



<LIFE13 NAT/SI/000550 LIFE DINALP BEAR>

Final Report

Covering the project financial activities from 01/07/2014 to 30/06/2019

Covering the project technical activities from 01/07/2014 to 30/06/2019

<25/10/2019>

<LIFE DINALP BEAR>



University of Ljubljana





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1 Project Data

Project location	Parts of Slovenia, Austria, Italy and Croatia
Project start date:	<01/07/2014 >
Project end date:	<30/06/2019> Extension date: /
Total Project duration (in months)	<60> months
Total budget	5,987,478 EUR
Total eligible budget	5,985,587 EUR
EU contribution:	4,149,202 EUR
(%) of total costs	69,29
(%) of eligible costs	69,32 %
Beneficiary Data	
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LIST OF ABBREVIATIONS USED

CB - Coordinating beneficiary

AB - Associated beneficiary

EC - European Commission

EU - European Union

SFS - Slovenia Forest Service

ARZ - Autocesta Rijeka-Zagreb d.d.

ERICo - Ecological Research & Industrial Co-operation Ltd.

FIWI – Research Institute of Wildlife Ecology University of Veterinary Medicine, Vienna

FVM – Veterinarski Fakultet, Sveučilište u Zagrebu

PAT – Provincia Autonoma di Trento – Servizio Foreste e Fauna

PLI – Progetto Lince Italia

RVEN – Regione del Veneto – Unità di progetto Caccia e Pesca

UL – University of Ljubljana

IR – Inception Report, submitted in 2015

MR1 – Mid-term Report 1, submitted in 2016

MR2 – Mid-term Report 2, submitted in 2018

FR – Final Report

2. Executive Summary

Project objectives:

The LIFE DINALP BEAR project, *Population level management and conservation of brown bears in northern Dinaric Mountains and the Alps* (LIFE13 NAT/SI/000550), began on 01/07/2014 and ended on 30/06/2019.

The project's main goal was to establish a more strategic and landscape-level approach to guide conservation, management and monitoring of brown bear populations in the northern Dinaric Mountains and south-eastern Alps. Other important goals included decreasing human-bear conflicts and improving coexistence between bears and humans. The ultimate goal of the project was to foster natural expansion of brown bears from the Dinaric Mountains to the Alps.

We are pleased to report that this project has been an unequivocal success. Project partners have been engaged, active, and have produced important results under their actions. Although collaboration was initially challenging, over time we developed strong partnerships across four countries that share the same brown bear population. By developing common rules through partnership agreements, establishing a project steering group and through regular communication, project activities were carried out efficiently and smoothly. We are pleased to report that nearly all project actions were completed as planned. In certain cases, our results exceeded many of our original objectives.

This project convened experts across four countries whose expertise, experience, and leadership were leveraged to elevate scientific rigor and improve management and conservation of brown bears within the project. In many respects, the partnerships, skills, and knowledge shared among participants have set a high standard for improved large carnivore conservation in Europe.

Key project deliverables:

- Guidelines for harmonization of brown bear population monitoring
- Management plan (Slovenia and Croatia)
- Focus group(s) report
- Project communication plan
- Project publications:
 - Leaflet about proper human behaviour in bear areas
 - Leaflets on prevention of bear – vehicle collisions related bear mortality
 - Leaflet promoting the bear friendly farming and honey label
 - Leaflet promoting buying »bear friendly« products
 - Practical handbook for managers to reduce human bear conflict
 - Handbook for inspection of damage cases
 - LGD Breeder handbook
 - Brochure about bears
 - Yearly bulletins
 - Educational posters
 - Best practice guides
- Project website
- Internet-based population-level monitoring geo-database
- Action plan for the implementation of the mitigation measures (Croatia and Slovenia)
- Info stands (5 in Slovenia, 6 in Croatia) and information boards
- Guidelines for responsible brown bear based ecotourism

- Bear emergency team protocol
- Guidelines for common management of Northern Dinaric Brown bear Population with the attention to management of Alpine Brown bear Population
- Integration of bear habitat connectivity and suitability into spatial planning handbook
- Habitat suitability and connectivity models for bears in the study area (2 maps in electronic (GIS) format)
- Genetic monitoring of brown bear population expansion from Dinaric Mountains into Eastern Alps
- Fleece jackets, caps, stickers
- After LIFE Conservation Plan
- Layman's report

Project outputs:

- The Common Guidelines for Population-level Brown Bear Management established among all international partners. In addition, they have been extended to entire Alpine area through WISO platform and adopted in Bosnia and Herzegovina.
- Produced Management Plans for management of the brown bear population in Slovenia and Croatia. The management plan was already successfully adopted into national documents in Croatia, while in Slovenia the Management Strategy and the Action Plan were successfully prepared and are now in the final stages of being adopted by the Government.
- Established Guidelines for optimized, common and long-term population-level monitoring of bear population in the Alps and Northern Dinaric Mountains. With this, a solid basis for common, long-term transboundary collaboration in brown bear monitoring is provided.
- Science-based data on bear population size and trends are secured. Extensive genetic sampling and next generation sequencing methodology resulted in highest ever precision of population size estimates. Reconstruction of population size and population dynamics modelling were produced. Thus, a solid methodological foundation and a best practice example was provided for long-term population monitoring.
- The bear population size is increasing. In Slovenia, the increase was 41,3 % in the 8-year period (from 2007 to 2015). The population reconstruction predicted that in SLO the average annual geometric population growth is 4.5 % (CI: 3.9-5.2 %) and 5.0 % (CI: 4.3-5.7 %) in CRO. The long-term population stability and viability are secured.
- Despite a significant bear population growth of the Dinaric population (in both countries, SLO and CRO, the maximum or spring pop. size increased by 30,2 % from 2015 to 2018), the conflict rate and the number of damage cases have not increased. The distribution and use of prevention measures will continue after the project, either in the frame of other nature conservation projects either as local initiatives or individual purchases by interested local inhabitants.
- In Slovenia, the sheep depredations by bears decreased in the period after the implementation of preventive measures by 43 %. In case of farmers and beekeepers, who received the protection equipment, the average yearly damages decreased by 97,5 % (amount compensated) in comparison to the period before the implementation of preventive measures. These best-practice examples will be continued in the frame of national damage compensation mechanisms, other nature conservation projects, or other public entities' preventive schemes.
- In overall for Slovenia and Croatia, bear traffic mortality was reduced by 25 % in the period 2016–2018 compared to the period 2013–2015, despite that the bear population

size increased in the meantime. On mitigated road and railway sections in Slovenia and Croatia, bear traffic mortality was reduced by 63 % in the same period.

- After the implementation of mitigation measures in Slovenia, there was no increase in the number of removed conflict bears in the 4-year period, comparing to the period before the measure implementation, although the bear population size increased for approximately one fifth in the meantime.
- Bear eco-tourism is developed. We have awarded more than 70 applicants with the bear friendly label in Slovenia and Croatia, producing more than 100 different bear friendly products and services. Close to 90.000 pieces of their products were labelled with the bear friendly sign. We promoted the Guidelines for responsible ecotourism and bear friendly label in 37 different events, reaching approximately 1.300 people. We have participated at 4 international tourism-related fairs.
- The project visibility and outreach are very successful in overall, as the media clips about the project were regular and frequent (356 media reports mentioned project; 70 foreseen). On average, media portrayed the project in a positive way and media pieces that mentioned the project have consistently portrayed bears in a more positive way than overall, suggesting that project was being presented as a solution provider by the local media. Reporting about bears during the project became on average increasingly positive and it actually changed from mostly negative sentiments about bears to mostly positive in the second half of the project.
- Awareness raising activities for general public, schools and pro-nature organizations were successful and efficient: we prepared 77 workshops about bear biology and conservation for schools, kindergartens, scouting and environmental organisations, in which 1.535 students, 396 scouts and 4.500 visitors of scouting events participated. We distributed 49 bear educational kits and 102 footprint plasters. During the project, we carried out 83 public events about the project and bears with at least 30.596 visitors.
- We were increasing awareness on many levels: directly in the field to local people when introducing conflict prevention measures; to wider public through printed and electronic publications, and through targeted events; to municipal authorities when setting ground for measures for conflict reduction; to management authorities and officials through targeted meetings and consulting. Leaflets, brochure, posters and roll-ups were produced in high quantities (more than 80.000 copies).
- The aspect of public attitudes that has considerably increased in the Dinarics is value of bears for local economy (non-consumptive uses of bears). Respectively, in Croatia and Slovenia Dinarics, the respondents scored 45 % and 9 % higher on average on this attitude index at the end of the project than in 2016.
- Spatial requirements of bears are taken into account in environmental impact assessment studies, protecting key areas for connectivity.
- Within the project, 22 feeding sites in 11 hunting areas within bear core area in Slovenia were selected on the basis of wild ungulate carrion availability and bear density. For much of the bear core area, 32 kg per km² of wild ungulate carcasses likely stayed in the environment and thus preserved natural cycle.
- Two new brown bear emergency teams are established, trained and active.
- Wardens and other technicians of public entities received adequate training in bear monitoring, damage assessment and damage prevention using non-lethal measures.

Administrative issues

Project implementation began with the preparatory phase, where we established the project steering group, a table of project activities, and groups of specialists who jointly developed a

timetable to implement all project actions. The preparatory work coincided with the preparatory A actions and was finished in the first year and a half of the project. The outputs of these actions served as a solid foundation for the conservation, C actions, which covered most of the activities until the end of the project. Dissemination actions (E) supported the project with great success throughout its duration, while D actions evaluated our progress.

Slovenia Forest Service acted as CB of the LIFE DINALP BEAR project. Apart from that, eight other AB worked on this project. The main project management goal was to implement all project tasks in an efficient and timely way so that all partners could carry out the objectives of the LIFE DINALP BEAR project. Partnership agreements were signed and submitted in the Inception report. We made financial support transactions according to the timetable set in the agreement for all partners except for RVEN and FIWI.

Each AB designated an individual to cover administrative issues and a person to act as a project coordinator on the AB's level. During the project's five years we organized: ten steering group meetings, six monitoring visits, a visit from the EC desk officers of the project, technical meetings within the actions, workshops, and platforms among different stakeholders. Clear, consistent, and regular communication was the foundation for our management approach to coordinating all project activities.

The partnership was well-balanced and inclusive. Despite the large number of partners, there was a shared dedication to the project. This resulted in high levels of cooperation and enthusiasm for brown bear conservation and serving the greater European public good.

Technical part

The LIFE DINALP BEAR project implemented 30 actions without any serious obstacles. Overall the project achieved and in many cases exceeded the expected results.

Some of the A actions were completed later than foreseen. For the deliverable in A1, where we analysed the damage cases and established guidelines for bear intervention groups, we prolonged the action because the deliverable was planned after the foreseen end date of the action. Within the action A2 we had some difficulties, but we successfully overcame the problems and the survey of attitudes of humans toward brown bear management was carried out. In action A3, the popular article was published at the end of the project. Analysis and supporting documents, which were produced in the A4 and A5 actions, were successfully finished in time and provided information for the "black spots" in traffic for C4 action and plan for supplementary feeding with carrion for the C7 action.

Within action A6 we elaborated Common Guidelines for population level Brown Bear Management in August 2017; they were discussed at the WISO platform in September 2017 and adopted for the entire Alps. This document will also help support bear management and conservation in Bosnia and Hercegovina. The management plans for Croatia that were adopted in 2019 were based on these guidelines. In Slovenia, the national documents were put into public debate and are in the process of adoption. Within the action A7, we developed the communication plan as outlined in the project. The project group decided that it was a living document, thus subject to updates when needed; the duration of the A7 action was prolonged by this decision.

All C actions began as planned and successfully implemented planned activities. Within the action C1 we exceeded most of the planned outputs. We installed 26 bear-proof garbage bins on selected "black spots" on Rijeka-Zagreb highway in Croatia. In Slovenia, we planned for 100 bear-proof containers and installed 143. We installed 100 compost bins in 6 selected hot spots. Because of very large interest from local communities that asked for additional

containers, we prolonged the action and produced 24 additional pieces for 5 new locations within the already chosen hot spots. After consulting with the monitor of the project, these were financed from the project savings. Action C2 was also a great success. In Slovenia, we distributed more sets of fences than initially planned. We distributed 55 sets (15 more than planned) of equipment and established so-called “intervention kits” that are at the disposal of regional units of SFS in order to provide instant help in the field when needed. To have the equipment ready for use, we bought new batteries at the end of the project since the first ones were bought in 2015 and already worn out. The distribution of 120 fences in RVEN began in summer 2017 and successfully finished in 2018. Working lines for dogs were established in Slovenia by SFS and in Italy by PAT. Within the project, we planned to establish 10 LGD working lines and established 14. From these working lines we distributed 45 pups to new owners. We set up a new portal for prevention measures where all the information regarding different types of prevention are gathered – in Slovenian and English: <https://www.varna-pasa.si/>.

Within action C3, the deliverable (handbook) and final milestone of the action (seminar) included a typing mistake – 2017 instead of 2018, and we finished the action later. The seminars in Slovenia and Croatia were very well attended, with participants coming from governmental institutions for spatial planning and the environment protection sector as well as non-governmental institutions and EIA companies. At least two additional seminars will be carried out in autumn 2019 based on demand of some of the participants.

Additionally, action C4 was successfully implemented. All mitigation measures on Croatian highways were successfully implemented, resulting in no accidents with bears on the highway through the end of the project. In Slovenia, three dynamic systems and 240 acoustic deterrents on regional roads have been implemented. Another 160 acoustic deterrents were installed along the railway. Some of the deterrents have been replaced due to maintenance issues. An electric fence was installed along the highway in Slovenia, and the national company for highways (DARS) took over the maintenance after the project ended.

Within action C5 we produced 5 population Status Reports, carried out field sampling of bear genetic material for the first transboundary estimation of the population size and completed other activities as planned in the action; this was the foundation for the genetic census estimates and effective population sizes of brown bears in northern Dinaric Mountains and south-eastern Alps, one of the most important outputs of the project. We developed a mathematical model for reconstructing population dynamics to understand past population dynamics and enable model-based estimates of population size in the years between genetic samplings. This was developed through an easy-to-use Internet-based tool in action C9 and is available to managers and researchers to produce model-based estimations of bear population size in periods between genetic-based estimates.

The Bear friendly label, developed within the action C6, became a recognisable “trademark”, while bear watching and other bear-related eco-touristic programmes, promoted by our website <http://www.discoverdinarics.org/>, are becoming a well-established tourism product of Slovenia and Croatia.

In action C7 the main finding was that bear presence tended to be higher at carrion feeding sites than maize feeding sites. An internet-based monitoring geo-database at the transboundary level (MBase portal, <https://portal.mbase.org/>) was developed in the action C8, with almost 200.000 data entries uploaded by the end of the project. Two intervention groups have been established, trained and equipped within the action C10 and are fully operational, so the goals of the action have been achieved.

Within the action D1, 25 captures have been carried out (21 different bears) and bears have been equipped with GPS/GSM collars; over 69,000 locations have been collected. The report on monitoring of bears exhibiting conflict behaviour and effectiveness of mitigation measures in conflict hot-spot areas exposed the conflict bears in Trentino and the report on habitat selection, use of anthropogenic food sources for bears living in a conflict area focused on bears in Slovenia. Within the action D2, we monitored the efficacy of implemented mitigation measures on roads in Slovenia. In addition to this, four bears around the motorway Rijeka - Zagreb in Croatia were equipped with GPS collars and monitored within the project.

In action D3, the analysis of the data showed that overall, all groups were supportive of bear conservation, but there were regional differences - the highest general support for bear conservation was documented in Austria, while in other countries, support for bear conservation was slightly lower. Content analysis of media articles began earlier than planned and lasted throughout the duration of the project. We analysed 3702 articles (planned 60). We have documented high levels of support for long-term bear conservation in all countries participating in the project LIFE DINALP BEAR.

