



LIFE Project Number

**LIFE07NAT/GR/000296**

## **Mid-term Report**

**Covering the project activities from 01/01/2009 to 31/12/2011**

Reporting Date

**31/01/2012**

LIFE+ PROJECT NAME or Acronym

**Actions for the conservation of coastal dunes with *Juniperus* spp. in Crete and the South Aegean (Greece)/JUNICOAST**

### Data Project

<b>Project location</b>	Greece, Crete and South Aegean
<b>Project start date:</b>	01/01/2009
<b>Project end date:</b>	31/12/2012 <b>Extension date:</b> 31/08/2013 (REQUESTED)
<b>Total budget</b>	1.501.210,00 €
<b>EC contribution:</b>	1.125.908,00 €
<b>(%) of eligible costs</b>	(%) 75

### Data Beneficiary

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## 1 Table of contents

1 Table of contents .....	2
2 List of key-words and abbreviations .....	2
3 Executive summary .....	3
3.1 General progress .....	3
3.2 Assessment as to whether the project objectives and work plan are still viable.....	3
3.3 Problems encountered.....	5
4 Administrative part.....	6
4.1 Description of project management.....	6
4.2 Organigramme of the project team and the project management structure .....	7
4.3 Reports delivered since the start of the project .....	9
5 Technical part.....	11
5.1 Actions .....	11
5.2 Envisaged progress until next report .....	48
5.3 Impact .....	50
5.4 Outside LIFE.....	50
6 Financial review by actions.....	51
7 Annexes .....	53
Annex 7.1 Deliverables .....	53
Annex 7.2 Dissemination materials.....	54
Annex 7.3 Answers to the Questions addressed by the Commission in the letter dated: Brussels, 22 of March 2011 – Ref: ENV/E3/MD/jv ARES (2011) 313837.....	73
Annex 7.4 Project actions, provisioned and modified time table .....	75

## 2 List of key-words and abbreviations

ERT: Electrical Resistivity Tomography

FDC: Forest Directorate of Chania

FDL: Forest Directorate of Lasithi

GCPs: Ground Control Points

GPR: Ground Penetrating Radar

GIS: Geographical Information System

GPS: Global Positioning System

MAICH: Mediterranean Agronomic Institute of Chania

NKUA: National and Kapodistrian University of Athens

PTA (Periferiako Tameio Anaptiksi): Regional Development Fund of Crete

### 3 Executive summary

The general objective of the JUNICOAST project is to promote and enable the long term conservation of the 2250\* priority habitat (Coastal dunes with *Juniperus* spp.) in Crete and the South Aegean (Greece) where the distribution of these habitats is mainly confined. All the actions of this project are being carried out in all the Natura 2000 designated habitats of Crete comprising approximately 54 % of the total number of this habitat type in Greece.

Additionally, dissemination actions are being carried out in the South Aegean providing the opportunity for the wider protection and restoration of this habitat in Greece.

The project started on time and during this reporting period (01.01.2009 – 31.12.2011) all “preparatory actions” have been completed. All “concrete conservation actions” are in progress and are currently being implemented. The “public awareness and dissemination of results” actions D1 (Development and implementation of a communication strategy), D2 (website development), D3 (environmental education campaign), D5 (Production and dissemination of habitat protection and restoration guidelines) and D6 (Dissemination of findings to the scientific community and Layman’s report) started on schedule and are currently being implemented. Actions D4 (Training for habitat protection and restoration) and D7 (After-LIFE communication and conservation plans) are scheduled to start according to the schedule on their foreseen start-date (D4: 01-01-2012 and D7: 01-07-2012). The “overall project operation and monitoring actions” (E actions) are also being implemented on schedule.

To date, we deem that an extension of the project duration by 8 months is necessary (Foreseen end-date: 31/12/2012 - Modified end-date: 31/08/2013). This request is submitted in a separate document (LIFE07NAT\_GR\_000296\_Request\_amendment\_to\_the\_agreement.doc) and we request its approval by the LIFE Unit in Brussels.

In this mid-term report, the proceedings and the envisaged progress until the end of each particular action are concisely described. Moreover, a financial review (summary cost by action) and a statement of expenditures are reported. This mid-term report is accompanied by the relevant annexes (annex 7.1: deliverables, annex 7.2: dissemination materials, annex 7.3: answers to the Questions addressed by the Commission in the letter dated: Brussels, 22 of March 2011 – Ref: ENV/E3/MD/jv ARES (2011) 313837.

A request for the 2<sup>nd</sup> payment is submitted with this mid-term report as the threshold of 150% of the first payment has been reached.

#### 3.1 General progress

The project started on the 1st of January 2009. The inception report and the first progress report have been submitted on the 30.09.2009 and on the 31.01.2011 respectively and have been approved by the LIFE Nature Unit. During the reporting period for this mid-term report (01.01.2009 – 31.12.2011), actions C1, C2, C3, C4, C5, C6, C7, C8, D1, D2, D3, D5, D6, E1, E2, E3, E4 and E5 are currently being implemented. Interim reports of action C3 (Enhancement of juniper regeneration) and action C4 (Restoration of the floristic composition and structure of the target habitat 2250\*) have been produced and have been submitted in separate documents together with this mid-term report (see annex 7.1, deliverables).

#### 3.2 Assessment as to whether the project objectives and work plan are still viable

The primary aim of this project is to promote and enable the long term conservation of the coastal dune habitats with *Juniperus* spp. in Greece.

The specific objectives of the project are:

1. To contribute to the consolidation and dissemination of a knowledge base for the protection, restoration, monitoring and evaluation of coastal dune with *Juniperus* spp. habitats in Greece.
2. To understand, quantify and halt natural and anthropogenic threats that contribute to the long term degradation of this habitat.
3. To design and implement actions for the protection and long term restoration of coastal dune with *Juniperus* spp. habitats.
4. To provide support for better environmental governance in Natura 2000 sites through stakeholder involvement and training.

By relying on the preparatory actions in Crete, the project allowed the consolidation of a national knowledge base providing insight on the abiotic and biotic factors that influence the habitat structure and quality but also on the effects of anthropogenic pressures (specific objective 1 and 2). These are being followed by the concrete conservation actions in Crete targeting the main natural and anthropogenic threats which put into practice, test and evaluate actions and methodologies unfamiliar to the Greek habitat's context (specific objective 3). Being a demonstration project, the public awareness and dissemination of the results are being carried out on a national level using a multi-stakeholder communication strategy allowing the promotion of the concrete conservation in the South Aegean (specific objective 4). This is being achieved by using a participatory approach and stakeholder engagement from the onset of the project which include:

- An environmental education campaign raising public awareness and long term support for the project in Crete and the South Aegean,
- The provision of training and guidelines on habitat protection and restoration methods at a national level,
- The creation of local, national and European networks for the protection of this habitat.

Based on the above and on the work in progress it appears that the project objectives are still very relevant, valid and viable. To date, no changes are considered necessary, regarding the primary aim and specific objectives of the project.

**However,** changes to the general work plan of the project are considered necessary. We request a postponement of the end date of the project due to unforeseeable, exceptional circumstances that we have faced during this reporting period (see request for the amendment to the agreement). Concrete conservation actions being implemented by the PTA and the Forest Directorates of Chania and Lasithi (actions C1, C2, C5 and C6) are behind schedule due to implications related to the new Governance structure of the Greek Regions. The new Governance structure of the Region of Crete was introduced by the new "Kalikrati" law voted in the Greek parliament on 27<sup>th</sup> of May 2010.

**These modifications were/are totally beyond the control of the coordinating and the associated beneficiaries of the project. They were not predictable and are not linked to any issue already refused during or before the conclusion of the revision phase during the selection procedure, and caused a serious delay in the implementation of the project. The project coordinating beneficiary and the associated beneficiaries fully guarantees to totally achieve the project objectives within the modified end date (31/08/2013) of the project.**

### 3.3 Problems encountered

Three major problems (see below, point 1, point 2 and point 3) have been encountered during this reporting period which led to serious delays in the on-site implementation of several concrete conservation actions (C1, C2, C5, C6 and C7) that are being implemented by the Forest Directorate of Chania and Lasithi and MAICH. Other implications related to these problems are delays concerning the submission of this mid-term report together with the request for the 2<sup>nd</sup> payment. Due to the delays in implementing the above-mentioned concrete conservation actions, the 150% threshold of the first pre-financing payment (article 28.3 of Common Provisions) has not been reached on time (foreseen due date 31.12.2010). These problems have now been solved and the request for the 2<sup>nd</sup> payment is being submitted together with this mid-term report.

#### Point 1)

Before the new “Kalikratis” law the PTA, the FDC and the FDL were under the jurisdiction of one public entity, the Region of Crete. The FDC and the FDL are responsible for the technical implementation (technical studies, publication of the auctions, onsite implementations of the auctions) of their concrete conservation actions (C1, C2, C5 and C6) and the PTA is responsible for the financial management of these actions. When the new “Kalikratis” law was voted in the Greek parliament on May 2010, the Governance structure of the Region of Crete has been changed. Two new public entities have been created on January 2011 after the regional elections on November 2010: a) the Region of Crete and b) the Decentralized Administration of Crete. The PTA remained under the jurisdiction of the Region of Crete whereas the Forest Directorates (FDC and FDL) were moved and placed under the jurisdiction of the Decentralized Administration of Crete. This new Governance structure created confusion and required ample time to solve jurisdiction problems between the two newly created public entities. Between January 2011 and September 2011 the project manager of the project devoted lots of efforts in negotiating a solution in order to solve this issue. Only until September 2011, an official decision by the Region of Crete and the Decentralized Administration of Crete was made public stating that the PTA will continue to financially manage the on-going projects of the previous Region of Crete signed before the implementation of the new “Kalikratis” law.

#### Point 2)

Moreover, several administrative problems between the PTA and the two Forest Directorates (FDC and FDL) relating to who will have the authority to publish and who will sign the contracts for the on-site implementation of the published auctions. The technical studies prepared by the Forest Directorates were not made public because the PTA would not recognize the authority of the Forest Directorates in signing the contracts for the published technical studies. The PTA has refused to pay expenses signed by other public services (FDC and FDL). The PTA has requested an official letter from the LIFE Unit stating that costs incurred by the two Forest Directorates (on-site implementation of the technical studies) are eligible in order to sign for the expenses. This problem was solved when the PTA received an official letter from the LIFE Unit (Brussels 7 Nov. 2011 ENV.E3/MD/PT/jv ARES (2011) 1181459) stating that “the costs incurred by FDC and FDL are considered eligible”.

#### Point 3)

During 2010 and 2011 the Coordinating Beneficiary faced a liquidity problem due to the Greek economic crisis. Before the economic crisis MAICH used to receive the National Greek contribution to its budget totally by the beginning of each year. During the crisis (2010 and

2011), the National contribution to MAICh's budget was decreased and partially deposited every 2 months which contributed to the lack of liquidity. This resulted in a delay in the implementation of the concrete conservation action C7 and also a delay in action E4.

Due to the above-mentioned major problems, the project remained behind schedule. Thus, we deem that an extension of the project duration by 8 months is necessary (Foreseen end-date: 31/12/2012 - Modified end-date: 31/08/2013) and we request a postponement of the end date of the project (Modified end-date: 31/08/2013).

Problems that have led to these delays have been solved as mentioned in point 1 and point 2. A new detailed calendar for the implementation of all actions is illustrated in a new Gantt chart (see request for the amendment to the agreement).

## **4 Administrative part**

### **4.1 Description of project management**

The project management team with the collaboration of the other beneficiaries and input from various stakeholders has carried out a number of meetings and activities to ensure the support and necessary collaboration for the project. These have taken place under the project "coordination and management" action E1, E3 (scientific committee), E5 (stakeholder committee) as well as the D actions and are described in detail in Section 5.

The **kick-off meeting** (action E.1, 22<sup>nd</sup> of January 2009) of the project, the **1<sup>st</sup> Scientific committee meeting** (E.3, 26<sup>th</sup> and 27<sup>th</sup> of February 2009) and the **1<sup>st</sup> stakeholder committee meeting** (E.5, 25<sup>th</sup> of February 2009) took place at the premises of the Mediterranean Agronomic Institute of Chania (for detailed results of these meetings, see annex 7.3 of the inception report submitted to LIFE Unit on the 30.09.2009). The **2<sup>nd</sup> project meeting** (E.1, 11<sup>th</sup> of March 2010), the **2<sup>nd</sup> scientific committee meeting** (E.3, 21 of October 2010) and the **2<sup>nd</sup> stakeholder committee meeting** (E.5, 22<sup>nd</sup> of October 2010) were also held at the premises of the Mediterranean Agronomic Institute of Chania (for detailed results of these meetings, see annex 7.4 of the progress report submitted to LIFE Unit on the 31.01.2011).

The coordinating beneficiary of the project represented by Ms. Hlektra Remoundou conducted a visit to the Forest Directorate of Rhodes Island in the South Aegean on the 13<sup>th</sup> of January 2011 in order to inform various stakeholders in the area about the progress of the project. Moreover, on the 14<sup>th</sup> of January, Ms. Remoundou conducted a field visit to the habitat 2250\* in Rhodes together with members of the Forest Directorate of Rhodes.

A meeting between the coordinating beneficiary and representatives of the municipality of Gavdos took place at the premises of MAICh on the 1<sup>st</sup> of April 2011 and on the 15<sup>th</sup> of December 2011 in order to discuss the progress of the project and specific concrete conservation actions that will be implemented on the 3 sites (Sarakiniko, Agios Ioannis and Lavrakas) of Gavdos.

Another meeting between the coordinating beneficiary and the Forest Directorate of Lasithi took place in Agios Nikolaos on the 4<sup>th</sup> of May 2011 in order to discuss and schedule the implementation of the concrete conservation actions in Chrysi. Moreover, the external monitoring team of the project represented by Ms. Georgia Valaoras conducted its annual monitoring mission on the 31 of May 2011. An update on the progress of the project and a visit to Chrysi Island were carried out.

Finally, the project manager and the coordination team of MAICh are in continuous communication with the associated beneficiaries, the external consultants and local stakeholders of the project in order to ensure the appropriate evolution of the project and the achievement of the deliverables and results on time as required by the common provisions.

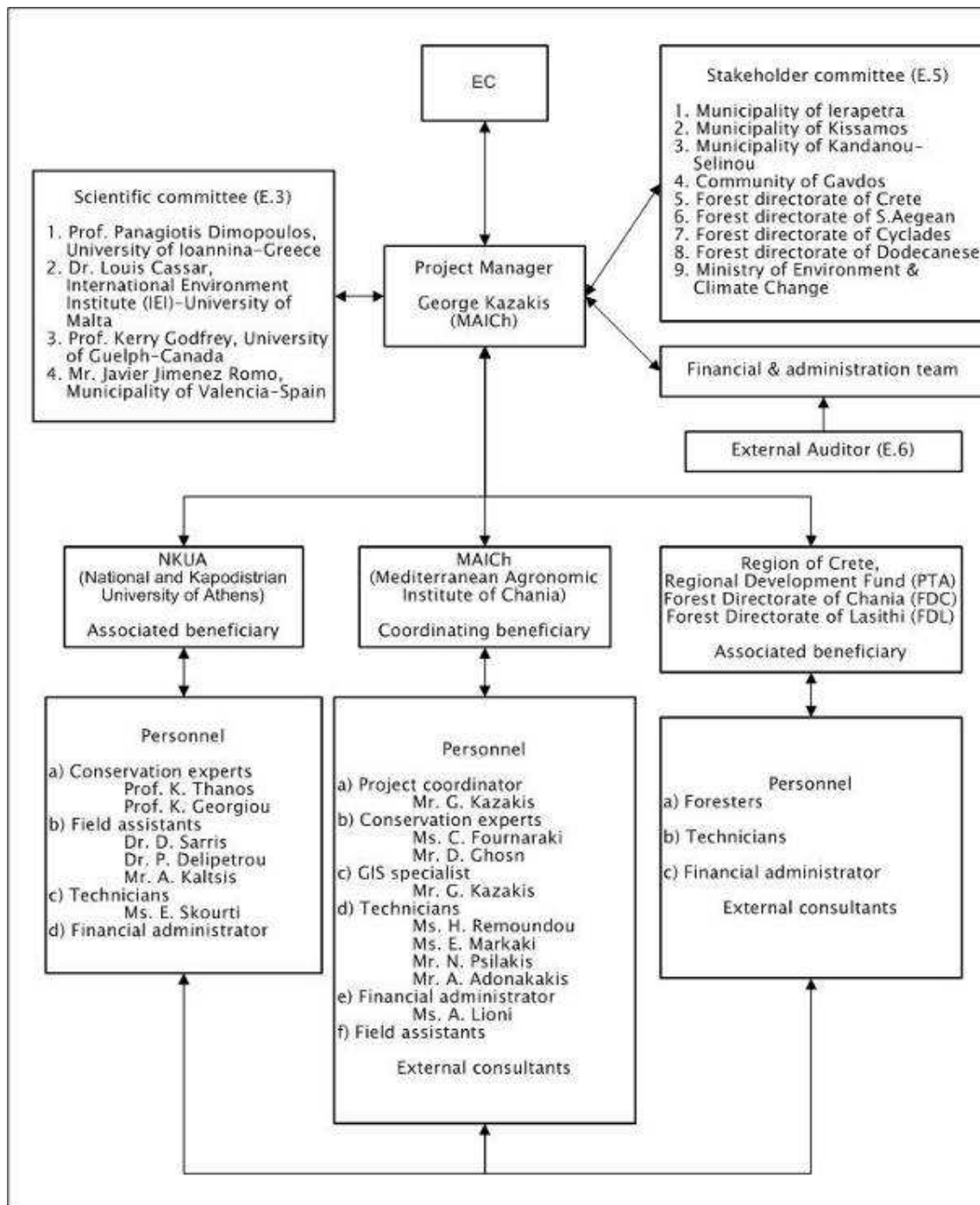
Regular email communications and consultations with scientific committee members has been taking place through this reporting period.

The third project meeting, third scientific committee meeting and third stakeholders committee meeting did not take place in 2011 due to the delays in the on-site implementation of some concrete conservation actions. All three meetings will be organized in summer 2012.

#### **4.2 Organigramme of the project team and the project management structure**

No changes in the project management structure took place and none of the partners were replaced or withdrawn (see inception report of 30.09.2009 for more details on the management structure of the project). See below the Organigramme of the project team and the project management structure.

