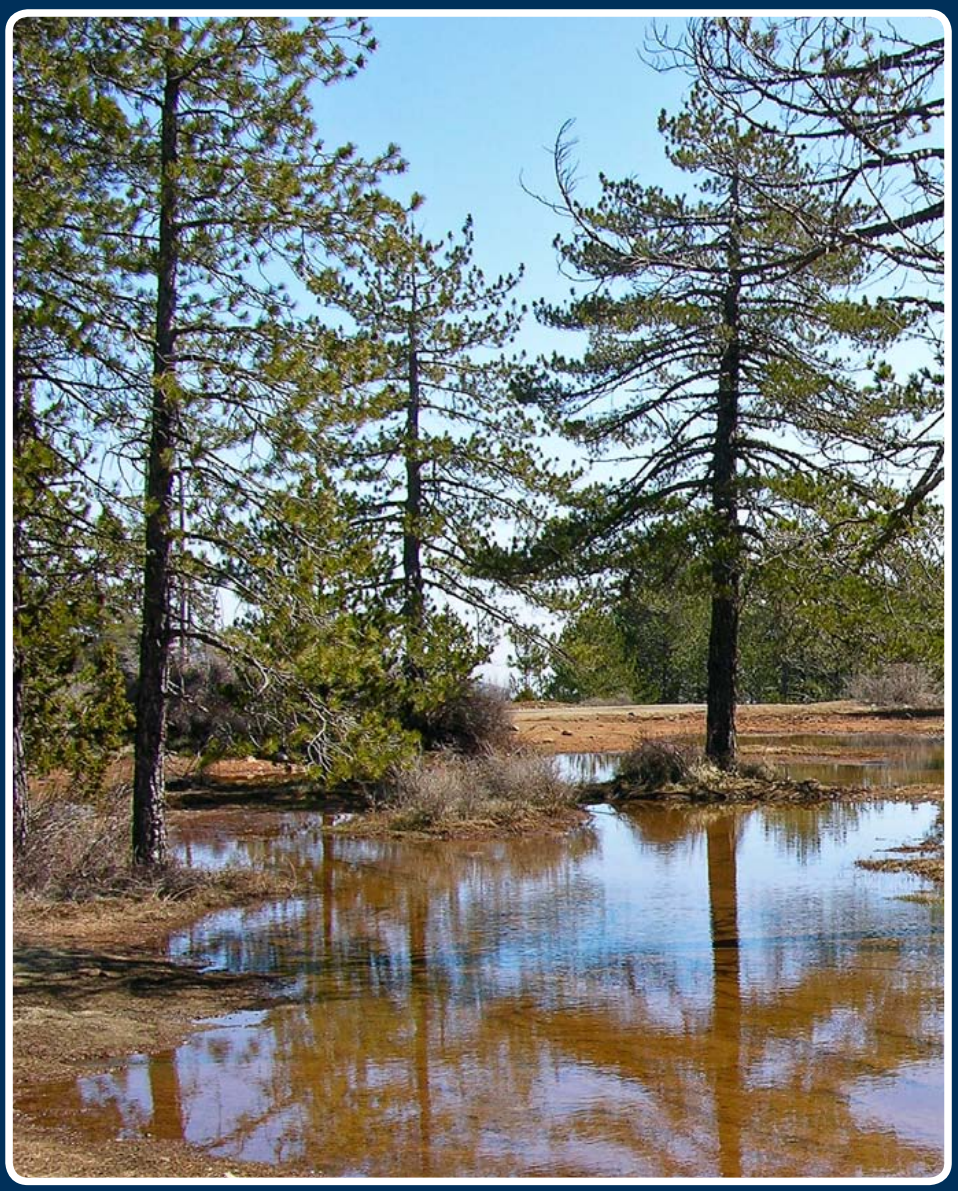


LIFE Nature Project

"Conservation management in NATURA 2000 sites of Cyprus"

LIFE 04 NAT/CY/ 000013

Layman's Report

ATHENS, OCTOBER 2008

NATIONAL & KAPODISTRIAN
UNIVERSITY OF ATHENS

The LIFE Nature Project

PROJECT TITLE

"Conservation management in NATURA 2000 sites of Cyprus"»

NUMBER OF APPROVAL

LIFE 04 NAT/ CY/ 000013

BUDGET - EU CONTRIBUTION

2.551.277 € - 60%

COMMENCEMENT AND DURATION OF PROJECT

NOVEMBER 2004 - 48 MONTHS

BENEFICIARY

Environment Service
Ministry of Agriculture Natural Resources and Environment

PARTNERS

Forestry Department

Department of Fisheries and Marine Research

Game Fund Service

National and Kapodistrian University of Athens

Greek Biotope/Wetland Centre

OIKOS- Nature Management Ltd

ATLANTIS Consulting Cyprus Ltd

Full reference: Georghiou Kyriacos, Delipetrou Pinelopi, Andreou Marios, Kardakari Niki, Zotos Savvas. 2008. Conservation management in NATURA 2000 sites of Cyprus. Layman's report. National and Kapodistrian University of Athens. Athens. 24 p.

Introduction

The project LIFE04NAT/CY/000013

The project "**Conservation management in NATURA 2000 sites of Cyprus**" is the first attempt at applied scientific management of five NATURA 2000 sites:

- **Kavo Gkreko** - CY3000005
- **Koilada Diarizou** – CY4000003
- **Vouni Panagias** - CY4000004
- **Troodos National Forest Park** - CY5000004
- **Alykes Larnakas** - CY6000002.

The **main objective** of the project was the implementation of immediate actions in order to secure a **favourable conservation status** for the natural habitats and wild species in the sites. In parallel, these actions will create a base of important experience and set standards for **the management of NATURA 2000 sites in Cyprus**. The targeted species and habitats are shown in the table (p. 22).

The project was based on the co-operation of eight partners who implemented a total of forty actions within four years. The whole operation was supported by the actions of group F, related to administrative and operative support as well as scientific, technical and local coordination.

Preparatory actions (Actions A) included studies prerequisite for the implementation of other actions as well as broad range actions concerning the future management of the NATURA network. The preparation of guidelines for the elaboration of management plans (A1) was followed by the actual elaboration of management plans for four sites (A2-A5). Technical specifications were set for certain actions (A2-A5) and environmental impact assessment studies were made for others (A8). Monitoring plans for the targeted habitats and species were elaborated (A7) and a database was created for recording the resulting data and assessments (A6). Also, a data information system was created for the all the NATURA sites in Cyprus (A9).

The **non-recurring, pilot management actions** (Actions C) which were implemented for the targeted habitats and species aimed at alleviating pressures and encountering the existing threats, a description of which can be found in the following units. The pilot restoration works constitute an important innovation. They are expected to expand the habitats and enhance the populations of species as well as to provide significant experience for future efforts.

The **recurring actions** (Actions D) included actions systematically carried out during the project and expected to be continued after its completion. They are mainly related to the implementation of monitoring plans. Their results are also presented in the following units.

The **actions for public awareness and communication** (Actions E) constitute an indispensable foundation for securing the success of any management measures. The deliberations with local communities (E2) constitute an action of basic importance through which public consensus was developed as regards the finalization and adoption of the management plans. Public awareness and education were achieved by contacting the mass media (E3), organising events (E4), producing printed and electronic material (E1, E8, E9), creating infrastructures (E6) and supporting environmental education (E7). The scientific results were publicized and discussed in conference presentations and by the organization of workshops.

"Conservation management in NATURA 2000

OVERALL ACTIONS (concerning the country)

A1. Guidelines for the elaboration of Management Plans of NATURA 2000 sites in Cyprus - **EKBY**
A7. Elaboration of monitoring plans for targeted habitats and species - **NKUA**
A6. Development and management of Database - **NKUA**
A9. Design and development of a Data Information System - **EKBY**

D2. Monitoring of targeted priority habitats and species - **FD**
D3. Monitoring of targeted bird species - **FD**, **GF**
D1. Wardening of habitats and species - **FD**, **GF**
A8. Elaboration of Environmental Impact Assesment Studies (EIA) - **ATLANTIS**

LOCAL ACTIONS (concerning a certain area)

VOUNI PANAGIAS 3

A4. Elaboration of Management Plan for Vouni Panagias - **OIKOS**
C6. Restoration works for *Querqus infectoria* woodland at Vouni Panagias (CY4000004) - **FD**
C7. Enhancement of the population of *Scilla morrisii* at Vouni Panagias (CY4000004) - **FD**
D4. Improvement of prey and water availability for Hieraaetus fasciatus - **GF**

KOILADA DIARIZOU 2

A3. Elaboration of Management Plan for Koilada Diarizou - **OIKOS**
C4. Enhancement of *Alnus orientalis* riparian woodland in Koilada Diarizou (CY 4000003) - **FD**, **ATLANTIS**
C5. Creation of pools in Koilada Diarizou (CY 4000003) - **FD**, **ATLANTIS**

