



LIFE07NAT/GR/000296

## FINAL Report

Covering the project activities from 01/01/2009 to 31/08/2013

Reporting Date

**31/01/2014**

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 (APPROVED)
<b>Total Project duration (in months)</b>	48 months <b>Extension months</b> 08 months (56 months in total)
<b>Total budget</b>	1.501.210,00 €
<b>EC contribution:</b>	1.125.908,00 €
<b>(%) of total costs</b>	75%
<b>(%) of eligible costs</b>	100%

### Data Beneficiary

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## 2. Executive summary

This document is the Final Report of the project **LIFE07NAT/GR/000296** entitled: **“Actions for the conservation of coastal dunes with *Juniperus* spp. in Crete and the South Aegean” (Greece) - JUNICOAST**. This report covers the period from 01/01/2009 to 30/08/2013. It includes a description of the activities undertaken within the project span and an evaluation of the project results and impact.

The **overall objective** of the JUNICOAST project was 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.

The **specific objectives** of the project were:

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

All the actions of this project have been carried out in 4 Natura 2000 designated sites of Crete (GR4340001, GR4340015, GR4340013, GR4320003) comprising the habitat 2250\* and covering approximately 54 % of the total area of this habitat type in Greece. Additionally, dissemination actions have been being carried out in the South Aegean (GR4220020, GR4220006, GR4220014, GR4210005) providing the opportunity for the wider protection of this habitat in Greece. The project started on the 1<sup>st</sup> of January 2009 and ended on the 31 of August 2013. All actions (30 in total, 9 preparatory, 8 concrete conservation, 7 public awareness and dissemination of results and 6 overall project operation and monitoring) of this project and their respective deliverables (31 out of 32 in total) and milestones (14 in total) have been completed.

The preparatory actions started with the **stakeholder consultation and community surveys (action A.6)** in order to establish the stakeholders' level of awareness, perceived values, threats and recommendations for conservation of the habitat in their localities. Moreover, and based on this participatory approach, various communication partners, channels and materials that were subsequently incorporated in the **communication strategy** of the project (**action D.1**) were also identified. Four deliverables (one per site, **D-A.6.1.1, D-A.6.1.2, D-A.6.1.3, D-A.6.1.4**) on stakeholder consultation & community surveys and one (D-A.6.2) on the effectiveness evaluation of stakeholder consultation method have been produced. Following the stakeholder consultation, several field surveys were conducted in order to collect baseline data and in order to obtain the required scientific knowledge needed for the proper implementation of the concrete conservation actions. More specifically, the **land-form and land degradation processes in dune systems (action A.1)** were described and mapped. Soil sampling and analysis showed that all sandy layers were alkaline (average pH=8.9) and very poor in organic matter. The state of the sand dunes in relation to aeolian erosion was considered satisfactory on average at all study sites. The study site receiving the highest pressure was the North beach on the Chrysi-East site. Seven geomorphological maps illustrating the dune type and height, sand

layer depth, parent material and the type and the intensity of land forming processes (one per site, **D-A.1.2**) and a report (including the geomorphological transect profiles of each habitat, **D-A.1.1**) on landforms, structures and processes of the dune systems in Crete have been produced. The **composition, the structure, and the ecological processes of juniper woodland communities on all Cretan sites (action A.2)** were determined and described. 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. Seven maps illustrating areas within the habitats in needs of restoration (one per site, **D-A.2.2**) and a report on plant associations, community types, composition and structure of coastal dunes with *Juniperus* spp. in Crete (**D-A.2.1**) have been produced. **The composition and structure of the Juniperus populations on all Cretan sites (action A.3)** was quantitatively determined and described. Lavrakas site in Gavdos showed the highest population density (145 individuals/ha) whereas the least dense site was 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. All populations showed an average age in the range of 100-200 years. A report on population size, age-size structure and sex ratios of the *Juniperus* populations in Crete (**D-A.3**) has been produced. The **exact boundaries (action A.4) of all Cretan habitats** were accurately identified and mapped. Seven habitat maps (one per site), a technical report on habitat mapping (**D-A.4**) have been produced. Moreover, a report on **mapping historical land cover changes of the habitat 2250\* in Crete** and 6 land cover change maps have been produced. Estimates of vegetation cover changes in habitat 2250\* between 1945 and/or 1968 and 2007, in Crete, showed that overall 80% of land cover did not change. Vegetated land shows an overall increase in all habitats from 95.7 ha (42%) to 117.7 ha (52%). Out of all sites under investigation, open areas that remained open account for the 43% of the total 227 hectares. Vegetative cover was maintained in 37%, it declined in 5% and increased in 15% of the total area. **A visitor impact assessment (action A.5)** was undertaken in all Cretan sites in order to ensure the effective implementation of the visitor management infrastructures. 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%) camps for two or more days, in Gavdos the majority of visitors (65%) are staying for 5 or more days, in Chrysi, the majority of visitors (67%) are mainly visiting the island on a daily trip and returning to Ierapetra in the afternoon. 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. Seven maps illustrating the location of visitor management infrastructures (one per site, **D-A.5.2**) and a report on visitor impact assessment (**D-A.5.1**) have been produced. **The elaboration of long term monitoring protocols and the selection of indicators (action A.7)** which enabled/will enable the evaluation of the effectiveness of the dissemination/concrete conservation actions as compared to the initial situation, objectives and expected results were developed. In total 10 indicators were identified and 5 long-term monitoring protocols with their sampling design and Standard Operating Procedures (SOPs) were developed (**D-A.7**). Additionally, **specific protection and restoration measures (action A.8)** for each Cretan site were elaborated (**D-A.8**) by integrating the results of various above mentioned preparatory actions. Finally, the **Governance structure and legal status of habitat 2250\* in Greece (action A.9)** were determined. 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. Moreover, the legislation itself was not considered to be a problem, but rather the lack of its enforcement. One report on the Governance structure (**D-A.9.2**) and one report on the habitat legal status (**D-A.9.1**) have been produced.

The preparatory actions were followed by the implementation of concrete conservation actions in Crete targeting the main natural and anthropogenic threats which put into practice, tested and evaluated actions and methodologies unfamiliar to the Greek habitat's context. More specifically, **239.31 ha of coastal dunes with *Juniperus* spp.** on all Cretan sites **were demarcated (action C.1)** and **cleaned (action C.2)** of which 11.48 ha are in Kedrodasos, 2.76 ha in Falasarna, 16.52 ha in Sarakiniko-Gavdos, 25.54 ha in Agios Ioannis-Gavdos, 98.55 in Lavrakas-Gavdos and 87.46 ha in Chrysi island (**M-C.1** and **M-C.2**). "Soft-fencing" material in the form of wooden posts (1.80m tall) was used in the habitat demarcation (122 wooden sticks have been installed in Gavdos, 15 in Falasarna, 29 in Kedrodasos and 161 on Chrysi island). All wooden posts were labelled with the LIFE and the Natura 2000 logos. **Litter waste removal** was carried out manually and continuously at all Cretan habitats with the help and the engagement of various stakeholders (volunteers, the local community and campers). **Fly-tipping waste removal** (dumping waste illegally instead of in an authorized rubbish dump) such as plastic ropes and tomato shoots in Falasarna (residues from the greenhouses in the area) and remaining tents and other leftovers by campers in Chrysi and Gavdos were carried out manually at the end of the project by allocating "Direct treaties" by the respective Forest Directorates of Chania and Lasithi to external assistants. Moreover, 23 four-wheeled Plastic Rubbish Bins have been installed in Gavdos (15), Kedrodasos (6) and Falasarna (2). The **enhancement of juniper regeneration (action C.3)** was conducted by planting and fencing 95 juvenile *Juniperus macrocarpa* plants (20 in Sarakiniko-Gavdos, 41 in Agios Ioannis-Gavdos and 34 in Kedrodasos) and by fencing 12 naturally established juveniles of *Juniperus macrocarpa* (6 in Sarakiniko-Gavdos and 6 in Kedrodasos). Moreover, 60 juvenile *Juniperus macrocarpa* plants and 30 female individuals are growing in the nursery of MAICH for future planting if needed (After-LIFE conservation plan). One interim report (**D-C.3.1**) and one final report (**D-C.3.2**) on the enhancement of the juniper regeneration have been produced. The **restoration of the floristic composition and structure of the target habitat 2250\* (action C.4)** was conducted by planting/fencing several keystone species within the habitat boundaries, by planting female individuals of *Juniperus macrocarpa* in Chrysi in order to balance the female/male ratio among the *Juniperus macrocarpa* subpopulations and by eradicating invasive species such as seedlings of *Pinus brutia* and *Carpobrotus edulis* from within the habitat boundaries. More specifically, 45 *Pancreatium maritimum* and 44 *Centaurea pumilio* individuals have been planted and fenced in Kedrodasos. 134 seedlings of *Pinus brutia* have been eliminated from several Cretan sites (39 from Sarakiniko-Gavdos, 8 from Agios Ioannis-Gavdos, 48 from Lavrakas-Gavdos, 18 from Chrysi-East and 21 from Chrysi-West) and *Carpobrotus edulis* have been eliminated from 2 localities in Chrysi-East. One interim report (**D-C.4.1**) and one final report (**D-C.4.2**) on the restoration of the floristic composition and structure of the target habitat 2250\* have been produced. The **fore dune stabilization through vegetation restoration (action C.5)** was conducted by erecting 14 units of sand trapping fences (200m long in total) at the North beach of the East site of Chrysi Island (**M-C.5**). All 14 units were labelled with the LIFE and the Natura 2000 logos. The **visitor management intervention and infrastructures (action C.6)** was implemented by installing 340 m of wooden boardwalks (120 m in Sarakiniko-Gavdos and 220 m in Chrysi-East), by erecting directional wooden (in Agios Ioannis-Gavdos, in



Lavrakas-Gavdos and in Chrysi) and metal (in Kedrodasos) sticks on the either side of the main paths, by installing 10 wooden rubbish bins at the main beach in Sarakiniko-Gavdos and by the creation of “resting points” (installation of wooden tables/benches) within the habitat boundaries in Sarakiniko-Gavdos (2 wooden tables with 2 wooden benches), Kedrodasos (3 wooden benches) and Chrysi-East (2 wooden benches) (M-C.6). All visitor management infrastructures were labelled with the LIFE and the Natura 2000 logos. The **design and installation of signs (action C.7)** was implemented by installing 16 information signs within the boundaries of all Cretan sites (4 in Kedrodasos, 2 in Falasarna, 2 in Sarakiniko-Gavdos, 2 in Agios Ioannis-Gavdos, 3 in Lavrakas-Gavdos and 3 in Chrysi island) (M-C.7). All information signs were labelled with the LIFE and the Natura 2000 logos. The **ex-situ conservation and propagation of keystone species (action C.8)** collected/propagated, cleaned and stored (at the seed bank/nursery of MAICH) genetic materials from the 30 keystone species identified by action A.2 and located within the habitat boundaries of all Cretan sites. Seeds/plant material of *Juniperus macrocarpa* have been also collected/propagated, cleaned and stored. Protocols for seed collection, handling and storage and for seed germination of collected keystone species have been developed. One progress report (D-C.8.1) and one final report (D-C.8.2) on *ex-situ* conservation have been produced.

Being a demonstration project, the public awareness and dissemination of the results were carried out on a national level using a multi-stakeholder communication strategy allowing the promotion of conservation of the habitat in the South Aegean. More specifically, the **implementation of the communication strategy (action D.1)** allowed the dissemination of various awareness raising materials (D-D.1.1) such as project leaflets; project T-shirts, a 30 minutes project documentary, one radio spot, TV's interviews, a code of conduct, notice boards, project articles, coloured posters, one YOUTUBE slide show presentation and several power point presentations. One report on the development and implementation of the communication strategy (D-D.1.2) has been produced. The development and maintenance of the project website ([www.junicoast.gr](http://www.junicoast.gr), action D.2, M-D.2) provided detailed description of the project, its objectives, actions, progress and results and improved interactions and communications between various stakeholders. The **environmental education campaign (action D.3)** allowed the promotion of the general public participation in the protection of habitat 2250\*, the exchange of experiences among various stakeholders and provided school teachers with information on the conservation of habitat 2250\*. A fairy tale for children and a teachers' guide were produced and distributed. Moreover, various workshops (3 for environmental educators and 2 for tourism representatives) were organized. Several local events (guided site visits, school visits, student weeks and final project event) were also organized (M-D.3). The **training for habitat protection and restoration (action D.4)** and the **production and dissemination of habitat protection and restoration guidelines (action D.5)** improved the capacity building (forest directorate staff, government officers), transferred know-how and promoted future best practices in habitat protection. Two workshops (one in Crete and one in the South Aegean) for stakeholders involved in the protection and management of coastal dunes with *Juniperus* spp. were organized (M-D.4) and one habitat protection and restoration guideline was produced (D-D.5). The **dissemination of findings to the scientific community and Layman's report (action D.6)** consolidated the knowledge base on habitat protection and disseminated the findings of the project to the international scientific community and to the general public. One report (D-D.6.1) on the dissemination of findings and a Layman's report (D-D.6.2) have been produced. The **after-LIFE communication and conservation plans (action D.7)** contribute to the long-term dissemination of the project results and conservation of the habitat by proposing future

communication and conservation activities after the end of the project, thus ensuring its long-term sustainability. One After-LIFE communication plan (**D-D.7.1**) and one After-LIFE conservation plan (**D-D.7.2**) have been produced (**free of charge**).

The overall project operation and monitoring activities and more specifically the project coordination and management action (**action E.1**) ensured the effective evolution of the project actions and allowed the achievements of the project objectives, deliverables and milestones according to the schedule and quality standards. Regular project meetings have been organized and several technical and financial (inception, 1<sup>st</sup> progress, mid-term, 2<sup>nd</sup> progress and final) reports have been submitted the LIFE Nature Unit. The **monitoring and evaluation of the effectiveness of the project (action E.2)** measured and documented the effectiveness of the dissemination actions (**D-E.2.1**) implemented throughout the project. Comparison between baseline data (summer 2009) and data from the second cycle of monitoring (summer 2013) showed a significant increase in the level of public awareness. The effectiveness of the conservation actions (**D-E.2.2**) has not been measured nor documented because the onsite implementation of some concrete conservation actions was delayed due to unforeseeable and exceptional circumstances explained in the mid-term report of the project. This effectiveness (concrete conservation actions) will be measured and documented as proposed in the after-LIFE conservation plan of the project. The coordination beneficiary has been supported by two distinct committees (**scientific and stakeholders committees, action E.3 and E.5** respectively). The scientific and stakeholders committees have been established at the onset of the project (31.03.2009, **M-E.3** and **M-E.5**). Four scientific and four stakeholders' committee meetings have been organized. The **networking with other similar LIFE projects (action E.4)** allowed the exchange of Know-how among various European stakeholders working on coastal dunes and/or *Juniperus* species. Three networking meetings with similar LIFE projects [PROVIDUNE (LIFE07NAT/IT/000519) and JUNIPERCY (LIFE10NAT/CY/000717)] have been organized. One report on networking with other similar LIFE projects (**D-E.4.1**) and one report on the success and failures of previous experiences in Europe (**D-E.4.2**) have been produced.

### 3. Introduction

#### Description of background, problem and objectives

Coastal dunes with *Juniperus* spp. have been classified as a “**priority habitat**” (code 2250\*) by the 92/43 Habitat Directive **which means type of habitat in danger of disappearance of which the Community has a particular responsibility for its conservation**. Until recently, there was no documented evidence in Greece that active conservation measures have been implemented for the protection and restoration of this threatened habitat. This demonstration project put into practice, tested, evaluated and disseminated actions/methodologies that were unfamiliar to the Greek geographical, ecological and socio-economical context.