Within action E1, we developed the project's visual identity, which was used on project outputs. We prepared Leaflets 1 and 2, five project bulletins, a brochure about brown bear, one version of educational posters (redesigned in 2017) and smaller foldable posters, and had several meetings and lectures for different target groups. Educational bear kits were distributed and their use demonstrated at workshops in schools and kindergartens. In March 2017 an international photo contest was organized. At the end of the project, printed exhibition photos were given to local organizations that are involved in local tourism activities and to frequently visited venues in order to continue promoting coexistence with bears and the project. We installed all planned information boards, the last 6 were installed at the resting points along the Rijeka – Zagreb motorway, thus informing the general public about coexistence with bears. A Livestock Guarding Dogs Breeders' Handbook was published. We managed to include our experiences with LGD pups (Action C2) to understand the importance of training dogs in the first period of their integration process, giving a step-by-step guide and describing different situation that farmers can encounter when educating young dogs. In action E2 we prepared the handbook for managers on how to address and reduce human-bear conflicts, organised seminars and trainings and produced the updated handbook for damage inspectors in five languages. This guidebook is a practical and useful handbook for damage inspectors when they arrive on the scene of damage presumably caused by carnivores.

In E3 we set up five info-stands in Slovenia and six in Croatia to inform and interact with local publics and visitors to the bear areas. We regularly update our online channels for communicating with general public (websites, Facebook and Twitter) (action E4). Five press conferences were organized, one in Croatia and four in Slovenia. We prepared 32 press releases and 49 popular articles. We maintained regular communication with the most important media outlets and journalists covering general and environmental topics and were regularly contacted by journalists themselves for taking part in interviews, TV-broadcasts, radio shows or public meetings about certain hot-topics. A Layman's report was prepared in 5 languages for the general public which includes information about the project, the background and our objectives to improve the coexistence with bears.

The After LIFE Conservation plan describes the main objectives that framed the work done within the LIFE DINALP BEAR project, and that provided the basis of the After LIFE Conservation Plan. The plan presents the expected long-term effects of the project, which aim to secure population-level brown bear management and further promote human-bear coexistence. Instead of the planned 10, we gave 111 oral presentations at different events. Members of our project team have attended an additional 40 workshops or meetings where they

actively participated in discussions. We have networked with other LIFE projects on 38 different occasions and carried out 4 experience exchange trips, 2 planned and 2 additional, as previously communicated with the monitor of the project. With previous approval from the EC, we hosted the 26th International Conference on Bear Research and Management in collaboration with the International Bear Association in 2018 in Ljubljana as the project's thematic conference. With more than 260 bear experts and researchers from 42 countries, the conference helped showcase many of our accomplishments of the project within a global context. Team members of LIFE DINALP BEAR contributed with 14 oral presentations and organized one of the four workshops available to the conference participants.

Financial report

The final expenses of the project reach to a total 94,47 % of the eligible costs from the project proposal. Comments are provided in this section regarding each cost category, providing justifications for costs that were incurred but not planned.

Periodic reports to the EC provided information on the progress of the LIFE DINALP BEAR project – within the project we have already submitted an Inception Report, First and Second Mid-term Reports, and hosted 6 monitoring visits (one combined with the visit of desk officers from the EC). Following that, we received seven official letters from EC:

1. ARES (2014) 4259781 from 17/12/2014 with no specific questions;
2. ARES (2015) 2134101 from 21/05/2015; the issues connected with it were answered with the letter from SFS of 04/08/2015;
3. ARES (2016) 1050298 from 01/03/2016; the questions were answered in the first Mid-term Report;
4. ARES (2016) 6886718 from 09/12/2016; the questions were answered in the second Mid-term Report;
5. ARES (2017) 5408055 from 07/11/2017; the questions were answered in the second Mid-term Report;
6. ARES (2018) 2492213 from 14/05/2018; the questions are answered in the Final Report;
7. ARES (2018) 5575006 from 31/10/2018; the questions are answered in this Final Report.

3. Introduction

In the politically divided landscape of Europe, one of the most important goals in conservation and management of brown bears is transboundary, population level monitoring, management and conservation of this charismatic large carnivore. The last large natural population of the western mtDNA lineage are the bears found in the Northern Dinaric Mountains. These bears have served as founders for reintroductions in north-eastern Italy and form the only current stepping stone towards the Alps that can serve as a link with the brown bear population in Trentino. Management fragmentation of this population across national or regional borders, high human-bear conflicts, and lack of acceptance of this species in some of the most critical areas make any hope of a natural expansion of brown bear into the Alps a practical impossibility and remain an ongoing threat to the conservation status of bears, even in the core area. Measures are needed to tackle challenges, such as: lack of understanding of bears' socio-economic and environmental value; inflated estimations of the risk of bear attacks leading to a lower tolerance of bears; and high traffic-related mortality associated with the increasing fragmentation of its habitat as a result of growing traffic infrastructure and urbanisation.

The project's overall objectives were to:

- Establish a strategic and landscape-level approach to the conservation, management, and monitoring of brown bears in northern Dinaric Mountains and south-eastern Alps.
- Decrease human-bear conflicts and promote better coexistence.
- Encourage natural expansion of brown bear from the Dinaric Mts. into the Alps.

The project had three specific objectives:

1. Population-level monitoring, management and conservation of brown bears in northern Dinaric Mountains and south-eastern Alps.

The main objective was to overcome local-scale practices of brown bear management and establish a transboundary network of professionals, optimize monitoring methods, begin long-term transboundary monitoring, and provide data about bears at the transboundary level.

2. Decrease of human-bear conflicts and promotion of coexistence.

We defined what drives conflict “hot-spots” and used non-lethal solutions to provide best practice examples. We demonstrated solutions in preventing bears from reaching anthropogenic food, and explored carrion from game road kills as an alternative source of protein. We promoted bears as an eco-tourist attraction, explored public attitudes towards bears, and used educational activities to enhance understanding of the species and promote co-existence.

3. Promotion of natural expansion of Brown bear from Dinaric Mts. into the Alps.

While habitat modelling has shown that the Alps are capable of supporting a bear population and the small reintroduced population in Trentino is thriving, natural expansion is slow. We used a multidisciplinary approach to try to understand the social and physical barriers to expansion, and the corridors that need to be protected. We provided solutions to slow down habitat fragmentation, increased acceptability of bears in the areas where they are not permanently present, and decreased traffic mortality.

Sites: Project area included the Alpine region of Slovenia, part of the Alpine region in Italy and Austria, and the Dinaric region of Slovenia and Croatia. The Dinaric project area is one of the European biodiversity hot-spots and covers almost the entire area of Slovenia and Croatia with regular brown bear presence. The Slovenian part of the Dinaric range, Kočevska and Notranjska, together with neighbouring Gorski Kotar and Lika in Croatia, is part of the largest

unfragmented forest complex in Central Europe. The Alps are one of the great mountain ranges of Europe, stretching approximately 1,200 kilometres across eight Alpine countries, three of which are included in the project. The Alpine region has a strong cultural identity, with traditions of farming, cheese making, and woodworking. Tourism is now dominant industry in the region, with 14 million inhabitants and 120 million annual visitors. The Alps are also a habitat for 30,000 species of wildlife, ranging from the tiniest snow fleas to brown bears which are present in the areas of the eastern Alps.

Target species: Brown bear (*Ursus arctos* Linnaeus, 1758; order Carnivora, family Ursidae).

Main conservation issues:

- Human-bear conflicts and insufficient conflict mitigation measures.
- Management fragmentation and poor transboundary cooperation in brown bear monitoring and management.
- Obstacles to brown bear population expansion that limit long-term population viability and evolutionary potential.
- Poor understanding of the value of brown bears, exaggerated perception of bear attack risks, and consequently lower tolerance of bears.
- High traffic-related bear mortality.
- Increasing fragmentation of habitat caused by expanding traffic infrastructure and urbanization.
- Depletion of wild ungulate carcasses available to bears.

Socio-economic context:

Direct economic benefits and an increase in the quality of life for local residents were achieved through reduction and better handling of bear-human conflicts. Local economies benefited from the activities aimed at creating opportunities for bear-based ecotourism and other non-consumptive use of brown bears as a natural resource. The inclusion of brown bears' requirements into spatial planning directly conserved the value of natural environment both for wildlife species as well as for humans, slowing down habitat fragmentation and conserving ecosystem functions and services.

Expected longer term results:

- Establishment of population-level management of brown bears across the Northern Dinaric Mountains and Alps over four neighbouring countries: Croatia, Slovenia, Austria and Italy.
- Management Plans for managing the core brown bear population in Slovenia and Croatia.
- The removals of bears in Slovenia and Croatia will be done in the way that secures the long-term population stability and viability in respect to the absolute numbers, as well as sex and age structure.
- Establishment of optimized common long-term transboundary, population-level monitoring of bear population in the Alps and Northern Dinaric Mountains.
- Overall conflict reduction by at least 10 % in core areas and over 30 % in the selected conflict hot-spots.
- Bear livestock depredations will decrease by at least 20 % and damages will decrease for at least 80% by the livestock breeders, beekeepers or fruit farmers included into the project.

- Bear traffic mortality will decrease of by at least 30 % overall and by at least 50 % on mitigated road and railway sections.
- The number of “problematic” bears removed will be reduced by at least 20 %.
- The knowledge and attitude scores of local inhabitants will increase by at least 10 % from the first poll.
- Spatial requirement of bears will be taken into account in environmental impact assessment studies, protecting key areas for connectivity.

4. Project administration

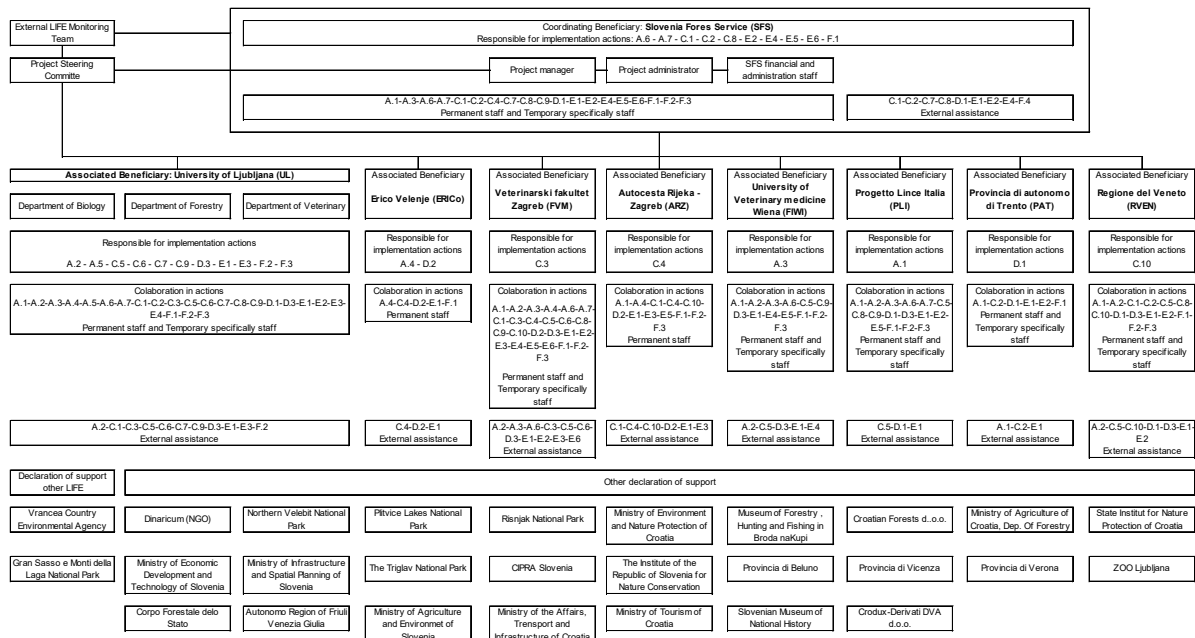
4.1 Description of the management system

The project started on the 1st of July 2014, after the signing of the Grant Agreement between the Slovenia Forest Service and the European Commission. Slovenia Forest Service acted as coordinating beneficiary of the LIFE DINALP BEAR project, which joined 9 partners from 4 different countries – Slovenia, Croatia, Italy and Austria. Partners include:

- Slovenia Forest Service (SFS – CB),
- Autocesta Rijeka-Zagreb d.d. (ARZ),
- EUROFINS ERICo, Ecological Research & Industrial Co-operation Ltd. (ERICo),
- Research Institute of Wildlife Ecology University of Veterinary Medicine, Vienna (FIWI),
- Veterinarski Fakultet, Sveučilište u Zagrebu (FVM),
- Provincia Autonoma di Trento – Servizio Foreste e Fauna (PAT),
- Progetto Lince Italia (PLI),
- Regione del Veneto – Unità di progetto Caccia e Pesca (RVEN),
- University of Ljubljana (UL).

The project was organized as shown in the organigram.

Organigram of the project team and the project management structure



Each beneficiary nominated individuals with specific skills for addressing different tasks within the project (scientists, technicians and administrative profiles). Each partner's team consisted of a leader, who worked closely with the project manager, and an individual responsible for the financial part of the project who worked closely with the financial manager.

The main aim of the project management was smooth progression of different tasks needed to develop the project correctly and achieve LIFE DINAP BEAR's objectives.

The Project Managers, Rok Černe (till 30th September 2017) and Bojana Lavrič (from 1st October 2017), were also the Coordinators of the project, both employed at the CB – SFS. The Project Manager relied upon the Financial Manager for supporting the administrative and financial activities of the project. The Project Manager's tasks included: communication with EC and Monitoring team; issuing partnership agreements; communication with project partners; adjustment of partnership agreements; communication with project experts, external institutions and subcontractors; ensuring the timeline of actions implementation was followed; monitoring actions implementation and quality; organizing steering group meetings; organizing the project's promotion in the media; preparation of project reports.

During the project, the report and planning cycles consisted of interim reports and reports to the EC (Inception report, 2 Mid-term Reports and Final Report). AB elaborated interim reports every three months and sent them to the CB; these documented the costs charged to the project for each period and included all needed documentation to justify the expenses and efforts (copies of timesheets, payrolls, invoices...). These reports were important to control progress versus planning, detect deviations, and provide input for the periodic management reports to the EC. The CB carefully checked all the documentation and sent requests for updates to each AB as needed. Periodic reports have been submitted to the EC with regards to the foreseen timetable.

No amendments to the grant agreement were needed for the LIFE DINALP BEAR project.

In addition, the progress of the project was carefully checked on in the steering group meetings. Each partner reported the progress of the actions for which they were responsible. Further steps and a detailed working plan for the next approximately 6 months until the next steering group meeting were discussed. Minutes of the meetings served as a reference point to steer the work on the project for the next period. In between, regular communication regarding administrative and technical issues went on, additional meetings of specific working groups were carried out as needed.

The first project steering group meeting was held on 27th November 2014 in Ljubljana (Slovenia) with all the partners (Annex 7.1-1_MR2) except RVEN. The Project manager (Rok Černe) provided an overview of the project and his strategy for "out-performance". The financial manager presented relevant rules from Common provisions, and instructions for financial and technical monitoring were set (Annex 7.1-2_MR2). The steering group was formed at this time. The implementation of the project actions was discussed, especially for those actions where more project partners were involved. The communication plan was discussed and developed. Next steering group meetings were held:

- second, 20th April 2015 in Postojna (Slovenia) with all partners present (Annex 7.1-3_MR2),
- third, 21st October 2015 in Trentino (Italy), organised by PAT (Annex 7.1-4_MR2),
- fourth, 24th May 2016 in Plitvička Lakes (Croatia), organised by FVM (Annex 7.1-5_MR2),
- fifth, 21st September 2016 in Ljubljana (Slovenia), organised by SFS (Annex 7.1-31_MR2). The final overview of the project activities and finances was done regarding the first Mid-term Report (due 30th September 2016),
- sixth, 17th May 2017 in Kolpa Valley (Slovenia), organised by SFS (Annex 7.1-32_MR2),
- seventh, 12th September 2017 in Klagenfurt (Austria), organised by FIWI (Annex 7.1-33_MR2),

- eighth, 6th February 2018 in Ljubljana (Slovenia), organised by SFS (Annex 7.1-34_ MR2). Emphasis was given to the second Mid-term Report, detailed instructions regarding the preparation of the technical and financial reports were presented by SFS,
- ninth, 10th-11th September 2018 in Ljubljana (Slovenia), organised by SFS (Annex 7.1-39_ FR List of participants). This meeting was held in order to prepare for the joint monitoring visit from the desk officers from EC and monitor of the project,
- tenth, 3rd April 2019 in Venice (Italy), organised by RVEN (Annex 7.1-40_ FR List of participants). The main item on the agenda was complete review of the project activities; ABs were given thorough instructions regarding the preparation of the final report.