TROODOS NATIONAL FOREST PARK 4

A5. Elaboration of Management Plan for Troodos National Forest Park - **OIKOS**
C8. Pilot management of *Pinus nigra* subsp. *pallasiana* forest (9536*) in Troodos National Forest Park - **FD**
E5. Organisation of Workshops - **NKUA**
C9. Protection of Peat grasslands (6460*) in Troodos National Forest Park - **FD**
C10. Protection of the habitat of Serpentinophilous grasslands (62B0*) in Troodos National Forest Park (CY5000004) - **FD**
C11. Protection of the populations of *Chionodoxa lochiae** and *Pinguicula crystallina** and enhancement of the population of *Arabis kennedyae** in Troodos National Forest Park (CY5000004) - **FD**

sites of Cyprus”

LIFE 04NAT/CY/000013

GENERAL ACTIONS
(concerning all the sites)

- **E1.** Communication and Public Awareness Guide for NATURA 2000 Network in Cyprus - **EKBY**
- **E2.** Deliberations - **ES**
- **E3.** Media work - **ES**
- **E8.** Production of audiovisual and printed material - **OIKOS**
- **D6.** Provision of equipment - ES
- **E10.** Interpretation works - **ES, ATLANTIS, OIKOS**
- **E4.** Organisation of events - **ES**
- **E9.** Technical publication on priority habitats and species - **NKUA**
- **E6.** Participation in scientific conferences - **NKUA**

LOCAL ACTIONS
(concerning a certain area)

KAVO GKRECO 1

- **A2.** Elaboration of Management Plan for Kavo Gkreco - **OIKOS**
- **C1.** Rehabilitation of Zizyphus lotus mattoral (5220*) in Kavo GKreko (CY3000005) - **FD**
- **C2.** Protection of Vernal Pools (3170*) in Kavo Gkreko (CY3000005) -**FD**
- **C3.** nstallation of anchoring system for vessels in Kavo Gkreko - **DFMR**

ALYKES LARNAKAS 5

- **C12.** Habitat protection and pilot management works in Alykes Larnakas (CY6000002) - **ATLANTIS, DFMR**
- **D5.** Monitoring of water parameters in Alykes Larnakas - **ATLANTIS**

PARTNERS - IMPLEMENTATION BODIES:

ES: Environment Service, Ministry of Agriculture, Natural Resources and Environment
FD: Forestry Department, Ministry of Agriculture, Natural Resources and Environment
GF: Game Fund Service
DFMR: Department of Fisheries and Marine Research
NKUA: National and Kapodistrian University of Athens
EKBY: Greek Biotope / Wetland Centre
ATLANTIS: Atlantis Consulting Cyprus Ltd
OIKOS : OIKOS –Nature Management Ltd

Posidonia beds (1120*)

A7. Elaboration of monitoring plan.
IMPLEMENTATION BODY: **NKUA**

D2. Monitoring of the habitat
IMPLEMENTATION BODY: **FD** (CONTRIBUTION **DFMR**)

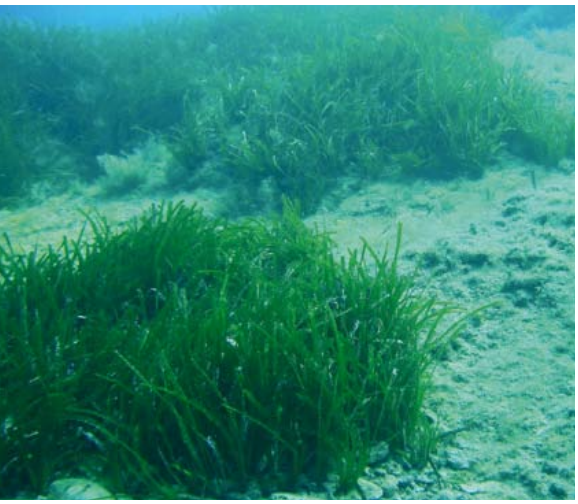
A8. Elaboration of Environmental Impact Studies (impacts of action C3)
IMPLEMENTATION BODY: **ATLANTIS**

C3. Installation of anchoring system for vessels in Kavo Gkreko (CY3000005)
IMPLEMENTATION BODY: **DFMR**

Posidonia oceanica (photo: A. Vidalis)

***Posidonia oceanica* beds** constitute a typical Mediterranean landscape. Contrary to what is commonly believed Posidonia is not an algae species. It is an angiosperm (a higher plant that makes flowers and fruits) which evolved on land and later adapted to the sea. What is more, these beds constitute an important part of the Mediterranean marine ecosystem since they serve as food for herbivore fauna species as well as reproduction sites for many fishes and other marine organisms.

They are protected by the Bern Convention and the Habitat Directive 92/43/EEC. However, they are threatened by human activities with local impact, for instance, vessel anchoring, as well as by wide range impact ones, such as the phenomenon of eutrofication due to waste disposal (nutrients) at their sites or the invasion of alien species.



Posidonia oceanica (photo: P. Orphanou)

Within the framework of habitat monitoring, a photographic survey of the sea bed at the habitat site was performed, permanent sampling quadrates (with frames) were established, and density measurements were made (leaf bundles/m^2) at a depth of up to 15 m. Moreover, since Posidonia has been proposed as a biological element of water quality at European level, parameters such as the deepest limit of its occurrence, the density of the bed at 15 m depth, and the average leaf surface per bundle at the same depth were estimated.

The comparison of the results with the respective reference values proves that the ecological quality of the waters at **the site of Kavo Gkreko** is high. The values of the parameters estimated in Kavo Gkreko are higher than the reference condition values of the South Aegean and comparable to the ones of Zakynthos Marine Park. This is the rationale under suggesting the values of Kavo Gkreko as reference values for the area of Ionio-Levantine Sea.

An **anchoring system for vessels** was installed at Kavo Gkreko (Konnos). The aim was to improve the conservation status of Posidonia beds and their protection from uncontrollable anchoring of recreation boats, especially during summer. A technical study for positioning the three anchorages as well as the required environmental impact assessment study were elaborated. Finally, the anchorages were signposted with mooring buoys equipped with lights.

Anchoring system for vessels in Kavo Gkreko (photo: DFMR)

Mediterranean vernal pools (3170*)

Ophioglossum lusitanicum (photo: P. Delipetrou)

The **Mediterranean vernal pools** are temporary, shallow (up to 20 cm deep), small, water ponds. They are characterized by specialised, amphibian, often dwarf plants, which emerge just as the pools start to dry. They later disappear and are successed by other species. The main ecological characteristic of the habitat is that the wet, water ecophase (autumn-winter) is followed by the dry terrestrial ecophase (spring-summer) and the plant species are adapted to this "life between flooding and drought". Indeed, certain species require the alternation of conditions in order to complete their life cycle and they do not appear otherwise.

Telmissa microcarpa (photo: M. Andreou)

Their sporadic distribution, their very small size and the brief appearance of the plants, besides the degradation of the habitat due to draining and cultivation all over Europe, have rendered the vernal pools rare and hard to find "floristic jewels".

In Cyprus, the vernal pools occur frequently in karstic, rain water fed depressions of hard limestone, named kafkala, and more rarely in shallow soil depressions. The term "kafkala" is the local name for the hard, secondary calcareous crust formed on several calcareous formations, especially on chavara.

In the **National Park of Kavo Gkreko**, both types of vernal pools occur at three locations, scattered at the openings of phoenician juniper shrub. The shallow pools are more widespread and their characteristic flora appears in February. The dominant species is the tiny fern *Ophioglossum lusitanicum* while the dwarf succulent *Crassula alata* occurs in drier sites. In the kafkales, the rare and threatened plants *Crassula vaillantii* and *Limosella aquatica* emerge during February-March while in March-April *Lythrum hyssopifolia* emerges, at the wetter and the red *Telmissa microcarpa* at the drier rocky spots.

The distribution of the vernal pools was mapped in detail and the maps were distributed to all the bodies involved, in order to facilitate their monitoring by the administrative personnel of the park and avoid any disturbance of the habitat. The three vernal pool locations were delimited and signposted with wooden poles and, apart from that, an informative sign board was set up. Moreover, floristic composition of the plant communities was recorded.

Kafkala
(photo: M. Andreou)

A7. Elaboration of monitoring plan
IMPLEMENTATION BODY: **NKUA**

D2. Monitoring of the habitat
IMPLEMENTATION BODY: **FD**

A2. Elaboration of Management Plan for Kavo Gkreco (conservation specifications)
IMPLEMENTATION BODY: **OIKOS**

C2. Protection of Vernal Pools (3170*) in Kavo Gkreko (CY3000005)
IMPLEMENTATION BODY: **FD**

Vernal pool (photo: M. Andreou)

Informative sign

Matorral with *Zizyphus* (5220*)

A2. Elaboration of Management Plan for Kavo Gkreco (conservation specifications)
IMPLEMENTATION BODY: **OIKOS**

A8. Elaboration of Environmental Impact Studies (impacts of action C1)
IMPLEMENTATION BODY: **ATLANTIS**

C1. Rehabilitation of *Zizyphus lotus* mattoral (5220*) in Kavo Gkreko (CY3000005)
IMPLEMENTATION BODY: **FD**

Zizyphus lotus sapling, during planting (photo: M. Andreou)

Young *Zizyphus lotus* plant, one year old (photo: M. Andreou)

The **open, medium height shrub (matorral) with *Zizyphus lotus*** constitutes a pre-desert vegetation type growing in xerophytic Thermo-Mediterranean bioclimate. In Cyprus, the shrubs of Zizyphus lotus (lotus jujube, local name: palloura) occur mainly in the central and eastern part, in areas with semi-desert climate. "Konnara", as the fruit of palloura is called, are edible and isolated shrubs or small stands are often left at the borders or in the middle of cultivated fields. Nevertheless, the formation of matorral is rare because its main area of distribution has been built or cultivated. Today, the most representative communities of habitat 5220 are to be found in Ammochostos and generally in Messoaria plain as well as at few sites of the hilly zone of central Cyprus.

