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LIFE17 NAT/GR/000511

LIFE Nature and Biodiversity project application

Language of the proposal:

English (en)

Project title:

restoration, management and valorisation of PRiority habitas of MEDiterranean coastal areas

Project acronym:

LIFE PRIMED

The project will be implemented in the following Member State(s) and Region(s) or other countries:

Greece Anatoliki Makedonia, Thraki
Italy Lazio

Expected start date: 02/07/2018

Expected end date: 30/06/2023

LIST OF BENEFICIARIES

Name of the **coordinating** beneficiary: Hellenic Society for the Protection of Nature

Name of the associated beneficiary: AGENZIA REGIONALE per lo SVILUPPO e l'INNOVAZIONE in AGRICOLTURA

Name of the associated beneficiary: Department of Environmental Biology - Sapienza University of Rome

Name of the associated beneficiary: Management Body of Nestos Delta - Vistonida - Ismarida

Name of the associated beneficiary: Institute of Mediterranean Forest Ecosystems, Hellenic Agricultural Organization "DEMETER"

LIST OF CO-FINANCERS

PROJECT BUDGET AND REQUESTED EU FUNDING

Total project budget:	2,136,775 Euro	
Total eligible project budget:	2,136,775 Euro	
EU financial contribution requested:	1,602,581 Euro	(= 75.00% of total eligible budget)

SECTOR

Nature



LIFE17 NAT/GR/000511

TECHNICAL APPLICATION FORMS

**Part B - technical summary and overall
context of the project**

SUMMARY DESCRIPTION OF THE PROJECT (Max. 3 pages; to be completed in English)**Project title:**

restoration, management and valorisation of PRiority habitats of MEDiterranean coastal areas

Project objectives:

The primary aim of this Project is to improve the conservation status of the habitats included in the Annex II of the Habitat Directive 92/43/EC: (a) 3170* Mediterranean temporary ponds; (b) 91E0* Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*; (c) 5230* Arborescent matorral with *Laurus nobilis*; (d) 91M0 Pannonian-Balkan oak-sessile oak forests, as well as of the species included in the Annex I of the Habitat Directive 92/43/EC: (e) *Eurotestudo hermanni*, (f) *Emys orbicularis*, (g) *Callimorpha (Euplagia) quadripunctaria**, and in the Annex II and III of the Birds Directive 2009/147/EC: (h) *Phasianus colchicus colchicus*, through interventions taking place within the SCI GR1150010 Delta Nestou Kai Limnothalasses Keramotis (Delta of River Nestos) and the SCI IT6030022 (Bosco di Palo Laziale).

The innovative solutions applied and tested during the Project will be actively replicated and transferred to other similar environmental contexts in order to promote and enable the long-term conservation of these habitats and species in the whole Mediterranean coastal area.

The specific objectives of the Project are the following:

- **to quantify the exact causes that have led to the current unfavourable conservation status and to define and implement appropriate and innovative actions capable to restore the affected ecosystems**
- **to develop mechanisms that will ensure the continuation of ecosystem conservation and the management actions even after the end of the Project**
- **to present the outcomes of the Project to the scientific community and to relevant institutions in order to scale-up the restoration, management and valorisation approach in other similar coastal ecosystems of Italy, Greece and Europe**
- **to support the local and regional economy by engaging residents in the Project activities and in the further management and touristic use of the sites**
- **to promote knowledge of the areas, its habitats and species, through outreach and environmental education initiatives**

Actions and means involved:

All the beneficiaries and stakeholders will participate in the technical-scientific implementation of the Project in order to ensure cost-effective integration and synergy of their expertise and competences.

The preliminary actions of the project are the following:

- to accurately define the geo-morphological and hydrologic characteristics of the area through surveying and mapping (**A2**).
- to quantify the exact causes that have led to the ecosystems' decline, in particular those related to the climatic phenomenon (**A4**) and to soil characteristics (**A3**) through specific field surveys and analysis of the collected data.
- to define the current conservation status and dynamics of the forest habitats (**A5**), as well as the vegetation and biocommunity composition in temporary ponds (**A6**), through field surveys and data processing .

These actions will furnish data and information on the causes that have led to the forest and temporary pond decline, and establish a strong baseline for defining effective concrete restoration and conservation actions as follows:

- to ensure restoration of the ecosystems by encouraging the natural regeneration of the wood through selective trimming and reforestation, as well as by expanding the area of the temporary ponds (**C1, C2**).
- to ensure ecosystem recovery by establishing two underground water tanks in order to collect rain water in the wet season and guarantee water supply during the dry season, and washing out of the soil salts (**C3**).
- to implement a Sustainable Forest Management Strategic Plan to ensure the long-term conservation of the wood after the Project end (**C4**).
- to install two weather stations in order to monitor the precipitation trends along the different seasons in both project sites (**C5**).
- To achieve ex situ conservation and propagation of keystone species of target habitats that may be helpful in future conservation actions (**C6**).

The monitoring actions of the Project aim at:

- verifying through field surveys and data processing the effectiveness of the restoration activities on the typical species of the targeted habitats (**D1, D3**);
- verifying through field surveys and data processing the effectiveness of the restoration activities targeting the wood and ponds (**D2, D4**);
- verifying through field surveys and data processing the effectiveness of the restoration activities targeting soil features (**D5**);
- verifying and assessing the impact of the Project actions on the socioeconomic conditions of the local communities (**D6**).

