



PLANT-NET CY

Establishment of a Plant Micro-Reserve Network in Cyprus
for the Conservation of Priority Species and Habitats



LIFE08 NAT/CY/000453

Action E.6: After – LIFE Conservation Plan



Deliverable: *After* – LIFE Conservation Plan

PLANT-NET CY

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I. INTRODUCTION

A. The project PLANT-NET CY

The present document entitled “After-Life Conservation Plan” is the last deliverable of the LIFE - Nature project entitled «Establishment of a Plant Micro-Reserve Network in Cyprus for the Conservation of Priority Plant Species and Habitats» (PLANT-NET CY; LIFE08 NAT/CY/000453), prepared as foreseen by European Commission and the project’s proposal.

The project entitled «Establishment of a Plant Micro-Reserve Network in Cyprus for the Conservation of Priority Species and Habitat types» (acronym PLANT-NET CY; LIFE08 NAT/CY/000453), was implemented within the framework of the LIFE program. It aimed at improving the conservation status of four priority plant species (**Arabis kennedyae*, **Astragalus macrocarpus* subsp. *lefkarensis*, **Centaurea akamantis* and **Ophrys kotschyi*) and two priority habitat types (9590 - **Cedrus brevifolia* forests (*Cedrosetum brevifoliae*) and 9390 - *Scrub and low forest vegetation of *Quercus alnifolia*) of Cyprus.

The project adopted the Plant Micro-Reserves (PMR) approach, which focuses on the protection of certain parts of the population of endemic, rare and threatened plant species through the establishment of a constant monitoring system and the implementation of targeted measures for their conservation. The establishment of PMRs, as a tool for the conservation of threatened plant species, was inspired by Dr. Emilio Laguna and was initially implemented, in the 90s, in Valencia (Spain) within the framework of the LIFE program (LIFE93 NAT/E/011100); since then it has been successfully implemented in other European countries (e.g. Greece, Slovenia and Bulgaria). Nowadays, the PMRs are not only important areas for the conservation of flora but also areas that attract the interest of scientists, schools and other categories of visitors.

The project PLANT-NET CY started in January 2010 and was completed in June 2013. PLANT-NET CY was co-funded by the European Commission within the framework of the LIFE+ program and was carried out by a well-organized consortium consisting of:

- Two governmental bodies - Department of Environment (coordinating beneficiary) and Department of Forests [Ministry of Agriculture, Natural Resources and Environment], which are the competent authorities of the Republic of Cyprus for nature conservation.
- Two Universities - Nature Conservation Unit of Frederick University and Faculty of Biology of the National and Kapodistrian University of Athens.
- Two non-government organizations - Federation of Environmental Organizations of Cyprus and the United Nations’ Development Program (UNDP-ACT).

The project included four main categories of actions:

- Preparatory actions, which were fundamental for accumulating the necessary scientific information for the initiation and implementation of the project.
- Conservation actions, which were the project’s core actions and contributed to achieving the project’s main aim. The conservation actions included monitoring and conservation measures, which were implemented based on Monitoring and

Management Plans, respectively. The conservation measures took place both within the PMRs (in situ conservation of the targeted species and habitat types) and outside the PMRs (ex situ conservation).

- Dissemination actions, which focused on presenting the project's actions and disseminating its results to the scientific committee, to interested stakeholders and to the general public. Additionally, these actions promoted the involvement of local communities in the decision-making process, as well as in the implementation of selected conservation measures.
- Management actions, which facilitated the coordination and cooperation among the project's beneficiaries, the involvement of interested stakeholders in the project and the networking with similar European projects.

Following the end of the project, its beneficiaries have derived important and significant results. The PMR network in Cyprus was established within four sites of the European *Natura 2000 network*: (1) «Periochi Miterou», (2) «Koilada Kedron - Kampos» (where two PMRs were established), (3) «Chersonisos Akama» and (4) «Periochi Asgatas» (Table 1; Fig. 1).

Table 1: The targeted species / habitat type and the Natura 2000 site of each PMR within the PMR network in Cyprus.

