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CYPRUS

FAA 119 BIODIVERSITY ANALYSIS

JANUARY 2006

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ACRONYMS AND ABBREVIATIONS

ACT	Action for Cooperation and Trust
ADS	Automated Directives System
ARI	Agricultural Research Institute (GCC)
BDP	Bicommunal Development Program
CAP	Common Agriculture Policy
CAMP	Coastal Area Management Plan
COAG	Cyprus Organic Farming Advisory Group
CYMEPA	Cyprus Marine Environment Protection Association
CyPEG	Cyprus Partnership for Economic Growth
CTO	Cyprus Tourism Organization
“DEP”	“Department of Environmental Protection” (TCC)
DOS	U.S. Department of State
EDGE	Economic Development and Growth for Enterprises
EIA	Environmental Impact Assessment
ECMC	Environmental Change Management Committee
EE/EG	Europe and Eurasia Bureau Office Economic Growth
ENVIS	Environmental Information System of Cyprus
EU	European Union
FEEO	Federation of Environmental & Ecological Organizations (GCC)
FAA	Foreign Assistance Act
FAO	Food and Agriculture Organization
GC	Greek Cypriot
GCC	Greek Cypriot Community
GDA	Global Development Alliance
GEF	Global Environment Facility
GFCM	General Fisheries Commission for the Mediterranean
IBPGR	International Board for Plant Genetic Resources
ICZM	Integrated Coastal Zone Management
IR	Intermediate result
IUCN	The World Conservation Union
LOE	Level of Effort
LOP	Life of Project
MADAG	Madison Dairy Advisory Group
MANRE	Ministry of Agriculture, Natural Resources, and Environment (GCC)
MAP	UNEP Mediterranean Action Plan
MedMPA	Regional Project for the Development of Marine and Coastal Protected Areas in the Mediterranean Region
METAP	Mediterranean Technical Assistance Programme
MOU	Memorandum of Understanding
NGO	Non-Governmental Organization
PFF	UNDP Partnership for the Future (funded by the EU)
RBEC	UNDP Regional Bureau for Europe and the CIS
REAP	Resource Efficiency Achievement Program
RFP	Request for Proposal
SACs	Special Areas of Conservation
SAVE	Supporting Activities that Value the Environment
SLC	Salt Lake Committee

SID	Society for International Development
SIDS	Small Island Developing States
SME	Small & medium-size enterprises
SO	Strategic Objective
STAG	Sustainable Tourism Advisory Group
TAIEX	Technical Assistance Information Exchange Office
TC	Turkish Cypriot
TCC	Turkish Cypriot Community
UK	United Kingdom
UN	United Nations
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNOPS	United Nations Office for Project Services
US	United States
USAID	United States Agency for International Development
USFS	United States Forest Service
WWF	World Wide Fund for Nature/World Wildlife Fund

PREFACE

The political landscape of Cyprus plays a significant role in shaping how work is conducted and is an ever present reminder of a country divided. The longstanding, unresolved conflict in Cyprus represents a major foreign policy concern for the U.S., whose regional interest is to secure strategic geopolitical stability in the Eastern Mediterranean. Since 1974, United Nations Peace Keepers have patrolled a buffer zone or “Green Line” that divides the island between the Greek Cypriot Community (GCC) in the south and the Turkish Cypriot Community (TCC) in the north. The so-called “Turkish Republic of Northern Cyprus” is not recognized by the international community, except by Turkey. It is just in the last few years that movement between the two communities has been permitted through three crossing points. This alone signifies the great strides that have been made towards a future resolution.

Due to this political environment, statements can be easily taken out of context and used on either side to hamper the fragile peace that exists. For this reason, the consultants took great care in preparing this report to minimize potential issues based on our reported findings. In most cases, governing authorities are referred to using only GCC and TCC. Where the use of TCC institutions was required, quotations are used, for example the “Department of Environmental Protection,” as these institutions are not recognized by the U.S. government.

This report was compiled for the United States Agency for International Development (USAID) office in Cyprus, in order to comply with Section 119 of the Foreign Assistance Act (FAA), in preparation for the new country strategic plan. The report provides the reader with a thorough view of Cyprus from an environmental perspective, focusing on biodiversity and environmental issues. Considerable effort was taken to accurately represent the environmental issues facing Cyprus. The findings and recommendations are presented a manner to be consistent with USAID’s Strategic Objective, “*conditions to foster a durable settlement in Cyprus are strengthened*” and to work within the existing framework of the Mission’s portfolio.

The bulk of this report provides background and descriptions of Cyprus in an environmental context and we hope it provides a valuable overview for those new to working in Cyprus. Of most use to USAID Mission staff will be the findings in Section V which address the Team’s findings of the threats, actions needed, and recommendations for conserving biodiversity.

EXECUTIVE SUMMARY

The FAA mandates that Missions, in preparation of their strategic plans, consider (1) the actions necessary in that country to conserve biological diversity, and (2) the extent to which the actions proposed for support by the Agency meet the needs thus identified (FAA, Sec. 119(d)).” In November 2005, USAID/Cyprus commissioned a study by a Team of experts to determine the biodiversity needs to comply with the FAA and enhance USAID support in Cyprus. The team also addressed overarching environmental needs.

To assure consistency with USAID guidelines, the team referred to the *FAA 118-119 Lessons Learned & Best Practices* (USAID 2005) in framing the assessment design. Throughout the report, we utilized the definition of biodiversity as presented in *Biodiversity Conservation: A Guide for USAID Staff and Partners* (USAID, 2005) as:

“Biological diversity, or biodiversity, is the variety and variability of living organisms broadly including a wide diversity of plant and animal species, communities, and ecosystems. The Earth’s biodiversity consists of genes, species, and ecological processes making up terrestrial, marine, and freshwater ecosystems that both support and result from this diversity.”

After a thorough review of available resources, meetings with a diverse range of stakeholders, and visits to priority sites, the Team identified the following to be the threats to biodiversity. These findings, presented in order of importance are discussed in detail in Section V.

A. DIRECT THREATS TO BIODIVERSITY AND NEEDED ACTIONS

1. Inappropriate/Uncontrolled/Unsustainable Development: Inappropriate Land Use; Habitat Degradation and Destruction; and Water Quantity and Quality Issues

The main threat to biodiversity, particularly along coastal areas, is the uncontrolled (mainly tourism) development currently taking place in Cyprus. 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 compromised or destroyed. In order to support the lucrative tourist industry, while ensuring adequate nature protection Cyprus should broadly implement integrated coastal zone management (ICZM) strategies. This will help ensure a balance between industries (i.e. tourism, aquaculture, agriculture) and nature protection. Actions for USAID/Cyprus may include, among others, promotion of local, regional and national ICZM strategies; transparent zoning; public involvement; awareness rising of officials and decision makers; identification of carrying capacity for tourism; and, participation in the direction development should take.

2. Uninformed Public: Unaware of the Need and Opportunities for and Benefits of Conservation

In general, the public in Cyprus believes that nature can be sufficiently protected in discrete protected areas and does not fully understand or embrace the concept of sustainable development. Actions for USAID/Cyprus may include encouragement of wise land stewardship at all levels for stakeholders in the environmental decision making process; and, a public awareness campaign, possibly using the “Green Media Campaign” model.

3. Inadequate Protected Areas management

The only effective management of protected areas currently in Cyprus is the National Forest Parks, implemented by the forestry authorities. Additional vital habitats for conservation have been identified and proclaimed under the Natura 2000 network, their management has yet to be realized. Management plans have not been developed for the majority of these sites and currently there is limited administrative structure for implementation and enforcement of the plans once they are developed. To compound the problem, there is limited understanding within effected communities of the EU “Natura 2000” protected areas concept. Actions for USAID/Cyprus may include, among others, supporting the development and implementation of management plans in Natura 2000 sites; explore/support land trust/conservation easements; and assess local needs, perspectives on land use options and social attitudes towards proposed protected areas.

4. Inefficient or Inadequate Legal/Regulatory Framework

The GCC’s framework is strong on paper, but implementation is limited, including enforcement of legal framework governing biodiversity and environmental protection. The TCC framework is inadequate with several gaps, inconsistencies, and limited implementation and enforcement. Actions for USAID/Cyprus may include strengthening capacity of responsible departments, provide models for transparent environmental decision making, especially in EIA and zoning/planning.

5. Abandonment of Low-Intensity Farmland: Changes in Agricultural Practices From Low-Intensity to i) Abandonment or to ii) High Intensity Farming

Low-intensity farmland often is transformed for economic reasons to abandonment of plots or adapted to high intensity farming. Both changes have a specific impact on the environment, in general, and on the biodiversity, in particular. Actions for USAID/Cyprus may include the provision of incentives for farmers to retain agricultural land and to maintain working farms; promotion of growing crops requiring less inputs (both chemical and water); and, other income generation opportunities in rural areas.

6. Solid Waste: Floating Debris and Construction Waste

Due to Mediterranean currents, the northeastern shores of Cyprus receive large amounts of “floating trash” deposition originating from other countries. Of particular concern to biodiversity are items such as plastic sheeting and plastic bags. Often consumed by endangered sea turtles, digestion of these items lead to death via starvation as they are neither digested or able to be past through the digestive tract. Another concern is the illegal dumping of construction waste (concrete) which is altering the landscape rendering it useless. Actions for USAID/Cyprus may include encouraging coastal cleanups, fostering rule of law (nationally and regionally) regarding illegal dumping.

7. Unsustainable and Illegal Hunting Practices

The hunting of wild birds and animals threatens the biodiversity of species of Cyprus, in general, as well as those migratory species. Actions for USAID/Cyprus may include the promotion of programs within the general public to raise the awareness of unsustainable hunting practices.

8. Forest Fires

Fire is a naturally occurring phenomenon in the Mediterranean. However, due development the loss of habitat results in decreased genetic diversity and species abilities to recover following fire. Localized endemics, with limited range are the most susceptible to forest fires. Actions for USAID/Cyprus to consider, should conditions change and be politically feasible, may include

facilitating the discussion to foster an agreement to enable bicommunal efforts to fight forest fires.

9. Invasive Species

Studies have identified sixteen of the 152 known adventive terrestrial plant species on Cyprus to be considered invasive. Of those only two, *Acacia saligna* and *Robinia pseudoacacia* pose considerable risk to the naturalize species and ecosystem. As the spread of these species is due to the decline in fuel wood needs, alternative uses or means for control should be explored and encouraged by USAID/Cyprus programs where applicable.

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, the *Caulerpa racemosa*, has spread very explosively, covering large areas of seabed around Cyprus, and is competing very successfully with local species, which it replaces. This species has now spread throughout the Mediterranean. It is likely to transform the East Mediterranean shallow water ecosystem, with far reaching effects on the native marine fauna and flora. The global scientific community is researching ways to combat this threat.

10. Grazing

Unregulated grazing has long been considered a minor cause of deforestation and impacts on the biodiversity of many areas that have already been taxed by drought and forest fires. In Akamas Peninsula, the pressure is from herded goats. In the Karpas Peninsula, the threat is from feral donkeys and pigs. Recent studies have attempted to establish a baseline from which to make population management decisions. Actions for USAID/Cyprus to consider may include studies to determine the carrying capacity for grazing in critical areas such as the Akamas and Karpas Peninsula.

B. INDIRECT THREATS TO BIODIVERSITY AND NEEDED ACTIONS

1. Inefficient / Inadequate Institutional Framework

TCC and GCC authorities lack effective governance with inefficient structures, overlapping responsibilities, and limited coordination among departments. In the GCC strength and skills of NGOs are not being harnessed to produce maximum effect. In the TCC NGOs are weak or non-existent, and have limited opportunity for participation. Actions for USAID/Cyprus may include promoting good governance and transparent environmental decision making; institutional strengthening for NGOs; strengthening environmental capacity of government staff including enforcement; improved coordination among environmental and other agencies; strengthening of environmental NGOs; and facilitation of information exchange.

2. Saltwater Intrusion / Increased Soil Salinity

Saltwater intrusion into Cyprus's aquifers is a pressing problem. The main cause is over-pumping of groundwater to meet consumption demands and for irrigation. Overtime as agricultural lands are irrigated with ever increasing levels of salinity, the soil will become an inhospitable environment for native species from invertebrates to flora. This sequence of events ultimately may result in desertification. Actions for USAID/Cyprus may include promoting: good governance, regulation of personal well usage, and aquifer recharge by wastewater treatment plants.

3. Climate Change

Climate change is of concern in Cyprus. Certain tree species in Troodos and species that have developed with them 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 has decreased and concern exists for increased saltwater intrusion to already stressed aquifers should sea levels rise. There are no actions proposed for this threat.

4. Overexploitation 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 agriculture and tourism are increasing in demand. Contamination and saltwater intrusion of aquifers further affect the utility of the available water resources. Actions for USAID/Cyprus may include the promotion of sound water policy, water conservation measures, alternative sources (cisterns), and measures to address limited water availability as well as projections for future water need and uses.

5. Insufficient Wastewater Infrastructure

Present wastewater treatment capacity is insufficient and in some cases no longer functioning. The environmental consequences range from odor (negatively effecting locals and tourists), discharge of untreated waste directly to the environment and/or sea, as well as septic systems polluting aquifers. Actions for USAID/Cyprus may include training for operation and maintenance of wastewater treatment; repair, expansion, or creation of new wastewater treatment infrastructure; and promotion of legislation requiring developers to contribute to the TCCs waste water infrastructure.

6. Inadequate Solid Waste Disposal

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

7. Abandoned Mines and Poorly Sited Stone Quarries

Mines and stone quarries radically alter the landscape and often result in pollution and drastic changes in land use surrounding the sites. Actions for USAID/Cyprus to consider may include encouraging reclamation at old sites, promotion of more environmentally friendly techniques, strengthening of oversight for quarry operations, and promotion of environmental impact assessments (EIAs) as a tool to address concerns.

SECTION I

INTRODUCTION AND BACKGROUND

A. Purpose and Objectives of the Analysis

The purpose of this biodiversity analysis is to ensure USAID compliance with FAA Section 119 and help inform and guide USAID/Cyprus planning with respect to biodiversity needs during the development of their new Operating Unit Strategic Plan. Specifically, the objectives of this analysis were the identification of the needs for biodiversity conservation in Cyprus and assess how the Mission strategy contributes to meeting such needs [FAA 119 requirement].

The team also went beyond the FAA 119 requirement to provide additional information to USAID/Cyprus with respect to the broader environment [FAA 117 and Automated Directives System (ADS) 201]. This enabled the team to further inform and guide USAID/Cyprus in their strategic planning by providing information and observations on how USAID might incorporate additional environmental activities into its existing programs under SO 1.

B. Methodology

To conduct the assessment, the Team members collected relevant available materials (reports, studies, etc.) and met with representatives of USAID/Washington prior to departure. The Team Leader and Principal Investigator then traveled to Cyprus and held meetings with a diverse range of people from government agencies, donors, implementers, the private sector and non-governmental organizations (NGOs) (see Annex F). The Team reviewed documents and reports (see References, Annex G); conducted site visits to make firsthand observations on the status of the environment and to interview local government officials and authorities, private citizens and experts, and NGOs regarding natural resources management and biodiversity issues at the local level. In the GCC the Team traveled to the Salt Lake in Larnaca, around the Paphos region and Akamas Peninsula. In the TCC the Team traveled east to west along the “new road” to the Karpaz Peninsula and west to Lefka. The Team held meetings with USAID/Cyprus staff to better understand their programs and emerging strategy. The Team held an exit briefing with USAID/Cyprus on November 22 to present preliminary findings and recommendations.

The findings in this report are based on information gathered during interviews and site visits, as well as from documents produced by a variety of sources (see References). The findings are separated into two groups. The first group addresses FAA 119 requirements, specifically addressing biodiversity issues, needs, and recommendations. The second covers broader environmental issues, needs, and recommendations.

C. Environmental Requirements for USAID Strategic Plans

The USAID Office in Cyprus is currently in the process of developing its first strategic plan for Cyprus. The U.S. Foreign Assistance Act (FAA) of 1961, Section 119, requires USAID to assess national needs for biodiversity and potential USAID contributions to these needs in all Operating Unit strategy documents. Specifically, FAA Section 119(d), Country Analysis Requirements, states:

“Each country development strategy statement or other country plan prepared by the Agency for International Development shall include an analysis of: (1) the actions necessary in that country to conserve biological diversity, and (2) the extent to which the actions proposed for support by the Agency meet the needs thus identified. (FAA, Sec. 119(d)).”

This requirement is also articulated in USAID's Automated Directives System (ADS), Section 201.3.4.1.3, on mandatory environmental analysis for strategic plans. The ADS regulations also indicate that while not required, an Operating Unit "can save time and be more efficient by including all aspects of environment when undertaking the mandatory biodiversity and tropical forestry work." For example, these environmental aspects may include topics such as water resources, urban environmental issues and private sector concerns. USAID/Cyprus is one such Office, which chose to go beyond the requirement for a biodiversity assessment and to look more broadly at environmental concerns and opportunities, which could enhance its strategy.

In October 2005, USAID/Cyprus procured the services of DevTech Systems, Inc. through the EPIQ II IQC to conduct the FAA 119 analysis of Cyprus' biodiversity, as well as other environmental aspects and natural resources. DevTech Systems field team consisted of Jeff Ploetz (Team Leader), Karen Menczer (Principal Investigator), Michael Loizides (GCC Environmental Consultant), and Sibel Parlik (TCC Environmental Consultant), and was supported by Loren Schulze (Institutional Specialist) operating from DevTech Systems, Roslyn office. The assessment was conducted from November 4-22, 2005.

A copy of the Scope of Work (SOW) for this assignment can be found in Annex A of this report.

D. Acknowledgements

The Team would like to thank USAID/Cyprus for providing its input and support to the field Team in this assignment. We would like to extend special thanks to Kim Foukaris of USAID and Nicholas Jarraud from the UNDP for their invaluable insight on the status of Cyprus' environment and biodiversity conservation needs as well as Nicholas valuable contribution to sections of this report.

SECTION II

CYPRUS' BIODIVERSITY AND ITS ECONOMIC SIGNIFICANCE

A. Overview of Environment and Status of Biodiversity in Cyprus

A.1. Physical Environment

Location and Physical Characteristics

Cyprus is the third largest island in the Mediterranean Sea. It is situated at the north-eastern end of the East Mediterranean basin, latitude 34 33' - 35 34' north and longitude 32 16' - 34 37' east. Geographically, Cyprus lies at a distance of 380 kilometers north of Egypt, 105 kilometers west of Syria, and 75 kilometers south of Turkey. The Greek mainland is about 800 kilometers to the west. The nearest Greek islands are Rhodes and Carpathos, 380 kilometers to the west.

With a total land area of 9,251 km², Cyprus is administratively divided by a United Nations (UN) buffer zone between the Greek Cypriot Community (GCC), covering 5,995 km² and the Turkish Cypriot Community (TCC), which covers 3,555 km². It has a maximum length of 240 kilometers from east to west and a maximum width of 100 kilometers from north to south (see Figure 2.1). The island emerged from the sea roughly 20 million years ago.



Figure 2.1. Map of Cyprus (composite map by Jeff Ploetz, utilizing Google Earth and US State Department map).

The island is composed of four east-west oriented geological features (FORTECH 1997, WaterStrategyMan Project 2003, Jarraud 2005.):

- The Kyrenia (Pentadaktylos) range in the TCC, a limestone range considered the southernmost expression of the Tauro Dinaric orogenic belt of Greece, Crete, and Southern Turkey;

- The Mesaoria plain, a broad valley underlain by a series of sedimentary rocks, located between the Kyrenia and Troodos ranges;
- The geologically varied Troodos range (highest peak 1,951 meters) in the GCC; and
- The Mamonia Complex in southwest Cyprus.

1) The Kyrenia mountain range (including the Karpaz peninsula) is an elongated mountain range extending from Kormakitis in the west to Apostolos Andreas in the east, consisting mainly of limestone enveloped on either side by chalks and flysch deposits. The limestone constitutes the major aquifer in this belt. Its width rarely exceeds five kilometers. It consists of a series of mountain peaks, the highest, a limestone peak, Kyparissovouno (1024 meters). The northern vertical cliffs, often covered with rich vegetation of thick pine and cypress forests, have contributed to the evolution of rare plant species, some that are endemic to the Kyrenia mountain range.

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

3) The Troodos mountain range is the dominant morphological feature of the island, and because of its ophiolite composition, forms the geological base of Cyprus, the central part of which is occupied by plutonic rocks. A sheeted intrusive complex constitutes the largest portion of the range and surrounds or occasionally intrudes the plutonic rocks. To these rocks, the Troodos Pillow Lava Series forms a rough girdle. The Troodos receives most of the available rainfall on the island. The nature of its constituent rocks precludes deep percolation except along fracture zones, resulting in considerable runoff. The drainages form a dense network of streams and rivers. The range is characterized by steep mountainsides, long mountain ridges, deep valleys and gullies, and cliffs. The Troodos includes the island’s highest peak, Olympus.

4.) The Mamonia complex consists of calcareous sediments that overlap onto the igneous rocks of the Troodos massif forming the foothills to the south and west. Within those, in the western part of the island, are outcrops of the highly contorted and predominant shales of the Mamonia complex. Within the calcareous sediments, the Middle Miocene contains aquiferous sediments, conglomerates and gypsum deposits.

Climate

On Cyprus, where differences in latitude are negligible, climatic conditions are primarily determined by altitude; and to a lesser extent by factors such as proximity to the sea and aspect. The Troodos mountain range is the major determinant of meteorological conditions. Although less significant, the Kyrenia mountain range also exerts influence on Cyprus’ weather conditions. The surrounding sea contributes most to meteorological conditions found along the coast (Tsintides, *et. al.* 2002).

Cyprus has an extreme Mediterranean climate, with a warm, dry summer and mild, rainy winter, although the upper reaches of the Troodos range have a more temperate climate, with frequent

snowfall in winter and lower summer temperatures. Cyprus' main climatic characteristics are a prolonged hot summer and a short, rainy, and mild winter.

Precipitation increases from 450 mm up the south-western windward slopes to nearly one meter at the top of the Troodos massif. On the leeward slopes, rainfall decreases steadily northwards and eastwards towards the central plain and the flat south-eastern parts of the island. The narrow ridge of the Kyrenia range, stretching 160 km from west to east along the extreme north of the island, receives approximately 550 mm of rainfall along its ridge, at an elevation of 1,000 meters. Analysis of rainfall on Cyprus reveals a decreasing trend over the last 30 years (Tsiourtic, 2002).

Temperature is also influenced by the island's relief and the surrounding sea. Mean daily temperatures in July and August range between 29°C on the central plain (the Mesaoria plain) and 22°C at higher altitudes of the Troodos range. Mean daily January temperatures are 10°C on the central plain and 3°C on the Troodos range.

Surface and Groundwater Hydrology

Most of the water on Cyprus comes from rainfall, which has been steadily decreasing over the last 30 years; and while surface water courses are mainly fed by overland flow, in some instances springs feed surface water. Cyprus' surface hydrology is subject to extreme seasonal variations. Most water courses, with the exception of a limited number of streams originating in the Troodos Mountains, only carry water following rainfall events or during continuous periods of wet weather. The volume of water flow on the surface area of the island is 4,600 mm³, 80 percent of which is lost through evapo-transpiration (Jarraud, 2005).

The main aquifers occur along the coast and in coastal valleys (the Mesaoria plains), where, while the rainfall is low, sedimentary rocks and alluvial soils of the rivers, which have high permeability, allow percolation and storage of surface water. Of the 300 mm³ of water that recharges aquifers, 270 mm³ are pumped from boreholes or emerge as springs. Another 70 mm³ are lost directly to the sea from aquifers. This water balance results in aquifers being depleted faster than they are being replenished (Jarraud, 2005). Throughout the island aquifers are over-exploited. Marine water intrusion is now evident in the coastal plains and in the western and eastern Mesaoria plain (See Indirect Threats #2 - Section V. B).

Water availability is a significant environmental concern in Cyprus. In the 1960s, following independence, the Government of Cyprus, under the motto "Not a drop to the Sea" implemented a policy to increase the island's reservoirs, and storage capacity increased from six mm³ in 1960 to over 307 mm³ today. With over 100 dams in the GCC, and new ones under construction, Cyprus now boasts more reservoirs per land area than any other country (Jarraud, 2005). The dams have been constructed to collect surface water and store water pumped from aquifers for irrigation or for potable water, reducing the amount of water flow and sedimentation downstream of the dams.



USAID supported a bicomunal effort to create the Water Resources Database known as Environmental Information System (ENVIS). Read more in Section VI.

Water Quality

Industrial activities on the island are limited and are not a major contributor to water pollution. The main causes of Cyprus' degraded water quality are over-pumping of groundwater and the

intrusion of sea water to aquifers; limited wastewater treatment; and fertilizers and pesticides used in agriculture, reaching ground and surface water resources.

Mainly in response to the limited amount of agricultural land and the high cost of labor and water, there has recently been a considerable increase in the application of fertilizers and pesticides to enhance agricultural production. Pollution of groundwater by nitrates is becoming a serious problem in agricultural areas. (WHO/UNEP, 1997)

Seasonal flooding of commercial and residential areas near the Larnaka salt lakes reportedly results in pollution of the salt lakes with residential heating oil and industrial solvents (personal communication).

Table 2.1. Water Quality - adapted from WaterStrategyMan Project, 2003.

Quality of surface water	Water quality is generally good for domestic and irrigation uses. However, insecticide residues and high nitrate concentrations have recently been observed in dams, especially where there is intensive agriculture in the upstream portions of the watersheds.
Quality of groundwater	Groundwater quality is generally good for domestic and irrigation uses. However, rising insecticide residues and high nitrate concentrations have been observed in the last few years in groundwater, especially where there is intensive agriculture and where the natural replenishment from surface streams has been cut off by surface reservoirs. In the same areas increased irrigation with available surface water has increased fertilizer leaching and insecticide input to the groundwater. Contamination from landfill leachate and old mine sites is a concern in localized areas.
Quality of coastal water	Water salinity is increasing in coastal areas due to sea intrusion in aquifers caused by over-pumping. All the major aquifers on the island exhibit seawater intrusion to various extents. In at least three of them, the inland propagation is on the order of 2 km, rendering the most productive part useless.

Water Use

The following information is adapted from WaterStrategyMan Project, 2003 and covers water use in the GCC only.

Agriculture, the major water-consuming sector (consumes about 70 percent of available water), contributes relatively little to the GDP. On the other hand, tourism consuming about six percent of the total water demand of all sectors, contributes over 20 percent to the GDP.

Recently, consecutive dry years have affected all water users, particularly agriculture and domestic uses. During 2000, the average water shortage was 37.6 percent for agriculture and 23.4 percent for domestic. This has led the GCC to look for alternative sources of supply, mainly desalinization, for domestic purposes. To date, the GCC has constructed four desalinization plants. While systems are in place for the use of tertiary treated wastewater for irrigation and aquifer recharge, in practice these applications are rarely used due to public mistrust and lack of knowledge about the safety of using treated wastewater.

The projected annual water demand in million m³ for the years 2005, 2010 and 2020 is as follows (estimates are based on: 215 liters/capita/day for main towns, 180 liters/capita/day for villages and 465 liters/capita/day for tourist demand):

Table 2.2. Water Demand in the GCC.

Sector of Demand / Year	2000	2005	2010	2020
Agriculture	182.4	182.4	182.4	182.4
Domestic				
Inhabitants	53.4	58.4	63.2	73.5
Tourism	14.1	18.0	22.9	30.8
Industry	3.5	5.0	6.0	7.0
Environment	12.5	14.0	16.0	20.0
TOTAL (Mm³/a)	265.9	277.8	290.5	313.7

A study by the Near East University reported that the annual water demand in the TCC could be met by capturing 10-20 percent of the annual rainfall (personal communication). To supplement their increasing demand and to alleviate persistent water shortages, the TCC is anticipating the construction of a water pipeline from Turkey. Reportedly the tender for its construction has recently been let, however all those interviewed by the Biodiversity Assessment Team were skeptical that this project would be completed.

A.2. Natural Environment: Major Ecological Features and Biodiversity

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 considering its small size 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 19 percent of Cyprus is covered in forest; and 47 percent is considered arable land, 21 percent of which is irrigated. According to the United Nations Convention to Combat Desertification (UNCCD), based on soil characteristics and low fertility, 30 percent of the island's arable land is affected by desertification. According to the World Wildlife Fund (WWF), only ten percent of the island is covered by its original vegetation. The dominant types of woody plants are the extensive pine forests, the sclerophyllous evergreen, high and low maquis, and garigue ecosystems; there are also more localized habitats 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.

WWF considers the entire island of Cyprus to be in the Cyprus Mediterranean Forest Ecoregion. The lowest elevations of this ecoregion, with wide altitudinal variation, are dominated by sclerophyllous evergreen and semi-deciduous oak forests (*Quercus coccifera*, *Q. infectoria*), maquis of strawberry tree (*Arbutus andrachne*) and juniper, and cypress woodlands (*Cupressus*

sempervirens, *Juniperus phoenicea*). The driest low plains, with less than 300 mm annual rainfall contain semi-arid, shrub-like vegetation; however, wild olive, carob, and jujube lotus were once common in the area, and remnants are still found today. At medium elevations, mesophyllous pine forests (*Pinus brutia*) are widespread, and endemic evergreen oak forests (*Quercus alnifolia*) are locally abundant. In the western Troodos range a protected valley of relict *Cedrus brevifolia* forest can be found. At the highest elevations, mountain pine (*Pinus pallasiana*) forests and juniper (*Juniperus foetidissima*) woodlands are dominant (www.wildlife.org).

Annex C, Figure 1 shows the Corine Land Cover types of Cyprus. The Corine programme was initiated in the European Union in 1985. 'Coordination of information on the environment' (Corine) was a prototype project working on many different environmental issues. The Corine databases and other program aspects have been taken over by the EEA. One of these is an inventory of land cover in 44 classes, and is presented as a cartographic product at a scale of 1:100 000. Original inventories, based on and interpreted from satellite imagery as well as ancillary information sources, are stored within national institutions. The European reference database is owned by GISCO, the European Commission geographical information system, which is a part of the European Statistic Agency, Eurostat. ETC/TE manages the Corine database (the production database) on behalf of EEA and delivers the updated database to GISCO every 12 months.

Ecosystem Types

For its small size, a wide range of ecosystems are found on Cyprus. The most significant for biodiversity are:

- Wetlands
- Forest
- Maquis
- Garigue
- Rocky outcrops
- Coastal ecosystems
- Agricultural ecosystems

These ecosystem types are described below:

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, there are two of significance listed under the Ramsar Convention¹, the Salt Lakes of Akrotiri (located on one of the two British military bases), and Larnaka. They are habitat 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 Cyprus. Within the TCC, there are 40 reservoirs of which 35 are designated as wetlands according to the Environmental Law 21/1997 which provides limited protection. Some important wetland areas in the TCC, as documented by Gündüz are:

Kanly Keuy and *Geunyeli* are very important for bird life due to the wetlands found in these areas; *Kouklia* (Famagusta), where flamingos are found; and the *Mia Milia* Waste Water

¹ The Ramsar Convention on Wetlands was signed in Iran, in 1979, and came into force in Cyprus in November 2001. For more information: www.ramsar.org.

Treatment facility, an artificial wetland, a unique example in the TCC, where communities of flora and fauna are gradually establishing, this area is being threatened by several factors, including construction and waste (Gündüz, 2004). Additional wetlands, not classified as such, do exist, one of which the Team visited outside of Kalkamli. Some of these sites may qualify under Ramsar but as the TCC is not internationally recognized they are unable to apply for consideration.

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. Forestland in Cyprus now occupies an area of approximately 178,000 hectares, of which 92 percent is state forest, representing 19 percent of the total area of Cyprus. Approximately 134,400 hectares are found in the GCC and 44,000 hectares in the TCC. Natural forests occur over approximately 78,000 hectares. Forests predominantly occupy the mountain ranges and elevated lands—lands unsuitable for agriculture and land not developed for residences, tourism, and other industry. Most forested land is found in the Troodos and Paphos forest areas in the GCC, and in the northern range (Kyrenia) of the TCC.

Originally, Cyprus' forests were dominated by *Quercus spp.*; however due to human disturbance over centuries, the dominant forest specie today is *Pinus brutia*. It can be found across 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, about 11 percent of the island. The main areas where *Brutia* pine forests are found are the Akamas, Paphos, Troodos, Adelphi, Makheras, and Stavrovouni Forests, and, in the Pitsilia, Akrotiri and Kyrenia 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. Subspecies *nigra* occupies the mountains of the northeastern Mediterranean region, more specifically the Var. *caramanica* is found only in Greece, Turkey, and Cyprus, at moderate to high altitudes (800-2000 m) in strictly Mediterranean climates with no summer rainfall. The latitude and longitude of Cyprus closely corresponds to the southern and eastern edge of this species range. 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. During the summer, when fire potential is highest, the GCC Forestry Department focuses particular attention on fire prevention at these sites (FORTECH, 1997).

As part of on going monitoring and protection of these important habitats, the GCC Forestry Department implements the "Program on the assessment and monitoring of air pollution effects on forests." Monitoring data from forest plots contributes data of relevance for forest policy at national, pan-European and global level, such as climate changes on forests, sustainable forest management, and biodiversity in forests. Fifteen plots, covering an area of 0,1 ha each, have been established for monitoring *Pinus brutia*, *Pinus nigra*, and *Cedrus brevifolia* ecosystems. In these plots, annual observations of crown conditions and periodic sampling and analysis of soil and needles are carried out.

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.

With the exception of limited timber production in the Troodos Range in the GCC and in the Kyrenia Range of the TCC, most forests are managed for nature protection, recreational use, and fire prevention. The GCC's Forest Department provides yearly subsidies to land owners and communities for the preservation of *Quercus infectoria*, *Quercus alnifolia*, and *Pistacia atlantica* with diameter at breast height greater than one meter.

Both GCC and TCC forestry administrations have reforestation programs. The goal for reforestation for both the GCC and TCC is 30 percent of Cyprus. Primarily *Pinus spp.* are used for reforestation efforts though the original dominant *Quercus spp.* are planted in limited areas. Forest areas burned in one year are reforested in subsequent years. The GCC target was reforestation of 600 hectares of governmental forest each year until 2010. This target has been changed to 300 hectares, allowing the remaining 300 hectares to regenerate naturally. This strategy is considered environmentally sound, and has been determined to be a success. The Nicosia Forest Division's reforestation program focuses on reforesting 'hali' (common) land released to the GCC Forestry Department and desertified landscapes between Larnaka and Nicosia. In the GCC only local species are now used for reforestation.

TCC authorities continue to use a mix of local and exotic species, including *Eucalyptus* and *Acacia*. This approach was described to the Team as an attempt to diversify stand structure for protection against insect infestation, fire control and soil enrichment. Reforestation initiatives funded through USAID/UNDP require the use of only local species. Reportedly, the Turkish Army also conducts reforestation projects. In 1995 a massive fire along the northern face of the Kyrenia Range burned ten percent of the TCC forests, and containment efforts were hampered by high winds. NGOs have also contributed to reforestation—in 1998, the Green Action Group planted 60,000 trees in the burned area.

On Cyprus the major insect pest of the coniferous pine forests is the Cyprus processionary caterpillar, *Thaumetopoea wilkinsoni* Tams. Outbreaks pose a considerable threat to young trees, which may be completely defoliated. For trees weakened by defoliation, death may be direct or more often indirect, following a secondary infestation of by bark beetles. Damage due to tree defoliation in young reforested or afforested areas is extremely serious. (Ciesta, 2003) Forestry authorities have active programs to control outbreaks. Currently the preferred approach is through the aerial application of *Bacillus thuringiensis*, a biological control method.



USAID has supported bicommunal efforts in reforestation and integrated pest management for combating the processionary caterpillar. Read more in Annex B.

Maquis and Garigue:

These ecosystem types cover a significant portion of Cyprus' land area and result largely from man-made activities—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).

Garigue on dry, eroded soils is found at low altitudes of the Mesaoria plain around Nicosia and in the eastern part of Larnaka District. Typical examples are the white colored hills near Lympia and Koshii, where high shrubs are completely absent and vegetation rarely exceeds 40-50 percent of the ground cover.

Garigue on moderately eroded soils is found from sea level to the Troodos Range in areas with moderate soil erosion and where vegetation is periodically burned (every 5-15 years), and in the Limassol, Paphos, Larnaka Districts, the Kyrenia Range and the Karpaz peninsula. Vegetation is dominated by shrubs with isolated trees. Total vegetative cover is usually more than 50 percent.

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).

Rocky Outcrops:

These areas contain sparse vegetation; however they are the main habitat for about 24 endemic plants. Rocky outcrops range from low to high altitudes on limestone or igneous formations.

Coastal Zone: (Adapted from Constantinides, 2002)

Defining the coastal zone as the area that extends two kilometers inland from the coastline, the terrestrial width of the coastal zone covers 23 percent of Cyprus' total area. In the coastal zone, the population density is 17.5 persons per hectare, and 47 percent of the total population lives and works in this zone. Ninety-five percent of the tourist industry (Cyprus' major source of revenue) is located in this zone.

The country has a total of 772 kilometers of shoreline, of which 404 kilometers are in the TCC (52 percent); 72 kilometers are within the British military bases (ten percent); and 296 kilometers are within the GCC (38 percent).

Approximately 54 percent of the shoreline is considered uneven and rocky; and approximately 46 percent sandy beaches. 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. Cyprus' coastal ecosystems provide habitats for critically important species such as the sea plant angiosperms, *Posidonia oceanica* and the sea turtles, *Chelonia mydas* and *Caretta caretta*. The portion of the coastal area that is protected in some manner covers approximately 14 percent of the total. Coastal vegetation is mostly low and sparse, and five endemic plants are found in this belt.

The northwestern part of the island is approximately 63 percent rocky and mainly contains the undeveloped areas of Tylliria, the Akamas peninsula, and Chrisochou Bay (however, recently this area has begun to develop at a rapid pace). The southwestern part of the Cyprus includes Paphos, an urban and tourist center whose outskirts include extensive shorelines and sea caves (recently, in some areas, zoning restrictions were eased, and the sea caves have been encroached upon by residential and tourism development), rocky islets, and sand dunes. The

southernmost (central) area includes the highly developed areas of Limassol and Larnaka, with 57 percent of the area composed of sandy beaches, some isolated shores with cliffs, and the wetlands of the Akrotiri and Larnaka Salt Lakes. The eastern part of the GCC has the most developed tourist areas: Ayia Napa and Protaras, where only 23 percent of the shoreline consists of beaches.

In the TCC, the coastal zone is much less developed than in the GCC, and still retains much of its natural character². Golden Beach is a five mile stretch of undeveloped, largely virgin sandy beach that remains in its natural state. Approaching the Karpaz peninsula, coves, cliffs, and sea caves become more prominent, and at the tip of the peninsula, there are striking cliffs and sea caves. There are several designated turtle nesting beaches along the north coast and on the southern side of the Karpaz peninsula. Natural habitats in the TCC are more intact than in the GCC, because of the slower pace of development in the last three decades; however, a recent wave of tourism and villa development is now threatening these unspoiled areas.

Agricultural Ecosystems:

In general, the predominant crops in rain fed lands are cereals (41 percent of the total crop area), fodder crops (ten percent), wine grapes (19 percent) and olive trees (five percent). Of the irrigated crops, the most important are citrus (16 percent), vegetables (seven percent) and fruit trees (two percent). The mean farm size is about four hectares, though a majority of farms (98 percent) are small holdings, 54 percent of which are below two hectares. The small farm size, the high degree of fragmentation, the fact that each farmer plants more than one and sometimes up to ten crops per year and the dependency of agriculture on imported inputs, leads to inefficient use of resources and high production costs. This high cost has led in recent years to the abandonment of small farms and for some crops (grape vines), government subsidies paid to farmers for uprooting or not planting.

A 2004 study of “Birds and Farming in Cyprus” found farmland, particularly small holdings with diversified crops, to be rich bird habitats hosting healthy populations of many species, habitats that are declining in Europe as a whole. About 39 percent of species encountered on local farmland are classified as threatened on a pan-European scale (Hellicar, 2004). This is further discussed in Section V.



USAID has supported bicomunal efforts in organic farming and agrotourism. Read more in Annex B.

Ecologically Important Areas

From reviewing documents and meeting with experts, the Biodiversity Assessment Team found that the “environmental community,” for the most part, considers the following areas the most biodiversity-rich on Cyprus:

The Akamas Peninsula (adapted from Jarraud, 2005): The Akamas peninsula, covering approximately 250 square kilometers, is rich in endemics and is of immense ecological significance. Most of the peninsula has remained untouched by development activities, and still supports an intact habitat rich in flora and fauna, beautiful beaches and landscapes, important archaeological sites, and historic and cultural elements. It is also the primary nesting ground in the GCC for the green turtle (*Chelonia mydas*) and the loggerhead turtle (*Caretta caretta*). The

² Natural character encompasses those elements that have been brought into being by nature and are, more importantly, subject to ecological processes (as opposed to cultural components).

endangered monk seal (local population reportedly consists of only two to six individuals) also visits the coastal area of the peninsula. Most of the peninsula is protected as State Forest and development is strictly controlled. Access is limited due to poor road conditions and therefore, the area gets only limited use. Pressure is increasing as “safari” vehicles, mainly used by tourists to visit remote areas, are damaging the fragile ecosystems. The peninsula is prime habitat for many birds and for the mouflon. Off-shore are underwater seabeds of *Posidonia oceanica* sea grass. For more than 20 years, the NGO community has pushed for the peninsula to be declared as a National Park. Its current status is as a Natura 2000³ site, but a management plan has yet to be created.

