

LIFE SAFE-CROSSING

ACTION F3. AFTER-LIFE CONSERVATION PLAN

AFTER-LIFE PLAN – August 2023



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1. Summary

The LIFE SAFE-CROSSING project aimed at reducing the impact of roads on three target species: Brown bears, Iberian lynx and Wolf. It has taken place in Italy, Romania, Greece and Spain.

This was achieved through the following steps:

- Monitoring the impact of roads on the target species;
- Mapping and characterization of the crossing structures;
- Installation of Animal-Vehicle Collision Prevention Systems and active wildlife roadside reflectors;
- Adaptation of already existing crossing structures to favour the passage of animals;
- Installation of specifically designed road information panels and implementation of other awareness raising activities.

The project was successfully concluded and all the foreseen activities have been developed. The effects of the concrete interventions of the project can be considered very significant. During the monitoring activities we have recorded a decrease of animal-vehicle collisions up to 100% on the road segments where AVC PS and virtual fences were installed. Also the adaptation of the crossing structures has been very successful, with a registered increase of their use by wildlife. Also, the installed road information panels have been evaluated very positively.

The aim of the present document is to guide the future activities of the partners of the project in order to assure sustainability and continuation of the developed interventions.

The continuation of the actions will mainly be assured by the beneficiaries with their internal resources. In fact, the LIFE SAFE-CROSSING project has foreseen the conditions to make the implemented activities as sustainable as possible, mainly by including as beneficiaries the authorities that have to guarantee continuation of the interventions and the functionality of the technical interventions.

2. Introduction

Roads represent an important cause of mortality for many species and a threat for the conservation of biodiversity. This phenomenon is constantly increasing in recent years, and must not be underestimated due to the following reasons:

- roads represent a disturbance factor and cause the reduction and fragmentation of habitats;
- road traffic accidents involving wildlife can have a significant impact on the survival of some species, especially the ones that are at risk of extinction;
- roads represent an important barrier for the movements of many wildlife species, thus reducing the interchange within and between populations;

Moreover, animal vehicle collisions (AVC) represent a serious problem for drivers' safety, and have a significant economic impact due to damages caused to vehicles, which have to be compensated by the public authority where this is foreseen by the national/regional law.

In the United States the wildlife mortality due to collisions with vehicles has been estimated around one million vertebrates per day (Laslo, 1987) and the data available about Europe seem to confirm an alarming situation. In fact, in Europe it has been estimated that between 10 and 100 million birds and

mammals are killed on the roads each year. According to a new computational procedure developed in Sweden, for each 10.000 km travelled by a vehicle one bird is killed. On a road with a traffic of 300 vehicles per hour, an amphibian has a probability of 18% to be killed, and a micromammal of 10% (in Guccione et al. 2008).

All the target species are affected in one way or another by the problem of increasing road infrastructures and traffic. For some (like in Italy for the Apennine brown bear) the presence of roads represents more a cause of fragmentation between different areas, whereas in other areas (e.g. Spain in the case of Iberian lynx) road mortality is the most impacting factor.

The present project aimed at implementing actions to reduce the impact of roads on some priority species in four European countries: Apennine brown bear and wolf in Italy, Iberian lynx in Spain, Brown bear in Greece and Romania.

The target species are severely threatened by road infrastructures, both by direct mortality as well as by the barrier effect.

The project therefore aimed at the following objectives:

- Demonstration of the use of the innovative Animal-Vehicle Collision Prevention Systems (AVC PS)
- Reduction of the risk of traffic collisions with the target species
- Improve connectivity and favour movements for the target populations
- Increase the attention of drivers as about the risk of collisions with the target species

The project activities have been successfully implemented in all four project countries, and the results are very encouraging. The effectiveness of the road kill prevention tools was evaluated to be almost 100%, whereas the interventions on crossing structure have shown to have significantly increased the use of these structures by the target species (and of wildlife in general). Also, the installed road information panels have been evaluated very positively.

The interventions need some follow-up activities and the maintenance by the responsible beneficiaries, in order to make sure that their effectiveness lasts in time.

The purpose of this After-LIFE conservation plan is to summarize the knowledge and main results obtained during the implementation of the LIFE SAFE-CROSSING project and to plan the major activities to be continued after the end of the project to reduce the impact of roads on the target species and on wildlife in general. The plan aims to address the main remaining threats posed by the presence of roads in the project areas, in order to guarantee the long-term sustainability of the implemented activities. The project partners, therefore, proposed a list of actions, and a detailed description, outlining the framework, timetable, and indicated sources of funding for the implementation of the given actions.

3. Description of results achieved

The effects of the concrete interventions of the project can be considered very significant. During the monitoring activities we have recorded a decrease of animal-vehicle collisions up to 100% on the road segments where AVC PS and virtual fences were installed. Also the adaptation of the crossing structures has been very successful, with a registered increase of their use by wildlife. This is

particularly significant in Greece, where we have recorded an increase of over 100% of the use of the adapted underpasses by the target species. The monitoring carried out through the use of the prototype “Wildlife Monitoring, Species’ Classification and Visualization” solution developed by COSMOTE has also shown extremely interesting footage of the behaviour of animals using the adapted structures.

Moreover, the results of the evaluation of the road information panels are very encouraging, with the majority of the respondents indicating that they have considered the panels positively and that their driving behaviour has changed after seeing them.

Another important effect of the project is that a big number of key stakeholders have been involved in the networking and replication activities, and now have an increased knowledge of potential instruments they can use to reduce the impact of linear infrastructures. The interest of the stakeholders and authorities is demonstrated also by the big number of replications that were already recorded.

As was also explained in the proposal, an immediate effect on the population sizes of the target species is not realistic to be registered. But the project will surely have a strong impact also on the long term, due to the following benefits:

- the reduction of the killing on roads, not only of the target species but of wildlife in general
- the increased ecological connectivity that allows the exchange between metapopulations and eases the movements of animals into new areas
- the increased awareness and participation of the key stakeholders, who have learned new important mitigation tools, which they can adapt also in the future

Besides the immediate reduction of mortality, the project will therefore have an important impact also in terms of population dynamics, genetic flow, and as a basis of improved conservation measures.

