(Projects funded under the Call 2014 onwards must use this format)

LIFE Project Number

LIFE15 NAT/IT/000914

Final Report

Covering the project activities from 01/11/2016[1] to 30/04/2022

Reporting Date[2]

<30/04/2022>

LIFE PROJECT NAME or Acronym

<Cal.Mar.Si.>

Data Project	
Project location:	Sicily - Italy
Project start date:	01/11/2016
Project end date:	31/10/2020 **Extension date:** 30/04/2022
Total budget:	€ 1,020,982
EU contribution:	€ 602,182
(%) of eligible costs:	58,98%

Data Beneficiary	
Name Beneficiary:	- Consiglio Nazionale delle Ricerche – Istituto di Bioscienze e BioRisorse (CNR-IBBR) - Dipartimento Regionale dell'Ambiente (DRA) – Regione Siciliana
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[1] Project start date

[2] Include the reporting date as foreseen in part C2 of Annex II of the Grant Agreement

This table comprises an essential part of the report and should be filled in before submission

Please note that the evaluation of your report may only commence if the package complies with all the elements in this receivability check. The evaluation will be stopped if any obligatory elements are missing.

Package completeness and correctness check	
Obligatory elements	**✓ or N/A**
Technical report	
The correct latest template for the type of project (e.g. traditional) has been followed and all sections have been filled in, in English *In electronic version only*	✓
Index of deliverables with short description annexed, in English *In electronic version only*	✓
Mid-term report: Deliverables due in the reporting period (from project start) annexed Final report: Deliverables not already submitted with the MTR annexed including the Layman's report and after-LIFE plan Deliverables in language(s) other than English include a summary in English *In electronic version only*	✓
Financial report	
The reporting period in the financial report (consolidated financial statement **and** financial statement of each Individual Beneficiary) is the same as in the technical report with the exception of any terminated beneficiary for which the end period should be the date of the termination.	✓
Consolidated Financial Statement with all 5 forms duly filled in and signed and dated *Electronically Q-signed or if paper submission signed and dated originals* and in electronic version (pdfs of signed sheets + full Excel file)*	✓
Financial Statement(s) of the Coordinating Beneficiary, of each Associated Beneficiary and of each affiliate (if involved), with all forms duly filled in (signed and dated). The Financial Statement(s) of Beneficiaries with affiliate(s) include the total cost of each affiliate in 1 line per cost category. *In electronic version (pdfs of signed sheets + full Excel files) + in the case of the Final report the overall summary forms of each beneficiary electronically Q-signed or if paper submission, signed and dated originals**	✓
Amounts, names and other data (e.g. bank account) are correct and consistent with the Grant Agreement / across the different forms (e.g. figures from the individual statements are the same as those reported in the consolidated statement)	✓
Mid-term report (for all projects except IPs): the threshold for the second pre-financing payment has been reached	**N/A**
Beneficiary's certificate for Durable Goods included (if required, i.e. beneficiaries claiming 100% cost for durable goods) *Electronically Q-signed or if paper submission signed and dated originals* and in electronic version (pdfs of signed sheets)*	✓
Certificate on financial statements (if required, i.e. for beneficiaries with EU contribution ≥750,000 € in the budget) *Electronically Q-signed or if paper submission signed original and in electronic version (pdf)*	**N/A**
Other checks	
Additional information / clarifications and supporting documents requested in previous letters from the Agency (unless already submitted or not yet due) *In electronic version only*	**N/A**
This table, page 2 of the Mid-term / Final report, is completed - each tick box is filled in *In electronic version only*	✓

**signature by a legal or statutory representative of the beneficiary / affiliate concerned*

1. Table of contents

2. List of key-words and abbreviations

AB: Associated Beneficiary
CB: Coordinating Beneficiary
CCG: Germplasm Conservation Center of Marianelli
CM: Calendula maritima
CNR-IBBR: National Research Council - Institute of Bioscience and BioResources
CP: Steering Committee
CTS: Technical Scientific Committee
DRA: Regional Department of Environment – Sicily
DRSRT: Regional Department of Rural and Territorial Development- Sicily
GURS: Official Gazette of the Sicilian Region
IAS: Invasive Alien Species
MEPA: Electronic Market for the Public Administration
MoA: Memorandum of Agreement
MP: Management Plan
MTR: Mid-Term Report
PdU: Utilisation Plan
PM: Project Manager
PR1, PR2: Progress Report 1 and 2
PPA: Approved Project Proposal
PUDM: Plan of Use of the Marine State Property
RDO: offer request for the electronic market

3. Executive Summary (maximum 2 pages)

The general objective of the project CalMarSi LIFE is the conservation of *Calendula maritima* Guss., a rare endemic and endangered plant species of western Sicily, exclusively distributed along the coast between Marsala and Mt. San Giuliano (province of Trapani). In order to fulfil these goals a number of actions have been carried out to eliminate or mitigate the main threats, namely: *i*) Contraction and fragmentation of the distribution area and habitat degradation; *ii*) Genetic pollution by the congeneric species *Calendula fulgida* Raf., *iii*) Seasonal disturbances connected with seaside tourism, *iv*) Competition with invasive alien species.

1) The Preparatory Actions concerned technical and policy issues. The first group aimed at improving the basic knowledge of the target species (distribution, viability, ecology and genetics) in order to address the conservation actions; the second group focused on the activation of legal measures to improve conservation. The main results provided key information about the current situation: a new unknown population was described, a complete georeferenced distribution map drawn up, the most suitable vegetation community/habitat and pedological requirements assessed, the genetic identity and diversity evaluated, with the identification of the purest genetic pools (i.e. populations of Maraone, Isola Lunga and Ronciglio). Based on that, new suitable sites for reintroduction actions (e.g. Isola Favignana, Isola Calcara and Fortino) were selected and mapped.

In the political point of view, a Presidential Decree of protection was promulgated, after a rather long and delicate process of bottom-up decision making. In addition, thanks to an independent enactment of the competent Regional Authority, the Guidelines for integrating the necessities of protection of CSIs and SPAs within PUDM and PdU were promulgated soon after the start of the project. However, since the DPRS already included the obligation to respect its rules for any subject responsible for planning, transformation and modification activities in the areas of concern, the implementation of this action was terminated in advance.

2) The Concrete Actions involved propaedeutic fulfilments (plant propagation and production) as well as active (reinforcement, reintroduction, ex-situ cultivation) and passive (protection barriers, IAS eradication) conservation actions.

The propagation method was well consolidated at the time of the PR1 though it was optimized later on. The massive production of plant material was subordinated to the definitive results of genetic information, that was suffering for delay, and this was one of the main reasons why at the beginning the action was delayed too. In addition, unexpected management problems of the produced plant stock involved additional slowing of the entire production process. They depended on the surprising fast growth of plants at both the aerial and the root level after their transfer outdoor, involving intensive manipulation (repeated pruning and repotting) in order to try to slow down their vigour until their transfer in the wild was feasible (wait for suitable planting season and entrusting of planting task to external assistance). The whole production process is by now well mastered in the technical point of view and about 3000 healthy plants were produced.

The reinforcement (C2) concerned the populations of Ronciglio, Isola Lunga and Isola Colombaia, where 1025 new plantlets (170% with respect to the minimum planned) were planted. With respect to reintroduction, three new sites were established at Salina Calcara, Isola Favignana and Fortino, respectively, employing in total 1177 plants (130% with respect to the minimum planned). Concerning ex-situ conservation, a lot of 75 plantlets

(100% with respect to planning) are cultivated at the public CCG managed by DRSRT. All planned protection barriers were built at the sites of Ronciglio (460 m), as well as those not planned at Isola Calcara (585 m) and Isola di Favignana (330 m). An additional fence, also not planned initially, was built to prevent the reiteration of heavy damages by rabbits occurred to the first reinforcement plantation on Isola Lunga. It was done on a perimeter of 294 m with anti-rabbit net before a new reinforcement plantation was carried out in 2022. The eradication of IAS was carried out on 6 out the native populations: Pizzolungo, San Giuliano, Villino Nasi, Colombaia, Torrente Baiata and Isola Lunga and concerned a total area of 7617 m^2.

3) The Monitoring Actions relating to concrete issues provided the following results: the success rate of plantations varied according to technical issues, year of planting and local biotic and abiotic disturbance. Three years after the first interventions, it currently is on average 31% (reinforcement), 61% (reintroduction) and 100% (ex situ conservation). However, almost all plants, including those that did not survive the first summer season, lived long enough to be able to produce flower and fruit. The offspring issuing from these individuals is the best indicator of the success of the actions, confirming that the target species is by now expanding locally. Genetic stability of the new plant material was confirmed through continued monitoring involving genetic analysis of several samples of newly produced plants (140 in total).

Finally, by administering a questionnaire to local stakeholders an outline was drawn up about their level of awareness concerning the target species and the need of its conservation, as well as their sensibility on environmental issues.

4) The Actions of Public awareness and dissemination focused on putting in place various initiatives to divulgate the project objectives and results. Among the most valuable results, it must be considered the effectiveness of the website and the participation to local animation events. Intensive efforts have also been addressed to the participatory planning procedures, through meetings with public and private stakeholders and two public events at the Municipalities of Trapani and Marsala. With regard to that, among the most noticeable results we can cite: *i)* the successful involvement of a private stakeholder in the translocation actions; *ii)* the commitment of CNR-IBBR to define a common action line after a project of an Urban Park was proposed by the Municipality of Trapani in the area of the *Calendula maritima* population at San Giuliano; *iii)* the effort in sharing with local Authorities and residents the content of the Presidential Decree of Protection. Before the introduction of Covid19 restrictions, two guided visits were done with primary and high schools. Also, the project has been presented in different TV reports (2 local and 2 national broadcasts). The goals and activities of the project were the subject of six presentations within international and national scientific conferences, as well as four scientific papers. Several different layperson dissemination materials have been produced, namely leaflets (1 in digital and 1000 in hardcopy formats), project and action notice boards (7 and 6, respectively), Layman's Report (1000 copies), scientific pendrives (500 copies). 4 public online meeting were held with different public and private stakeholders within an animation programme directed by professionals (NEXT s.r.l. society), with the final signature of a Memorandum of Agreement by some Public Institutions and Organisations.

5) The Actions of Project Management ensured the effective implementation of the project. The Project Manager got fully operational soon after the beginning of the project, as well as the Steering Committee. The activities were carried out regularly and all expected Deliverables and Milestones were accomplished.

As a general evaluation, after a period of delay and adjustments mainly due to administrative lengths in finalizing the procedures within the foreseen deadlines, the main fulfilments were accomplished and almost all actions were completed according to planning.

4. Introduction (maximum 2 pages)

The project CalMarSi had initially a duration of 48 months (from 01/11/2016 to 31/10/2020), but a prolongation was needed up to 66 month (actual end date 30/04/2022). The budget was 1,020,982 Euro, of which 602,182 Euro (58.98% of total eligible budget) as EU financial contribution.

The general objective is the preservation of *Calendula maritima* Guss., a rare endemic plant species restricted to small patches of the coastal area of the province of Trapani, W Sicily (Italy). *C. maritima* is an herbaceous plant species playing a key functional role within a variety of coastal ecosystems, even affecting their physiognomy. It often takes part to nitrophilous and ruderal communities concerned by high and continuous input of organic nutrients, contributing remarkably to the overall biodiversity of coastal ecosystems. It can be found in different habitats such as: 1210-Annual vegetation of drift lines, 1240-Vegetated sea cliffs of the Mediterranean coasts with endemic *Limonium* spp., 1420-Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*), 2110-Embryonic shifting dunes, 2210-*Crucianellion maritimae* fixed beach dunes.

Despite its notable ecological amplitude and its adaptability to disturbed environments, *C. maritima* has a very discontinuous distribution. In fact, its area has been concerned by strong and incessant regression during the last 150 years, mainly due to habitat fragmentation triggered by intensive anthropogenic pressure (urbanisation, seaside tourism, etc.). Moreover, recent studies had pointed out that hybridisation with the relative *Calendula fulgida* Raf. could represent a severe threat for the survival of this endangered species. According to IUCN classification criteria *C. maritima* is ranked in the category "CR" (= Critically Endangered).

The conservation goals involved putting in place a number of specific actions aiming at removing/mitigating the main threats, such as:

- Reduction and fragmentation of the distribution area and further degradation of current habitats
- Genetic pollution
- Seasonal disturbances related to coastal use
- Competition by invasive alien plant species.

The actions planned to counteract these threats relate to different issues, namely: *i*) improvement of basic knowledge to address conservation, *ii*) active and passive conservation, *iii*) policy implications, *iv*) dissemination and awareness.

With regards to knowledge the main topics focuses on the inventory and mapping of all existing populations, the evaluation of viability and demographic trends at population and species level, the assessment of ecological requirements of the species, the genetic characterization of all known population in order to select the purest lineages for active conservation.

The active conservation includes a preliminary step concerning the production of new plants through *in-vitro* techniques from genetically certified plant material; the obtained plants are to be used to increase the current area of occupancy of the target species through actions of reinforcement and reintroduction, according to the approach of Species Translocation. The passive conservation involves the construction of physical barriers in the most degraded sites to reduce the vehicular disturbance and trampling, and the eradication of the invasive alien species *Carpobrotus edulis*, that competes for space and resources with the target species.

At policy level, the promulgation of a Presidential Decree for the legal protection aims at improving the global strategy of protection of threatened species at regional level, whereas the guidelines for PUDMs and PdUs aims at providing the coast Municipalities with executive plans in order to enhance the correct use of coastal areas.
The Actions of Public awareness and dissemination focuses on putting in place various initiatives to divulgate the project objectives and results. This is done by a project website, the promotion and participation to animation events, the organisation of meetings to stimulate the participatory planning procedures, the involvement of public and private stakeholder in the conservation actions, the production of dissemination materials such as leaflets, scientific pen drives and notice boards, the participation to scientific conferences and the publication of scientific papers.
The expected results of the project are aimed in the whole at improving the status and the conservation perspectives of *Calendula maritima*. More in detail, the main concrete expected results are:

- Updated assessment of the actual distribution of the target species, with relative mapping at large scale;
- Ascertained identification of populations ascribed to the target species, in addition to the availability of performing tools for the correct genetic identification of populations that could be eventually found in the future in areas other than those of the project;
- Promulgation of a Decree for the legal protection of the target species at regional scale;
- Increase of the area currently occupied by the different populations, in addition to the improvement of the populations' number and the greater habitats' diversification;
- Reduction of the physical impacts on most affected populations of *C. maritima* and, accordingly, facilitation of the target species expansion;
- Increase of the naturalness and the continuity level of the plant communities including the populations of concern;
- Removal of competition by *Carpobrotus edulis* on some populations of *C. maritima* and likely reduction of this alien species in public and private green areas;
- Increase of awareness by customary and seasonal users about the vulnerability and the naturalistic value of sites concerned by the project actions with special regards with *C. maritima*;
- Increase of awareness by the public opinion about the topics related to biodiversity loss and involvement of local people in policies of conservation of their own territory.