Asparagus stipularis (agreli) and *Noaea mucronata* (androukliagros) are the characteristic species of *Zizyphus* matorral, while the shrubs *Phagnalon rupestre* (asprothymaro) and *Thymus capitatus* (thyme) participate frequently. A large number of herbs grow among the shrubs.

Restoration site of *Zizyphus lotus* shrubs in a field and protective nets (photo: M. Andreou)

In the site of **Kavo Gkreko**, the habitat 5220 used to consist of only two, isolated stands of *Zizyphus* and was not representative. The pilot restoration of *Zizyphus lotus* matorral was implemented successfully at three locations, in a total area of 0.84 ha: in a thin coastal shrub in the area of Faros, where a palloura stand had already been growing; in a coastal neglected field close to a waste disposal site; and in one more neglected field among phoenicean juniper shrub. Saplings of *Zizyphus lotus* and of other characteristic species, such as *Thymus capitatus* and *Asparagus stipularis*, were produced in the nursery of the Forestry Department from seeds collected at Kavo Gkreko. Soil restoration works were necessary at the waste disposal site. Overall, 650 *Zizyphus* saplings were planted at the restoration sites. The restoration sites are monitored and maintained by plant replenishment, weed removal and irrigation during summer. The young *Zizyphus* plants are protected from consumers by specially constructed nets.

In parallel with the restoration of habitat 5220, a pilot restoration of the phoenicean juniper shrub (*Juniperus phoenicea*, habitat 5212) was implemented in Kavo Gkreco. The alien invasive species *Acacia saligna* (acacia) and *Eucalyptus gomphocephala* (eucalyptus) were removed with a hacksaw in an area of 14 acres, and subsequently any plant regrowth was being removed by hand for three years. At the same time new juniper saplings from the forest nursery of Athalassa were planted.

Zizyphus lotus shrub in the restoration site at Faros (photo: M. Andreou)

Acacia removal (photo: FD)

Riparian forests with *Alnus orientalis* (92C0)

***Alnus orientalis* (oriental alder,** local name: **skledro)** forms riparian forests, pure or with oriental plane or more rarely with willow, at the rivers of Cyprus where the water flow is maintained for longer periods. Oriental alder forests are a special case of the habitat 92C0 (riparian forests with *Platanus orientalis*). They only occur in Cyprus within the European Union, and are rare in the other countries of their distribution (Israel, Lebanon, Syria, Turkey). The riparian forests provide habitat for many fauna and flora species and they also contribute to the improvement of the local climate and most importantly to the replenishment of groundwater aquifers while preventing erosion, as well.

The **oriental alder forests of Diarizos valley**, particularly at Tzielefos bridge, are included among the most representative ones in Cyprus. Their cover has decreased due to the reduction of the floodplain caused by the spread of cultivations, drilling, dam construction and a recent seven-year period of drought. Moreover, forest degradation is caused by overgrazing and management through burning and logging.

Oriental plane forests in Diarizos valley, as shown from the detailed mapping of the riverbank riparian vegetation, cover no more than 6.5 ha. They are smaller than the oriental plane forests (9.2 ha) while the greatest part of the site is covered by riparian shrub (108 ha) and willow forests are very small (0.4 ha). Permanent monitoring quadrates were established for the evaluation of habitat quality and dynamics. The forest communities are characterized by a variety of species but the frequent participation of alien plants, such as acacia, is alarming.

There are mature stands of big trees in the area of Platys and in Kidasi, while trees are younger in other locations. In fact, there is significant natural regeneration of the oriental alder, particularly at locations with constant water flow downstream the dam. At the area of Kelokedara, the density of young oriental alder trees reaches 23 individuals in 50 m^2.

The regeneration potential of oriental alder determined the method for the restoration of the riparian forest: the natural regeneration of the forest was protected against grazing and trampling by fencing two areas, of 2.5 and 10 ha, along the riverbed. Local Authorities were informed and both the areas were signposted in order to avoid human intervention, including burning. Currently the areas are monitored. It has also been decided that, in cases of drought, water will be released from the dam of Arminou, in order to support the riparian fauna and flora and to enhance the groundwater aquifers of the area.

A7. Elaboration of monitoring plan
IMPLEMENTATION BODY: **NKUA**

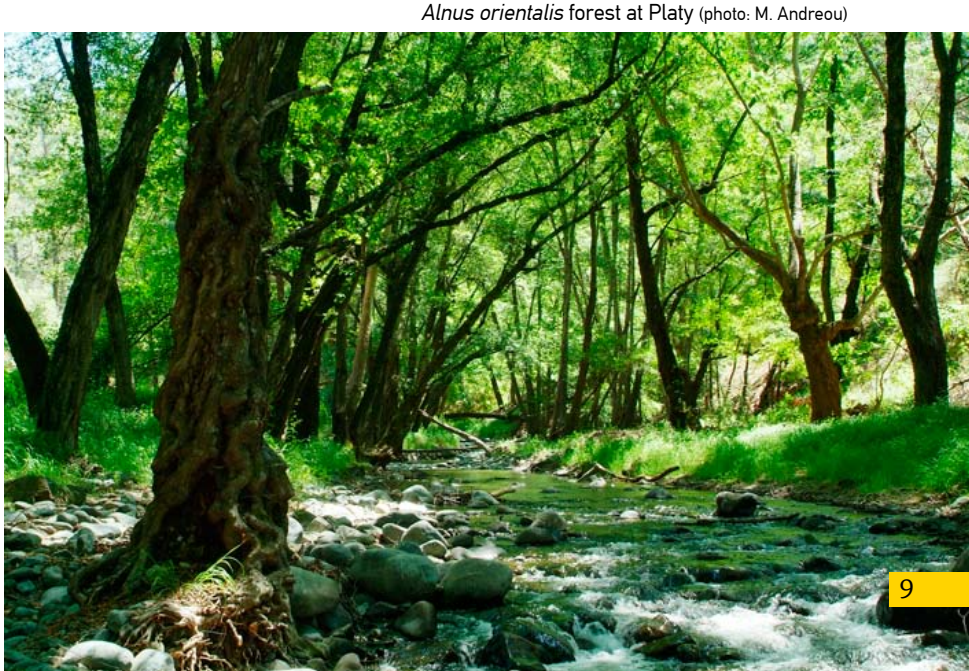
D2. Monitoring of the habitat
IMPLEMENTATION BODY: **FD**

A3. Elaboration of Management Plan for Koilada Diarizou (Status specifications)
IMPLEMENTATION BODY: **OIKOS**

C4. Enhancement of *Alnus orientalis* in Koilada Diarizou (CY 4000003)
IMPLEMENTATION BODY: **FD, ATLANTIS**

Signposting of restoration area
(photo: FD)

Alnus orientalis forest at Platy (photo: M. Andreou)



Regeneration of *Alnus orientalis* in the restoration area (photo: Th. Kyriakou)

Forest stands with *Quercus infectoria* (93A0) woodland

A7. Elaboration of monitoring plan
IMPLEMENTATION BODY: **NKUA**

D2. Monitoring of the habitat
IMPLEMENTATION BODY: **FD**

A4. Elaboration of Management Plan for Vouni Panagias (Restoration specifications)
IMPLEMENTATION BODY: **OIKOS**

C6. Restoration for *Querqus infectoria* at Vouni Panagias (CY4000004)
IMPLEMENTATION BODY: **FD**

Cyprian oak fruit (photo: P. Delipetrou)

Forest stands of *Quercus infectoria* subsp. *veneris* (cyprian oak, local name: drys) constitute a type of broadleaved East Mediterranean forest occurring in Cyprus only, within the European Union. The cyprian oak is the unique broadleaved oak in Cyprus. There are giant, perennial trees in many areas and, in the past, the oaks used to be protected in Troodos villages because acorns were used as pig food.

In Cyprus, as well as in the neighboring distribution areas, Turkey, Lebanon and Syria, the cyprian oak is believed to have formed big forests in the past, which were logged or cultivated or turned into to pine forests. Nowadays, in Cyprus, there are but relic forest stands or isolated trees, growing on the north and south slopes of Troodos mountain range, on alkaline soils at altitudes of 100-1100 m, and more rarely up to 1700 m.

During the last decades it has been observed that *Quercus infectoria* is capable of colonizing neglected fields and even expanding in the shrub vegetation. This indicates that if disturbances, such as grazing and logging, are absent, the cyprian oak has the potential for regeneration and natural establishment at suitable locations. In these cases the numerous stands of *Quercus infectoria*, traditionally left at field borders and riverbanks and maintaining a miniature of the typical floristic composition of the habitat, may function as colonization cores.

The cover of forest oak stands in the site of **Vouni Panagias**, according to the implemented detailed mapping, is no more than 32 ha, whereas there are many isolated trees, especially at the eastern part. Permanent monitoring quadrates were established in order to evaluate the quality and dynamics of the habitat. The first results have verified the potential of oak regeneration even following fire or in old cultivations.