The results of the project interventions (increased number of animal passages in crossing structures and reduced number of AVC along the virtual fence) have an important impact in terms of improvement of connectivity of Natura 2000 sites, of protected areas, and of metapopulations of the target species. The project took place in 30 Natura 2000 sites, and therefore the impact inside and among these sites will be very significant.

In Italy the activities on Road SS17, which divides PNM from PNALM, reduces the fragmentation between these two protected areas and therefore eases the movement of bears from PNALM (the bear core area) towards PNM, and from there into other territories. This expansion is a key factor for the future conservation of this strongly endangered endemic species.

In Romania a strong benefit is on the connection of the Natura 2000 sites Piatra Mare (ROSCI0195) and Postavaru (ROSCI0207), which are interrupted by the targeted road and both are important bear areas. The installation of the 2 unforeseen km of virtual fences in the Prejmer area (ROSCI 0170) is important because this area was recently recolonized by bears, and since it is located in the lowlands surrounded by mountain and forest areas, this site is to be considered an important stepping stone not only for bears but for all wildlife.

In Greece the works on the underpasses on the Egnatia Highway has an extremely strong defragmentation value in terms of connecting different bear ranges, of which it was known that bears try to move from one to the other but were hindered and often killed on the motorway.

In Spain the conservation actions (actions C1 to C3) of the project are being carried out within areas included in the Natura 2000 Network or which, not being included, connect them. The area of Donana

is one of the historical ranges of the Iberian lynx, and therefore represents a fundamental nucleus for the expansion of the species into other areas. Contrarily, the area of Sierra Morena is one of the recolonization areas, and therefore the conservation of the species is crucial also as stepping stone into new ranges.

4. SWOT Analysis

Strengths	Weaknesses
<ul style="list-style-type: none"> • Reduction of threats on 500 km of roads. • Effectiveness of the mitigation tools implemented (AVC-PS and virtual fence) • Effectiveness of the interventions to improve ecological connectivity (adaptation of crossing structures) • Strong positive reactions of drivers to an innovative communication tool. • Fruitful cooperation with road management authorities. • Important replication cases of activities carried out during the project. • Cooperation of partners with different expertise and responsibilities. 	<ul style="list-style-type: none"> • Complicated bureaucratic procedures for some interventions (permits and tendering procedures). • Increases of prices of raw materials. • Limited possibilities of “in person” communication activities due to Covid-19 limitations. • Technical challenges in the set-up of the AVC PS.
Opportunities	Threats
<ul style="list-style-type: none"> • Availability of new AVC prevention tools. • Use of the prototype developed by COSMOTE. • Increasing Know-how to intervene on the existing crossing structures. • Training of the staff. • High level of effectiveness of AVC PS and VF. Strong interest from decision makers and conservationists from other areas to implement similar activities. • Effectiveness of the neuromarketing technique to identify effective communication tools. • Networking activities and contacts developed 	<ul style="list-style-type: none"> • Increasing development of linear infrastructures and of traffic. • Scarce inclusion of conservation aspects in planning of infrastructures. • Demanding technical maintenance of some interventions. • Lack of funding sources to implement activities on larger scales.

5. Assessment of the problem situation faced and of persisting problems in the project areas

In all the project areas roads have an important impact on the local populations of the target species, either due to the direct mortality on the roads or in terms of fragmentation of the territory and therefore the limitation of the animal movements.

The LIFE SAFE-CROSSING project has intervened in the most critical areas, as identified during the initial monitoring activities, and therefore the impact of roads has significantly decreased. However, it has not been possible, in the frame of this project, with a limited amount of time and of funds, to cover the whole road network segments that pose a threat to the target species.

The tools to prevent road mortality (AVC PS and virtual fence) have been installed in the most critical areas, but these do not cover the entire road stretches where animals could potentially cross. Furthermore, the movements of animals can change in the future on the basis of different causes, such as the population density, habitat changes, the changes in traffic densities, the creation of new roads etc. Therefore, these tools should be implemented in other areas.

The adaptation of the crossing structures will most likely have a more constant long-term effectiveness, although it is fundamental that the interventions carried out are adequately maintained in time.

The road information panels, which have proven to have a high level of effectiveness, cover a very long number of kilometres of roads, and therefore complement the prevention effect of the AVC PS and virtual fence. It is however not known how long the effectiveness of these messages will last. Therefore, in time there will be the need for strengthening and changing the messages, in order to further raise the awareness of drivers on the importance of driving carefully.

Another persisting issue that will have to further pursued on the long term is the lack of awareness and proactiveness to the key stakeholders responsible for management of roads and of the prevention of the impacts of the infrastructures, such as road management authorities, regional and provincial authorities, protected areas management bodies, territorial authorities etc. These are the ones that on the long term will be in charge of implementing activities to prevent road kills and to minimize the fragmentation represented by linear infrastructures. Some road authorities (such as ANAS in Italy and the Romanian road authority CNAIR) have already been very supportive in the project development phase, and some responsible authorities have even participated as beneficiaries (e.g. Egnatia Odos in Greece), but it is crucial that all these authorities become more self-sufficient in the reduction of the impact of their roads, and also that they try to go a step further and start acting in more significant ways such as constructing proper dedicated crossing structures or proactively including biodiversity aspects in their future planning activities.

6. What activities have to be continued

In the frame of the LIFE SAFE-CROSSING project the objectives have been successfully achieved, and the technical interventions (the implementation of the road kill prevention tools, the use of the prototype Wildlife Monitoring, Species' Classification and Visualization" solution developed by COSMOTE, the interventions on underpasses and the use of the road panels), have also autonomously

started showing replication effects. In fact, similar activities have already been implemented in several other areas of the project countries by other entities.

The LIFE SAFE-CROSSING project has foreseen the conditions to make the implemented activities as sustainable as possible, mainly by including as beneficiaries the authorities that have to guarantee continuation of the interventions and the functionality of the technical interventions.

However, some action will still be needed after the project in order to assure that the implemented actions remain effective on the longer term.