5. Administrative part (maximum 1 page)

As soon as the project was launched, the CB started the public selection procedure to recruit the Project Manager, that was engaged on April 2017. However, prior to the formal recruitment of the PM, the CB carried out an effective action to coordinate the project and the Steering Committee was anyway operational thanks to the commitment of the representatives of CNR-IBBR and DRA. We immediately proceeded to the drafting, approval and signing of the Partnership Agreements, which established the criteria for meeting and exchanging data and information between the Beneficiaries. The PM carried out meetings at least fortnightly within the internal CNR-IBBR unit and/or with both Beneficiaries and assisted in all technical and administrative activities, including purchasing of goods and services through MEPA, compulsory for both Beneficiaries in compliance with the Italian law.
Several internal meeting, especially in the starting phase, have been dedicated to discuss operative protocols for concrete actions (CNR-IBBR) and procedures related to the Preparatory Actions according to the regional Law (DRA), as well as for the accounting system or timesheets compilation. No particular problem has been noticed.
Conversely, though it could not be claimed as a justification in view of the implementation of a LIFE project, we would like just notice that the major problems we encountered depended on the extreme length of the administrative procedures of public administration, that involved delays on starting of a number of actions. We met indeed heavy difficulties to breakdown the first EC payment amount in the different cost items, in compliance with both the project timetable and the financial management system of CNR-IBBR. As a matter of fact, the CNR-IBBR (and DRA, too) financial rules involve that the budget required for any activity/service must be entirely bound since the beginning; it is not usually allowed to split it in two or more instalments in case the available cashed budget is not enough to cover the cost of activities as foreseen in the project timetable. In a comprehensive project, this often obliges to concentrate the budget on temporally priority actions so that the subsequent foreseen activities cannot be started unless an additional budget is made available. In some cases, this issue can be overcome by requiring a supplementary budget anticipation to the CNR Financial Head Office, but most often these requests are refused or only partially accepted. Due to that, as a matter of fact about 90% of the entire amount of the first EC payment to CNR-IBBR was immediately absorbed for the additional personnel recruitment and some external assistance for the Preparatory Actions, so we had to wait for further budget availability in order to be allowed to start other actions needing consumables or requiring other external assistance. However, after this period of delay and adjustments, the main fulfilments were accomplished and most actions were ongoing (and some concluded) at the time of MTR. From then onward these problems did not affect significantly the implementation of the project. However, additional hurdles affected the contract renovation of additional personnel, slowing down the activities ascribed to him. According to CNR-IBBR internal rules, after three consecutive years, an expiring contract should be changed in a different type. This involved a long waste of time to identify the most suitable new one and start the new contracting procedure.
Concerning the Beneficiary DRA, other problems related to the typical bureaucratic difficulties of the Administrative System of the Sicilian Region, in addition to "political instability" issues (e.g. frequent rotation of service directors and project responsibles). This involved an excessive time widening even for activities expected as reasonably "quick and easy", as well as difficulties to commit the foreseen external assistance, the most important of which achieved just one year before the project termination.

According to the above, in order to recover the cumulated delays and to avoid significant reductions of the foreseen objectives and results, a prolongation of the project duration was obtained until 30/04/ 2022, and the Grant Agreement amended consistently.
With regard to communications with the Agency and Monitoring team no particular problem deserves to be reported. Finally, according to the Letter Amendment n.1 to the Grant Agreement (Note EASME.B.3 (2018) 3792965), since the sum of the total contribution of CE does not exceed the amount of €750,000, we acknowledged that a "Certificate on the Financial Statement" is not required.

6. Technical part (maximum 25 pages)

6.1. Technical progress, per Action

6.1.1. A1 - Geo-referenced inventory and characterization of current populations (distribution, demography, genetic diversity)

Beneficiary responsible for implementation: CNR-IBBR
Status of the action: completed
Foreseen start date: 12/2016 **Actual start date**: 01/2017
Foreseen end date: 06/2018 **Actual (or anticipated) end date**: 12/2018

Progress achieved:
Field work: the coast area from the southernmost to the northernmost known populations of the target species has been explored and one new unknown population has been described. In total 15 populations of the target species have been found out and georeferenced. A definitive distribution map of *Calendula maritima* populations was drawn up (MTR, Annex 1). All along two years, each population has been evaluated for its density, dispersal effectiveness (presence/absence of plantlets) and presence of individual with hybrid phenotype. We observed in 4 populations (CAVB, S-CUS-N, PZL, TBN) fluctuations in number of individuals, presence of plantlets and hybrid phenotype, while 2 populations (IL, COL) showed a severe reduction in flowering individuals and a weak or absent recruitment. Floristic and vegetation data on the community hosting each population have been also recorded for two years and reported on a vegetation map (MTR, Annex 2). In particular, most of populations are part of more or less disturbed coastal communities referring to *Ammophiletea* or *Crithmo-Limonietea*, while some of them thrive within ruderal community belonging to *Stellarietea*. For details cfr. MTR, Annex 3.
Laboratory work: leaf material for RNA sequencing and genetic characterization of all populations has been collected and georeferenced (see PR1 Annex 2). DNA has been extracted, amplified and tested for 267 sampled individuals. From two individuals of *Calendula maritima* and *Calendula fulgida* RNA has been extracted and sequenced, 2913 SSRs markers have been identified, and 238 of them theoretically discriminating the species have been selected. Among the 238 specific SSRs markers, 19 were selected and used for genetic characterisation of all populations. The genetic analysis allowed differentiating "pure" *Calendula maritima* individuals from hybrids (MTR, Annex 4). In particular, one of the species-specific discovered markers allowed the identification of many hybrid individuals in 5 populations, especially concentrated in the northernmost distribution area of the species. The remaining 10 populations showed a clear and increasing degree of genetic "purity" from northern to southern populations. Based on these results we decided to collect plant material for *in-vitro* propagation from the southern population of Ronciglio and the two isolated ones from the islands of Maraone and Isola Lunga. In addition a satisfactory genetic diversity was revealed at species and population level, that is of great importance in respect to the viability of an endangered species and in the frame of a successful conservation programme.
Problems encountered: concerning the field work the action started one month later due to administrative delay. Moreover until March 2017 the action was carried out by internal personnel owing to the delay in the recruitment of the external assistant unit. Concerning the laboratory activities, some problems with the selection of the sequencing society, as

well as with the procedures of sending the RNA material for analyses, involved some additional delay. Moreover, according to the results of a more comprehensive survey and knowledge of the totality of populations (i.e. hybridization problems more widespread than expected), analyses of genetic patterns revealed crucial before engaging in the subordinated actions (e.g. C1, C2, C3, C6, C7).

Results achieved:

- definitive map of actual distribution of all known populations of the target species (MTR, Annex 1)
- vegetation map of communities hosting the target species (MTR, Annex 2)
- report on population conservation status and community stability (MTR, Annex 3)
- genetic characterisation of all existing populations (MTR, Annex 4)

6.1.2. A2 - Physico-chemical characterization of substrates of current populations and reintroduction areas

Beneficiary responsible for implementation: CNR-IBBR
Status of the action: completed
Foreseen start date: 12/2016 **Actual start date**: 04/2017
Foreseen end date: 03/2018 **Actual (or anticipated) end date**: 12/2018

Progress achieved: general surveys have been carried out in December 2017 in order to get an overview of the representative soil types hosting the target species, and soil samples were collected for preliminary analysis from two different populations. In January 2018 a systematic campaign of sampling was started for the remaining 13 populations.
All field surveys were completed in June 2018, both on areas where populations of *Calendula maritima* occur and where new populations should be reintroduced. Soil types have been sampled according to their natural horizon sequence (on average 3 soil samples per profile). All the soil physical, chemical and biological attributes have been determined on each soil sample; some analyses have been carried out in two or three replicates. Attributes of soil quality have been used to evaluate both the real requirement of the target species and to evaluate the suitability of candidate areas for reintroduction actions. According to that, the optimal conditions can be found in deep soils (>40 cm) with more than 1% of organic carbon, sandy or sandy-loam texture, low to moderate soluble salt content, top organic layer >5cm in depth, but a wide range of suitability to soil has been nevertheless observed. This is consistent with the remarkable ecological amplitude of the target species. A detailed report and a map of these areas have been drafted (MTR, Annexes 5 and 6) in order to represent the evaluation of the soil suitability level to support the concrete conservation actions C2 and C3.
Problems encountered: the action started five months later due to administrative delay in the finalization of the Agreement with the University of Palermo which provided the external assistance for this task. Additional delay was due to administrative procedures in acquiring chemicals, consumables and small equipment needed for lab analysis, that impacted on soil attributes determination.
Results achieved: 14 soil profiles opened in total, plus 10 minipits, 65 soil samples collected in total. Drawing up of a detailed Report (MTR, Annex 5), a thematic map of soil suitability (MTR, Annex 6) and a relational database.

6.1.3. A3 - Exploration of the territory to identify reintroduction sites

Beneficiary responsible for implementation: CNR-IBBR

Status of the action: completed
Foreseen start date: 12/2016 **Actual start date**: 04/2017
Foreseen end date: 12/2017 **Actual (or anticipated) end date**: 12/2018

Progress achieved: Based on literature data, exploration activity and vegetation surveys have been carried out in areas where *C. maritima* has disappeared in the recent past, such as the Favignana Island, or the coastline between San Vito Lo Capo and M. Cofano. Additional surveys were carried out in different locations in the Nature Reserve of "Saline di Trapani and Paceco" (Bajata River mouth, the Salina Calcara and the Nubia Tower), in the Nature Reserve of "Isole dello Stagnone di Marsala" (Mozia Island, Isola Lunga Island, and the Coast of San Teodoro), in the Nature Reserve " Foce del Fiume Belice e dune limitrofe" and the SCA Paludi di Capo Feto e Margi Spanò (ITA010006). Some 13 potential areas, subdivided in 27 potential reintroduction sites were explored and mapped (cfr. MTR, Annex 7).
A number of indicators/criteria had to be satisfied for the selection of the most suitable sites of reintroduction, able to ensure the species survival in a long term perspective, e.g.: type of plant communities, soil suitability, low degradation and human pressure, absence of the congener *C. fulgida* in the surroundings, presence of a protection regime (e.g. protected area, Natura2000 site), preferably public property. Considering that on the whole the western coast of Sicily is subject since centuries to very heavy anthropic pressure, it was not easy to match at a time the totality of these criteria, so we were constrained to find the best compromise. According to that, we selected two definitive suitable areas: Cala Pozzo, in the northern coast of Favignana Island (SCA ITA010004 site within the "Marine Protected Area Egadi Islands"), and Salina Calcara, a private area within the A zone of the Nature Reserve of the “Saline di Trapani and Paceco”, and SCA ITA010007 and SPA ITA010028 site at a time. A couple of additional rather suitable sites were considered in “stand-by”, for eventual future interventions. All selected sites showed a good habitat quality, hosting undisturbed natural coastal vegetation community.
Problems encountered: the action started five months later due to the delay in the recruitment of the external assistant unit. Due to the delay of Action A2 this action has been completed 6 months later.
Results achieved: 27 reintroduction sites were evaluated. According to vegetation and soil characteristics in addition to the protection regime two main sites were selected.

6.1.4. A4 - Emanation of the Presidential Decree of Protection

Beneficiary responsible for implementation: DRA
Status of the action: completed
Foreseen start date: 12/2016 **Actual start date**: 05/2017
Foreseen end date: 12/2017 **Actual (or anticipated) end date**: 10/2019

Progress achieved: The Presidential Decree of the Sicilian Region (DPRS n.339/2019) has been published in the Gazzetta Ufficiale delle Regione Siciliana (GURS) on 11 October 2019 (Annex 1), becoming since that date fully operational.
The entire accomplishment procedure was rather long and delicate requiring a bottom-up decision making process, because it was necessary to evaluate and share with different stakeholders (e.g. Municipalities of Trapani and Marsala, the former Province of Trapani, environmental associations, local population) the territorial limits of its more rigorous provisions and applicability. Accordingly, the document was subject to a number of

administrative steps, involving also progressive adjusting revisions to both the text and the related cartography.
Problems encountered: The action started six month later due to administrative delay. Additional delays were accumulated due to the particularities of the key areas that were concerned by the protection regime, since most of them are affected by economic interest that are often in conflict with the needs of nature protection and conservation. In order to overcome such difficulties it was necessary to adjust several times the perimeter of the areas concerned by the strictest rules and modify the text of the Decree accordingly.
Results achieved: Establishment of the legal protection regime for the target species throughout the whole regional territory through a specific Decree of the President of the Sicilian Region.

6.1.5. A5 - Emanation of the guidelines for PUDM e PdU drafting

Beneficiary responsible for implementation: DRA
Status of the action: ended, though not fully implemented
Foreseen start date: 12/2016 **Actual start date**: 05/2017
Foreseen end date: 12/2017 **Actual (or anticipated) end date**: 10/2019

Progress achieved: Thanks to an independent enactment of the competent Regional Authority, the foreseen guidelines were promulgated soon after the start of the project. Therefore, some activities were carried out in order to trigger the execution process in the administrative territories of the respective Municipalities. At first, a recognition of the owner regime of the intervention areas was done. Internal meetings were carried out with the Head of the Service 4 (Financial Management of Environment Interventions - DRA) aimed at establishing the procedure to cooperate with the Service 2 (Environmental Planning and Programming - DRA), responsible for PUDMs implementation. Then, two meetings were held on 4/7/2018 and 13/11/2018, at the Town Hall of the Municipalities of Trapani and Marsala with representatives of the Municipalities of Trapani, Paceco and Marsala in order to inform about the project and to promote a participated strategy aimed at drawing the executive plans for PUDM and PdU.
However, after the promulgation of the Presidential Decree for the protection of *C. maritima* (DPRS n.339/2019, see par 6.1.4) these executive plans became somehow superfluous, because the Presidential Decree already included the obligation to respect its rules for any subject responsible for planning, transformation and modification activities in the areas of concern. According to that, the implementation of the action was stopped.
Problems encountered: action started six month later due to administrative delay.
Results achieved: two meetings with the public stakeholders; inclusion of obligations of PUDM and PU executive plan in the rules of the DPRS n.339/2019.

