



## **LIFE14 NAT/PT/001081 Progress Report<sup>1</sup>** Covering the project activities from 01/08/2015 to 31/07/2017

Reporting Date  
**31/08/2017**

### LIFE PROJECT NAME or Acronym **LIFE LINES - Linear Infrastructure Networks with Ecological Solutions**

#### Data Project

<b>Project location:</b>	Alentejo (Évora, Montemor-o-Novo, Arraiolos, Estremoz, Vendas Novas) - Portugal
<b>Project start date:</b>	01/08/2015
<b>Project end date:</b>	31/07/2020
<b>Total budget:</b>	5,540,485 €
<b>EU contribution:</b>	3,324,303€
<b>(%) of eligible costs:</b>	60%

#### Data Beneficiary

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<sup>1</sup> Progress Report without any payment request

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## 2. List of key-words and abbreviations

AB – Beneficiário Associado (Associated Beneficiary)  
ANSR – Autoridade Nacional de Segurança Rodoviária  
CA – Comissão de Acompanhamento (Scientific Monitoring Committee)  
CB – Beneficiário Coordenador (Coordinating Beneficiary)  
CCDRA – Comissão de Coordenação e Desenvolvimento da Região Alentejo  
CG – Comissão de Gestão (Management Committee )  
CIMAC – Comunidade Intermunicipal do Alentejo Central  
CME – Câmara Municipal de Évora (Municipality of Évora)  
CMMN – Câmara Municipal de Montemor-o-Novo (Municipality of Montemor-o-Novo)  
CP – Coordenação do Projeto (Project Coordination)  
CTAG – Comissão Técnica de Apoio à Gestão (Technical Committee to Support Project Management)  
EASME – Agência de Execução para as Pequenas e Médias Empresas (Executive Agency for Small and Medium-sized Enterprises)  
EC – Comissão Europeia (European Commission)  
EDP-Distribuição – Energias de Portugal, SA - Distribuição  
EGSP – Energia e Sistemas de Potência, Lda  
FCUL – Faculdade de Ciências da Universidade de Lisboa  
FCUP – Universidade do Porto - Faculdade de Ciências (University of Oporto - Faculty of Sciences)  
GA – Contrato de Subvenção (LIFE Grant Agreement)  
GESAMB - Gestão Ambiental e de Resíduos, E.E.I.M.  
IA – Área de Intervenção (Intervention Area)  
ICNF – Instituto da Conservação da Natureza e das Florestas  
IGeoE - Instituto Geográfico do Exército  
IP – Infraestruturas de Portugal, SA (Infrastructures of Portugal, SA)  
LINES – (Redes de Infraestruturas Lineares com Soluções Ecológicas (Linear Infrastructure Networks with Ecological Solutions)  
LPN – Liga para a Proteção da Natureza  
MARCA – Marca, Associação de Desenvolvimento Local (Marca, Local Development Association)  
NIA – Núcleo de Interpretação Ambiental de Montemor-o-Novo  
PA – Acordo de Parceria (Partnership Agreement)  
pA1E – Programa “Adota um Estrada”.  
QUERCUS – QUERCUS, Associação Nacional de Conservação da Natureza  
REN - Redes Energéticas Nacionais  
SA – Área de estudo (Study Area)  
UA – Universidade de Aveiro (University of Aveiro)  
UEVORA – Universidade de Évora (University of Évora)

**KEYWORDS:** Green infrastructure, Roads, Powerlines, Deactivated railways, Invasive plants control, Biodiversity refuges, Fauna database

### 3. Executive summary

#### 3.1. General progress

The date of reporting for the technical component is 31 July 2017 and corresponds to the end of the second year of the project. The day of report of the financial component is until 30 June 2017, because August is typically a holiday month in most services in Portugal.

To date, most of the actions A1, A2 and A3 tasks are finished and most of the milestones have been achieved. However, in action A1, technical problems with the GPS devices, difficulties in catching owls and the need to complete the characterization of vegetation in a few micro-reserves have postponed the ending of this particular task to June 2018. In action A2, most of the external entities invited to include their road-kill data in the National Database didn't answer to this request. A new approach, including direct talks have already started. Despite this, a higher number of records than predicted were included in the database. Action A4 is delayed due to several constraints associated with the grant award and material acquisition (see below). Nevertheless, it is expected that all the prototypes will be finished at 31 March 2018 and be installed/ and fully operational by the end of 2018. Action A5 is finished, and all the deliverables and milestones have been achieved.

New versions of actions A6 (and C5), also directed to medium voltage powerlines and involving new designs to reduce electrocution and collision risk, are already prepared. Authorization request for these changes to EASME and alterations to Grant Agreement are underway. If it is approved, a new Associated Beneficiary, QUERCUS will join the project, with the strong support and commitment of the medium tension powerline operator, EDP – Distribuição.

Moreover the signature of a cooperation protocol with REN, SA, the operator a very High Voltage Powerlines, in the framework of actions A1 and (C10) is on-going. Once signed REN will be an official collaborator of the LIFE LINES project.

None of the reported adjustments in preparatory actions will put in question the implementation of actions C or the evaluation of their effectiveness.

The bigger projects and processes needed to implement the “heavier” conservation actions are completed or in an advanced stage of progress. Actions C are beginning to be implemented in force and is expected that many will be fulfilled until the midterm report (June 2018). All the intervention areas are selected and mapped. IP has finished the terms of reference of a Road Maintenance Contract in the framework of which several tasks included in actions C1 and C2 will be done, according to the LIFELINES specifications. However, opening the call for this contract is depending on Government approval. The construction of dry ledges in five culverts in national roads (action C1) is almost finished. A solution to direct and elevate the height of flight of vertebrates was already defined following the suggestions of the Scientific Monitoring Committee and the execution project should be ready in October.

The process of creating a final list and monitoring of socio-economic indicators is delayed. After a large discussion and analysis of this issue in the project meetings, a new exhaustive list was developed. However, after the first attempts to fill it the team recognized that is extremely difficult to get some of the information needed and a reformulation process is on-going. Monitoring of the effects of verge vegetation cutting on road-kills (action D3) has already begun on national roads.

Website of the project (action E.1) is online and is being updated more often than scheduled.

A Communication Plan was developed and approved. The project was broadcasted on National Television and Radio, but the team recognizes that is being extremely difficult to include it in the spotlight of the media, despite the high number of formal and informal contacts that have already been done. We will continue with the efforts to make the project visible and attractive for the media. Nevertheless, many other tasks and materials have been produced to promote and disseminate the project results. The Media Report (deliverable of action E3, annex XXXVI) summarizes the published news, links, TV or radio broadcasts, press releases, oral and poster presentations and the videos produced.

The project management and monitoring actions F1, F2 and F3 are normally running and the main goals associated with them are being fulfilled. CA and CTAG meetings took place every time they were needed. However, for operational reasons, some of these meetings were replaced by partial meetings including the beneficiaries (often two or three) involved in the tasks being discussed. At least 43 partial meetings took place since February 2016.

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

Major changes are on-going due to the leaving of EGSP from the project. Nevertheless, to fill this gap, an amendment request with similar goals to the ones of actions A6 and C5 (reduce bird mortality in medium tension powerlines) is being proposed to EASME. The new proposal also includes new designs for poles and lines alignment, an innovative component that was highlighted in the original application. Other tasks are being, or will be, done broadly as planned, despite the inevitable adjustments that are needed in such a large project. Thus, the overall objectives and work plan of the project still hold and are viable.

### 3.3. Identified deviations, problems and corrective actions taken in the period

As mentioned before, a major change for the substitution of the original Associated Partner EGSP and the adaptation of the actions previously supervised by them is underway (see section 3.1 – General Progress and the amendment request annex I).

Some delays in material acquisition and open of calls aiming to hire specialized services are due to the heavy administrative work and government authorizations that are required to fulfil these tasks. The renting car contract to be made by UEVORA and the Road Maintenance Contract to be made by IP are good examples of this. Concerning the cars, the renting contracts are already signed and the delivery of both vehicles is projected to take place in September 2017. Old cars from the University or private cars have been used until now and none of the tasks have been stopped, delayed or modified because of this.

Other changes that are worthwhile to highlight are:

A full time person aiming to support Project Management was hired. Instead of the service acquisition proposed in the LIFE application, this technician was hired through an open public call, as enforced by the Portuguese law for contracts exceeding 75000 €. This procedure did not involve any additional costs for the project.

A few number of press releases than predicted have been delivered due to the delay in approval the Communication Plan and because the key actions of the project, for which these releases are particularly suitable, only recently started to be implemented.

The monitoring of the socio-economic effects is revealing to be a particularly complex task. A list of socio-economic indicators has already been approved. However, major changes to this list are needed because some information required to fill are not achievable. A simplification of the list is being prepared and will be submitted for approval to the next CG and CTAG meetings.



A new automatic camera (photographing every 15 seconds), not predicted in the LIFE application, and used for the first time in Portugal was acquired to monitor the use of small culverts by small fauna (amphibian, reptiles and small mammals) as well as a service to run an algorithm that automatically identifies the species/group photographed. We used the money left from the acquisition of the regular trapping cameras and, thus, there are no additional costs for the project.

A miswording between “radio spots” and “radio events” may have occurred in the original application. An explanation of this and its correction is now provided (see technical part – action E4).

#### 4. Administrative part

Figure 1 presents an updated organogram of the project management structure including the composition of the CP, CTAG and CG and CA.

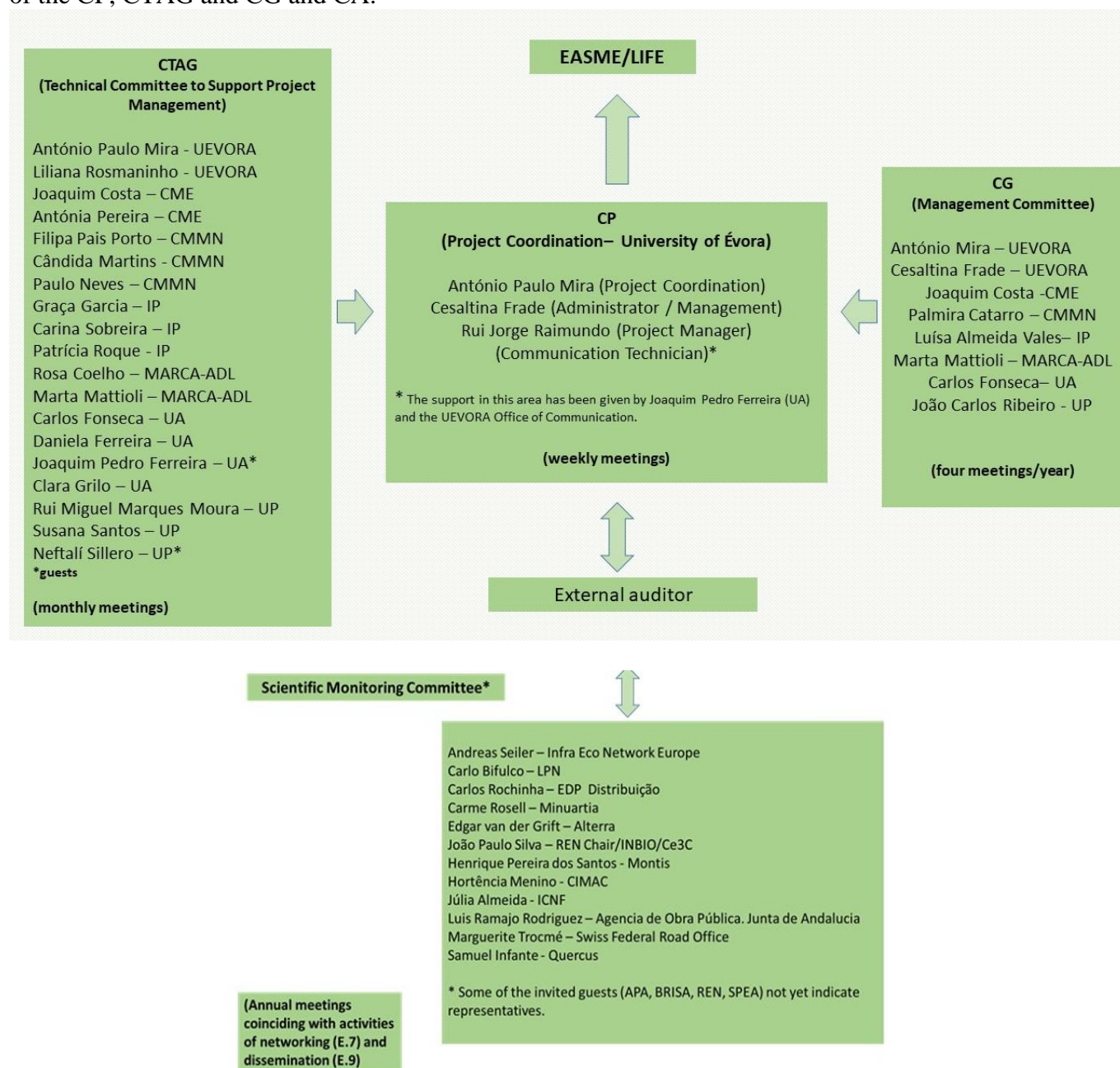


Figure 1. Organogram of the project Management Structure.