## Organigramme of the project team and the project management structure





### 4.3 Reports delivered since the start of the project

The reports and deliverables that have been submitted to the LIFE Nature Unit since the start of the project are mentioned below:

**Inception report** covering the period from 01.01.2009 until 30.09.2009

**Deliverables** (submitted with the inception report in separate documents on 09.10.2009):

- D-A.6.1.1 Stakeholder consultation and community survey for Chrysi Island
- D-A.6.1.2 Stakeholder consultation and community survey for Gavdos Island
- D-A.6.1.3 Stakeholder consultation and community survey for Kedrodasos
- D-A.6.1.4 Stakeholder consultation and community survey for Falasarna
- D-A.6.2 Stakeholder Consultation Method Effectiveness Evaluation

**Progress report** covering the period from 01.10.2009 until 31.12.2010

**Deliverables** (submitted with this progress report in separate documents, see annex 7.1):

- D-A.1.1 Geomorphology of coastal dunes with *Juniperus* spp. in Crete (In Greek with executive summary in English).
- D-A.1.2 Geomorphological maps of the habitat 2250\* in Crete (In Greek)
- D-A.2.1 Report on plant associations, community types, composition and structure of coastal dunes with *Juniperus* spp. in Crete (In English with executive summary in Greek)
- D-A.2.2 Maps of restoration interventions (In Greek)
- D-A.3 Report on population size, age-size structure and sex ratios of the *Juniperus* populations in Crete (In Greek with executive summary in English)
- D-A.4 Technical report on habitat mapping (In Greek and in English) and maps of the habitat 2250\* in Crete (In English)
- D-A.5.1 Visitor impact assessment (In English with executive summary in Greek)
- D-A.5.2 Maps of visitor management infrastructures (In Greek)
- D-A.7 A Compendium monitoring protocols to evaluate effectiveness of concrete conservation and dissemination actions (In English with executive summary in Greek)
- D-A.8 Working manuals on specific protection and restoration specifications (In Greek with executive summary in English)
- D-A.9.1 Determination of the legal status of habitat 2250\* in Greece (In Greek with executive summary in English)
- D-A.9.2 Determination of the governance structure (In Greek and in English)
- D-C.8.1 Progress report on *Ex-situ* conservation and propagation of keystone species (In Greek with executive summary in English)

**Mid-term report** covering the period from 01.01.2009 until 31.12.2011 (current document)

**Deliverables** (submitted with this mid-term report in separate documents, see annex 7.1):

- D-C.3.1 Interim report on juniper regeneration and enhancement (In Greek with executive summary in English)
- D-C.4.1 Interim report on protection and enhancement of keystone species (including juniper male/female balancing) (In Greek with executive summary in English)
- Educational guideline on coastal dunes with *Juniperus* spp.

All deliverables include an executive summary in Greek or English if they are written in English or Greek and they have been uploaded to project website: [www.junicoast.gr](http://www.junicoast.gr)

Up to day, we deem that an extension of the project duration by 8 months is necessary (Foreseen end-date: 31/12/2012 - Modified end-date: 31/08/2013). This request is included in written (see request for the amendment to the agreement), and we request its approval by the LIFE Unit in Brussels.

## 5 Technical part

### 5.1 Actions

#### 5.1.1 Action A.1: Landform and land degradation processes in dune systems

The purpose of this action was to map and describe the landforms, structures and processes on the surface and the subsurface of the 2250\* habitat in all Cretan sites. This action started on 01.01.2009 and was completed on 30.06.2010.

#### **The activities performed up to the completion of this action are:**

- Literature review on the geomorphology, landform and land degradation processes in dune systems
- Geo-referenced geo-physical transects using Electrical Resistivity Tomography (ERT) in the following Cretan sites (4 in Kedrodasos-Elafonisi, 5 in Sarakiniko-Gavdos, 5 in Agios Ioannis-Gavdos, 7 in site1-Chrysi, 4 in site2-Chrysi and 2 in Falasarna)
- Transects with Ground penetrating Radar (GPR) in the following Cretan sites (1 in kedrodasos-Elafonisi, 4 in Sarakiniko-Gavdos, 4 in Agios Ioannis-Gavdos, 7 in site1-Chrysi, 4 in site2-Chrysi and 2 in Falasarna)
- 1.2 m soil core samples, soil profile description and soil sample analysis in the following Cretan sites: 3 in Kedrodasos-Elafonisi, 2 in Sarakiniko-Gavdos, 1 in Agios Ioannis-Gavdos, 1 in site1-Chrysi, 1 in site2-Chrysi and 2 in Falasarna
- Landscape unit description and first observations on erosion patterns in Kedrodasos-Elafonisi, Lavrakas-Gavdos and site1-Chrysi
- Vegetation description along all ERT transects in Kedrodasos-Elafonisi, Sarakiniko-Gavdos, Agios Ioannis-Gavdos, site1-Chrysi and site2-Chrysi
- Acquisition of ground Control points (GCPs) in Kedrodasos-Elafonisi, Agios Ioannis-Gavdos, and the whole island of Chrysi
- Water sampling and analysis in Lavrakas-Gavdos
- Hydrological modelling in Kedrodasos-Elafonisi
- Data input and processing
- Data analysis
- Production and submission of seven geomorphological maps (one per site, see progress report annex 7.1, submitted on 31.01.2011)
- Write-up and submission of the report on landforms, structures and processes of the dune systems (see progress report annex 7.1, submitted on 31.01.2011)
- Photo documentation from all Cretan sites

#### **Conclusions or main findings:**

The final identifiers for geomorphological mapping and description were: dune type and height, sandy layer depth, parent material, type and intensity of land forming processes. Based on those criteria 36 units were mapped in all study sites. Soil sampling and analysis showed that all sandy layers were alkaline (average pH=8.9) very poor in organic matter (soil organic matter= 0.7%) with 60% CaCO<sub>3</sub>. Additionally, all minerals were found in very low concentrations with the exception of Magnesium and in some cases Potassium. Water Analysis in Lavrakas revealed that all mineral compounds are below the limits for drinking water with the exception of Chloride which concentration was 425 ppm while the limit for drinking water according to EU standards is 230 ppm. Sampling of two locations within 2250\* habitat in Chrysi were on saline water. All profiles conducted with geophysical methods showed variable sand depth and no relation of the presence of *Juniperus* spp. with

freshwater water table. On the contrary its competitors namely pine trees do not grow on deep sandy layer or sandstone substrate. The state of the sand dunes in relation to aeolian erosion is considered satisfactory on average at all study areas. The study area receiving the highest pressure is the East Chrysi site. At this site, high velocity North winds dominate with the highest intensity from all sites. The high number of visitors has a significant impact on these phenomena due to the pressure on the vegetation of the northern part. Trampling inhibits the formation and development of embryonic dunes and diminishes the capacity of vegetation to stabilize the sand thus allowing for a net transport of sand from the north to the south. Restoration of the front dunes is proposed for the mitigation of this pressure through sand stabilizing fencing and planting of sand fixing keystone species.

No major problems were encountered in implementing this action. This action is completed and no further activities or technical modifications are envisaged.

Action A.1 has met its objectives; seven geomorphological maps (one per site) and a report (including the geomorphological transect profiles of each habitat) on landforms, structures and processes of the dune systems in Crete have been produced.

**For detailed results of this action see deliverables:**

- D-A.1.1 Geomorphology of coastal dunes with *Juniperus* spp. in Crete (In Greek with executive summary in English).
- D-A.1.2 Geomorphological maps of the habitat 2250\* in Crete (In Greek)

These two deliverables were submitted with the progress report (annex 7.1) on the 31 of January 2011.

### **5.1.2 Action A.2: Determining the dune system plant communities' composition and structure**

The purpose of this action was to determine and describe the composition, the structure, and the ecological processes of juniper woodland communities on all Cretan sites. This action started on 01.01.2009 and was completed on 30.06.2010.

#### **The activities performed up to the completion of this action are:**

- Literature review on various topics such as dune system plant communities' composition and structure, and the ecological processes of Juniper woodlands.
- Geo-referenced 30x30m plots, each including two relevés (10x10m and 3x3m sub-plots) have been established in the following Cretan sites (6 in Kedrodasos-Elafonisi, 4 in Sarakiniko-Gavdos, 6 in Agios Ioannis-Gavdos, 8 in Lavrakas-Gavdos, 6 in East-Chrysi, 4 in West-Chrysi and 2 in Falasarna)
- Species composition and cover have been measured in all established plots and relevés (sub-plots).
- GPS measurements of all individual trees within the 30x30m plots in all Cretan sites (Kedrodasos-Elafonisi, Sarakiniko-Gavdos, Agios Ioannis-Gavdos, Lavrakas-Gavdos, Chrysi-East Chrysi-West and Falasarna)
- Vegetation transects at all study sites (2 in Kedrodasos-Elafonisi, 1 in Sarakiniko-Gavdos, 3 in Agios Ioannis-Gavdos, 2 in Lavrakas-Gavdos, 2 in East-Chrysi and 2 in West-Chrysi)
- Data input and processing
- Data analysis
- Production and submission of 7 maps of specific areas within the habitats in need of restoration (one per site, see progress report annex 7.1, submitted on 31.01.2011)
- Write-up and submission of the report on plant associations, community types, composition and structure of the dune systems (see progress report, annex 7.1 submitted on 31.01.2011)
- Photo documentation from all Cretan sites

#### **Conclusions or main findings:**

The total number of species recorded in all sites was 142 belonging to 33 different families. Five plant communities were identified from the analysis of the vegetation plots and 18 plant community types were identified from the analysis of the transect vegetation data. A set of 36 keystone species and 80 indicator species were identified.

No major problems were encountered in implementing this action. This action is completed and no further activities or technical modifications are envisaged.

Action A.2 has met its objectives; seven maps within the habitats in needs of restoration (one per site) and a report on plant associations, community types, composition and structure of coastal dunes with *Juniperus* spp. in Crete have been produced.

#### **For detailed results of this action see deliverables:**

- D-A.2.1 Report on plant associations, community types, composition and structure of coastal dunes with *Juniperus* spp. in Crete (In English with executive summary in Greek)
- D-A.2.2 Maps of restoration interventions (In Greek)

These two deliverables were submitted with the progress report (annex 7.1) on the 31 of January 2011.

### 5.1.3 Action A.3: Composition and structure of *Juniperus* populations

The purpose of this action was to quantitatively determine and describe the population composition and structure of the typical species of habitat type 2250\*, *Juniperus oxycedrus* subsp. *macrocarpa* in all Cretan sites. This action started on 01.01.2009 and was completed on 30.06.2010.

#### **The activities performed up to the completion of this action are:**

- Literature review on various topics such as studies on the genus *Juniperus*, communities of *Juniperus macrocarpa* on Mediterranean sand dunes, and Sex ratio in dioecious plant populations.
- GPS measurements of all individuals of *Juniperus macrocarpa* and *Juniperus phoenicea* within the habitat type 2250\* in Kedrodasos-Elafonisi and Falasarna.
- The completion of the GPS measurements of Juniper trees in Gavdos and Chrysi
- Determination of the *Juniperus* population size as well as numbers of trunks per individual in Kedrodasos-Elafonisi and Falasarna.
- Determination of the *Juniperus* population sexual ratio in Kedrodasos-Elafonisi, Gavdos, Chrysi and Falasarna.
- Sampling of tree cores from selected individuals of *Juniperus* for age structure estimation in Kedrodasos-Elafonisi, Sarakiniko-Gavdos, Agios Ioannis-Gavdos, Lavrakas-Gavdos and Chrysi
- Sampling of cones and seeds for reproductive biology studies in Kedrodasos-Elafonisi.
- Photo documentation from Kedrodasos-Elafonisi, Sarakiniko-Gavdos, Agios Ioannis-Gavdos, and Lavrakas-Gavdos.
- Data input and processing
- Data analysis
- Write-up and submission of the report on population size, age-size structure and sex ratios of the *Juniperus* populations (see progress report, annex 7.1 submitted on 31.01.2011)
- Photo documentation from all Cretan sites

#### **Conclusions or main findings:**

Lavrakas site in Gavdos showed the highest population density (145 individuals/ha) whereas the least dense site is Agios Ioannis in Gavdos with 43 individuals/ha. The sex ratio of all studied populations was very close to 1:1 except those of Chrysi (Chrysi-east and Chrysi-West) where the sex ratio was 1.68 and 1.24 respectively. The total number of juvenile plants in five study sites was under or just above 10% of the total number of adult individuals. The two study sites in Gavdos (Sarakiniko and Lavrakas) hosted a higher number of juvenile plants with regeneration index equal to 1:2.2 and 1:1.6 respectively. All populations showed an average age in the range of 100-200 years. Kedrodasos and Lavrakas populations seem to be the youngest (100-110 years) while in Agios Ioannis the average age is 170-180 years. The oldest tree among those sampled was found to be 300 years old.

No major problems were encountered in implementing this action. This action is completed and no further activities or technical modifications are envisaged.

Action A.3 has met its objectives; a report on population size, age-size structure and sex ratios of the *Juniperus* populations in Crete has been produced.

#### **For detailed results of this action see deliverable:**

D-A.3 Report on population size, age-size structure and sex ratios of the *Juniperus* populations (In Greek with executive summary in English).

This deliverable was submitted with the progress report (annex 7.1) on the 31 of January 2011.

#### **5.1.4 Action A.4: Habitat mapping**

The purpose of this action was to accurately identify and map the target habitats at all Cretan sites. This action started on 01.01.2009 and was completed on 31.03.2010.

##### **The activities performed up to the completion of this action are:**

- Topographic maps (scale 1:5000) of all Cretan sites were scanned and geo-referenced.
- Digitizing of all topographic maps of all Cretan sites.
- Aerial photos of 1968 (scale 1:15.000) of all Cretan sites have been bought
- Recent aerial photos (1992 and 2004, scale 1:8.000) where available (Gavdos and Chrysi islands), have been bought.
- Scanning and geo-referencing of all aerial photos.
- GPS data collected from Kedrodasos-Elafonisi, Gavdos, Chrysi and Falasarna were imported into GIS.
- GIS data analysis and processing of all study sites.
- Identification of habitat boundaries in all Cretan sites
- Production and submission of all Cretan habitat maps (see progress report annex 7.1, submitted on 31.01.2011)
- Write-up and submission of the technical report (English and Greek) for habitat mapping (see progress report, annex 7.1 submitted on 31.01.2011).

No major problems were encountered in implementing this action. This action is completed and no further activities or technical modifications are envisaged.

Action A.4 has met its objectives; seven highly accurate/large scale maps illustrating the exact boundaries and the topographic elements of each Cretan site and a technical report for habitat mapping have been produced.

##### **For detailed results of this action see deliverable:**

D-A.4 Habitat mapping including the technical report (English and Greek) and habitat maps, (in Greek).

This deliverable was submitted with the progress report (annex 7.1) on the 31 of January 2011.

### **5.1.5 Action A.5: Visitor impact assessment**

The purpose of this action was to undertake a visitor impact assessment in order to ensure the effective implementation of visitor management actions in all Cretan sites. This action started on 01.01.2009 and was completed on 30.06.2010.

#### **The activities performed up to the completion of this action are:**

- Literature review on various topics such as recreation ecology, methodologies on visitor impact assessment and measurement of visitor impacts on sand dunes.
- Vegetation damage surveys for Sarakiniko-Gavdos, Agios Ioannis-Gavdos, Lavrakas-Gavdos and Kedrodasos-Elafonisi.
- Measurements of visitor numbers and tents (intensity and distribution) on a monthly basis starting from May/June in Chrysi, Sarakiniko-Gavdos, Agios Ioannis-Gavdos, Lavrakas-Gavdos and Kedrodasos-Elafonisi. (using GPS).
- Path density using GPS has been recorded in Chrysi, Sarakiniko-Gavdos, Agios Ioannis-Gavdos, Lavrakas-Gavdos and Kedrodasos-Elafonisi.
- Visitor Survey Questionnaires were developed and piloted and revised for all Cretan sites apart from Falasarna.
- On site surveys have been conducted for Chrysi and Kedrodasos-Elafonisi off peak and on peak samples are obtained for representativeness.
- Questionnaires with stands and “Junicoast” pencils from recycled material have been placed on boats to Gavdos and Chrysi as well as tavernas.
- Meetings with tourism and local representatives to obtain an overview of tourism flow and waste quantities.
- Walks through the habitat with permanent visitors indicating problem areas and recommendations for visitor management measures were carried out on several occasions.
- A visitor consultation meeting in Gavdos, with campers in Agios Ioannis-Gavdos took place on the beach of Agios Ioannis on the 5th of July 2009. During this meeting, the coordination team of MAICH presented the project and an open discussion with the campers on the different actions to be implemented took place. (see Annex 7.3 for minutes of the meeting)
- Data Input
- Litter surveys in Kedrodasos, Sarakiniko-Gavdos, Agios Ioannis-Gavdos, Chrysi-East and Chrysi-West.
- Tourism survey analysis and spatial data input and processing
- Production and submission of 7 maps illustrating the location of visitor management concrete actions (one per site)
- Write-up and submission of the visitor impact assessment (see progress report, annex 7.1 submitted on 31.01.2011)

#### **Conclusions or main findings:**

Results from the social survey showed that the main type of tourism performed by visitors when visiting the 2250\* habitats in Crete is nature-based tourism and more specifically, beach-based tourism. In Kedrodasos, almost half of visitors (54%) camp for two or more days and the other half are one-day trippers. In Gavdos the majority of visitors (65%) are staying for 5 or more days. Visitors going to Gavdos on a daily trip accounted only for 2%. In Chrysi, the majority of visitors (67%) are mainly visiting the island on a daily trip and returning to Ierapetra in the afternoon. Only 13% of the visitors to Chrysi are staying for more than 2 days. The comparison between the “used” and “unused” plots showed significant difference in the number of broken branches per juniper tree, the cover of root exposure and the ground



vegetation cover. The litter survey showed that the visitor effect on the dune system (hazard introduction and litter import) is important and not only reduces the aesthetic value of the habitat but also increases the risk of fire.

No major problems were encountered in implementing this action. However, in Gavdos the distribution of tents was not recorded with a GPS because at some point, visitors were bothered and started complaining. Therefore, each habitat in Gavdos was separated into different zones and the number of tents in each zone was counted. This action is completed and no further activities or technical modifications are envisaged.

Action A.5 has met its objectives; seven maps illustrating the location of visitor management infrastructures and a report on visitor impact assessment have been produced.

**For detailed results of this action see deliverables:**

- D-A.5.1 Report on visitor impact assessment (In English with executive summary in Greek)
- D-A.5.2. maps illustrating the location of visitor management infrastructures (In Greek).

These two deliverables were submitted with the progress report (annex 7.1) on the 31 of January 2011.

### **5.1.6 Action A.6: Stakeholder consultation**

The purpose of this action was to establish the stakeholders' level of awareness, perceived values, threats and recommendations for conservation of the habitat in their localities. This action started on 01.01.2009 and was completed on 30.09.2009.

#### **The activities performed up to the completion of this action are:**

- 1 stakeholder workshop at MAICh (25-02-2009)
- 1 community workshop in Gavdos (04-07-2009)
- 35 interviews with stakeholders
- Community surveys in Kissamos, Pelekanou, Inahoriou, and Ierapetra municipalities
- Door to door Survey Gavdos community
- Questionnaire Data entry, interview transcription and analysis
- Production of 1 report with stakeholder and community consultation result per site (4) (see inception report, annex 7.1 submitted on 30.09.2009)
- Production of 1 report with results of stakeholder consultation method effectiveness evaluation (see inception report, annex 7.1 submitted on 30.09.2009)

No major problems were encountered in implementing this action. . This action is completed and no further activities or technical modifications are envisaged.

Action A.6 has met its objectives; four (one per site) reports on stakeholder consultation & community survey and one report on the effectiveness evaluation of stakeholder consultation method have been produced.