Expected results (outputs and quantified achievements):

- increasing the current surface of the **3170*** in the SCI of Palo Laziale up to 0.8 ha and in Nestos Delta by 0.02 ha (**C1, C2, C3**);
- recovering 40 ha of **91M0** of the SCI of Palo Laziale, currently highly degraded, restored (**C1, C2, C3**)¹;
- improving the chemical-physical conditions of the soil in **91M0** (Italy) and **91E0*** (Greece), through the provision of water during dry season and the consequent washing out of the substrate sodicity (**C3**), which is one of the stress factor causing the wood decline;
- increasing the population size of *T. hermanni*, *E. orbicularis*, *C. quadripunctaria**, *P. colchicus* by improving the conservation status of the SCIs' habitats (**C1, C2, C3, C6**);
- disseminating good-practices on the restoration and management of lowland ecosystems (**E3, E6**), and mainstreaming the methodological approach of the Sustainable Forest Management Strategic Plan (SFMSP);
- involving at least 400 people during the International Workshops (**E3**) that will be organised to scale-up the Project outcomes among the scientific community and relevant institutions across Europe (e.g. managing authorities of Natura 2000 sites, NGOs);
- training at least 200 people during tailor-made ToT trainings on conservation engineering (e.g. training on the job to engineering students), restoration ecology, PAs management, EU funding Programmes (e.g. LIFE programme, Interreg, IPA, etc.), sustainable tourism, sustainable agriculture, with the aim to create new jobs and/or new curricula in the topics targeted by the Project;
- engaging at least 2,500 among tourists (local and foreign; "traditional" and cruisers) and residents in the touristic-recreational initiatives facilitated by the Project (e.g. local food festivals and/or markets, guided naturalistic tours, Science and Junior Café, etc.);
- engaging at least 2,500 people among the local communities in the environmental awareness activities focused on the LIFE programme, Natura 2000 Network and its value for generating incomes,

jobs, ecosystem services benefits and quality of life improvements (e.g. guided tours, schools, volunteer campaigns such as Bioblitz, Citizen Science, etc.) (**E1, E2, E4, E5**).

¹ The restoration of the floodplain oak wood is **essential** to avoid any further diffusion/invasion of shrub species in the area and the consequent **irreversible** siltation of the temporary ponds (3170*). As detailed below, the floodplain oak wood (91M0) and the temporary ponds (3170*) are strictly connected by ecological and spatial means.

Is your project significantly climate-related?

Yes No

According to even the most cautious scenarios, future climatic changes will bring about a further rising of average temperatures (about 2-4° C on a global level) with a significant drying up of certain regions, such the whole **Mediterranean Basin**, and a greater frequency and gravity of extreme drought events (IPCC). Understanding and foreseeing the effects of these changes on ecosystems is becoming one of the great challenges in responding to global changes. The knowledge of the impact on the Mediterranean coastal ecosystems is especially important, as is the possibility of having the technical and scientific tools to confront the consequent loss of ecosystems.

Restoration and management actions targeting such peculiar Mediterranean coastal ecosystems must be intended as an urgent necessity. However, accurate and innovative interventions, as in the case of this Project, can represent a good opportunity to provide solutions for mitigating the climatic change effects. The analysis of the weather data (**A4, C5**) collected in the project areas will allow quantification of the effects of global climate change at the local level. By cross-referencing these data with the wood's current condition it will be possible to define the exact role of the climatic changes in the habitat's decline. Moreover, the data elaboration will support any eventual adjustments of the restoration actions, and will certainly support the formulation of an experimental approach to mitigation and adaptation to climatic changes for sensitive habitats. The hydraulic approach that will be implemented during the Project (**C3**), indeed, represents a good example of adaptation to climate change, and a good option to mitigate climate change effects. This approach will provide to the stakeholders an innovative method - environmentally-friendly and climate change efficient - of how to efficiently protect such fragile ecosystems.

The proposal addresses the following project topic(s):

- Projects aimed at improving the conservation status of habitat types or species (including bird species) of Community Interest, targeting the Natura 2000 sites proposed or designated for these habitat types or species.
- Projects aimed at improving the conservation status of habitat types in Natura 2000 sites or species (including bird species) of Community Interest, provided, their status is not "favourable/secure and not declining" or "unknown" according to the most recent overall assessments that Member States have provided at the relevant geographic level according to Article 17 of the Habitats Directive or to the most recent assessments according to Article 12 Birds Directive and EU-level bird assessments.

Reasons why the proposal falls under the selected project topic(s):

According to the 3rd National Report of the Habitat Directive, published by ISPRA in 2014 (194/2014 Reports "Species and habitats of Community Interest in Italy: distribution, conservation status and trends"), and the relevant 2nd Greek National Report for the habitats and species targeted by this Project, the following is stated:

3170* Mediterranean temporary ponds

Palo Laziale contains 70% of the Italian surface of this habitat, conservation status "inadequate". In Nestos Delta only Greek site where 3170* is associated with broadleaved forest, conservation status "unfavourable".

91E0* Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*

In Greece conservation status "favourable", however almost 40% of the sampled plots "poor" with declining trend.