Partnership agreements between the coordinating beneficiary and all associated beneficiaries were signed. The dates of all agreements are illustrated in the Inception Report and copies of all agreements were annexed and sent to the EC with the Inception Report.

4.2. Evaluation of the management system

The project management system established for the project operated smoothly and had up-to-date information on the project progress. Each action had a beneficiary responsible for implementation. Issues that required immediate answer were discussed via e-mails and telephones. Planning and other issues were discussed at the Steering group meetings.

In case of a potential delay or deviation of planned deadlines of any activity, all the possible measures were undertaken to prevent delays or to finalize the planned activities as soon as possible. The most significant deviations from the partnership agreement represented the collaboration with the Italian partner RVEN. Due to their non-active participation in the project activities at the beginning, we sent several letters to remind them about the necessary activities (Annex 7.1-6 – Annex 7.1-11_ MR2) which needed to be undertaken for the implementation of the project. On 10th December 2015, members of the RVEN arrived to Ljubljana for a meeting and terms of future collaboration were set to catch up with the project implementation (Annex 7.1-12_ MR2). Since then, the pace of the work of RVEN increased, activities have been implemented, and administrative documents were provided within the time schedule.

The communication with the Commission has been handled by e-mail and correspondence letters. We had frequent contacts with the monitoring team, especially with Mr Mitja Kaligarič, who monitored our project.

We had the first meeting with our monitoring team (Mr Mitja Kaligarič) on 3rd December 2014. All actions were presented at the meeting, including the overview of the project, accomplished tasks, technical progress, our approach, and project management issues. Mr Mitja Kaligarič presented the main issues concerning Common Provisions, outlined the LIFE+ expectations, replied to all questions, and provided excellent advice. The meeting closed with a discussion on financial and communication checklists, which partners had to complete in advance (Annex 7.1-13_ MR2).

Other monitoring visits:

- second, 28th January 2016 (Annex 7.1-14_ MR2),
- third, 22nd September 2016 in Ljubljana (Annex 7.1-35_ MR2) – the first Mid-term Report was discussed,
- fourth, 13th September 2017 in Klagenfurt (Austria) (Annex 7.1-36_ MR2),
- fifth, 11th-12th September 2018 in Ljubljana (Slovenia) (Annex 7.1-41_ FR List of participants). The purpose of the joint monitoring visit from the desk officers from EC

and monitor of the project was to check if the project implementation followed the foreseen plan and if management was correctly in place,

- sixth, 19th September 2019 in Ljubljana (Slovenia) (Annex 7.1-42_ FR List of participants) - was organised to verify the implementation of the project, the achievement of deliverables, milestones and expected results in light of the final report.

During the monitoring visits, coordinators of actions presented the technical progress on all actions, while the monitor presented the questions raised by the EC in feedback letters, and explained the rules of LIFE+ when needed (before the reports, in case of questions from the CB or Abs). Field visits were regularly organised to show the monitor the measures in the field.

Implementation of the actions is illustrated in the Gantt chart below:

5. Technical part

5.1. Technical progress, per task

Action A.1: Analysis of the damage cases and bear intervention group interventions, preparation of guidelines for Intervention group protocols

The purpose of this action was to understand factors that affect human-bear conflicts, prepare guidelines for intervention group protocols, and implement these guidelines into national protocols. Additionally, we planned exchange meetings among intervention group members.

In 2015, we completed collecting damage data from the whole project area for the years 2004–2014. Damage data from Veneto and Austria were only partly available. This emphasised the importance of standardised data collection, e.g. Veneto had no bear damage database prior to the LIFE DINALP BEAR project. Additionally, different types of human-bear conflicts were grouped, and a questionnaire was sent to bear conservation experts from all participating countries to estimate the relative significance of conflict types per country. Based on this data, we analysed which types of conflicts occur with what frequency, their spatial distribution, and what factors affect the occurrence of conflicts. The maps and report are combined in Annex A1-1_Deliverable »Maps showing densities of different kind of damages and conflict hotspots« and »Report based on long-term data where, when, how, and why damages and other human-bear conflicts occurred«.

Four meetings with participants of all project partners were held in the frame of A1 to draft “GUIDELINES FOR BEAR INTERVENTION GROUPS” (Annex A1-2_Technical: photo proofs of meetings held within A1), as planned.

A common protocol for members of Bear Intervention Groups improves data comparison and monitoring of temporal dynamics of human-bear conflicts, which has important effects on bear management decisions. Guidelines for actions recommended for different situations enable the Bear Intervention Group’s work to be more transparent and effective, and improves the group’s credibility in the public. The report also includes a protocol for gathering human-bear conflict data by national information centres. The GUIDELINES FOR BEAR INTERVENTION GROUPS (Annex A1-3_Deliverable: Bear emergency team protocol with recommendations for actions to be undertaken in different conflict cases) were approved by all project partners in December 2015. The implementation of the GUIDELINES into national intervention group protocols is a task of Action E2.

In addition, a comparison of the occurrence of human-bear conflicts between the northern Dinaric Mountains and the south-eastern Alps was published in CDP News (Molinari et al. 2016: Comparison of the occurrence of human-bear conflicts between northern Dinaric Mountains and south-eastern Alps. Carnivore Damage Prevention News 12, 9-17, Annex A1-4_Technical).

Based on networking activities of the Croatian LIFE DINALP BEAR team, a Bear Intervention Group was established in Republika Srpska, part of Bosnia and Herzegovina (BIH) (Annex A1-5_Technical: photo of participants). The GUIDELINES FOR BEAR INTERVENTION GROUPS were integrated into their protocol.

Tasks of A1 action were completed according to the time schedule, with the only drawback being the data from Veneto was not included into the analysis of human-bear conflicts. However, damage cases from Veneto were included in the publication prepared for “Carnivore Damage Prevention News”.

DELIVERABLE	Action	Expected	Progress	Annex
Report based on long-term data where, when, how, and why damages and other bear-human conflicts occurred	A1	15.04.2015	Completed 4/2015	A1-1_Deliverable_MR1
Maps showing density of different types of damages (in orchards, beehives, livestock, fields and gardens) and conflict hot-spots	A1	15.04.2015	Completed 4/2015	included in A1-1_Deliverable_MR1
Bear emergency team protocol with recommendations for actions to be undertaken in different conflict cases.	A1	01.08.2016	Completed 12/2015	A1-3_Deliverable_MR1

MILESTONE	Action	Expected	Progress	Annex
Protocol with recommendations for actions to be undertaken in different conflict cases	A1	2.12.2015	Completed 12/2015	A1-3_Deliverable_MR1
Improved protocol for gathering of human-bear conflict data by national information centres	A1	2.12.2015	Completed 12/2015	N/A

EXPECTED RESULTS	Action	Achieved results	Annex
Report based on long-term data where, when, how and why damages and other bear-human conflicts occurred.	A1	Completed. Additionally, a report was produced for CDP News	A1-1_Deliverable_MR1 / A1-4_Technical_MR1
Maps showing density of different types of damages (in orchards, beehives, livestock, fields and gardens) and conflict hot-spots.	A1	Completed.	The maps are included in the report Annex A1-1_Deliverable_MR1
4 meetings with leaders of neighbouring and Romanian national intervention groups. Written reports made.	A1	Completed.	A1-2_Technical_MR1
Bear intervention group protocol with recommendations for actions to be undertaken in different conflict cases. Guidelines implemented into national emergency team protocols within action E2.	A1	Completed and adopted in 2015. Additionally, guidelines were implemented into the protocol in BIH – Republika Srpska	A1-3_Deliverable_MR1 A1-5_Technical_MR1
Improved protocol for gathering of human-bear conflict data by national information centres	A1	Completed.	It is included in the guidelines for BIGs Annex A1-3_Deliverable_MR1

Action A.2: Attitudes of humans toward bears and brown bear management

The objectives of this action were to explore people's tolerance of bears, what actually represents a conflict with bears in a certain area, levels of knowledge and interest about bear management, and to implement a baseline survey necessary to evaluate the project's outreach efforts at the end of the project. Focus group meetings were used for the qualitative part of the assessment.

Guidelines for implementation of the focus groups (Annex A2-1_Technical_IR) were prepared by the UL and discussed and accepted by all involved partners. The focus groups were implemented in Slovenia (n=3) and in Croatia (n=2). Due to problems with contracts, Italian and Austrian partners were unable to complete the focus groups by the extended deadline (end of Feb. 2015). Since it was necessary to continue with the implementation of the second part of the public attitude survey, this shortcoming was mitigated by organizing a focus group with the IT and AT project team members during a project steering group meeting. In this way we have indirectly documented the spectrum of expected opinions about bears in Italy and Austria. The report from the focus groups was updated following the meeting (Annex A2-2_Deliverable_MR1).

The questionnaire for the quantitative part of the attitude survey was developed as planned at the UL with inputs from all project partners (Annex A2-3_Technical_MR1). Target group for the attitude survey were adult inhabitants of the project area that live in communities with < 10 000 inhabitants, stratified by country and Alpine/Dinaric region. In SI and HR, the questionnaire was implemented via postal services with included envelopes with prepaid postage for returning of the questionnaires. In order to increase the response rate, we produced a reminder/thank you postcard which was sent to potential respondents 7-10 days after the questionnaire (Annex A2-4_Technical_MR1). We obtained 1231 samples in SI and 292 in HR. In AT and IT, market research institutes were hired to implement the questionnaire online (n=400 each). In IT, due to the difficulties with RVEN involvement in the project, UL took over their role and hired a market research company to implement the questionnaire, resulting in reallocating the costs in external assistance to UL. We prepared a report with policy brief (Annex A2-5_Deliverable_MR1). Furthermore, as part of a networking activity, the questionnaire developed for our project is being implemented in BIH as a part of a process for developing their bear management plan (Annex F2-67_Technical_MR1).

During a project steering group meeting in May 2017, a workshop was held to discuss the use of the results in project communication and dissemination activities. Accordingly, we agreed on an update to the project communication plan (action A7) (Annex A2-6_Deliverable_MR2). Four popular articles, one in each participating country (Annexes A2-7_Deliverable_MR2, A2-8_Deliverable_MR2, A2-9_Deliverable_MR2, A2-10_Deliverable_MR2), were prepared to present the results of the survey. Furthermore, Slovenian Press Agency recorded a short audio interview with the coordinator of the action and made it available to radio stations free of charge (Annexes A2-11_Technical_MR2 and A2-12_Technical_MR2). Project team members also prepared 3 news articles highlighting the results of the action for the project web page (<https://goo.gl/EyS6Yj>) and one article for the 2017 issue of the project bulletin "Life with bears" (Annexes E1 – 57 to 61). Results of the action were also presented to the Slovenian stakeholders at the workshop for developing a national bear conservation strategy (<https://goo.gl/7PXtnx>) and to the bear researchers and managers at the 25th IBA Conference (Annex F2 – 85). In addition, a MSc thesis entitled "Determination of factors of conflict between humans and brown bear in its habitat" was completed using the data collected in Slovenia (<http://tiny.cc/we5fbz>). The implementation of the action in Italy caused delays in reaching the action deadlines, but overall we can conclude that the action has been implemented and completed successfully.

DELIVERABLE	Action	Expected	Progress	Annex
Report from the focus groups	A2	1.11.2014	Completed 5/2015	A2-2_Deliverable_MR1
Policy brief	A2	1.10.2015	Completed 8/2016	A2-5_Deliverable_MR1
Workshop report on utilisation of the results in dissemination	A2	1.12.2015	Completed 5/2017	A2-6_Deliverable_MR2
4 popular articles published	A2	01.4.2016	Completed 9/2017	A2-7 to A2-10_Deliverable_MR2

MILESTONE	Action	Expected	Progress	Annex
Policy brief produced and passed on to the decision-makers	A2	1.10.2015	Completed 8/2016	A2-5_Deliverable_MR1

EXPECTED RESULTS	Action	Achieved results	Annex
Documented attitudes of the inhabitants of the project area towards bears and bear management.	A2	Completed. The sample size was considerably greater than expected 2000 (2280). Additional analysis of the data was performed within a MSc thesis "Determination of factors of conflict between humans and brown bear in Slovenia"	A2-1_Technical_IR, A2-2_Deliverable_MR1, A2-3_Technical_MR1, A2-4_Technical_MR1, A2-5_Deliverable_MR1, A2-6 to A2-10_Deliverable_MR2
At least 6 focus groups carried out.	A2	Completed.	A2-1_Technical_IR, A2-2_Deliverable_MR1
Survey on a representative sample of public carried out in core and recovery area (targeted sample size is 400 per each of the studied areas – CRO, SI core, SI recovery, I, A).	A2	Completed with bigger sample size than planned.	A2-5_Deliverable_MR1
1 policy brief prepared, published on the project web page and passed on to the decision-makers.	A2	Completed. Besides sending the policy brief to the decision-makers, the results were also presented at workshops for development of management plans in Slovenia and Croatia with all stakeholders.	A2-5_Deliverable_MR1
1 workshop report on utilisation of the results in the dissemination and awareness raising activities.	A2	Completed. Project communication plan was updated based on the discussion.	A2-6_Deliverable_MR2, A7-1
4 popular articles presenting the results published in national media (1 per country).	A2	Completed.	A2-7 to A2-10_Deliverable_MR2

Action A.3: Analysis of spatial connectivity and preparation of environmental impact assessment guidelines

The research objectives of the preparatory A.3 action were:

- a) to model and predict the spatial distribution and habitat suitability of bears in the study area that encompasses Slovenia, Croatia, North of Italy, and the South of Austria and Switzerland, and
- b) to determine the most plausible paths connecting hot-spots of maximum suitability and potential bear presence among populations.

We used location data of bears (N=63) equipped with GPS collars in three populations and tracked between 2003 and 2017. The western population was placed in the Italian region of the Trentino (N = 6, males = 2, females = 4); the Central population in the eastern Italian Alps and west Slovenian Dinaric mountain range (N = 8; males = 7, females = 1), and the Eastern population in the rest of Slovenia and Croatia (N = 49; males = 26, females = 23).

Location data from each research team was compiled, filtered, processed, and integrated into a database suitable for the purpose of geographic analyses. Because animals use space according to the distribution of the most important resources ensuring food, protection and reproductive opportunities, each bear location was associated with different on-site environmental variables quantified at different sample grains using a geographic information system (GIS). The environmental variables consisted of topographic (digital elevation models –DEM-, terrain roughness index, hill shade, aspect, and topographic position index) land cover extracted from Corine 2012, and anthropogenic variables (distance to human settlements, roads, agriculture land cover). These spatial variables were an improvement to the original dataset because they incorporated essential anthropogenic variables impacting the space use by bears in highly humanized areas.

Predictive maps were produced for each population and scale and integrated into a final predictive map on bear distribution associated with habitat suitability over the entire study area. These maps have been validated. Then putative corridors between potential and existing bear presence areas using an approach based on cost-distance and least-cost path analyses were identified. The most important results are:

- 1) Most suitable areas for brown bears in the study area are – based on scale-integrated resource selection functions (RSFs) - in the Dinaric Mountains and to a lesser extent in the South Eastern Alps and further North to the Fischbacher Alpen.
- 2) Plotting habitat suitability as a binomial map, large areas in the South West of the study area also show up as suitable. These areas cover most of Trentino and the alpine part of Lombardy.
- 3) The most unsuitable areas in the Alps are the areas with high elevation, consisting of areas above the timberline mostly with rocks and glaciers. These areas are located at the main alpine ridge in Austria and large areas in Switzerland.
- 4) Connectivity varies between areas. Best connected areas are in the Dinaric Mountains, but also Western Trentino and parts of Lombardy. Smaller, but also well-connected areas are located in Eastern Trentino, the South Eastern Alps, and the Fischbacher Alpen. The results slightly vary between the connectivity indices used for analysis.
- 5) Least-cost-paths (best connections) are shown in a few examples for selected areas in the study area.