#### **For detailed results of this action see deliverables:**

- D-A.6.1.1 Stakeholder Consultation & Community Survey for Chrysi island (In English with executive summary in Greek)
- D-A.6.1.2 Stakeholder Consultation & Community Survey for Gavdos island (In English with executive summary in Greek)
- D-A.6.1.3 Stakeholder Consultation & Community Survey for Kedrodasos (In English with executive summary in Greek)
- D-A.6.1.4 Stakeholder Consultation & Community Survey for Falasarna (In English with executive summary in Greek)
- D-A.6.2 Effectiveness evaluation of stakeholder consultation method (In English with executive summary in Greek)

These deliverables were submitted with the inception report (annex 7.1) on the 30.09.2009.

### **5.1.7 Action A.7: Elaboration of long term monitoring protocols and selection of indicators**

The purpose of this action was to develop long term monitoring protocols which will enable the evaluation of the effectiveness of the concrete conservation and dissemination actions as compared to the initial situation, objectives and expected results. This action started on 01.01.2009 and was completed on 31.07.2010.

#### **The activities performed up to the completion of this action are:**

- Literature review of existing indicators data bases and tools
- Selection of the indicators and the development of long term monitoring protocols
- Write-up and submission of a compendium with monitoring protocols to evaluate the effectiveness of concrete conservation and dissemination actions (see progress report, annex 7.1 submitted on 31.01.2011)

#### **Conclusions or main findings:**

In total 10 indicators were identified and 5 long term monitoring protocols with their sampling design and Standard Operating Procedures (SOPs) were developed.

No major problems were encountered in implementing this action. This action is completed and no further activities or technical modifications are envisaged.

Action A.7 has met its objectives and a compendium monitoring protocols to evaluate effectiveness of concrete conservation and dissemination actions have been produced.

#### **For detailed results of this action see deliverable:**

- D-A.7 compendium with monitoring protocols to evaluate the effectiveness of concrete conservation and dissemination actions (In English with executive summary in Greek)

This deliverable was submitted with the progress report (annex 7.1) on the 31 of January 2011.

### **5.1.8 Action A.8: Elaboration of target habitat protection and restoration specifications**

The purpose of this action was to propose protection and restoration specifications for the habitat 2250\* in the Natura 2000 sites of Crete. This action started on 01.01.2009 and was completed on 31.07.2010.

#### **The activities performed up to the completion of this action are:**

- Literature review on habitat-specific conservation and restoration techniques.
- Integration of the results from various preparatory actions (A1, A2, A3, A4, A5 and A6)
- Data input, processing and integration
- Write-up and submission of a working manual on habitat protection and restoration specifications (see progress report, annex 7.1 submitted on 31.01.2011)

#### **Conclusions or main findings:**

The main proposed intervention measures that will take place within the habitat are:

- Reduce camping sites through a public environmental campaign,
- Restrict and remove litter from the habitat,
- Eradicate the invasive species *Carpobrotus edulis* from Chrysi-East and Lavrakas,
- mild intervention to reduce the number of *Pinus brutia* juveniles from within the habitat, restore habitat 2110 and 2250\* where necessary by planting sand fixing and keystone species, balance the male/female ration of *Juniperus macrocarpa* in Chrysi and Agios Ioannis in Gavdos
- Delineation of paths within the habitat to avoid trampling by visitors.

No major problems were encountered in implementing this action. This action is completed and no further activities or technical modifications are envisaged.

Action A.8 has met its objectives and working manuals on specific protection and restoration specifications have been produced.

#### **For detailed results of this action see deliverable:**

- D-A.8 habitat protection and restoration specifications (In Greek with executive summary in English).

This deliverable was submitted with the progress report (annex 7.1) on the 31 of January 2011.

### **5.1.9 Action A.9: Determination of the Governance structure and legal status**

The purpose of this action was to determine the governance structure and the legal status of the Coastal dune with *Juniperus spp.* habitats in Greece. This action started on 01.01.2009 and was completed on 31.03.2010.

#### **The activities performed up to the completion of this action are:**

- Literature review on environmental governance and governance evaluation methodologies and theory
- Literature review of relevant studies carried out in Greece, as well as of past studies conducted and plans proposed for Cretan sites.
- A series of interview templates were developed and piloted
- Stakeholders' analysis.
- Interviews with 35 key governance bodies as well as individuals who have authority, responsibility or "ownership" of the target habitat on national, regional (Crete and south Aegean) as well as local level.
- Interviews were transcribed and processed
- Completion of the interviews with key governance bodies
- Data input and processing
- Data analysis
- Write-up and submission of the report on the legal status of Habitat 2250\* (see progress report, annex 7.1 submitted on 31.01.2011)
- Write-up and submission of the report on the determination of Governance structure (see progress report, annex 7.1 submitted on 31.01.2011)
- Translation of the report on determination of Governance structure from English to Greek

#### **Conclusions or main findings:**

The analysis of the governance structure showed a fragmentation of responsibilities and a lack of clarity regarding the form of governance and delegation of responsibilities resulting in confusion and inability to determine accountability. The analysis of the responsibilities of various agencies and services recognized the lack of Management Bodies who should have the authority to ensure the effective management and long-term protection of the areas. The legislation is not considered to be a problem, but rather the lack of its enforcement. Limiting factors for the relevant bodies included: lack of adequate funding, difficult access to the areas, and incomplete information on the necessary measures to be implemented. The Greek legislation does not provide specific provisions to protect the habitat 2250\*. The protection of this habitat occurs under general provisions on the environment through legal and administrative acts related to protected goods, which are in direct relation to the habitat (coast, dunes, beach, etc.).

No major problems were encountered in implementing this action. This action is completed and no further activities or technical modifications are envisaged.

Action A.9 has met its objectives and two reports on governance structure and habitat legal status have been produced.

#### **For detailed results of this action see deliverables:**

- D-A.9.1 Legal status of Habitat 2250\* (In Greek with executive summary in English).
- D-A.9.2 Determination of Governance structure (In Greek and English)

These two deliverables were submitted with the progress report (annex 7.1) on the 31 of January 2011.

#### **5.1.10 Action C.1: On site habitat demarcation**

The purpose of this action is to demarcate the on-site boundaries of the habitats in all Cretan sites. This action started on 01.01.2010 and is still in progress.

##### **The activities performed up to the submission of this mid-term report include:**

- Exchange of data on habitat demarcation from various preparatory actions,
- Onsite discussions on habitat demarcation (field trips to Kedrodasos, 07.07.2010, to Falasarna, 13.07.2010 and to Gavdos 27.09.2010),
- Clarification of technical issues on habitat demarcation (fencing materials, boundaries to be demarcated, etc.) between the partners
- The technical study for the habitat demarcation in Kedrodasos-Elafonisi, in Srakiniko-Gavdos, in Agios Ioannis-Gavdos, in Lavrakas-Gavdos and in Falasarna has been completed by the FDC.
- Tender specification for habitat demarcation has been published on 26<sup>th</sup> of November 2011
- Offers have been submitted to the FDC.
- Evaluation of the submitted offers to the FDC has been completed
- The external assistant who will implement this action for the FDC has been selected.

##### **It is envisaged that by the end date of this action, the following activities will be completed:**

- Tender specification for habitat demarcation will be made public by the Forest Directorate of Lasithi for the two sites (East and West) of Chrysi
- Offers (external assistants) will be submitted to the FDL
- Evaluation of the submitted offers by the Forest Directorate of Lasithi
- Selection of the external assistant who will implement this action for the FDL
- On site demarcation of all Cretan study sites

During this reporting period, major problems were encountered in implementing this action. These problems were solved (see paragraph 3.3, point 1 and point 2, “problems encountered” of this report). This action is in progress and it is envisaged that its objectives will be met.

**Due to the above mentioned major problems and the delays encountered, we require a postponement of the end-date of this action from 31-03-2012 to 31-12-2012** (see annex 7.4 Project actions, provisioned and modified time table)

### **5.1.11 Action C.2: Waste removal**

The purpose of this action is to remove existing solid waste present on all the Cretan sites within the boundaries of the habitats. This action started on 01.01.2010 and is still in progress.

**The activities performed up to the submission of this mid-term report include:**

- Exchange of data on waste removal from various preparatory actions,
- Onsite discussion on waste removal (field trips to Kedrodasos, 07.07.2010, to Falasarna, 13.07.2010 and to Gavdos 27.09.2010), discussions on practical issues on waste removal
- The FDL initiated the waste removal from Chrysi Island on April 2011 (remaining tents and other leftovers by campers were removed).

**It is envisaged that by the end date of this action, the following activities will be completed:**

- Direct treaties for waste removal from Kedrodasos, Falasarna and Chrysi.

During this reporting period, major problems were encountered in implementing this action. These problems were solved (see paragraph 3.3, point 1 and point 2, “problems encountered” of this report). This action is in progress and it is envisaged that its objectives will be met.

**Due to the above mentioned major problems and the delays encountered, we require a postponement of the end-date of this action from 31-03-2012 to 31-12-2012** (see annex 7.4 Project actions, provisioned and modified time table)

### **5.1.12 Action C.3: Enhancement of juniper regeneration**

The purpose of this action is to protect the existing natural regeneration of junipers and to enrich, wherever needed, *Juniperus macrocarpa* subpopulations with the introduction of new individuals produced from genetic material from each site. This action started on 01.03.2010 and is still in progress.

#### **The activities performed up to the submission of this mid-term report include:**

- Exchange of data on Juniper regeneration from various preparatory actions,
- Collection of genetic material (seeds and cuttings) of *Juniperus macrocarpa* and seedlings/cuttings propagation
- Seedlings and cuttings of *Juniperus macrocarpa* were collected from Kedrodasos-Elafonisi (23.02.2011), Gavdos (10-16.03.2011), Chrysi (18.05.2011) and transplanted in the greenhouses of MAICH.
- Onsite technical intervention methods (such as micro-fencing) of *Juniperus macrocarpa* young juveniles and seedlings were made available through discussions between NKUA and the FDC.
- Juvenile *Juniperus macrocarpa* individuals were fenced in Kedrodasos-Elafonisi (27-30.06.2011), while micro-fences protecting replanted individuals coming from seedlings or cuttings were established on Chrysi (November 2011) and Gavdos (December 2011).
- Write-up and submission of the interim report on juniper regeneration and enhancement (D-C.3.1), covering the period from 01.03.2010 to 30.06.2011 has been completed (see annex 7.1 of this report).

#### **It is envisaged that by the end date of this action, the following activities will be completed:**

- Seedlings and saplings of *Juniperus macrocarpa* will be available
- Enhancement of the *Juniperus* populations where appropriate through planting of new individuals
- Protection of juvenile plants with fencing and shading
- Write-up and submission of the final report on juniper regeneration and enhancement (D-C.3.2)

Up to day, no major problems are encountered in implementing this action. This action is in progress and it is envisaged that its objectives will be met.

**Since we are asking to postpone the end-date of the project until 31-08-2013, we would like to change also the end-date of this action from 30-06-2012 to 30-06-2013** (see annex 7.4 Project actions, provisioned and modified time table). **We believe that the objectives of this action will be better met if another planting season is included in the implementation of this action. During this time period we can repeat wherever necessary, the planting of some Juniper plants that did not survive from the first planting.**



#### **5.1.13 Action C.4: Restoration of the floristic composition and structure of the target habitat 2250\***

The purpose of this action is to restore the floristic composition and structure of the 2250\* habitat to a desired state at the Cretan sites. This action started on 01.03.2010 and is still in progress.

##### **The activities performed up to the submission of this mid-term report include:**

- Exchange of data on floristic composition and structure from various preparatory actions, collection of genetic material (seeds) of keystone species of habitat 2250\* and control of invasive species
- Genetic materials of selected keystone species from all Cretan sites were made available. Onsite technical intervention methods (micro-fencing, shading, etc...) of *Juniperus* young juveniles and seedlings were made available through discussions between NKUA and the FDC.
- Restoration of floristic structure of habitat 2250\* focused on balancing the female/male ratio among the *Juniperus macrocarpa* subpopulations, where needed
- Micro-fences for *Juniperus macrocarpa* were established in Kedrodasos-Elafonisi (27-30.06.2011), Chrysi (November 2011) and Gavdos (December 2011).
- Control of the invasion of *Pinus brutia* into habitat 2250\* took place with the removal of juvenile pines within identified pilot zones at Gavdos and Chrysi sites.
- Eradication of invasive species (*Carpobrotus edulis*) from Chrysi was conducted. Balancing the male/female ratio of *Juniperus macrocarpa* in both sites of Chrysi was conducted by planting female individuals coming from cuttings previously collected from both sites.
- Write-up and submission of the interim report on protection and enhancement of keystone species (including juniper male/female balancing) (D-C.4.1) covering the period from 01.03.2010 to 30.06.2011 has been completed (see annex 7.1 of this report).

##### **It is envisaged that by the end date of this action, the following activities will be completed:**

- Young individuals of more selected keystone species will be available
- Balancing of the male/female of *Juniperus macrocarpa* subpopulation ratio in both sites at Chrysi
- Enhancement of the floristic composition and structure where appropriate
- Write-up and submission of the final report on protection and enhancement of keystone species (including juniper male/female balancing, D-C.4.2)

Up to day, no major problems are encountered in implementing this action. This action is in progress and it is envisaged that its objectives will be met.

**Since we are asking to postpone the end-date of the project until 31-08-2013, we would like to change also the end-date of this action from 30-06-2012 to 30-06-2013** (see annex 7.4 Project actions, provisioned and modified time table). **We believe that the objectives of this action will be better met if another planting season is included in the implementation of this action. During this time period we can repeat wherever necessary, the planting of some Juniper and key-stone species that did not survive from the first planting.**

#### **5.1.14 Action C.5: Fore dune stabilization through vegetation restoration**

The purpose of this action is to implement concrete conservation actions needed to inhibit land degradation processes identified in action A.1 namely sand removal through wind erosion. This action started on 01.03.2010 and is still in progress.

#### **The activities performed up to the submission of this mid-term report include:**

- State of the art on dune stabilization,
- Exchange of data from various preparatory actions,
- Collection of genetic material (seeds) of keystone species of habitat 2250\*
- Field trips to Kedrodasos, 07.07.2010, to Falasarna, 13.07.2010 and to Gavdos 27.09.2010 (MAICh and FDC)
- Field trip to the island of Chrysi on the 31/05/2011 to measure the exact positions (GPS) of posts and fences has been conducted.
- Discussions on technical issues on dune stabilization between partners and the scientific committee have taken place.
- Preparation of the technical study for the dune stabilization through vegetation restoration in Chrysi has been completed by MAICh and will be submitted to the FDL for discussion in order to produce and publish the tender specification by the FDL.

#### **It is envisaged that by the end date of this action, the following activities will be completed:**

- Tender specification for dune stabilization will be made public
- Offers (external assistants) will be submitted to the FDC and FDL
- Evaluation of the submitted offers by the Forest Directorates
- Planting key stone species or implementation of other techniques where appropriate

During this reporting period, major problems were encountered in implementing this action. These problems were solved (see paragraph 3.3, point 1 and point 2 “problems encountered” of this report). This action is in progress and it is envisaged that its objectives will be met.

**Due to the above mentioned major problems and the delays encountered, we require a postponement of the end-date of this action from 30-06-2012 to 30-04-2013** (see annex 7.4 Project actions, provisioned and modified time table).

### **5.1.15 Action C.6: Visitor management intervention and infrastructures**

The purpose of this action is to protect the habitats from the impacts of tourism such as vegetation and tree damage, sand dune erosion and littering through the proposed visitor management interventions and infrastructures. This action started on 01.03.2010 and is still in progress.

#### **The activities performed up to the submission of this mid-term report include:**

- Discussions on technical issues on visitor management interventions and infrastructures between partners and the scientific committee,
- Field trips to Kedrodasos, 07.07.2010, to Falasarna, 13.07.2010 and to Gavdos 27.09.2010 (MAICH and FDC) and exchange of data from various preparatory actions
- Preparation of the technical study for the **visitor management intervention and infrastructures** in Kedrodasos-Elafonisi, in Srakiniko-Gavdos, in Agios Ioannis-Gavdos, in Lavrakas-Gavdos and in Falasarna has been completed by the FDC.

#### **It is envisaged that by the end date of this action, the following activities will be completed:**

- Tender specification the **visitor management intervention and infrastructures** in Kedrodasos-Elafonisi, in Sarakiniko-Gavdos, in Agios Ioannis-Gavdos, in Lavrakas-Gavdos and in Falasarna will be published on January 2012.
- Offers will be submitted to the FDC.
- Evaluation of the submitted offers to the FDC will be completed
- External assistant who will implement this action for the FDC will be selected.
- Tender specification for the **visitor management intervention and infrastructures** will be made public by the Forest Directorate of Lasithi for the two sites of Chrysi
- Offers (external assistants) will be submitted to the FDL
- Evaluation of the submitted offers will be completed by the Forest Directorate of Lasithi
- Onsite implementation of visitor management interventions and infrastructures in all Cretan sites

During this reporting period, major problems were encountered in implementing this action. These problems were solved (see paragraph 3.3, point 1 and point 2 “problems encountered” of this report). This action is in progress and it is envisaged that its objectives will be met.

**Due to the above mentioned major problems and the delays encountered, we require a postponement of the end-date of this action from 30-06-2012 to 30-04-2013** (see annex 7.4 Project actions, provisioned and modified time table).

#### **5.1.16 Action C.7: Design and installation of Signs**

The purpose of this action is to design and install on all Cretan sites directional and information signs in order to help protect the habitats by minimizing visitor impacts and threats. This action started on 01.03.2010 and is still in progress.

#### **The activities performed up to the submission of this mid-term report include:**

- Finalization of signs standards (design and fabrication guidelines),
- Finalization of signs content and discussions on the assessment of strategic locations of signs in all Cretan sites.

#### **It is envisaged that by the end date of this action, the following activities will be completed:**

- Construction and installation of signs on all Cretan sites

During this reporting period, major problems were encountered in implementing this action. These problems were solved (see paragraph 3.3, point 3 “problems encountered” of this report). This action is in progress and it is envisaged that its objectives will be met.

**Due to the above mentioned major problems and the delays encountered, we require a postponement of the end-date of this action from 30-06-2011 to 31-12-2012** (see annex 7.4 Project actions, provisioned and modified time table).

### **5.1.17 Action C.8: Ex situ conservation and propagation of keystone species**

The purpose of this action is to collect, store, and propagate the keystone species of the coastal dunes with *Juniperus spp.* outside of their natural habitat thus enhancing their conservation *ex situ*. This action started on 01.01.2009 and is still in progress.