6.1 Maintenance and running of App and database

Why the continuation is necessary:

The geodatabase will be a useful tool in the future for road management and wildlife management actors and authorities, because it can provide important information on which to base conflict prevention and management activities. Therefore, it is necessary that the database is updated with incoming data about road kills and future interventions implemented in the project areas. The App is useful, besides the delivery of data about road kills, as a tool for raising the awareness and information of the general public. It's therefore important that this tool is further disseminated and used.

With what means is the continuation guaranteed

Since the maintenance of the database and of the App does not involve investments and costly activities it is quite easy that this is assured by the internal staff of the beneficiaries and of the entities with which they cooperate.

Specifically, in Italy the maintenance of the database will be guaranteed by the staff of the two National Parks, which will also involve ANAS and police agents in providing information to be uploaded in the database .

In Greece CALLISTO is continuously monitoring the impact of transportation infrastructures on wildlife from 2005, and will continue to carry on this task through the use of the database. Also, EO SA will continue using these tools on the roads under its competence.

In Spain the Junta de Andalucia constantly carries on its efforts for the conservation and recovery of the LYNX population, therefore this entity will guarantee the maintenance of the database and App also in the frame of other projects and with partners who cooperate in these projects.

In Romania INCDS "Marin Dracea" and Fundatia Carpati will ensure the use of the App and the update of the database by means of the projects in cooperation with other partners and in the effort of conservation of the brown bear population and of other wildlife species populations.

6.2 Monitoring

Why the continuation is necessary:

It is necessary to continue to monitor the mortality of wildlife on roads because this is a phenomenon which can vary in time and space, on the basis of several causes such as the changes of the population dynamics of the target species, the further development of infrastructures, the increase of traffic etc..

Therefore, it is important to have constantly updated information about the extent and distribution of the roadkills.

Moreover, the permeability of the roads has to be constantly kept under control in the future, in order to make sure that possibilities to cross the roads safely exist in case of new areas where animals need to pass from one side to the other.

Only through the update of the geographic database it will be possible to identify the main risk areas, which can change in time, and therefore to adapt the concrete interventions accordingly.

The continuation of these activities will allow the competent authorities to have constant control on the situation on the ground and to judge where management interventions are most needed.

With what means is the continuation guaranteed

The continuation of the activities will be assured with internal funds of the single beneficiaries. It will not be possible to extend the methods that were applied during the project onto the whole regional/park territories, however the monitoring will continue through regular data storage of the registered claims and of the road kills that are reported by the developed app.

The online database is a very useful management tool and its update will allow to identify new emerging hotspots. In all project areas we created the necessary contacts with official entities (road management authorities, hunting associations, forestry corps...), which have been established to be informed in case of a roadkill, and if it will be necessary a direct monitoring protocol will be implemented the same already implemented in Action A5 and Action D1

On the basis of the methods applied during the project development, in Actions A4, A5 and D1, a monitoring protocol is available, and can be used in all the project countries, in order to constantly keep under control the impact of roads on wildlife.

Roles and responsibilities

The role of the National Park is to guarantee wildlife conservation, therefore in Italy the National Parks will continue the monitoring with the internal park funds, also in association with the other commonly developed activities.

In Terni Province the internal funds will be used to continue the monitoring activities by the agents of Province Police.

In Romania the staff of INCDS as well the ones of FC will continue, with the internal funds, to monitor the roadkill in the project area, because they are always on the field for their institutional activities.

The monitoring of the radio-collared bears will continue as ordinary activity of the INCDS, because this is the authority responsible for brown bear management.

In Spain the monitoring will be carried on by the staff of the Junta de Andalucia, also in the frame of other initiatives for lynx conservation, for which the Junta is constantly raising funds. The Junta de Andalucia also has a network of other local partners who can be involved and provide information of key risk areas for AVCs and areas that need interventions for defragmentation.

In Greece the NGO CALLISTO will continue to raise funds for the future implementation of the monitoring scheme. In the area of the Egnatia Highway EO SA will continue constantly to monitor the adapted crossing structures and guarantee their maintenance. In fact, this organization has already started to apply the same monitoring scheme on other segments of the highway and is planning interventions for adapting more underpasses.

6.3 Maintenance and monitoring of the installed road-kill prevention tools (AVC PS and virtual fence)

Why the continuation is necessary:

The road kill prevention tools that were installed during the project are quite complex from the technical point of view, especially the AVC PS. The AVC PS consist of several different components (sensors, central unit, solar panels, batteries, driver alert sign, radar Doppler, acoustic scaring device, modem etc.), which request regular monitoring and maintenance. Actually, each device can be checked remotely, but nevertheless regular direct field control is necessary to make sure that all the components function correctly.

The virtual fence devices are easier to maintain from the technical point of view, but also there it is necessary to regularly check the road segments where the tools are installed to make sure that all the devices function properly and whether any of them have been stolen.

Besides the control of the working of the devices, it is also necessary to continue monitoring their effectiveness, in order to understand if further adjustments must be made.

With what means is the continuation guaranteed

In all the project areas the installation of the AVC PS has been under the responsibility by the competent territorial public authority, with the exception of the virtual fence in Romania, which was installed by both the NGO Fundația Carpați and INCDS. These entities will continue to monitor the functionality and effectiveness of the tools, as well as if some components were stolen, damaged etc. This was planned in order to make sure that the maintenance of the devices is under the responsibility and control of a persisting authority, which has the duty to assure its functionality and effectiveness. The personnel of all the authorities involved in the project has been trained, therefore they are able to check and to intervene in case of problems.

AVC PS monitoring will be continued through the use of camera traps and through the download/analysis of data stored in the web portal for which each partner has its own access.

Specifically, in Italy maintenance will be carried on by the supplier (VANESERVICE S.R.L.). Periodic field inspection will be carried out in order to verify the correct position and functioning of the single components and especially clean the PIR sensors from vegetation. VANESERVICE S.R.L. will routinely check all the AVC PSs 3 times/year and will intervene anytime needed if issues come up.

Field inspections will be carried out by staff of the three Italian partners once/month. Data from the camera traps and from the database will be downloaded and analysed once/month in order to evaluate the effectiveness of the devices.

The monitoring of the VF with camera traps will be continued as well as the field inspections to check the devices. The supplier of the devices will also implement periodic field inspections to check the operation of the devices (E' vero?).

