LIFE Project Number

LIFE13 NAT/GR/000909

FINAL Report
Covering the project activities from 01/08/2014 to 30/09/2019

Reporting Date
13/1/2020

LIFE+ PROJECT NAME

Conservation measures to assist the adaptation of *Falco eleonorae** to climate change

Project Data

Project location	Voreio Aigaio, Notio Aigaio, Kriti, Attiki
Project start date:	01/08/2014
Project end date:	30/9/2018 **Extension date:** 30/9/2019
Total Project duration (in months)	62 months (including **Extension of 12 months**)
Total budget	1,206,201€
Total eligible budget	1,198,201 €
EU contribution:	898,632€
(%) of total costs	74.50%
(%) of eligible costs	75.00%

Beneficiary Data

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1. List of contents

2. Executive Summary

The project's main goal was to facilitate *Falco eleonorae* adaptation to the ongoing and future climate change in 6 project areas located at the center of the species' breeding range, the Aegean Sea (Greece). This goal is being accomplished through actions aiming at (a) the improvement of its breeding performance (rat eradication operations, construction of artificial nests) and (b) the improvement of the species' conservation status at its foraging areas (creation of refueling oasis to increase prey availability, identification and quality assessment of the species' foraging areas, networking with species' experts, compilation of Good Practice Guide).

Secondary objectives included increasing public awareness, disseminating project's results to the scientific community and assessing the socio-economic impact of the project actions.

The main outputs of the project included the eradication of rats from two islet complexes at two project areas covering an area of ca 700ha (Action C1), the construction of more than 1,000 artificial nests at five project areas (Action C2), the creation of a refueling oasis in an 1ha area in one project area (Action C3) and the production of a Good Practice Guide (Action E4) that was distributed to competent authorities in Greece and abroad.

The project was run by the coordinating beneficiary, University of Patras, in collaboration with the associated beneficiaries, Hellenic Ornithological Society and Nature Conservation Consultants Ltd.

The project started in August 2014 and was completed in September 2019, following the approval of the request for a one-year extension. The project was divided in three, yet partially overlapping, phases. The first phase ran for ca 2 years and consisted of preparatory actions that provided the necessary baseline information and technical operational plans for the implementation of the project's main activities. The second phase ran for ca 3 years and consisted of the concrete conservation actions. The final phase ran during the last project year involved the preparation of the main dissemination output, the Good Practice Guide, which summarized the results of the project actions and prescribed appropriate management measures to ensure the long-term benefits for the target species, ultimately achieving and sustaining a favourable conservation status for Eleonora's falcon in the future. During the entire duration of the project, dissemination activities ran to ensure ample promotion of the project, its progress and results to the wide audience and increase of their environmental awareness. At the same time, networking activities with related LIFE projects and species' experts took place in order to share technical know-how and expertise. In addition, monitoring of the effectiveness and the socio-economic impact of the concrete conservation actions took place along with the progress of the latter.

The present final report covers the activities carried out throughout the project implementation (i.e., from 1/8/2014 till 30/9/2019).

Overall the project actions were implemented without significant delays or problems. The Project Management Group, consisting of partner members responsible for the supervision and coordination of working groups, made every effort to ensure the proper execution of related activities and the circumvention of any problems encountered during the project duration (Action F1: Overall project coordination).

All project objectives were met, as detailed. Rat eradication operations were successfully implemented on 7 islets hosting colonies of the Eleonora's Falcon and in 2 island

complexes covering a total area of 705 hectares (ha) (Action C1: rat eradication operations); 1,100 artificial nests for the Eleonora's Falcons were constructed in 5 Natura 2000 sites (Action C2: construction of artificial nests); a fully operational refueling oasis was created on Antikythira island (Action C3: creation of refueling oasis). Despite the negative financial environment and the difficulties derived from the capital control restrictions taking place in the country since the middle of 2015, the coordinated efforts of the project team managed to overcome these obstacles and achieve and even exceed the initially set objectives with slight delays, not jeopardizing the original project time planning.

Bureaucratic problems resulted in a delay in the purchase of land (Action B1: land purchase), which however, was successfully completed in January 2017. This delay resulted in postponing some of the main activities related to the third concrete conservation action i.e. the creation of the oasis on Antikythira (Action C3: creation of refuelling oasis). However, in order to minimize the delay of the overall action's implementation, several interventions were made on the site, including vegetation clearing and habitat restoration activities before finishing the purchase of the land parcel. Additionally, the project partnership proceeded to the implementation of all relevant preparatory activities to ensure no further delays, including foreseen land management interventions and targeted field surveys in the frame of the corresponding preparatory action (Action A3: assessment of refueling pattern of migratory passerines).

The implementation of the concrete conservation actions was based on the technical guidance provided by the corresponding operational plans and the exchange of expertise and know-how with experts in the frame of an international workshop that was held during the first year of the project implementation (Action A1: operational planning for concrete conservation actions). Monitoring of the effectiveness of these actions (Action D1) took place according to the progress of the concrete conservation actions. Final conclusions were reached by comparing the available baseline information collected during the preparatory phase of the project (Action A2: update of the species' baseline information, Action A3: assessment of refueling pattern of migratory passerines) and the actual outcome of the concrete conservation actions, indicating a positive impact of the latter. These preparatory actions had to be extended beyond the original timetable due to unforeseen reasons. In particular, bad weather conditions experienced during the second year of the project resulted in cancelation of scheduled visits at the breeding colonies (Action A2); they were subsequently resumed in the following breeding seasons. Furthermore, as explained above, in order to make most efficient use of the reduced implementation time of the third concrete conservation action, the project partnership decided to prolong the period of field surveys for migratory passerines (Action A3). More specifically, field surveys were conducted for 2 additional seasons at the land plot that was to be purchased, in order to provide targeted, spatially explicit information of habitat use by passerines and hence, adopt appropriate habitat management practices.

The project's promotion through communication and dissemination activities were implemented during its entire duration as originally scheduled. Deliverables, including the project leaflet, newsletters, banners, notice boards, environmental education kit, press releases (Action E1: public awareness campaign) were available for the public through the project website (Action E2: project website) and specific distribution points. The PMG decided to extend the preparation time of specific deliverables (i.e., project leaflet and environmental education kit) to maximize their efficiency. Promotion of the project was further enhanced through the project's Facebook page (Action E2); announcements on the progress of the project actions, as well as links to related conservation announcements are

regularly posted. In general, the project was embraced by the wider audience, given the statistics of the project website and Facebook page. A two-phase socioeconomic survey was implemented (Action D2: monitoring of the socio-economic impact of the project). Moreover, the PMG participated to conferences well ahead the start date of the corresponding action (Action E3: workshops and conferences) in order to maximize the dissemination of the project results and the exchange of knowledge and expertise with the scientific community, which led to the production of scientific publications. Furthermore, networking activities (Action F2: networking) were carried out, including regular communication with species' experts and collaboration with other (LIFE) projects.

Given the progress and outcome of the project actions, the methodology for the implementation of the project was chosen correctly. Therefore, the project objectives and targets were achieved in full. The long-term sustainability of the project results and further dissemination will be ensured by the Greek Ministry of Environment and Energy and the BirdLife International. These efforts will be further supported by the project partnership through networking activities in the frame of ongoing and future projects within the project areas. For the implementation of the project actions the project partnership adopted best practices used abroad and modified them to fit the needs of the current project; thus, the current project may also serve as a demonstration for other projects related to conservation and climate change.

Finally, all project expenses complied with the EE regulation and national legislation, reaching 95.51% of the foreseen (non-eligible) costs.

3. Introduction

The project's main objective was to facilitate *Falco eleonorae* adaptation to the ongoing and future climate change. This goal was accomplished through (a) the improvement of its breeding performance and (b) the improvement of the species' conservation status at its foraging areas.

Eleonora's falcon is a long-distance migratory raptor; a breeder of the Mediterranean region and Macaronesia and a wintering dweller of SE Africa. It is considered as one the most important bird species in Greece because the country and particularly the islands of the Aegean Sea host >85% of its global breeding population. Its populations are highly dependent on the quality of the breeding and foraging habitats, as well as on the availability of food. Recent data are indicative of a northward shift in the species distribution in the Aegean, a pattern consistent with the predictions of the Climatic Atlas of the European Birds. The reasons for this shift remain unclear, but are possibly related to the constant raising of maximum summer air temperatures in the Eastern Mediterranean, affecting egg thermoregulation and leading to increased egg infertility, as well as leading to a possible mismatch of the its breeding period with the changing passerine migratory flux over its colonies. There is evidence that summer heat waves can have a strong negative effect on both, the breeding performance of the falcons, as well as, on the vegetation, which is used for nesting. Increased pressure from invasive species at its breeding colonies, namely abandonment of nesting sites and reduction of productivity through the predation of eggs and nestlings by rats, is another important threat that is expected to further exacerbate the impacts of climate change at the species' breeding sites. Furthermore, ongoing and future land-use changes and human activities at the species' foraging grounds both within its breeding and wintering range are expected to have severe impact on the species' long-term population viability, although they have not been properly quantified to date.

The LIFE ElClimA project was implemented in seven project areas of the Aegean Sea, which hold important breeding colonies of the species. In order to tackle the aforementioned threats to the Eleonora's falcon, a series of targeted preparatory, concrete conservation and dissemination actions were implemented in these areas.

In particular concrete conservation actions, namely rat eradication operations (Action C1) and construction of artificial nests (Action C2) were designed to reduce egg losses and mortality rates of nestlings, as well as to improve the quality and availability of nesting sites. Furthermore, the improvement of prey availability and quality at the species foraging grounds was achieved through the creation of a refueling oasis (Action C3).

The preparatory actions aimed at updating current knowledge on the species' status within the project areas and thus providing valuable baseline information (Actions A2, A3, A4), in order to be able to fine-tune the technical specifications (Action A1), but also to quantify the effectiveness of the concrete conservation actions in the framework of monitoring actions (Action D1).

The dissemination actions were designed to promote the outcomes of the project to the wider audience, but also to the scientific community and conservation agents (Actions E1, E2, E3, E4). Networking actions (Action F2) were aimed to further promote exchange of knowledge and technical know-how among species' experts and interested parties in order

to properly assess the species' conservation status both at its breeding and wintering grounds, and hence to formulate appropriate mitigation measures (Action E4).

A targeted action was also designed to assess the socio-economic impact of the project actions through public surveys that will eventually provide information on the degree of public awareness on the status of Eleonora's falcon, but also on their understanding of ecosystem services (Action D2).

The main expected long-term result was the maintenance of the species' favourable status within the project areas, but also in a wider spatial context (through the dissemination and adoption of the Good Practice Guide-Action E4- by competent authorities). This will also be achieved through the continuation of monitoring activities to ensure the permanence of the concrete conservation actions, namely

1. maintenance of a total of > 700ha rat-free area, thus improving breeding habitat quality for >6% of the species' national breeding population,
2. maintenance of 1,100 artificial nests for the improvement of breeding habitat quality on at least 5 islets complexes hosting 19% of the national breeding population
3. maintenance of 1 ha of managed land to serve as a refueling oasis for migratory passerines.

4. Administrative part

4.1 Description of the management system

The project partnership consisted of the coordinating beneficiary, University of Patras (hereafter; UOP) and the associated beneficiaries Hellenic Ornithological Society (hereafter; HOS) and Nature Conservation Consultants Ltd (hereafter; NCC). The project started in August 2014 and was completed within a 62month period (i.e., in September 2019). The original project duration was 50 months (original end date: 30/9/2018). However, in June 2018 the Project coordinator requested a 12month extension along with an amendment to the original budget allocation and the addition of another project area. The requested changes were approved by the EC and the **amendment to the original grant agreement** was signed by both parties in September 2018.

The project was divided in 3 main, partially overlapping, **phases**:

The preparatory phase ran for ca 2 years and involved 3 preparatory actions focusing on the preparation of operational plans (Action A1), update of baseline information for the study species (Action A2) and assessment of habitat use by migratory passerines (Action A3). It also included the first phase of the socio-economic monitoring of the project actions (Action D2) and the purchase of land (Action B1). Following the completion of this phase and based on the furnished results, the implementation phase of the main activities took over, lasting for ca 3 years. It involved 3 concrete conservation actions, namely rat eradication operations (Action C1), construction of artificial nests (Action C2) and creation of refuelling oasis (Action C3), as well as monitoring actions to assess their effectiveness in both an ecological and socio-economic context (Actions D1 and D2). Throughout the project duration, dissemination actions (Actions E1, E2, E3) took place to promote the project's outcome to the general public, as well as to more specialized target groups. These actions were refined and updated based on the progress of the remaining actions. Networking activities with species' experts and other related LIFE projects (Action F2) also promoted the dissemination of the project, but most importantly contributed to the refinement of technical specifications of the project actions. In addition, an almost stand-alone action dealing with the identification and assessment of the species' foraging grounds (Action A4) ran since the beginning of the project and for ca 3 years. At the last stage of the project, lasting ca 1 year, the results of all project actions were summarized and discussed with species' experts to design appropriate mitigation measures ensuring Eleonora's falcon favourable conservation status in the long run (Action E4).

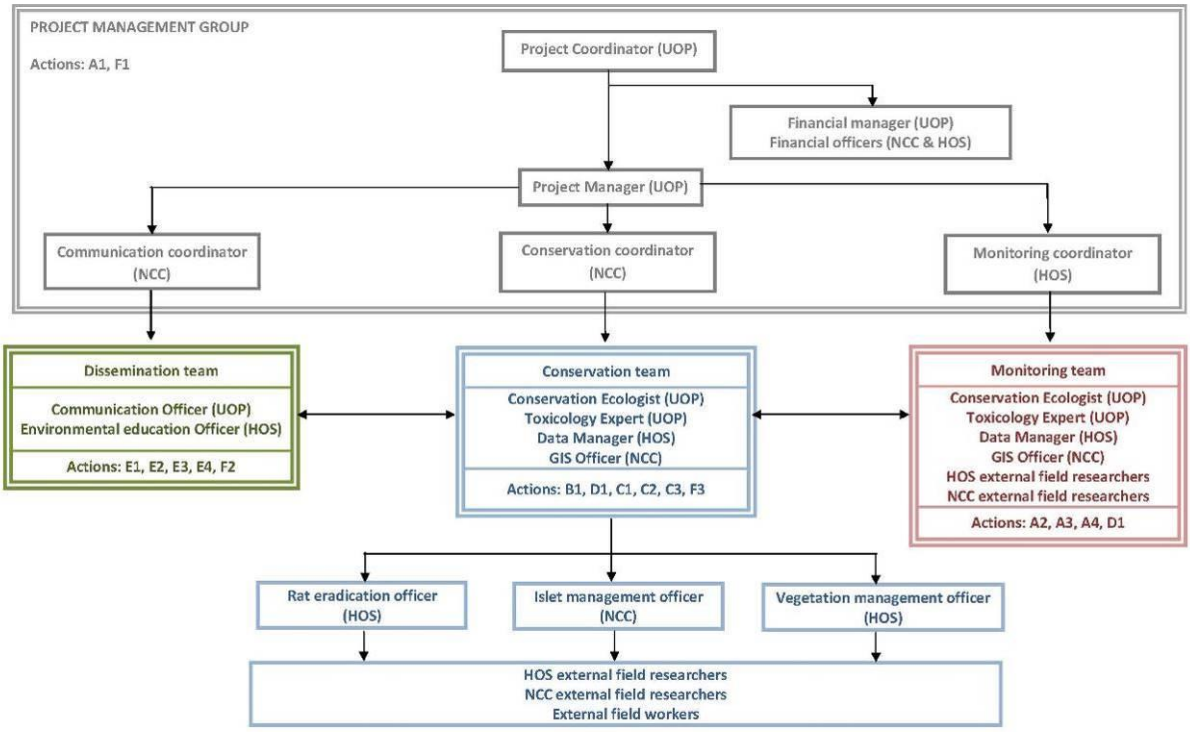
The **project organigramme** is presented in the Figure below. It is divided into 4 main components, the Conservation team, the Monitoring team, the Communication team and the Financial team, all of them consisting of staff members with great experience in LIFE projects, as well as strong scientific background and expertise. The overall implementation of the project is supervised by the Project Management Group, consisting of head officers of the four components.

The project management (Action F1) was carried out from the project office of the coordinating beneficiary in Patras. Since August 2015, the position of Project manager was assigned to Dr. Christina Kassara. Both the Project coordinator (Associate Professor Sinos Giokas) and the Project manager have a strong scientific background in wildlife conservation. The UOP team was also staffed with the Communication officer (Dr Vassiliki Kleftoyanni), the Research Ornithologist (MSc Eleftherios Kakalis), the Toxicology researcher (Dr

Vassiliki Tsarpali) and the Financial manager (Mrs Kalliopi Spala). Together with the remaining permanent academic staff of UOP involved in the project (namely, Dr Stefanos Dailianis - Toxicology Expert and Dr Evangelos Tzanatos – Conservation ecologist), they constituted a research group with sound scientific experience and technical know-how, providing high quality services to the project and ultimately maximizing its effectiveness and success.

The Conservation coordinator (Dr Anastasios Dimalexis) and the Islet Management officer (Mr Jakob Fric), together with the Monitoring coordinator (MSc Nikolaos Tsiopelas), the Rat Eradication officer (MSc Angelos Evangelidis) and the Communication coordinator (MSc Margarita Tzali) were the main actors of the NCC and HOS team respectively. They are senior members of the respective project partners with long experience in LIFE projects.

Organigramme of project team



A project operational plan, consisting of a brief summary of the project, a codified description of project actions and a detailed description of the tasks undertaken by the project teams per action, was compiled upon the onset of the project and submitted to the EC along with the Midterm Report (Annex 7.1.2 of Midterm Report). This operational plan served since then as a guideline for the coordination of the project teams, as well as a means to monitor the overall progress of the project. Technical details on the implementation of the concrete conservation actions and dissemination actions were detailed in the respective operational plans (Operational plans for concrete conservation actions –Annex 7.2.1 of Inception report / Communication plan - Annex 7.2.2 of Midterm Report).

Throughout the project duration the Project manager together with the Project coordinator organized regular PMG meetings to review the project progress, organize upcoming project activities and address any problems on time. In particular, **thirteen PMG meetings** took place

in total. The minutes of the PMG meetings that had taken place until the 30th of June 2018 were submitted to the EU along with the project reports as follows:

- Annex 7.3 of 1st Progress Report (October 2016)
- Annex 7.1.1 of Midterm Report (March 2017)
- Annex 7.3 of 2nd Progress report (August 2018)

Another **three PMG meetings** took place since then and until the end of the project duration. Their corresponding minutes are submitted along with the **present report in Annex 7.1.1**.

Furthermore, the original agreements between the project partners were prepared and signed upon the onset of the project and were submitted to the EC along with the Inception Report (refer to Annex 7.1 of Inception report). Following the **approval of the amendment request**, the original agreements were revised to accommodate the approved changes. The **revised agreements** are submitted along with the **present report in Annex 7.1.2**.

Regarding the foreseen **activity reports**, four reports were submitted by the Project coordinator to the EC until now. More specifically,

- the Inception report was submitted on the 8th of June 2015 according to the original time schedule, covering the project activities during the period 1/8/2014-30/4/2015 (9 months).
- the first Progress report was submitted on the 27th of October 2016, covering the project activities during the period 1/5/2015-30/9/2016 (17 months).
- the Midterm report was submitted on the 7th of March 2017, covering the project activities during the period 1/8/2014-30/1/2017 (30 months).
- the second Progress report was submitted on the 24th of August 2018, covering the project activities during the period 1/2/2017-30/6/2018 (18 months).

In addition, the Project coordinator ensured that all necessary **fieldwork permits** would be issued by the competent authorities. These were submitted with the Inception report (Annex 7.4.2), Midterm Report (Annex 7.2.2.4; first renewal). The **last renewal** is submitted along with the **present report in Annex 7.1.5**.

4.2 Evaluation of the management system

The overall management of the project and the communication among the project teams ran smoothly. The UOP personnel in collaboration with the Research Committee of UOP, which has a long-term experience in the management of research projects including Life projects, were working closely together to ensure the smooth implementation of the project. Regarding the technical part of the project, its progress and its overall success relied on the great scientific knowledge, experience and know-how of the HOS and NCC personnel obtained through previous LIFE projects and on the strong scientific background of the UOP personnel. No significant deviations from the arrangements contained in the partnership agreements occurred.

The overall communication with the EC and the Monitoring team ran smoothly, too. During the project implementation **five project visits and three additional field visits** took place by the Monitoring Team; **two project visits and one field visit** took place since the end of the previous reporting period (i.e. 30/6/2018). In particular,

- 1st audit: 26th of June 2015; both the financial and technical audit took place in Patras (the list of participants and respective minutes was provided in Annex 7.5 of the 1st Progress report)
- 1st field visit: 15th of April 2016, only field visit on Makares islets
- 2nd audit: 16th of June 2016; both the financial and technical audit took place in Athens (the list of participants and respective minutes was provided in Annex 7.5 of the 1st Progress report)
- 3rd audit: 19th of May 2017; both the financial and technical audit took place in Athens (the list of participants and respective minutes was provided in Annex 7.4 of the 2nd Progress report)
- 2nd field visit: 27th of September 2017, only field visit on Dionysades islets
- 4th audit: 11th of December 2018; both the financial and technical audit took place in Athens (the list of participants and respective minutes is provided in **Annex 7.1.3 of present report**)
- 5th audit & 3rd field visit: 13th -15th of May 2019 (the list of participants and the agenda is provided in **Annex 7.1.3 of present report**); the financial audit was carried out in Athens, while the technical audit and the field visit were carried out in Crete.

Comments and clarifications made by the EC regarding the progress of the project actions enabled the project partnership to proceed to corrective measures wherever necessary. The actions taken by the project partnership to address the issues raised by EC regarding the Inception report were detailed in Annex 7.6 of the 1st Progress report, those raised after the inspection of the 1st Progress report were detailed in Annex 7.1.3 of the Midterm report, while those raised after the inspection of the Midterm report were detailed in Annex 7.5 of the 2nd Progress report. Furthermore, clarifications on the issues raised in the European Commission letters of 31 October 2018 on the 2nd Progress report, 8 March 2019 on the 4th project visit and 10 October 2019 on the 5th project visit, as well as on the financial issues raised in the European Commission letter of 16 May 2017 on the Mid-term report are given in **Annex 7.1.4 of the present report**.

5. Technical part

5.1. Technical progress, per task

5.1.1. Action A1: Operational planning for concrete conservation actions

Foreseen start date: 1/8/2014 *Actual start date: 1/8/2014*
Foreseen end date: 31/1/2015 *Actual end date: 31/3/2015*

Beneficiary responsible for the implementation: UOP

2014		2015				2016				2017				2018				2019		
3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T

Realised Foreseen

Description: This action involved the compilation of (a) 3 operational plans for the respective concrete conservation actions (Actions C1, C2, C3) and (b) protocols for scientific monitoring (Action D1), based on the outcome of the international workshop, networking with species' experts and the expertise and technical know-how of the project teams.

The compilation of the operational plans for the concrete conservation actions was the main task of the Monitoring coordinator and the Islet Management officer, while the Project coordinator was responsible for the preparation of the protocols for scientific monitoring.

The three operation plans included a description of the problem/threat and objectives the corresponding conservation action was planned to deal with, presentation of project areas where the conservation actions would take place and a detailed description of the methodology (including subactions, methods and timeplan). Likewise, a detailed description of the methodology used for monitoring of the effectiveness of the three concrete conservation actions (including subactions, methods, timeplan, personnel duties, special protocols for each subaction) was presented in a separate deliverable that was available to the field teams prior to the onset of the corresponding actions.

Participants of the international workshop held in March 2015 in Athens

The international workshop, which was held in Athens in March 2015, was organised by the Project coordinator, the Conservation coordinator and the Communication coordinator. The

international workshop was stemmed with great success, counting more than 30 participants and including 16 oral presentations, which focused on the technical implementation of the project actions. The workshop conclusions are available for download at the project website.

Action performance indicators: production of 3 operational plans and protocols for monitoring action; organization of international workshop.

Action modifications: None

Achievement of objectives and coherence with the original time schedule: The action was completed successfully although there was a slight delay in its implementation. In particular, the international workshop was held three months later than originally predicted to ensure the availability of all participants and thus, the final version of the operational plans was ready in March. Nonetheless, drafts of the operational plans were already available prior to the onset of the corresponding fieldwork, resulting in no further delays of the overall project implementation.