#### **The activities performed up to the submission of this mid-term report include:**

- Seed collection from all Cretan sites of Keystone species and the production and propagation of plant materials (*Juniperus macrocarpa*, *Juniperus phoenicia*, *Lotus halophilus*, *Helianthimum stipulatum*, *Pistacia lentiscus*, *Pancratium maritimum*, *Silene colorata*, *Pseudorlaya pumila*, *Triplachne nitens*, *Vulpia fasciculata*, *Medicago marina*, *Centaurea pumilo*, *Muscari spreinzhoferi*, *Nigella stricta*, *Valantia hispida*, *Prasium majus*, *Coridothymus capitatus*, *Ononis hispanica*, *Silene succelenta*, *Elytrigia juncea*, *Limoniastrum monopetalum*, *Limonium greacum*, *Salsola kali*, *Cackile maritime* and *Asparagus stipularis*),
- Collection and germination of seeds of *Juniperus macrocarpa* from Kedrodasos, Chrysi and Gavdos.
- Collection and propagation of cuttings of *Juniperus macrocarpa* from Kedrodasos, Chrysi and Gavdos.
- Draft protocols for seed collection, handling and storage of collected keystone species have been produced,
- Draft protocols for seed germination of collected keystone species have been produced,
- A model sand dune including *Juniperus macrocarpa*, *Juniperus phoenicea* and other keystone species was established at the botanical garden of MAICH.
- Write-up and submission of the progress report on *Ex situ* conservation (see progress report annex 7.1, submitted on 31.01.2011)

#### **It is envisaged that by the end date of this action, the following activities will be completed:**

- Final protocols for seed collection, handling and storage of collected keystone species
- Final protocols for seed germination of selected keystone species
- Seed collection of various Keystone species from all Cretan sites
- Production and propagation of plant material (*Juniperus macrocarpa* and selected key stones species)
- Write-up and submission of a the final report on *Ex situ* conservation

Up to day, no major problems are encountered in implementing this action. This action is in progress and it is envisaged that its objectives will be met.

**Since we are asking to postpone the end-date of the project until 31-08-2013, we would like to change also the end-date of this action from 31-12-2012 to 30-04-2013** (see annex 7.4 Project actions, provisioned and modified time table). **This action provides genetic material of *Juniperus macrocarpa* and other key-stone species that are used to implement the actions C3 and C4. The postponement of the end-date of this action by four months would help providing more genetic material and better implementation of actions C3 and C4.**

### **5.1.18 Action D.1: Development and implementation of a communication strategy**

The purpose of this action is to develop and implement a communication strategy to raise awareness and disseminate the results of this project in Crete and the South Aegean. This action started on 01.01.2009 and is still in progress.

#### **The activities performed up to the submission of this mid-term report include:**

- Literature review on best practice regarding environmental education and participation
- Communication and information about the project with primary and nursery school teachers including environmental education bodies from pilot sites.
- Educational and tourism representatives were invited to the stakeholder meeting and asked to provide input on the development of the educational and dissemination activities.
- Short TV interview (onsite-Chrysi Island) on the National Television Channel (NET, Menoume Ellada). Broadcasted on Sunday 5th of July 2009 and again on the 18<sup>th</sup> of August 2009 at 13:00.
- Two interviews on a Local TV Channel (Chania, Nea TV), during the 1st stakeholder consultation meeting. Broadcasted on the 25<sup>th</sup> and the 26<sup>th</sup> of February 2009.
- Production of 20.000 project leaflet (in English and Greek),
- Distribution of leaflets to various stakeholders in Crete and the South Aegean (Naxos),
- Onsite distribution of leaflets to site visitors,
- Production (6000) and distribution of T-shirts (see annex 7.2 of this report) to various stakeholders and school students,
- Production and broadcasting of radio spot with the collaboration of Gavdos FM (in English and Greek, see annex 7.2 of the progress report submitted on the 31.01.2011),
- Discussions with professionals on the video content, recording of scenes for the video from all Cretan sites and student's week in MAICH,
- Publication of 5 Articles and 9 Press releases in local newspapers (Chaniotika Nea, Kyrikas, and Anatoili, see annex 7.3 of the inception report submitted on 30.09.2009)
- Publication of 6 articles and 3 press releases in National and local newspapers (Eleftherotypia, Chaniotika Nea and Kyrikas). Moreover, online publications on various forums and blogs (in relation to the above-published articles) have been published (see annex 7.2 of the progress report submitted on the 31.01.2011).
- Online Publication on various forums and blogs of 5 press releases and 3 information articles about coastal dunes with *Juniperus* spp. (see annex 7.2 of this report).
- Participation in the conference on "Promoting destination stewardship and sustainable tourism standards in Greece" organized in Chania on the 19th of September 2011 by the Mediterranean Association to Save the Sea Turtles (MEDASSET)
- A short slide presentation on coastal dunes with Junipers was produced and uploaded on YOUTUBE (uploaded on 26.10.2011)

#### **It is envisaged that by the end date of this action, the following activities will be completed:**

- Preparation/production and distribution of high quality colored posters
- Distribution of T-shirts
- Distribution of leaflets
- Preparation of notice boards content
- Radio spot broadcasting by Gavdos FM during summer seasons
- Collection of various materials for the production of the video
- Production and dissemination of a video
- Continuous Media publicity

- Write-up and submission of the report on communication strategy

Up to day, no major problems are encountered in implementing this action. This action is in progress and it is envisaged that its objectives will be met.

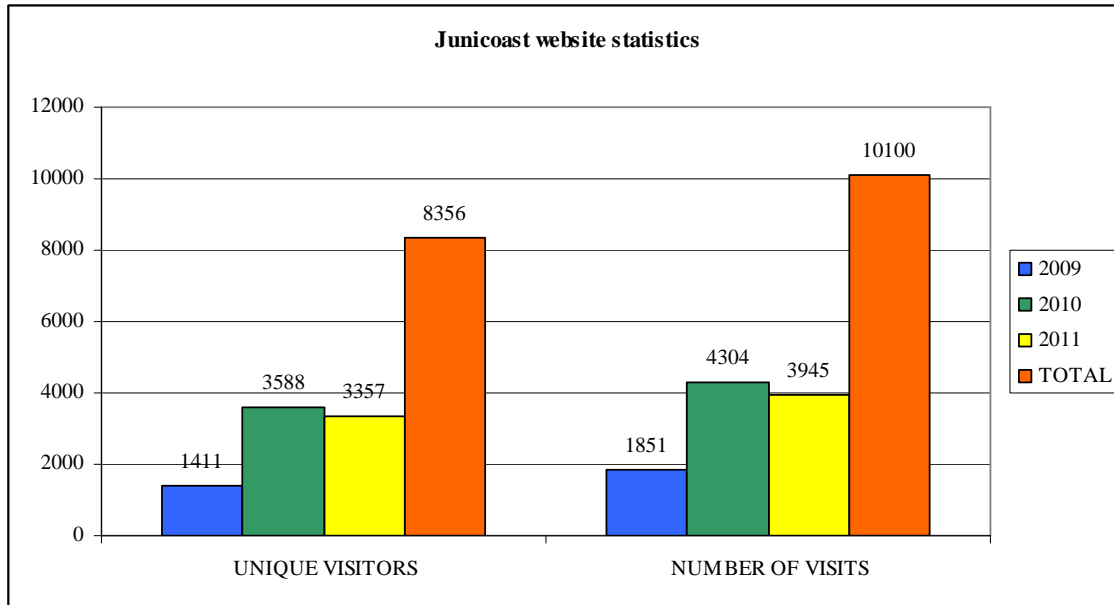
**Since we are asking to postpone the end-date of the project until 31-08-2013, we would like to change also the end-date of this action from 31-12-2012 to 31-08-2013** (see annex 7.4 Project actions, provisioned and modified time table). **The extension of the end-date of this action would enable us to better disseminate the results of the project and to raise the public awareness.**

### 5.1.19 Action D.2: Website development

The purpose of this action is to develop, update and maintain a project website. This action started on 01.01.2009 and is still in progress.

**The activities performed up to the submission of this mid-term report include:**

- Website developed and launched (www.junicoast.gr) in March 2009.
- Website being maintained and updated regularly.
- Web statistics are available from May 2009 to 31 of December 2011



**It is envisaged that by the end date of this action, the following activities will be completed:**

- Continuous website maintaining and updating

Up to day, no major problems are encountered in implementing this action. This action is in progress and it is envisaged that its objectives will be met.

**Since we are asking to postpone the end-date of the project until 31-08-2013, we would like to change also the end-date of this action from 31-12-2012 to 31-08-2013** (see annex 7.4 Project actions, provisioned and modified time table). **The extension of the end-date of this action would enable us to better disseminate the results of the project and to raise public awareness.**



### **5.1.20 Action D.3: Environmental education campaign**

The purpose of this action is to carry out an environmental education campaign aimed at increasing the public's environmental knowledge to enhance people's values of habitat and to promote participation in their management. This action started on 01.01.2009 and is still in progress.

#### **The activities performed up to the submission of this mid-term report include:**

- Meetings with environmental education representatives and primary schools head from different municipalities.
- Participation of education and tourism representatives at the first stakeholder workshop at MAICH
- Meetings with key tourism stakeholders to discuss visitor information provision needs and appropriate media (boat owners, local tourism entrepreneurs, tourism guides and hoteliers and travel agent representatives of Crete, Greek National Tourism Organisation)
- Production and distribution to school teachers of an educational booklet on coastal dunes with *Juniperus* spp. (see annex 7.1 of this report),
- Organization of 3 local events (site visits to Kedrodasos with school teachers and students on 15.12.2009, 03.03.2010 and 15.04.2010),
- Onsite (Kedrodasos) information meeting with volunteers on (04.08.2010) in Crete
- One local event in the South Aegean on the island of Naxos where many volunteers participated in cleaning of the 2250\* habitat (October 2011),
- Organization of two student weeks at the premises of MAICH (03.05.2010 – 07.05.2010 and 09.05.2011 – 13.05.2011),
- Organization of a one day environmental education workshop on “Biodiversity and Tourism” at the premises of MAICH with school teachers (14.12.2010),
- Participation and presentation of the project in the environmental education workshop on “Coastal dunes with *Juniperus* spp.” organized by the environmental education center of Ierapetra on the 4<sup>th</sup> of May 2011
- Presentation of the project to school teachers and students (10.01.2010 – 13.04.2010),
- Presentation of the project to children (5 to 13 years old) in summer camp in Akrotiri-Chania (24.06.2011 and 19.07.2011) and to M.Sc. students from the Aegean University (21.06.2001).

Moreover, the organization of one local event in Gavdos (July 2011) on Coastal dunes with *Juniperus* spp. was cancelled due to extreme weather conditions and is re-scheduled for summer 2012.

#### **It is envisaged that by the end date of this action, the following activities will be completed:**

- Two student weeks at the premises of MAICH
- Two workshops with tourism representatives
- Various local events in Crete and South Aegean (one local event on coastal dunes with *Juniperus* spp. and the flora of Naxos will be held at the island of Naxos in the South Aegean on the 25<sup>th</sup> of February 2011)

Up to day, no major problems are encountered in implementing this action. This action is in progress and it is envisaged that its objectives will be met.

**Since we are asking to postpone the end-date of the project until 31-08-2013, we would like to change also the end-date of this action from 31-12-2012 to 31-08-2013** (see annex 7.4 Project actions, provisioned and modified time table). **The extension of the end-date of**

**this action would enable us to better disseminate the results of the project, to raise the public awareness and to boost the environmental education.**

#### **5.1.21 Action D.4: Training for habitat protection and restoration**

The purpose of this action is to train stakeholders involved in the protection of coastal dune with *Juniperus spp.* 2250\* habitat throughout Greece, (e.g. forest directorate staff, government officers, etc) in the demonstrated trial techniques for habitat restoration and protection. This action started according to the schedule on the foreseen start-date of 01-01-2012 and it is scheduled to be completed on 31-12-2012.

**It is envisaged that by the end date of this action, the following activities will be completed:**

- Two training workshops
- Creation of a national network of stakeholders

Up to day, no major problems are encountered in implementing this action. This action is in progress and it is envisaged that its objectives will be met.

**Since we are asking to postpone the end-date of the project until 31-08-2013, we would like to change also the end-date of this action from 31-12-2012 to 31-08-2013** (see annex 7.4 Project actions, provisioned and modified time table). **The extension of the end-date of this action would enable us to better disseminate the results of the project, to raise the public awareness and to expand the training of the stakeholders involved in the protection of the habitat.**

### **5.1.22 Action D.5: Production and dissemination of habitat protection and restoration guidelines**

The purpose of this action is to produce and disseminate protection and restoration guidelines at the end of the project to the various stakeholders involved in the conservation and management of this priority habitat throughout Greece. This action started on 01.07.2011 and is still in progress.

#### **The activities performed up to the submission of this mid-term report include:**

Exchange of data and state of the art on the protection and restoration of the habitat 2250\* between the beneficiaries of the project

#### **It is envisaged that by the end date of this action, the following activities will be completed:**

- Production and distribution of habitat protection and restoration guidelines

Up to day, no major problems are encountered in implementing this action. This action is in progress and it is envisaged that its objectives will be met.

**The produced guidelines will be used in the training activities (Action D4). For this reason no postponement of this action is required and will be completed by its foreseen end-date 31-12-2012** (see annex 7.4 Project actions, provisioned and modified time table).

### **5.1.23 Action D.6: Dissemination of findings to the scientific community and Layman's report**

The purpose of this action is to disseminate the findings of the project to the international scientific community. This action started on 01.01.2011 and is still in progress.

#### **The activities performed up to the submission of this mid-term report include:**

- Preparation of a scientific publication entitled: "Vegetation diversity and dynamics of coastal dunes with *Juniperus* spp. in Crete, Gavdos and Chrysi". This manuscript is in its final stage and it will be submitted to the journal of "Plant Ecology and Diversity" on February 2012 (see abstract of this manuscript in annex 7.2 of this report).
- The associated beneficiary NKUA presented a poster entitled: "Population data analysis of *Juniperus macrocarpa* subpopulations in four sites at Crete towards the implementation of specialized conservation actions" at the 12th Congress of Hellenic Botanical Society that was held on September 2011 in Rethymno (see poster in annex 7.2 of this report).
- The associated beneficiary NKUA presented a poster in Greek entitled: "Σύνθεση και δομή των υποπληθυσμών του είδους *Juniperus macrocarpa* στην Κρήτη" at the 5th Panhellenic Congress of Ecology that was held on 07-10.10.2010 in Patras (see poster in annex 7.2 of this report).
- The Technical University of Crete (external assistant, action A.1) and MAICH presented a manuscript entitled: "Imaging Sand Dunes at Kedrodasos Coastal Area, Crete, Greece" at the 6<sup>th</sup> Congress of Balkan Geophysical Society – held on the 3<sup>rd</sup> to the 6<sup>th</sup> of October 2011 in Budapest, Hungary (see published manuscript in annex 7.2 of this report).

#### **It is envisaged that by the end date of this action, the following activities will be completed:**

- Publication of a series of scientific papers in peer reviewed journals
- Presentation of major findings in conferences and their proceedings
- Production of a Layman's report

Up to day, no major problems are encountered in implementing this action. This action is in progress and it is envisaged that its objectives will be met.

**Since we are asking to postpone the end-date of the project until 31-08-2013, we would like to change also the end-date of this action from 31-12-2012 to 31-08-2013** (see annex 7.4 Project actions, provisioned and modified time table).

#### **5.1.24 Action D.7: After-LIFE communication and conservation plans**

The purpose of this action is to develop and disseminate After-LIFE communication and conservation plans at the end of the project. This action has not started yet. It will start according to the schedule on the foreseen start-date of 01-07-2012 and it is envisaged that its objectives will be met.

**Since we are asking to postpone the end-date of the project until 31-08-2013, we would like to change also the end-date of this action from 31-12-2012 to 31-08-2013** (see annex 7.4 Project actions, provisioned and modified time table).

### **5.1.25 Action E.1: Project coordination and management**

The purpose of this action is to ensure effective project coordination and management enabling the achievement of the projects objectives according to the schedule and quality standards. This action started on 01.01.2009 and is still in progress.

#### **The activities performed up to the submission of this mid-term report include:**

- Translation of the proposal from English to Greek.
- Partnership agreement developed and signed.
- Kick-off meeting at MAICH premises on the 22<sup>nd</sup> of January 2009 (MAICH, NKUA and Forest Directorate of Chania).
- Meeting with Forest Directorate of Lasithi on the 18<sup>th</sup> of February 2009.
- Frequent contacts with associate beneficiaries and daily project meetings at MAICH.
- Preparation and organization of the second project meeting (11.03.2010),
- Production of the minutes of the second project meeting,
- Meetings with Forest Directorate of Lasithi (MAICH) on 02.07.2010 and with the NKUA on 12.07.2010,
- Field visits and on site discussions with the Forest Directorate of Chania (Kedrodasos, 07.07.2010, Falasarna, 13.07.2010 and Gavdos 27.09.2010)
- Completion/collection of the time sheets and the monitoring of the project finances through the project cost centre
- Visit by Ms. Hlektra Remoundou (MAICH) to the Forest Directorate of Rhodes Island in the South Aegean on the 13<sup>th</sup> of January 2011 in order to inform various stakeholders in the area about the progress of the project. Moreover, on the 14<sup>th</sup> of January, Ms. Remoundou conducted a field visit to the habitat 2250\* in Rhodes together with members of the Forest Directorate of Rhodes.
- Meeting between the coordinating beneficiary and representatives of the municipality of Gavdos took place at the premises of MAICH on the 1<sup>st</sup> of April 2011 and on the 15<sup>th</sup> of December 2011 in order to discuss the progress of the project and specific concrete conservation actions that will be implemented on the 3 sites (Sarakiniko, Agios Ioannis and Lavrakas) of Gavdos.
- Meeting between the coordinating beneficiary and the Forest Directorate of Lasithi took place in Agios Nikolaos on the 4<sup>th</sup> of May 2011 in order to discuss and schedule the implementation of the concrete conservation actions in Chrysi.

Moreover, the external monitoring team of the project represented by Ms. Georgia Valaoras conducted its annual monitoring missions on the 3<sup>rd</sup> of July 2009 (Gavdos), on the 28<sup>th</sup> of January 2010 (Falasarna) and on the 31 of May 2011 (Chrysi).

Additionally, the inception report (submitted on 30.09.2009), the progress report (submitted 31.01.2011) and the mid-term report of the project with its annexes (current document) and the financial report with the second payment request have been prepared and submitted to the LIFE Unit in Brussels.

Finally, the project manager and the coordination team of MAICH are in continuous communication with the associated beneficiaries, the external consultants and local stakeholders of the project in order to ensure the appropriate evolution of the project and the achievement of the deliverables and results on time as required by the common provisions. Regular email communications and consultations with scientific committee members has been taking place through this reporting period.

#### **The envisaged progress until the next report would include:**

- Continuous follow up of proposed actions schedule, scheduling of meetings etc, thus ensuring the achievement of the entire projects objectives

- Preparation and organization of the final project meeting
- Write up and submission of the final technical and financial reports

Up to day, no major problems are encountered in implementing this action. However, during this reporting period, three major problems were encountered in implementing five concrete conservation actions (C1, C2, C5, C6 and C7) which caused serious delay in the progress of the project in general. These problems were solved (see paragraph 3.3, point 1 point 2 and point 3 “problems encountered” of this report). This action is in progress and it is envisaged that its objectives will be met.

**Due to the above mentioned major problems and the delays encountered, we require a postponement of the end-date of this action from 31-12-2012 to 31-08-2013** (see annex 7.4 Project actions, provisioned and modified time table).