5230* Arborescent Matorral with *Laurus nobilis*

Palo Laziale contains 97% of the Italian surface of this habitat, conservation status "inadequate"

91M0 Pannonian-Balkan Turkey oak - sessile oak forests

Palo Laziale contains 87% of the Italian surface of this habitat, conservation status "inadequate"

Eurotestudo hermanni (included in Annexes II and IV of the Habitat Directive 92/42/EC)

Palo Laziale hosts 89% of the presence in cells of the EC monitoring network in Italy, conservation status "inadequate" and trend "declining", Greece conservation status "vulnerable"

Emys orbicularis (included in Annexes II and IV of the Habitat Directive 92/42/EC)

Palo Laziale hosts 89% of the presence in cells of the EC monitoring network in Italy, conservation status "poor" and trend "declining", Greece conservation status "near threatend"

Callimorpha (Euplagia) quadripunctaria* (include in the Annex II of the Habitat Directive 92/42/EC)

A conservation priority species with "favourable" conservation status, however, forest decline threatens its conservation status in the Palo Laziale wood.

Therefore, the poor conservation status of the above-listed habitats and species present in the Natura 2000 sites targeted by the Project justifies the restoration and the proposed conservation actions which respond to the specific objectives of the Natura 200 priorities.

The preliminary information of the SCI of Palo Laziale (IT6030022) are reported in the Management Plan elaborated by DEB which has been delivered to Competent Authority, i.e. the Lazio Region. The approval procedure is being completed. The updated SDF contains the inclusion of the habitats not present in the previous Natura 2000 SDF (5230* and 91M0) (Form A8).

GENERAL DESCRIPTION OF THE AREA / SITE(S) TARGETED BY THE PROJECT

Name of the project area:

Bosco di Palo Laziale

Surface area (ha):

129.000

Surface description:

The surface is referred to the whole extension of the SCI IT6030022 "Bosco di Palo Laziale"

EU protection status:

SPA NATURA 2000 CodepSCI NATURA 2000 Code IT6030022**Other protection status according to national or regional legislation:**

None

Main land uses and ownership status of the project area:Land use:

The area of greatest naturalistic interest within the SCI is the Wood of Palo in which the actions of the Project are concentrated. It lies in the core of the SCI covering about 50 hectares. It is mainly composed by a planitial oak wood (Habitat 91M0), Mediterranean temporary ponds (Habitat 3170*), and high sclerophyllous maquis as well as a small portion of "Arborescent Matorral with *Laurus nobilis*" (Habitat 5230*). A strip of meadow extends for about 18 hectares between the wood and the beach. The remaining part is predominantly affected by strong anthropic use.

The habitat and the land use map extracted from the SCI Management Plan, and the related table are shown in the attached picture.

Ownership:

The whole area is privately owned and fenced. The wood is owned by the Odescalchi-Lancellotti family (see forms A8 in the attached).

Scientific description of project area:

The Palo Laziale wood is located along the coastline of the Lazio Region, in the province of Rome, about 40 km NW of Italy's capital, within the territory of the Municipality of Ladispoli. It is set within an entirely fenced-off private property within the SCI IT6030022 "Bosco di Palo Laziale". It is a flat area of about 50 hectares, with an altitude of between 3 and 10 meters above sea level and about 100 meters far away from the coastline.

According to the bioclimatic features, the area is located within the Mediterranean region, as defined by the compensated summer ombrothermic index (Rivas Martìnez 2008). During the summer, the high temperatures and the low precipitation give rise of a dry period and negative water balance of the soil due to the high evapotranspiration.

Lithology shows an alternation of alluvial and deltaic sediments with different permeability. Sands and biocalcarenes of the Middle Pliocene (Macco formation), alluvial deposits and sand layers of the Pleistocene, coastal sand and polygenic pebbles reworked with volcanic elements of the Holocene are all more permeable, while the quaternary deposits consisting of clay, silt and clay of lakes and marshes, peat and cemented sand may be considered of low permeability.

The wood of Palo is the area of greatest naturalistic interest within the SCI which is currently showing a

serious state of decline. This bad condition must require the interventions detailed in this proposal. The area is composed by (see also the attached habitat and land use map):

- a foodplain (or planitial) oak wood (habitat 91M0) with prevalence of Turkey oak (*Q. cerris*), manna ash tree (*F. ornus*) and downy oak (*Q. pubescens*);
- temporary ponds (habitat 3170*), formed on clay flaps for accumulation of meteoric waters;
- small portion of "Arborescent Matorral with *Laurus nobilis*" (habitat 5230*);
- high sclerophyllous maquis dominated by *Phillyrea angustifolia*, *P. latifolia*. and *Pistacia lentiscus*;
- a strip of meadow which extends for about 18 hectares between the wood and the close beach.

The remaining portion is predominantly affected by a strong anthropic use.

These habitats are essential for the survival of most of the animal species of Community interest living in the SCI such *Carabus alysidotus*, *Triturus vulgaris*, *Hyla italica*, *Elaphe longissima*, ***Callimorpha quadripunctaria****, *Elaphe quatuorlineata*, ***Emys orbicularis***, ***Testudo hermanni*** (latter four are included in the Annex II of the Habitats Directive 92/43/EEC; latter three included also in the Annex IV; *Callimorpha quadripunctaria** is a priority species).

Moreover, a large number of bird species, both settled and migratory, are quite frequent. They include *Porzana porzana*, *Luscinia svecica*, *Nycticorax nycticorax*, *Emberiza hortulana*, *Egretta garzetta*, *Alcedo atthis*, *Ixobrychus minutus*, *Emberiza hortulana*, *Caprimulgus europaeus*, *Lanius collurio*, which are also listed in the Annex I of the *Birds Directive* 2009/147/EC.

More interesting wildlife species are: *Zamenis longissimus* (former *Elaphe longissima*), *Hystrix cristata*, *Muscardinus avellanarius* listed in the Annex IV of Habitat Directive 92/43/EEC; *Hyla intermedia* (former *Hyla italica*) and *Lissotriton vulgaris* (former *Triturus vulgaris*) protected species pursuant to the Berne Convention.