The first, in Cyprus and in the world, pilot effort to restore the oak forest was realized at the N.E. part of Vouni Panagias, The restoration site is a church property of 12 ha, with old vineyards and forest stands of oak at the field margins which was kindly granted by the prior of Chrysorogiatissa Monastery. The site was fenced and planting started in 2006. For three successive years the fencing and the plantation were maintained by irrigation, weeding, plant replenishment and trimming. A total of 4,330 shrubs of cyprian oak, terebinth, kermes oak, hawthorn, originating from the forest nurseries of Stavros tis Psokas, were planted. Today, 3,500 young trees, of which 3,000 are young oaks, constitute the newly-established forest which is expected to evolve into the biggest oak forest in Cyprus.

Restoration saplings (photo: FD)

Cyprian oaks at field borders (photo: M. Andreou)

Shrub with cyprian oak (photo: M. Andreou)

Scilla morrisii (photo: M. Andreou)

Scilla morrisii Meikle

Scilla morrisii is a bulb with milky white flowers tinged with violet or blue. The "typical" *Scilla morrisii*, occurs only in the area of Vouni Panagias, at three locations. It forms small colonies, in shaded, rather humid places with deep soil, exclusively under *Quercus infectoria* (cyprian oak) trees and *Pistacia terebinthus* (terebinth) shrubs, at an altitude of 800-980 m. It flowers in March-April and fruits in March-May.

It is regarded as a species of the ancient oak forests which today remain at a relic state. The main threat for the plant is the increased possibility of loss or degradation of its already rare habitat. All the locations of the plant are close to fields and roads or at field borders, and are threatened by the very probable expansion of either the cultivations or the roads, besides the logging of oak trees.

Scilla morrisii is a rare and endangered endemic species of the flora of Cyprus, one of the "Top 50 Plants of Mediterranean Islands" and it is included in the "Red Data Book of the Flora of Cyprus". As a plant important for the conservation of biodiversity, it is an Annex II Directive 92/43/EEC priority species and it is protected by the Bern Convention.

A7. Elaboration of monitoring plan
IMPLEMENTATION BODY: **NKUA**

D2. Monitoring of species
IMPLEMENTATION BODY: **FD**

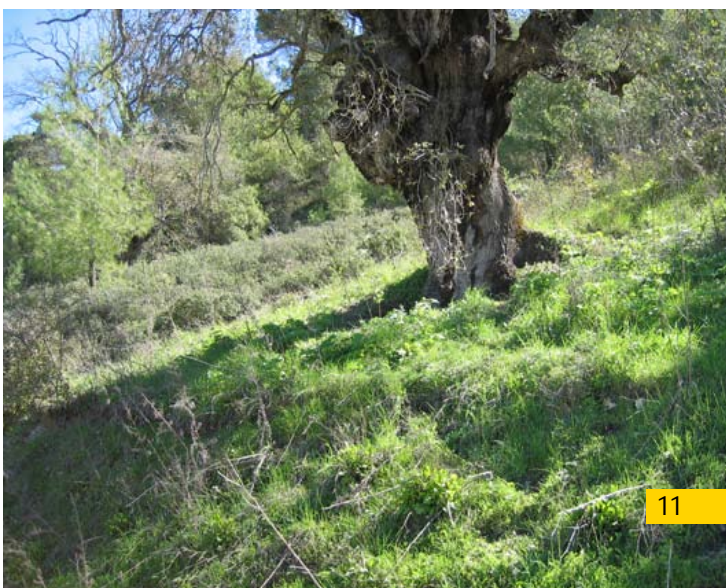
A4. Elaboration of Management Plan for Vouni Panagias (Restoration specifications)
IMPLEMENTATION BODY: **OIKOS**

C7. Enhancement of the population of *Scilla morrisii** at Vouni Panagias (CY4000004)
IMPLEMENTATION BODY: **FD**

Mapping of its colonies, counting of mature plants and of plants with consumption signs as well as a reproductive biology study were performed during the three-year implementation of the monitoring plan. Moreover, habitat samplings were performed in the broad distribution area of the plant for the creation of an ecological sensitivity map. The number of mature individuals in each colony fluctuated yearly. The total population size was 1044 plants, in 2008, with the biggest colony at the new location which was discovered in 2007. Reproductive success rates are rather high (55-96%) but one of the locations presents a rather high rate of consumption by rodents (19-33%). The permanent loss of several colonies with at least 400 individuals in all its three locations, due to the expansion of cultivations and roads, demonstrates the necessity for immediate protection of the plant. According to this new data it is classified under the threat category "Critically Endangered" (CR)

Within the framework of the plant protection, a big colony was fenced. Moreover, new colonies were successfully established within the fenced *Quercus infectoria* restoration site. The plant was propagated in a nursery from seeds originating from the wild population and 150 plants were planted at 3 new locations in 2007 and 2008. Apart from this, it has been attempted to introduce the plant by sowing in the new *Quercus infectoria* forest.

Scilla morrisii habitat (photo: M. Andreou)



Scilla morrisii (photo: M. Andreou)

Peat grasslands (6460*) of Troodos

A7. Elaboration of monitoring plan
IMPLEMENTATION BODY: **NKUA**

D2. Monitoring of the habitat
IMPLEMENTATION BODY: **FD**

A5. Elaboration of Management Plan for Troodos National Forest Park
IMPLEMENTATION BODY: **OIKOS**

C9. Protection of Peat grasslands (6460*) in Troodos National Forest Park
IMPLEMENTATION BODY: **FD**

Sign board (kiosk) (photo: FD)

The **peat grasslands in Troodos National Forest Park** are two wetlands with reed colonies, characterized by the formation of peat. They develop at two only neighboring locations of Troodos in Cyprus, Almyrolivado and Passia Livadi, at an altitude of 1600-1650 m. The peat grasslands are flooded from October – November until June – July. Even in summer, though, a great part of the soil remains wet and muddy and thus peat is formed from plant relics which do not fully decompose. The peat grasslands of Troodos are alkaline, with soil pH >6 and fed groundwater or surface water of the springs of Kouri river. The conservation of the habitat is absolutely depended on the hydrologic development of the area.

According to the detailed mapping, the peat grasslands cover no more than 1.5 ha. The area was delimited and signposted, and areas of 17,200 m^2 and 16,000 m^2 were fenced at **Almirolivado** and **Pasia Livadi**, respectively. Metallic sign boards were put on the fence for visitor's information. Moreover, the adjacent picnic site was removed and 5 wooden information kiosks were built around the perimeter of the peat grasslands. These actions prevent the degradation of the habitat by uncontrolled intrusion of cars and walkers.

Thirteen permanent sampling transects, covering sufficiently the whole of the wetland area, were established in order to monitor the quality and dynamics of the habitat. According to the floristic composition study the characteristic plants of the peat grasslands are four rare in Cyprus graminoids, occurring only in wet grasslands of high altitudes: the dominant in the peat grasslands but threatened in Cyprus *Calamogrostis epigejos*, the endemic *Brachypodium firmifolilum*, the threatened *Poa pratensis* and the extremely rare and critically endangered *Crypsis hadjikyriacou*, which occurs exclusively in Passia Livadi. The plant communities are diversified by the participation of three more wetland sedges more widespread in Cyprus: *Carex distans*, *Juncus heldreichianus* and *Juncus littoralis* (threatened species). The presence of alien species and weeds near disturbed locations indicates degradation and is a potential threat to the peat grasslands.

Fencing (photo: FD)

Peat grasslands in the summer (photo: M. Andreou)

Signposting with wooden poles (photo: FD)

Serpentinophilous grasslands (62B0*)

Onosma troodi, characteristic species
(photo: M. Andreou)

The **Serpentinophilous grasslands** of Cyprus are communities with perennial herbs and semi-shrubs growing at rocky and stony locations exclusively on serpentines (serpentinite and serpeninized harzburgite and dunite). This habitat occurs only in Cyprus, throughout the serpentine zone of Troodos mountain range and Akamas peninsula. It is characterized by plant species with limited distribution specialized to serpentines. Steno-endemic species of the genus Alyssum, adapted to the hostile substrate, always participate in the habitat, and diversify the local variations of the communities: *Alyssum troodi* on Troodos, *Alyssum akamasicum* at Akamas, and *Alyssum chondogynum* in Lemesos forest.

A7. Elaboration of monitoring plan
IMPLEMENTATION BODY: **NKUA**

D2. Monitoring of the habitat
IMPLEMENTATION BODY: **FD**

A5. Elaboration of Management Plan for Troodos National Forest Park (protection specifications)
IMPLEMENTATION BODY: **OIKOS**

C10. Protection of the habitat of Serpentinophilous grasslands (62B0*) in Troodos NFP (CY5000004)
IMPLEMENTATION BODY: **FD**

In **Troodos National Forest Park** the serpentinophilous communities occur sporadically, at stony locations, usually in big openings of pine forests, at altitudes of 1400-1950 m. The characteristic plants, apart from the endemic in Troodos *Alyssum troodi*, are two rare Troodos endemics, *Onosma troodi*, and *Acinos troodi* subsp. *troodi*, as well as the eastern Mediterranean *Arenaria saponarioides*. The plant communities include other rare and threatened plants, such as *Scariola tetrantha* and *Sedum microstachylum*, as well as more common Cyprus endemics, such as *Alyssum cypricum*, *Teucrium cyprium* and *Scorzonera troodea*. The floristic composition is partly differentiated according to altitude, exposition, substrate and rock cover.