PMR	Targeted species / habitat type	PMR size (ha)	Natura 2000 site
PMR 1	* <i>Ophrys kotschy</i>	2.8	Periochi Miterou (CY2000003)
PMR 2	*9390 Scrub and low forest vegetation of <i>Quercus alnifolia</i>	22.9	Koilada Kedron – Kambos (CY2000008)
PMR 3	*9590 <i>Cedrus brevifolia</i> forests (<i>Cedrosetum brevifoliae</i>) and * <i>Arabis kennedyae</i>	15.8	
PMR 4	* <i>Centaurea akamantis</i>	17.3	Chersonisos Akama (CY4000010)
PMR 5	* <i>Astragalus macrocarpus</i> subsp. <i>lefkarensis</i>	2.7	Periochi Asgatas (CY5000007)

The establishment of the PMR network, as well as the implementation of monitoring and conservation actions focusing on the targeted species and habitat types, has contributed to the implementation of the Council Directive 92/43/EEC (Habitats Directive) in Cyprus. The conservation actions resulted in combating the threats that the targeted species face and enriching their subpopulations within the PMRs. It also secured their *ex situ* conservation.

Beside this, a significant outcome of the project was the recognition of the PMRs as areas of great value and their declaration as Natural Micro-Reserves by a Ministerial Order, through the Cyprus Forestry Legislation (2012). This development contributes to the protection of the targeted species and habitat types as well as the PMRs in their entirety. Additionally, an important achievement of the project was the inclusion of educational activities relating to the PMR approach in the 'Primary Teachers' guide for implementing the National Curriculum for Environmental Education - Education for Sustainable Development'. The guide was developed by the Ministry of Education and Culture of the Republic of Cyprus, within the framework of the newly established National Curriculum for Environmental Education / Education for Sustainable Development.

B. The SWOT analysis

A structured planning method used the Strengths, Weaknesses, Opportunities and Threats involved in the project venture through this deliverable. The SWOT (Strengths – Weaknesses – Opportunities – Threats) analysis aimed to identify the key internal and external factors that have been affecting the targeted species/habitats in order to achieve the project's objectives. Thus, the SWOT analysis illustrates the effort implemented within the framework of the project and will help towards the sustainable management of the PMR network. The basic results that derived from this analysis are the following:

- The project adopted the Plant Micro-Reserves (PMR) approach; this approach has been successfully implemented in several European countries through funding by the LIFE/LIFE+ programme. The establishment, monitoring and management of the PMR network in Cyprus ensures the successful implementation of concrete *in situ* and *ex situ* conservation activities. Such networks could improve the conservation status of priority targeted species and/or habitat types of the island.
- The negative public attitude towards the Natura 2000 network and the low awareness of the inhabitants in the places neighbouring the PMRs were one of the main problems faced at the beginning of the project. This resulted in the delay in the nomination of the Stakeholders Board at the beginning of the project. However, this was overtaken via rural appraisals and workshops aiming to inform inhabitants, as well as involve them in decision-making actions.
- The project developed a strong awareness and dissemination campaign which aimed at informing the general public about the project's objectives and the importance of the Natura 2000 network. In addition, the project aimed at involving the general public, especially local communities and youth, in certain conservation actions (even outside LIFE activities). A result of the awareness campaign was the inclusion of educational activities relating to the PMR approach in the "Primary Teachers" guide for implementing the National Curriculum for Environmental Education - Education for Sustainable Development.
- A significant result of the project was the recognition of the PMRs (found within forest land) as areas of great value and their declaration as «Natural Micro-Reserves» by a Ministerial Order, based on the new Forest Law (2012).

- The viability of targeted species and habitat types in the long-term continues to be threatened by the biotic and abiotic factors, such as desertification, extended droughts and high temperatures (climate change), as well as flower and/or fruit consumption by predators (e.g. *Astragalus macrocarpus* subsp. *lefkarensis*, *Quercus alnifolia*).