Other interesting plant species are *Centaurea pullata*, *Hydrocotyle ranunculoides*, *Romulea columnae*, *Triglochin laxiflorum*.

The scientific description of the project area mainly comes from surveys carried out by DEB and from the SCI Management Plan and the related Natura2000 Standard Data Form accurately updated. The Management Plan is currently deposited in the Lazio Region and its approval is in the process of being concluded (this is the reason why the updated SDF has not been sent to the EC yet).

The Management Plan describes the overall deterioration of the SCI conservation status due to a significant regression of the ponds surface and a high decline of the oak wood, in which the ponds are embedded. Beyond that, it also reports the presence of two new habitats, the 91M0 and the 5230*, and a new bird species, *Egretta garzetta* (Annex I of Directive Habitat 92/42/EEC). These new habitats and species have been already included in the Management Plan as well as in the related SDF. This integration is fully recognized by the Lazio Region (Competent Authority of the SCI) as well as the importance of the conservation actions targeted on them proposed by the project. This commitment is reported in the "Declaration of Support from the Competent Authority" (form A8, see also figure attached in the section B2d).

Importance of the project area for biodiversity and/or for the conservation of the species /habitat types targeted at regional, national and EU level (give quantitative information if possible):

The project represents an important opportunity for making and evaluating restoration and management actions able to break the decline of Mediterranean coastal ecosystems caused by a synergy of different stress factors, in particular those related to the climate change.

These negative effects on the habitats of the SCI "Bosco di Palo Laziale" such as the 91M0 (Pannonian-Balkan turkey oak-sessile oak forests) and the 3170* (Mediterranean temporary ponds), here in close spatial and ecological connection (as many other natural sites across the Mediterranean), are particular evident.

The project area is represented by the Wood of Palo situated in the core part of the SCI within an entirely fenced-off private property. The wood already appears in maps of the Military Geographic Institute dating to the 19th century, and it has gradually surrounded by an increasingly extending

anthropization, especially of the town of Ladispoli and of the many agricultural activities of the area. It was ruled a copse until 1975, when the area was turned into a natural oasis and its management was passed over to the WWF. Since then, no silvicultural treatments have been performed and the copse has aged. The first signs of forest dieback were observed in 1995 and have progressively increased until, after the summer drought of 2003, approximately 40% of tree individuals were found to be dead, as a consequence of the presence of *Biscogniauxia mediterranea* at a pathogenic stage. In 2004, very intense plant cuts were performed, which explain why the wood has almost disappeared in some places. The tree crown cover has been reduced at the current 20%, the plants still alive shows senescence and low seed production. There is still wood renewal but the growing seedlings are suffocated by the approaching shrubs. This condition results in a severe decline factor to the forest, and represents a serious regression factor of the temporary ponds since it provokes their burying (that is one of the pressures reported in the EU Technical Report 2008 07/24 MANAGEMENT of Natura 2000 habitats "Mediterranean temporary ponds").

The project area, therefore, should be considered as a pilot area in which testing and demonstrating the effectiveness of an integrate system, mainly based on forestry interventions and hydraulic works, to favor the recovery and the conservation of threatened ecosystems (see also the attached map).

The demonstration project aims to the conservation of the habitats and species of the SCI. The actions will be mainly implemented in the area of the Palo Laziale wood, as reported in the attached map (for the single actions, please see every related map attached in the section of the action). The proposed interventions therefore aim to the restoration of the floodplain oak wood (91M0) and of the temporary ponds (3170*) which are located within the wood. The restoration action also aims to double the current extension of the ponds.

The restoration of the wood is strictly necessary for the conservation of the temporary ponds. Ponds are both spatial and ecological connected with the wood. Moreover, an uncontrolled invasion of the shrubs is causing a progressive burying and disappearing of the temporary ponds. The forestry interventions will also ensure the conservation of the little strip of habitat 5230* Matorral arborescent of *Laurus nobilis* which is defined as "inadequate" with "worsening" trends in the 3rd National Habitats Directive Report - ISPRA Report Series 194/2014- sent to the European Commission.

Regarding the wildlife species, the conservation status of *Testudo hermanni* is considered "inadequate", whereas *Emys orbicularis* is "bad" with negative trend. *Euplagia quadripunctaria** is considered a priority species, and though its conservation status is considered "favourable", the forest decline has caused its disappearing from the SCI. The wood restoration and conservation, thereby, will definitely favour the demographic increase of these wildlife species. All the three species are included in the Annexes II and IV of the Habitat Directive 92/42/EEC.

In conclusion, the project aiming at the restoration and conservation of the coastal ecosystem as a whole, will lead to the safeguard of an important and threatened natural capital.

Their state of conservation is considered as bad for the first and inadequate for the second with negative by the above-mentioned Report. As for the *Euplagia quadripunctaria** in the Mediterranean Region with conservation state "favourable", one should in any case consider that it can disappear with the forest habitat within the SCI.

Once the successful and effectiveness of the proposed solutions will be demonstrated, the project will provide useful indications for other environmental contexts affecting by similar pressures, nowadays becoming increasingly frequent across the Mediterranean area. This transferring and replication purposes will contribute to the conservation of habitat and species of community interest as well as will provide good approaches to mitigate climate change effects.