Sign board

The serpentinophilous communities of Troodos National Forest Park were mapped at 182 spots in total, and cover 66 ha approximately. The production and distribution of the maps to the Administration of Troodos NFP and other bodies involved will help prevent the accidental destruction of the communities by construction works.

The most representative communities are located in 9 areas, mainly around Chionistra and along Atalanti path. These nine areas were signposted with boards and with the establishment of numbered wooden poles at their perimeter. Moreover an informative sign board for the public was established close to a Path for the Study of Nature.

Acinos troodi, characteristic species
(photo: Ch. Christodoulou)

Alyssum troodi, characteristic species
(photo: M. Andreou)

Sign board for the serpentinophilous grasslands (photo: FD)

Pinus nigra forest (9536*)

A7. Elaboration of monitoring plan
IMPLEMENTATION BODY: **NKUA**

D2. Monitoring of the habitat
IMPLEMENTATION BODY: **FD**

A5. Elaboration of Management Plan for Troodos National Forest Park (protection specifications)
IMPLEMENTATION BODY: **OIKOS**

C8. Pilot management of Pinus nigra subsp. Pallasiana forest (9536*) in Troodos National Forest Park
IMPLEMENTATION BODY: **FD**

E5. Organisation of Workshops
IMPLEMENTATION BODY: **NKUA**

Cone collection (photo: FD)

The **black pine (*Pinus nigra*)** is an indigenous tree of the flora of Cyprus and occurs exclusively on the highest peaks of Troodos, in pure stands, at altitudes 1300 - 1952 m, as well as in mixed stands with brutia pine (Pinus brutia), at altitudes 1100 - 1650 m.

The greatest part of the black pine forest lies within the **National Forest Park of Troodos** and the forest constitutes a priority habitat of the Directive 92/43/EEC.

The main threats to the habitat are two: human intervention due to recreation activities and increased risk of fire during the summer months (either natural fire or induced by human negligence). Human activities are high during the winter months (skiing, snowballing) and cause the destruction of the small sized black pine seedlings. Fire has a serious impact on the population of the species since it has no postfire regeneration mechanism unlike the brutia pine which is aggressive and becomes a serious competitor after fire. Climate change is also expected to affect the black pine, since the rise of temperature will restrict its distribution area to even higher altitudes. It is worth noting that in Cyprus the black pine is close to its southernmost distribution limit.

Within the framework of the pilot management of the black pine, seeds were collected from the wild population and young plants were produced at the forest nursery of Platania. Specifications for experimental establishment of the species were prepared and a two acre area with trampled black pine regeneration was fenced in order to exclude visitors and monitor the development of the vegetation. A number of brutia pine trees were felled at the transition zone between pure and mixed stands and 1,200 kg of black pine cones were collected from trees all over the habitat. The seeds extracted from these cones were put in deep freeze in order to create a gene bank for possible future use.

Permanent monitoring sites were established and "critical" meteorological data, such as soil temperature and humidity, was recorded by two digital meteorological stations established on the spot. Vegetation samplings revealed the large number of endemic (and local endemic) species hosted in the black pine habitat. The seed rain and the regeneration potential were determined and the establishment and survival potential of the seedlings were estimated. The high death rate of the seedlings during the summer months, when soil temperatures exceed 50°C, is alarming. Finally, a preliminary study on the competition between black pine and brutia pine indicated a higher establishment and survival potential for the brutia pine seedlings compared to the black pine ones. However, the comparison of young plants (up to 1.5m tall) of the two species did not show any differences in plant height.

Artificial regeneration of *Pinus nigra* (photo: N. Kardakari)

Pinus nigra forest (photo: C. Thanos)

Arabis kennedyae Meikle

Arabis kennedyae (photo: M. Andreou)

Arabis kennedyae is an annual, small plant (it rarely reaches 30 cm) with numerous white flowers. It flowers in April - May and fruits in May - July. It forms very small seeds which may be drifted by the rain water or even by the wind. It occurs at stony or rocky locations, in openings and road margins in cedar forest, in very sparse juniper forest and near streams on the boundaries of riparian vegetation and mixed forests of pine - golden oak forest.

A7. Elaboration of monitoring plan
IMPLEMENTATION BODY: **NKUA**

D2. Monitoring of the habitat
IMPLEMENTATION BODY: **FD**

A5. Elaboration of Management Plan for Troodos National Forest Park (Protection - restoration specifications)
IMPLEMENTATION BODY: **OIKOS**

C11. Protection of the populations of the genus *Arabis kennedyae** in Troodos NFP (CY5000004)
IMPLEMENTATION BODY: **FD**

Arabis kennedyae is endemic in Cyprus and occurs exclusively on the Troodos mountain range. It was first discovered in 1938 and collected again in 1962. Since then, after years of futile search, a few plants were found again, at Xerokolympos, in 1994, but today there is none left. Fortunately, it has been recently found at two more locations in Troodos NFP, at Kryos Potamos and at Chionistra, and at one location in Trypilos (Pafos forest).

All its locations are near "paths for the study of nature" or roads accessible to tourists and holiday-makers. The small colonies are threatened by potential habitat loss or degradation caused by road construction, trampling (especially at Kryos Potamos) and fire.

Arabis kennedyae is a rare and threatened species, one of the "Top 50 Plants of the Mediterranean Islands" and included in the "Red Data Book of the Flora of Cyprus". As a plant important for the conservation of biodiversity it is an Annex II Directive 92/43/EEC priority species and it is protected by the Bern Convention.

During the three-year implementation of the monitoring plan, all the plant colonies were mapped and individuals were counted. Its reproduction was studied and its habitat was evaluated. The total population size fluctuated yearly: from 1,500 plants in 2006, it increased to more than 7,000 plants in 2007 to be reduced to 5,200 in 2008. The reproductive success of the plant is satisfactory (46-64%). According to the new population data it is classified under the threat category "Critically Endangered" (CR).

The attempts to enhance the population of *A. kennedyae* by establishing new colonies in the area of Troodos NFP have not been successful until now.

Arabis kennedyae in fruiting (photo: M. Andreou)

Arabis kennedyae location at Kryos Potamos (photo: M. Andreou)

Arabis kennedyae habitat (open shrub with *Juniperus foetidissima*) (photo: M. Andreou)

Chionodoxa lochiae Meikle

A7. Elaboration of monitoring plan
IMPLEMENTATION BODY: **NKUA**

D2. Monitoring of the habitat
IMPLEMENTATION BODY: **FD**

A5. Elaboration of Management Plan for Troodos National Forest Park (Protection specifications)
IMPLEMENTATION BODY: **OIKOS**

C11. Protection of the populations of the species *Chionodoxa lochiae** in Troodos NFP (CY5000004)
IMPLEMENTATION BODY: **FD**

(photo: M. Andreou)

Chionodoxa lochiae is an impressive bulb with bright blue flowers. It usually bears 1-3 flowers but there are also plants with 8 flowers! It is named after its habit to blossom in the period of March – April when the soil is still covered by a thin layer of snow. It fruits in May. It reproduces by both seed and bulbs. It occurs in the pine forests of **central Troodos**, in shaded, wet locations, rich in organic matter, at an altitude of 900–1,500 m. The main part of its population lies in neighbouring colonies, in the area of Prodromou-Pedoula-Marathou, but there are isolated colonies at Eso Galata, Spilia and on the north of Amiantos, too.

It is an endemic and threatened species of Cyprus, included in the "Red Book of the Flora of Cyprus" and characterized as vulnerable (VU). As a plant important for the conservation of biodiversity it is an Annex II Directive 92/43/EEC priority species of Παραρτηματος and it is protected by the Bern Convention.

Almost all of its locations are near picnic sites or near settlements and private land. The unsuccessful management of picnic areas and roads, and the construction of new houses (particularly at the area of Pedoulas) may destroy an important part of the population. Other threats include flower and bulb collection by hobbists and fire risk.

During the three-year implementation of the monitoring plan, all the known colonies were mapped and new colonies were located. Moreover, the population of the plant estimated by individual count and allocated to stages (seedlings, young and mature plants) and, also, individuals with consumption signs were counted. Additionally, the reproductive biology was studied and the habitat was evaluated. The number of mature individuals of each colony fluctuated significantly. The total size of the population exceeded the number of 11,000 individuals in 2008. Reproductive success is quite low to nil in most locations, which is probably due to lack of pollinators. Consumption by herbivores is relatively low (1-4%) in the total population, but rather high (25-59%) at certain locations, probably due to increased rodent presence.

Fencing was not considered necessary for the protection of the population, however, signposting was implemented at two locations, mainly in order to prevent destruction of the plants by trampling or cleaning of the picnic site at Marathos.