Problems encountered: None

Complementary actions outside LIFE: In the frame of the international workshop, species' experts involved in various satellite tracking projects on Eleonora's falcon decided to work together on a joint publication to produce a species-wide habitat suitability model at its main wintering grounds (i.e., Madagascar) under present and future environmental conditions. The results of this modelling exercise have been submitted in a peer-reviewed journal (refer to Annex 7.2.9 of the 2nd Progress report). This was the first time that a habitat suitability model had been generated for a species based on data from individuals originating from colonies across its entire breeding distribution. Thus, this collaborative work is considered a solid benchmark for the species' conservation and can be used as an early warning system in the case that climate change should alter the wintering area of this rare raptor species substantially. The published paper was circulated to conservationists and species' experts working across Eleonora's falcon range, both in the Mediterranean basin and NE Africa (i.e., in the frame of the project's networking activities - Action F2). The conclusions of this paper, together with the results of satellite tracking activities in the framework of Action A4, were used during the last year of the project for the production of the Good Practice Guide (Action E4) as a first step to assess the species' resilience to global environmental changes as well human-caused habitat changes during the wintering period, as well as any possible carry-over effects throughout its life cycle.

Perspectives for continuing the action after the project: None

Deliverables previously submitted to EC:

a) Operation plans for C1 and C2 actions (Annex 7.2.1.1 of Inception Report)

b) Operational plan for C3 action (Annex 7.2.1.2 of Inception Report)

c) Protocols for scientific monitoring (Annex 7.2.2 of Inception Report)

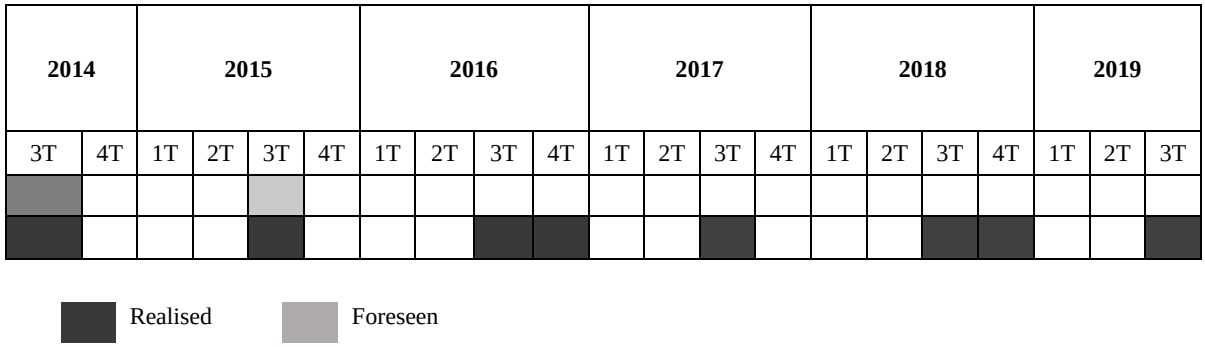
d) Workshop material (Annex 7.2.3 of Inception Report)

Deliverables submitted with the present report: None

5.1.2. Action A2: Update of the species baseline information

Foreseen start date: 1/8/2014 *Actual start date: 1/8/2014*
Foreseen end date: 31/10/2015 *Actual end date: 30/9/2019*

Beneficiary responsible for the implementation: HOS

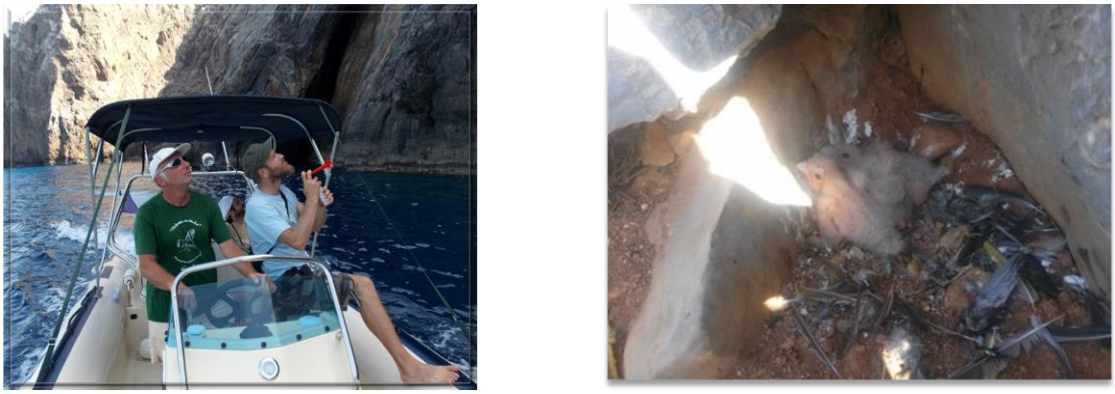


Description: The action involved a series of population census and breeding performance monitoring activities in 6 project areas (Table 1; but see below), aiming (a) to provide a reliable estimate of the current population size of Eleonora's falcon in the areas under research, and (b) to record the breeding performance of the species in the project areas. The goal of this action is (a) to establish favourable reference values and (b) to determine potential changes in the breeding distribution of the species within the last decade and their relation to the climate change. Additionally, this action was designed to provide the necessary baseline information in order to be able to evaluate the efficiency of the concrete conservation actions implemented in selected project areas (Actions C1 and C2) in the framework of the foreseen monitoring activities (Action D1).

Following the approval of the project in 2014, the boundaries of the N2000 sites changed as part of the 3rd evaluation of the N2000 network. The information provided for each project area below refers to the former boundaries of the involved SPA sites, as described in the grant agreement. However, the project partnership decided to expand the spatial coverage of the fieldwork surveys in the Cyclades region (central Aegean Sea) to obtain data for important breeding colonies of Eleonora's falcon hosted in islets that were later (in 2016) included in the N2000 network, and more specifically in the SPA site GR4220021, which corresponds to Project Area IV. Thus, for clarity the results presented for Project Area IV correspond to the islets of the former limits of this Natura site, whereas the results for some of islets subsequently included in this Natura site are referred to as "Other Cyclades areas (1)" throughout this report. Moreover, the project partnership decided to conduct surveys in additional colonies hosting a large number of breeding pairs in the Cyclades and Sporades (northern Aegean Sea) region, where a census had not taken place since the end of the previous LIFE project for the species (LIFE03/NAT/GR000091). These surveys incurred no further cost to the project. The results for these additional islets are referred to as "Other Cyclades areas (2)", "Western Cyclades" and "Voreies Sporades".

Fieldwork activities were carried out by the HOS and NCC field teams and were supervised by the Monitoring coordinator, which was also the main responsible for the preparation of the final deliverable, assisted by NCC and UOP personnel. The data that were collected during the fieldwork activities were recorded in the Hellenic Seabirds DataBase developed through

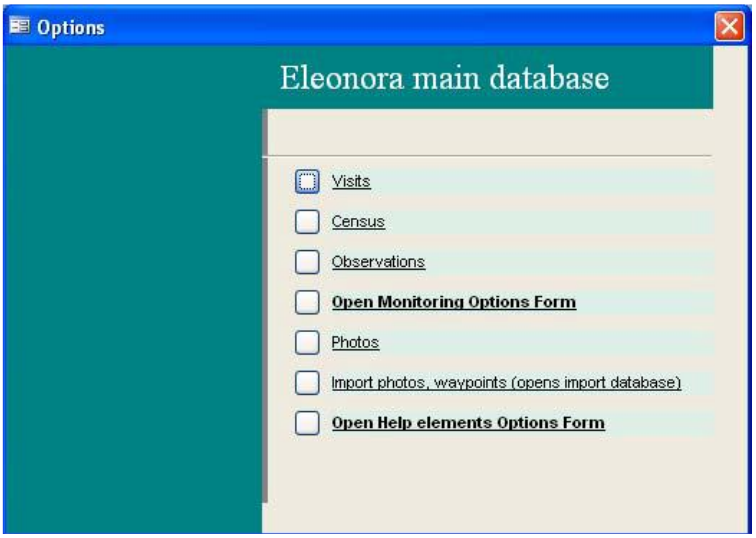
LIFE03 NAT/GR/000091 for storing, managing and analyzing Eleonora's falcon census and breeding data and further developed in the framework of LIFE07/NAT/GR000285, thus creating a unified database for seabirds and Eleonora's falcon. The necessary data analysis (GIS, statistical analysis) was carried out by the Data officer and the GIS officer.

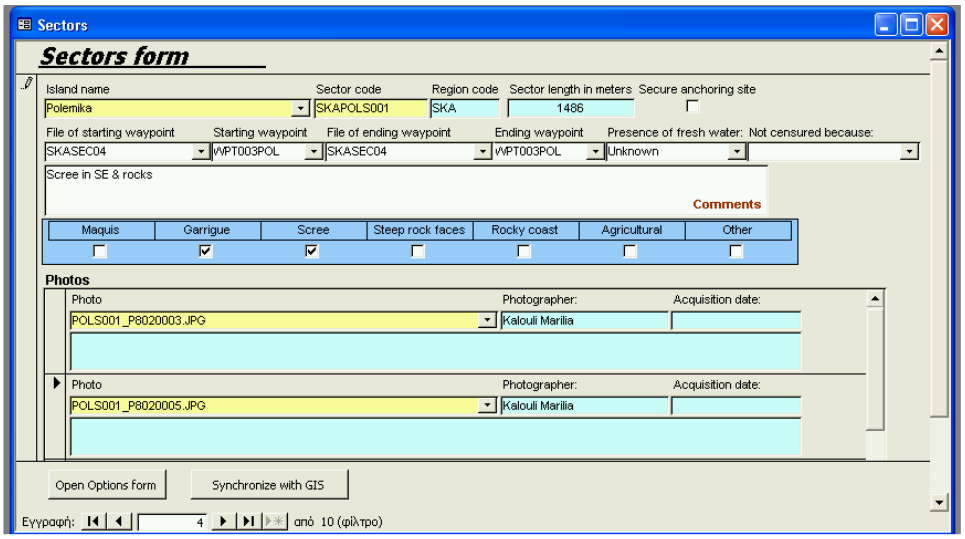


Census and monitoring activities at Eleonora's falcon colonies

The information collected during the foreseen fieldwork activities (plus the data available for the Karpathos-Saria project area) was compared to the results of available information; in particular, with the results of the 1st national census of the species breeding population and monitoring of its breeding performance in Greece (census 2004-2007; LIFE03 NAT/GR/000091) and other LIFE projects that involved the species (LIFE09 NAT/GR/000323, LIFE10 NAT/GR/000637) and other national projects.

In general, the species population and trend are considered to be stable. Some cases of demographic changes are within the natural fluctuation. The population counted may present annual variations, due to local-scale habitat differentiations and the limits posed by the methodology.





Snapshot of the Hellenic Seabirds DataBase used for data entry

(up: main form, down: data entry form for census data per sector)

Action performance indicators: number of project areas censused and monitored; production of final report

Action modifications: None

Achievement of objectives and coherence with the original time schedule: Overall, the objectives of the action were met. The project partnership had to extend the period of its implementation due to bad weather conditions during the previous breeding periods, to ensure that the original objectives were met at their fullest. Nevertheless, the adverse weather conditions prevented the conduction of a complete census and monitoring of breeding performance in Tilos. More specifically strong, northern winds up to 8bf, which prevail in the area during the breeding season, did not allow any visit at the breeding sites. The field team tried to conduct a complete census in 2016, 2017 and 2018, but this was not possible due to the prevailing strong winds that resulted in low detectability of the falcons (i.e., the horn sound cannot be heard on the cliffs in windy conditions). In addition, in such windy conditions the boat of the fieldwork team would not be able to get safely to the shore. Thus, safety of the team was taken into account regarding the final decision of not implementing the census and monitoring of the breeding performance in this project area. However, although the foreseen fieldwork activities in Tilos project area were not carried out, the incorporation of data from the Karparthos-Saria area are considered indicative of the population status of Eleonora's falcon in the general region of SE Aegean.

Last but not least, during the breeding season of 2019, the fieldworking teams had the chance to repeat the census in some of the project areas, as well as in other colonies where a census had not taken place since the end of the previous LIFE project for the species (LIFE03/NAT/GR000091).

The 2019 field surveys were carried out in parallel with fieldwork implemented in the framework of Action D1, thus incurring no further cost to the project.

Table 1. Summary of the fieldwork activities carried out in order to update the baseline information regarding the population and breeding status of Eleonora's falcon. *Breeding success = number of fledged birds per nest. Nesting success = percentage of nests with at least one chick (i.e. percentage of successful pairs).*

Area	Population census		Monitoring of breeding performance
	Fieldwork period	No of islets censused	Fieldwork period
PROJECT AREAS			
I: NISOS ANTIKYTHIRA AND NISIDES PRASONISI, LAGOUVARDOS, PLAKOULITHRA AND NISIDES THIMONIES	2014 2019	3	2016
I: CHERSONISOS GRAMVOUSAS KAI NISIDES IMERI KAI AGRIA GRAMVOUSA, PONTIKONISI	2014	3	-
II: DIONYSADES NISOI	2015 2019	4 1	2015
III: NISOS TILOS AND NISIDES	2016 2018	1	-
IV: MIKRES KYKLADES	2014 2019	8 5	2014 2016
V: SKYROS (OROS KOCHYLAS) AND NISIDES SKYROU	2014 2016	21	2014 2015 2016
VI: NISIDES AND VRACHONISIDES LIMNOU	2014	8	2014
VII: VOREIA KARPATHOS AND SARIA *	2012	16	2013
WESTERN CYCLADES	2019	8	-
OTHER CYCLADES 1 (Schoinousa, Koufonisia, Keros, Antikeria)	2014 2019	7 6	-
OTHER CYCLADES 2 (Mykonos, Serifos, Gyaros)	2014	5	

Area	Population census		Monitoring of breeding performance
	Fieldwork period	No of islets censused	Fieldwork period
VOREIES SPORADES	2019	2	-

* Fieldwork activities in this project area were conducted as part of the project entitled "*Monitoring of the species and habitats of the protected area Karpathos-Saria*" that was carried out by NCC Ltd and its associates on behalf of Management Agency of Karpathos and Saria.

Problems encountered: Due to bad weather conditions experienced the implementation period of the action had to be extended and some minor deviations from the activities foreseen in the grant agreement happened as explained above.

Complementary actions outside LIFE: None

Perspectives for continuing the action after the project: Please refer to Action D1 for more information.

Deliverables previously submitted to EC:

a) Progress report (Annex 7.2.6 of Inception Report)

b) Progress report (Annex 7.1.1 of 1st Progress report)

c) Final report (Annex 7.2.1.1 of Midterm Report)

Deliverables submitted with the present report:

a) Final report (updated, **Annex 7.2.7**)

5.1.3. Action A3: Assessment of refuelling pattern of migratory passerines on Antikythira

Foreseen start date: 15/8/2014 *Actual start date: 15/8/2014*
Foreseen end date: 31/10/2015 *Actual end date: 30/11/2016*

Beneficiary responsible for the implementation: HOS

2014		2015				2016				2017				2018				2019		
3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T

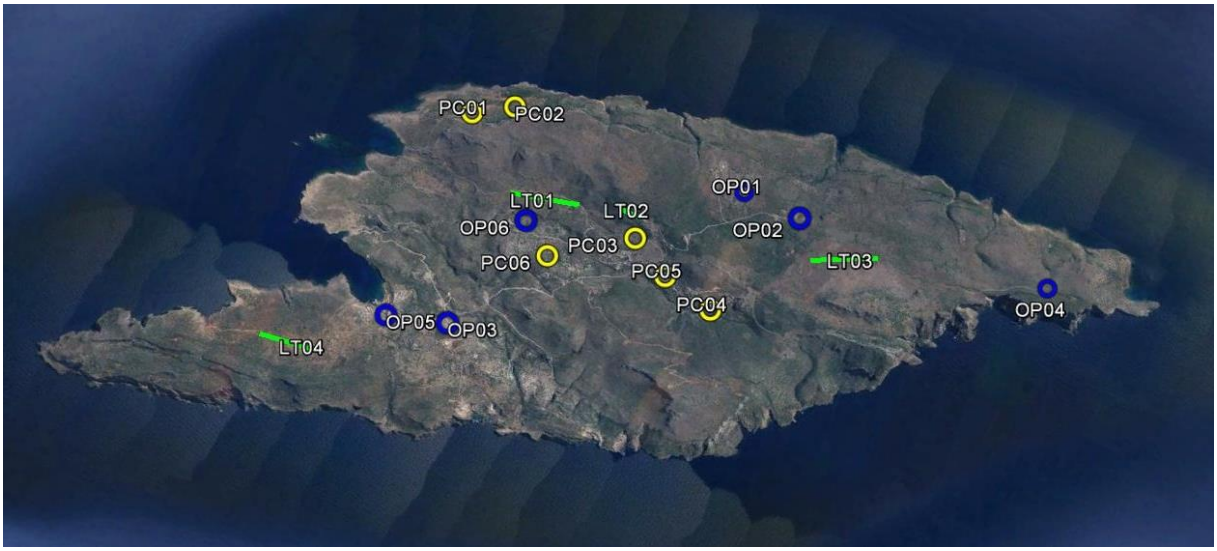
Realised Foreseen

Description: This action involved the identification of habitat used by the migrating passerines, which use Antikythira as a stopover site for refueling and the assessment of the value of each habitat for the refueling of migratory passerines. The goal of this action was to determine the type of fruit trees, bushes, cereals etc, to be planted (Action C3) in order to improve the quality and availability of Eleonora's falcon prey, i.e. migrant passerines, through targeted habitat management practices (Action C3), as well as to gather baseline information in order to be able to evaluate the efficiency of these practices in the framework of Action D1.

A set of different methods were implemented to gather the required information (Table 2), while past HOS data were also used during data analysis.

Fieldwork activities were carried out by HOS field teams and volunteers of the Antikythira Bird Observatory and were supervised by the Monitoring coordinator and the Vegetation management officer, who were also responsible for the preparation of the final deliverable.

Ringing and radiotracking of migratory passerines



Satellite image depicting the location of sampling points and line transects

Table 2. Summary of the fieldwork activities carried out in order to assess the refuelling pattern of migratory passerines on Antikythira island.

Season	Activities
Autumn 2014	Ringing, point counts
Spring 2015	Ringing, point counts, transects, radiotracking
Autumn 2015	
Spring 2016	
Autumn 2016	

According to the final results, once birds land on the island, it seems that the most used and selected habitat from almost all the species studies are agricultural land and maqui vegetation (both high and low). Even though the location of Antikythira, i.e. just before the Mediterranean and the Sahara desert, is strategic for birds to prepare for the barrier crossing, there are no indications the target species are doing so. Thus, the improvement of the available habitat for passerines is expected therefore to be beneficiary for birds stopping over during both spring and autumn on the island.

Results regarding the stopover ecology and time allocation of one of the main prey species of Eleonora's falcon, namely the Woodchat Shrike (*Lanius senator*), were presented in the 13th International Conference on the Zoogeography and Ecology of Greece and adjacent regions that was held in Heraklion (Crete) in October 2015 and subsequently published in a peer-reviewed journal (refer to Annexes 7.3.2.23 and 7.3.2.24 of Midterm report) in the frame of Action E3.

Action performance indicators: number of trapping seasons; number of radiotagged species; production of final report.

Action modifications: None

Achievement of objectives and coherence with the original time schedule: This project action was carried out smoothly. The project partnership decided to extend the period of its implementation to ensure the maximum efficiency of the related conservation action (i.e., Action C3). In particular, the additional fieldwork activities conducted in spring and autumn 2016 focused on the land plot that was selected for purchase, in order to gain a more detailed knowledge of the stopover behaviour of passerines in this area that will allow the project partnership to make more efficient use of available resources during the implementation of Action C3. Moreover, the sampling effort design that was used for this purpose will be continued during Action D1 in order to be able to get comparable results regarding the impact of Action C3 to the stopover behavior of passerines.

Problems encountered: No significant problems were encountered. During the first fieldwork season (i.e., autumn 2014) the reduced detection rate of passerines during point count surveys was subsequently circumvented with the use of a complementary method, namely line transect counts using the "distance sampling" method during the following fieldwork seasons (i.e., spring and autumn 2015, 2016).

Complementary actions outside LIFE: None

Perspectives for continuing the action after the project: Bird surveys regarding migratory passerines will continue by the HOS staff and volunteers after the completion of the current LIFE project as part of the main activities of the Antikythira Bird Observatory.

Deliverables previously submitted to EC:

a) Progress report (Annex 7.2.6 of Inception Report)

b) Progress report (Annex 7.1.2 of 1st Progress report)

c) Final report (Annex 7.2.1.2 of Midterm report)

d) revised Final report (Annex7.1.2 of 2nd Progress report)

Deliverables submitted with the present report: None

5.1.4. Action A4: Identification and quality assessment of foraging grounds during the breeding and wintering period

Foreseen start date: 1/4/2015 *Actual start date: 1/1/2015*
Foreseen end date: 31/10/2017 *Actual end date: 20/09/2019*

Beneficiary responsible for the implementation: UOP

2014		2015				2016				2017				2018				2019		
3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T

Realised Foreseen

Description: This action involved the identification of Eleonora's falcon foraging grounds during the breeding and wintering period and the subsequent quality assessment of these. Its ultimate goal was to provide the necessary information to derive guidelines for the conservation of the species in the long run, as these will be detailed in the Good Practice Guide (Action E4) during the last phase of the project.

Since the beginning of the project extensive fieldwork activities took place by the HOS and UOP field teams, supported by HOS volunteers of the Antikythira Bird Observatory, as well as networking with species' experts (Table 3). The Monitoring coordinator has been closely collaborating with the Toxicology expert and the Project manager to ensure the smooth implementation and maximum effectiveness of the action.

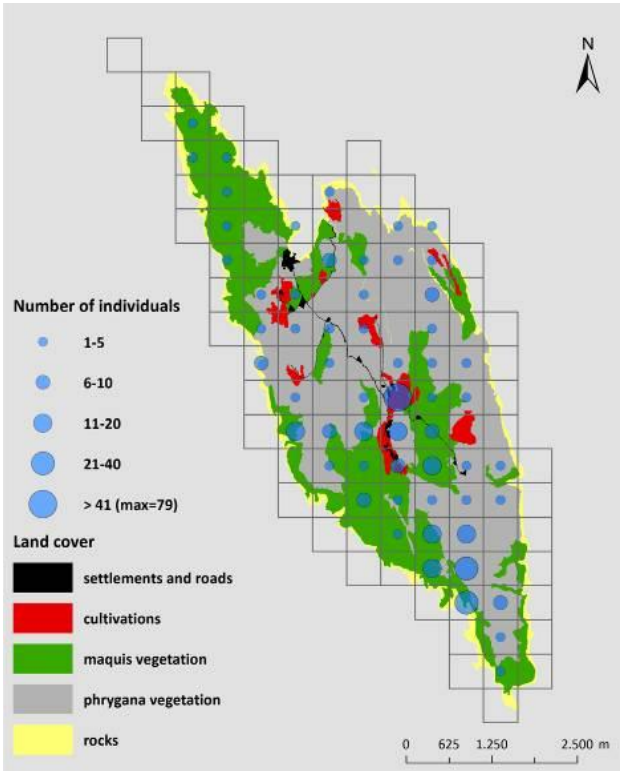
Fieldwork activities in the frame of this action comprised of a combination of complementary methods to collect the necessary information, namely tagging and satellite tracking of selected individuals year-round, direct observations of foraging falcons during the pre-breeding period, estimation of prey availability during the pre-breeding period and breeding period through insect surveys and radar technology, habitat assessment at the species' foraging grounds and toxicological analyses.