The overall objective of the JUNICOAST project was to promote and enable the long term conservation of the 2250\* priority habitat in Crete and the South Aegean (Greece).

The specific objectives of the project were:

- 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,
- To understand, quantify and halt natural and anthropogenic threats that contribute to the long term degradation of this habitat,
- To design and implement actions for the protection and long term restoration of coastal dune with *Juniperus* spp. habitats,
- To provide support for better environmental governance in Natura 2000 sites through stakeholder involvement and training.

JUNICOAST dealt with all the known localities of the habitat in Greek Natura 2000 network in the regions of Crete and South Aegean (Table 1).

#### Natura 2000 sites

The Natura 2000 sites targeted by the project are shown in the following table (Table 1.)

**Table 1 Natura 2000 sites targeted by the project**

Site code	Region	Name of the project area
GR4340001	Crete	Imeri Kai Agria Gramvousa - Tigani Kai Falasarna - Pontikonisi, Ormos Livadia-Viglia
GR4340015	Crete	Paralia Apo Chrysoskalitissa Mechri Akrotirio Krios
GR4340013	Crete	Nisoi Gavdos Kai Gavdopoula
GR4320003	Crete	Nisos Chrysi
GR4220020	South Aegean	Nisos Milos: Profitis Ilias - Eyryteri Periochi
GR4220006	South Aegean	Nisos Polyaigos-Kimolos
GR4220014	South Aegean	Kentriki Kai Notia Naxos: Zefs Kai Vigla Eos Mavrovouni Kai Thalassia Zoni (Ormos Karades-Ormos Moutsounas)
GR4210005	South Aegean	Rodos: Akramytis, Armenistis, Attavyros Kai Thalassia Zoni (Karavola-Ormos Glyfada)



### Habitat type and species targeted

The project targeted the habitat type of Coastal dunes with *Juniperus* spp. (2250\*) which consist of *Juniperus macrocarpa* and *Juniperus phoenicea* stands.

### Main conservation issues being targeted (including threats)

Over the last decades, coastal dunes with *Juniperus* spp. in Greece have been subjected to severe anthropogenic pressure and are mainly threatened by: **restricted natural regeneration, uncontrolled tourism growth, lack of public awareness, waste disposal, fire, wood cutting and grazing and browsing.** JUNICOAST implemented in Crete a range of concrete conservation actions to reduce anthropogenic threats that contribute to the long term degradation of the habitat. More specifically, a range of *in situ* and *ex situ* conservation measures were implemented in order to enhance the natural regeneration of the *Juniperus* and other *keystone species* (actions C.3, C.4 and C.8) and to reduce the grazing impact. Other concrete conservation (C.1, C.2, C5, C6, C.7) and dissemination (D.1 and D.3) actions which incorporated management infrastructures and raising awareness materials were implemented in order to reduce the visitors' impacts on the habitat. Moreover, dissemination actions (all D actions) built within a multi-stakeholder communication strategy (action D.1) and active stakeholder consultation and engagement from the onset of the project (actions A.6) were implemented on a National level in order to increase the level of public awareness. A “waste removal” action (C.2), the provision of infrastructure such rubbish bins (actions C2 and C.6) and public awareness activities (actions C.7, D.1 and D.3) were implemented to ensure that the sites are kept clean, to reduce the risk of fire and to reduce the damage of woodcutting on the *Juniperus* trees. Last but not least, **climate change** is expected to affect all natural ecosystems. In response to all these growing threats, it was deemed necessary to undertake concrete conservation/management and dissemination actions in order to protect and to ensure the long-term sustainability of this priority habitat in Greece.

### Socio-economic context

Coastal dunes with *Juniperus* spp. are so popular for outdoor recreation which often causes difficult dilemmas in coastal dune management. On one hand, recreation is considered a legitimate and appropriate function of many areas. On the other hand, recreation can result in a loss of the natural qualities and, even worse, in a complete destruction of the area. Only, through adequate management, nature-based tourism can be a compatible and a complementary land use. Since many people will continue to visit the habitats and since the economy of some local communities (such as the community of Gavdos) is based mainly on outdoor recreational activities such as camping, more effort is needed to mitigate the visitors' impacts on those sites. Impact control measures such those implemented by the JUNICOAST project (boardwalks, habitat and trails demarcation, sign posting and public education) would allow minimizing the adverse effects.

### Expected longer term results

The expected longer term results of the project could be measured on National and Cretan levels.

*On the National level:* The **preparatory actions** in Crete allowed the consolidation of a **National** knowledge base providing insights on:

- The **geomorphology** of coastal dunes in Crete,
- The dune system plant communities and *Juniperus* population composition and structure,
- The **effect of anthropogenic threats** on the habitat's ecological conditions,

- **Effective conservation and monitoring methods** through the elaboration of habitat protection and restoration guidelines and monitoring protocols.

Moreover, the **public awareness and dissemination actions** and more specifically, the **National communication strategy** allowed the promotion of concrete conservation and dissemination actions in the South Aegean, disseminated the lessons learnt in Crete, promoted and provided training of the trialled techniques and methods nationally, as well as raised public awareness ensuring the wider conservation of this priority habitat throughout Greece.

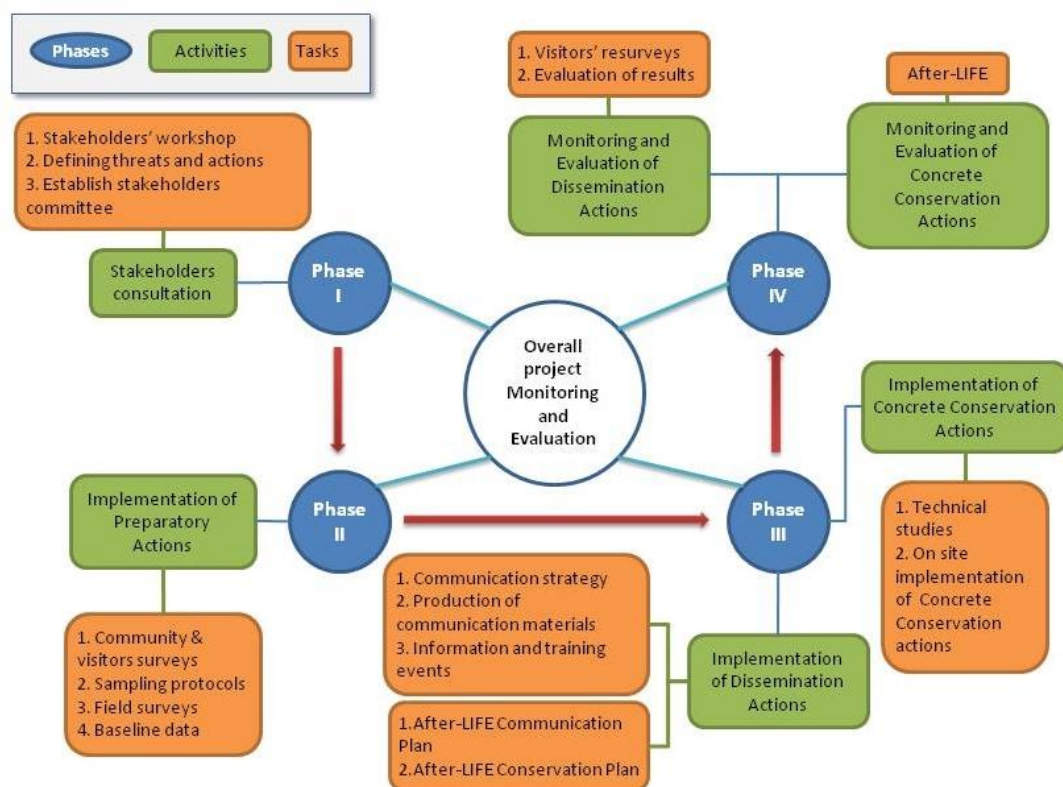
*On the Cretan level:* The expected longer term results on the Cretan level is the **improved conservation status of the habitats** and **halting of threats** through a series of concrete conservation actions which resulted in the following:

- 239.31 ha of coastal dunes with *Juniperus* spp. in Crete have been mapped, demarcated, cleaned and protected,
- 96 juvenile *Juniperus macrocarpa* plants were replanted and fenced at all Cretan sites,
- 12 naturally established juveniles of *Juniperus macrocarpa* were fenced,
- 150 juvenile *Juniperus macrocarpa* plants and 60 female individuals are growing in the nursery of MAICH for future planting if needed,
- 45 *Pancratium maritimum* individuals have been planted and fenced in Kedrodasos,
- 44 *Centaurea pumilio* individuals have been planted and fenced in Kedrodasos,
- 184 invasive species (*Pinus brutia*) have been eliminated from Cretan sites,
- The invasive species *Carpobrotus edulis* have been eliminated from 2 localities in Chrysi-East,
- 36 keystone and 80 indicator species have been identified at all Cretan sites,
- Seeds from *Juniperus macrocarpa* and all keystone species have been collected, cleaned and stored at the seed bank of MAICH,
- 14 units of sand trapping fences (200m length in total) were installed at the North beach of the East site of Chrysi Island,
- 340 m of wooden boardwalks have been constructed and installed (120 m in Sarakiniko-Gavdos and 220 m in Chrysi-East),
- 65 directional wooden sticks have been installed for the main trails delineation in Gavdos (Agios Ioannis and Lavrakas), 40 in Chrysi Island and 8 directional metal sticks for the E4 path in Kedrodasos,
- 10 wooden Rubbish bins have been installed at the main beach in Sarakiniko-Gavdos,
- 15 four-wheeled Plastic Rubbish Bins have been installed in Gavdos, 6 in Kedrodasosi and 2 in Falasarna,
- 2 wooden tables with wooden benches have been installed within the habitat in Sarakiniko-Gavdos.
- 3 wooden benches have been installed within the habitat in Kedrodasos-Elafonisi and 2 on Chrysi Island,
- 16 information signs have been installed within the boundaries of all Cretan sites,
- 15 notice boards have been installed at strategic points outside the boundaries of the sites (relevant municipalities and ferry boats connecting Crete with Gavdos and Chrysi islands).

## 4. Administrative part

### 4.1. Description of the management system

#### Description and schematic presentation of working method



#### Project phases

The JUNICOAST project consisted of the following 4 phases:

- **Phase I:** Consultation phase (stakeholders workshop, defining threats and actions needed, establish stakeholders' committee),
- **Phase II:** Preparatory phase (preparatory actions, field surveys, baseline data),
- **Phase III:** Implementation phase (concrete conservation and dissemination actions),
- **Phase IV:** Monitoring and evaluation phase (overall project operation and monitoring).

#### Activities and tasks per phase

The **consultation phase** of the project (**phase I**) started with the **stakeholder consultation** (action A.6) in order to establish the stakeholders' level of awareness, perceived values, threats and recommendations for conservation of the habitat in their localities. Moreover, and based on this participatory approach, various communication partners, channels and materials that were subsequently incorporated in the **communication strategy** of the project (**action D.1**) were also identified. The **preparatory phase** of the project (**phase II**) consisted of **all preparatory actions** (A.1, A.2, A.3, A.4, A.5, A.6, A.7, A.8 and A.9) in which baseline data, that is the required scientific knowledge needed for the proper implementation of the concrete conservation actions (specific objectives 1 and 2), were collected and obtained. The **implementation**

**phase** of the project (**phase III**) implemented **concrete conservation actions** (C.1, C.2, C.3, C.4, C.5, C.6, C.7 and C.8) in Crete targeting the main natural and anthropogenic threats (specific objective 3). Moreover, **public awareness and dissemination of the results** (D1, D.2, D.3, D.4, D5, D.6 and D.7) were carried out on a national level using a multi-stakeholder communication strategy allowing the promotion of conservation of the habitat in the South Aegean (specific objective 4). The **monitoring and evaluation phase** of the project (**phase IV**) implemented **project operation and monitoring actions** (E.1, E.2, E.3, E.4, E.5 and E.6) in order to ensure the effective evolution of the project actions and allow the achievements of the project objectives, deliverables and milestones according to the schedule and quality standards.

Planning. Modified time table of the project (supplementary agreement)

Tasks/Activities		2009				2010				2011				2012				2013			
		I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
Overall Project Schedule	Proposed (black box)	Start date		Inception report				Mid-Term				End date									
	Actual (white box)	Start date		Inception report				1st Progress report				2nd Progress report				Final report					
	Proposed																				
	Actual	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
A1	Proposed																				
	Actual	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
A2	Proposed																				
	Actual	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
A3	Proposed																				
	Actual	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
A4	Proposed																				
	Actual	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
A5	Proposed																				
	Actual	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
A6	Proposed																				
	Actual	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
A7	Proposed																				
	Actual	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
A8	Proposed																				
	Actual	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
A9	Proposed																				
	Actual	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
C1	Proposed																				
	Actual	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
C2	Proposed																				
	Actual	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
C3	Proposed																				
	Actual	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
C4	Proposed																				
	Actual	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
C5	Proposed																				
	Actual	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
C6	Proposed																				
	Actual	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
C7	Proposed																				
	Actual	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
C8	Proposed																				
	Actual	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
D1	Proposed																				
	Actual	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
D2	Proposed																				
	Actual	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
D3	Proposed																				
	Actual	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
D4	Proposed																				
	Actual	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
D5	Proposed																				
	Actual	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
D6	Proposed																				
	Actual	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
D7	Proposed																				
	Actual	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
E1	Proposed																				
	Actual	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
E2	Proposed																				
	Actual	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
E3	Proposed																				
	Actual	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
E4	Proposed																				
	Actual	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
E5	Proposed																				
	Actual	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
E6	Proposed																				
	Actual	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

### Presentation of the beneficiary, partners and project organisation

The structure of the project organization is as follow:

#### **MAICh: Coordinating beneficiary**

**Project Manager:** Mr. George kazakis responsible for the overall project coordination and management.

**Researchers and field assistants:** Mr. Dany Ghosn, Dr. Kalliope PEDIADITI, Dr. Chariton Kalitzidis and Dr. Christina Fournaraki assist the project manager in ensuring the accomplishment of the project's goal, objective, activities, and results; provide essential assistance required to carrying out various actions of the project.

**Technicians and field assistants:** Ms. Hlektra Remoundou, Ms. Eleni Markaki. Mr. Nikos Psilakis and Mr. Alexis Adonakakis provide essential assistance to the researchers and the project manager required to carrying out various actions of the project.

**Financial Administrator:** Ms. Artemisia Lioni responsible for the financial management of the project and Ms. Klironomou Anastasia financial officer provide essential assistance to financial issues.

#### **NKUA: Associated beneficiary**

**Responsible for the NKUA team:** Prof. Kostas Thanos

**Researchers and field assistants:** Dr. Dimitris Sarris, Dr. Penelopi Delipetrou, Ms. Katerina Koutsovoulou, Mr. Apostolis Kaltsis, Mr. George Mitrouskas and Ms. Eleni Skourti assist the responsible of the NKUA team in ensuring the accomplishment of the NKUA actions.

**Financial Administrator:** Special Account for Research Grants of the University of Athens, responsible for the financial management of the NKUA actions.

#### **FDC, FDL and PTA: Associated beneficiary**

**Responsible for the FDC team:** Ms. Polimia Sklavaki (Director of FDC)

**Senior staff:** Mr. Ioannis Rekatsinas responsible for the overseeing and execution of key concrete conservation actions.

**Responsible for the FDL team:** Mr. Emmanouil Syligardos (Director of FDL)

**Senior staff:** Mr. Emmanouil Koudoumas responsible for the overseeing and execution of key concrete conservation actions.