Helpful For achieving the project's objective	Harmful For achieving the project's objective
Strengths	Weaknesses
<ul style="list-style-type: none"> - Innovative project, implementing the PMR approach for the first time in Cyprus. - Strong consortium of governmental bodies, universities and NGOs. - Improvement of conservation status of targeted species/habitat types in PMRs. - <i>In situ</i> and <i>ex situ</i> conservation. - Networking with European scientists and similar projects. - Good dissemination and public awareness campaign. - Public involvement in decision-making. - The project provided a platform for networking of all previous LIFE projects with a focus on the establishment of PMRs in Europe, through which scientific information and best practices have been exchanged by publishing the first book on the PMR approach. 	<ul style="list-style-type: none"> - Negative public attitude in relation to the Natura 2000 network and conservation activities due to limited information.
Opportunities	Threats
<ul style="list-style-type: none"> - Enhancement of Council Directive 92/43/EEC and Natura 2000 network. 	<ul style="list-style-type: none"> - Unpredictable environmental conditions (e.g. extended droughts, high temperatures) and climate change.

<ul style="list-style-type: none"> - Declaration of the PMRs as «Natural Micro-Reserves» by a Ministerial Order in the new Cyprus Forestry Legislation (2012). - Educational activities in relation with the PMR approach in the 'Primary Teachers' guide for implementing the National Curriculum for Environmental Education - Education for Sustainable Development. 	<ul style="list-style-type: none"> - Uncontrolled flower/fruit consumption by predators (e.g. <i>Bruchidius plagiatus</i> for <i>Astragalus macrocarpus</i> subsp. <i>lefkarensis</i>).
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II. PROSPECTS AND NEEDS OF “*AFTER-LIFE CONSERVATION PLAN*”

The management of the PMRs is a critical issue that will assure the sustainability of the network in Cyprus and the future conservation of the subpopulations of the targeted species / habitat types. The objective of the “*After-LIFE Conservation Plan*” is to describe the way in which the partners are planning to continue to develop the actions that have been initiated throughout the project’s duration. Hence, the ultimate purpose of the implementation of the plan presented here is the sustainable management of the PMR network in Cyprus, the maintenance of their operational character and also the assurance of the long-term conservation of the targeted species / habitat types. The “*After-LIFE Conservation Plan*” illustrates:

- i. The foreseen *After-LIFE* actions.
- ii. The beneficiary who is responsible for the implementation of each *After-LIFE* action.
- iii. The timeline for the implementation of each action.

All efforts and actions implemented following the project’s completion should be solid and responsible, as were all activities during the project’s implementation. For the sustainable management of the PMR network, the “*After-LIFE Conservation Plan*” consists of three issues:

- A. Administrative part.
- B. Monitoring and management part.
- C. Dissemination and public awareness part.

A. *Administrative part*

The implementation of critical administration activities regarding the newly established PMR network in Cyprus will focus on PMR network legislation and PMRs stability. Hence, the administration needs are the following:

- i. Maintain the legal status of PMRs: Based on the new Forest Law (2012), three (PMRs 2, 3, 4) out of the five PMRs are nominated by Article 16 [Article 16: «Declaration of forest monuments and Micro-Reserves»], as areas of great importance for the conservation of biodiversity. The Department of Forests is the responsible body for implementing this law. In addition, Department of Environment must investigate the possibility of the other two PMRs (PMRs 1, 5) to come under specific legislation status within the next five years.

Responsible Beneficiary: **DF** (PMRs 2, 3, 4) & **DE** (PMRs 1, 5)

Timeline: **Implementation within five years.**

- ii. Maintenance of PMRs: The establishment of PMRs in the field was carried out in different phases during the project's implementation (Actions C.1, C.2, C.3 and D.1). The establishing of PMRs in the field was characterized by the:

- a. definition of the PMR's boundaries by the placement of signs at their borderline,
- b. construction of a pathways allowing the visitors to walk only along designated areas within each PMR,
- c. installation of permanent monitoring plots within each PMR,
- d. installation of automatic monitoring stations within each PMR for the collection of biotic data and
- e. installation of notice boards (describing the project and the target species/habitat) in each PMR.

These elements (signs, pathway, monitoring stations, notice boards) which define each PMR (and the PMR network in Cyprus) need to be maintained after the end of the project. For this, the maintenance of the pathways, notice boards and signs at the PMR borderline must be carried out once every year for each PMR.