An adult falcon tagged with GPS-UHF transmitter on Antikythira island in September 2015

Satellite tracking: Tagging of the falcons was originally planned for late spring-early summer in 2015. However, due to unforeseen reasons, the project partnership proceeded to the necessary modifications in the time schedule to ensure that the action will be implemented at its fullest as detailed in continuation. In particular, due to unforeseen reasons (most likely related to the lack of adequate food availability) the falcons were not present on the island of Antikythira during that period. For this reason, the field team decided to repeat the capturing attempts in September 2015 (i.e., during the breeding period), which were stemmed with success. Given that the main target of this subaction was to monitor the prebreeding movements of the falcons and that until the 2016 prebreeding period the falcons would travel thousands of kilometres to their wintering grounds and back, the field team fitted only three tags (out of five that were originally purchased) to reduce the risk of failure either due to technical malfunction of the tags or mortality of the falcons. Unfortunately, just a few days after the onset of autumn migration, one tag stopped transmitting properly and according to the data gathered, the falcon in question had most likely been captured by falconers in Egypt. For this reason, the project partnership decided to replace the tag and, hence UOP purchased another tag that was fitted in 2016 together with the remaining two. Tagging attempts were resumed in spring 2016 on Antikythira island. Although the field team captured 20 falcons, none of them was heavy enough to be able to carry a tag. Therefore, the tagging attempts were repeated in September 2016 (i.e., during the

breeding period) with success, during which another three adult falcons were captured and fitted with GPS-UHF tags. This was the first telemetry study carried out in Greece regarding the species' prebreeding and breeding period, as well as the first one that covered the entire prebreeding and breeding period

Direct observations: Despite tag failures, visual observations for the study of the foraging behaviour of the species on the island of Antikythira during the pre-breeding period complemented this action and provided valuable information. To this end the surface of the island was divided in rectangular cells of 500x500m within which data on the abundance of Eleonora's falcon and their foraging behaviour were collected via visual observations during daylight in spring 2015, 2016 and 2017.



Distribution of foraging Eleonora's falcon during the prebreeding period on the island of Antikythira in relation to the existing land cover, indicating preference over cultivated areas

Insect surveys: Insect surveys with traditional means (line transects and Malaise trap) took place 2016 to estimate prey availability on the island of Antikythira in springtime 2016, following the same sampling design as the visual observations of foraging falcons to gain comparable results.

Radar surveys: In autumn 2017 a joint NCC and National Observatory of Athens (NOA) radar survey took place, using NCC ornithological radar and NOA meteorological radar, which allowed for a detailed assessment of the Eleonora's falcon, as well as its prey species, i.e. migratory passerines and insects, within a range of few 10s of kilometres around the island of Antikythira. This was the first ever attempt of using XPOL weather radar to monitor bird migration in Greece.

NOA XPOL weather radar and NCC marine surveillance radar at Antikythira

The results of these surveys indicated relatively lower passerine migration flows in southwestern Aegean Sea, compared to other sites in the Aegean Sea. Additionally, telemetry revealed that Thrace was one of the main regions where Eleonora's Falcons spend their pre-breeding season. Therefore, additional comparative surveys of autumn migration in the eastern part of Crete (Sitia), as well as in Evros (Thrace-northern Greece) were carried out in autumns of 2018 and 2019, while spring migration was assessed in Evros in spring 2019. The results of these surveys indeed confirmed that that migration flow at Antikythira was relatively lower than in eastern Crete and in northern Greece. Furthermore, radar surveys in association with visual observations in spring 2019 showed that there is significant presence of foraging Eleonora's Falcons in Evros region during pre-breeding period and a significant migration flow of nocturnal migratory passerine and insects. These data further support the importance of mountainous areas of northern Greece for the Eleonora's Falcons during the pre-breeding season and provide further indication on the falcons' prey abundance which is considered to be the main reason for the presence of the Eleonora's Falcon so far from their colonies.

Assessment of habitat quality: At the species wintering grounds, a field survey was carried out in Madagascar in April 2015 to assess the pressures and threats at the species' most used foraging areas. At the species' breeding grounds, bibliography data, including the results and conclusions of previous monitoring projects and climate change predictions at the Natura 2000 areas that the tagged Eleonora's falcons used most intensively, were used for the same purpose.

Field surveys at Madagascar

Toxicological analyses: given the scarcity of dead specimens and infertile eggs found during the foreseen fieldwork activities at the species' breeding colonies (Actions A2 and D1), but also in light of the data collected in May 2016 regarding Eleonora's falcon body condition after completion of the spring migration (see above), the project partnership decided to collect and analyze blood samples from alive falcons to test for the presence of heavy metals and pesticides. No previous data exist on the body condition of Eleonora's falcon during the prebreeding period that could serve as a baseline for comparison with the collected data. Thus, one possible scenario explaining the low body weight of the captured falcons could be that the falcons had been exposed to pesticides during the wintering and/or migratory period, which could challenge the falcons' overall physical condition and foraging efficiency. Another possible scenario is related to the abnormal weather conditions that were experienced both in Europe and North Africa in winter and spring 2016, which could have resulted in excessive consumption of fat reserves by the falcons en route, late arrival at their breeding grounds and/or low food availability at their breeding grounds. Therefore, the toxicological analysis conducted on additional samples collected during the prebreeding (spring) and breeding period (autumn) in 2017, coupled with body measurements, shed more light on the quality of the species' foraging habitats and possible implications for the falcons' body condition. For this reason, UOP hired a toxicology researcher with great experience in ecotoxicological studies to conduct the aforementioned analysis. This was the first study assessing a set of biomarkers derived from alive falcons with no clinical symptoms, which could be thus used as reference values for future studies.

Table 3. Summary of the activities carried out in order to identify and assess the quality of the foraging grounds of Eleonora's falcon during the breeding and wintering period.

Season	Activities
Winter - Spring 2015	Purchase of tracking equipment based on literature review and networking with species' experts
Spring 2015	On-site habitat assessment of the species' foraging grounds at its wintering grounds.
Spring 2015, 2016, 2017	Visual observations for the study of the foraging behaviour of the species on the island during the pre-breeding period
Spring 2016	Insect surveys on Antikythira island
Autumn 2015, 2016	Tagging of 6 female adults with GPS-UHF transmitters to monitor their movements during the entire annual cycle, with particular emphasis on the (pre)breeding and wintering period
Autumn 2015 – September 2019	Satellite tracking of tagged adults
Autumn 2017	Radar surveys at Antikythira
2014-2017	Collection of samples of any dead falcons and failed eggs
Spring-Autumn 2017	Toxicological analyses
Autumn 2018	Radar surveys at Sitia (Crete)
Spring-Autumn 2019	Radar surveys in Evros (Thrace)

The conclusions drawn from the analyses of the data collected during the aforementioned activities are summarized as follows:

- at the species' breeding grounds during the prebreeding period (a) the most important foraging areas are located in the SE Balkans, SE Peloponnese, as well as on the islands of Lesvos, Naxos, Crete and Antikythira, (b) these areas are rather productive and species-rich in terms of prey abundance, and (c) although these areas overlap the network of protected areas to a great extent, based on the ongoing pressures and anticipated threats in these areas and in the lack of conservation measures, the quality of these foraging areas for Eleonora's falcons is expected to decrease.
- at the species' breeding grounds during the breeding period (a) hunting activity occurs within a radius of 100km around the breeding colonies on the island of Antikythira and (b) the island hosts a high number of migratory passerines that stop over on the island and thus constitute an abundant food resource for Eleonora's falcons. However, ongoing land cover changes and anticipated climate change effects pose a potential threat to the habitat quality for staging passerines and consequently food availability for Eleonora's falcon.
- at the species' main wintering grounds (a) the most suitable foraging areas currently occur in the northern and central part of Madagascar, (b) the distribution of suitable areas for the species in the future will move southward to areas, which are yet more heavily exploited by local societies and (c) the quality of these foraging areas in the future is uncertain if unsustainable management practices continue to take place.

In addition, the observed levels of biomarkers in blood samples of alive falcons, tissues of dead falcons, water samples, as well as in unhatched eggs, implied that exposure to genotoxic factors is not a point of concern at the moment, although more data are needed to validate these findings.

Action performance indicators: number of tagged Eleonora's falcons; number of collected samples for toxicological analyses; production of final report.

Action modifications: The involvement of UOP was greater (relative to Personnel, Consumables and Travel) than originally foreseen, as detailed above and notified to EC with the Inception report (Annex 7.4.1 of the Inception report). In addition, the duration of the action was extended to accommodate the additional radar surveys detailed above.

Achievement of objectives and coherence with the original time schedule: Overall, all foreseen tasks were implemented according to the revised time schedule. Modifications to the timing of fieldwork activities regarding tagging of adult falcons were imposed by unforeseen reasons, as explained above. Yet the use of complementary methods, as well as the incorporation of further activities that were not foreseen in the original proposal (i.e., additional blood samples for toxicological analysis) ensured that the objectives of this action were accomplished to their fullest. Given the increasing demands of this action with regards to the different methods used in the field and required expertise and technical know-how of involved field teams, the UOP contributed with specialized personnel and subcontractors in the implementation of this action. Thus, compared to the original proposal, the UOP had increased expenditure of expenses related to personnel hours, external assistants and equipment, to ensure the best possible outcome. Furthermore, the furnished results provided valuable insight in the species ecology, which together with networking with species' experts resulted in the production of a significant amount of scientific work.

More particularly, in the framework of Action E3:

- the preliminary results of the aforementioned activities were presented in the 8th Congress of the Hellenic Ecological Society that was held in Thessaloniki in October 2016 (Annex 7.3.2.23 of the Midterm report), the 29th annual meeting of the Society of Environmental Toxicology and Chemistry that was held in Rome in May 2018, the 40th conference of the Hellenic Society for Biological Sciences that was held in Veria in May 2018 (Annex 7.2.8 of 2nd Progress report) and the 9th HELECOS conference that was held in Heraklion in October 2018 (**Annex 7.2.6 of present report**).
- The final results of the assessment of the species' foraging grounds at Madagascar in view of climate change were published in a peer-reviewed journal (Annex 7.2.8 of 2nd Progress report). The final results of the space use patterns of Eleonora's falcons at Antikythira island, of the toxicological analyses, as well as fine scale assessment of space use and evaluation of pressures and threats at Madagascar were published in peer-reviewed journals (**Annex 7.3.2.9 of present report**).

Problems encountered: Overall the project action was implemented without any significant problems.

Complementary actions outside LIFE: None

*Perspectives for continuing the action after the project: S*atellite tracking of the three falcons that were tagged in September 2016 will continue depending on data availability. Monitoring of falcons (visual observations and capturing for blood sampling and body measurements) that occur on the island during the prebreeding period will continue as part of the main activities of the Antikythira Bird Observatory, given the availability of manpower and funds. UOP will also contribute to the continuation of these activities.

Deliverables previously submitted to EC:

a) Final report (Annex7.1.1 of 2nd Progress Report)

Deliverables submitted with the present report:

a) Final report (updated to include the results of the radar surveys in northern and southern Greece, **Annex 7.2.8**)

5.1.5. Action B1: Purchase of land for the creation of "refuelling oases" for migrating passerines

Foreseen start date: 1/8/2014 *Actual start date: 1/8/2014*
Foreseen end date: 30/9/2015 *Actual end date: 31/1/2017*

Beneficiary responsible for the implementation: HOS

2014		2015				2016				2017				2018				2019		
3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T

Realised Foreseen

Description: This action involved the purchase of a land plot up to 1ha on the island of Antikythira, in order for the foreseen activities of the concrete conservation Action C3 (i.e., creation of refueling oasis) to take place there. During a preliminary phase (8 months) an initial list of all available for sale land plots was compiled. This task was carried out through a series of on-site visits, as well as communications (phone calls, emails, meetings) with landowners and the national land registry. Given the complicated ownership status of property in Greece, especially in rural areas, this phase was unexpectedly prolonged. Based on the results of Action A3 regarding habitat use by passerines, the initial list was reduced to those land plots that fulfilled particular habitat criteria. A second round of communications took place to resolve the ownership status of the candidate land plots in order to determine which plots could be actually purchased on time for the project goals to be feasible. One plot fulfilled all above criteria. Unfortunately, further delays (12 months) resulted from the fact that three people owned the plot, rendering the exchange of the necessary documents and the overall communication rather slow. The land purchase was finally completed in January 2017. The property was registered in the Land Purchase Database in summer 2019.

This action was mainly run by the Monitoring coordinator and was further supported by HOS Director and HOS Scientific Coordinator.

Action performance indicators: purchase of a 1ha land plot

Action modifications: None

Achievement of objectives and coherence with the original time schedule: The completion of the action was delayed in comparison to the revised time schedule. In particular, the action was planned to be completed on the 3rd trimester of 2015 but was completed 1 year later for the reasons explained above. However, this delay did not have any major impact on the Action C3 and the consequent monitoring Action D1. The major part of the management practices took place before the spring migration season of 2017. Migrating passerines showed immediate response to the creation of favorable habitat (see Action D1). The implementation of monitoring activities in the frame of Action D1 covered three years during the project (6 migrating seasons), which is considered sufficient for assessing the efficiency of the refueling areas created.

Problems encountered: As explained above, the implementation period of this action had to be extended due to bureaucratic problems related to the overall problem in Greece regarding the complicated owner status of land, as well as to the fact that the owners of the land that was finally purchased are not currently living on Antikythira island and thus the communication and exchange of necessary documentation was rather slow, in spite of the huge effort made by the project team to speed up the corresponding procedures.

Complementary actions outside LIFE: None

Perspectives for continuing the action after the project: Not applicable

Deliverables previously submitted to EC

a) Contract and schematics (Annex 7.2.2.1 of Midterm report)
b) Report on subtasks (Annex 7.2.2.2 of Midterm report)

Deliverables submitted with present report: None

5.1.6. Action C1: Rat eradication operations for the improvement of nesting habitat quality for Eleonora's Falcon

Foreseen start date: 01/11/2015 *Actual start date: 01/11/2015*
Foreseen end date: 30/9/2019 *Actual end date: 30/9/2019*

Beneficiary responsible for the implementation: NCC

2014		2015				2016				2017				2018				2019		
3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T

Realised Foreseen

Description: Rat eradication operations at Mikres Kyklades and Dionysades project areas were implemented based on the outcomes of the 1st project workshops and relevant operational plan (Action A1).

Preparation of bait stations

Preparatory phase

The initial stage of rat eradication operations included the acquisition of licences, formal correspondence with the state, regional and local, the purchase, preparation and maintenance of equipment (e.g. boat, cars, GPS and VHF communication equipment) and consumable materials, as well as the construction of custom-made bait stations. The permit for the eradication of rats issued by the Ministry of Environment and Energy was included in the overall project's permit for work at the Eleonora's falcon colonies (refer to Annex 7.2.2.4 of Midterm report).

Taking into consideration the geomorphology of the areas, vegetation composition and rat abundance data collect during direct field observations, the preliminary layout and locations of bait stations were computed in GIS environment and field maps were prepared. Based on the number of bait stations and the difficulty of terrain, the required man-power to carry out rat eradication operations was estimated to ensure that sufficient field researchers and workers (personnel, external assistance and volunteers) are available at all stages of rat eradication operations. Finally, the arrangements for the project staff accommodation, transportation of materials, equipment, vehicles and boat were made, while the arrangements for the technical support were made with the local authorities i.e. Municipalities and Forestry Services. When necessary, field trips to project areas were carried out prior to the initiation of the field work in order to acquire necessary information and carry out on site necessary arrangements e.g. meetings with local or regional authorities. Following all these preparations, rat eradication field work was carried out, as described in the paragraphs below. In order to achieve optimal efficiency, minimize personnel risks, as well as, any collateral damage to non-target species, the project team decided to follow the most selective and precautious available methods concerning bait deployment, i.e. using bait stations, and closely collaborate with local Forest

services, to better safeguard the future sustainability of the activities. An enormous human effort was invested in this action, with NCC, HOS and UOP field teams closely collaborating at all stages of the rat eradication operations at all project areas where the action is taking place. Particularly for the Dionysades case, where a very large area had to be treated with selective methods, NCC involved an experienced external assistant, which used well trained local workforce, additional to the NCC, HOS and UOP resources, for the bait station creation, deployment, monitoring and re-baiting campaign to be implemented on time.

Main activities in Mikres Kyklades project area

Rat eradication operations in Mikres Kylades project area were implemented on Makares islet complex, consisting of 3 uninhabited islets with the total surface area 155ha. Nearby island of Donousa, located 5 nautical miles from Makares, was used as the mission's base, while boats used for taking personnel, equipment and materials to Makares were regularly refuelled on Koufonisia.

The 1st phase of the rat eradication operation on Makares islets, which started in March 2016, involved the transportation and deployment of 166 bait stations over the entire surface area of the target islets and was finished later the same month. Based on the final locations of the bait stations, a special database was created to allow for monitoring of overall and bait-station specific bait consumption and their graphic representation on maps during the following phases of the rat eradication.
The 2nd phase of the operation involved regular monitoring of bait consumption, rat presence and replacement of bait taken by rats at each bait station. All the data was recorded, stored and analysed with the geodatabase described above in GIS environment to allow for monitoring of the rat eradication process, as well as fine-tuning of the rat eradication method, if needed. Rat activities and bait consumption on two islets have ceased in spring 2016. Therefore, the eradication operations on these two islets entered their 3rd phase, i.e. post-eradication monitoring, which includes regular but less frequent monitoring of bait consumption and detection of any remaining rats until the end of the project.

The progress of the rat eradication on the third islet was more complicated. By the beginning of Eleonora's falcon breeding season in July 2016, there was still some bait consumption at individual bait stations, indicating that some rats may still have survived. In November 2016, after the Eleonora's falcons have migrated for their wintering grounds, monitoring and replacement of baits continued, in collaboration with the LIFE ANDROSSPA project team and the project vessel which carried the project fieldworkers and assisted in the field work at Makares, for the second time within 2016. Rat activities have ceased by the beginning of 2017. In late spring of 2018, however, rat presence, i.e. rat bait consumptions and fresh rat faeces, was detected and confirmed again Taking into account the fact that for more than 1-year period there were no signs of rat presence, it is assumed that rats were eradicated during the initial baiting in 2016 but reinvaded the islet in 2018, potentially from boats visiting Makares. In order to tackle the reappearance of rats, intense and frequent baits, as well as, a deployment of additional bait stations to reduce the spacing between neighbouring bait

Monitoring bait consumption

stations in the areas where rat presence has been detected and to increase the number of bait stations along the coastline to reduce the risk of reinvasion were carried until autumn 2018. Since November 2018, when again no rat activities were recorded, post eradication monitoring was carried out until the end of the project in September 2019.

All field activities were carried out by experienced NCC, HOS and UOP field teams, supported by volunteers and the personnel of the Municipality of Andros (in collaboration with LIFE ANDROSSPA project), with the use of HOS boat, hired local boats and the boat of the Municipality of Andros. The transportation of field materials and equipment in Athens and on Donousa was carried out with NCC and HOS vehicles.

Main activities in Dionysades project area

Preparations for bait station deployment

The initial planning for the rat eradication operation on Dionysades islet complex, which consists of 4 uninhabited islets with a total surface area 550ha, involved aerial deployment of the rodenticide bait over the entire surface area of the target islets. The choice of this method was based primarily on the large size of the islets, as well as the presence of the numerous high and inaccessible cliffs, where bait deployment would be difficult and very laborious task if using the conventional land-based broadcast methods i.e. bait stations or hand-broadcast methods. For this reason, technical specifications of the aerial broadcast method to be used on Dionysades was already discussed during and after the 1st project workshop (Action A1), in particular with the representatives of ISPRA, the Italian National Institute for Environmental Protection and Research, who have been involved in several successful rat eradication operations on Italian islands, some of which also involved aerial broadcast of bait, e.g. LIFE Montescristo 2010. These discussions also involved the potential of using a special bucket, designed and purchased from New Zealand, which is carried by a helicopter and automatically releases a predefined amount of bait, that was purchased by the Italian colleagues and made available for use by interested parties.

However, the project team decided to modify these initial plans and use a more selective and preventive eradication method, in order to minimize any collateral damage to local ecosystems. Especially after the discussions with the Forestry Departments in Sitia and Agios Nikolaos (Crete), it was concluded that the method used should not affect rabbits (*Oryctolagus cuniculus*), which are present on the three largest islets of Dionysades and are related to the prey abundance for large raptors, migrating over the islets or overwintering there. Dionysades are also used as a refuge for rabbit and hares that are released to areas where their populations need to be enhanced. Therefore, the aerial broadcast of bait was not an option anymore, because the bait would be exposed on the surface of the islets and could be consumed apart from the rats also by rabbits. The final rat eradication design was prepared after the final reconnaissance assessment of the area for Dionysades terrain/vegetation/fauna/accessibility/rat abundance assessment and in collaboration with the Natural History Museum of Crete experts and local as well as regional Forestry Departments. The revised eradication design therefore was mainly based on bait-stations deployment in a very large scale, on the accessible parts of the islets in combination with and hand-broadcasting on the inaccessible cliffs. A very selective and precautious design was implemented, minimising collateral damage to non-target species, but demanding an

enormous human effort to be properly and timely implemented in the difficult and dangerous terrain of Dionysades, which has proved to be fatal for certain researchers in the past.

In technical terms this method involved the deployment of over 600 bait stations and a significantly larger human-effort required for placement, regular checking and baiting of the bait stations. However, this design minimized the release of the rodenticide bait into the environment. It has been the first time for the country that a selective eradication project of such size has been implemented and it was decided to motivate the most experienced and well trained available human resources, to carry out the field work, in order to achieve the highest possible personnel safety standards and to minimize chances of action's failure due to poor implementation.

Based on this updated design, it was decided to involve experienced external assistance, to improve the efficiency of the project workforce and timely carry out the foreseen activities in the limited time window, after the departure of falcons from the colony (early November), and before the initiation of heavy winter storms, which make the access and work at the Dionysades islet complex impossible. Preparations for the rat eradication fieldwork were made in September, and October 2016, which included detailed technical fieldwork planning, call for external assistance, purchase and construction of equipment and materials, construction of bait stations, maintenance of existing equipment, vehicles and HOS boat as well as logistics preparations for the rat eradication operations. Joined preparation work was carried out by the project team and the external assistant, to achieve the strict timeline. Transportation of the equipment and material to mission's base in Sitia (Crete) was carried out in late October and early November. Due to the large amount of materials required, storage arrangements have been made by the Municipality and Port Authority of Sitia.

Hundreds of bait stations were distributed over the entire area of the islets

Bait station deployment

The 1st phase of the rat eradication on Dionysades, i.e. the deployment and baiting of bait stations, started in early November 2016 on 3 out of 4 target islets. The field work was carried out by parallel work of at least 3 field teams consisting of up to 11 field workers. It required approximately 1 month to deploy the total of 535 bait stations on the >516 ha of the 3 islets surface The 2nd rat eradication phase i.e. monitoring of bait consumption and replacement of the bait taken by rats was initiated a week after the start of bait station deployment, in order to assess the bait consumption and the acceptance of bait by rats in order to optimize the eradication method. This resulted in the deployment of additional bait stations and the increase of the bait available to rats at each bait station. Bait consumption was also monitored at individual bait stations using three night vision trail cameras at individual bait station, indicating that bait consumption was high already within the first days after the bait was laid and demonstrating appropriate selection of method used and season of eradication.

Positioning of trail cameras

Rat attendance at bait station as revealed by a trail camera

The deployment of baiting stations on the remaining islet started in late January 2017, after severe weather conditions have passed, and was carried out only by the project's most experienced field researchers to minimize the risk to field personnel. Bait consumption by rats ceased by March 2017 when post-eradication monitoring was initiated on this islet, also. Post-eradication monitoring on all islets continued until the end of the project in September 2019.

In December 2017 no bait was found in 10 bait stations on one of the four islets with no conclusive evidence regarding the reasons responsible for the absence of bait. The consecutive regular monitoring revealed that bait is being simultaneously degraded by humidity, rain and wind as well as by beetles and snails, however not signed of rat presence have been found since December 2016.