6.1.6. C1 - In vitro production of propagation material for reinforcement and reintroduction

Beneficiary responsible for implementation: CNR-IBBR
Status of the action: completed (but still continued as after-LIFE action)
Foreseen start date: 12/2016 **Actual start date**: 01/2017
Foreseen end date: 06/2020 **Actual (or anticipated) end date**: 04/2022

Progress achieved: An effective propagation protocol was designed and even refined during the project. In order to allow the appropriate understanding of this very peculiar

action and its possible hurdles we report shortly its framework. The complete procedure of in-vitro propagation involves four different and consecutive steps: *i*) sterilization/in-vitro introduction, *ii*) propagation, *iii*) rooting, and *iv*) acclimatization. Each step is subordinated to the success of the previous one. The entire protocol was already satisfactorily developed at the date of PR1, though during the following months little refinements have been incorporated in the final steps *iii*) and *iv*). At the MTR time, we were in the condition to master completely the whole production process in all its steps. We can obtain plantlets fully acclimatized and ready to be planted in the wild in the total time lapse of 8 weeks: 3 weeks for *in-vitro* rooting (step *iii*), 2 weeks for pre-acclimatization in climatic chamber on ground soil and 3 more weeks outdoor, in the shadow (step *iv*).
According to results of genetic analyses, plant material for propagation was collected mainly from the two populations of Maraone Island and Ronciglio (and only a few amount from Isola Lunga), who revealed the purest lineages. After the very first stocks of newly produced plants, some unforeseeable management problems raised when plantlets were moved outdoor (step *iv*), because they revealed an unexpectedly fast growth at both the aerial and the root level. We were obliged to repot the plants and even to prune them in order to try slow down their vigour; notwithstanding that many plants began to decline and even die. Consequently, in the wait of the suitable occurrences for their transfer to the wild we decided to temporarily slow down the production. Only the continuous rejuvenation of the explants in step *ii*) (that is compulsory to maintain the propagation stock) was carried out and the activities of rooting and acclimatization were reduced. Additional refinements to the standard protocol were introduced during 2020 and 2021 (refer to Annex 2 for details). Within the entire project duration, more than 10000 explants were manipulated.
Problems encountered: The action started one month later due to administrative delay. In the technical point of view, no problem strictly connected to the production process was encountered. As exposed above, the only, unexpected problem refers to the difficulty to manage properly the coordination between the production steps and the time of planting in the wild. This involved an enforced delay in the whole production step, that was further enhanced by collateral problems related to the waiting for the definitive results of genetic analyses (see section 6.1.1), as well as the administrative slowness in the procedure for entrusting the task to external assistance (see action C2 and C3).
Results achieved: Establishment and improvement of an effective protocol to propagate the target species; transfer to acclimatization phase of about 3000 rooted plantlets

6.1.7. C2 - Reinforcement of natural populations

Beneficiary responsible for implementation: CNR-IBBR
Status of the action: completed
Foreseen start date: 12/2017 **Actual start date**: 10/2018
Foreseen end date: 06/2020 **Actual (or anticipated) end date**: 01/2022

Progress achieved: The first planting was carried out on February 2019 at the site of Ronciglio (Trapani). The total of 104 plants was planted in the empty patches included within the existing nuclei and in suitable surrounding space. Plants were arranged in small groups of 10 plants on circular plots of about 4 m^2. In order to facilitate the successive monitoring, the centre of each plot was marked by a stick and a label, and its position was recorded by high precision GPS device.
Being the first time that a batch of plants was introduced in the wild, this activity in addition to the preservation value also represented a kind of “test” for the future interventions. Additional plantations were carried out in winter 2019-20, 2020-21 and

2021-22 at Isola Lunga (Marsala) and Isola Colombaia (Trapani), as well as at Ronciglio (in total 1025 plants employed) (Annex 3). In the latter site, a formal agreement was established with the stakeholder WWF (MTR, Annex 9) to provide n. 250 genetically certified plants of *C. maritima* produced through *in-vitro* techniques by CNR-IBBR. They were employed, through a commitment to the private Nursery Iberis s.l.r., in the mitigation interventions requested in the area of Ronciglio by the project of breakwater and quays completion of the Interregional Administration Service of Public Works.

Problems encountered: owed to strictly scientific issues, arisen after a more comprehensive survey and knowledge of the totality of populations (hybridization problems suspected more widespread than expected) we preferred to wait for the definitive results of genetic investigations before starting the action. Furthermore, due to the difficulties described in Section 5, the first procurement for the external assistance suffered for significant delay (provisional and definitive award got on December 2018 and February 2019, respectively).

In the technical point of view, major hurdles causing partial failure included: post-planting water stress in case of impossible irrigation (e.g. logistic problems at Isola Lunga in plantation 2020-21 and Isola Colombaia); unsuitable edaphic environment (hyper-saline soil of the planting area in the mitigation interventions 2019-20 of Ronciglio); rabbit browsing at Isola Lunga (plantation 2020-21) and seagull trampling and nesting at Isola Colombaia (all plantation phases).

Results achieved: Three native populations on the total area of 5927 m^2 were reinforced with a total of 1025 plants.

6.1.8. C3 - Establishment of new populations according to the Species Translocation criteria

Beneficiary responsible for implementation: CNR-IBBR

Status of the action: completed

Foreseen start date: 12/2017 **Actual start date**: 10/2018

Foreseen end date: 06/2020 **Actual (or anticipated) end date**: 01/2022

Progress achieved: Translocation activities of *C. maritima* were carried out within the historical distribution range of the species and included 1 large plot at Cala Pozzo (Favignana Island), 4 plots at Salina Calcara (Municipality of Paceco), and 1 plot at Fortino (Municipality of Erice) (Annex 4). The sites of Cala Pozzo and Salina Calcara results from the selection procedure carried out within Action A3. The site of Fortino was added at the final stage of the project as a proposition of the Municipality of Erice within the activities of awareness and involvement of stakeholders foreseen in actions E5 and E10 (cfr. sections 6.1.21 and 6.1.26).

The plantations were carried out in three phases, each concentrated in the fall-winter season of the years 2019-2020, 2020-2021 and 2021-2022. A total of 1177 plants were reintroduced in the wild, i.e. 484 at Cala Pozzo, 613 at Salina Calcara, and 80 at Fortino, respectively. In order to facilitate the following monitoring, the plantations were carried out in nuclei of 10 plants each as described for reinforcement actions (cfr. section 6.1.7).

Problems encountered: as for Action C2, due to strictly scientific issues arisen after a more comprehensive survey and knowledge of the totality of populations (hybridization problems suspected more widespread than expected) we preferred to wait for the definitive results of genetic investigations before starting the action. Moreover, as for Action C2, due to the problems described in Section 5 the procurement for the external assistance suffered for significant delay.

In the technical point of view, major hurdles causing partial failure were triggered by extreme weather events in winter 2020-2021, namely: at Favignana strong sea storms beached large amounts of *Posidonia oceanica* residues, which covered and suffocated many of the newly transplanted young seedlings closer to the coastline; at Salina Calcara sea water flooded until the innermost coastal strip causing extensive die-offs even among the well-established and developed plants from the previous year; at Fortino significant mortality was caused by sand deposition by wind over the young plantlets.
Results achieved: Three new populations counting in total 1177 plantlets and totalizing an area of 5601 m^2 were established.

6.1.9. C4 - Building of physical barriers to prevent vehicular access

Beneficiary responsible for implementation: CNR-IBBR
Status of the action: completed
Foreseen start date: 06/2018 **Actual start date**: 06/2018
Foreseen end date: 06/2020 **Actual (or anticipated) end date**: 01/2022

Progress achieved: All the planned barriers (460 m) at the site of Ronciglio were built, as well as those not initially planned at the new reintroduction sites of Isola Calcara (585 m) and Isola di Favignana (330 m), needed to protect the new plantations from grazing disturbance of domestic cattle. In addition, to prevent the reiteration of heavy damages by rabbits incurred on the first reinforcement plantation on Isola Lunga, before the new 2022 plantation was carried out a 294 m fence with anti-rabbit net was built, although it had not been initially planned due to the logistic difficulties to its realisation. Conversely the fence planned at S. Giuliano-Punta Tipa were not finally built because during the LIFE project implementation a new project of Urban Park (currently still under amendment) was presented for that area by the Municipality of Trapani.
Problems encountered: Due to the problems described in Section 5, as for Actions C2 and C3 the procurement for the external assistance suffered for significant delay. Logistic difficulties concerned material transportation on Isola Lunga.
Results achieved: A total of 1375 m of woody fence and 294 m of anti-rabbit fence was built in four sites.

6.1.10. C5 - Control of alien species

Beneficiary responsible for implementation: CNR-IBBR
Status of the action: completed
Foreseen start date: 03/2017 **Actual start date**: 06/2018
Foreseen end date: 03/2020 **Actual (or anticipated) end date**: 02/2022

Progress achieved: All planned interventions to eradicate the IAS *Carpobrotus edulis* within the *C. maritima* populations were completed. The action concerned 6 of the native populations: Pizzolungo (Erice), San Giuliano (Trapani), Villino Nasi (Trapani), Colombaia (Trapani), Torrente Baiata (Trapani) and Isola Lunga (Marsala) (Annex 5). At S. Giuliano the eradication was partial and did not include the area internal to the security fence existing around the ruined building of the ancient tuna factory, that was inaccessible due to security reasons posed by the owner. The methodology used involved manual extirpation, subsequent stacking on site, and covering with plastic sheets to accelerate the decomposition of remains; alternatively, fresh biomass was shredded and transported to an authorized landfill. One year after only at Isola Colombaia some significant evidences of

recovering were observed, whereas in all other sites we found only sporadic individuals regenerated from seeds or plant fragments escaped during the previous eradication. All sites underwent a second intervention to completely remove the species.
Problems encountered: Due to the problems described in Section 5, as for Actions C2 and C3 the procurement for the external assistance suffered for significant delay.
Results achieved: A total area of 7617 m^2 was cleaned by the IAS *Carpobrotus edulis* in six *Calendula* populations.

6.1.11. C6 - Acclimatization in nursery of the new *Calendula maritima* plants

Beneficiary responsible for implementation: CNR-IBBR
Status of the action: completed (but still continued as after-LIFE action)
Foreseen start date: 06/2017 **Actual start date**: 06/2018
Foreseen end date: 12/2020 **Actual (or anticipated) end date**: 04/2022

Progress achieved: The acclimatization, intended as the process within which a plant become accustomed to a certain environment, is not a problem at all with regard the case of the *in-vitro* production of the target species. The plants of *Calendula maritima* adapt rather successfully and quickly when moved from the growth chamber to the outdoor environment. In total 2784 plants have been acclimatized in the nursery.
Problems encountered: As described in Action C1, the acclimatization phase posed some problems due to the unexpected fast growth in the external conditions, issuing difficulties in coordinating the production process and the time when plantlets could be transferred in the wild. Plants should need repeated transfer in larger pots in addition to pruning. Therefore, managing large amounts of plants requiring such an intensive manipulation become rather unsustainable in the practical point of view, so that entrusting the task to external assistance as foreseen in the project proposal seemed inappropriate. This is why the CNR-IBBR finally decided to fulfil this action directly in its structures by its internal personnel.
Results achieved: acclimatization of 2784 vital plantlets in the nursery.

6.1.12. C7 - Ex-situ conservation in the CCG (DRSRT) and diffusion in other conservation institutions

Beneficiary responsible for implementation: CNR-IBBR
Status of the action: completed
Foreseen start date: 12/2017 **Actual start date**: 12/2018
Foreseen end date: 12/2020 **Actual (or anticipated) end date**: 12/2021

Progress achieved: A batch of 75 plants, issuing from the populations of Ronciglio, Maraone and Isola Lunga, are under cultivation at the Centre for the Conservation of Germplasm (CCG) of Marianelli (Province of Siracusa), that is managed by the Regional Department for the Development of Agriculture and Territory (DRSRT). For the first time a conspicuous lot of plants from different populations and with ascertained and differentiated genetic identity is conserved *in-vivo* in secured conditions.
Problems encountered: The action was delayed since subordinated to the definitive results of genetic analyses.
Results achieved: A lot of 75 genetically certified plants from 3 populations are conserved *ex-situ* in a public institution.

6.1.13. D1 - Monitoring the impact of concrete actions on the conservation status of the target species

Beneficiary responsible for implementation: CNR-IBBR
Status of the action: completed (but still continued as after-LIFE action)
Foreseen start date: 12/2017 **Actual start date**: 12/2017
Foreseen end date: 12/2020 **Actual (or anticipated) end date**: 04/2022

Progress achieved: To monitor the impact of the concrete actions on the conservation of the target species a number of indicators were selected; the type and size is directly correlated to the effects expected from the implementation of each single action. For details on mode and time of data collection, as well as on results and evaluation criteria refer to the 3rd Monitoring Report (Annex 2). In Table 1 we report schematically the main data summarizing the results obtained in terms of quantities or sizes of the works done.

Table 1. Elements of evaluation of the impact of Concrete Actions

Action	Monitoring protocol	Indicators	Verification parameters
C1 In-vitro production of propagation material for reinforcement and reintroduction	verification of the activities steps (plant material collections, culturing start, cultivation)	- foreseen plants - produced plants	COMPLETED (but still continued as after-LIFE action) - n. foreseen: max 4000 (min 1500) - n. produced: 2784 - % produced: 69% with respect to max (185% with respect to min)
C2 Reinforcement of natural populations	verification of the activities steps (preparation to plantation, planting, post-plantation maintenance)	- plants used - plants established - area increase	CONCLUDED - n. planted: 1025 - n. survived: 322 - % survival: 31% - +5927 m^2 - % planted: 68% with respect to max (170% with respect to min)
C3 Establishment of new populations according to the Species Translocation criteria	verification of the activities steps (preparation to plantation, planting, post-plantation maintenance)	- plants used - plants established - area increase	CONCLUDED - n. planted: 1177 - n. survived: 752 - % survival: 64% - +5601 m^2 - % planted: 47% with respect to max (130% with respect to min)
C4 Building of physical barriers to prevent vehicular access	verification of the realization steps	- realization - lenght of barriers	CONCLUDED - yes - 1669 m,of which 294 m anti-rabbit fence (167% with respect to foreseen
C5 Control of alien species	verification of the realization steps	- esotic species - treated area	CONCLUDED - presence: yes - m^2 : 7617 - % treated surface: 100%
C6 Acclimatization in nursery of the new Calendula maritima plants	verification of the realization steps	- plants transferred - plants estblished	COMPLETED (but still continued as after-LIFE action) - n. transferred: 2784 - n. acclimatized: 2327 - % acclimatized: 83%

C7 Ex-situ conservation in CCG (DRSRT) and diffusion in other conservation institutions	verification of the activities steps (genotype selection, culturing start, cultivation, diffused plantlets)	- plants foreseen - plants diffused	COMPLETED - n. foreseen: min 75 - n. diffused: 75 - % diffused: 100%

At the end of the project, all Concrete Actions have been completed. However the two ones related to plant production (C1 and C6) are being prosecuted also after the end of the project in order to make available a stock of plant material to be eventually used within post-LIFE activities.

Concerning the direct impact on conservation, the Action C1 and the related C6 already provided the basics to implement successfully the conservation activities (Actions C2, C3 and C7) of the current project and to plan any future program as well. The satisfactory mastering in the propagation and production process of the target species significantly contributes to reduce the risk of extinction because it is by now consolidated the procedure to obtain genetically certified plants with no impact in terms of depauperation on the native populations.

With concerns to Actions C2 (Reinforcement) and C3 (Translocation) the success rate varied according to technical issues, the year of planting and local biotic and abiotic disturbance. Three years after the first interventions, it currently ranges between the average of 31% (Action C2) and 61% (Action C3). However, almost all plants, including those that did not survive the first summer season, lived long enough to be able to produce flower and fruit. The offspring issuing from the first planted individuals is the best indicator of the success of the actions, confirming that the target species is expanding locally. Thanks to the project, there are now three new populations of *Calendula maritima*, while the conservation status of some of the most degraded populations has clearly improved.

Physical barriers (Action C4) demonstrated effective to protect plant populations against disturbances such as human trampling and vehicular circulation, especially in the population of Ronciglio. Eradication of IAS, particularly on the populations of Isola Colombaia and Villino Nasi allowed the recovery of suitable surface to the diffusion of the target species, that especially at Isola Colombaia already started to re-occupy the new available space.

The implementation of Action C7 allowed to set up the first core of *ex-situ* conservation of living plants of *Calendula maritima*, that up to now was known to be secured only in seed banks (e.g. Universities of Catania and Palermo) or as single/very few individuals (e.g. Botanical Gardens of Berne - Switzerland, Palermo and Catania – Italy, and Botanical Conservatory of Brest - France).

Problems encountered: nothing

Results achieved: assessment of the impact of the project actions and drawing up of 3 Monitoring Reports (cfr. MTR Annex 14, PR2 Annex 2, current Final Report Annex 2).