### **5.1.26 Action E.2: Monitoring and evaluation of the effectiveness of the project**

The purpose of this action is to monitor, to measure and to document the effectiveness of the concrete conservation and dissemination actions implemented through this project. This action started on 01.01.2009 and is still in progress.

#### **The activities performed up to the submission of this mid-term report include:**

- State of the art on monitoring and evaluation of effectiveness and the preparation of monitoring actions based on defined indicators of A.7.

#### **It is envisaged that by the end date of this action, the following activities will be completed:**

- Initiation of monitoring actions based on defined indicators of A.7 in order to evaluate the effectiveness of the concrete conservation and dissemination actions
- Onsite implementation of the monitoring actions
- Write up and submission of a monitoring report on the effectiveness evaluation of the concrete conservation and dissemination actions

Up to day, no major problems are encountered in implementing this action. However, during this reporting period, three major problems were encountered in implementing five concrete conservation actions (C1, C2, C5, C6 and C7) which caused serious delay in initiating the monitoring of their effectiveness and in the progress of the project in general. These problems were solved (see paragraph 3.3, point 1 point 2 and point 3 “problems encountered” of this report). This action is in progress and it is envisaged that its objectives will be met.

**Due to the above mentioned major problems and the delays encountered, we require a postponement of the end-date of this action from 31-12-2012 to 31-08-2013** (see annex 7.4 Project actions, provisioned and modified time table).

### **5.1.27 Action E.3: Scientific Committee**

The purpose of this action is to establish a scientific committee which will advise and evaluate the scientific quality of the work undertaken for this project. This action started on 01.02.2009 and is still in progress.

#### **The activities performed up to the submission of this mid-term report include:**

- Preparation and organization of the first scientific committee meeting held on 26<sup>th</sup> of February 2009 in MAICH
- Field visit to Kedrodasos-Elafonisi on the 27<sup>th</sup> of February 2009.
- Minutes of the 1st scientific committee meeting have been produced (see annex 7.3 of the inception report submitted on the 30.09.2009)
- Preparation and organization of the second scientific committee meeting held on the 21<sup>st</sup> of October 2010 in MAICH (see annex 7.4 of the progress report submitted on the 31.01.2011)
- Regular informal communication with committee members, for consultation on various scientific issues

The third scientific committee meeting did not take place in 2011 due to the delays in the on-site implementation of some concrete conservation actions. The third scientific committee meeting will be organized during summer 2012.

#### **The envisaged progress until the next report would include:**

- Organization and the execution of the third and the final (fourth) scientific committee meetings

Up to day, no major problems are encountered in implementing this action. This action is in progress and it is envisaged that its objectives will be met.

**Due to the above mentioned major problems and the delays encountered, we require a postponement of the end-date of this action from 01-07-2012 to 31-05-2013** (see annex 7.4 Project actions, provisioned and modified time table).

#### **5.1.28 Action E.4: Networking with other similar LIFE projects**

The purpose of this action is to establish networks with other relevant Life Projects. This action started on 01.01.2010 and is still in progress.

##### **The activities performed up to the submission of this mid-term report include:**

- Official contacts with a number of similar LIFE projects (PROVIDUNE, ITALY LIFE07NAT/IT/000519 see annex 7.4 of the progress report submitted on 31.01.2011)
- Exchange of know-how and dissemination materials with similar Spanish LIFE projects on coastal dunes with *Juniperus* spp. (DUNA [www.lifeduna.com](http://www.lifeduna.com), ENEBRO [www.lifeenebro.com](http://www.lifeenebro.com))

##### **It is envisaged that by the end date of this action, the following activities will be completed:**

- Set up and implement series of activities with PROVIDUNE (exchange of visits, meetings, workshop, seminar, etc...) to pull together information and experiences on coastal dunes with *Juniperus* spp. habitat restoration in Europe.
- Lessons learnt from previous experiences in Europe

Up to day, no major problems are encountered in implementing this action. This action is in progress and it is envisaged that its objectives will be met.

**No postponement of this action is required and will be completed by its foreseen end-date 31-12-2012** (see annex 7.4 Project actions, provisioned and modified time table).

### **5.1.29 Action E.5: Stakeholder Committee**

The purpose of this action is to establish a stakeholder committee which will assist the project by providing the necessary support and commitment as well as information to overcome external, political, administrative, and management issues that may arise. This action started on 01.02.2009 and is still in progress.

#### **The activities performed up to the submission of this mid-term report include:**

- Preparation and organization of the first stakeholder committee meeting held on the 25<sup>th</sup> of February 2009 in MAICH (see annex 7.3 of the inception report submitted on the 30.09.2009)
- Establishment of the stakeholder committee.
- Preparation and organization of the 2<sup>nd</sup> stakeholder committee meeting held on the 22<sup>nd</sup> of October 2010 at MAICH (see annex 7.4 of the progress report submitted on the 31.01.2011)
- Regular informal discussions with committee members
- Regular informal communications with various stakeholders on issues related to the onsite implementation of various concrete conservation actions.

The third stakeholder committee meeting did not take place in 2011 due to the delays in the on-site implementation of some concrete conservation actions. The third meeting will be organized during summer 2012 in parallel with the third scientific committee meeting.

#### **The envisaged progress until the next report would include:**

- Organization and the execution of the third and the final (fourth) stakeholder committee meetings

Up to day, no major problems are encountered in implementing this action. This action is in progress and it is envisaged that its objectives will be met.

**Due to the above mentioned major problems and the delays encountered, we require a postponement of the end-date of this action from 01-07-2012 to 31-05-2013** (see annex 7.4 Project actions, provisioned and modified time table).

### **5.1.30 Action E.6: External auditing**

This action has not started yet.

In the progress report submitted on the 31-1-2011 we have mentioned that two financial external audits will take place. The first one should have been in conjunction with the mid-term report and the second one with the final report. The expenses of the first financial audit in conjunction with the mid-term report would be covered by MAICH whereas the expenses of the second and final financial audit in conjunction with the final report of the project will be covered by action E6 “External auditing”.

However, due to the liquidity problem that MAICH faced during 2011 (see point 3 paragraph 3 “problems encountered”) MAICH was not able to proceed with the financial auditing at the level of mid-term report and will execute one and final financial auditing at the level of the final report.

**We require a postponement of the end-date of this action from 31-12-2012 to 31-08-2013** (see annex 7.4 Project actions, provisioned and modified time table).

The name and the contact details of the auditing company are:

#### **HBP CERTIFIED PUBLIC ACCOUNTANTS LTD**

81 Ifigenias & Velikopoulou

N. Ionia

GR 142 31

Athens, Greece

Tel.: 0030 210 2776496

Fax: 0030 210 2774923

E-mail: [info@e-hbp.gr](mailto:info@e-hbp.gr)

<http://www.e-hbp.gr>

DELIVERABLE PRODUCTS OF THE PROJECT

Name of the Deliverable	Action	Foreseen Deadline (Progress report)	Modified deadline	Deliverable Status
Report on community surveys and stakeholder consultation	A6	30-9-2009	-	Completed
Effectiveness evaluation report on stakeholders consultation methods	A6	30-9-2009	-	Completed
Report on Governance structure	A9	31-3-2010	-	Completed
Report on habitat legal status	A9	31-3-2010	-	Completed
Report on landforms, structures and processes of the dune systems	A1	31-6-2010	-	Completed
Geomorphological maps	A1	31-6-2010	-	Completed
Report on plant associations, community types, composition and structure of the dune systems	A2	31-6-2010	-	Completed
Maps of specific areas within the habitats in need of restoration	A2	31-6-2010	-	Completed
Report on population size, age-size structure and sex ratios of the <i>Juniperus</i> populations	A3	31-6-2010	-	Completed
Habitat maps	A4	31-3-2010	-	Completed
Report on visitor impact assessment	A5	31-6-2010	-	Completed
Maps illustrating the location of visitor management concrete actions	A5	31-6-2010	-	Completed
A compendium monitoring protocols to evaluate effectiveness of concrete conservation actions	A7	30-7-2010	-	Completed
Monitoring protocols to evaluate the effectiveness of public awareness actions	A7	30-7-2010	-	Completed
Working manuals on specific protection and restoration specifications	A8	30-7-2010	-	Completed
Progress report on <i>Ex situ</i> conservation	C8	31-12-2010	-	Completed
Awareness raising materials (leaflets, posters, notice boards), T-shirts and video	D1	31-12-2010	-	Completed
Interim Report on juniper regeneration and enhancement	C3	31-3-2011	-	Completed
Interim Report on protection and enhancement of keystone species (including juniper male/female balancing)	C4	31-3-2011	-	Completed
Final report on juniper regeneration and enhancement	C3	30-6-2012	30-6-2013	Not Started
Final report on protection and	C4	30-6-2012	30-6-2013	Not Started

Name of the Deliverable	Action	Foreseen Deadline (Progress report)	Modified deadline	Deliverable Status
enhancement of keystone species (including juniper male/female balancing)				
Final report on <i>Ex situ</i> conservation	C8	31-12-2012	30-4-2013	Not Started
Report on Communication strategy	D1	31-12-2012	31-8-2013	Not Started
Habitat protection and restoration guidelines	D5	31-12-2012	31-12-2012	Not Started
Report on dissemination of findings	D6	31-12-2012	31-8-2013	Not Started
Layman's report	D6	31-12-2012	31-8-2013	Not Started
After-Life communication plan	D7	31-12-2012	31-8-2013	Not Started
After-Life conservation plan	D7	31-12-2012	31-8-2013	Not Started
Monitoring report presenting effectiveness evaluation results of concrete conservation actions	E2	31-12-2012	31-8-2013	Not Started
Monitoring report presenting effectiveness evaluation results of dissemination actions	E2	31-12-2012	31-8-2013	Not Started
Report on Networking with other similar LIFE projects	E4	31-12-2012	31-12-2012	Not Started
Report on the success and failures of previous experiences in Europe	E4	31-12-2012	31-12-2012	Not Started

## MILESTONES OF THE PROJECT

Name of the Milestone	Action	Foreseen Deadline (Progress report)	Modified deadline	Milestone Status
Project website activation	D2	31-3-2009	-	Completed
Establishment of the scientific committee	E3	31-3-2009	-	Completed
Establishment of the stakeholders committee	E5	31-3-2009	-	Completed
Installation of directional and information signs	C7	30-06-2011	31-12-2012	Not Started
Habitats demarcation	C1	31-3-2012	31-12-2012	In Progress
Habitats clean from solid waste	C2	31-3-2012	31-12-2012	In Progress
Protection of natural, juniper seedling regeneration and population enrichment with additional seedlings	C3	30-6-2012	30-6-2013	In Progress
Establishment of seedlings/saplings of keystone species (including juniper saplings, balancing male/female ratio)	C4	30-6-2012	30-6-2013	In Progress
Sand stabilization and sand fixation in previously erosive areas.	C5	30-6-2012	30-4-2013	Not Started
Installation and designation of board walks, parking areas, rubbish bins	C6	30-6-2012	30-4-2013	Not Started
Storage and cultivation of seed-lots and cuttings	C8	31-12-2012	30-4-2013	In Progress
Educational workshops, students week, local events and networks	D3	31-12-2012	30-8-2013	In Progress
Training workshops	D4	31-12-2012	30-8-2013	Not Started
Network of stakeholders	D4	31-12-2012	30-8-2013	Not Started

### 5.2 Envisaged progress until next report

Since the delay between this Mid-term report and the final report exceeds 18 months (Common Provisions, article 12.1) the next progress report is scheduled to be submitted on the 31-12-2012. By then it is envisaged that the concrete conservation C1, C2 and C7 will be completed. The actions C3, C4, C5, C6, and C8 will be well in progress. Actions D1, D2 D3, D4, D5, D6 and D7 will continue their implementation according to schedule.

So far E actions have been carried out according to schedule achieving milestones of Actions E3 and E5. Actions E1, E2, E3, E4 and E5 will continue their implementation according to schedule.

The final report is scheduled to be submitted within three months after the modified- end-date of the project (31-08-2013).





### **5.3 Impact**

So far, only the preparatory actions have been completed. All concrete conservation and dissemination actions are still in progress. The impact so far of JUNICOAST on the 2250\* habitat is mostly related to the preparatory actions and partially related to the dissemination actions. This positive impact can be summarized as follow:

- Consolidation and dissemination of a knowledge base for the protection, restoration, monitoring and evaluation of coastal dune with *Juniperus* spp. habitats in Greece (results of all completed and disseminated preparatory actions),
- Raising public awareness/capacity building and long term support for the project in Crete and the South Aegean (results of various dissemination actions)

The concrete conservation actions and their respective milestones will also have a positive impact on the 2250\* habitat and its conservation status will be improved through:

- Demarcation of the habitats
- Enhanced regeneration of the *Juniperus* species in all Cretan habitats
- *In situ* and *ex situ* conservation of *Juniperus* and habitat keystone species
- Primary/front dune zone restoration
- Minimization of threats and negative impacts on all habitats

#### **Indirect impacts:**

### **5.4 Outside LIFE**

This section will be filled in at the final report stage. It will be related to activities which have not been paid by the project, such as networking with other initiatives, advances in the conservation scene in general, and/or meetings/events organized by all beneficiaries or stakeholders in Crete, South Aegean (Greece) or elsewhere.

## 6 Financial review by actions

Action number and name	Foreseen costs (A)	Modified costs (B)	Spent so far (C)	Remaining (B-C)	Projected final cost
A1-Landform and land degradation processes in dune systems	51000	50100	50129	-29	50100
A2-Dune system plant communities composition and structure	55000	48200	48255	-55	48200
A3-Composition and structure of Juniperus population	42000	41000	40607	393	41000
A4-Habitat Mapping	64000	57000	50528	6472	57000
A5-Visitor Impact Assessment	39000	40700	40534	166	40700
A6-Stakeholder consultation	32000	24000	24092	-92	24000
A7-Elaboration of long term monitoring protocols and selection of indicators	39000	20000	20000	0	20000
A8-Elaboration of target habitat protection and restoration specifications	24000	22000	15107	6893	22000
A9-Determination of governance structure and legal status	12000	12000	11609	391	12000
C1-On site habitat demarcation	85000	89500	19422	70078	89500
C2-Waste removal	62000	48000	9024	38976	48000
C3-Enhancement of juniper regeneration	45000	48000	17318	30682	48000
C4-Restoration of the floristic composition and structure of the target habitat 2250*	50000	50000	14220	35780	50000
C5-Fore dune stabilisation through vegetation restoration	58000	51000	11029	39971	51000
C6-Visitor management intervention and infrastructure	93000	109500	14141	95359	109500
C7-Design and installation of signs	54000	68400	20324	48076	68400
C8-Ex situ conservation and propagation of keystone species	70000	70900	43996	26904	70900
D1-Development and implementation of a communications strategy.	59000	74700	23010	51690	74700
D2-Website development	35000	35500	27583	7917	35500
D3-Environmental education campaign	67000	62000	13044	48956	62000
D4-Training for habitat protection and restoration	40000	50000	0	50000	50000
D5-Production and dissemination of habitat protection and restoration guidelines	20000	20000	0	20000	20000
D6-Dissemination of findings to the scientific community and Layman's report	36000	36000	0	36000	36000

<b>Action number and name</b>	<b>Foreseen costs (A)</b>	<b>Modified costs (B)</b>	<b>Spent so far (C)</b>	<b>Remaining (B-C)</b>	<b>Projected final cost</b>
D7-After-LIFE communication and conservation plans	0	0	0	0	0
E1-Project coordination and management	156000	158000	97005	60995	158000
E2-Monitoring and evaluation of the effectiveness of the project	60000	53000	17000	36000	53000
E3-Scientific Committee	30000	32000	12252	19748	32000
E4-Networking with other similar LIFE projects	10000	16500	2500	14000	16500
E5-Stakeholder Committee	5000	5000	2500	2500	5000
E6-External auditing	10000	10000	0	10000	10000
<b>TOTAL</b>	<b>1403000</b>	<b>1403000</b>	<b>645228</b>	<b>757772</b>	<b>1403000</b>

## 7 Annexes

### Annex 7.1 Deliverables

List of Deliverables submitted with this mid-term report in separate documents:

- D-C.3.1 Interim report on juniper regeneration and enhancement (In Greek with executive summary in English)
- D-C.4.1 Interim report on protection and enhancement of keystone species (including juniper male/female balancing) (In Greek with executive summary in English)
- Action D3 Educational booklet on coastal dunes with *Juniperus* spp.