Responsible Beneficiary: **FD** (PMRs 2, 3, 4) & **DE** (PMRs 1, 5)

Timeline: **Implementation for five years.**

In addition, the collection of biotic data by automatic monitoring stations (see Deliverable: Operational and maintenance protocol for the Monitoring Stations. Action C.3) should be continuous for all PMRs. The data should be downloaded every six months for the next five years.

Responsible Beneficiary: **FD**

Timeline: **Implementation for five years.**

B. Monitoring and management part

The implementation of specific monitoring and management measures will ensure and further improve the conservation status of the targeted species and habitat types. The long-term

monitoring and management measures are due to contribute towards the sustainability of the network in the long term, after the conclusion of the project. This will be ensured by the implementation of the most sustainable practices that have been adopted during the project's implementation.

The implementation of critical monitoring and management measures will focus on the PMR network as these are presented in the project's Deliverable: Post-Project, Long-term Monitoring and Management Plan (Action C.3) (Annex A). Having set the general framework for the monitoring and management action in previous deliverables, the After-LIFE Conservation Plan, will adopt this Annex A in its entirety.

All monitoring and management activities will be carried out within the PMRs and more intensively within the monitoring plots. The boundaries of the PMRs, as well as the location of each monitoring plot within the PMRs are defined by the following deliverables:

- Five Monitoring Plans (one for each PMR)
- Five Management Plans (one for each PMR)

C. Dissemination and public awareness part

The promotion of greater public awareness on the importance of the conservation of targeted species and habitats and on the EU conservation policies. Besides, one of the most important aspects of the role of protected areas is to show the necessary “extroversion”, meaning that, apart from the conservation work itself, the information and the results produced from this work should be communicated to large parts of the society. The PLANT-NET CY project adopted this approach through numerous activities in this direction, such as: printing of information material and distributing this to several target groups, organized workshops and participating in scientific conferences. In addition, the project encouraged the participation of local people and other stakeholders in the design and implementation of conservation activities. Both dissemination and public awareness activities are implemented during the *After-LIFE* period, through:

- Public information*: Dissemination of project's objectives and their results will continue to be presented in the project's website (www.plantnet.org.cy). The website has been operating since the beginning of the project (2010) and has been constantly updated. This website will keep operating for up to five years (following the LIFE+ program completion) and it will be a significant dissemination tool for the project's results and deliverables. In this way, these results and deliverables will be available for future research related to the PMR concept and for the conservation issues of targeted species and habitat types.
Responsible Beneficiary: FU
Timeline: Implementation for five years.
- Utilisation of existing Botanic Gardens for public awareness*: Live collections of targeted species and habitat types have been hosted in three Botanic Gardens

(Athalassa, Akamas, Troodos) of the Department of Forests since the project's implementation. These live collections will continue to be maintained in the three Botanic Gardens for promoting about the importance of biodiversity conservation and specifically the uniqueness and the value of the target species / habitats. In addition, for the **dissemination** of the project and its objectives the DVD that was created during the project will be screened in specific screens in two out of the three Botanic Gardens

Responsible Beneficiary: FD

Timeline: Implementation for five years.

- iii. *Public awareness and environmental education*: An important achievement of the project is its link with the academic and education system of the island. Thus, the PMR approach is nowadays included in the "Primary Teachers" guide for implementing the National Curriculum for Environmental Education-Education for Sustainable Development; as a case of collaboration and interaction of students-NGOs-researchers for the conservation of rare endemic plant species of Cyprus. The guide was developed by the Ministry of Education and Culture of the Republic of Cyprus, within the framework of the newly established National Curriculum for Environmental Education / Education for Sustainable Development.

In addition, the network of PMRs in Cyprus was presented as a best-case practice of cooperation among scientists, teachers and local societies for the conservation of biodiversity in Cyprus, in MSc program in "Education for the Environment and Sustainable Development" (EESD) of Frederick University. Therefore PMRs are now a study area for MSc Master Theses focusing on the project's objectives and the preparation of education material.

Both of these activities will be continuous, in order to increase the public awareness on plant conservation and issues on biodiversity in Cyprus.