The Karpaz Peninsula is also of great ecological importance. The peninsula contains turtle nesting areas and rich biodiversity, including areas visited by the rare monk seal. Approximately 150 million birds are reported to migrate through the area in the autumn; and a similar number in the spring. It is one of three areas in the TCC identified by Birdlife International as an Important Bird Area (IBA); the other two, the Klidhes islands and the Kyrenia range. The peninsula is also rich in endemics (Gündüz, 2004). An estimated 450 feral Cypriot donkeys are found on the peninsula. For more on the Cypriot donkey see Terrestrial Wildlife, in this section. Off-shore are underwater seabeds of *Posidonia oceanica* sea grass. The Karpaz Peninsula has also been proposed as a “National Park” by NGOs and individuals in the TCC, and some have even submitted proposed management plans to the TCC authorities. Currently much of the peninsula is protected by the “Karpaz Decree”. Though not enforced in the TCC (because of political considerations), under the Natura 2000 network, as submitted by the GCC to the EU, the peninsula is a Natura 2000 site.

*The Larnaka Salt Lakes*⁴ are critical migratory bird habitat (20,000 over-wintering birds, 130 total species, with 63 species listed in Annex 1 of the European Birds Directive including several species listed under national legislation, the Bern Convention, and CITES) and also havens for plant diversity, in particular for fragile halophytic plant communities. The main Larnaka Salt Lake was designated a Wetland of International Importance under the Ramsar Convention⁵ in 2001. The lake complex is flanked by light industry, residential development, and was divided by the construction of the Larnaka airport, which disrupted the ecological balance of the lake, isolating one section from the rest. The lake complex also includes wastewater treatment lagoons that provide additional habitat for migratory birds. The Salt Lake Committee (SLC) successfully managed to protect the lake from being further impacted by the proposed airport expansion. The SLC also successfully lobbied for closing down a lakeside shooting range, which had contaminated the lake with lead shot, implicated in the poisoning of migratory flamingos. The shooting range has now been removed, and the pellets cleared (Jarraud, 2005).

*The Akrotiri Salt Lake*⁶, designated a Ramsar site in 2003, covers an area of approximately 2,000 hectares, and falls within the UK sovereign base area. The lake contains 11 natural habitat types listed in Annex 1 of the European Habitats Directive; 45 bird species included in Annex 1 of the European Birds Directive; and supports 13 endemic species of plant. To the

3 The title for the network of areas designated to conserve natural habitats and species of wildlife which are rare, endangered or vulnerable in the European Community. The term Natura 2000 comes from the 1992 EC Habitats Directive; it symbolizes the conservation of precious natural resources for the year 2000 and beyond.

4 See Ramsar website: <http://www.wetlands.org/RSDB/Default.htm>

5 The Ramsar Convention on Wetlands was signed in Iran, in 1979, and came into force in Cyprus in November 2001. For more information: www.ramsar.org.

6 See Ramsar website: http://www.ramsar.org/w.n.cyprus_akrotiri2.htm

north of the lake, there is a belt of *Eucalyptus* spp. (originally introduced by the British for mosquito control), with rushes (*Juncus* spp.) and reeds. The marsh area outside the forest is dominated by tamarisk, rushes, couch grass, reeds and brambles. The orchid, *Orchis palustris*, as well as several other species of orchid, occurs here. The lake margin is bordered with *Juncus* spp., *Salicornia europea* and *fruticosa* and *Suaeda* spp. In the south, remnants of a maquis ecosystem are found. In the lake itself, the alga *Dunaniella* forms the basis of the food chain. Migratory birds include *Phoenicopterus ruber* (2,500 to 7,000 individuals) and *Anas acuta* (2,000 to 4,000 individuals). Raptors, such as *Falco peregrinus* and Eleanor's falcon, nest near the lake (Jarraud, 2005).

The *Phassouri marshes* are connected to the Akrotiri Salt Lake and are the main breeding ground in Cyprus for the Cypriot Tree Frog, *Hyla savignyi* (*Hyla arborea*), which is prey for many species of birds, and an endangered species. Also breeding in the area are *Rana ridibunda* and *Bufo virides*. *Brachianella spinosa* (fairy shrimp) is abundant in the marshes. *Aphanius fasciatus* (a brackish water fish) and Cyprinodonts occur in small ponds in the area (Jarraud, 2005).

The *UN Buffer Zone*, which since 1974, has been under UN control, has been allowed to develop without major disturbance over the last 30 years. Reportedly, the area contains rich flora and fauna, and healthy ecosystems have re-established. There is only anecdotal evidence of the biodiversity in this area since entry is strictly limited, however, mouflon, birds, fox, reptiles, and amphibians would be expected to be found there in abundant numbers. Feral dogs have been observed hunting in packs in the Buffer Zone. Since the establishment of the Buffer Zone, there has not been a biological study of this area.

Gündüz (2004) undertook a survey, funded by the USAID BDP, in which twenty-one ecologically important areas in the TCC were identified, namely: Limnitis, Kalo Horio (Kapouti), Coast of Ayia Irini, Coast of Liveras, Coast of Orga, Panagra, Kambyli, Kanly Keuy, Geunyeli St. Hilarion, Bufavento Castle, Kantara Castle, Ronnas Bay, Ayios Philon, Cape Andreas, Klidhes Island, Salamis Ruins, Salamis Salt Marshes, Silver Beach and Glapsides, and Kouklia (Ammohostus) Forest Areas of the Northern Range. For detailed descriptions of these sites, see *Ecologically Important Areas* by Serife Gündüz located on the resource CD of this report.

Key Threatened and Endangered Species

Human-caused extinctions have a long history. The arrival of the first pre-historic humans on the island coincided with the extinction of dwarf hippopotami and elephants. The Mesopotamian fallow deer (*Dama mesopotamica*) disappeared approximately 400 years ago, due to hunting and deforestation. The wild boar was also driven to extinction.

Of global biodiversity importance, is the Mediterranean monk seal (*Monachus monachus*) which is on the brink of extinction in the coastal waters surrounding Cyprus. Most surveys estimate two to six individuals surviving along the entire coastline of Cyprus. In the 1950s, there were seven colonies of monk seals. As a whole, the Mediterranean monk seal is listed as critically endangered by The World Conservation Union (IUCN). This species is also listed on Appendix I of the Convention on International Trade in Endangered Species (CITES). Extremely sensitive to human disturbance, today the Mediterranean monk seal numbers between 300- 500 animals. Dolphins, and most recently sharks, have been given protected status as well.

The Cyprus mouflon (*Ovis orientalis ophion*), a rare sheep, is found only on Cyprus. While it was introduced to the island nearly 8,000 years ago, DNA testing has confirmed it to be a sub-species and is considered endemic. Less than a decade ago, the mouflon was close to

extinction. According to the FORTECH report, by 1997, breeding programs had increased the population to between 800 and 1000 individuals. The mouflon continues to be strictly protected, though poaching does exist. Today, numbering near 3000 individuals and reportedly near the carrying capacity for their limited range, limited hunting is being considered by the Game Fund.

Large avifauna such as the Griffon vulture (*Gyps fulvus*) are in extreme danger of extinction partly because of hunting, but mainly due to accidental poisoning by farmers intended to control foxes and crows. The long-legged buzzard (*Buteo rufinus*), once only a migratory became established itself on Cyprus in the early 1990s, as breeding habitat became available when other raptor populations declined. The black vulture (*Aegypius monachus*) has become extinct and others such as the imperial eagle (*Aquila heliaca*) and Bonelli's eagle (*Hieraetus fasciatus*) are threatened.

Conservation Effort: Griffon Vulture



The population of Griffon vultures has undergone massive fluctuations in the last ten years. In 1996, 35 birds were lost to poisoning. In 2000, with funding from USAID/UNDP, the Forest Department established feeding stations and an incubation program. By 2003, the population of Griffon vulture had reached 50 when another incident of accidental poisoning resulted in the loss of ten breeding pairs during nesting season causing loss of that year's juvenile birds. Currently, the population consists of only 30 individuals (seven breeding pairs, consisting of 20 wild and ten captive for *in situ* conservation efforts).

The green turtle (*Chelonia mydas*) and the loggerhead turtle (*Caretta caretta*) are both globally endangered. Both species nest on the sandy beaches of western and northern Cyprus. Adult turtles have no natural predators—the exception is rare shark attacks. Primary threats to the population are loss of nesting beaches to development (the primary nesting beaches in the GCC are permanently protected), pollution (particularly floating plastic which is consumed and results in starvation), light pollution (disorients hatchlings preventing them from reaching the sea), and hatchling predation (including dogs, foxes, birds, crabs and fish). Approximately one in 1000 hatchlings reaches sexual maturity (20 years). There are conservation initiatives in both the GCC and TCC. Though DNA testing has shown that the nesting population in the Mediterranean originated from the Atlantic population several generations ago, they are now considered to be distinct subpopulations.

Conservation Effort: Turtle Conservation/Recovery Project in the Lara-Toxeftra



Since 1978, the Department of Fisheries has been operating a Turtle Conservation/Recovery Project in the Lara-Toxeftra area aimed at helping the ailing populations of green and loggerhead turtles. The project focuses on green turtles, which are more endangered. About 100 green turtles still nest on the west coast beaches, while the Loggerhead nesting population is about 300 turtles, mainly on the extensive Polis beaches. Turtle populations were much larger in the past and they were breeding on many more beaches. Nesting turtles are tagged so that the population can be monitored; eggs are incubated, under protection, in-situ or in the hatchery at Lara; and research is carried out on turtle hatchery techniques. About 8,000 turtle hatchlings, of both species, are released from the Lara/Toxeftra beaches every year. In situ nest protection is also now afforded to loggerhead nests on the Polis beaches and with regular monitoring of nests, about an equal number of hatchlings reach the sea on these beaches. The project is the first turtle conservation project in the Mediterranean, operating on a regular basis for 27 years.

Animal Diversity and Endemism

The arrival of animals in Cyprus has been a subject of interest to zoologists, since it has always been an island. According to existing evidence, the first arrivals were pigmy hippopotami and elephants, both excellent swimmers. They arrived 1.5 million years ago and apart from some shrews and mice, were the only land mammals roaming the island prior to Man's arrival 9,000 years ago. It was around the same time that several species were introduced to Cyprus including the mouflon, fox, boar, deer and domestic dogs and cats. Archaeological records indicate introduction of these species during the Neolithic period. Over the centuries the mouflon, fox, boar and deer became naturalized to the island's ecosystem. The Cyprus Mouflon, *Ovis gmelini ophion*, according to DNA testing has been confirmed as a distinct sub-species and is considered endemic.

The present-day fauna of Cyprus includes some 10 species of land mammals (11 including the feral donkey), 27 species of amphibians and reptiles, 370 species of birds, a great variety of insects and mites, while the coastal waters of the island give shelter to hundreds of fish species, and various species of crabs, sponges, and echinoderma. According to WWF, ten of the bird

species are endemics. The only endemic lizard is the Troodos lizard, (*Lacerta troodica*). The only endemic snake is the extremely rare Cyprus whip snake (*Coluber cypriensis*).

Table 2.3. Fauna of Cyprus

Category	Species	Number of Species	Total
Mammals	Mouflon	1	30
	Fox	1	
	Hare	1	
	Hedgehog	1	
	Rodents	6	
	Bats	16	
	Seal	1	
	Dolphins	3	
Birds	61 Families	370	370
Reptiles	Snakes	10	24
	Lizards	11	
	Turtles	3	
Amphibians	Frogs	3	3
Fishes	Fishes	250	250
Insects	Butterflies	52	Around 6000
	Microlepidoptera	461	

Source: MANRE

Table 2.4. Cypriot Flora and Fauna Species Protected under the Bern Convention

APPENDIX I Flora Species: 22	APPENDIX II Birds: 247 Mammals: 19	APPENDIX III Birds: 104 Mammals: 2
<ul style="list-style-type: none"> • Alyssum akamasicum B.L. Burt • Arabis kennedyae Meikle • Astragalus macrocarpus D.C. ssp. Lekarensis Agerer-Kirchoff et Meikle • Brassica hilarionis Post • Centaurea akamantis T. Georgiades et G. chatzikiyiakou • Chinodoxa lochiaie Meikle • Crocus cypricus Boiss. Et Ktocschy • Crocus harmannianus Holmboe • Delphinium caseyi B.L. Burt • Onosma troodi kotschy • Ophrys kotschyi H. Fleishcm. Et Soo • Orchis Punctulata Stev. Ex Lindl. • Origanum cordifolium (Aucher-Eloy et Montbret ex Benth). Vogel • Phlomis cyprica Post var. cyprica • Phlomis cyprica Post var occidentalis Meikle • Pinguicula crystallina Sm • Posidonia oceanica (L.) Del • Ranunculus kykkoensis Meikle 	<p>Terrestrial species: (16)</p> <ul style="list-style-type: none"> • Crocidura russula cyprica • (Crocidura cyprica) <p>Bats</p> <ul style="list-style-type: none"> • Eptesicus serotinus • Hypsugo savii • Miniopterus schreibersii • Myotis blythii • Myotis capaccinii • Myotis nattereri • Nycalus noctula • Pipistrellus Kihlii • Plecotus austriacus • Plecotus sp. • Rhinolophus blasii • Rhinolophus euryale • Rhinolophus ferrumequinum • Rhinolophus hipposideros • Rhinolophus mehelyi 	<p>Terrestrial species: (1)</p> <ul style="list-style-type: none"> • Ovis gmelini ophion (Cyprus moufflon) <p>Marine species : (1)</p> <ul style="list-style-type: none"> • Stenella coeruleoalba (dolphin) <p>Reptiles: 9</p> <p>Terrestrial species: (8)</p> <p>Lizards</p> <ul style="list-style-type: none"> • Hemidactylus turcicus • Acanthodactylus schresberi • Lacerta laevis troodica • Mabuya vittata • Eumeces schneideri <p>Snakes</p> <ul style="list-style-type: none"> • Typhlops vermicularis • Malpolon monspessulanus • Coluber nummifer

<ul style="list-style-type: none"> • <i>Salvia veneris</i> Hedge • <i>Sideritis cypria</i> Post • <i>Tulipa cypria</i> Stapf 	<p>Marine species: (3)</p> <ul style="list-style-type: none"> • <i>Delphinus delphis</i> (dolphin) • <i>Monachus monachus</i> (monk seal) • <i>Tursiops truncatus</i> (dolphin) <p>Reptiles: (14)</p> <p>Terrestrial species: (10)</p> <ul style="list-style-type: none"> • <i>Ablepharus kitaibeli</i> • <i>Chalcides ocellatus</i> • <i>Chamaeleo chamaeleon</i> • <i>Coluber cypriensis</i> • <i>Coluber jugularis</i> • <i>Cyrtodactylus kotschy</i> • <i>Ophisops elegans</i> • <i>Stellio stellio</i> (<i>Agama stellio</i>) • <i>Telescopus fallax</i> • <i>Vipera lebetina</i> <p>Marine species: (3)</p> <ul style="list-style-type: none"> • <i>Caretta Caretta</i> • <i>Chelonea mydas</i> • <i>Dermochelys coriacea</i> <p>Fresh Water species: (3)</p> <ul style="list-style-type: none"> • <i>Mauremys caspica</i> <p>Amphibians: 1</p> <ul style="list-style-type: none"> • <i>Bufo viridis</i> <p>Fish: 1</p> <ul style="list-style-type: none"> • <i>Aphanius fasciatus</i> 	<p>Fresh water species: (1)</p> <ul style="list-style-type: none"> • <i>Natrix natrix</i> (freshwater snake) <p>Amphibians: 2</p> <ul style="list-style-type: none"> • <i>Rana ridibunda</i> • <i>Hyla savignyi</i> (<i>Hyla arborea</i>) (tree frog)
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Source: <http://www.cypruscoasts.org/flora.html>

Terrestrial Wildlife

One of the most important terrestrial wildlife species is the previously mentioned Cyprus mouflon (*Ovis-gmelini ophion*). The mouflon arrived approximately 8,000 years ago and is now considered endemic. The mouflon has been cited as a pest in agricultural fields, although most farmers appreciate the need to protect and conserve the mouflon. Other terrestrial wildlife species include various types of rodent, hedgehogs, hares, foxes, bats (which have yet to be studied in detail), the feral Cyprus donkey, and in the Buffer Zone, packs of feral dogs.

During the events in Cyprus in 1974, a large number of domestic donkeys and pigs were released. Most were subsequently captured. However, in the Karpaz Peninsula feral populations of donkeys and pigs have become established. Little is known with respect to the current population size and impact these feral animals have on the local environment. A recent scientific study of the feral donkeys estimated the population of donkeys to be near 800 (Hamrick *et. al*, 2005) while the “Department of Environmental Protection” estimates the number of feral donkeys to be around 300 (Gündüz 2004). Villagers have complained of agricultural

damage. The team found no study regarding the number of feral pigs. The estimated donkey population density in the Karpaz Peninsula was >2 times densities reported in arid regions of the United States and Australia, but slightly lower than earlier density estimates reported for the Karpaz region (Hamrick *et. al*, 2005). These estimates of feral donkey populations in the Karpaz Peninsula provide a quantitative baseline from which to make population management decisions.

Birds

Cyprus falls between two major migratory routes, one from western Russia southwards to the Middle East and East Africa (the west Palearctic-African route) and the Balkan-African route. As a result, over 200 species of migratory birds, numbering in the millions, find refuge throughout the island. This includes up to 15,000 greater flamingos that over-winter on the island's salt lakes.

Up to 370 species of avian fauna have been observed in Cyprus, representing 17 of the 27 zoological classes (Christoforou, 1998); 300 of these species are considered to be common. According to WWF, ten of the bird species are endemics. Forty-six residents and 27 migratory species breed on the island. Several large birds of prey are also found throughout Cyprus. According Birdlife International, fourteen species found on Cyprus are considered "Globally Threatened Birds" (those evaluated as Critically Endangered, Endangered, and Vulnerable).

In the TCC, the entire area eastward from Rizo Karpazo to the Klidhes Islands is designated by Grimmet and Jones (1989) as an important bird area of Europe. This area is also designated as the most important area in Cyprus for the threatened black francolin *Francoelinus francoelinus* (Boye, 1990), and where, during migration large number of passerine migrants occur. The Klidhes Islands, a chain of nine small, rocky islands adjacent to Cape Andreas, are a breeding site for the shag *Phalacrocorax aristotelis desmarestii*, Peregrine falcon, *Falco peregrinus* and Audouin's gull, *Larus audouinii*, threatened throughout large parts of Europe (Grimmet and Jones, 1989).

With respect to avian flu, at the time of this report, there had yet to be a confirmed case on Cyprus. Previous reports of avian flu in northern Cyprus were later deemed a mistake by authorities. On February 9, 2006, the US Embassy in Nicosia hosted seven Greek Cypriot and six Turkish Cypriot senior medical doctors and veterinarians participated in a Digital Video Conference on Avian Influenza with Dr. Michael Perdue, Senior Microbiologist with Influenza Branch, Centers for Disease Control in Atlanta, GA, who is presently working with the World Health Organization. The program, which lasted for 90 minutes, succeeded in bringing Cypriot health officials up to date on the avian flu situation worldwide. There is concern that birds migrating from Africa may introduce Avian Flu. It is unclear how a response will impact native populations.

Reptiles, Amphibians, and Freshwater Fish

Apart from birds and large mammals, the fauna of Cyprus has not been well-studied. Recent efforts have identified a total of 27 species of reptiles and amphibians including three frog and toad species (*Anura*), 11 lizards (*Lacertilia*), three turtles (*Testudinata*) and ten snakes (*Ophidia*). The only endemic lizard is the Troodos lizard, (*Lacerta troodica*). The only endemic snake is the extremely rare Cyprus whip snake (*Coluber cypriensis*). Poisonous snakes in Cyprus include the Cyprus catsnake (*Telescopus fallax cyprianus*), the Montpellier snake (*Malponon monspessulanus inisgnitus*), and the blunt-nosed viper (*Vipera lebetina lebetina*).

Of the three turtles, two are sea turtles (described above under “Key Threatened and Endangered Species).

There are no naturally occurring freshwater fish in Cyprus though several introduced species are found. Rainbow trout is farm-raised in the Troodos Mountains, Cyprus’ only freshwater aquaculture site.

Marine Life⁷

Characteristic of the marine life of the Mediterranean, Cyprus’ coastline is rich in biodiversity. Along Cyprus’ coast, there are more than 80 species of fish, and as described above, the Mediterranean monk seal and green and loggerhead turtles are found along the coast. In shallow rocky areas, the common fish are peacock and rainbow wrasses, Two-banded bream (Haradjida), blennies and gobies and small parrot fish. On the near rocks are small groups of bearded red mullets (*Barbouni*). Below ten meters, the *Posidonia oceanica* meadows begin, providing a very characteristic Mediterranean seascape. In these meadows, which can be very extensive, fish life is rich and varied, with small wrasses, breams, sea perches, groupers and the odd bullnose ray. The *Posidonia* meadows are a vital part of the Mediterranean ecosystem, and serve as a breeding area for many organisms.

Below 15-20 meters, on sandy and muddy bottoms *Caulerpa prolifera* dominates, and forms very extensive beds in which are found the largest bivalve shells in the Mediterranean, the pinna fan shells.

The most striking terrain is the deep-water outcrops - the reefs below 25 meters. 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.

The opening of the Suez Canal 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 Indo-Pacific animals and plants that established, first in the Canal and later in the Mediterranean Sea. Several hundred species have since established in the Eastern Mediterranean, and the number is growing fast. These Indo-Pacific species now form over 15 percent of the marine fauna of the East Mediterranean, many species, including the red soldier fish and two *Siganids* (rabbit fish), are now common in the commercial catches of Cypriot fishermen. A recent immigrant from the Red Sea, the *Caulerpa racemosa*, has spread very explosively, to cover large areas of seabed around the island, and is now successfully competing with and replacing local species. With no enemies in the Mediterranean, it is likely to transform the East Mediterranean shallow water ecosystem, with far reaching effects on the native marine fauna and flora.

Marine aquaculture is on the rise in the waters surrounding Cyprus. Its impact on water quality as well as native flora and fauna is of concern to some scientists (personal communication). Aquaculture takes place mainly in the coastal zone where biodiversity is high and human pressures are increasing (e.g. tourism, urban development, transport, nature reserves and

⁷ Excerpt from The Marine Life of Cyprus, by Andreas Demetropoulos, Former Director, Department of Fisheries. www.cyprus.gov.cy

agriculture). Habitat degradation in the vicinity of the cages and conflicts with the tourist industry on the use of natural coves does occur. Diseases of the fish, which could affect the wild population, as well as degradation of the benthic community under the cages, are also included in the possible impacts of aquaculture on the coastal marine environment. (EEA, 2005)

Terrestrial Plant Diversity, Endemism and Invasives

Typical of many islands, Cyprus has a large number of endemic species. Depending on the source, estimates of endemic species range from 109 to 141. The 2002 publication, *Trees and Shrubs in Cyprus*, places the number of endemics at 140. Of these, 60 are found only in the GCC and 17 only in the TCC. Of the 17 found in the TCC, two are considered threatened. One of these, *Delphinium caseyi*, may now be extinct as a 2005 survey of its limited range failed to find any plants. Nineteen of the endemic species have been recognized as requiring special protection under the Bern Convention⁸.

A total of 1,907 taxa have been recorded as native or naturalized in Cyprus, while 376 taxa are considered as cultivated (Della, 1995). These include 45 species of orchid, one of which is endemic (*Ophrys kotschyi*). Some of these plants have economic value (see "Economic Significance of Biodiversity" for plants that have economic value).

Exotic plants arrived on Cyprus from as far as Australia and America, and from surrounding Mediterranean countries. The largest introduction of plants took place during the British occupation with the establishment of the Forestry Department in 1879. The department first introduced commercial trees, including over 100 eucalyptus species and many acacias and pines. Later the department brought in ornamentals. This wave of plant introductions grew dramatically with the establishment of privately owned nurseries and plant shops, which imported ornamentals. Additional species have been accidentally introduced by contaminated imported crop seeds. Environmental authorities stated that introduced or invasive terrestrial species were not a significant concern to biodiversity (personal communications).

The scientific record states otherwise. As of 1994, 152 adventive species had been identified for Cyprus (Hadjikyriakou, 2002). Of those the following 16 species were regarded as spreading to natural habitats: *Vinca major*, *Cistus ladanifer*, *Tagetes minuta*, *Tanacetum balsamita*, *Tanacetum parthenium*, *Corylus maxima*, *Iris albicans*, *Acacia saligna*, *Robinia pseudoacacia*, *Epilobium angustifolium*, *Oxalis pescaprae*, *Eschscholzia californica*, *Papaver somniferum*, *Dodonaea viscosa*, *Antirrhinum majus*, and *Vitis vinifera* (Hadjikyriakou, 2002).

A 2002 study re-examined the spreading status of these species and found that *Acacia saligna*, wattle as it is commonly known, to be the most serious invasive species on Cyprus. Wattle now threatens many natural habitats, invading forests, maquis, garigue, marshy areas and agricultural land (Hadjikyriakou, 2002). Wattle was originally introduced by the British for fuel wood and the high demand for fuel wood kept it under control. As its use has been largely replaced by electricity or butane, the wattle has been left to grow unchecked. It has also been planted extensively along highways for green strips as well as control erosion. In some

⁸ The Convention on the Conservation of European Wildlife and Natural Habitats was adopted in Bern on 19 September 1979 and came into force on 1 June 1982. Forty-five European and African States as well as the European Community are parties to the convention. It has a threefold objective: to conserve wild flora and fauna and their natural habitats; to promote co-operation between states; and to give particular emphasis to endangered and vulnerable species, including endangered and vulnerable migratory species.

locations small but dense wattle forests now exist. *Robinia pseudoacacia* similarly to *Acacia saligna*, but to a less extent is spreading in forests, maquis, and garigue vegetation (Hadjikyriakou, 2002).

Protected Areas: GCC

Most protected areas in the GCC are National Forest Parks, which are managed primarily for nature protection and recreation. Established in 1879, the Forest Department has historically provided the bulk of the nature protection on Cyprus. Presently, 20 percent of the GCC's land is in 13 National Forest Parks, which are managed by the Forest Department. The majority of the GCC's individual technical expertise, institutional capacity, and structure for nature protection are found in the Forestry Department.

National Forest Parks

- Akamas
- Asinou
- Athalassa
- Ayia Forest Station
- Cape Greco
- Kapoura
- Kyparissia
- Mandra tou Kambiou
- Paedagogical Akademi
- Platys Valley
- Polemidia
- Potamos Liopetriou
- Randi
- Troodos

In addition to the National Forest Parks, there are two Marine Reserves, Lara-Toxeftra and Limni, designated for the protection of the green and loggerhead sea turtles. Since 1989, the main green turtle nesting beaches in the Lara-Toxeftra area have been protected by the Fisheries Legislation. Turtles and their eggs, along with the monk seal and dolphins, have been protected under this Legislation since 1971. See Text Box "*Conservation Effort: Turtle Conservation/Recovery Project in the Lara-Toxeftra*" for more information on sea turtle conservation.

A national plan to develop marine protected areas was elaborated under the MedMPA Project 'Regional Project for Developing Marine and Coastal Protected Areas in the Mediterranean Region' (2002-2005). Carried out in three stages, this action consisted of:

- (i) Identifying marine sites of conservation interest (July 2002);
- (ii) Field prospecting trips (December 2002, October 2003 and May 2004)
- (iii) Elaborating a national plan to promote and develop marine protected areas in three sites (Cape Greco, Moullia and Akamas) on the Cypriot coast on the basis of scientific and socio-economic studies. (UNEP(DEC)/MED WG.268/12, 2005)

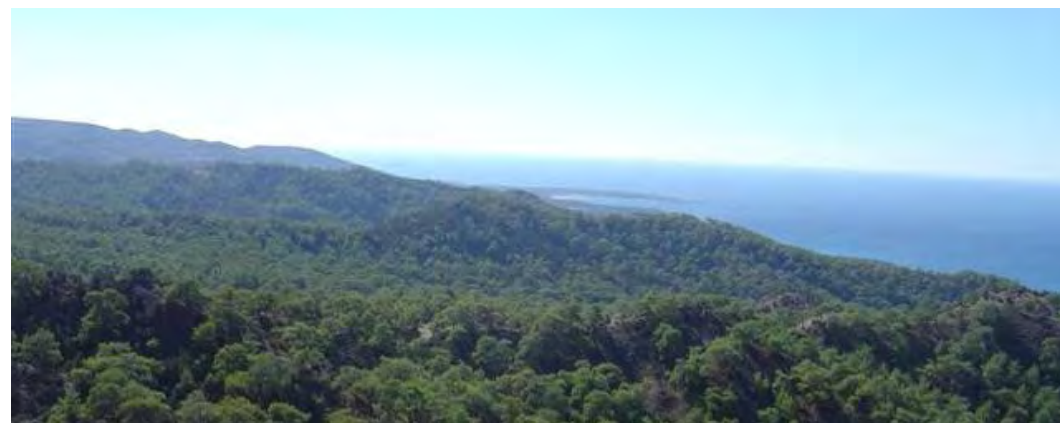
With Cyprus' accession to the EU 2004, the Natura 2000 network was established. Through exhaustive studies of Cyprus' habitats, 31 sites were ultimately designated as Natura 2000 sites in the GCC. Total terrestrial area covered under Natura 2000 is 82,143.49 hectares or 14.6 percent of the total GCC land area. GCC marine areas in the Natura 2000 network cover an additional 12,665 hectares. Approximately 440 hectares in the Buffer Zone are also listed under Natura 2000. Currently, management plans are being developed for five sites and tenders have been let to develop management plans for another eight sites. Annex C, Figure 6 shows the map of Cyprus' designated Natura 2000 sites. The map shows additional Natura 2000 sites in the TCC as proposed by the GCC. The totals above do not include these areas.

Natura 2000 does not provide strict protection, but rather identifies sites of special concern that, because of their critical biodiversity, should be protected. Management of these sites will be based on zones. These zones will range from strict protected area (normally, a core of the site)

and radiate out with decreasing protection. Development is permitted in specified areas of Natura 2000 sites. Some areas currently managed as National Forest Parks also fall within Natura 2000 boundaries. Section 3 contains details of the legal framework for Natura 2000.

The Akamas Question

The Akamas Peninsula has been the subject of fierce debate between environmental groups and the authorities, as well as private land owners who wish to develop the area for mass tourism. For decades, the majority of the peninsula has been protected as National Forest, which in Cyprus, provides a high level of protection.



According to the Cyprus Conservation Foundation, many of the Government's plans for the area are incompatible with the principles of sustainable development. In 1992, the World Bank's Mediterranean Technical Assistance Programme (METAP) undertook a study on the 230 km² peninsula, which called for the strict protection of the beaches and heartland of Akamas, and the creation of buffer zones around the protected areas, where development would be limited (similar to the zoning concept under Natura 2000). Due to pressure from local land owners, the recommendations of the report were never implemented. For example, the Anassa beach hotel, a gigantic luxury hotel complex, was built by the family of a former Minister of Foreign Affairs in what had been designated one of the buffer zones. In addition, a number of illegal installations (e.g. restaurants) operate within the areas that should be protected. However, some positive measures have been taken, such as freezing of new permits for "safaris", as well as the re-examination of existing ones, the exclusion of Akamas from the Cyprus Rally, allocation of funds for cleaning the area, and controlling grazing. In relatively small, specified areas, such as Lara Beach, development is prohibited.

In late October 2005, the Council of Ministers designated a National Park on the Akamas Peninsula. Management of the park will now focus on working with local communities to gain support for the park.

The two coastal wetlands in the GCC are protected. In 1997, the Council of Ministers approved a management plan for the Larnaca Salt Lake Ramsar site. A management plan for the Akrotiri Salt Lake and Phassouri marsh was prepared but management is the responsibility of the British authorities as the site is located in sovereign territory. There is some concern over the management of the Akrotiri Salt Lake as well as the British military's use of the area. For example, in 2001 a large array (antenna) was constructed in the salt lake.

Wildlife/Game Reserves

There are two kinds of game reserves (no hunting areas), managed by the Ministry of Interior. These designated areas amount to about 35 percent of the Government-controlled surface area and are designed to protect habitat and wildlife.

Distinctive habitats have been designated as Permanent Game Reserves (no hunting areas). These account for about 900 km² of Government-controlled area and include the Paphos State Forest area, all wetlands, and significant migration corridors. Other important habitats for wildlife are designated as Game Reserve Areas which are also no hunting areas.

With an estimated 50,000 hunters in the GCC, the management of Game Reserve Areas is one of the major tools used for wildlife conservation. During hunting season, additional areas are designated as no hunting areas so that migratory corridors are protected.

In Paphos, a significant swath of land from the coast inland has been designated as a Game Reserve Area to allow migrating species to safely arrive on the island, to feed and rest. Prior to this designation, hunters would concentrate along the coast, and hunt exhausted migrants as they approached the island.

Protected Areas: TCC

There is no official protected area network in the TCC (while not in force, the GCC did propose Natura 2000 sites in the TCC). Not officially protected areas in the traditional sense, state forests in the TCC are managed mainly for conservation and recreation. The “Town Planning” authorities have designated areas for protection either under “Subject Plans” (which establish permanent zoning) or “Ordinances” (which are temporary measures, with no time limit, used to regulate development).

To date areas protected by these measures include:

- The Karpaz Peninsula – the ordinance under the “Karpaz Decree”, issued in 2005, designates much of the peninsula as protected from development and delineates areas for nature protection, mainly turtle nesting beaches and lands currently not farmed (hill tops);
- Alagadi Turtle Nesting Beach – is protected from development by a “Subject Plan,” which delineates the beach and an extent of buffer strip as protected.
- Akdeniz and Kormacit – the Team viewed the map of the new ordinance during our meeting at the “Town Planning” office. It delineates turtle nesting beaches for protection, as well as forested lands, an indication that the planning office had taken environmental considerations into account when developing this plan.

B. Economic and Cultural Significance of Biodiversity

Timber production in the GCC and the TCC is limited, and a secondary objective of forest management activities. Approximately 2,000 cubic meters are harvested annually in the TCC and processed locally by small-scale sawmill facilities. In the GCC, 35-40,000 cubic meters are harvested. Approximately 50 percent is processed into chip board by Cyprus forest Industries, and the remaining volume is used by small-scale, local sawmills (FORTECH, 1997). Current harvesting levels are reportedly sustainable.

Traditional ethnobotanical species of economic value as listed by Jarruad, 2005 are:

- Edible wild plants: caper bush (*Capparis spinosa*), wild artichoke (*Cynara scolymus*), bladder campion (*Silene cucubalus*), wild asparagus (*Tetragonolobus purpureus*), wild mallow, thyme, rosemary, marjoram, fennel, juniper, myrtle, lovage, bergamot, lavender, marigold, borage, mint, nettle, sage, camomile, elder etc.
- Medicinal species: wild sage (*Salvia fruticosa*), wild thyme (*Thymus integer*), fennel plant (*Foeniculum vulgare*), sweet marjoram (*Origanum marjorana*), Myrtle (*Myrtus communis*), rock rose (*Cistus salvifolius*), mandrake (*Mandragora officinarum*), St. John's Wort (*Hypecum spp.*).

Small-scale farming has a long history on Cyprus and contributes to the cultural identity of the island. Traditional crop stocks are some of the oldest in the world, although not all continue to be cultivated. Many of the crop stocks are unique varieties to Cyprus, such as the artichoke local variety "Kiti". Relicts of the old durum wheat varieties "Kyperounda", "Tripolitiko" and "Famira" might now only be found in semi-mountain areas of Paphos. The Agriculture Research Institute has begun to collect the valuable germplasm to conserve in the institute's genebank (Della, 1995).

Olive trees have significant cultural value, and several groves and individual trees are protected to retain this heritage. In her report for the BDP, Gunduz states that, of the olive tree plantations in the TCC, the plantation in the ravine close to Kalo Horio (Kapouti) is the most outstanding. These olive trees are several hundred years old, and they are considered historic/monumental trees. The plantation has an extensive irrigation network. Multi-use olive tree plantations are an age-old component of traditional Mediterranean landscape, and are an integral part of the natural and cultural heritage of the Mediterranean (Gündüz, 2004).

Fishing in Cyprus waters, as in most Mediterranean countries, is intensive with signs of local over fishing. Fish production is about 3.100 tons per year valued at about \$22.78 million. Management measures such as closed seasons, limitations to the size of the fleet, closed areas etc., have been implemented with success. While four of the eight trawlers licensed are being taken out of service, sport fishing is on the rise. Authorities realize more remains to be done and intensive fishing inevitably has an impact on the sustainability of marine resources and on the marine biodiversity of the island. Examples of actions taken to mitigate the impact of the fisheries industry in Cyprus include banning fishing in the shallow waters where there are *Posidonia*. Additionally, Cetaceans have been protected since 1971. Studies are being done to mitigate impacts on fishing nets and reduce the fishermen's negative attitude to some marine mammals (UNEP, 2005).

Marine aquaculture is on the rise throughout the coastal areas of Cyprus. Its impact on water quality and impact on native fauna is of concern to some scientists (personal communication). Aquaculture takes place mainly in the coastal zone where biodiversity is high and human pressures are increasing (e.g. tourism, urban development, transport, nature reserves and agriculture). Therefore it exacerbates the effects of potential impacts. Habitat degradation in the vicinity of the cages and conflicts with the tourist business on the use of natural coves does occur. Diseases of the fish, which could affect the wild population, as well as degradation of the benthic community under the cages, are also included in the possible impacts of aquaculture on the coastal marine environment.

SECTION III

LEGAL AND INSTITUTIONAL FRAMEWORK GOVERNING BIODIVERSITY, ENVIRONMENT AND NATURAL RESOURCES

This section contains a detailed account of the legal and institutional framework governing environment and natural resources in both the GCC and TCC that have the most relevance and impact on biodiversity. The intent is to provide the reader with a comprehensive understanding of the intent of the law and governing policies. Findings with respect to effectiveness of the laws and institutional framework, harmonization, and primary conclusions are presented in Section V.

A. Legal Framework

1. GCC

The Strategic Development Plan, covering the period 1994-1998 set the major sustainable development goals for the GCC; and the Development Plan for 1999-2003 further incorporated sustainability into economic development policies, emphasizing social aspects of development and improvements in the quality of life, including protection of the environment.

Environmental concerns were integrated into other socio-economic sectors in the Action Plan for the Protection of the Environment, 1996. This Plan was reformulated and expanded in 2000, and became the National Programme for the Adoption of the Environmental Acquis Communautaire of the European Union. The main objective of the Programme is sustainability, based in part on adequate protection of the environment, and includes a series of measures such as fiscal tools, environmental impact studies, protection of nature, landscape and wildlife, protection of waters, and management of waste and chemical substances. The majority of the measures derive directly from policy and legislation of the EU.

The Council of Ministers has overall responsibility for the formulation of environmental policy, which is coordinated by several ministries and departments. In general, GCC environmental policies have been radically overhauled to be harmonized with over 300 EU directives and regulations. The EU identified the Environment Service as department responsible for environmental management and conservation, and transposition and implementation of the bulk of the directives. However, the Environment Service is hindered by insufficient staffing: 20 people are responsible for over 200 EU directives. The relatively small Environment Service staff, constrained by technical capacity and funding, is admittedly overwhelmed with the reporting requirements of the EU directives, not to mention their implementation. The Environment Service plans to increase staff by five during 2005 and expand to 40-45 over the next three years.

The following is a synopsis of GCC policies and regulations most relevant to biodiversity conservation:

Legal Framework for Nature Conservation

The Habitats Directive is the EU's main policy governing nature conservation. Its main objective is the conservation of biological diversity "through the conservation of natural habitats and of wild fauna and flora in the European territory of the Member States to which the Treaty applies" (Council Directive 92/43/EEC). Member States must compile national lists of important habitats and species and submit them to the EC, which is responsible for verifying that the lists are adequate. The important habitats are then designated into Special Areas of Conservation

(SACs) and these sites form the basis for the Natura 2000 network. The Habitats Directive does not call for exclusion of all human activity in Natura 2000 sites, but specifies conservation objectives should shape their development. As previously stated, the GCC has designated 31 Natura 2000 sites and development is currently restricted. The premise of the system establishes a core zone for protection with other zones of varying levels of protection surrounding. The main agency responsible for implementing the Habitats Directive is the Environment Service.

BIOCYPRUS, an electronic archive of ecological data in the GCC was developed with funding from the EU LIFE project to help prepare documentation for the Natura 2000 network and includes an inventory of flora and fauna, biotopes, and maps. The GCC's Forest Department has recently compiled the data for the "Red Book of Cyprus Flora," the first book of its kind covering all of Cyprus.

The GCC ratified CITES in 1975, and regulations covering trade in endangered species are well enforced. Protection of turtles, seals, dolphins, and habitats of sea turtles during nesting periods (1 June through 30 September) is governed by the Consolidated Amending Regulations (No. 273/90) enacted under the Fisheries Law (CHAPTER 135).

Migratory birds are protected under the Game and Wild Birds Law of 1974, amended in 1991 and 1996, which establishes permanent and temporary game reserves. All gulls, waterfowl (except ducks and geese), and birds of prey are protected. This law also regulates hunting of hare and game birds (partridge, ducks, geese, thrushes, and francolins) and prohibits traps for hunting of game species and wild birds. Hunting legislation is enforced through the Game Fund Service of the Ministry of the Interior. The EU Bird Directive provides a list of important EU species requiring protection.