**Financial Administrator:** Mr Nikolaos Zografakis (Director of PTA) and Mr. George Pantelakis (Financial officer) responsible for the financial management of the FDC and FDL actions.

**All persons involved and their role in the project are shown in Annex 7.16.**

The project management team in collaboration with the other associated beneficiaries, and input from various stakeholders, has carried out a number of activities to ensure the effective implementation of the project. These have taken place under the project "coordination and management" actions E.1, E.3 (scientific committee), E.4 (networking with other LIFE similar projects) and E.5 (stakeholder committee) as well as the D actions that are described in details in section 5 of this report (technical part). 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<sup>st</sup> 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 MAICh (for detailed results of these meetings, see annex 7.4 of the 1<sup>st</sup> progress report submitted to LIFE Unit on the 31.01.2011). The **3<sup>rd</sup> project meeting**, organized by the coordinating beneficiary (MAICh) and attended by the associated beneficiaries (NKUA and FDC) took place at the premises of the MAICh in parallel with the **3<sup>rd</sup> scientific committee meeting** on the 25<sup>th</sup> of October 2012 (action E.3, for more details on the 3<sup>rd</sup> scientific committee meeting, please see annex 7.3 of the 2<sup>nd</sup> progress report submitted to LIFE Unit on the 31.12.2012). The **3<sup>rd</sup> stakeholder committee meeting** (E.5, 29-03-2013) took place at the premises of the FDC. The **4<sup>th</sup> project**, the **4<sup>th</sup> scientific committee** and the **4<sup>th</sup> stakeholder committee** meetings were held in parallel with the final event of the JUNICOAST project that took place at the premises of MAICh on the 27<sup>th</sup> of August 2013. Moreover, **networking with other similar LIFE projects (action E.4)** allowed the exchange of Know-how, sharing problems and solutions among various European stakeholders working on coastal dunes. Three networking meetings with similar LIFE projects [PROVIDUNE (LIFE07NAT/IT/000519) and JUNIPERCY (LIFE10NAT/CY/000717)] have been organized in Cagliari-Italy, Chania-Greece and Nicosia-Cyprus respectively on 27-28 June 2012, 25-26 of October 2012 and 21-22 November 2012. Networking between PROVIDUNE, JUNICOAST and JUNIPERCY showed and confirmed that similar anthropogenic pressures are threatening coastal dunes in Greece and Italy and that the genus Juniperus, in general, is threatened by its low regeneration potential which is due to several natural factors such as slow growth, low seed viability and/or difficulty in germinating as well as the imbalance between the female/male ratio in the natural stands. Results from the various preparatory actions of JUNICOAST, PROVIDUNE and JUNIPERCY proved that more efforts are needed to mitigate the natural and anthropogenic pressures and impacts on habitat 2250\* and habitat 9650\*. To that end, similarities between various concrete conservation/public awareness actions and other best practices and success stories in order to enhance the protection/conservation of habitat 2250\* and habitat 9650\* as well as to preserve their habitat values have been also discussed. Additionally, successes and failures of previous experiences in Europe (see D-E.4.2) showed that a number of weaknesses and constraints in dune conservation and management remain. These relate mainly to planning and governance systems, a fact also confirmed on the Greek level (see D-A.9.2, report on Governance structure). Therefore, more research for the development of appropriate decision-making tools/methods is needed and governance aspects need to be further addressed in future projects.

Finally, the **monitoring and evaluation of the effectiveness of the project (action E.2)** measured and documented the effectiveness of the dissemination actions (**D-E.2.1**) implemented throughout the project. Comparison between baseline data (summer 2009) and data from the second cycle of monitoring (summer 2013) showed a significant increase in the level of public awareness. The evaluation of the effectiveness of the conservation actions (**D-E.2.2**) has not been measured nor documented because the on-site implementation of several concrete conservation actions was delayed due to unforeseeable and exceptional circumstances explained in the mid-term report of the project. This effectiveness (concrete conservation actions) will be measured and documented as proposed in the after-LIFE conservation plan of the project.



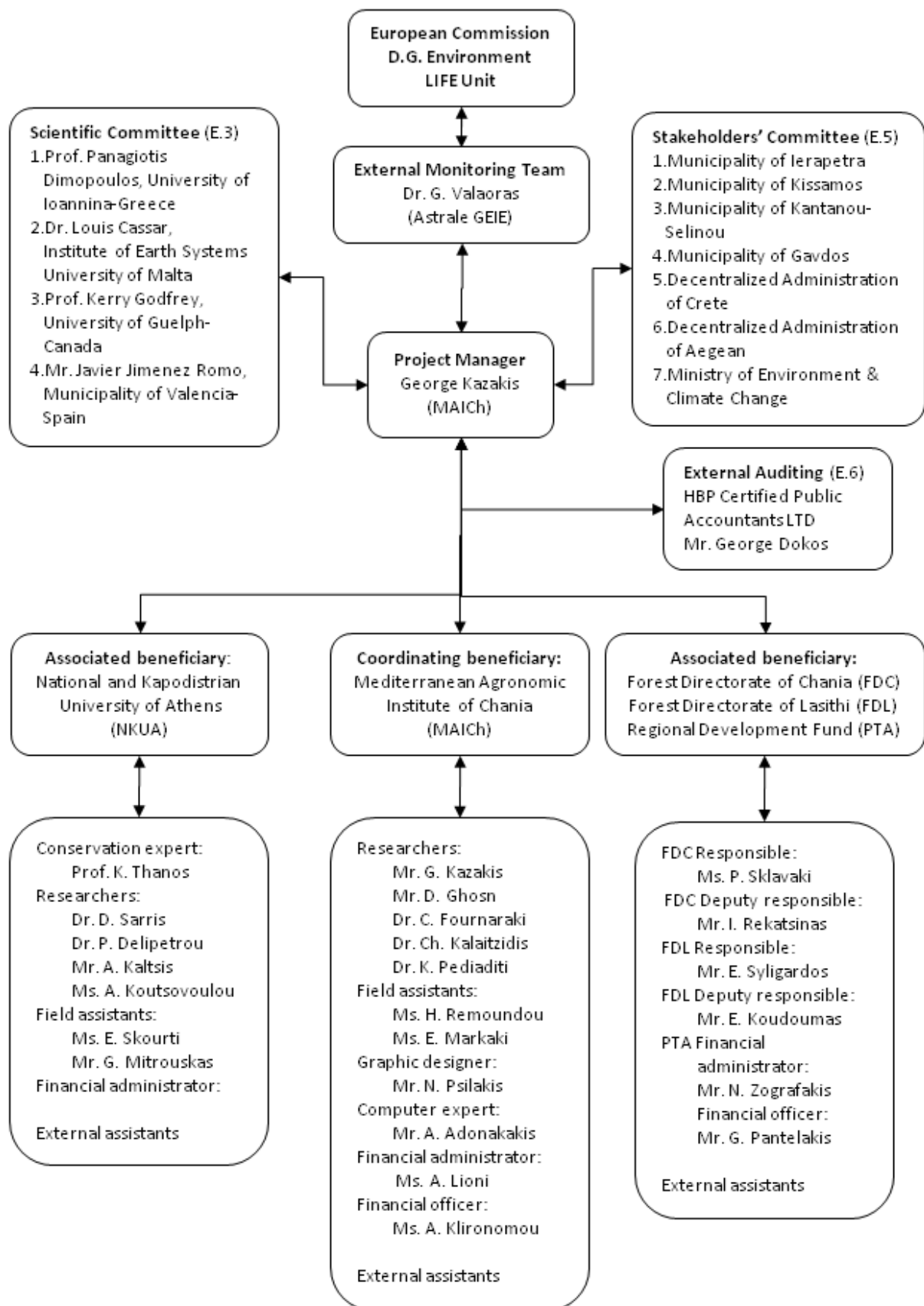
The external monitoring team of the project represented by Ms. Georgia Valaoras conducted its four (4) annual monitoring missions respectively on the 3rd of July 2009 (Gavdos), on the 28th of January 2010 (Falasarna), on the 31 of May 2011 (Chrysi) and on the 07, 08 and 09 of June 2012 (Kedrodasos). Updates on the technical and financial progress of the project and field visits to the priority habitat 2250\* in Gavdos, Falasarna, Chrysi and Kedrodasos were carried out.

The **LIFE Nature Unit** represented by Ms. Muriel Drukman (technical officer), Mr. Pappas Konstantinos (financial officer) and Ms. Georgia Valaoras (external monitoring team) **conducted the technical and financial auditing of the Junicoast project** on the 11th of September 2012 at the premises of the Mediterranean Agronomic Institute of Chania (MAICh). Field visits to the priority habitat 2250\* (3 in total, Sarakiniko, Agios Ioannis and Lavrakas) on Gavdos Island were carried out on the 12-15 of September 2012. Upon the request of the representatives of the LIFE Nature Unit, a brief report on the “adjustments to the implementation terms of some technical issues” has been submitted to the LIFE Nature Unit in Brussels on 20.09.2012. For more details on this report, please see annex 7.3 “others” of the 2<sup>nd</sup> progress report, “Report on the adjustments to the implementation terms of some technical issues”.

The inception, the 1<sup>st</sup> progress, the mid-term, the 2<sup>nd</sup> progress and the final (current document) technical and financial reports with their annexes have been submitted the LIFE Nature Unit respectively on 30.09.2009, 31.01.2011, 30.01.2012, 31.12.2012 and 30.11.2013

Moreover, updates on the project progress, have been submitted to the external monitoring team on a monthly basis.

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



### Partnership agreements

A partnership agreement (in Greek) between the coordinating and associated beneficiaries has been signed and submitted together with the inception report (annex 7.1 of the inception report) to the LIFE Nature Unit on September 2009. The content of the partnership agreement followed all the key characteristics (internal organisation of the partnership, roles, rights and responsibilities of the partners, the distribution of the Community financial contribution, additional rules on dissemination and use of results, intellectual property rights arrangements, settlement of internal disputes, common provisions annexed) required in the “guidelines to partnership agreements” of the LIFE+ programme.

## 4.2 Evaluation of the management system

By relying on the preparatory actions in Crete (Phase I and Phase II), JUNICOAST 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 objectives 1 and 2**). The preparatory actions were followed by the implementation of concrete conservation actions (Phase III) in Crete targeting the main natural and anthropogenic threats which put into practice, tested and evaluated 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 (Phase III) were carried out on a national level using a multi-stakeholder communication strategy allowing the promotion of conservation of the habitat in the South Aegean (**specific objective 4**). **Based on the above, the overall and specific objectives of the project were fully achieved and the management system of the project proved to be relevant and valid.**

Three major problems (explicitly described in the mid-term report under paragraph 3.3 “problems encountered”) have been encountered during the implementation of the concrete conservation actions (phase III) of the project which led to serious delays in the on-site implementation of several concrete conservation actions (C1, C2, C5, C6 and C7) that were being implemented by the Forest Directorate of Chania and Lasithi and MAICH. Due to these problems, the project remained behind its foreseen schedule (foreseen end-date: 31/12/2012). Thus, the coordinating beneficiary submitted together with the mid-term report of the project (31.01.2012) a “request for the amendment to the agreement” in which an extension of the project end-date by 8 months (modified end-date: 31/08/2013) and some modifications to the financial structure of the project were requested. A new detailed calendar for the implementation of all actions was illustrated in a new Gantt chart and all modifications to the financial structure of the project were fully described and justified (see request for the amendment to the agreement). **This amendment did not modify the general objective of the project nor increased the maximum contribution of the European Commission.** The Supplementary Agreement No 1 to Grant Agreement was approved and signed by the LIFE Unit and the Coordinating beneficiary on 21-3-2012.

**The effectiveness of the dissemination activities** was documented under action E.2 “monitoring and evaluation of the effectiveness of the project”. The objective of this action was to monitor; measure and document the effectiveness of the implemented dissemination actions. For that purpose, JUNICOAST developed long term monitoring protocols (action A.7) that enabled the evaluation of the effectiveness of the dissemination actions as compared to the initial situation, objectives and expected results. Comparison

between baseline data (summer 2009) and data from the second cycle of monitoring (summer 2013) showed a significant increase in the visitors' level of awareness particularly in relation to their perception on the protection status of habitat 2250\* and the reasons why the habitat is protected. Moreover, the visitors' awareness about the habitat main anthropogenic and natural threats has increased significantly between to 2009 and 2013 (for more details, please see D-E.2.1 report on the effectiveness of dissemination actions, submitted in annex 7.2 with this final report).

**The continuation of the project** is fully described in the “After-LIFE” communication and conservation plans submitted in separate documents together with this final report. The **remaining threats** such as the **lack of public awareness mainly regarding the main goal of the Natura 2000 network in Greece**, the **expansion of the impact of climate change on *Juniperus* populations and/or on other keystone species** and the **increase number of campers due to the present economic crisis** will be tackled by the developed communication strategy of the project through the identified and proposed communication activities which will be implemented after the end of the project (see After-LIFE communication plan in annex 7.2).

## 5. Technical part

### 5.1. Task by task - description

#### 5.1.1 Action A.1: Land-form 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, was implemented by MAICH and was completed on 30.06.2010.

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

- Literature review on the geomorphology, land-form and land degradation processes in dune systems,
- Measurement of Geo-referenced Geo-physical transects using Electrical Resistivity Tomography (ERT),
- Transects measurements with Ground penetrating Radar (GPR),
- Soil profile description and soil sample analysis,
- Landscape unit description and observations on erosion patterns,
- Vegetation description along all ERT transects,
- Acquisition of ground Control points (GCPs),
- Water sampling and analysis,
- Data processing and analysis,
- Hydrological modelling in Kedrodasos,
- Production and submission of seven geomorphological maps (one per site, D-A.1.2, see 1<sup>st</sup> progress report annex 7.1, submitted on 31.01.2011),
- Write-up and submission of the report on land-forms, structures and processes of the dune systems (D-A.1.1, see 1<sup>st</sup> 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%). Water Analysis in Lavrakas revealed that all mineral compounds are below the limits for drinking water. 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 fences and planting of sand fixing keystone species.

No major problems were encountered in implementing this action. This action is completed and no further activities 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.

Foreseen budget: 51.000 €

Modified budget: 50.100 €

Amount spent at the end of the project: 50.129,31 €

### **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, was implemented by MAICH 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,
- Identification and Geo-referencing 30x30m plots, each including two relevés (10x10m and 3x3m sub-plots),
- Identification of species composition and estimation of cover in all established plots and relevés,
- GPS measurements of all individual trees within the 30x30m plots,
- Measurement of vegetation transects,
- Data processing and analysis,
- Production and submission of 7 maps of specific areas within the habitats in need of restoration (one per site, D-A.2.2, see 1<sup>st</sup> 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 (D-A.2.1, see 1<sup>st</sup> 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 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.



Foreseen budget: 55.000 €

Modified budget: 48.200 €

Amount spent at the end of the project: 48.254,76 €

### 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 macrocarpa* in all Cretan sites. This action started on 01.01.2009, was implemented by NKUA 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 *Juniperus macrocarpa* and *Juniperus phoenicea* individuals,
- Determination of the *Juniperus* population size as well as numbers of trunks per individual,
- Determination of the *Juniperus* population sex ratio,
- Estimation of the *Juniperus* age structure,
- Sampling of cones and seeds for reproductive biology studies in Kedrodasos,
- Data input, processing and analysis
- Write-up and submission of the report on population size, age-size structure and sex ratios of the *Juniperus* populations (D-A.3, see 1<sup>st</sup> 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 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.