Roles and responsibilities

Italy: For the AVC PS, PNM, PNALM and Terni Province have made first maintenance contracts with VANESERVICE for the duration of 1 year. Reallocations of the internal Park funds have been made by PNM to guarantee these funds for 2023-2024, and the same is already foreseen by PNALM.

For the virtual fence, PNM and PNALM staff will implement field inspections and camera traps data download once/month. In PNM own funds will be used to both purchase the additional devices and to pay maintenance costs.

In Greece the maintenance will be assigned to external contractor by RWM, using its own financial resources. According to the contract signed between RWM and the contractor for the supply and installation of the AVC PS equipment, the contractor has ensured the connection to a mobile network and the insurance of good operation of the equipment, for both installation and operation of the AVC PS, for the next three years from the end of the project.

Monitoring of AVC PS will be carried out by CALLISTO, in cooperation with RWM. Actually, CALLISTO has already allocated the necessary funds for AVC PS monitoring in 2023 (source: Leventis Foundation - <https://www.leventisfoundation.org/environmental-conservation>). The NGO has already started efforts to secure the necessary funds for covering the monitoring needs in the next couple of years. If necessary, additional funds for securing the proper monitoring of the AVC PS will be covered by RWM through its own budget.

In Spain the Junta de Andalucía (CSMAEA/AMAYA) will carry on the monitoring and maintenance of the AVC PS and of the virtual fence in the frame of the Plan de recuperación del lince ibérico.

In Romania, the National Institute for Research and Development in Forestry “Marin Dracea” will continue to monitor the AVC PS equipment by regularly checking the functionality and by ensuring the mobile network connection with the mobile company, which transmits the data remotely. Fundatia Carpati will continue monitoring the virtual fence at least once per month by checking whether all the components are effectively working.

6.4 Maintenance of interventions to enhance permeability

Why the continuation is necessary

The adapted underpasses and the installed fences are very important to allow the passage of animals from one side to the other of the road in a safe way. The interventions will not require specific ordinary maintenance activities, but it will be important to make sure that the fences are not damaged and that the accessibility and attractiveness of the underpasses remains optimal.

Moreover, since the crossing of animals does not occur always in the same areas, it might be that in time new requirements for adaptation of crossing structures will appear. It is therefore important that the structures are regularly checked for their completeness and safety, whereas the assessment of potential needs for new interventions was discussed in par 5.1.

With what means is the continuation guaranteed

The competent authorities and partners have already planned regular surveys, which will be carried out by the technical staff. This will consist in systematic field visits on the sites of interventions to check if the fences are still entire or if they are damaged, if the underpasses are still clean and accessible to wildlife, if the dry ledges are always effective, and if the vegetation is still growing the way to invite the animals to approach the underpasses but does not encroach the passage.

The underpasses adapted where cleaning interventions have been carried out will be checked and, if needed, the cleaning operation will be repeated.

In Italy the fences installed along the SS17 by PNM will be object of additional works in order to better accomplish the requirements imposed by ANAS for driver safety (e.g. improvement of the gates to create escaping routes, improvements to better resist to the snow). The fences will be constantly checked to verify their integrity. The same will be done by PNALM on the adapted crossing structures.

In Greece the maintenance of interventions, including cleaning of debris, maintenance of plants, pruning, and all the other interventions will be part of the main maintenance contract for the motorway, procured by EGNATIA ODOS S.A.

Roles and responsibilities

Cleaned underpasses will be inspected once/year (in spring).

In Italy the field inspections will be implemented by ANAS workers and by PNM and PNALM staff. ANAS workers will check the general integrity of the fences 1 time/week while PNM and PNALM staff will implement more in-depth inspections 4 times/year.

Underpasses cleaning will be implemented by civil servants of the two partners, thus no specific funds are requested.

To improve the installed fences on the SS17 road, PNM will use its own funds.

Greece: The interventions on the Egnatia Highway will be done through the contractor for maintenance and operation of the motorway, which has also carried out the works for the adaptation of the underpasses. This will be included in the maintenance and operation contract and the contract will be funded by motorway toll revenues.

Romania: In Romania the road authority CNAIR will have to assure the regular continuation of cleaning of the underpasses off debris, garbage and vegetation. The status of the underpasses will also be regularly checked by the staff of Fundatia Carpati, with own internal resources. Annex 1 includes a letter of CNAIR in which it states that these activities are under their responsibility.

Spain: Although no interventions on crossing structures have been made in the frame of the LIFE SAFE-CROSSING project, in the future periodically basic maintenance work will be carried out on the infrastructures, such as repairing the perimeter fence infrastructure and cleaning of road sides. This includes also the clearing of banks in order to assure the sustainability of the road side cleaning activities carried out in the project. The interventions will be carried out in the frame of the “Plan de recuperación del lince ibérico”, by the two Spanish partners CAGPRS and AMAYA, and with the support of CFIOT, the competent road administration in Andalucía.

6.5 Maintenance of road information panels

Why the continuation is necessary

The road information panels installed in Action C3 are fully efficient and most likely will not need any maintenance, but only a regular check to control if they are always in place and are not damaged. This will be ensured by the internal staff of each project partner, because the road panels are installed on the roads daily travelled by the personnel of each entity involved in the project.

In case of the necessity to replace a damaged road panel internal funds will be used.

With what means is the continuation guaranteed

Periodic field inspections will be implemented in order to assess the possible need to cut the vegetation that could affect the road panels visibility. If any type of damage will be detected during the inspections the responsible entities will repair it and, if necessary, will replace the panels.

Costs: No specific funds are needed because the work is done by the civil servants of the partners.

Roles and responsibilities

ANAS workers will check the general integrity of the panels 1 times/month. PNM and PNALM staff will implement more in-depth inspections 2 times/year. PNM and PNALM will replace the damaged panels with new ones through own financial funds.

In Terni province at least 4 additional panels will be produced with internal funds, and will be placed on other roads in the project area. The installation and the maintenance of all the panels will be guaranteed by the staff of the province with internal funds.

In Greece, if needed, external assistance using subcontracting, will be covered by RWM through its own budget.