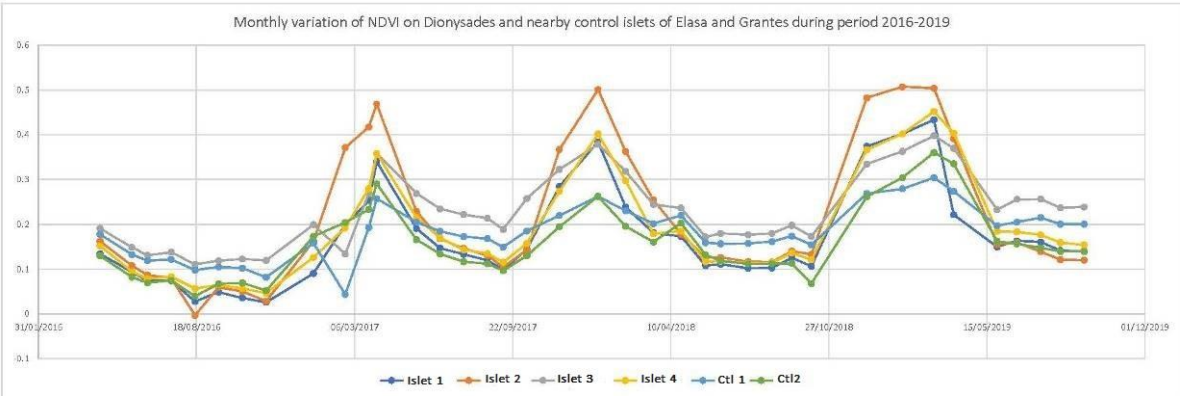
The field work has been a real achievement on behalf of the project team and the external assistants. Through a well-coordinated effort, the deployment of the bait stations, within a month of hard fieldwork, the project fieldworkers had to cover by walking, hiking or climbing a total length of over 650km on rugged, dangerous and difficult islet terrain, to reach the predefined bait station locations, deploy and bait the bait stations and do initial checks of bait consumption to optimize the eradication method.

All field activities have been carried out by experienced NCC, HOS, UOP field teams and experienced external subcontractor, supported by the Natural History Museum of Crete, Forestry Department of Sitia, Municipality of Sitia and Port Authority of Sitia. The transportation of the field personnel, equipment and materials was carried out primarily by the HOS boat, however local boatmen were also hired occasionally for this task. The transportation of field materials and equipment in Athens and on Crete was carried out with NCC and HOS vehicles. Monitoring of rat absence was further enhanced by local fishermen and visitors from Sitia, which regularly (and with enthusiasm) informed the project team and the Sitia Forestry Department that there are no more rats on Dionysades.

Notice boards (Action E1) which present the project and provide additional information on the target islets, the rat eradication operations, as well as, guidelines to islet users to minimize the risk of rat reinvasion, were produced and erected in nearest ports of Donousa and Sitia, as well as, on the access points on the target islets on Dionysades and Makares. In particular, six signs (EL/EN) informing/warning about the implementation of rat eradication were placed at Dionysades islets, and another four signs (EL/EN) informing about the biosecurity measures that users of the islets have to follow in order to keep them rat free were placed at Dionysades islets. The signs were provided in Annexes 7.3.2.16 and 7.3.2.20 of the Midterm report.

Notice board informing visitors of the rat eradication operation

During field surveys it was observed that rat eradications seemed to have a positive impact on the native vegetation of the target islets. Because no systematic recording of the vegetation before and after rat eradication operations was initially foreseen, a study of the variations of the vegetation cover of Makares and Dionysades islets was carried out, using satellite telemetry, in collaboration with the Agricultural University of Athens, Forestry Department of Karpenisi. The study involved the assessment of the Normalized Difference Vegetation Index (NDVI) obtained from Copernicus satellite telemetry before and after rat eradication operations. The results of the study showed no statistically significant difference in monthly variations of vegetation abundance/quality between islets where rats were eradicated and neighbouring islets. Other environmental factors e.g. precipitation and draughts are considered to play more important role for the islets' vegetation. However, when examining the proportion of change of NDVI during the Eleonora's Falcon breeding season (August-September) there was a higher proportional increase of NDVI on rat-free Dionysades in comparison to rat-infested near-by islet. Additionally, it is considered that fine scale variations of vegetation are hindered by the limited spatial resolution of the satellite telemetry (10x10m) and therefore NDVI cannot fully represent the impacts of the rat eradication on the vegetation abundance and quality at the level of Eleonora's Falcon's nesting sites and territories.



Monthly average NDVI for Dionysades and nearby control islets, indicating similar variations of NDVI by seasons.

The overall planning and coordination of the field teams was the task of the NCC Islet management officer and HOS Rat eradication officer. The overall implementation of the action would not be possible without dedicated involvement of NCC, HOS, UOP and

subcotractor BIOMA field teams, as well as the support of the local authorities and organizations on Donousa and in Sitia.

Table 4. Summary of the progress of field activities carried out in the framework of the rat eradication operations per trimester.

	2016				2017				2018				2019		
Project areas	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III
Makares															
Dionysades															
	Bait station deployment					Bait consumption monitoring					Post-eradication monitoring				

Action modifications: The major modifications of the action's implementation refer to the modification of the initially planned aerial bait broadcast by helicopter to the deployment of bait in bait stations at Dionysades project site in order to minimize impacts on the non-target species. The initial choice of the aerial broadcast was made primarily based on the large size of the islets, as well as on the presence of numerous high and inaccessible cliffs, where bait deployment would a difficult, dangerous and very laborious task of conventional bait station and hand-broadcast methods would be used. This modification lead to more time-consuming, personnel- and effort-demanding implementation of rat eradication on Dionysades. A deployment of a limited amount of bait at regular time intervals in bait stations extents the baiting process from few weeks (in the case of aerial broadcast method) to several months (in case of bait station method), before all rat individuals are removed. Additionally, the bait station method provides at the same time a means for post-eradication monitoring of bait consumption and thereby presence of rats, thus making significantly less likely the possibility of any surviving rat individuals remaining undetected. Therefore, post-eradication monitoring, which is an indispensable part of the eradication process (Action C1), when carried out by bait stations is much more efficient but also much more time and effort consuming than hand or aerial bait broadcast, because the whole system of established bait stations is also used for monitoring rat presence, rather than a limited number of sampling locations randomly selected over the entire island in the case of hand/aerial broadcast. For this reason, approximately half of the effort required for creation, deployment, baiting and re-baiting of bait stations and their monitoring was outsourced by NCC to the subcontractors (company BIOMA), whose members have extensive previous experience in fieldwork on islets and implementation.

Action performance indicators: the number of project sites; the number of islets and the surface area of the target islets, where rat eradications have been successfully implemented; the presence/absence status of rats on the target islet; the impacts of rat eradications on the Eleonora's Falcon breeding performance and on the non-target flora and fauna species; production of final report

Achievement of objectives and coherence with the original time schedule: The preparations for rat eradication operations and the initiation of the eradications on Makares started on time. There has been a 2-3 trimester delay of the initiation of rat eradication operations on Dionysades however, the removal of rats there was completed on time. A 12month project prolongation allowed for dealing with all uncertainties regarding potential or actual reinvasion of rats on two islets.

Despite the requirement of modification of initially planned rat eradication method on Dionysades and unexpected challenges which occurred during the implementation of rat eradication operations e.g. rat reinvasion on one islet in Makares, the rat eradication operations have reached 100% of their initially set objectives by removing rats from 705 ha of 7 target islets on Makares and Dionysades project sites by the end of the project. According to our experience, this has been the most difficult, demanding and complicated rat eradication campaign in the country and its successful implementation and tackling of rat reinvasion provides confidence for the future of such operations, on an even larger scale. The achievement should be considered significant on the international context as well, due to the selectivity and precautious character of the methods used, causing no collateral damage to non-target local biodiversity. Apart from direct benefits of eliminating rat predation on the nesting Eleonora's Falcons, other species of native fauna and flora have also benefited from the removal of rats.

Regarding the breeding success of the Eleonora's Falcons there seems to be an increase in the breeding success following rat eradication operations, however the changes in the breeding success vary from site to site. It should be stressed however, that on most the target islets artificial nests have been constructed, as well as, thus contributing to the improved breeding performance.

Following the rat eradication in 2016 there were indication on field that the vegetation abundance on one islet in Dionysades has increased in autumn 2017 in comparison to autumn 2016. This could have contributed to the increased breeding success following rat eradication and construction of artificial nests. As described above, an analysis of NDVI has been carried out, however its results do not conclusively show a significant short-term increase of vegetation on rat free islets in comparison to rat infested islands. Additionally, the number and size of Chukar partridges' flocks on Dionysades in 2017 seems to have increased, following the rat eradication in 2016. Although no systematic chukar population survey has been carried out, the number of flocks and the number of birds in flocks have been recorded to increase by the project field workers, as well as local people visiting the islands.

Comparison of vegetation cover on one islet (Dionysades) in late November 2016 (prior to rat eradication) and in early December 2017, following rat eradication.

Problems encountered: No significant problems have been encountered that would jeopardise the implementation of the action. However, numerous challenges had to be dealt with in order for the action to be properly implemented. The major ones are described below. Rat eradication operations on the Dionysades had to be redesigned in order for the eradication method not to affect rabbits and other local biodiversity. A vast number of bait stations needed to be constructed and deployed, significantly more trained human resources needed to

be engaged in extreme terrain conditions, to ensure that rat eradications are implemented smoothly, and without risk for the project personnel. Due to longer time period and more human effort required for the implementation of the rat eradication with the use of bait stations, the project team ensured that the field members were experienced, physically fit, properly equipped and that the work schedule of involves an optimal balance between working and resting period to ensure (A) optimal work is carried out by the available team members and (B) teams can work continuously for prolonged periods of time i.e. >1 month. To ensure optimal balance between field crew output and personnel safety, several field teams of 2-3 persons were operating simultaneously and were coordinated by through VHF communication. In order to ensure harmonized and coherent implementation of field operations, all field researchers and subcontractor workers, and other project staff worked under direct guidance and supervision of the NCC Islet management officer and HOS Rat eradication officer. Other challenges which occurred during the action's implementation were (1) rat reinvasion of an islet on Makares in spring 2018 and (2) inconclusive data on bait removal at particular bait stations on one of the islets on Dionysades. Both problems were tackled promptly by (a) regularly monitoring bait consumption at both islets and (b) intensive baiting. Rats, which reinvaded Makares were eradication by autumn 2018.Finally, unpredictable weather conditions i.e. strong winds and rain that obstruct or prevent fieldwork were compensated by a flexible work schedule.

Complementary actions outside LIFE: The Decentralized Administrations of the South Aegean and Crete, which are the respective supervising regional forest services for Makares and Dionysades islets, are well aware of the problems caused by invasive species to the native islet biodiversity and therefore agree and support the above rat eradication operations. In addition, Decentralized Administration of Crete has requested additional advice regarding the potential of future rat eradication operations on more islets of Crete, e.g. Dia, where rats are also threatening local biodiversity. Similarly, the potential for the implementation of rat eradications on other islets in the jurisdiction of the Forestry Service of Lasithi (eastern Crete) are being assessed by the Forestry Services in Agios Nikolaos and Sitia in collaboration with the project team. The Forestry Service of Sitia has been actively involved in the fieldwork on Dionysades thus gaining experience in the implementation of eradication operations. The experience that was gained by the implementation of the action on Dionysades islets may be used by local services for further expansion in other islets, with the direct collaboration of the project team and the Natural History Museum of Crete.

Perspectives for continuing the action after the project: Maintaining treated islets rat free in a long-term is the main objective following the end of the project. This includes checking and replacing bait in bait stations at key locations of potential rat reinvasion pathways i.e. landing sites on islets and along the coastline. These activities will be carried out as part of the core NCC and HOS activities and will be further supported by cooperation with local authorities, i.e. Municipalities of Donousa and Sitia and Forestry Departments in Siteia and Syros, and local inhabitants of Donousa and Sitia that regularly visit Makares or Dionysades. Following successfully rat eradication on Makares and Dionysades has significantly increased the appreciation of the local inhabitants and authorities of the removal of rats, and particularly its positive impacts for the people and biodiversity. Therefore, the support of the local communities and inhabitants in regards to the implementation of the action and monitoring of the rat absence has been demonstrated throughout project duration and is expected to continue after its end. The continuation of actions in the Cyclades is further supported by collaboration of the project team with the field team of the Municipality of Andros, which has put in practice on numerous occasions its willingness to support conservation efforts in the wider area northern and central Cyclades by its boat and personnel. Due to the fact that Makares and

Dionysades are project site of the on-going LIFE Bonelli eastMed project on the Bonelli's Eagle (*Aquila fasciata*), the After-LIFE post-eradication monitoring will also be carried out in cooperation with this project.

Furthermore, as described in the paragraph above, there is a great interest on the behalf of the local and regional Forestry Services of Crete of the expansion of rat eradication operation to other uninhabited islets for the purposed of conservation of bird as well as other animal or plant biodiversity. The prospects of applying and implementing such projects are being assessed in collaboration with the project team. After the end of the project, islets where rats have been eradicated will be visited on annual basis to verify rat presence/absence and to replace bait in permanent baits stations, which will be left on the islets to prevent rat reinvasion.

Annexes submitted with previous reports to EC:

a) interim report (Annex 7.2.2.3 of Midterm report)

Annexes submitted with the present report:

b) Vegetation assessment report (**Annex 7.2.1.2**)

Deliverables submitted with the present report:

c) Final report (**Annex 7.2.1.1**)

5.1.7. Action C2: Increase of nesting habitat availability for Eleonora's falcon with the use of artificial nests

Foreseen start date: 01/11/2014 *Actual start date: 01/11/2014*
Foreseen end date: 30/09/2019 *Actual end date: 30/09/2019*

Beneficiary responsible for the implementation: NCC

2014		2015				2016				2017				2018				2019		
3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T

Realised Foreseen

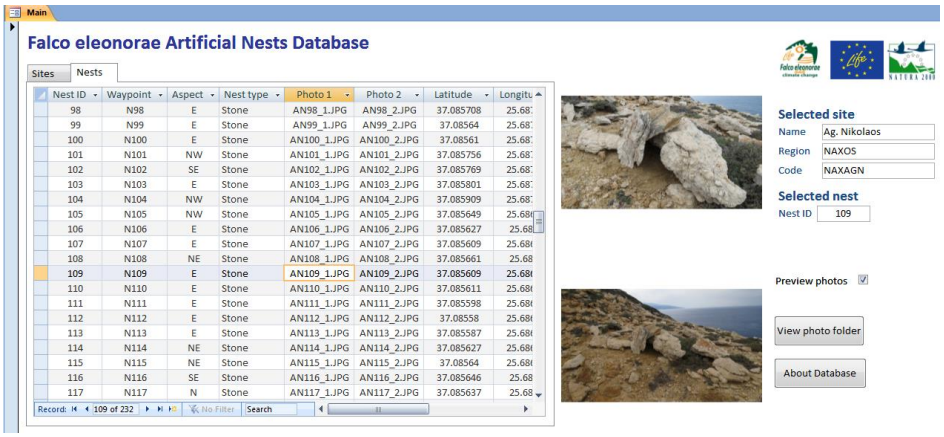
Description: The action involved the construction of artificial nests in order to increase the availability of good nesting sites for Eleonora's falcon in view of the impacts of climate change on the habitat quality of its breeding grounds. The artificial nests were constructed in order to (A) provide shade during the hottest parts of the day to protect the nest from excessive heat, while at the same time provide sun exposure during early morning hours to reduce humidity in the nest; and (B) protect nests against prevailing summer, mainly northern winds.

The technical specifications regarding the regions and sites of artificial nest construction, their technical specifications, as well as their monitoring methods have been prepared in a relevant operational plan (Action A1), based on the outcomes of the 1st project workshop, as well as

the experience and know-how gained by the project partners through the construction of artificial nests for the Eleonora's falcon in the LIFE project on Andros (LIFE10 NAT/GR/000637) and Skyros (LIFE09NAT/GR/000323).

The preparations for the construction of artificial nests started in autumn 2014. The construction of artificial nests at all project areas followed a similar pattern. Potential sites for artificial nest construction were assessed on the basis of (A) presence of Eleonora's falcon breeding sites, (B) types of existing natural nests in term of their vulnerability to climatic changes e.g. nest under vegetation are more susceptible to be affected by increased temperatures or the nests exposed to prevailing meltemi winds are more likely to be affected by stronger winds, and (C) the availability of natural nest building materials i.e. stone. Following this assessment, the preparations of the necessary equipment and materials were made. Artificial nests were constructed based on the specifications regarding nest design, direction, dimensions and layout, provided in the operational plan (Action A1). Each nest was marked with a unique code to allow for easier future identification. Based on the previous experience from construction of artificial nests on Andros and Skyros, Eleonora's falcon use each year one of the available nesting sites within their breeding territory, while the others may be used to roosting or caching food, which again improve the breeding performance of falcons. Therefore, in several breeding territories more than one artificial nesting sites were constructed in order to allow the falcons to use the most appropriate ones and result to an overall improvement of nesting habitat quality.

In order to manage data regarding the artificial nests constructed, i.e. location, type, nest aspect and photos, a special database linked with GIS environment was designed to allow for subsequent data analysis and monitoring (Action D1; refer to Annex 7.2.2.5 of Midterm report).



Access database form for nest data entry and management

In total, 1011 artificial nests have been constructed at 5 project sites i.e. on Skyros, Dionysades, Tilos, Mikres Kyklades and Antikythira between 2015 and 2018 (Table 5, below).

The construction of artificial nests started on Skyros in February 2015; 84 nests were constructed at 4 major Eleonora's falcon islet colony sites, following a pilot construction of artificial nests within a LIFE SKYROSBIODIVERSITY project. Artificial nests were constructed of natural local stone material, where available, while at other colony sites artificial nests where constructed with the use of wooden or mesh wire frame, covered with vegetation.

Construction of artificial nest on islet of Skyros

Artificial nest of wood and stone

In March 2016 the construction of artificial nests continued on Makares islet complex at Mikres Kyklades project area, following the baiting for rat eradication operations (Action C1), in order to construct nests at sites where rats have been either eradicated or their abundance was significantly reduced for the rat predation to be minimal. In total 282 stone nests were constructed on Makares. Additional 92 stone artificial nests were constructed on Makares in spring and early summer of 2018, reaching the total of 374 of artificial nests in this project site.

Construction of artificial nests on Makares

Example of an artificial nest

In April 2016 a total of 36 artificial nests were constructed of natural materials on Antikythira. During the following year, an additional 62 stone nests were constructed in spring of 2017 and spring of 2018, reaching the total number of 98 artificial nests on Antikythira.

The construction of artificial nests on Dionysades started in spring and early summer of 2017, following the successful rat eradication and ended in spring 2018. From the total of 440 artificial nests constructed on Dionysades, 25 are wooden, due to the lack of stone material, while the remaining are made of stone.

The last project site, where the action was implemented, was Tilos, where 15 stone artificial nests were built in spring 2018.

Following their construction, the artificial nests were regularly checked and maintained, as well as repaired, when necessary, particularly during spring months, prior to the initiation of the Eleonora's Falcon breeding season.

The construction and maintenance of artificial nests was implemented by the NCC, HOS and UOP field teams, external field researchers and volunteers under the supervision of the Conservation coordinator and the Islet management officer. Transportations at sea are carried

out by the HOS vessel or hired vessels and in certain occasions in collaboration with the ANDROSSPA LIFE project vessel, through the networking activities between the two LIFE projects.

Action modifications: No significant modifications have been made. Due to the availability of natural stone material for building of artificial nests, the vast majority of artificial nests are stone and only 25 are wooden nests, in order to minimize the introduction of foreign materials to uninhabited islets. This also led to reduced cost of artificial nest construction material.

Action performance indicators: the number of constructed artificial nests; the number of project sites and the number of islets, where artificial nests were constructed; the impacts of artificial nests on the Eleonora's Falcon breeding performance; production of final report

Achievement of objectives and coherence with the original time schedule: The action was implemented smoothly and according to the original time planning. A total of 1,011 nests have been constructed at 5 project sites and 12 islets or islands, which host 19% of the national breeding population of the Eleonora's Falcon, corresponding to 101% of the original target. While on large islets no significant increase in the number of active nests has been observed, the number of active nests has more than doubled and the productivity has significantly increased on one islet (Dionysades) (please also see Actions C1 and D1), following the construction of artificial nests and rat eradication (from 12 active nests in 2017 to 29 active nests in 2019). Contrary to the low level of use of artificial nests on larger islet where there are numerous nesting sites available, the occupancy of artificial nests on one particular islet was very high, reaching up to 65% of active nests.

Table 5. Summary of nests constructed at the corresponding project areas and in total

Project area	**Fieldwork period**	**Number of nests**
I: NISOS ANTIKYTHIRA AND NISIDES PRASONISI, LAGOUVARDOS, PLAKOULITHRA AND NISIDES THIMONIES	Spring 2016	36
	Spring 2017	37
	Spring 2018	25
	TOTAL	*98*
II: DIONYSADES NISOI	Spring 2017	286
	Spring 2018	154
	TOTAL	*440*
III: TILOS AND NISIDES	Spring 2018	15
	TOTAL	*15*
IV: MIKRES KYKLADES	Spring 2016	282
	Spring 2018	92
	TOTAL	*374*
V: SKYROS (OROS KOCHYLAS) AND NISIDES SKYROU	Spring 2015	84
	TOTAL	*84*
	GRAND TOTAL	**1011**

Problems encountered: No significant problems have been encountered, except of adverse weather conditions in certain occasions. Prevailing strong wind was the main limiting factor

for the implementation of project's actions, including the construction of artificial nests at Tilos project site.

Complementary actions outside LIFE: Additional 102 and 20 artificial nest for the Eleonora's Falco have been already constructed outside the LIFE project in the protected areas of Karpathos/Saria area (45-50 nautical miles northeast of Dionysades), as well as on another islet (10 nautical miles east of Dionysades), respectively. These actions were coordinated by the local Management bodies of these protected areas and the regional/local government and highlight the transferability and replicability of this conservation measure at other sites in southern Aegean Sea.

Perspectives for continuing the action after the project: Annual visits at sites where artificial nests have been constructed to check the condition and use of the artificial nests, as well as to make repairs, when necessary, will continue after the end of the project, in association with the After-LIFE activities related to rat eradications and Eleonora's Falcon monitoring. In particular, NCC and HOS will perform maintenance works, wherever necessary, as part of on-going projects and in cooperation with local institutions and organizations. The costs will be covered through own funds and, if necessary, Green fund co-financing.

Deliverables previously submitted to the EC: None

Annexes previously submitted to the EC:

a) *Falco eleonorae* Artificial nests database (Annex 7.2.2.5 of Midterm report)

Deliverables submitted with the present report: None

b) Final report (**Annex 7.2.2**)

5.1.8. Action C3: Creation of "refueling oases" for migratory passerines on Antikythira Island

Foreseen start date: 1/10/2015 *Actual start date: 1/2/2016*
Foreseen end date: 30/9/2019 *Actual end date: 30/9/2019*

Beneficiary responsible for the implementation: HOS

2014		2015				2016				2017				2018				2019		
3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T

Realised Foreseen

Description: This action involved the creation of a refuelling oasis for migratory passerines on Antikythira island, following the guidelines of the respective operational plan (refer to Annex 7.2.1.2 of Inception report), as well as the results of the preparatory Action A3 (refer to Annex 7.1.2 of 1st Progress report report, Annex 7.2.1.2 of Midterm report). The ultimate goal

of the action was to secure food availability for Eleonora's falcon in view of the ongoing and anticipated impacts of climate change on the migration phenology of passerines.

This action consisted of plantations, installation of watering system, restoration of abandoned wells, fencing of the land plot and creation of a nursery garden. Preparatory activities were mainly carried out in spring and summer 2016 given the delay regarding the onset of the plantations. The latter had to be postponed for one year due to the delay in the purchase of the land plot (please see Action B1). Nonetheless, in the meantime the project partnership proceeded to all necessary preparatory activities in order to ensure that soon after the signing of the contract the plantations would start without any further delays. Following the signing of the contract the main implementation phase was initiated in spring 2017 and was carried out until summer 2018, while the final phase consisted of maintenance works that were carried out in 2019.

More in detail, the activities that took place in the framework of the C3 Action can be classified as following:

Preparatory activities:

Preparatory activities aimed to facilitate the main task of the field team, which was habitat enhancement by plantations and cultivations. These activities took place from March 2016 to May 2017. Even though the finalization of the purchase was achieved in January 2017, the field team of HOS had been in contact with the previous owners who gave permission for the start of some preparatory actions in the area. The preparatory actions were namely:

- The restoration of the traditional paths (more than 350m in total) both within the land plot and the surrounding area, thus enabling the movement of the working teams and the transportation of construction and other materials.

Restoration of traditional stonewall-built path in the border of the purchased land (September 2016)

- The restoration of abandoned stone walls in terraces within the plot, which had collapsed causing the loss of soil by erosion and creating difficulties in the fence installation. About 650 meters of stone walls have been restored up to date. This process will carry on after the end of the project since there are still some stonewalls that need reinforcement while also, all the rest must be routinely inspected for damage.