Foreseen budget: 42.000 €

Modified budget: 41.000 €

Amount spent at the end of the project: 40.606,56 €

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

The purpose of this action was to accurately identify and map the target habitat at all Cretan sites. This action started on 01.01.2009, was implemented by MAICh and was completed on 31.03.2010. During the implementation of this action, and after the suggestions of the scientific and stakeholder committees, an additional study on “**Mapping historical land cover changes of habitat 2250\* in Crete**”, was deemed necessary. This additional study did not modify the general objective of this action. It produced interesting and useful results which were taken into consideration when planning various concrete conservation actions and offered crucial information on the assessment of the state of the Cretan habitats without incurring additional unforeseen costs and remains an important tool for the future management of the sites. Justifications for this study are fully described and explained in annex 7.11 of this final report.

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

- Scanning and Geo-referencing topographic maps (scale 1:5000) of all Cretan sites,
- Digitizing of all topographic maps,
- Acquiring aerial photos of 1945 and 1968 (scale 1:15.000) of all Cretan sites,
- Acquiring recent aerial photos (1992 and 2004, scale 1:8.000) where available (Gavdos and Chrysi islands),
- Scanning, Geo-referencing and orthorectification of all aerial photos,
- Import of collected GPS data from Kedrodasos, Gavdos, Chrysi and Falasarna 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 1<sup>st</sup> report annex 7.1, submitted on 31.01.2011),
- Write-up and submission of the technical report (English and Greek) for habitat mapping (D-A.4, see 1<sup>st</sup> progress report, annex 7.1 submitted on 31.01.2011),
- Image analysis and vegetative cover change detection,
- Assessment of changes and presentation of results in maps,
- Production and submission of all Cretan land cover changes maps (submitted in separate document together with this final report),
- Write-up and submission of the study on mapping historical land cover changes of habitat 2250\* in Crete (submitted in annex 7.2 with this final report).
- Submission of the habitat 2250\* boundaries of all Cretan sites to the appropriate authorities, in Greece and in the EC in digital format (GIS Shapefile), together with metadata created according to the INSPIRE regulation using the “INSPIRE GEOPORTAL Metadata Editor”.

Conclusions or main findings:

Estimates of vegetation cover changes in habitat 2250\* between 1945 and/or 1968 and 2007, in Crete, showed that overall 80% of land cover did not change. Vegetated land shows an overall increase in all habitats from 95.7 ha (42%) to 117.7 ha (52%). Out of all sites under investigation, open areas that remained open account for the 43% of the total 227 hectares. Vegetative cover was maintained in 37%, it declined in 5% and increased in 15% of the total area. Land cover changes per site show that in all study sites, the increase of vegetation cover was at least marginally greater than areas of decline. The most significant changes have been detected in Lavrakas. It is the most densely vegetated site with 65% cover in 2007. Vegetation cover has increased overall by 15 ha (~15%). This

accounts for more than 2/3 of vegetation increase in all sites (22 ha in total). Chrysi island sites are 2<sup>nd</sup> and 3<sup>rd</sup> in vegetation increase with 2.43 and 2.13 ha (West and East sites respectively).

No major problems were encountered in implementing this action. This action is completed and no further activities 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, a technical report on habitat mapping, 6 land cover changes maps and technical report on mapping historical land cover changes of habitat 2250\* in Crete have been produced.

Foreseen budget: 64.000 €

Modified budget: 57.000 €

Amount spent at the end of the project: 59.137,67 €

### **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, was implemented by MAICH 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,
- Distribution and intensity of visitors and tents on a monthly basis starting from May/June (using GPS),
- Recording paths density using GPS,
- Visitor survey questionnaires,
- On site visitor surveys,
- Meetings with tourism and local representatives,
- Visitor consultation meetings,
- Data input,
- Litter surveys,
- 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, D-A.5.2, see 1<sup>st</sup> progress report, annex 7.1 submitted on 31.01.2011),
- Write-up and submission of the visitor impact assessment (D-A.5.1, see 1<sup>st</sup> 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 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.

Foreseen budget: 39.000 €

Modified budget: 40.700 €

Amount spent at the end of the project: 40.533,96 €

### **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, was implemented by MAICh and was completed on 30.09.2009.

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

- Organization of a stakeholder workshop at MAICh (25-02-2009),
- Organization of a community workshop in Gavdos (04-07-2009),
- 35 interviews with various 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) (D-A.6.1.1, D-A.6.1.2, D-A.6.1.3, and D-A.6.1.4, see inception report, annex 7.1 submitted on 30.09.2009),
- Production of 1 report with results of stakeholder consultation method effectiveness evaluation (D-A.6.2, see inception report, annex 7.1 submitted on 30.09.2009).

Conclusions or main findings:

Major communication partners (central government, local authorities, local communities, tourism operators, environmental education practitioners, conservation practitioners, politicians, general public, media and relevant non-governmental organizations) were identified. Perceived threats identified by the various stakeholders were related mainly to tourism, overgrazing, fire risk, pine encroachment, cutting of branches and lack of public awareness. Perceived values were natural/cultural heritage, recreation and education. Existing management of all sites at the onset of the project was considered as insufficient or ineffective, Governance issues were considered barrier to the effective management of the habitat.

No major problems were encountered in implementing this action. This action is completed and no further activities 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.

Foreseen budget: 32.000 €

Modified budget: 24.000 €

Amount spent at the end of the project: 24.092,40 €

### **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, was implemented by MAICH 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 (D-A.7, see 1<sup>st</sup> 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 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.

Foreseen budget: 39.000 €

Modified budget: 20.000 €

Amount spent at the end of the project: 20.000 €

### **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, was implemented by NKUA 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 (D-A.8, see 1<sup>st</sup> progress report, annex 7.1 submitted on 31.01.2011).

Conclusions or main findings:

The main intervention measures that were proposed to 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 are envisaged.

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

Foreseen budget: 24.000 €

Modified budget: 22.000 €

Amount spent at the end of the project: 15.107,39 €

### **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, was implemented by MAICH 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\* (D-A.9.1, see 1<sup>st</sup> progress report, annex 7.1 submitted on 31.01.2011),
- Write-up and submission of the report on the determination of Governance structure (D-A.9.2, see 1<sup>st</sup> 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 are envisaged.

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

Foreseen budget: 12.000 €

Modified budget: 12.000 €

Amount spent at the end of the project: 11.608.64 €

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

The purpose of this action was to demarcate the on-site boundaries of the habitats in all Cretan sites. This action started on 01.01.2010, was implemented by the FDC (Kedrodasos, Sarakiniko-Gavdos, Agios Ioannis-Gavdos, Lavrakas-Gavdos and Falasarna) and the FDL (Chrysi-East and Chrysi-West) and was completed on 31.05.2013. Some technical adjustments in the implementation terms of this concrete conservation action were fully described and explained in the “**Adjustments to the implementation terms of some technical issues**” document that was submitted upon the request of the “monitoring team” to the LIFE Nature Unit on 20.09.2012 (see also annex 7.3 “others” of the 2<sup>nd</sup> progress report, 31.12.2012). These adjustments were minor and did not modify the purpose of this action neither the general objective of the project. They were fine-tuned to the specificity of each site and were the results of various discussions and consultations between the project consortium, the scientific committee and various stakeholders’ of the project.

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

- Exchange of data on habitat demarcation from various preparatory actions,
- On-site discussions on habitat demarcation,
- Clarification of technical issues on habitat demarcation (fencing materials, boundaries to be demarcated, etc.) between the partners,
- Preparation of tender specifications (technical studies) for the habitat demarcation,
- Publication of tender specifications for habitat demarcation,
- Submission of offers for habitat demarcation,

- Evaluation of the submitted offers,
- Selection of the external assistants for the implementation of this action,
- On-site demarcation of all Cretan study sites.

Main outputs:

239.31 ha of coastal dunes with *Juniperus* spp. in Crete have been demarcated of which 11.48 ha are in Kedrodasos, 2.76 ha in Falasarana, 16.52 ha in Sarakiniko-Gavdos, 25.54 ha in Agios Ioannis-Gavdos, 98.55 in Lavrakas-Gavdos and 87.46 ha on Chrysi Island. 122 wooden sticks for habitat demarcation have been installed in Gavdos, 15 in Falasarna, 29 in Kedrodasos and 161 on Chrysi Island.

**Major problems** were encountered in implementing this action. These problems were described and solved (see paragraph 3.3, point 1 and point 2, “problems encountered” of the mid-term report submitted on 31.12.2011). Due to these major problems and the delays encountered, the coordinating beneficiary (MAICh) required a postponement of the end-date of this action from 31-03-2012 to 31-12-2012 (see annex 7.4 of the mid-term report-Project actions, provisioned and modified time table). Moreover, other minor problems were encountered after implementing this action on the Island of Gavdos (Agios Ioannis and Lavrakas sites) where acts of vandalism have occurred. Some of the wooden posts that have been installed to demarcate the boundaries of the habitat and labelled with the LIFE and the Natura 2000 logos have been damaged or destroyed by the visitors or campers. Some “slogans” were written by visitors or campers on the wooden sticks, reflecting specific ideological or political point of views. This phenomenon is on the rise due to the economic crisis and the general “political atmosphere” in Greece. We believe that increasing public awareness is a fundamental controlling factor of these acts and that people are more inclined to accept restrictions when they know the reasons behind them. Consequently, damaged wooden posts have been replaced and more communication efforts were undertaken with the local communities and the visitors (on-site information meetings during the last summer season of the project) in order to minimize vandalism acts and to ensure an appropriate visitor conduct while on sites. **This action is completed and further After-LIFE maintenance activities are envisaged** (see D-D.7.2, After-LIFE conservation plan submitted in annex 7.2 with this final report).

Action C.1 has met its objectives and M-C.1 “soft fencing of all Cretan sites” has been completed.

Foreseen budget: 85.000 €

Modified budget: 89.500 €

Amount spent at the end of the project: 77.810,35 €

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

The purpose of this action was to remove existing solid waste present on all the Cretan sites within the boundaries of the habitats. This action started on 01.01.2010, was implemented by the FDC (Sarakiniko-Gavdos, Agios Ioannis-Gavdos, and Falasarna) and the FDL (Chrysi-East and Chrysi-West) and was completed on 31.07.2013. Some technical adjustments in the implementation terms of this concrete conservation action were fully described and explained in the “**Adjustments to the implementation terms of some technical issues**” document that was submitted upon the request of the “monitoring team” to the LIFE Nature Unit on 20.09.2012 (see also annex 7.3 “others” of the 2<sup>nd</sup> progress report, 31.12.2012). These adjustments were minor and did not modify the

purpose of this action neither the general objective of the project. They were fine-tuned to the specificity of each site and were the results of various discussions and consultations between the project consortium, the scientific committee and various stakeholders' of the project.

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

- Exchange of data on waste removal from various preparatory actions,
- On-site discussion on practical issues on waste removal,
- Allocation of direct treaties for waste removal,

Main outputs:

Based on the results of the litter survey and the discussions between the coordinating beneficiary and the associated beneficiaries (FDC and FDL), sites where direct treaties have been allocated are Sarakiniko-Gavdos, Agios Ioannis-Gavdos Falasarna and Chrysi. Greenhouses residues have been removed from the site in Falasarna (FDC). Camping left overs and other solid waste material have been removed from the island of Chrysi (FDL) and from Sarakiniko-Gavdos, Agios Ioannis-Gavdos (FDC). Other sites where no direct treaties have been allocated (Kedrodasos and Lavrakas-Gavdos) have been cleaned (litter removal with public engagement) with the help of the local communities and various volunteers.

239.31 ha of coastal dunes with *Juniperus* spp. in Crete have been cleaned (litter and solid waste removal) of which 11.48 ha are in Kedrodasos, 2.76 ha in Falasarana, 16.52 ha in Sarakiniko-Gavdos, 25.54 ha in Agios Ioannis-Gavdos, 98.55 in Lavrakas-Gavdos and 87.46 ha on Chrysi Island. 15 four-wheeled plastic rubbish bins have been installed in Gavdos, 6 in Kedrodasos and 2 in Falasarna.

**Major problems** were encountered in implementing this action. These problems were described and solved (see paragraph 3.3, point 1 and point 2, “problems encountered” of the mid-term report submitted on 31.12.2011). Due to these major problems and the delays encountered, the coordinating beneficiary (MAICH) required a postponement of the end-date of this action from 31-03-2012 to 31-12-2012 (see annex 7.4 of the mid-term report-Project actions, provisioned and modified time table). **This action is completed and further After-LIFE solid waste and litter removal activities are envisaged** (see D-D.7.2, After-LIFE conservation plan submitted in annex 7.2 with this final report).

Action C.2 has met its objectives and M-C.2 “habitats clean from solid waste” has been completed.

Foreseen budget: 62.000 €

Modified budget: 48.000 €

Amount spent at the end of the project: 26.671,36 €

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

The purpose of this action was 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, was implemented by the NKUA and was completed on 30-06-2013.

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

- Exchange of data on Juniper regeneration from various preparatory actions,

- Collection of genetic material (seeds and cuttings) of *Juniperus macrocarpa*,
- Fencing of juvenile *Juniperus macrocarpa* individuals in Kedrodasos,
- Planting and micro-fencing new junipers individuals derived from cuttings in Chrysi and Gavdos,
- Write-up and submission of D-C.3.1 “Interim report on juniper regeneration and enhancement” (see annex 7.1 of the mid-term report submitted on 31.01.2012),
- Planting and micro-fencing new junipers individuals derived from cuttings in Kedrodasos,
- Installation of information signs regarding the enhancement of juniper regeneration in Kedrodasos,
- Maintenance of the micro-fencing around planted juvenile plants and placement of artificial shading,
- Micro-fencing of 5 juvenile *Juniperus macrocarpa* plants in Sarakiniko-Gavdos,
- Processing of the *Juniperus macrocarpa* survival data collected during the field visits to Gavdos, Chrysi and Kedrodasos,
- Evaluation of the survival rate of the replanted juvenile *Juniperus macrocarpa* plants,
- Monitoring the development and maintenance of the remaining *Juniperus macrocarpa* seedlings at the nursery of MAICh,
- Evaluation of the plantation features of *Juniperus macrocarpa* (time, place, means of protection),
- Planning of the future plantations of juvenile *Juniperus macrocarpa* plants growing at the nursery of MAICh, based on the evaluation results,
- Transplanting and fencing the remaining juvenile *Juniperus macrocarpa* plants from the nursery of MAICh in Kedrodasos,
- Transplanting and fencing the remaining juvenile *Juniperus macrocarpa* plants from the nursery of MAICh in Gavdos (Sarakiniko and Agios Ioannis),
- Write-up and submission of D-C.3.2 “Final report on juniper regeneration and enhancement” (submitted in annex 7.2 with this final report).

Main outputs:

96 juvenile *Juniperus macrocarpa* plants were replanted and fenced at various Cretan sites (21 in Sarakiniko-Gavdos of which 14 have survived, 41 in Agios Ioannis-Gavdos of which 25 have survived and 34 in Kedrodasos-Elafonisi of which 14 have survived). Moreover, 12 naturally established juveniles of *Juniperus macrocarpa* were fenced (6 in Sarakiniko-Gavdos and 6 in Kedrodasos-Elafonisi). Finally, approximately 150 juvenile *Juniperus macrocarpa* plants and 60 female individuals are growing in the nursery of MAICh for future planting if needed.

**No major problems** were encountered in implementing this action. However, the coordinating beneficiary (MAICh) required the postponement of the end-date of this action from 30-06-2012 to 30-06-2013 (see annex 7.4 of the mid-term report-Project actions, provisioned and modified time table) in order to take advantage of another “planting season” during the implementation of this action. During this time period, re-planting of some Juniper plants that did not survive from the first planting was repeated. **This action is completed and further After-LIFE maintenance activities are envisaged** (see D-D.7.2, After-LIFE conservation plan submitted in annex 7.2 with this final report).