In Spain the maintenance will be guaranteed by CSMAEA/AMAYA through the plan de recuperación del lince ibérico.

In Romania, Fundatia Carpati and INCDS will regularly check the general integrity of the panels, at least 1 time/month, and in the case of damage of the panels, will try to change/repair them through own financial funds.

6.6 Further dissemination activities

Why the continuation is necessary

The LIFE SAFE-CROSSING Project has made a big effort in terms of dissemination activities, mainly towards drivers, but also towards the general public as well as to the key stakeholders. This has been done by producing and disseminating information materials, through media activities, by broadcasting an information spot, by presenting the project at public events, through the activities with driving schools etc. Furthermore, a big effort has been done for the dissemination of the developed techniques and the lessons learned to other potentially interested parties.

A huge number of persons has been reached by all these activities. This can be considered very significant in terms of dissemination.

Nevertheless, the need for raising this awareness still exists, especially regarding its importance for biodiversity and also for human safety. As we were able to see through the measurements of traffic volume and speed of the vehicles, the driving behavior of people still has to improve because in many cases the registered speeds are far exceeding the foreseen limits.

Besides this, although there has already been a good level of cooperation with the road authorities, the awareness of the key decision makers and authorities still has to improve, in order to make sure that these become more proactive in implementing measures to prevent the impact of roads.

With what means is the continuation guaranteed:

The beneficiaries of the LIFE SAFE-CROSSING project do not have specific budgets and assignments for raising awareness about wildlife road kill issues. However, the reduction of road kills is in the strict interest especially of the public authorities, which are responsible for this issue and therefore have been keen to be involved in this project.

Awareness raising and information activities of the partners are always included in projects dealing with Large Carnivores and the conditions of their coexistence with local societies. They are financed by European financial tools (e.g., LIFE Programme), National funds (e.g., Green Fund), or several private sources (e.g., sponsors, donors, and charitable institutions).

Also, the local NGOs will have an interest for continuing awareness raising activities because this is in the scope of their mission of conservation.

The following activities will be further carried out:

- The video game will be proposed to children during all the local events organized as well as during all the activities in the schools carried on by the National Park Environmental Education Centers and Visitor Centers, and by the other partners during their educational activities.
- The TV spot and the project video will remain on the project website, on YouTube and accessible through Facebook and Instagram, and therefore will be further disseminated.
- The project website will remain active during the next five years.
- The Facebook and Instagram pages will constantly be updated also in the future and all kind of information regarding the impacts of infrastructures on biodiversity will be posted.
- The itinerant exhibitions will be further circulated by the partners, in whatever events and locations that are suitable.
- Activities in the schools will be implemented from October to May every year while local events will be organized from May to October
- In relevant public events the App and videogame will be disseminated and the video about project activities will be showed to the public
- Information about similar topics from the project areas will be spread through the IENE Newsletter
- links to the project documents will be included in the 'Transport Ecology Guidelines portal' by MINUARTIA and the IENE staff.

Roles, responsibilities and funding:

The communication activities will be carried out by all project partners with their own funds. Some partners are planning the development of new projects and applications for funds, where the costs for such communication activities will be included.

In Italy the awareness raising activities will be carried out by the Environmental Education Centers and Visitor Centers of the two National Parks.

In Greece CALLISTO organises several events in the framework of projects on coexistence of People with Large Carnivores. The impact of infrastructures and possible mitigation measures represent issues that usually are discussed in these meetings. Relevant information will be provided by CALLISTO to the audience of such events. RWM uses National or European funds, while EO SA and COSMOTE SA use own resources for information activities implementing their natural environment protection policies.

In Spain and intense communication campaign regarding the Iberian lynx is ongoing, and will include also aspects regarding the impacts of roads. CSMAEA/AMAYA will carry on the communication activities through the plan de recuperación del lince ibérico.

The results and lessons learned in the project will be disseminated by the two national park in all the communication campaigns carried out for the conservation of the Apennine brown bear.

7. Conclusions

The LIFE SAFE-CROSSING project has been a very important start of concrete interventions to reduce the impact of roads in significant areas in four countries, where roads have a strong impact on protected large carnivore species. The project has implemented roadkill prevention and defragmentation activities on significant lengths of road segments, therefore achieving an important conservation impact. All these interventions are now actively working and effective, but especially the more technologically demanding tools (AVC PS and virtual fence) will surely need specific attention and maintenance and therefore the competent authorities will have to foresee the needed technical assistance.

A huge effort was also applied to raise awareness of the general public about the impact of roads on biodiversity. All the materials produced will be used in the future also outside project area through the contacts developed in the frame of the project

It will also be important that the impact of roads in general, not only on the target species but on all wildlife, is further monitored, to understand if the interventions carried out have to be further implemented or redirected.

The partnership of the LIFE SAFE-CROSSING project has been chosen with the scope to guarantee the sustainability of the activities, through the direct involvement of the key decision makers and local authorities, which will assure the continuation of the interventions.

The project also had an important demonstration character because it has attracted the attention of some key decision maker and management authority such as ANAS in Italy and CNAIR in Romania. But it is crucial that the relevant authorities and stakeholders take up the best practices, lessons and further replicate them and build on them in more ambitious ways in the future. In fact, the reduction of the impact of roads should not be limited to the installation of road kill prevention tools and defragmentation activities, but it should reach out to more ambitious initiatives, which can be reached only with the full participation of the relevant authorities.

The afterlife plan developed will ensure that all the activities will continue after the end of the project and the interventions carried out will be applied in other areas.