- The clearing of the areas that would be planted and cultivated by rocks and boulders, unwanted vegetation and debris. Also, in some terraces where the destruction of stonewalls had caused partial landslides, flattening of the land was needed. All the purchased area used to be agricultural land, but has been abandoned being used as such, for at least 40 years now. This resulted in the prevalence of mastic-trees (*Pistacia lentiscus*) and other dense vegetation that led to plant-biodiversity loss.

- A soil analysis was done in order to investigate the quality of the soil. This would enable the Vegetation manager and the Agronomist to conclude on the fertilization program that would be followed and also to check for any unwanted soil properties that would create problems to the newly planted trees or stall the growth of the cultivations. The analysis specimens were collected from depths of 30 and 60 cm in 5 different points within the plot. A final average was calculated for all the samples in order to simplify the results.

- 1 main dirt road, about 2m wide, was constructed along the biggest plot of the purchased land, in order to enable vehicles enter the area. For this reason, a bulldozer had to be used.

- A traditional cistern was restored. One cistern with ca. $30m^3$ capacity was restored. The cistern is situated within HOS property, but outside the land plot. There was no

traditional cistern within the purchased land. The water from the restored cistern is transported with $1m^3$ tanks to the land plot.

- All equipment needed for the main part of the Action implementation was selected and purchased. This, amongst others, included a motocultivator, other planting and maintenance equipment as well as parts for the irrigation system that was later installed.

The aforementioned activities were carried out by the HOS field team, external assistance and volunteers of the Antikythira Bird Observatory (ABO) under the supervision of the Vegetation management officer and the Monitoring coordinator, with the assistance of UOP field team.

Main activities of the Oasis creation:

The creation of the oasis within the purchased land was mainly realised during the period from November 2017 to November 2018. Nevertheless, the management, maintenance and improvement of the oasis, is a continuous task that will be taken care of by HOS and especially the ABO project (Antikythira Bird Observatory) for the years to come. The main tasks for the construction of the oasis were the following:

- Fencing. The island of Antikythira is home to around 4,000 free roaming goats that pose an immediate danger to all plantations. For this reason, the creation of an effective obstacle for them to enter the oasis was necessary. The traditional fencing with mesh wire was rejected because it had a very high cost and also has been proved unable to deter the goats in similar occasion on the island. The solution that was finally chosen was the one of electrical fencing. That was an innovation for the area, as it had not been tested before on Antikythira. The fencing works took place in November 2017 and were carried out by HOS personnel and volunteers. The total structure consisted of more than 100 wooden poles and around 5000 km of wiring. The final construction design that has been implemented was customised by the supplier of the fencing materials in cooperation with the vegetation management officer, creating a protected perimeter of ca. 850m and having a height of 150cm. The results were very successful as no entry of goats or other animals has been recorded since the installation. The maintenance of the materials though, needs to be consistent and a full check and maintenance of the fence is scheduled to take place at least every 3 months.

- Plantations and Cultivations. The planting of trees and bushes as well as the cultivation of cereals and legumes were designed according to the principal of having a low environmental impact. As a result, the use of water for irrigation was strictly controlled, the fertilisers used were all organic and the soil management was targeting long-term sustainability. The planting of trees was completed within the period November 2017 – November 2018. In total, 105 trees and 40 shrubs and aromatic plants were planted in a total

area of 0.4ha. The species were selected according to their tolerance in drought, high soil and atmosphere salinity and high wind velocity. Three factors that, more or less, have shaped the flora of the island. In addition, the selected plants should have the capacity to support the needs of passerines as far as foraging, cover and nesting are concerned. In addition, 34 trees (mainly olive trees) that existed in the field, yet almost totally covered by bushes and other vegetation, were recovered and were provided with the basic maintenance (fertilizing, pruning, trimming and mechanical support) wherever needed.

- Cultivations, one species of cereals (Barley) and three species of legumes (Medic, Vetch and Alfalfa) were selected to be established on the purchased land. These cultivations covered a total area of 0,44ha in 2018 and 0,50ha in 2019. Furthermore, two more cultivations were experimentally sawn in order to investigate their potential in the area. These were a mix of grass species for the creation of artificial meadows (0,05ha) and Sorghum (0,03ha). Lastly, three local varieties of seeds were granted in small amounts by locals to the project team and were cultivated in small areas. These three local plants were Fava beans, Field peas and Barley. They all show extremely good adaptation to the climatic and soil conditions of the island and samples of them have been forwarded to the agricultural University of Athens in order to initiate the procedure of the variety description and their inclusion in the national list of local varieties.

- A complete drip-irrigation watering system was established on the field and connected with a 4m^3 tank and a pump. Drip-irrigation is considered as a highly efficient irrigation system that has almost no losses and thus can preserve the valuable water resources.

- A Greenhouse, dedicated to the creation of new tree saplings and the ex-situ conservation and reproduction of local pant species was constructed on July 2018 within the purchased land area. The greenhouse covers an area of 18m2 (dimensions in m. 6*3*2.2) and is constructed by aluminium and polycarbonate sheets. Other equipment includes benches, planting material (turf, soil and fertilizers), hand-tools and propagating materials.

- Rain-Water collectors / Artificial wildlife-ponds

Initial experience deriving from the first two cultivation seasons (2017-2018 and 2018-2019) highlighted the lack of water for irrigation as a major restricting factor for the management of the oasis. Furthermore, ornithological surveys on the island implemented by this project and Antikythira Bird Observatory (ABO) independent research schemes, showed that the

provision of water is of high importance for both Eleonora's falcons and passerines. The project team occupied with the management of the oasis, decided that the optimum solution would be the creation of a rain-water collector that would also act as a source of water, readily available to local fauna. For this reason, we proceeded to the construction of two artificial wildlife ponds situated in two adjacent terraces within the purchased land and connected with pipes in order to enable overflow from the one to the other. The two ponds cover an area of $92m^2$ and $130m^2$ respectively, and their capacity is calculated at about $150m^3$ of water. In order to avoid water loss by evaporation and drainage, the two ponds were lined with non-toxic, very durable EPDM membranes that are widely accepted as a highly effective solution when it comes to the construction of wildlife-friendly water reservoirs. An underwater pump is used in order to transfer water from the collectors to the irrigation tank. The capacity of the reservoirs is enough to cover all irrigation needs and the lining used ensures that no water is lost. Water will be available for wildlife all year long including the driest summer months.

Maintenance and management.

Maintenance and management of the oasis has been mainly a task implemented by the same team that was responsible for its creation. This enabled them to have an overall knowledge regarding the maintenance and management needs of the land and the infrastructure. The total effort was complemented by the provision of voluntary work by the ABO volunteers who were trained by the project fieldwork team in undertaking management tasks such as irrigation, propagation, land management etc. The establishment of this way of management (combination of HOS personnel and ABO volunteers) will facilitate the continuation of the maintenance and management needs of the oasis well beyond the end of this project.

Table 6. Summary of activities carried out for the creation of the refuelling oasis.

Period	**Description of activities**
Preparatory phase	
March 2017 – September 2017	clearing and restoration of the traditional pathway of 75m length that existed in the land plot and another 300m that connected the land plot with the ABO premises
March 2017 – May 2017	restoration of traditional stonewall in the land plot to be purchased
May 2017 – November 2017	partial restoration (outer wall) of a traditional cistern
March 2017 – March 2018	tree mapping in the land plot
January 2017 – May 2019	arboricultural works in the existing trees within the land plot
May 2017	collection of samples for soil analysis
Main implementation phase	
March 2017-May 2019	landscaping activities
	creation of a dirt road within the property
November-December 2017, February 2017, February 2018	plantations (105 trees)
November-December 2017 November 2018	cereal and legumes sowing in a 0.44ha area cereal and legumes sowing in a 0.50ha area
November-December 2017	installation of a solar-powered electric fence of 850m length around the purchased land-plot
June 2018	Installation of nursery-greenhouse, covering a total area of 18sq.m.
April 2017-April 2018 – April 2019	collection of local plants to be maintained in the greenhouse
February 2018	installation and operation of a complete watering system (drop irrigation system), covering over 1200m in length
July 2019	completion of water reservoirs (bed lining and installation of overflow tubing)
Maintenance phase	
Spring 2018-Autumn 2019	Maintenance works in all equipment and infrastructure in regular periods by HOS personnel and volunteers

Action performance indicators: number of trees planted; surface of cultivated area; production of final report

Action modifications: Only one slight modification was made in comparison to the initial plan and the suggestions of the relevant Action Plan (refer to Annex 7.2.1.2 of Inception report). One traditional cistern was restored but the efficiency of its use for irrigation purposes was limited because it is sited in a distance of 500m from the plantations, posed a significant difficulty in water transfer. Due to the lack of available cisterns/wells for restoration within, or in the vicinity of, the purchased land plot, two open surface rain-water collectors were constructed instead. This infrastructure ensured availability of a much larger quantity of water than the one of the restored cistern, while in parallel it acts as a very powerful biodiversity enhancement tool within the oasis.

Achievement of objectives and coherence with the original time schedule: The objectives of the action were achieved to their fullest, in spite of the delay in the initiation of the main activities as explained above. The creation of the oasis has also attracted the interest of all the local community, which in various ways has been constantly showing its support to the project. This was also due to the fact that the Action managed to showcase a set of innovative -for the island-, practices and types of infrastructure, such as the electrical fencing, the lined water collectors and the drip-irrigation system. With the support of ABO and the expertise gained from this project it is expected that any future efforts on the field of agriculture at Antikythira (even at a non-professional) level will take advantage of this existing knowledge.

Problems encountered: The reasons for the delay in the onset of the implementation of the present action are related to the delay in the completion of the related preparatory action (Action B1), as explained in detail in the corresponding section. This problem was tackled efficiently with the 12-month project extension. Another problem encountered was the lack of a sufficient source of water for irrigation. This issue was tackled with the construction of the two rainwater reservoirs.

Complementary actions outside LIFE:

Perspectives for continuing the action after the project: The running and maintenance of the refuelling oasis, as well as monitoring activities on habitat use by passerine habitats will continue as part of the main activities of the Antikythira Bird Observatory, given the availability of manpower and funds. HOS has been present on the island of Antikythira for two decades. What used to be a two-week camp in the first years of ABO operation has grown to be a fully operational ornithological station active for at least 5 months per year, with self-owned premises and significant scientific work. The success and longevity of the Antikythira Bird Observatory has been based on the strategic planning of HOS regarding the ABO project, which ensures the constant flow of funds provided by a combination of self-funding and the long-term support that has been provided by A.G. Leventis Foundation. Furthermore, numerous cooperation with scientific institutions from both Greece and abroad, along with the volunteers of HOS, have been providing ABO with all the personnel (specialized or not) that is needed for the effective implementation of its work. The following years (2020-2023), HOS strategic plan aims to expand the activities of ABO, in both temporal and quantitative terms, thus promoting it to a pillar of development for the whole island.

Deliverables submitted with the inception report: None

Deliverables submitted with the 1st progress report: None

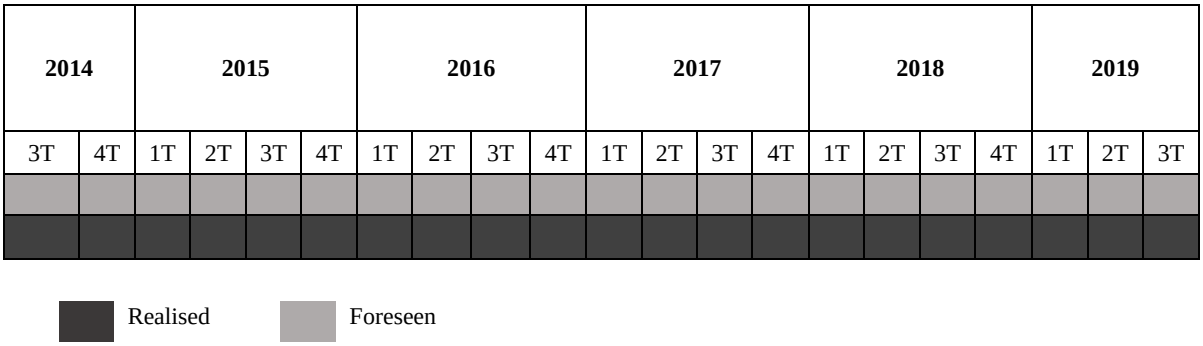
Deliverables submitted with the present report:

a) Final report (**Annex 7.2.3**)

5.1.9. Action D1: Scientific monitoring to assess the effectiveness of the concrete conservation actions

Foreseen start date: 1/8/2014 *Actual start date: 1/8/2014*
Foreseen end date: 30/9/2019 *Actual end date: 30/9/2019*

Beneficiary responsible for the implementation: HOS



Description: This action involved scientific monitoring of all three concrete conservation actions, in order to assess their progress, results and efficiency. It consisted of field surveys at all project areas where concrete conservation actions had taken place to monitor (a) breeding success following rat eradication operations, (b) nest occupancy and breeding success in artificial nests, and (c) habitat use by migratory passerines within the refuelling oasis and in relation to the surrounding habitats of the area. All fieldwork activities were following the protocols compiled during the preparatory action A1 (refer to Annex 7.2.2 of Inception report). The efficiency of these actions was determined based on the comparison between the data gathered through the current action and the baseline information collected through Actions A2 and A3. The conclusions drawn during this exercise contributed to the formulation of guidelines to be included in the Good Practice Guide (Action E4).

Prior to the onset of the main activities, during the first project year all necessary equipment and materials were purchased. Field surveys began in summer 2016 at all project areas where concrete conservation actions C1 and C2 had already taken place (i.e., Action C1-Makares islets / Action C2-Skyros, Makares islets and Antikythira island). In particular, data on nest occupancy and breeding performance were gathered and recorded in the database that was created in the framework of Action C2 (refer to Annex 7.2.2.5 of Midterm report).

Regarding the monitoring of the impact of the concrete conservation Action C3 (habitat use by migrating passerines in the oasis created on Antikythira island), this was initiated shortly after the first planting activities in the purchased land plot were completed (2018). The year before that (spring and autumn season 2017), baseline data was collected (within the same area and using the same methodology), which along with the results of Action A3 enabled a valid assessment of the impact that C3 concrete conservation Action had.

The results of the monitoring surveys regarding the impacts of each conservation action are presented in detail below.

Monitoring of the impact of rat eradication operations (Action C1)

Regarding the assessment of the effectiveness of rat eradication operations (Action C1), the results from the monitoring of breeding success during the period 2016-2019 indicate that the species has, in general, shown a positive reaction to the eradication of rats. In some occasions

the results are not as direct as in others, due to specific factors that are related to each area. Field surveys were carried out by the HOS, NCC and UOP field teams under the supervision of the Monitoring coordinator, while data entry and analysis were the main tasks of the Data manager.

More in detail the two areas where the efficiency of rat eradication was monitored were:

- **Makares islets**

On Makares islets, the monitoring of the breeding success for the species was implemented on the two islets of the complex where the bulk of the colony's population is located). Regarding the productivity of the species, the monitoring shows that this has been fluctuating during the years, however. the small sample size cannot allow for statistically robust results.

In spite of the successful completion of rat eradication operations before the end of the monitoring, the spatial distribution of the nests in the monitoring colony has not changed significantly since 2014, as it is expected that it may take years for the falcons to reoccupy sites, which were used in the past, but abandoned due to rats. As a result, for the time being the falcons continue to nest mainly on vertical cliffs, posing difficulties in the access of the researchers and thus leading to a small sample size.

- **Dionysades project area**

Regarding Dionysades islets, monitoring efforts indicated that in general there was a positive effect from the rat eradication activities on the breeding performance of the Eleonora's falcon. This was mostly profound on the smallest islet of the complex where the limited nesting opportunities and the fact that most of the nests were situated on bare ground, magnified the positive effect on the breeding population. The positive trend of breeding success that has

been recorded for the population breeding on this islet since the rat eradication was complete (2017).

Monitoring the impact of increase of nesting habitat availability for Eleonora's falcon with the use of artificial nests (Action C2)

In the framework of Action C2, the field team constructed more than 1,000 artificial nests for the Eleonora's falcons within the project areas. The systematic monitoring of the aforementioned artificial nests was implemented on Dionysades islets, Makares islets, Skyros islets and Antikythira. Assessment of the efficiency of the artificial nests was based on (a) the percentage of the occupied nests that were artificial and (b) the breeding success of the species when artificial nests were used and compared to the one in natural nests within the same areas. Temperature dataloggers were used in order to investigate if there were any significant temperature differences between artificial and natural nests. Moreover, information regarding the preferable features that an artificial nest should provide, were collected and were made available to a wide audience through the publication of the Good Practice Guide (Action E4).

Regarding the effectiveness of the artificial nests, preliminary results indicated that when artificial nests are located within existing Eleonora's falcon breeding territories, the falcons gradually adopt them, while in the areas where the artificial nests are not located within existing breeding territories, it is expected that new breeders will start nesting in artificial nests during following breeding seasons. As a result, in areas such as Antikythira, Makares and Dionysades where Eleonora's falcons mainly breed in vertical cliffs, artificial nests were less used. On the contrary, in areas where the species breeds in nests on the ground, the percentage of used artificial nests was significantly higher.

Lastly, 10 temperature dataloggers were deployed in 5 artificial and 5 natural nests in Antikythira and Dionysades during 2018. The concluding result from the data retrieved was that no significant difference in temperature was detected between artificial and natural nests as shown in Figure 1, whereas it was also evident that nests with north aspect showed lower average temperatures, as expected.

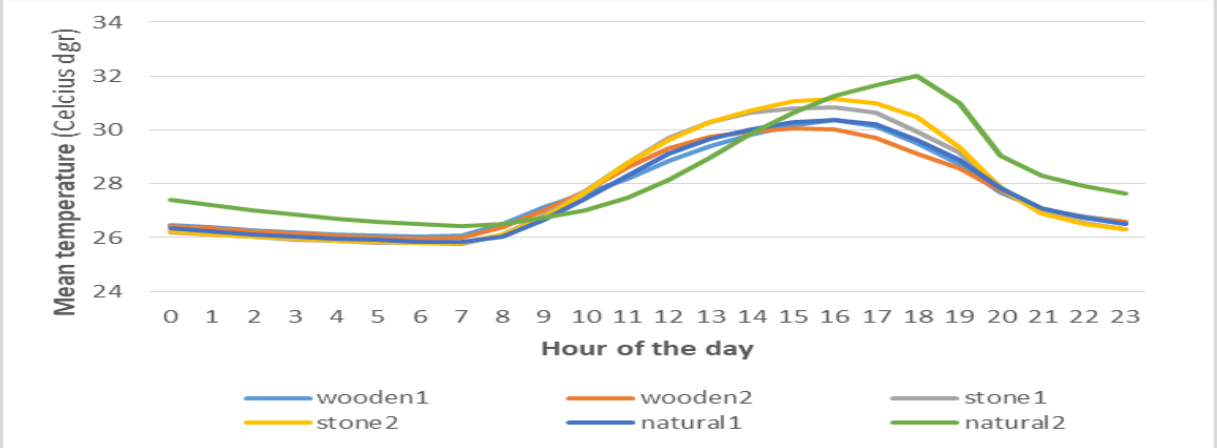


***Figure 1**. Comparison of average temperatures in artificial and natural nests (2018)*

Field surveys were carried out during the period from 2017 to 2019 by the HOS, NCC and UOP field teams under the supervision of the Monitoring coordinator, while data entry and analysis were the main tasks of the Data manager.

Assessment of the efficiency of the refuelling oasis for migrating birds (Action C3)

Following the completion of Action C3 (creation of an oasis for migratory birds in Antikythira), a systematic monitoring was implemented in order to assess the impact of this action on migratory passerines. For this reason, a set of monitoring methods including visual observations, bird ringing and radio tracking was used. This methodology had been designed and implemented during the previous years, in the framework of Action A3 (assessment of refueling pattern of migratory passerines on Antikythira). The initiation of the action was in spring season 2017, initially aiming at gathering baseline data from the site where the oasis was going to be created and from 2018 on, it continued until the end of the project in September 2019.

During the monitoring period, mist netting within the managed land took place for 230 days in total, and resulted to the ringing of 2048 birds, belonging to 49 species. In parallel a total of 51 surveys based on visual observations (point counts) took place between 2018 and 2019 in which a total of 1269 birds from 64 species were recorded. Moreover, in order to get more detailed information regarding the effect of the oases on the stopover duration of migratory birds stopping over at Antikythira, light weight radio transmitters were used. Throughout the project 51 tags were used: 36 tags were deployed to Woodchat Shrikes (*Lanius senator*), 7 to Willow warbler (*Phylloscopus trochilus*), 8 to Spotted flycatcher (*Muscicapa striata*), 8 to Red-backed shrike (*Lanius collurio*) and 2 to Whinchat (*Saxicola rubetra*).

Both mist netting and direct observational data indicate that the managed land referred to as the "oases" attracted a large amount of birds both in numbers of individuals as well as in number of species. The bird abundance at the "oases" was comparable only with the equivalent values for the agricultural land on the island as shown in Figure 2.

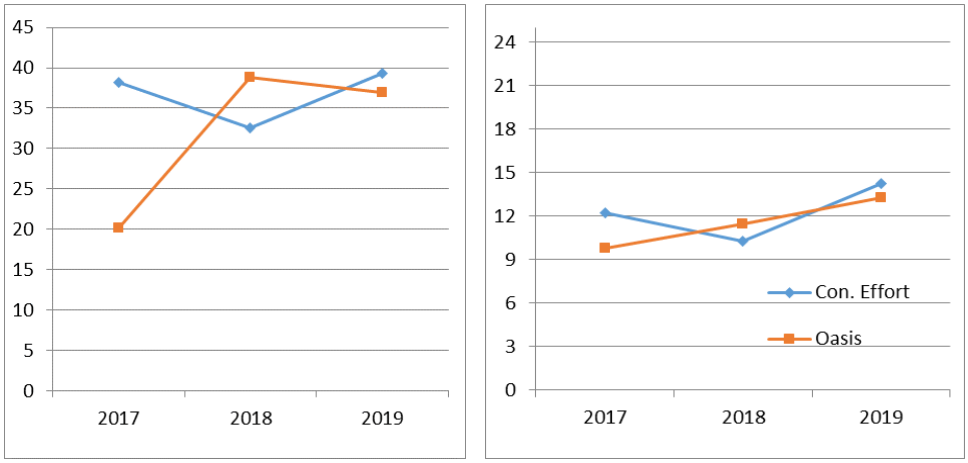


***Figure 2**. Average number of birds trapped per meter of mist net per season at the constant effort site and the "oases" for spring (left) and autumn (right) during the implementation of D1 Action*

Also, most species of birds showed prolonged stopover duration in the managed area in comparison to the surrounding agricultural land as shown in Figure 3.

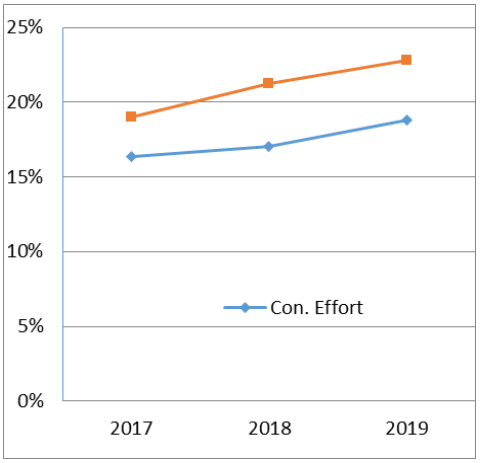


***Figure 3**. Percentage of retrapped birds in the "oases: and the constant effort site per year*

Taking in mind that Antikythira is progressively abandoned and the once cultivated or managed land is largely recolonized by wild vegetation, transforming into phrygana and maquis, our results indicated that the construction of the "oases" will be beneficiary for the migratory passerines.

It should be noted that the "oases" has not yet reached its full potential as the planted trees and bushes are still low in height and have not yet reached their full productivity. It is evident form the average number of birds trapped per meter of mist net that there is a clearly increasing trend of recorded birds each year as the "oases" are gradually improving.