Forestry Legislation

National forest policy promotes the multiple use (protection, recreation, and commercial) and sustainability of the forest resource. The National Forest Programme, prepared in 2000, also emphasizes multiple use and sustainability and aims to protect the natural environment and national heritage. Among those the Team interviewed, illegal harvesting was not cited as an issue in the GCC.

Legal Framework for Coastal Area/Zone Management (adapted from Constantinides, 2002)

While there is no specific legal or functional definition of the coastal zone or area in the GCC there are two main geographical demarcations that are important for biodiversity conservation:

1) The *Foreshore Protection Law* defines the foreshore as all lands within 100 yards of the high water mark. This law establishes a foreshore protection zone, where it is prohibited to perform certain works, build, or construct various structures and buildings, dispose waste, park vehicles or place articles on the beach.

2) The *New Tourist Policy of 1990* (see below) designated a zone of three kilometers from the coastline for control of tourism development.

The GCC is bound by several protocols and laws regulating land and sea-based pollution.

Legal Framework for Land Use Planning

The Town and Country Planning Law (No. 90/72, Amending Laws 56/82, 7/90, 28/91, 91(I) 92, 55(I)/93) regulates, controls, and promotes physical development. Under this Law, the Finance

Ministry is to prepare an Island Plan, establishing the policies to be followed regarding the promotion and control of development; the Ministry of the Interior is to prepare a Policy Statement for the development of areas where Local Plans are not in force; and the Planning Authority reviews applications for any type of development and issues a Planning Permit or rejects the application. In theory, all types of development are regulated through the provision of Local Plans and the Policy Statement for the Countryside, prepared under the Town and Country Planning Laws.

Fisheries Legislation

In June 2000, the House of Representatives passed the Amendments to the Fisheries Law (Cap 135) and Fisheries Regulations (1990-1994) to regulate the fishing licenses system outside territorial waters and the monitoring of fishing activities. All fishing vessels are required to install a blue box for monitoring.

The licensing policy for the fleet fishing in territorial waters, takes into consideration the available fishing resources of the area around the island and their sustainable use. For the conservation of fishing resources, several management measures were enacted in 1994, introducing substantial limitations to the fishing effort. Parameters taken into account include, among others, the number of vessels, the engine power, closed fishing zones and season, and mesh size.

A new Law on Aquaculture, prepared with the help of FAO experts, to facilitate a National Action Plan for the development of aquaculture, was passed by the House of Representatives, in July 2000 (No.117(I)/2000). A set of regulatory acts for this law covering licensing, safeguards, environmental monitoring, etc. has been or are currently being prepared.

A number of Fisheries Conventions and Agreements have been or will be signed and ratified, *i.e.* GFCM (General Fisheries Commission for the Mediterranean); the 1993 FAO Agreement to promote compliance with International Conservation and Management Measures by Fisheries Vessels on the High Seas; the 1995 UN Agreement for the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks; and ICCAT (International Commission for the Conservation of Atlantic Tunas).

Legal Framework for Tourism (adapted from Jarraud, 2005)

The GCC's tourism policy is formulated, promoted and coordinated by the Cyprus Tourism Organization (CTO), a semi-government organization under the Ministry of Commerce, Industry and Tourism. The CTO has no spatial plan preparation and implementation powers but, through its participation on the Planning Board, tourism policies are incorporated in the Local Plans and the Policy for the Countryside. Developed by the CTO, the Strategic Plan for Tourism, covering the period 2003 to 2010, aims at introducing sustainability into tourism development by preserving culture and the environment while increasing revenues. The CTO already provides small incentives for owners of traditional houses to convert to agrotourism. Already over 70 traditional houses in 31 different villages have been converted. The non-profit *Cyprus Agrotourism Company*⁹ was established in 1996 at the initiative of the CTO. Financial incentives are regularly developed to encourage agrotourism.

Legal Framework for Environmental Impact Assessment (EIA)

In 1991, the Council of Ministers approved a comprehensive system of EIA. A new law on EIA was approved in 2001. It established a committee which meets regularly to review EIAs. A

⁹ <http://www.agrotourism.com.cy>

Strategic EIA process is gradually being introduced. Problems with the EIA process include: limited ecological data incorporated, and decisions based on economic rather than environmental concerns; limited public input into the process; building permits issued prior to EIA approval; duplicate efforts when preparing EIAs because scientific data for EIAs may exist, but are unavailable to EIA preparers; and EIA mitigation measures are not monitored and enforced.

Legal Framework for Water Management

The GCC's efforts to comply with EU policies and directives are shaping the GCC's actions in water management. The Water Framework Directive (2000/60/EC) supports an integrated approach to water management, placing conservation as a guiding force, and promoting stakeholder participation in water management. In the GCC, the provisions of the Water Framework Directive have been transposed into national legislation in the Water Protection and Management Law of 2004.

The GCC's water conservation measures include subsidies for installation of gray water treatment plants and for the use of inferior quality groundwater for flushing of toilets and irrigation of house gardens. Subsidies are also available to farmers for the collection of rainwater from roofs of greenhouses and for the installation of advanced irrigation systems.

Groundwater use and protection is regulated by the Water Pollution Control Law and a Decree issued in 1996 under this law. The law includes a list of substances whose direct and indirect discharge into groundwater is prohibited.

2. TCC

Environmental protection in the TCC is hindered by the lack of international recognition; this significantly limits the extent and type of international assistance the TCC can obtain to strengthen environmental policies and practices. For example, the TCC has no means of officially designating sites under international environmental conventions; only the GCC can officially designate sites that are located in the TCC. Also, in their professional capacity, TCC environmental experts are not invited and are unable to attend, as representatives of their agencies, official international symposia. For the most part, TCC experts go unrecognized in their fields.

However, the TCC is receiving assistance from the EU to harmonize environmental legislation with the EU, and to identify priorities in the environment sector. To this end, the TC Environmental Change Management Committee (ECMC) was formed with the help of the EU Technical Assistance Information Exchange Office (TAIEX). Its purpose is to assist TC authorities to cope with the *acquis* if and when the TCC is integrated fully into the EU.

As the TCC's environmental legislation is not currently aligned with that of the EU as in the GCC, a more extensive listing of the relevant biodiversity conservation and environment legislation is provided below:

Table 3.1. Relevant Environmental "Legislation" (TCC)

"Legislation"	"Institution"	Content Overview
"Environmental Law 21/97"	"The Department of Environmental Protection" ("DEP")	Environmental protection of various environmental sectors, monitoring requirements, prevention of pollution
"EIA Regulation"	"DEP"	Procedures regarding report preparation and auditing
"Control of Solid Wastes Regulation"	"DEP"	Collection, removal, disposal, handling techniques, and recycling issues
"Protection of Watery Regions and Wetlands Regulation"	"DEP"	Biological and chemical criteria and declaration of protected wetlands
"The Methods and Standards for the Protection of the Environment and the Prevention of Pollution Regulation 1991" (under 9/90 environmental law still in force)	"DEP"	Methods and scientific standards for receiving bodies (pollution control)
"Control and Protection of Air Quality Regulation"	"DEP"	Emission standards, assessment techniques, and mitigation
"Protection of Settlement Areas in Terms of Environmental Aesthetics Regulation"	"DEP"	Sets limits for activities causing pollution and endangering the aesthetics of settlement areas
"The Department of Environmental Protection Foundation, Duties and Working Conditions Regulation"	"DEP"	Basis for setting responsibilities for the department's staff
"Protection of Flora and Fauna Decree"	"DEP"	List of flora and fauna, some of which are of special concern to Northern Cyprus
"Incitement Law 47/2000"	"Dept of State Planning"	The basis for the stimulation of businesses

“Legislation”	“Institution”	Content Overview
“Hotels Law (Chapter 138)”	“Dept of Tourism Planning”	Hotel specifications
“2003 Hotels Regulation”	“Dept of Tourism Planning”	Classification of hotels and standardization, including environmental standards
“Chapter 96 of the Streets and Buildings Law”	“The Ministry of Interior”	Specifications on the arrangement of streets and buildings
“Construction Law 55/89”	“Dept of Town Planning”	Specifications related to healthy and sustainable construction
“The Department of Town Planning Foundation and the Basis of Duties and Distribution of Responsibilities Law 47/88”	“Dept of Town Planning”	Basis for assigning responsibilities of department staff
“The Department of Geology and Mining Foundation and the Basis of Duties and Distribution of Responsibilities Law 60/89”	“Dept of Geology and Mining”	Basis for assigning responsibilities of department staff
“The Chapter 270 of the Mining and Stone Quarries Law”	“Dept of Geology and Mining”	Activities of stone quarries
“The Department of Water Works Foundation and the Basis of Duties and Distribution of Responsibilities Law 60/89”	“Dept of Water Works”	Basis for assigning responsibilities of department staff
“The Use and Inspection of Beaches Law 26/93”	“Ministry of Interior”	Control measures for Municipalities and Kaymakamlık regarding the usage and supervisions of beaches within 100m of coastlines
“The Foreshore Protection Law 22/61 amended by 28/96”	“Ministry of Interior”	Control measures for Municipalities and Kaymakamlık for the protection of coastlines and prevention of pollution
“The Chapter of Game and Wild Bird Protection Law 1934 “	“Ministry of Interior”	Covers wild birds and other game species
“The Department of Forest Foundation and the Basis of Duties and Distribution of Responsibilities Law “	“Dept of Forests”	Basis for assigning responsibilities of department staff
“The Prevention and Contention of Land Fires Law 6/79”	“Dept of Forest”	Measures for prevention of fire
“The Utilisation and Protection of Forests Regulation 81/48”	“Dept of Forest”	Measures for forest protection and reforestation
“Organised Industrial Areas Law 23/77, 58/77, 11/87”	“Dept of Industry”	Collection of businesses in the production sector in areas outside city centres (zoning)
“Chapter 170 Electricity Law and Chapter 171 Electricity Development Law”	“The Foundation of Electricity”	Healthy supply of electricity to the citizens

B. Institutional Framework

1. GCC

a. GCC Authorities

At the national level, the Council of Ministers has overall responsibility for the formulation of environmental policy, which is coordinated through the Minister of Agriculture, Natural Resources, and Environment (MANRE). The Council for the Environment has wide representation, and advises the Minister and thereby, the Council of Ministers, on environment and sustainable development issues.

Responsibility for environmental issues is shared between several Ministries and Departments. The Environment Service resides within the MANRE. This Department may soon be promoted to the level of a Directorate, in line with EU recommendations. Among its many responsibilities, the Environment Service is mandated to advise on environmental policy; ensure implementation and coordinate the process for adoption of EU environmental policy and legislation; chair the committee on EIA; promote environmental awareness and training; and disseminate information on the environment. Table 3.2 shows the GCC's institutional framework for implementation of environmental legislation.

In numerous interviews the “paper house” of environmental policy and legislation was highlighted to the Biodiversity Assessment Team as a major administrative weakness and threat to biodiversity. Without significant increases in staffing or a reorganization of GCC authorities, the situation is unlikely to change. For an in-depth analysis of the structure, needs, and recommendations for GCC authorities please see the report prepared by J. Verstrynge, *“The Institutional Organization of the Environmental Policy of Cyprus”* included in the *Cyprus FAA 119 Analysis Resources CD* associated with this report.

Table 3.2. GCC Responsible Authorities in the Environment Sector (Jarraud, 2005)

Institution	Affiliation	Activities
Natural Resources Information and Remote Sensing Centre	MANRE	Inventory and monitoring of natural resources, state of the environment etc.
Meteorological Service	MANRE	Monitoring weather and climatic trends.
Agricultural Research Institute	MANRE	Scientific Research for sustainable Agricultural Development.
Water Development Dept.	MANRE	Water resources determination and management strategy.
Department of Agriculture	MANRE	Agriculture reform and strategy.
Department of Forests	MANRE	Administers state forests, reforestation program.
Department of Fisheries	MANRE	Responsible for marine water quality monitoring and marine biodiversity.
Statistical Service		Contains an Environmental Statistics Unit.
Geological Survey Dept.	MANRE	
MANRE		Environment and Agriculture Policy Formulation and Executive Functions.
Game Fund	Ministry of Interior	Enforcement of Game and Wild Birds Law.

Institution	Affiliation	Activities
Environment Service	MANRE	Coordinating agency for government environment programs. Implementation of EU Environmental Acquis, focal point for international environmental agreements and conventions. Advice and Strategy Development on Environmental Policy.
Planning Bureau	Ministry of Interior	Five-year development plans.
Ministry of Commerce, Industry and Tourism (MCIT)		Energy management and conservation, renewable energies, waste treatment grants scheme.
Cyprus Tourism Organization	MCIT	Promotes agrotourism, coordinates Blue Flag scheme.
Ministry of Communications and Works (MCW)		Shoreline defense, Aviation and Shipping regulations, Motor Vehicle Inspection.
Department of Labor Inspection	Ministry of Labor and Social Insurance	Implementation of law on Atmospheric Pollution, Safety and Health at Work, Dangerous substances, Asbestos laws.
Ministry of Health		Quality control of drinking water, microbiological monitoring of recreational waters, research and analysis of pollution (laboratories in environmental chemistry, microbiology, virology, ecotoxicology and risk assessment).
Cyprus Ports Authority		Handles oily waters and refuse from ships in dock.
Planning Board		Responsible for the approval of Development Plans. Includes 10 members, including 4 private members (e.g. The Chairman), and 6 representatives of various key ministries. Technical advice and coordination provided by the Director and staff of the Town Planning and Housing Dept. Development plans reflect existing policies and strategies.
Department of Town Planning and Housing		Town and Country Planning law implementation.

b. Municipal Authorities

Local authorities are involved in environmental protection, as shown in the Table 3.3 below. It is particularly interesting to note that there is no local government involvement in nature protection.

Table 3.3. Responsibilities of GCC Municipal and Central Governments (Constantinides, 2002)

Decision-making level	Central government	Municipal level
Economic and social development policy	XX	0
Land use planning strategy	XX	X
Preparation of development plans	XX	X
Issuance of planning permits	XX	X
Issuance of building permits	0	XX
Social housing schemes	XX	0
Main urban road network	XX	0
Local road network	X	XX
Water distribution and sewerage network	XX	0
Environmental management	XX	X
Nature protection	XX	0
Education and health services	XX	0

XX = main responsibility. X = some responsibility. 0 = no responsibility

2. TCC

a. TCC Authorities

Table 3.4 provides a brief overview of each TCC authority with responsibilities in environmental protection and nature conservation.

Table 3.4. TCC Authorities and responsibilities.

“Ministry of Economics and Tourism”		Responsibilities
“Department of Environmental Protection”	Environmental policy formulation; drafting and enforcement of environmental legislation; environmental training; control of solid waste, including collection, handling, organizing and monitoring of handling methods; evaluation of EIAs; consultation with other authorities as part of permitting; cooperation with and advising of other authorities; inspection of installations; monitoring air quality; environmental project preparation and planning; nature protection and monitoring; and inspection of industries.	
“Department of Tourism Planning”	Receives applications for investments related to tourism and is responsible for reviewing and approving them.	
“Department of Industry”	Control and placement of industrial activities in industrial areas; ensure compliance; provide the necessary infrastructure in industrial areas; maintain industrial areas (not including waste collection); formulate industrial policy.	
“Department of State Planning”	Prepare long-term plans and annual programs for economic sectors.	
“Department of Antiquities and Museums”	Oversee inventories, research and protect historical sites and remains; and protect the Karpaz peninsula on account of the historical sites located in that area.	
“Ministry of Agriculture and Forestry”		
“Department of Agriculture”	Support the agriculture sector and protect the environment to ensure production of healthy agricultural products and the livelihoods of rural people.	
“Department of Forestry”	Protect forests against forest fires; implement reforestation; maintain picnic areas; prepare a 10-year management plan for silvicultural works in the forests; and declare monument trees.	

“Department of Veterinary”	Oversee health and welfare of livestock.
“Ministry of Interior”	
“Department of Town Planning”	Prepare/update land use plans; organize public meetings on land use plans; tourism planning, in consultation with the “Departments of Industry, Trade, Tourism and Transportation.”
“Department of Geology and Mining”	Grant permits for quarries, for explosions in quarries and for drilling for groundwater exploration; estimate groundwater yield; monitor groundwater levels and chemical and microbiological quality; perform seismic monitoring; prepare groundwater quality maps; and grant licenses for borehole drilling and exploitation.
“Department of Cadastre”	Boundaries are all drawn by hand. The department is not computerized. There is currently no consultation process or exchange of information with the department of town planning during the planning processes.
“Department of Water Works”	Ensure water supply to villages; chemical and bacteriological analyses; monitoring of bathing waters; collect information on the amount of water pumped from wells and from reservoirs; sanctions in cases of noncompliance; monitor ground water level in boreholes; responsible to a certain degree for village sewer networks outside of municipalities and for construction of dams and irrigation systems; usage rights for reservoir water; water level measurements in dams; and control of industrial discharges outside municipalities.
Regional Authorities (Kaymakamlıks)	Grant permits for buildings, activities that produce noise, storage of fuel oil or gas, digging wells, and hunting.
“Ministry of Public Works and Transportation”	
“Department of Meteorology”	Measure meteorological and climatic parameters; operate 50 meteorological stations; make seismic measurements and weather forecasts.
“Department of Highways”	Maintain and develop the road network; operate two stone quarries; prepare highway master plans; plant trees along the roads.
“Ministry of Health”	
“Department of Basic Health”	Perform occupational health inspections in industrial facilities.
“State Laboratory”	Analyses of water and air quality.
“Municipal Authorities”	Collect and transport waste; manage water distribution and water quality, sewer and wastewater; monitor the condition of the sewerage network and operate wastewater treatment plants; inspect and measure pollution from transportation. Municipalities are responsible for issuing building permits (only for the municipalities of Nicosia, Gönyeli, Kyrenia, Famagusta, Iskele, Mehmetic, Güzelyurt and Lefke) including inspection and final approval.

It stands to reason that the recommendations by Verstryngge (if adopted) for the restructuring of GCC authorities would be appropriate to a certain extent in the TCC. This would result in similar structures of environmental authorities, ultimately easing their unification or at a minimum easing of joint work when a resolution is reached.

C. Civil Society (GCC and TCC)

There are approximately 70 environment-related NGOs in Cyprus (TCC and GCC combined). However, environmental civil society in Cyprus is generally quite fragmented, with significant amounts of overlap and a large number of small, single-issue, unsustainable organizations. In the GCC, the Federation of Environmental and Ecological Organizations (FEEO) is a member of the EIA committee. However, the FEEO is not recognized as an umbrella organization by the majority of NGOs, and only has nine member organizations. Moreover, it has had political links with the Cyprus Green Party and is therefore not seen as completely independent. A number of NGOs also sit on the Council for the Environment and the Steering Committee for Protected Areas. They are also invited to present their views at the Parliamentary Environmental Committee. According to the government, all active NGOs receive an annual grant (MANRE, 2001); though the Team was informed this amounts to only 100 Cypriot Pounds (approximately USD 200).

In many ways, the situation of environmental NGOs in the TCC is less favorable than in the GCC. The environmental NGOs are often small, lack funding, and depend heavily on expatriate members for survival.

Some environmental NGOs are more active than others. For example, the Cyprus Marine Environment Protection Association (CYMEPA) is the focal point of several important international and national environmental campaigns, such as the Eco-schools and the Blue Flag campaign. In general (apart from a few exceptions), the main problem of environmental civil society is its fragmentation into minute, often low-impact organizations.

In terms of stakeholder participation, the National Forest Policy is an example of progressive policy by the GCC Forestry Department, incorporating broad social dialog. It provides an opportunity for all stakeholders (local communities, land owners, environmental NGOs, etc.) to have input into new projects, and their recommendations are taken into consideration at the planning and decision-making phases. Local people are thereby made partners in forest conservation.

SECTION IV

USAID'S PROGRAM

A. Overall Program

USAID has provided support to Cyprus since 1975. The focus of the support shifted from humanitarian relief and infrastructure development in 1998, when the UN Commissioner for Refugees concluded its role as implementer of the USAID program. The UNDP took over implementation through a multi-year grant with a focus on bicomunal activities that help reduce tensions between GC and TC communities.

USAID classifies Cyprus as a Strategic State, which guides USAID assistance to first address any politically defined mandates, and then to follow a transformational development approach. As a Strategic State, USAID's program in Cyprus must maintain a strong link to the earmark language which allocates funds for (1) scholarships and their administrative costs; and (2) other measures that reduce tensions and promote a climate of peace between the two communities. USAID programs support number (2); while the US Department of State manages scholarship programs, and bi-communal grants to help reduce tensions and promote a climate of peace.

Currently, USAID/Cyprus is developing a new strategy, which includes support towards the common UN-EU-US policy designed to reduce longstanding economic and political isolation of the Turkish Cypriot community. Under this new strategy, USAID designed a set of economic development activities to complement ongoing bicomunal programs. The overarching problems being addressed by the new strategy are reconciliation, intolerance, suspicion and distrust, negative stereotypes, and isolation, as well as economic inequality, lack of opportunity, poor financial services, and enterprise/firm inefficiencies.

USAID/Cyprus' Strategic Objective (SO) is:

Conditions to foster a durable settlement in Cyprus are strengthened.

USAID/Cyprus has targeted the following Intermediate Results (IRs):

IR 1: *a strengthened culture of mutual understanding; and*

IR 2: *increased parity of economic opportunity.*

IR2 is based on the foundation that increased parity of economic opportunity will help level the economic playing field and ensure that Turkish Cypriots can more ably undertake and finance development that will be needed post-settlement.

Achieving IRs 1 and 2 will involve increasing:

- public dialog on issues critical for settlement by supporting various forums for opinion exchanges;
- the quantity and quality of civic partnerships and cooperation, with a focus on creating deeper, more substantial relationships and interactions of a longer-term nature;
- public expressions of tolerance in ways that begin to change attitudes and behaviors of the two sides; and,

- economic and social interdependence between the two communities on issues of common interest, such as cultural heritage and environmental protection.

The crosscutting themes are conflict; global development alliances; media; human and institutional capacity building; and youth.

The following activities constitute USAID/Cyprus' program:

1) Action for Cooperation and Trust (ACT), the successor to the Bicomunal Development Program (BDP), is funded by a USAID grant to the UNDP, and funds projects that encourage Greek and Turkish Cypriots to work together on common issues. ACT's SO is "to encourage a stronger culture of tolerance and reconciliation and support for a settlement in all sectors of Cypriot society through sophisticated, sustained, and complex collaboration and cooperation between Greek Cypriots and Turkish Cypriots." Thematic areas, over the life of the project (LOP), are: organizational networking; cultural heritage preservation; civil society and local governance; formal and informal education; sustainable development (covering areas such as dairy production, organics, agro-tourism, waste management, and cultural and natural resource conservation); and humanitarian relief. ACT works through government and NGOs to achieve the activity's objectives.

The following themes have been identified for 2006: cultural heritage, including sustainable tourism; education (including environmental and artistic initiatives); and bicomunal summer camps.

2) The following activities are implemented under the umbrella, Cyprus Partnership for Economic Growth (CyPEG), which encourages growth in the TCC to contribute to beneficial TC interaction with GC, American and other businesses; better enable the TC economy to shoulder its share of the future economic costs of a settlement; and advance the adoption and implementation of EU and international standards and practices across the island.

a) Economic Development and Growth for Enterprises (EDGE), June 2005-May 2008, implemented by BearingPoint, is strengthening the domestic and international competitiveness of TC small and medium-sized enterprises (SMEs) and helping to restructure the financial sector to help SMEs thrive. Because establishing early successes in developing new market relationships is critical, EDGE is following a simultaneous two-track program, with Track 1 representing the more dominant and immediate of the two tracks: Track 1 is implemented at the firm level, and involves technical assistance to help selected companies within the targeted sectors identify and engage in income generating business transactions; and Track 2 targets industry level assistance offered through associations or other relevant institutions in the target sectors, which could lead to more formalized cluster-type relationships during the life of the project. The complete set of target sectors (firms and industries) for EDGE support had yet to be finalized at the time the Biodiversity Assessment Team conducted the 119 Assessment, however, EDGE staff mentioned citrus, textiles, and handicrafts as possible focus sectors.

b) Resource Efficiency Achievement Program (REAP) is being implemented by CORE International, over a two-year period, October 2005-September 2007. The objective of REAP is to promote resource efficiency and, in turn, improve the competitiveness, financial status and quality of SME service delivery. By conducting audits and upgrades

of business establishments and households, the activity aims to promote more efficient use of water and energy.

c) Supporting Activities that Value the Environment (SAVE), implemented by International Resources Group, over a three-year period from October 2005 to September 2008, will (1) improve competitiveness, financial status, and quality of basic services and infrastructure to more easily meet EU standards; and (2) strengthen the TCC capacity to manage natural and cultural resources for economic growth. Achievement of these objectives is intended to provide a more practical foundation for reunification, increase effective management of cultural heritage and natural resource assets, and form the basis for sustainable economic growth.

There are two broad concepts that underpin SAVE's approach:

1) Provision of basic services and infrastructure investment for sustainable economic growth can be used to catalyze significant policy and institutional reforms, including restructuring, private-public participation, and new approaches to regulation, monitoring, and enforcement. Such reforms can lead to improved financial and management performance, increased investment, productivity and service coverage, and improved environmental quality.

2) Cypriot cultural heritage and natural assets are a well-recognized patrimony, a primary source of pride, and reflects an opportunity for the island's population to develop and share respect for millennia of multi-cultural history. Cypriot cultural and natural assets, if managed sustainably, could provide a significant opportunity to improve the competitiveness of the TC economy and increase the economic well being of both communities, generate jobs and foreign exchange, and increase opportunities for cross-cultural exchanges and community partnerships.

d) The fourth activity, currently in the design phase will focus on vocational and technical education.

B. USAID Support for Environment and Biodiversity—Past and Present:

USAID's program in Cyprus since 1998 was implemented by UNDP, first with a three year, US \$30 million grant, which in 2001 was extended through December 2004, with an increase in funding amounting to a LOP level of US \$60 million. The grant to UNDP funded bicomunal initiatives that benefited both communities, covering activities such as public infrastructure, environmental management, public and animal health, agriculture, urban renewal, historic preservation, NGO development, economic development and information education and communication. Approximately US \$3.9 million was expended on environmental activities, covering forestry, recycling, environmental pollution, clean-ups, animal protection and conservation, surveys and studies, and environmental education and awareness. Detailed descriptions of several of the activities are found in Annex B.

SECTION V

THREATS, ACTIONS, AND RECOMMENDATIONS FOR BIODIVERSITY CONSERVATION

This section provides the threats to biodiversity identified during the November 2005 Biodiversity Analysis and the actions needed to conserve biodiversity. It provides background and detail on each threat and actions needed – these findings are also summarized in Table 5.2 on page 63.

A. Direct Threats to Biodiversity and Actions Needed

1. Inappropriate/Uncontrolled/Unsustainable Development: Inappropriate Land Use; Habitat Degradation and Destruction; and Water Quantity and Quality Issues

Background

One of the main threats to biodiversity is the uncontrolled development currently taking place in Cyprus, both in the GCC and the TCC. Hotels, luxury apartment complexes, casinos, villas and golf courses are being built in natural areas, destroying and/or altering important habitats such as along the coast in the TCC near Bafra and along the northern-eastern edge of the Akamas peninsula. The urbanization trend is adding to this problem, as cities are continuously expanding into previously undeveloped lands.

Tourism and residential developments, in both the GCC and TCC, have largely taken place without controls, proper planning, consideration of carry capacity and infrastructure needs, and local community input. The permissive planning processes have had disastrous consequences, resulting in massive urbanization and tourism development in environmentally and culturally important areas. A deeply ingrained belief that all land should be developed with a view to maximize the number of tourists visiting the island leads to a conflict between short-term profit expectations and long-term sustainable development imperatives. This conflict is exacerbated by the limited environmental awareness on the island (*See Direct Threat #2*).

Table 5.1. Tourist arrivals in the GCC

Year	Tourist Arrivals in the GCC
1981	423,563
1990	1.56 million
1995	2.1 million
2000	2.7 million
2005	3 million

Source: Constantinides, 2002; UNEP/CI; 2005 are estimates from personal communications.

The GCC receives about three million tourists each year. Table 5.1 illustrates the explosive growth in tourism from 1981 to 2005. New infrastructure to support this increased demand has made its mark along the southern coast (except for the Akamas peninsula). The number of available beds in the GCC in 1980 was 12,524. By 2001, this had increased to 88,302, roughly a 20 percent increase per year. Ninety-five percent of the accommodations in the GCC are in the coastal zone.

A common practice, now banned, was the mining of sand and gravel from beaches for use in the construction boom. The mining resulted in the acceleration of erosion and deterioration of beaches. Compounding the problem, sediment from rivers no longer reached the coast due to the numerous dams. The combination of beach mining and decreased rate of sediment deposition resulted in the loss of as much as 60 to 100 meters of beachfront in certain areas over a 20 year period (personal communication). The demand for raw materials in both the GCC and TCC is now met by numerous quarries (See *Indirect Threat #7*).

The southern coastal cities have grown at an annual rate of 2.7 percent. The growth trend and its widespread effects are described in a 1996 report (Constantinides, 2002):

“The most important characteristics of land use change arising from haphazard urban expansion are the shrinking of agricultural land in favour of residential land; fragmented settlements and isolated buildings, uncontrolled growth often coupled with insufficient services; and a spatial pattern of land use in the fringe areas that is heterogeneous and unstable. Parallel to rapid residential growth, the fringe areas have witnessed an influx of other urban uses such as industrial, commercial and institutional. All these have a very negative impact on the physical and human environment caused by industrial wastes, increased levels of traffic congestion, air and noise pollution, lack of open space, lack of adequate facilities and infrastructure, loss of agricultural land and visual deterioration.”

The following figures for population growth in the period 1982-2001 clearly illustrate a trend towards coastalization, the tendency for growth to concentrate in the coastal zone (Constantinides, 2002):

“35 percent total population growth in the GCC is broken down as follows: 46 percent total urban population growth (55 percent coastal urban growth; 35 percent inland urban growth); and 15 percent total rural population growth (45 percent coastal rural growth; 8 percent inland rural growth) “.

Net immigration (returning Greek and Turkish Cypriots, expatriates—mostly retirees, and Turkish settlers), as well as the growth trend in Cypriot migration from rural areas to urban, has placed an enormous strain on coastal resources. Rural areas are experiencing significant population declines. Younger people are moving to towns in search of better employment opportunities and a modern lifestyle, towns, and villages are perceived as places for older people (See *Direct Threat #4*).

Following the failed referendum of the Annan Plan in 2004, a surge of building is sweeping across the TCC. The “new road” along the north coast from Kyrenia to Kapilca has resulted in peripheral developments, primarily vacation villas for foreigners with little or no municipal services. Water will most likely be purchased from tankers and treatment of wastewater will rely on septic tanks. However, water use is much more significant in the agriculture sector than in tourism and for residences (See *Indirect Threats #4 & 5*).

A study by the Near East University determined the tourism carrying capacity of the TCC to be 35,000. A massive casino/hotel development (illegal according to the TCC “Town Planning Department”) by Turkish developers on the coast outside of Bafra (Vokolida) alone could surpass 21,000 beds. Currently, concessions being developed at this site have a capacity of approximately 2,500 beds. Construction began prior to finalizing the land planning ordinance, which in draft, designated protection for a large portion of sand dunes and a 100 meter buffer

strip surrounding the salt marsh. Construction is taking place on the vital sand dunes and has resulted in the loss of the salt marsh. Again, no municipal services currently exist for this area.

Another concession of 7,000 beds is under construction in northwestern TCC. In the Karpaz peninsula, even though only very small areas are designated for development according to the “Karpaz Decree”, the calculations used by the planners allow up to 20,000 beds to be constructed across four designated zones (reportedly this is a mistaken calculation, nonetheless this number may guide development concessions in the area).

With this development surge, there is a concomitant need for treatment of wastes and wastewater; however, most of the new developments have failed to plan adequately. The TCC is in dire need of new waste treatment facilities and extensions to existing facilities. Existing wastewater infrastructures in northern Nicosia and in Kyrenia need to be repaired (*See Indirect Threat #5*).

Impacts

Many coastal habitats, such as dune systems and coastal marshes, have been compromised or destroyed placing additional pressure on native flora and fauna. Construction above sea cases (requiring drilling of foundation stabilizers into the caves due to unstable substrate) as witnessed by the team near Paphos, may impact the few remaining Mediterranean monk seals. Additional lights (from buildings and roads) near to or along sea turtle nesting beaches negatively affects nesting turtles as well as hatchlings.

Actions needed

In order to support the lucrative tourist industry, while ensuring adequate nature protection Cyprus should broadly implement ICZM strategies. This will help ensure a balance between industries (i.e. tourism, aquaculture, agriculture) and nature protection. High priority areas for biodiversity conservation, such as Akamas and Karpaz, need quick protection/successes through implementation of pilot projects that show income can be generated through conservation and sustainable use.

Actions for USAID/Cyprus may include:

- *Promotion of local, regional and national ICZM strategies;*
- *Promote public-private partnerships in support of biodiversity conservation to fill funding gaps;*
- *Identification of carrying capacity for tourism; and, participation in the direction development should take;*
- *Development of a strategy, with buy-in from government, civil society, including NGOs, developers, professional societies, on the direction development on the island should take;*
- *Promote clear, transparent zoning for protected areas, development, and types of development;*
- *Educating/raising awareness of high level officials (Members of Parliament) and environmental decision makers about the trade-offs of mass development and benefits of environmental conservation and sustainable development to help inculcate a tradition of conservation versus resource mining at high levels of government;*
- *Explore income generation opportunities from sustainable tourism, especially agro-tourism, eco-tourism, and cultural tourism, with the aim of developing a range of destinations and activities rather than a “one-off” tourism experience. (A tourism strategy should include: identified carrying capacity, communities/local people in the preparation of*

tourism strategies; a strong link to markets; local products, including organics; certification schemes for tourism and organics based on market demand).

Noteworthy findings pertaining to disputed lands: *The development of Greek Cypriot lands in the TCC is a highly political issue, and from the team's interviews in the TCC some critical findings emerged. For example, the development outside of Bafra is taking place on previously protected low forest land, opened up for development under the "New Law." As explained to the team, this action was taken to enable development of "state" lands, thereby deterring construction on traditional Greek Cypriot lands. It was also explained to the team that the majority of the areas currently under development pressure were lands that under the Annan Plan would have remained in the TCC. One last note: The two recent ordinances from the TCC "Town Planning Department," developed in the last year, have designated a large portion of lands that would have been returned to the GCC under the Annan Plan as protected from development. Incidentally these ordinances closely match two areas proposed by the GCC as Natura 2000 sites.*

2. Uninformed Public: Unaware of the Need and Opportunities for and Benefits of Conservation

Background

The 1991 UNDP report, "Environmental Programming for Action in Cyprus," identifies a social factor in the environmental problems facing Cyprus: *"In general, the level of public awareness of environmental issues in Cyprus is still inadequate to serve as a basis for widespread environmental action. This applies both to the public at large and the public and private sector. Too often, the interrelationship between socio-economic development and its long-term impact on the environment and the quality of life is ignored."*

Unfortunately, while the importance of nature conservation has been increasingly recognized since that report was prepared, many people believe that nature can be protected in small, isolated patches. Actions outside these isolated protected areas are often not considered to impact the protected areas. The concept of sustainable development has not been widely accepted or practiced. Cyprus is a microcosm, embodying the mistakes of so many other nations—building a society that values growth and consumption. However, on this small, fragile island, limited by water availability, this "growth at all costs" focus is especially threatening to biodiversity and natural resources conservation. Sustainable development, rather than quick profits, should be the over-riding factor in decisions on land use if Cyprus is to retain its natural and cultural heritage and character.

In discussions the Biodiversity Assessment Team had with government authorities and NGOs, limited public awareness of environmental conservation (as well as environment issues in general) was cited as a threat to biodiversity. The public is unaware of the benefits, economic and lifestyle, of environmental conservation; civil servants are ill-prepared to deal with the increased realm of environmental regulations; many NGOs are unaware of or unable to implement effective measures for bringing pressure to bear on government and the private sector to advocate for environmentally sound development and minimization of environmental effects; and tourists and new residents are unaware of the impacts of their actions.

With respect to protected areas in the GCC, the Biodiversity Team was repeatedly told that most people do not understand the Natura 2000 network or potential benefits of living in or around a Natura 2000 site (i.e. increased niche tourism, etc). This is largely a result of

government failure to inform and include local populations in the Natura 2000 planning and decision making process.

Probably the most environmentally conscious people in Cyprus are those living in rural areas, with long traditions of living on the land. Rural people who live near areas of high biodiversity have a tremendous amount of knowledge about those areas and recent studies indicate their desire to have input into decisions made about how to manage and protect these areas. While rural people may sometimes oppose conservation measures, it is likely a reaction to being excluded from decision making processes and because they fear that their lives will be negatively affected, rather than an “anti-conservation” ethic.

Rather than raising awareness of rural people, most of those interviewed stated that authorities, developers, politicians, including Members of Parliament, new residents, and tourists need to be educated about their actions and how they affect biodiversity. In addition, authorities need to understand the importance of including local communities in decisions on environmental conservation.

An example of how fundamental concepts of conservation are misunderstood is illustrated by a proposed plan to develop ecotourism activities at a wetland site in the TCC. The joint proposal by a municipality and a university called for developing “entertainment facilities” (i.e., for concert facilities) around the site—a basic misconception of what attracts ecotourists. NGOs blocked the funding of this project.

Actions needed

Authorities must include local communities and other stakeholders in environmental decision making processes to help encourage wise land stewardship. A public awareness campaign, possibly using the “Green Media Campaign” model – targeting and promoting communication and cooperation among reporters, editors, and other environmental professionals may be a powerful tool to raise the Cypriot environmental conscious. The goal of this type of campaign is to use the media to forge relationships and facilitate a focused consistent effort to educate the public on environmental issues. As past efforts have shown, in Cyprus and around the world, environment issues can be used successfully as a catalyst to bring people together (in the case of Cyprus, to improve bicomunal relations). Raising awareness of all stakeholders (discussed above) is crucial for long term conservation and biodiversity protection.

Actions for USAID/Cyprus may include:

- *Encourage a bicomunal Green Media Campaign;*
- *Promote “branding” of Cyprus’ environmental, cultural, and agricultural heritage that can be used in awareness campaigns.*

3. Inadequate Protected Areas management

One conservation strategy to offset habitat loss due to development is to establish areas of protection (e.g. parks and protected areas). The only effective management of protected areas currently in Cyprus is the National Forest Parks, implemented by the forestry authorities. Additional vital habitats for conservation have been identified and proclaimed under the EU Natura 2000 network, their management has yet to be realized. Management plans have not been developed for the majority of these sites and currently there is limited administrative structure for implementation and enforcement of the plans once they are developed. To compound the problem, there is limited understanding of the Natura 2000 protected areas concept within effected communities.

Actions needed

Protected areas on Cyprus would benefit from the creation and effective implementation of management plans for proposed Natura 2000 sites. Additionally, the creation of National Parks on Akamas and Karpaz Peninsulas would ensure preservation of some of the most intact and landscapes and critical habitats on Cyprus.

Actions for USAID/Cyprus may include:

- *Promote establishment/management of protected areas on Akamas and Karpaz Peninsulas, including implementation of pilot projects that show income can be generated through conservation and sustainable use;*
- *Supporting the development and implementation of management plans for the Natura 2000 network and other protected or proposed areas;*
- *Promote clear, transparent zoning for protected areas;*
- *Explore/support innovative measures to support conservation, such as Land Trusts and Conservation Easements.*
- *Assess local needs, perspectives on land use options and social attitudes towards proposed protected areas.*

4. Inefficient Legal/Regulatory Framework: the GCC's Framework is Strong on Paper, but Implementation is Limited; the TCC's Framework is Weak, with Gaps and Inconsistencies.

The inefficient (GCC) and inadequate (TCC) legal framework is a direct threats to biodiversity as it is the underlying cause of the principle threats to biodiversity conservation. The overall results of this inadequate (in regard to existence and implementation) legal framework are:

- Policies are development-driven with low priority given to conservation;
- Potential economic benefits derived from environmental assets are not considered in decision making;
- Lack of a coordinating process to bring authorities together on key topics (such as carrying capacity assessment, resource valuation and strategic environmental assessment);
- Lack of harmonization between development and conservation;
- Vulnerability of the planning system to local interests and the lack of a common national / local level vision (or language);
- Over-protected land development rights and compensation for development restrictions; and,
- Fragmentation of responsibilities and lack of policy coordination mechanisms.

GCC

The GCC framework is in line with all EU laws and regulations, but harmonization is largely on paper only. Many of the laws and regulations are not currently being implemented due to limited human and financial resources and an overwhelming amount of regulatory requirements. Nearly 300 laws have been adopted, each with their own implementation and reporting requirements. The lack of implementation and enforcement of policy and legislation is a serious hindrance to effective biodiversity and environmental protection.

Cyprus (GCC) ratified the Convention on Biological Diversity. However, it has yet to produce a Biodiversity Strategy, as required by the Convention.

TCC

Environmental protection in the TCC is hindered by the lack of international recognition. This significantly limits the extent and type of international assistance the TCC can obtain to strengthen environmental policies and practices. The TCC has no means of officially designating sites under international environmental conventions; therefore there are no officially recognized wetlands or protected areas such as Natura 2000 sites (although the GCC has designated sites that are located in the TCC).

