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5.4.1 Environmental benefits

1. a. *Direct / quantitative environmental benefits:*

Project's pressure upon the Egnatia highway company EGNATIA ODOS SA following numerous bear traffic fatalities along highway KA45 resulted in the replacement of the old highway fence with a new bear-proof fence which was installed along the total 110km length of the highway. After fence installation completion, and in combination with the warning signs and the Wildlife Reflectors installation (under action C1) bear traffic fatalities decreased to almost 100% thus contributing decisively to the minimization of a serious bear-human caused mortality factor.

Positive effects for the targeted species (*Ursus arctos**) were also achieved by the actions aiming at reducing the direct conflict between bears and farmers (due to damage to livestock and agricultural production). This was achieved through concrete conservation actions such as: monitoring of livestock damage, disseminating the use of LGD and electric fences etc. The simple fact that the regional authorities assisted the farmers in finding concrete solutions has given the farmers a feeling not being let alone with their problems. Therefore, besides the clear practical benefit in terms of reduced numbers of damage cases, these activities have helped reduce the aversive feelings towards bears.

In the course of the project the Bear Emergency Team (BET) has intervened in no less than 79 conflict cases, most of which involved bears being in vulnerable situations in interference with human presence and activities. Therefore these interventions have helped to save several bear individuals. These teams continue to operate after the end of the project, following the official instauration by law on 07/02/2014 of a national BET thus saving many other bears during this period and in the foreseen future. The project has also transferred significant knowledge and know-how related to the BETs, damage prevention and bear deterring methods and actions, to the personnel of the relevant competent services on a wider scale.

Also the presence of the project's field teams during implementation of field actions and their contacts with local inhabitants and target groups (i.e. shepherds, beekeepers etc.) had very probably a dissuasive (positive) effect upon potential bear-human caused mortality incentives.

1. b. *Relevance for environmentally significant issues or policy areas*

EGNATIA ODOS S.A. adopted the suggested mitigation measures implemented by the project (warning signs and artificial deterrents providing safer road network and reducing wildlife mortality): The company will use the specifications included in the relevant Technical Report prepared by CALLISTO within the project framework for installing WWRs at the vertical axis connecting Egnatia Highway to Bulgaria (near the Greece-Bulgaria border area).

5.4.2 Long-term benefits and sustainability

1. c. *Long-term / qualitative environmental benefits*

The Project aimed at setting the conditions for long-term bear conservation practices beyond the simple implementation of conflict management tools on the ground. The implementation of protocols, the revision of regulation and the training activities had the objective to make the conflict management tools become more autonomous. This has succeeded in several ways: The Bear Emergency Team is now operating on an official basis. Also improved damage

monitoring tools are now in place and will ease data collection and control of the conflict situations.

Also specific concrete conservation actions such as C1, C3, and C5 will continue to develop and produce their positive effects upon the targeted species on a long term basis as follows: the continuous operation of the warning signs, wildlife reflectors and the bear proof fence placed along highway KA45 are expected to maintain bear traffic fatalities at their lowest possible levels.

The continuation of the LGD's network operation by CALLISTO is expected to further reduce conflicts between bears and livestock raisers. Finally the national BET which has become by law the official management instrument in cases of bear-human interferences will operate on national resources in order to ensure the resolution of such cases for the benefit of the targeted species on a long term basis. However we estimate that illegal hunting (poaching) and poisoned baits are among the major remaining threats potentially affecting the targeted species although the project addressed them in the best possible way during its implementation period.

1. d. Long-term / qualitative economic benefits

The project made great efforts and has persuaded a considerable part of the rural people and of the local authorities in the project area that human/bear coexistence is possible and that, under certain conditions, may be beneficially for development of promising economic activities (e.g. sustainable tourism) and for creation of jobs in sectors related to the nature conservation (e.g. development of business related with installation of electric fences).

Furthermore, the creation of the LGDs Owners' Network and the deployment of damage prevention measures (part of which will be continued by the new Rural Development Programme of Greece 2014-2020), offer concrete ways of reducing the costs of agricultural, apicultural and livestock breeding activities in remote and mountainous rural areas.

1. e. Long-term / qualitative social benefits

The infrastructure created by the LIFE project enhanced road safety and reduced traffic accidents, which were threaten animal and human lives in the region. This is probably the most important contribution of the project to the local society.

Moreover, the cooperation of the local authorities with specialized environmental organizations, the operation of Bear Emergency Team in the project area, the implementation of damage prevention measures, the coordination-activation of volunteers, both from the local society and other places of Greece, and other concrete management measures made a considerable part of the local peoples to feel that public services, local authorities and environmentalists are not indifferent on the real problems they face. Many of them feel now that human/bear coexistence is possible, provided that stakeholders will cooperate in the framework of a jointly agreed conflict resolution system.