Responsible Beneficiary: FU

Timeline: Implementation for three years.

III. FINANCIAL OUTLOOK

Part	Action	Expense (in Euro)				Beneficiary	Fund
		Personnel costs	Travel and subsistence costs	Consumables	Total		
Administrative part	Maintain the legal status of PMRs	500,00	0	0	500,00	DE	Department's budget category regarding NATURA 2000 management.
	Maintenance of PMRs	1.000,00	100,00	8.000,00	9.100,00	DE	Department's budget category regarding NATURA 2000 management.
		1.215,00	80,00	1.000,00	2.295,00	DF	Department's budget.
Monitoring and management part	See Annex A	10.000,00	400,00	6.000,00	16.400,00	DE	Department's budget category regarding NATURA 2000 management.
		12.937,50	200,00	0	13.137,50	DF	Department's budget.
	Public information	0	0	200,00	200,00	FU	University's budget.
Dissemination and public awareness part	Utilization of existing Botanic Gardens for public awareness	1.800,00	0	300,00	2.100,00	DF	Department's budget.
	Public awareness and environmental education	6.000,00	500,00	0	6.500,00	FU	University's budget.



Annex A: Post-Project, Long-Term Monitoring and Management Plan

This deliverable has been produced within the framework of Action C3 of the PLANT-NET CY project. Action C3 focuses on the monitoring of the Plant Micro-Reserves (PMRs) by recording factors relating to the priority species and their habitats. The Post-Project, Long-term Monitoring and Management Plan contributes towards the sustainability of the PMR Network in the long term. Specific conservation priorities (monitoring parameters and management measures) are designated in this plan to be implemented after the completion of the PLANT-NET CY project. The elaboration of this Plan took into consideration several sources of information, such as the experiences gained throughout the implementation of project's conservation actions, the data derived during the four years of monitoring and the results presented in the Final Monitoring Reports (Action C.3)

The monitoring parameters and management measures, which are presented at Tables 1-6 below, were agreed between the competent authorities of Cyprus for nature conservation (Department of Environment and Department of Forests, Ministry of Agriculture, Natural Resources and Environment). One of the main concerns for determining the monitoring parameters and management measures included in the Plan, was to secure the feasibility of the implementation of these measures by the personnel of Department of Environment and Department of Forests. The wider aim was to secure the sustainability of the PMRs in the long term.

The selected parameters are divided in Compulsory "compulsory" and "non-compulsory". The compulsory Compulsory parameters are considered crucial for the re-assessment of the conservation status of the targeted species and habitat types in the near future. These parameters should be implemented according to the proposed timeframe. The non-compulsory parameters are considered useful for a more complete monitoring of the targeted species/habitat types, however, the competent authorities are expected to decide whether they will adopt them, according to their available resources. The implementation period of this plan is 10 years. The plan must be revised by the end of period.

The methodology described in the Monitoring Plans (Action A.3) and Management Plans (Action A.4) for each PMR related to the targeted species and habitat types, will be used for the proper implementation of the Post-Project, Long-term Monitoring and Management Plan.

Table 1. Monitoring parameters and management measures apply in PMR 1 (**Ophrys kotschyi*).

*<i>Ophrys kotschyi</i>						
S/N	Monitoring Indicator	Management Measure	Timeframe	Frequency	Type	Notes
1.	Geographical distribution	-	March	Every 3 years	Compulsory	Mapping of new individuals within the boundaries of the PMR.
2.	Subpopulation size	-	March	Every 3 years	Compulsory	Recording of <i>Ophrys kotschyi</i> individuals within the PMR.
3.	Habitat's composition	-	April	Every 5 years	Compulsory	Flora recording using the modified Braun-Blanquet 9-grade cover-abundance scale within the 9 (1x1 m) established sample plots.
4.	Threats	-	March-April	Every 3 years	Compulsory	Recording of the direct threats and stresses, according to the IUCN categories.
5.	Individuals' monitoring	-	March	Every 5 years	Non-compulsory	Recording of the status of the 70 marked <i>Ophrys kotschyi</i> individuals, according to the respective Monitoring plan.
6.	Reproductive effort	-	March-April	Every 5 years	Non-compulsory	Flowers and fruits recording of each one of the 70 marked <i>Ophrys kotschyi</i> individuals.
7.	Relative Reproductive Success	Hand pollination	March	Every 3 years	Non-compulsory	Hand (self and cross) pollination of <i>Ophrys kotschyi</i> flowers to promote sexual reproduction and recording of the fruit setting achieved.
8.	-	Removal of dried, flammable biomass	March-April	Very year	Non-compulsory	The dried, flammable biomass degrades <i>Ophrys kotschyi</i> habitat and increases wildfire risk.

