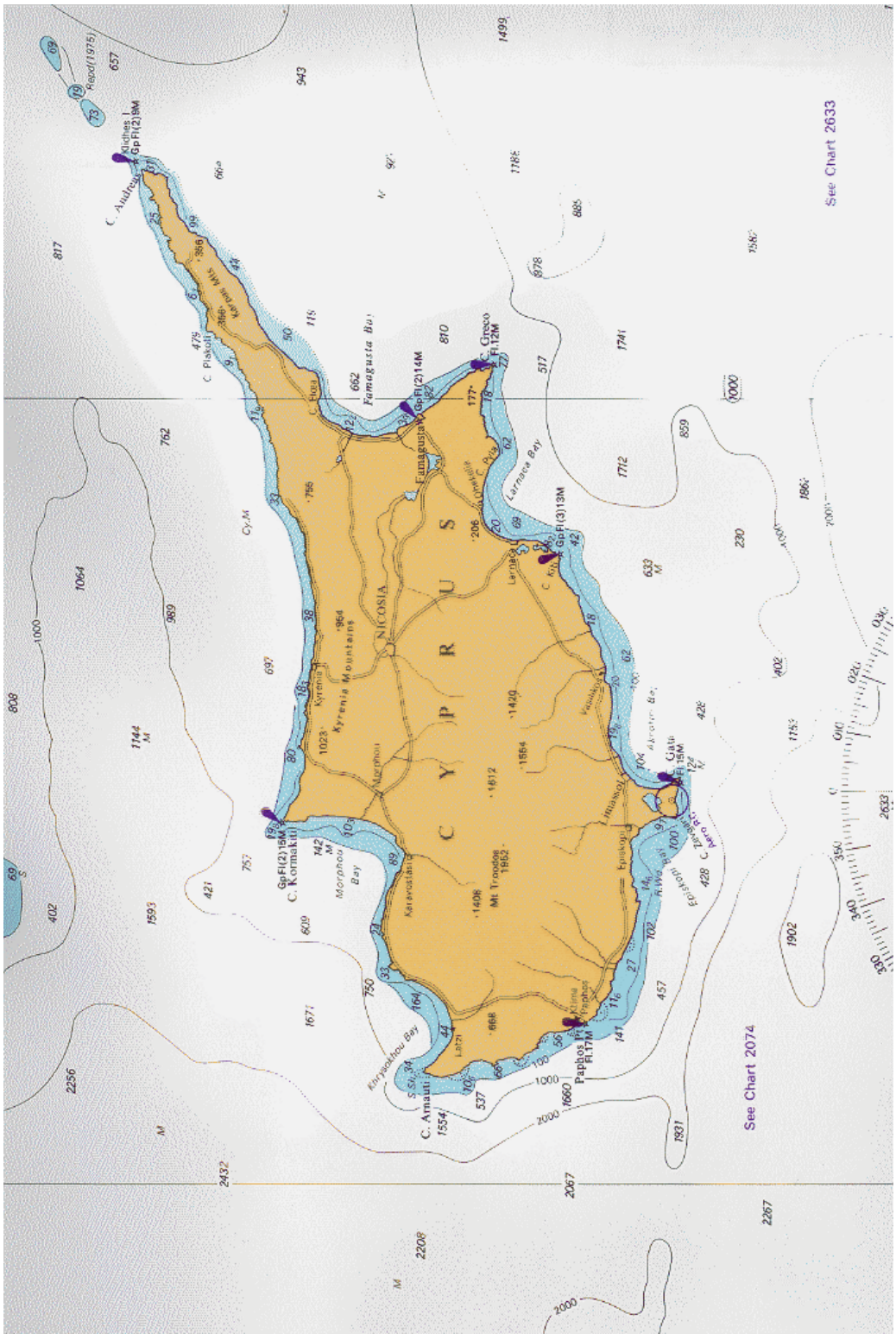
Map 2. Larnaca Salt Lake with RAMSAR boundaries **ANNEX 3**



Map 3. Larnaca Salt Lakes as Proposed NATURA Site. Source: Life Project **ANNEX 4**



Map 4. Bathymetric Chart in Metres. Source: British Admiralty Chart No 183 **ANNEX 5**



ANNEX 6

(Handout to visitors to the Lara Turtle Station)

DEPARTMENT OF FISHERIES
AND MARINE RESEARCH
MINISTRY OF AGRICULTURE
NATURAL RESOURCES AND
ENVIRONMENT
Aeolou 13, Nicosia.

Turtles and Turtle Conservation in Cyprus

Of the marine turtles two, the Green Turtle *(Chelonia mydas)* and the Loggerhead Turtle *(Caretta caretta)* breed regularly on the island's beaches. Both were more abundant in the past. Though records are sparse, old fishermen support this and so does the toponomy of at least one area, Chelones. This is a fisherman's cove in the Karpas adjoining an area of extensive sandy beaches stretching to Cape Andreas. Leatherback turtles *(Dermochelys coriacea)* are also occasionally found in the waters of Cyprus. However no nesting activity of this species has been noted in Cyprus or in the Mediterranean.