## Annex 7.2 Dissemination materials

**Published activities** (01.01.2009 - 30.09.2009, for detailed breakdown of these published activities see annex 7.3 of the inception report submitted on 30.09.2009)

No	Subject	Source	Type of Media	Date of publication
1	Press release- Kick-off meeting	Anatoli	Local Newspaper	21-01-09
2	Press release -Kick-off meeting	Haniotika nea	Local Newspaper	21-01-09
3	Press release -Kick-off meeting	Kirykas	Local Newspaper	23-01-09
4	Project description	Haniotika nea	Local Newspaper	23-01-09
5	Project description	Aera.gr (html)	e-magazine	23-01-09
6	Project description	Anatoli	Local Newspaper	29-01-09
7	Invitation to Stakeholder meeting	Ecocrete (html)	e-magazine	13-02-09
8	Press release Stakeholder meeting	Ecocrete (html)	e-magazine	24-02-09
9	Press release Stakeholder meeting	Haniotika nea	Local Newspaper	24-02-09
10	Press release Stakeholder meeting	Kirykas	Local Newspaper	24-02-09
11	Press release Stakeholder meeting	Haniotika nea	Local Newspaper	25-02-09
12	Stakeholder meeting- news bulletin	Nea Tileorasi	Local TV	25-02-09
13	Stakeholder meeting	Haniotika nea	Local Newspaper	26-02-09
14	Natura 2000	Nea Tileorasi “Antirriseis”	Local TV	26-02-09
15	Stakeholder meeting	Anatoli	Local Newspaper	28-02-09
16	Press release Scientific committee meeting	Haniotika nea	Local Newspaper	06-03-09
17	Project description – Chrysi	Anatoli	Local Newspaper	06-04-09
18	Project description - Chrysi	NET “Menoume Ellada”	National TV	05-07-09

**Published activities** (01.10.2009 - 31.12.2010, for detailed breakdown of these published activities see annex 7.2 of the progress report submitted on 31.01.2011)

<b>No</b>	<b>Subject</b>	<b>Source</b>	<b>Type of Media</b>	<b>Date of publication</b>	<b>Means of distribution</b>	<b>Printed</b>	<b>Target audience</b>
1	Press release- Student week	Haniotika nea	Local Newspaper	11.05.2010	kiosk/ subscription	Daily	General public
2	Press release- Student week	Kirykas	Local Newspaper	11.05.2010	kiosk/ subscription	Daily	General public
3	Project article	Haniotika nea	Local Newspaper	06.08.2010	kiosk/ subscription	Daily	General public
4	Project article/Press release 2 <sup>nd</sup> Scientific and 2 <sup>nd</sup> Stakeholders meetings	Haniotika nea	Local Newspaper	16.10.2010	kiosk/ Subscription	Daily	General public
5	Project article/Press release 2 <sup>nd</sup> Scientific and 2 <sup>nd</sup> Stakeholders meetings	Haniotika nea	Local Newspaper	20.10.2010	kiosk/ Subscription	Daily	General public
6	Project article	Haniotika nea	Local Newspaper	22.10.2010	kiosk/ Subscription	Daily	General public
7	Project article	Elefthero typia	National Newspaper	23.10.2010	kiosk/ Subscription	Daily	General public
8	Workshop press release	Haniotika nea	Local Newspaper	11.12.2010	kiosk/ Subscription	Daily	General public
9	Project article	Haniotika nea	Local Newspaper	15.12.2010	kiosk/ subscription	Daily	General public

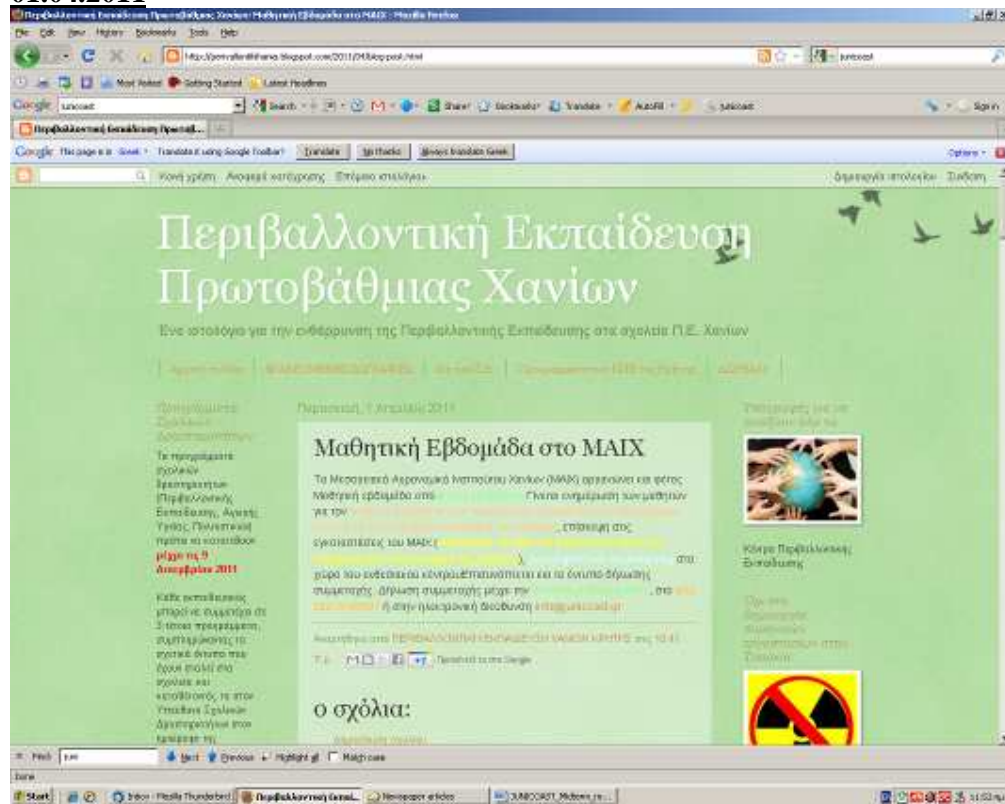
**Published activities** (01.01.2011 – 31.12.2011, for detailed breakdown of these published activities see below)

No	Subject	Source	Type of Media	Date of publication	Means of distribution	Printed	Target audience
1	Press release- Student week	Internet ( <a href="http://perivallontikihania.blogspot.com">http://perivallontikihania.blogspot.com</a> )	Internet	01.04.2011	Internet		General public
2	Information article/ <i>Juniperus</i> forests in Crete	Internet ( <a href="http://cretanbeaches.com">cretanbeaches.com</a> )	Internet	18.04.2011	Internet		General public
3	Press release- environmental education workshop on “Coastal dunes with <i>Juniperus</i> spp.”	IerapetraLive.com	Internet	19.04.2011	Internet		General public
4	Information article/ <i>Juniperus</i> forests in Naxos	Internet blog (Naxos fan)	Internet	25.04.2011	Internet		General public
5	Press release- presentation of the project in summer camp in Akrotiri-Chania	Haniotika Nea	Local Newspaper	06.07.2011	kiosk/ subscription	Daily	General public
6	Press release- invitation to beach cleaning	Internet blog (naxos 365)	Internet	05.10.2011	Internet		General public
7	Press release- local event in the South Aegean on the island of Naxos	Internet blog (naxos 365)	Internet	09.10.2011	Internet		General public
8	Project short presentation on YOUTUBE	Junicoast coordination team	Internet	26.10.2011	Internet		General public
9	Information article/ <i>Juniperus</i> forest in Crete	Internet <a href="http://crete.decouverte.free.fr/EchosCreteenvironment.html">http://crete.decouverte.free.fr/EchosCreteenvironment.html</a>	Internet	18.12.2011	Internet		General public



## Detailed breakdown of published activities, 01.01.2011 – 31.12.2011

### 1 Press release- Student week, Internet (http://perivallontikihania.blogspot.com), 01.04.2011



### 2 Information article/ Juniperus forest in Crete, cretanbeaches.com, 19.04.2011



### 3 Press release- environmental education workshop on “Coastal dunes with *Juniperus spp.*”, IerapetraLive.com, 19.04.2011



### 4 Information article/ *Juniperus* forest in Naxos, Naxos fan blogspot, 25.04.2011



**5 Press release- presentation of the project in summer camp in Akrotiri-Chania, Haniotika nea newspaper, 06.07.2011**

-ΧΑΝΙΟΤΙΚΑ ΝΕΑ-, Τετάρτη 6 Ιουλίου 2011 25

## Ειδήσεις

ΣΕ ΠΑΙΔΙΑ

# Ενημέρωση για τις αμμοθίνες με είδη κέδρων

**Για τις αμμοθίνες με είδη κέδρων στην Κρήτη ενημερώθηκαν παιδιά στο Χανιά!**

**Η** ενημέρωση έγινε από ημερήσιον στην παιδική εκπαιδευτικόν διαί ή Για Ελά, που διεξάγεται στον Σανατό Ακροτιρίου, οι συνεργασία με το Μεσογειακό Αγρονομικό Ινστιτούτο Χανίων (Μ.Α.Ι.Χ.).

Οι εκπαιδευτικόν ενημερώθηκαν για τη βιολογική κατάσταση της Κρήτης και της σπάνιας οικογένειά της κηρύσι. Τα παιδιά έδειξαν μεγάλο ενδιαφέρον και ενημερώθηκαν για τους σκοπούς των παρεχόμενων αμμοθινών με είδη κέδρων, τις παρεχόμενες πληροφορίες, για το πως απαιτούνται και για τους πρώτους παραστασιών αυτού τον παιδικό φυσικό ύψιστον.

Η ενημέρωση έγινε στο πλαίσιο της Περιβαλλοντικής Εκπαίδευσης των σχολείων της LIFE + κέντρον "Αγρονομία για την προστασία των παρεχόμενων αμμοθινών με είδη κέδρων στην Κρήτη και στο νότιο Αιγαίο (Ελλάδα)", το οποίο υλοποιείται υπό την αιγίδα του Μ.Α.Ι.Χ. Το πρόγραμμα συντονίζει το Μεσογειακό Αγρονομικό Ινστιτούτο Χανίων και συμμετέχουν το Εθνικό και Καποδιστριακό Πανεπιστήμιον Αθηνών και οι Διευθύνσεις Διαιτητικών και Αειθαλών και Αειθαλών.

Μετά το τέλος της παρεχόμενης διάσημης μελοζέουα τον παρεχόμενος και ενημερωτικόν φύλλοα στα παιδιά των ενημερωτικόν.



**6 Press release- invitation to beach cleaning, Naxos 365 blogspot, 05.10.2011**

naxos 365: ΚΥΡΙΑΚΗ 9/10 ΚΑΘΑΡΙΖΟΥΜΕ ΤΟ ΚΕΔΡΟΔΑΣΟΣ ΑΛΥΚΟΥ - naxos365.blogspot

http://naxos365.blogspot.com/2011/10/0910.html

Google naxos365

naxos 365: ΚΥΡΙΑΚΗ 9/10 ΚΑΘΑΡΙΖΟΥΜΕ...

Κύρια 365 - Άνετη επίσκεψη - Επισκεφτείτε μας

# naxos 365

naxos365@gmail.com

Αθήνα, Ελλάδα, Κόσμος, Νέος, Παράλιον, Πάλασος, Ψάχαγγια, Σοφο, Ναι...

Τετάρτη, 5 Οκτωβρίου 2011




Τι διαβάσατε περισσότερο τον τελευταίο μήνα



## ΚΥΡΙΑΚΗ 9/10 ΚΑΘΑΡΙΖΟΥΜΕ ΤΟ ΚΕΔΡΟΔΑΣΟΣ ΑΛΥΚΟΥ

Το πρωί στις 12, στην παραλία του Αγίου Γεωργίου, στο Αλικό, πίνουμε καφέ, παίρνουμε σακουλάτσες, γάντια και κάνουμε βόλτα-καθαριότητα!

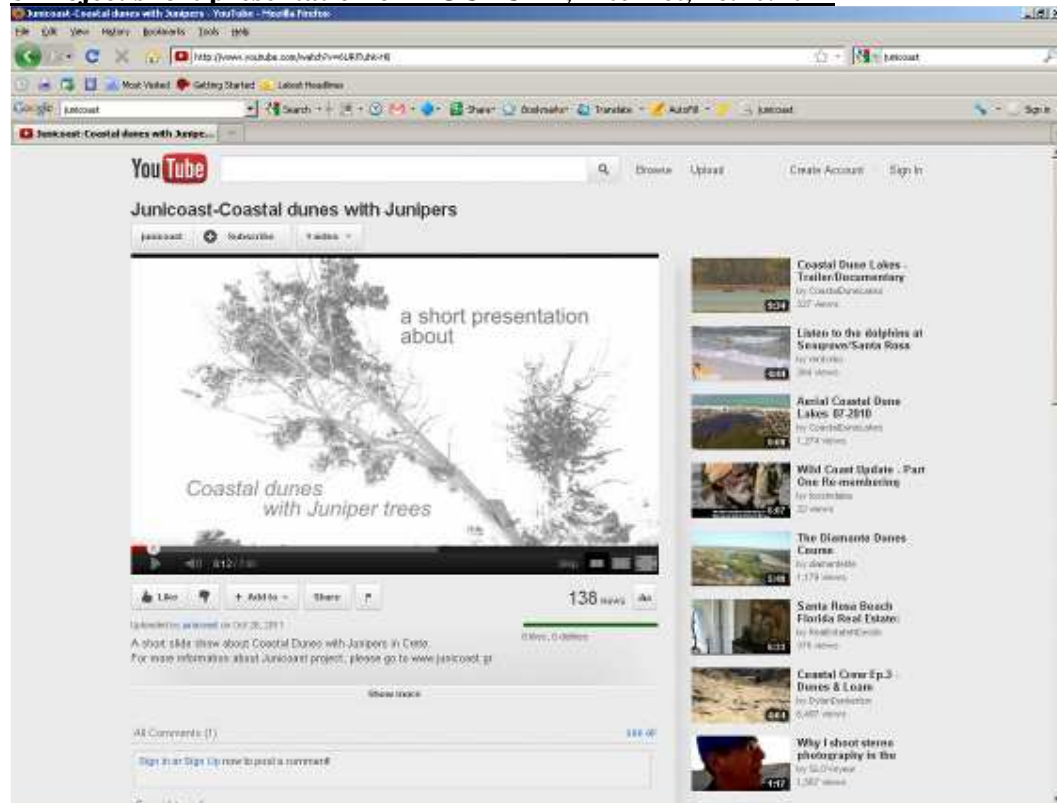
Σας προσκαλούμε για ένα διαφορετικό Κυριακάτικο μεσημέρι στο δάσος! Όλοι οι συμμετέχοντες θα πάρουν official μπλουζάκι της junicoast για την προστασία της φύσης!



## 7 Press release- local event in the South Aegean on the island of Naxos, Naxos 365 blogspot, 09.10.2011



## 8 Project short presentation on YOUTUBE, Internet, 26.10.2011



## 9 Information article/ *Juniperus* forest in Crete, <http://crete.decouverte.free.fr/EchosCreteenvironnement.html>, 18.12.2011



ENVIRONNEMENT / BOTANIQUE (περιβάλλον / βοτανική)  
La dégradation des habitats des "cèdres crétois" met en péril la survie de l'espèce sur l'île

Les "cèdres crétois", appellation commune découlant de mauvaises transcriptions ou interprétations, de leur nom générique (*Juniperus oxycedrus* subsp. *microcarpa* et *Juniperus phoenicea*) sont en danger. Le programme Junicoast dont l'objectif est de protéger et restaurer les habitats côtiers a bien été lancé début 2009 mais rien n'y fait : la lente dégradation se poursuit. La régénération naturelle devient insuffisante et la prévention ne suffit pas face aux différentes menaces (surpâturage, incendie, excès dus au tourisme ...).

Principaux accusés à Kadirkosas et Hrisi, les campeurs sauvages qui en toute illégalité trouvent au pied des arbres un emplacement bon marché mais qui détruisent irrémédiablement l'habitat, certains n'hésitant pas à couper des branches pour faire du feu et à laisser sur place leurs ordures. Devant de tels abus les écologistes et les différentes autorités semblent vouloir prendre les choses en main et sanctionner toutes les infractions à la législation.

Sources : Hannou-Mia ; Aera ; EcoCrete ; Junicoast depuis janvier 2009  
Pour en savoir plus sur les actions pour la protection du *Juniperus* et les sites Natura 2000 concernés, découvrez le [programme Junicoast](#) (terme grecque ou version anglaise)

*Juniperus oxycedrus* subsp. *microcarpa* à Elafonisi

**JUNICOAST T-shirts (produced in 2 colors: Sand and Green)**



## Dissemination of findings to the scientific community

### **Vegetation diversity and dynamics of coastal dunes with *Juniperus* spp. in Crete, Gavdos and Chrysi islands (Greece)**

This manuscript will be submitted to the scientific Journal of “Plant Ecology and Diversity” on February 2012.

#### **Abstract**

**Background:** Coastal dunes with *Juniperus* spp. have been included as a priority habitat in the European Union Habitats Directive (habitat code 2250\*) as an acknowledgement of its threatened status in Europe. Vegetation is by far one of the most important components of this habitat as it is directly involved in establishing the dune forms and creating the structure of the dune habitat.

**Aims:** The objective was to determine the composition, the structure and the ecological processes of the vegetation of the coastal dunes with *Juniperus* spp. in Southern Greece, mainly on the islands of Crete, Gavdos and Chrysi.

**Methods:** Vegetation data from seven study sites were classified using Two-Way Indicator Species Analysis (TWINSpan). The exploration of the major patterns of the vegetation data and their relation to environmental variables was made by linear (Principal Component Analysis-PCA) or unimodal (Detrended Correspondence Analysis-DCA, Canonical Correspondence Analysis-CCA) ordination techniques.

**Results:** The vegetation was made up of 142 plant species. Thirty three (33) families and six (6) different life forms were recorded with Poaceae (14%) and Compositae (13.4%) being the most widely represented. Therophytes were the dominant life form (56% of total species). Twenty three (23) plant communities and sub-communities were described in the different geomorphologic units.

**Key words:** coastal dunes, dune vegetation, geomorphologic units, Crete, Gavdos, Chrysi

**Ανάλυση πληθυσμιακών δεδομένων σε υποπληθυσμούς του είδους *Juniperus macrocarpa* σε τέσσερις περιοχές της Κρήτης προς την κατεύθυνση της εφαρμογής εξειδικευμένων δράσεων διατήρησης**

**Καλτσής Α., Κουτσοβούλου Κ. & Θάνος Κ.Α.**

Τομέας Βοτανικής, Τμήμα Βιολογίας, Εθνικό και Καποδιστριακό Πανεπιστήμιο Αθηνών, Πανεπιστημιόπολη, 15784 Αθήνα, [apkaltsis@biol.uoa.gr](mailto:apkaltsis@biol.uoa.gr)

Στο πλαίσιο του Ευρωπαϊκού Προγράμματος LIFE+ “JUNICOAST: Δράσεις για την διατήρηση των παράκτιων αμμοθινών με είδη *Juniperus* στην Κρήτη και στο Νότιο Αιγαίο” (2009-2012) υλοποιήθηκε η καταγραφή των πληθυσμιακών δεδομένων 7 υποπληθυσμών του είδους *Juniperus macrocarpa* στις τέσσερις περιοχές μελέτης του Προγράμματος (Χρυσή, Γαύδος, Κεδρόδασος, Φαλάσσαρνα). Η ανάλυση των δεδομένων εστιάστηκε στην αποτύπωση πληθυσμιακών παραμέτρων που επηρεάζουν την κατάσταση διατήρησης του οικοτόπου ‘2250\*, παράκτιες αμμοθίνες με είδη αρκεύθων’ (οικότοπος προτεραιότητας σύμφωνα με την Οδηγία 92/43/ΕΟΚ), δηλαδή την αναλογία φύλου, την αναγέννηση του είδους και τα προβλήματα ανταγωνισμού από άλλα είδη. Προέκυψε η ανάγκη υλοποίησης σειράς εξειδικευμένων διαχειριστικών δράσεων όπως:

- φυτεύσεις θηλυκών ατόμων προερχόμενων από μοσχεύματα σε θέσεις όπου η αναλογία φύλου αποκλίνει σημαντικά από το λόγο 1:1,
- εγκατάσταση περιφράξεων και φυτεύσεις νεαρών ατόμων (1-2 ετών) σε θέσεις με χαμηλή αναγέννηση (μικρή αναλογία νεαρών προς ενήλικα άτομα),
- απομάκρυνση ξενικών ειδών και δράσεις ήπιου ελέγχου της εξάπλωσης της τραχείας πεύκης (*Pinus brutia*) όπου κρίνεται αναγκαίο.

**Population data analysis in *Juniperus macrocarpa* subpopulations at four sites in Crete towards the implementation of specialized conservation actions**

**Kaltsis A., Koutsovoulou K. and Thanos C.A.**

Department of Botany, Faculty of Biology, National & Kapodistrian University of Athens, Panepistimiopolis, 15784 Athens, [apkaltsis@biol.uoa.gr](mailto:apkaltsis@biol.uoa.gr)

In the framework of the implementation of the European LIFE+ project “JUNICOAST: Actions for the conservation of coastal dunes with *Juniperus* spp. in Crete and the South Aegean” (2009-2012) a thorough survey to record population data from seven *Juniperus macrocarpa* subpopulations at the four target-sites of the project (Chrysi, Gavdos, Elafonisi, Falasarna) has been undertaken. Further analysis of these data focused on the designation of the population parameters affecting the conservation status of the target-habitat ‘2250\*, Coastal dunes with *Juniperus* spp.’ (priority habitat according to Directive 92/43/EEC), i.e. the subpopulation sex ratio, the regeneration of the species and the competition with invasive plants. To address these problems, specific conservation actions have been decided (currently under implementation), such as:

- Planting of female individuals, grown from cuttings, on sites where sex ratio is significantly different than 1:1,
- Fencing and planting of juvenile plants (1-2 yrs old) on sites where regeneration is poor (low ratio of juvenile/mature plants)
- Eradication of alien plant species and mild control of *Pinus brutia* invasion where needed.