Summarizing, the construction of the "oases" seems to be able to mitigate - in some degree - the effects of the climate change to migratory passerines by providing preferred habitats to the species and prolonging their stopover duration on the island. In the forthcoming years the impact of climate change along with land abandonment are expected to deteriorate further the habitat quality in the area of Antikythira. The creation of the oasis, will have even more significance in the future, possibly making it one of the few high-quality habitats available for migrating passerines at Antikythira.

Action performance indicators: number of project areas monitored for the evaluation of the effectiveness of the concrete conservation actions; number of nests monitored; number of field surveys for the assessment of the habitat use of staging passerines; production of final report

Action modifications: None

Achievement of objectives and coherence with the original time schedule: Overall this action was completed successfully and all the targets were met. The monitoring efforts regarding the assessment of the concrete conservation Actions C1 and C2 were implemented according to the original time schedule. On the other hand, the implementation of the assessment of Action C3 did not follow the initial time schedule. The belated completion of B1 Action (purchase of land) due to bureaucratic reasons, caused a delayed initiation in this part of Action D1. For this reason, a 12-month extension of the project's initial time schedule was requested and granted. This enabled the monitoring efforts to be completed and provided a coherent set of final results. In summary, the action was successfully completed, providing a clear assessment on the impacts of the concrete conservation action, Action C3.

Problems encountered: The fact that in some areas the Eleonora's falcon colonies were mainly situated in inaccessible cliffs, resulted to small sample sizes. Also, a part of the monitoring efforts had to delay its initiation. Nevertheless, the extension of time schedule enabled the successful outcome.

Complementary actions outside LIFE: Beyond the foreseen activities, UOP in collaboration with HOS evaluated the contribution of the refuelling oasis not only to staging migratory birds, but also to insects. Standard insect surveys took place in spring and summer 2019 in plots representative of all types of habitat that are present on the island (namely, phrygana, maquis and abandoned cultivated field) as well as in the refuelling oasis, to obtain data regarding the species' richness and abundance of the insect fauna. Data analysis is currently ongoing and preliminary results are expected to be produced in spring 2020. The incurred costs have not been charged to the LIFE ElClimA project, but are covered through other sources of funding.

Perspectives for continuing the action after the project: Monitoring activities will be continued as presented in detail in the After LIFE Conservation plan (**Annex 7.2.6 of present report**).

Deliverables previously submitted to the EC: None

Annexes previously submitted to the EC

a) Database for data entry (Annex 7.2.2.5 of Midterm report)

Deliverables submitted with the 1st progress report: None

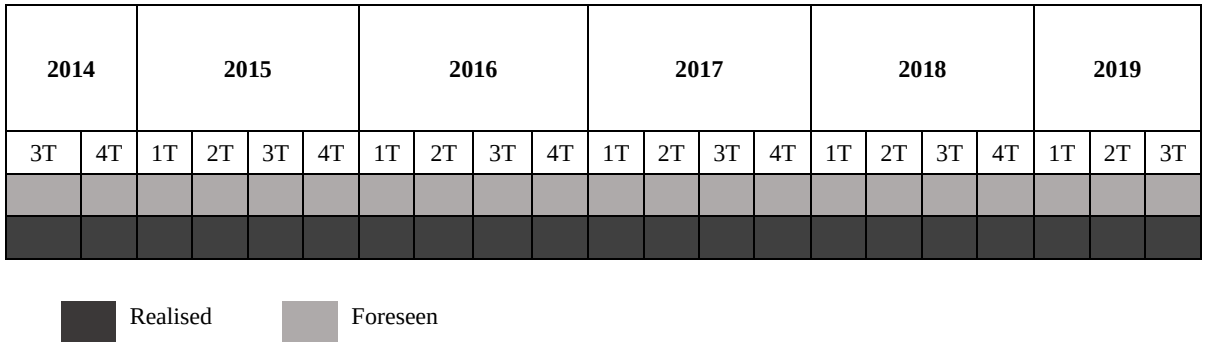
Deliverables submitted with the present report:

a) Final report (**Annex 7.2.4**)

5.1.10. Action D2: Monitoring the socio-economic impact of the project actions

Foreseen start date: 1/8/2014 *Actual start date: 1/8/2014*
Foreseen end date: 30/9/2019 *Actual end date: 30/9/2019*

Beneficiary responsible for the implementation: NCC



Description: This action aimed at monitoring, measuring and evaluating the socio-economic impact of the project actions on the local economy and people, as well as on the ecosystem functions at the project areas. Both components were fulfilled through the foreseen public awareness/dissemination actions, as well as through a public survey posted in the project website. The public survey consisted of two phases; the establishment of baseline information (first year) and the assessment of the impact of the project actions (last year). The first phase was implemented through the distribution of questionnaires to local people (up to 200 inhabitants) at the project areas, while the second phase was implemented through an online survey. The questionnaire included questions about the status of Eleonora's falcon and the threats that it is currently facing, as well as the existing knowledge and perceptions on the benefits and drawbacks of ecosystem functioning. A pilot questionnaire was tested, applied by personal interviews to a small number of collaborators (30 interviewees) in order to evaluate the clarity of the questions, the time required for answering etc. The results of that evaluation were incorporated in the final version of the questionnaire (refer to Annex 7.1.4 of Progress report).

During the first phase 200 questionnaires were filled at seven project areas. The analysis shows that the residents of most project areas are familiar with Eleonora's falcon and the Natura 2000 sites. The residents of Antikythira, Donousa (Mikres Kyklades) and Skyros project areas are the ones most familiar with Eleonora's falcon, probably due to the fact that the previous LIFE project (LIFE 03NAT/GR/000091) was implemented on all three sites and there was systematic presence of field teams on the islands in the frame of the current LIFE project. On the other hand, less than 40% of residents in Lemnos project area have ever seen or know the existence of the species on the island and 44% of the residents in Sitia have never seen an Eleonora's falcon or were unaware of seeing it.

In terms of different professional occupations, most of the fishermen, farmers and employees in the tourism sector, were familiar with Eleonora's falcon and the Natura 2000 sites in their area and in less extent the civil servants. Over 80% believe that the existence of a protected area is very important for their own life. Overall, the ones most familiar with the species were fishermen and farmers, while the ones most familiar with the Natura 2000 network were employees of the tourism sector.

During the second phase two questionnaires were produced, one for the general public and one for stakeholders using the islets where interventions were carried out. Both were distributed electronically and in some cases in paper. In total 100 questionnaires were filled in by the general public and 5 by stakeholders. The majority of the questionnaires were filled in by residents of Sitia, indicating the interest of the local population. The 23.5% of the residents of Sitia stated that they had never seen an Eleonora's falcon, which is reduction almost by half compared to the first phase. The response of the stakeholders was enthusiastic for Dionysades, especially for the rat eradication operation and had positive impact to the ecosystem services.

The distribution of the questionnaires was carried out by HOS, NCC and UOP field teams in the frame of scheduled visits at the project areas for the implementation of concrete conservation and dissemination actions. The Communication coordinator supervised the implementation of the action, supported by the Communication officer.

Action performance indicators: number of project areas covered in both phases; number of participants in both surveys; production of final report

Action modifications: None

Achievement of objectives, coherence with the original time schedule
The objective of action was achieved to its fullest. The first phase was prolonged, as the survey was carried out mainly in combination with the initiation of the fieldwork of preparatory and concrete conservation actions.

Problems encountered: None

Complementary actions outside LIFE: None

Perspectives for continuing the action after the project: None

Deliverables previously submitted to the EC: None

Annexes previously submitted to the EC:

a) Questionnaire (Annex 7.1.4 of 1st Progress report)

Deliverables submitted with the present report:

a) Final report (**Annex 7.2.5**)

5.1.11. Action F1: Overall project coordination

Foreseen start date: 1/8/2014 *Actual start date: 1/8/2014*
Foreseen end date: 30/9/2019 *Actual end date: 30/9/2019*

Beneficiary responsible for the implementation: UOP

2014		2015				2016				2017				2018				2019		
3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T

Realised Foreseen

Description: The description of the action and the relevant activities that took place are provided in section 4.

Action performance indicators: number of PMG meetings; number of reports submitted to EC; number of monthly reports submitted to the External Monitor Team.

Action modifications: None

Achievement of objectives and coherence with the original time schedule: The action was implemented without delays and in accordance with the revised time schedule. Effective project management resulted in a coordinated implementation of project actions.

Problems encountered: None

Complementary actions outside LIFE: None

Perspectives for continuing the action after the project: None

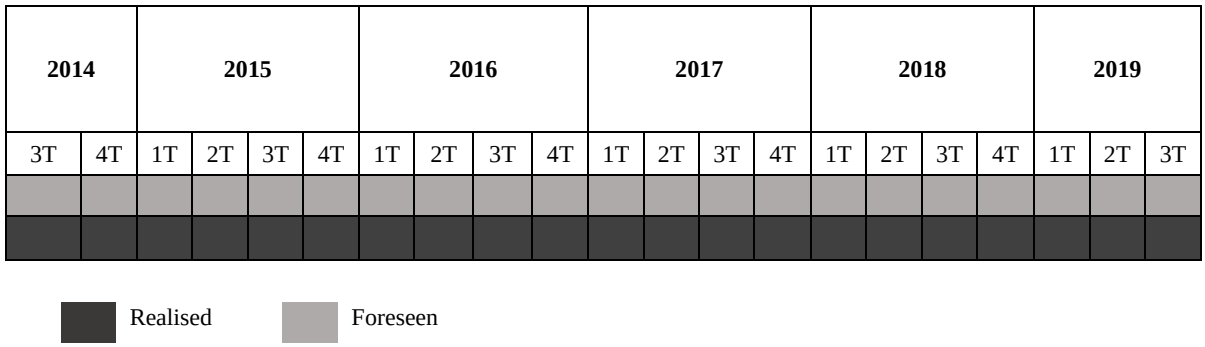
Deliverables previously submitted to the EC: None

Deliverables submitted with the present report: None

5.1.12. Action F2: Networking with other programmes

Foreseen start date: 1/8/2014 *Actual start date: 1/8/2014*
Foreseen end date: 30/9/2019 *Actual end date: 30/9/2019*

Beneficiary responsible for the implementation: HOS



Description: This action involved networking activities with past and/or on-going LIFE projects, research institutions and independent researchers in Greece and abroad related to the conservation of Eleonora's falcon and uninhabited islands, as well as projects involved in mitigation measures for the impact of climate change on biodiversity.

Throughout the project duration, the project partnership carried out networking activities with other programmes, as well as with the scientific community. In particular, two declarations of cooperation were signed between the LIFE ElClimA project with LIFE projects coordinated by the University of Crete - Natural History Museum of Crete, namely the LIFE Natura2000 Value Crete (http://ecovalue-crete.eu/en) and the LIFE Natura THEMIS (http://www.lifethemis.eu/en). Networking with ANDROSSPA LIFE project (LIFE10 NAT/GR/000637) resulted in the exchange of experience, information and know-how for the implementation of common activities (i.e. rat eradications and construction of artificial nests), dissemination of information material and joint missions to Makares islets (Mikres Kyklades; Actions C1 and C2), which also included the annual visit of the External monitoring team.

Networking with SKYROS LIFE project (LIFE09 NAT/GR/000323) enabled the field team of HOS to work with more precision and efficiency on the islets surrounding Skyros, while the established volunteer network of the project, assisted the fieldwork. In addition, data regarding the biology of Eleonora's falcon that had been collected under the framework of Skyros project were available for the aims of Action A2 of the LIFE ElClimA project.

Networking activities also took place with the ongoing project dedicated to the production of Environmental Studies for all N2000 areas in Greece. These involved, in particular, participation of the LIFE ElClimA team in fieldwork activities in N2000 areas in Kyklades (Aegean Sea) and technical meetings for the exchange of knowledge and technical know-how.

Moreover, the partnership participated in a series of events organized by the Greek Life Task Force for exchange of expertise and knowledge among LIFE partners (Athens, May 2017), as well as in the framework of the 25th anniversary N2000 celebration (May 2017), made a presentation to the general public in the framework of a training/informational event organized by the Greek Life Task Force (Patras, June 2017) and participated in the workshop "Invasive Alien Species – IAS" organized by GESTIRE 2020 "Nature Integrated Management to 2020" (LIFE 14-IPE 000018) (Milan, November 2017).

The partnership also pursued regular communication and knowledge exchange with species' experts and other scientists, especially in the framework of conferences. These activities promoted further collaboration with the scientific community as evidenced by the joint publications (see Action E3).

Moreover, networking with other LIFE programmes was promoted through the project Facebook page. All networking activities were further reinforced through the dissemination of the project annual newsletters.

Networking activities were the main duty of the PMG group, assisted by the Communication officer and the scientific personnel of the project.

Action performance indicators: number of agreements signed; number of species experts contacted.

Action modifications: None

Achievement of objectives, coherence with the original time schedule: The action was implemented without delays and in accordance with the revised time schedule. The action's objectives were fulfilled by a variety of communication means as described above.

Problems encountered: None

Complementary actions outside LIFE: None

Perspectives for continuing the action after the project: None

Deliverables previously submitted to the EC: None

Annexes previously submitted to the EC:

a) Declarations of cooperation (Annex 7.7 of 1st Progress report)

Deliverables submitted with the present report: None

5.1.13. Action F3: After LIFE Conservation Plan

Foreseen start date: 1/9/2018 *Actual start date: 1/9/2018*
Foreseen end date: 30/9/2019 *Actual end date: 30/9/2019*

Beneficiary responsible for the implementation: UOP

2014		**2015**				**2016**				**2017**				**2018**				**2019**		
3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T

Realised Foreseen

The After-LIFE Conservation Plan, prepared in autumn 2019, outlines the schedule of actions, funding sources and responsible parties to ensure the continuation of the conservation actions, initiated by the project, for the years to follow the end of the project. These actions involve the continuation of quarantine measures on islets, where rats were eradicated, maintenance of constructed artificial nests, maintenance of the "refuelling oasis" on Antikythira and monitoring of the Eleonora's Falcon breeding performance. The Plan is based on Strengths-Weaknesses-Opportunities-Threats (SWOT) analysis, taking into account the outcomes of the project concrete conservation and monitoring actions, available resources and socio-economic aspects in the key project sites. The plan provides details on the implementation of the aforementioned actions for a five-year period following the end of the project.

Action modifications: None.

Action performance indicators: preparation of After LIFE Conservation plan.

Achievement of objectives, coherence with the original time schedule: The objective of the action was achieved to its fullest. The action was implemented in accordance with the revised time schedule.

Problems encountered: None

Complementary actions outside LIFE: None

Perspectives for continuing the action after the project: None

Deliverables previously submitted to the EC: None

Deliverables submitted with the present report:

a) After-LIFE Conservation Plan in English and Greek (**Annex 7.2.6**)

5.2 Dissemination actions

5.2.1 Objectives

The project dissemination actions aim to:

(a) promote the concept of the importance and conservation of the Eleonora's Falcon, biodiversity and the Natura 2000 network and their relation to the climate change to the general public (Action E1),

(b) disseminate information regarding the project objectives, as well as on the progress and outcome of the project actions to the general public (Actions E1, E2)

(c) exchange information on the project progress and outcome with the scientific community and conservation groups worldwide (Actions E2, E3) and,

(d) disseminate the acquired knowledge and know-how for the improvement of species adaptation to the on-going and future climate change to competent authorities and interested parties, i.e. stakeholders, environmental conservation organizations and local and national authorities (Action E4).

5.2.2 Dissemination: overview per activity

5.2.2.1 Action E1: Public awareness campaign

Foreseen start date: 1/8/2014 *Actual start date: 1/8/2014*
Foreseen end date: 30/9/2019 *Actual end date: 30/9/2019*

Beneficiary responsible for the implementation: NCC

2014		2015				2016				2017				2018				2019		
3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T

Realised Foreseen

Description: The action involved a series of public awareness activities aimed to promote the project objectives, progress and results to the general public and key stakeholders, as well as the Natura 2000 network and the LIFE+ funding instrument. The campaign focused on (a) work with media, (b) production and distribution of dissemination material, (c) the production of an environmental education kit and implementation of relevant activities and (d) organization of and participation in events.

The project Communication Plan was compiled (refer to Annex 7.3.2.1 of Midterm report) to ensure the smooth implementation and coordination of all related activities. The project logo was created soon after the start of the project (refer to Annex 7.3.2.18 of Midterm report) and was used ever since in all project outputs' and equipment purchased by the project, together with the LIFE and Natura 2000 logos (refer to Annex 7.3.2.19 of Midterm report).

Media work

During the project implementation 7 press releases and articles were prepared and sent to media or collaborating stakeholders (please refer to Annex 7.3.2.2 of Midterm report, 7.2.2 of 2nd Progress report). As a result, a series of news mainly in internet news websites and their social media were published. In total 60 articles were published (please refer to **Annex 7.3.2.1 of present report**). Furthermore, three interviews were granted to a local radio, a tv channel and a e-channel (**Annex 7.3.2.1 of present report**). Four articles and news of the project were included in 4 issues of the HOS magazine "Oionos" (2,500 recipients) and an article was included in the online magazine of UoP "@up", while one article was included in the newsletter of the LIFE Andros project - a member of the project's network (refer to Annex 7.3.2.5 of Midterm report and **Annex 7.3.2.5 of present report**). The project is mentioned in the EU publication "LIFE and climate change adaptation" (EU, 2015).

A video has been produced concerning Eleonora's falcon and Cory's shearwater and was uploaded on the project's Facebook page, receiving >1,000 visits.

The project was also presented on the Greek LIFE Task Force website as "Project of the month" (March 2019).

Environmental education (EE kit)

The HOS Environmental Education Department prepared the **project environmental education (EE) material (kit),** which supported the public awareness campaign. The EE kit is entitled ***"Feathered messengers for the climate"***. It consists of ten (10) lesson plans (98-pages), addressed to students of 9-15 years old. The kit posed issues regarding the threats that birds face due to climate change. It mainly focuses on the migratory birds where the Eleonora's falcon represented the main messenger of threats from climate change and solutions for nature and people. The folder of the material also includes (a) a 32-page Teacher's Guide with information on how to work with the educational activities, as well as information on Eleonora's falcon ecology and issues related to climate change, (b) a colored educational comic and (c) a CD-ROM with the project educational material in digital form and supplementary material that can be used by the educators (Power Point presentations, colored activity sheets, etc.). The educational comic was used supplementary to the learning procedure since its 10 stories related respectively to the 10 lesson plans. The comic was also presented as a teaching method at the HOS magazine "Oionos", at a special section for the Environmental Education.

The EE kit received the approval of the Greek Ministry of Education after the successful audit of the Greek Institute of Educational Policy (refer to Annex 7.3.2.10 of the Midterm report). The material was printed in 100 copies as to be distributed to schools and public bodies of the project areas (EE Centres, Directorates of Education, etc). A full list of the EE activities and distribution points was provided in Annex 7.2.5 of the 2nd Progress report. Moreover, 100 extra copies of the educational material in digital form were produced in order to ensure its long-term distribution beyond the spatial scope of the project areas. The comic (refer to Annex 7.3.2.6 of the Midterm report) was printed in 500 copies as to be distributed to classrooms or/and schoolchildren. Furthermore, a sticker was printed in 2,000 copies as to be distributed to students of Primary Education. The sticker (please refer to Annex 7.3.2.7 of the Midterm report) was based on the comic's illustration and it depicts the feathered messengers of the climate change. All the educational material (refer to Annex 7.3.1.3 of the Midterm report) was also available through the project website, under the "Environmental Education" session.

The project EE campaign started immediately after the EE material production. The HOS educational team visited in total **20 schools**, primary and secondary, at Chania, Kissamos, Kythira, (Project area I, May and November 2017), Naxos, Donousa, Koufonisi (Project area II, May 2018) and Sitia (Project area III, November 2016); in total **1,539 students** participated in the EE campaign. The HOS school visits at Sitia received a big acceptance from the local educational community. Soon after the school visits, HOS received a letter of appreciation by the local School Counselor (refer to Annex 7.3.2.11 of the Midterm report).

Production and distribution of communication material

A bilingual leaflet (EL/EN) (refer to Annex 7.3.1.1 of Midterm report) was produced in 10,000 copies and was available for distribution in January 2016. Until the production of the project leaflet, a **flyer** was produced and was distributed (refer to Annex 7.3.2.12 of Midterm report) to serve as the main informative material during visits at the project areas. The flyer was produced in 10,000 copies in Greek and English and was available for distribution in March 2015. The distribution of information material was carried out (a) in the frame of fieldwork activities of the project, (b) during on-site visits explicitly planned for dissemination activities, (c) at special selected distribution points (e.g. Karpathos Saria Protected Area Management Body, NHMC, on ferryboat local lines, HOS info kiosks, etc.) and (b) during special events (e.g. conferences, British Birdwatching Fairs). A full list of the distribution points and the number of copies distributed is provided in **Annex 7.3.2.2 of the present report.**

Two project banners (EL/EN) (refer to Annex 7.3.1.2 of Midterm report) were produced in 2015.

Five annual newsletters (EL/EN), were produced and distributed through the platform MailChimp. They were distributed to about 170 subscribers and 534 HOS members through its mailing list. A subscription form was included in the projects' website and the Facebook page for individuals who are interested in receiving the newsletter. The 1st and 2nd newsletter were provided in Annex 7.3.2.14 of the Midterm report, the 3rd newsletter was provided in Annex 7.2.3 of the 2nd Progress report, while the **4th and 5th newsletters** are provided in **Annex 7.3.1.1 of the present report**.

The project's **Layman's report** (EL/EN) was produced in 200 copies. It has 24-pages, including a summary of the project scope and objectives, presentation of the species and the project sites, a description of the applied actions and their results, as well as its transferability and after LIFE. It is provided in **Annex 7.3.1.2 of the present report**. Distribution information is provided in **Annex 7.3.2.2 of the present report.**

All the communication material is available at the project website.

Events

During the project implementation a total of 5 events were organized or attended by the project team (refer to Annex 7.3.2.15 of the Midterm report, Annex 7.2.1 of the 2nd Progress report).

Notice boards

Four notice boards (EL/EN) concerning general presentation of the project, its actions and the project site where they were erected were prepared. One was erected at the port of Donousa island referring to Makares islets, two more about Dionysades islets at the port of Sitia and at one islet in Dionysades, and another one at the Antikythira Bird Observatory

premises on Antikythira island. A full account of the photos of the noticeboards at the erection points is provided in **Annex 7.3.2.3 of the present report**.

Collaborations with local stakeholders

In the framework of the project the Communication team collaborated with local stakeholders for the distribution of the communication material, the achievement of wider dissemination to the local community and for the implementation of concrete conservation actions. Such stakeholders include Municipalities, Forestry, Museums and Management Bodies of Protected Areas.

An indicative photo gallery of the photos produced during the project is provided as **Annex 7.3.2.3**, as well as a project presentation in **Annex 7.3.2.4** (EL/EN).

The supervision and preparation of the informational material and of the campaign implementation was the main task of the Communication coordinator, supported by the Communication officer and the Communication staff, the Conservation ecologist, the Environmental Education officer and the Project Manager.

Achievement of objectives, coherence with the original time schedule, feedback: The objectives are achieved in coherence with the original time schedule. There was a small delay regarding the leaflet production as the project partnership decided to postpone it in order to include data on the progress of the project actions and hence increase its dissemination impact. Likewise, the project partnership decided to postpone the production of the final version of the environmental education kit and run a pilot implementation phase to maximize its efficiency. The feedback concerning the implementation of the action is positive, as the contribution of Municipalities and other stakeholders in the dissemination and implementation of the actions is high, the teachers and the school counsellors where the environmental education activities took place were enthusiastic and the participants of events and the majority of the recipients of the dissemination material showed real interest in the project and the species. The dissemination of the EE kit in particular was stemmed with great success as it doubled its original goal of 10 schools.

Problems encountered: None

Complementary actions outside LIFE: Beyond the foreseen communication material, the project partnership decided to produce a novel (EL) on Eleonora's falcon and climate change without incurring any additional cost to the project. The novel was produced in June 2017. Distribution information is provided in **Annex 7.3.2.2 of the present report.** The novel and the associated thank-you letters were provided in Annexes 7.2.4 and 7.2.6 of the 2nd Progress report.

Perspectives for continuing the action after the project: The dissemination material will be available to the general public through the project's website for at least 5 years and the remaining printed material will continue to be distributed, as detailed in the After LIFE Conservation Plan (**Annex 7.2.6 of the present report**).