1. f. Continuation of the project actions by the beneficiary or by other stakeholders.

The After LIFE Conservation Plan presented in *Annex VI* of this report includes commitments and particular plans adopted by the project beneficiaries in order to achieve goals such as:

- Continue monitoring the efficiency and effective use of the mitigation structures, and increase permeability of the KA45 highway.
- Improve the damage assessment and the agricultural insurance system, amplify the LGD owner's network created by the project and utilise financial tools, European programmes and all

funding opportunities to encourage implementation of efficient damage prevention techniques.

- Continue capacity building of authorities involved in wildlife management in the region and implement in practice the Joint Ministerial Decision adopting the operation of Bear Emergency Teams (BET) and secure the financial support to it by the Green Fund.
- Upgrade the stakeholder involvement and consultation processes to a conflict resolution system and continue public information and awareness activities.
- Enrich environmental education and eco-volunteering programmes.

5.4.3 Replicability, demonstration, transferability, cooperation:

The use of damage prevention tools such as livestock guarding dogs and electric fences is a common best practice in the management of large carnivores and was already previously applied many times. Therefore its replicability is commonly known. In the frame of the LIFE ARCKAS project the use of electric fences is being replicated by the involved regional authorities. Also the propagation of the use of LGDs among shepherds was also endorsed and replicated by the regional authorities. These tools are widely replicable wherever there is an overlap livestock raising activities and the ranges of large carnivores. In fact not only across Europe but also in other continents the use of electric fences and LGDs are increasingly implemented as the most appropriate preventive measures to ensure the coexistence between wild predator populations and rural communities. The BET operation was new in the project area but paved a new way towards the official instauration of a national BET after the elaboration (under this project) of a detailed and scientifically based operational manual. These teams have up to now mainly been developed for the management of problem bears (Bear Emergency Teams). The development and operation of a BET has an important demonstration value also at international level. The problems faced by such tools are common to most of the areas where bears occur and the use of BETs has been extremely effective and highly valued everywhere they were implemented. For instance in Spain, France and Italy, where conflicts involving bears are not rare, such a tool is of great effectiveness.

5.4.4 Best Practice lessons

The operation of the BET under this project was an example of best practice which has been legislatively transferred and put in force at a national level. According to the BET operational frame set and defined by the relevant legislative text possible operational adjustments are expected in order to better coordinate the competent bodies involved and thus to optimize its efficiency.

The “best-practice manual” edited by the project was based on experience gained during this and previous LIFE projects regarding conservation of brown bear in Greece. It provides technical instructions on proper use of LGDs (Livestock Guarding Dogs) and electric fences, as damage prevention measures.

5.4.5 Innovation and demonstration value:

The implementation of some best practice techniques and demonstration methods such as satellite telemetry, operation of a “Bear Emergency Team”, non-invasive genetic monitoring of the brown bear, mitigation measures for safer road network operation standards and reduction of wildlife mortality risks, the design and implementation of Environmental Education Programmes on bear-human coexistence, the establishment and initial operation of an “Eco-Volunteers Programme”, and the incorporation of local people attitudes analysis, can be judged as of essential contribution to the improvement of of bear-human coexistence conditions.

5.4.6 Long term indicators of the project success:

The conservation of bears depends on a large number of extrinsic and intrinsic factors. In general the conflict between local authorities and stakeholders, caused by the interaction between rural populations and large carnivores, is probably one of the most important problems. However, the well-being of the populations of brown bears can be also affected by other factors such as: poaching, road-kills, diseases, natural food shortage etc. Therefore it is not possible to identify single (isolated) indicators for the success of a bear conservation project, but instead several factors have to be taken into consideration simultaneously and in a combinatory way. E.g. the size of a bear population might increase due to a reduced amount of conflicts but suffer from other human related or natural limiting factors.

The amount of damage caused on livestock can be influenced by different factors such as the quality of damage prevention, the damage monitoring procedures, the techniques applied by the staff that assesses the damage and by the predator populations. Also the amount of interventions made by BETs can depend on bear population sizes, the tolerance levels of the local communities, on the severity of the incidents but also on the quality of the work done by the BET. Therefore also for the future success of the project it is not possible to point out single indicators, but a combination of a set of different factors which represent the variety of parameters involved in an evaluation system as much close to reality as possible. In any case, specific quantifiable indicators which, as mentioned, need to be evaluated in an integrated manner be summarized as follows:

- numbers, distribution and range of the targeted bear population
- mortality due to illegal killing, which is an indirect indicator for discontent of local communities
- extent of damage on livestock and other agricultural facilities
- quality of information about carnivore-livestock conflicts available to local authorities
- extent of the use of damage prevention tools as a reply of the project activities
- amount of compensation payments
- number of cases involving conflicts between bears and human activities/number of BET interventions
- number of local authorities that apply stakeholder consultation techniques for decisionmaking