Existing environmental laws and policies are largely ineffective, as they are outdated and inadequately enforced. Policies of different departments are not harmonized and significant gaps exist. For example, the time required for comment on an EIA (Department of Environmental Protection) is longer than the required maximum wait for a planning permit (Town Planning Department).

Actions needed

Implementation and enforcement of established mandates and laws, strengthened capacity of responsible departments (technical capacity and other resources) for implementation and enforcement of regulations, especially EIA (help ensure ecological conditions are taken into account in decisions rather than being economically-driven). Development of a National Biodiversity Strategy as required by the CBD.

Actions for USAID/Cyprus may include:

- *Strengthening capacity of responsible departments;*
- *Promote harmonization between development and conservation;*
- *Provide models for transparent environmental decision making, especially in EIA and zoning/planning.*
- *Assist in the development of a National Biodiversity Strategy.*

5. Abandonment of Low-Intensity Farmland: Changes in Agricultural Practices from Low-Intensity to i) Abandonment or to ii) High Intensity Farming

Background

Intensification and abandonment have been occurring for 30-40 years and are not new phenomena. In the north, agriculture is less intensive but intensifying; and abandonment is occurring (Morphou and Kyrenia), but not at as quickly in the north as in the south.

Low-intensity farmed land is found on the Laona plateau (bordering the Akamas Peninsula), the Limassol Hills, and the Kyrenia coastal plain and throughout rural communities. Because agricultural products imported into Cyprus are less expensive than crops grown on the island, these areas are being abandoned. The result has been (subsidized) uprooting of vineyards and abandonment of plots.

Across the EU, the Common Agriculture Policy¹⁰ (CAP) has been the main catalyst of intensification and abandonment because of the protected market and price support mechanisms it created. As in the rest of the EU, the CAP is expected to drive intensification and increase abandonment in Cyprus, and as Cyprus comes under the influence of the CAP, intensification and abandonment become more significant threats. While small-scale farmers are already feeling the effects of competition from farmers in other EU countries, there could be additional pressure to abandon their land since they will be unable to compete with high intensity farms on Cyprus.

Hellicar (2004) found that farmland provided rich bird habitat with healthy populations of many species. Approximately 39 percent of the species found on Cyprus' farm land are classified as threatened on a pan-European scale. Twenty-two percent of species classified as threatened or declining on a European scale were common on at least one of the farmland habitats surveyed by Hellicar. Fifteen of these are breeders and five are high priority (SPEC 2¹¹) conservation species. Hellicar found that "Cyprus farmland remains in a relatively bird friendly state, at least compared to its western European counterpart." More intensively farmed land is poorer as far as species richness and abundance, especially in cereal and olive plots. The study further found that non-intensively managed farmland is better bird habitat than abandoned farmland and hosts more threatened species than abandoned farmland or scrub. Hellicar discusses other studies that support his findings: farmland held more bird species than other semi-natural or natural habitats. Birds are environmental indicators, and these habitats would be expected to provide good habitat for mammals, reptiles, insects, and other wildlife.

Impact

i) Abandonment: On more marginal land, the trend is expected to be toward abandonment. Hellicar cites studies that show that abandonment of low intensity farmed land is the main cause of declines in bird diversity in the Mediterranean. In the Mediterranean, abandoned land turns to scrub, and later to open forest. Although considered natural vegetation, these habitat types do not provide as good a habitat for fauna, particularly avian fauna, as low intensity farmed land. They are simpler in structure than the farmed areas, and while shrubby abandoned land may be rich in seeds, the food source is not as accessible to birds as it is in more open farmed habitats. Most Mediterranean birds prefer more open habitat.

ii) Intensification: Intensification would be expected to take place on the more productive land. With intensification, fields are enlarged and non-crop features removed. Farms are mechanized, pesticides and fertilizers are increased, decreasing invertebrate populations and seed crops, crop rotation and fallows are abandoned, and rather than diverse cropping systems, more simplified cropping systems are created. The patchwork, where edge habitat is common, disappears. Hellicar states that the effects of intensification come mainly from the reduction in available insects, plant food, and habitat simplification.

10 The set of policy principles, regulations and subsidy mechanisms adopted by the Member States of the European Community that consolidates efforts in promoting or ensuring reasonable pricing of food products, fair standards of living for farmers, stable agricultural markets, increased farm productivity and methods for dealing with food supply or surplus.

11 **SPEC 2** species are those which have an unfavorable conservation status in Europe (if the population is threatened, declining, depleted from historical levels or is found only in a few locations) and are concentrated in Europe (*i.e.* more than 50% of the global population occurs in Europe).

The Biodiversity Assessment Team witnessed several vineyards that had been uprooted as a result of government subsidies in line with CAP. In addition, several villages in the Paphos Forest region were in obvious decline. Homes have been abandoned or have become dilapidated, and populations were overwhelmingly older and young people are moving to urban areas where opportunities are greater.

Actions needed

Incentives are needed for farmers to retain agricultural lands. In areas of intensification, farmers should be encouraged to maintain some areas of non-crop features to provide habitat as well as buffer strips and riparian zones.

Actions for USAID/Cyprus may include:

- *Incentives for farmers to retain agricultural land and to maintain working farms, such as:*
 - *promotion of agro-tourism and cultural tourism*
 - *other income generation opportunities in rural areas, including tourism support enterprises, as well as non-tourism related enterprises.*

6. Solid Waste: Floating Debris and Construction Waste

Due to Mediterranean currents, the northeastern shores of Cyprus receive large amounts of “floating trash” deposition originating from other countries. Analysis of collected waste by the Green Action Group identified waste from five other countries including Egypt, Turkey, and Syria. Of particular concern to biodiversity are items such as plastic sheeting and plastic bags. Consumption of floating plastics (and subsequent starvation) is one of the leading causes of adult sea turtle mortality (after bi-catch).

The other solid waste issue with cause for concern for its impact on biodiversity is illegal dumping of construction waste (concrete). The massive amount of construction in the TCC has resulted in illegal dumping of excess cement, as shown in the picture below, throughout the countryside rendering the land where the dumping occurs useless.



Actions needed

International efforts are needed to reduce the amount of dumping into the Mediterranean. TCC authorities need to aggressively address the practice of illegal dumping with stiff penalties, rewards for reporting dumping, and incentives for proper disposal.

Actions for USAID/Cyprus may include:

- *Encouraging coastal cleanups;*

- *Fostering rule of law (regionally) regarding dumping of wastes into the Mediterranean and (nationally) illegal dumping of construction waste.*

7. Unsustainable and Illegal Hunting Practices

Species legally hunted in Cyprus include hare, partridge, duck, geese, thrushes and francolins. The island has an enormous number of hunters, roughly 50,000 in the GCC and 30,000 in the TCC. Game reserves help maintain populations of these animals. Hunting seasons, areas, and limits for certain species are controlled. Unfortunately, mistakenly and purposefully, rare and threatened species, including endangered birds of prey are reportedly shot.

Despite strict hunting laws in the GCC, the Game Fund is still concerned about illegal killing of birds. Using illegal mist nets, which catch flocks of songbirds, and lime sticks, also used for collection of songbirds, poachers earn up to US \$1 for a single songbird; a meal consists of many birds, in restaurants, costing nearly US \$4 each. Songbirds are considered a delicacy on Cyprus.

Between 1996 and 2000, the Game Fund (GCC) reported 1,070 cases of poaching, including illegal trapping. In 2000 alone, 241 cases of poaching were prosecuted in Court. While enforcement efforts in recent years have resulted in fewer cases of poaching and other illegal practices, illegal activities still persist. Illegal practices, such as use of mist nets and lime sticks, are also prevalent in the TCC.

Actions needed

Continued enforcement of hunting laws and prosecution of poachers is needed to curb the illegal practice.

Actions for USAID/Cyprus may include:

- *Facilitating improved enforcement of hunting laws, including poachers using illegal trapping methods;*
- *Raising awareness on unsustainable hunting, its effects on wildlife; and*
- *Encouraging more stringent penalties (increased fines/prison sentences) for illegal activities.*

8. Forest Fires

While a natural and integral part of Mediterranean ecosystems, natural fire regimes on Cyprus are suppressed and fuel loads managed by collection. Forest damage caused by wildfire is considered one of the most important threats to the survival of forests and their flora and fauna in both the GCC and the TCC, particularly as development has decreased the distribution of many species. Cyprus' climate provides ideal conditions for forest fire development and rapid spread. The intense heat, low rainfall, low humidity and strong winds, which are common throughout the island during the summer period (May through October), have led to intense and large-scale forest fires throughout the island's history.



Prevention and management of fire is therefore a priority in forest management. An extensive network of firebreaks exists throughout the island (see picture above) and all efforts are made to extinguish fires rapidly. Fuel loads are managed through strict, permitted collection of dead wood by local communities.

The increased number of visitors for recreational purposes has increased the number of fires. Approximately 91 percent of forest fires in the GCC are of human origin (Public Information Office, 2004). Steps have been taken, in both the GCC and TCC, to prevent forest fires including the banning burning of agricultural fields and public awareness campaigns.

Actions needed

Continued public service announcements like those currently run in both the GCC and TCC to decrease the rate of human caused fires. Agreement should be brokered between the GCC and TCC authorities to enable fire brigades and air support to fight large fires.

Actions for USAID/Cyprus may include:

- *if conditions change and it becomes politically feasible - work to foster agreement to enable bicomunal efforts to fight forest fires.*

9. Invasive Species

Studies have identified sixteen of the 152 known adventive terrestrial plant species on Cyprus to be considered invasive. Of those only two, *Acacia saligna* and *Robinia pseudoacacia* pose considerable risk to the naturalize species and ecosystem. The spread of these species is due to the decline in fuel wood needs.

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, the *Caulerpa racemosa*, has spread very explosively, covering large areas of seabed around Cyprus, and is competing very successfully with local species, which it replaces. This species has now spread throughout the Mediterranean. It is likely to transform the East Mediterranean shallow water ecosystem, with far reaching effects on the native marine fauna and flora. The global scientific community is researching ways to combat this threat.

Actions needed

Authorities should ban the use of all species deemed to be invasives and explore means for their control.

Actions for USAID/Cyprus may include:

- *Alternative uses or means for control should be explored and encouraged for *Acacia saligna* and *Robinia pseudoacacia*.*
- *Encourage participation of GCC and TCC scientists at international symposiums and conferences for the control of *Caulerpa racemosa* and other marine invasives.*

10. Grazing

As far back as 1946, a conference on Land Use Problems in Cyprus highlighted the necessity of eliminating free range grazing, particularly by goats. Today, grazing is prohibited in forest areas except in Akamas. This grazing ban is considered essential for restoring and maintaining forest cover. Grazing is considered a minor cause of deforestation (Cyprus Johannesburg Report, 2002). The National Report to the Fifth Session of the United Nations Forum on Forests (Cyprus, January 2005) states that today the two main factors resulting in deforestation and

forest degradation are drought and successive forest fires. When these factors are followed by grazing, they have tremendous consequences on the ecosystem.

In the Karpas Peninsula, the threat is from feral donkeys and pigs. Recent studies have attempted to establish a baseline from which to make population management decisions. Actions for USAID/Cyprus to consider may include studies to determine the carrying capacity for grazing in critical areas such as the Akamas and Karpas Peninsula.

The Biodiversity Assessment Team witnessed several herds of goats grazing in the Akamas peninsula and noted that they had stripped trees of bark and denuded vegetation from many plots. Government subsidies in recent years have greatly increased the size of goat herds. This is an emerging issue for Akamas, one of the GCC's most important areas for biodiversity.

Actions needed

Authorities must determine the carrying capacity of Akamas and Karpaz peninsulas for grazing and enforcement of findings as well as encouraging rotation of grazing lands where feasible.

Actions for USAID/Cyprus may include:

- *studies to determine the carrying capacity for grazing in critical areas such as the Akamas and Karpas Peninsula.*

B. Indirect Threats to Biodiversity and Actions Needed

1. Inefficient / Inadequate Institutional Framework (TCC and GCC authorities are not as effective as they should be; GCC: strength and skills of NGOs are not being harnessed to produce maximum effect; TCC: NGOs are weak or non-existent, and have limited opportunity for participation)

GCC

There is a significant overlap of responsibilities of Government authorities as pertains to biodiversity, natural resources, and the environment. Staffing is a major constraint—the Environment Service, which has the greatest responsibility for biodiversity protection, has a staff of 20 people responsible for over 200 laws and regulations. In some cases, under the existing government structure and with limited coordination among departments, as many as three management plans will be prepared for one protected area. This duplication, or triplication, of efforts, wastes limited resources and results in ineffective protection.

Government officials lack incentives to advocate and actively protect environmental assets, and as frequently found in large government bureaucracies, efforts are spent supporting the bureaucracy rather than moving conservation initiatives forward.

A range of scientific data is available to support environmental decision making, however it exists in a variety of locations, and may be unavailable to environmental professionals outside of government.

TCC

There are gaps, inconsistencies, and overlaps in the responsibilities of authorities. As an example, the process of designating and protecting areas is the responsibility of different departments, who often fail to coordinate. Depending on the type of land or subject; the “department of environmental protection”, the “department of forestry”, the “department of town planning”, or the “high committee of monuments” may have the responsibility to declare an area protected. As related to tourism development, the “town planning department” has no role in permitting; tourism units above 20 bed capacities are approved by the “department of tourism planning,” and smaller units are approved by municipalities. This can have devastating effects on coastal resources as departments may take unilateral actions without consultation.

Limited technical capacity and financial resources pose significant limits to implementation of regulations. For example, environmental concerns are often not considered in EIAs, and those reviewing EIAs may not be fluent in environmental fields. Therefore, decisions may be made on development projects which favor quick economic returns over sustainable development, enforcing the false concept that there is a conflict between environmental protection and development.

Existing scientific data are weaker in the TCC than the GCC, but as in the GCC, there is no centralized location, and limited public availability.

Civil Society

In general, the environmental civil society movement in Cyprus is fragmented and has low impact. NGOs often fail to communicate, coordinate, and share information, resulting in duplicated efforts and weak advocacy. While the GCC and TCC share some of the same issues regarding NGO capacity and status, TCC NGOs face an additional constraint—there are limited avenues for participation, and they are often not included in decision making processes.

When local communities become involved in environmental conservation, it is often because of conflicts over protection measures, usually because of fear that conservation actions will threaten short-term profits and their prospects for development. This, in turn, paralyzes authorities, which may delay or indefinitely postpone much-needed conservation and sustainable development measures in order to avoid public backlash. Rather than acting as wise stewards with a stake in environmental sustainability, local communities may be threatened by conservation initiatives, largely because they have limited or no opportunity to be involved in the design of the initiatives. Some of the authorities have yet to be convinced that the most effective route to achieve sustainable development and conservation is to implement broad participatory measures. An exception is the Forestry Department, as described in Section III-C.

The EIA process can be a model of good governance, when it is transparent and participatory. However, in the GCC and TCC, civil society input into the EIA process has been limited.

A weak institutional framework is an indirect threat and a root cause of the fragmented and limited biodiversity conservation on Cyprus.

Actions needed

Authorities must strive for good governance and transparent environmental decision making that incorporates public participation. Additionally understaffed departments should be strengthened to ensure they can meet their mandated responsibilities. Authorities need to improve coordination among environmental and other agencies and build enforcement capacity.

Environmental NGOs must be strengthened and functional networks created (strength in numbers, minimize overlap, harness power of each NGO to strengthen the “environmental voice”).

A unified GIS system and collective knowledge management “Conservation Data Center” where environmental data could be collected and available to the public should be promoted. Unified GIS system would support an improved and transparent planning process and EIA process. ENVIS should be expanded to other GCC/TCC authorities and beyond current water database to include other environmental thematic layers such as Natura 2000, CORINE, species data, forests, etc. The system should also be made public accessible via a web-based system (vital for GCC EU. compliance).

Actions for USAID/Cyprus may include:

- *Promoting good governance and transparent environmental decision making;*
- *Institutional strengthening for NGOs;*
- *Strengthening environmental capacity of government staff including enforcement;*
- *Improved coordination among environmental and other agencies;*
- *Strengthening of environmental NGOs; and facilitation of information exchange.*
- *Promote the expansion of ENVIS to other GCC/TCC authorities and beyond current water database to include other environmental thematic layers such as Natura 2000, CORINE, species data, forests, etc. Promote a publicly accessible web-based system (vital for GCC EU. compliance).*

2. Saltwater Intrusion / Increased Soil Salinity

Saltwater intrusion into Cyprus's aquifers is a pressing problem. The main cause is over-pumping of groundwater to meet consumption demands and for irrigation. Overtime as agricultural lands are irrigated with ever increasing levels of salinity, the soil will become an inhospitable environment for native species from invertebrates to flora. This sequence of events ultimately may result in further desertification of Cyprus.

Actions needed

Authorities must regulate personal well usage and encourage alternative water sources, such as cisterns.

Actions for USAID/Cyprus may include:

- *Promoting good governance and regulation of personal well usage;*
- *Encourage aquifer recharge by wastewater treatment plants;*
- *Encourage alternatives to current crops with high water demands (i.e. bananas and citrus) for crops that are less water intensive.*

3. Climate Change

Climate change is of concern in Cyprus. Certain tree species in Troodos and species that have developed with them 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°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 drought. With the decrease in precipitation (and increase in water demand) aquifer recharge has decreased, raising concern for increased saltwater intrusion to already stressed aquifers. .

The current discussion of climate change in the context of Small Island Developing States (SIDS) generally focuses on the SIDS of the tropics. The primary impact to date of climate change on Cyprus has been the reduced availability of adequate water supply as a result of a decrease in mean summer precipitation over the Mediterranean Sea region. The implications for Cyprus include increasing the rainwater harvesting and decreasing losses.

There are no actions or recommendations for this threat.

4. Overexploitation and Contamination of Surface and Ground Water

The BDP environmental overview found that water resources continue to be scarce, and past policy decisions as well as several years of drought have compounded the problem, although new policies are now in place. For example, dam construction has actually encouraged an increase in water use, and reduced sedimentation downstream in the GCC. Generous water supply prices to agriculture have encouraged over-use of this resource. Although farm water distribution systems are now efficient, in this severely water limited region, farmers should be converting to crops that require less water. However, this meets with cultural and social obstacles because many farmers have had citrus plantations in their families for several generations and refuse to change to less water-demanding crops. Some farmers are turning to new crops such as bananas, which are financially rewarding but require massive water consumption. However, agriculture is still the sector that uses the greatest percent of water in Cyprus.

Water contamination is primarily from industrial mining activities and urban effluents, in the Bay of Limassol, the Bay of Liopetri and Ayia Napa, and the Bay of Vassilikos. (EEA, 2005)
In more detail:

- Bay of Limassol: Urban and untreated industrial effluents. The construction of the Limassol harbour resulted in beach erosion and the rectification measures (breakwaters perpendicular to the coastline) resulted in serious degradation of the water quality.
- Bay of Liopetri and Ayia Napa: Nitrogen leaching from the intense agricultural area because of overfertilisation (150 tonnes of nitrogen per year).
- Bay of Vassilikos: Mining activity (ferrous pyrite ore) resulted in copper, iron and zinc contamination of the marine environment. Inert material from the industrial activity blanketed the bay's sediments destroying the benthic community of the area.

All aquifers in Cyprus, including those of marginal quality and capacity, are used, and most are over-pumped, resulting in seawater intrusion salinization of coastal aquifers. The construction of dams has also interrupted the water flow to coastal aquifers, preventing them from flushing as frequently as before, leading to groundwater contamination. The trend towards agricultural intensification translates into an increase in the use of fertilizers and pesticides, and consequent contamination of groundwater resources.

Similarly, in the TCC, overuse of water resources has resulted in saltwater contamination in the Morphou and Famagusta aquifers. Aquifers are also contaminated by effluent from septic tank systems. Water supply in the TCC is irregular and unsafe: water quality is barely monitored. The TCC water department staff are lacking in resources (both human resources and equipment).¹²

In the TCC, Kaymakamlıks ("District Officers") issue permits for digging private wells. In some cases these private wells are being used for personal gain through sale to tankers for distribution to the growing tourism/villa industry (accelerating the salinization of aquifers). There is no oversight of this practice and it continues, unregulated.

Current water demands from the tourism sector is approximately 18 percent, by 2020 it is expected to rise to 30 percent. Water resources are scarce and, in the absence of the implementation of appropriate policies, growth and tourism will eventually be limited. However, the current poor water balance is a significant concern for biodiversity conservation. Where there are so many conflicting demands on water resources, wetlands, riverine habitat, and other areas that are rich sources of biodiversity show consistent and marked decrease in annual water levels.

Actions needed

It is crucial that water conservation measures and development take into account the limited water availability, including projections for future water need and uses. Private well usage in the TCC must be regulated with usage meters including the establishment of daily limits. Alternative sources for water supply should be explored such as the development of catch basins and personal cisterns. In the agriculture sector, organic farming should be promoted as well as

¹² However, the Water Resource Databases Project set up with help from USAID in 2000 was able to lead to joint training and technical exchanges between communities, and the upgrading and computerization of TC water monitoring systems.

conversion to crop stocks requiring less chemical inputs, and training and oversight for pesticide usage and proper application.

Actions for USAID/Cyprus may include:

- *Promote installation of meters, daily limits, and excess water usage fee for private wells.*
- *Promote use of cisterns in the TCC. Identify alternative to citrus production (high H2O demand).*
- *Promote a unified campaign for linen use (hotels/tourist) –“Green Destination” programs. Targeting hotel managers and cleaning staff. Successful implementation will decrease water use and phosphate pollution.*
- *Promote organic farming (under agro-tourism and enterprise development umbrella).*

5. Insufficient Wastewater Infrastructure

In most areas currently being developed there is no existing municipal systems for collection and treatment of wastewater. Some larger developments have onsite primary and secondary contained treatment, most new developments will rely on septic systems. Most villages in the TCC rely solely on septic systems and effluent from these sources has been found to be polluting aquifers. Reportedly, the wastewater treatment facility in Kyrenia, a major tourism destination in the TCC is not functioning. In the summer months, the Team was told that tourists leave to escape the smell. Broken sewer mains in North Nicosia are also causing contamination of ground water.

Actions needed

Targeted actions needed include repair of WW treatment facility at Kyrenia and repair of leakages in north Nicosia’s sewage network. On a macro scale, there is pressing need in the TCC to expand existing networks as well as the creation of new networks for areas where none currently exist. New developments should be required by law to be tied in to existing networks or required to contribute to the creation of new infrastructure needed to provide WW services.

Actions for USAID/Cyprus may include:

- *Provide capacity building in priority sites in preparation for the EU/PFF implementation, i.e., operation and maintenance.*

6. Inadequate Solid Waste Disposal

Solid waste management is an island-wide issue. In the GCC only one landfill, located in the Paphos region is constructed to EU standards. In the TCC, the main landfill, located outside of Nicosia, has been in operation for 25 years, with no liners or leachate collection systems. To compound the problems, there is little to no separation of wastes (the Team learned that Turkey has recently given nearly one million USD to support the construction of a new properly designed section for municipal wastes). The island has no facility with the capacity to handle hazardous waste, and these substances are stored in inadequate facilities, illegally dumped, or mixed with municipal wastes and brought to the landfills.

EU regulations require that a percent of waste is separated and recycled. The GCC is not currently meeting this goal. In the TCC authorities issued a concession at the main landfill for a private firm to separate a small percentage of waste brought to the landfill. Unfortunately, the planned market for the separated, recyclable waste was Turkey which ultimately rescinded its offer to purchase the material.

Reportedly, there has been an increase in respiratory problems, particularly in children in the TCC population around Nicosia. One expert attributes this increase to air pollution produced from the landfill. While burning is not practiced, there are frequent explosions with subsequent burning (see pictures below) due to built up methane gas and other chemical interactions from improper landfilling. Leachate from the landfill is also polluting the aquifer that flows towards village water sources.



Additionally, slaughterhouse waste is disposed of in the North Nicosia landfill, resulting in an increase in the rat population, as the site is not covered on a daily basis. Furthermore, farm waste from pig, cattle, and chicken manure are not being properly handled or utilized resulting in increased pollution.

Actions needed

Targeted actions include improved solid waste management, incorporating separation, and recycling, especially at source, monitoring at landfill, and enforcement. Alternatives to landfilling organics such as biogas facilities, incineration of slaughterhouse waste at cement facilities, and municipal composting facilities. Revisiting/implementation of recommendations of the SWECO report.

Actions for USAID/Cyprus may include:

- *Facilitate partnerships between GCC firms and TCC firms for the collection, separation, and marketing of recyclables through the Green Line.*

7. Abandoned Mines and Poorly Sited Stone Quarries

In both the GCC and TCC there are numerous mines and quarries to supply raw materials for industry and construction. Leachate and surface drainage from contaminated mine tailings and slag piles is of concern in specific locals. Quarries in the GCC for the most part are out of site, in the TCC the 61 quarries currently in operation dispersed primarily along the Kyrenia range in plain view causing an esthetic problem. Furthermore, the locations of these quarries were not chosen based on an EIA, nor are best practices implemented at the majority of these sites.

With respect to biodiversity, steps were not taken to ensure protection of endangered species; several of the endemics, such as *Delphinim caseyi* in the TCC occur only in localized areas along the Kyrenia range.



Actions needed

Targeted actions include encouragement of mine reclamation and strengthening of oversight for quarry operations, enforcement of more environmentally friendly extraction techniques, such as terracing; requirement for use of EIA for siting, decommissioning, and reclamation.

Actions for USAID/Cyprus may include:

- *Foster cooperation and information exchange between GCC & TCC quarry owners.*

C. Actions Needed to Conserve Biodiversity and Protect the Environment: Recommendations

The table below is a consolidated matrix which presents the threats identified, actions necessary to address the threats and recommendations for USAID consideration. The Team has made every effort to present recommendations that fit within the Mission's existing SO 1 as well as current project SOWs that largely focus on the overarching US interest of fostering a peaceful resolution through bicomunal work. The Team has identified the project or other mechanisms, **denoted in red text**, for implementing each recommendation. See Annex H for further explanation of mechanisms and resources available to the Mission. The recommendations, while exhaustive, are based on the Teams findings and represent the ideal situation for measures the Mission could take to address the threats identified. These recommendations should not be interpreted as mandatory, but wherever possible within the Missions four projects, and if politically feasible, they should be duly considered. The Team acknowledges that it mostly is not feasible, monetarily or politically, at this time for all recommendations to be implemented.

Table 5.2. Consolidated Matrix of Threats, Actions, and Recommendations.

No	Direct Threats to Biodiversity	Actions Necessary to Address the Threat	Recommendations for USAID Consideration.
1	<p>Unsustainable, ad-hoc Development (TCC and GCC) inappropriate land use</p>	<ul style="list-style-type: none"> • Land Use Plans, transparent, vetted in public forum, consultation with relevant government agencies. • ICZM strategies • Biodiversity Strategy/Action Plan developed in participatory manner with government buy-in. • Educate/raise awareness of sustainable development; income generation opportunities from environmentally sound development, etc: MPs, public, developers, authorities. 	<ul style="list-style-type: none"> • Support preparation of Land Use Plans & ICZM strategies (pilot project). (SAVE) • Promote EIA as a method for participatory input into land use plans. (SAVE) • Catalyze/assist in preparation of a joint National Biodiversity Strategy. (currently in the GCC budget for 2006) (ACT for bicommunal element, with SAVE in TCC) • Expand ENVIS system to other GCC/TCC authorities and beyond current water database to include other environmental thematic layers such as Natura 2000, CORINE, species data, forests, etc. Promote a publicly accessible web-based system (vital for GCC EU compliance). (ACT and potential support through an IAA with USGS-EROS Data Center) • Promote a strategic vision, based on carrying capacity, (Master Tourism Plan/Tourism Strategy) for sustainable tourism development (rather than piecemeal development) by assisting in tourism planning and promoting transparency and community input. (SAVE)
	<p>over-reliance on mass tourism</p>	<ul style="list-style-type: none"> • Promote agro, cultural, and eco-tourism in broad consultation with government and civil society, and within an overall strategy. • Promote use of local products in tourism development (organics, handicrafts, local tour guides) to spread benefits beyond tourism. 	<ul style="list-style-type: none"> • Public awareness and agro, cultural, and eco-tourism campaign to attract tourists to the TCC. (SAVE with EDGE) • Incorporate local products into tourism destinations (organics, handicrafts, local tour guides). (SAVE with EDGE) • Raise awareness among tourism professionals, developers, NGOs, authorities about the benefits of sustainable tourism. (SAVE)
	<p>lack of bicommunal cooperation</p>	<ul style="list-style-type: none"> • Promote biodiversity conservation theme for 2007, 2008 (ACT). 	<ul style="list-style-type: none"> • Request bicommunal proposals in support of environmental protection and biodiversity conservation. Environment (in particular biodiversity) is a good rallying point for bicommunal efforts. Suggested areas for funding are listed below this table. (ACT)

No	Direct Threats to Biodiversity	Actions Necessary to Address the Threat	Recommendations for USAID Consideration.
2	<p>Limited Environmental Awareness</p>	<ul style="list-style-type: none"> Raise public awareness of environmental issues among public, property developers, tourists, new residents, government authorities and other environmental decision makers. 	<ul style="list-style-type: none"> Green Media Campaign – creation of an informal mechanism of communication and cooperation among reporters, editors, and other environmental professionals. The goal: forging lasting relationships and facilitating a focused consistent effort to educate the public via the media regarding environmental issues. (ACT) *The BCEG project in Bulgaria had great success with this model for more information contact Svetlana Aladjem at consult@ecologybg.com Environmental awareness campaigns, educational seminars, and conferences for a broad range of participants. (ACT) Promote “branding” of Cyprus’ environmental, cultural, and agricultural heritage that can be used in awareness campaigns. (SAVE and EDGE)
3	<p>Inadequate Protected Areas management (TCC and GCC)</p>	<ul style="list-style-type: none"> Strengthen protected area status and conservation. 	<ul style="list-style-type: none"> Assist in the preparation of Protected Area Management Plans for two priority areas for biodiversity conservation (Akamas and Karpaz). (Potential pilot project SAVE for TCC and ACT to build on bicommunal nature and potential support through an IAA with US Dept. of Interior) Implement select actions in Karpaz (possibly before finalization of MP) to show quick successes from conservation measures. (SAVE) Explore/support land trust/conservation easements to provide sustainable conservation effort with income generation potential. (SAVE) Assessment of local needs, land use and acceptance limits surrounding proposed SPAs. (SAVE) Raise awareness among tourism professionals, developers, NGOs, authorities about the benefits of PAs. (SAVE)

No	Direct Threats to Biodiversity	Actions necessary to address the threat	Recommendations for USAID consideration.
4	<p>Inefficient/Inadequate Legal Framework: limited implementation, including enforcement, of legal framework governing biodiversity and environmental protection (GCC), and gaps, inconsistencies, duplication in TCC framework.</p>	<ul style="list-style-type: none"> Strengthen capacity of responsible departments (technical capacity and other resources) for implementation and enforcement of regulations, especially EIA (help ensure ecological conditions are taken into account in decisions rather than being economically-driven). Central database, as described above. Provide models for transparent environmental decision making, especially in EIA and zoning/planning. 	<p>Bicommunal workshops to promote EIA lessons learned and share experiences. (ACT)</p> <p>Workshops and seminars on nature conservation for those preparing and reviewing EIAs, through support to the KKTOMB. (ACT)</p> <p>Ensure proper EIA preparation and implementation in all USAID-supported activities as a model with buy-in from TCC authorities and public.</p>
5	<p>Abandonment of Farmland/Intensification of farming in the GCC and TCC (currently less extensive in the TCC)</p>	<ul style="list-style-type: none"> Provide income generation opportunities (pilot/demo projects) that encourage retention of small, low intensification farms. 	<ul style="list-style-type: none"> Activities to promote organic farming in association with agro, eco, and cultural tourism, as above. (SAVE and EDGE)
6	<p>Solid Waste: Floating Debris and Construction Waste (TCC)</p>	<ul style="list-style-type: none"> International efforts are needed to reduce the amount of dumping into the Mediterranean. TCC authorities to address the practice of illegal dumping. 	<ul style="list-style-type: none"> Encouraging coastal cleanups; (ACT and SAVE) Fostering rule of law (regionally) regarding dumping of wastes into the Mediterranean and (nationally) illegal dumping of construction waste. (SAVE)
7	<p>Unsustainable and illegal hunting (GCC and TCC)</p>	<ul style="list-style-type: none"> Enforce hunting seasons and limits, and hunting only in area and for species designated. 	<ul style="list-style-type: none"> Discourage hunting in areas designated for agro, eco, and cultural tourism so that character of these areas is not disrupted. Promote only sustainable hunting as a means of building advocates for conservation. (SAVE or ACT)

No	Direct Threats to Biodiversity	Actions necessary to address the threat	Recommendations for USAID consideration.
8	Forest fires (GCC and TCC)	<ul style="list-style-type: none"> Encourage bicomunal forest fire fighting. 	<p>If conditions change and it becomes politically feasible - work to foster agreement to enable joint efforts to fight forest fires. (ACT with potential capacity building support through the IAA with US Forest Service*)</p> <p>*Currently the FS is working in Jordan and Israel and often holds meetings in Cyprus. Forest Structures are similar.</p>
9	Invasive Species (GCC and TCC)	<ul style="list-style-type: none"> banning the use of all species deemed to be invasives and explore means for their control. 	<ul style="list-style-type: none"> Alternative uses or means for control should be explored and encouraged for Acacia saligna and Robinia pseudoacacia. (SAVE or ACT) Encourage participation of GCC and TCC scientists at international symposiums and conferences for the control of <i>Caulerpa racemosa</i> and other marine invasives. (ACT)
10	Grazing (GCC and TCC)	<ul style="list-style-type: none"> Understanding of the carrying capacity of the Akamas and Karpaz Peninsula for grazing Encourage rotation of grazing lands 	<ul style="list-style-type: none"> Study to determine the carrying capacity for Akamas Peninsula (goats) and Karpaz Peninsula (donkeys) (ACT)

No	Indirect Threats to Biodiversity	Actions Necessary to Address the Threat	Recommendations for USAID Consideration.
1	<p>Inefficient / Inadequate Institutional Framework & Civil Society (GCC and GCC - lack of contact and cooperation among NGOs)</p>	<ul style="list-style-type: none"> Facilitate information exchange. Strengthen civil society (NGOS involved in environmental conservation). Promote civil society input into EIA process (the main process that calls for public input into environmental decision making). 	<ul style="list-style-type: none"> Facilitate the formation of Umbrella NGOs to strengthen civil society's voice in decision making. (ACT) Establish an internet based information network/portal where shared areas of concerns, projects, and notices of upcoming events can be effectively disseminated. (ACT)
2	<p>Saltwater Intrusion (GCC and TCC)</p>	<ul style="list-style-type: none"> Authorities must regulate personal well usage and encourage alternative water sources, such as cisterns. 	<ul style="list-style-type: none"> Promoting good governance and regulation of personal well usage; (REAP or SAVE) Encourage aquifer recharge by wastewater treatment plants; (REAP and ACT) Encourage alternatives to current crops with high water demands (i.e. bananas and citrus) for crops that are less water intensive. (EDGE, REAP, ACT)
3	<p>Climate change</p>	<ul style="list-style-type: none"> Monitoring of ecosystems 	<ul style="list-style-type: none">
4	<p>Overexploitation and Contamination of Surface and Groundwater (including uncontrolled water usage from wells at private dwellings) (GCC and TCC)</p>	<ul style="list-style-type: none"> Water conservation measures. Monitor/control overexploitation. Alternative water sources. Increased use of drip irrigation for agricultural. Enact law to regulate water use from private wells, install usage meters and establish daily limits. Investigation of extent of pesticide use and effects on the environment. Promotion of organic farming. Conversion to crop stocks requiring less chemical input Proper pesticide application. 	<ul style="list-style-type: none"> Promote installation of meters, daily limits, and excess water usage fee for private wells. (REAP) Promote use of cisterns in the TCC. (REAP) Identify alternative to citrus production (high H2O demand). (ACT, EDGE, SAVE) Unified campaign for linen use (hotels/tourist) –“Green Destination” programs. Targeting hotel managers and cleaning staff. Successful implementation will decrease water use and phosphate pollution. (ACT with SAVE) Promote organic farming (under agro-tourism and enterprise development umbrella). (SAVE and EDGE)

No	Indirect Threats to Biodiversity	Actions Necessary to Address the Threat	Recommendations for USAID Consideration.
5	Insufficient WW Infrastructure (TCC)	<ul style="list-style-type: none"> Repair of WW treatment facility at Kyrenia. Repair of leakages in North Nicosia's sewage network. Extension/creation of WW Treatment networks in the TCC. 	<ul style="list-style-type: none"> Provide capacity building in priority sites in preparation for the EU/PFF implementation, i.e., operation and maintenance. (SAVE)
6	Inadequate Solid Waste Disposal and Management (GCC and TCC)	<ul style="list-style-type: none"> Construction of proper landfills. Promotion of separation and recycling. Facility to properly handle and/or store hazardous and toxic materials for export. Promotion of biogas technology for slaughterhouse and other organics waste. Promotion of municipal composting. Opening of Green Line Regulations for transport of recyclable materials from the TCC to the GCC for processing/shipping. 	<ul style="list-style-type: none"> Encourage theme for 2007/8 ACT RFPs in environmental management/protection to fund activities, as described below. (these will aid the GCC to achieve EU mandated goals for recycling and alternative energy production). Facilitate partnerships between GCC firms and TCC firms for the collection, separation, and marketing of recyclables through the Green Line. (Possible GDA) In lieu of or to complement biogas, a short term solution to the TCC slaughterhouse waste is to apply the same disposal technique used in the GCC. This involves incineration of the waste at cement facilities, where furnaces burn at high enough temperatures to properly dispose of the waste. (ACT* & SAVE) *expansion of the "Cans for Kids" program to the TCC
7	Abandoned Mines and Poorly Sited Stone Quarries (TCC)	<ul style="list-style-type: none"> Reclamation of abandoned sites. Siting of future quarries following proper EIA. Use of more environmentally friendly extracting, such as terracing. 	Foster cooperation and information exchange between GCC & TCC quarry owners. (ACT)

With regards to the above recommendations, USAID/Cyprus may wish to consider the following to further develop the Office's capacity to address the identified needs:

a. Potential Activities to be Supported under a Biodiversity Conservation/Environmental Protection Bicomunal Theme under ACT:

- 1) Population surveys for species endemic/important to Cyprus;
- 2) Scientific assessment of the Buffer Zone's ecology, possibly to assist in declaration of a "Bicomunal Peace Park" to preserve sensitive areas once a resolution is found. (ACT and potential support available from the UNEP Post Conflict Assessment Unit (<http://postconflict.unep.ch>) if invited by the GCC authorities.);
- 3) Establishment of a public online knowledge management system of Cypriot scientific studies and environmental analyses. Potential venue could be the new joint environment office of the ETEK/KKTOMB either in a public institution, NGOs or through Chambers and Unions.
- 4) Implementation of pilot/demo biogas projects on farms and/or slaughterhouses.
- 5) Implementation of municipal pilot/demo project for composting facilities.

b. At USAID Strategic Level:

- 1) USAID, in its increased presence and in this new strategy period, has the opportunity to be a model for the environmental community, as well as for other sectoral communities: As USAID implements the new program, it should promote transparency and broad public input at every step along the way; and it should strengthen synergies among the four projects, ACT, REAP, SAVE, and EDGE.
- 2) USAID can also serve as a model of good environmental governance by ensuring TCC and GCC EIA requirements are complied with, as well as USAID's Regulation 216.

c. Donor Coordination

- 1) To address the issue of lack of financing for parks and protected areas, USAID could help (potentially in partnership with the EU and/or GEF) launch and finance a Cypriot Protected Areas Fund. As with similar funds of this nature, the "Cypriot Protected Areas Fund" would be a fund management mechanism, preferably endorsed and prescribed by law. The "Cypriot Protected Areas Fund" would ensure sustainable funding for implementing management activities identified in the Management Planning process for the islands protected areas. The fund may be managed by a Bicomunal Board and Executive Bureau consisting of community leaders from the GCC and TCC. In this context, funds would be equally distributed to the GCC and TCC protected areas to implement projects conducted by NGOs in support of protected areas throughout the island.

D. Extent to Which USAID Programs Meet Identified Needs

Under USAID/Cyprus' new strategy, biodiversity conservation and environmental issues will continue to be one focus of support under the bicomunal program and the economic growth program. As described above in Section IV. A, depending on the specific grants that the UNDP will award, ACT (bicomunal activities) will support biodiversity conservation and environmental management through its support for sustainable tourism, informal education, and in the summer camps, targeting GC and TC youth. REAP supports biodiversity conservation and environmental

management by promoting the conservation of water and energy. EDGE has the opportunity to contribute to environmental protection through their support of sustainable enterprises that are environmentally sound.

USAID's most significant contribution to biodiversity conservation will be realized from SAVE activities, especially those focusing on sustainable tourism, technical assistance to strengthen natural resources management capacity, and working with the environmental and business communities to build partnerships.

SECTION VI

DONOR ACTIONS TO ADDRESS ENVIRONMENTAL SECTOR NEEDS

Sections A and B serve as a historical look at international donor work in Cyprus for the betterment of the Cypriot environment. The text for this section has been adapted with permission from the 2005 UNDP Environmental Strategy, compiled by Nicolas Jarraud. It is included to ensure continuity of knowledge among USAID staff. Sections C and D contain tables of recent and current environmental projects and initiatives in the GCC and TCC.