After the official starting date of the project, 78 meetings of the CP, 16 official meetings of the CTAG and two meetings of the CG aiming to organize tasks, analyse the project progress and discuss possible adjustments took place until 31 of July 2017. The first meeting of the Scientific Monitoring Committee was held at 2<sup>nd</sup> and 3<sup>rd</sup> of June 2016, and included a LIFE LINES Seminar open to the general public. Finally the two visits of the NEEMO monitoring team took place at 12<sup>nd</sup> and 13<sup>rd</sup> of April 2016 (with Joao Salgado) and in 23<sup>nd</sup> and 24<sup>nd</sup> of March 2017 (with Sara Barceló). During the project development, several changes in the team have occurred due to different reasons, as reported in the annex II (personnel structure). Some CTAG and CG members replaced, Filipa Pais Porto of CMMN is on maternity leave and was replaced by Cândida Martins (CTAG) and the previous head director of Environmental Department of IP Ana Cristina Martins has replaced by the new head of the Department Luisa Almeida Vales (CG). All the information about these meetings is compiled and ready to consult in the administrative services of the University of Évora.

## 5. Technical part

### 5.1. Progress per action

The next sections report only on actions that are actually in progress. Table I compares the original with new proposed deadlines for the milestones and deliverables of the project, for the reporting period. Green cells corresponded to the commitments already achieved and yellow cells to the new updated deadlines for tasks/products that needed to be changed. Table II updates the project indicators achieved so far. Table III presents a Gantt chart where the foreseen and actual project progresses are compared.

Table I. Original and newly proposed deadlines for the Milestones predicted for the reporting period.

Action number	Action name	Deliverable Name		Original deadline	New deadline
D.1	Monitoring / evaluation of socio-economic impacts of the project	List of socio-economic indicators to evaluate project progress and to be analysed/discussed in the CG meetings		Mar 2016	Jan 2017*
E.10	"Adopt a road", environmental educational/awareness program with local schools	T-shirt		Apr 2016	Jun 2017
A.6	Development of prototypes for deterring avifauna in medium voltage lines	Technical report about the work done in the action		Jun 2016	Amendment (no longer valid)
A.1	Completing and updating of baseline characterization	Project GIS database with all the compiled information		Jul 2016	Jul 2016
E.10	"Adopt a road", environmental educational/awareness program with local schools	Flyer to promote the project in Montemor-o-Novo and Évora counties		Aug 2016	Jun 2017
A.5	Installation of autochthonous plant nursery for conservation actions	Non-Technical report about the work done in the action		Dec 2016	Dec 2016
A.3	Communication Plan - Public disclosure sessions and contacts with the media	Media Report		(annex in each progress report)	(annex in each progress report)
Action number	Action name	Milestone Name	Start date	Original deadline	New deadline
A.1	Completing and updating of baseline characterization	Conclusion of Remote Sensing	Aug 2015	Out 2016	Completed
		Conclusion of Modelling		Jun 2016	Completed
		Conclusion of following animals by GPS		Mar 2016	Jun 2018
		Conclusion of integration of the results of A.1 action in A.2(National GIS) and A.3 (execution projects)		Jul 2016	Completed
		Conclusion of the integration of pre-existing SIG data		Dec 2015	Completed
A.2	Compilation, structuring and implementation of national database and multi-user web platform	National database and WebSIG full operational	Oct 2015	Dec. 2017	Dec 2017
		Conclusion of the integration of pre-existing SIG data.		Mar 2016	Mar 2018
A.3	Project implementation, licensing, procurement of permits and contracting procedures necessary to actions C	First administrative procedure of Licensing / Opinion / Authorization or communication accomplished *	Aug 2015	Feb. 2016	Completed
		1º procedure of contract needed to actions C *	Aug 2015	Jun 2016	Completed Jun 2017
		1st execution project accomplished	Aug 2015	Jan. 2016	Completed
A.4	Development, testing and evaluation of automated systems of monitoring and/or deterrence	Conclusion of the results of the existing prototypes and analyze the viability of develop new ones.	Aug 2015	Mar 2016	Dec 2017
		Completion of the installation of the three new prototypes of dissuasion	Aug 2015	Feb 2017	Jun 2018
		Completion of the installation of the three new prototypes of monitoring	Aug 2015	Apr 2017	Jun 2018
A.5	Installation of autochthonous plant nursery for conservation actions	Concluded (report in annex).	Aug 2015	Dec 2016	Completed

A.6	Development of prototypes for deterring avifauna in medium voltage lines	In reformulation	Aug 2015	Jun 2016	Amendment (no longer valid)
C.1	Integrated Mitigation of the reduction of conductivity and permeability of the landscape in national and principal roads.	-	Apr 2016	Dec 2017	Sep 2018
C.2	Potential of the verges and marginal parcels of roads infrastructures as shelter areas, refuge, food and / or displacement.	-	Apr 2016	Aug 2018	Jul 2020
C.3	Development and installation of vertical road traffic signs.	Delivering the process of homologation in ANSR	Oct 2015	Apr 2017	Dec 2017
C.4	Mobile Application to promote the collect of mortality data.	Beginning of the utilization of the app by the teams (D3)	Oct 2015	Jan 2018	Jan 2018
C.5	Testing devices for deterring avifauna landing in medium voltage lines.	In reformulation	Jun 2018	Dec 2018	Amendment (no longer valid)
C.6	Development, essay and application of biodiverse grasslands to promote biodiversity in linear infrastructures.	Collect a minimum of 20 species of seeds to the essays.	Set 2015	Out 2016	Completed
C.7	Mitigation measures and potentiation of roads in Évora municipality.	Beginning of the measures of the action	Out 2015	Mar 2017	Completed
		Conclusion of the measures of the action	Out 2015	Jun 2018	Dec 2018
C.8	Mitigation measures and potentiation of roads in Montemor-o- Novo municipality.	Conclusion of the measures of the action	Aug 2015	Jun 2018	Dec 2018
C.9	Operations in plant nursery to the conservation actions.	First bulbous plants/seeds available for conservation actions.	Jan 2017	Set 2017	Set 2017
		First herbaceous seeds form the propagations plots.	Jan 2017	Set 2017	Set 2017
C.10	Promotion of "islands" of Biodiversity along the power lines.	Installation of "Biodiversity Islands " concluded.	Jul 2016	Dec 2018	Dec 2018
D.1	Monitoring / evaluation of socio-economic impacts of the project	List of analysis / evaluation indicators approved.	Ago 2015	Dez 2015	Completed* (Jan 2017)
		Procedures to adopt internally by each partner for the collection / delivery of information approved.	Ago 2015	Dez 2015	Completed (Jan 2017)
D.3	Monitoring / evaluation of the effects / impacts of conservation measures.	-	Jul 2016	Set 2020	Set 2020
E.1	Communication Plan - Project Website	1 <sup>st</sup> quarterly content updating	Aug 2015	Dec 2015	Completed
		Website operational and "on-line"	Aug 2015	Oct 2015	Completed
E.2	Communication Plan - Placards/Outdoors in intervention areas	Outdoor graphical image and placard standard structure in the intervention area approved	Aug 2015	Dec 2015	Completed
		Conclusion of the installation of all placards and the outdoor panel.	Jan 2017	Jun 2019	Jun 2019
E.3	Communication Plan - Public disclosure sessions and contacts with the media	Project Communication Plan approved in CG	Aug 2015	Dec 2015	Completed (Nov 2016)
		Media report (annex in each progress report)	Mar 2016	Jul 2020	Jul 2020

E.4	Communication Plan - Complementary works and materials	1 <sup>st</sup> thematic video with specialized media for visitors available	Aug 2015	Jan 2016	Completed
		1 <sup>st</sup> Project teaser "on-line"	Aug 2015	Dec 2015	Completed
		1 <sup>st</sup> radio spot transmitted	Aug 2015	Dec 2017	Dec 2017
E.5	Awareness and involvement of the academic community in collecting information/data	PhD Thesis approved in assessment of landscape connectivity changes.	Aug 2016	Jul 2020	Jul 2020
		Master Thesis approved in effectiveness of automatic amphibian monitoring devices.	Aug 2016	Jul 2018	Jul 2019
		Master Thesis in effectiveness of the new devices to reduce bird mortality in medium tension powerlines finished**	Oct 2017**	Sep 2019**	Sep 2019** Amendment (adjusted Thesis theme)
E.7	Networking with other LIFE and not LIFE projects.	1 <sup>st</sup> visit of a European expert to the project	Feb 2016	Aug 2020	Aug 2020
		1 <sup>st</sup> visit of a team of LIFE LINES outside of Portugal	Feb 2016	Aug 2020	Completed (Feb 2016)
E.8	Volunteer Program for young people.	1 <sup>st</sup> activity of "Voluntariado Corporativo/Institucional" program.	Out 2015	Dec 2016	Completed
		1 <sup>st</sup> activity of "Voluntariado Jovem" program.	Out 2015	Jun 2016	Completed
		1 <sup>st</sup> activity of "Voluntariado associativo" program.	Out 2015	Set 2016	Completed
E.9	Technical seminars to present the developments and results of the project.	1 <sup>st</sup> Seminar of LIFE LINES project (Beginning).	Jun 2016	Jun 2016	Completed
E.10	"Adopt a road", environmental educational/awareness program with local schools	Implementation of the Education and Awareness Program in Montemor-o-Novo started		Apr 2016	Completed
		Conclusion of the flyers "Adopta uma estrada"		Jun 2016	Completed (Jun 2017)
		Beginning of the implementation of the Education and Awareness Program in Montemor-o-Novo		Aug 2015	Completed
F.1	Project management	Presence of 2 CP representatives in the European kick-off meeting		Dec 2015	Completed
		1 <sup>st</sup> CG meeting and appointment of CTAG representatives		Aug 2015	Completed (Mar 2016)
		1 <sup>st</sup> CP meeting		Aug. 2015	Completed
		1 <sup>st</sup> CTAG meeting		Aug 2015	Completed (Sep 2015)
		1 <sup>st</sup> CA meeting		Oct 2015	Completed (Jun 2016)
F.2	Structuring and compilation of project development indicators	1 <sup>st</sup> biannual update of project developments indicators posted online		Feb 2016	Completed Jul 2017
F.3	External audit	Adjudication of project external auditor services to a certificated ROC <b>Concluded</b>		Dec 2015	Dec 2017***

\* - Despite being already accomplished needs to be modified.

\*\* - Deliverables/Milestones are changed/updated according to amendment request to replace Actions A.6 and C.5.

\*\*\* Despite the formal adjudication to the auditor is still ongoing, UEVORA is already working with this entity in the framework of the LIFE LINES, whenever needed.

#### *Action A.1 – in progress*

Foreseen start date: 01/08/2015

Actual start date: 01/08/2015

**Foreseen end date: 30/07/2016**

**Anticipated end date: 30/06/2018**

All the tasks to this action are concluded with the exception of the capture of all owls (12) predicted in the application. Moreover, 3 genets followed by GPS produced very few data and would be useful to capture and follow additional animals. The annex III includes a full, in a “near final report”, all the updates in the tasks, methods and expected results obtained so far. The capture and monitoring the owls are the only part not fully accomplished due to difficulties in capture and recapture the animals. However, after a lot of diligences made by the team of the project, the procedure to acquisition of new material that avoids the need of recapture is completed now. We expect until the mid-term report (June 2018) close the Action A1 and provide full data on the movement of the owls and additional (higher quality) data on movement of genets. The deliverable “Project GIS database with all compiled information” is done and in operation in the project main computer. It includes 386 layers of data and part of it can be seen online through the project WebGIS ([https://mapserver.uevora.pt/webgis\\_lifelines/lizmap/www/index.php/view/](https://mapserver.uevora.pt/webgis_lifelines/lizmap/www/index.php/view/)). The database layers (deliverable Action A1), excluding the six that cannot freely distributed due to licence constrains, are available through the following web link [https://mapserver.uevora.pt/lifelines\\_geodata](https://mapserver.uevora.pt/lifelines_geodata) (username: lifelines; password: ]?9jx3;l3\*V)V}C).