The results clearly show large suitable areas for brown bears in the study, more in the Dinaric Mountains than in the Alps. It is important to consider habitat connectivity when creating artificial barriers as highways with bear-proofed fences, especially in the Alps. A popular magazine article about spatial connectivity for brown bears was prepared and published on the project website: [article](#)

DELIVERABLE	Action	Expected	Progress	Annex
Popular magazine article about spatial connectivity for brown bears.	A3	30.09.2017	Completed 2019	A3-1_Deliverable_FR
Habitat suitability and connectivity models for bears in the study area (2 maps in electronic (GIS) format)	A3	01.03.2018	Completed 2018	A3-2_Deliverable_FR
Report about habitat suitability and spatial connectivity for brown bears, and movement and gene flow across national borders.	A3	01.03.2018	Completed 2018	A3-3_Deliverable_FR

MILESTONE	Action	Expected	Progress	Annex
Habitat suitability and connectivity models for bears in the study area	A3	01.03.2018	Completed 2018	A3-2_Deliverable_FR

EXPECTED RESULTS	Action	Achieved results	Annex
Habitat suitability and connectivity models for bears in the study area (2 maps in electronic (GIS) format).	A3	Completed.	A3-2_Deliverable_FR
Popular magazine article about spatial connectivity for brown bears.	A3	Completed.	A3-1_Deliverable_FR
Report about habitat suitability and spatial connectivity for brown bears, and movement and gene flow across national borders.	A3	Completed.	A3-3_Deliverable_FR

Action A.4: Impact of bear-vehicle collisions on brown bear population, determination of “black spots” and preparation of action plan of mitigation measures

Within the action A4, we first detected the ‘black-spots’ of the traffic related bear mortality on micro location scale in Slovenia and on highway Rijeka - Zagreb in Croatia. Bear mortalities on highways, state roads and railways were mapped in Slovenia (Annex A4-1_Technical_MR1) and bear mortalities on highways were recorded in tables for Croatia (Annex A4-2_Deliverable_MR1, page 5, 6). These locations were then used to select the most critical ‘black-spots’ of traffic related bear mortality, which were then used when selecting the best practice demonstration sites for the implementing preventive measures described in the Action C4. ‘Black spots’ for all three infrastructure types (roads, highways and railroads) in Slovenia are presented in the Annex A4-3_Technical_MR1 and ‘black spots’ for Croatia are presented in the Annex A4-2_Deliverable_MR1. In Slovenia, the work was done by ERICo and UL, in Croatia the work was carried out by ARZ and FVM.

Afterwards a basic research report *Impact of traffic mortality on Slovenian-Croatian brown bear population and on their expansion into the Alps* was prepared by UL (Annex A4-4_Deliverable_MR1). The analysis of the vehicle-caused mortality in the Slovenian-Croatian part of the Alpine-Dinaric-Pindos brown bear population and the evaluation of impact of vehicle collisions on the expansion of the bear population into the Alps was presented. For the analysis, we used data of 891 bears removed from population in Slovenia during 2004–2012 and 535 bears removed in Croatia during 2005–2010. During 2005–2010, 181 were recorded killed in vehicle collisions in Slovenia and Croatia, which represents 17 % of all recorded bear mortality. Overall, 17,7 % of vehicle collisions occurred on highways, 40,3 % on other types of roads and 42,0 % on railways. For vehicle-caused bear mortalities in Slovenia, we also calculated sex- and age-specific mortality according to the reconstructed structure of the entire population in the country. For the Alpine part we further evaluated demographic self-sustainability of this part of the population and effects of vehicle collisions on it, using simplified age-non-structured model.

Based on the selected ‘black-spots’ of the traffic related bear mortality in both countries and based on the research report *Impact of traffic mortality on...*, two Action plans for the implementation of the mitigation measures for reducing road mortality of brown bear in Slovenia/Croatia were prepared. For Slovenia, the action plan was written by ERICo (Annex A4-5_Deliverable_MR1) and for Croatia by ARZ and FVM (Annex A4-2_Deliverable_MR1). Additionally, a popular paper *Traffic mortality of brown bears* was published in the Slovenian professional journal of Slovenian Hunting organization “Lovec” (Annex A4-6_Deliverable_MR1). It was prepared by UL and ERICo. In the paper, the results of the research report *Impact of traffic mortality on...* were summarised. Additional to the project proposal, a scientific paper was published in *Ceste i mostovi*, a bulletin of the Croatian society for roads (ARZ, FVM; Annex A4-7_Technical_MR1).

At the end of the action, we prepared a report *The effect of improper rubbish bins on highways to the attraction of bears on highways* (Annex A4-8_Deliverable_MR1). It was written by ARZ and FVM.

This action presented some important results for future management, especially the results of the research report *Impact of traffic mortality on...* These results will enable bear population managers to make better decisions on how to manage the population in following years, especially in the content of its expansion into the Alps.

DELIVERABLE	Action	Expected	Progress	Annex
Action plan for the implementation of the mitigation measures in Croatia	A4	30.06.2015	Completed 2015	A4-2_Deliverable_MR1
Technical report (rubbish bins on highways)	A4	30.06.2015	Completed 2015	A4-8_Deliverable_MR1
Popular paper	A4	30.06.2015	Completed 2015	A4-6_Deliverable_MR1
Action plan for the implementation of the mitigation measures in Slovenia	A4	30.06.2015	Completed 2015	A4-5_Deliverable_MR1
Technical report (influence of traffic on bear population)	A4	30.06.2015	Completed 2015	A4-4_Deliverable_MR1

MILESTONE	Action	Expected	Progress	Annex
"Black-spots" selected	A4	31.03.2015	Completed 2015	A4-1_Technical_MR1, A4-2_Deliverable_MR1

EXPECTED RESULTS	Action	Achieved results	Annex
1 Research report and 1 popular paper on the traffic related bear mortality on the Slovenian-Croatian bear population as a whole and on its expansion front towards the Alps, with map showing the distribution of traffic related mortality of bears, importance of traffic mortality compared to other mortality sources, effects of traffic mortality on brown bear spatial expansion.	A4	Completed	A4-4_Deliverable_MR1, A4-6_Deliverable_MR1
1 Report on the effect of improper rubbish bins on highways to the attraction of bears on highways.	A4	Completed	A4-8_Deliverable_MR1
Identification and selection of 'black-spots' – exact problematic sections (micro locations) used as a best practice demonstration points for the implementation of the countermeasures for reducing number of bear-vehicle collisions in Action C.4 – separately for Slovenia and Croatia.	A4	Completed	A4-1_Technical_MR1, A4-2_Deliverable_MR1
2 Plans (agenda, used measures, time-table and milestones) for the implementation of technical mitigation measures in Action C.4 (Slovenia and Croatia).	A4	Completed	A4-2_Deliverable_MR1, A4-5_Deliverable_MR1

Action A.5: Availability of carrion from wild ungulates and preparation of plan for supplemental feeding with carrion

Within this action, we completed the following documents that represent the basis for establishing supplementary feeding of bears with carrion on selected feeding sites within action C7:

- 1 report about spatial and temporal availability of carrion from wild ungulates with recommendations for possibilities of supplementary carrion feeding of bears in Slovenia (Annex A5-1_Deliverable_MR1) was prepared on the basis of the collected data from UL, SFS and from literature review (hunting removals and other mortalities, dressed and undressed weights of alive and culled animals, local densities for bears and wild ungulates, frequency predation for lynx and wolf etc.).
- We selected 22 existing bear feeding sites to establish supplementary feeding of bears with carrion from wild ungulates. As it is noted in the project proposal, the preliminary plan was to select 20 feeding sites. But in the final stage, we decided to establish supplementary feeding with carrion on 2 additional feeding sites within the same budget, which enabled us to obtain enough data in case of potential problems of any kind at any of the feeding sites.
- On the basis of the report on the availability of carrion from wild ungulates (Annex A5-1_Deliverable_MR1), we prepared 1 detailed plan for the establishment of supplementary feeding with carrion on selected feeding sites and for monitoring its efficacy (Annex A5-2_Deliverable_MR1). In addition, we also prepared detailed instructions for equipment use in the monitoring visits to the bears feeding sites (automatic cameras and their accessories). These instructions were included as an annex to this activity plan.

Action activities, regular checks of camera traps and feeding sites, were carried out with help of local hunting clubs.

DELIVERABLE	Action	Expected	Progress	Annex
1 plan for the establishment of supplementary feeding with carrion on selected feeding sites and monitoring of its effectiveness.	A5	31.12.2015	Completed 2015	A5-2_Deliverable_MR1
1 report on the spatial and temporal availability of carrion from wild ungulates with recommendations for possibilities of supplementary carrion feeding of bears in Slovenia	A5	31.12.2015	Completed 2015	A5-1_Deliverable_MR1

EXPECTED RESULTS	Action	Achieved results	Annex
1 report on the spatial and temporal availability of carrion from wild ungulates with recommendations for possibilities of supplementary carrion feeding of bears in Slovenia.	A5	Completed	A5-1_Deliverable_MR1
20 existing bear feeding sites selected for the supplementary feeding with carrion from wild ungulates.	A5	Exceeded – 22 feeding sites selected	N/A
1 plan for the establishment of supplementary feeding with carrion on selected feeding sites and monitoring of its effectiveness.	A5	Completed	A5-2_Deliverable_MR1

Action A.6: Elaboration of Common Guidelines for Population-level Brown Bear Management and Management Plans for Slovenia and Croatia

The first step of this action was to prepare the Common Guidelines for Population-level Brown Bear Management in Slovenia, Croatia, Italy and Austria. Common guidelines are providing the basis for population-level management of Northern Dinaric brown bear population and also being used to help direct the management of the bear population in the Alps and its connection to the bears in the Dinaric Mountains. The second important step of this action was to elaborate and adopt the revised national Management plans for brown bear in Slovenia and Croatia.

The initially planned range of the common guidelines (Italy, Austria, Slovenia, and Croatia) was significantly extended on the WISO platform meeting in Bolzano - Nova Levante (Annex A6-1_Technical_MR1) where LIFE DINALP BEAR project was presented. At the meeting, it was suggested and accepted that the guidelines would be extended to the entire Alpine area. At the third project steering group meeting (San Lorenzo in Banale, October 2015,) the project group members confirmed the extension of the area covered by the common guidelines. Experts from Alpine and N Dinaric countries also discussed which topics should be covered by the document.

At a workshop held in January 2016 in Valdieri, Italy (Annex F2-42_Technical_MR1), we determined the topics/chapters of the strategic document. In addition, the observers from Bosnia and Hercegovina were present and included in the developing the guidelines. In 2017, two more international workshops were organized for the development of the Common Guidelines for Population-level Brown Bear Management, in February 2017 in Venice and the other in May 2017 in Prelesje, Slovenia. Guidelines for Common Management of Brown Bear in the Alpine and Northern Dinaric Region were completed in August 2017 (Annex A6-6_Deliverable_MR2 Guidelines for Common Management of Brown Bear).

In **Slovenia**, several workshops with stakeholders were organized in 2016 and 2017 in which how to implement the common guidelines for management of brown bear into national strategic documents was discussed. In December 2016, a working meeting with SFS regional wildlife managers was held in Peskovci, and the next workshop in October 2017 with more than 50 participants from several stakeholder groups (farmers, hunters, foresters, NGOs, researchers, etc.) and national organisations (ministries, agencies) involved in bear management. The workshop focused on garnering the interested stakeholders' opinions about present brown bear management in Slovenia and about their wishes, how they imagine management should look in the future.

On the third workshop with stakeholders in Ljubljana in November 2017, over 50 participants took part, representing a wide array of stakeholders' viewpoints (managers, farmers, livestock breeders, hunters, researchers, natural conservationists etc.). During the workshop, participants expressed their opinions and beliefs about current and future bear management in Slovenia and about the implementation of the Common guidelines into Slovenian national strategy for brown bear.

The fourth workshop was dedicated to the farmers – as the key stakeholder group – and their problems with bears, searching for possible measures and long-term solutions for easier coexistence with bears in the rural areas.

Acknowledging the outcomes of the workshops, Brown bear Strategy and Action Plan for Slovenia was drafted by SFS and UL and sent to the Ministry of the Environment and Spatial Planning in 2018. In this version of the document, the Common Guidelines and other outputs of the LIFE DINALP BEAR project were taken into consideration. From the project point of view, the needed work from project personnel ended there, and we consider the expected results as achieved – to influence and dictate the process of confirmation from there on was no longer in the hands of the project.

Ministry of the Environment held four additional workshops, together with the experts from different institutions, to produce the final versions of the documents (March, April and August 2018 – Annexes A6-11 to 14_Technical_FR) and organized the last workshop with all stakeholders in February 20th 2019 (Annex A6-15_Technical_FR). The Strategy (Annex A6-16_Technical_FR) and Action Plan (Annex A6-17_Technical_FR) entered a process of public revision in the end of July, which lasted until the end of August 2019 and was extended through September 2019. Depending on the comments received, it will be further adjusted before final adoption by the Slovenian Government.

In **Croatia**, representatives of FVM actively participated in the work of the “Committee for bear management in Croatia”. Action plan for the year 2018 was composed based on the international guidelines prepared within LIFE DINALP BEAR project. The Croatian brown bear management plan (of 2008) was revised and completed in 2019 following the LCIE international guidelines and accepted by the Ministry of Agriculture on July 19th, 2019 (Annex A6-18_Technical_FR). Management plan was printed in August 2019 (Annex A6-19_Deliverable_FR).

In **Italy**, an official note was prepared by Italian project partners RVEN and PAT and sent to the Ministry for the Environment stating the differences between the PACOBACE and the Common Guidelines to be taken into consideration with the next novel of the PACOBACE (Annex A6-20_Technical_FR).

In **Austria**, project partner FIWI ensured that the Common guidelines were incorporated into the national strategic document already in 2018.

DELIVERABLE	Action	Expected	Progress	Annex
Guidelines for common management of Northern Dinaric Brown bear Population with the attention to management of Alpine Brown bear Population	A6	31.12.2016	Completed 8/2017	A6-6_Deliverable_MR2
2.000 copies of Management plans - 1.000 in Slovenia and 1.000 in Croatia	A6	30.06.2019	Partially completed, printed in Croatia in August 2019	A6-19_Deliverable_FR

MILESTONE	Action	Expected	Progress	Annex
Adoption of 2 Management plans by responsible Ministry - 1 in Slovenia and 1 in Croatia	A6	30.06.2019	Adopted in CRO in July 2019, not yet adopted in SLO In Italy, the differences between the PACOBACE and the Common Guidelines were notified to the Ministry of the Environment.	A6-16_Technical_FR A6-17_Technical_FR A6-18_Technical_FR A6-20_Technical_FR

EXPECTED RESULTS	Action	Achieved results	Annex
Produced, edited and presented to the broader public the Guidelines for Common Management of Northern Dinaric Brown bear Population with the attention to management of Alpine Brown bear Population.	A6	Completed and greatly exceeded. The initially planned range of the common guidelines was significantly extended to the entire Alpine area (WISO platform members), the observers from Bosnia and Hercegovina were included into the development of the guidelines.	A6-6_Deliverable_MR2
Produced Management Plans for management of brown bear population one in Slovenia and one in Croatia that incorporate the principles defined in the Common Guidelines (2x).	A6	Completed for Slovenia and Croatia.	A6-16_Technical_FR A6-17_Technical_FR A6-19_Deliverable_FR
Adopted Management Plans for management of brown bear population one in Slovenia and one in Croatia from competent state authorities of both countries (2x).	A6	Partially completed. Adopted in Croatia, not yet in Slovenia.	A6-18_Technical_FR
Printed and distributed to the authorities, managers, stakeholders Management Plans for management of brown bear population in Slovenia and Croatia (2000 copies in each country) for common management of Northern Dinaric Brown bear Population.	A6	Printed in Croatia. Not yet printed in Slovenia as there is no final version of the document	A6-19_Deliverable_FR N/A

Action A.7: Development of Project Communication Plan

A draft communication plan was developed at the University of Ljubljana and further developed and accepted by the project steering group. It was agreed that the communication plan was an internal document (i.e. it will not be shared with the public) and that it was a living document that would be evaluated and, if needed, revised at least once a year. Since the inception phase of the project included an important phase of internal and external rule formation, the first revision of the communication plan by the project steering group was carried out in April 2016. Since then, the communication plan has been updated four more times (Annex A7-1_Deliverable_MR2). The activity was successfully implemented.