8. Detailed After-LIFE plans per country

ITALY

Action	Intervention	Methods/techniques	Who (organization/staff etc.)	Funding source	Timing	Comments
A6	Maintenance and running of App and database	We will continue to encourage the use of the App by the people that manage the roads as well as by the people that intervene in case of AVC. Data collected with the monitoring/surveillance activity will be provided to the database managers to upload the database.	PNM staff (civil servants) ANAS Police agents PNALM staff (civil servants, park rangers) Staff of Terni Province, through the staff of Province Police	No funds requested	Specific activities to encourage the use of the App will be carried on within 6 months from the project end. Data for the database will be provided every 6 months	
C1	Maintenance and monitoring of AVC PS	Maintenance will be carried on by the supplier (VANESERVICE S.R.L.). Periodic field inspection will be carried out in order to verify the correct position of the single components and eventually clean them from vegetation. AVC PS monitoring will be continued through the use of camera traps and through the download/analysis of data	PNM Staff (civil servants) VANESERVICE S.R.L. PNALM Staff (civil servants) Terni Province, through the staff of Province Police	PNM, PNALM and Terni Province own funds will be used to pay for the external assistance of VANESERVICE S.R.L. PNM: (8.000 €/year) PNALM: (3000 €/year) TERNI (3000 €/year)	VANESERVICE S.R.L. will routinely check all the AVC PSs 3 times/year and will extraordinarily check them anytime needed if issues come up. The field inspection will be carried out by the staff of PNM, PNALM and Terni Province once/month. Data from the camera traps and from the database will be downloaded and	A special re-allocation of funds has been made by PNM and PNALM in order to ensure the availability of the needed funds for 2023-2024. Every year the same special re-allocation will be renewed in order to ensure funds availability.

Action	Intervention	Methods/techniques	Who (organization/staff etc.)	Funding source	Timing	Comments
		stored in the database of each device.			analysed by PNM and PNALM staff once/month.	
C1	Maintenance and monitoring of virtual fence	<p>The Virtual Fence installation will be continued along other critical road stretches through the purchase of new devices.</p> <p>The monitoring with camera traps will be continued as well as the field inspections to check the devices.</p> <p>The supplier of the devices will also implement periodic field inspections to check the operation of the devices.</p>	<p>PNM Staff (civil servants)</p> <p>iPTE Traffic Solutions Ltd.</p> <p>PNALM Staff (civil servants)</p>	<p>PNM own funds will be used to both purchase the additional devices (10.000 Euros) and to pay maintenance costs (2.000 Euros/year)*.</p> <p>PNALM: no additional purchases are foreseen.</p>	<p>The new devices will be installed by PNM within spring 2024.</p> <p>iPTE Traffic Solutions Ltd.staff will implement field inspections once/year.</p> <p>PNM and PNALM staff will implement field inspections and camera traps data download once/month.</p>	
C2	Maintenance and monitoring of interventions on underpasses and fences	<p>The underpasses adapted with cleaning will be checked and, if needed, the cleaning will be repeated.</p> <p>The fences installed by PNM along the SS17 will be object of additional works in order to better accomplish the</p>	<p>PNM staff (civil servants)</p> <p>ANAS</p> <p>PNALM Staff (civil servants)</p>	<p>Underpasses cleaning will be implemented by PNM and PNALM civil servants thus no specific funds are requested.</p> <p>To improve the installed fences</p>	<p>Cleaned underpasses will be inspected once/year (in spring).</p> <p>ANAS workers will check the general integrity of the fences 1 time/week while PNM and PNALM staff will implement more</p>	

Action	Intervention	Methods/techniques	Who (organization/staff etc.)	Funding source	Timing	Comments
		<p>requirements imposed by ANAS for driver safety (e.g. improvement of the gates to create escaping routes, improvements to better resist to the snow).</p> <p>The fences will be constantly checked to verify their integrity.</p>		<p>along SS17, PNM will use his own funds (20.000 Euros).</p> <p>The field inspections will be implemented by ANAS workers and by PNM and PNALM staff.</p>	in-depth inspections 4 times/year.	
C3	Maintenance of road panels	<p>Periodic field inspections will be implemented in order to assess the possible need to clean from vegetation.</p> <p>In Terni Province at least 4 additional panels will be installed on other roads in the project area.</p>	<p>PNM staff (civil servants)</p> <p>ANAS</p> <p>PNALM Staff (civil servants)</p> <p>Terni Province staff</p>	<p>No specific funds requested.</p> <p>If any type of damage is detected during the inspections by ANAS and the Parks staff, PNM and PNALM will be willing to fix the damaged panels or replace them if needed through own financial funds.</p> <p>In Terni Province the additional panels will be installed with internal funds.</p>	<p>ANAS workers will check the general integrity of the panels 1 times/month. PNM and PNALM staff will implement more in-depth inspections 2 times/year.</p> <p>Additional panels in Terni will be installed in 2024.</p>	
E2	Circulation of video game	The video game will be proposed to children during all the local events organized as well as during	<p>PNM staff (civil servants)</p> <p>PNALM Staff (civil servants)</p>	No special funds requested	Activities in the schools will be implemented from October to May every	

Action	Intervention	Methods/techniques	Who (organization/staff etc.)	Funding source	Timing	Comments
		all the activities in the schools carried on by the PNM/ PNALM own EEC (Environmental Education Center and Visitor Center).	Terni Province staff EEC staff		year while local events will be organized from May to October.	
E4	Raising awareness about impact of infrastructures	<p>Distribution of the dissemination material produced (Action E1) and still available during all the events organized by PNM and PNALM. Available posters will also be distributed again at Petrol Stations and bars along the roads interested by the project.</p> <p>The collaboration with Driving schools to “train the trainers” will be continued through the distribution of new information material and the distribution of the spot produced to each driving school.</p> <p>The Itinerant Exhibition will be showed during all the</p>	PNM staff (civil servants) Driving schools PNALM	No specific funds required	<p>The posters will be distributed to the patrol stations within 30/04/2024.</p> <p>The new information material and the spot will be sent to around 40 driving schools within 31/05/2024.</p> <p>Local events to show the itinerant exhibition will be organized during spring-summer.</p>	

Action	Intervention	Methods/techniques	Who (organization/staff etc.)	Funding source	Timing	Comments
		local events organized by the Parks.				

* In addition to after-LIFE activities continued with PNM funds, additional VF devices will be installed along the State Road SS5, which separates the PNM from the Gran Sasso e Monti della Laga National Park in one of the most important corridors for Apennine brown bear expansion, using 25.000 Euros provided by the Ministry of Environment and Energy Security (MASE). This intervention, to be implemented within 2025, is part of a wider project that, beyond PNM, involves the Carabinieri Biodiversity Department (belonging to the Carabinieri Forestale, former Forestry Service of Italy) of Pescara.