All the milestones except the “Conclusion of following animals by GPS” were already achieved. A quasi-final A1 report is in annex III.

#### *Action A.2 – in progress*

Foreseen start date: 01/10/2015

Actual start date: 01/10/2015

Foreseen end date: 31/12/2016

**Anticipated end date: 31/03/2018**

A national database was already implemented with the data provided by the main entities holding this type of data, including IP (Systematization and validation of road kills data at Évora district), FCUP, and UEVORA teams.

A protocol with National Republican Guard since this entity has a database of the car accidents involving large animals is in progress (annex IV). All other Road Concessionaries and Sub-concessionaries have been contacted for the same purpose, but until now there were only negative answers or no answers (annex V). Thus the milestone “Conclusion of the integration of pre-existing SIG data” was postponed. More efforts, including the schedule of live meetings, will be made in the next months to involve these concessionaires and other entities that may have this type of data. Despite this, by the end of the reporting period 50076 records of roadkills belonging to 199 species are already in the database. A manual with the guidelines and procedures to prepare de information for the database was produced (annex VI). The data introduced in the study area, whenever possible, were previously validated by specialists. Doubtful data were excluded. Thus we are confident that the quality of the data is very high. Concerning IP, the process of validation is slower and priority has been given the study area and its surroundings. Thus, until now, the spatial representation of the road-kill is data biased towards the SA, but this will be overcome at least when all the other data from IP and GNR will be included. (Question 1 – 2<sup>nd</sup> Monitoring Visit)

Meanwhile the aggregated road-kill data can be viewed online through the WebGIS the project ([https://mapserver.uevora.pt/webgis\\_lifelines/lizmap/www/index.php/view/](https://mapserver.uevora.pt/webgis_lifelines/lizmap/www/index.php/view/)). This database application aims two kinds of users: public data, available at a broad scale; and private working data that at this stage is available at a finer scale only for the project team.

After meetings have taken place between the teams of Évora and IP a specialized firm was hired to specifically develop the web services. These are the command lines that link the database to the application that is being developed in the action C4. At this moment all the scripting to synchronize data between the database from UE and the database from IP have been developed and are in testing phase.

#### *Action A.3 – in progress*

Foreseen start date: 01/08/2015

Actual start date: 01/08/2015

Foreseen end date: 30/06/2017

**Anticipated end date: 31/12/2017**

This action has begun in the expected date. Nevertheless, an additional amount of time was invested in talks with different stakeholders in order to improve/adapt the projects according to the expectations of all the parts involved and whenever possible, increase the cost-benefits ratio. This together with all the mandatory administrative procedures needed by law is responsible to the delay of some milestones. At moment 10 execution projects are already finalized and two are in an advance stage of development. So we propose a new deadline (31-12-2017) to complete this action. However this will not jeopardize the foreseen objectives.

List of projects already finished:

- (1) Design of the amphibian passage warning signal (annex VII);
- (5) Projects of construction of dry ledges for fauna on 5 culverts at EN4, EN114 e IP2 (annex VIII);
- (1) Road Maintenance Contract including invasive plant species control (annex IX) ;
- (1) EM 529 - Implementation of barriers and tunnels for amphibians (annex XIII);
- (1) EM 535 - Intervention Plan (annex XVI);
- (1) NIA – Restoration of Nucleus of Environmental Interpretation - NIA (annex XVII).

Some details about the procedures taken are as follows:

#### **IP**

2015 - Design of amphibian passage warning signal have been concluded and internally approved at IP. Other documents (e.g. examples in other countries, etc.) to support the license request to ANSR have already been sent (annex X). Road signals homologation may take longer than initially predicted. This is the main reason why we anticipate that the end date of the action may be delayed.

2015- Elaboration and conclusion of the project of construction and implementation of dry ledges for fauna passages on five culverts at EN4, EN114 e IP2. (annex VIII).

02/2017 - Elaboration and conclusion of the terms of reference for Road Maintenance Contract, including the LIFE LINES specifications (annex IX). Still not received the Government approval to initiate contract procedures. Multi-annual budgets for activities that take longer than one fiscal year must be approved by the Government (by both the Ministry of Finance and the Ministry of Planning and Infrastructure). A



close and permanent contact is held, to ensure that these approvals are given without delaying the procurement processes, however, till now, IP did not receive yet the approval for this activity.

06/2017 - IP is developing the projects for the execution of amphibian barriers and culvert adaptations as well as the barriers to elevate vertebrate fly flight. Justification of the delay and changes in the project are explained in action C1 (annex XI).

07/2017 - Contract signing for adaptation with dry ledges for fauna of five culverts on EN4, EN114 e IP2 construction (Auto de Consignação da Obra) (annex XII). The construction as already began.

## **CME**

04/2017 - Conclusion of the requalification of EM529 road project to allow the implementation of barriers and tunnels for the amphibians. The public contest was open during the month of July and the final administrative procedures are closing (Relatório Final de Adjudicação). The prevision to initiate the intervention is about two months from now (October of 2017) and it is expected that it will be finalized until the end of 2017. All the documents regarding these procedures are in annexes XIV and XV.

## **CMMN**

The tendering procedures have been speed up (Question 2 – 2<sup>nd</sup> Monitoring Visit) as follows:

03/2017 –The initial proposal for intervention in the EM529 road proposed by the UEVORA team has been approved by the municipality, followed by the opening of the public contest (24<sup>th</sup> May 2017) and all of the administrative procedures needed for it. At 12<sup>th</sup> of July the final proposal of the project and the details of the public contest (Caderno de Encargos) were approved by the Municipal Assembly (annex XVIII). Intervention at the road is planned to begin in September 2017. The documents regarding all the procedures at the intervention in EM535 are in annex XIX.

07/2017 – The project of NIA restoration was approved by the municipality. The written and drawn components of the project are in annexes XX and XXI, respectively.

## **UEVORA**

03/2017 - After several meetings of UEVORA with REN, the firm that operates Very Highly Voltage Power Lines, a draft of a cooperation protocol aiming the implementation of action C10 and REN to be formal collaborator of the LIFE LINES was agreed between both entities. The protocol (annex XXII) is at REN waiting for signatures.

### *Action A.4 – started*

Foreseen start date: 01/08/2015

Actual start date: 01/08/2015

Foreseen end date: 30/06/2018

Actual end date: 30/06/2018

In the original proposal, the University of Minho was indicated as the main provider of materials to the project. Currently, the University of Minho has been substituted by the FCUP in order to maintain the final costs of Task A4 as previously planned.

Task A4 is delayed because the process to hire the grant-holders took about one year. This was due to the time consuming authorizations and administrative procedures need do open the call and to the absence of candidates with the requested profile. Moreover, many materials necessary to build the devices had to be purchased outside EU, and took longer to arrive than initially predicted. Despite this we believe that the

original deadline proposed for this action will be fulfilled. After analysing the existing monitoring prototypes we decide to update the algorithms of the already existing device for automatic survey of amphibian road-kills (MMS1) and create a smaller one (MMS2), easier to use, that will also be tested to monitor bird road-kills. Currently, several tasks of this action are on-going, including: (i) fieldwork to test road-killed animal data for the mobile mapping trailer (MMS1); (ii) control tests on 20 meters of road for the mobile mapping trailer (MMS1) with road-killed amphibians from the biological collection of UEVORA; (iii) Updating of the algorithm for detecting road-killed amphibians on the images recorded by the mobile mapping trailer (MMS1), (iv) collection of images of road-killed small birds to feed the detection algorithm by the mobile mapping trailer (MMS1); (v) adaptation of the algorithms to detect road-killed small birds on the images recorded by the mobile mapping trailer; (vi) development of a desktop application for automatic detection of road-kills on the images recorded by the mobile mapping trailer; (vii) acquisition of the components for the new mobile mapping system (MMS2) and dissuasion devices for rodents and owls.

The dissuasion devices for rodents and owls will be finished at the end of December 2017. The updated monitoring device will be finished on October of 2017. The new mobile mapping system (MMS2) will be finished at June of 2018. Annex XXIII summarizes the procedure to improve the algorithm for detecting road-killed amphibians on the images recorded by the mobile mapping trailer (MMS1) and the material acquired.

#### *Action A.5 - Concluded*

Foreseen start date: 01/08/2015

Actual start date: 01/08/2015

Foreseen end date: 31/12/2016

Actual end date: 31/12/2016

The nursery infrastructure was finished in the foreseen end date, as explained in the non-technical report of the action A5 (annex XXIV). The new place found to install the nursery did not interfere with its functioning neither the end date of the action. All the deliverables/milestones and indicators were achieved.

#### *Action A.6 – in reformulation*

**Delayed due to AB (EGSP) withdrawal from the project. An amendment to project proposal was sent to EASME/EU Commission and is now under evaluation. See section “Amendment request annex I”.**

Foreseen start date: 01/08/2015

**New proposal starting date: 01/09/2017**

Foreseen end date: 30/06/2017

**New proposal end date: 31/08/2018**

#### *Action C.1 – started*

Foreseen start date: 01/03/2016

Actual start date: 01/03/2016

Foreseen end date: 31/12/2017

**Anticipated end date: 30/09/2018**

Most of the procedures needed for interventions in the framework of action C1 started on the predicted date. However, time consuming administrative processes or difficulties in contracting with some suppliers delayed the beginning of some interventions on the field. At the moment the following tasks are finished or ongoing:

07/2017

### Fauna passages in 5 culverts at EN4, EN114 e IP2

The building work has been initiated in July and is expected to be finished in September 2017.

07/2017

### Implementation of fences in small segments near 7 culverts at EN4, EN114 e IP2

There has been a meeting between IP and the actual contractor of the Road Maintenance Contract in order to define the best way to apply these fences, which will be installed between the private landers' fences and the culverts. There are still some points that will need adjustments but IP expects to have this installation concluded until the end of 2017.

### Installation of 100 Swareflex wildlife warning reflector at EN4

It was difficult to find a company willing to sell and install these devices and only by the end of July 2017 we have the confirmation from JP Gaspar that they are available to sell. Meanwhile a field visit with a technician from the firm has already happened and a detailed project to implement these devices is being developed.

06/2017

### Amphibian's road-kill mitigation measures

IP is developing the projects for the execution of amphibian barriers and culvert adaptations. It was identified one important segment at EN114 with high numbers of amphibians' road-kills. Thus, it is important to implement measures to reduce this high level of mortality. The first solution, proposed in LIFE LINES project (construction of tunnels for amphibians), was studied during the preparatory studies and the IP civil engineers did not approve it for the following reasons: due to safety and maintenance constrains it is not viable to construct in EN114 the kind of tunnels usually used in smaller roads with reduced traffic and velocity. In fact, EN114 is a main road that supports high levels of traffic associated to high speed. The introduction of different structures in the pavement can risk the safety driving since the irregularities associated to these different structures tend to cause accidents. Usually, the drainage culverts are deeper and have an embankment large enough to prevent this problem. For this reason, and because there are few segments in this road with embankments large enough to implement tunnels, it was necessary to look for alternative solutions. During the preparatory studies, it was realized that there were two drainage culverts at that road segment predicted to be intervened that could be adapted to allow its use by amphibians, as long as they were guided by the barriers. So, a project including the necessary adaptations to be made on the culverts to promote their use by amphibians is ongoing. Adaptions comprise building ramps for amphibians' access (there are steps in the actual accesses) and rising the lateral culvert walls to connect with the barriers that will be implemented.

We expect to achieve with these alternative solutions similar results to the ones of the original proposal. If this happens, its application in the future will be easier since all roads have a large number of culverts that can be adapted for this purpose. Since the project is not finished yet, we do not have final costs for it. However, it is possible that some changes to the original proposal will occur. Nevertheless, IP expects not to overpass the total costs predicted for this action. The exploratory studies to find alternatives had brought some delay to the project design but IP expects to initiate its construction in the very beginning of 2018. Annex XI includes the first drafts of the project under development.