(photo: M. Andreou)

Chionodoxa lochiae (photo: M. Andreou)

(photo: M. Andreou)

Pinguicula crystallina subsp. *crystallina*

(photo: M. Andreou)

Pinguicula crystallina is a perennial herb with rosette which forms 2-6 flower bearing stems. Each stem forms one white flower tinged violet at the edges. The duration of flowering and fruiting is long (from March to November). Its fruits contain approximately 50 very small seeds which are easily drifted by the wind or the rain. It occurs at 7 locations of the **central mountain range of Troodos**, at high altitudes (1300 - 1640m) and also at an inaccessible, isolated area, at the river of Kyparissia, at a lower altitude (250 m). Its habitat is specialized: bare, rocky and permanently wet locations, though not inundated by water, near springs and water flows or along streams.

It is the only carnivorous (insectivorous) plant of Cyprus. This ability enables the absorption of nitrogen from the digestion of the insects stuck on its leaves surface. The leaves bear two types of glands. The "penduncular" glands secrete a mucilaginous substance in water-like droplets which lures and entraps insects. The "digestive" glands are responsible for the digestion of the captured insects.

The distribution of *P. crystallina* is limited to Cyprus and in the South-eastern coast of Turkey. It has been characterized as a threatened species in both countries and is classified as vulnerable (VU), in the "Red Data Book of the Flora of Cyprus". Its uniqueness and rarity increase the importance of its conservation. It is an Annex II Directive 92/43/EEC priority species and it is protected by the Bern Convention.

Its survival depends on the presence of water and is threatened mainly by loss or degradation of its habitat due to either human intervention or natural causes. Habitat desiccation caused either by prolonged drought or by depletion of groundwater aquifers (drilling, water over-exploitation) may even lead to the extinction of the species.

During the three-year implementation of the monitoring plan, the distribution of the plant was mapped in detail. In 9 of the colonies population size was estimated by individual count. Reproduction success was also estimated and habitat status evaluated. The total population size was rather high in 2006 (67,400 plants – Red Book counting) and the reproductive success of the plant was high (78-100%). However, in the three years between 2006-2008, a 40 % reduction of population size was observed in almost all the colonies monitored, apparently associated with the desiccation phenomena. According to this new data, the species is classified under the threat category "Critically Endangered" (CR). Nevertheless, three new colonies have appeared, a fact which points out the ability of the plant to easily colonize new locations as long as appropriate conditions are present.

(photo: M. Andreou)

Within the framework of protective management measures, fencing was considered redundant, however, signposting of two locations was implemented, mainly in order to prevent destruction of the plants by the road expansion in Koskinias area.

A7. Elaboration of monitoring plan
IMPLEMENTATION BODY: **NKUA**

D2. Monitoring of the habitat
IMPLEMENTATION BODY: **FD**

A5. Elaboration of Management Plan for Troodos National Forest Park (Protection specifications)
IMPLEMENTATION BODY: **OIKOS**

C11. Protection of the populations of the species *Pinguicula crystallina* * in Troodos NFP (CY5000004)
IMPLEMENTATION BODY: **FD**

Pinguicula crystallina (photo: M. Andreou)

Pinguicula crystallina habitat (photo: M. Andreou)

Coluber cypriensis (=*Hierophis cypriensis*) Cyprian snake

A7. Elaboration of monitoring plan
IMPLEMENTATION BODY: NKUA

D2. Monitoring of the species
IMPLEMENTATION BODY: FD

(photo: S. Zotos)

Coluber cypriensis is the only endemic snake at species level in Cyprus. It is a small and thin snake, harmless and poisonless. It has dark, olive green colour and its basic characteristic feature is a white ring around its eyes and a series of transversal pale white lines intersecting its back. The length of its body is no more than 115 cm.

Individuals of this species are very similar to individuals of the species Dolichopis jugularis (black snake, local name: therko, pervolaris). The main difference between them is the size. The Cyprian snake is much smaller, in length as much as in body diameter.

Coluber cypriensis (photo: S. Zotos)

As a rule, it is absent from dry, coastal areas and it occurs from the foot of Troodos up to an altitude of 1400 m. It frequents sunny, cool areas near streams with dense shrub vegetation in which it can find refuge if hunted.

It is less aggressive than the other snakes of Cyprus (even when captured) but equally fast and agile, able to move easily on rough, rocky surfaces. It feeds on occasion on whatever it finds, and its food ranges from arthropods and amphibians to lizards and snakes.

It is a threatened species, characterized as endangered (EN) by the International Union for the Conservation of Nature (IUCN) due to its small total distribution area and to the constant, gradual degradation and reduction of its habitats. The main threats to the Cyprian snake are hunting and killing by humans (mainly due to ignorance about its harmlessness and its importance) and the reduction of its habitats due to logging.

Capture trap (photo: S. Zotos)

An attempt was made to locate and monitor the population of the Cyprian snake. Certain sites meeting the bibliographic habitat requirements for the presence of the snake were located in Troodos NFP and in some of them specially made traps were established for its capture.

Monitoring was implemented in three sampling periods: August 2006 (one week long), September – October 2006 (one month long) and June – July 2006 (one month long). In each period, the effort to locate, capture and monitor C. *cypriensis* was made not only by the use of traps, but also by road inspection and walking surveys of the areas. The results of the first two periods were hardly encouraging. Only one black snake (*Columber jungularis*) was captured while numerous lizards were found in the traps. Two individuals of C. *cypriensis* were observed, standing still on the dirt roads of the areas. Improvement of the methodology gave better results during the third period, when two individuals C. *cypriensis* and 7 individuals of other snakes were captured in the traps. Unfortunately, the number of the collected and observed individuals was not sufficient to draw a first estimation of the Cyprian snake's population size in Troodos NFP. It is suggested that the next effort at studying the Cyprian snake population is complemented by the application of transmitters on captured individuals aiming at monitoring and locating its basic ecological and behavioural traits. This knowledge, will constitute an invaluable tool for the determination of the appropriate management measures for the protection of the species.

Suaeda aegyptiaca (threatened)
N – NW of Tekes (photo: M. Andreou)

Halophytic habitats (1150*, 1310, 1410, 1420, 1510)

The **wetland ecosystem of Alykes Larnakas** is one of the four large coastal **halophytic wetlands** of Cyprus. It includes the large hyper-saline lake Alyki and in the South the smaller brackish lakes Soros, Orphani and Limni Aerodromiou. These lakes are interconnected and it seems that they had been lagoons in the past. Salinity and depth of water fluctuate seasonally as well as yearly in all the lakes and especially in Alyki. A 3-year monitoring of the water biological and physicochemical parameters was implemented at 10 stations. The results demonstrated the problems of water quality and determined the elaboration of a continuous monitoring plan.

A variety of halophytic habitats, actually all types identified in Cyprus, are found in Alykes Larnakas, despite human pressures. These habitats were preliminarily studied and mapped.

A zone of submerged aquatic communities develop at the deepest parts of the lakes, but the characteristic species of the habitat (1150*) are the unicellular alga *Dunaniella salina* and the tiny shrimps *Artemia salina* and *Branchianella spinosa* (which are flamingo's main food resource).

At the margins of this zone, at the places where water dries last, a zone with annual halophytes, such as *Salicornia europaea* and *Halopeplis amplexicaulis* (habitat 1310), develops late during the summer. The most extended habitat of the area, halophilous scrubs (habitat 1420), develop, at higher places with high salinity, which retain humidity during spring and winter but are very dry in the summer. It is characterised by perennial halophilous plants: *Arthrocnemum macrostachyum*. *Halocnemum strobilaceum*, *Sarcocornia fruticosa*, *Suaeda vera* and *Suaeda aegyptiaca* (threatened). Salt steppes (habitat 1510) appear in areas which are soaked but not inundated by water and are characterised by species of the genus *Limonium*. Salt meadows (habitat 1410) develop in hollows that retain water almost constantly and are characterized by various *Juncus* species. Reedbeds and *Tamarix* stands develop at the margins of the canals.

The **pilot restoration of halophilous vegetation** was attempted in two ways. The first was to expand the halophilous vegetation. The alien-invasive species *Acacia saligna* which had displaced the halophilous vegetation was cleared at the margins of Alyki at an area of 500 m^2 at the eastern and an area of 100 m^2 at the southern part. Acacias were felled my mechanical means or by hand where necessary. Experimental cutting of the underground part of the trunks, instead of simple cutting, and chemical means for the control of acacia regeneration were applied at various locations of the felled area. Five acres in these areas were ploughed and subsequently150 *Tamarix* saplings were planted with a special material for retaining and gradually releasing water. Secondly, works were implemented for the alleviation of the pressures causing degradation of the halophytic habitats. In order to restrict access to and avoid trampling of the vegetation a channel was constructed and fencing was established with informative and prohibitory boards at two locations at the NW part of Alyki. Garbage was cleared from vulnerable areas as well as from the NW part of Alyki and from locations along dirt roads in order to improve the quality of abiotic elements. Constant maintenance and surveillance of the area and information of the public are required for the success of the above actions.