Spain

Action	Intervention	Methods/techniques	Who (organization/staff etc.)	Funding source	Timing	Comments
A6	Maintenance and running of App and database	Update of database in the frame of Lynx conservation activities.	CSMAEA/AMAYA	Own funding	Permanent	
C1	Maintenance and monitoring of AVC PS	Defragmentation measures and their annual maintenance,	Plan de recuperación del lince ibérico. CSMAEA/AMAYA	Own funding	Permanent	
C1	Maintenance and monitoring of virtual fence	including devices and signalling, are carried out periodically	Plan de recuperación del lince ibérico. CSMAEA/AMAYA	Own funding	Permanent	
C2	Maintenance and monitoring of interventions on underpasses and fences	Periodically, basic maintenance work is carried out on the infrastructures, such as repairing the perimeter fence infrastructure, such as repairs to the perimeter fence, cleaning of ODTs, clearing of banks, etc.	Plan de recuperación del lince ibérico. CSMAEA/AMAYA and CFIOT (Competent road administration in Andalucía)	Own funding	Permanent	(CSMAEA/AMAYA only in the Iberian Lynx distribution area)
C2	Spain: road side cleaning			Own funding	Permanent	(CSMAEA/AMAYA only in the Iberian Lynx distribution area)
C3	Maintenance or road panels	Same as C1 actions	Plan de recuperación del lince ibérico. CSMAEA/AMAYA	Own funding	Permanent	
E2	Circulation of video game	Through own resources	Plan de recuperación del lince ibérico. CSMAEA/AMAYA	Own funding	Permanent	
E4	Raising awareness about impact of infrastructures	By commissioning own resources	Plan de recuperación del lince ibérico. CSMAEA/AMAYA	FEADER	At least until 2025	

E7	Guidelines dissemination	Sending information by IENE Newsletter and including link in the 'Transport Ecology Guidelines portal'	MINUARTIA and IENE staff	No cost	2023-2024	The dissemination of the guidelines to the community of IENE will enhanced the replication of activities
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Romania

Action	Intervention	Methods/techniques	Who (organization/staff etc.)	Funding source	Timing	Comments
A6	Maintenance and running of App and database	The Romanian team will continue to encourage the use of the App by all our employees which will regularly check the roads from the project area.	INCDS Fundatia Carpati	No funds requested	Permanent	
C1	Maintenance and monitoring of AVC PS	The monitoring of the use of the AVC PS will be ensured by the contract with the phone company which will provide the network connection, and the maintenance will be ensured by our employees whici will regularly chech this devices.	INCDS	Own budget	Permanent	
C1	Maintenance and monitoring of virtual fence	By regularly check the functioning of the devices.	Fundatia Carpati	Own budget	Permanent	The LSC project areas are targeted by the activity of Fundatia Carpati, which implies a specific frequency of monitoring of the road sectors where the

						virtual fences are installed.
C2	Maintenance and monitoring of interventions on underpasses and fences	The road company has an agreement with INCDS that will ensure the maintenance of the underpasses, and the monitoring will be ensured by INCDS and Fundatia Carpati	Road company INCDS Fundatia Carpati	Own funding	Permanent	Please check Annex 1
C3	Maintenance or road panels	By regularly check the status.	Fundatia Carpati INCDS	Own funding	Permanent	
E2	Circulation of video game	In Romania all the schools have a special designated period each year when they have to do environmental related activities. As in the past years, our institute is visited by hundreds of children, and in our presentation the video game will also be included.	INCDS	No funding needed	Permanent	
E4	Raising awareness about impact of infrastructures	Presentations and information during public events or special meetings, seminars, national and international conferences.	INCDS Fundatia Carpati	Own funding	Permanent	

Greece

Action	Intervention	Methods/techniques	Who (organization/staff etc.)	Funding source	Timing	Comments
A6	Maintenance and running of App and database	Use and updating of App and database by new data concerning the project area	CALLISTO is continuously monitoring the impact of transportation infrastructures on wildlife from 2005	European financial tools (e.g., LIFE Programme), National funds (e.g., Green Fund), or several private sources (e.g., charitable institutions)	Depending on the availability of financial tools	