### Barriers to elevate the bird's flight

Following is detailed explanation of the processes and tasks already taken, justifications for some delays/modifications and proposal of new deadlines, whenever possible (Questions 3, 4, 5 and 6 – 2<sup>nd</sup> Monitoring Visit)

Putting in place barriers and/or drift nets to guide bird's flight is major task proposed to take place in EN114 in a location with higher levels of road-kills of flying vertebrates. Several options remained open

in project application proposal. However, after the advice of road ecology specialized members of the Scientific Monitoring Committee, building simple barriers to elevate flight height should be the option first tested. Despite this, the solution raised a few doubts to IP civil engineers about how to execute it, and some safety restrictions were identified, especially in what concerns its implementation on a bridge. The implementation of high barriers on bridges is unadvisable, due to the risk of falling when submitted to wind action. Due to this fact there were some delays in the project design which is now being developed assuming barriers of 3m high, with metal resistant nets that are permeable to wind.

The LIFE LINES project had predicted several alternative measures and the financial amount estimated was not accurate, so it is possible that there will be changes to the budget of this task. Nevertheless, IP expects not to overpass the total costs predicted for this action and the necessary adjustments will be made after execution of all the tasks in the field.

The owl's and amphibian's measures are projected by the same engineer and will be built by the same contractor. IP expects to initiate its construction in the very beginning of 2018. Annex XI presents the first drafts of the project under development.

06-10/2016

#### Repair/replacement of the existing fences and implementation of the new net, set in L format, stapled to the existing fence in IP2

The fences are essential to avoid animals on the roads. This segment of IP2 was a hotspot of mortality in previous years despite it was fenced. The fences in place were conceived to large animals as cattle and are not efficient to prevent small animals to pass through or below them, especially old fences whose net is not so stretched anymore. We believe the good conditions and the proper characteristics of the fences can make a difference in this impact and for that reason, they are being replaced/repared on this segment. Simultaneously it is projected the implementation of a new net, with smaller mesh, stapled to the existing one, in "L" set, to complement its efficiency. This net cannot replace the existing one, because it will be buried to about 50 cm (to avoid animals from digging under it), and therefore will not be high enough to prevent climbing/jumping (annex XXV). Moreover, technically it is not advisable to staple the new net directly to the old one since it is not stretched in many places and will degrade sooner. Both nets complement each other in preventing animals to reach the road. This justifies the need to repair/replace the existing fences.

The execution of these measures will be included in the Road Maintenance Contract, which includes the Life Lines specifications. The terms of reference are concluded but IP has not received the Government approval to initiate contract procedures. Nevertheless, IP expects to have the contract procedures completed in the very beginning of 2018, and if so, it will be asked the contractor to implement this measure still in the first trimester of 2018.

#### Implementation of nets covering the slopes to avoid rabbits

As in the previous task, the execution of this measure will be included in the Road Maintenance Contract, which includes the Life Lines specifications. The same budget approval constraints mentioned in the previous paragraph are applied to this task and justify its delay. Nevertheless, IP expects to have the contract procedures completed in the beginning of 2018, and if so, it will be asked the contractor to implement this measure in the first trimester of 2018.

#### Electronic prototypes to avoid owls and micromammals near the roads

These devices are being developed by FCUP under the framework of Action A4. IP will help to install them whenever they are concluded.

Due to the mentioned delays, especially the tasks depending on the new Road Maintenance Contract, we suggest to extend the period of action C1 execution until September 2018.

#### *Action C.2 – started*

Foreseen start date: 01/03/2016

Actual start date: 01/03/2016

Foreseen end date: 30/06/2018

**Anticipated end date: 31/07/2020**

Preparatory tasks of this action started on March 2016, as predicted.

Procedures and tasks that took place until now or are ongoing are as follows:

2015 – 06/2017

#### Mowing of verges at IP2, EN4, EN114, EN18/IP2

This task has been executed regularly, preventing vegetation from growing too much, which diminishes the visibility of animals (that are easily run over) and attract small animals to the road.

Note: The LIFE LINES Project describes this task in Action C1, but its financial costs are referred in Action C2 (Table F3, p. 315). Therefore we included this task in Action C2.

#### Mowing of verges with improved techniques at IP2, EN4, EN114, EN18/IP2

Mowing is an important way of reducing road-kills as explained in the previous point. But it can be improved in order to be more efficient in this task and cause less damage to the green corridor role played by the slopes. Thus, the improved techniques will include: more frequency in mowing actions (shorten the time intervals between mowing actions when weather conditions promote excessive vegetation growth); possibility of mowing just 1.5 m instead of the 3 m established on the actual contract (in areas where it's important to keep a green strip as corridor for small animals); and possibility of leaving some bushes and vegetation "islands" (instead of cutting all the vegetation) that can create refuges and stepping stones for small animals.

The execution of this measure will be included in the Road Maintenance Contract, which includes the Life Lines specifications. The terms of reference are concluded but IP has not received the Government approval to initiate contract procedures. Thus, the delays and limitations explained in Action A3, apply in this situation. IP expects to have the contract procedures completed in the beginning of 2018. If this will happen, it will be asked the contractor to implement this measure in the first trimester of 2018.

05/2017

#### Implementation of a strawberry tree barrier to elevate owl's flight

It was agreed with Fundação Mata do Bussaco (BRIGHT Life project - "Bussaco's Recovery from Invasions Generating Habitat Threats") the acquisition of 400 *Arbutus unedo* (strawberry tree) to plant on EN4 slopes. They're growing and will be planted in the 3<sup>rd</sup> trimester of 2017, during the autumn (when starts to rain) in order to guarantee its successful establishment and growing.

03-10/2016

#### Control of Invasive Species Plan

UEVORA compiled and selected improved methods, based on literature, consultancy of specialists and other projects experience, to control invasive flora, in particular *Acacia dealbata*, *Acacia melanoxylon*, *Ailanthus altissima* and *Arundo donax*, as requested by IP. The suggested methods were adjusted according to IP internal specifications and to the typology of the selected intervention areas. Since then, there were several meetings with UEVORA team and MARCA, as well as field work, in order to define and select the invasive species parcels to control and the best methods to use on each particular case (annex XXVI).



07/2017

### Control of Invasive Species Plan

IP concluded the Plan (1<sup>st</sup> phase – Initial Control) to control invasive species in the areas selected during the preparatory studies. This selection took into consideration the possibility of choosing the best technique at each case and the budget available to apply in this task.

In the Plan, annex IX to this document, are presented the estimated areas of intervention, its location, and the methods that will be used. Fifty-one patches were selected for control and three patches to be used as “reference situation” (in those 3 patches, for comparison purposes, invasive control will be done using the traditional techniques and not the improved ones). The improved methods were chosen according to the species and parameters such as age, density, proximity to other patches in private lands, and presence of native species. The following methods will be used: sequential cuts; cut and herbicide application; injection of herbicide; debark of the tree trunk; manual removal; and complementary plantation of native species.

In the 1<sup>st</sup> year – 2018 – actions of initial control will be applied in all of the 51 patches predicted to be intervened. It is not possible in most situations guarantee the eradication of the invasive species in the first year, since there is a seed bank in the soil that will take several years to control. Also, these species are very resistant to the control actions, being necessary to repeat the procedures, sometimes year after year. These facts are well documented in the bibliography. So IP strategy consists in applying sequential actions. Therefore, there will be a 2<sup>nd</sup> phase (2019) to repeat procedures if necessary or even to apply alternative solutions, as well as to control the new shoots that predictably will appear in some patches – Continuity Control. The 3<sup>rd</sup> phase, called Maintenance Control, will be similar to the 2<sup>nd</sup> one, but hopefully in a much less frequency, regarding mainly the plants from the bank seeds in the soil. This 3<sup>rd</sup> action will start in 2020 and go on through the sequent years, including after LIFE work since it is not possible to assure a definitive eradication of the invasive species during the project lifetime.

Please note that the indicator (100% control of woody invasive plants) refers to the proportion of the areas that will be intervened and not to all the area with invasive plants. That is, we expect to fully control only the areas that were selected to be intervened, the extension of which was defined according the budget available for this task (15154 €) (Question 7 – 2<sup>nd</sup> Monitoring Visit).

These works will be a part of the Road Maintenance Contract, which includes the Life Lines specifications. The terms of reference are concluded but IP has not received the Government approval to initiate contract procedures. The same limitations and restrictions referred in previous tasks depending on this contract apply in this situation.

### Implementation of micro-reserves

UEVORA has suggested some patches along the roads to be used as micro-reserves. Due to difficulties in detecting the land registry of some parcels, IP, in 2016, only approved one of the suggested parcels. However, efforts have been made to choose another patch in order to complete the 4 ha of micro-reserves predicted for this action. On June 2017 IP has sent to UEVORA a proposal to add a new patch to the previously selected one. If the suggestion will be accepted by the other partners of this action, as expected, the two patches will match a total area of 4,78ha (annex XXVII).

The next step is the micro-reserves installation project that is being developed by UEVORA. As soon as it will be ready, IP will initiate the work aiming micro-reserve installation.

As there are some tasks of this action that are supposed to continue until the end of the project LIFE (mowing of the verges and controlling of the invasive species) we believe the end of this action predicted to occur at June 2018 is an inaccuracy in the original proposal. In fact, it is mentioned in the project proposal, on the table F3 (p.315) that either the mowing with the improved techniques, either the control



of invasive species, will happen during 2017-2020). This makes sense since it is not a task that can be done in just a one year period. Thus, we ask for the correction of this error on the deadlines previously defined for this action and propose the new deadline to be 31-07-2020.

#### *Action C.3 – in progress*

Foreseen start date: 01/10/2015

Actual start date: 01/10/2015

Foreseen end date: 31/03/2017

**Anticipated end date: 31/12/2017**

The design of amphibians road sign is completed for more than a year (annex VII). The process of requesting authorization was initiated in September 2016. New road signs must be approved by the National Authority for Road Safety. A close and permanent contact is held with this entity, to ensure that these approvals are given without delaying the process. However, until now, IP did not receive the approval of the signal. For this reason, we suggest that the deadline of this action is extended to the end of 2017.

#### *Action C.4 – started*

Foreseen start date: 01/10/2015

Actual start date: 01/10/2015

Foreseen end date: 31/07/2020

Actual end date: 31/07/2020

Several meetings to define the interoperability among IP and UEVORA teams have taken place. Work done includes the definition of the mobile application data model; developments and technical adjustments to the integration of services (web services) between the database and the android mobile application; progress and functional adjustments in the front-office of the mobile application; definition of the operational groups of species and design of the groups icons (annex XXVIII). The application will be ready to start the tests in October of 2017 and finalized until the end of the year. The official launch of the application (including a major media event) is set to the first trimester of 2018.

#### *Action C.5 – in reformulation*

**Delayed due to AB (EGSP) withdrawal from the project. An amendment to project proposal was sent to EASME/EU Commission and is now under evaluation.** See section “Amendment request - annex I”.

Foreseen start date: 01/07/2016

New proposal starting date: 01/09/2018

Foreseen end date: 31/12/2019

**New proposal end date: 31/12/2019**

#### *Action C.6 – in progress*

Foreseen start date: 01/01/2016

**Actual start date: 01/09/2015**

Foreseen end date: 31/12/2019

Actual end date: 31/12/2019

09-12/2015

UEVORA have completed the preliminary selection of potential plant species (i.e. species expected to occur on the studied area - 1,064 species), to be used in the biodiverse seed mixtures and summarized ecological information of each species. Plant species chosen (annex XXIX) took in consideration the promotion of the project's target butterflies and small mammals.

Since 03/2016

Seed harvesting by UEVORA, based on the above species list and on prospection of flora populations of action A1, is ongoing. Until now, seeds of 153 plant species have been harvested, 30% of which were collected by volunteers. These seeds are to be used in both the biodiverse seed mixture (*ex situ* and *in situ* trials, aiming at further species selection) and to integrate a seed bank for future actions. After cleaning, weighing, and quantity estimating, the harvested seeds have been stored in a seed bank, organized in identified lots. Seed harvesting as well as the maintenance and organization of the seed bank will continue throughout the project. Additionally, some collected seeds species will also be used to promote the micro-reserves biodiversity, either alone or in combination with other plants.