Table 2. Monitoring parameters and management measures apply in PMR 2 (*9390 - Scrub and low forest vegetation of *Quercus alnifolia* monitoring parameters).

*9390 - Scrub and low forest vegetation of <i>Quercus alnifolia</i>						
S/N	Monitoring Indicator	Management Measure	Timeframe	Frequency	Type	Notes
1.	Geographical distribution	-	April-May	Every 5 years	Compulsory	Mapping of habitat type 9390 within the boundaries of the PMR
2.	Subpopulation density	-	April-May	Every 5 years	Compulsory	Recording of <i>Quercus alnifolia</i> individuals in two age-structured classes: young and mature individuals, within the 5 established sample plots (20x20 m).
3.	Habitat's composition	-	April-May	Every 5 years	Compulsory	Flora recording using the modified Braun-Blanquet 9-grade cover-abundance scale within the 5 established sample plots.
4.	Threats	-	March-April	Every 3 years	Compulsory	Recording of the direct threats and stresses according to the IUCN categories.
5.	Regeneration	-	Jan-Feb: initial seedlings emergence Apr-May: seedlings establishment Sep-Oct: final survival	Every 3 years	Non-compulsory	Monitoring of seedling emergence within the 25 established sample plots.
6.	-	Addressing seed predation	Through the year	-	Non-compulsory	An integrated study on predation of <i>Quercus alnifolia</i> seeds is needed. The study will point the species responsible for the low sound seeds percentage. The study's outcomes will contribute to the sustainable management of predation in <i>Quercus alnifolia</i> .

Table 3. Monitoring parameters and management measures in PMR 3 (*9590 - *Cedrus brevifolia* forests (*Cedrosetum brevifoliae*)).

*9590 - <i>Cedrus brevifolia</i> forests						
S/N	Monitoring Indicator	Management Measure	Timeframe	Frequency	Type	Notes
1.	Geographical distribution	-	April-May	Every 10 years	Compulsory	Mapping of habitat type 9590 within the boundaries of the PMR according to the methodology described in the respective Monitoring plan.
2.	Subpopulation density	-	April-May	Every 5 years	Compulsory	Recording of <i>Cedrus brevifolia</i> individuals in two age-structured classes: young and mature individuals, within the 5 established sample plots.
3.	Habitat's composition	-	April-May	Every 5 years	Compulsory	Flora recording using the modified Braun-Blanquet 9-grade cover-abundance scale within the 5 (20x20 m) established sample plots.
4.	Threats	-	March-April	Every 5 years	Compulsory	Recording of the direct threats and stresses according to the IUCN categories.
5.	Regeneration	-	May-Jun: initial seedlings emergence Aug: seedlings establishment Oct-Nov: final survival - summer Feb-Mar: final survival - winter	Every 3 years	Non-compulsory	Monitoring of seedling emergence within the 5 established sample plots.
6.	Seedrain	-	-	Every 3 years	Non-compulsory	Cones recording of each of one of the 30 marked <i>Cedrus brevifolia</i> trees. .
7.	Survival of seedlings and saplings	Provision of water in extreme drought conditions	June-September	Annually	Non-compulsory	Recording of cedar seedlings and saplings that will survive after a period of extreme drought.