Deliverables previously submitted to the EC:

a) Project leaflet (Annex 7.3.1.1 of Midterm report and Annex 7.2.3 of the 1st Progress report)
b) Project banner (Annex 7.3.1.2 of Midterm report and Annex 7.2.4 of Inception report)
c) Environmental education kit (Annex 7.3.1.3 of Midterm report and Annex 7.2.10 of 1st Progress report)

d) 1st newsletter (Annex 7.2.6 of 1st Progress report and Annex 7.3.2.14 of Midterm report)
e) 2nd newsletter (Annex 7.2.7 of 1st Progress report and Annex 7.3.2.14 of Midterm report)
f) 3rd newsletter (Annex 7.2.3 of 2nd Progress report)

Deliverables submitted with the present report

a) 4th and 5th newsletter (**Annex 7.3.1.1**)
b) Layman's report (**Annex 7.3.1.2**)

Annexes previously submitted to the EC:

a) Communication Plan Annex 7.3.2.1 of Midterm report and Annex 7.2.2 of 1st Progress report
b) Press releases (Annex 7.3.2.2 of Midterm report and Annex 7.2.8 of 1st Progress report)
c) Media work Annex 7.3.2.3. of Midterm report
d) Press cuttings Annex 7.3.2.4 of Midterm report
e) Articles in Partner Media (Annex 7.3.2.5 of Midterm report and Annex 7.2.9 of 1st Progress report)
f) EE comic (Annex 7.3.2.6 of Midterm report)
g) EE sticker (Annex 7.3.2.7 of Midterm report)
h) List of participating in EE activities schools (Annex 7.3.2.8 of Midterm report)
i) List of recipients of EE kit (Annex 7.3.2.9 of Midterm report)
j) Ministry approval for EE kit (Annex 7.3.2.10 of Midterm report)
k) Letter of appreciation for EE kit (Annex 7.3.2.11 of Midterm report)
l) Project flyer (Annex 7.3.2.12 of Midterm report and Annex 7.2.4 of Inception report)
m) Leaflet distribution list (Annex 7.3.2.13 of Midterm report)
n) Event list (Annex 7.3.2.15 of Midterm report)
o) Request for WR designation (Annex 7.3.2.17 of Midterm report)
p) Project logo (Annex 7.3.2.18 of Midterm report)
q) Use of project logos (Annex 7.3.2.19 of Midterm report)
r) Photo Gallery (Annex 7.3.2.20 of Midterm report, Annex 7.2.12 of 1st Progress report and Annex 7.2.7 of 2nd Progress report)
s) Project presentation (Annex 7.3.2.21 of Midterm report)
t) Novel (Annex 7.2.4 of 2nd Progress report)
u) Notice boards (Annex 7.3.2.16 of Midterm report and Annex 7.2.5 of 1st Progress report)

Annexes submitted with the present report

a) Media work (**Annex 7.3.2.1**)
b) Distribution of printed material (**Annex 7.3.2.2**)
c) Photo gallery (**Annex 7.3.2.3**)

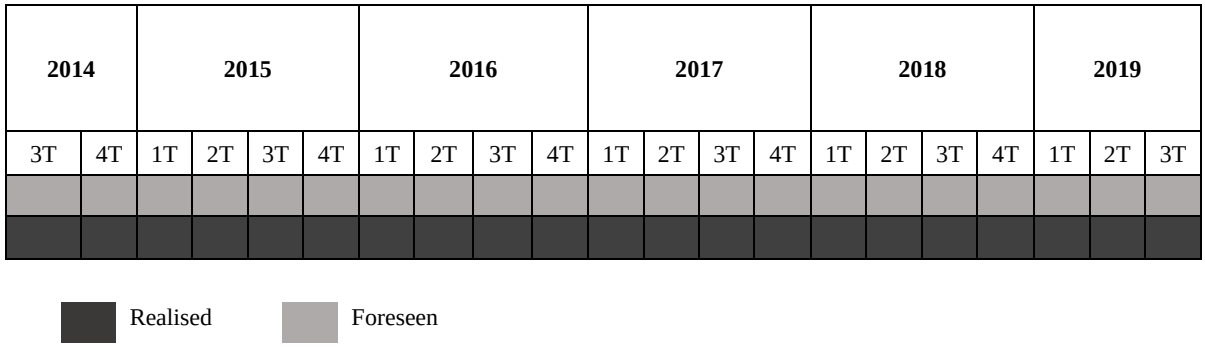
d) Project presentation (**Annex 7.3.2.4**)

e) Partner media (**Annex 7.3.2.5**)

5.2.2.2 Action E2: Project website

Foreseen start date: 1/8/2014 *Actual start date: 1/8/2014*
Foreseen end date: 30/9/2019 *Actual end date: 30/9/2019*

Beneficiary responsible for the implementation: NCC



Description: The action involved the creation and operation of a bilingual website (EL/EN), aimed to provide information on the project objectives and actions. The promotion of the project to the wider audience and targeted groups was also enhanced through the use of interactive social media tools. Following a pilot test phase, the project website (www.lifefalcoeleonorae.gr) became operational in January 2015.

The website consisted of 7 sections, namely the home page and pages concerning (a) the project, its actions, progress and deliverables, (b) general information about LIFE+ instrument and Natura 2000 network, (c) the species, (d) photo gallery, (e) contact and (f) relevant links and is regularly updated (refer to Annex 7.3.2.22 of Midterm report). A total of 47 news were published, all dissemination material was uploaded, as well as deliverables of the project. To date the project website has about 28,800 visitors.

For the website needs an infographic about Eleonora's falcon was created. An updated version is provided in **Annex 7.3.2.6 of the present report**.

A facebook page (EL/EN) was created (www.facebook.com/lifeelclima) and was regularly updated with news from the field, the project progress and results (including deliverables) of all actions and news of conservation interest. By the end of the project it had 613 followers, over 142,000 were reached, while over 7.200 reactions have been triggered (likes, comments, sharing, questions asked). Furthermore, the journeys of "Plagara", the tagged Eleonora's falcon, was promoted through the facebook page of HOS and a total of 250,000 persons were reached.

Furthermore, the project was regularly presented through the HOS online media, namely the facebook page (9,350 members), HOS mailing lists (5,000 members) and HOS fora (534 members), as well as through the facebook of NCC. The project was also presented through the websites and facebook pages of the LIFE projects "ANDROSSPA", "THEMIS" and "Natura2000 Value Crete", in the framework of the project's networking.

The design of the website was carried out by an external web-developer under the supervision of the Communication coordinator. The latter together with the Communication officer were responsible for the update of the website and the Facebook page.

Achievement of objectives, coherence with the original time schedule, feedback: The project objective was reached, as the website and the Facebook page attracted a large number of internet users. The goal set for monthly website visitors was also achieved, while the number of reactions triggered through Facebook was satisfactory. Furthermore, the website was user friendly and was regularly updated.

Problems encountered: None

Perspectives for continuing the action after the project: The project's website will be maintained for at least 5 years.

Deliverables previously submitted to the EC: None

Deliverables submitted with the present report: None

Annexes previously submitted to the EC:

a) Website material (Annex. 7.3.2.22 of Midterm report)

Annexes submitted with the present report

a) Infographic (**Annex 7.3.2.6**)

5.2.2.3 Action E3: Workshop and conferences

Foreseen start date: 1/9/2017 *Actual start date: 1/8/2015*
Foreseen end date: 30/9/2019 *Actual end date: 30/9/2019*

Beneficiary responsible for the implementation: UOP

2014		2015				2016				2017				2018				2019		
3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T

Realised Foreseen

Description: This action mainly involved the organization of a workshop in the framework of an international conference at the final phase of the project, which was dedicated to the presentation and assessment of the project results, with special emphasis on the promotion of the Good Practice Guide (Action E4). The overall dissemination of the project results to the scientific community was further promoted by the participation of the project team members to national and international conferences in Greece and abroad.

Although this action was originally scheduled to start during the 3rd trimester of 2017, the project partnership decided to hasten its initiation in the light of the progress of the project actions, but also with the aim of maximizing the impact of the dissemination actions and networking activities with the scientific community.

The project partners participated in total in **8 conferences**, of which 6 international and 2 national:

– 10th European Ornithologist Union conference (Badajoz, August 2018; related to the overall project presentation)

- 13th International Congress on the Zoogeography and Ecology of Greece and Adjacent Regions (Heraklion, October 2015; related to Action A3)
- 8th Hellenic Ecological Society conference (Thessaloniki, October 2016, related to Action A4)
- 3th Island Invasives Conference (Dundee, July 2017; related to Action C1),
- 6th International Eurasian Ornithology Conference (Heidelberg, April 2018; related to Action A4),
- 28th annual meeting of the Society of Environmental Toxicology and Chemistry (Rome, May 2018; related to Action A4)
- 40th conference of the Hellenic Society for Biological Sciences (Veria, May 2018; related to Action A4)
- 9th Hellenic Ecological Society conference (Heraklion, October 2018; related to Action A4

The related conference contributions of the **latter one** are presented in **Annex 7.3.2.7** of the present report, while of the remaining ones were presented in Annexes 7.3.2.23 and 7.3.2.24 of the Midterm report, Annex 7.2.14 of the 1st Progress report and Annex 7.2.8 of the 2nd Progress report.

The **final workshop** was held in the framework of the 14th International Congress on the Zoogeography and Ecology of Greece and Adjacent Regions in summer 2019. In particular, the organizing committee of the conference devoted one particular session ("Birds II") for the presentation of the project results (four presentations) followed by a roundtable on "*Conservation measures & Good Practices to assist the Adaptation of Birds to Climate Change*". The project partnership invited delegates of all competent authorities and collaborators, including among others the Ministry of Environment and Energy, Green Fund, Management Bodies, Natural History Museum of Crete, to participate in the project session.

The conference was attended by ca 180 participants, of which ca 40 also participated in the 3.5hr project session. During the roundtable the Project coordinator made a brief presentation of the Good Practice Guide and coordinated a very constructive discussion on the impact of climate change on birds among scientists of various backgrounds, from all the academic institutions of the country as well as delegates from Management Bodies and the Natural History Museum of Crete. The final workshop invitation, program, presentations and abstracts are presented in **Annex 7.3.2.8 of the present report**. The participants' list is not available, since during this 3.5hr session there was another parallel session ("Animal Diversity and Conservation II") and the participants moved in between rooms according to their scientific interest. Furthermore, there was no official reply to the invitation letter sent by the Project Coordinator to 28 competent authorities and/or scientists in May. Therefore, the number of participants could not be known in advance. Still, quite a few of the scientists included in the mailing list attended the conference, as well as the project session. The remaining ones were scientists interested in Ecology and Animal Conservation, yet not necessarily involved with avian species and/or insular ecosystems.

In addition, **two scientific publications** were published in peer-reviewed journal based on the results of the preliminary actions (Action A3 and A4). Two of them were published in the journals *Current Zoology* and *Scientific Reports* and were presented in Annex 7.2.13 of the 1st Progress report, Annexes 7.3.2.23 and 7.2.3.24 of the Midterm report, Annex 7.2.9 of the 2nd Progress report, while **another three** published and/or in press in the peer-reviewed journals *Avocetta, Landscape Ecology* and *Science of the Total Environment* are presented in **Annex**

7.3.2.9 of the present report. The latter were also based on the results of the preliminary Action A4. The total list of conference contributions and scientific publications produced during the course of the project is provided in **Annex 7.3.2.10 of the present report**.

The Project coordinator and the Project manager were the main responsible team members for the implementation of this action, assisted by other UOP, HOS and NCC members.

Achievement of objectives, coherence with the original time schedule, feedback: The objectives of this action were achieved to the fullest. The project partnership devoted special effort to disseminate the project results to the scientific community throughout the project duration.

Problems encountered: None

Complementary actions outside LIFE: None

Perspectives for continuing the action after the project: The conference contributions and the scientific publications will be available to the general public through the project's website for at least 5 years. At least two more papers are expected to be published.

Deliverables previously submitted to the EC: None

Deliverables submitted with the present report: None

Annexes previously submitted to the EC:

a) Conference contributions (Annex 7.2.14 of the 1st Progress report, Annexes 7.3.2.23 and 7.2.3.24 of the Midterm report, Annex 7.2.8 of the 2nd Progress report)

b) Scientific publications (Annex 7.2.13 of the 1st Progress report, Annexes 7.3.2.23 and 7.2.3.24 of the Midterm report, Annex 7.2.9 of the 2nd Progress report)

Annexes submitted with the present report:

a) Conference contributions (**Annex 7.3.2.7**)

b) Final workshop material (**Annex 7.3.2.8**)

c) Scientific publications (**Annex 7.3.2.9**)

d) List of scientific publications and conference contributions (**Annex 7.3.2.10**)

5.2.2.4 Action E4: Production of a Good Practice Guide for the adaptation of the Eleonora's falcon to the climate change

Foreseen start date: 1/10/2017 *Actual start date: 1/10/2017*
Foreseen end date: 30/9/2019 *Actual end date: 30/9/2019*

Beneficiary responsible for the implementation: NCC

2014		2015				2016				2017				2018				2019		
3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T

Realised Foreseen

Description: This action involved the production of a Good Practice Guide providing updated information on the conservation status of Eleonora's falcon and proposing related management guidelines, based on the results at the species' breeding grounds following the implementation of concrete conservation actions (Actions C1, C2 and C3) and on the results at its foraging grounds following the implementation of preparatory actions (Action A4).

The Good Practice Guide was produced during the last year and was the main task of the Communication coordinator, supported by the PMG members. The guide is a 56-page document including information on Eleonora's falcon, climate change and its effect on biodiversity and the species, management practices to tackle climate change impacts to species and habitats within Natura 2000 sites and detailed presentation of the proposed by the project conservation actions based on the project's results. It was produced in 1,000 copies (EL: 600, EN: 300, FR: 100) and was distributed to interested parties in Greece, the Mediterranean and Africa. The Good Practice Guide is provided in **Annex 7.3.1.3** and the distribution list in **Annex 7.3.2.2**.

Achievement of objectives, coherence with the original time schedule, feedback: The objectives of this action were achieved to the fullest. Preparatory activities (i.e. data analysis and compilation, literature review) began according to the original (revised) timetable, but its final production was delayed given the extension in the implementation period of the concrete conservation actions. The GPG was produced in time according to the revised time schedule.

Problems encountered: None

Complementary actions outside LIFE: None

Perspectives for continuing the action after the project: Distribution of the remaining hardcopies. The GPG will be available in the project's website for at least 5 years.

Deliverables previously submitted to the EC: None

Deliverables submitted with the present report:

a) Good Practice Guide (**Annex 7.3.1.3**)

Annexes previously submitted to the EC: None

Annexes submitted with the present report:

a) Distribution list (**Annex 7.3.2.2**)

5.3 Evaluation of Project Implementation

Generally, the methodology for the implementation of the project was chosen correctly.

The preparatory actions were planned in a way to ensure smooth implementation of concrete conservation actions. They provided the necessary guidelines and baseline information for the corresponding concrete conservation actions. The project partnership decided to extend the period of implementation of two preparatory actions, namely Action A2, due to bad weather conditions experienced during the original timeplan, and Action A3, to ensure the maximum efficiency of the corresponding concrete conservation action (Action C3).

Regarding the concrete conservation actions, they were implemented smoothly showing great progress in relation to the desired goals. Despite the delay in the purchase of land (Action B1), the project partnership proceeded to every necessary action to prevent any further delays in the implementation of the corresponding concrete conservation action (Action C3). However, the project partnership decided to request a 12month extension so that the objectives of all concrete actions would be achieved to their fullest.

Monitoring methods were satisfactory and adapted to the needs of the project. However, in such a short time the actual impact of the concrete conservation actions in the breeding performance of Eleonora's falcon is unlikely to be properly estimated, since it may take years for the species to react to the implemented habitat interventions Still, preliminary results showed positive signs in relation to the effectiveness of rat eradication operations (Action C1) and construction of artificial nests (Action C2). In addition, the construction of the refuelling "oases" for migratory passerines were found to have a positive impact as an increasing number of birds used them as a stopover site.

Public awareness and educational activities support the general aim of the project, as indicated by the improvement demonstrated during the second phase of the socioeconomic survey (Action E1) and the wide acceptance of the project activities by local communities. Thus, the methodology used is expected to facilitate the distribution of the gained knowledge and help increase environmental awareness.

Finally, as detailed in section 4.1 the project team was wisely chosen. Besides their long-term experience in relevant projects, the project partners had worked together in the past and thus formed a solid group team.

The overall progress of the project in relation to the original objectives is presented in the following table (Table 7).

Table 7. Summary and evaluation of the progress of project actions in relation to original milestones and deliverables.

Task	Foreseen in the revised proposal	Achieved	Evaluation
Action A1	Preparation of three operational plans corresponding to each concrete conservation action, through networking with LIFE and non-LIFE projects in Europe. Preparation of protocols for monitoring of the effectiveness of the concrete conservation actions. Organization of one international workshop.	The action objectives were achieved at their fullest. A small deviation from the original timetable was necessary to secure the availability of all invited scientists for the international workshop. The operational plans and the monitoring protocols were annexed in the Inception report.	The contribution of the participants of the international workshop was crucial in the finalization of the operational plans. Their expertise and technical know-how helped the project field teams to fine-tune the specifications of the corresponding actions. This resulted in proper, well-designed and feasible operational plans, which have provided ever since detailed guidelines for the implementation of the concrete conservation actions. In addition, the interaction among species' experts in the frame of the international workshop brought about a fruitful collaboration regarding the habitat suitability of Eleonora's falcon at its main wintering area, Madagascar, and the likely impacts of future climate change. The conclusions drawn from this collaborative work were utilized in the frame of Action E4.
Action A2	A complete census of the Eleonora's falcon breeding populations within all the project sites and monitoring of parameters of the breeding performance at least 1 accessible colony (i.e. those not located at cliffs) at each project site for at least 1 breeding season providing	The establishment of census and monitoring field teams and commencement of field work took place before the beginning of the project (i.e. in July 2014). The action objectives were achieved at their fullest. The fieldwork activities had to be extended	The data collected during this action enabled the project team to (a) establish baseline information and favourable reference values for the species' breeding status at the project areas, to be compared against the effectiveness of the related concrete conservation

Task	Foreseen in the revised proposal	Achieved	Evaluation
	baseline information on the population distribution and breeding performance. Use of unmanned guided drones for the first time to determine the contents and the breeding performance of the Eleonora's falcon on inaccessible cliffs where up till now monitoring was not feasible. Collection of samples of unhatched eggs, as well as, from adult individuals, nestlings and prey items to identify the presence of agrochemicals in their tissues. Preparation of final report.	for three more breeding seasons (i.e. summer 2016-2018) due to bad weather conditions. Action progress reports were produced and annexed in previous reports (Inception report, 1st Progress report). The final report was produced and annexed in previous reports (Midterm report), but a revised version is provided in **Annex 7.2.7** of the present report.	actions, and (b) determine potential changes in the breeding distribution of the species within the last decade and their relation to the climate change. Ancillary data (i.e., collection of biological samples) were utilized in the frame of Action A4. All the results and conclusions drawn were utilized in the frame of Action E4.
Action A3	Assessment of habitat use by the migrating passerines which exploit Antikythira as a stopover site for Refuelling, with the use of visual recording of passerine abundance (line transects and/or point counts), mist net trapping and ringing, radiotracking and identification of types of vegetation which are most frequently used by the passerines. Preparation of final report.	The assessment of migratory passerine refueling patterns started according to the original time schedule. The action objectives were achieved at their fullest. Foreseen activities were extended beyond the original timetable in order to conduct targeted field surveys in the land plot that was to be purchased and hence help design site-specific management activities in the frame of the corresponding concrete conservation action (Action C3). Action progress reports were produced and annexed in previous reports (Inception report, 1st Progress report). The final report was produced and annexed in previous reports (Midterm report, 2nd Progress report).	The data gathered and the corresponding results enabled the identification of the most suitable areas to be purchased (Action B1) for the plantation of fruit trees and bushes (Action C3), as well as the most suitable types and species of vegetation to be used for plantation (Action C3). Ringing data analysis allowed for the identification of variations in migration timing and potential impacts of the climate change on it, thus providing additional information for effective climate change adaptation measures (Action E4).

Task	Foreseen in the revised proposal	Achieved	Evaluation
Action A4	Identification and assessment of foraging areas during the breeding and wintering season with the use of satellite transmitters and visual observations of foraging falcons. Study of foraging movements with the use of radar. Toxicological analysis on biological samples (dead falcons, infertile falcons). Preparation of final report.	The action started 1 month ahead of the original time schedule to ensure that all necessary equipment would be available for the foreseen fieldwork activities on time. Following literature research and communication with providers, we purchased and subsequently tagged six falcons with GPS-UHF transmitters. Data transmission was not successful for all of them. Visual observations of foraging falcons were carried out as planned throughout the island of Antikythira. Insect surveys were conducted on Antikythira to estimate prey availability. One on-site habitat assessment at the species' main wintering area was carried out. Radar surveys were conducted to quantify food availability at the species' breeding grounds Biological samples were collected upon availability during foreseen fieldwork activities on the breeding colonies. The final report was produced and annexed in previous reports (2nd Progress report).	In spite of tag failure in some cases, the remaining subactions ensured collection of all necessary data for the identification and assessment of the species' foraging areas and the successful completion of this action.
Action B1	Purchase of up to 1ha private land on the island of Antikythira	The action objectives were achieved to their fullest. Significant delays took place during the contact with potential sellers, as well as during preparatory activities for the signing of the contract. Consequently, the duration of the action	The delay in the completion of all relevant procedures resulted in postponing of the main activities of the corresponding concrete conservation action (Action C3), yet without affecting its overall success (see below). The

Task	Foreseen in the revised proposal	Achieved	Evaluation
		had to be extended for 1 year. The signed contract and the schematics of the land plot were produced in previous reports (Midterm report).	reasons for the delay were mainly bureaucratic and could not have been foreseen by the project team. A detailed description of the related subtasks was provided in previous reports (Midterm report).
Action C1	Implementation of rat eradication operations in 2 Eleonora's falcon breeding areas (Dionysades and Mikres Kyklades colonies), covering a total surface area of 705 ha. First ever successful rat eradication by aerial bait deployment using a helicopter. An immediate significant increase of the Eleonora's falcon breeding success (~13% of national population). Preparation of final report.	The action objectives were achieved at their fullest. Two project sites consisting of 7 islets that total a 700ha (Dionysades-4 islets, Makares-3 islets) are rat-free. The rat eradication operations that took place are by far the largest eradication campaign in the country. Using bait stations, a method demanding an enormous human effort, compared to helicopter aerial baiting, but far more selective and precautious in relation to non target species. The experience from such a campaign will be useful in national and international context. The final report was produced and is provided in **Annex 7.2.1.1** of the present report. An additional study was carried out to assess the impact of the rat eradication operations on the vegetation of the islets involved. The report is provided in **Annex 7.2.1.2** of the present report.	Despite various challenges which needed to be tackled, i.e. modification of eradication method on Dionysades and rat reinvasion on Makares, and huge human effort needed for the implementation of the action, a complete success has been achieve by (A) completing the largest rat eradication operations carried out in Greece and eastern Mediterranean up to date, (B) creating minimal risk to non-target species, (C) creating significant habitat improvement for the Eleonora's Falcon, as well as other biodiversity groups e.g. flora, lizards, Chukar patridges, Bonelli's Eagle and (D) creating large support and appreciation of the local authorities and inhabitants thus ensuring the support for the post-eradication monitoring and potentially expansion of rat eradication operations to other islets with significant rat problem.
Action C2	1000 artificial nests constructed in 4 project areas hosting 19% of the national breeding population of the species.	The nest construction campaign, as an important measure for improving nesting habitat quality for the species	The action achieved fully its initial objectives without any problems, thus providing additional suitable nesting