A7. Elaboration of monitoring plan
IMPLEMENTATION BODY: **NKUA**

D2. Monitoring of the halophytic habitats
IMPLEMENTATION BODY: **FD**

D5. Monitoring of water parameters in Alykes Larnakas
IMPLEMENTATION BODY: **Atlantis**

A8. Elaboration of Environmental Impact Studies (Impacts of action 12)
IMPLEMENTATION BODY: **ATLANTIS**

C12. Habitat protection and management works in Alykes Larnakas (CY6000002)
IMPLEMENTATION BODY: **ATLANTIS, DFMR** (PARTICIPATION **FD**)

Annual vegetation with *Halopeplis amplexicaulis* (1310, Kamares) (photo: M. Andreou)

Acacia invasion in halophilous scrub (NE Alyki) (photo: M. Andreou)

Avifauna

A7. Elaboration of monitoring plan for the avifauna
IMPLEMENTATION BODY: **NKUA**

D2. Monitoring of priority species
IMPLEMENTATION BODY: **FD**

D3. Scientific monitoring of the avifauna
IMPLEMENTATION BODY: **FD, GF**

A3. Elaboration of Management Plan for Koilada Diarizou (specifications for action C5)
IMPLEMENTATION BODY: **OIKOS**

A8. Elaboration of Environmental Impact Studies (Impacts of actions C5, C12)
IMPLEMENTATION BODY: **ATLANTIS**

C5. Creation of pools in Koilada Diarizou (CY 4000003)
IMPLEMENTATION BODY: FD, **ATLANTIS**

D4. Improvement of prey and water availability for *Hieraaetus fasciatus*
IMPLEMENTATION BODY: **FD, GF**

C12. Habitat protection and management works in Alykes Larnakas (CY6000002)
IMPLEMENTATION BODY: **ATLANTIS, DMFR**

Coal Tit (*Parus ater cypriotes*) (photo: P. Panagidis)

Part of the LIFE project was dedicated to the **study and conservation of birds**. An important action in this aspect was the monitoring of certain protected bird species throughout the five project sites.

Raptors are the most threatened group among the protected bird species of Cyprus. The total population of the Griffon Vulture (*Gyps fulvus*) in Cyprus is less than 30 individuals, and is significantly smaller than it used to be. Today it is a rare visitor to Troodos massif where colonies existed in the past. Diarizos valley, on the other hand, still offers valuable foraging grounds for the species. In general, Diarizos valley is a hunting terrain for raptors such as the Bonelli's Eagle (*Hieraaetus fasciatus*) which nests in Troodos and Vouni Panagias. The Long–legged Buzzard (*Buteo rufinus*) nests in Vouni Panagias and forages in Diarizos valley. Diarizos valley is also important for smaller raptors such as the Peregrine (*Falco peregrinus*, local name: Tzanos or Siahini) which nests at nearby cliffs. Eleonora's Falcon (*Falco eleonorae*, local name: Mavromatis) hunts for insects in mountainous areas in May. Kavo Gkreko is particularly important for migratory birds of prey such as the Hen Harrier (*Circus cyaneus*), the Pallid Harrier (*Circus macrourus*), the Lesser Kestrel (*Falco naumannii*) and the Red-footed Falcon (*Falco vespertinus*).

The **National Forest Park of Troodos** is very important for the endemic Cyprus Pied Wheatear (*Oenanthe cypriaca*) and the endemic subspecies Coal Tit (*Parus ater cypriotes*) and Short-toed Treecreeper (*Certhia brachydactyla dorotheae*). The Crossbill (*Loxia curvirostra*) is confined to and dependent on the black pine forests of Troodos. The Cretzschmar's Bunting (*Emberiza caesia*) is another protected species that nests in Troodos.

Large numbers of the Cyprus Pied Wheatear and the Masked Shrike (*Lanius nubicus*) are met in **Vouni Panagias**. Moreover large numbers of the Black-headed Bunting (*Emberiza melanocphala*) nest in the vineyards of the site.

Cyprus Pied Wheatear (*Oenanthe cypriaca*) (photo: P. Panagidis)

The Cyprus Pied Wheatear and the Stone Curlew (*Burchinus oedicnemus*) nest in **Diarizos valley**. The valley also hosts a large population of the Black Francolin (*Francolinus francolinus*) and it is a valuable stage for waders and passerines during migration.

Thousands of migratory waterfowl and waders, raptors and passerines land every year in **Kavo Gkreko**, this being the first land they meet when returning from Africa. The site is a valuable wintering refuge for the Kingfisher (*Alcedo atthis*) and the Tawny Pipit (*Anthus campestris*). The most important breeders are the endemics Cyprus Warbler (*Sylvia melanothorax*) and Cyprus Pied Wheatear.

The **salt lake of Larnaka** is one of the most important wetlands of Cyprus, particularly for wintering and staging populations of the Grater Flamingo (*Phoenicopterus rubber*), the Glossy Ibis (*Plegadis falcinelus*), the Crane (*Grus grus*) and the Shelduck (*Tadorna tadorna*). Quite a few protected species also nest here, such as the Kentish Plover (*Charadrius alexandrinus*), the Stone Curlew, the Spur-winged Plover (*Vanellus spinosus*), the Black-winged Stilt (*Himanto-*

Masked Shrike *(Lanius nubicus)* (photo: P. Panagidis)

pus himantopus), the Common Tern (*Sterna hirundo*) and the Little Tern (*S. albifrons*).

Bonelli's Eagle is one of the most important raptors of Cyprus. It feeds on small mammals and birds. An effort was made to improve the availability of its prey through the release of captive Chucars (1,670 individuals in total) every September at three release cores in Vouni Panagias. Bonelli's Eagles pairs from the neighbouring forest of Pafos and immature visitors hunt in this area.

Long-legged Buzzard (*Buteo rufinus*) (photo: N. Kasinis)

Red-footed Falcon (*Falco vespertinus*) (photo: N. Kasinis)

Lack of freshwater during summer and autumn migration is a serious stressing factor for birds and other animals in Cyprus. The situation is getting critical for autumn migrants. An important conservation action implemented through LIFE for the provision of freshwater during the dry season was the clearance and maintenance of natural springs as well as the establishment of troughs in Vouni Panagias. Additionally two interconnected artificial pools were constructed (a total surface of 2,000 m^2), which create favourable conditions for reptiles, amphibians and other species of the local fauna, too. The pools were fenced so as to allow access to wild animals only, and signposted with boards. Deliberations with local communities secure their sound function and their future management (water replenishment, clearing and maintenance) will be taken on by the FD in co-operation with ES and GF.

View of the artificial lake in Diarizos valley (photo: Atlantis)

Poisoned baits pose a serious threat for raptors in Cyprus, a problem that can be addressed through constant information and public awareness actions. In this direction a special leaflet was produced and distributed among stock raisers and rural dwellers explaining the catastrophic results of the uncontrolled use of poisons and pesticides.

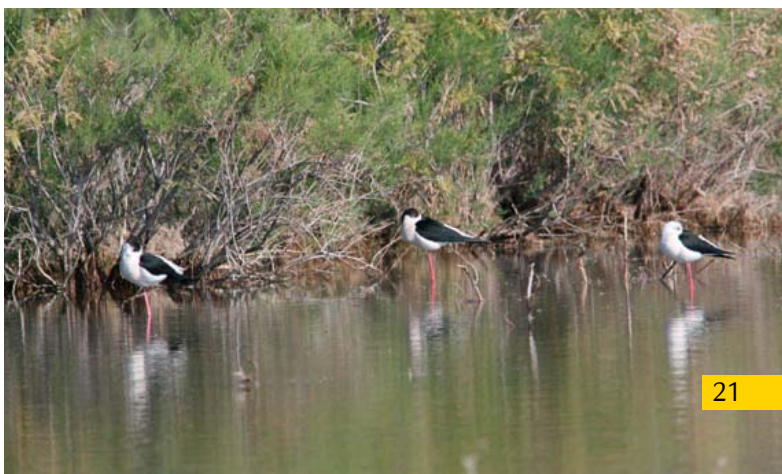
The **salt lake of Larnaka** is one of the most popular birdwatching places. In order to support and enhance this activity the LIFE project installed **two birdwatching hides** by the wetland banks. The hides are equipped with information signs and public access is free.

Birdwatching hides in Alyki Larnakas (photo: Atlantis)

Spur-winged Plover (*Vanellus spinosus*) (photo: P. Panagidis)

Grater Flamingo (*Phoenicopterus ruber*) (photo: N. Kasinis)

Black-winged Stilt (*Himantopus himantopus*) (photo: P. Panagidis)



Targeted habitats and species of the project

Habitats	Sites	Results
Posidonia beds (1120*)	Kavo Gkreco	Monitoring, pressure/threat alleviation (anchoring)
Vernal pools (5220*)	Kavo Gkreco	Monitoring, protection (fencing, signposting)
Mattoral with *Ziziphus* (5220*)	Kavo Gkreco	Monitoring, restoration (0.84 ha increase of habitat cover with 3 new locations)
Mediterranean riparian forests with *Alnus orientalis* (92C0)	Diarizou valley	Monitoring, restoration (12,5 ha increase of habitat cover by protection of natural regeneration)
Forest stands with *Quercus infectoria* (93A0)	Vouni Panagias	Monitoring, restoration (12 ha increase of habitat cover with 1 new location)
Serpentinophilous grasslands (62B0*)	Troodos NFP	Monitoring, protection (fencing, signposting)
Peat grasslands (6460) in Troodos	Troodos NFP	Monitoring, protection (pressure/threat alleviation by delimitation, signposting, fencing, removal of picnic site)
Pinus nigra forest (9536*)	Troodos NFP	Monitoring, conservation (study and regeneration enhancement)
Annual vegetation of mud and sand (1310)	Alyki Larnakas	Protection, restoration (pressure/threat alleviation by removal of acacia trees and garbage, restriction of vehicle passage, maintenance of channels, public awareness/information actions)
Mediterranean salt meadows (1410)	Alyki Larnakas	
Mediterranean halophilous scrub (1420)	Alyki Larnakas	