N.B. As abovementioned, a general map of the area (A4 format) drafted above the Regional Technical Map is here attached. In this map is reported:

- the area of the Palo Wood in which will be implemented the "concrete conservation actions" within the SCI;
- the habitats and the land use of the SCI

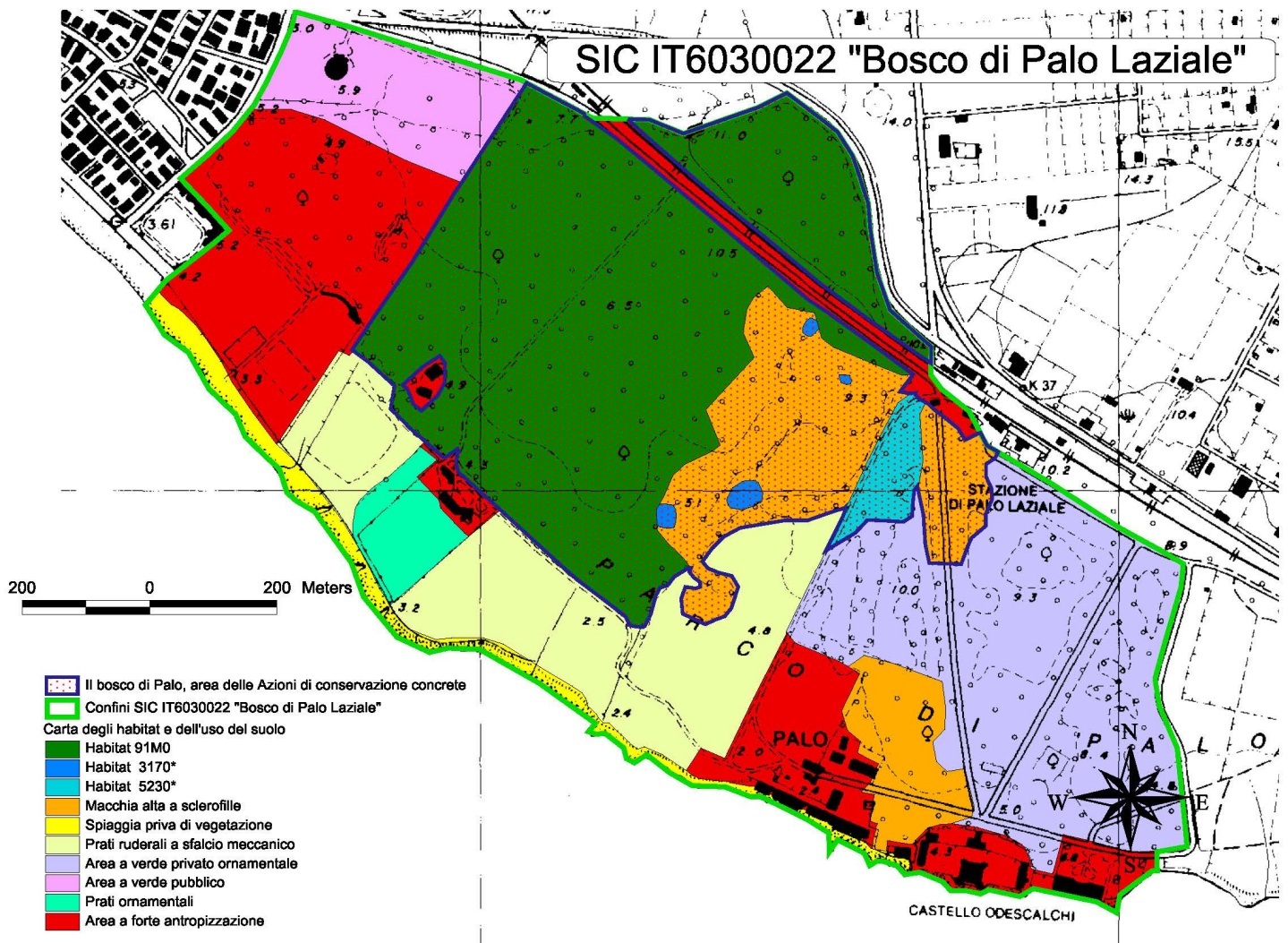
Furthermore, it is attached also a tab with habitat surfaces and the related %.

For the single actions, will be following attached specific maps in the related sections.

Name of the picture: SCI boundaries (aerial picture of 2013)



Name of the picture: Map of the habitats, of the land use, and of the proposed "Concrete conservation actions" within the SCI



A. Preparatory actions, elaboration of management plans and/or of action plans

ACTION A.5: Structure and Dynamics of Wood Ecosystem

Description and methods employed (what, how, where, when and why):

The action consists of the survey and elaboration of the forest parameters that can provide a precise and current description of the composition, structure and regeneration of the Palo Laziale forest and aluvial forest (91E0*) in Netos Delta. The surveys will be carried out by a team consisting of a Forest worker and a Forest Technician in at least 15 permanent areas of study in each SCI (at least 15 in Palo Laziale and 15 in Nestos Delta). These areas will be located by means of a GPS receiver (because they will be the same where samplings for the soil analyses will be carried out in action A3 and will remain the same for the respective monitoring actions D4 and D5),

In these GPS-located sites according to a specific protocol:

- all the tree and shrub species present will be identified (alien invaders will also be recorded in Nestos);
- measurements of the diameter of the plants with a diameter greater than 2.5 cm will be taken via dendrometric easel;
- a certain distance shall be measured by means of a laser spacer for each test area;
- the height of the established forest renewal will be measured, identifying also the species, i.e. all seedlings with a diameter less than 2.5 cm and heights above 20 cm.