Task	Foreseen in the revised proposal	Achieved	Evaluation
	Preparation of final report.	was implemented successfully and according to time schedule. A total of 1011 nests were constructed in 5 project areas. The final report was produced and is provided in **Annex 7.2.2** of the present report.	sites to some of the major colonies of the Eleonora's Falcon which are expected to experience the impacts of the climate change first. While on large islets the use of artificial nests remains to be seen in long-term, in a small islet hosting more than 71 breeding falcons, the majority of birds already nest in artificial nests.
Action C3	Construction of refuelling oasis in the purchased land (in the frame of Action B1). Creation of a nursery garden. Fencing works. Restoration of old, abandoned wells and cisterns and installation of automated watering system. Vegetation management works. Preparation of final report.	The action objectives were achieved to their fullest. Preparatory activities included (a) clearing and restoration of the traditional pathway that is connecting the land plot with the ABO premises, (b) clearing and restoration of the traditional pathway that exists in the land plot, (c) restoration of traditional stonewall in the land plot to be purchased, (d) partial restoration (outer wall) of a traditional cistern, (e) tree mapping in the land plot, and (f) arboricultural works in the existing trees within the land plot, (g) collection of samples for soil analysis. The main activities included (a) landscaping activities, (b) creation of access dirt road, (c) plantation of 105 trees, (d) cereal cultivation in a 0.45ha area, (e) placement of solar-powered electrical fence of 850m length, (f) installation of greenhouse-nursery, (g) collection and	The main activities of the action (i.e. plantations) and related tasks (installation of automated watering system and creation of nursery garden) had to be postponed given the delay in the completion of the land purchase. These began eventually in March 2017. However, the on-time completion of all preparatory activities ensured that no further delays would occur. In addition, the targeted field surveys carried out in the frame of Action A3 on the land plot provided specific information on habitat use of passerines and thus, have enabled the identification of vegetation species that are favoured by the passerines. The creation of the water reservoir which was not originally foreseen was done at no additional cost to the project and is expected to improve the habitat quality of the refuelling oasis, providing a drinking place for migratory passerines

Task	Foreseen in the revised proposal	Achieved	Evaluation
		cultivation of local varieties of seeds, (h) installation of watering system and (i) construction of a water reservoir, not originally foreseen. The final report was produced and is provided in **Annex 7.2.3** of the present report.	in an island that suffers from drought in summer-autumn. The extension of the action duration by 12months ensured that the main activities (i.e. plantations) would furnish the desired results in the refuelling pattern of migratory passerines.
Action D1	Annual internal reports and final report regarding the effectiveness of the concrete conservation actions.	Monitoring activities took place in those project areas where concrete conservation actions were implemented (i.e., Makares-Actions C1 & C2, Dionysades-Actions C1 & C2Antikythira-Action C2 & C3, Skyros-Action C2), following the guidelines established in Action A1. The final report was produced and is provided in **Annex 7.2.4** of the present report.	The action ran smoothly, in accordance with the progress of the concrete conservation actions. Given the 12month extension of the latter, the monitoring activities were also extended by 1 year. The protocols used for the evaluation of the efficiency of the concrete conservation actions were chosen correctly.
Action D2	Evaluation of impacts of Actions E on the target groups through 2 surveys. Preparation of socio-economic monitoring report.	The 1st phase of the survey was conducted through on-site visits in all 7 project areas during which local inhabitants were asked to fill in a questionnaire. The questionnaire was annexed in the 1st Progress report. The 1st survey was completed in winter 2017. 200 questionnaires were collected in total. The 2nd phase of the survey was conducted via an online questionnaire, beginning in winter 2018. 105 questionnaires were collected in total. The final report was produced and is provided in **Annex 7.2.5** of the present	The action objective was achieved. The results of the 1st phase of the public survey helped to fine-tune the dissemination activities during the rest of the project duration, as well as to properly design the 2nd phase of the public survey. The target for the number of collected questionnaires was also achieved. However, the 1st phase had to be delayed in order to cover all project areas. Despite the 12month project extension, preparatory activities (i.e. creation of the 2nd questionnaire) for the 2nd phase began as originally foreseen

Task	Foreseen in the revised proposal	Achieved	Evaluation
		report.	(i.e., in 2018). The 2nd phase was carried out electronically and two questionnaires were prepared for general public and stakeholders. Due to the major interest of the public and the stakeholders, the majority of the responses came for the Dionysades islets Natura 2000 site.
Action E1	20,000 leaflets, 100 environmental education kits implemented in 10 schools, thematic banners, 200 copies of Layman's report produced and distributed. 6 notice boards erected. Release of press releases, local radio and TV interviews provided and presentations given, newsletter released.	10,000 bilingual leaflets and 10,000 flyers, 100 environmental education kits implemented in 20 schools, 3 thematic banners, 200 copies of Layman's report, 4 notice boards erected. 7 press releases and articles released, 3 interviews granted, 5 newsletters released, a Novel produced. Deliverables have been provided in previous reports (Inception report, 1st and 2nd Progress report, Midterm report). The last deliverables are provided in **Annexes 7.3.1.1 and 7.3.1.2** of the present report.	All foreseen dissemination activities ran smoothly according to the original timetable (but see below*) and the guidelines provided in the Communication Plan, annexed in the 1st Progress report). *The project partnership decided to postpone the production of two deliverables, namely the bilingual leaflet and the environmental education kit, in order to maximize their effectiveness (i.e. incorporation of results of preparatory actions in the leaflet, pilot implementation period for the environmental education kit). The action objectives were achieved at their fullest, and surpassed in some occasions (i.e. implementation of EE kit in 10 more schools than originally foreseen, production of a novel)
Action E2	A well-designed, informative, attractive, user-friendly and operational project website. Utilization of social media.	Creation of a well-designed, informative, attractive, user-friendly and operational project website and a	The project website and facebook account were very popular.

Task	Foreseen in the revised proposal	Achieved	Evaluation
		facebook page. Regular updating regarding the progress of the project actions and production of deliverables. The website had 28.800 visitors, while the facebook page 613 followers. Through facebook (project's and HOS's) about 390,000 people were reached, while over 7.200 reactions were triggered (project's).	
Action E3	Organization of the final project workshop with the attendance of at least 100 experts. Promotion of the project and its results through participation at other national and international conferences.	Participation in 2 national and 6 international conferences. Organization of the last workshop in the framework of 1 international conference (14th ICZEGAR) in June 2019 with ca 180 participants. Production of 3 scientific publications based on the results of the preparatory actions. Some of the conference proceedings and the scientific publications were annexed in previous reports (Midterm report, 2nd Progress report). The last ones are provided in **Annexes 7.3.2.7 - 7.3.2.8** of the present report.	The activities undertaken surpassed the original objectives. The project team decided to hasten the initiation of the action to maximize the dissemination of the project actions and results among the scientific community. The project team produced 3 scientific publications, not originally foreseen, another two are currently under review/in press.
Action E4	1000 copies of a colour 50–page Good Practice Guide in Greek, English and French.	A 56-page GPG was produced in 1,000 copies, in three languages (EL, EN, FR). The GPG content was based on the results of the preparatory and concrete conservation actions, was presented in the last workshop (Action E3). The GPG was distributed to interested parties in Greece and abroad (Europe and Africa).	The action objective was met according to the revised time schedule.

Task	Foreseen in the revised proposal	Achieved	Evaluation
		The GPG is provided in **Annex 7.3.1.3** of the present report.	
Action F1	Effective, well-structured and concrete overall project coordination and coordination of actions in responsibility of project partners. Preparation of project reports (inception report, midterm report, progress report, final report).	All foreseen activities started on time and ran according to the revised time schedule, i.e. establishment of PMG in August 2014, regular PMG meetings since then (13 in total), production of operational plan for the coordination of all project teams in August 2014, signing of partner agreements, acquisition and renewal of fieldwork permits, regular contact among project teams, the EC and the External monitoring team, and organization of annual audits (5 project visits and 3 field visits). Four project reports were produced, namely the Inception report in June 2015, 1st Progress report in October 2016 (in lieu of the present midterm report), Midterm report in March 2017, 2nd Progress report in August 2018. On behalf of the project partnership, the Project coordinator requested a 12month extension to ensure that all project objectives would be achieved.	Fruitful discussions during PMG meetings and less formal meetings among the project teams took place to ensure the on-time resolution of any problems that might occur during the duration of the project. The minutes of previous PMG meetings were annexed in previous reports (1st Progress report, Midterm report, 2nd Progress report) and the last ones are provided in **Annex 7.1.1** of the present report. The various tasks of all project members were outlined in the operational plan that was prepared for this purpose. The operational plan was annexed in previous report (Midterm report). In addition, the technical and on-site visits performed by the External Monitoring Team (NEEMO) were successful and productive. Information on previous audits was annexed in previous reports (1st Progress report, Midterm report, 2nd Progress report), while information regarding the last ones is provided in **Annex 7.1.3** of the present report. The EC mail correspondence also provided useful guidelines for the successful implementation of all project actions. Replies to the issues raised were

Task	Foreseen in the revised proposal	Achieved	Evaluation
			provided in previous reports (Midterm report, 2nd Progress report), while the most recent ones are provided in **Annex 7.1.4** of the present report. Fieldwork permits were annexed in previous reports (Inception report, 1st Progress report, Midterm report), while the last renewal is provided in **Annex 7.1.5** of the present report. The original partner agreements were provided in previous report (Inception report), while the revised ones (following the 12month extension and the approval of the requested changes in the financial forms) is provided in **Annex 7.1.2** of the present report
Action F2	Networking with other past or on-going LIFE projects in Greece and abroad, as well as experts and research institutions in Greece and abroad, especially in Madagascar	Networking activities initiated according to the original time schedule. Two declarations of support were signed between the LIFE ElClimA project partnership and the LIFE Natura2000 Value Crete and the LIFE Natura THEMIS (annexed in 1st Progress report). Joint field missions took place with the personnel of the ANDROSSPA LIFE project and the National History Museum of Crete. The project partnership attended workshops organized by other Life projects and public events organized by the Greek Life Task Force. Networking with other	Networking activities were very fruitful, providing on one hand valuable input during the preparation of the Good Practice Guide (Action E4) and the implementation of the concrete conservation actions, and on the other hand, contributing to the dissemination of the project activities and results.

Task	Foreseen in the revised proposal	Achieved	Evaluation
		projects took place through the facebook account of the project. Email communication with species' experts working at both the breeding and wintering grounds of Eleonora's falcon occurred throughout the project. The latter contributed to the production of joint scientific publications (see Action E3).	
Action F3	After-LIFE Conservation Plan in English and in Greek language.	After-LIFE Conservation Plan was prepared in Greek and English language, outlining the framework for the continuation of the project's actions after the project's end as well as their financial sustainability. It is provided in **Annex 7.2.6** of the present report	The action's objectives have been met.

5.4 Analysis of long-term benefits

– Environmental benefits

The project incurred direct benefits on the target species, *Falco eleonorae.* The species is included in Annex I of the Directive 2009/147/EC on the conservation of wild birds, in Annex II of the Bern Convention and belongs to the category "SPEC 2" of BirdLife International, which means that is a "species with an unfavourable European conservation status, and with more than half of the global breeding or wintering population concentrated in Europe". Greece hosts the bulk of its breeding population (>85%, corresponding to ca 12,300 pairs). The implemented concrete conservation actions (i.e., rat eradication operations-Action C1, construction of artificial nests-Action C2, creation of refuelling oasis-Action C3) took place in 6 project areas in the Aegean Sea holding important breeding colonies, corresponding to ca 32 % of the species' national population. Furthermore, the project areas were also part of the Natura 2000 network of protected areas, being designated as SCI and/or SPA as well as Wildlife Refuges, thus the project implemented and promoted direct conservation and management in protected areas. Although the project did not directly target specific types of habitats, the project actions also benefited the health and quality of the ecosystems in these areas. It should be noted that active involvement of the competent local and regional authorities in the implementation of the concrete conservation actions, which is considered one of the main parallel achievements of the project, ensured that similar conservation actions will be implemented and promoted in other sites of their jurisdiction.

The project's concrete conservation actions consisted of best practices for the conservation of the Eleonora's falcon. Rat eradications (action C1) and the construction of the artificial nests (action C2) had already proven their ecological benefits for the Eleonora's Falcon, as well as, for islet ecosystems through previous LIFE projects in Greece which included similar actions. The main ecological benefits of the rat eradication and the construction of artificial nests in the case of the present project include: (1) elimination of rat predation on eggs/chicks of Eleonora's Falcons in colonies hosting 6% of the species national population, as well as elimination of the predation on the native vegetation vital for nesting of the Eleonora's Falcon and other native species of flora and fauna of the target islets , (2) construction of more than 1000 artificial nest at colonies which represent 19% of the national population of the Eleonora's Falcon. The creation of refuelling oasis, which is a novel conservation approach is also expected to create direct significant conservation benefits for the Eleonora's falcon as well as its prey i.e. migratory passerines on Antikythira and will provide the base of reference for other similar conservation efforts elsewhere in Greece and abroad.

Short-term environmental benefits are already evident, based on the results of the monitoring activities (Action D1), which revealed positive impacts on the species' breeding performance on islets, where project's concrete conservation actions were implemented. In general, following rat eradication operations the breeding success of the Eleonora's Falcons has increased in term of productivity and use of artificial nesting sites in case available natural nesting sites were already limited. Additionally, there are indications that the native vegetation and Chukar partridge populations have recovered more, following the rat eradications. Based on the project's scientific monitoring results, the greatest short-term impacts of the construction of artificial nests were observed on a small islet in Dionysades, where the limited availability and quality of nesting sites prior to the current conservation efforts led to significant increase of the local breeding population of Eleonora's Falcon and their use of the artificial nests. This result should be taken as an indication of the importance of artificial nest construction for tackling on-going or future reduction of good quality nesting

sites due to climate change or other causes. Furthermore, rat eradication operations (Action C1) involved a total area of ca 700ha in two islet complexes that host a rich biodiversity consisting, among others, of many endemic taxa. Rats are one of the top 10 most invasive species that disrupt the ecosystem functions wherever they intrude, preying on other animal species, as well as on vegetation. It should be noted that Mikres Kyklades and Dionysades host two among the largest colonies of Yelkouan Shearwater (*Puffinus yelkouan*) and Scopoli's Shearwater (*Calonectris diomedea*) in Greece and in the Eastern Mediterranean, respectively. Rats have detrimental impact on the breeding performance of these two species because due to rat predation the breeding success is as low as 0% in some colonies of the Scopoli's Shearwater in the Mediterranean (references: Amengual & Aguilar 1998, Orueta et al. 2002, Igual et al. 2006 & Corbi et al. 2005), while Yelkouan Shearwater egg losses due to rat predation vary between 40% and 100% in colonies on Malta (J. Borg pers. comm.). Therefore, the removal of rats from these two colonies is expected to create significant increase in the breeding performance of the shearwater species nesting at Makares and Dionysades.

Moreover, the creation of the refuelling oasis (Action C3) in one of the most important island stopover areas in Greece improved the habitat quality for a large number of passerines that use the island of Antikythira for refuelling. The Mediterranean Sea and the Sahara desert form a rather hostile environment for migrants that fly over this large area twice during the year. Adequate refuelling is thus considered vital for their survival. Considering that global environmental conditions, especially in the Mediterranean region, are expected to deteriorate due to the ongoing and anticipated impacts of climate change, management of stopover areas is considered of top conservation priority.

Therefore, the foreseen project actions are expected to have a direct impact not only on Eleonora's falcon, but also on the status of local biodiversity and ecosystem services in these project areas in the long-term.

In addition, the foreseen networking and dissemination activities were designed to promote the project's results beyond the extent of the project areas, both in Greece and abroad. One of the most important deliverables, the Good Practice Guide (Action E4), was produced in 1,000 copies and will be distributed to competent authorities in the Mediterranean and Africa. Thus, a larger part of the species global population is expected to benefit from the guidelines that were detailed therein to ensure the species' favourable status in a wider spatial context in short- as well as long-term.

- Long-term benefits and sustainability

The rat eradication operations (Action C1) and the construction of artificial nests (Action C2) targeted some of the largest regional colonies of the Eleonora's Falcon. Apart from anticipated short-, mid- and long-term benefits on the breeding performance of the Eleonora's Falcons nesting there, the improved breeding habitat quality will enhance resilience to the future climate change thus ensuring that areas treated within the present project will act as refuges for the regional population of the species which through the dispersal of individuals can disperse to other surrounding satellite colonies. Therefore, long-term improvement of the Eleonora's Falcon conservation status is expected to result from the project.

As described above, the eradication of rats (Action C1) had immediate, as well as, long-term beneficial impacts on the breeding performance of other species of conservation concern nesting on Makares and Dionysades as well as overall quality of islet ecosystems and habitats. The reduced pressure of rat predation will improve the conservation status and resilience to

the impacts of climate change on all rat prey species (i.e. birds, invertebrates, lizards, vegetation, etc.) as well as on the ecosystems as whole.

The long-term benefits of the artificial nests (Action C2) should be rather considered in a site-specific context. In particular, in the species' southern colonies the artificial nests are expected to provide better nesting conditions for Eleonora's falcon in the event of extreme weather conditions, like prolonged periods of very high temperatures and frequent heat waves according to future climate scenarios. Those breeding pairs that will not be able to cope with these deteriorating climate conditions will be forced to leave their territories and move to northern colonies. The artificial nests constructed there are expected to increase the carrying capacity of the northern colonies and thus help sustain the surplus of breeding pairs, which would otherwise have to nest in nesting sites of inferior quality.

Regarding the creation of the refueling oasis (Action C3), the planned habitat interventions are expected to be beneficial for all species stopping over on the island of Antikythira (i.e, not only the ones that are preyed by Eleonora's falcon), but also to resident species of the island. The results of the preparatory actions A3 and A4 suggest that parts of the island dominated by maquis vegetation or cultivations are the most important foraging areas for (migrant) birds and consequently for Eleonora's falcon. Given the fact that the current agricultural activities are very limited, and that local human population is declining over the years, the project's fieldwork activities are expected to maintain the necessary habitat requirements for the breeding and staging avifauna of the island.

The anticipated benefits and sustainability of the project results will be mainly assured through the distribution of the Good Practice Guide, as explained above, to competent authorities. As stated in the corresponding declaration of support, the Greek Ministry of Environment and Energy has committed to "*...support the project and make efficient use of the project recommendations and deliverables in relation to the species conservation and management of its critical habitats and will take into account the guidelines provided in the Good Practice Guide that will be compiled in future conservation practices".* Likewise, Birdlife International has also committed to facilitate overall networking activities, including the distribution of the Good Practice Guide in Africa.

The project partnership has been contacting local management authorities, mainly Forest services, to inform them about the implementation of the project actions in their jurisdiction area.

Thus, these efforts will eventually contribute to the sustainability of long-term environmental benefits of the project results in the project areas and beyond.

At the same time, the enhancement of the ecological value of the project areas through the implementation of the foreseen concrete conservation actions, as well as the promotion of these areas through the foreseen dissemination and networking actions, is expected to boost local businesses related to green economy and ecotourism, and thus, indirectly, the overall local economy.

Moreover, the public awareness activities, including social media, press releases and public events, are expected to bring about positive changes in the environmental awareness of local societies. Most importantly, the implementation of the environmental education kit is expected to have a great impact on future generations.

After the end of the project, the project partnership will make every effort to continue monitoring activities in the project areas to ensure the long-term sustainability of the project results, as detailed in the After LIFE Conservation Plan (**Annex 7.2.6 of the present report**). Both NCC and HOS are currently running other LIFE projects, some of which overlap with

the area of implementation of the LIFE ElClimA project. They will thus make use of networking activities among these projects to secure long-term effects. With regards to the habitat management interventions on island of Antikythira, the Antikythira Observatory Unit of HOS will be responsible for its future maintenance.

– Replicability, demonstration, transferability, cooperation

The replication and transfer of the construction of artificial nests conservation measure has already taken place at Karpathos/ and NE Crete islets, which involved construction of 122 artificial nests for the Eleonora's Falcon outside LIFE project. This measure is expected to expand to other protected areas of the Aegean Sea hosting the species though implementation measures of the Management Bodies of protected areas. Similarly, there has been a great interest by the local Forestry Departments and local government on Crete for the expansion of rat eradication operations to other islets surrounding Crete, where rats cause problems to the local biodiversity and people. Some of project actions have been included in the Priority Action Framework, while the current technical plans of measures carried out by Management Bodies of protected areas in Greece include actions implemented by the project.

As explained above, the organization of information events for the personnel of local competent authorities (e.g. Management Bodies, Forestry Services), networking with other projects (e.g. Environmental Studies for N2000 areas in Greece) and the dissemination of the Good Practice Guide, will promote the transferability and replicability of the project actions.

Besides, the conservation measures elaborated and promoted through the project are expected to be applicable either directly or with minor adjustments for the conservation of other bird species and their habitats, in Greece and elsewhere, which already are or are expected to be affected by the climate change.

– Best Practice lessons

The Eleonora's falcon has proven a very good species-model for the implementation and subsequent assessment of climatic adaptation conservation measures, given its quick response to previous conservation projects involving the improvement of its habitat conditions. Moreover, being one of the best-studied migratory raptors in Europe, the species provides a unique case for testing the effectiveness of the proposed practices.

In particular, the provision of artificial nests in the southern species colonies in the proposed large scale for the first time in Greece is expected to significantly improve our knowledge for the effectiveness of such conservation interventions in the Mediterranean.

The success of the rat eradication operations and the construction of artificial nest has created a big support and appreciation by the competent authorities and the local populations in the project areas. Apart from the obvious efficiency of the measures, this has been further enhanced by active involvement local competent authorities in the action's implementation as well as by direct informing and communication with the local inhabitants and islet visitors by the project's communication team and field teams. As a result, the concrete conservation actions were not only welcomed by the local communities, but also actively supported and replicated/transferred.

– Innovation and demonstration value

The project took advantage of the experience gained from similar projects implemented recently in Southern Europe and of the expertise and experience of partners in specific project

actions. Thus, the project partnership did not invent new methods, but rather adjusted existing methods to the specifications and needs of the current project. Demonstration actions included the improvement of Eleonora's falcon nesting habitat (via the rat eradication operations and the construction of artificial nests) and prey availability/quality (via plantations at stopover areas).

– Long term indicators of the project success

Regarding long term indicators of the project success, these include the incurred changes in the breeding success of Eleonora's falcon in those project areas where rat eradication and construction of artificial nests took place, the number of artificial nests occupied in these areas, the presence/absence of rat populations in areas where rat eradications were carried out, the number of passerines using the refuelling oasis on the island of Antikythira, and the number of visitors at the project website.

7. Annexes

7.1 Administrative annexes

Annex 7.1.1_PMG meetings

Annex 7.1.2_Revised agreements

Annex 7.1.3_Audits

Annex 7.1.4_Response to EC letters

Annex 7.1.5_Fieldwork permit

7.2 Technical annexes

List of abbreviations

ABO	Antikythira Bird Observatory
EC	European Committee
EE kit	Environmental Education kit
HOS	Hellenic Ornithological Society
NCC	Nature Conservation Consultants
PMG	Project Management Group
UOP	University of Patras

7.2.1. Technical deliverables

Annex 7.2.1.1_ActionC1_Final report

Annex 7.2.1.2_ActionC1_Vegetation assessment study

Annex 7.2.2_ActionC2_Final report

Annex 7.2.3_ActionC3_Final report

Annex 7.2.4_ActionD1_Final report

Annex 7.2.5_ActionD2_Final report

Annex 7.2.6_ActionF3_After LIFE Conservation Plan

Annex 7.2.7_ActionA2_Final report (updated)

Annex 7.2.8_ActionA4_Final report (updated)

7.3 Dissemination annexes

7.3.1. Dissemination deliverables annex

Annex 7.3.1.1 _ActionE1_Newsletters

Annex 7.3.1.2_ActionE1_Laymans_report

Annex 7.3.1.3_ActionE4_GPG

7.3.2. Dissemination annexes

Annex 7.3.2.1_ActionE1_Media work

Annex 7.3.2.2. _ActionE1_Distribution of printed material

Annex 7.3.2.3_ActionE1_Photo gallery

Annex 7.3.2.4_ActionE1_Presentation

Annex 7.3.2.5_Action E1_Partner media

Annex 7.3.2.6_Action E2_ Infographic

Annex_7.3.2.7_Action_E3_Conference_contributions

Annex_7.3.2.8_Action_E3_Final_workshop_material

Annex_7.3.2.9_Action_E3_Scientific_publications

Annex_7.3.2.10_Action_E3_List_of_contributions_publications

7.4 Final table of indicators

Annex 7.4_Final output indicators

7.5 Previously submitted deliverables and annexes

Annex 7.5_Submitted_deliverables_annexes