Since 11/2016

Fifty out of the 153 plant species were selected for chamber germination and *ex situ* seeding. In the germination tests, seeds were subjected to different pre-treatments and temperature and photoperiod conditions. The *ex situ* tests included seeding of two typologies of mixtures (with two mixtures per typology) and seeding of single species.

05/2017

The performance and sustainability of the biodiverse seed mixtures were evaluated through assessment of species frequency, abundance, and biomass production, for each tested species, individually.

Spaces at the University of Évora campus are being re-qualified. This implied the necessity to translocate the old infrastructure to the new place

Spaces at the University of Évora campus are being re-qualified. This implied a new definition of the location of the greenhouse and the necessity to translocate the old infrastructure to the new place. The Greenhouse final location is now approved by University and the electricity supply system is being installed. We expect the greenhouse will be fully installed in until the end of 2017. Nevertheless, milestones and indicators have been achieved as the temporary use of part of an existing greenhouse was facilitated.

*Action C.7 – started*

Foreseen start date: 01//04/2016

**Actual start date: 01/10/2015**

Foreseen end date: 30/06/2018

**Actual end date: 31/12/2018**

UEVORA analysed the amphibian roadkill data and defined with CME the priority locations of the 5 new amphibian tunnels and barriers predicted to be installed on EM529. All the procedures and details of the project are described in the documents “Caderno de Encargos da Beneficiação da EM 529” inside annex XIV and “Execution project (drawn parts)” (annex XV).

During March 2017, UEVORA in collaboration with CME selected ten micro-reserves in Évora ecotrail that summed up a total of 2.15 ha and five reference plots (for the BACI procedure) totalizing 0.52 ha. Concerning exotic invasive plants, *Arundo donax* was the only well represented species in Évora ecotrail (see invasive flora cartography in annex to action A1). Among the other five expected species only three were detected and even those were poorly represented: small nuclei of *Acacia dealbata* and *Acacia* sp. on private land and of *Robinia pseudoacacia* in private land or on instable slopes difficult to access and to be intervened. Thus, as requested by CME, UEVORA compiled and selected improved methods, with basis on literature and other projects to control *Arundo donax* only (March 2017). To perform this UEVORA and CME selected eight patches of *Arundo donax* with a total of 0.66 ha for improved methods and also four reference plots totalizing 0.13 ha. The methods predicted to be used might still be adjusted according to each intervention area characteristics (annex XXX). (Question 8 – 2<sup>nd</sup> Monitoring Visit)

For monitoring purposes, in April 2017 UEVORA performed the native flora detailed cartography, in the selected Évora ecotrail areas (micro-reserve and invasive flora control), using surveying quadrats (annex III– Action A.1).

*Action C.8 – in progress*

Foreseen start date: 01/08/2015

Actual start date: 01/08/2015

Foreseen end date: 30/06/2018

**Actual end date: 31/12/2018**

It is expected that the mitigation measures to be implemented on EM535, could be finished until the end of 2017. The “Intervention plan” has already been approved and the adjudication process is in a final stage (annex XIX).

These interventions will cover seven of the nine areas initially proposed by UEVORA, supported on the data collected from November 2015 until December 2016 (Action A1).

Interventions aim to reduce road-kills and road barrier effect for small fauna, mainly amphibians. At each site the project took into account the collected data on road-kills and road crossings and the terrain conditions. Different types of materials and designs were considered in order to test for the more efficient solution, as proposed in the original application. Some examples of these mitigation measures are: installation of normal round concrete culverts or ACO style culverts with a non-metal grid; amphibian fences constructed with concrete or made with plastic membrane; construction of dry-ledges in some culverts.

As complementary work it's planned to test new practices of management of the vegetation on verges (mandatory by Portuguese Law to reduce fire ignition and spreading risks). The aim is to minimize the impact of the current management practices on amphibians and small mammals. The measures are planned to start to be implemented during 2018, after a more detailed planning between the CMMN and UEVORA. Vegetation cutting done annually at EM535 verges by CMMN was done early on 2017 which made it impossible an exhaustive characterization of the vegetation at these places. To complement the data UEVORA will conduct during 2018 new vegetation monitoring, followed by the plantation of sprouts and seeds during autumn/winter.

The control of the exotic flora developed by MARCA (E.8) already started for the four species identified. Despite that, some areas need a larger intervention, and some of that work is predicted to be done by voluntaries (E.8). The next step will be to evaluate new and more efficient ways of doing the invasive plants control in these large areas, ensuring the objectives and indicators of the project (control of 3.2 ha of invasive plant species and dissemination of good practices) will be fulfilled.

To promote the habitat for the target small mammals and butterflies, UEVORA with the support of CMMN selected ten micro-reserves in the Ecotrail with a total area of 1.58ha and six areas for reference in the BACI design with 0.14 ha. The characterization of the vegetation at each area was done by UEVORA during the spring of 2017.

*Action C.9 – started*

Foreseen start date: 01/01/2017

Actual start date: 01/01/2017

Foreseen end date: 31/09/2020

Actual end date: 31/09/2020

The nursery is already operating. In the first season a total of 1225 plants belonging to 17 native species of trees and shrubs are being produced. Additionally, bulbous of three plant species are being grown, and

seeds of 15 grass species have been produced. We were not successful with some of the herbaceous species that we have tried to produce. Only 15 species of the 25 that have been sown seem to be viable (annex XXIV– Deliverable: Report of Action A.5).

#### *Action C.10 – started*

Foreseen start date: 01/07/2016

Actual start date: 01/07/2016

Foreseen end date: 31/12/2018

Actual end date: 31/12/2018

In the scope of C10 action, prior to the promotion of biodiversity "islands" along powerlines paths, we sampled small mammals, carnivores, butterflies and vegetation on the base of 20 very high voltage powerlines poles (annex III –Action A.1). A group of 15 powerline poles includes five experimental sets of three poles each (one with no intervention, for control; another only fenced to avoid livestock grazing; and still another fenced and with active intervention including plantation and sown of several native species of grasses and shrubs). Additionally a group of 5 sequential poles linking, as stepping stones, the borders of two Mediterranean forest patches will be actively intervened (fenced, planted and sown). Each powerline pole base has about 48 m<sup>2</sup>. Thus, in total an area of 720 m<sup>2</sup> (including all the fenced bases of poles) are expected to act as biodiversity islands and stepping stones for flora and small fauna.

This action has begun on the predicted date. However, the first months were spent in talks with REN, the operator of these powerlines, aiming to sign a protocol of collaboration and to have their support on getting landowners authorization for the interventions. Protocol signing is ongoing (annex XXII).

#### *Action D.1 – started*

Foreseen start date: 01/08/2015

Actual start date: **01/01/2016**

Foreseen end date: 31/07/2020

Actual end date: 31/07/2020

This action is more complex than initially predicted and, because of that, is delayed. A first draft of the list was produced in the first trimester of 2016. However, CTAG concluded that it needed to be reformulated. After this, several members of the team (Rosa Coelho, Rui Raimundo and António Mira) worked on a list that should be as exhaustive as possible in order to reflect, in detail, the socio-economic impacts of the project. At 11<sup>th</sup> January of 2017 the list of socioeconomics indicators was finally approved by CTAG and delivered to all the associated beneficiaries to be updated on a trimestral basis (annex XXXI). However, after the first trials, CP and CTAG concluded that the contents of this list were very hard to fill for the majority of the beneficiaries. So CTAG, in the Meeting of 23<sup>rd</sup> of March decided to develop a new list that should be simpler and filled with data on local businesses dynamics, employment and training (capacity building), synergies and leverage easier to obtain. The results of the 1<sup>st</sup> semester are compiled until now and in annex XXXII.

Some of the indicators in the existing list and probably in the new list whose production is ongoing may overlay with progress indicators. However, we don't see any problem with that as long as the "doubled listed" indicators are fundamental for a real monitoring of the socio-economic effects of the project (Question 9 – 2<sup>nd</sup> Monitoring Visit).

#### *Action D.3– started*

Foreseen start date: 01/07/2016

Actual start date: 01/07/2016

Foreseen end date: 31/07/2020

Actual end date: 31/07/2020

Despite many preparatory works were still ongoing, this action started on the predicted date. However, at this initial stage, only the effects of the mowing of the verges, which is being executed since 2015/2016

on roadkills have been monitored by IP, on a weekly basis, on a few road stretches. The data was validated and integrated on IP's GIS database and sent to UEVORA (Action A2). On June 2017, IP enlarged the monitoring to other road stretches located in the project Intervention Area in order to increase and complement the data.

Other monitoring of the effects/impacts of the project will begin as each conservation task is completed. Daily road-kills monitoring (all year) on EN4 and EN 114) and on EM 529 and M535 (only on rainy nights of Spring and Autumn) and passages on intervened culverts (continuous monitoring through Camera trapping) will restart on Spring 2018. Owls and Genets movements monitoring are predicted to restart on January 2019. At least 10 x 5 days trapping sessions are predicted, after which GPS data will be acquired. The effects of improved techniques on verge management on small mammals, butterflies and autochthonous plant species and the success invasive plant control will be evaluated through surveys done on Spring of 2019 and 2020. (Question 10 – 2<sup>nd</sup> Monitoring Visit).

*Action E.1 – in progress*

Foreseen start date: 01/08/2015  
Foreseen end date: 31/07/2020

Actual start date: 01/08/2015  
Actual end date: 31/07/2020

The LIFE LINES website is online in both English and Portuguese languages (<https://lifelines.uevora.pt>) since October 2015 and a major update was made on February 2016. Since then, small changes to the page design have been made taking into account the feedback of people visiting the page. Overall the LIFE LINES webpage, till now, have been updated 24 times and has an average number of 148 visitors/month, from 10 different countries. A summary statistics of webpage visits is in annex XXXIII (Deliverable - Media Report). Additionally, since February of 2016 a Facebook account was created and the promotion and dissemination of the project is also made through this platform. The web page also includes a link to the LIFE LINES Facebook account.

*Action E.2 – in progress*

Foreseen start date: 01/10/2015  
Foreseen end date: 31/07/2020

Actual start date: 01/10/2015  
Actual end date: 31/07/2020

Till now, three outdoors of medium size were putted in placed, since the beginning of 2017: one near the plant nursery (Montemor-o-Novo), other in the experimental field of Herdade da Mitra (University of Évora facilities) and another in the Ecotrail of Montemor-o-Novo (annex XXXIV). Most of the remaining outdoors belong to conservation actions on roads and ecotrails and will be located in highly visible places as soon as each conservation task will be completed. (Question 11 – 2<sup>nd</sup> Monitoring Visit).

*Action E.3 – in progress*

Foreseen start date: 01/08/2015  
Foreseen end date: 31/07/2020

Actual start date: 01/08/2015  
Actual end date: 31/07/2020

Since the last report, a high effort has been made to put the LIFE LINES in national and local media. A Communication Plan produced with the help of a professional Communication Agency was produced and approved by CTAG in 18th of November 2016. It includes a communication strategy and graphic guidelines standards aiming a better and uniform image for LIFE LINES promotion and dissemination (see annex XXXIII – Media Report). At the same meeting, a LIFE LINES Communication Committee (integrating the project manager and specialized communication technicians from IP and UA) has been approved. We hope this will speed up the achievement of the main indicators predicted in the application.



Nevertheless, we now recognize that some (including the number of press conferences and radio spots, see action E4) may have been overestimated (Question 12 – 2<sup>nd</sup> Monitoring Visit).

Despite the smaller number of press releases that have been produced until now (situation that we want to change from now on), with had informal talks and exchange of E-mail messages with journalists of different media types aiming to promote the project.

Meanwhile, important outputs have been produced, from which we highlight: (1) a 25 minutes television documentary, included in the “Biosfera” series that was dedicated to the impacts of linear infrastructures on biodiversity that was mostly based on the LIFE LINES project (it was broadcasted on National Television Network - RTP2 on April 2017); (2) a short radio program of the series “90 segundos de ciência” (90 seconds of science) that was broadcasted on National Radio (Antena 1) on July 2017 and was entirely dedicated to the LIFE LINES. For details about these and another tasks performed under the framework of this action see the deliverable “Media Report” in annex XXXIII.