DELIVERABLE	Action	Expected	Progress	Annex
Project Communication Plan	A7	31.12.2014	Completed 11/2014	A7-1_Deliverable_MR2

EXPECTED RESULTS	Action	Achieved results	Annex
Project Communication Plan produced and shared among the all participants of the project.	A7	Completed and additionally regularly updated.	A7-1_Deliverable_MR2

Action C.1: Conflict mitigation in the hot spot areas – organic waste

This action addressed two main problems, bears approaching human settlements and crossing highways. The main drivers for such encounters are constantly available and easily accessible anthropogenic food sources. To reduce human-bear conflicts on the chosen “hot spots”, negative interactions, and also bear mortality on the “black spots”, various protection measures to prevent bear access to food residues were designed and implemented in the field. Together, with additionally equipped locations, 143 bear-proof containers (68 bear-proof housing for large containers and 75 individual containers) and 100 compost bins were implemented at the six “hot-spots” (SLO). In Croatia, 26 bear proof garbage containers have been set in the field along the motorway Rijeka – Zagreb.

Based on the action A.1 (Analysis of occurrence of human-bear conflicts in Slovenia and neighbouring countries), we identified areas in Slovenia with the highest rate of conflicts deriving from bears approaching human settlements. We managed to establish contact with all of the 12 municipalities in the targeted area, and we focused further efforts in conflict mitigation in areas where locals perceive conflicts as most critical and communities responded most positively to proposed solutions. We also met with representatives of regional waste-management companies and decided to find bear-proof solutions for:

1. small plastic bins for individual households; replaced with firm plastic bins, reinforced with steel frame at the top and the lid with a built-in mechanism to automatically lock when released (photo of the prototype in Annex C1-20_Technical_MR1).
2. large group containers; containers are enclosed with housing of metal frame (construction) and wooden sides from massive oak planks; front side with two-side doors to pull-out/push-in the container; lid on the top for garbage disposal (photo of the prototype in Annex C1-19_Technical_MR1).

For optimal bear-proof composters, we decided on a close-to-nature solution that fits well into the traditional Slovenian landscape – compost bins are made of robust oak planks. The bins have wooden lids with an automatic locking mechanism when the lid is released (see photo in Annex C1-22_Technical_MR1).

In 6 chosen “hot spots” (see Annex C1-27_Technical_MR2 for the map of all six conflict mitigation hot-spots) detailed locations of bear-proof measures were selected based on field inspection in cooperation with locals and waste management companies (see lower photo in Annex C1-13_Technical_MR1), 119 bear-proof containers and 100 compost bins were installed. Within Action E5 (in close collaboration with Action C1), we prepared two press conferences, immediately after the implementation of bear proof measures in two Municipalities and one lecture for local residents.

Proper and constant use and maintenance are crucial for the maximum effectiveness of the implemented measures. To achieve this, we inspected the use and state of the measures on the “hot-spots” (SLO). The inspections revealed that the measures effectively prevented bear access to containers’ contents, were in good condition, and generally well-maintained (see Annex C1-32_Deliverable_FR). From November 2018 onwards, local experts from five “hot-spots” (see Annex C1-33_Technical_FR) were the contact point for the receivers of the measures, and their main role was monthly inspection of the situation in the field and reporting of their findings to SFS (Annex C1-35-39_Technical_FR). To inform local communities about the cooperation, a popular article has been written and published in the local newsletter of each “hot-spot” (Annex C1-34_Technical_FR). Since all small irregularities in operation and questions regarding proper use or maintenance could be solved immediately, working with the local experts turned out to be a good cooperation practice between local users, namely local residents of the “hot-spots” and preventive measures recipients, and project experts. Besides person-centred communication in the field, we also adopted a community-based

communication approach. For this purpose, 5 workshops at all five wider “hot-spots” were conducted (see Annex C1-40_Technical_FR). To reach wider public and also demonstrate the measures production, implementation, and consequently replicability, we prepared a manual of best practices and recommendations (see Annex C1-41_Technical_FR). A high number of manuals has already been distributed, also by local communities, and we will translate it into foreign languages to distribute among tourists.

Based on the telemetry data, gathered within the D.1, 3 illegal waste disposal locations have been detected in the municipality Ilirska Bistrica. Two of them have been removed in our further inspections. With an official letter (see Annex C1-42_Technical_FR), we called on municipality leadership to remove waste from the 3rd location. Sodražica is the second municipality, where 2 locations with illegal waste disposal have been detected. The locals responded to our call immediately and remediated the landfills within the annual yearly cleaning action. Since illegal re-disposal has not been detected so far, we assume that our active participation was of great importance. For more detailed information regarding illegal dumpsites please see Annex C1-43_Technical_FR.

Since we received much positive feedback regarding implemented measures from the individual receivers and local experts, we, in addition to the planned project activities, evaluated the use of the measures at a larger scale. We surveyed the workshop participants. More than 60 % of the respondents saw the implemented measures as effective in preventing bears from accessing food and other waste leftovers and thus diverting them from the settlements. A majority of respondents also stated that the implementation of the measures should continue in the future. Furthermore, more than 80 % of the respondents expressed a long-term need of communication actions. Afterwards, we also wanted to analyse if there was any correlation between implemented measures and calls to the bear intervention team. Despite the fact that all conflict situations with bears are not reported, we did find the trend of conflict reduction at the “hot-spots” (see Annex C1-44_Technical_FR).

Because of a high demand for bear-proof containers and compost bins at a local scale due to the efficacy of the measures, we applied for the translocation of some of the funds from other cost categories (personnel) and we extended the duration of the action till the end of the project. We purchased 24 additional bear-proof containers and equipped five new locations, and we supplemented one already established bear-proof waste collection point. For detailed information please see Annex C1-45_Technical_FR. Before the prevention measure implementation, two additional meeting in Loška dolina were carried out (see Annex C1-46_Technical_FR). After the bear-proof containers at Loška dolina were installed, a popular article has been published in the local newspaper (see Annex C1-47_Technical_FR). Additionally, 10 local inhabitants decided to buy their own bear-proof compost bins in free sale. Since the activity has been recognized and transferred as an example of good practice regarding better human-bear coexistence, 3 bear-proof compost bins were also distributed in Switzerland. Two Slovenian local tourist centres from Kočevje and Loška dolina decided to promote the prevention activities and allocate funds from bear viewing eco-tourism back to the community with the intention to buy additional preventive measures (see Annex C1-48_Technical_FR), and some contributions are also made from tourists. To continue with the prevention measure implementation, we foresaw the distribution within one project in progress (Interreg SLO-HR410 Carnivora Dinarica) and included the activities in future project applications. In order to achieve maximum prevention of bears visiting settlements, the measures would need to be distributed at all bear presence areas. This activity has been included in the strategic documents in Slovenia regarding brown bear conservation and management as one of the most important practices for tolerant coexistence.

For the “black spots” sections of A1 motorway Rijeka-Zagreb (CRO), 26 bear-proof garbage containers were installed on highway lay-bys to prevent bear access to garbage leftovers and, consequently, to exclude one of the main attractants for bears. After some problems with the quality of the products, we rectified the situation and the garbage containers have been fully operational,

resulting in these achievements: in the period 2016-2018 there were no bear-vehicle collisions, also no bears spotted on the A1 motorway Rijeka-Zagreb (CRO). Therefore, implementation of the bear-proof garbage containers and removal of the main attractants has been proven to be effective. For more detailed information, please see Annex C4-13_Technical_MR1.

DELIVERABLE	Action	Expected	Progress	Annex
Detailed plan for implementation of bear proof garbage bins and distribution of fences produced	C1	31.05.2016	Completed 2016	C1-24_Deliverable_MR1
2 reports for each chosen hotspot area written	C1	03.03.2018	Completed 2018	C1-32_Deliverable_FR
3 reports for the chosen hotspot areas written	C1	27.04.2018	Completed 2018	C1-32_Deliverable_FR

MILESTONE	Action	Expected	Progress	Annex
All bear proof containers and compost bins set in the field	C1	31.12.2016	Completed 2017	C1-28_Technical_MR2

EXPECTED RESULTS	Action	Achieved results	Annex
At least 100 bear-proof garbage bins deployed in the field in chosen communities and districts in Slovenia.	C1	Completed and greatly exceeded: 143 bear-proof garbage bins deployed on the field in Slovenia.	C1-28_Technical_MR2, C1-32_Deliverable_FR, C1-45_Technical_FR
At least 100 bear-proof compost bins in three different sizes distributed in chosen communities in Slovenia.	C1	Completed.	C1-28_Technical_MR2, C1-32_Deliverable_FR,
15 meetings with majors, local opinion leaders and locals carried out. Within these meetings concrete plans for implementation of the C1, C2 and E3 actions will be developed for each particular chosen community or region.	C1	Completed and exceeded: 19 meetings were carried out with the municipalities (majors), waste management companies and locals. Meeting arrangements were included directly into the distribution plan and further implementation on the field. They were also considered within the second implementation of the bear-proof garbage containers.	C1-13 to C-17_Technical_MR1, C1-46_Technical_FR
5 workshops with local communities carried out.	C1	Completed and exceeded (6 workshops) plus additional 6 popular articles in local media	C1-31_Technical_MR2, C1-40_Technical_FR
5 concrete mitigations plans for the chosen areas made.	C1	Completed, plans included into the Detailed plan for implementation of bear proof garbage bins and distribution of fences produced.	C1-24_Deliverable_MR1
Removed, reported or with GPS telemetry found illegal rubbish dumps.	C1	Completed.	C1-43_Technical_FR

EXPECTED RESULTS	Action	Achieved results	Annex
Single spots in the recovery zone where damages will happen equipped with proper garbage or compost bins and in connection with the action C2 with fences.	C1	Completed – Vojsko (within the recovery zone - western Slovenia).	C1-24_Deliverable_MR1, C1-28_Technical_MR2, C1-32_Deliverable_FR
At least 25 bear-proof containers set on the selected locations on the highway Rijeka Zagreb in Croatia.	C1	Completed and exceeded (26).	C1-1_Technical_MR1, C4-13_Technical_MR1 (connection with the C4 action)
Report for each area, where conflict mitigation measures implemented. At least 5 reports written.	C1	Completed and exceeded (6 reports). Besides the separated reports for each "hot-spot", overall report has been prepared to demonstrate the general state and use of the measures on the field.	C1-32_Deliverable_FR
Manual of best practices with recommendations on prevention measures for different conflict types made.	C1	Completed.	C-41_Technical_FR
6 cameras bought and film material gathered.	C1	Completed. Some films were also received from the locals (e.g. surveillance camera at the school entrance).	C1-25_Technical_MR1, C1-26_Technical_MR2
IUCN Human-Bear Conflict Specialist Group expert for human dimension and working with people hired.	C1	Completed. The cooperation with the human dimension expert greatly contributed to our regular work with local stakeholders.	N/A Accessible online (news)
Local experts and opinion makers for bear issues hired and directly involved into the project.	C1	Completed.	C1-33_Technical_FR, C1-35 to C1-39_Technical_FR

Action C.2: Conflict mitigation in the hot spot areas – damage cases

In action C.2, we addressed damages caused by brown bears and helped landowners properly protect their beehives, livestock and orchards.

A. Protection of property with electricity

Electric fences - Slovenia

In 2015, we started collecting information about landowners interested in protecting their property from damages caused by bear. We focused on areas recognized as “hot-spots” in the analysis prepared in action A1. We presented the project to several municipalities in Slovenia (mentioned in action C.1), which helped us spread the information. We promoted our project through the Slovenian Beekeepers’ Association and published an article in “Slovenian Beekeeper” magazine (listed in action E.5), including a call of interest. A call of interest was published on their webpage (http://www.czs.si/objave_podrobno/6369). An article about effective protection of sheep was published in the magazine “Kmečki glas”, including a call of interest. During the project, 10 articles about damage prevention promoted our activities and the interest among farmers and beekeepers was consistently rising.

Within the project, we distributed 55 (15 more than planned) sets of equipment to livestock owners and beekeepers, protecting 21 mobile beehives (Annex C2-3_Technical_MR1), 16 stationary beehives (Annex C2-4_Technical_MR1) and 18 sheep herds (Annex C2-5_Technical_MR1). We signed contracts with all recipients (Annex C2-6_Deliverable_FR). A field visit was made before distributing the equipment in order to determine the needed equipment. When delivering the equipment, we gave instructions on use. One set of equipment generally included an energizer, a battery, a voltmeter and electric nettings (170 cm). Recipients received the material needed to complete their protection. For pastures and mobile beehives, we donated electric nettings and for stationary beehives we generally used six lines of metallic wires to set a permanent fence.

Moreover, in order to be ready to offer help to farmers, we introduced “intervention sets” - sets of equipment needed to quickly set up an effective protection. Five intervention sets are available at SFS regional premises to react quickly when damages occur in a short period of time. For example, in June 2016, we used an intervention set to temporarily protect an orchard. We performed 15 interventions (Annex C2-36_Technical_FR), in most cases to protect sheep or beehives, and in one case to protect cattle. We also instructed SFS officials how to use el. fences (organized in Action E2). The intervention sets will continue to be available at SFS premises after the project’s completion.

The results of our activities are very positive. The equipped beekeepers have not experienced any damages, while only two farmers experienced one attack on sheep, most likely due to incorrect use of fences. After the attack, we immediately checked the circumstances and did not detect problems with the equipment. To emphasize the importance of the correct use of fences, our project members and SFS officials visited the recipients at least once per year and controlled the use of the equipment. We also hired the Society Dinaricum to perform field controls. To document each control, we use a form (Annex C2-8_Technical_MR1) to record the measurements and observations. If used correctly, the equipment can last a long time, so we expect the fences will be used well after the project ends.

The knowledge and experiences obtained through the project have been transferred to different projects (e.g. Interreg project Carnivora Dinarica) which continue the practices regarding damage prevention in terms of using both electric nettings and livestock guarding dogs.

Based on project’s positive results, the Slovenian Environment Agency decided to subsidize electric fences for farmers and beekeepers who experienced damages from large carnivores, which represents a great added value in terms of continuation of good practices. After that decision, we also donated equipment to landowners who had no damages in the past and also in areas where bears were absent

for decades to provide protection to as many farmers as possible and to maintain the tolerance towards bears in newly recolonized areas. Through the project, in cooperation with farmers and beekeepers, our team at SFS has become an advising expert and resource for landowners in the areas of bear presence.

Electric fences – Italy (RVEN, PAT)

In Veneto region, the action was implemented in collaboration with similar action of LIFE12 NAT/IT/000807 Wolfalps project, particularly in the damage hot-spot areas for both bear and wolf. In 2017, 120 electrified fences provided by the LIFE DINALP BEAR project were purchased together with 60 sets funded through Wolfalps project, in order to achieve a better price. In summer 2017, we delivered the fences to farmers who requested help. The delivery was carried out with the support of BIT members of the Provincial Polices. For each set, we signed a contract of free loan. The set included an energizer, battery, solar panel; nettings for sheep, wire and poles for cattle and other species (Annex C2-24 and C2-25_Technical_MR2). After the signing an agreement between Veneto Region and the Italian Alpine Club (CAI), CAI volunteers collaborated in the installation of fences. In 2018, thanks to technicians appointed by the Veneto Region with its own funds and to BIT staff, the delivery of fences to landowners in the provinces of Vicenza and Belluno was completed. A minimum number of materials was held as a reserve for emergency interventions. The technicians also verified the functionality of the fences already delivered in 2017. In 2019, 40 camera traps (Annex C2-37_Technical_FR) were purchased and, thanks to an external assignment to the “Il Villaggio degli Orsi” Association, were used to document the effectiveness of preventive measures on sample fences. The results are documented in action D1. The camera traps were then supplied to the provincial police for future monitoring of large carnivores and the efficacy of preventive measures by the BIT staff.

In 2018 and 2019, Veneto Region replicated the positive experience of dissemination of prevention systems from LIFE Projects through provision of its own funds (208.209,08 EUR) help farmers purchase prevention. In June 2019, after the EC authorization for a modification of the 2014-2020 Rural Development Programme (RDP), Measure 4.4.3 of the Veneto RDP was activated, with provision of 1 million EUR for the period 2019-2020 for investments in preventive measures. Also in 2019, the technicians assigned by Veneto Region for supporting farmers in planning and installation of measures and the support of CAI volunteers were confirmed.