Exploitation of turtles in the Mediterranean, from the beginning until about the middle of this century, has decimated turtle populations. Very large numbers of turtles were shipped from the Eastern Mediterranean to Europe where there was a large demand for turtle soup. The intensive use of beaches, for tourism and recreational purposes, is now threatening turtles in the Mediterranean by depriving them of their nesting grounds. Many turtles drown or are killed when caught in fishermen's nets or on long-lines. Turtles and especially the Green turtles are, as a result, on the verge of extinction in the Mediterranean.

Both the Green and the Loggerhead turtles, have been declared by the World Conservation Union (IUCN), as endangered. The Mediterranean population of Green turtles has been declared as critically endangered. Both species are protected under the Council of Europe's Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention). They are also protected under the Barcelona Convention (UNEP) and an Action Plan for their conservation has been approved by Mediterranean States within the Mediterranean Action Plan. The Convention on Migratory Species (CMS) and the CITES Convention also protect turtles. Cyprus has ratified these.

In 1976 a project was conceived to help the marine turtles of Cyprus. Two years later, in 1978, the project was launched by the Fisheries Department. It includes a seasonal station and a hatchery at Lara. The Cyprus Government finances the project. In 1980, it received World Wildlife Fund support for three years, as an IUCN/WWF project. In 1990 it received assistance from the European Union as a MedSPA Project.

The main thrust of the project aims at:

- Protecting and managing the remaining turtle nesting beaches.
- Protecting eggs and hatchlings from predation - and human activities.
- Protecting adult turtles.
- Monitoring the turtle population and nesting activity in Cyprus
- Raising public awareness in turtle conservation

In 1976 and 1977, thorough surveys of the turtle nesting beaches were undertaken. They showed that Green turtles were breeding on several beaches, including those of Ayia Napa and the unspoilt surf-swept west coast beaches north of Paphos. Since then, nesting at

Ayia Napa and on some beaches in Paphos has ceased because of their intensive use for tourism and recreation or because they were degraded by sand extraction. Loggerhead turtles nest on the same beaches and also on the extensive beaches of Chrysochou Bay (mainly Polis/Limni), which are still their main nesting area. Regular but less dense nesting also takes place in Episkopi Bay. Sparse nesting also takes place on a number of other beaches.

Turtles are an ancient group of reptiles that, like the marine mammals such as dolphins, seals and whales, have "reversed" their evolution and returned to the sea. This reverse process is however, incomplete and though turtles have adapted well to life in the sea - they are excellent swimmers and can stay underwater for long periods - their ties to their land adapted ancestors are unmistakable. Turtles still have to breathe air and they have to come up on land to lay their eggs.

Turtles lay every 2-5 years. Loggerheads nest mainly from the beginning of June to about the end of July, while Greens start and finish about two weeks later. During the breeding season they lay 3-5 times, every two weeks. Loggerheads lay about 80 eggs per clutch while Green turtles lay on average 120 eggs. In Loggerheads the eggs are laid in chambers about 40-50 cm deep, while Green turtles lay their eggs deeper, at about 50-80 cm. The hatchlings emerge from the sand at night, about seven weeks later. They head directly for the sea. Their instinctive location of the sea is based on their attraction to the lightest part of the horizon - which is normally the sea. This instinct, however, may well be the downfall of the turtles. Hatchlings are attracted to the brightest light near the nesting beach - be it a hotel or a taverna - hence the need to avoid any such development near the nesting beaches. Nesting turtles are shy and lights and movement on, or near, the beaches at night will make them head back to the safety of the sea - interrupting their nesting. If the female turtle is unable to lay her eggs and retains them for too long, she will dispose of them into the sea

On surveys undertaken on the extensive beaches of Polis/Limni, more than 80% of the nests were found dug up and eaten by foxes. Many nests also perish by being covered by waves. Once the hatchlings reach the sea new enemies face them there. Predation is, however, natural and for thousands of years, sufficient numbers of hatchlings reached the sea and survived, to keep a stable population. It is human interference that has caused their demise. To counteract this, control of predation has been undertaken so as to increase the number of hatchlings reaching the sea.

In the Lara-Toxeftra Reserve and on the Polis/Limni beaches, all nests are protected *in situ*, i.e., where the eggs were laid, by placing special aluminium cages over them. These allow the hatchlings to escape to the sea, as soon as they emerge from the sand, but prevent foxes from getting at the nest. A hatchery is used for nests that cannot be adequately protected where they were laid, e.g., on some tourist beaches. It is a fenced off part of the beach where eggs are transferred and re-buried. The eggs have to be buried at the right depth as sex determination in turtles is dependent on the incubation temperature. Incubation at 29^{o}-30^{o}C results in half the hatchlings being male and the other half female. Low temperatures result in male hatchlings. Higher temperatures than normal produce females.