6.1.14. D2 - Monitoring the socio-economic impact of concrete actions on the beach economy

Beneficiary responsible for implementation: DRA

Status of the action: completed

Foreseen start date: 06/2018 **Actual start date**: 01/2021

Foreseen end date: 12/2020 **Actual (or anticipated) end date**: 4/2022

Progress achieved: The action was implemented by the professional team NEXT, operating under the responsibility of DRA and with the collaboration of IBBR, and was complementary to Actions E5 (see par. 6.1.21) and E10 (see par. 6.1.26). It involved a preliminary identification of about 200 potential stakeholders operating in the area of interest, grouped in categories (e.g. associations, hospitality services, catering services, schools, nautical services, beach operators, businesses, tour operators, government bodies etc.). A questionnaire was administered to all of them aimed at: i) collecting information about the level of awareness and dissemination of the general knowledge concerning the target species, ii) contributing to the dissemination of information about the European programmes concerning the environmental policy, iii) assessing the degree of stakeholder interest with respect to their involvement in identification processes and strategies, tools and resources that could be activated for the valorisation of the target species (for details refer to Annex 6). Some 40 complete answers were obtained, and on this basis a participatory process was organised through four meeting events.
Problems encountered: As for other actions, the action suffered for significant delay owed to the bureaucratic difficulties of the Beneficiary DRA in implementing the procedures for identification and procurement of the external assistance. In addition, Covid 19 restrictions prevented to hold the public events in presence, that being done in videoconference resulted less effective.
Results achieved: An outline about the level of awareness of local stakeholders concerning the target species and the need of its conservation, as well as their sensibility on the environmental issues.

6.1.15. D3 - Monitoring of the genetic stability of the propagated plants

Beneficiary responsible for implementation: CNR-IBBR
Status of the action: completed
Foreseen start date: 06/2018 **Actual start date**: 02/2019
Foreseen end date: 09/2020 **Actual (or anticipated) end date**: 11/2021

Progress achieved: The action start was delayed due to late conclusion of the propaedeutic Action A1. Moreover it was stopped from March 2020 to March 2021 due to Covid-19 restriction measures that involved the total laboratory activity suspension. However, five different lots of regenerated plants were analyzed, for a total of 140 samples. The investigated plant material issued from populations of Ronciglio, Maraone Islet and Isola Lunga. According to the results already obtained since the first analyzed plant lot, we could state that the whole plant material produced trough micro-propagation techniques conserved the required genetic purity of the selected lineages. For details refer to the specific Deliverable "Report on the genetic stability of the *Calendula maritima* plants propagated *in-vitro*" (Annex 7) released on 30/12/2021.
Problems encountered: In the technical point of view no problem can be highlighted. A delay was due to the late conclusion of the propaedeutic Action A1, whereas the whole action partially suffered owed to Covid19 restriction measures.
Results achieved: Verification of the genetic lineage purity of the propagated plant material.

6.1.16. D4 - Monitoring and evaluation of the indicators of the project performances

Beneficiary responsible for implementation: CNR-IBBR
Status of the action: completed
Foreseen start date: 12/2016 **Actual start date**: 02/2017
Foreseen end date: 12/2020 **Actual (or anticipated) end date**: 04/2022

Progress achieved: significant variation in the Project Specific Indicators were recorded with respect to the previous version (see MTR Annex 20). For more information, see Section 7.1 Key Project-level Indicators and Annex 8
Problems encountered: nothing
Results achieved: see Section 7.1

6.1.17. E1 – Drawing up of a communication plan

Beneficiary responsible for implementation: DRA
Status of the action: completed
Foreseen start date: 12/2016 **Actual start date**: 09/2017
Foreseen end date: 12/2017 **Actual (or anticipated) end date**: 03/2018

Progress achieved: The communication plan is available (MTR, Annex 15). The Plan includes the main goals of communication, related to the concrete actions of the project as well as to the dissemination activities linked to the territory. It is addressed to both specialized and not-specialized audience. The communication strategies focus on these basic issues: touristic/recreational use of the areas concerned by the target species, indirect influence of the conservation activities on the reduction of the current impact on the habitat, conservation of the target species which is to be considered a flag case of problems related with the global conservation of biodiversity.
Problems encountered: The action was delayed due to the re-assignment of tasks for the DRA personnel.
Results achieved: Communication plan.

6.1.18. - E2 Press conferences

Beneficiary responsible for implementation: DRA
Status of the action: ended, though not fully implemented
Foreseen start date: 12/2016 **Actual start date**: 12/2016
Foreseen end date: 12/2020 **Actual (or anticipated) end date**: 12/2020

Progress achieved: The start press conference for the presentation of the project was held on December 15th 2016 at the DRA Beneficiary Head Office, with the participation of representatives of local press, Public Authorities and other Sicilian Life projects. Moreover, 12 press releases were published online (Annex 9). After the end of the project a press release was presented on 05/05/2022 in the institutional website of the Sicilian Region (https://www.regione.sicilia.it/la-regione-informa/ambiente-cordaro-difendiamo-calendula-maritima-specie-rischio) (see also Annex 10).
Problems encountered: After the start press conference, since the most important actions were delayed due to various reasons, no significant elements of novelty were available to be presented in the following three years. This is why two successive foreseen press conferences were not held. Moreover, Covid19 restrictions applied from March 2020 onward prevented to organize additional press conferences.

Results achieved: presentation of the project to the representatives of local press. Publication on local printed and online journals.

6.1.19. E3 - Creation and management of the project website

Beneficiary responsible for implementation: CNR-IBBR
Status of the action: completed (but still continued as after-LIFE action)
Foreseen start date: 01/2017 **Actual start date**: 01/2017
Foreseen end date: 12/2020 **Actual (or anticipated) end date**: 04/2022

Progress achieved: The definitive website of the project was created and published online by April 2018, though a provisional version was online since January 2017. The website consists of nine sections containing detailed information on the partners of the project, the target species, the actions foreseen and their progress. A specific download section contains the main deliverables of the project and other documents such as the press release; a photo gallery shows the places and the activities undertaken. The news section is constantly updated to show the results obtained and the progress of the different actions.
Problems encountered: the action started on time, but the administrative procedure for the engagement of the external service delayed the realization of the official website of the project. The delay was finally recovered and the website is now fully operational and constantly updated. Due to re-structuring of the serving host, the activity data (e.g. sessions, page views, etc.) of the period before 20/07/2020 were lost and since that date the counter started again from 0 by the counter.
Results achieved: At the date of release of the present report: 92 News on the activities of the project published, 97 pages, 16 Downloadable documents, 1 Portfolio Filter Gallery. Data from Google analytics dashboard until 30/07/2020: Sessions: 1406, Users 784, Page Views 4501; from 20/07/2020-13/06/2022: Sessions 1687, Users 1228, Page Views 7222, Bounce Rate 6,64%, Organic Search 115, Pages/Session 4,28, Time on Page 00:02:04.

6.1.20. E4 - Dissemination materials of the project

Beneficiary responsible for implementation: CNR-IBBR
Status of the action: completed
Foreseen start date: 12/2016 **Actual start date**: 12/2016
Foreseen end date: 12/2020 **Actual (or anticipated) end date**: 04/2022

Progress achieved: The notice board was printed in two versions: the first one was done before the MTR, but since it contained some errors and omissions a second version was printed in 2021 and the most significant updates on the activities progress were therefore incorporated therein (Annex 11). Two of them are displayed in the respective seats of the two Beneficiaries, two others were put in the two sites of reintroduction at Isola Calcara and Isola Favignana, one at the reinforcement site of Isola Lunga, one at the visit center of the Nature Reserve of Saline di Trapani e Paceco, and one at the project site of IAS eradication of Villino Nasi. Additional explanatory boards containing information on specific actions were displayed in the sites of translocation and IAS eradication (e.g. Annex 12).
A first leaflet illustrating the project and its objectives was done in digital format (MTR, Annex 17). An updated version with the main results obtained was printed in 1000 copies in 2021 (Annex 13). Moreover, 500 scientific pendrives containing the most important

project deliverables and documents were produced in April 2022. About 30% of these 2nd version materials have been already distributed through the WWF Head Office of Trapani and some divulgation activities carried out in the laboratories of IBBR with the University of Palermo.
A clip on the Project was done on 16/2/2017, and broadcasted by local TV stations (Video Regione and TGS) (http://tgs.gds.it/2017/02/26/calendula-marittima-tra-le-specie-a-rischio-di-estinzione_634027/). The scientific responsible of the project, dr. G. Garfì, participated in the national TV programme Linea Blu aired on 28 November 2020 (link https://www.raiplay.it/video/2020/11/Linea-Blu-Trapani---Isole-Egadi-2ffa9227-4701-44c4-b189-f28989d5d37d.html), in a news report by the Trapani broadcaster TeleSud (https://www.telesudweb.it/2021/02/17/natura-da-preservare/) and in the popularisation national programme Linea Verde Life by Rai1 (https://www.raiplay.it/programmi/lineaverdelife), where he presented the project aims and activities.
Four videos showing project activities were produced and diffused through the project website and in the youtube channel of the project (https://www.youtube.com/playlist?list=PLMxrdelcqVZb-f8LJMPK2UK4bpkSMyobO)
Scientific papers:

1. Pasta S., Garfì G., Carimi F., Marcenò C., 2017. Human disturbance, habitat degradation and niche shift: the case of the endemic *Calendula maritima* Guss. (W Sicily, Italy). Rend. Fis. Acc. Lincei DOI 10.1007/s12210-017-0611-5.
2. Pasta, S., Troìa A., Garfì, G. 2017. *Calendula maritima*. In Pasta S., Perez-Graber A., Fazan L. and Montmollin B. de (Eds). 2017. The Top 50 Mediterranean Island Plants UPDATE 2017. IUCN/SSC/Mediterranean Plant Specialist Group. Neuchâtel (Switzerland). E-book and on line. 141 pp. top50.iucn -mp sg.org.
3. Abeli T. et al., 2021. IDPlanT: the Italian database of plant translocation. Plant Biosystems. https://doi.org/10.1080/11263504.2021.1985004.
4. D'Agostino M. et al, 2022. Half a century of plant translocation in Italy: best practices, errors and perspectives. Biological Conservation, submitted
5. Gristina A.S., Pasta S., Mercati F., Zerbo M., Fontana I., Carra A., Catalano C., Marcenò C., De Michele R., Abbate L., Labella F., Motisi A., Livreri Console S., Carimi F., Garfì G., 2022. Linking past and current distribution patterns, population genetics and plant conservation: the case of the narrow endemic *Calendula maritima* Guss. (Asteraceae). Biodiversity and Conservation, submitted.

Problems encountered: The action started on time but later on it had an unexpected delay depending on legal problems of the first selected print company, since after the procedure was almost accomplished we were obliged to start it again with a new procedure.
Results achieved: 4+7 project notice Boards and 6 action panels printed, a midterm digital leaflet + 1000 final hardcopy leaflets and 500 scientific pendrives produced; 5 scientific papers published (or submitted); presentation of the project in different TV reports (2 national and 2 local).

6.1.21. E5 - Territorial animation for stakeholders

Beneficiary responsible for implementation: DRA
Status of the action: completed
Foreseen start date: 06/2017 **Actual start date**: 11/2017
Foreseen end date: 12/2020 **Actual (or anticipated) end date**: 02/2022

Progress achieved: Two public meetings were specifically organized with the collaboration of the Municipalities of Trapani and Marsala (see also section 6.1.26) to present the objectives of the project. The project was also the focus within the animation events “Le riserve naturali siciliane. Preziose per Natura” and “Giornata delle Oasi”, organised by the WWF Trapani (the Management Body of the Nature Reserve “Saline di Trapani e Paceco”) on 21 May 2018. We also sponsored an event within the Campaign Plastic Free (7 July 2018), titled “Il Ronciglio e la *Calendula maritima*, un luogo da tutelare”, involving the exceptional cleaning of the beach of Ronciglio with the cooperation of associated volunteers and common people, and also the direct participation of CNR-IBBR personnel. On 15 and 17 April 2019, within the activities of environmental education organized by the society “Palma Nana s.c.”, four classes from the primary school “ICS Politeama-G. La Masa” and two classes from the high school “Pio La Torre” from Palermo visited the Ronciglio reinforcement site with the guidance of the project staff, who illustrated the project goals and activities. On 27 September 2019 a presentation of the project entitled "The LIFE Programme 2014/20 and Concrete Actions for the Conservation of Biodiversity: Project LIFE15/NAT/IT/914 CalMarSi" was carried by the PM Dr. S. Livreri Console within the meeting organised by Europe Direct-Trapani on behalf of DG Communication of the European Commission. On 10 March 2022 the project was presented at the Environmental Education and Awareness Course organised by the Association Trapani Welcome sponsored by WWF Nature Reserve Saline di Trapani and addressed to tourist operators.
As a consequence of Action D.2 (see par. 6.1.14), and in close connection with it, several meetings of animation involving a number of different local stakeholders were carried out within the activity programme managed by the Society NEXT. Each meeting consisted of a working table with scheduled and free interventions, as well as online document sharing (for details refer to Annex 6). All events were aimed at promoting the participatory planning all over the territory of concern.
Problems encountered: action started five months later due to administrative delay. Since 2020, due to Covid19 restrictions all planned activities, especially with schools, were canceled and public meetings were held only in videoconference.
Results achieved: 2 public meetings held, and the participation to 2 animation events in cooperation with the WWF Trapani, Management Body of the Nature Reserve “Saline di Trapani e Paceco”. 2 guided visits with schools, and several meetings, 4 of which public, with different local stakeholder.

6.1.22. E6 - Networking for sharing the conservation actions

Beneficiary responsible for implementation: DRA
Status of the action: completed
Foreseen start date: 09/2017 **Actual start date**: 03/2018
Foreseen end date: 12/2020 **Actual (or anticipated) end date**: 04/2022

Progress achieved: With respect to the results of Action A2 and to the starting of Actions C2 and C7 a first group of participants to the coordination technical table was set up, composed by: Università di Palermo – Dipartimento Scienze Agrarie, Alimentari e Forestali (SAAF), Riserva Naturale Orientata “Saline di Trapani e Paceco”, Dipartimento Regionale per lo Sviluppo Rurale e Territoriale (DRSRT), Area Marina Protetta “Isole Egadi”, and Museo Archeologico Regionale Lilibeo Marsala - Baglio Anselmi.
The project staff contributed in the establishment of a “Database on the Conservation actions on threatened plant species”, in the framework of the European COST Action

CA18201 "ConservePlants" (https://conserveplants.eu/en/). Within a formal agreement established with the stakeholder WWF (MTR, Annex 9), n. 250 genetically certified plants of *C. maritima* produced by *in-vitro* techniques by CNR-IBBR were provided to the private Nursery Iberis s.l.r., who employed them in the mitigation interventions requested in the area of Ronciglio by the project of breakwater and quays completion of the Interregional Administration Service of Public Works (see section 6.1.7).
Problems encountered: The action started late since awaiting for more relevant results from the actions of Concrete conservation, that were postponed. Covid19 restrictions significantly reduced the opportunities of meeting organization.
Results achieved: set up of methodologies and procedures for the ecological evaluation in compliance with urbanistic suitability to reinforcement and reintroduction actions, and sharing of a protocol to eradicate the alien species *Carpobrotus* sp. Sharing of data and information on European conservation case studies.