#### *Action E.4 – in progress*

Foreseen start date: 01/08/2015

Actual start date: 01/08/2015

Foreseen end date: 31/07/2020

Actual end date: 31/07/2020

Until the reporting date six teasers (videos for social networks and webpage of the project) and six thematic videos (interviews with simple editing to be available to the media whenever necessary) were produced (annex XXXIII). In the original project proposal the production of ten spots of radio were suggested in the project indicators, for which was allocated a budget of 1624 €. This value is too small and corresponds, on average, to the value of producing and broadcasting one radio spot. This issue was broadly discussed in the CTAG, where it was concluded that a technical miswording happened in the original application where “radio spot” meant indistinctly true radio spots and radio news. Thus, it was agreed that at least one high quality true radio spot regarding the promotion on the app to be developed in action C4 and to broadcast as widely as possible, should be produced. Moreover, we propose that the project should aim to achieve at least more nine radio events (including news, spots, and specialized information programs such as “90 minutos de Ciência” – see Action E3) to fulfil the project indicators, changing the original “10 radio spots” to “10 radio events”.

All the audiovisual material produced since June 2017 as now an explicit audio mention to the LIFE financial support. Additionally, whenever possible, we added this audio for the previously produced videos and teasers (Question 13 – 2<sup>nd</sup> Monitoring Visit).

#### *Action E.5 – in progress*

Foreseen start date: 01/08/2016

Actual start date: 01/08/2016

Foreseen end date: 31/07/2020

Actual end date: 31/07/2020

Until July of 2017 two Master Thesis done in the framework or with the support of LIFE LINES were finished: (1) “Factors influencing the use of road-crossing culverts by carnivores” by João Craveiro and “Road and landscape fragmentation effects on tawny owls: density, population trend, and intra-and inter-year territory occupancy” by Shirley van der Horst (annexes XXXV and XXXVI). A PhD and another Master thesis are ongoing. Awareness for the project and app has already begun with room and field classes for students at the University of Évora and University of Lisboa in order to get volunteers for the project. A summer course co-organized with CEBE (Council of Biology Students of University of Évora) took place between 7 and 11 of July 2017 (annex XXXVII).

#### *Action E.7 – started*

Foreseen start date: 01/04/2016

**Actual start date: 01/02/2016**



Foreseen end date: 31/03/2020

Actual end date: 31/03/2020

On February 2016 part of the team of the LIFE LINES project conducted a field trip to Toledo, Spain, to visit and networking with the “LIFE Impacto Cero” project (Development and demonstration of an anti-bird strike tubular screen for High Speed Rail lines - LIFE12 BIO/ES/0000660). Two different visits (MARCA and UEVORA) were made to Buçaco (BRIGHT - Bussaco’s Recovery from Invasions Generating Habitat Threats - LIFE10 NAT/PT/0000759) in the framework of invasive plants control actions. Strong networking took place also when The LIFE LINES team was invited to present the project in events organized by several LIFE and non-LIFE projects: (1) Seminar “Ways to Green Infrastructure Today and Tomorrow” (poster) - organized the LIFE ZARAGOZA NATURAL - Creación, gestión y promoción de la Infraestructura Verde de Zaragoza - LIFE12 ENV/ES/000567” (Zaragoza, October 2016); (2) “1<sup>st</sup> Ibero-American Congress on Biodiversity and Road Infrastructure” (oral talk), organized by Centro Brasileiro de Ecologia de Estradas (Lavras – Brasil, November 2016) (with no costs for the LIFE LINES project); (3) Seminar “INTER LIFE PT 2016” (oral talk) organized by LIFE14 CAP/PT/000004 (Luso, Novembro 2016); (4) II International Congress Education, Environment and Development (oral talk) (5) Workshop “Formation/Capacitation to support of call proposals” (oral talk) , organized by LIFE14 CAP/PT/000004 (Évora, April 2017).

Moreover the coordinator of the project attended 5th IENE International Conference on Ecology and Transportation in Lyon in August 2016, where the intention to organize the 7th IENE International Conference in 2020 in Évora in the framework of the LIFE LINES was presented to the IENE Steering Committee (a formal written proposal is now being prepared). Two members of the team attended the “CEDR research Workshop on Roads and Wildlife Workshop” organized by Conference of European Directors of Roads (Cologne, November 2016) and the Railways Ecology Symposium organized by Cátedra REFER (Lisbon, December 2017) (annex XXXVIII)

#### *Action E.8 – in progress*

Foreseen start date: 01/04/2016

**Actual start date: 01/10/2015**

Foreseen end date: 31/07/2020

**Actual end date: 31/07/2020**

Until the reporting date, the E8 youth and institution volunteer program performed 16 activities, with a total of 358 participants, including young people and adults. The control of the exotic flora developed by MARCA in Montemor-o-Novo Ecotrail by voluntary actions already started for the four species identified (annex XXXIX).

In November 2016 IP organized an institutional volunteer event, “Apanha da Bolota”, (annex XL) with 35 participants. Between April and July 2017 IP in cooperation with MARCA elaborated the terms of reference needed to acquire external assistance to implement three Institutional volunteer events in 2017. The contract procedures for these have already been initiated. There is some delay in what concerns the number of already executed events, due to IP’s constraints in contracting this type of services. IP expects to compensate this delay during the next two years.

In May 2017 CME organized the first volunteer action in Ecotrail of Évora involving local students to help the control of exotic invasive flora. Tasks include the cutting of reeds in both sides of the Ecotrail and remove the garbage. This action was published in the regional newspaper “Diário do Sul” of 2<sup>nd</sup> May 2017 (annex XXXIII-Media Report).

#### *Action E.9 – in progress*

**Foreseen start date: 01/06/2016**

**Actual start date: 01/06/2016**

**Foreseen end date: 30/07/2020**

**Actual end date: 30/07/2020**

We held the first LIFE LINES seminar on 2<sup>nd</sup> June 2016. This event took place at auditorium of PCTA in Évora and was included the first Monitoring Committee reunion. It was attended by 102 people from different entities. A second seminar entitled “25 years of LIFE program in South of Portugal” was held on 26<sup>th</sup> May 2017 in the framework of the Celebrations of the 25 years of the program LIFE. It included eight oral presentations about LIFE projects recently finished or ongoing in southern Portugal and was attended by 65 people. All the information about the seminars (press releases, program, communications, journal news, poster and video) is in the Media Report (annex XXXIII).

The intention to organize the 2020 IENE International Conference in Évora was already communicated, orally, to the IENE Steering Committee. This proposal was welcomed but its evaluation and decision on it depends on the formal written proposal that is now being prepared in accordance with the “Guidelines for IENE Conferences and Workshops” (Question 14 – 2<sup>nd</sup> Monitoring Visit).

*Action E.10 – in progress*

Foreseen start date: 1/08/2015

Foreseen end date: 30/07/2020

**Actual start date: 1/09/2015**

**Actual end date: 30/07/2020**

The action started one month after the scheduled.

Regarding the activities to be developed at NIA, two holiday camps were already done, together with three thematic fieldtrips concerning environmental problems associated with the presence of infrastructures and observation of biodiversity (fauna and flora). These camps work together with the camps organized since 2009 by the CMMN Juvenile Center during Easter Holidays. They are designed for youngsters between 14 and 21 years old. These actions involved 22 youngsters that acquired a higher interest in biodiversity in general (annex XLI).

In 2018, after the mobile application is finished (C4) and the mitigation measures implemented at the road M535 (C8), a new camp will be promoted with activities focused directly with the project: wildlife recording, conservation actions at the Ecotrail and road M535.

The NIA is a support for the E10 activities, but needs some restorations. The restoration plan (finished and approved at May 2017- Annex XVII) is already at award phase. These restorations, already planned in the project, are slightly delayed due to the occurrence of vandalism acts on the building that made necessary to review the initial proposal.

Regarding the programme “Adopt a Road”, the actions started at January 2016, with the presentation of the project on county schools. Following these, two groups including 42 students from the 10<sup>th</sup> and 11<sup>th</sup> years) were established. For 60 minutes, the project and the environment problems of infrastructures was explained to each group (Annex XLII). After, the 11<sup>th</sup> year class (21 students and 2 teachers) made a visit to the University of Évora, Mitra campus (March 2016), where they had an explanatory session with the UEVORA Amphibian technician followed by a fieldtrip to learn about landscape, fauna and flora and how the infrastructures affect them. The 10<sup>th</sup> year class made a work about the road-kills and how to prevent them (13 sessions). In the framework of this task, a video about road-kills including a song with letter and music written by the students was filmed (Annex XXXIII – Media Report). Additionally, in an environmental education activity targeting 42 children from the 1<sup>st</sup> cycle school, students were challenged to design their own version of a road sign to alert drivers about the road-kills (annex XLII).

In March of 2017 we performed a night walk in Montemor-o-Novo Ecotrail, to observe fauna. This was open to local population (20 participants – children and adults in a hard rainy night). This was noticed in the local newspaper “Diário do Sul” (Annex XLII).

To empower this action, a group of students from the University of Évora has been created to perform and assist the future night-walk activities.

The “adoption” of the parts of roads by the young people to register the mortality will start in the first semester of 2018, and will include the use of the mobile application. So, despite the slight delayed in the time frame of the project, this will not compromise the initial objectives of this action.

Fifty-four t-shirts (since April 2017), 18 reflector vests (since April 2016) and camping material (since July 2017) are available to support the activities at NIA (Deliverable – action E10)) (annex XLIII)

Meanwhile, the flyer “adota uma estrada” was designed and printed and is ready to be distributed at the beginning of the next school year (2017/2018) (annex XLIV). (Question 15 – 2<sup>nd</sup> Monitoring Visit).

#### *Action F.1 – in progress*

Foreseen start date: 01/08/2015

Actual start date: 01/08/2015

Foreseen end date: 31/07/2020

Actual end date: 31/07/2020

This action was initiated as initially proposed.

The coordinator and the operational administrative supervisor of the LIFE LINES have been present on the LIFE14 Kick-off Meeting that took place on 4<sup>th</sup> November 2015 in Murcia and presented the project to the LIFE External Monitoring teams, EASME/Commission and other LIFE 14 beneficiaries.

Management structure including the CP, CTAG, CG, and CA are implemented and working properly. Sometimes, whenever discussing specific small issues involving only a few beneficiaries, large CTAG and CG meetings were replaced by partial/informal meetings involving only the directly interested parts. This proved to be more efficient and productive than ordinary CG and CTAG meetings. Because of this, a lower number of these meetings than predicted in the original proposal took place. However all strategic and important issues were only approached in CTAG and CG formal meetings. The CP, does not have an individual technician specialized in communication. However the project manager accumulates his regular functions with the supervision of the communication, and when needed, Joaquim Pedro Ferreira (an invited post-doc from UA specialized in science communication) attends the CP meetings. Moreover, a Communication Committee was formed (see action E3) and UEVORA Communication Office supports communication tasks when needed.

The composition of the CTAG and CG has been submitted to adjustments due to reorganization of the departments and/or teams of some of the beneficiaries (fig. 1). Until July of 2017 16 CTAG, 88 CP and 2 CG meetings were performed.

All the procedures concerning predicted grant awards by UEVORA are concluded. However, the Database Manager and Modelling technician was awarded with an External FCT grant and will leave the project team on 1<sup>st</sup> September. A call to replace him is already underway. The Project Manager started working on 1<sup>st</sup> April 2016. Most of the main services and material acquisitions by UEVORA despite the highly complex procedures associated with the recent legislation are concluded or expected to be concluded soon. Concerning the cars, the contract is already made and we expect the delivery to take place until September of 2017 (annex XLV). The logistic and administrative procedures needed to repair/implement the greenhouse are completed and preparatory works for its implementation in the field as already begun.

### Action F.2 – started

Foreseen start date: 01/08/2015

Foreseen end date: 31/07/2020

Actual start date: 01/08/2015

Actual end date: 31/07/2020

The original LIFE LINES proposal already included, for each action, a list of indicators to be achieved along the project development. These are the main indicators to be incorporated and used in Action F2. Table II summarizes, for each action already in progress, the foreseen and the actual status of each proposed indicator. Since July of 2017 this list is on the LIFE LINES website.

### Action F.3 – in progress

Foreseen start date: 01/08/2015

Foreseen end date: 31/07/2020

Actual start date: 01/09/2015

Actual (or anticipated) end date: 31/07/2020

The administrative process of contracting an external auditory team have started on September 2015, and contrary to was written in the first report project, is not formally signed yet. Despite this the normal audit process is ongoing.