A. International Organizations

Food and Agriculture Organisation (FAO)

The FAO has a long history of involvement in Cyprus. The FAO helped launch the Agricultural Research Institute and developed the original National Water Master Plan. However, FAO involvement in Cyprus has declined in recent decades, as the country required less and less assistance. Nonetheless, the FAO was recently involved in helping to prepare the new law on aquaculture, paving the way for a National Action Plan for the development of aquaculture. In 1975, Cyprus agreed to cooperate with FAO's International Board for Plant Genetic Resources (IBPGR), through the Agricultural Research Institute (ARI).

United Nations Environment Programme (UNEP)

The United Nations Environment Programme (UNEP) has been involved in Cyprus through the Mediterranean Action Plan (MAP), whose headquarters are in Greece. At the same time, Cyprus falls under the overall responsibility of the UNEP Regional Office for Europe, based in Geneva. However, as yet, Cyprus has no UNEP National Committee. The UNEP Post-Conflict Assessment Unit (PCAU) analyzes the impact of conflict on the environment and sets priorities for cleaning hazardous sites. They would be a likely candidate to invite to Cyprus to assess the situation, and provide ideas for the eventual redevelopment of the buffer zone (Buffer Zone Environmental Master Plan) as well as for post-conflict environmental disasters, such as the contamination of Lefke. However, to begin an assessment, the PCAU must be invited by a host government, so ACT could play a role in convincing the GC Environment Service to invite UNEP. Another branch of UNEP that would be relevant to the Cyprus Problem is the Environment and Security Initiative (ENVSEC), which is a partnership between UNEP, UNDP, and the OSCE. ENVSEC attempts to locate areas of conflict by mapping structural factors that can contribute to conflict, such as environment, population, migration, and social issues in Southeastern Europe, Central Asia, and the Southern Caucasus.

UNDP and UNOPS

UNDP and UNOPS implement two programs in Cyprus. One is the USAID-funded Bicomunal Development Programme, and the other is the EU-funded Partnership for the Future (PFF) (more details available at www.undp-unops-pff.org). There is some overlap between BDP and PFF activities, which should be minimized in the future. (Note: the BDP which was implemented by UNOPS through 2005 has been replaced by ACT which is implemented directly by the UNDP.)

Some examples of overlap are:

- Organic Farming: PFF has organized several seminars on organic farming, as has the BDP. However, the BDP COAG is mainly dealing with the technical issues regarding organic farming, whereas the PFF is more focused on EU legislation. PFF lacks the

technical expertise to undertake anything more than networking events and seminars. The BDP, on the other hand, has the potential to provide scientific assistance as well as advice on best practice.

- Agrotourism: The PFF has organized several seminars on agrotourism in the TCC; however they lack the BDP's bicomunal aspect in this field.

The UNDP Regional Bureau for Europe and the CIS (RBEC) has recently decided to consider the BDP as the environmental focal point for the Global Environment Facility (GEF), even though the BDP is not a country office. The BDP Environmental Officer recently participated in the RBEC Environment and Energy Practice meeting in Kazakhstan, which should lead to further integration of the successor programme into the RBEC Energy and Environment (E&E) Network. One option is to include RBEC E&E experts in an evaluation mission to Cyprus to help the new programme develop its sustainable development activities.

UNHCR

UNHCR implemented multi-donor humanitarian relief programs from 1975 until approximately 1980, and continued to implement USAID-funded bicomunal programs including the predecessor program to the BDP until 1997. UNHCR also recognized the importance of environmental peace building. In fact, UNHCR had supported forest management programs since 1975. Many BDP environmental projects were follow-ups to UNHCR projects. In 1997, for example, FORTECH produced a report entitled *Environmental Assessment of Forestry Projects – Cyprus*, analyzing the environmental impact of forestry projects funded by UNHCR. The BDP's reforestation and silviculture project was based on these recommendations.

World Bank

In 1993, the World Bank prepared an Environmental Review and Action Plan, which was used as the cornerstone of the GCC Environmental strategy. This was undertaken under the World Bank's METAP programme. However, this report places the same emphasis on environmental conservation as it does on promoting free-trade and neo-liberal theories.

Institute for European Environmental Policy (IEEP)

The Institute for European Environmental Policy (IEEP) recently produced a background study on the link between agriculture and environment in EU accession countries, including Cyprus.

European Union

In order to accede to the European Union, Cyprus was obliged to incorporate the EU Environmental *acquis communautaire* into its legislation. The EU also provides funding for restructuring of certain sectors, such as the fisheries and farming industries. For example, under the Financial Instrument for Fisheries Guidance (FIFG), the EU made €3.5 million available to Cyprus. This funding will be directed towards two types of measures:

- Adjustment of the fishing fleet capacity to available fisheries resources
- Investment in the modernization of processing, aquaculture, and fishing port facilities

The BDP recently collaborated with the EU on potato testing, using the VET laboratory facilities. EU experts also recently visited the BDP in order to discuss potential involvement of Cypriot environmental civil society organizations in EU sustainable development plans for the island, in particular in the TCC.

United States

Apart from the Bicomunal Development Programme, the US has supported activities in Cyprus through the Bicomunal Support Program of the American Embassy.

The Bicomunal Support Program of the American Embassy was designed to bring together Greek Cypriots and Turkish Cypriots in theme-based programs that allow Cypriots to explore issues of common concern. The program covers areas that range from health to youth leadership to media and education. These programs give participants the chance to break down barriers and find practical solutions to island-wide concerns. Since its inception in 2000, BSP has directly reached more than 400 Cypriots through a wide variety of activities. BSP programs are administered by AMIDEAST, a US-based non-profit organization that maintains a staff and office in Cyprus. In addition to AMIDEAST programs, BSP also administers a small-grants fund, which supports bicomunal projects of under \$10,000. These grants are intended to help Cypriots support their own bicomunal undertakings in Cyprus.

Program Highlight – ENVIS

From the late 1990s through 2005, a series of environmental capacity building programs funded by USAID and implemented by the USGS and BSP supported Cypriot water experts and resulted in the Environmental Information System of Cyprus (ENVIS). The program provided Greek Cypriot and Turkish Cypriot water resource experts with the technical and material support to develop a database and geographic information system (GIS) that allows them to compile, store, and manage the majority of environmental resource data collected in Cyprus.

A key result of these projects is the Environmental Information System (ENVIS), a distributed database system shared by the experts, and a suite of software tools that provide integration between the database and GIS, and allow geospatial processing to monitor and model the hydrologic cycle in Cyprus. Together, ENVIS and GIS provide an important tool for data compilation quality assurance and quality control, as well as an integral tool for evaluating and reporting water resource conditions, trends, and projected future needs.

During the initial Cyprus Water Resources Databases Project (2000-2003) the USGS provided a technology transfer program to assist the experts with issues related to the development and use of the database. This program included technical and scientific training including: data quality assurance and quality control; statistical analysis of hydrological data; ground-water resource evaluation and modeling; introduction to GIS; administration and maintenance of computer hardware and software; and user and administrator training for Microsoft Access and Microsoft SQL Server.

During Phase II, which was implemented by Geodigital Mapping through the BSP from 2003-2005, the project focused on upgrading the database to SQL, adding a GIS interface and providing advanced training in modeling. ENVIS is now a distributed database in which data is entered via a graphical user interface or loaded from files using provided menus. An extensive menu system provides users the ability to update and query the database and retrieve reports or export data from ENVIS for use in other applications. The database is accessed from a network of workstations and SQL database servers installed in the expert's offices. Advanced users can make direct retrievals from the database using Microsoft Access, Microsoft SQL Server tools, or any client software that provides support for database client queries. Trained technical staff in the expert's offices provide support for database users, and maintain the administrative tasks required for the database.

The ENVIS database contains data that can be grouped into four themes: Ground-Water, Surface-Water, Water-Quality, and Meteorology.

ENVIS - FUTURE DIRECTIONS

The ENVIS database provides a framework that could be expanded easily to include new types of data. Environmental data that was discussed, but not included in ENVIS during the projects due to time constraints, include critical items such as water use information, surface water weir rating curves, irrigation diversions, treated sewerage water quality and quantity, and air quality monitoring data. Technical staff or outside providers could be called on to add these additional data types using the existing framework. Because they would be working in an existing, distributed database, they would be able to build on the framework and avoid many of the time consuming tasks associated with creating and maintaining additional databases. ENVIS has a fully implemented security system. Permissions to add, edit, or delete data are controlled by the database administrator. The network, backup and recovery, replication, and other administrative tasks are already in place and operating.

The database is already installed in the core offices which took part in the water databases project, and is used by a large number of staff, ranging from senior scientists and engineers to technical and data entry staff. In the future, the ENVIS database could be installed in other offices which could share some of the data entry tasks which are now centralized. For example, water quality data could be entered into the ENVIS database in the state water quality laboratory, and ground water level measurements, which are taken by district water department staff, could be entered by the district officers rather than be sent to a central office for processing. In most cases, the more closely the data producers are to the data entry, the better the quality of the data which will be added to the database.

Additionally, the database could be installed in other offices purely for reporting and data sharing needs. Because of the design of the security system in ENVIS, it would be easy to allow users, such as senior scientists and managers, access to the database so that they can produce reports that are shared with the public, or used for internal managerial decisions. Since ENVIS is a distributed system, any user with access to the database, would have the latest information available, and it would not take additional staff time to process data requests. A web-based system for sharing data among departments could also be implemented easily, since the ENVIS framework is built in Microsoft Access which has automated means for creating web-based reports and menus.

Throughout the Cyprus Water Databases Project, capacity building and technical training have been stressed. Each of the departments that participated in the project have staff who have attended training dealing with database, GIS, statistical analysis of environmental data, quality assurance and quality control, and(or) database maintenance and administration. These staff are qualified to maintain and build onto the existing ENVIS database. Through their efforts, the system will continue to grow, and handle more and more of the departments data processing needs.

USAID's Cyprus Partnership for Economic Growth Program (CyPEG) is discussed in Section IV.

B. GCC Environmental Projects and Funding Instruments for Environmental Projects

Table 6.1. GCC Environmental Projects and Funding Instruments for Environmental Projects.

Donor(s)	Project Name	Project Objectives/Purpose
EU	LIFE	<p>LIFE-Nature (conservation of natural habitats and of wild fauna and flora of Community and international interest),</p> <p>LIFE- Environment Demonstration projects (development of innovative and integrated techniques and methods and further development of community environment policy),</p> <p>LIFE- Environment Preparatory Projects (development of new Community environmental actions and instruments, and/or upgrading of environmental legislation and policies),</p> <p>LIFE-Third Countries (establishment of the means and administrative structures needed in the environmental sector and development of environmental policy and action program in third countries).</p>
<p>Specific Information can be found at: http://europa.eu.int/comm/environment/life/funding/index.htm</p>		
EU	SMAP	<p>The SMAP is the common basis for environmental purposes (as regards both policy orientation and funding) in the Mediterranean region. The SMAP is a framework program and not a separate funding instrument. It should be taken into consideration when national activities are scheduled and carried out, and should guide all environmental actions and funding within the Euro-Med Partnership context, at both bilateral and regional levels.</p>
<p>Specific Information can be found at: http://europa.eu.int/comm/environment/smap/howto.htm</p>		
EU	Sixth Framework Programme (FP6) of DG Research	<p>Research in Sustainable development, global change and ecosystem.</p>
<p>Specific Information can be found at: http://europa.eu.int/comm/environment/integration/research_fund_en.htm</p>		
EU	Leonardo da Vinci	<p>Vocational Training and Life Long Learning - environment sector.</p>
<p>Specific Information can be found at: http://www.europa.eu.int/comm/education/programmes/leonardo/new/leonardo2_en.html</p>		

Donor(s)	Project Name	Project Objectives/Purpose
EU	Interreg III	Promoting transnational and transregional cooperation - environment sector. Specific Information can be found at: http://europa.eu.int/comm/regional_policy/interreg3/
EU	Financial support for European Environmental NGOs	Focus: Strengthening EU Environmental NGOs and networks Specific Information can be found at: http://europa.eu.int/comm/environment/funding/general/index_en.htm
EU	General Call of proposals (published every year)	Currently no projects benefiting Cyprus Focus: Environmental Protection – Specific Information can be found at: http://europa.eu.int/comm/environment/funding/general/index_en.htm
EU	Call for Proposals in the field of Community co-operation in the field of accidental or deliberate marine pollution (2000-2006)	Currently no projects benefiting Cyprus Focus: Protection of Marine Environment, Coastlines, and Human Health Specific Information can be found at: http://europa.eu.int/comm/environment/funding/general/index_en.htm
EU	Call for Proposals in the field of Community co-operation as regards civil protection	Currently no projects benefiting Cyprus Focus: Emergency Actions for Severe Climatic Situations Specific Information can be found at: http://europa.eu.int/comm/environment/funding/general/index_en.htm
EU	YOUTH	Activities dedicated to youth. Environmental education and awareness raising activities can be included. Usually small budget projects.
EU - Planning Bureau of Cyprus	EU Structural Funds in Cyprus	http://www.planning.gov.cy

Donor(s)	Project Name	Project Objectives/Purpose
WWF Mediterranean	Across the Waters	<p>Across The Waters is a capacity building program of WWF Mediterranean. It aim is to strengthen environment and development NGOs by helping them build their operational skills and develop their institutional capacity.</p> <p>Specific Information can be found at: http://www.panda.org/index.cfm</p>
Research Promotion Foundation		<p>Founded in 1996, the Research Promotion Foundation (RPF) was established at the initiative of the Government of the Republic of Cyprus, to promote the development of scientific and technological research in Cyprus due to the fundamental importance of research in contemporary societies.</p> <p>Specific Information can be found at: http://www.research.org.cy/</p>
UNDP/ACT		<p>The purpose of ACT is to build on the successes of the Bi-communal Development Programme and create opportunities for both communities to work together on concrete projects which will benefit all people on the island, while at the same time promoting tolerance and mutual understanding. With the financial support of USAID the hope is that projects under ACT will support principles of multiculturalism and European values and provide Greek Cypriots and Turkish Cypriots the resources and opportunities to jointly build the foundations for a sustainable solution to the Cyprus Problem.</p> <p>The overall goal of the program will be to build a stronger culture of tolerance, reconciliation and support of settlement in all sectors of Cypriot society.</p> <p>Specific Information can be found at: http://www.undp-act.org/</p>
UNDP/PFF		<p>Since 2001, UNDP in conjunction with its executing agency UNOPS has been responsible for the implementation of the EU funded Programme “Partnership for the Future (PFF)”.</p> <p>The PFF aims at contributing to the peace-building process in Cyprus through different levels of intervention ranging from urban infrastructure rehabilitation to assistance to small and medium-sized enterprises as well as the de-mining of the Buffer Zone.</p> <p>Specific Information can be found at: www.undp-unops-pff.org/</p>

Donor(s)	Project Name	Project Objectives/Purpose
ES/MANRE		Very small annual grants to support activities of environmental NGOs.
Governmental Departments	General Public Tenders	Studies on environment including EIAs. The tenders are announced in the National newspapers.
Municipalities	General Public Tenders	Studies on environment, including EIAs. The tenders are announced in the National newspapers.

C. TCC Environmental Projects and Funding Instruments for Environmental Projects

Table 6.2. TCC Environmental Projects and Funding Instruments for Environmental Projects

Donor (s)	Project name	TCC partner	Project Objectives / Purpose
UNDP/ACT		Various	<p>The purpose of ACT is to build on the successes of the Bi-communal Development Programme and create opportunities for both communities to work together on concrete projects which will benefit all people on the island, while at the same time promoting tolerance and mutual understanding. With the financial support of USAID the hope is that projects under ACT will support principles of multiculturalism and European values and provide Greek Cypriots and Turkish Cypriots the resources and opportunities to jointly build the foundations for a sustainable solution to the Cyprus Problem.</p> <p>The overall goal of the program will be to build a stronger culture of tolerance, reconciliation, and support of settlement in all sectors of Cypriot society. Specific Information can be found at: http://www.undp-act.org/</p>
UNDP/PFF		Various	<p>Since 2001, UNDP in conjunction with its executing agency UNOPS has been responsible for the implementation of the EU funded Programme “Partnership for the Future (PFF)”.</p> <p>The PFF aims at contributing to the peace-building process in Cyprus through different levels of intervention ranging from urban infrastructure rehabilitation to assistance to small and medium-sized enterprises as well as the de-mining of the Buffer Zone.</p> <p>Specific Information can be found at: www.undp-unops-pff.org</p>

Donor(s)	Project Name	TCC Partner	Project Objectives / Purpose
Republic of Turkey (2005) Real Sector Support Budget	Determination of flora in botanically important areas and determination of wetland areas	“The Ministry of Economy and Tourism” & Near East University	To determine and protect flora and wetlands in north Cyprus.
Republic of Turkey Aid Commission (2004)	Proper land filling of solid wastes	“DEP” & Eco-Rech environmental technologies Ltd.	To facilitate separation of wastes and proper land filling of organic wastes.
Republic of Turkey Aid Commission (2004)	Improvement of wastewater services and contribution project	“DEP” & “Kyrenia Municipality”	To improve the collection network and wastewater treatment plant serving to Kyrenia region.
Kıbrıs Mobile Telecommunication Ltd. (2005) and Republic of Turkey	Cleaning of Karpaz Coastline	“DEP”	To increase environmental awareness by cleaning beaches.
British High Commission	Training, education	The management centre	Fields: 1. policy framework for sustainable economic development 2. labor study 3. green line regulation 4. tourism

In addition to the above stated support from Turkey, there are protocols signed between the TCC Authorities; “The Ministry of Economy and Tourism” and Republic of Turkey’s Ministry of Environment. These protocols are for the development of environmental strategies and long-term planning. They are signed every year since 1994.

Locally Funded TCC Environmental Projects

Table 6.3. Locally Funded TCC Environmental Projects.

Sponsoring Organization	Project Name	TCC Partner	Project Objectives / Purpose
“Ministry of Economy and Tourism” Fund Account	Protection of sea turtles project	“DEP”	To protect nesting sea turtles, hatchlings and their nesting habitat.
Fund from the “Ministry of Finance”	Measurement of ambient air quality project	“DEP”	To determine ambient air quality at various locations in north Cyprus.
“DEP” (in the budget every year from 2002)	Development of game production project	“DEP”	To protect game birds and animals from extinction.
“DEP” (in the budget every year from 2002)	Interurban environmental cleaning project	“DEP”	To organize and clean the sites in between cities.
“DEP” (in the budget every year from 2002)	Cumhuriyet Park project	“DEP”	To organize Cumhuriyet Park and the activities.
“DEP” (in the budget every year)	Environmental education project	“DEP”	To increase environmental awareness and consciousness.
“DEP”	Continuing emergency investment	“DEP”	This fund supports past projects requiring continuing funding such as ambient air quality monitoring or turtles protection. (Fund from the Republic of Turkey)
“DEP”	Real sector support	“DEP”	This fund supports various projects. (Fund from the Republic of Turkey)

ANNEX A

SCOPE OF WORK AND CVS

ANNEX A

SCOPE OF WORK: STRATEGIC ENVIRONMENTAL ASSESSMENT: CYPRUS

I. Purpose and Objective

The purpose of this task is to conduct an assessment of biodiversity conservation needs for the purposes of complying with sections 117 and 119 of the Foreign Assistance Act of 1961, as amended, and country strategy guidelines under ADS 201.3.4.11 and ADS 204.5. Based on this assessment, assist the Mission to define how its new five-year country program strategy contributes to conservation needs, as required by agency regulations. This assessment could also serve as a planning tool to assist USAID/Cyprus in better integrating environment concerns into their overall program.

II. Background

USAID/Cyprus is currently in the process of developing a new country strategic plan for Cyprus.

The U.S. Foreign Assistance Act of 1961 Section 119 requires USAID to analyze national needs for conserving biological diversity and potential USAID contributions to these needs in all country strategy plans. Specifically, FAA Section 119(d), Country Analysis Requirements requires that:

“Each country development strategy statement or other country plan prepared by the Agency for International Development shall include an analysis of: (1) the actions necessary in that country to conserve biological diversity, and (2) the extent to which the actions proposed for support by the Agency meet the needs thus identified.
(FAA, Sec. 119(d).”

III. Statement of Work

Under the direction of a Team leader, the assessment Team shall evaluate biodiversity concerns in Cyprus. The focus of all activities taken under this assignment is two fold: 1) to identify actions necessary to conserve biodiversity, and 2) to describe how and to what extent actions proposed in the country strategic plans meet, or could meet, the biodiversity needs thus identified.

The assessment Team shall perform the following activities:

A) Data Collection:

1. Prior to departure, hold meetings with the Bureau Environmental Officer and E&E Bureau technical staff, and any other Washington, DC, based organizations (such as conservation NGOs with active programs in Cyprus) to gather relevant information on regional programs and agency environmental regulations.
2. After arrival in the field, meet with USAID/Cyprus to get an understanding of the Mission’s ongoing sectoral assessments, program goals and objectives under its proposed strategy. The Mission also may provide the Team with advice and protocol on approaching USAID partners and host country organizations with respect to this assignment. The Team shall be aware of

sensitivities related to an assessment exercise (e.g., the potential for raising expectations, and the need to be clear as to the purpose of the assessment) and respect Mission guidance. The Team will discuss organizations to be contacted and any planned site visits with the Mission and coordinate as required.

3. Mission staff will facilitate meetings with embassy staff as appropriate to allow the Team to gain a full understanding of the country program and strategy. Mission staff will help facilitate interaction and information exchange with any other contractor teams in the field as necessary.

4. Obtain, review and analyze existing documentation on biodiversity conservation in Cyprus, such as that prepared by government agencies, bilateral donors, and national and international NGOs. Examples of such documentation may include the National Biodiversity Conservation Strategies and Action Plan (NBSAP), National Environmental Action Plan (NEAP); Global Environment Fund (GEF) project reports; reports by FAO, UNESCO, UNEP, or UNDP; reports by conservation NGOs, etc.

5. Hold meetings with relevant ministries and agencies, donor organizations, NGOs, and other organizations that are involved in forest and biodiversity conservation, cross-cutting issues, or which are implementing noteworthy projects, and gather relevant information.

6. Conduct several (a minimum of one to three) priority site visits, if necessary to supplement the understanding gained from interviews, literature, and other second-hand sources.

B) Analysis:

Summarize the status of biodiversity in Cyprus. Summarize the social, economic, institutional, legal, and policy context for their use and conservation, including actions currently being taken by government, other donors, NGOs, and the private sector. Identify the key direct and indirect threats to biodiversity. Identify the actions necessary to conserve and sustainably manage natural resources and biodiversity in Cyprus in the current context based on analysis of country donor and NGO responses to meet these needs. Prepare a report on the status of biodiversity conservation efforts in Cyprus and implications for USAID or other donor programming and environmental monitoring which shall define the actions necessary for conservation.

C) Report:

Prepare a report describing the analysis and conclusions. This report shall clearly meet the legal requirement of FAA Sec 119 by:

1) clearly articulating the actions necessary to conserve biodiversity in Cyprus, and 2) clearly describing the extent to which actions proposed in new the USAID/Cyprus strategic plan meet the needs identified. FAA Sections 119 do not require USAID to invest in conserving biological diversity, although it is encouraged more broadly to do so under these sections of the FAA.

The report, of between 30 and 60 pages in length (excluding appendices), shall include sections covering the following topics:

Title Page, including the date of completion of the analysis report

Table of Contents

A. Introduction, describing the purpose of the analysis and methods used in conducting it, including the timing of the analysis in relation to the timing of USAID strategy development.

B. An overview of the status of biodiversity in Cyprus, including ecosystem diversity, species diversity, threatened & endangered species, genetic diversity, agricultural biodiversity, ecological processes and ecosystem services, and values and economics of biodiversity and forests. A map of potential natural vegetation and of land use or land/forest cover should be provided if available.

C. An overview of the social, economic, and political context for sustainable natural resources management and the conservation of biodiversity and forests in Cyprus, including the social and economic environment; institutions, policies, and laws affecting conservation; the national protected area system including all IUCN categories of protected areas; laws affecting the protection of endangered species; and participation in international treaties. A map of the protected areas system should be provided if available.

D. A review and summary of government, NGO, and donor programs and activities that contribute to conservation and sustainable natural resources management, and an assessment of their effectiveness, strengths, and weaknesses.

E. An assessment of the threats to biodiversity, including direct threats and indirect threats or root causes of the direct threats.

F. A list or description of the actions necessary to conserve biodiversity and forests in Cyprus, logically flowing from the review of the threats, and what is currently being done by government, NGO, and donor programs that address those threats.

G. A review of the proposed USAID/Cyprus strategy and program, including all SOs and SPOs, followed by an analysis of the extent to which actions proposed for support by USAID help meet the needs identified in F. This section should also point out any threats to biodiversity and forests from activities proposed for USAID support, and suggest mitigating actions. It should also identify opportunities for cross-cutting, cross-sectoral linkages with proposed activities (for all proposed SOs and SPOs), especially those that would be low cost and/or would enhance the effectiveness of the proposed activities.

H. All references used and cited in the report should be listed; web URLs for information resources should also be provided.

I. Appendices to the report should contain, at minimum the SOW for the analysis, biographical sketches of analysis Team members, a list of persons contacted and their institutional affiliation, and other background or supporting material as needed.

** further notes or requests for information to be included in analysis report may be added as desired by the Mission

IV. Methodology

A three-person Team with the following composition and expertise is required to conduct this analysis:

International Technical Assistance (1or 2 persons). Senior Level Natural Resource Management Specialists with post-graduate qualifications in biology, zoology, forestry or closely related field in natural resource management or natural resource economics. Background in tropical biodiversity and natural resource conservation. Knowledge of USAID Strategic Planning

process related to Biodiversity (FAA 119). Knowledge of 22 CFR 216 and of FAA 117 is also desirable. Demonstrated expertise in assessing development programs for impacts on environment and tropical ecosystems and of environmental impact assessments. Experience in the region and in Cyprus desirable.

Local Technical Assistance (1 or 2 persons). Senior Level Natural Resource Management Specialists with demonstrated experience in Cyprus environmental law, the policy and legal frameworks governing environmental management in Cyprus and the analysis of relevant policies. Good contacts within the Cypriot government agencies, NGOs, international donors, and private sector preferred.

V. Deliverables:

The primary deliverable under this task order is an Analysis Report for USAID/Cyprus that examines the biodiversity, natural resource management, (tropical forestry) and other related environmental issues and identifies contributions and/or potential contributions to meeting identified conservation needs by the Mission's proposed strategy.

VI. Anticipated Level of Effort

The LOE for this assignment is a total of 50 person-days, to be allocated as follows:

VII. Schedule and Logistics

Meetings in Washington, DC, will take place between October 3 and 7, 2005 for the Team Leader, and the analysis will begin immediately thereafter in Cyprus. The Team will coordinate logistical arrangements with the USAID/Cyprus Mission Environment Officer, and prepare a draft schedule of activities acceptable to the mission staff, a presentation to the mission of preliminary findings, delivery of the draft report, and delivery of the final report which will include mission review comments. The Mission will assist the Team by providing key references and contacts as well as logistical support where necessary. USAID/Cyprus will also help facilitate meetings with other staff to fully brief the Team on USAID's program and future vision for their strategy.

CONSULTANT CVS

JEFFREY D. PLOETZ

Mr. Ploetz is a Natural Resource Management Specialist with experience in Eastern Europe, Latin America, and Africa. He has professional experience in biodiversity assessments, environmental assessments and compliance, park development, environmental education, and a technical background in forestry, biodiversity, biology, and environmental policy. Mr. Ploetz has conducted, managed, reviewed and backstopped biodiversity assessments for USAID Missions, developed training materials for Agency environmental procedures, and managed website infrastructure and content for environmental projects. He has been involved with environmental compliance support for Cyprus for over four years and has a unique knowledge of USAID support activities. He has provided technical assistance to USAID staff members both in USAID/Washington and in Missions of the Bureau for Europe and Eurasia (E&E). He was a team member for the 2001 USAID/Bulgaria Biodiversity and Environmental Assessment and managed the 2002 USAID Serbia/Montenegro Biodiversity Assessment team. He has reviewed FAA 119 assessments on E&E's behalf including Croatia, Kosovo, Albania, Georgia, Azerbaijan, and Serbia/Montenegro. He provided resource allocation and backstopping for USAID/Romania Biodiversity Assessment and creation of a "Biodiversity Training Module" for E&E Missions. Mr. Ploetz has recruited consultants to provide short-term technical assistance for biodiversity assessments and conduct research in related environmental areas in E&E. Mr. Ploetz has provided technical assistance to USAID including support to comply with environmental regulations, report writing and review, backstopping, knowledge management, and workshop planning. He currently holds a Secret Clearance for USAID from DSS.

KAREN B. MENCZER

Ms. Menczer has more than 20 years of experience in natural resources management and conservation in Africa, Asia, Latin America, the Caribbean, Europe and Eurasia, and the U.S., covering a range of fields: wetland and watershed management, wildlife management, sustainable forestry, community-based natural resources management, eco/nature tourism, and environmental impact assessment. She has worked with USAID and other donors, NGOs, governments, and communities to: design environment strategies and activities; implement, monitor, and evaluate environment/natural resource activities, ensuring focus is on achieving results; conduct environmental reviews and assessments (EA) to ensure that development activities comply with USAID, local, and other pertinent regulations; strengthen environment/natural resources policies and regulations; and implement and strengthen ecological monitoring and management in the field.

ANNEX B

PAST USAID/UNDP BDP ENVIRONMENTAL PROJECTS IMPLEMENTED THROUGH UNOPS

ANNEX B

PAST USAID/UNDP BDP ENVIRONMENTAL PROJECTS IMPLEMENTED THROUGH UNOPS

Annex B serves as an historical look at USAID's work in the environment through the UNDP/UNOPS Bicomunal Development project. The text has been adapted with permission from the 2005 UNDP Environmental Strategy, compiled by Nicolas Jarraud. It is included to ensure continuity of knowledge among USAID program staff.

Past environmental projects can be placed in several categories, some of which are no longer relevant:

1. Conservation activities
2. Education and awareness
3. Scientific studies, monitoring and surveys
4. Infrastructure (Sewerage etc.) and waste management
5. Environmental Impact Assessments, Feasibility Studies and Strategy Documents
6. Veterinary and Agricultural Projects
7. Cleanup and recycling activities

The list of projects below is hyperlinked to UNDP's website for further details. Some of these projects are discussed below due to their relevance to the new ACT program.

USAID/UNDP ENVIRONMENT PROJECTS

- [Assessment of Marine Debris Accumulation Along the Coastline](#)
- [Bird Diversity and Agricultural Intensification](#)
- [Cancer-Related Research into the Selenium Content of Cyprus Soils](#)
- [Cans for Kids](#)
- [Conservation of the Griffon Vulture](#)
- [Control of the Pine Processionary Caterpillar Threat to Forest Lands](#)
- [Determination of the Threat to the Built Environment from Swelling Clays](#)
- [Green Corners of my Neighborhood Garbage Clean-ups](#)
- [Introducing Migrant and Resident Birds to the Public](#)
- [Inventory and Assessment of Olive Trees](#)
- [Inventory of Biodegradable Waste Sources in Urban and Rural Areas in Cyprus](#)
- [Lefka-Xeros Copper Mine Area Environmental Assessment](#)
- [Measuring Ambient Air Pollution Levels](#)
- [Mediterranean Deep Sea Clean-up](#)
- [Monitoring and Protection of Sea Turtles](#)
- [Monitoring Dust Pollution in Workshops and Factories](#)
- [Monitoring of Garbage Pollution on Cyprus Beaches](#)
- [Pedieos River Flora and Fauna Survey](#)
- [Promoting the Welfare of Working Donkeys in Cyprus](#)
- [Publication of a Book on Cyprus Snakes](#)
- [Recycle a Can to Repel Cancer](#)
- [Reforestation, Silviculture and Forest Management](#)
- [Research to Develop an Island-wide Conservation Strategy for the Cyprus Mouflon](#)
- [Survey of Ecologically Important Areas](#)
- [The Young Green Consumer - Survey and Awareness Campaign](#)

1. Conservation Activities

Reforestation, Silviculture and Forest Management

The project involved the restoration of bare, degraded, and burned areas through cultivation, sowing and planting, fencing off newly planted areas for protection and the installation of an irrigation system. The improvement of forest conditions involved the cleaning, thinning and pruning of young forests, and the basing and watering of plants. The second phase (2003-2004) incorporated the additional element of training of Forest Department staff. During the first phase of the project (2001-2002), 75ha of old terraces and 3.5ha of newly constructed terraces were cultivated and sowed. A further 7ha were reforested through planting and 25ha benefited from cultivation, mixed planting and sowing. 250m of wooden fence were erected and an irrigation system covering 4ha was installed. An area of 155ha of young forest was cleaned, thinned and pruned while a further 251ha were thinned and pruned along forest roads. In all, 11,200 plants over 75ha were based and watered. During the second phase of the project (2002-2003), 75ha were cultivated and sowed on old terraces and a further 169ha were reforested through planting, fertile soil was brought to the area for spreading and 3ha benefited from a new irrigation system. In addition, 85ha of young forest in the Paphos area was cleaned, thinned, and pruned, and 234ha of the Mahairas-Stavrovouni and College Forest area benefited from the same treatment with additional weeding, basing and irrigation. A further 48ha was thinned, based, and irrigated. As mentioned above, Forest Department staff participated in training including attendance at the 12th World Forestry Congress in Canada, 2003, the International Exhibition on Techniques and Machinery for the prevention and extinguishing of forest fires, and regeneration of affected areas, and the "Corine Land Cover 2000" Congress in Greece, 2004.

Control of the Pine Processionary Caterpillar Threat to Forest Lands

The pine processionary caterpillars *Thaumetopoea pityocampa* and *Thaumetopoea wilkinsoni* are the most important insect pests of pine forest in the Mediterranean countries of Africa, Europe and the Near East. Defoliation caused by these insects weakens and reduces the growth of pines and the hairs of the larvae can cause severe irritation to humans and animals. An outbreak of pine processionary caterpillar has been underway in Cyprus for several years. Systematic monitoring is carried out using pheromone traps and counting the number of males caught to reveal patterns of adult appearance, flight period and an indication of the adult population level. This is complemented by field observations and sampling. Direct control measures used to deal with extensive infestation in recent years include aerial and ground spray treatments using biological and chemical controls, and the mechanical collection and destruction of larval nests (used only in limited areas at camping or picnic sites, parks and schoolyards). Indirect control methods aim to strengthen trees so they can stand a higher degree of infestation - these include practices such as thinning, cleaning, pruning and weeding, plus the use of pine tree species resistant to caterpillar attack. The main aim of this project was to reduce the damage caused to both natural forests and plantations by the pine processionary caterpillar. The project supported the development of a more effective integrated pest management programme for this damaging insect. This project focused on population monitoring including identification of areas requiring treatment based on counts of egg masses and larval colonies, post-treatment assessments based on counts of surviving larval colonies and aerial and ground surveys designed to estimate area and intensity of defoliation. It also analysed current practices and alternative prevention techniques, and made recommendations for changes to forest policy. It focused on procurement of equipment for future efforts and on training activities including integrated pest management, health and safety training and preparation of a conference on the pine processionary caterpillar. In accordance with the project's priorities, a study of egg masses and larval colonies was carried out on sample

plantations where the tree height was less than 2 metres between October and December 2002. In March of the following year, a survey was carried out to assess the intensity of foliage damage in each of the 30 sample plantations and to determine the relationship between egg masses and subsequent damage. The project benefited throughout from the advice and support of a Forest Protection Specialist from Forest Health Management International, Colorado, U.S.A. The prediction/decision support model developed as a result of this work can be used to identify young pine plantations in need of direct control of pine processionary caterpillar infestations. As planned, a workshop was held from 8 to 11 April 2003 at the Ledra Palace Hotel.

Research to Develop an Island-wide Conservation Strategy for the Cyprus Mouflon

The Cyprus Mouflon (*Ovis gmelini ophion*), which is unique to Cyprus, is the largest wild land mammal living on the island. Until recently it was an endangered species. Introduced to Cyprus by prehistoric humans in the Neolithic, the Mouflon soon colonized the island. However, hunting and the destruction of its habitat almost drove the Mouflon to extinction. At the beginning of the 20th Century, the Cyprus Mouflon population had been reduced to a few dozen. Conservation efforts in recent years have saved the Mouflon from this fate, and there are now over 3,000, mainly in the Paphos forest area. Unfortunately, over the last few years, more and more animals have been found dead for unknown reasons. The dangers facing the Mouflon include diseases carried by domestic sheep and wild dogs. The main objectives of this project were to study the movements and activities of the Mouflon populations on either side of the buffer zone, to provide them with water in times of drought, and to check the health of the animals. This project required close collaboration between GC and TC conservationists and scientists. In October 2003, at the BDP Veterinary and Environmental Training Facility, the Greek Cypriot Games Fund gave advice to their TC counterparts on the equipment and techniques required for observing the Mouflon. The TC was then invited to training at a Game Fund Service mission in the buffer zone. Teams including wildlife biologists and trained game wardens set out to trap the animals using coral-type traps, box traps, drop nets and dart guns. Radio transmitting collars were fitted on the captured animals to assess their movements. The marked animals were monitored and their location, type of activity (resting, moving, feeding, etc) and possible interaction with domestic animals was noted. Blood samples were taken to the Veterinary Services and checked for disease. A complementary water development project was designed to increase the supply of water to Mouflon in this area where natural springs are scarce and drought lasts for extended periods. As part of a Mouflon Management Plan, the Game Fund had already created 25 small artificial watering sites in such areas but this project expanded that coverage further north. The project placed 8 (2-4 tonnes) water tanks in areas depleted by natural springs to provide water to Mouflon a few hundred metres downhill. This measure was designed to prevent Mouflon from drinking in troughs used by livestock in order to avoid potential disease transmission or from moving south into the forest and crowding the few existing springs, which would increase the disease transmission from other Mouflon groups and exhaust vegetation close to the springs. This project benefited from excellent co-operation between experts from the GCC and TCC in their efforts to understand the behavior of the Cyprus Mouflon and plan for its future preservation. The water improvement project is completed. A number of monitoring routes have now been established covering all Mouflon inhabited areas and suitable places for traps have been identified. In addition, the teams are now fully equipped for future monitoring and preservation efforts. Testing is ongoing.

Monitoring and Protection of Sea Turtles

This project aimed to protect and monitor turtles nesting and hatching on northern Cyprus beaches; provide a suitable environment for turtles to nest and breed; protect the nests and eggs; and protect hatchlings until they reach the sea. It also aimed to monitor turtle activities in

the area by tagging turtles to determine their migration routes. The first 24-hour monitoring schemes were set up in June 1999 at two beaches in the Karpaz peninsula. Other beaches were also monitored during the day. Female turtles coming to nest were identified and tagged, beaches were marked at intervals of 50m to identify the location of nests, and nests were covered with metal netting as protection against predatory foxes. Nests where hatching occurred were opened afterwards to count the number of eggs, number of hatchings, and number of fertilised and unfertilised eggs. Nests where hatching did not happen were opened after 60 days to determine the number of eggs and reasons for the failure to hatch. The project was initially established as a Turkish Cypriot initiative based in the Karpaz peninsula. However, communication was gradually opened up with members of the Greek Cypriot community engaged in similar work on the Akamas Peninsula, particularly at Lara Beach. Initially, information and results were exchanged and in 2002 Turkish Cypriot experts spent three days visiting the Lara Beach Conservation Project. A reciprocal visit of Greek Cypriots to Sunset Beach in the Karpaz peninsula was arranged for the following year, and the Turkish Cypriot visit to the Akamas peninsula was repeated. The project co-ordinators also presented at the 23rd Annual Symposium on Sea Turtle Biology and Conservation in Kuala Lumpur, March 2003. After the first year, the project was redesigned to incorporate plans for financial sustainability. Steps considered included developing a partnership with a local environmental NGO in order to promote the project, identify potential financial sources, obtain the support/collaboration of local and international institutions, and prepare public awareness activities. By 2003, almost half of the project's expenses were covered by alternative sources. The project has also been expanded to include international partnerships. In 2001, volunteer university students from ten different countries assisted the projects, and the University of Swansea has been using a satellite system in an attempt to determine turtles' feeding grounds. In North Karpaz, the relocation of nests to safer areas resulted in a higher number of nests hatching than in previous years. The number of previously tagged turtles nesting has also increased, indicating that they are still able to survive in their environment. Nests were further protected with metal nets. This project continues to monitor and protect sea turtles in Cyprus to ensure their survival. As part of the project, beaches are cleaned and a public education and awareness campaign has been conducted for the local community and visiting tourists, to increase awareness and understanding about sea turtles as an endangered species. Information has been provided on steps to protect sea turtles on Cyprus beaches. Local communities and international students have now taken over the responsibility for these activities.

Conservation of the Griffon Vulture

Studies initiated in 1987 by the Ministry of Agriculture, Natural Resources and Environment, with the participation of the Cyprus Association of Professional Foresters and the Cyprus Association for the Protection of Avifauna showed that the Griffon Vulture population was facing extinction. The population had reached the critical stage at which it could no longer sustain itself without the implementation of urgent and effective management and conservation measures. The main aims of this project were to protect the Griffon Vulture throughout Cyprus through investigating factors affecting breeding, population dynamics, nesting site selection and feeding behavior; gathering information on food supply and its effects; establishing an integrated unit for captive propagation and juvenile protection; promoting public awareness; and facilitating appropriate conservation measures. The project included the following activities:

- Each year, in the early breeding season, all nest sites (active, potential and historical) were visited to record the dates when Griffon Vulture pairs bred. In addition information such as dates for egg laying, period of incubation, hatching, period of breeding, fledging, period of post-fledging dependence and causes of breeding failures of territorial pairs were collected and recorded in a database.
- All nestlings were then marked before they left their nests using temporary (paint on

wings) and permanent (colored leg bands) techniques. Radio transmitters were attached to some nestlings before fledging and to some adult vultures, which were trapped in the feeding station. These provided information on their movements, habitat use, juvenile dispersion and population dynamics.