In Trentino, electric fences were also needed in the field to protect property in the area where bears are present. An additional 19 electric fences were bought to protect beehives and livestock in an emergency situation where the young male bear called M49 caused damages in the summer 2018, including several instances of predation to livestock (38 % of all damage to livestock caused by bears population in 2018, 80 % of the total to cows and horses). The electric fences have been used to resolve specific situations of conflict between breeders and the bear in few hours; in particular, M49 had the habit of returning to the place of damage the following nights to try other attacks.

Savings from the funds foreseen for the livestock guarding dogs were used for these fences; according to the administrative frame in Trentino, PAT could not buy dogs and distribute them to new owners (in accordance with the legislation, PAT would have to be the owner of the dogs).

B. Protection of livestock with guarding dogs (LGDs)

The goal of these activities was to develop working lines of livestock guarding dogs in Slovenia and Italy.

LGDs – Slovenia (Slovenia Forest Service, SFS)

In 2016, we started with developing working LGD lines by searching for motivated and competent breeders to collaborate with. We hired two experts to provide help in the field. We selected five

experienced LGD breeders and signed contracts, thus we established 5 working lines of LGD. In December 2016, we announced the first litter, and by the end of the project we had delivered 20 pups to new owners (Annex C2-30_Technical_FR). Both the breeders and cynology experts follow the dogs in new environments to provide expert opinion to farmers who have little to no experiences in using LGDs. The progress, challenges and reports from meetings were described by each breeder and experts in yearly reports.

All the distributed dogs have been working very well. The collaboration between new owners and LGD breeders represents a good way to raise successful LGDs in the long-term. LGD breeders act as field-advisors and already have plenty of experiences to teach new owners how to raise the dogs. We held a meeting with all breeders and cynologists to exchange experiences and set future steps for breeding LGDs in Slovenia (Annex C2-38 and C2-39_Technical_FR). In collaboration with LGD breeders and cynologists, we prepared the LGD breeders handbook (within E1; Annex C2-40_Technical_FR) to distribute to interested farmers on meetings and in the field. To give farmers a detailed overview of using LGDs for herd-protection, we organized a special meeting with a field-demonstration. At the meeting, the breeders, cynologists and project members shared their experiences regarding damage prevention, the work with LGDs, about raising pups, and presented the legal frames. We finished with a visit at one breeder's farm (Annex C2-41 and C2-42_Technical_FR).

LGDs – Italy (Provincia Autonoma di Trento, PAT)

PAT invested its own resources into the project to buy 51 LGDs to establish new working lines. The dogs are certified by the association “Circolo maremmano abruzzese” that guarantees the pedigree. Each dog was periodically visited by a veterinarian LGD expert, paid by the project's budget. We hired an expert referent for LGD for LIFE WOLFALPS, to check the health of dogs and the activities of breeders (Annex C2-44 and C2-45_Technical_FR). It is very important to follow the first steps introducing dogs to the new environment, as the first period is crucial for future abilities and protection of the herd. Nine breeders who received the puppies established their own working lines and distributed 25 pups to new owners. Also, for these dogs, the veterinary visit was guaranteed (Annex C2-46_Technical_FR). The distribution of LGDs is seen in the Annex C2-43_Technical_FR.

In May 2017, PAT organized a two-day meeting with interested breeders in LGDs by the Trentino breeders' association (Annex C2-33 to C2-35_Technical_MR2). At the meeting, the Trentino large carnivore management was explained and a specific course on LGD training carried out. On the second day, the participants visited some farms where the dogs are already used. During spring 2017, PAT distributed specific signs to be placed in the field close to livestock protected by LGD, to inform and warn hikers and others on the best behaviour to maintain in these areas. The content of the panel was made in collaboration with the LIFE WOLFALPS project. At the beginning of 2018, the owners of the dogs established an LGD Association to guarantee continuation in the appropriate management of the dogs, as well as proposing common initiatives (e. g. common purchasing of LGD food, with favourable prices).

C. Scaring devices – Slovenia (Slovenia Forest Service)

In order to test the efficacy and usefulness of scaring devices, we used different types of devices in areas where bears are regularly present. We tested three electronic motion-activated devices (an ultrasonic device, a reflector, a speaker). Based on experiences from abroad, we also decided to test the electric mat - a different electricity-based approach to prevent bear from approaching beehives. This is basically an electric netting placed on a rubber mat on the ground. An animal that steps on the mat receives an electric shock that scares it away. Altogether, we tested 4 types of devices in five different locations (Annex C2-47_Technical_FR). The electric mat proved to be the only effective device, therefore we distributed two such electric mats to two interested beekeepers (Annex C2-6_Deliverable_FR).

All the results and recommendations regarding electric fences, livestock guarding dogs, and different kind of deterrents are included in the report about implemented measures (Annex C2-48_Technical_FR). Photo-materials from 6 purchased cameras within the action are also included in the report.

MILESTONE	Action	Expected	Progress	Annex
All fences set on the field in Slovenia	C2	02.07.2017	Completed in 2017	C2-6_Deliverable_FR
All fences set on the field in Veneto	C2	02.07.2018	Completed in 2018	C2-27_Deliverable_FR

EXPECTED RESULTS	Action	Achieved results	Annex
40 sets of fences for protection of livestock, beehives, orchards, bales of silage and other damage objects will be deployed in the field in Slovenia.	C2	Completed and exceeded. 55 sets distributed and 5 intervention kits were introduced to help farmers prevent damages.	C2-6_Deliverable_FR, C2-36_Technical_FR
120 sets of fences will be distributed in Regione di Veneto	C2	Completed.	C2-27_Deliverable_FR
Scaring devices (chemical and/or electronic) will be used in at least 4 localities in Slovenia.	C2	Completed and exceeded. 4 different scare devices were tested in 5 localities.	C2-47_Technical_FR
Established working line of LGDs. Donation of LGD pups (future breeding animals) to at least 5 chosen future breeders in Slovenia and 5 in Provincia autonoma di Trento. Contract between project and future breeders of LGDs signed. Chosen breeders trained for breeding LGDs and advising interested farmers who will get puppies and use them as guarding dogs.	C2	Completed and exceeded. Collaboration with 5 LGD breeders established in SLO, 20 pups distributed. In ITA, 9 working lines, 25 dogs from these distributed. Regular visits performed, all the breeders are well trained (through collaboration with cynology experts and trainings), and interested farmers informed.	C2-30_Technical_FR, C2-46_Technical_FR
Call for interest (for breeders of working lines) published in specialized farmer magazines (Drobnica, Kmečki glas). Provided advertisements for the first litter of puppies from working line among livestock breeders.	C2	Completed. Several calls of interest published in different magazines, webpages, etc. Advertisements for litters provided through different media, webpages, etc.	C2-2_Technical_MR1
Workshop/training for selected breeders of guarding dogs to educate them as advisors for LGDs (i.e. practice, role plays, quiz...) organized (1 in Slovenia and one in Italy). An additional seminar for all interested breeders organized (legal aspects, understanding and methodology of proper raising of LGDs and ability for proper breeding).	C2	Completed and exceeded. A training was organized both in ITA and in SLO. An extra seminar organized for interested farmers in SLO.	C2-38 and C2-39_Technical_FR, C2-33 to C2-35_Technical_MR2 C2-41 and C2-42_Technical_FR

EXPECTED RESULTS	Action	Achieved results	Annex
At least 20 pups subsidized and placed as working LGDs as a result of the established working lines in Slovenia.	C2	Completed. 20 pups of LGDs distributed to interested farmers from different areas in SLO - distributed from established working lines.	C2-30_Technical_FR
At least 1 visit per year of each owner of the donated electric fences. More in cases of trouble	C2	Completed. Regular visits performed and foreseen in the signed contracts.	C2-6_Deliverable_FR
At least 3 visits per year of the dog breeders.	C2	Completed. Regular contacts between the project, LGD breeders, cynology experts and new owners - this approach worked very well, as the farmers have not had any difficulties in raising the dogs.	C2-12_Technical_MR1, C2-13_Technical_MR1
Local experts and opinion makers hired.	C2	Completed. Two cynology experts hired and the Society Dinaricum to perform field controls of the distributed equipment.	C2-12_Technical_MR1
6 cameras will be bought and film material gathered (Slovenia).	C2	Completed. Cameras purchased and used to monitor the perimeter of the installed fences, intervention kits and in case of troubles.	C2-48_Technical_FR
40 cameras will be bought and film material gathered (RVEN)	C2	Completed. Cameras purchased and used to monitor the perimeter of the installed fences, intervention kits and in case of troubles.	C2-37_Technical_FR
Report about implemented measures within this action written.	C2	Completed.	C2-48_Technical_FR

Action C.3: Integration of bear habitat connectivity and suitability into spatial planning

The purpose of this action was to minimize the gap in expert knowledge on brown bear habitat connectivity issues among experts and companies dealing with the spatial planning and environmental impact assessment. The action was a logical continuation of the action A.3 where the current specific knowledge on the brown bear habitat connectivity and suitability has been upgraded.

Re-colonization of Eastern Alps through the natural expansion of bear individuals from the Dinaric population in Slovenia and Croatia is one of the priorities of bear conservation in Europe. Connectivity between habitat patches is a critical issue for long-term survival of any wildlife population, as it directly affects not only its dynamics and chances of long-term survival, but also its possibilities for expansion. The most affordable effective way to preserve connectivity is to prevent development in small, critical areas that connect large habitat patches. An effective way to do this is to provide correct information for environmental impact assessment (EIA). Hence, one of the challenges for ecologists, infrastructure planners and engineers is to develop adequate tools for the assessment, prevention and mitigation of the impacts of infrastructure. However, such assessments must be based on a solid understanding of landscape connectivity for brown bear, which is what we aimed for. The advice provided in the prepared “Handbook for integrating the bear habitat suitability and connectivity to spatial planning” is based upon the accumulated knowledge of a broad range of experts from the participating countries. The handbook was written in English and was translated into Slovenian and Croatian. One-hundred copies of the English version were printed (C3-1_Deliverable_FR), and 400 copies were printed in Slovenian (C3-2_Deliverable_FR) and Croatian C3-3_Deliverable_FR), each. The EIA guidelines handbook is also available in an electronic form on the project web site.

In Slovenia and Croatia, we organized (9.4.2019 Ljubljana – C3-4_Technical_FR, 4.6.2019 Zagreb – C3-5_Technical_FR) two educational seminars for spatial planners and companies that carry out appropriate assessments and environmental impact assessments. We had 41 participants in Ljubljana and 51 participants in Zagreb attended the seminar. Participants represented governmental institutions for spatial planning and environment protection sector, non-governmental institutions, and EIA companies. At the seminars, experts presented and explained main principles of bear-friendly spatial planning. The principles have been illustrated through presentations of the examples of best practice from Greece and Croatia and results from preparatory actions in Slovenia and Croatia. Main principles and areas crucial to lynx habitat connectivity have been presented as part of synergistic cooperation with LIFE Lynx. Each attendee received his/her own copy of the handbook. A discussion session at the end of the seminar was facilitated. Attendees evaluated the seminars as very useful since it covered many gaps in their knowledge in this topic, and at least two additional seminars will be carried out in autumn 2019, hosted by Slovenian Nature Protection Agency and Interreg project Carnivora Dinarica.

Initially, in the project proposal, the seminar was also planned for Italy, but during the application procedure, this activity has not been supported from the partners. In the proposal, the text has not been corrected, only in the paragraph for the responsibilities and from the costs planned it can be established that the activity has been planned just for Croatia and Slovenia (as it has been carried out).

DELIVERABLE	Action	Expected	Progress	Annex
Integration of bear habitat connectivity and suitability into spatial planning handbook	C3	01.09.2017	Completed 2019, printed in SLO, HR and EN	C3-1 to C3-3_Deliverable_FR

MILESTONE	Action	Expected	Progress	Annex
Integration of bear habitat connectivity and suitability into spatial planning seminars	C3	1.12.2017	Completed 2019 in Slovenia and Croatia	C3-4_Technical_FR, C3-5_Technical_FR

EXPECTED RESULTS	Action	Achieved results	Annex
Integration of bear habitat connectivity and suitability into spatial planning" handbook produced and printed in four languages (n=400 in each language).	C3	Partially completed - printed in SLO, HR and EN	C3-1 to C3-3_Deliverable_FR
Educational seminar carried out in each country with minimum of 100 attendees in total.	C3	Partially completed - carried out in Slovenia and Croatia	C3-4 and C3-5_Technical_FR

Action C.4: Decrease of traffic-caused bear mortality

This action is divided into two sub-actions. In each sub-action the following actions/results were delivered:

1. Implementation of mitigation measures in Slovenia:

(i.) Two dynamic traffic systems were installed along Jasnica and Ortnek state road sections to warn drivers when an animal (bear or other wildlife) is approaching the road. These systems have never been implemented in Slovenia before (Annex C4-1_Technical_MR1). Additionally, a new dynamic traffic system was installed near Turjak (till March 2018). The installation of new traffic sign on another highly problematic section of the road Ljubljana – Kočevje was approved by EC and contributed to the general goal of the Action C4 to reduce traffic-caused bear mortality (Annex C4-20_Technical_MR2). The contract for monitoring and maintenance of all three dynamic traffic systems after the end of the project was concluded between SFS and DRSI, with the goal to propose new locations for additional systems financed from the Slovenian national budget and hence transfer and replicate the measure into the national scheme for traffic safety as they were recognised on a national level as an effective mitigation measure.

(ii.) 160 acoustic deterrents were installed on electric poles along the most problematic (“black”) spots of railway sections for bear-train collisions on the railway Ljubljana - Postojna, at the sections Rakek – Unec and Postojna – Prestranek. Acoustic deterrents were placed on one verge of the railway app. 8 km in total (Annex C4-2_Technical_MR1). Another 50 acoustic deterrents were placed on the railway in April 2017 to follow-up maintenance of the protected sections and another 30 acoustic deterrents in 2019 (Annex C4-26_Technical_FR).

(iii.) 240 acoustic deterrents were installed into the roadside traffic pillars on the regional road Ljubljana – Kočevje. The devices were installed in four road sections on a total length 7,3 km (Annex C4-3_Technical_FR). The work was postponed as approved by the EC and successfully carried out by ERICo in the beginning of April 2016, since we had to wait for the material longer than was agreed in the contract. 120 acoustic deterrents were placed in July 2018 to follow-up maintenance of the protected sections (Annex C4-27_Technical_FR).

(iv.) The implementation of electric fences at highways was postponed until 31.6.2017. There are many reasons for this delay (explained in the Annex C4-4_Technical_MR1). Only on 11th February 2016, we got the permit from DARS to start with the work on the highway. At the same time, we got their commitment to take over maintaining the fence after the end of the project (Annex C4-12_Technical_MR1). The procedure of finding a reliable and competent contractor was a long one and it is described in detail in the second Mid-term Report. Because of the underestimated budget for the external assistance, the lowest bid was contingent on the help of personnel of project partner ERICo (additional work and additional costs in the personnel) in the field. In the beginning of year 2017, we sent the new inquiries to different providers and we got the applicable offers in March. The installation of electric fence was done in cooperation with our staff. DARS has enabled electric fence connection to the electric current; this part of installation was time-consuming, and we finished with most of the work at the end of November 2017 (5 systems out of 7 working, Annex C4-23_Technical_MR2). All sections were completed in early 2019 (Annex C4-28_Technical_FR) and operational. As shown in the official records of SFS, there have been no bear mortalities on the mitigated sections of highway since 2018.