**Table II. Predicted and achieved progress indicators. (\*\*\*\*\* - not applicable at the present time)**

Action	Indicator	Quantity	Executed
<b>A. Preparatory actions, elaboration of management plans and/or of action plans</b>			
<b>A.1 - Completing and updating of baseline characterization</b>	Data information layers integrated into GIS database	N, O=79	388
	Occurrence records integrated into GIS database	N, O=25.000	79819
	Species covered by wildlife database	N, O=7 amphibians, 8 reptiles, 25 mammals and 80 birds	Amphibians= 14 Reptiles=17 Mammals=53 Birds=170
	Connectivity maps generated	N, O=2	6
	Fraction of intervention sites covered by detailed data / maps in GIS database	%, O=100	100
	Animals tracked with GPS/GSM system	N, O=12	6
	Number of wildlife crossings and culverts mapped	N, O=50	307
	Invasive species with new approach of remote sensing methodology	N, O=4	6
<b>A.2 - Compilation, structuring and implementation of national database and multi-user web platform</b>	Number of persons / organizations that contributed with GIS data information layers	N, O=16	3
	Roadkill data incorporated into GIS database	N, O=50.000	50076
	Species incorporated into GIS database	N, O=120	199
	Nº of Institutional users registered and with a regular use of the platform	N, O=4	*****
	Nº of academic users registered and with a regular use of the platform	N, O=6	*****
	Nº of professional users registered and with a regular use of the platform	N, O=8	*****
	Nº of NGO's registered with a regular use of the platform	N, O=4	*****
	Nº of citizens registered with a regular use of the platform	N, O=20	*****
	Average number of new records send in a regular basis to the platform	N/month, =600	*****

	Records send by mobile application	%/total, O=10%	*****
<b>A.3 - Project implementation, licensing, procurement of permits and contracting procedures necessary to actions C</b>	Execution projects (Forestry and civil engineering / Landscaping) produced	N, O=12	10
	Authorizations, licensing and procurement of permits necessary to actions C obtained	%, Target=100	100
	Procedures of public contracting launched	%, Target=100	50
<b>A.4 - Development, testing and evaluation of automated systems of monitoring and / or deterrence</b>	No. of monitoring prototypes developed	N, O=2	1
	No. of dissuasion prototypes developed	N, O=3	0
	Effectiveness of automated prototypes comparing with traditional methods	%, O=150	-----
	Records of approach to powerlines obtained with the monitoring prototype		-----
	Records of passerines mortality obtained with the monitoring prototype		-----
<b>A.5 - Installation of autochthonous plant nursery for conservation actions</b>	No. of created nurseries	N, O=1	1
	Area of produced plants created	m2, O=5.000	5000
	Plots to seeds production installed	m2, O=1.000	1000
	Number of woody species in growth	N, O=4	22
	Number of bulbous species in growth	N, O=1	2
	Growing plants to conservation tasks (Actions C)	N, O=1000	3000
<b>C. Concrete conservation actions</b>			
<b>C.1. Integrated Mitigation of the reduction of conductivity and permeability of the landscape in national and principal roads.</b>	Passages for fauna installed on culverts.	N, O=5	*****
	Structural improvement of culverts to prepare mitigation work	N, O=1	*****
	Restauration of fences and plantations to lead to culvert paths.	N, O=7	*****
	Total length of national roads (EN) and main itineraries (itP) covered by mitigation measures	km, O=37	*****
	Total length of national roads (EN) and main itineraries (itP) covered by complementary measures to support mitigation measures	km, O=104	*****
	Number of typologies of innovative solutions	N, O=4	*****
	Number of typologies of demonstrative solutions	N, O=5	*****
<b>C.2 - Potentiation of the verges and marginal parcels of roads infrastructures as shelter areas, refuge, food and / or displacement.</b>	Micro reserves installed /established	N, O=2	*****
	Favourable habitat increase to target butterflies populations.	Ha, O=4	*****
	Occupied area for invasive species subject to initial control actions.	%, O=100	*****
	Occupied area related to the initial, by invasive species subject to monitoring control actions.	%, O=75	*****
	Occupied area related to the initial, by invasive species subject to following control actions.	%, O=25	*****
	Control methods of reeds tested and evaluated as effective.	N, O=2	*****
	Protocols to prevent, detect and control of invasive species along the IP roads.	N, O=2	*****



	Mortality reduction of Tawny Owl by installing shrub screens	%, O=10	*****
<b>C.3 - Development and installation of vertical road traffic signs</b>	Vertical signals created	N, O=1	1
	Vertical signals acquired and installed.	N, O=10	*****
<b>C.4 - Mobile Application to promote the collect of mortality data.</b>	Mortality records validated in GIS database by mobile application.	N/month, O=600	*****
	Records send by mobile application	(%/total; O=10%)	*****
	Validation time (between entry and validate the data)	(days, O=4)	*****
<b>C.6 - Development, essay and application of biodiverse grasslands to promote biodiversity in linear infrastructures.</b>	Species evaluated in preselection	N, O=20	1064
	New protocols of species germination with conservation interest	N, O=5	*****
	Species with harvested seeds	N, O=20	153
	Selected species	N, O=10	50
	Intervention essay areas	N, O=10	*****
	Quantity of seeds collected by volunteers	%, O=25	30
	Rehabilitated greenhouses for conservation objectives	N, O=1	0
<b>C.7 - Mitigation measures and potentiation of roads in Évora municipality.</b>	Total length of municipal roads parts covered by mitigation measures.	Km, O=9	*****
	Total length of disabled railways covered by mitigation measures.	Km, O=21	*****
	Endemic flora species target of potentiation work.		*****
	Butterflies species target of habitat potentiation	N, O=6	*****
	Invasive plant species target of control/eradication	N, O=4	1
	Reduction of mortality records in EM529	N, O=6	*****
<b>C.8 - Mitigation measures and potentiation of roads in Montemor-o- Novo municipality.</b>	Total length of municipal roads parts covered by mitigation measures.	Km, O=15	*****
	Total length of disabled railways covered by mitigation measures.	Km, O=13	*****
	Endemic flora species target of potentiation work.	N, O=2	*****
	Butterflies species target of habitat potentiation	N, O=3	*****
	Micromammals species target of habitat potentiation	N, O=2	*****
	Invasive plant species target of control/eradication	N, O=7	4
	Invasive flora area species target of control/eradication	m2, , O=32000	*****
<b>C.9 - Operations in plant nursery to the conservation actions.</b>	Plant Production area installed	m2, O=5000	5000
	Plots of production of seeds installed	m2, O=1000; N=10	1000;
	Woody species propagated with the action	N, O=9	22
	Herbaceous species propagated with the action	N, O=11	*****
	Produced plants vs necessary plants to the conservation works	%, O=100	*****
<b>C. 10 - Promotion of “islands” of Biodiversity along the power lines.</b>	Experimental plots installed to create Biodiversity Islands	N, O=3	*****
	Total area covered	m2, O=300	*****
	Installed fence	m, O=75	*****
<b>D. Monitoring of the impact of the project actions (obligatory)</b>			
<b>D.1- Monitoring / evaluation of socio-economic effects of the project.</b>	Adopted indicators to monitoring the effects	N, O=20	18
	Trimensal update of the indicators	N, O=15	1
	Produced and sent reports	N, O=1	*****
<b>D.3 - Monitoring / evaluation of the effects / impacts of conservation measures.</b>	Update of data information layers integrated into GIS database	N, O=20	*****
	New occurrence records integrated into GIS database	N, O=10000 to 20000	*****
	Update of fauna species mortality records covered by the fauna database (10 amphibians, 10 reptiles, 35 mammals and 85 birds).	N	*****



	New permeability maps produced	N, O=15	*****
	New functional connectivity maps produced	N, O=2	*****
	Animals tracked with GPS/GSM system	N, O=12	*****
	Monitored of power lines supports	N, O=60	*****
	Seeds plots of biodiverse mixtures monitored	N, O=20	*****
	Monitored sites of successful invasive species control	N, O=20	*****
	Invasive species target of remote sensing methods of analysis	N, O=4	*****
<b>E. Public awareness and dissemination of results (obligatory)</b>			
<b>E.1 - Communication Plan - Project Website</b>	Content update frequency	N of updates, O=20	24
	Monthly average users	N, O=200	148
	Statistics on numbers, average session time (AST) and geographical provenience of users		Viewers=14025 AST = 3:11 min Countries=10
	Downloads from the website	N, MB	Not available
<b>E.2 – Communication Plan – Placards/Outdoors in intervention area</b>	Placards of medium size installed in sites of C Actions interventions	N, O=50	3
	Large Outdoor installed as part of C.1 Action intervention	N, O=1	N=0
<b>E.3 - Communication Plan - Public disclosure sessions and contacts with the media</b>	Press releases/schedule emitted or written throughout the project	N, O=30	3
	Press conferences organized during the project	N, O=10	0
	Public seminars organized (annual)	N, O=5	2
	Average of participants in the public seminars	N, O=80	83.5
<b>E.4 - Communication Plan - Complementary works and materials</b>	Short teasers (about 1 minute) produced and distributed on the Internet throughout the project	N, O=20	6
	Thematic videos of medium duration with audiovisual supporting content for specialized media visits	N, O=20	6
	Radio spots produced/broadcasting	N, O=10	1
	Project documentary	N, O=1	*****
	Tutorials videos	N, O=2	*****
<b>E.5 - Awareness and involvement of the academic community in collecting information/data.</b>	Researchers of UEVORA, FCUP and UA With credentials to the national platform.	N, O=14	*****
	PhD and Master Thesis concluded.	N, O=6	2
	Students of UEVORA, FCUP and UA registered in mobile application	N, O=200	*****
	Researchers of UEVORA, FCUP and UA registered in mobile application	N, O=80	*****
<b>E.7 - Networking with other LIFE and not LIFE projects.</b>	Collected data by academic community of UEVORA, FCUP and UA	N, O=8000	*****
	European experts invited to visiting the project	N, O=4	4
	LIFE and non-LIFE projects visited by members of the project team.	N, O=4	4
	Presentations of the project in Green Week editions	N, O=2	0
	Presentations of the project in European seminars/events	N, O=4	2
	Ideas of network projects to integrate the Communication and Conservation Post-LIFE Plan.	N, O=2	*****
<b>E.8 - Volunteer Program for young people.</b>	Average number of young people participants in the program	N, O=30	22
	Associations and IPSS participants in the program	N, O=12	2
	Enterprises/institutions participants in the program	N, O=8	4
	Habitat area beneficiated by voluntary work	Ha, O=2	*****
	Species of flora beneficiated by voluntary work	N, O=10	*****
	Species of fauna beneficiated by voluntary work	N, O=8	*****
<b>E.9 - Technical seminars to</b>	Professional participants in the initial seminar	N, O=50	102

<b>present the developments and results of the project.</b>	Professional participants in the middle seminar	N, O=120	*****
	Professional participants in the final seminar	N, O=200	*****
	Power Point presentations	N, O=80	22
	Abstract book edited in digital form.	N, O=3	0
<b>E.10 - "Adopt a road", environmental educational/awareness program with local schools</b>	Young people involved by municipality in vacation camps	N/year, O=9	11
	Total of young people involved by municipality in vacation camps	N, O=72	22
	Juvenile Center use by young people between regular activities	N/month, O=1250	*****
	Juvenile Center use by young people involved by municipality	N, O=9	*****
	Identified roadkilled animals	N, O=1000	*****
	Adopted sections of roads	N, O=2	*****
	Surveys at stretches of roads adopted	N, O=24	*****
	Mortality records of fauna in the mobile app by section of road	N, O=100	*****
<b>F. Project management and monitoring of project progress (obligatory)</b>			
<b>F.1 – Project management</b>	CP team members present in the kick-off meeting	N, O=2	2
	CG meetings accomplished	N, O=20	2
	CTAG meetings accomplished	N, O=60	16
	CP meetings accomplished	N, O=240	88
	CA meetings accomplished	N, O=6	1
	CA members present in meetings	%, Target=90	82

## 5.2. Envisaged progress until next report

The next report corresponds to the midterm report and will be sent to EASME/Commission till 30<sup>th</sup> June 2017 (reporting activities from 1<sup>st</sup> August 2017 to 31<sup>st</sup> May 2017). All the updated deliverables and milestones foreseen in Table I for this period will predictable be achieved.

Complementary field work will be finished (A1). The heavier construction interventions in National Roads EN4, EN114 and IP2” (C1) and EM529 (C7) and EM535 (C8) are expected to be done and monitoring its effects on the target groups and biodiversity in general will began (D3). The tests on the road-kill App (C4) will be finished.