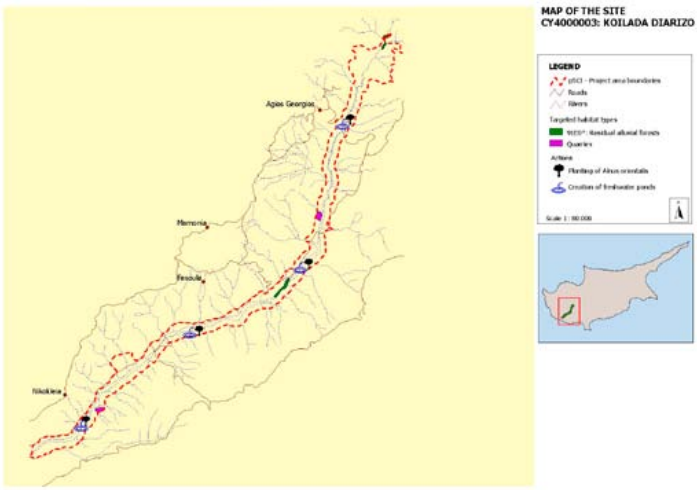
Plants	Sites	Results
*Scilla morrisii**	Vouni Panagias	Monitoring, protection by fencing, restoration (3 new locations)
*Arabis kennedyae**	NFP Troodos	Monitoring
*Chionodoxa lochiae**	NFP Troodos	Monitoring, protection by fencing
*Pinguicula crystallina**	NFP Troodos	Monitoring, protection by fencing

Reptile	Sites	Results
*Coluber cypriensis**	NFP Troodos	Monitoring

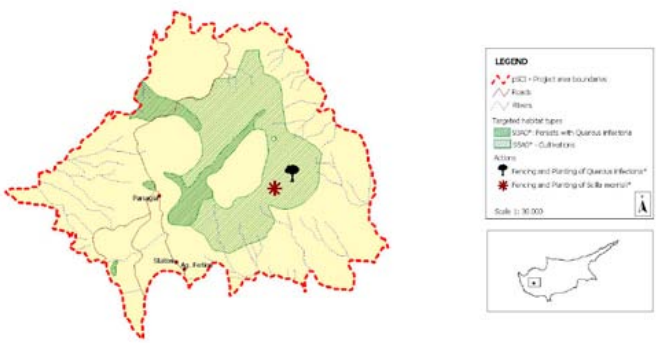
Birds	Sites	Results
*Aquila heliaca**	Troodos NFP	Monitoring, habitat improvement in Diarizos valley (maintainance of springs, troughs, artificial lakes), birdwatching hides construction at Alyki Larnakas, public information and awareness actions about the impacts of baits and pesticides.
*Aythya nyroca**	Alyki Larnakas	
*Branta ruficollis**	Alyki Larnakas	
Buteo rufinus	Vouni Panagias, Troodos NFP	
Certhia brachydactyla dorotheae	Troodos NFP, Kavo Gkreko	
Charadrius alexandrinus	Vouni Panagias, Alyki Larnakas	
Circus aeruginosus	Vouni Panagias, Troodos NFP, Diarizos, Alyki Larnakas	
Circus aeruginosus	Alyki Larnakas	
Circus cyaneus	Vouni Panagias, Troodos NFP, Kavo Gkreko, Alyki Larnakas	
Circus macrourus	Vouni Panagias, Troodos NFP, Kavo Gkreko, Alyki Larnakas	
Egretta alba	Alyki Larnakas	
Egretta garzetta	Alyki Larnakas, Kavo Gkreko	
Emberiza caesia	Vouni Panagias, Kavo Gkreko	
*Falco eleonorae**	Vouni Panagias, Troodos NFP	
Falco peregrinus	Vouni Panagias, Troodos NFP	
Garrulus glandarius glaszneri	Vouni Panagias, Troodos NFP	
Gelochelidon nilotica	Alyki Larnakas	
Gyps fulvus	Vouni Panagias, Troodos NFP	
*Hieraaetus fasciatus**	Vouni Panagias, Troodos NFP	
Himantopus himantopus	Alyki Larnakas	
Ixobrychus minutus	Alyki Larnakas	
Lanius minor	Vouni Panagias, Kavo Gkreko	
Lanius nubicus	Vouni Panagias, Diarizos	
Loxia curvirostra guillemardi	Vouni Panagias, Troodos NFP	
Nycticorax nyxticorax	Alyki Larnakas	
Oenanthe cypriaca	Vouni Panagias, Troodos NFP, Kavo Gkreko, Diarizos	
*Oxyoura leucocephala**	Alyki Larnakas	
Parus ater cypriotes	Vouni Panagias, Troodos NFP	
Pernis apivorous	Vouni Panagias	
Philomachus pugnax	Alyki Larnakas	
Phoenicopterus ruber	Alyki Larnakas	
Platalea leucorodia	Alyki Larnakas	
Plegadis falcinellus	Alyki Larnakas	
Recurvirostra avocetta	Alyki Larnakas	
Sylvia mela nothorax	Vouni Panagias, Troodos NFP, Kavo Gkreko, Diarizos	
Sylvia rueppeli	Vouni Panagias, Kavo Gkreko	
Tringa glareola	Alyki Larnakas	

Site maps

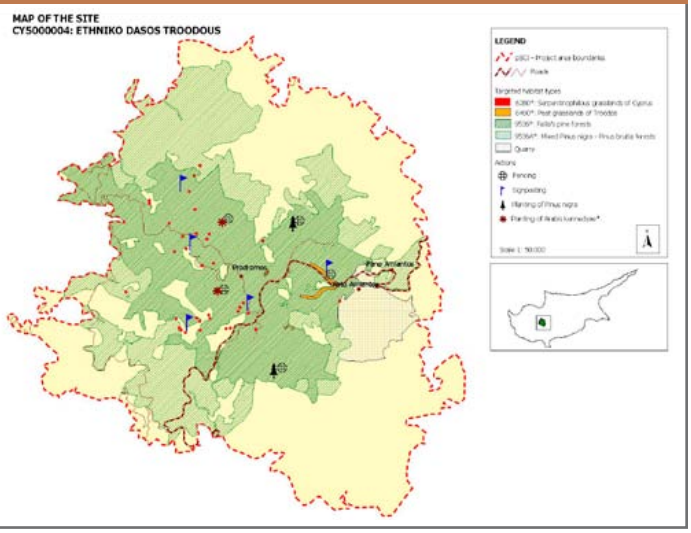
DIARIZOS VALLEY



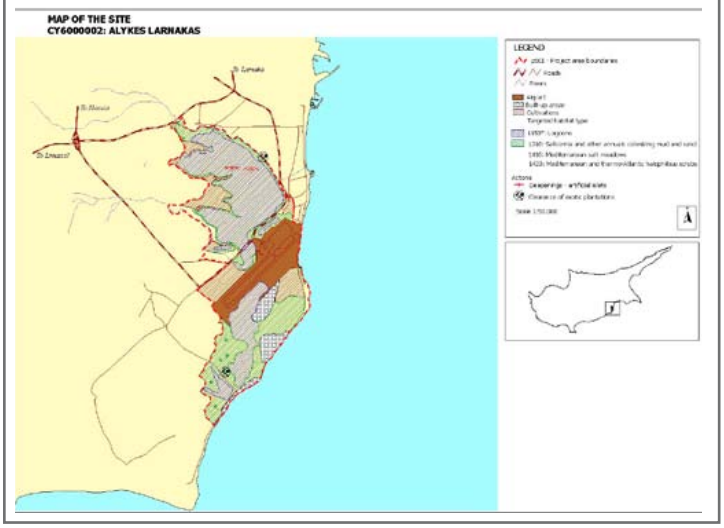
VOUNI PANAGIAS



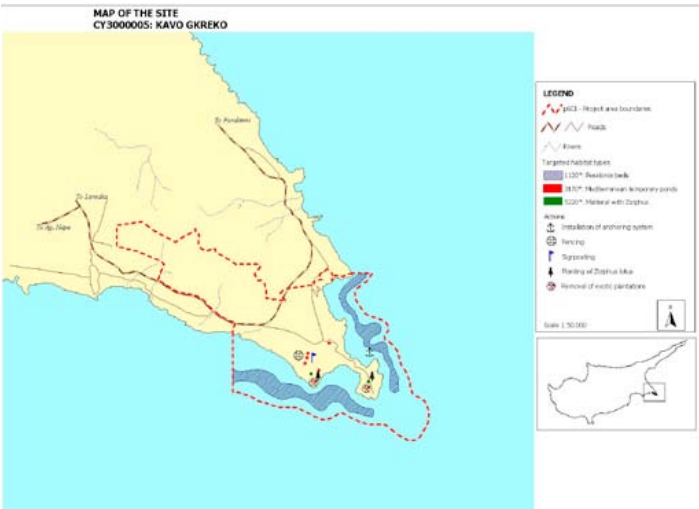
TROODOS NATIONAL FOREST PARK



ALYKI LARNAKAS



KAVO GKREKO













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