6.1.23. E7 - Participation to conferences for the dissemination of the project

Beneficiary responsible for implementation: CNR-IBBR
Status of the action: completed (but still continued as after-LIFE action)
Foreseen start date: 11/2017 **Actual start date**: 11/2017
Foreseen end date: 12/2020 **Actual (or anticipated) end date**: 04/2022

Progress achieved: Participation of dr. Alessandro Silvestre Gristina at the Platform Meeting on Invasive Alien Species, held at Milan, 29-30 November 2017.
Within the 1° Congress of SISS-SIPe (Italian Society of Soil Sciences and Italian Society of Pedology, Palermo 10-13 September 2018), a presentation of problems and strategies of conservation of flora along the coastline of Sicily and of the activities of the project CalMarSi was done by dr. Giuseppe Garfì during the field excursion at Salina Calcara, Trapani.
Presentation of a communication titled "*Conservation of coastal soils and measures integrated for the conservation of Calendula maritima Guss. in W Sicily (Italy)*", at the 9th European Society for Soil Conservation (ESSC) International Congress, Tirana (Albania), 26-28 September 2019.
Presentation of the project at the: 3rd Natura 2000 seminar for the Mediterranean Biogeographical Region, Region Calabria and the Sila National Park, 4-7 maggio 2021.
Presentation of posters at: 3rd Mediterranean Plant Conservation Week (3MPCW) - 27 September - 1 October 2021, Chania – Greece (title "*Integrated conservation measures of Calendula maritima Guss., a rare and threatened species from the western coast of Sicily*"); 1st International Plant Translocation Conference, Rome, 20-23 June 2022 (title "*From planning to practice: translocation of Calendula maritima Guss., an extremely rare and endangered plant from western Sicily*").
Problems encountered: nothing, excepted the limitations in possible events organization and/or participation related to Covid19 measures.
Results achieved: Established direct contacts with other Life projects dealing with conservation of rare species/habitat and limitation of invasive species. Dissemination of the activities of the project and expertise exchange within the scientific community.

6.1.24. E8 - Layman's report drawing up

Beneficiary responsible for implementation: CNR-IBBR
Status of the action: completed

Foreseen start date: 01/2020 **Actual start date**: 01/2020
Foreseen end date: 12/2020 **Actual (or anticipated) end date**: 04/2022

Progress achieved: the Layman's Report (Annex 14) has been drawn up and printed in 1000 hardcopies on April 2022.
Problems encountered: Nothing
Results achieved: Printing of 1000 copies, 40% of which already distributed at the Nature Reserve Saline di Trapani e Paceco, the Marine Protected Area Isole Egadi and some divulgation activities carried out in the laboratories of IBBR with the University of Palermo.

6.1.25. E9 - Networking activities with other projects

Beneficiary responsible for implementation: DRA
Status of the action: ended, though not fully implemented
Foreseen start date: 12/2016 **Actual start date**: 05/2017
Foreseen end date: 12/2020 **Actual (or anticipated) end date**: 04/2022

Progress achieved: several LIFE projects with similar issues have been contacted; moreover the participation to the Platform Meeting on Invasive Alien Species, Milan 29-30 November allowed to get in touch with some project responsibles. The following projects were included in our contact list:

- LIFE17 NAT/IT/000596 LIFEorchids - Improving the conservation status of critically endangered orchid communities in selected habitats in Northwestern Italy
- LIFE16 NAT/PT/000754 LIFE RELICT - Preserving Continental Laurisilva Relics
- LIFE15 NAT/IT/000946 FLORANET LIFE - Safeguard and valorization of the plant species of EU interest in the Natural Parks of the Abruzzo Apennine.
- LIFE15 NAT/CZ/000818 Life for Minuartia - The rescue of endemic priority plant species Minuartia smejkalii
- LIFE15 NAT/ES/000805 LIFE OREKA Mendian - Conservation and management of Basque mountain grasslands.

However, no real exchange followed these first contacts. On the contrary, several informal meetings with LIFE11 NAT/IT/000093 Pelagic Birds project have been done to share their protocol to eradicate alien species *Carpobrotus* sp., that was therefore taken into account during the implementation of Action C5.
Since March 2021, the IBBR project staff collaborated to the establishment of a "Database on the Conservation actions on threatened plant species", in the framework of the European COST Action CA18201 "ConservePlants" (https://conserveplants.eu/en/).
Problem encountered: Excepting with project LIFE11 NAT/IT/000093 Pelagic Birds, no meeting was done with other projects, mainly due to "political instability" issues (e.g. frequent rotation of service directors and project responsibles) affecting the Beneficiary DRA responsible for its implementation, coupled to engagement overload of the Coordinating Beneficiary.
Results achieved: obtainment of basic information concerning the eradication techniques of IAS; contribution in the establishment of a "Database on the Conservation actions on threatened plant species".

6.1.26. E10 - Involvement of public and private stakeholders in participatory planning procedures

Beneficiary responsible for implementation: DRA
Status of the action: completed
Foreseen start date: 01/2017 Actual start date: 05/2017
Foreseen end date: 12/2020 Actual (or anticipated) end date: 04/2022

Progress achieved: Soon after the project started, a permanent relationship of cooperation was established with the Trapani WWF Head Office, the Management Body of the Nature Reserve of Saline di Trapani and Paceco and the SPA ITA010007. The aim was to share the activities planning to be carried out in the areas under their responsibility. The relationships became more intensive since the autumn 2017, when the need raised to define a common action line after a project of an Urban Park was proposed by the Municipality of Trapani in the area of the *Calendula maritima* population at Tonnara Tipa/S. Giuliano. For the purpose of participatory planning the CNR-IBBR was actively involved in the evaluation of the impact of the project; it also formulated some observations on the Environmental Impact Assessment of the Urban Park project and submitted them to the responsible Service of the Department of the Environment (MTR, Annex 18), together with the suggestion for a technical table to be convened in order to avoid critical issues and inconsistencies between this project and the Project Life CalMarSi. Mainly based on the prescriptions of DPRS n.339/2019 (cfr. Action A4, par. 6.1.4.) that in the meanwhile had been definitively approved, the competent Authority finally rejected the Urban Park project in its current version due to incompatibility between its purposes and the preservation of the target species.
Public events have been organised at the Town Hall of the Municipalities of Trapani (on 4/7/2019, 14 participants) and Marsala (on 13/11/2018, 9 participants) aimed at presenting the scope and objectives of the projects, as well as to share with local Authorities and residents the content of the President Decree of Protection (DPRS n.339/2019, cfr. Action A4, par. 6.1.4.). Several meetings were also made with private owners (Isola Calcara) and Public land Managers (Marine Protected Area Isole Egadi) in order to get the formal permissions for the implementation of Action C3.
An intensive awareness and animation activity was carried out by the Society NEXT from January 2021 among the local stakeholder, involving four public events (for details cfr. Annex 6). It resulted in the final signature by some Public Institutions and Organisations of a Memorandum of Agreement (Annex 15) aimed at promoting actions and initiatives for the conservation of the target species and improve the consciousness towards the importance of biodiversity conservation. Another relevant result consisted in a specific collaboration arisen during the second online meeting between the CNR-IBBR and the Municipality of Erice. This led to the co-design of an additional translocation intervention in the site of Fortino, on an area made available by the Municipality of Erice (see Action C3, section 6.1.8).
Problem encountered: action started 4 months later due to administrative delay.
Results achieved: 11 meetings at the Saline di Trapani Natural Reserve Head Office; 2 public events, respectively at Trapani and Marsala; 4 and 3 meetings with private and public stakeholders; several non-official meetings among NEXT, CNR-IBBR, DRA and some selected stakeholders; 4 public online meeting with different public and private stakeholders within the animation programme directed by NEXT; signature by some Public Institutions and Organisations of a Memorandum of Agreement

6.1.27. F1 - Coordination and methods of the project management
Beneficiary responsible for implementation: CNR-IBBR

Status of the action: completed
Foreseen start date: 11/2016 **Actual start date**: 11/2016
Foreseen end date: 12/2020 **Actual (or anticipated) end date**: 04/2022

Progress achieved: Overall, most of the foreseen activities have been accomplished according to mode and scheduling. For details see section 5 - Administrative part.
Problem encountered: Due to mistakes in cost assignment in the project proposal, for this action no transfer costs were foreseen for the BA. Therefore, possible transfer costs were ascribed to Action E.10. In many instances, despite not considered in the original project proposal it was necessary that the scientific responsible, dr. G. Garfì, participated actively in the project coordination and management. For details see section 5 - Administrative part.
Results achieved: In addition to ordinary activities (administration, reporting, financial management, etc.), all expected Deliverables and Milestones were accomplished.

6.1.28. F2 - External Audit

Beneficiary responsible for implementation: CNR-IBBR
Status of the action: Not implemented.
Foreseen start date: 09/2018 Actual start date: 09/2018
Foreseen end date: 12/2020 Actual (or anticipated) end date: 12/2020

Progress achieved: Nothing. According to the Grant Agreement Amendement n° 1, note EASME (2018) 3792965, as no Beneficiary has an EC contribution exceeding € 750.000,00, the appointment of an Audit is not required.
Problem encountered: Nothing
Results achieved: Nothing

6.1.29. F3 - Drawing up of the "AfterLIFE Plan"

Beneficiary responsible for implementation: CNR-IBBR
Status of the action: completed
Foreseen start date: 01/2020 **Actual start date**: 01/2020
Foreseen end date: 12/2020 **Actual (or anticipated) end date**: 04/2022

Progress achieved: The After Life Plan was drawn up (Annex 16).
Problem encountered: Nothing
Results achieved: Production of the After Life Plan

6.2. Main deviations, problems and corrective actions implemented

During the implementation of the project no unsurmountable problems or significant deviation have been noticed. Nevertheless, some unexpected or underestimated issues triggered some difficulties and delays.

As described in section 5, the most important ones related to the difficulties in the financial management of available funding from the first pre-payment in compliance with both the project timetable and the CNR-IBBR financial management system (see section 5 for details). This impediment itself was responsible of some delays on various actions, and especially for some of them (e.g. C1, C6) it associated also to technical issues. With regard to that, indeed unforeseeable organisation problems of the produced plant stock raised after their moving outdoor, because they revealed a surprisingly fast growth at both the aerial and the root level. We were obliged to transfer the plants in larger pots and even to prune them in order to try to slow down their vigour, and notwithstanding that, many plants began to decline or even die. Consequently, in order to wait that the complementary activities necessary to start the field actions were accomplished, we were compelled to slowdown the production, reducing the activities of rooting and acclimatization. Moreover, managing large amounts of plants requiring such an intensive manipulation became rather unsustainable in the practical point of view, so that entrusting the task to external assistance seemed inappropriate. This is why the CNR-IBBR finally decided to fulfil this action directly in its structures by its internal personnel, hence introducing a deviation with respect to what foreseen in the project proposal. Actually, such a deviation involved a greater engagement for the Beneficiary CNR-IBBR, but finally it had not any negative impact on the correct accomplishment of the related activities or on the outcomes of the project.

After this first period of adjustments, the main fulfilments were satisfactorily achieved and from then onward these problems did not affect significantly the subsequent implementation of the project overall. However, in order to recover the cumulated delays due to them and to avoid significant reductions of the foreseen objectives and results, a 18 months prolongation request of the project duration was considered necessary and was obtained until 30 April 2022.

6.3. Evaluation of Project Implementation

With regard to the methodologies applied in the implementation of activities, two different issues must be considered: 1) the general management of the project, 2) the carrying out of each single action.

1) From the beginning of the project the general management focused on outlining good practices to facilitate the complex decisional mechanisms of the two public Beneficiaries. The correct methodology involves a division of labours between partners, identifying the personnel of greater experience in solving the eventual criticisms. According to that, since the very beginning a strict cooperation was established between the Project Manager and the contact persons of CNR-IBBR and DRA. All together continuously looked after the compliance among the technical necessities of the project, the administrative procedures and the foreseen objectives. Despite the cumbersome financial management of both Beneficiaries and the consequent delays (cfr. section 5), the Partnership was able to implement the project with satisfactory effectiveness.

2) Concerning the single actions, the most important Preparatory Actions, propaedeutic to others, were implemented according to complementary principles of correlational study (e.g. vegetation investigations, genetics, soil suitability) and expert judgment. Such an

approach allowed us to select more properly, for instance, the purest genetic lineages, as well as the most suitable habitats to reintroduction. Moreover, as planting of the target species in the wild had never been done before, new plantations (Actions C2 and C3, as well as C7) were planned according to consecutive steps. A first test-plantation was done in 2019 in order to develop the most effective technique and assess the most suitable planting season. The following regular bi/three-weekly monitoring (Action D1), always carried out until the critical summer seasons, allowed to eventually correct errors or introduce improvements in the planting steps of the successive years.

The Action A4 (Promulgation of DPRS of protection) deserves a special mention. Its entire accomplishment procedure was rather long and delicate requiring a bottom-up decision making process. Accordingly, the document was subject to a number of administrative steps, involving also progressive adjusting revisions to both the text and the related cartography. Its promulgation, in late 2019, represented a fundamental milestone because it significantly improved the global strategy of protection of threatened species at regional level, already outlined in a former process within the frame of a past LIFE project (Zelkov@azione).

The actions of awareness, territorial animation and involvement of stakeholders in participatory planning procedures (especially Actions D2, E5, E10) based on the administration of a questionnaire to different types of stakeholders aiming at: *i)* collecting information about the level of awareness and dissemination of the general knowledge concerning the target species, *ii)* contributing to the dissemination of information about the European programmes concerning the environmental policy, *iii)* assessing the degree of stakeholder interest with respect to their involvement in identification processes and strategies, tools and resources that could be activated for the valorisation of the target species. Some 40 complete answers were obtained, and on this basis a participatory process was organised through four meeting events, finally culminating in the signature of a MoA.

In order to recover the cumulated delays affecting several actions and to avoid significant reductions of the foreseen objectives and results, a prolongation request of the project duration was presented and obtained until 30/04/2022.

In the following table we summarize for each action the results and their evaluation as compared to what foreseen in the project proposal.