Though there are fluctuations in the number of turtles nesting from year to year, on average about 8,000 hatchlings of both species are released every year from the Lara/Toxeftra Reserve area alone. Over 12,000 Loggerhead hatchlings also reach the sea from protected nests on the Chrysochou Bay beaches. These numbers are many times the number that would normally reach the sea if the nests were not protected.

The breeding population of Green Turtles is about 100 females, nesting in the Lara-Toxeftra area mainly (about 98 females have been tagged so far). The Loggerhead

population is somewhat larger and has been estimated at about 300 females. Turtles are tagged and their reappearance on the nesting beaches is monitored.

Though the time required for turtles to reach maturity is still uncertain, it is estimated that Loggerhead turtles mature at about 15 years and Green turtles at about 25-30 years. Turtles imprint on the beaches on which they incubated and hatched. When mature they will find their way back to the same beaches to lay their own eggs. The imprinting mechanism, through which they know on which beach they were born, is based on a variety of clues, among which are geomagnetic forces. Therefore, all precautions are taken to disturb as little as possible the hatchlings incubation and first descent to the sea.

Raising turtles to larger sizes and releasing them has also been researched into. Several hundred Green turtles mainly, ranging from one to ten years old were kept in sea cages, in Paphos harbour and in special tanks in Nicosia. These were released at various ages. Pending results from this experiment further rearing of turtles has been suspended, as it is not clear if the benefits form such rearing outweigh the dangers that are also involved.

In Cyprus, turtles and their eggs, have been protected by law, since 1971, along with dolphins and seals, (Regulations made under the Fisheries Law). In 1989 the Lara-Toxeftra coastal region and adjacent sea was declared into a Protected Area, under the same law and is managed as such by the Fisheries Department. It covers a stretch of coastline, 10 km long, from the location known as Aspros, near Ayios Georghios, to Argaki tou Yousouphi, about three kilometres north of Lara. This includes the main beaches from Toxeftra to the north Lara bays. The sea-area protected stretches to the 20m isobath. The management measures aim at avoiding human interference with the breeding activity, both during nesting and during the incubation and hatching period of the eggs.

Without habitat protection the long-term prospects for the survival of the turtles in Cyprus, irrespective of the success of the project in increasing the recruitment of young turtles into the population, are, at best, doubtful. As turtles return to their natal beaches to reproduce, they form local populations, the survival of which depends on their protection on those particular beaches. In other words, protecting turtle in one area/country will not help turtles in another area. Currently the Mediterranean Green Turtle nests mainly in Cyprus and on a few beaches in Turkey and sparsely in Israel. Its breeding activity in other neighbouring countries has ceased practically completely. Loggerhead turtles, in the Mediterranean, nest mainly in Greece, Turkey and Cyprus. Some nesting also takes place in Libya (now being assessed) and Israel while sparse nesting takes place also in Egypt, Lebanon, Syria and Tunisia and on some southern Italian islands.

The Cyprus Turtle Conservation Project is the first turtle conservation project in the Mediterranean. Every year, since 1989, the Fisheries Department and the Cyprus Wildlife Society, which helps in running the project, have been holding training courses in Turtle Conservation Techniques and Beach Management for Mediterranean scientists, at the Lara Station. The United Nations Environment Programme (RAC/SPA of the Mediterranean Action Plan) sponsors trainees to these courses.

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Nicosia, June 2002

LARA RESERVE REGULATIONS

Please note that you are in a Protected Area (Fisheries Law, Cap 135, 1989 Regulations). The purpose of the Regulations is to protect turtles and their eggs and hatchlings, near or on the nesting beaches. The Protected Area starts at Aspros (near Ayios Georghios) in the south and extends to Argaki tou Yousouphi in the north (about 3 km north of the Station).

In the Protected area it is forbidden to:

- Place any sun bed, umbrella, caravan, tent etc.

- Stay on the beaches or the coastal area at night (one hour before sunset until sunrise).

- Drive any vehicle on a beach or tolerate such action.

- Fish, except with a rod and line.

- Use or anchor a boat without a special permit or tolerate such action.

Subject to other legislation it is illegal to:

- Leave your rubbish on the beaches or anywhere else in the area - please take it back with you.

- Light fires on the beaches or anywhere else in the area.

Please :

- Do not take any crabs or other live animals from these beaches. The Ghost crabs are a protected species everywhere in Cyprus.

- Stick to the existing paths and do not disturb the sand-dune vegetation.

DEPARTMENT OF FISHERIES AND MARINE RESEARCH

Nicosia, June 2002