2. Implementation of mitigation measures in Croatia:

(i.) 30 one-way doors were installed within the existing wire fence on a section of the Vukova Gorica - Vrbovsko motorway (20 small doors and 10 big doors); **(ii.)** Six jump-out ramps were constructed the on inner side of motorway wire fence. Ramps are the same height as the wire fence to make escape

possible for any bear or other wildlife that enters the fenced area of motorway; **(iii.)** The electrical fence was installed on twelve selected sections along both sides of the motorway from Vukova Gorica to tunnel Vrata, in total length more than 60 km. Electrical fence was installed on the outer side up to 1 m away from the existing wire fence, with five wires fixed to the ground with pillars. Technical inspection of the wire fence was completed. The work was done by ARZ and finished in May 2015. During 2016, the installed fence, ramps and doors were maintained and cleared of growing grass and shrubs. Occasionally the electrical fence wires and poles (pillars) were repaired and straightened. The maintenance of 60 kilometres of electrical fence was more difficult than expected because of the ground morphology and vegetation growth, which requires a lot of manual work. The electrical fence is constantly monitored for its proper operation. The operating fencing results in a noticeable decrease in bear appearance within fenced area of the motorway and there have been no bear-vehicle collisions to the conclusion of the project (last intervention in November 2015). Since the 2014 there were some major changes in the organization of the ARZ highway company (Autocesta Rijeka-Zagreb d.d.), at which point routine maintenance, together with highway tooling, is allocated to the newly established daughter company (HACONC). ARZ remained responsible for highway concession management, periodic maintenance and investments. To assure required quality and proper support to LIFE DINALP BEAR project, we requested HACONC allocate one person to be responsible for wildlife issues on the highway and with whom we closely cooperate. On the 1st of December 2017, company HAC ONC d.o.o. joined the company HAC d.o.o. (Croatian motorways) which, as a legal successor, took over all the HAC ONC's property, rights and obligations. ARZ remained responsible for highway concession management, periodic maintenance and investments. In 2018 and 2019 ARZ organized routine and periodic maintenance of the electrical fence through external assistance contracts in order to keep electrical fences in operative condition. The grass cutting and maintenance of existing wire mesh fence remained as contractual obligation of HAC d.o.o. This way of operation will be maintained in the following years.

(b) Supporting activities for raising general awareness of public and end-users:

(i.) First meeting with Slovenian railways was held on 5th October 2015 (Annex C4-14_Deliverable_MR1).

(ii.) First meeting with local community (hunters' organisations) in Slovenia was held on 8th July 2015 (Annex C4-15_Deliverable_MR1).

(iii.) Second meeting with local community (hunters) in Slovenia was held on 13th July 2016. (Annex C4-16_Deliverable_MR1).

(iv.) On May 21st 2015 a press conference in Bosiljevo (Croatia) was organised by ARZ to present the project LIFE DINALP BEAR as described in the action E5 (Annex C4-17_Deliverable_MR1).

(v.) On May 8th 2015 the Motor Company of the Republic of Slovenia (DARS) organised a workshop 'Wildlife on highways' on the Jable Castle, Mengeš. Two talks were dedicated to the LIFE DINALP BEAR project, with emphasis on the presentation of the Action C.4 (ERICo). Similarly, several activities that have already been implemented on the highway Rijeka-Zagreb (Croatia; ARZ) were presented (Annex C4-18a, b_Deliverable_MR1).

(vi.) A second meeting with Slovenian railways was held on 23 June 2017. ERICo institute and Slovenian Forest Service held a presentation about brown bears and wolves for employees of Slovenian Railways in Postojna, Slovenia. We also presented LIFE DINALP BEAR project activities and mitigation measures for reducing traffic-caused bear mortality. Most attention was given to

mitigation measures already implemented along the most problematic railway sections near Postojna (Annex C4-24_Deliverable_MR2, Annex C4-25_Deliverable_MR2). It was planned that also the third meeting Slovenian railways will be held till the end of 2017. Since the last meeting on 23 June, we estimated that it would be too soon to organize a new meeting; further, more results can be presented if we postponed the meeting in 2018.

(vii.) At the third meeting with local hunters on 30th May 2019, representatives of Eurofins ERICo and Slovenian Forest Service had a meeting with representatives of Kočevje Hunting Association. Hunting clubs are located in the area where we set two systems of dynamic traffic signs within the LIFE DINALP BEAR project. We presented the results of the project connected with bear traffic mortality, the system of dynamic traffic signs, the importance and functioning of the acoustic deterrents (Annex C4-29_Deliverable_FR, Annex C4-30_Deliverable_FR).

(viii.) On 17th July 2019, Eurofins ERICo and Slovenian Forest Service held a presentation about brown bears for employees of Slovenian Railway in Postojna. (The meeting was scheduled for June 2019, but due to a railway accident, the meeting was postponed until July). We presented biology, ecology and some recommendations on how to behave when encountering bears in nature. We also presented LIFE DINALP BEAR project activities and mitigation measures for decreasing traffic-bear mortality. Most attention was given to mitigation measures already implemented along the most problematic railway sections near Postojna (Rakek-Postojna; Postojna-Prestranek) (Annex C4-31_Deliverable_FR, Annex C4-32_Deliverable_FR).

DELIVERABLE	Action	Expected	Progress	Annex
1st meeting with Slovenian railways carried out	C4	30.11.2015	Completed 2015	C4-14_Deliverable_MR1
2nd meeting with Slovenian railways carried out	C4	30.11.2016	Completed 2017	C4-24 and C4-25_Deliverable_MR2
3rd meeting with Slovenian railways carried out	C4	30.11.2017	Completed 2019	C4-31 and C4-32_Deliverable_FR
6 meetings with local community and hunters carried out	C4	30.04.2019	Completed 2015-2019	C4-15 and C4-16_Deliverable_MR1, C4-18a,b_Deliverable_MR1, C4-29 and C4-30_Deliverable_FR

MILESTONE	Action	Expected	Progress	Annex
Preventive measures on railways implemented	C4	30.09.2015	Completed 2016	C4-2_Technical_MR1
Preventive measures on state roads (animal activated warning system) implemented	C4	30.09.2015	Completed 2018	C4-1_Technical_MR1, C4-20_Technical_MR2
Preventive measures on state roads (deterrents) implemented	C4	31.12.2015	Completed 2015	C4-3_Technical_MR1
Preventive measures on highways implemented	C4	31.12.2015	Completed 2019	C4-23_Technical_MR2, C4-28_Technical_FR

EXPECTED RESULTS	Action	Achieved results	Annex
Decreased traffic-caused mortality of brown bear (>30% in overall, >50% on mitigated state roads and railway sections, and for nearly 100% on mitigated highway sections, respectively).	C4	In overall for Slovenia and Croatia, bear traffic mortality was reduced by 25 % in the period 2016-2018 compared to the period 2013-2015, although the bear population size increased in the meantime. On mitigated road and railway sections in Slovenia and highway section in Croatia, bear traffic mortality was altogether reduced by 63 % in the same period.	D2-13_Deliverable_FR
Protection of the majority of known 'black-spots' in Slovenia against bear-vehicle collisions (7-8 km of state roads, 8-9 km of railways, and up to 15 km of highways, respectively).	C4	Completed.	C4-1 to C4-3_Technical_MR1, C4-28_Technical_FR
Protection of the majority of known 'black-spots' on highways in Croatia against bear-vehicle collisions by additional protection of up to 30 km of motorways, 30 exit doors and 6 jump-out ramps.	C4	Completed.	C4-13_Technical_MR1
Increased probability of successful population expansion by decreasing mortality of juvenile brown bears, which are particularly subjected to dispersion/migration.	C4	Completed – as the numbers of the traffic-caused mortality decreased on all mitigated segments of roads, railways and highways	Annexes of the D2
6 organized meetings with local community and hunters in Slovenia and Croatia (3 per country).	C4	Completed	C4-15 and C4-16_Deliverable_MR1, C4-18a,b_Deliverable_MR1, C4-29 and C4-30_Deliverable_FR
3 organized meetings with the Slovenian railways.	C4	The activity was completed successfully.	C4-14_Deliverable_MR1 C4-24 and C4-25_Deliverable_MR2 C4-31 and C4-32_Deliverable_MR2

Action C.5: Establishment and optimization of an integrated, population-level surveillance of brown bear conservation status

The goal of this action was to start a comprehensive, optimized monitoring of the Alpine-Dinaric bear population that would cover its entire range within the participating countries. The action was large and included several interconnected activities.

In this action, we demonstrated several innovative best-practice approaches. We used citizen science with thousands of volunteers for cost-effective and extremely efficient genetic sample collection. As the first in the world, we used new cutting-edge genetic methods (genotyping-by-sequencing using high-throughput sequencing) in a large study of a natural population. We used mathematical population modelling to understand and simulate bear population dynamics, and applied this in an innovative, easy to use tool for managers (see Action C.9). We introduced the concept of yearly Population Status Reports, first population-level documents ever produced for the bear population in this area that provide a detailed overview of the population's conservation status that transcends national borders. In most cases, our activities were designed to represent a beginning of long-term international cooperation in monitoring of brown bears in NW Dinaric Mts. and SE Alps. Approaches we used can be transferred and replicated in other populations and species across our continent and have, as such, considerable added value.

Besides practical applications and reports, we published the results of this action in 9 peer-reviewed papers in scientific journals and a book chapter (Annex C5-19_Technical_FR). Another scientific paper has been submitted and is awaiting publication (Annex C5-21_Deliverable_FR), and several other manuscripts are in preparation.

a) Estimates of population size, sex structure and pop. range using non-invasive genetic sampling.

Robust monitoring of population size forms a backbone of any wildlife monitoring. We used state of the art non-invasive genetics methods, paired with mark-recapture modelling, to estimate population size and sex structure (Annex C5-9_Deliverable_MR2), and to track expansion of bears into the Alps (Annex C5-18_Deliverable_FR).

We organized a large-scale, highly intensive non-invasive genetic sampling, using volunteers through citizen-science approach, in autumn 2015. Altogether, we managed to collect **4687 samples**, with good temporal and spatial coverage. This is over **56% more than the target** 3000 samples. We estimate that **over 2500 people were actively participating** in the study (target was 500). We consider the action an absolute success.

As the final goal of Action C.5 was to establish long-term monitoring of the bear population, we worked to provide a solid foundation by improving the analytical pipeline for genetic samples. With use of laboratory robotics and the switch to next-generation sequencing (NGS) for genotyping, we **considerably shortened analysis turnover time and decreased the costs**, which made possible analysis of a much larger number of samples than planned (Annex C5-9_Deliverable_MR2). The NGS method for genotyping is cutting edge, has been recently published, and to our knowledge we are the first laboratory in the world to use it in a large real-world study. Besides being much faster, cheaper, and more reliable, the method solves the result transferability issues of the 'old' methods.

The advances in analytical procedures allowed us to process **4370 samples**, or **45.7% more** than the 3000 we planned. We also genotyped and included in the analysis all bear mortality sampled during the sampling period. Results are summarized in Table C5-1. We managed to successfully genotype **3218 non-invasive samples**, or **73.6%** of processed samples (Figure C5-1). We identified **1136 different animals** (goal was 400), and 730 of them were captured more than once. We produced bear population abundance estimates for 2015, both minimum and maximum yearly abundance, and sex ratio for both countries (Table C5-1).

Table C5-1: Non-invasive genetic sampling and mark-recapture modelling estimates of brown bear abundance and sex ratio in NW Dinaric Mts. in 2015.

Area	CMR Model	Minimum Yearly N (95% CI)	Maximum Yearly N (95% CI)	Sex ratio F:M [%]
Entire study	MhChao+Capwire TIRM	1363 (1248-1522)	1619 (1504-1778)	58.9 % : 41.1 %
Slovenia	MhChao	599 (545-655)	711 (657-767)	59.6 % : 40.4 %
Croatia	MhChao+Capwire TIRM	764 (679-893)	908 (823-1037)	58.2 % : 41.8 %

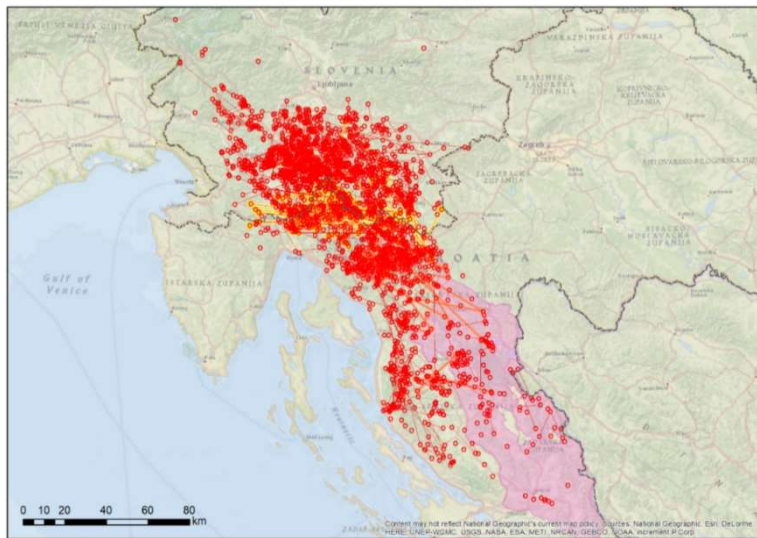


Figure C-1: Successfully genotyped samples. Lines connect samples of the same animal (paths), paths of transboundary animals between Slovenia and Croatia are marked yellow.

For Croatia, this is the first reliable estimate of brown bear abundance and the historical reference point, while in Slovenia a similar study was done in 2007 when the population was an estimated 424 (383-458) bears. The 2015 estimate obtained in this study is 599 (545-655) bears, a **41.3 % increase over the period of 8 years**. Detected population growth (at least in Slovenia) looks positive for bear conservation but is also opening a wider discussion about tolerance of bears and about the future of bear management and conservation.

We also detected a considerable increase in the number of bears in Slovenian Alps (Annex C5-18_Deliverable_FR). The number of bears west in pre-Alpine and Alpine areas more than doubled (from 21 to 48, 129 % increase), and even more importantly, the proportion of females increased from 30% to 40%. However, the range of females, although larger, remains located in the pre-Alpine areas, and is extending very slowly. In Alps proper, we're detecting only males, four of them, which we've been detecting in genetic samples since 2005 or 2007, showing that bears can exist in the Alps and cause a relatively small amount of problems.

b) Genetic monitoring of bear mortality and effective population size

The dataset included genotyped samples of **2022 individual bears** (1040 from Slovenia and 982 from Croatia), bear mortality. While building on the previously acquired genetic data, we re-analysed all samples collected and genotyped prior to this project (1326 samples) with the new NGS markers, both to ensure compatibility with the non-invasive dataset and to increase the information content for downstream analyses. Within LIFE DINALP BEAR, we **collected and analysed 696 tissue samples**

(331 from Slovenia and 365 from Croatia). The total dataset includes **29 polymorphic microsatellite loci** + 2 loci for confirmation of field determined sex id.

One of the important goals of the project was to start with systematic monitoring of the effective population size (N_e), the paramount genetic index showing both the evolutionary potential of the population and its vulnerability to random genetic change and inbreeding. The most recent estimate for 2014 is $N_e = 261.6$ (**247.5 – 277.0 95% CI**) – this means that there is no danger of inbreeding depression in the population, but that work should still be done on connectivity with other populations to maintain evolutionary potential. We also see that **total effective population size is growing** and seems to have more than doubled since the end of 1990s (Figure C5-2).

A surprising and very interesting result is that we are seeing a considerable and opposing effects that different management approaches in both countries have on the brown bears at the most fundamental, molecular level (Figure C5-2).