## Ανάλυση πληθυσμιακών δεδομένων σε υποπληθυσμούς του είδους *Juniperus pseudosabina* σε τέσσερις περιοχές της Κρήτης προς την κατεύθυνση της εφαρμογής εξειδικευμένων δράσεων διατήρησης



Καλιός Α., Κουτσοβούλου Κ. & Θάνος Κ.Α.

Τομέας Βοτανικής, Τμήμα Βιολογίας, Εθνικό και Καποδιστριακό Πανεπιστήμιο Αθηνών, Πανεπιστημιόπολη, 15704, Αθήνα, [kcalios@bio.uoa.gr](mailto:kcalios@bio.uoa.gr)

Οι παρακτικές αμοιότητες με είδη αρκτικού (2250° C) σε ένα δάσος με *Juniperus* spp.) αποτελούν οικότοπο προτεραιότητας σύμφωνα με την Οδηγία των Οικότοπων (Οδηγία 92/43/ΕΟΚ). Στο πλαίσιο του Προγράμματος LIFE+ "JUNICOAST: Δράσεις για την διατήρηση των παρακτικών αμοιότητων με είδη *Juniperus* στην Κρήτη και στο Νότιο Αιγαίο" (2009-2012) πραγματοποιήθηκε εργασία καταγραφής της σύνθεσης και δομής των υποπληθυσμών *J. pseudosabina* στις 4 περιοχές (7 θέσεις) που εμφανίζεται ο οικότοπος 2250° στην Κρήτη. Από την εργασία αυτή εκτιμήθηκε ο συνολικός αριθμός ατόμων κάθε υποπληθυσμού και η πυκνότητα ανά θέση μελέτης, η αναλογία φύλου, ο βαθμός αναγέννησης κ.α. Με την επεξεργασία των αποτελεσμάτων προέκυψαν εξειδικευμένες διαχειριστικές δράσεις για κάθε θέση μελέτης με στόχο την μεσο- και μακροπρόθεσμα βελτίωση της κατάστασης διατήρησης του οικότοπου.

Θέση μελέτης	Επιτολική έκταση (ha)	Επιτολικός αριθμός ατόμων (ατομ.)	Επιτολική πυκνότητα (άτομα/ha)
Χρυσή Α	37,3	4400-4800	123,76
Χρυσή Β	52,3	2700-3000	55,35
Σαμακέτιο	16,5	1200-1400	79,3
Δε. Ιαδίνης	22,5	940-1000	42,9
Λαυρακάς	99,8	14500-14800	145,95
Κεφρόδαοι	11,5	770	67,65
Φαλόδαοι	2,4	179	68,85
ΣΥΝΟΛΟ	241,1	24000-26000	104,15

ΦΑΛΟΔΑΟΙ - GR4340001

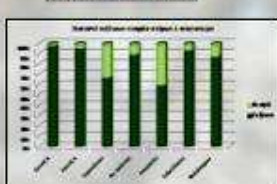


ΕΛΑΦΟΝΗΙ (ΚΕΦΡΟΔΑΟΣ) - GR4340015



ΧΡΥΣΗ - GR4320003

ΓΑΥΔΟΣ - GR4340013



Μεταφύτευση αρθρολαστών (Αυ. Ιαδίνης)



Περιφράξη νεαρών Κεφροδ. (Κεφρόδαοι)

### Κύριες διαχειριστικές δράσεις

1. Σε δύο από τις περιοχές μελέτης (Χρυσή Α και Χρυσή Β) καταγράφηκε σημαντική απόκλιση από την οικολογικά σταθερή σχέση 1:1 στην αναλογία φύλου (τα αρσενικά άτομα είναι περισσότερα). Στις δύο περιοχές αυτές και κυρίως στη Χρυσή Α κρίθηκε αναγκαία η φυτεύση θηλυκών ατόμων προερχόμενα από μοσχεύματα που ληφθήκαν από τις δύο αυτές περιοχές. Τα μοσχεύματα αναπτύσσονται για πάνω από ένα χρόνο σε βελτιότερες συνθήκες σε φυτώριο και θα επαναφτεφθούν με την έναρξη των φαινομενικών βροχών (λήξη της ξηρής περιόδου).
2. Ο χαμηλός βαθμός αναγέννησης του είδους στις περισσότερες περιοχές μελέτης φαίνεται να οφείλεται μεταξύ άλλων, και στη δυσκολία εγκατάστασης των αρθρολαστών, αλλά και στη βόσκηση. Για την αύξηση του βαθμού αναγέννησης, αρθρολάσται από τις περιοχές μελέτης μεταφτεφθήκαν για να αναπτυχθούν υπό βελτιότερες συνθήκες σε φυτώριο και στη συνέχεια να επαναφτεφθούν μετά την πάροδο ενός και δύο ετών. Σε περιοχές με έντονη βόσκηση, επίσης (π.χ. Κεφρόδαοι), τοποθετήθηκαν περιφράξεις γύρω από νεαρά άτομα Κεφροδ.
3. Στο πλαίσιο της αποκατάστασης της χλωρίδικης σύνθεσης του οικότοπου πραγματοποιείται εδαφική γενίκων ειδών, αλλά και ήπιος έλεγχος της εδάφωσης της τραχείας πέτρας εντός του οικότοπου 2250°, με την απομάκρυνση νεαρών τεύκων και κλειστών κωνών από ήδη εγκατεστημένα άτομα.



ΧΡΥΣΗ Α



ΛΑΥΡΑΚΑΣ



Εκφύτευση νεαρών τεύκων που καταλαμβάνουν κρήνες ακοθόσεις εντός των αμοιότητων (Χρυσή)



Εδαφική γενίκων ειδών (*Caryobrotus edulis*) (Χρυσή)

## Σύνθεση και δομή των υποπληθυσμών του είδους *Juniperus macrocarpa* στην Κρήτη

**Αποστόλης Καλτσής, Κατερίνα Κουτσοβούλου, Ευαγγελία Σκούρη & Κώστας Α. Θάνος**

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Οι παράκτιες αμμοθίνες με είδη αρκεύθων (2250\* Coastal dunes with *Juniperus* spp.) αποτελούν οικότοπο προτεραιότητας σύμφωνα με την Οδηγία των Οικοτόπων (Οδηγία 92/43/ΕΟΚ). Στο νότιο Αιγαίο και την Κρήτη ο οικότοπος έχει χαρτογραφηθεί σε 8 περιοχές. Η σπανιότητα και σποραδικότητα της εμφάνισής του καθώς και η αυξημένη πίεση που δέχεται από την τουριστική ανάπτυξη (αλλά εν μέρει και από τη βόσκηση) καθιστούν αναγκαίες την επισταμένη μελέτη της δομής του οικοτόπου και τη λήψη διαχειριστικών μέτρων διατήρησής.

Στα πλαίσια του Ευρωπαϊκού Προγράμματος LIFE+ “JUNICOAST: Δράσεις για την διατήρηση των παράκτιων αμμοθινών με είδη *Juniperus* στην Κρήτη και στο Νότιο Αιγαίο” (2009-2012) πραγματοποιήθηκε εργασία καταγραφής της σύνθεσης και δομής των υποπληθυσμών *Juniperus macrocarpa* στις 4 περιοχές όπου συναντάται ο οικότοπος στην Κρήτη (Γαύδος, Χρυσή, Κεδρόδασος, Φαλάσσαρνα). Η εργασία πεδίου περιέλαβε την καταγραφή αρσενικών-θηλυκών ατόμων, νεαρών φυτών και αρτιβλάστων, πλήθους κορμών ανά άτομο και λοιπών βιομετρικών δεδομένων των 7 συνολικά υποπληθυσμών του είδους *J. macrocarpa* καθώς επίσης και την καταγραφή της συμμετοχής του είδους *J. phoenicea* στη δομή του οικοτόπου. Πραγματοποιήθηκαν επίσης συλλογές κώνων *J. macrocarpa* για την εργαστηριακή μελέτη της φύτευσης των σπερμάτων.

Ακολουθούν τα κυριότερα αποτελέσματα της εργασίας πεδίου:

- η αναλογία φύλου σε όλους τους υποπληθυσμούς δεν αποκλίνει στατιστικά σημαντικά από την οικολογικά σταθερή σχέση 1:1 (με μικρή απόκλιση στον έναν υποπληθυσμό της Χρυσής),
- η παρατηρούμενη αναγέννηση (παρουσία νεαρών φυτών) είναι χαμηλή ως ελάχιστη στις περισσότερες περιοχές μελέτης, γεγονός που αποδίδεται εν μέρει στα πολύ μικρά ποσοστά πλήρων σπερμάτων (<10%) αλλά και στη δυσκολία επιβίωσης των αρτιβλάστων,
- παράλληλα με τον συνήθη ανταγωνισμό με το συγγενές είδος *Juniperus phoenicea*, στις περιοχές της Γαύδου (κυρίως) αλλά και της Χρυσής παρατηρείται μία σημαντική εισβολή της τραχείας πεύκης (*Pinus brutia*) εντός του οικοτόπου 2250\*, που δυνητικά μπορεί να προκαλέσει σημαντικά προβλήματα στα εξαιρετικά βραδυαυξή φυτά του *Juniperus macrocarpa*.



ΚΕΔΡΟΔΑΣΟΣ



## Σύνθεση και δομή των υποπληθυσμών του *Juniperus macrocarpa* στην Κρήτη

Α. Καλτσής, Κ. Κουτσοβούλου, Ε. Σκούρτη & Κ. Α. Θάνος  
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 E-mail: akaltsis@biof.uoa.gr, kkoutso@biof.uoa.gr, skeve@biof.uoa.gr, cthanos@biof.uoa.gr



ΦΑΛΑΣΙΑΡΝΑ - GR4340001



ΕΛΑΦΟΝΗΣΙ (ΚΕΔΡΟΔΑΣΟΣ) - GR4340015



ΓΑΪΔΟΣ - GR4340013



ΧΡΥΣΗ - GR4320003

Οι παράκτιες αμμοθίνες με είδη αρκίθων (2250° Coastal dunes with *Juniperus* spp.) αποτελούν οικότοπο προτεραιότητας σύμφωνα με την Οδηγία των Οικοτόπων (Οδηγία 92/43/ΕΟΚ). Η σπανιότητα και σποραδικότητα εμφάνισής του, αλλά και η πίεση που δέχεται από την τουριστική ανάπτυξη λόγω του φυσικού κάλλους των παρακτινών εμφάνισής του, καθιστούν ιδιαίτερης σημασίας τη μελέτη και διακρίση του. Χαρακτηριστικό και κυρίαρχο είδος του οικοτόπου είναι το *Juniperus macrocarpa* ενώ σε διάφορους βαθμούς συμμετέχει το (κοινό και εκτός του οικοτόπου) είδος *J. phoenicea*.

Στα πλαίσια του Προγράμματος LIFE+ "JUNICOAST: Δράσεις για την διατήρηση των παράκτιων αμμοθινών με είδη *Juniperus* στην Κρήτη και στο Νότιο Αιγαίο" (2009-2012) πραγματοποιήθηκε εργασία καταγραφής της σύνθεσης και δομής των υποπληθυσμών *J. macrocarpa* στις 4 περιοχές που εμφανίζονται ο οικοτόπος 2250° στην Κρήτη.

Θέση φαλάσης	Συνολική έκταση (ha)	Ποσοστό έκτασης διαγυμολογίας (%)	Επιφάνεια κωνόφυλλου (έκταση/ha)
Αρ. Α	92,8	10	189
Χρ. Δ	37,1	12	106
Ελαφονήσι	16,3	10	179
Αρ. Γαϊδούς	22,3	10	144
Λαοραϊά	86,6	5	320
Καλαμολογία	11,5	100	88
Φαλάσσαρα	2,6	95	78

\* Η έκταση αφορά τα μικρά ποσοστά διαγυμολογίας που υπάρχουν και τα μικρά βάλια κωνόφυλλου που καταγράφονται.



Ήσυχρη φυτά *J. macrocarpa* (Λαοραϊά)

Το είδος *Juniperus macrocarpa* είναι δίοικο. Συνήθως τα άτομα του είδους εμφανίζουν περισσότερους από έναν κορμούς, οι οποίοι αναδύονται μέσα από το αμμώδες έδαφος, με συνήθως 6 σαφώς καθορισμός των ατόμων να εμπεριέχει και ένα βαθμό υποκαταμεριστικότητας. Για το λόγο αυτό καταγράφηκε και ο συνολικός αριθμός «αρσενικών» και «θηλυκών» κορμών ώστε να ληφθεί υπόψη στην εκτίμηση της αναλογίας φύλου. Είναι γνωστό, επίσης, ότι τα άτομα του είδους εκτείνουν οριζόντιες ρίζες σε μεγάλη απόσταση, από τις οποίες μπορούν να αναπτυχθούν κλωνικά «νέα» άτομα (παράκληστατα).



Συμπίδα με *J. phoenicea* (Κεδροδάσος)



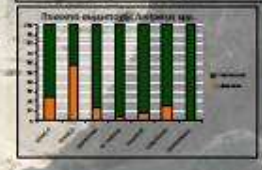
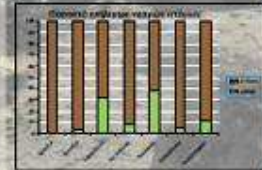
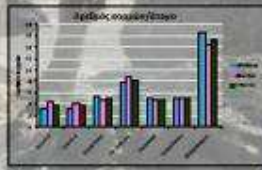
Συμπίδα με *J. phoenicea* (Κεδροδάσος)



Εισβολή της τρακιάς πούκης (Αρ. Α)

### Αποτελέσματα

1. Από την καταγραφή φύλου στους 7 υποπληθυσμούς του *Juniperus macrocarpa* μόνο στην ανατολική θέση της Χρυσής παρατηρήθηκε στατιστικά σημαντική απόκλιση από την οικολογικά σταθερή σχέση 1:1. Η απόκλιση αυτή, πάντως, αβλύνεται στον υπολογισμό της αναλογίας φύλου με βάση τον συνολικό αριθμό κορμών (MF=1,25). Αυτή η απόκλιση, σε συνδυασμό με το χαμηλό ποσοστό νεαρών ατόμων στη θέση αυτή, πιθανώς να υποδηλώνει περιβαλλοντική καταπόνηση, στην οποία τα θηλυκά άτομα είναι κατά κανόνα πιο ευάλωτα.
2. Ο βαθμός αναγέννησης του είδους στις περισσότερες περιοχές μελέτης είναι πολύ χαμηλός έως ακαθόριστος. Εξίσηρη φαίνεται να αποτελούν οι περιοχές του Λαοραϊά και του Σαρανιτικού στη Γαΐδο, όπου πάνω από το 30% των καταγραφόμενων ατόμων ήταν νεαρά, χωρίς να μπορεί να προσδιοριστεί με ακρίβεια ποιο ποσοστό αυτών αποτελούν ανεξάρτητα άτομα ή παράκληστατα από ήδη εγκατεστημένα άτομα. Αν και η παραγωγή «κωνικών»/σπερμάτων σε γενικές γραμμές είναι πολύ μεγάλη, το ποσοστό πλήρων και υγιών σπερμάτων είναι πολύ χαμηλό (~23%), ενώ και αυτά εμφανίζουν χαμηλή φυτρωτικότητα (<30%) σε ποικιλία συνθηκών (θερμοκρασία, φως, κατεργασία). Εκτιμάται ότι τα οικολογικά λίγα αρθροπόδα που εμφανίζονται στις περιοχές μελέτης αντιμετωπίζουν δυσκολία στην εγκατάστασή τους.
3. Το είδος *Juniperus phoenicea* συμμετέχει σε μικρό ποσοστό στη πληθυσμιακή δομή του οικοτόπου (ως προς το συνολικό αριθμό ατόμων *Juniperus* spp.), εμφανίζοντας μεγαλύτερη πικνότητα σε σημεία με βραχυβίως υπόστρωμα εκτός των τυπικών αμμοθινών. Μάλιστα, στη δυτική θέση της Χρυσής, όπου δεν έχουμε τυπικές αμμοθίνες, η συμμετοχή των δύο ειδών είναι ακαθόριστο οριζοντιογραφικά.
4. Εκτός από τη θάλασσα, παράγοντας υποβάθμισης του οικοτόπου (στις περιοχές της Γαΐδου και της Χρυσής) μπορεί να αποτελέσει η παρουσία και εξάπλωση της τρακιάς πούκης (*Pinus brutia*) που εμφανίζει ταχεία ανάπτυξη και ανταγωνίζεται επιτυχώς τα λοιπά φυλλώδη είδη.



P11

## Imaging Sand Dunes at Kedrodasos Coastal Area, Crete, Greece

S. Zannetidis (Technical University of Crete), N. Economou (Technical University of Crete), H. Hamdan (Technical University of Crete), P. Nyktas (Mediterranean Agronomic Institute of Chania), G. Kazakis (Mediterranean Agronomic Institute of Chania), D. Ghosh (Mediterranean Agronomic Institute of Chania), E. Remoundou (Mediterranean Agronomic Institute of Chania) & A. Vafidis\* (Technical University of Crete)

### SUMMARY

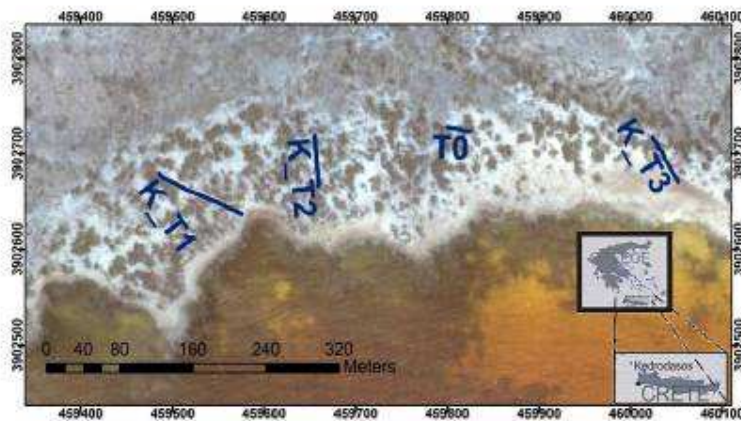
In this work, we present preliminary results from a geophysical survey conducted at Kedrodasos, south Crete, Greece. The scope of this survey is to characterize the subsurface at the Kedrodasos Juniperus trees forest. We used GPR and electrical tomography to map the root system of these trees and to image the sand dunes. We used three methods for the inversion of the resistivity data. We applied deterministic deconvolution on the GPR data and employed a reflected wave from a lab experiment as reference wavelet. The thickness of the sand dunes does not exceed 2 m. Low resistivity regions with abundance of diffracted EM waves are attributed to the juniperous trees root system zones.