- Feeding stations were established at two different locations in 2001 and 2002 and food provided fortnightly. Data on feeding behavior was then collected.
- In addition a cage for the protection of juvenile vultures unable to survive in the wild and a unit for breeding in captivity were established.
- **All this was accompanied by an education and public awareness campaign.** A booklet and posters were printed and distributed in Greek and English. In addition, three meetings were held with international and national experts to which Turkish Cypriot members were invited. At these meetings the project was presented and evaluated, and its results were discussed. Finally a public seminar was held to which members of the Turkish Cypriot community, environmental groups and NGOs, as well as Greek Cypriot administrative bodies were invited.

A final report was prepared using data from 2001 to 2003 in which future actions for conservation of the Griffon Vulture in Cyprus were discussed and recommendations made. Sadly conservation efforts were severely hampered by a bout of poisoning, which left almost half the vulture population in the Pissouri area dead in May 2003. In total around 4,000 copies of the public awareness information booklet on the Griffon Vulture were prepared and distributed to the public, schools, environmental organizations and other interested bodies. The experience and knowledge acquired through this project will provide valuable contributions to conservation efforts not only for the Griffon Vulture, but also for other threatened birds throughout the island of Cyprus.

2. Education and Awareness

Apart from the Education and Awareness activities *per se*, most of the other environmental projects contained some element of public education and awareness, either through a seminar or leaflets and brochures or training of key personnel. It is aimed to mainstream education and awareness across all projects in the future.

3. Land use

Land use has an impact on conflict resolution as well as on the environment, and the BDP has funded a few projects relating to this theme:

Training of Facilitators for Rural Land Use Decision-Making Processes

In economically marginalised rural areas, conflicts between agriculture and environment issues are evident. Efforts to protect the environment and to develop it in a way that is in keeping with contemporary thinking cause emotional aggravation for those affected, and also lead to questionable decisions in terms of the environment and the interests of those concerned. New concepts of environmental and landscape protection are directly connected to initiatives to develop rural tourism and qualitative agriculture. However such measures are often perceived as threats by local land owners leading to negative reactions and polarised positions which tend to prevent reasoned judgement and constructive discussion. This project aimed to help protect the Cypriot countryside and the interests of its inhabitants by developing a method of reaching sustainable decisions over land-use; to overcome the polarised situations that often arise over land-use issues by introducing a decision model for conflict resolution; and to educate Cypriots

in the use and appliance of this model. The project provided a structured 'Social Learning' experience lasting three days, aimed at training facilitators from the public and NGO sectors in land-use decision-making. It also offered a one-day pilot workshop, where these trainees observed and assisted the specialist trainer in applying the Decision Modelling framework. The facilitators trained by the project will be able to replicate the workshops to a wider audience using the information, material and expertise acquired through this programme. This project will have an impact on the BDP agrotourism strategy.

Bird Diversity and Agricultural Intensification

Farmland is not usually thought of as an important habitat for birds or other wildlife. Birds and other wildlife are not often thought of as important for farming. Yet both are true, or at least can be so. In Cyprus, agriculture dominates much of the landscape. A wealth of bird species from harriers to finches, francolins to wheatears, live in this strongly human-influenced environment. Some are permanent residents and others come to breed. Many pass through on their annual migrations between Africa and mainland Europe. A significant number of the birds using Cypriot cereal fields, vineyards, groves and grazing lands are classified as endangered and are in need of protection - an obligation Cyprus has as a signatory of international wildlife protection treaties such as the Berne Convention. This project aimed to discover more about the effects of intensive agricultural methods on the island's bird populations, with a view to making recommendations for future approaches to bird protection and management of farming ecosystems. Aware of the potential impact of agricultural intensification on the island's birdlife, a one-year island-wide study of the issue was co-coordinated by the Environmental Studies Centre with funding from the Leventis Foundation and the Bi-communal Development Programme. Completed in November 2003 this study utilized the skills of a team of volunteer recorders to compare bird communities in more and less intensively farmed sites in the Paphos, Limassol, Nicosia, Larnaca, Famagusta, Kyrenia and Morphou districts. The project covered cereal field sites, vineyards, groves (citrus, olive, almond and carob orchards) and abandoned scrub sites in all seasons. A booklet outlining the findings of the study and containing information on birds resident in Cyprus was produced in English, Greek and Turkish. The project showed that non-intensive farmland generally hosts higher bird populations and a greater variety of birds than intensive farmland. The project also found that non-intensive farmland is comparable in bird abundance and species richness to scrub, which a semi-natural habitat is generally considered to be good for birds. Abandoned farmland was consistently more species-poor and held fewer birds than non-intensively farmed sites or scrub sites. The main recommendations of the study were:

- Keep and plant trees and scrub in and around fields, vineyards and groves.
- Maintain and create non-cultivated headlands and verges within farmland.
- Leave some land fallow each year.
- Minimize insecticide and molluscicide use.
- Plant a variety of crops.

Further information is available at <http://www.birdfarmstudy.com>

4. Scientific studies, monitoring and surveys

Cancer-Related Research into the Selenium Content of Cyprus Soils

Selenium has been identified as a mineral supplement that is helpful for the prevention of breast and prostate cancer, although it is toxic in large concentrations. The human body extracts selenium from vegetables and from meat and milk. Following the publication of scientific studies, many countries have reorganized their agricultural policies and activities to aim for soil with optimum concentrations of selenium. This project set out to determine the selenium

content of soils in four different locations (mainly agricultural) in Cyprus and to make recommendations to the relevant authorities on the completion of the investigation. A list of the agricultural areas where soil was to be examined for selenium content was compiled. Emphasis was placed on areas used for vegetable cultivation and animal grazing. Soil specimens were collected from the appropriate depths by trained volunteers using carefully designed equipment. A random sampling procedure was used to obtain 500-600 samples. These samples are being analyzed for their selenium content using the Inductively-Coupled Plasma Spectrometer method. The laboratory testing was carried out in Cyprus with cross checks completed by an internationally recognized laboratory at Imperial College, UK. The results are currently being analyzed. They will then be used to prepare selenium level and distribution data (showing clearly the lands currently cultivated or used for stockbreeding), which will be distributed to the relevant authorities, along with a set of recommendations on the present cultivation strategy and the actual content of selenium in the lands studied.

Pedieos River Flora and Fauna Survey

The Pedieos River runs north through Nicosia along the western edge of the city, turning eastward at the northern edge of the city to pass by and beyond the Nicosia Sewerage Processing Plant at Mia Milea. Rubbish, vegetation and other materials have accumulated in the riverbed over many years of neglect. This accumulation has led to thick vegetation growth, water pooling and riverbed migration. This project aimed to perform a flora and fauna inventory in the Pedieos River to help understand the river's ecosystem and protect key species during any future works. In addition it aimed to remove rubbish and other obstructions in the riverbed to enable the river to flow freely and improve hygiene and sanitation. The flora and fauna along the stretch of river was inventoried in both winter and summer. Sensitive areas were flagged as out-of-bounds for the clean-up crew that followed. Care was taken to protect endemic and rare Cypriot plants:

- Fauna survey: Special traps were used to ensure the safety of animals during collection and animals were released after identification. Species needing protection were moved temporarily. Habitats needing protection were flagged.
- Flora survey: Experts noted the location of all trees. Endemic and rare plants were noted and areas flagged off to ensure their protection.
- Stagnant Water Sampling and Sludge Removal/Fill/Gradient Restoration: Stagnant water and sludge were sampled and the results were used to identify discharge points and to determine a final plan for stagnant water areas. The plan included re-grading of the riverbed to improve river flow and removal of sludge from stagnant water locations. Some reed beds were left in stagnant water areas to encourage growth of vegetation as a biological form of treatment for the areas.

In addition, teams of volunteers, together with municipal workers, cleared garbage from stretches of the Pedieos River in the Nicosia area. Debris was removed, facilitating the flow of the river and thus reducing the health hazards that could result from stagnant water. The flora and fauna survey was completed as planned and the resulting reports were distributed to the relevant authorities and other interested parties. In addition, several companies discharging contaminated water into the river were approached and agreed to make arrangements for water treatment or alternative disposal. The project has made a significant difference to the regular flow of the Pedieos and Klimmos rivers, and has also helped to improve the quality of the water. Regular follow-up river cleaning projects have helped to sustain the progress made with this initial effort.

Monitoring Dust Pollution in Workshops and Factories

The dust concentration in workshops such as flour manufacturing factories, grain storing and processing factories, limestone, cement production factories and quarries, is known to be persistently high in Cyprus, and to pose a real risk for the health of the people employed there. In 2002, the estimated number of workshops with a dusty atmosphere in the Turkish Cypriot community was 338, in which over 1,900 workers were employed. This project aimed to reduce occupational illnesses by providing a healthier atmosphere in workplaces with heavy dust presence. Based on a sampling and monitoring methodology for particulate matter developed for the purpose of this project, air samples were taken from workshops and factories for laboratory analysis to determine the dust concentration in the indoor air. A medical survey of workshop employees was also carried out, focusing on their respiratory functions. This involved a medical questionnaire on occupational and health history, a pulmonary function test and X-rays. Dust monitoring data was collated and analyzed along with the medical survey results. Based on the evaluation of results, workshops with poor scores were required to take the necessary steps to improve working conditions such as modifications to existing work practices, improvement of ventilation systems or purchase of personal protective equipment. A training program was then organized for workshop/factory employers and employees to inform them of the possible health effects related to dust pollution, to raise awareness of the subject, and to improve existing working conditions. Seminars and training programs on dust pollution were conducted at some schools and factories, and an informative brochure was prepared for all employees, employers, students, teachers, inspectors and journalists involved in the project. In total tests included:

- 77 carpentries, of which 8 had elevated dust concentrations
- 6 animal feed production workshops, of which none had elevated dust concentrations
- 2 flour production factories and 2 grain processing workshops, of which 1 grain processing workshop had an extremely high dust concentration due to an uncovered processing unit.
- 4 rock breaking workplaces, of which 3 had elevated dust concentrations
- 9 mosaic, brick, concrete, painting, plaster and asphalt producing workplaces of which 4 had elevated dust concentrations
- 1 cement factory, which had normal dust concentrations
- 7 banks and offices (control group) of which one had unexpectedly elevated dust concentration levels due to the money counting process.

In total 200 employees underwent a medical survey. Of those, 38 were found to have some form of respiratory problem. Seminars and training programs on dust pollution were conducted at some schools and factories, and an informative brochure was prepared for all employees, employers, students, teachers, inspectors and journalists involved in the project.

Measuring Ambient Air Pollution Levels

Ambient Air Quality measurements have been carried out in the GCC since 1991 and in the TCC since 1995, using mobile measuring stations provided by the 'Environmental Protection - Air Pollution Monitoring and Control' project supported by UNHCR. According to the European Union (EU) Framework Directive 96/62/EC, a preliminary assessment of Ambient Air Quality is necessary for EU countries, the results of which are to be used to determine a network to be established for the systematic monitoring of air quality in accordance with the relevant EU Directives. In order to comply with this Directive, the internationally recommended diffusive sampling technique (involving a minimum of 200 sampling points) was used. This project aimed to assess ambient air quality, identify and suggest corrective measures for pollution sources,

make information on ambient air quality available to the public, supply input for the formation of air pollution management policies, and increase public awareness on the issues of urban and rural air pollution. For this project, measurement campaigns were concentrated primarily in urban areas throughout Cyprus to determine the geographical areas that receive the heaviest pollution load. Areas were divided into grids in which diffusive sampling of pollutants was carried out. Additional measurements were taken at selected points in rural areas to provide a comprehensive picture. Measurement involved:

- Diffusive sampling of aromatic hydrocarbons: Benzene, Toluene, Xylene, Nitrogen Dioxide, Ozone and Sulfur Dioxide.
- Active sampling for particulate matter, for size distribution of particles, and for aromatic hydrocarbons to validate the diffusive sampling process at different representative sites.
- Continuous monitoring using a mobile monitoring station.
- Vertical profile measurements of wind speed and direction using a tethered balloon in order to determine the influences of meteorological and climatological conditions.

Two weeks of bi-communal training were given to participants to ensure the use of effective and appropriate testing techniques and additional co-ordination workshops were held throughout the duration of the project. The results were then included in a report and a workshop took place to enable all participants to fully understand the program and its results. After the project ended, the results were presented in a conference aimed at building public awareness on pollution. The final report, completed in August 2004, contains the results of the preliminary assessment of Ambient Air Quality in Cyprus and makes recommendations for the Greek Cypriot and Turkish Cypriot implementing agencies on the network to be established for systematic monitoring of air quality in accordance with the relevant European Union Directives.

Assessment of Marine Debris Accumulation Along the Coastline

A pilot version of this project was implemented during the summer of 1998 and presented at an international meeting on the environment held in the Turkish Cypriot community in August 1998. The results indicated that the garbage problem on the beaches needed to be taken up on an international level as it appeared to originate from other countries in the Eastern Mediterranean. This project set out to compile the required data and scientific proof to initiate further action. The project aimed to determine the origin, source, composition, density, accumulation rate, geographic distribution and age of marine debris deposited along the coastline, to bring attention to the problem and promote a halt to the dumping of garbage in the Eastern Mediterranean, and to clean and maintain all beaches incorporated into the project. This project lasted a year. Six beaches that are not heavily used during the summer season were selected, measured and added to the five already covered by the pilot study. The sites were visited during the project period and all new debris was catalogued and recorded. Any changes in beach shape, width, etc. were also noted. The beaches were totally cleared of existing debris and the debris collected was categorised according to type (plastic container, medical, household goods etc). The data was analysed throughout the process and compiled at the end of the project period for comprehensive statistical analysis presented in a report. The main findings were the following:

- The bulk of the debris on northern Cyprus beaches is of marine origin.
- The debris consists mainly of plastic materials, medical waste and footwear, with varying smaller amounts of metal, glass and Styrofoam.
- The major portion of the debris is of Arabic and Lebanese origin.

- The composition and origin of the debris is similar at all sites, with higher levels of domestic debris at the Kalecik site.
- The amount of debris accumulation is highest at sites located along the northern shore of the Karpaz Peninsula, with levels decreasing towards the west.
- A large component of the debris is well-worn plastic pieces, which indicates the presence of a reservoir of old debris offshore that is repeatedly disturbed and deposited on beaches.
- No change was observed in the composition and origin of marine debris accumulating on northern Cyprus shores since 1998.

The report was distributed to environmental authorities, experts, international organizations and environmental societies.

Survey of Ecologically Important Areas

The aim of the study was to be able to designate 'Ecologically Important Areas' in the northern part of Cyprus in order to provide plans for their protection. A detailed study of the geological, graphical and climatic factors, as well as the flora and fauna of the region was undertaken. For the purposes of this study, twenty one different ecologically important areas were identified: Limnitis, Kalo Horio (Kapouti), Coast of Ayia Irini, Coast of Liveras, Coast of Orga, Panagra, Kambyli, Kanly Keuy, Geunyeli, St. Hilarion, Bufavento Castle, Kantara Castle, Ronnas Bay, Ayios Philon, Cape Andreas, Klidhes Island, Salamis Ruins, Salamis Salt Marshes, Silver Beach, Glapsides, Kouklia (Famagusta) and forest areas of the Northern Range. The first stage of the study was a review of recent literature on areas such as geology, climate, ecology, flora and fauna, archeology and human settlement. Thereafter, moving into the field, factors taken into consideration included the presence of diverse plant and animal species, climate, altitude, soil, water, topography and geographical formations. The report identified some Ecologically Important Areas and recommended preservation measures.

Inventory and Assessment of Olive Trees

This project aimed to prepare an island-wide inventory of the extent of olive and carob trees and their location/concentration in order to recommend a strategy for promoting awareness of their environmental value and historical significance. It also aimed at developing policies and directives to protect these landscapes and integrate them into tourist marketing and tourism projects. This project broadened the perspective with which olive trees have typically been viewed, not only seeing them as an agricultural resource but also incorporating insights from landscape ecology and tourism, and drawing on the discipline of ecological economics. The project produced a definitive country-wide inventory of olive trees and an assessment of their current status. A leading specialist made an extended field trip for this purpose, drawing on local expertise and involving local stakeholders to ensure that the knowledge gained remains within the community. Local university students were also involved. This was followed by the preparation of a management plan to ensure the trees' preservation for future generations. This included a strategy for promoting awareness of their environmental value and historical significance to target students of all ages, administrators and the general public, sensitising them to this important part of their natural/cultural heritage. It also included a set of policies and directives to protect these landscapes and ensure that their potential for environmental protection and for leisure and tourism is not threatened. Finally it proposed a set of practical measures on how to integrate olive and carob tree landscapes into tourist marketing and tourist projects. The final report was produced and disseminated. The recommendations in the report outlined an integrated approach including sensitising local communities and building awareness; alternative approaches to the management of olive landscapes; and inter-governmental

collaboration, and necessary directives to support the effort.

Monitoring of Garbage Pollution on Cyprus Beaches

This project was part of parallel initiatives of CYMEPA in the Greek Cypriot community and the Green Action Group in the Turkish Cypriot community, both of which are NGOs dedicated to environmental protection and conservation. Garbage collection projects on Cyprus beaches have been taking place in various forms since 1996. The main objective of this project was to permanently reduce garbage found on the beaches of Cyprus. In order to do so it aimed to create a databank on marine environment pollution; to enhance environmental awareness through top-level and massive public participation, as well as extensive press coverage; to clean beaches by removing garbage; and to bring environmentalists from the two communities together to share information on the marine environment. For each of these projects, teams of volunteers were formed to collect garbage from Cyprus beaches. Volunteers received T-shirts, garbage bags and specially designed data processing cards to record collected items. Collecting activities were accompanied by public awareness campaigns, where possible involving high-profile personalities. Where possible, the initial collection was complemented by follow-up visits and spot-checks. In 1999, teams of 4,235 volunteers collected 43,242 pieces of garbage from 57 beaches between May and November 1999. This data was used to start a databank that was added to during subsequent collections. Although bi-communal collection campaigns were not possible at that stage, the Green Action Group organized a parallel clean-up in the Kyrenia district and collaborated throughout in preparing the data collection cards and sharing results. The following year, 4,780 volunteers collected garbage from 72 beaches and the information was fed into the databank established the previous year. In 2001, the Green Action Group led the initiative and 30 beaches were cleaned by 1,012 volunteers. A parallel CYMEPA project was also implemented and results were exchanged between the two organizations. Studies resulting from each year's clean-up have been distributed to all relevant authorities and interested parties.

5. Infrastructure And Waste Management

Upgrading and Rehabilitation of Nicosia Area Sewerage System

In the late 1960s, the Government of Cyprus prepared a 50-year Master Plan for the sewerage and storm water collection system in the greater Nicosia area. Mia Milia, in the northeast of the city, was selected as the location for the sewerage treatment plant. A three-stage plan was prepared for construction of the treatment plant and expansion of collection system coverage, and implementation began in 1972. The events of 1974 however delayed completion of Stage I until 1980, and Stage II until mid-1986. An additional expansion of the treatment plant was completed in 1990, and further extensions to the collection system were carried out with UNHCR funds, including the trunk main along Hilarion Ave. and Trunk Sewer E. The rate of expansion of the collection system and high strengths of influents reaching the plant began to cause problems like strong unpleasant odours in the early 1990s. Initial efforts to resolve the problem, including the removal of embankments between the first two facultative lagoons in each series and installation of additional mixing and surface aerators in the existing lagoons, had limited success. All parties agreed on the need to incorporate proposals for alleviating the overload on treatment works into the long-term strategic plan. In 1998, the Bi-communal Development Programme supported the treatment plant expansion works and the relining of Trunk Sewer E, which was in danger of collapse. The sewerage project was designed to improve and extend the Nicosia sewerage system, which was being used and co-managed by both communities. The aim was to reduce environmental pollution from the overloaded and malfunctioning sewage treatment plant. Initial activities involved the expansion of the existing sewage treatment plant and the relining of the Trunk Sewer E. These were followed by

extensions of the sewerage network within Nicosia. Several environmental sub-projects followed the plant expansion:

- Tree-planting to replace those cut down to make room for the plant's facilities
- Study of flora and fauna within the boundaries of the treatment plant
- Study and design of a management plan for sludge disposal and reuse, if needed.

In 2000, a review of the management of the Nicosia sewerage system was approved, and carried out by the Turkish Cypriot Management Centre. The Management Centre audit team commented on the strengths and weaknesses of the Sewerage Department, identified possible management improvement measures, and developed an action plan for implementing their recommendations. Also in 2000, a project to install early warning systems was launched. The Integrated Monitoring Project collected data on effluent from the Mia Mila treatment plant. The General Laboratory used the data to develop an early warning tool for the Sewerage Department to avoid unsafe effluent entering the Pedieos River. Additional data collected at groundwater boreholes was used to refine the early warning model. The infrastructural elements were successfully completed. The project has also seen significant progress in terms of bi-communal co-operation and co-ordination. As early as September 2000 (long before the relaxation of travel restrictions throughout the island), two Greek Cypriot engineers from the Nicosia Sewerage Board were able to visit the treatment plant, and communications between the Greek Cypriot and Turkish Cypriot experts have been of high quality.

Waste Management Strategy for Cyprus

Most waste management projects approved by the BDP following this report were based on its recommendations. Before this project, Cyprus had neither an island-wide waste management plan nor the facilities for effective collection, treatment and disposal, although there were municipal solid and hazardous waste strategies being implemented for the Greek Cypriot community. Instead, waste was generally disposed of in 'landfills' that were not constructed according to any specifications or standards, or discharged into absorption/infiltration pits at industrial plants. Illegal dumping was common and the lack of segregation between municipal and hazardous solid and liquid waste posed a major problem to public health and the environment. Furthermore, the uncontrolled disposal of hazardous waste adversely impacted groundwater, surface waters, and the overall natural environment of the island. Environmental legislation did exist to protect public health and the environment in the Greek Cypriot community but the methodologies to do so had not been formulated or implemented. There was no legal framework regulating the collection, treatment and disposal of waste in the Turkish Cypriot community. Both communities are keen to further develop waste management methodologies in line with EU and US standards to improve public health and environmental conditions. The project aimed to prepare a waste management strategy for Cyprus based on a comprehensive assessment of past, current and proposed practices in both communities, and to identify possible areas of co-operation between public entities, private enterprises and NGOs, and between the Greek Cypriot and Turkish Cypriot communities. The project began with reviews of:

- relevant EU Directives and documents, US EPA Guidelines and USAID work on municipal solid and hazardous waste management and practices;
- completed and on-going Bi-communal Development Programme work in the area of waste management;
- relevant and available documentation/legislation/regulations, project reports/proposals, and statistical data on past, current and proposed waste

- management practices in both communities (through meetings and site visits as appropriate);
- the status of current waste management practices in both communities (with reference to the EU harmonization process).

The next phase involved the evaluation and interpretation of waste management practices, during which collected data from both communities was evaluated, practices were compared and the strengths and weaknesses of each community identified, and similarities and differences evaluated. The existing landfills that were candidates for upgrade, retrofit or expansion according to established standards were also identified. On the basis of this work, a set of island-wide waste management strategies was identified that would incorporate existing work plans/strategies for hazardous waste (liquid and solid) and municipal waste (solid) in areas where co-operation was considered feasible. The strategies were designed to be suitable for the local geographical, geological, and meteorological conditions, for waste minimization at source, waste collection, transport, storage, treatment and disposal, based on the quantity and characteristics of generated waste in Cyprus. They defined island-wide activities or projects and included recommendations and cost estimates on health risk assessment in order to develop better guidelines for public health and the environment, as relating to waste management. They also took into consideration assessment of municipal, regional and local capacities, as well as NGO and private sector capacities, to implement new waste management plans. The project also set out to identify problems in waste management in each community that could be resolved in a co-operative manner. Two workshops/seminars for local professionals, public entities, private enterprises and NGOs were organized in order to raise awareness and disseminate knowledge. The final report was presented in October 2003 and incorporates island-wide strategy recommendations that have subsequently had an important influence on Cypriot waste management policies, as well as leading to other projects such as *Inventory of Biodegradable Waste* and *Waste Management - Training the Trainers*.

Detection of Water Leaks in the Nicosia System

One of the environmental problems facing Cyprus is the decreasing availability of potable water supplies. One of the main reasons for this decrease in potable water reaching consumers is leakages in pipes, some of which were installed over 40 years ago. The aim of this project was to measure and ascertain the water losses due to leakages in the main potable network pipe, which encircles the old city of Nicosia and serves both communities of Nicosia, and in the subnetworks that serve consumers. It had been estimated that losses were approximately 50%. The project included studies on both the Inner and Outer Ring serving Nicosia. It concentrated on ascertaining leakages for two pilot areas served by the main pipe. The two areas selected for study were both in Kösklüçiftlik to the west of Nicosia. They were selected because of their good settlement order, their location near the green line, the fact that they receive their water through the southern part of Nicosia and the Inner Ring, and the fact that they receive a continuous water supply as needed. The pilot scheme involved placing water meters and valves on every inlet and outlet point to measure the amount of water coming in and going out - the difference was the loss of water through leakage from those pipes. The readings were recorded automatically by a data collector and transferred to a computer database for evaluation. Once the rate of leakage was determined, a leak detection program was launched involving the following:

- selection of an area to be served
- use of a listening rod on access points of the network to decide whether a pipe has a leak or not

- use of a noise correlator to locate the leak along the pipe
- use of a geophone to check the presence of leaks pinpointed by the noise correlator

The water leak detection pilot study showed estimated losses due to leakage of 55-75% in one area and 50-70% in the other. The detection of leaks took place between 19 November and 11 December 2002.

Water Supply Pilot Project - Installation of Pre-paid Meters in the Nicosia Area

This project followed on from the Water Leakage Detection Project. That project discovered that leakage was in excess of 75% of water purchased - in other words only 25% of the water was reaching the consumer. This project therefore focused on minimizing that water loss. The Water Leakage Detection Project provided the Municipality with equipment and skills to undertake detailed measurements of the water network to identify the location and rate of water loss from the system. Facilities were also provided (manpower and equipment) to record the survey findings and to create the basis of a detailed record of the water installation of Greater Nicosia in the north. The overall objective of this project was to improve the water supply network in certain areas of Nicosia by reducing leaks and wastage and improving the correct collection of water rates from consumers in the project area. In the long term, the project hoped to ensure the successful supply of water to the residents of Nicosia at a fair and economic cost. This project undertook works to the water supply network in the Taskinkoy and Ogremen Evleri areas of Nicosia including renewal of service pipes and the installation of pre-pay meters. These activities were accompanied by a Public Awareness and Information Leaflet. It is hoped that these elements will enable the development of an economic model and standard installation specifications meeting EU Standards for future development work. A public awareness campaign was conducted through the local press, information leaflets were distributed, meters purchased and connections are underway. The development of an economic model based on the pilot project is currently underway. It is hoped that the model will ultimately help to bring about the upgrading of the complete network and ensure its future maintenance.

De-silting and Fixing of Valves of the Marathassa Dam

The location of the Marathassa dam is such that the water catchment area is south of the buffer zone, the dam is in the buffer zone and the users are north of the buffer zone. The dam was built in the early 1960s and over the years has accumulated large amounts of silt. The estimate of silt depth at the start of this project was around 9m, amounting to around 30,000 cubic meters in total. The two gates used to regulate flow downstream are no longer operational. The accumulated silt has reduced the capacity of the dam and made it difficult for the irrigation channel to operate. The main objectives of this project were to clear the silt from the dam and dispose of it appropriately, fix two damaged gates, and enable the downstream farmers to get water for irrigation. The project involved emptying the dam in time for it to drain before the start of the November seasonal rains and to have the silt dried so that de-silting could be carried out and the silt could be transported for disposal at designated sites. 30,000 cubic meters of silt were removed during this project, which also involved the replacement of the existing gates. The project was completed as planned: silt removed, damages repaired and the irrigation channel is now functioning normally.

6. Environmental Impact Assessments

Lefka-Xeros Copper Mine Area Environmental Assessment

Sulfide ores have been mined and processed commercially for copper, gold and pyrite in the Lefka-Xeros area of northern Cyprus for much of the 20th century. Ores extracted from three primary mines, including the Mavrovouni mine near the town of Lefka, were processed at a plant

near the town of Xeros on the Mediterranean Sea. The mines and plant were abandoned after 1974, although some processing of ores did occur during the 1980s. After 1994, the Xeros plant was dismantled. This project aimed to assess the environmental situation of the Lefka-Xeros copper mine with a view to preparing recommendations for future action. Dr. Harvey Cohen, an environmental expert and geologist, carried out the initial assessment of the environmental situation of the Lefka-Xeros copper mine area in 2001. This assessment, which was performed in line with international standards, resulted in a report detailing the environmental impact of copper mining and processing activity in the Lefka-Xeros area. It highlighted concerns over elevated levels of metals and sulfate in soils and contamination of groundwater. Although the town's public water supply wells had not been significantly impacted, the report recommended a number of short-term and longer-term mitigation measures, including restricting access to the former CMC area, removal of some of the chemicals for storage or disposal, consultation of local residents, evaluate the extent of the contamination and the risk to local residents, implementation of remedial measures to alleviate soil and water contamination.

Environmental Assessments for UNHCR

As part of the BDP-funded project to control the pine processionary caterpillar, the BDP commissioned an environmental impact assessment comparing various control methods (chemical, biological, mechanical). This was performed by Dames and Moore.

Dames and Moore had performed assessments for UNHCR before the inception of the BDP, such as an EIA for the construction of an abbatoir, forestry and one for the use of pesticides and rodenticides against rats.

Another consultancy firm, Halcrow, had produced an environmental assessment study of the Nicosia sanitary sewerage system in 1997. But later, the BDP moved away from the UNHCR policy of commissioning environmental impact assessments themselves.

7. Veterinary and Agricultural Projects

Eradication of Echinococcosis

Echinococcosis/Hydatidosis (*Echinococcus granulosus*), a cyst-producing tapeworm, was widespread in Cyprus before the 1970s. A serious public health problem, with an annual surgical incidence rate of 12.9 per 100,000 inhabitants in 1970 (second only to Uruguay in the world), it also causes significant economic losses in animal production. The large number of stray dogs, and their contact with infected offal in the vicinity of abattoirs has been a major factor in the spread of the disease in Cyprus. In 1971, the first Echinococcosis Campaign was implemented. The primary eradication measure was the control of the dog population, particularly of strays, using specialist dog-destruction teams throughout the island. However, the shooting method used provoked serious complaints from organizations for the prevention of cruelty to animals. After 1974, the island-wide control program was divided into separate areas. In the north, control programs were suspended, while the program continued in the south. Over 85,000 dogs were exterminated between 1971 and 1985, after which the parasite was considered to have been eradicated from both livestock and dogs, and the campaign was officially terminated. However, intermittent outbreaks discovered during slaughterhouse inspections led to the reintroduction of the program in 1993. The project aims to support efforts towards the island-wide eradication of Echinococcosis, and to enhance co-operation between Turkish Cypriots and Greek Cypriots. The Eradication program was planned in three phases: Attack, Consolidation and Control. When the project was initiated in 1998, the northern part of Cyprus exhibited infection rates of 25-30% in sheep, 14% in cattle, 1% in goats and 3% in dogs,

and therefore began with the attack phase. Southern Cyprus, having eradicated the disease from most areas, maintained a consolidation program of testing and treatment. Attack phase activities implemented in the north involved:

- Control of stray dogs
- Registration and identification of all owned dogs
- Spaying of bitches
- Improved control of livestock slaughter and of carcass/offal disposal methods
- Testing and treatment of all dogs
- An information campaign, aimed mainly at local authorities in areas where teams would be working.

Specialist teams were trained to carry out all these activities. A humane cage-trap system compliant with the standards for prevention of cruelty to animals was designed and tested by the BDP's technical experts for use in the Echinococcosis Control Programme. After a successful pilot phase, and approval of the system by the animal welfare organizations of Cyprus, traps were set up island-wide in 1999, with 30 in the north, 47 in the south, and 13 in the buffer zone. The traps were supplemented by immobilization weapons in the north until 2002 in order to deal with the substantial population of half-wild stray dogs. In support of the control program, slaughterhouses were also upgraded, first in the south and later in the north, to allow for more hygienic disposal of carcasses and offal. Accompanying activities have included seminars and training workshops attended by technicians from both communities, and visits of Turkish Cypriot technicians to slaughterhouses in the south in order to prepare their own slaughterhouse plans. In June 2001, veterinary doctors from both communities attended the Congress of Hydatidology/Echinococcosis in Izmir, Turkey, and presented a common paper on the Eradication of Echinococcosis Project, receiving a special award for their presentation. The project results were also presented at the World Veterinary Congress in Tunisia in September 2002.

Eradication of Brucellosis

Brucellosis is a contagious disease that primarily affects cattle, pigs, sheep, goats and dogs. It is caused by bacteria of the *Brucella* genus and characterized primarily by abortion. Brucellosis also occasionally affects horses and can also cause serious public health problems for humans. This project sought the island-wide eradication of Brucellosis, the preparation of a common database of animals (cattle, sheep, goats) and to pave the way for inter-community trade in animals and animal products. It also aimed to enhance co-operation between Turkish Cypriots and Greek Cypriots on this subject. The project involved the following activities:

- Thorough survey of the sheep and goat population in the Greek Cypriot community in order to ascertain that Brucellosis continues to be under control.
- Obtaining data on the prevalence of Brucellosis among the sheep and goat population in the Greek Cypriot community that will assist in the declaration of the island as an officially Brucellosis-free island. Otherwise, if the disease is found to constitute a problem, to apply measures for its eradication;
- Introduction of a system of marking and identification of sheep and goats that will assist the Veterinary Service in carrying out the project effectively and, at the same time, which will be very useful in the control of various animal diseases, and the keeping of reliable epidemiological data;
- Blood sampling from a sample of sheep and goat flocks. If it is found that the disease was present at a level higher than 0.2% of the flocks, then the investigation

- would be expanded to include all flocks and all animals in any given flock. Infected animals would be removed and slaughtered.
- In infected flocks blood testing repeated monthly until the flock was declared free from brucella. All sheep and goats were to be identified with ear tags and their movement recorded in a database. Early infection rates were found at around 4.7-5.6% in sheep and 1.3-2.5% in goats.

Accompanying activities included joint training sessions attended by staff from both communities. As a result of the successful implementation of the Brucellosis Eradication Project, the disease rate in animals (cattle, sheep, goats) has decreased to below 1% throughout Cyprus. Its maintenance at this rate will depend on continued eradication and control activities.

Eradication of Salmonella in Poultry and Poultry Products

Salmonellosis is a zoonosis affecting humans and animals, including birds. Human Salmonellosis is a notifiable disease but the number of investigated cases in Cyprus is very low due to under reporting. Between 1989 and 1996, the Salmonella contamination of chicken carcasses and eggshells was 57% and 1.7% respectively. In addition 3.6% of breeding flocks tested positive for the disease. This project aimed to introduce a monitoring system of Salmonella prevalence in poultry rearing and breeding farms, as well as in broilers and their carcasses; to obtain data on the prevalence of Salmonella among the poultry population in Cyprus; to reduce Salmonella presence in rearing and breeding poultry farms; and to minimize the Salmonella presence on chicken carcasses and table eggs. The project was designed as a multi year project that began in the Greek Cypriot community with the hope of incorporating Turkish Cypriot participation at a later stage. The plans for this island-wide project involved a range of activities including registration of rearing and breeding farms, control of stock movement and testing of rearing and breeding flocks; microbiological examination of feedstuffs, hatcheries, day-old chickens, faeces, eggs and carcasses. Unfortunately, this project suffered from difficulties related to financial and technical reporting, and subsequently with a vaccination program. There were also problems related to the fact that farmers were giving the vaccinations rather than qualified officials. As a result, the project was suspended and equipment transferred to other projects such as the Echinococcus eradication program and the Moufflon conservation project.

Laboratory Facility and Equipment for Viral Diseases Detection

The original aims of this project were to set up a training laboratory for both communities for training in modern test methods in accordance with EU regulations; to develop standardized test methods for Cyprus; and to implement approved techniques based on international rules and regulations island-wide. It also aimed to obtain data on two specific diseases - Bluetongue and Infections Bovine Rhinotracheitis. During the implementation phase of this project, priority was given to the setting up of the laboratory for provision of training. The laboratory facilities have now been built and have made a valuable, and at times unexpected, contribution to a range of bi-communal projects that have benefited from the facilities. These include joint activities in the areas of Brucellosis control, Organic Farming and information about Mycorrhiza use. Several workshops and training sessions have taken place involving hundreds of participants.

Agriculture Protection - Field Rat and Medfly Campaigns

There are two species of rat that cause damage in Cyprus: the black rat (*rattus rattus frugivorous*) and the house mouse (*mus musculus*). In addition the brown rat (*rattus rattus norvegicus*) is prevalent in port towns. Rats have been a persistent problem in Cyprus, in both rural and urban areas. They attack a variety of crops, including carob, almonds, citrus,

strawberries and vegetables. Damage to carob trees is of most concern. Severe attacks on most carob-growing areas have been observed in the past. Rats attack carob pods both on the trees and in the stores. They also eat the bark, which can kill the tree. Livestock areas also provide conditions conducive to the presence of rats. Feed losses and spoilage are of great concern. Public health is also endangered as the rat flea can transmit murine typhus from rats to humans. The Mediterranean fruit fly, *ceratitis capitata*, commonly known as the Medfly, is known for its proficient reproductive cycle and voracious appetite for fruits and vegetables, which makes it difficult to eradicate and highly damaging to Cypriot citrus fruit production.

The aims of the field rat control campaign were to:

- Minimize rat population in rural and urban areas throughout Cyprus.
- Protect human and animal health from rodent related diseases.
- Protect crops, stored products, foodstuffs, etc.
- Protect plants, especially carob trees, deciduous trees and vegetation.

The Medfly campaign aimed to:

- Minimize the medfly population, which damages citrus crops.
- Minimize the economic damage caused to citrus trees by medfly.

From the start it was anticipated that these projects would be incorporated into an Integrated Pest Management (IPM) scheme at a later date. A comprehensive Environmental Impact Assessment was carried out before permission to use pesticides and rodenticides was received in 2000. The rat control program was designed to be bi-communal, and to involve both the health and waste management sectors. It was structured to emphasize hygiene in order to reduce possible breeding areas for the rat population. It was accompanied by an active public awareness campaign. The Medfly control program began with the use of malathion spraying but also explored alternative methods for medfly control including new technologies in mass trapping, and coordinated campaigns based on fly-counting exercises in badly infected areas. The introduction of an Integrated Pest Management scheme involved the use of a range of control methods in order to determine the optimum method or combination of methods. These methods were combined with an active public awareness campaign, careful monitoring and sampling and analysis to determine any detrimental side-effects of control methods used. IPM approaches to rat control included the use of the rodenticide Bromadiolone in carob trees, farms and buildings, the use of traps in buildings in rural areas, biological control through reintroducing snakes and owls to infested areas as natural predators. Careful co-ordination ensured that populations did not simply migrate to other unaffected areas during campaigns. IPM approaches to medfly control involved the use of the pesticide Malathion in combination with the insect attractant protein hydrolysate, use of traps to monitor the medfly population during the year, removal of fallen fruit from the ground where possible and again coordinated campaigns. Bi-communal meetings were held regularly throughout this project and were attended by experts from both sides. Efforts to reduce the island's rat population have not only measurably reduced damage to carob trees (as seen through controlled monitoring of marked trees) but have also reduced health risks, such as cases of murine typhus disease. After some problems with traps in livestock areas, the shift was made to wax bait blocks only. A significant difference was noted between livestock areas that were cleaned and had control programs implemented and those that were not cleaned and had limited intervention. Rat populations are now at an all-time low for Cyprus, although they are still sufficiently numerous to generate significant problems and to require the continuation of control efforts. The medfly control program has had limited success in bringing down medfly population numbers but has had a positive impact in that it has

encouraged growers to use less chemicals on their crops, thereby protecting the environment and saving money. Programs to release sterile medfly in future years are being investigated and considered.

Madison Dairy Advisory Group (MADAG)

Since 1999 bi-communal projects under the umbrella of UNDP/UNOPS were implemented and a significant rapprochement between the two communities has been achieved, at least on issues concerning control of dairy animal diseases. During a workshop in the United States sponsored by the US Embassy “**On the Enhancement of the Dairy Industry Management in Cyprus**” a comprehensive program was developed and the MADAG group established.

To achieve the goals of this integrated program and to be able to implement it, it was imperative that it was divided into smaller project proposals suitable for successful implementation. The proposal for “**Establishing Training Farms for Upgrading Farm Management Practices in Cyprus**” is the final of three projects designed under this initial program. “Synchronization and Harmonization of EU – Regulations was successful implemented and also the “Farm Survey Project” has successful started and the field work is presently ongoing.

It is a vital component of the program to enhance the Dairy industry in Cyprus that all parties are working to the same standards. This will prepare the ground for trade in animal and milk products. At present the existing rules and regulations and practices are not compatible. By establishing training farms and the provided training, a more level playing field will be established.