A new a list of socioeconomic indicators (D1) will be developed, approved and updated on a trimestral basis. Public awareness and dissemination of the results (actions E) will be strongly reinforced. The active implementation of Project Communication Plan (E3) will give a higher promotion and visibility to the project.

Actions A6 and C5 are being subjected to an amendment which is still being evaluated by EASME. New milestones will be proposed for this action in the framework of the amendment process.

**Table III.** Gantt table. Summary of the foreseen (grey) and actual (brown) progress for each action. Red thick line shows actual project time\* means action in reformulation that depend on amendment approval by EASME/Commission; X - Progress report; O - Midterm/Final Report.

Action			2015		2016				2017				2018				2019				2020				
Action number	Name of the action		3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	
Overall project Schedule		Proposed			X						X			O				X						O	
		Actual			X						X			O				X						O	
A. Preparatory actions, elaboration of management plans and/or of action plans																									
A.1	Completing and updating of baseline characterization	Proposed																							
		Actual																							
A.2	Compilation, structuring and implementation of national database and multi-user web platform	Proposed																							
		Actual																							
A.3	Project implementation, licensing, procurement of permits and contracting procedures necessary to actions C	Proposed																							
		Actual																							
A.4	Development, testing and evaluation of automated systems of monitoring and / or deterrence	Proposed																							
		Actual																							
A.5	Installation of autochthonous plant nursery for conservation actions	Proposed																							
		Actual																							
A.6*	Development of prototypes for avifauna deterrence in medium voltage power lines	Proposed																							
		Actual									*	*	*	*	*	*									
A.7	Development and adoption of internal guidelines to support the management in post-project	Proposed																							
		Actual																							
C. Concrete conservation actions																									
C.1	Integrated mitigation of connectivity reduction and landscape permeability by national roads and other main roads	Proposed																							
		Actual																							
C.2	Potentiation of verges and other road marginal patches as shelter, food and / or corridors	Proposed																							
		Actual																							
C.3	Development and installation of vertical road traffic signs	Proposed																							
		Actual																							

Action			2015		2016				2017				2018				2019				2020				
Action number	Name of the action		3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	
C.4	Mobile app to promote roadkill data collection	Proposed																							
		Actual																							
C.5*	Test of devices for deterring bird landing in medium voltage power lines	Proposed																							
		Actual									*	*	*	*	*	*	*	*	*	*					
C.6	Development, testing and application of biodiverse seed mixtures to promote plant biodiversity in the surroundings of linear infrastructures	Proposed																							
		Actual																							
C.7	Mitigation and potentiation measures in Évora municipality routes	Proposed																							
		Actual																							
C.8	Mitigation and potentiation measures in Montemor-o-Novo municipality routes	Proposed																							
		Actual																							
C.9	Plant nursery operation for conservation actions	Proposed																							
		Actual																							
C.10	Promotion of biodiversity "islands" along powerlines paths	Proposed																							
		Actual																							
D. Monitoring of the impact of the project actions																									
D.1	Monitoring / evaluation of socio-economic impacts of the project	Proposed																							
		Actual																							
D.2	Monitoring / evaluation of the project impacts on ecosystem functioning	Proposed																							
		Actual																							
D.3	Monitoring / evaluation of project conservation actions effects / impacts	Proposed																							
		Actual																							
E. Public awareness and dissemination of results																									
E.1	Communication Plan - Project Website	Proposed																							
		Actual																							

Action			2015		2016				2017				2018				2019				2020				
Action number	Name of the action		3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	
E.2	Communication Plan - Placards/Outdoors in intervention areas	Proposed																							
		Actual																							
E.3	Communication Plan - Public disclosure sessions and contacts with the media	Proposed																							
		Actual																							
E.4	Communication Plan - Complementary works and materials	Proposed																							
		Actual																							
E.5	Awareness and integration of the academic community in data/information collection	Proposed																							
		Actual																							
E.6	Training / dissemination among stakeholders	Proposed																							
		Actual																							
E.7	Networking with other LIFE and non-LIFE projects	Proposed																							
		Actual																							
E.8	Young and institutional volunteer program	Proposed																							
		Actual																							
E.9	Technical seminars for presentation of project developments and results	Proposed																							
		Actual																							
E.10	"Adopt a road", environmental educational/awareness program with local schools	Proposed																							
		Actual																							
E.11	Layman report	Proposed																							
		Actual																							
F. Project management and monitoring of project progress																									
F.1	Project management	Proposed																							
		Actual																							
F.2	Structuring and compilation of project development indicators	Proposed																							
		Actual																							

Action			2015		2016				2017				2018				2019				2020			
Action number	Name of the action		3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T
F.3	External audit	Proposed																						
		Actual																						
F.4	Post-LIFE conservation and communication plan	Proposed																						
		Actual																						



### 5.3. Impact

This is a LIFE Biodiversity project and thus do not target specifically Natura 2000 sites or conservation of only threatened species according to Birds or Habitats directives.

The main input of the project is the mitigation of negative effects from transport/energy infrastructures in wild fauna and creation, along them, of a demonstrative Green Infrastructure, based in corridors and stepping stones that can increment connectivity and improve conservation of local/regional biodiversity. In short, LIFE LINES aims to solve a set of biodiversity conservation problems induced by transport/energy infrastructures, through the implementation of cost-efficient methods that will support the creation of a Green Infrastructure.

We expect that all the target native species, to be benefited by the project. However, the amphibians, owls and mammal carnivores, groups for which a higher number of actions is directed will benefit the most. Mortality of medium and large birds, including *Ciconia ciconia*, listed of annex I of Birds Directive on powerlines are expected to be strongly reduced. Moreover some species included in annex II and or IV of habitat directives will be also benefited. These include the small mammal *Microtus cabreræ* whose colonies in the intervention area are located mostly on road verges and several bat species including *Pipistrellus* spp., *Barbastella barbastellus*, *Myotis* spp., *Rhinolophus* spp., *Miniopterus schreibersii*, etc., for which barriers to raise the height of fly (targeting owls and passerines).

### 5.4. Outside LIFE

The studies aiming to evaluate and propose mitigation and compensation measures for fauna of a new high velocity train corridor that will cross partially the Intervention Area were done in the framework of a protocol between UEVORA and IP. These studies took into account and integrate with the LIFE LINES conservation actions. Moreover we expect that major guidelines for vegetation management on verges will extent, globally to other roads, outside the intervention area.

## 6. Financial part

### 6.1. Costs incurred

Tables IV and V inform about the expenses for the first seven months of the project, corresponding to about 11.5% of its predicted duration. For the reasons explained in previous sections, particularly those concerned with the new, complex and slow, administrative procedures required by law to hire people and acquire goods and services, despite the efforts to speed them up, have been the main forces preventing a higher budget implementation. For instance, large expenses such as vehicle renting, contracts with informatics and communication teams and expenses for hiring the Project Manager are not included yet in the costs incurred. However, predictably this will happen in the next few months. Despite these, 5% of budget has already been spent. Most of the incurred costs correspond to personal (grants and AB's staff), external assistance (for smaller contracts), travel and equipment fulfilling the basic needs (despite the abnormal situation with the vehicles) for the implementation of the projects actions scheduled to be running. Till now, no project task or action have been stopped or delayed due to budget reasons. The big problem has been the bureaucracy.

Taking in account that the main problems related with conclusion of some of major acquisitions and contracts are predicted to be solved in the next few months and that the start or full speed implementation of some of the most costly conservation actions (e.g. C.1, C.7 and C.8) is scheduled to happen in the next 16 months, we expect that about 100% of the first pre-financing payment will be absorbed until July 2017.

**Table IV.** Project budget summary by category of expenditure, indicating the amounts spent until 29/02/2016 and the respective percentage in terms of the total costs predicted by category.

Budget breakdown categories	Budgeted costs in €*	Costs incurred from the start date to 29/02/2016 in €	% of Budget**
<b>1. Personnel</b>	2.061.181,00	161.009,26	8%
<b>2. Travel and subsistence</b>	270.821,00	836,07	0%
<b>3. External assistance</b>	1.309.611,00	80.634,97	6%
<b>4. Durable goods</b>			
Infrastructure	852.485,00		0%
Equipment	165.612,00	11.709,38	7%
Prototype	56.606,00		0%
<b>5. Land purchase / long-term lease</b>			
<b>6. Consumables</b>	371.551,00	340,25	0%
<b>7. Other Costs</b>	106.740,00		0%
<b>8. Overheads</b>	345.878,00	17.817,10	5%
<b>TOTAL</b>	<b>5.540.485,00</b>	<b>272.347,02</b>	<b>5%</b>

**Table V.** Summary of budget implementation by project action, including the budgeted costs and hours and proportions of them that have already been spent.

Action number and name	Budgeted costs	Budgeted days	% of Budget spent	% of hours spent
A.1 - Completing and updating of baseline characterization	373.043,00	1803	26%	41%
A.2 - Compilation, structuring and implementation of national database and multi-user web platform	89.310,00	419	9%	12%
A.3 - Project implementation, licensing, procurement of permits and contracting procedures necessary to actions C	174.075,00	830	14%	16%
A.4 - Development, testing and evaluation of automated systems of monitoring and / or deterrence	85.535,00	584	4%	1%
A.5 - Installation of autochthonous plant nursery for conservation actions	51.693,00	240	1%	4%
A.6 - Development of prototypes for avifauna deterrence in medium voltage power lines	31.780,00	200	0%	0%
A.7 - Development and adoption of internal guidelines to support the management in post-project	13.839,00	63	0%	0%
C.1 - Integrated mitigation of connectivity reduction and landscape permeability by national roads and other main roads	660.090,00	444	0%	0%
C.2 - Potentiation of verges and other road marginal patches as shelter, food and / or corridors	517.746,00	472	0%	0%

Action number and name	Budgeted costs	Budgeted days	% of Budget spent	% of hours spent
C.3 - Development and installation of vertical road traffic signs	5.678,00	19	14%	5%
C.4 - Mobile app to promote roadkill data collection	59.472,00	315	1%	0%
C.5 - Test of devices for deterring bird landing in medium voltage power lines	115.372,00	612	0%	0%
C.6 - Development, testing and application of biodiverse seed mixtures to promote plant biodiversity in the surroundings of linear infrastructures	259.299,00	934	0%	0%
C.7 - Mitigation and potentiation measures in Évora municipality routes	680.578,00	1247	0%	1%
C.8 - Mitigation and potentiation measures in Montemor-o-Novo municipality routes	522.014,00	626	1%	6%
C.9 - Plant nursery operation for conservation actions	66.031,00	1014	0%	0%
C.10 - Promotion of biodiversity "islands" along powerlines paths	71.047,00	354	0%	0%
D.1 - Monitoring / evaluation of socio-economic impacts of the project	25.400,00	180	0%	0%
D.2 - Monitoring / evaluation of the project impacts on ecosystem functioning	26.520,00	180	0%	0%
D.3 - Monitoring / evaluation of project conservation actions effects / impacts	548.571,00	3379	0%	0%
E.1 - Communication Plan - Project Website	19.132,00		61%	
E.2 - Communication Plan - Placards/Outdoors in intervention areas	21.483,00		11%	
E.3 - Communication Plan - Public disclosure sessions and contacts with the media	49.856,00		83%	
E.4 - Communication Plan - Complementary works and materials	16.337,00		65%	
E.5 - Awareness and integration of the academic community in data/information collection	5.331,00	10	0%	0%
E.6 - Training / dissemination among stakeholders	31.537,00		36%	
E.7 - Networking with other LIFE and non-LIFE projects	15.600,00		0%	
E.8 - Young and institutional volunteer program	131.904,00	205	0%	1%
E.9 - Technical seminars for presentation of project developments and results	49.454,00		0%	
E.10 - "Adopt a road", environmental educational/awareness program with local schools	132.672,00	685	6%	8%
E.11 - Layman report	5.000,00		0%	
F.1 - Project management	288.480,00	900	9%	14%
F.2 - Structuring and compilation of project development indicators	10.248,00	60	0%	0%
F.3 - External audit	28.158,00	90	0%	0%
F.4 - Post-LIFE conservation and communication plan	12.322,00	18	0%	0%
Overheads	345.878,00		5%	
<b>TOTAL</b>	<b>5.540.485,00</b>	<b>15.883,00</b>		