## Introduction

In this work, we present preliminary results from a geophysical survey conducted at Kedrodasos, south Crete, Greece. The scope of this survey is to characterize the subsurface at the Kedrodasos Juniperus trees forest. This is part of the European research project Junicoast, which involves actions for the conservation of coastal dunes with Juniperous in Greece. Electrical tomography and GPR methods were employed in order to map the root system of these trees and to image the sand dunes.

## Geophysical survey

Kedrodasos is located at the southwestern part of Crete (Figure 1). The sand dunes, cover neogene and quaternary formations. Neogene formations are mainly marly limestones. Electrical tomography and GPR scanned the study lines K\_T1 and K\_T3. We collected electrical tomography measurements using the AGI Inc. Sting R1, the dipole-dipole array with electrode spacing of 1 m and 55 electrodes. The GPR method employed the Pulse Ekko 1000 and the 225 MHz antennas. Space and time intervals are set to 0.1 m and 0.4 ns respectively and recording time is 200 ns.



*Figure 1 Study lines in Kedrodasos, Crete, Greece (from Google Earth).*

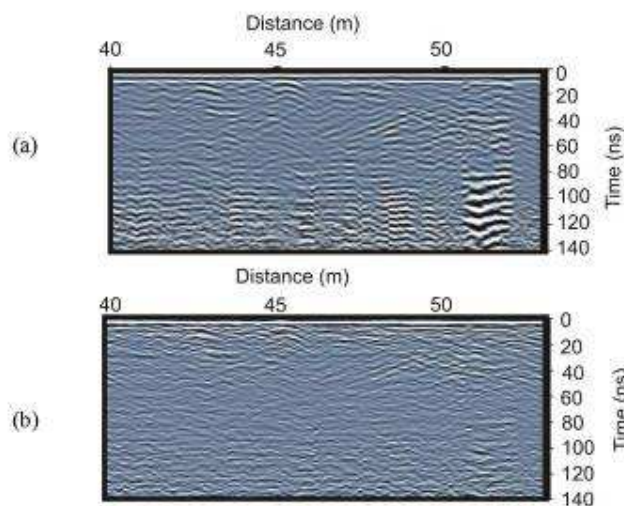
## Processing

Three inversion techniques were applied on electrical tomography data (Hamdan et al., 2010), namely: a) Smoothness constrained inversion, b) combined damping and smoothing technique, and c) the L1 norm (robust) inversion. The smoothness constrained inversion technique is the most commonly used, due to its fast convergence and quite satisfactory results. In this technique the resistivity values vary smoothly. The combination of damping and smoothing techniques delineates large variations of resistivity values (Loke, 2002). Robust inversion enhances sharp boundaries.

We processed the GPR data using a deterministic deconvolution technique which is implemented in t-f domain (Economou and Vafidis, 2011). We first apply spectral balancing, using the methodology proposed by Economou and Vafidis (2010a). The deterministic deconvolution requires a reference E/M wavelet. The deconvolution operator is calculated from this reference wavelet. This method involves reference wavelet extraction, spectral balancing, and time-variant deconvolution. It is a time-window procedure which uses the flexible S-transform. The reference wavelet corresponds to a reflected wave from an air /water interface which is recorded in a plastic tank (0.9 m x 1.6 m and 0.6 m height) filled with water. By changing the height of the GPR antenna we control the arrival time of direct and side reflected waves.

Additionally, by pointing the GPR device on the air, we record the direct air wave. Then one cross-correlates these GPR traces in order to estimate the time shift between the direct waves present on both traces. In order to get the reference reflected wavelet we apply this time shift on a recorded trace and remove the direct waves by subtracting the shifted trace from the other one. This reference reflected wavelet, radiated in air, will differ in phase and amplitude spectrum from the source wavelet radiated by a ground-coupled antenna. Although this method does not estimate the source wavelet, the reflected wave exhibits negligible dispersion and is acceptable as reference wavelet.

The GPR section (portion of line KT3 is displayed in Figure 2a) exhibits a dense sequence of reflections making interpretation difficult. Deconvolution increases the temporal resolution (Figure 2b). Additionally, we performed velocity analysis by selecting clearly visible diffractions on the deconvolved section, in order to produce GPR depth sections.

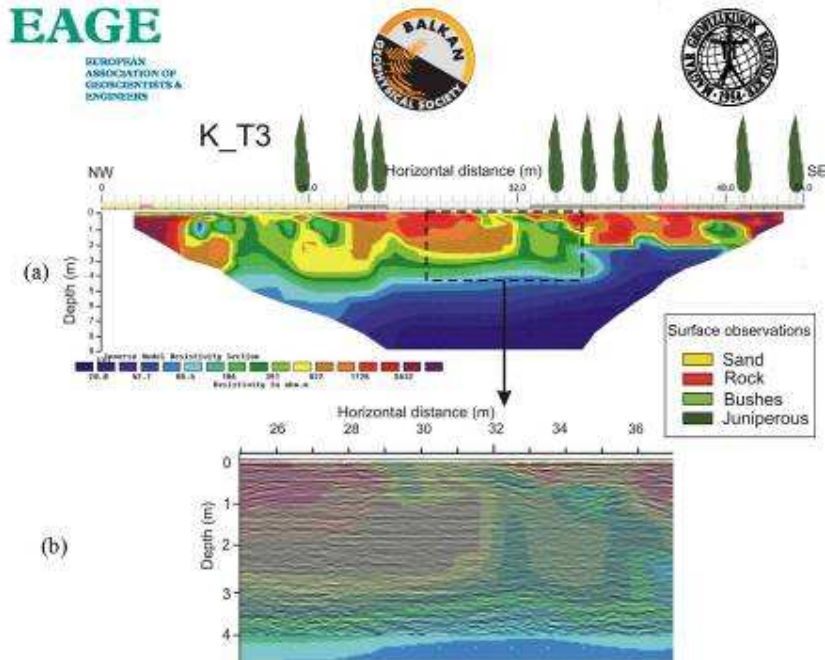


*Figure 2 GPR section (portion of line K\_T3) before (a) and after (b) deconvolution in the t-f domain.*

#### Line K\_T3

The combined interpretation of the geophysical data involves superposition of the GPR and resistivity sections. Figure 3a shows the electrical tomography section K\_T3. Figure 3b displays a portion of the GPR section superimposed on the electrical tomography section. We used the electrical tomography sections derived from the robust inversion. The geoelectrical sections from the combined and smoothness constrained methods are similar for the electrical tomography lines at Kedrodasos. Meanwhile, the robust inversion sections are better, due to the ability of this method in imaging sharp boundaries and producing electrical resistivity sections more comparable with the GPR sections.

High resistivity anomalies at shallow depths (less than 2m) are attributed to sand dunes. Still, rock formations appear at the shallow subsurface. This is confirmed by the presence of diffractions (Figure 3b). The velocity exhibits values of almost 0.13 m/ns typical for sands. The low resistivity layer at depths greater than 2 m is attributed to a formation saturated by water.



**Figure 3** Geoelectrical section *K\_T3* (a) and superposition of GPR and geoelectrical sections for a portion of line *K\_T3* (b) corresponding to the black rectangle.

#### Line *K\_T1*

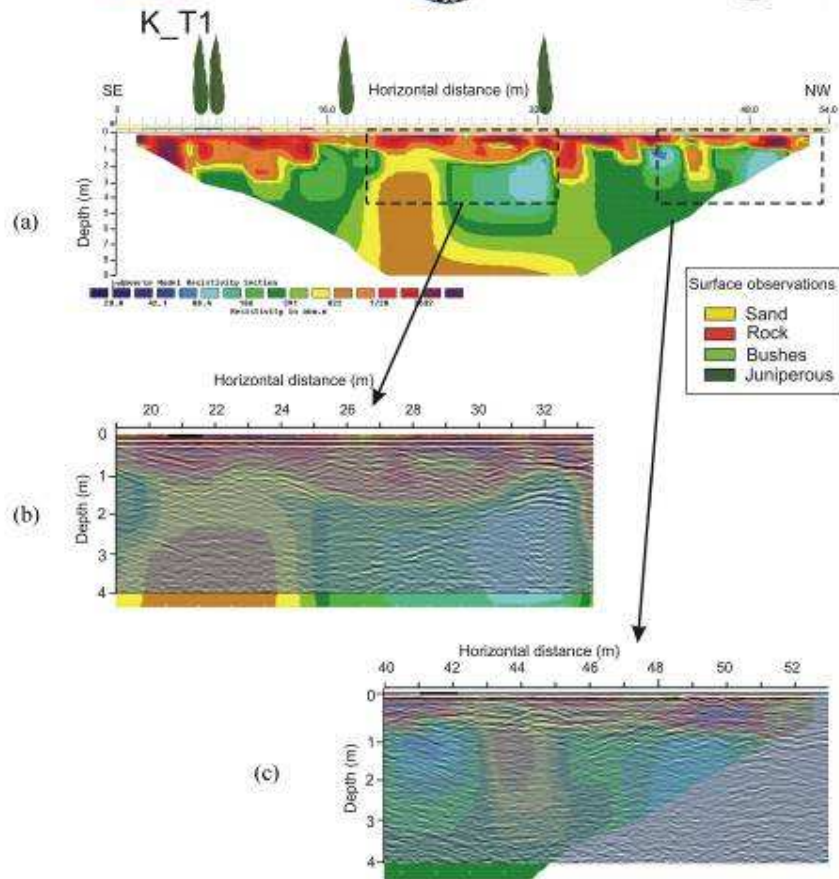
Robust inversion of the electrical tomography data from line *K\_T1* mainly detects two geoelectrical layers (Figure 4) attributed to the sand dunes and the rock formations. Figures 4b and c show portions of the GPR section superimposed on the electrical tomography section. Sand dunes are present at regions where electrical resistivity is higher than 1700 Ohm.m and the GPR section exhibits internal reflections from sand dunes horizons (Figure 4b). Diffractions from the roots of the Juniperous trees are present at depths greater than 2 m on the GPR sections, exhibit velocity of around 0.06 m/ns, correspond to low resistivity anomalies and are in accordance with surface observations (Figure 4).

#### Conclusions

Superposition of electrical tomography and GPR sections helped in the interpretation of the geophysical data. L1 norm inversion enhanced the sharp interfaces. Deconvolution improved the resolution of the GPR sections. Geoelectrical and GPR sections gave valuable information about the thickness of the sand dunes at the Kedrodasos which does not exceed 2 m. Low resistivity regions with abundance of diffracted EM waves are attributed to the juniperous trees root system zones.

#### Acknowledgements

This research was funded by the European Union and is part of the European research project JUNICOAST, LIFE07NAT/GR000296.



**Figure 4** Geoelectrical section *K\_T1* (a) and superposition of GPR and geoelectrical sections for portions of line *K\_T1* (b and c) corresponding to the black rectangles.

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**Annex 7.3 Answers to the Questions addressed by the Commission in the letter dated: Brussels, 22 of March 2011 – Ref: ENV/E3/MD/jv ARES (2011) 313837**

Question 1

*With respect to Falasarna, the reported illegal wooden structure was observed during the mission of the external monitoring team on 8 January 2010. It was built under a group of juniper trees. Nearby, evidence of fire was observed, probably in connection with waste disposal. Please comment on the discrepancy between those observations and your answer to question 2 of the EC letter of 19 March 2010.*

Answer to Question 1

It is true that we have mentioned that no illegal constructions or fire damage have taken place within the borders of the habitat in Falasarna in our answer to question 2 of the EC letter of 19 March 2010. We would like to clarify that the wooden structure that was observed during the mission of the external monitoring team on 8 January 2010 is very old and was constructed many years ago by a local farmer. It is under an isolated Juniper tree on a small patch south of the two main locations of the habitat. Moreover, according to the habitat ecological information of Natura 2000, the “representativity” value of this small patch is C or D. Having in mind the peculiar character of the locals and after a long discussion with the Forest Service we decided to take no action for this construction in order not to create a conflict with the locals and to focus our actions on the two main localities of the habitat which on one hand cover a larger area and on the other hand have a representativity value of B.

The evidence of fire that was observed during the mission of the external monitoring team is mainly burning of agricultural waste (mainly tomato plant residues). This incident will not occur again after the implementation of the concrete actions C1 (habitat demarcation) and C2 (waste removal).

Question 2

*Concerning the A7 deliverable, “A compendium with monitoring protocols to evaluate effectiveness of concrete conservation and habitat status”, each of the graph and tables should be labelled with the total number of responses which resulted in the number/percentages which are indicated. A total of 5 indicators with monitoring protocols are described in detail. However, in the progress report (p.10) it is stated that 10 indicators and 10 long term monitoring protocols were developed. Moreover, the table on pp. 50-51 of the report list 28 indicators for the total of the project actions. Please clarify.*

Answer to Question 2

There is a mistake in what we have stated in the progress report (p.10). In total 5 monitoring protocols were developed. Each monitoring protocol includes and measures one or more indicators. For example the monitoring protocol for Indicator 2 includes 4 indicators in total (“Number of broken branches, cover of root exposure (%), ground vegetation cover (%), and total number of plant species”).

On pp. 50-51 of the report some identical indicators are mentioned more than once. In total, 5 monitoring protocols have been developed to measures 10 different indicators.

Question 3

*In the progress report of 1 February 2011 the end date of action C.7, “Design and installation of signs”, has been delayed by six months from the original end date (31*

*December 2010 to 30 June 2011). An explanation should be provided for the delay. I consider that is important to install the visitor management infrastructure at the beginning of the tourist season. Please provide a realistic estimate of when, what, and where signs and visitor infrastructure will be installed.*

#### Answer to Question 3

A request for the six months delay of action C.7 “Design and installation of signs” has been asked for in the “inception report”. We have asked to move the foreseen start-date and the foreseen end-date of this action by three months. Consequently, the modified-start date became 1-3-2010 and the modified end-date 30-6-2011 (please see inception report p. 16). This delay was due to the modified-end dates of action A.5 and action A.8.

Moreover, this action encountered more delays during 2011 due to the liquidity problem faced by MAICH as explained in the paragraph “Problems encountered” point 3. The installation of signs would be completed during summer 2012.

#### Question 4

Please state when monitoring protocols will be applied at the sites. I suggest that you also estimate the costs of the monitoring protocol being proposed as it would apply to the after-LIFE period and presumably should be included in the after-LIFE conservation plan.

#### Answer to Question 4

The monitoring protocols and the indicators measurements were scheduled to take place at all Cretan sites after the implementation of the concrete conservation actions. Due to the delays encountered in the implementation of some concrete conservation actions, all monitoring protocols and indicators measurements will be applied during spring/summer 2012 and 2013 before the end of the project.

The cost of implementing the monitoring protocols will be estimated and will be included in the after-LIFE conservation plan. At the moment we roughly estimate this cost at 15.000 € depending on which institution or authority will conduct the monitoring.

#### Annex 7.4 Project actions, provisioned and modified time table

Actions	Foreseen start-date	Actual start-date	Foreseen end-date	Modified end-date (Progress Report)	Modified end-date (Mid-term Report)	Status
<b>A1-Landform and land degradation processes in dune systems</b>	1-1-2009	-	31-3-2010	30-6-2010	-	Completed
<b>A2-Dune system plant communities composition and structure</b>	1-1-2009	-	31-3-2010	30-6-2010	-	Completed
<b>A3-Composition and structure of <i>Juniperus</i> population</b>	1-1-2009	-	31-3-2010	30-6-2010	-	Completed
<b>A4-Habitat Mapping</b>	1-1-2009	-	31-3-2010		-	Completed
<b>A5-Visitor Impact Assessment</b>	1-1-2009	-	31-3-2010	30-6-2010	-	Completed
<b>A6-Stakeholder consultation</b>	1-1-2009	-	30-9-2009	-	-	Completed
<b>A7-Elaboration of long term monitoring protocols and selection of indicators</b>	1-6-2009	-	30-6-2010	31-7-2010	-	Completed
<b>A8-Elaboration of target habitat protection and restoration specifications</b>	1-6-2009	-	30-6-2010	31-7-2010	-	Completed
<b>A9-Determination of governance structure and legal status</b>	1-1-2009	-	31-12-2009	31-3-2010	-	Completed
<b>C1-On site habitat demarcation</b>	1-1-2010	-	31-3-2012	-	31-12-2012	In progress
<b>C2-Waste removal</b>	1-1-2010	-	31-3-2012	-	31-12-2012	In progress
<b>C3-Enhancement of juniper regeneration</b>	1-1-2010	1-3-2010	31-3-2012	30-6-2012	30-6-2013	In progress
<b>C4-Restoration of the floristic composition and structure of the target habitat 2250*</b>	1-1-2010	1-3-2010	31-3-2012	30-6-2012	30-6-2013	In progress
<b>C5-Fore dune stabilisation through vegetation restoration</b>	1-1-2010	1-3-2010	31-3-2012	30-6-2012	30-4-2013	In progress
<b>C6-Visitor management intervention and infrastructure</b>	1-1-2010	1-3-2010	31-3-2012	30-6-2012	30-4-2013	In progress
<b>C7-Design and installation of signs</b>	1-1-2010	1-3-2010	31-12-2010	30-6-2011	31-12-2012	In progress
<b>C8-Ex situ conservation and propagation of keystone species</b>	1-1-2009	-	31-12-2012	-	30-4-2013	In progress
<b>D1-Development and implementation of a communications strategy.</b>	1-1-2009	-	31-12-2012	-	31-8-2013	In progress
<b>D2-Website development</b>	1-1-2009	-	31-12-2012	-	31-8-2013	In progress
<b>D3-Environmental education campaign</b>	1-1-2009	-	31-12-2012	-	31-8-2013	In progress
<b>D4-Training for habitat protection and restoration</b>	1-1-2012	-	31-12-2012	-	31-8-2013	Not started
<b>D5-Production and dissemination of habitat protection and restoration guidelines</b>	1-7-2011	-	31-12-2012	-	-	Not started
<b>D6-Dissemination of findings to the scientific community and Layman's report</b>	1-1-2011	-	31-12-2012	-	31-8-2013	In progress

<b>Actions</b>	<b>Foreseen start-date</b>	<b>Actual start-date</b>	<b>Foreseen end-date</b>	<b>Modified end-date (Progress Report)</b>	<b>Modified end-date (Mid-term Report)</b>	<b>Status</b>
<b>D7-After-LIFE communication and conservation plans</b>	1-7-2012	-	31-12-2012	-	31-8-2013	Not started
<b>E1-Project coordination and management</b>	1-1-2009	-	31-12-2012	-	31-8-2013	In progress
<b>E2-Monitoring and evaluation of the effectiveness of the project</b>	1-7-2010	-	31-12-2012	-	31-8-2013	In progress
<b>E3-Scientific Committee</b>	1-2-2009	-	1-7-2012	-	31-8-2013	In progress
<b>E4-Networking with other similar LIFE projects</b>	1-1-2010	-	31-12-2012	-	-	In progress
<b>E5-Stakeholder Committee</b>	1-2-2009	-	1-7-2012	-	31-8-2013	In progress
<b>E6-External auditing</b>	1-10-2009	-	31-12-2012	-	31-8-2013	Not started

**Green text: Beneficiary responsible for implementation MAICH**

**Bleu text: Beneficiary responsible for implementation NKUA**

**Orange text: Beneficiary responsible for implementation PTA (FDC and FDL)**