Subsequent data processing will be carried out by the forest technician in order to define:

- plant composition (percentage of the different tree species and shrubs per hectare);
- plant density (per hectare);
- plant coverage (basin area per hectare);
- plant average height.

Diameter distribution curves will be also verified by applying the Weibull function.

As far as concerning the regeneration:

- a regeneration index will be obtained (cm of renovation per square meter) which expresses the amount of renewal present;
- the average height of regeneration will be calculated in order to have a qualitative parameter for it.

The area covered by this action includes the area of Palo Wood as shown in the attached map, for an extension of about 50 hectares. In Nestos Delta, the sampling areas will be around 3170* and in 91E0* priority habitats.

The action will be carried out in the spring/summer 2018, i.e. during the vegetative season. The elaboration of a final report containing the field survey and data processing protocol and its results is foreseen.

The responsible body for the action is **ARSIAL**, who will employ:

- a Technical Officer expert who will oversee the implementation of the detailed protocol of data and processing, as well as validate the final report of the action. He/she will have a 4 day commitment / man;
- a Forestry Technician with documented experience in the field of monitoring of forest ecosystems and GIS techniques, who will provide field and data processing, as well as the realisation of the relevant cartographies and the final report. He/she will have a commitment of 45 day/man;
- a Forestry worker, who must have documented experiences in the field of forestry, which is indispensable for the realisation of the field relief. He/she will have a 10 day commitment / man.

IMFE will employ:

- a Researcher who will oversee the implementation of the detailed protocol of data and processing, as well as validate the final report of the action. He/she will have a commitment of 12 day/man;
- a Forestry Technician with documented experience in the field of monitoring of forest ecosystems and GIS techniques, who will provide fieldwork and data processing, as well as the realisation of the relevant cartographies and the final report. He/she will have a commitment of 65 day/man;

The state of decline of the Palo Laziale forest is obvious, as can be seen from the pictures. The purpose of the action is to quantify the current state of conservation and the ecological trend of the floodplain oak forest (Habitat 91M0) within which lie the temporary Mediterranean ponds (Habitat 3170*). At present, the ponds are also heavily regressed and partly disappeared as a result of the decline of the woods and the advancement of the shrub (both in Palo Laziale and Nestos Delta) and parts of the alluvial forests (91E0*) in Nestos are also declining. This preparatory action therefore represents an important starting point on the species status, including their quantitative characteristics, which attests and quantifies the state of forest decline and will give an important indication of what the current trends in the forest habitats are. This information is essential to properly set up restoration actions, including the shrub removal of action **C2**, and to evaluate its outcome at the end of the project, by repeating the surveys in the same test areas. In addition, the knowledge of the characteristics of the forest will be useful for defining its water needs, as in the Action **C3** and **C5**, and to adjust the planned actions. The relief will also affect the small flap of the habitat 5230* *Arborescent matorral with *Laurus nobilis**: although this has not apparently been affected by forest degradation phenomena, it is necessary to verify its conservation status and its dynamism at the project inception. This data will be also used for the preparation of the Sustainable Forest Strategic Management Plan (SFSMP) provided for in Action C4.

Beneficiary responsible for implementation:

ARSIAL

IMFE will be responsible for the implementation of the Action in Nestos Delta.

Assumptions related to major costs of the action:

The cost of the listed material is shown based on market quotations. Purchases will be made, by law, via the Electronic Market of P.A. (MEPA):

- dendrometric stand serves to detect the size of the trees. It will also be used in Action C4 and D4.
- laser spacer is used to dimension the test areas and measure the heights of the plants. It will also be used in Action C4.

Salary tables for Arisial's structured staff; market cost for contract staff.

For missions, following the Green Public Procurement (GPP), the train will be used to reduce CO2 emissions. The Trenitalia rates (Rome - Ladispoli to € 8) were used and they were estimated at € 15 of daily meals per person.

As far as **the final report**, always following the GPPs, the telematics form will be preferred, with the printing of only relevant parts (which will always indicate "printed on recycled paper"). Any paper media used will be ECOLABEL, FSC or PEFC certified. In addition, the use of both facets of the sheets (double-sided printing or draft reuse) will be encouraged.

Name of the picture: Forest relief using dendrometric stand



A5's PROJECT DELIVERABLE PRODUCTS

Deliverable name	Deadline
Final report on the structure and dynamism of the Palo wood	05/2019

A5's PROJECT MILESTONES

Milestone name	Deadline
Forestry data for the assessment of the wood water needs and adjustment of the bush-cutting work	05/2019

C. Conservation actions

ACTION C.2: Habitat recovery: bush trimming and realisation of temporary ponds

Description and methods employed (what, how, where, when and why):

The aim of the action is to promote forest renewal with the consequent restoration of the wood that is the baseline to avoid shrub spreading and therefore burying of temporary ponds (habitat 3170*), as has already happened in both in Palo Laziale and Nestos Delta. The ponds will be also restored by carrying out specific excavation works as needed. This action consists of three parts:

Selective shrub cutting and planitial oak wood restoration

Weeds and invasive shrubs will be cut, especially *Rubus ulmifolius* and other *Rubus* sp., while maintaining forest regeneration of the typical planitial oak wood species: *Quercus cerris*, *Q. pubescens*, *Fraxinus ornus*. It will be carried out on approximately 40 ha in the central part of the Palo Laziale SCI, as shown in the attached map. In Nestos Delta two of the eight temporary ponds need shrub cutting because they are buried. Shrub removal will also be carried out in 40 hectares in 91E0* (including alien invasive shrubs in that area). Restoring the habitat also means clearing the vegetation that covers and falls into the existent temporary ponds. The shrub removal, therefore, will be also useful for the survival of the populations of 92/43/ECCf species ***Emys orbicularis***, ***Testudo hermanni*** and ***Callimorpha quadripunctaria*** *, which live in these habitats.