Action	Foreseen in the revised proposal	Achieved	Evaluation
A1 Geo-referenced inventory and characterization of current populations (distribution, demography, genetic diversity)	Objectives: Mapping all existing populations, and viability and genetic assessment Expected results: Improving knowledge for conservation planning	15 populations inventoried, including an unknown new one; Evaluation of viability and stability of each population; Genetic identity and diversity evaluated	Obtained basic data for the correct planning of conservation
A2 Physico-chemical characterization of substrates of current populations and reintroduction areas	Objectives: Evaluate pedologic requirements of the target species Expected results: Identification of the most suitable soil conditions for reintroduction actions	Soil samples analysed in all 15 known populations and in potential new sites; The optimal soil type identified	Outlined the best soil conditions in respect to the requirements of the target species to address reintroduction actions; Drawing up of thematic maps of soil suitability
A3 Exploration of the	Objectives:	Explored 27 potential sites	2(-4) sites satisfying all the selection

Action	Foreseen in the revised proposal	Achieved	Evaluation
territory to identify reintroduction sites	Identification of suitable sites for reintroduction Expected results: Selection of the necessary sites for reintroduction	all along the western and south-western coast of Sicily; Identified 2(-4) new sites where the translocation action were carried out	criteria were identified
A4 Emanation of the Presidential Decree of Protection	Objectives: Promulgation of a legal rule for the protection of the target species Expected results: Achieve the legal protection of the target species	Promulgation of the Presidential Decree of the Sicilian Region (DPRS n.339/2019), published in the Gazzetta Ufficiale delle Regione Siciliana (GURS) on 11 October 2019	Improved the global strategy of protection of threatened species at regional level, already outlined in a former process within the frame of a past LIFE project (Zelkov@azione)
A5 Emanation of the guidelines for PUDM e PdU drafting	Objectives: Providing the guidelines for integrating the necessities of protection of CSIs and SPAs in PUDM and PdU Expected results: Drawing of guidelines	Guidelines promulgated soon after the start of the project following an independent enactment of the competent Regional Authority; Two meetings held at the Municipalities of Trapani and Marsala to trigger the process of execution in the respective administrative territories. However, after the inclusion of obligations of PUDM and PU executive plan in the rules of the DPRS n.339/2019 the implementation of the action was stopped	Laid the foundations to provide the coastal Municipalities with executive PUDMs and PdUs
C1 In-vitro production of propagation material for reinforcement and reintroduction	Objectives: Production of new plant material of certified genetic identity Expected results: Obtaining large amount of propagation material at no risk of depauperation for the native populations	Optimization of the already known *in-vitro* propagation protocol; Produced about 3000 new viable plants	Complete mastering of a basic tool for any *in-situ* and *ex-situ* conservation action and programs; Action delayed due to the late availability of genetic analysis results and to unexpected problems in managing the produced plants material with respect to the compliance of the project timetable vs. the administrative procedures and financial management
C2 Reinforcement of natural populations	Objectives: Improve the viability of the most degraded populations Expected results: Increase the area occupied by the target species and the general conservation of the native populations	Three native populations (Ronciglio, Isola Colombaia and Isola Lunga) were reinforced with a total of 1025 plants (103 nuclei) on the total area of 5927 m^2	Increased the area of occupation of three populations; Satisfactory recovery of the two extremely depauperated populations of Isola Colombaia and Isola Lunga
C3 Establishment of new populations according to the Species Translocation criteria	Objectives: Create new populations in suitable sites Expected results: Increase the area occupied	Three new populations counting in total 1177 plantlets (118 nuclei) and totalizing an area of 5601 m^2 were established	Successful reintroduction of the species in three new locations, two of which protected by law and free from disturbances; Significant improvement of the perspectives of conservation of the

Action	Foreseen in the revised proposal	Achieved	Evaluation
	by the target species and its global conservation		species
C4 Building of physical barriers to prevent vehicular access	Objectives: Protect the most disturbed populations against vehicular damages Expected results: Eliminate the disturbances due to vehicle crushing in some populations	A total of 1375 m of woody fence and 294 m of anti-rabbit fence was built in four sites	Effective protection of two native and two newly established populations against human disturbance, as well as against browsing of domestic cattle and wild herbivores
C5 Control of alien species	Objectives: Eradicate the invasive alien species from some populations of the target species in order to reduce competition Expected results: Enhance the viability of some papulations	A total area of 7617 m^2 cleared by the IAS *Carpobrotus edulis* in six *C. maritima* native populations	Successful elimination of competition from IAS with the target species; Recovery of suitable areas to the target species, that started to spontaneously disperse in it (e.g. Isola Colombaia, Villino Nasi)
C6 Acclimatization in nursery of the new *Calendula maritima* plants	Objectives: Produce well adapted plants before their reintroduction in the wild Expected results: Obtain plant material that can successfully establish in the natural conditions	Produced about 3000 acclimatized plants	Complete mastering of a basic tool for any *in-situ* and *ex-situ* conservation action and programs; Action delayed due to the late availability of genetic analysis results and to unexpected problems in managing the produced plants material with respect to the compliance of the project timetable vs. the administrative procedures and financial management
C7 Ex-situ conservation in CCG (DRSRT) and diffusion in other conservation institutions	Objectives: Create a pool of genetically certified plants to be cultivated in a public structure; Further diffusion of the species in other repositories Expected results: Cultivate the target species in secured conditions	A pool of 75 genetically certified plants from 3 populations conserved *ex-situ* in a public institution	Setting up of a core of living plants of the target species in *ex-situ* conservation
D1 Monitoring the impact of concrete actions on the conservation status of the target species	Objectives: Evaluate the impact of concrete action on improving the conservation through specific indicators Expected results: 4 monitoring reports illustrating the progress of conservation of the target species through time	Delivering of 3 Monitoring Reports	Action initially suffering for delay, but with no prejudice for the other actions. At the end of the project, 3 Reports were delivered describing the level of success obtained and the reasons of locally partial failure
D2 Monitoring the socio-economic impact of concrete actions on the beach economy	Objectives: Evaluate the economic impact of the new use of sites of intervention	A Report outlining the level of awareness of local stakeholders concerning the target species and the	Started with significant delay, but finally provided the basis for a participatory process held through four meeting events;

Action	Foreseen in the revised proposal	Achieved	Evaluation
	Expected results: A Monitoring Report to be used for subsequent feedback	need of its conservation, as well as their sensibility on the environmental issues	Culmination with a MoA involving some Public Institutions and Organisations
D3 Monitoring of the genetic stability of the propagated plants	Objectives: Evaluate the genetic stability of newly *in-vitro* propagated plant material Expected results: Confirmation of the genetic stability of the produced plants	Analysed 140 sample plants issued from *in-vitro* propagated material for genetic purity	Action suffering significant delay, especially due to laboratory inactivity caused by Covid19 restriction measures; Confirmed however the lineage purity of propagated and diffused plant material
D4 Monitoring and evaluation of the indicators of the project performances	Objectives: Evaluate the project results with respect to the LIFE Programme Expected results: Periodical comparative reports	Filled out 3 datasets in the KPI database web tool	Action carried out regularly
E1 Drawing up of a communication plan	Objectives: Make available a communication plan to optimize the communication approaches with stakeholders Expected results: Optimize the information and awareness	Plan drawn up	Provision of a tool for the temporal and structural organisation of the communication activities
E2 Press conferences	Objectives: Inform on the start and progress of the project through representatives of press Expected results: Give the maximum publicity to the goals of the project	Held the start press conference for the presentation of the project	The action was left incomplete due to the delay of the most important actions, that did not allow to get significant elements of novelty to be communicated in the following three years, in addition to the restrictions caused by Covid19 from March 2020
E3 Creation and management of the project website	Objectives: Divulgate the project at national and international level; create opportunities of contacts Expected results: Maximize and facilitate information about the project	Website online from January 2017 and regularly updated	Though suffering of a small starting delay, got very good results in terms of divulgation of the project activities
E4 Dissemination materials of the project	Objectives: Produce dissemination material of different types (leaflets, notice boards, pen drives) Expected results:	Printed 4+7 project Notice Boards and 6 action panels; One midterm digital leaflet + 1000 final hardcopy leaflets; Produced 500 scientific	Action delayed and partly made differently than foreseen (e.g. leaflets in electronic format instead than hardcopies; Notice Boards printed twice to update of results and to remediate to omissions)

Action	Foreseen in the revised proposal	Achieved	Evaluation
	n° 5000 leaflets, n° 7 notice boards, 1000 scientific pen drives	pen drives; Produced 4 video clips; Presentation of the project in different TV reports (2 national and 2 local); Published 5 scientific papers	
E5 Territorial animation for stakeholders	Objectives: Improve awareness for stakeholders Expected results: Improvement of awareness for stakeholders	Two meetings at the Town Halls of Trapani and Marsala; Participation to two animation events in cooperation with WWF; 2 guided visits with schools; Several meetings, 4 of which public, with different local stakeholder	Satisfactory result achieved in terms of awareness of public and private stakeholders, as well as promotion of the participatory planning all over the territory of concern
E6 Networking for sharing the conservation actions	Objectives: Setting up a scientific-institutional network involving Public Administrations, research institutions, NGOs, seaside resort's concessionaires Expected results: Sharing of conservation approaches and their consequences on the species and the territory	Set up of methodologies and procedures for the ecological evaluation in compliance with urbanistic suitability to reinforcement and reintroduction actions; Sharing of a protocol to eradicate the alien species *Carpobrotus* sp. Sharing of data and information within European conservation case studies	The action started later since awaiting more relevant results from Concrete Conservation actions. Nevertheless, it contributed actively in the establishment of a European Database on the Conservation actions on threatened plant species (COST Action CA18201 "ConservePlants")
E7 Participation to conferences for the dissemination of the project	Objectives: Dissemination of the project activities and results among a scientific audience Expected results: Exchange expertise achieved with a scientific audience	Participation to six scientific events, five of which international	Established direct contacts with other Life projects dealing with conservation of rare species/habitat and limitation of invasive species; Dissemination of the activities of the project and expertise exchange within the scientific community
E8 Layman's report drawing up	Objectives: Provide a dissemination document addressed to general public Expected results: Improve the dissemination of the project goals and results among a general public	Printed 1000 hardcopies of the Layman's Report	No particular problem encountered; 40% of copies already distributed at the Nature Reserve Saline di Trapani e Paceco, the Marine Protected Area Isole Egadi and some divulgation activities carried out on May 2022 in the laboratories of IBBR with the University of Palermo
E9 Networking activities with other projects	Objectives: Exchange know-how and expertise with other Beneficiaries of conservation projects, including LIFE projects Expected results:	Established contacts with representatives of six LIFE projects; Obtainment of basic information concerning the eradication techniques of IAS; Contribution in the	The action was not fully implemented, mainly due to "political instability" issues (e.g. frequent rotation of service directors and project responsibles) affecting the Beneficiary DRA responsible for its implementation, coupled to engagement overload of the Coordinating Beneficiary CNR-IBBR

Action	Foreseen in the revised proposal	Achieved	Evaluation
	Improve know-how and expertise exchange on the issues of biodiversity conservation	establishment of a “Database on the Conservation actions on threatened plant species”(COST Action CA18201 "ConservePlants")	
E10 Involvement of public and private stakeholders in participatory planning procedures	Objectives: Involve public and private stakeholders in participated planning Expected results: Sharing decisions and improve awareness	Held 11 meetings at the Saline di Trapani Natural Reserve Head Office; 2 public events, respectively at Trapani and Marsala; 4 and 3 meetings with private and public stakeholders, respectively; several non-official meetings among Project Beneficiaries and some selected stakeholders; 4 public online meeting with different public and private stakeholders within an animation programme; Signature of a MoA by some Public Institutions and Organisations	Engagement of some Public Institutions and Organisations at promoting actions and initiatives for the conservation of the target species and improve the consciousness towards the importance of biodiversity conservation
F1 Coordination and methods of the project management	Objectives: Ensure the effective implementation of the project Expected results: Correct implementation of operational activities and effective facing up of eventual criticalities	Accomplishment of ordinary activities (administration, reporting, financial management, etc.) and all expected Deliverables and Milestones	Satisfactory implementation of operational activities and effective facing up of eventual criticalities
F2 External Audit	Objectives: Certification of the project Financial Statement Expected results: Certification of the project Financial Statement presented with the Final Report	Nothing	We aware that it is not required a “Certificate on the Financial Statement”
F3 Elaboration of the “After LIFE Plan”	Objectives: Provide a plan explaining what and how will be prosecuted after the end of the project Expected results: Drawn up an After LIFE Plan	After LIFE Plan drawn up	Realistic planning of prosecution of some activities, such as monitoring of actions C2 and C3, awareness and dissemination, possible new reintroduction actions

In summary, the project has provided some visible results of great value for the conservation of this rare and threatened species, such as: 1) the significant improvement of knowledge about the target species, its habitat and ecological requirements, as well as its genetic features and diversity, allowing to address correctly the conservation planning,

2) the optimization of the plant production process through *in-vitro* techniques, which made possible massive plant production of certified genetic identity and with no impoverishment of the native populations 3) the successful reinforcement of 3 native populations and the setting up of 3 new populations, also providing valuable information about the response of the species to voluntary introduction in new sites, 4) the improvement of the global strategy of protection of threatened species at regional level by legal enactment, 5) the effectiveness of the activities of participated planning, with the involvement of a private stakeholder to contribute concretely to the conservation of a threatened species, and through the signature of a MoA by different public Institutions. A photographic summary of some highlights during the project implementation is presented in Annex 17.

Concerning the Dissemination activities, among the most valuable results it must be considered the effectiveness of the website and the organisation/participation to animation events that significantly improved the awareness at local scale.

At policy level, it must be noticed the contribute of the project to the improvement of the global strategy of protection of threatened species at regional level, as a prosecution of a former process achieved within the frame of a past LIFE project (Zelkov@azione).

6.4. Analysis of benefits

1. Environmental benefits

The project, though mainly focusing on improving the conservation of a rare and threatened species, can indirectly provide some benefits on the environmental point of view of the involved habitats. The actions put in place, from the concrete ones to the legal protection and awareness ones, may have important policy implications on Natura2000 sites, at least at local scale. The promulgation of a Protection Decree from one side will improve the global strategy of protection of threatened species at regional level, already outlined in a former process within the frame of a past LIFE project (Zelkov@azione); from the other side, it will confer to the target species the value of "flag" species, of special significance in those very vulnerable habitats such as the coastal habitats. This involves that all sites, current and future, hosting populations of the target species will be submitted to a special protection regime that will limit the risk that their natural value could be significantly changed or decreased. This could be the case, for instance, of its application to the project of an Urban Park proposed by the Municipality of Trapani on the SPA ITA010007 area of *Calendula maritima* population at Tonnara Tipa/S. Giuliano (see section 6.1.26 for details).

The awareness actions have got the practical result to involve a private owner in the active conservation of the target species. This means that in the next years the related area will be bound for the aims of environmental conservation. Since this stakeholder is also a manager of a family enterprise that aims at the touristic valorisation of the area, the presence of a population of this very rare and protected species in his estate can represent a potential element of attractiveness for high quality nature tourism.

The activities carried out succeeded to eliminate (or at least mitigate) the main threats defined in Form B2d of the Grant Agreement. In fact, the distribution range has been extended and improved by the establishment of 3 new populations in the historical area and the reinforcement of 3 native populations. Almost all plants completed at least one phenological cycle, starting to disperse and to originate new recruitments, that are the best indicators of such intervention success. Moreover, two out of the three new populations

lay within protected areas, therefore enhancing remarkably the conservation perspective of the target species (reduction of threat 1). All the new plantations were carried out by using genetically certified germplasm, hence contrasting the impact of genetic pollution (threat 2) at species level; it did not change anyway in the previously affected populations. The pressure of trampling and vehicular circulation, as well as any damaging of plants (threat 3) was completely removed from one of the most impacted population (Ronciglio) by building a protection barrier, whereas in other sites disturbances are expected to be reduced thanks to awareness and dissemination activities, in addition to the effects of the Presidential Decree of protection. Competition by IAS (threat 4) was completely eliminated from five out of the six populations concerned, and significantly reduced from one of them.
With regard to new populations, the general management and surveillance in the next years will be achieved thanks to the cooperation with the local WWF section, who is the management body of the Nature Reserve "Saline di Trapani e Paceco" (population of Salina Calcara), and the personnel of the Protected Marine Area "Isole Egadi" (population of Favignana Island). Monitoring of all field concrete actions will be assured by the personnel of CNR-IBBR, who will use available internal funds for travel and other eventual minor costs.

2. Economic benefits

Considering the nature of the project, it cannot be recognized a direct economic benefit. The only aspect that could be related to that refers to the potential touristic valorisation, as cited in the former point 1.

3. Social benefits

The most prominent social benefits are depending on the implications deriving from the value of "flag" species of the target species. This involve a new type of management of the coastal areas concerned by the target species, with a greater awareness for nature conservation and a sustainable use of biological diversity.

4. Replicability, transferability, cooperation

The procedure used to draw up the Presidential Decree of Protection had been previously outlined within the frame of a past LIFE project (Zelkov@azione). However, in the case of *Calendula maritima* owed to the particularities of its habitat (highly anthropized coastline areas) a more intensive activity of participated planning and a bottom-up decision making process was needed before getting the final statement. This involved also an accurate analysis of the specific territorial peculiarities before drawing the definitive cartography. This represents an element of novelty in respect to the former experience, that enlarged the expertise for the competent Authority and improved a procedure model for future replicability for other species groups to be put under protection.
Coupled to that, the success in involving a private stakeholder in the active conservation is in concrete an important replicable result.
An additional replicable model refers to the technical applications. The *in-vitro* production of plant material revealed successful, hence allowing to make available large amounts of new genetically certified plants without risk of depauperation of the native populations, what is greatly desirable for rare and threatened species.
In a global evaluation, we can assess that the project in the whole has a high likelihood of replication.