Existing achievements and reports

MADAG is a team of Bi-communal Experts (Veterinarians, Dairy experts, Farmers, Trade experts) brought together under a small grant proposal who are looking to the future and want to find ways to enhance the Dairy Industry as a whole in Cyprus. www.madag.info.

The main objectives are:

1. To establish model farms in accordance to EU & USA – Regulations **concerning milk and meat production** for demonstration purposes.
2. To use the farms as training facilities for farmers and farm labor.
3. To familiarize the farmers with the required technologies based on EU and USA standards.
4. To expose the farmers on practical advanced methods in:
 - Animal Breeding/Culling
 - Animal Feeding
 - Animal Health/Welfare
 - Milk production and milking methods
 - Hygiene methods
 - Fodder production
 - Waste management treatment
5. To educate the farmers on financial viable dairy farms.
6. To use the farms to train by year 2006 all Cypriot farmers (in the moment 1840 Dairy cattle farmers GC 240 / TC 1600) and 4400 Sheep and goat farmers (GC 4000 /TC 400)] on modern farm management systems and methods.

The project is supported by a Secretariat funded by the Bi-communal Development Program, which is implemented by UNDP/UNOPS. The two administrators, one Greek Cypriot one

Turkish Cypriot, working presently on the Farm Survey project will continue with the Training Farm project under the direction of the MADAG group and the guidance of UNDP/UNOPS. The sustainability of the project can be guaranteed by the following facts:

- Participation of Greek and Turkish Cypriot farmers
- Continuous exchange of experiences gained from the running of the model farms through Bi-communal meetings and Exchange of visits to the farms from either side
 - i. It is in the interest of the processors and they will promote their milk suppliers to participate in this program
- The support of the individual “consultants” in this field along with the respective officials would enable the project to provide a clear path for all to follow should the situation for trade become available.

The project output is to have the four training farms established and contracted for further use of training activities for farmers, with the ultimate objective of the gradual introduction of organic farming practices into Cyprus.

Key stakeholders

The Dairy industry in Cyprus is valuable to all Cypriots, both GCC & TCC. Any efforts leading to a more regulated and enhanced industry will benefit both communities. The main beneficiaries will obviously be the 8000 farmers who can play a vital role in the support of the entire sector. Since the raw material milk is the key issue in the dairy business and as such is being recognized by all legislator and technical European and World Authorities it is essential to support the milk production. Most of the Cyprus farmers are a family business so the role of the woman-farmers is actually really important, therefore this survey will also implement several genders related questions.

Implementation strategy

- Establishment of one to two demonstration farms of each type (dairy cattle, sheep and goat) in each community, with the purpose of providing training to 6240 Cypriot farmers, Greeks and Turks, on modern farm management practices.
- Inform dairy farm managers of the demonstration farms project and the benefits to and obligations of those selected.
- Actively encourage the managers for those types of farms to apply.
- MADAG will determine the types and sizes of farms they would like as demonstration farms.
- Assist dairy farm manager that apply in constructing a financial and labor analysis of their farm business. A complete financial and labor analysis is a necessary condition of selection.
- Select willing progressive dairy farm managers.
- Have an open house at this farm before the capital improvements are put in place.
- At the open house have “experts” on hand to explain to those attending what they think needs to be done in order to bring this farm up to EU standards and what that will cost.
- Renovations should be selected with profit and labor savings in the forefront, not to the newest, latest and greatest technologies.
- Have the “experts” work with the farm manager to construct a capital renovation plan.
- Do the capital renovations.
- Have a demonstration day as soon after construction as possible and provide information as to costs and constructing problems and challenges.
- Get both GCs and TCs to attend the demonstration days in both communities.
- The methods employed will be the latest, by international standards, technologies but adjusted, where applicable, to the Cyprus climatic/soil conditions. These will include:

- Facilities to implement in practice modern animal husbandry methods
- Hygienic production/handling of milk and related products.
- Training on the management of small, cost effective effluent/ manure treatment systems
- Training on financial running of the farm

COAG and IBARESS

The term “Organic” refers to the agricultural production systems used to produce food and fiber. All kinds of products can be produced organically, including grains, meat, dairy, eggs, and fibers such as cotton, flowers, and processed food products. The production of organic products is especially gentle on the environment - this is good for nature, the producers and consumers of this food. Organic Agriculture counts on the self-regulation forces of nature. Chemical-synthetic mineral fertilizers and pesticides are not allowed to be used. Organic food is produced by farmers who emphasize the use of renewable resources and the conservation of soil and water to enhance environmental quality for future generations. Organic meat, poultry, eggs, and dairy products come from animals that are given no antibiotics or growth hormones. To put it simply, the Organic system of farming is the purest practical way to minimise chemicals in food, and environmental impact, combined with the highest standards of animal welfare. During 2004 several activities, seminars, workshops and site visits, relating to Organic Farming took place under the BDP program with high success rate. From the beginning there was a high level of interest with over 140 attendees for the first seminar, being an equal split between the two communities. From the very first joint activity, the participants from both communities addressed their continuing interest in this subject and asked for further support. Based on this fact, Organic Farming (OG) was integrated in the Substantive Revision of the Bi-communal Development Programme and there implemented under outcome “Economic Partnerships for Growth and Environmental Sustainability” with the intended output “Organic Farming – Workshops to consolidate island-wide organic farming association.” Cyprus being a small island, the environmental consequences of intensive conventional agriculture, deforestation and ground and water pollution can be devastating. Following the success of the recent Organic Agriculture Technology workshops organised jointly by AKTI and Ace Care Consultancy (TC) at the Veterinary and Environmental Training (VET) Facility, it has become clear that Cypriots are keen to find sustainable solutions to ecological problems.

Existing achievements and reports

The BDP Organic Farming Strategy was implemented in several phases, first by introducing the concept to Cypriot farmers and other interested parties, then by providing them with an introduction to the tools required for a successful organic farming conversion, and more recently by the creation of the Cyprus Organic Advisory Group:

- ***Organic Farming Seminar (Promotion of Organic Agriculture):*** The main objective of this project was to provide support to efforts for promoting organic agriculture and providing farmers with information about making the shift from conventional to organic agriculture, in the hope of generating momentum and support for further development of organic agriculture in Cyprus. The focus of the initial project was a bi-communal seminar/workshop held on 17 March 2004 at Ledra Palace for Turkish Cypriot and Greek Cypriot farmers, along with people from relevant authorities and consumer associations. At the seminar, presentations were given on the following themes:
 - Prof. Bernhard Freyer, Organic Farming Institute, BOKU University, Vienna: 'Why go organic? The EU policies and the good example of Austria.'

- Dr Jocken Kopp, University of Hohenheim, Germany: 'Production, processing, labelling and marketing.'
- Dr. Ioannis Papastylianou, Agriculture Research Institute: 'Research in organic agriculture in Cyprus.'
- Nicolas Kanaris, Horticulturist and Farmer: 'Organic Agriculture - The current situation in Cyprus.'
- Huda Aksoy, Farmer: 'The current situation and the potential of agriculture in the north of Cyprus.'

An active round-table discussion entitled 'Organic Agriculture: Our Common Future' co-ordinated by environmental engineer, Michael Lozides, followed the presentations. A Bi-communal Farmers Committee was established prior to the seminar to promote the seminar, and with the broader responsibility to help bring together Greek Cypriot and Turkish Cypriot farmers, promote their interests, and try to find common solutions to their problems. An information leaflet was distributed to inform farmers and the public about the environmental and economic benefits of organic agricultural practices, existing sources of information, and funding opportunities in Cyprus and the EU. All material was provided in Greek, Turkish and English. Over 120 people attended the seminar on 17 March 2004.

- *Natural Solutions for Agriculture: Application of Organic Tools in Farming*: Based on the success of the organic farming seminar, it was decided to introduce farmers and researchers to some scientific concepts that would aid the implementation of organic farming in Cyprus. Mycorrhizae are fungal organisms, which live in symbiosis with plant roots in the soil. They help provide the plants with nutrients, but also to protect them against dangerous chemicals or soilborne diseases. They could be extremely useful in Cyprus for helping the revegetation of abandoned copper and asbestos mines and for helping plants colonise areas of high salinity or semi-desert areas. Mycorrhizae can help access nutrients in soil that plant roots alone cannot exploit; they can protect their host from invasion by soilborne pathogens such as *Fusarium*, which are a common problem for Cypriot agriculture; and they can protect plants against heavy metals and other toxic compounds often found in waste water - a function that would help with projects to exploit waste water for agriculture in Cyprus. The ultimate objective of this project was to provide organic agriculture in Cyprus with an additional tool (Mycorrhizae) to produce better crops; to provide a solution for the re-vegetation of abandoned mines and quarries; and to improve exploitation of nutrient-poor soils for agricultural purposes. This project was a 'training the trainers' exercise involving a 4-day technical training seminar. Although the knowledge acquired will ultimately benefit farmers, participants were scientists or technicians in agronomy, ecology or forestry. Additional lectures were offered to a much broader audience, including the media. Potential participants each from the Greek Cypriot and Turkish Cypriot communities were invited. Universities, forestry and agricultural departments, farming representatives, the agronomic business community and research institutes were asked to put forward a list of interested staff. Trainers included experts from the UK, Turkey, the Czech Republic and Israel. The first day of the workshop involved a series of seminars on the potential applications of mycorrhizal technology in Cyprus, to which a broader audience was invited including local farming representatives, environmental NGOs, and forestry and agriculture officials. The second day of the workshop entailed specific lectures aimed at agriculture/forestry professionals and scientists. The lectures presented more technical information. On the third day, a laboratory training session involving the handling and manipulation of mycorrhizal fungi was held for 30 scientists at the UNDP/UNOPS Veterinary and Environmental Training Facility. On day four, a visit was made to an organic farm, as well as an environmentally stressed site (a copper mine) in

order to discuss the potential practical applications of the technology. Despite the vast range of potential applications of mycorrhizae in Cyprus (re-forestation, organic farming, erosion control, bioremediation of abandoned mines and quarries), the general public is relatively unaware about them. Press releases were issued to inform the media about the workshop and its implications. Trainers offered interviews to interested journalists, and information leaflets were widely distributed in Greek, Turkish and English. Over 50 people from the Greek Cypriot and Turkish Cypriot communities attended the four-day workshop, which brought together scientists, farmers, representatives of civil society and civil servants concerned with a sustainable future for farming, mining and forestry in Cyprus. The lectures, laboratory demonstration and field trip gave the participants a thorough introduction to the biology, ecology and agricultural applications of mycorrhizae, and generated wide interest in follow-up activities in the fields of re-forestation and organic agriculture.

- *Innovative Biological Approaches for the Reforestation of Environmentally Stressed Sites* (IBARESS). Based on the success of the two previous workshops, it was decided to set up the Cyprus Organic Advisory Group (COAG), which would help TC and GC farmer's network and develop a strategy for conversion to organic farming. In parallel, the IBARESS project will use mycorrhizal technology in several field trials in order to demonstrate the power of this natural, sustainable technology for organic farming and reforestation in Cyprus.
- **Contaminant Content of Cyprus Soils:** This is a sequel to a successful project funded by the BDP in 2004, which was entitled *Selenium content of Cyprus soils*. This new project will use soil samples collected under the Selenium project, to test for dangerous, possibly carcinogenic compounds such as Cadmium, in Cyprus soils. Cadmium and other toxic compounds are often caused by inputs from intensive farming, so this project could provide additional justification for COAG's aims to implement organic farming in Cyprus.

Key stakeholders

- Since 2001, a program to support organic farming was introduced, including a law on organic farming. The Department of Agriculture is preparing a register of organic farmers and developing certification and inspection guidelines.
- The PFF also has an organic farming support program (€ 400,000), especially in the TCC, where they intend to create an association of organic farmers).
- Agricultural Research Institute (GC): This institute, which operates under MANRE, will be a key partner for any organic farming initiative, since it is a source of expertise in agricultural technology, agricultural economics and applied agricultural science.

Implementation strategy

The established integrated workgroup "COAG" began to operate in 2005 as an island wide operating group on Organic Farming and will start with an awareness campaign. In particular the group has established a website (www.cyprusorganics.org), designed market research and awareness material for farmers and consumers, and retailers, arranged seminars, and participated in the 2005 state fair. A Strategy (Assessment) for the practical implementation of Organic Farming in Cyprus is being developed.

8. Cleanup and recycling activities

Cans for Kids

Cans for Kids (Cyprus Anthropoc Society for Children) started in November 1990 as a small-scale idea aimed at promoting environmental awareness in Cyprus. It was based on the belief

that the public would more readily recycle aluminum if the proceeds were used to benefit the community. The organization is now a registered charity, which collects and recycles aluminum cans and uses the funds raised by the sale of scrap aluminum to buy medical equipment for the children's wards at Makarios Hospital in Nicosia. In this way it not only benefits Nicosia residents but very sick children from all over Cyprus who are sent to Makarios Hospital for treatment. This project aimed to prepare a mobile crushing unit to expand the collection and crushing of aluminum cans for recycling from all over Cyprus. The project bought a can condenser, a can pre-sorter and a lightweight lorry to prepare the mobile recycling unit. Through an intensive publicity campaign to advertise the new mobile unit and its schedule, the public was also informed about the benefits and advantages of recycling, as well as encouraged to bring their cans to appropriate points for recycling. Municipalities, hotels, seaports and airports were all invited to participate. Following its launch at a press conference in December 2001, the mobile recycling unit began its collections in February 2002 from the Makarios Hospital, the Green Line schools, the Falcon School, the American International School, Highgate School, Ayii Omologites school and other existing collection points in Nicosia. Can banks were later placed at a range of other locations including schools in Limassol, locations on British bases and a supermarket in Paphos. New collection points are still being established and the project has continued regularly to donate equipment to Makarios Hospital.

Recycle a can to repel cancer

The Environment and Energy Association's (EEA) mission is to raise interest to promote the use of renewable forms of energy in as many applications. This project aimed to collect and recycle metal cans in order to reclaim part of the energy used in producing them; to raise public interest, especially among the younger generation, in renewable energy sources and their applications; and to raise funds for a local hospital engaged in cancer research. This project focused initially on the Eastern Mediterranean University (EMU) campus where around 8,000 cans a day are dumped in rubbish bins. A Solar Photovoltaic system was used as the power supply for separating and crushing units designed by the Environment and Energy Association (EEA) and manufactured locally. Cans were collected using separator and crushing units. Initial supplies came from the catering services within the EMU campus, who were asked to participate by collecting cans in sacks provided by the EEA. The Student Union was asked to organize volunteers to collect the filled sacks. In addition notices were placed throughout the area asking students to use dustbins supplied for can collection. Crushed cans were sold to a local merchant and the income from this was used to maintain and operate the collection units. Any profits were donated to a local hospital engaged in cancer research. Additional demonstrations of the unit were organized in primary and secondary schools, as well as at the Environment Day celebrations in June 2003. The can separator and crusher units are now fully operational and independent in terms of energy supply. They are in place at the Eastern Mediterranean University campus and are kept well supplied with cans for recycling. In all, 26 demonstration visits to secondary and technical schools were organized. In addition 5,000 brochures were printed and a website is under construction. The funds raised from selling the crushed cans go to a local hospital engaged in cancer research. A successful meeting was held to share experiences and knowledge with the parallel Greek Cypriot project - Cans for Kids.

Mediterranean Deep Sea Clean-up

The long term goal of this project was to generate a permanent reduction in garbage found in the sea and on beaches around Cyprus. In order to do so, the project aimed to clean up the Mediterranean seabed at locations around Cyprus by removing garbage; to raise awareness about the issue of marine pollution; and to create an inventory of garbage items and the locations in which they were found; to encourage action to eliminate garbage in the marine environment. It also aimed to bring environmentalists from the two communities together, and

to promote public awareness and concern for the state of Cyprus beaches and seabed. On 26 November 2002, CYMEPA organized a beach and underwater clean up covering 14 beaches from Paralimni to Pomos. Local radio and TV stations, as well as newspapers, magazines and Cypriot celebrities were invited to promote the event. Volunteers were provided with free T-shirts and with disposable plastic gloves to safeguard personal hygiene during the collection. A data collection card was designed with easy-to-follow instructions for filling in. The card was printed in both Greek and English to allow non-Greek speakers to participate. The data recorded on the cards were fed into a spreadsheet for analysis. The results were displayed on the CYMEPA website and the inventory was distributed to relevant authorities and interested individuals/organizations in Cyprus and abroad. Locations were selected on the basis of local authorities' recommendations of sites with significant garbage problems accessible to divers. The surrounding Municipalities undertook to remove safely all collected garbage to licensed landfills. All divers were PADI certified. The teams of divers were later invited to adopt and regularly clean their designated location. 116 divers in 14 teams cleaned spots on the seabed. Items collected included tires, sunbeds, umbrellas and even a motorbike. Divers left anything that improves fish habitat by providing shelter on the seabed such as large items encrusted with marine life. A group of Turkish Cypriots joined a group of Greek Cypriots to clean the seabed near Castella of Agios Tychonas. 1,180 volunteers participated in the beach clean up on 11 beaches and collected 20,511 garbage items. 68% were plastic or polystyrene, 10% were metal, 9% were paper and 7% were glass. It was discovered that the vast majority of garbage found on the beaches originates from land sources as opposed to shipping sources. Within 48 hours of the clean up activities the local authorities removed the garbage collected.

Pedieos River and Green Corners of my Neighbourhood Garbage Clean-ups

This project, which began as an initiative of the Cyprus Marine Environment Protection Agency (CYMEPA) was subsequently able to expand to incorporate the Society for International Development (SID) in a bi-communal effort through the Green Corners of my Neighborhood project, drawing on experience gained by both organizations in environmental clean-ups, public awareness campaigns and volunteer management. For the first two years (2000 and 2001) these related project aimed to organize a clean up campaign in the Pedieos River, first for Nicosia and then for Strovolos municipality. The project aimed to use data collection cards to contribute to a databank on city pollution and to enhance environmental awareness through public participation, media coverage and by running various competitions. The spin-off of these projects - Green Corners of my Neighborhood - aimed to clean up green corners in urban areas and to create awareness about pollution in order to encourage the protection of the environment. All these projects aimed to foster relationships between Greek Cypriot and Turkish Cypriot environmentalists. For each year, awareness campaigns were launched to attract attention to the problem of litter and to help enroll a large number of volunteers. The awareness campaigns included leaflets distributed door-to-door; posters advertising the projects; advertisements through newspapers, TV and radio; information packs; and activity packs for children. During the 2004 campaign, special emphasis was placed on the concept of protecting local 'green corners' and ecosystems. The campaigns of 2001 and 2002 focused on the Pedieos River in the Nicosia and Strovolos municipalities respectively. For 2004, in addition to the planned clean-up of the banks of the Pedieos River, twenty 'Green Corners' were identified for cleaning in the Nicosia and Morphou areas. Specific teaching packs were prepared for schools involved in the project to promote increased recognition of the value of green spaces of the city and coastal areas as refuges for life; to teach observation skills for plants, animals and rock formations; to provide information about and encourage protection of local ecosystems, and to help make their neighborhoods better places. For each of the clean-ups, registered teams were given an information pack, T-shirts, data cards, gloves, plastic bags, and participation certificates. Data cards were given to selected groups of volunteers for

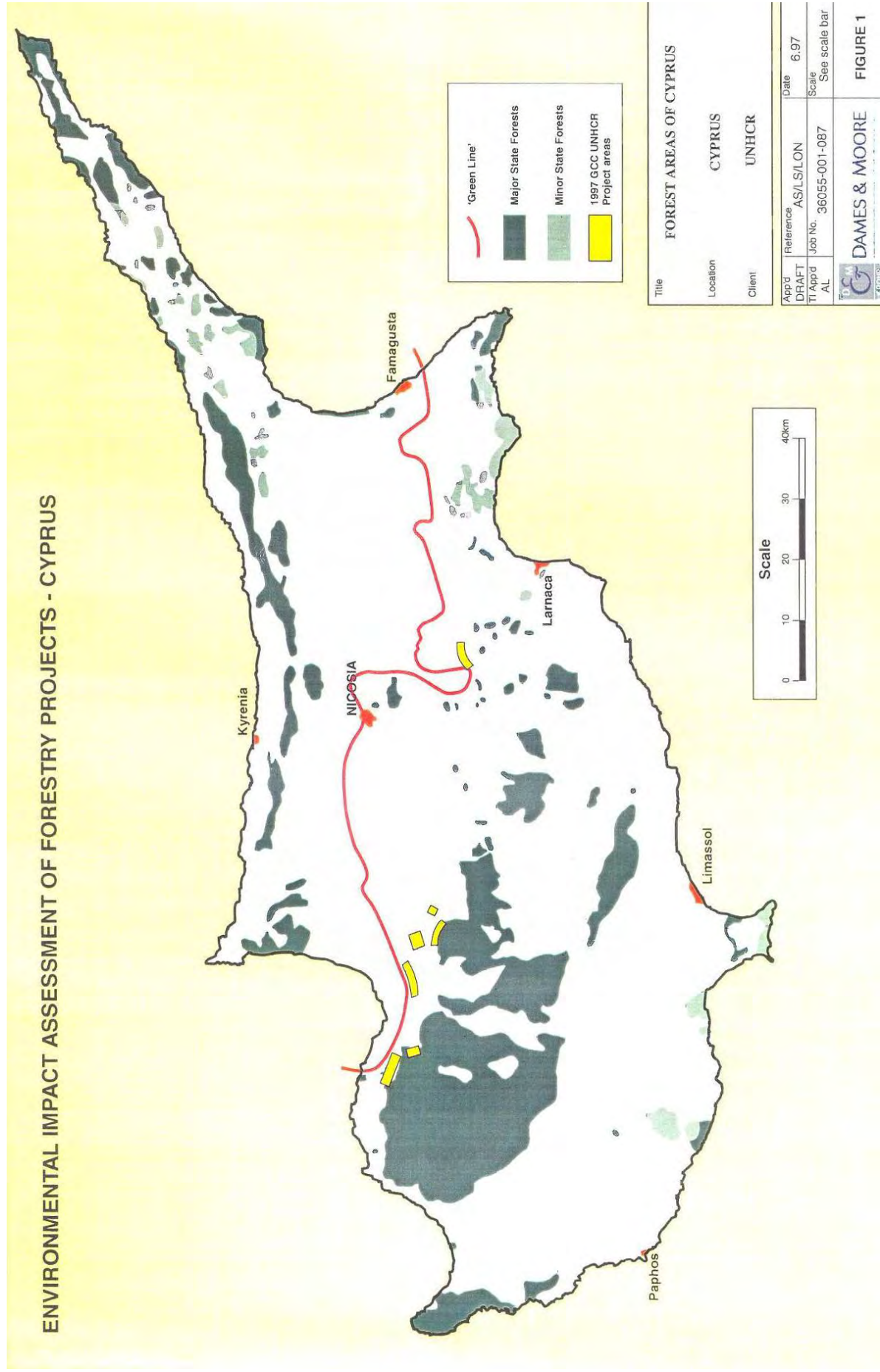
completion. The completed cards were used to compile a database to help trace the sources of pollution. The database was then given to the local authorities to aid them in removing these sources. The clean-ups have had consistently high attendance - around 850 in 2001, 950 in 2002 and nearly 1,500 in 2004. The easing of crossings greatly improved the flow of information between the two communities. By 2004, the clean-up process was a fully integrated bi-communal effort with high levels of participation and interaction from both communities.

ANNEX C

Environment, Natural Resources, and Biodiversity Related Maps of Cyprus

Annex C, Figure 2. Forested Areas of Cyprus

Source: FORTECH, 1997



Annex C, Figure 3. Location of Endemic Flora in Cyprus

Source: FORTECH, 1997

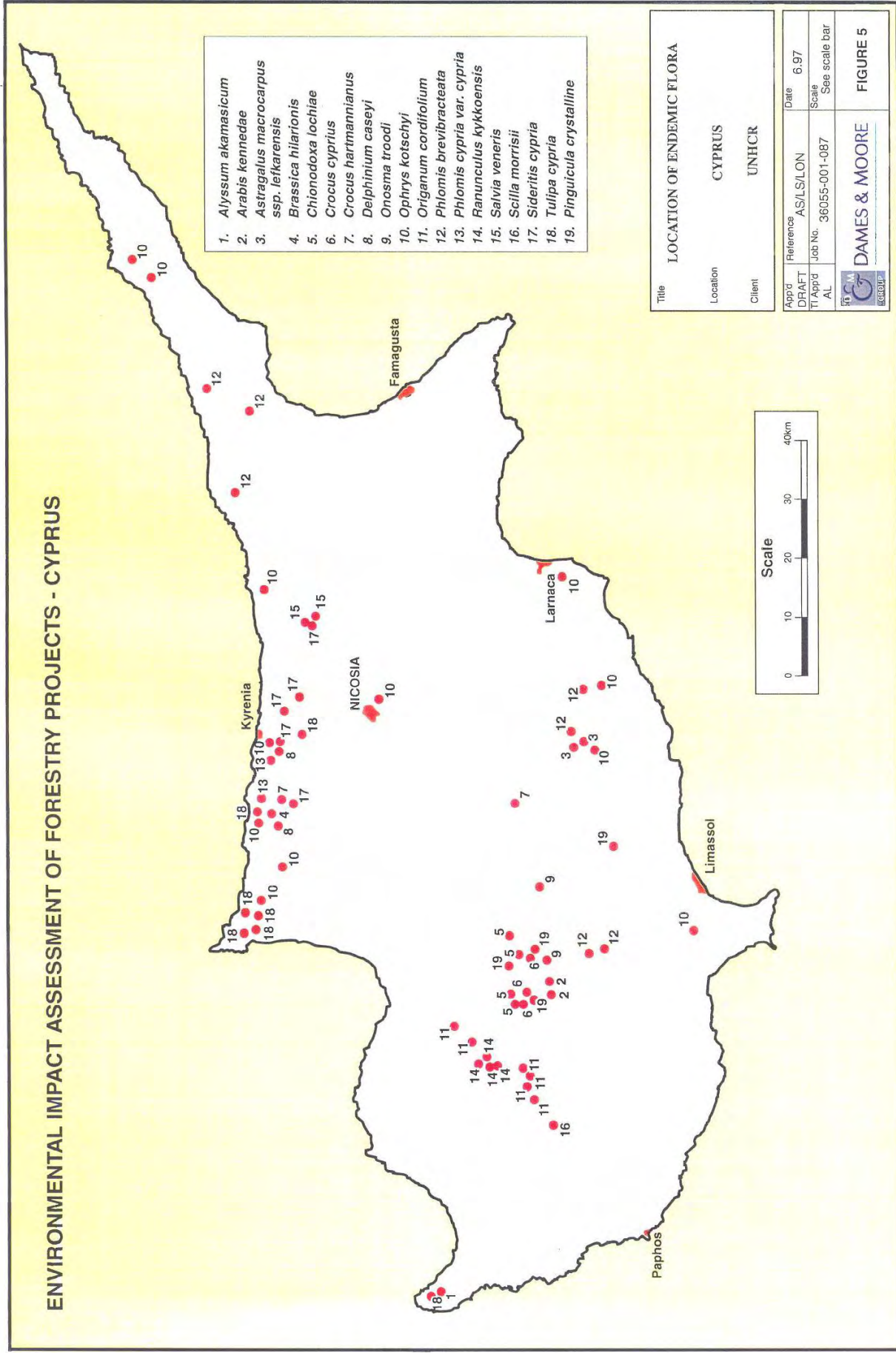
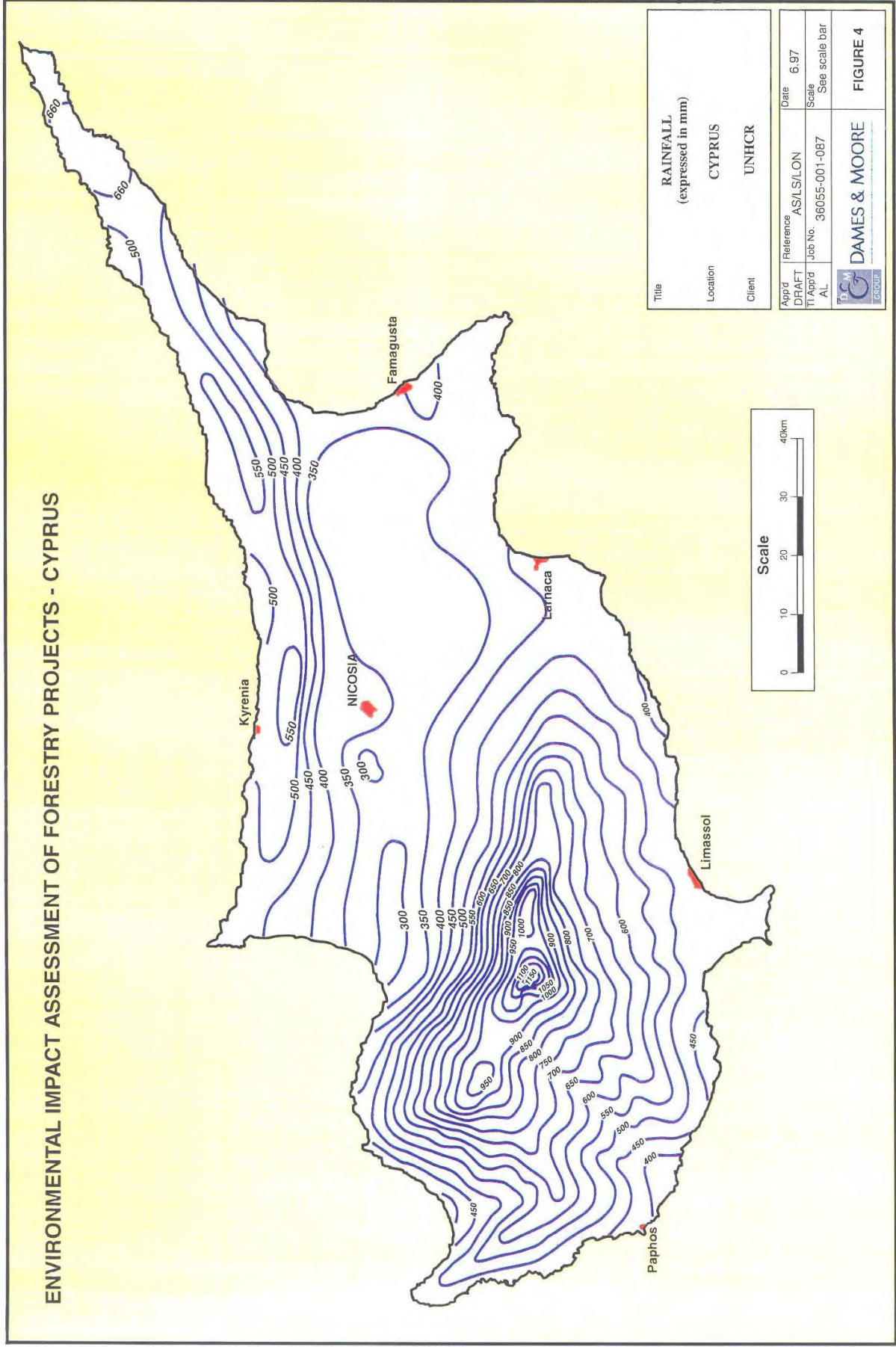


FIGURE 5

DAMES & MOORE

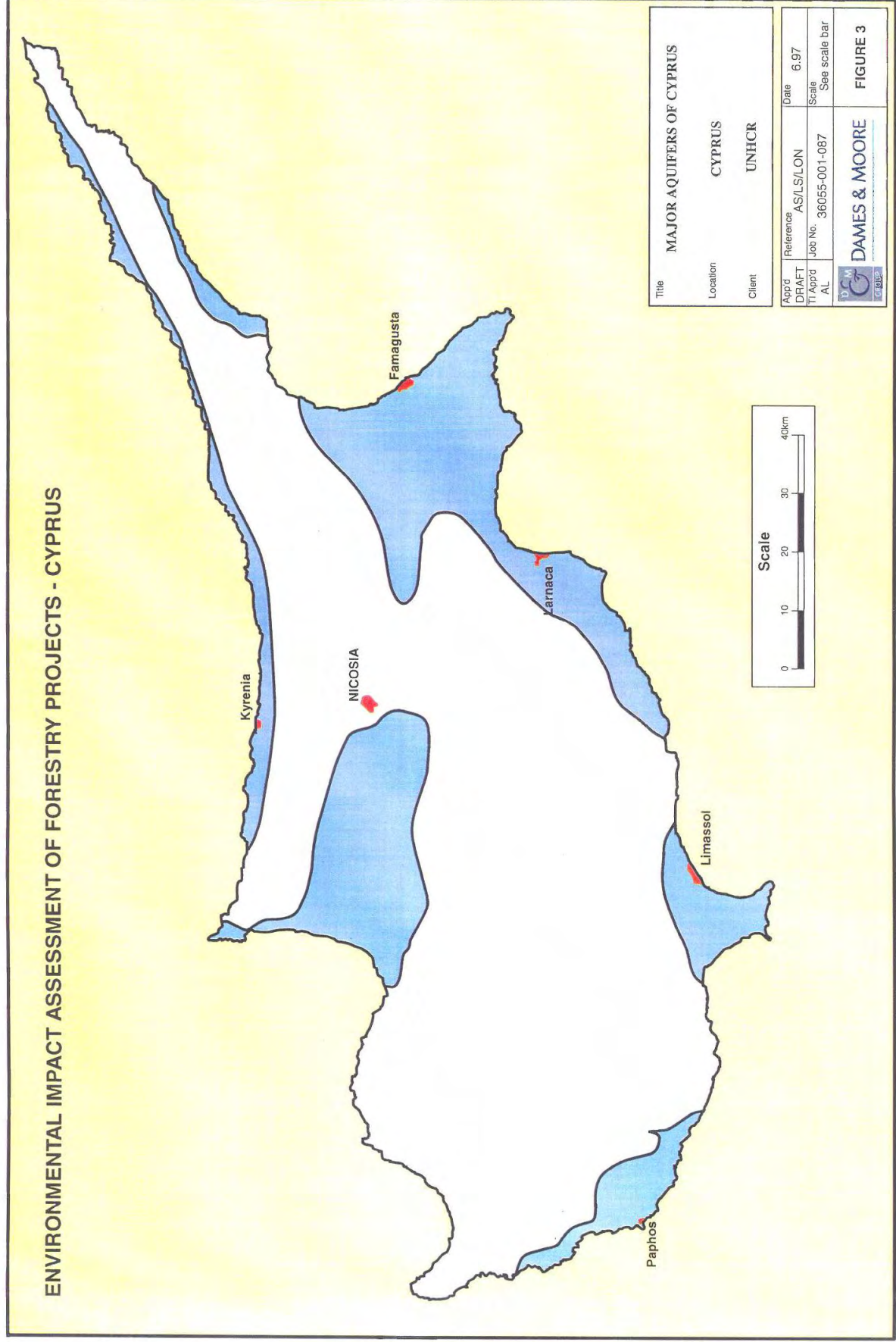
Annex C, Figure 4. Estimated Rainfall in Cyprus

Source: FORTECH, 1997

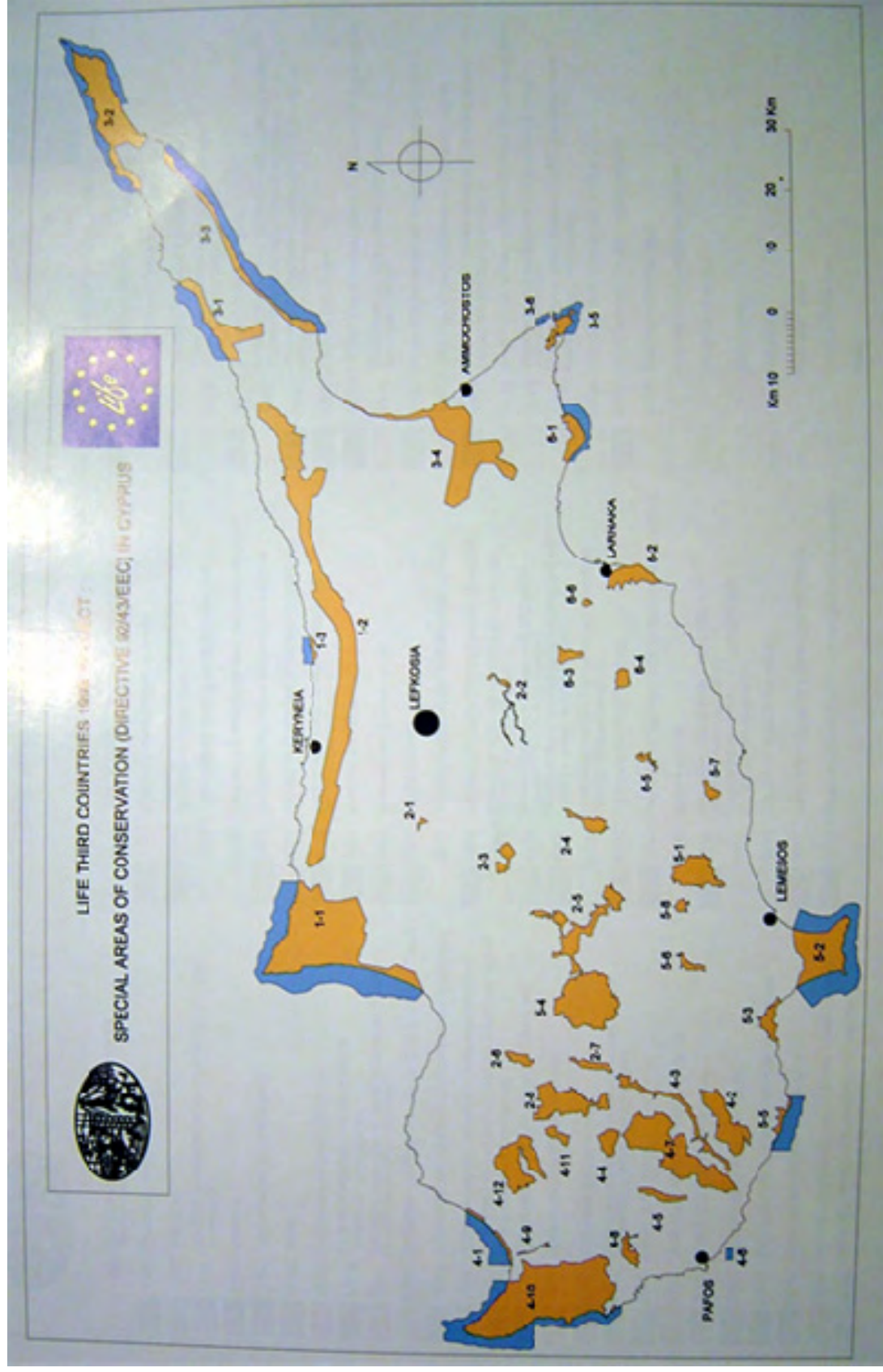


ANNEX C, Figure 5. Major Aquifers of Cyprus

Source: FORTECH, 1997



ANNEX C, Figure 6. Natura 2000 sites designated by the Republic of Cyprus.



Note: Natura 2000 sites located in the TCC are not currently in force. Map Source: "Natura 2000" Network: Special Areas of Conservation (Directive 92/43/EEC) in Cyprus.

ANNEX D

International Conventions

ANNEX D

INTERNATIONAL CONVENTIONS

To-date, Cyprus has ratified several international environmental agreements. Unfortunately, these conventions apply only to the officially recognized Republic of Cyprus, and recent efforts by the TCC to have sites listed under the Ramsar convention, the Blue Flag campaign or other conventions have been unsuccessful due to issues of recognition of the TCC. Adapted from Jarraud, 2005.