C1	Maintenance and monitoring of AVC PS	<p>Monitoring includes the operation of AVC PS systems and can be made using AVC PS management/monitoring tool. Some on-the-spot visits are also necessary.</p> <p>Maintenance includes checks on components functionality, panels orientation, substitution of batteries, mobile subscription renewal etc</p>	<p>Maintenance will be assigned to external contractor of RWM, using its own financial resources.</p> <p>Monitoring of AVC PS will be carried out by CALLISTO, in cooperation with RWM.</p> <p>If necessary, additional funds for securing the proper monitoring of the AVC PS will be covered by RWM through its own budget.</p>	<p>Monitoring costs include CALLISTO's staff and travel costs. It will be covered by CALLISTO's own resources.</p> <p>Actually, CALLISTO has already allocated the necessary funds for AVC PS monitoring in 2023 (source: Leventis Foundation - https://www.leventisfoundation.org/environmental-conservation). The NGO has already started efforts to secure the necessary funds for covering the monitoring needs in the next couple of years.</p> <p>Maintenance cost include costs for checking, fixing or substituting equipment or consumables.</p> <p>It will be covered by RWM own budget or by Public Investments Program/Regional Operational Program.</p>	<p>Monitoring will be done weekly remotely and with a visit once a month.</p> <p>For the first period until the middle of November 2023, at least 3 visits will be made to the area.</p> <p>Maintenance will be made on an annual frequency/base.</p>	<p>According to the contract signed between RWM and the contractor for the supply and installation of the AVC PS equipment, the contractor has ensured the connection to a mobile network and the insurance of good operation of the equipment with legal coverage, for both installation and operation of the AVC PS, for the next three years from the end of the project.</p>
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C1	Maintenance and monitoring of virtual fence	Maintenance of the virtual fence installed in Amyntaio district by the LIFE AmyBear project (LIFE15 NAT/GR/001108) is responsibility of the public bodies who were associated beneficiaries of this project	Municipality of Amyntaion, and Decentralised Administration of Epirus - W. Macedonia	National funds	<p>Maintenance should be made when damage is reported.</p> <p>So far, no maintenance of the virtual fence has been made, although CALLISTO has reported damages that came to its attention</p>	<p>No regular monitoring of the virtual fence has been secured so far. From time-to-time CALLISTO and other NGOs active in Amyntaio district, report to the local authorities damages that come to their attention</p>
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C2	Maintenance and monitoring of interventions on underpasses and fences	The maintenance of interventions, including cleaning of debris, maintenance of plants, pruning, will be part of the main maintenance contract for the motorway, procured by EGNATIA ODOS S.A.	<p>The Contractor for maintenance and operation of the Egnatia motorway already has the organization and staff for the maintenance.</p> <p>COSMOTE's R&D staff could offer the "Wildlife monitoring, species categorization and statistics' extraction solution", they have developed, for free for a limited number of cameras/underpasses.</p>	<p>The maintenance of interventions will be part of the maintenance and operation contract of EGNATIA ODOS S.A., funded by Toll revenues.</p> <p>Internal (COSMOTE) funding for the monitoring.</p>	<p>The maintenance of interventions will take place throughout the period of motorway maintenance and operation of Egnatia motorway.</p> <p>The offer from COSMOTE is valid for 2 years after the project end.</p>	<p>Solar/Battery-powered 4G/5G cameras could be installed at specific underpasses for monitoring/ assessing the impact of the interventions on wildlife/ biodiversity.</p> <p>The cameras' material (photos, videos) will be uploaded to a cloud infrastructure for storage, processing (e.g., species categorization, real-time alerting), visualization and statistics' extraction in an automated way.</p> <p>Note: If trail cameras used instead, the abovementioned</p>
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						<p>processes shall be done manually.</p> <p>In the context of a future project, COSMOTE could develop a smart “species tracking solution”, which will, upon detection, follow the movement of specific species, by utilizing Pan-Tilt-Zoom (PTZ), such as the Reolink KEEN Ranger PT one (https://reolink.com/product/keen-ranger-pt/).</p>
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C3	Maintenance of road panels	Panels specifications include AlMg alloys material for the signs, guaranteed antigraffiti membrane and ultra-high reflective film and galvanized iron pipes. Therefore, usually maintenance is not needed.	If needed, graffiti cleaning/erasing will be assigned to external contractor of RWM.	If needed, external assistance using subcontracting, will be covered by RWM through its own budget.	Maintenance will be made when damage is reported.	
E2	Circulation of video game	Presentations and demonstration of the video game during public events or environmental education activities	CALLISTO through awareness raising and environmental education activities. See also E4 below.	Awareness raising, information and environmental education activities of CALLISTO are always included in projects dealing with Large Carnivores and the conditions of their coexistence with local societies. See also E4 below.	CALLISTO organise at least 6-8 awareness raising and environmental education activities per year	

E4	Raising awareness about impact of infrastructures	Presentations and information during public events or special meetings-seminars	<p>CALLISTO organises several events in the framework of projects on coexistence of People with Large Carnivores. The impact of infrastructures and possible mitigation measures represent issues that usually are discussed in these meetings. Relevant information is provided by CALLISTO to the audience of such events.</p> <p>Other project partners organise also such activities from time to time, targeting regional or national audience.</p>	<p>Awareness raising and information activities of CALLISTO are always included in projects dealing with Large Carnivores and the conditions of their coexistence with local societies. They are financed by European financial tools (e.g., LIFE Programme), National funds (e.g., Green Fund), or several private sources (e.g., sponsors, donors, and charitable institutions).</p> <p>RWM uses National or European funds, while EO SA and COSMOTEA use own resources for information activities implementing their natural environment protection policies.</p>	<p>CALLISTO organise at least 6-8 awareness raising and environmental education activities per year.</p> <p>Other project partners organise also such activities from time to time, targeting regional or national audience.</p>	
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E7	Activities to ensure replicability and transferability of the implemented activities	Awareness raising activities, lobbying and specific interventions regarding mitigation of the impact of roads on wildlife	CALLISTO considers minimisation of the impact of transportation infrastructures on wildlife as one of its main thematic fields of action	European financial tools (e.g., LIFE Programme), National funds (e.g., Green Fund), or several private sources (e.g., sponsors, donors, and charitable institutions)	Depending on the available financial tools. So far, besides LIFE Safe Crossing, starting from year 2005, CALLISTO has implemented eleven (11) projects dealing with impact of roads on wildlife.	In May 2018, CALLISTO won both the "Natura 2000" and the "Best of the Best LIFE" Awards, for its work in the LIFE project ARCTOS/KASTORIA "Improving conditions of bear-human coexistence in Kastoria Prefecture, Greece - Transfer of best practices" (LIFE09 NAT/GR/000333)
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INDICATIV 3
Nr. 3/214/18.10.2023

Către: INCDS „Marin Drăcea”
Ref: răspuns la adresa dvs. cu privire la întreținerea podurilor rutiere
- Înregistrată la DRDP Brașov cu nr. BV01_/23/IN/21504/13.10.2023
- Înregistrată la Compartimentul Comunicare al DRDP Brașov
cu nr. 3/202/18.10.2023

Stimate Doamnă/Domn,

În urma adresei dvs. legată de *Proiectul LIFE SAFE – CROSSING, LIFE 17NAT/TT/000464*, cu privire la întreținerea podurilor rutiere vă comunicăm următoarele precizări:

Direcția Regională de Drumuri și Poduri BRAȘOV administrează și întreține podurile rutiere aflate pe sectoarele de drum DN 1 Brașov – Perșani și Brașov – Predeal, DN 1A Brașov – Babarunca și DN 13 (E60) Brașov – Rupea Gară.

Podurile rutiere aflate pe sectorul de drum DN 1 Predeal – Azuga sunt în administrarea și întreținerea Direcției Regionale de Drumuri și Poduri BUCUREȘTI.

Cu stimă,
DIRECTOR REGIONAL
Tudor Alexandru DUȚU



Compartimentul Comunicare

Întocmit: specialist relații publice
Elicia Robert

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