5. Best Practice lessons

The effort to confer *Calendula maritima* the value of "flag" species with the consequent implications can be considered an example of Best Practice. In addition, the approach to conduct the participated planning as well as the bottom-up decision making process for the drawing up the documents of the Presidential Decree of Protection and to involve private stakeholders in the protection of an endangered species, can be regarded as examples of Best Practice.

6. Innovation and demonstration value

The conservation of rare and endangered species through the approach of Species Translocation is still rather uncommon, especially for plants. In our case, its application is particularly delicate and requires accurate awareness preparation when related to such vulnerable habitats such as coastal areas, so heavily concerned by human impacts. Moreover, facing a so sneaky threat as genetic pollution (threat 2 in Form B2d of the Grant Agreement) requires the use of sophisticated tools such as genetic evaluation of the existing populations and the propagation of plant material from only certified germplasm. According to that, in the frame of a correct and effective planning of biodiversity conservation, on the whole putting in place the activities of Action C3 (but, at less extent, also of Actions C2 and C7) contains many elements of innovation and demonstration at various levels (e.g. processes, methods & tools, nature management methods, models for stakeholder involvement).

7. Policy implications:

The promulgation of the Presidential Decree of Protection (DPRS n.339/2019), under the Regional Law n.16/1996, improved the global strategy of protection of threatened species at regional level, already outlined in a former process within the frame of a past LIFE project (Zelkov@azione). It represents a valuable policy outcome of the regional legislation for the protection of the target species, in particular, and nature and biodiversity, in general.

7. Key Project-level Indicators

All KPI improved more or less significantly from the beginning of the project. We report below the trends, by comparing Indicator Values at the beginning and at the end of the project, including the expected value 5 years after the end.

- 1.5. Project area/length: 0 to 7, expected 7 (ha);
- 1.6. Humans (to be) influenced by the project: 0 to 100, expected 200 (No. of persons)
- 7.1. Ecosystem assessment - Ecosystem assessment: 5.3 to 6.0, expected 6.5 (ha)
- 7.1. Ecosystem assessment - Ecosystem Condition: Poor/unfourable to Good/favourable, expected Good/favourable
- 7.1. Ecosystem assessment - Ecosystem Trend: Deterioration to Improvement and/or deterioration in different locations, expected Improvement and/or deterioration in different locations
- 7.2. Ecosystem services assessment - Ecosystem Service Condition: Poor/unfourable to Good/favourable, expected Good/favourable
- 7.2. Ecosystem services assessment - Ecosystem Service Trend: Some deterioration to Some improvement, expected Improving
- 7.4. Wildlife species - Other: 5.3 to 6, expected 6.5 (ha)
- 7.4. Wildlife species - Other: 15 to 18, expected 18 (No. of populations)
- 7.4. Wildlife species – Species Trend: decreasing to increasing, expected increasing
- 7.4. Wildlife species – Species Status: Critically Endangered to Critically Endangered, expected Critically Endangered
- 7.5.1. Invasive Alien Species Carpobrotus acinaciformis: 1 to 0, expected 0 (ha)
- 7.5.1. Invasive Alien Species Carpobrotus acinaciformis: 6 to 0, expected 0 (No. of colonies)
- 10.2. Involvement of NGOs and other stakeholders in project activities – NGO: 0 to 1, expected 2 (No. of stakeholders)
- 10.2. Involvement of NGOs and other stakeholders in project activities – Public Bodies: 1 to 4, expected 6 (No. of stakeholders)
- 11.1. Website - No. of unique visits: 0 to 12489, expected 20000 (No. of visits)
- 11.2. Other tools for reaching/raising awareness of the general public – No. of events/exhibitions organised: 0 to 9, expected 14 (No. of reports, events, etc)
- 11.2. Other tools for reaching/raising awareness of the general public – No. of different displayed information created (posters, information boards): 0 to 8, expected 10 (No. of reports, events, etc)
- 11.2. Other tools for reaching/raising awareness of the general public - Other distinct media products created (e.g. different videos/broadcast/leaflets): 0 to 17, expected 20 (No. of reports, events, etc)
- 11.2. Other tools for reaching/raising awareness of the general public – No. of discrete Project Reports drafted: 0 to 23, expected 30 (No. of reports, events, etc)
- 11.2. Other tools for reaching/raising awareness of the general public – No. of articles in print media (e.g. newspaper and magazine articles): 0 to 19, expected 25 (No. of reports, events, etc)
- 12.1. Networking - Pupils (of school age): 0 to 100, expected 500 (No. of individuals)
- 13. Jobs: 0 to 4, expected 2 (No. of FTE)
    - 14.1. Running cost/operating costs during the project and expected in case of continuation/replication/transfer after the project period: 0 to 854,815.05, expected 968,815.00 (€)
- 14.3 Future funding - Beneficiary own contribution: expected 114,000.00 (€).

8. Comments on the financial report

8.1. Summary of Costs Incurred

PROJECT COSTS INCURRED				
	Cost category	Budget according to the grant agreement in €*	Costs incurred within the reporting period in €	%**
1.	Personnel	610,532.00	585,319.86	95.87
2.	Travel and subsistence	38,450.00	9,970.67	25.93
3.	External assistance	253,000.00	206,451.53	81.60
4.	Durables goods: total non-depreciated cost			
	- *Infrastructure sub-tot.*			
	- *Equipment sub-tot.*	0.00	2,136.72	#DIV/0!
	- *Prototype sub-tot.*			
5.	Consumables	57,000.00	21,420.29	37.58
6.	Other costs	17,000.00	11,883.87	69.91
7.	Overheads	45,000.00	17,632.11	39.18
	TOTAL	**1,020,982.00**	**854,815.05**	**83.72**

*) If the Agency has officially approved a budget modification through an amendment, indicate the breakdown of the revised budget. Otherwise this should be the budget in the original grant agreement.
**) Calculate the percentages by budget lines: e.g. the % of the budgeted personnel costs that were actually incurred

The overall project expenditure has reached about 84% of the foreseen costs. As referred, until the MTR the project suffered some delays for different reasons, so some concrete actions started late involving their expenditure had not yet been fully expressed. Accordingly, to remediate to delays we obtained a prolongation of 18 months, that might have compensated such reduction in expenditure. However, the Covid19-related restrictions involved a complete stop (or significant slowdown) in many activities throughout 2020-2021, partially nullifying the possibility of recovery of expenditure. With regard to the different cost items, we can observe:

Personnel: the expense attains about 96% of foreseen, which should be indeed rather satisfactory. The total annual working time for non-additional permanent personnel is usually based on the time registration system as explained in point 8.2 below. For the Beneficiary DRA, only in some cases when some personnel worked in average less than 2 days per month on the project or total annual working time through the time registration system could not be obtained for whatever the reason, the value of 1720 was indicated. The actual hours that each employee spent working on the project was recorded using timesheets, according to Annex X, point VIII.1-Personnel Costs.
Within the CNR-IBBR some personnel units changed status all along the project implementation. Dr. Angela Carra and Dr. Antonio Motisi, mainly involved in Actions C1 and C6, were initially assigned to the project as “additional” personnel, from 3/3/2017 to

2/4/2018 the former, and from 1/4/2017 to 31/3/2018 the latter. On December 2018 both of them were employed as Permanent staff at CNR and their status in the project changed into “non-additional”. Dr. Caterina Catalano, also involved in actions C1 and C6, was assigned to the project as “additional” from 1/6/2019 to 31/8/2019. Afterwards, due to internal rules of CNR concerning Personnel recruitment, it was not possible to renovate this type of contract (cfr. Section 5) and from 3/3/2020 she carried out as external assistance the specific project activities until its end date. Dr. Alessandro Silvestre Gristina was assigned to the project as “additional” (research fellow) from 1/3/2017 to 28/2/2020, collaborating in the implementation of many actions (A1, A2, A3, C2, C3, C6, C7, D1, E1, E3, E7, E9, E10). For the same reasons as dr. Catalano, he prosecuted his participation until the end date of the project as external assistance.

Travel and subsistence: the expenditure is relatively low because some actions involving travelling, especially related to dissemination and awareness, were significantly reduced or impeded due to Covid19 restrictions. For instance the first chance to participate in presence after 2019 to a scientific conference was only in late September 2021 (3rd Mediterranean Plant Conservation Week, 27 September - 1 October 2021, Chania – Greece), whereas the successive conference was after the end of the project (1st International Plant Translocation Conference, Rome, 20-23 June 2022), therefore no related cost could be included in the actual expense incurred.

External Assistance: as explained in the related Actions, many activities to be accomplished through External Assistance suffered significant delay due to the slowness of the administrative procedures for assigning the procurements, in addition to the administrative problems described in Section 5. Nevertheless, the expenditure became finally more dynamic after the MTR, and the final cost incurred approached remarkably to the budgeted costs. Moreover, the costs of External Assistance for Action C6 has been no longer accounted for, and the relative costs were moved to the item Personnel, because as described in Technical Section (see Section 6.1.11) the foreseen activities were finally fulfilled by Direct Personnel of CNR-IBBR.

Durables goods: total non-depreciated cost (Equipment): this item was not foreseen in the budgeted costs, but it was added during the project implementation. It concerns the purchase of a new dedicated laptop that became necessary after the already available notebook became obsolete and no longer functional to fulfill Action D1 (Monitoring the impact of concrete actions on the conservation status of the target species). The necessary budget was shifted from the item Consumables.

Consumables: the final incurred costs are less than expected basically due to over-estimation of the budgeted costs.

Other costs: budgeted costs within this item were foreseen mainly for external auditing and catering services during events of territorial animation. However, the former was not necessary because a “Certificate on the Financial Statement” is not required for our project (see point 8.4 below). The latter were not used because almost all planned events were cancelled due to Covid19 restrictions. The costs actually incurred mainly relate to the Memorandum of Agreement (5000€) with the Marine Protected Area Isole Egadi for the logistic support provided in many activities (e.g. new reintroduction at Isola Favignana, assistance for monitoring activity of new plantations, the marine transportation of the project monitoring team, etc.), and the purchase of a dedicate

software package for genetic investigations (6841.00 €).

8.2. Accounting system

Both Beneficiaries are Public Bodies. Therefore, their accounting systems must be in compliance to as established by Italian Law for Public Bodies Accountability.
In the case of the project LIFE CalMarSi, the identification of cost items is based on a specific CUP Code (Codice Unico di Progetto), a national progressive codification that is exclusively dedicated to this project, so each cost item is linked to this code. The CNR-IBBR also uses another internal Code, the GAE (Gruppo Azioni Elementari), which identifies univocally the LIFE CalMarSi cost items.
For CNR-IBBR the procedure sequence of an expenditure approval involves that the Administrative Responsible proposes to the Responsible of Unit the Act of payment (Determina di Liquidazione) that must be signed; then the Administrative Responsible, through the Accounting System, sends the Act of payment to the bank for the final payment.
For DRA, the procedural sequence for approving and liquidating the expenditure provides that the Head of the procedure proposes to the Head of the Service the liquidation Decree, which must be signed and sent to the competent Area to be repertorized. Through the internal accounting system, the repertorized act is sent to the central accounting office together with the payment mandate in case the budget chapter is in the availability of the service. Such an action is consequent both to the approval of the budget by the Region as well as to the reaccounting of the residual liabilities by the Budget Department. The Accounting Department, having registered the liquidation decree, proceeds to the audit and on the basis of the acquired Payment Warrant proceeds to the liquidation and crediting of the sum.
Both Beneficiaries use electronic systems of working time recording; every unit of Personnel records its own entrance and exit time by badging or typing the personal code; the system produces a file that is controlled and validated by the Responsible of Personnel of the respective Beneficiaries. The working time on the project of each personnel unit is reported on timesheets, that are monthly supervised by the Office Responsible.

8.3. Partnership arrangements (if relevant)

Financial transactions between the Coordinating Beneficiary and the Associated Beneficiary took place first after CNR-IBBR received on its accounting system the total first pre-payment from EC. Then, by a procedure of reallocation of funds, the CNR-IBBR transfers to the DRA dedicated budgetary chapter the relative share of first pre-payment. These methods (established by Italian Law for Public Bodies Accountability) is repeated at every payment from the EC and is rather slow and complex.

8.4. Certificate on the financial statement

According to the Grant Agreement Amendement n° 1, note EASME (2018) 3792965, as no Beneficiary has an EC contribution exceeding € 750.000,00, the appointment of an Audit is not required.

8.5. Estimation of person-days used per action

Action type	Budgeted person-days	Estimated % of person-days spent
Action A: Preparatory actions	678	87.7%
Action C – Concrete conservation actions	819	104.3%
Action D: Monitoring and impact assessment	458	70.6%
Action E: Communication and Dissemination of results	303	75.7%
Action F: Project management (and progress)	408	118%
TOTAL	2666	93.1%

The major deviations consist in the person-day shortage for Actions E and D, and in the moderate overload for Actions F. As indicated all along the description of each single action, most of them have suffered for more or less significant delay and this partially explains why especially in Actions E and D the day/person spent is below the schedule (e.g. monitoring of the impact of Concrete actions on conservation could not start until the Concrete actions were initiated o accomplished, involving a shifting). Furthermore, once again we must highlight the impact of Covid19 restriction measures, especially on the activities in presence of communications and dissemination, that were significantly reduced.

The excess of person-days in Actions C was mainly affected by the decision to fulfil plant acclimatization activities (Action C6,) directly by the internal personnel of CNR-IBBR in its structures, instead to have recourse to external assistance (cfr. Section 6.1.11). Also, the surplus recorded in Action F depended on the unforeseen need to engage in project management activities, especially by the project scientific responsible, dr. Garfì, who was required to get involved in many administrative issues, especially concerning the additional personnel recruitment and the external assistance selection and commitment.

LIST OF ANNEXES

Annex 1 DPRS_Protection Decree

Annex 2 Report3 D1 April2022

Annex 3 Deliverable_C2 Maps of nuclei reinforcement

Annex 4 Delivarable_C3 Maps of nuclei reintroduction

Annex 5 Deliverable_C5 Maps IAS eradication

Annex 6 Report NEXT

Annex 7 Report Genetic stability

Annex 8 kpi_project_data_snapshot_export_29_07_2022

Annex 9 MIGI - press releases

Annex 10 final press release

Annex 11 Notice board2

Annex 12 Notice board eradication

Annex 13 Leaflet2021

Annex 14 Layman's Report

Annex 15 MoA Action_E10

Annex 16 After LIFE Plan

Annex 17 Photographic repertory

1. PROJECT DATA

Project LIFE15 NAT/IT/000914 Cal.Mar.Si. - Measures of integrated conservation of *Calendula maritima* Guss., a rare and endangered species of the Sicilian vascular flora

Duration: 66 Months (from 01/11/2016 to 30/04/2022)

Project location: Sicily - Italy

Total budget: € 1,020,982

EU contribution: € 602,182

% of eligible costs: 58,98%

Coordinating Beneficiary: Consiglio Nazionale delle Ricerche – Istituto di Bioscienze e BioRisorse (CNR-IBBR)

Associated Beneficiary: Dipartimento Regionale dell'Ambiente (DRA) – Regione Siciliana

Contact person: Giuseppe Garfì (CNR-IBBR) - giuseppe.garfi@ibbr.cnr.it

Project Website: www.lifecalmarsi.eu

2. PROJECT OVERVIEW

Calendula maritima Guss. is a very rare herbaceous plant of the Asteraceae family, found exclusively in some small coastal stretches and in micro-insular contexts in the municipal territories of Trapani and Marsala (Western Sicily - Italy). Due to its extreme rarity, it is ranked in the IUCN Red List as CR (Critically Endangered), and is considered among the 50 most threatened plants growing on the Mediterranean islands.