Action C.3 has met its objectives, two reports on reports on juniper regeneration and enhancement have been produced and M-C.3 “Protection of natural, juniper seedling regeneration and population enrichment with additional seedlings” has been completed.

Foreseen budget: 45.000 €

Modified budget: 48.000 €

Amount spent at the end of the project: 48.525,07 €

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

The purpose of this action was 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, was implemented by the NKUA and was completed on 30-06-2013.

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

- Exchange of data on floristic composition and structure from various preparatory actions,
- Collection of genetic materials of selected keystone species from all Cretan sites,
- Discussions on on-site technical intervention methods (micro-fencing, shading, etc.) of *Juniperus* young juveniles and seedlings,
- Micro-fencing of *Juniperus macrocarpa* in Kedrodasos, Chrysi and Gavdos,
- Control of the invasion of *Pinus brutia* into habitat 2250\* by removing juvenile pines within identified pilot zones at Gavdos and Chrysi sites,
- Eradication of invasive species (*Carpobrotus edulis*) from Chrysi,
- Balancing the male/female ratio of *Juniperus macrocarpa* in both sites of Chrysi 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 (see annex 7.1 of the mid-term report submitted on 31.01.2012),
- Collection of *Centaurea pumilio* and *Pancratium maritimum* juvenile plants from Elafonisos,
- Replanting seedlings and juvenile plants from selected species (*Centaurea pumilio*, *Pancratium maritimum*, *Triplachne nitens*, *Nigella stricta*) in Kedrodasos,
- Fencing of seedlings and juvenile plants with micro-fences and installation of information signs regarding the restoration of habitat 2250\* in Kedrodasos,
- Monitoring and care of *Juniperus macrocarpa* cuttings from Chrysi at the NKUA laboratory,
- Evaluation of the survival rate of the replanted juvenile plants (keystone species) in Kedrodasos and Maintenance of the micro-fencing around them,
- Evaluation the results of the removal of *Pinus brutia* juvenile plants and alien species in Chrysi,
- Write-up and submission of the final report on protection and enhancement of keystone species (including juniper male/female balancing, D-C.4.2, submitted in annex 7.2 with this final report).

Main outputs:



45 *Pancratium maritimum* and 44 *Centaurea pumilio* individuals have been planted and fenced in kedrodasos of which 21 *Pancratium maritimum* and 19 *Centaurea pumilio* have survived. 35 female young individuals of *Juniperus macrocarpa* were planted in Chrysi. 184 saplings of *Pinus brutia* have been eradicated from Cretan sites (57 from Sarakiniko-Gavdos, 30 from Agios Ioannis-Gavdos, 57 from Lavrakas-Gavdos, 19 from Chrysi-East and 21 from Chrysi-West). Moreover, the invasive species *Carpobrotus edulis* have been eliminated from 2 localities in Chrysi-East.

**No major problems** were encountered in implementing this action. However, the coordinating beneficiary (MAICh) required the postponement of the end-date of this action from 30-06-2012 to 30-06-2013 (see annex 7.4 of the mid-term report-Project actions, provisioned and modified time table) in order to take advantage of another “planting season” during the implementation of this action. During this time period, re-planting of some *Juniperus* female individuals and other keystone species that did not survive from the first planting were repeated. **This action is completed and further After-LIFE maintenance, monitoring and evaluation activities are envisaged** (see D-D.7.2, After-LIFE conservation plan submitted in annex 7.2 with this final report).

Action C.4 has met its objectives, two reports on protection and enhancement of keystone species have been produced and M-C.4 “Establishment of seedlings/saplings of keystone species (including juniper saplings, balancing male/female ratio” has been completed.

Foreseen budget: 50.000 €

Modified budget: 50.000 €

Amount spent at the end of the project: 42.768.68 €

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

The purpose of this action was 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, was implemented by the FDL and was completed on 31.05.2013. Some technical adjustments in the implementation terms of this concrete conservation action were fully described and explained in the “**Adjustments to the implementation terms of some technical issues**” document that was submitted upon the request of the “monitoring team” to the LIFE Nature Unit on 20.09.2012 (see also annex 7.3 “others” of the 2<sup>nd</sup> progress report, 31.12.2012). These adjustments were minor and did not modify the purpose of this action neither the general objective of the project. They were fine-tuned to the specificity of each site and were the results of various discussions and consultations between the project consortium, the scientific committee and various stakeholders’ of the project.

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

- State of the art on front dune stabilization,
- Exchange of data from various preparatory actions,
- Discussions on technical issues on front dune stabilization between partners and the scientific committee,
- Preparation of tender specifications (technical studies) for the front dune stabilization in Chrysi-East,
- Publication of tender specifications for the front dune stabilization in Chrysi-East,
- Submission of offers for the front dune stabilization in Chrysi-East,
- Evaluation of the submitted offers,



- Selection of the external assistant for the implementation of this action,
- On site front dune stabilization in Chrysi-East.

Main outputs:

14 units of sand trapping fences (200m length in total) were installed at the North beach of the East site of Chrysi Island.

**Major problems** were encountered in implementing this action. These problems were described and solved (see paragraph 3.3, point 1 and point 2, “problems encountered” of the mid-term report submitted on 31.12.2011). Due to these major problems and the delays encountered, the coordinating beneficiary (MAICh) required a postponement of the end-date of this action from 30-06-2012 to 30-04-2013 (see annex 7.4 of the mid-term report-Project actions, provisioned and modified time table). **This action is completed and further After-LIFE maintenance, planting and monitoring activities are envisaged** (see D-D.7.2, After-LIFE conservation plan submitted in annex 7.2 with this final report).

Action C.5 has met its objectives and M-C.5 “Sand stabilization and sand fixation in previously erosive areas” has been completed.

Foreseen budget: 58.000 €

Modified budget: 51.000 €

Amount spent at the end of the project: 28.271,76 €

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

The purpose of this action was 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, was implemented by the FDC (Kedrodasos, Sarakiniko-Gavdos, Agios Ioannis-Gavdos, Lavrakas-Gavdos and Falasarna) and the FDL (Chrysi-East and Chrysi-West) and was completed on 31.05.2013. Some technical adjustments in the implementation terms of this concrete conservation action were fully described and explained in the “**Adjustments to the implementation terms of some technical issues**” document that was submitted upon the request of the “monitoring team” to the LIFE Nature Unit on 20.09.2012 (see also annex 7.3 “others” of the 2<sup>nd</sup> progress report, 31.12.2012). These adjustments were minor and did not modify the purpose of this action neither the general objective of the project. They were fine-tuned to the specificity of each site and were the results of various discussions and consultations between the project consortium, the scientific committee and various stakeholders’ of the project.

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

- Exchange of data from various preparatory actions,
- Discussions on technical issues on visitor management interventions and infrastructures between partners and the scientific committee,
- Preparation of tender specifications (technical studies) for the visitor management intervention and infrastructures,
- Publication of tender specifications for the visitor management intervention and infrastructures,
- Evaluation of the submitted offers,

- Selection of the external assistants for the implementation of this action,
- On-site implementation of visitor management infrastructures on all Cretan sites.

Main outputs:

340 m of wooden boardwalks have been constructed and installed (120 m in Sarakiniko-Gavdos and 220 m in Chrysi-East). 65 directional wooden sticks have been installed for the main trails delineation in Gavdos (Agios Ioannis and Lavrakas), 40 in Chrysi Island and 8 directional metal sticks for the E4 path in Kedrodasos. 10 wooden rubbish bins have been installed at the main beach in Sarakiniko-Gavdos. 2 wooden tables with wooden benches have been installed within the habitat in Sarakiniko-Gavdos, 3 wooden benches have been installed within the habitat in Kedrodasos and 2 on Chrysi Island.

**Major problems** were encountered in implementing this action. These problems were described and solved (see paragraph 3.3, point 1 and point 2, “problems encountered” of the mid-term report submitted on 31.12.2011). Due to these major problems and the delays encountered, the coordinating beneficiary (MAICH) required a postponement of the end-date of this action from 30-06-2012 to 30-04-2013 (see annex 7.4 of the mid-term report-Project actions, provisioned and modified time table). Moreover, other minor problems were encountered after implementing this action on the Island of Gavdos (Agios Ioannis and Lavrakas sites) where acts of vandalism have occurred. Some of the wooden posts that have been installed to delineate the main trails and labelled with the LIFE and the Natura 2000 logos have been damaged or destroyed by the visitors or campers. Some “slogans” were written by visitors or campers on the wooden sticks, reflecting specific ideological or political point of views. This phenomenon is on the rise due to the economic crisis and the general “political atmosphere” in Greece. We believe that increasing public awareness is a fundamental controlling factor of these acts and that people are more inclined to accept restrictions when they know the reasons behind them. Consequently, damaged wooden posts have been replaced and more communication efforts were undertaken with the local communities and the visitors (on-site information meetings during the last summer season of the project) in order to minimize vandalism acts and to ensure an appropriate visitor conduct while on sites. **This action is completed and further After-LIFE maintenance activities are envisaged** (see D-D.7.2, After-LIFE conservation plan submitted in annex 7.2 with this final report).

Action C.6 has met its objectives and M-C.6 “Installation and designation of board walks, parking areas, rubbish bins” has been completed.

Foreseen budget: 93.000 €

Modified budget: 109.500 €

Amount spent at the end of the project: 101.288,19 €

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

The purpose of this action was 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, was implemented by MAICH and was completed on 31.05.2013.

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

- Initiation and preparation of signs standards (design and fabrication guidelines),
- Discussions on the assessment of strategic locations of signs in all Cretan sites,

- Finalization of signs standards (design and fabrication guidelines),
- Finalization of signs content,
- Correction and improvement of the content of the information signs of all Cretan sites and market research for the printing of the signs,
- Print out of the content of the information signs,
- Construction and installation of signs on all Cretan sites.

Main outputs:

16 information signs have been installed within the boundaries of all Cretan sites (4 in Kedrodaso, 2 in Falasarna, 2 in Srakiniko-Gavdos, 2 in Agios Ioannis-Gavdos, 3 in Lavrakas-Gavdos and 3 on Chrysi Island). The information signs in electronic format (\*.pdf) are submitted in annex 7.3 with this final report.

**Major problems** were encountered in implementing this action. These problems were described and solved (see paragraph 3.3, point 1 and point 2, “problems encountered” of the mid-term report submitted on 31.12.2011). Due to these major problems and the delays encountered, the coordinating beneficiary (MAICh) required a postponement of the end-date of this action from 30-06-2011 to 31-12-2012 (see annex 7.4 of the mid-term report-Project actions, provisioned and modified time table). **This action is completed and further After-LIFE maintenance activities are envisaged** (see D-D.7.2, After-LIFE conservation plan submitted in annex 7.2 with this final report).

Action C.7 has met its objectives and M-C.7 “Installation of directional and information signs” has been completed.

Foreseen budget: 54.000 €

Modified budget: 68.400 €

Amount spent at the end of the project: 53.970,02 €

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

The purpose of this action was 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, was implemented by MAICh and was completed on 31.08.2013.

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

- 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*, *Pancretium maritimum*, *Silene colorata*, *Pseudorlaya pumila*, *Triplachne nitens*, *Vulpia fasciculata*, *Medicago marina*, *Centaeurea 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,

- Production of draft and final protocols for seed collection, handling and storage of collected keystone species,
- Production of draft and final protocols for seed germination of collected keystone species,
- 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 D-C.8.1 (see 1<sup>st</sup> progress report annex 7.1, submitted on 31.01.2011),
- Write-up and submission of the final report on *Ex situ* conservation D-C.8.2, (submitted in annex 7.2 with this final report).

Main outputs:

Seeds from *Juniperus macrocarpa* and all keystone species have been collected, cleaned and stored at the seed bank of MAICH. Germination tests, seed collection, handling and storage protocols of collected keystone species have been produced and plant materials from keystone species have been propagated.

No major problems were encountered in implementing this action. This action is completed and further After-LIFE collection, storage and propagation of *Juniperus macrocarpa* and other keystone species activities are envisaged (see D-D.7.2, After-LIFE conservation plan submitted in annex 7.2 with this final report).

Action C.8 has met its objectives, two reports on *ex-situ* conservation have been produced and M-C.8 “Storage and cultivation of seed-lots and cuttings” has been completed.

Foreseen budget: 70.000 €

Modified budget: 70.900 €

Amount spent at the end of the project: 66.096,12 €

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

The purpose of this action was 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, was implemented by MAICH and was completed on 31.08.2013.

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

- State of the art on monitoring and evaluation of effectiveness,
- Preparation of monitoring actions based on defined indicators of action A.7,
- Preparation of visitor surveys questionnaires' for Kedrodasos and Gavdos,
- On site visitor surveys (July-August 2013, 320 questionnaires in total) in Kedrodasos (80 questionnaires) and Gavdos (240 questionnaires),
- Questionnaires data entry and analysis,
- Comparison between baseline data (summer 2009) and data from the second cycle of monitoring (summer 2013),
- Write up and submission of a monitoring report on the effectiveness evaluation of the dissemination actions D-E.2.1 (submitted in annex 7.2 with this final report).

Main outputs:

Comparison between baseline data (summer 2009) and data from the second cycle of monitoring (summer 2013) showed a significant increase in the visitors' level of awareness particularly in relation to their perception on the protection status of habitat 2250\* and the reasons why the habitat is protected. Moreover, the visitors' awareness about the habitat main anthropogenic and natural threats has increased significantly between to 2009 and 2013.

**Major problems** were encountered in implementing this action. These problems were described in paragraph 3.3, point 1 and point 2, “problems encountered” of the mid-term report submitted on 31.12.2011. Due to these major problems and the delays encountered in the on-site implementation of several concrete conservation actions (C1, C2, C5, C6 and C7), the coordinating beneficiary (MAICH) required a postponement of the end-date of this action from 31-12-2012 to 31-08-2013 (see annex 7.4 of the mid-term report-Project actions, provisioned and modified time table). Moreover, and due to the above-mentioned delays, the evaluation of the effectiveness of the concrete conservation actions (D-E.2.2) has not been measured nor documented. This effectiveness (concrete conservation actions) will be measured and documented as proposed in the after-LIFE conservation plan of the project. **This action is completed and further After-LIFE monitoring activities are envisaged** (see D-D.7.2, After-LIFE conservation plan submitted in annex 7.2 with this final report).

Action E.2 has **partially** met its objectives; one report on the effectiveness evaluation of the dissemination actions has been completed.

Foreseen budget: 60.000 €

Modified budget: 53.000 €

Amount spent at the end of the project: 21.787.10 €

### 5.1.19 Action E.3: Scientific Committee

The purpose of this action was to establish a scientific committee which will advise and evaluate the scientific quality of the work undertaken for this project. This action started on 01.01.2009, was implemented by MAICH and was completed on 31.08.2013.

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

- Establishment of the scientific committee,
- Preparation and organization of the 1<sup>st</sup> scientific committee meeting held on 26<sup>th</sup> and 27<sup>th</sup> of February 2009 in MAICH,
- Field visit to Kedrodasos and on-site discussions on various aspects of the project (27<sup>th</sup> of February 2009),
- Minutes of the 1<sup>st</sup> 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 2<sup>nd</sup> scientific committee meeting held on the 21<sup>st</sup> of October 2010 in MAICH ,
- Minutes of the 2<sup>nd</sup> scientific committee meeting (see annex 7.4 of the 1<sup>st</sup> progress report submitted on the 31.01.2011),
- Preparation and organization of the 3<sup>rd</sup> scientific committee meeting held on the 25<sup>th</sup> and 26<sup>th</sup> of October 2012 in MAICH,
- Field visit to Kedrodasos and on-site discussions on the implementation of the concrete conservation and dissemination actions (26<sup>th</sup> of October 2012),

- Minutes of the 3<sup>rd</sup> scientific committee meeting (see annex 7.3 of the 2<sup>nd</sup> progress report submitted on the 31.12.2012),
- Preparation and organization of the 4<sup>th</sup> scientific committee meeting held in parallel with the final event of the project on the 27<sup>th</sup> of August 2013 in MAICh,
- Minutes of the 4<sup>th</sup> scientific committee meeting are included in the minutes of the final event (see annex 7.14),
- Regular informal communication with committee members, for consultation on various scientific issues.