D.1. Cyprus membership of International Environmental Conventions

Convention	Date	Ratification by Cyprus
United Nations Framework Convention on Climate Change (UNFCCC)	1992	1997
Kyoto Protocol on Climate Change	1997	1999
Ramsar Convention on Wetlands	1971	2001
United Nations Convention to Combat Desertification (UNCCD)		1999
United Nations Convention on Biological Diversity (CBD)	1992	1996
Convention on Long-Range Transboundary Air Pollution	1979	
Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES)	1973	1975
Convention on the Prohibition of Military or any other Hostile Use of Environmental Modification Techniques	1977	1978
Convention on the Protection of Migratory Species of Wild Animals (also known as CMS or Bonn Convention)		2001
Vienna Convention for the Protection of the Ozone Layer/Montreal Protocol	1985/1987	1992/2001
European Convention for the Protection of Pet Animals	1993	1993
European Convention for the Protection of Vertebrate Animals Used for Experimental and other Scientific Purposes	1993	1999
European Convention for the Protection of Animals During International Transport	1976	1976
European Convention for the Protection of Animals Kept for Farming Purposes	1977	1977
Convention on the Conservation of the European Wildlife and Natural Habitats		1988
Convention on the Prevention of Marine Pollution by Dumping of Waste and Other Matter	1972	
International Convention for the Prevention of Marine Pollution from Ships	1973	
Barcelona Convention		
General Fisheries Commission for the Mediterranean		~2003
FAO agreement to promote compliance with International Conservation and Management Measures by Fisheries Vessels on the High Seas	1993	

Convention for the Protection of the Mediterranean Against Pollution		
Protocol for the Prevention of Pollution of the Mediterranean by Dumping from Ships and Aircraft		
Protocol for Co-operation in Combating Pollution of the Mediterranean by Oil and Other Harmful Substances in Cases of Emergency		
Convention for the Protection of the Mediterranean Against Pollution from Land-based Sources		
UN Agreement for the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks	1995	
International Commission for the Conservation of Atlantic Tuna (ICCAT)		
United Nations Convention on the Law of the Sea (UNCLOS)	1982	
Aarhus Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters	1998	2002
Cartagena Protocol on Biosafety	2000	2004
Convention for the Safe Use of Asbestos	1992	1992
Basel Convention on Hazardous Wastes	1989	1992
Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS)		1996
Natura 2000/Emerald Network		2001
International Union for Plant Variety Rights (UPOV) Convention		2002

ANNEX E

List of Endangered Species: IUCN Red List for Cyprus

ANNEX E

LIST OF ENDANGERED SPECIES: IUCN RED LIST FOR CYPRUS

E.1 IUCN Red List for Cyprus

CRITICALLY ENDANGERED (CR)			
Scientific Name	Common Name(s)	[Red List]	Trend
Chelonia mydas (Mediterranean subpopulation)	GREEN TURTLE	CR A1a, B1+2ce, E ver 2.3 (1994)	
Monachus monachus	MEDITERRANEAN MONK SEAL	CR C2a ver 2.3 (1994)	?
Numenius tenuirostris	LONG-BILLED CURLEW SLENDER-BILLED CURLEW	CR C2a(ii); D ver 3.1 (2001)	↓
ENDANGERED (EN)			
Scientific Name	Common Name(s)	[Red List]	Trend
Ovis orientalis ssp. ophion	CYPRIAN WILD SHEEP CYPRUS MOUFLON	EN A1a ver 2.3 (1994)	↓
Caretta caretta	LOGGERHEAD	EN A1abd ver 2.3 (1994)	
Pagrus pagrus	RED PORGY	EN A1bd+2d ver 2.3 (1994)	
Delphinus delphis (Mediterranean subpopulation)	SHORT-BEAKED COMMON DOLPHIN	EN A2abc ver 3.1 (2001)	↓
Falco cherrug	SAKER FALCON	EN A2bcd+3bcd ver 3.1 (2001)	
Oxyura leucocephala	WHITE-HEADED DUCK)	EN A2bcde ver 3.1 (2001)	↓
Chelonia mydas	GREEN TURTLE	EN A2bd ver 3.1 (2001)	↓
Epinephelus marginatus	DUSKY GROUPER	EN A2d ver 3.1 (2001)	↓
Coluber cypriensis		EN C2a, D ver 2.3 (1994)	
VULNERABLE (VU)			
Scientific Name	Common Name(s)	[Red List]	Trend
Carcharias taurus	GREY NURSE SHARK SAND TIGER SHARK	VU A1ab+2d ver 2.3 (1994)	?
Squatina squatina	ANGEL SHARK	VU A1abcd+A2d ver 2.3 (1994)	↓
Galeorhinus galeus	SCHOOL SHARK TOPE SHARK	VU A1bd ver 2.3 (1994)	↓
Mobula mobular	DEVIL FISH GIANT DEVILRAY	VU A1cd ver 2.3 (1994)	?

VULNERABLE (VU)			
Scientific Name	Common Name(s)	[Red List]	Trend
Carcharodon carcharias	GREAT WHITE SHARK	VU A1cd+2cd ver 2.3 (1994)	?
Chlamydotis undulata	HOUBARA BUSTARD	VU A2bcd+3bcd ver 3.1 (2001)	↓
Falco naumanni	LESSER KESTREL	VU A2bce+3bce ver 3.1 (2001)	↓
Rhinolophus euryale	MEDITERRANEAN HORSESHOE BAT	VU A2c ver 2.3 (1994)	↑
Acrocephalus paludicola	AQUATIC WARBLER	VU A2c+3c ver 3.1 (2001)	↓
Pelecanus crispus	DALMATIAN PELICAN	VU A2c+3c ver 3.1 (2001)	→
Marmaronetta angustirostris	MARbled DUCK MARbled TEAL	VU A2cd+3cd ver 3.1 (2001)	↓
Capra aegagrus	WILD GOAT	VU A2cde ver 2.3 (1994)	?
Ovis orientalis	MOUFLON URIAL	VU A2cde ver 2.3 (1994)	?
Otis tarda	GREAT BUSTARD	VU A3c ver 3.1 (2001)	↓
Branta ruficollis	RED-BREASTED GOOSE	VU B2ab(iii) ver 3.1 (2001)	?
Aquila clanga	GREATER SPOTTED EAGLE SPOTTED EAGLE)	VU C1 ver 3.1 (2001)	↓
Aquila heliaca	IMPERIAL EAGLE	VU C1 ver 3.1 (2001)	↓
Cedrus brevifolia		VU D2 ver 2.3 (1994)	
LOWER RISK (LR) Conservation Dependent (cd) Near Threatened (nt) Least Concern (lc)			
Scientific Name	Common Name(s)	[Red List]	Trend
Aegypius monachus	BLACK VULTURE CINEREOUS VULTURE	NT ver 3.1 (2001)	↓
Aythya nyroca	FERRUGINOUS DUCK FERRUGINOUS POCHARD WHITE-EYED POCHARD	NT ver 3.1 (2001)	
Circus macrourus	PALE HARRIER PALLID HARRIER)	NT ver 3.1 (2001)	↓
Crex crex	CORN CRAKE CORNCRAKE	NT ver 3.1 (2001)	↓

LOWER RISK (LR) Conservation Dependent (cd) Near Threatened (nt) Least Concern (lc)			
Scientific Name	Common Name(s)	[Red List]	Trend
Emberiza aureola	YELLOW-BREASTED BUNTING	NT ver 3.1 (2001)	
Emberiza cineracea	CINEREOUS BUNTING	NT ver 3.1 (2001)	
Gallinago media	GREAT SNIPE	NT ver 3.1 (2001)	↓
Haliaeetus albicilla	GREY SEA EAGLE WHITE-TAILED EAGLE	NT ver 3.1 (2001)	
Larus audouinii	AUDOUIN'S GULL	NT ver 3.1 (2001)	↑
Phalacrocorax pygmeus	PYGMY CORMORANT	NT ver 3.1 (2001)	
Rhinolophus blasii	BLASIUS'S HORSESHOE BAT	NT ver 3.1 (2001)	↓
Tetrax tetrax	LITTLE BUSTARD	NT ver 3.1 (2001)	↓
Stenella coeruleoalba	EUPHROSYNE DOLPHIN STRIPED DOLPHIN	LR/cd ver 2.3 (1994)	
Carcharhinus brevipinna	SPINNER SHARK	LR/nt ver 2.3 (1994)	?
Carcharhinus melanopterus	BLACKTIP REEF SHARK	LR/nt ver 2.3 (1994)	?
Carcharhinus plumbeus	SANDBAR SHARK	LR/nt ver 2.3 (1994)	?
Emys orbicularis	EUROPEAN POND TURTLE	LR/nt ver 2.3 (1994)	
Hexanchus griseus	BLUNTNOSE SIXGILL SHARK	LR/nt ver 2.3 (1994)	?
Isurus oxyrinchus	SHORTFIN MAKO	LR/nt ver 2.3 (1994)	?
Lamna nasus	PORBEAGLE	LR/nt ver 2.3 (1994)	?
Myotis myotis	GREATER MOUSE-EARED BAT LARGE MOUSE-EARED BAT MOUSE-EARED BAT	LR/nt ver 2.3 (1994)	
Prionace glauca	BLUE SHARK	LR/nt ver 2.3 (1994)	?
Raja clavata	THORNBACK SKATE	LR/nt ver 2.3 (1994)	?
Rhinolophus ferrumequinum	GREATER HORSESHOE BAT	LR/nt ver 2.3 (1994)	

LOWER RISK (LR)

Conservation Dependent (cd) Near Threatened (nt) Least Concern (lc)			
Scientific Name	Common Name(s)	[Red List]	Trend
Sphyrna zygaena	SMOOTH HAMMERHEAD	LR/nt ver 2.3 (1994)	?
Squalus acanthias	PIKED DOGFISH SPINY DOGFISH	LR/nt ver 2.3 (1994)	?
DATA DEFICIENT (DD)			
Scientific Name	Common Name(s)	[Red List]	Trend
Acomys nesiotus	CYPRUS SPINY MOUSE	DD ver 2.3 (1994)	?
Alopias vulpinus	THRESHER SHARK	DD ver 3.1 (2001)	?
Alosa fallax	TWAIT SHAD TWAITE SHAD	DD ver 2.3 (1994)	
Aphanius fasciatus	MEDITERRANEAN KILLIFISH SOUTH EUROPEAN TOOTHCARP	DD ver 2.3 (1994)	
Atherina boyeri		DD ver 2.3 (1994)	
Echinorhinus brucus	BRAMBLE SHARK SPINOUS SHARK SPINY SHARK	DD ver 3.1 (2001)	?
Glareola nordmanni	BLACK-WINGED PRATINCOLE	DD ver 3.1 (2001)	
Hippocampus guttulatus	LONG-SNOURED SEAHORSE	DD ver 3.1 (2001)	?
Mycteroperca rubra	MOTTLED GROUPER	DD ver 2.3 (1994)	
Sphyrna mokarran	GREAT HAMMERHEAD	DD ver 2.3 (1994)	?
Syngnathus abaster		DD ver 2.3 (1994)	?
Thunnus alalunga	ALBACORE TUNA	DD ver 2.3 (1994)	
Thunnus thynnus	NORTHERN BLUEFIN TUNA	DD ver 2.3 (1994)	
Xiphias gladius	SWORDFISH	DD ver 2.3 (1994)	
Zosterisessor ophiocephalus		DD ver 2.3 (1994)	

Adapted from: IUCN 2004. *2004 IUCN Red List of Threatened Species*. <www.redlist.org>. Downloaded on **06 November 2005**.

2001 Categories & Criteria (version 3.1)

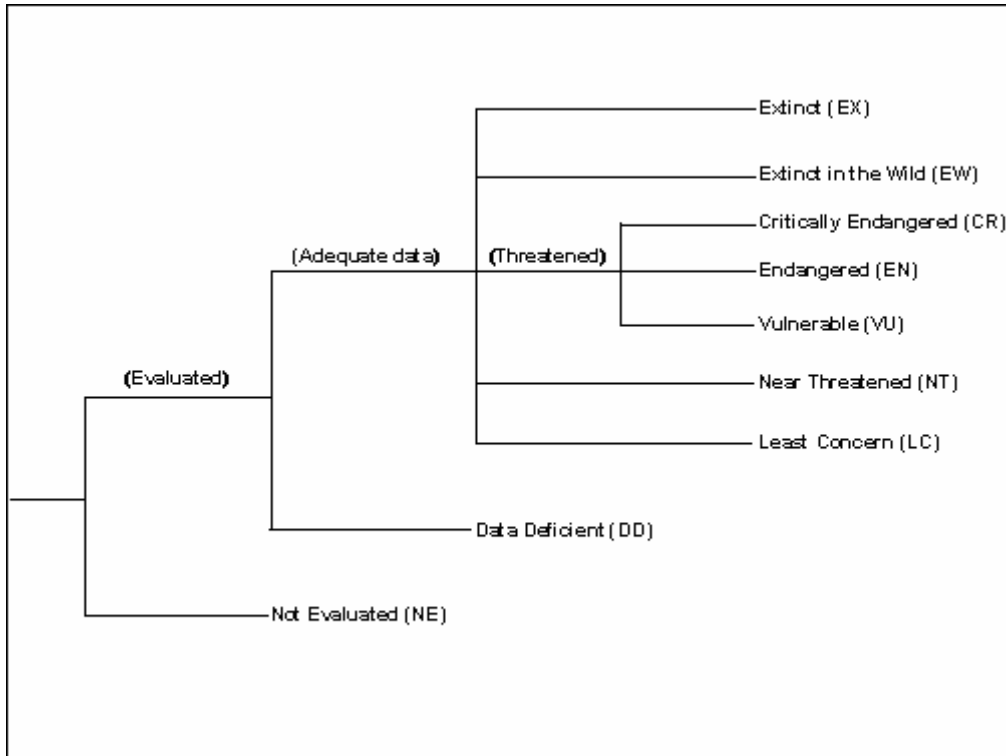


Figure 1. Structure of the categories.

IUCN CATEGORIES

EXTINCT (EX)

A taxon is Extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed Extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

EXTINCT IN THE WILD (EW)

A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A taxon is presumed Extinct in the Wild when

CRITICALLY ENDANGERED (CR)

A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered (see Section V), and it is therefore considered to be facing an extremely high risk of extinction in the wild.

ENDANGERED (EN)

A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered (see Section V), and it is therefore considered to be facing a very high risk of extinction in the wild.

VULNERABLE (VU)

A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable (see Section V), and it is therefore considered to be facing a high risk of extinction in the wild.

NEAR THREATENED (NT)

A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.

LEAST CONCERN (LC)

A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.

DATA DEFICIENT (DD)

A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate. It is important to make positive use of whatever data are available. In many cases great care should be exercised in choosing between DD and a threatened status. If the range of a taxon is suspected to be relatively circumscribed, and a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified.

NOT EVALUATED (NE)

A taxon is Not Evaluated when it has not yet been evaluated against the criteria.

THE CRITERIA FOR CRITICALLY ENDANGERED, ENDANGERED AND VULNERABLE**CRITICALLY ENDANGERED (CR)**

A taxon is Critically Endangered when the best available evidence indicates that it meets any of the following criteria (A to E), and it is therefore considered to be facing an extremely high risk of extinction in the wild:

A. Reduction in population size based on any of the following:

1. An observed, estimated, inferred or suspected population size reduction of $\geq 90\%$ over the last 10 years or three generations, whichever is the longer, where the causes of the reduction are clearly reversible AND understood AND ceased, based on (and specifying) any of the following:

- (a) direct observation
- (b) an index of abundance appropriate to the taxon
- (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
- (d) actual or potential levels of exploitation
- (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.

2. An observed, estimated, inferred or suspected population size reduction of $\geq 80\%$ over the last 10 years or three generations, whichever is the longer, where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.

3. A population size reduction of $\geq 80\%$, projected or suspected to be met within the next 10 years or three generations, whichever is the longer (up to a maximum of 100 years), based on (and specifying) any of (b) to (e) under A1.

4. An observed, estimated, inferred, projected or suspected population size reduction of $\geq 80\%$ over any 10 year or three generation period, whichever is longer (up to a maximum of 100 years in the

future), where the time period must include both the past and the future, and where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.

B. Geographic range in the form of either B1 (extent of occurrence) OR B2 (area of occupancy) OR both:

1. Extent of occurrence estimated to be less than 100 km², and estimates indicating at least two of a-c:
 - a. Severely fragmented or known to exist at only a single location.
 - b. Continuing decline, observed, inferred or projected, in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) area, extent and/or quality of habitat
 - (iv) number of locations or subpopulations
 - (v) number of mature individuals.
 - c. Extreme fluctuations in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) number of locations or subpopulations
 - (iv) number of mature individuals.
2. Area of occupancy estimated to be less than 10 km², and estimates indicating at least two of a-c:
 - a. Severely fragmented or known to exist at only a single location.
 - b. Continuing decline, observed, inferred or projected, in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) area, extent and/or quality of habitat
 - (iv) number of locations or subpopulations
 - (v) number of mature individuals.
 - c. Extreme fluctuations in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) number of locations or subpopulations
 - (iv) number of mature individuals.

C. Population size estimated to number fewer than 250 mature individuals and either:

1. An estimated continuing decline of at least 25% within three years or one generation, whichever is longer, (up to a maximum of 100 years in the future) OR
2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals AND at least one of the following (a-b):
 - (a) Population structure in the form of one of the following:
 - (i) no subpopulation estimated to contain more than 50 mature individuals, OR
 - (ii) at least 90% of mature individuals in one subpopulation.
 - (b) Extreme fluctuations in number of mature individuals.

D. Population size estimated to number fewer than 50 mature individuals.

E. Quantitative analysis showing the probability of extinction in the wild is at least 50% within 10 years or three generations, whichever is the longer (up to a maximum of 100 years).

ENDANGERED (EN)

A taxon is Endangered when the best available evidence indicates that it meets any of the following criteria (A to E), and it is therefore considered to be facing a very high risk of extinction in the wild:

A. Reduction in population size based on any of the following:

1. An observed, estimated, inferred or suspected population size reduction of $\geq 70\%$ over the last 10 years or three generations, whichever is the longer, where the causes of the reduction are clearly reversible AND understood AND ceased, based on (and specifying) any of the following:
 - (a) direct observation

- (b) an index of abundance appropriate to the taxon
- (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
- (d) actual or potential levels of exploitation
- (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.

2. An observed, estimated, inferred or suspected population size reduction of $\geq 50\%$ over the last 10 years or three generations, whichever is the longer, where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.

3. A population size reduction of $\geq 50\%$, projected or suspected to be met within the next 10 years or three generations, whichever is the longer (up to a maximum of 100 years), based on (and specifying) any of (b) to (e) under A1.

4. An observed, estimated, inferred, projected or suspected population size reduction of $\geq 50\%$ over any 10 year or three generation period, whichever is longer (up to a maximum of 100 years in the future), where the time period must include both the past and the future, and where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.

B. Geographic range in the form of either B1 (extent of occurrence) OR B2 (area of occupancy) OR both:

1. Extent of occurrence estimated to be less than 5000 km², and estimates indicating at least two of a-c:

- a. Severely fragmented or known to exist at no more than five locations.
- b. Continuing decline, observed, inferred or projected, in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) area, extent and/or quality of habitat
 - (iv) number of locations or subpopulations
 - (v) number of mature individuals.
- c. Extreme fluctuations in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) number of locations or subpopulations
 - (iv) number of mature individuals.

2. Area of occupancy estimated to be less than 500 km², and estimates indicating at least two of a-c:

- a. Severely fragmented or known to exist at no more than five locations.
- b. Continuing decline, observed, inferred or projected, in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) area, extent and/or quality of habitat
 - (iv) number of locations or subpopulations
 - (v) number of mature individuals.
- C. Extreme fluctuations in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) number of locations or subpopulations
 - (iv) number of mature individuals.

C. Population size estimated to number fewer than 2500 mature individuals and either:

1. An estimated continuing decline of at least 20% within five years or two generations, whichever is longer, (up to a maximum of 100 years in the future) OR

2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals AND at least one of the following (a-b):

- (a) Population structure in the form of one of the following:

- (i) no subpopulation estimated to contain more than 250 mature individuals, OR
- (ii) at least 95% of mature individuals in one subpopulation.
- (b) Extreme fluctuations in number of mature individuals.

D. Population size estimated to number fewer than 250 mature individuals.

E. Quantitative analysis showing the probability of extinction in the wild is at least 20% within 20 years or five generations, whichever is the longer (up to a maximum of 100 years).

VULNERABLE (VU)

A taxon is Vulnerable when the best available evidence indicates that it meets any of the following criteria (A to E), and it is therefore considered to be facing a high risk of extinction in the wild:

A. Reduction in population size based on any of the following:

1. An observed, estimated, inferred or suspected population size reduction of $\geq 50\%$ over the last 10 years or three generations, whichever is the longer, where the causes of the reduction are: clearly reversible AND understood AND ceased, based on (and specifying) any of the following:

- (a) direct observation
- (b) an index of abundance appropriate to the taxon
- (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
- (d) actual or potential levels of exploitation
- (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.

2. An observed, estimated, inferred or suspected population size reduction of $\geq 30\%$ over the last 10 years or three generations, whichever is the longer, where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.

3. A population size reduction of $\geq 30\%$, projected or suspected to be met within the next 10 years or three generations, whichever is the longer (up to a maximum of 100 years), based on (and specifying) any of (b) to (e) under A1.

4. An observed, estimated, inferred, projected or suspected population size reduction of $\geq 30\%$ over any 10 year or three generation period, whichever is longer (up to a maximum of 100 years in the future), where the time period must include both the past and the future, and where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.

B. Geographic range in the form of either B1 (extent of occurrence) OR B2 (area of occupancy) OR both:

1. Extent of occurrence estimated to be less than 20,000 km², and estimates indicating at least two of a-c:

- a. Severely fragmented or known to exist at no more than 10 locations.
- b. Continuing decline, observed, inferred or projected, in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) area, extent and/or quality of habitat
 - (iv) number of locations or subpopulations
 - (v) number of mature individuals.
- c. Extreme fluctuations in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) number of locations or subpopulations
 - (iv) number of mature individuals.

2. Area of occupancy estimated to be less than 2000 km², and estimates indicating at least two of a-c:

- a. Severely fragmented or known to exist at no more than 10 locations.

- b. Continuing decline, observed, inferred or projected, in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) area, extent and/or quality of habitat
 - (iv) number of locations or subpopulations
 - (v) number of mature individuals.
 - c. Extreme fluctuations in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) number of locations or subpopulations
 - (iv) number of mature individuals.
- C. Population size estimated to number fewer than 10,000 mature individuals and either:
1. An estimated continuing decline of at least 10% within 10 years or three generations, whichever is longer, (up to a maximum of 100 years in the future) OR
 2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals AND at least one of the following (a-b):
 - (a) Population structure in the form of one of the following:
 - (i) no subpopulation estimated to contain more than 1000 mature individuals, OR
 - (ii) all mature individuals are in one subpopulation.
 - (b) Extreme fluctuations in number of mature individuals.
- D. Population very small or restricted in the form of either of the following:
1. Population size estimated to number fewer than 1000 mature individuals.
 2. Population with a very restricted area of occupancy (typically less than 20 km²) or number of locations (typically five or fewer) such that it is prone to the effects of human activities or stochastic events within a very short time period in an uncertain future, and is thus capable of becoming Critically Endangered or even Extinct in a very short time period.
- E. Quantitative analysis showing the probability of extinction in the wild is at least 10% within 100 years.

Adapted from: IUCN 2004. *2004 IUCN Red List of Threatened Species*. <www.redlist.org>. Downloaded on **06 November 2005**.

ANNEX F

List of Persons Interviewed

ANNEX F

LIST OF PERSONS INTERVIEWED

F.1. USAID, Donor, and Implementor Contacts

Name & Contact	Organization
Kimberly Foukaris Foukariska@state.gov	Senior Program Advisor, USAID/Cyprus
Elizabeth Kassinis KassinisEV@state.gov	Senior Program Advisor, USAID/Cyprus
Mohammad Latif mloitf@usaid.gov	E&E Bureau Environmental Officer, USAID/EE/EG
Nicholas Studzinski nstudzinski@usaid.gov	Leader, Team for SE Europe USAID/EE
Mary Rown mrown@usaid.gov	USAID/EGAT/NMR/B
Robin Mason mmason@usaid.gov	USAID/EGAT/ENV/ENR
Nicholas Jarrud Nicolas.jarraud@undp.org www.undp-act.org	UNDP Environmental Compliance Officer
Dr. John Butson John.butson@enviro-markets.com	Consultant to the EC, working with the TCC Environmental Change Committee
Gretta Goldenman g.goldenman@milieu.be www.milieu.be	Consultant to the EC, working with the TCC Environmental Change Committee
Kate Thompson kathy.thompson@bearingpoint.com	Bearing Point, EDGE Project, Chief of Party
Dr. Gerhard Zechner ganzltd@spidernet.com	Bearing Point, EDGE Project, Senior Consultant, Trade
Jim Tarrent jtarrant@irgltd.com	IRG, SAVE Project, Chief of Party
Martyn Osborn martyn@corecyprus.com	CORE International, REAP Project, Project Manager

F.2. GCC Contacts

Name & Contact	Organization	Other Affiliations
Michael Loizides michael@isotech.com.cy	Isotech Ltd., Environmental Consultants	Technical Chamber of Cyprus (ETEK) AKTI projects and research centre (NGO)
Xenia Loizidou xenia@isotech.com.cy	Isotech Ltd., Environmental Consultants	AKTI, projects and research centre (NGO)
Savvas Iezekiel iezekiel@cytanet.com.cy	Forestry Department, Paphos Region	Cyprus Association for the Protection of Avifauna
Antonia Therdosiou feeo_cyprus@hotmail.com	Federation of Environmental and Ecological Organizations of Cyprus	Friends of Akamas
Costas Kadis, Ph.D pre.kc@fit.ac.cy	Frederick Institute of Technology	
Dr. Michael Ierides cymepa@cytanet.com.cy	Cyprus Marine Environment Protection Association	
Andreas Demetropoulos andrecws@logos.cy.net	Cyprus Wildlife Society	Former Director, Department of Fisheries
Antonis Antoniou registry@moa.gov.cy	MANRE, Environmental Service	
Takis Tsintides management@fd.moa.gov.cy	MANRE, Forestry Department	

F.3. TCC Contacts

Name & Contact	Organization	Other Affiliations
Ms. Sibel Paralik sibel@soleiles.com	Consultant/Founder, SOLEIL Environmental Solutions	Chamber of Environmental Engineers (KTMMOB)
Ms. Halime Akdeniz	Director - Friends of Karpaz	
Dr. Orhan Küçükgül	Manager, Dikmen Land Fill	
Ms. Özge Özden ozgeozden77@yahoo.com	Endomologist - European University of Lefke	
Mr. Martin Marangos	Director - Society for International Development	Society for the Protection of Birds and Nature (KUSKOR)
Ms. Hasibe Kusetoğulları hkuset@yahoo.com	Nature Protection – “Department of Environmental Protection”	Chamber of Civil Engineers (KTMMOB)
Ms. Hülya Altan	“Vice Director” - “Department of Environmental Protection”	
Ms. Ersever Beyaz ersever03@yahoo.co.uk	“Department of Environmental Protection”	
Ms. Neylan Naim	EIA evaluation committee – “Department of Environmental Protection”	Chamber of Environmental Engineers (KTMMOB)
Ms. Tuncay Oydas	EIA evaluation committee – “Department of Environmental Protection”	
Mr. Cemal Akkesen	“Deputy Director”, “Forest Department”	Chamber of Forest Engineers (KTMMOB)
Ms. Guliz Kuset gkuset@yahoo.com	Forest Engineer, “Forest Department”	Chamber of Forest Engineers (KTMMOB)
Mr. Doğan Sahir dogansahir@neu.edu.tr	Director, Green Action Group	Vice Chair, Near East University
Dr. Şerife Gündüz serife2001cy@yahoo.com http://www.gau.edu.tr/	Girne American University	
Dr. Bülent Kanol bkanol@mancentre.org http://www.mc-med.org/	Executive Director, The Management Center	
Ms. Ayşe Dönmezer adonmezer@mancentre.org http://www.mc-med.org/	Consultant, The Management Center	Former “Minister of Economy and Tourism”
Mr. Niyazi Türkseven niyazi@analiz.net www.biologlardenegi.org	President, Association of Biologists Nature Research and Protection	
Mr. Ali Rıza Özkök	Association of Biologists Nature Research and Protection	
Mr. Halil Özder	Association of Biologists Nature Research and Protection	
Mr. Hasan Sarpten	Association of Biologists Nature Research and Protection	
Mr. Seral İçener	Association of Biologists Nature Research and Protection	
Ms. Layik Topcan Mesutoğlu layiktopcan@yahoo.com	“Deputy Director”, “Town Planning”	TC Assoc. of Town Planners Friends of Nature

ANNEX G

REFERENCES

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REFERENCES

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ANNEX H

RESOURCES AVAILABLE TO SUPPORT USAID/CYPRUS

ANNEX H

RESOURCES AVAILABLE TO SUPPORT USAID/CYPRUS

This Annex provides information concerning resources and mechanisms available to support USAID/Cyprus with respect to biodiversity and environmental projects. The annex provides a condensed overview for quick reference regarding technical, financial and organizational services to be of assistance as the recommendations of the Biodiversity Assessment are considered for incorporation into USAID/Cyprus programs.

Information from the USAID Intranet. The primary resource of information is the USAID Intranet, where one can easily access descriptions of USAID contracts, grants, cooperative agreements, inter-agency agreements, and blanket purchase agreements that are directly or indirectly related to biodiversity and biodiversity activities. The vehicles are divided by sector as follows:

- Agriculture
- Development Credit
- Economic Growth
- Education
- Energy and Infrastructure Technology
- Environment and Science Policy
- Natural Resource Management
- Poverty Reduction
- Urban Programs
- Women in Development

At present, the information on the various vehicles can be accessed through the USAID Intranet on the EGAT Home Page. At that point, one can select the specific information required, as presented in “EGAT User’s Guide – Contract & Grant Mechanisms.”

The Biodiversity and Tropical Forestry Support Indefinite Quantity Contract (BIOFOR IQC) has expired; however, the vehicles listed in the EGAT User’s Guide can be creatively utilized to meet the biodiversity needs of a Mission.

A recent and valuable resource is the “**EGAT Biodiversity Conservation: [A Guide for USAID Staff and Partners](#)**”. Updated in September 2005, this EGAT publication was prepared to provide USAID Staff and partners with basic information about designing, managing, and implementing biodiversity conservation programs or activities. The Guide was prepared as a starting point to shape and guide programs or activities that should ultimately be implemented based on local environmental and socioeconomic conditions and the capacity of implementing partners, and should be managed adaptively in the field. The Guide provides useful information about USAID’s approach to biodiversity for partners and colleagues. The guide can be downloaded from the EGAT Home Page as well as from the above link.

Of the various USG support mechanisms available to USAID Missions are a series of Interagency Agreements (IAAs) which can be helpful as a source of information and guidance for Mission staff. These include:

- **USAID/US Forest Service Partnership to Promote Sustainable Forest Management and Conservation in Developing Countries:** G/ENV and the IP staff can tap the skills of the entire USFS, as well as personnel from the Natural Resource Conservation Service (formally SCS) to meet the technical needs of Missions. The range of resource personnel includes land management professionals from silviculturists to economists, wildlife

biologists, and wildland recreation specialists. Examples of the types of assistance available through the IAA include analyzing policy, implementing technical programs and conducting training in the field, and research. Technical experts can provide assistance in emergency preparedness in responding to such disasters as forest fires, hurricanes, and landslides; habitat and stream restoration; and forest pest control. In addition, technical assistance can be provided in: sustainable forest management, integrated forest monitoring, fire management, watershed management, habitat and protected area management and invasive species.

- ***Agricultural & Environmental Geospatial Information Systems (AEGIS)***: This initiative provides a mechanism for USAID clients to access the science and technology capacity of the USGS-EROS Data Center (U.S. Geological Survey--International Programs) to support capacity building, technology transfer, and sustainable development in the areas of spatial data infrastructure (SDI), RS/GIS, geospatial data clearinghouses, database creation and access, internet mapping and webportal design, metadata, and related science analysis in all sectors and regions. The service provider (USGS-EDC) will support and implement activities worldwide including: design of research activities; synthesis of research findings; development of databases and indicators; improving and designing geographic information systems (GIS); building of Spatial Data Infrastructure (SDI); technical support, program design and implementation; training and human capacity development in support of all sectoral activities that require information technology/science applications in the geospatial analysis and related ICT (Information and Communications Technologies) arenas. Sectors of primary interest: environment, agriculture, natural resources, health, economic growth, poverty reduction, trade and e-commerce (location-based services), tracking and monitoring, earth observation, land/water management, carbon sequestration, and hazard mitigation.
- ***U.S. Department of the Interior, International Technical Assistance Program:*** Agreement provides broad access to personnel across the Department, which includes the following bureaus: National Park Service, U.S. Fish and Wildlife Service, U.S. Geological Survey, Bureau of Land Management, Bureau of Reclamation, Minerals Management Service, Office of Surface Mining, and Bureau of Indian Affairs. The agreement accesses the Department's extensive staff expertise in such areas as protected area management, cultural resources management, environmental education and community outreach, endangered species conservation, recreation management, fire management, invasive species control, minerals management, reclamation of abandoned mine lands, ecotourism, wildlife law enforcement, resource interpretation, park infrastructure, and concessionaire management. Staff typically engage in longer-term (3 years +) initiatives to build partnerships but are also available for short-term punctual assignments.

In addition to these IAAs, EGAT's Office of Natural Resource Management has four teams which are available to provide technical assistance to Missions worldwide. These teams¹³ are:

- ***Biodiversity Team:*** The Biodiversity Team promotes in situ conservation of globally significant biodiversity through improved management of biologically rich landscapes and seascapes — whether protected areas, community lands, or logging concessions. Through the Global Conservation Program, a partnership with six U.S.-based conservation organizations, the Biodiversity Team supports strategic conservation and development

¹³ Please note that hyperlinks to team websites are only available from within the USAID Intranet

programs, including community-based natural resources management, protected areas management, enterprise development, and policy development.

- [Forestry Team](#): The Forestry Team promotes sustainable forest management through improved forestry practices; responsible trade in forest products; expanded community-based forest management; policy and regulatory reform; reduction in illegal logging; and improved knowledge of forest ecosystems and management of forest resources. Team activities support agroforestry, biodiversity conservation, carbon sequestration, and the integration of assessment and monitoring systems for improving forest health. An agreement with the U.S. Forest Service augments the Team's technical expertise in support of Mission activities in forest management, watershed management, fire management, and environmental policy.
- [Land Resources Management Team](#): Through improved policies and programs, the Land Team promotes sustainable productive use, restoration and preservation of land resources at the nexus with poverty reduction, environmental and human health, natural hazard mitigation, conflict resolution, and democratic governance. Missions can draw on the Team's multi-disciplinary expertise to help them design and evaluate programs leading to improved governance and the sustainable use of natural resources. The Team includes experts in sustainable agriculture, soil science, integrated pest management, property rights, community-based natural resources management, natural resources based enterprise development, geospatial information technology, communications and knowledge management. Agreements and mechanisms managed by the Team provide access to research programs and services in the Team's areas of expertise.
- [Water Team](#): The Water Team promotes improved policies, management and optimal use of freshwater and coastal resources at the basin, aquifer and watershed scales, including the integration of land and water use, groundwater and surface water, and coastal and marine resources. The Team includes experts from throughout the Agency, as well as USAID field units, and other federal agencies. The wealth of expertise provides a significant resource for support of field operations in all aspects of integrated water resources management, including water supply and sanitation, wastewater management and pollution control, watershed management, integrated coastal management, irrigation, fisheries and aquaculture, hydropower, and disaster preparedness activities. The Team plays a lead role in interagency dialogue and support of USG initiatives, and manages agreements providing technical, analytical, and managerial assistance to the Missions and Bureaus.

ANNEX I

CYPRUS ENVIRONMENT RELATED INTERNET RESOURCES

ANNEX I

CYPRUS ENVIRONMENT RELATED INTERNET RESOURCES

The following Internet web sites and resources were gathered to assist with the USAID/CYPRUS 2005 Biodiversity Analysis. The web sites have been divided into the following sections:

- Section 1. GCC Authorities
- Section 2. Cyprus NGO & Local Info
- Section 3. International Efforts in Cyprus
- Section 4. Other Internet Resources

Section 1. GCC Authorities

General

http://www.moi.gov.cy/moi/pio/pio.nsf/index_en/index_en?opendocument

Department of Forests – English version is not complete

http://www.moa.gov.cy/moa/fd/fd.nsf/DMLreserves_en/DMLreserves_en?OpenDocument

Republic of Cyprus

<http://www.parliament.cy/parliamenteng/index.htm>

Section 2. Cyprus NGO & Local Info

PROACT Cyprus Project

<http://proaction.tripod.com/projectcyprus/index.html> - Main page

<http://proaction.tripod.com/projectcyprus/id3.html> - EU Acquis Alignment

Cyprus Conservation Foundation

<http://www.conservation.org.cy/>

Athienou Gymnasium - A LIFE Funded Project, provides a background to nature protection in Cyprus

<http://www2.cytanet.com.cy/gym-ath-lar/nature.htm>

Federation of Environmental and Ecological Organizations of Cyprus (FEEOC)

<http://www.oikologiafeeo.org> (Greek Only)

An English summary of organization can be found at:

<http://www.medies.net/staticpages/index.php?page=FEEOC>

Animal Info – Cyprus

<http://www.animalinfo.org/country/cyprus.htm>

Section 3. International Efforts in Cyprus

This section provides Internet resources available from international non-governmental organizations and donor governments working in Cyprus

Report on Some Priority Issues Concerning Sustainable Development and the Environment in Cyprus

http://www.johannesburgsummit.org/html/prep_process/national_reports/cyprusreport.pdf

The Convention on Biological Diversity (CBD)
The Convention on Biological Diversity Around the World – Cyprus Country Report 2005
<http://www.biodiv.org/doc/world/cy/cy-nr-03-en.pdf>

Case-studies from Cyprus – Migratory birds
<http://www.biodiv.org/doc/case-studies/ms/cs-ms-cy-01-en.pdf>

UN Convention to Combat Desertification
Cyprus Report for Combating Desertification
<http://www.unccd.int/cop/reports/northmed/national/2002/cyprus-eng.pdf>

USAID Cyprus
http://www.usaid.gov/locations/europe_eurasia/countries/cy/
<http://www.birdfarmstudy.com/> - USAID Funded project site
<http://www.cyprusorganics.info/> - USAID Funded project site
<http://www.cyprusgeology.org/> - USAID Funded project site

UNDP-ACT
<http://www.undp-act.org/MAIN/default.aspx>

UNDP-PFF
<http://www.undp-unops-pff.org/>

UNOPS Cyprus Page
<http://www.unopspmu.org/links.htm>

NBII – National Biological Information Infrastructure
<http://www.nbii.gov/>
<http://www.nbii.gov/geographic/international/CY.html>

World Bank (WB)
World Bank - Seawater and brackish water desalination in the Middle East, North Africa and Central Asia : A review of key issues and experience in six countries Vol. 7 of 7 / Annex 6 - Cyprus (English)
http://www-wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/2005/09/08/000160016_20050908165842/Rendered/PDF/335150v70Seawater0annex060cyprus.pdf

EU
List of EU Environmental Programs
http://europa.eu.int/grants/topics/environment/environment_en.htm

The Impact of the Accession Process on the Environment
www.eeb.org/activities/enlargement/full-text-survey-april30.pdf

United Nations Sites
UNDP Bi-Communal Development Programme – Environmental Projects
<http://mirror.undp.org/cyprus/projects/search.asp?search=§or=2&submit=search>

Coastal Zone Management for Cyprus: Trans-national Technology Transfer and Diffusion

<http://www.grida.no/climate/ipcc/tectran/344.htm>

Agenda 21 – UN Main Site

<http://www.un.org/esa/sustdev/documents/agenda21/index.htm>

Agenda 21 – Cyprus Site

<http://www.un.org/esa/agenda21/natlinfo/countr/cyprus/index.htm>

Seminar on the Role of Ecosystems as Water Suppliers – Cyprus National Report

www.unece.org/env/water/meetings/ecosystem/Reports/Cyprus_en.pdf

Draft Report of Cyprus – Timber

<http://www.unece.org/trade/timber/docs/jc-sessions/jc-25/Country%20statements/CYPRUS-2004.pdf>

Biodiversity resources in small island developing States

<http://islands.unep.ch/dd98-7a5.htm>

Country Report to the International Conference and Programme on Plant Genetic Resource

<http://www.fao.org/ag/AGP/AGPS/Pqrf/p/cyprus.pdf>

National Report to the Fifth Session of the United Nations Forum on Forests

www.un.org/esa/forests/pdf/national_reports/unff5/cyprus.pdf

Section 4. Other Internet Resources

WRI EarthTrends Data

Biodiversity and Protected Areas—Cyprus

http://earthtrends.wri.org/pdf_library/country_profiles/bio_cou_196.pdf

Water Resources and Freshwater Ecosystems—Cyprus

http://earthtrends.wri.org/pdf_library/country_profiles/wat_cou_196.pdf

Forests, Grasslands, and Drylands—Cyprus

http://earthtrends.wri.org/pdf_library/country_profiles/for_cou_196.pdf

Biodiversity and Protected Areas - COUNTRY PROFILE - Cyprus

<http://earthtrends.wri.org/text/biodiversity-protected/country-profile-47.html>

Ramsar Convention on Wetlands National Report of the Republic of Cyprus

www.ramsar.org/cop9/cop9_nr_cyprus.pdf

2004 IUCN Red List of Threatened Species

http://www.redlist.org/search/search.php?freetext=&modifier=phrase&criteria=wholedb&taxa_species=1&redlistCategory%5B%5D=all&redlistAssessyear%5B%5D=all&country%5B%5D=CY&aquatic%5B%5D=all®ions%5B%5D=all&habitats%5B%5D=all&threats%5B%5D=all&Submit.x=38&Submit.y=16

Cyprus - International Environmental Agreements and Associations

http://aol.countrywatch.com/aol_topic.asp?vCOUNTRY=46&SECTION=APP&TOPIC=EVPOL&TYPE=APPEN

2005 CIA World Factbook

<http://www.cia.gov/cia/publications/factbook/geos/cy.html>

Species Inventories

Avibase - Bird Checklists of the World – Cyprus

<http://www.bsc-eoc.org/avibase/avibase.jsp?region=cy&pg=checklist&list=clements>

Butterflies of Cyprus

<http://www.grayling.dircon.co.uk/page2.html>

An Investigation on Fishes of northern Cyprus

<http://journals.tubitak.gov.tr/veterinary/issues/vet-01-25-2/vet-25-2-3-9909-13.pdf>

Akamas Peninsula

General info

<http://www.heureka.clara.net/sunrise/akamas.htm>

<http://www.conservation.org.cy/akamas/akamas.htm>

BirdLife IBA Factsheet for Akamas

<http://www.birdlife.org/datazone/sites/?action=SitHTMDetails.asp&sid=25&m=0>

More info

<http://www.paphosfinder.com/cyprus-info/akamas.htm>