Two interventions are planned:

a) a first intervention will be carried out immediately after the Project start (by January 2019) and will focus on larger individuals, eliminating at least 70% of the shrubs to facilitate tree renewal (a total elimination of the shrubs would cause excessive soil exploration, causing excessive soil evapotranspiration and damage to forest renewal).

b) a second intervention is planned after about 1 year from the first, and will eliminate the residual shrubs, whose will still show competition with the young new tree species of the habitat in restoration process. All the other growing shrubs can be left because they will naturally disappear (they are included in the dominant vegetation layer). This action will be carried out as a result of action **A5** which will give detailed information about the localization and the plant typologies to be removed, as well as the extent of the shrub-cutting work required.

Shrub-cutting and digging out of new temporary ponds

In Palo Laziale, all vegetation covering three identified areas will be totally eliminated. These three areas will have a circular shape of about 0.13 ha each (for a total of 0.4 hectares) and have been identified in areas deemed appropriate for the persistence of the temporary Mediterranean ponds through GIS topographic analysis carried out in action **A2** and following the soil analysis of action **A3**. The restoration of 3170* is essential for the survival of the population of ***Emys orbicularis***. The topographic survey is necessary to identify suitable areas where the flow of the meteoric waters converges more easily, allowing natural water filling of the ponds during the wet season. The soil survey will identify the areas featured by a waterproof clay substrate, which is indispensable for the persistence of temporary ponds.

A max 50 cm-excavation will be carried out in each identified area so as to facilitate the formation of temporary ponds. The digging out work will be mechanically carried out by a team of 4 workers under the supervision of 1 Forestry Technician (expert in the field of forestry management), The workers will be also supposed to remove and to dispose of excavated material. This activity is planned to be done after the first bush-cutting intervention and following actions **A2** and **A3**.

Such enlargement of the habitat **3170*** area is necessary due to the reduction of the total pond surface area that has occurred during the last 20 years, as verified during previous studies conducted by DEB in the SCI.

The area of intervention is shown in the attached map (in blue the existent ponds, in yellow the three ponds that will be implemented). The location of the new ponds will be confirmed as result of considerations made through actions **A2** and **A3**. The location shown in the map has been chosen because of its proximity to the other ponds and easy accessibility for plants and animals, as well as for its favorable position towards the hydrographic system of the area.

The same methodology will be implemented in Nestos Delta, in order to create a new temporary pond, at a site to be defined, covering an area of 0,1 ha. Keystone species will be introduced in the pond (assisted through action **C6**) and HSPN experts will monitor the progress of vegetation in the new pond.

Shrub-cutting in the construction area

It will be necessary to eliminate the vegetation covering the area where the water tank will be buried (action **C3**). This work will be done in an area of approximately 2,200 m² that will be precisely identified after that the Action Plan provided through action **C3** is elaborated, and following action **A2**.

It will be carried out with non-invasive mechanical appliances by a team of forest workers under the supervision of 1 Forestry Technician (expert in the field of forestry management). The resulting material will be used to produce organic fertilizer and mulch to be reused on-site.

Fencing of 3170*

Permanent open wooden or metallic pole fences will be established at eight ponds in the Nestos Delta, with a total perimeter of fencing c. 800 m. Specifications to be provided at the beginning of this Action through cooperation with the Forestry Service and the EMTNP Authority. Fencing access control will prevent the frequent off-road vehicle traffic which is a main cause of disturbance and degradation of the target habitat.

Signboards

Establishment of signboards with information about the project, SCIs and target habitats and species at the fenced ponds and at the main entrances to the priority habitat 91E0*.

Action C2 will be carried out by DEB in Palo Laziale, which will commit:

- a Researcher who will provide scientific supervision on the plan for the shrub-cutting works and its implementation. He/she will be hired for 10 days in toto.
- a Forestry Technician with in-depth knowledge and documented experience in the field of forest ecosystems and of GIS techniques. He/she will draft a detailed plan for the bush-cutting work and will coordinate the entire cutting and digging process. He/she will be hired for 80 days in total.
- a team of forest workers as external assistance for the selective shrub-cutting (40 ha) and for digging out sites for new ponds (0.40 ha). They will handle non-invasive eco-friendly mechanical appliances. The resulting material will be used to produce organic fertilizer and mulch to be reused on-site.

For action C2 in Nestos the will be committed:

HSPN: Technical Officer / supervision on the realisation of the fence of the temporary ponds of Nestos (10 days/man)

IMFE: Forestry Technician / planning and supervision of the bush-timbering activities (60days/man)

EPAMATH: Technical Officer / supervision of the Action (30 days/man)

Beneficiary responsible for implementation:

DEB

HSPN will be responsible for the implementation of the Action in Nestos Delta.