#### Main outputs:

Scientific committee of the project has been established, four (4) scientific committee meetings have been organized and minutes for each specific meeting have been produced.

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

Action E.3 has met its objectives; the scientific committee of the project has been established (**M-E.3**), 4 scientific committee meetings have been organized and minutes for each specific meeting have been produced.

Foreseen budget: 30.000 €

Modified budget: 32.000 €

Amount spent at the end of the project: 23.295,96 €

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

The purpose of this action was to establish networks with other relevant LIFE Projects. This action started on 01.01.2010, was implemented by MAICh and was completed on 31-12-2012.

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

- Official contacts with a similar LIFE+ Nature project (PROVIDUNE, Italy LIFE07NAT/IT/000519 see annex 7.4 of the 1<sup>st</sup> 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)),
- Preparation of the Joint meeting between JUNICOAST-Greece and PROVIDUNE-Italy,
- Visit to the PROVIDUNE project in Sardinia-Italy (26-29/6-2012) in order to exchange knowledge, best practices and discuss various concrete conservation actions being implemented by both projects in Greece and Italy,
- Submission of an article for the LIFE Newsletter about the joint meeting between PROVIDUNE and JUNICOAST that took place in Cagliari on 27-28 June 2012,
- Official contacts with a similar LIFE project (JUNIPERCY, Cyprus LIFE10NAT/CY/000717),
- Participation of the coordinating and associated beneficiaries of the Cypriot JUNIPERCY project in the 3<sup>rd</sup> scientific committee meeting of JUNICOAST,
- Visit to the Cypriot JUNIPERCY project in Nicosia-Cyprus on 20-23 of November 2012 in order to exchange knowledge, best practices and discuss



various concrete conservation actions being implemented by both projects in Greece and Cyprus,

- Write-up and submission of the report on networking with other similar LIFE projects D-E.4.1 (see 2<sup>nd</sup> progress report annex 7.1, submitted on 31.12.2012),
- Write-up and submission of the report on the success and failures of previous experiences in Europe D-E.4.2 (see 2<sup>nd</sup> progress report annex 7.1, submitted on 31.12.2012).

#### Main outputs:

Know how among various European stakeholders working on coastal dunes and/or *Juniperus* species was exchanged. Results from the networking meetings showed and confirmed that similar anthropogenic pressures are threatening coastal dunes in Greece and Italy and that the genus *Juniperus*, in general, is threatened by its low regeneration potential which is due to several natural factors such as slow growth, low seed viability and/or difficulty in germinating as well as the imbalance between the female/male ratio in the natural stands.

Successes and failures of previous experiences in Europe (see D-E.4.2) showed that a number of weaknesses and constraints in dune conservation and management remain. These relate mainly to planning and governance systems, a fact also confirmed on the Greek level (see D-A.9.2, report on Governance structure).

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

Action E.4 has met its objectives; one report on networking with other similar LIFE projects and one report on the success and failures of previous experiences in Europe have been produced.

Foreseen budget: 10.000 €

Modified budget: 16.500 €

Amount spent at the end of the project: 16.005,79 €

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

The purpose of this action was 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 01.01.2009, was implemented by MAICh and was completed on 31.08.2013.

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

- Preparation and organization of the 1<sup>st</sup> 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 1<sup>st</sup> progress report submitted on the 31.01.2011),
- Preparation and organization of the 3<sup>rd</sup> stakeholder committee meeting held on the 29<sup>th</sup> of March 2013 at the offices of the FDC,

- Preparation and organization of the 4<sup>th</sup> stakeholder committee meeting held in parallel with the final event of the project on the 27<sup>th</sup> of August 2013 in MAICH,
- Regular informal discussions with representatives of relevant municipalities (Gavdos, Ierapetra, Kissamos, Kantanou-Selinou, Naxos),
- Regular informal communications with various stakeholders on issues related to the on-site implementation of various concrete conservation actions.

Main outputs:

Stakeholders committee of the project has been established and four (4) stakeholders' committee meetings have been organized.

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

Action E.5 has met its objectives; the stakeholders committee of the project has been established (**M-E.5**) and 4 stakeholders' committee meetings have been organized.

Foreseen budget: 5.000 €

Modified budget: 5.000 €

Amount spent at the end of the project: 5.000 €

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

The purpose of this action was to examine by an external auditor all the project financial data and cost statements of the project. The external financial auditing for MAICH and PTA was conducted on 13-14/11/2013. The external financial auditing for NKUA was conducted on 28/01/2014 due to the strike of the Special Account for Research Grants of the University of Athens.

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

- Identification of the auditing company and the financial auditor,
- Implementation of the external financial auditing,
- Write-up and submission of the auditing report by the financial auditor (see annex 7.6 of this final report).

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

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

Name and the contact details of the auditor:

Auditor Name: **George Dokos**

VAT No: EL 998683050

Registration Number: **SOEL 152**

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

Action E.6 has met its objectives; financial data and cost statements of the project have been examined by an external auditor and one auditing report, which is being submitted together with this final report, has been produced.

Foreseen budget: 10.000 €

Modified budget: 10.000 €

Amount spent at the end of the project: 10.000 €

## 5.2. Evaluation

In order to evaluate whether the overall and the specific objectives of the JUNICOAST project were actually met, it is necessary to assess the results of all the project actions on the short and long-terms levels:

On the short term-level that is within the timeframe of the project, the working method (see paragraph 4.1, description of the working method) of the JUNICOAST project proved to be valid and effective in the implementation of the project as a whole, as well as, of its particular actions. Upon completion of the project duration, the overall effectiveness of the JUNICOAST working method became quite evident since:

The demonstration aspect of the project and the implementation of its actions at two parallel levels (Cretan and National levels) proved to be extremely useful and practical. It allowed to put into practice, test, evaluate actions and methodologies that were unfamiliar to the Greek geographical, ecological and socio-economical context, at the Cretan level, and to effectively disseminate them at the National level,

The project fulfilled its overall and specific objectives (see paragraph 4.2 evaluation of the management system and table 2 below),

The expected results both at the Cretan and National levels were fully achieved.

It is obvious that continuous efforts and collaborations between all stakeholders are needed in order to enable the long-term conservation of priority habitat 2250\* in Crete and the South Aegean. More specifically, regular monitoring, after-LIFE communication and conservation activities and an adaptive management approach should be implemented after the end of the project to secure the sustainability of the concrete conservation actions implemented by the project in Crete, to promote the implementation of similar actions within habitat 2250\* on the South Aegean and National Levels and to ensure that the project results and all dissemination materials developed within the project will be accessible to the general public (see After-LIFE communication and conservation plans submitted in annex 7.2 with this final report). All the above mentioned activities were agreed upon between the project beneficiaries, the local authorities and the stakeholders during the final event of the project.

**Table 2 Comparison between achieved deliverables/milestones and objectives as foreseen in the revised proposal**

<b>Action / Objectives as foreseen in the revised proposal</b>	<b>Achieved Deliverables/Milestones</b>	<b>Evaluation</b>
A1 / To map and describe the landforms, structures and processes on the surface and the subsurface of the 2250* habitat in all Cretan sites	7 geomorphological maps (one per site) 1 report (including the geomorphological transect profiles of each habitat) on landforms, structures and processes of the dune systems in Crete	The objectives of action A1 have been met. The project succeeded in mapping and describing the landforms structures and processes of habitat 2250* in Cretan sites. The state of the sand dunes in relation to aeolian erosion was considered satisfactory on average at all study areas except the North beach at the East Chrysi site.
A2 / To determine and describe the composition, structure and ecological processes of juniper woodland communities on all Cretan sites	7 maps within the habitats in needs of restoration (one per site) 1 report on plant associations, community types, composition and structure of coastal dunes with <i>Juniperus</i> spp. in Crete	The objectives of action A2 have been met. 142 plant species were recorded at all Cretan sites. Plant communities, keystone and indicator species were identified and at all Cretan sites.
A3 / To quantitatively determine and describe the population composition and structure of the typical species of habitat type 2250* ( <i>Juniperus macrocarpa</i> ) in all Cretan sites	1 report on population size, age-size structure and sex ratios of the <i>Juniperus</i> populations in Crete	The objectives of action A3 have been met. 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. All populations showed an average age in the range of 100-200 years.
A4 / To accurately identify and map the 2250* habitats at all Cretan sites	1 technical report (English and Greek) for habitat mapping	The objectives of action A4 have been met. The exact boundaries of all Cretan sites have been identified and mapped.
A5 / To undertake a visitor impact assessment in order to ensure the effective implementation of visitor management actions in all Cretan sites	7 maps illustrating the location of visitor management concrete actions (one per site) 1 report on visitor impact assessment	The objectives of action A5 have been met. The intensity/spatial distribution of use that the habitat receives, the damages on the <i>Juniperus</i> trees and on the ground vegetation and the distribution and the composition (type) of debris in the habitats have been estimated.

<b>Action / Objectives as foreseen in the revised proposal</b>	<b>Achieved Deliverables/Milestones</b>	<b>Evaluation</b>
A6 / To establish the stakeholders' level of awareness, perceived values, threats and recommendations for conservation of the habitat in their localities	4 reports on stakeholder Consultation & community surveys (one per site) 1 report on the effectiveness evaluation of stakeholder consultation method	The objectives of action A6 have been met. Major communication partners (stakeholders) and their perceived values and threats have been established.
A7 / 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	1 compendium with monitoring protocols to evaluate the effectiveness of concrete conservation and dissemination actions	The objectives of action A7 have been met. 10 indicators were identified and 5 long-term monitoring protocols with their sampling design and Standard Operating Procedures (SOPs) have been developed.
A8 / To propose protection and restoration specifications for the habitat 2250* in the Natura 2000 sites of Crete	1 working manual on habitat protection and restoration specifications	The objectives of action A8 have been met. Site specific intervention measures have been proposed.
A9 / To determine the governance structure and the legal status of the Coastal dune with <i>Juniperus spp.</i> habitats in Greece	1 report on the legal status of Habitat 2250* 1 report on Governance structure of Habitat 2250*	The objectives of action A9 have been met. The Greek legislation on habitat 2250* has been reviewed and the analysis of the Governance structure have been conducted.
C1 / To demarcate the on-site boundaries of habitat 2250* in all Cretan sites	On-site demarcation of all Cretan sites	The objectives of action C1 have been met. 239.31 ha of coastal dunes with <i>Juniperus spp.</i> have been demarcated.
C2 / To remove existing solid waste present within the boundaries of the habitats on all the Cretan sites	Cretan habitats clean from solid waste	The objectives of action C2 have been met. 239.31 ha of coastal dunes with <i>Juniperus spp.</i> have been cleaned.
C3 / To protect the existing natural regeneration of junipers and to enrich, wherever needed, <i>Juniperus macrocarpa</i> subpopulations with the introduction of new individuals	2 reports (interim and final) on juniper regeneration and enhancement	The objectives of action C3 have been met. 12 naturally established juveniles of <i>Juniperus macrocarpa</i> were fenced and 95 <i>Juniperus</i> juvenile individuals have been planted and protected.
C4 / To restore the floristic composition and structure of the 2250* habitat to a desired state at the Cretan sites	2 reports (interim and final) on protection and enhancement of keystone species (including juniper male/female balancing)	The objectives of action C4 have been met. Keystone species have been planted and fenced. Invasive species have been eliminated or reduced.

Action / Objectives as foreseen in the revised proposal	Achieved Deliverables/Milestones	Evaluation
C5 / To implement concrete conservation actions needed to inhibit land degradation processes	Sand stabilization and sand fixation in erosive areas	The objectives of action C5 have been met. 14 units of sand trapping fences (200m length in total) were installed at the North beach of the East site of Chrysi Island.
C6 / 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	Installation/designation of board walks, rubbish bins, resting points and main trails delineation.	The objectives of action C6 have been met. 340 m of wooden boardwalks have been constructed and installed. Directional wooden sticks have been installed for the main trails delineation. Wooden and four-wheeled plastic rubbish bins, wooden tables and benches have been installed.
C7 / To design and install on all Cretan sites directional and information signs	Installation of directional and information signs	The objectives of action C7 have been met. 16 information signs have been installed within the boundaries of all Cretan sites.
C8 / To collect, store, and propagate the keystone species of the coastal dunes with <i>Juniperus spp.</i> outside of their natural habitat	Storage and cultivation of seed-lots and cuttings 2 reports (interim and final) on <i>ex-situ</i> conservation	The objectives of action C8 have been met. 36 keystone and 80 indicator species have been identified at all Cretan sites. Seeds from <i>Juniperus macrocarpa</i> and all keystone species have been collected, cleaned and stored at the seed bank of MAICH.

### 5.3. Analysis of long-term benefits

#### 1. Environmental benefits

The JUNICOAST project had a **significant positive impact on the conservation status** of coastal dunes with *Juniperus spp.* in Crete and the South Aegean, in particular:

- Coastal dunes with *Juniperus spp.* on all Cretan sites have been **mapped, demarcated, cleaned and protected**,
- **Regeneration** of the *Juniperus* species (where needed) has been **enhanced**,
- **Floristic composition and structure** of the target habitat (where needed) has been **restored**,
- **Primary/front dune zone** of the habitat (where needed) has been **restored**,
- Threats and visitors' negative impacts on all habitats have been minimized,
- **Seeds** from *Juniperus macrocarpa* and all keystone species have been **collected, cleaned and stored** at the seed bank of MAICH.

Moreover, the project allowed the consolidation of a **National knowledge base** providing insights on:

- The **geomorphology** of coastal dunes in Crete,



- The dune system plant communities and *Juniperus* population composition and structure,
- The **effect of anthropogenic threats** on the habitat's ecological conditions,
- **Effective conservation and monitoring methods** through the elaboration of habitat protection and restoration guidelines and monitoring protocols.

Finally, the **public awareness and dissemination actions** and more specifically, the **National communication strategy** allowed the promotion of concrete conservation and dissemination actions in the South Aegean, disseminated the lessons learnt in Crete, promoted and provided training of the trailed techniques and methods nationally, as well as raised public awareness ensuring the wider conservation of this priority habitat throughout Greece.

## 2. Long-term sustainability

### a. Long-term / qualitative environmental benefits

Regular monitoring, after-LIFE communication and conservation activities (After-LIFE communication and conservation plans, D-D.7.1 and D-D.7.2) and an adaptive management approach would be implemented after the end of the project to secure the long-term sustainability of the concrete conservation actions implemented by the project in Crete, to promote the implementation of similar actions within habitat 2250\* on the National level and to ensure that the project results and all dissemination materials developed within the project will be accessible to the general public (for more details, please see After-LIFE communication and conservation plans submitted in annex 7.2 with this final report).