Table 4. Monitoring parameters and management measures in PMR 3 (**Arabis kennedyae*)

*Arabis kennedyae						
S/N	Monitoring Indicator	Management Measure	Timeframe	Frequency	Type	Notes
1.	Geographical distribution	-	April	Every 3 years	Compulsory	Mapping of new colonies within the boundaries of the PMR.
2.	Subpopulation size	-	April	Every 3 years	Compulsory	Recording of <i>Arabis kennedyae</i> individuals within the PMR.
3.	Habitat's composition	-	April	Every 5 years	Compulsory	Flora recording using the modified Braun-Blanquet 9-grade cover-abundance scale within the 10 established sample plots (8 plots of 25 m ² and 2 plots of 900 m ²).
4.	Threats	-	April-May	Every 3 years	Compulsory	Recording of the direct threats and stresses according to the IUCN categories.
5.	Relative Reproductive Success	-	March-April	Every 5 years	Non-compulsory	Recording of flowers and fruits in 40 <i>Arabis kennedyae</i> individuals.
6.	<i>Arabis kennedyae</i> density	-	March-April	Every 5 years	Non-compulsory	Individuals count within the 10 sample plots (1x1 m).
7.	-	Enrichment	November-December	Every 3 years	Non-compulsory	Seedlings establishment at selected sites of Tripylos area. Seedlings will be produced in the nurseries of the Department of Forests.
8.	-	Restoration or Enhancement	June	Every 3 years	Non-compulsory	Seed dispersal for subpopulation enhancement of certain colonies or for the restoration of colonies that have been lost.

Table 5. Monitoring parameters and management measures in PMR 4 (**Centaurea akamantis*)

*<i>Centaurea akamantis</i>						
S/N	Monitoring Indicator	Management Measure	Timeframe	Frequency	Type	Notes
1.	Geographical distribution	-	June-July	Every 3 years	Compulsory	Mapping of new polygons within the boundaries of the PMR according to the methodology described in the respective Monitoring plan.
2.	Subpopulation size	-	June-July	Every 3 years	Compulsory	<i>Centaurea akamantis</i> individuals' count within the PMR.
3.	Threats	-	June-July	Every 3 years	Compulsory	Recording of the direct threats and stresses according to the IUCN categories.
4.	Reproductive effort	-	June-September	Every 5 years	Non-compulsory	Flowers and fruits recording in 5 inflorescences of 30 <i>Centaurea akamantis</i> individuals.
5.	-	Subpopulation enhancement	April	Every 3 years	Non-compulsory	Seedlings establishment at selected sites in Avakas Gorge. Seedlings will be produced in the nurseries of Department of Forests.

Table 6. Monitoring parameters and management measures in PMR 5 (**Astragalus macrocarpus* subsp. *lefkarensis*)

<i>*Astragalus macrocarpus</i> subsp. <i>lefkarensis</i>						
S/N	Monitoring Indicator	Management Measure	Timeframe	Frequency	Type	Notes
1.	Subpopulation trend	-	March-April	Every 3 years	Compulsory	<i>Astragalus macrocarpus</i> subsp. <i>lefkarensis</i> individuals' count within the 3 established sample plots (2 plots of 225 m ² and 1 plot of 100 m ²).
2.	Habitat's composition	-	March-April	Every 5 years	Compulsory	Flora recording using the modified Braun-Blanquet 9-grade cover-abundance scale within the 2 established sample plots (225 m ²).
3.	Threats	-	March-April	Every 3 years	Compulsory	Recording of the direct threats and stresses according to the IUCN categories.
4.	Relative Reproductive Success	-	March-June	Every 5 years	Non-compulsory	Recording of flowers and fruits in 30 <i>Astragalus macrocarpus</i> subsp. <i>lefkarensis</i> individuals.
5.	-	Addressing seed predation	February-May	-	Non-compulsory	A study on seed predation by <i>Bruchidius plagiatus</i> is needed. All efforts to sustainable control the negative impact of the species to the fruits of <i>Astragalus macrocarpus</i> subsp. <i>lefkarensis</i>) failed.
6.	-	Mild pruning - weeding of the main competitors	February-March	Every 3 years	Non-compulsory	This measure decreases <i>Astragalus macrocarpus</i> subsp. <i>lefkarensis</i> competition by other plant species.
7.	-	Subpopulation enhancement	February-March	Every 3 years	Non-compulsory	Seedlings establishment at selected sites within PMR. Seedlings will be produced in the nurseries of Department of Forests.