Coastal environments are by their very nature subject to multiple disturbance factors that have or may have severe and irreversible impact on the persistence of the last surviving populations of *C. maritima*. The project aims at reducing or removing the main threats to the long-term conservation of the species, consisting of: a) the reduction, fragmentation and degradation of stands as a result of the destruction of coastal habitats due to heavy anthropisation (e.g. bathing facilities, industrial activities, waste dumps); b) seasonal disturbances associated with beach tourism, such as mechanical beach cleaning, trampling due to the continuous passage of bathers or recreational activities on the beach, access to the beach of motorized vehicles, etc.; c) competition by hybrid plants, originating from the cross between *C. maritima* and the related congeneric species *C. fulgida*, the latter invading the habitat of the target species as a result of human disturbance; d) competition from invasive alien species such as *Carpobrotus edulis*, a plant widely used for ornamental purposes in coastal areas and now widespread throughout the distribution range of the target species.

The objectives of the LIFE CalMarSi Project were to improve the conservation prospects of *C. maritima* by carrying out several actions including: 1) activities aimed at increasing the knowledge on the ecology and genetics of the species to better address conservation strategies, 2) in-situ and ex-situ conservation, 3) implementation of safeguard and policy protection measures, 4) dissemination and awareness raising addressed to the large public, citizens and stakeholders.

3. SHORT REVIEW OF RESULTS

1) Population's geo-referenced inventory and mapping were carried out and a new unknown population was censused. Through specific indicators (e.g. floristic composition, estimated numerical consistency, recruitment, habitat quality, presence of possible hybrids, presence of invasive alien species, etc.) the species' global conservation status was assessed. Only 20% of all populations was classified as good, while over 53% of them were in poor to very poor conditions.

Genetic diversity analyses were performed in order to evaluate the extent of possible hybridisation with *C. fulgida*. The populations from Maraone Islet, Isola Lunga and Ronciglio resulted to be the genetically purest lineages; they were then

multiplied by in-vitro techniques in order to produce certified plant germplasm for in-situ and ex-situ conservation actions.

2) With regard to in-situ conservation, reinforcement measures significantly improved the state of conservation of the most depleted populations (i.e. Isola Colombaia and Isola Lunga) and those subject to environmental recovery measures (Ronciglio). Moreover, within the historical range of the species, translocation interventions were carried out in 3 new sites, with the establishment of 3 new viable populations, two of which within nature protected areas. Ex-situ activities involved the cultivation of 75 individuals of various genetic lineages at the Germplasm Conservation Centre of Marianelli managed by the Regional Department of Rural and Territorial Development. Summarizing data are in the table below.

		site	n. nuclei	n. plants	surface m²
***In-situ* conservation**	**Reinforcement**	Ronciglio	36	355	1138
		Isola Colombaia	21	210	2169
		Isola Lunga	46	460	2620
		Total	**103**	**1025**	**5927**
	Translocation	Favignana	48	484	2220
		Calcara	61	613	2793
		Fortino	8	80	588
		Total	**118**	**1177**	**5601**
***Ex-situ* conservation**		CCG Marianelli		**75**	

3) The issuing of a special Decree by the President of the Region (DPRS n.339/2019) ensured a special protection regime to the target species on the entire regional territory, explicitly forbidding plant collecting, damaging and extirpating in all present (and future) populations of *C. maritima*.
For the scope of physical safeguard, a total of 0.46 km of deterrent barriers were built against trampling and vehicular traffic, whereas 1.21 km of fences allowed to protect from browsing of domestic herbivores and rodents damages. Finally, competition by the invasive exotic species *Carpobrotus edulis* was removed from six different populations on a total area of 0.76 ha.

4) Several activities were performed to involve local public stakeholders, like the signing of a Memorandum of Agreement (MoA) and a formal commitment to take into account the conservation needs of *C. maritima* in any intervention within the area of concern. The objectives and results of the project were presented in various national and local television broadcasts, as well as in popular events, professional training courses, and scientific conferences. Finally, dissemination activities were carried out within schools and private citizens.

4. SWOT ANALYSIS AT THE END OF THE PROJECT

At the end of the project, a SWOT analysis was performed in order to evaluate comprehensively the major results of project implementation, and the pending or unsatisfactory issues.

Strengths

- Achievement of satisfactory knowledge and expertise to address the species' conservation planning
- Identification of genetically pure populations
- Mastering of an effective in-vitro propagation protocol allowing genetically certified massive plant production and at no risk of offspring depletion from the wild
- Raise of viability at species and population level
- Mitigation of disturbance in most impacted populations
- Removal of competition from IAS in six populations
- Conservation of a first stock of diversified germplasm in secured conditions
- Establishment of legal protection on the entire regional territory
- Improvement of awareness about the species conservation issues among local stakeholder and large public
- Involvement of a private stakeholder in the active conservation of the species
- Engagement through a MoA of some local Public Institutions and Organisations at promoting actions and initiatives for the conservation of the target species
- Consolidation of cooperation with the local WWF Unit of Trapani, which is the Management Body of the Nature Reserve "Saline di Trapani e Paceco", and the Marine Protected Area "Isole Egadi"

Weakness

- Still inadequate awareness among large public
- Insufficient competence by territorial management Bodies in applying the protection rules
- Lack of appropriate surveillance in the territory of concern
- Impossibility to eliminate the risk of hybridisation in the affected populations
- Lack of funding for maintenance and restoration
- Low availability of new suitable areas for future translocations
- High expertise, cost and time consuming for plant material propagation through in-vitro techniques

Opportunities

- Good opportunity for environmental education development
- Important source of ecosystem services (education, recreation, culture)
- Possible implementation of high quality nature tourism
- Social function, citizen engagement in protection, easy access thanks to the vicinity to towns and villages
- Value of "flag" species of the target species involving a new type of management of the coastal areas

Threats

- Illegal impacting activities to the current habitat
- Impossible long-term control of disturbance by wild fauna (e.g. seagulls trampling and nesting, rabbit browsing, rat predation)
- Urban development and uncontrolled beach activities (e.g. kitesurf)
- Climate change (increasing summer drought, extreme weather events)

Based on the above the After LIFE Plan was drawn, focusing only on the actions and activities that could contribute to capitalize the results obtained so far.

5. AFTER LIFE PLAN

The implementation of the project included 29 actions. Some of which are definitively concluded, while others require to be pursued in order to maintain and consolidate the most significant outcomes. Among these, some are more properly framed within Concrete and Monitoring actions, whose purpose is preservation or conservation management (C, D), others refer to the requirement of continuing the work of dissemination and outreach to improve the culture of environment sustainability and values (actions E).

ACTION	Post LIFE activity	
A. Preparatory actions, elaboration of management plans and/or action plans		
A1 Geo-referenced inventory and characterization of current populations		**NO**
A2 Physico-chemical characterization of substrates		**NO**
A3 Exploration of the territory to identify reintroduction sites		**NO**
A4 Emanation of the Presidential Decree of Protection		**NO**
A5 Emanation of the guidelines for PUDM e PdU drafting		**NO**
C. Concrete conservation actions		
C1 In vitro production of propagation material for reinforcement and reintroduction	**YES**	
C2 Reinforcement of natural populations		**NO**
C3 Establishment of new populations according to the Species Translocation criteria	**YES**	
C4 Building of physical barriers to prevent vehicular access	**YES**	
C5 Control of alien species	**YES**	
C6 Acclimatization in nursery of the new *Calendula maritima* plants	**YES**	
C7 Ex-situ conservation in CCG (DRSRT) and diffusion in other conservation institutions	**YES**	
D. Monitoring of the impact of the project actions		
D1 Monitoring the impact of concrete actions on the conservation of the target species	**YES**	
D2 Monitoring the socio-economic impact of concrete actions on the beach economy		**NO**
D3 Monitoring of the genetic stability of the propagated	**YES**	
D4 Monitoring and evaluation of the indicators of the project performances		**NO**
E. Public awareness and dissemination of results		
E1 Drawing up of a communication plan		**NO**
E2 Press conferences		**NO**
E3 Creation and management of the project website	**YES**	
E4 Dissemination materials of the project		**NO**
E5 Territorial animation for stakeholders	**YES**	
E6 Networking for sharing the conservation actions	**YES**	
E7 Participation to conferences for the dissemination of the project	**YES**	
E8 Layman's report drawing up		**NO**
E9 Networking activities with other projects	**YES**	

ACTION	Post LIFE activity
E10 Involvement of public and private stakeholders in participatory planning procedures	**YES**
F. Project management	
F1 Coordination and methods of the project management	**NO**
F2 External Audit	**NO**
F3 Elaboration of the "After LIFE Plan"	**NO**

Overall, with a few exceptions almost all post-LIFE activities will be implemented by the Partner CNR-IBBR with its own permanent staff (i.e. relative costs consist of the personnel salary) and funds, as well as with possible external resources (e.g. INTERREG Euro-Med, 2. Greener Mediterranean - 2.7. *Enhancing protection and conservation of nature, biodiversity and green infrastructure including in urban areas and reducing all forms of pollution*). Furthermore, due to the special scientific concern of results obtained in certain actions (e.g. in-situ conservation by Species Translocation), CNR-IBBR has the interest to continue the monitoring activities and following up the evolution of the newly established populations. The activities described below refer to the actions that will be performed in the period 2022-2027.

5.1. ACTIVITIES RELATED TO CONCRETE CONSERVATION

- Actions **C1** and **C6** are the basis for future in-situ and ex-situ conservation. The maintenance of the cell cultures and the production of a basic stock of 100 plants/year will be assured by CNR-IBBR in its structures, with internal personnel assigned to this task for 30 persons/days/year. The necessary consumables will be supplied from the ordinary availability of the Institute.
- Action **C3** requires specific funding and expertise and will be performed under the responsibility and supervision of CNR-IBBR, who will take charge to find the necessary resources. Potential new reintroduction sites are already identified in the south-western coast of Sicily (e.g. ZSC ITA010006 Paludi di Capo Feto e Margi Spanò).
- Actions **C4** and **C5** require only the maintenance of the state of fact. Necessary activities will be done through volunteers, with the cooperation of personnel of the WWf Unit of Trapani and the Marine Protected Area "Isole Egadi", under the supervision of researchers of CNR-IBBR. Needed person/day is estimated in 20 unit/year (4 CNR-IBBR researcher, 16 volunteers). Each participant will also provide by its internal budget the necessary funding for travel and subsistence.
- Action **C7** will be implemented by CNR-IBBR, who will select the recipient institutions for ex-situ conservation and will engage to provide the plant material to be cultivated therein. It is estimated an engagement of 4 person/day/year and a small funding for plant expedition or transportation that will be provided by internal budget of the Institute.

5.2. ACTIVITIES RELATED TO MONITORING

- Action **D1** will be performed by personnel of IBBR-CNR in order to monitor in the medium term the outcomes of Actions C2 and C3, as well as to collect data of scientific interest. It is estimated an engagement of 8 person/day/year and a small funding for travel and subsistence that will be provided by the internal budget of the Institute.
- Action **D3** requires specific expertise and lab facilities, indeed in the availability of CNR-IBBR. It will be carried out once a year on a sample of newly produced plants and will involve 10 person/day/year. The necessary consumables will be supplied from the ordinary availability of the Institute.

5.1. ACTIVITIES RELATED TO AWARENESS AND DISSEMINATION

- Action **E3** revealed very effective for dissemination and information about the project activities. The website will be active until 30/06/2025 and the relative costs are already payed. An operational prolongation is foreseen until 30/06/2027 and the necessary funds will be supplied from the ordinary budget of CNR-IBBR. Content updating is under the responsibility of the Institute and will require 4 person/day/year.
- Actions **E5**, **E6**, **E9** and **E10** will be continued mainly by CNR-IBBR, with the cooperation of DRA and the WWF Unit of Trapani. It is planned to organize 3 meetings/year with primary and secondary schools. It is also expected to contribute to any public event organised at local scale and addressed to various stakeholders (the next one is already planned on 20/07/2022 at Favignana within the promotion campaign by Legambiente for the institution of the National Park of Isole Egadi e Saline di Trapani e Marsala), and touristic visits of the Nature Reserve of Saline di Trapani e Paceco. Networking, especially with other LIFE projects to share expertise and results, will be prosecuted by CNR-IBBR as well. It is estimated the involvement of total 10 person/day/year; the cost for travel and subsistence will be covered from the internal budget of each respective contributor.
- Action **E7** will be prosecuted by researchers of CNR-IBBR. It is expected to participate to at least a conference per year (we already can list one conference after the end of the project, cfr. Section 6.1.23 of the Final Report). The relative costs will be covered by the internal budget of the Institute.

A synthesis of scheduling and structure of the After-LIFE Plan is presented in the table below:

Action	Objective and action	When, How often	Where	Who	Source of funds	Needed finances	Priority
C. Concrete conservation actions							
C1	In vitro maintenance and propagation	2022-2027	CNR-IBBR structures	CNR-IBBR	Internal budget	€€€€	**
C3	Establishment of	2024-2027	Various sites	CNR-IBBR	Project	€€€€	*

Action	Objective and action	When, How often	Where	Who	Source of funds	Needed finances	Priority
	new populations		along the regional coastal area		financing with external fundings		
C4	Maintenance and repair of physical barriers	2022-2027	Ronciglio and Favignana	CNR-IBBR, WWF, PMA Isole Egadi	Internal budget	€	***
C5	Repetition of cleaning	2022-2024	Populations of Pizzolungo, S. Giuliano, Villino Nasi, Isola Colombaia, Torrente Baiata, Isola Lunga	CNR-IBBR, WWF	Internal budget	€	***
C6	Acclimatization and cultural care in nursery	2022-2027	CNR-IBBR structures	CNR-IBBR	Internal budget	€€€€	**
C7	Ex-situ conservation in conservation institutions	2022-2027	Various repositories	CNR-IBBR	Internal budget	€€	**
D. Monitoring of the impact of the project actions							
D1	Monitoring outcome of actions C2 and C3	2022-2027	Sites of actions C2 and C3, and new future sites	CNR-IBBR	Internal budget	€€€	***
D3	Monitoring of the genetic stability	2022-2027	CNR-IBBR structures	CNR-IBBR	Internal budget	€€€	**
E. Public awareness and dissemination of results							
E3	Management of the project website	2022-2027	CNR-IBBR structures	CNR-IBBR	Internal budget	€	***
E5, E6, E9, E10	Territorial animation, networking, information	2022-2027	Various sites in the province of Trapani	CNR-IBBR, WWF, DRA	Internal budget	€€€	***
E7	Participation to scientific conferences	2022-2027	Various locations in Italy and abroad	CNR-IBBR	Internal budget	€€	**

LEGEND:
Budget needed: €=up to 5000 euro; €€= 5000 to 10000 euro; €€€=10000 to 15000euro; €€€€= more than15000 euro.
Priority: *** =the action is absolutely necessary and crucial for reaching the objectives; **= it would be very good to implement this action – it will lead to enlarged scope and efficiency of the project; *= this action may be implemented if financial resources are available/provided