### b. Long-term / qualitative socio-economic benefits

The project did not contain actions directly targeting employment opportunities or revenue generation mechanisms for local population. However, coastal dunes with *Juniperus* spp. are so popular for outdoor recreation. Their presence in the vicinity of some villages attracts local/foreign visitors and campers. In such, local communities benefit indirectly through the provision of services to visitors and campers. This is particularly important since the economy of some local communities such as the community of Gavdos and to some extent the communities of Ierapetra and Elafonisi depends to a large extent on beach-based and outdoor recreational activities such as swimming and camping. In this regard, one of the key messages promoted by the communication strategy of the project highlighted the fact that **economic growth** of the local communities **depends also** on the **conservation and sustainable management of coastal dunes with *Juniperus* spp.**

## 3. Replicability, demonstration, transferability, cooperation

Being a **demonstration** project, the public awareness and dissemination of the results of the JUNICOAST project were carried out on a national level using a multi-stakeholder communication strategy allowing the promotion of conservation of the habitat in the South Aegean (see D-D.1 report on communication strategy, submitted in annex 7.2 with this final report). The training for habitat protection and restoration (action D.4) and the production and dissemination of habitat protection and restoration guidelines (action D.5) improved the capacity building (forest directorate staff, government officers), transferred know-how and promoted future best practices in habitat protection on a National level. In this regards, The JUNICOAST project could be easily used as a **“model” project** (rationale, design and activities) for preparing and implementing other coastal dunes conservation projects in Greece or in Europe. In fact, the Decentralized Administration of the Aegean, the forest directorates of Dodecanese and Cyclades, relevant municipalities

where habitat 2250\* is present in the South Aegean and NGOs have expressed their desire to prepare/submit a similar LIFE project proposal and to implement similar concrete conservation actions for the protection of coastal dunes with *Juniperus* spp. in the South Aegean. The consortium of the JUNICOAST project agreed to provide assistance in case if such initiative would be taken. The project served as a good basis for establishing **cooperation** among Forest Directorates, Municipalities, Environmental Organization and Local Communities. There are already great expectations expressed regarding common work in the future. Moreover, the **transfer of know-how** was underlined by the fact that various deliverables (Habitat mapping, plant associations, community types, *Juniperus* populations composition and structure and habitat protection and restoration specifications) of the JUNICOAST project have been cited in different National and European studies such as the “Transnational joint strategy and tools for the better management and implementation of Natura 2000 sites” of the BE-NATUR project – SEE Programme and the “Post-Fire Management and Restoration of Southern European Forests” (<http://www.springer.com/series/6247>). Additionally, lessons learned by JUNICOAST mainly the stakeholders consultation approach (action A.6) and the development of the communication strategy (action D.1) of the project were taken into account by other LIFE+ project projects which implemented similar actions (Conservation of priority forests and forest openings in "Ethnikos Drymos Oitis" and "Oros Kallidromo" of Sterea Ellada, LIFE11 NAT/GR/1014).

#### 4. Innovation and demonstration value

The aesthetic and economic value of coastal dunes with *Juniperus* spp. in Greece has been widely recognized as they receive ample weight of the tourist industry. However, their physical and ecological functions have received little attention and until recently, there were no documented evidence that active conservation or management measures have been implemented for the protection and restoration of this priority habitat in Greece. The **innovation and demonstration value** of the JUNICOAST project was that **it implemented concrete conservation and dissemination actions in new geographical and socio-economic contexts**. The whole concept of the project had a strong innovative character, since it tackled for the first time a long lasting conflict between nature conservation and campers. The project structure, methodology and more specifically the multi-stakeholder communication strategy (see D-D.1 report on communication strategy, submitted in annex 7.2 with this final report) was quite innovative. Information about dune systems, their values, characteristics, functions and dynamics were incorporated into a communication strategy to raise public awareness about basic understanding of the nature of dune systems. The communication strategy started with the “stakeholders consultation (action A.6), provided a framework for communication and addressed various possible communication channels such as Internet/TV/radio stations/newspapers, communication materials such as brochures/posters/reports/videos/promotional materials and communication activities such as community and environmental education events/workshops/conferences, publications/networking. This participatory approach allowed the promotion of similar concrete conservation and dissemination actions in the South Aegean, disseminated the lessons learnt, promoted and provided training of the trailed techniques and methods nationally, as well as raised public awareness ensuring the wider conservation of this priority habitat throughout Greece. Despite of its high national demonstration value, the biggest expectations are related to changes in attitudes and awareness of decision makers and local communities whose livelihoods are also related to the conservation and sustainable management of coastal dunes with *Juniperus* spp.

It is worth noting that, in 2013, the municipality of Ierapetra was chosen among 500 South European destinations by the QualityCoast International Certification Program of EUCC ([http://www.qualitycoast.info/?page\\_id=717](http://www.qualitycoast.info/?page_id=717)) as one of the 50 most attractive tourist destinations for visitors interested in cultural heritage, environment and sustainability. It was one of the only three destinations in Greece that won the Gold QualityCoast award, ranking 2<sup>nd</sup> among the TOP 100 chosen European destinations. This award was based on the conservation of coastal dunes with *Juniperus* spp. at Chrysi Island, Ierapetra (the JUNICOAST project) as one of the “VISTAS (Visions Innovative Sustainable Tourism Award Series, [http://www.qualitycoast.info/?page\\_id=1611](http://www.qualitycoast.info/?page_id=1611)) Best Practice Cases in Sustainable Tourism Destinations” that the municipality submitted to the Certification program.

#### 5. Long term indicators of the project success:

A methodology for implementing a monitoring system designed to provide quality information on the conservation status of coastal dunes with *Juniperus* spp. has been developed within action A.7 “Elaboration of long term monitoring protocols and selection of indicators” (see D-A.7 compendium monitoring protocols to evaluate effectiveness of concrete conservation and dissemination actions). Long term monitoring protocols with their sampling design and Standard Operating Procedures (SOPs) and specific long term indicators which enable the evaluation of the project success and the effectiveness of the concrete conservation and dissemination actions as compared to the initial situation, objectives and expected results were developed. **Quantifiable indicators that can be used in future assessments of the project success are mentioned below:**

- Number of *Juniperus* broken branches,
- Cover of *Juniperus* root exposure (%),
- Ground vegetation cover (%),
- Total number of plant species,
- Number of *Juniperus* seedlings,
- Vegetation cover of keystone species (%),
- Sex ratio of *Juniperus macrocarpa*,
- Presence of invasive species,
- Amount, distribution and composition of litter within the 2250\* habitat,
- Level of public/environmental awareness.

#### 5.4. Dissemination issues

The main objectives of the JUNICOAST communication strategy were:

- To promote and enable the long term conservation of the coastal dune with *Juniperus* spp. habitat in Greece and
- To design public awareness, education, training or networking activities for the protection and long term restoration of coastal dune with *Juniperus* spp. habitats.

The main objectives of the JUNICOAST communication plan were:

- To promote and advertise the values of coastal dunes with *Juniperus* spp. to the general public and influence decisions-makers,
- To increase key stakeholder’s understanding of the threats and pressures that coastal dunes with *Juniperus* spp. are facing and the importance of investing in their sustainable management,
- To raise the general public awareness on coastal dunes with *Juniperus* spp. and to encourage feedback and participation from various stakeholders,

- To guide stakeholders to implement formal and informal environmental education and information sharing activities in a more effective and coordinated way.

## 5.4.1 Dissemination: overview per activity

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

The purpose of this action was 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, was implemented by MAICH and was completed on 31.08.2013. Some technical adjustments in the implementation terms of this dissemination action were fully described and explained in the “**Adjustments to the implementation terms of some technical issues**” document that was submitted upon the request of the “monitoring team” to the LIFE Nature Unit on 20.09.2012 (see also annex 7.3 “others” of the 2<sup>nd</sup> progress report, 31.12.2012). These adjustments (preparation of Radio spot content, preparation of a YOUTUBE presentation of the project) were minor and did not modify the purpose of this action neither the general objective of the project. They were the results of various discussions and consultations between the project consortium, the scientific committee and various stakeholders’ of the project.

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

- 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,
- Preparation of leaflets content and design,
- Preparation of posters content and design,
- Preparation of notice boards content and design,
- Preparation of code of conduct content and design,
- Formulation of Key messages,
- Preparation of T-shirts stamp and content,
- Media publicity content and format,
- Preparation of Radio spot content,
- Video scenes and interviews,
- Preparation of a YOUTUBE presentation of the project,
- Power point presentations,
- Write-up and submission of the report on communication strategy (D-D.1, submitted in annex 7.2 with this final report).

Main outputs:

- Production and distribution of 20.000 leaflets to various stakeholders,
- Production and distribution of 7.000 T-shirts to various stakeholders,
- Production and distribution of 200 copies of the documentary video entitled: “A journey to coastal dunes with *Juniperus* spp.” to various stakeholders,
- Broadcasting 1 Radio spot in Greek and English,
- Publications of approximately 60 project articles,
- Production and distribution of 15 notice boards to various stakeholders,
- Production and distribution of 1.200 posters to various stakeholders,
- 6 TV interviews on coastal dunes with *Juniperus* spp.

- 1 slide show presentation (YOUTUBE) on coastal dunes with *Juniperus* spp.

**No major problems** were encountered in implementing this action. However, the coordinating beneficiary (MAICH) required the postponement of the end-date of this action from 31-12-2012 to 31-08-2013 (see annex 7.4 of the mid-term report-Project actions, provisioned and modified time table). The extension of the end-date of this action enabled the coordinating beneficiary to better disseminate the results of the project and to raise the public awareness. **This action is completed and further After-LIFE dissemination activities are envisaged** (see D-D.7.1, After-LIFE communication plan submitted in annex 7.2 with this final report).

Action D.1 has met its objectives, one report on the communication strategy has been produced and awareness raising materials (leaflets, posters, and notice boards), T-shirts and video have been produced and distributed. The video was submitted to the LIFE-AEIDL communications team and it is included in the LIFE video clip page of the LIFE website. (<http://lifevideos.eu/videos/>).

Foreseen budget: 59.000 €

Modified budget: 74.700 €

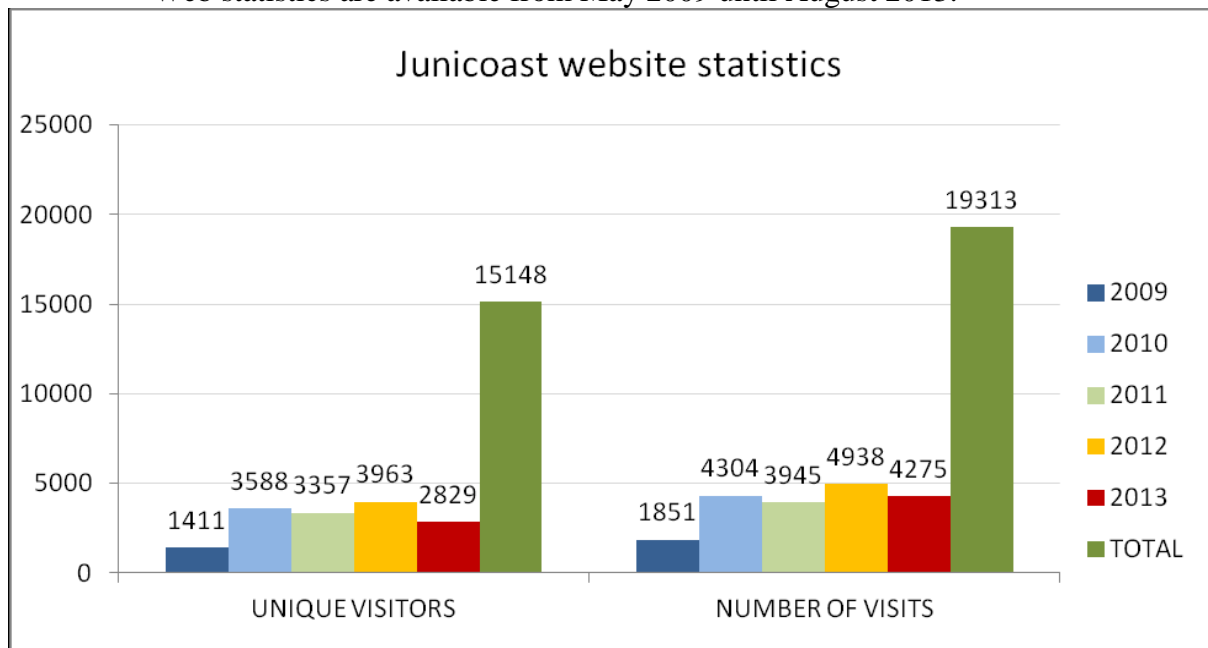
Amount spent at the end of the project: 72.994,19 €

#### 5.4.1.2 Action D.2: Website development

The purpose of this action was to develop, update and maintain a project website. This action started on 01.01.2009, was implemented by MAICH and was completed on 31.08.2013.

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

- Website developed (content and design) and launched ([www.junicoast.gr](http://www.junicoast.gr)) in March 2009,
- Website being maintained and updated regularly,
- Web statistics are available from May 2009 until August 2013.



Main outputs:

- The project official website ([www.junicoast.gr](http://www.junicoast.gr))

**No major problems** were encountered in implementing this action. However, the coordinating beneficiary (MAICH) required the postponement of the end-date of this action from 31-12-2012 to 31-08-2013 (see annex 7.4 of the mid-term report-Project actions, provisioned and modified time table). The extension of the end-date of this action enabled the coordinating beneficiary to better disseminate the results of the project and to raise the public awareness. **This action is completed and further After-LIFE Project Website update and maintenance are envisaged** (see D-D.7.1, After-LIFE communication plan submitted in annex 7.2 with this final report).

Action D.2 has met its objectives; M-D.2 “Project website activation” has been completed.

Foreseen budget: 35.000 €

Modified budget: 35.500 €

Amount spent at the end of the project: 34.128,42 €

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

The purpose of this action was 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, was implemented by MAICH and was completed on 31.08.2013. Some technical adjustments in the implementation terms of this dissemination action were fully described and explained in the “**Adjustments to the implementation terms of some technical issues**” document that was submitted upon the request of the “monitoring team” to the LIFE Nature Unit on 20.09.2012 (see also annex 7.3 “others” of the 2<sup>nd</sup> progress report, 31.12.2012). These adjustments (Production and distribution of fairy tale for children, production and distribution of a teachers' guide for coastal dunes with *Juniperus* spp.) were minor and did not modify the purpose of this action neither the general objective of the project. They were the results of various discussions and consultations between the project consortium, the scientific committee and various stakeholders’ of the project.

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

- Preparation and organization of 3 educational workshops for environmental educators,
- Preparation and organization of 2 workshops for tourism representatives,
- Preparation and organization of 4 students weeks and 11 students days,
- Preparation and organization of 20 local events (meetings with campers, school visits, field visits, information workshops, final event),
- Production and distribution of fairy tale for children entitled: “A journey of a sand grain to the coastal dunes with *Juniperus* spp.”,
- Production and distribution of a teachers' guide for coastal dunes with *Juniperus* spp.
- Creation of a small “model” garden with sand dunes and keystone species of habitat 2250\* at the botanical garden of MAICH,
- Establishment of a local educational network of schools and environmental education bodies to facilitate and promote basic environmental education on coastal dunes with *Juniperus* spp.
- Power point presentations.



Main outputs:

- Organization of 3 educational workshops for environmental educators,
- Organization of 2 workshops for tourism representatives,
- Organization of 4 students weeks and 11 students days,
- Organization of 20 local events,
- Distribution of 4.000 fairy tale for children,
- Distribution of a teachers' guide for coastal dunes with *Juniperus* spp. for environmental educators,
- 1 local educational network of schools and environmental education bodies.

**No major problems** were encountered in implementing this action. However, the coordinating beneficiary (MAICh) required the postponement of the end-date of this action from 31-12-2012 to 31-08-2013 (see annex 7.4 of the mid-term report-Project actions, provisioned and modified time table). The extension of the end-date of this action enabled the coordinating beneficiary to better disseminate the results of the project and to raise the public awareness. **This action is completed and further After-LIFE environmental education activities are envisaged** (see D-D.7.1, After-LIFE communication plan submitted in annex 7.2 with this final report).