Assumptions related to major costs of the action:

For the cost of the DEB's internal staff will be considered the salary tables; the market costs for the external assistance personnel. External assistance will be assigned by public notice as provided by current legislation. The regional inventory for "Forestry Interventions" of the Region of Lazio (Resolution of the Regional Council of 24 April 2008 No 318) has been used and appropriately re-evaluated as follows:

- selective cutting of shrubs, removal and disposal of the resulting material: 1.500 €/hectare X 40 hectares = 60.000 €

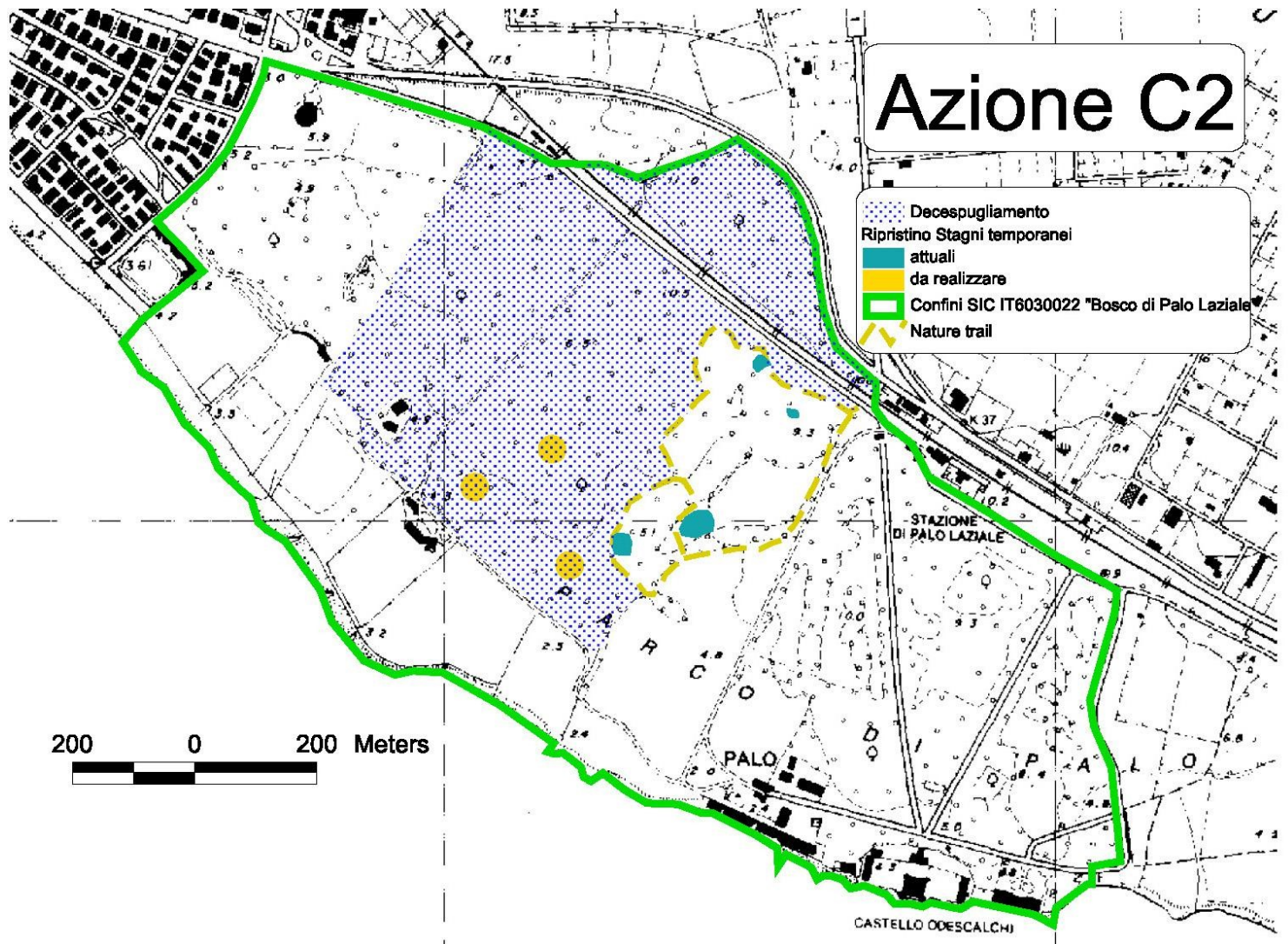
- digging out three identified areas for temporary ponds: 7.500 €/hectare X 0,4 hectare = 3.000 €

As regards the funding request, it is noted that the Action is focused entirely on the restoration of the priority Habitat **3170***.

In order to minimize the impact on ecosystems and according to the Green Public Procurement (GPP), will be used an environmentally-friendly manual equipment with low noise, low emissions and low fuel consumption. It is noted that Action C2 is a selective intervention aimed at eliminating invasive shrub vegetation and for promoting forest renewal. In addition, the material resulting from the bush-cutting will be used to produce organic fertilizer and mulch to be reused on-site (and therefore does not generate any income). As described in Action C3, the material resulting from the digging-out will be used for settling the water tank and the hydraulic trench system. It will not, therefore, be necessary to dispose it to landfill with remarkable cost containment and environmental impact. Local and national concerning regulation is described in Form **B3**.

According to the GPP, for missions will be promoted the train transportation, keeping CO₂ emissions low; official train rates have been used for the round-trip journey (Trenitalia: Rome - Ladispoli 8 €). Meal cost has been as € 22.50 per person per day.

Name of the picture: Implementation area of the Action C2



C2's PROJECT DELIVERABLE PRODUCTS

Deliverable name	Deadline
Final report on habitats restoration	10/2022

C2's PROJECT MILESTONES

Milestone name	Deadline
Cutting of the shrub vegetation (at least 70%) covering the forest and enabling the access to the area	01/2019