Action D.3 has met its objectives, M-D.3 “Educational workshops, students’ week, local events and networks” has been completed.

Foreseen budget: 67.000 €

Modified budget: 62.000 €

Amount spent at the end of the project: 52.422,39 €

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

The purpose of this action was 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, was implemented by MAICh and was completed on 31.08.2013.

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

- Preparation and organization of 2 training workshops (Naxos and Chania) with stakeholders involved in the protection and management of coastal dunes with *Juniperus* spp. (forest directorate staff, government officers). More specifically, participants were trained and provided with the demonstration of the following:
- Concrete conservation action techniques (*in situ* & *ex situ*),
- Procedures for monitoring habitat status,
- Stakeholder participation and engagement methods for habitat management,
- Lessons learned and effectiveness evaluation results.

Main outputs:

- Organization of 2 training workshops (Naxos and Chania) with stakeholders involved in the protection and management of coastal dunes with *Juniperus* spp. (forest directorate staff, government officers),
- Creation of a National network of stakeholders.

**No major problems** were encountered in implementing this action. However, the coordinating beneficiary (MAICh) required the postponement of the end-date of this

action from 31-12-2012 to 31-08-2013 (see annex 7.4 of the mid-term report-Project actions, provisioned and modified time table). The extension of the end-date of this action enabled the coordinating beneficiary to better disseminate the results of the project and to raise the public awareness and to expand the training of the stakeholders involved in the protection of the habitat. **This action is completed and further After-LIFE communication activity (educational Kit, dissemination of the project knowledge and experience to all local authorities of the 17 Natura 2000 sites in Greece with the habitat 2250\*) is envisaged** (see D-D.7.1, After-LIFE communication plan submitted in annex 7.2 with this final report).

Action D.4 has met its objectives, M-D.4 “Training workshops and network of stakeholders” has been completed.

Foreseen budget: 40.000 €

Modified budget: 50.000 €

Amount spent at the end of the project: 27.645,36 €

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

The purpose of this action was 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, was implemented by MAICH and was completed on 31.12.2012.

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

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

##### Preparation of the habitat protection and restoration guidelines.

- Completion and submission of the D-D.5 on “habitat protection and restoration guidelines” (see annex 7.1 of the 2<sup>nd</sup> progress report submitted on 31.12.2012).

##### Main outputs:

- Production (50 hard copies and 200 copies on CDs) and distribution of a “habitat protection and restoration guidelines” to stakeholders involved in the protection and management of coastal dunes with *Juniperus* spp. (Ministry of Environment, Ministry of Agriculture, Forest Service, Municipalities, Region of Crete, Region of South Aegean etc.). These guidelines were used in the training workshops (Action D.4) as the main training material.

No major problems were encountered in implementing this action. This action is completed and further After-LIFE dissemination activity (distribution of habitat protection and restoration guidelines) is envisaged (see D-D.7.1, After-LIFE communication plan submitted in annex 7.2 with this final report).

Action D.5 has met its objectives; one guideline on “habitat protection and restoration” has been produced and distributed.

Foreseen budget: 20.000 €

Modified budget: 20.000 €

Amount spent at the end of the project: 13.508,33 €

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

The purpose of this action was to disseminate the findings of the project to the international scientific community and to produce the Layman's report of the project. This action started on 01.01.2011, was implemented by MAICH and was completed on 31.08.2013.

##### 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 was submitted to the journal of "Plant Ecology and Diversity" on February 2012 and has not been accepted due to the local character of the manuscript. Comments of the reviewers will be taken into consideration and the manuscript will be submitted to a different Scientific Journal,
- Publication of the results of action A.6 (stakeholders' consultation) in the "Environmental Management" peer reviewed scientific journal (*Apostolopoulou, E., Drakou, E.G., Padiaditi, K., 2012, The role of participation in the management of Greek Natura 2000 sites: evidence from a cross-level analysis, Journal of Environmental Management, Vol. 113, pp 308-318,*
- 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),
- Write-up and submission of the report on "Dissemination of findings to the scientific community" (D-D.6.1, submitted in annex 7.2 with this final report)
- Write-up and submission of the Layman's report of the project (D-D.6.2, submitted in annex 7.2 with this final report).

##### Main outputs:

- Publication of one scientific paper in peer reviewed journal,
- Presentation of major findings in 3 conferences and their proceedings,
- Production and distribution of the Layman's report in English and in Greek (200 hard colour copies).

**No major problems** were encountered in implementing this action. **This action is completed and further After-LIFE dissemination activities are envisaged** (see D-D.7.1, After-LIFE communication plan submitted in annex 7.2 with this final report).

Action D.6 has met its objectives; one report on "Dissemination of findings to the scientific community" and a Layman's report have been produced and distributed.

Foreseen budget: 36.000 €

Modified budget: 36.000 €

Amount spent at the end of the project: 24.000 €

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

The purpose of this action was to develop and disseminate After-LIFE communication and conservation plans at the end of the project. This action started on 01.07.2012, was implemented by MAICH and was completed on 31.08.2013.

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

- Write-up and submission of the After-LIFE communication plan (D-D.7.1, submitted in annex 7.2 with this final report),
- Write-up and submission of the After-LIFE conservation plan (D-D.7.2, submitted in annex 7.2 with this final report).

Main outputs:

- Production (100 hard colour copies) and distribution of the After-LIFE communication plan in English and in Greek,
- Production (100 hard colour copies) and distribution of the After-LIFE conservation plan in English and in Greek.

**No major problems** were encountered in implementing this action. **This action is completed and further After-LIFE dissemination activities are envisaged** (see D-D.7.1, After-LIFE communication plan submitted in annex 7.2 with this final report).

Action D.7 has met its objectives; one After-LIFE communication plan and one After-LIFE conservation plan have been produced and distributed.

**Foreseen budget: free of charge**

List of deliverables or milestones of the dissemination actions

- D-D.1 Report on communication strategy (In English with executive summary in Greek), submitted in annex 7.2 with this final report,
- Awareness raising materials (leaflets, posters, notice boards), T-shirts, video, radio spot have been produced and distributed,
- M-D.2 “Project website activation” has been completed on March 2009,
- M-D.3 “Educational workshops, students week, local events and networks” has been completed,
- M-D.4 “Training workshops and network of stakeholders” has been completed,
- D-D.5 Habitat protection and restoration guidelines (In Greek with executive summary in English), submitted with second progress report on 31.12.2012,
- D-D.6.1 Report on the dissemination of findings to the scientific community (In English with executive summary in Greek), submitted in annex 7.2 with this final report,
- D-D.6.2 Layman's report (In Greek and in English), submitted in annex 7.2 with this final report,
- D-D.7.1 After-LIFE communication plan (In Greek and in English), submitted in annex 7.2 with this final report,
- D-D.7.2 After-LIFE conservation plan (In Greek and in English), submitted in annex 7.2 with this final report.

The LIFE and the Natura2000 logos have been placed on all deliverables, durable goods, dissemination materials (leaflets, posters, notice boards), T-shirts, video, radio spot and management infrastructures.

#### **5.4.2 Layman's report**

The **Layman's report** of the project (**D-D.6.2**) was aimed at a broader target group and serves to inform decision-makers and non-technical parties on the objectives of the project and the results achieved. It has been produced in English and in Greek and is submitted both paper and in electronic form together with this final report (annex .7.2).

#### **5.4.3 After-LIFE communication and conservation plans**

The objective of the **after-LIFE communication plan (D-D.7.1)** of the JUNICOAST project was to identify and propose communication activities which will be implemented after the end of the project to ensure that the project results and all dissemination materials developed within the project will be accessible to the general public. To that purpose, several communication activities are expected to be carried at the National level.

The objective of the **after-LIFE conservation plan (D-D.7.2)** of the JUNICOAST project was to identify and propose conservation and management activities which will be implemented after the end of the project to ensure the long term conservation of coastal dunes with *Juniperus* spp., to secure the sustainability of the concrete conservation actions implemented by the project in Crete and to promote the implementation of similar actions within habitat 2250\* on a National Level. To that purpose, several conservation and management activities are expected to be carried at the Cretan Regional level.

The after-life communication and conservation plans have been produced in **English** and in **Greek free of charge**. They have been finalized and approved by the project beneficiaries and the stakeholders during the final event of the project. They are being submitted in paper and electronic format together with this final report (annex .7.2).

## 6. Comments on the financial report

The financial report consists of a statement of expenditures for each beneficiary. The statement of expenditures of the coordinating beneficiary includes also the “payment request”, the “Certificate for Nature projects” and the “Consolidated Cost statement” forms.

For this purpose, the “standard statement of expenditure” attached to the Grant Agreement was used.

### *Note:*

Most of personnel of the Forest Service of Chania and Lasithi were involved in the project only for some months every year. The time which each employee spent working on the project was recorded on a monthly basis using standard timesheets. The amount of each employee salary that was charged on the project, under the category “personnel”, was calculated based on the monthly salary, the monthly working hours and the hours spent on the project.

The columns E (Annual gross salary) and G (Annual number of working time units) in the cost statement of the beneficiary PTA under the category “personnel”, include the “Total gross salary” and the “Total working hours” respectively **only for the months that the personnel of the forest services were involved in the project**. The “Time unit rate” which is calculated in column H (ColumnE/G) is **equal** to that if its calculation would be based on the “Annual gross salary” and the “Total annual working hours”.

Also, the calculation of the hourly cost for the employees of the forest services in annex I of the audit report was calculated in the same manner.

### 6.1. Costs incurred

The total project costs per cost category are presented in the following table:

PROJECT COSTS INCURRED				
	Cost category	Budget according to the Amendment No1 to the Grant Agreement	Costs incurred from 01/01/2009 to 31/08/2013	%
1.	Personnel	706.800	713.781,85	100,99
2.	Travel	184.150	125.420,85	68,11
3.	External assistance	257.950	205.115,32	79,52
4.	Durables: total <u>non-depreciated</u> cost	63.000	40.560,91	64,38
	- Infrastructure sub-tot.	45.000	27.510,88	61,14
	- Equipment sub-tot.	18.000	13.050,03	72,50
	- Prototypes sub-tot.			
5.	Consumables	159.500	99.717,17	62,52
6.	Other costs	31.600	20.549,15	65,03
7.	Overheads	98.210	84.360,16	85,90
	SUM TOTAL	1.501.210	1.289.505,41	85,90



## 6.2. Accounting system

For the working time registration of the personnel involved in the project the “Time sheet model” which is included in the “standard statement of expenditure” file was used by all beneficiaries. (see annex 7.4 of this report). The time sheets were completed and signed by the staff members and the project manager accordingly at the end of each month.

All invoices were stamped with the project contract number (LIFE07NAT/GR/000296) before their registration at the cost centres of the beneficiaries.

## 6.3. Partnership arrangements (if relevant)

The financial transactions between the coordinating beneficiary and the associated beneficiaries were done through special bank accounts created for each beneficiary for the needs of the project. The amount of transferred funds from the coordinating beneficiary to the associated beneficiaries was done taking into account, (a) the project schedule and (b) the percentage contribution of each beneficiary to the project. Each beneficiary had its own cost centre for the project and completed/signed separate statement of expenditure. The coordinating beneficiary maintained an additional cost centre for the whole project where the expenditures of all beneficiaries were recorded and monitored throughout the project duration.

## 6.4. Auditor's report/declaration

The audit report was based on the “standard audit report” (LIFE+ 2007 INDEPENDENT AUDIT REPORT) which was downloaded from the LIFE website. The audit report with its annexes is included in the annex 7.6 of this report.

## 7. Annexes

### 7.1. Administrative annexes (Partnership agreements)

A partnership agreement (in Greek) between the coordinating and associated beneficiaries has been signed and submitted together with the inception report (see annex 7.1 of the inception report) to the LIFE Nature Unit on September 2009.

### 7.2. Technical annexes

The annex 7.2 includes:

- Key-words
- Abbreviations
- List of reports delivered since the start of the project
- List of Deliverables submitted with each report
- The remaining deliverables which are submitted with this final report

### 7.3. Dissemination annexes

The annex 7.3 in Electronic Format consists of a DVD labelled:

“LIFE07NAT/GR000296-Dissemination annex 7.3 electronic format” which includes:

- All Dissemination products
- The Layman’s report
- Photos
- Presentations
- TV news
- Project Video

The annex 7.3 in paper format includes:

- A separate document entitled: “Annex 7.3 Dissemination material in paper format covering the period 01.01.2009 – 31.08.2013”.
- The **Layman's** report (in **Greek** and in **English**)

### 7.4. Financial annexes

The annex 7.4 includes the type of time sheets which were used by all employees of all beneficiaries.

### 7.5. Final indicators tables

The annex 7.5 includes the final indicators tables

### 7.6. Financial report

The annex 7.6 is the financial report and includes:

- The statements of expenditure of MAICh, PTA and NKUA
- The consolidated cost statement
- The payment request
- The certificate for Nature project
- The audit report with its annexes

#### 7.7. Deliverables and Milestones of the project (foreseen and modified deadlines)

The annex 7.7 includes the foreseen and the modified deadlines of the Deliverables and Milestones.

#### 7.8. Foreseen Start/End Dates and Actual Start/End Dates of Deliverables and Milestones

The annex 7.8 includes the foreseen start/end date and the actual start/end date of the Deliverables and Milestones.

#### 7.9. Evaluation of the “Report on the successes and failures of previous experiences in Europe” (D-E.4.2)

The annex 7.9 includes the evaluation of the Deliverable E.4.2 “Report on the successes and failures of previous experiences in Europe” as it was requested by the EC in the letter Ref: ENV.E.3/MD/jv ARES (2013) 344320-15-03-2013.

#### 7.10. Evaluation of the project by the scientific committee members

The annex 7.10 includes the overall project evaluation by the scientific committee member Prof. Panayotis Dimopoulos (in Greek).

#### 7.11. Additional study on “Mapping historical land cover changes of habitat 2250\* in Crete”

The annex 7.11 includes the justifications about the additional study “Mapping historical land cover changes of habitat 2250\* in Crete” which was conducted by the coordinating beneficiary (MAICh) in the framework of the action A.4 (Habitat mapping).

#### 7.12. Answers to the questions addressed by the Commission in the letter dated: Brussels, 15 of March 2013

The annex 7.12 includes the answers to the questions addressed by the Commission in the letter dated: Brussels, 15 of March 2013 – Ref: ENV.E.3/MD/jv ARES (2013) 344320.

#### 7.13. Answers to the questions addressed by the Commission in the letter dated: Brussels, 01 of October 2013

The annex 7.13 includes the answers to the questions addressed by the Commission in the letter dated: Brussels, 01 of October 2013 – Ref: ENV.E.3/MD/bp ARES (2013) 3153091.

#### 7.14. Minutes of the final event

The annex 7.14 includes the minutes of the final event (in Greek) which was held on the 27<sup>th</sup> of August 2013 in Chania, the list of participants and the agenda of the event.

#### 7.15. Copies of the contracts between the FDC/FDL and external assistants (Actions C1, C2, C5 and C6)

The annex 7.15 includes all contracts between the FDC/FDL and external assistants for the implementation of the concrete conservation actions C1, C2, C5 and C6 as they were requested by the EC in the letter dated: Brussels, 01 of October 2013 – Ref: ENV.E.3/MD/bp ARES (2013) 3153091.

## 7.16 Persons involved and their role in the project

The annex 7.16 includes a list with all persons involved and their role in the project in alphabetical order.