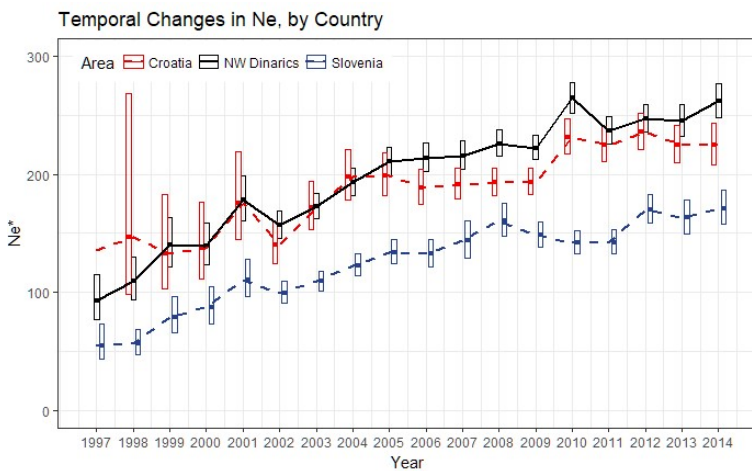


Figure C-2: Temporal variation in effective population size of brown bears in NW Dinaric Mts. from 1999 until 2014. Estimates are made using all samples (NW Dinarics) and samples from each respective country. Animals aged 0 to 8 years (~ generation interval) and alive in the target year were used in each yearly sample. The estimates are not independent, but each estimate in year t represents the harmonic mean of N_e for the period $t - GI$, where GI is generation interval ~ 8 years.

c) Monitoring of population trends and reproductive parameters using a network of permanent counting sites

Monitoring of brown bear population using a network of permanent counting sites is a time-honoured method that has been used to monitor bears in Slovenia since early 1990s and has been recently started in Croatia. For the first time, we systematically and thoroughly analysed the data obtained with this method and explored its strengths and weaknesses. We made analytical improvements (Annex C5-12_Deliverable_FR) that allow the method to be used for abundance estimates for independent verification of model-estimates of population size (see paragraph g).

d) Monitoring of reproductive characteristics

We collected and histologically analysed reproductive organs of 87 females and 158 males to determine reproductive status. Results showed that testicles of male bears start to be active in their third year of life (Annex C5-24_Technical_FR). We used age-at-death and genetic data (see paragraph b) to estimate age- and sex-specific reproductive success of bears (Annex C5-13_Deliverable_FR). Reproductive success varies considerably by age and sex of the bear. Results were used for population dynamics modelling (paragraph g) and to help parameterize the population modelling system (Action C.9).

e) Monitoring of health status of brown bears

In Slovenia, we collected and examined samples of 99 bears. We performed 99 necropsies, 495 parasitological, 59 microbiological, 6 mycological, 168 molecular and 392 histopathological examinations. In Croatia we collected and examined samples of 338 dead bears. We performed 338 necropsies and parasitological analyses, and samples were taken for a list of virology, mycology, microbiology and fatty acids composition tests. A detailed overview is in annex C5-23_Technical_FR, a scientific paper (Vranković et al.) is in annex C5-19_Technical_FR.

f) Permanent monitoring of damages done by bears and signs of bear presence

This data has been collected in all participating countries and assembled in yearly Population Status Reports (Annexes C5-1 and C5-2_Deliverable_MR1, C5-8_Deliverable_MR2, C5-14_Deliverable_FR and C5-20_Deliverable_FR). We co-authored a scientific paper with some of the results (Bautista et al., annex C5-19_Technical_FR).

g) Cost-benefit analysis and optimization of monitoring methods

We developed a mathematical model for reconstruction of population dynamics to understand past population dynamics and enable model-based estimates of population size in the years between genetic samplings (Annex C5-13_Deliverable_FR). We implemented it as an easy-to-use Internet-based tool (action C.9). We submitted a manuscript to a scientific journal (Annex C5-21_Deliverable_FR). We did a comprehensive cost-benefit analysis where the relative strengths and weaknesses of different approaches were evaluated, and suggestions for long-term monitoring provided (Annex C5-15_Deliverable_FR). We wrote a manuscript for publication in an expert journal (Annex C5-22_Deliverable_FR). Transboundary monitoring was discussed in an international expert forum in a two-day moderated workshop (annex C5-16_Technical_FR). The results of the workshop were used to draft Guidelines for transboundary harmonization of brown bear population monitoring (Annex C5-17_Deliverable_FR) which will be used in the future to harmonize monitoring at the population level.

h) Coordination, harmonization and data sharing

The data is being included in the Monitoring Geo-Database (Action C.8), which is becoming the backbone of data sharing. Coordination, data sharing between countries/regions and interpretation is also done through direct communication / data sharing between experts and summarized in the yearly Population Status Reports. A decision was made to continue with collaboration in monitoring after completion of the project through forming of the DINALP BEAR international expert group. A founding meeting has been scheduled.

DELIVERABLE	Action	Expected	Progress	Annex
Yearly report about population status at the level of all participating countries - 2014/15	C5	01.06.2015	Completed 2015	C5-1_Deliverable_MR1
Yearly report about population status at the level of all participating countries - 2015/16	C5	01.06.2016	Completed 2016	C5-2_Deliverable_MR1
Yearly report about population status at the level of all participating countries - 2016/17	C5	01.06.2017	Completed 2017	C5-8_Deliverable_MR2

DELIVERABLE	Action	Expected	Progress	Annex
1 report – genetic mark-recapture estimate of census population size and effective population size of brown bears in northern Dinaric Mountains and south-eastern Alps	C5	01.09.2017	Completed 2018	C5-9_Deliverable_MR2
1 report about population size reconstruction for the years between high-precision genetic estimates and precision/accuracy of population size interpolation using non-genetic methods.	C5	01.03.2018	Completed 2018	C5-13_Deliverable_FR
Yearly report about population status at the level of all participating countries - 2017/18	C5	01.06.2018	Completed 2018	C5-14_Deliverable_FR
1 report about utility of bear counts on counting sites for monitoring of the dynamics of relative brown bear abundance, fecundity and proportion of females with cubs.	C5	15.12.2018	Completed 2018	C5-12_Deliverable_FR
1 report - cost benefit analysis of different monitoring approaches and guidelines for optimized transboundary monitoring of brown bears in northern Dinaric Mts. and south-eastern Alps	C5	01.02.2019	Completed 2019	C5-15_Deliverable_FR
Genetic monitoring of brown bear population expansion from Dinaric Mountains into Eastern Alps	C5	01.03.2019	Completed 2019	C5-18_Deliverable_FR
Guidelines for harmonization of brown bear population monitoring (produced following the international workshop)	C5	01.06.2019	Completed 2019	C5-17_Deliverable_FR
Yearly report about population status at the level of all participating countries - 2018/19	C5	01.06.2019	Completed 2019	C5-20_Deliverable_FR

MILESTONE	Action	Expected	Progress	Annex
Genetic mark-recapture estimate of census population size and effective population size of brown bears in northern Dinaric Mountains and south-eastern Alps	C5	01.09.2017	Completed 2018	C5-9_Deliverable_MR2
Cost benefit analysis of different monitoring approaches and guidelines for optimized transboundary monitoring of brown bears in northern Dinaric Mts. and south-eastern Alps	C5	01.02.2019	Completed 2019	C5-15_Deliverable_FR
Guidelines for transboundary harmonization of brown bear population monitoring (produced following the international workshop)	C5	01.07.2019	Completed 2019	C5-17_Deliverable_FR

EXPECTED RESULTS	Action	Achieved results	Annex
1 workshop report – transboundary harmonization of brown bear population monitoring	C5	Completed.	C5-16_Technical_FR
1 report –genetic mark-recapture estimate of census population size and effective population size of brown bears in northern Dinaric Mountains and south-eastern Alps	C5	Goals were considerably exceeded. A replication (funded from national budgets) is planned for 2022.	C5-9_Deliverable_MR2
1 report about utility of bear counts on counting sites for monitoring of the dynamics of relative brown bear abundance, fecundity and proportion of females with cubs.	C5	Completed.	C5-12_Deliverable_FR
At least 100 bear counting sites established in Croatia.	C5	Completed.	C5-12_Deliverable_FR, C5-6_Technical_MR1, C5-10_Technical_MR2
1 report and 1 article in a scientific journal about population size reconstruction for the years between high-precision genetic estimates and precision/accuracy of population size interpolation using non-genetic methods.	C5	Mostly achieved. The activity was great success, modelling approach is being integrated in practical population management. The scientific paper has been submitted to a scientific journal, but not yet published.	C5-13_Deliverable_FR, C5-21_Deliverable_FR
At least 1.000 entries in the monitoring database (Action C8)	C5	Considerably exceeded. For instance, 5382 genetic samples are inserted into MBase.	N/A
At least 400 bears genetically tagged (with known genotypes and later recognizable)	C5	Considerably exceeded, altogether 1136 bears were tagged only in the intensive sampling 2015.	C5-9_Deliverable_MR2
At least 500 people participating in the intensive sampling effort	C5	We estimate that over 2500 were actively participating. 962 different people sent back collected samples.	C5-9_Deliverable_MR2
At least 80 non-invasive genetic samples, at least 60 genotypes, collected at the population expansion front towards the west.	C5	Within the expansion zone we collected and analysed 302 samples, and genetically identified 68 individuals.	C5-18_Deliverable_FR
1 report – Genetic monitoring of brown bear population expansion from Dinaric Mountains into Eastern Alps.	C5	Completed.	C5-18_Deliverable_FR

EXPECTED RESULTS	Action	Achieved results	Annex
1 report and 1 article in a scientific journal – cost benefit analysis of different monitoring approaches and guidelines for optimized transboundary monitoring of brown bears in northern Dinaric Mts. and south-eastern Alps.	C5	Partially achieved. The report was completed and used in drafting the population level monitoring guidelines (Annex C5-17). The topic proved less suitable for a scientific publication and an expert article has been drafted (pending publication). However, this is compensated by considerable other direct and indirect scientific output from action C5 (9 original scientific papers in journals with impact factor, 1 book chapter).	C5-15_Deliverable_FR, C5-22_Deliverable_FR, C5-19_Technical_FR
Yearly reports (4) about population status at the level of all participating countries.	C5	Five reports have been produced. They were a complete success and have for the first time compiled the recent status of the population at the transboundary level in an easily approachable format. We have agreed to keep producing them also after the project completion.	C5-1_Deliverable_MR1, C5-2_Deliverable_MR1, C5-8_Deliverable_MR2, C5-14_Deliverable_FR, C5-20_Deliverable_FR

Action C.6: Implementation and promotion of the non-consumptive use of brown bears

The overall goal of this action was to enhance the acceptance of bears in local communities through development of responsible bear related tourism activities and bear-friendly label. First we investigated potential interest for non-consumptive use of bears among foreign tourists interested in Slovenia and hunting organizations. Expert meetings were held to develop Guidelines for responsible non-consumptive use of bears in SL, HR and EN (Annexes C6-3 to C6-5_Deliverable_MR1). Guidelines were presented at educational seminars for tourist guides and hunters in SI and in HR (Annexes C6-6 to C6-10_Technical_MR1). Bear Friendly T-shirts (Annex C6-11_Technical_MR1) were produced for participants.

Field trips and meetings were held with hunting and local tourism organizations to develop 3 different modules of bear related ecotourism trips: (1) bear watching; (2) bear trail, and (3) coexistence were held: 15 in SI and 6 in HR. Meetings with tourism experts were held to develop concrete tourism packages and web portal Discover Dinarics. The portal allows booking of best practice bear related tourism programs, offered by tourism agencies, which cooperate with different hunting organizations that follow the guidelines for responsible bear tourism. Additionally, tourism agencies promoted on Discover Dinarics portal agreed to allocate part of the tourism funds to nature conservation non-governmental organizations (Annexes C6-38_Technical_MR2, C6-63_Technical_FR) in 2018 and for the additional purchases of bear-proof garbage bins in 2019. 16100 leaflets and 22000 information cards in SL, HR, EN, FR, IT, DE promoting ecotourism trips were produced. A thematic study tour for foreign journalists and travel agents was organized (Annex C6-46 and 47_Technical_MR2) and the Discover Dinarics portal was promoted in Bradt Travel Guide (Annex C6-45_Technical_MR2). We have also prepared bear maps to promote responsible ecotourism and appropriate behaviour in the bear area among tourists (Annex C6-52_Technical_FR).

Bear friendly label that promotes human-bear coexistence was designed (Annex C6-20_Technical_MR1), boards of experts for awarding the label were established in SI and HR and online application forms (Annex C6-21 to 23_Technical_MR1) prepared. We've produced 1000 leaflets to promote the use of the label in SL (Annex C6-12_Deliverable_MR1) and HR (Annex C6-13_Deliverable_MR1). The label was awarded to more than 70 applicants: goo.gl/5sPBuQ. To label their products, 77530 bear friendly stickers and miniature leaflets were produced (Annex C6-40_Deliverable_MR2). To promote bear friendly products among consumers, 10000 leaflets in SL and HR (Annex C6-41_Deliverable_MR2) were prepared. Bear friendly label and responsible ecotourism trips were also promoted on 4 agriculture/food and tourism fairs, within different meetings, field trips and events (Annex C6-62_Technical_FR). Because the bear friendly label was very well accepted among locals, we have additionally organized workshop with label users and a marketing agency to develop a marketing strategy and further operational steps for sustainable use of the label in the future (Annexes C6-60 and C6-61_Technical_FR).

In addition to activities planned to promote responsible ecotourism and bear friendly label, we have produced: 5000 copies of leaflet How to behave in the bear area (Annexes E1-50 and E1-51_Technical_MR2) for tourists; 2 roll up posters (Annex E1-78_Technical_MR2) and 5 info boards (Annex C6-50_Technical_FR) presenting the portal and bear friendly label; stamps for bear friendly clay products (Annex C6-51_Technical_FR); 10000 additional leaflets promoting buying bear friendly products among consumers, upgraded with the information about all three large carnivores (SL/ENG version: Annex C6-53_Deliverable_FR, HR/ENG version: Annex C6-54_Deliverable_FR); and 10000 leaflets about rules and guidelines for bear watching tourism in SL, HR and EN (Annex C6-55 to 57_Technical_FR). Where possible we've helped bear friendly ambassadors to integrate bear friendly label into their own product labels (Annex C6-49_Technical_FR) to ensure sustainable use of the label after the project ends.

Throughout the project, we have cooperated with the Ministry of environment and spatial planning in preparation of the legal regulation of bear watching activities. Based on field experience and expert consultation workshop, we have prepared proposals for the regulation of bear watching activities for the Ministry (Annex F2-136_Deliverable_FR).

DELIVERABLE	Action	Expected	Progress	Annex
Guidelines for responsible brown bear based ecotourism	C6	01.07.2015	Completed 2016	C6-3 to C6-5_Deliverable_MR1
Leaflets promoting the bear friendly farming and honey label produced	C6	1.10.2015	Completed 2015	C6-12 and C6-13_Deliverable_MR1
Stickers and miniature leaflets of “bear friendly honey/farming” label	C6	01.06.2016	Completed 2016	C6-20_Deliverable_MR1, C6-40_Deliverable_MR2
Leaflets and info cards promoting ecotourism trips produced	C6	01.03.2017	Completed 2017	C6-42, C6-43, C6-44_Deliverable_MR2
Leaflets promoting buying “bear friendly honey/farming” labelled products	C6	01.05.2017	Completed 2017	C6-41_Deliverable_MR2, C6-53 and C6-54_Deliverable_FR

MILESTONE	Action	Expected	Progress	Annex
2 educational seminars for the tour guides carried out	C6	1.11.2015	Completed 2016	C6-6 to C6-10_Technical_MR1
2 modules for ecotourism trips developed	C6	1.12.2016	Completed 2016	C6-14 to C6-19_Technical_MR1 C6-32 to C6-37_Technical_MR2
Web-portal set up	C6	01.04.2017	Completed 2017	C6-14 to C6-19_Technical_MR1 C6-32 to C6-37_Technical_MR2
Thematic study tour for tourism journalists	C6	01.05.2017	Completed 2017	C6-46, C6-47_Technical_MR2

EXPECTED RESULTS	Action	Achieved results	Annex
Guidelines for responsible brown bear based ecotourism in English, Slovenian and Croatian.	C6	Completed. Moreover, Ministry of Environment and spatial planning used the guidelines in the process of preparing the legal regulation of bear watching activities.	C6-3 to C6-5_Deliverable_MR1
At least 2 educational seminars for the tour guides carried out (one in Croatia and one in Slovenia).	C6	Completed	C6-6 to C6-10_Technical_MR1
At least 2 modules for ecotourism trips involving bears developed.	C6	Completed and exceeded - 3 modules for ecotourism trips involving bears were developed.	C6-14 to C6-19_Technical_MR1 C6-32 to C6-37_Technical_MR2

EXPECTED RESULTS	Action	Achieved results	Annex
At least 10 hunting organizations start offering bear- related ecotourism trips.	C6	On the portal Discover Dinarics (www.discoverdinarics.org) we promote different tour operators who offer responsible bear tourism programs and follow guidelines produced within the project. These tour operators cooperate with different hunting organizations (at least 10) in Slovenia and Croatia.	N/A
Web-portal experience.bears.si (or similar name) for promotion and booking of bear related trips set up.	C6	Completed, web portal www.discoverdinarics.org was set up, it presents programs offered by different tour operators that follow the guidelines for responsible bear watching, direct inquiries can be made on the portal. Part of the portal is also a bear friendly map, enabling users to find bear friendly products in their proximity.	C6-14 to C6-19_Technical_MR1 C6-32 to C6-37_Technical_MR2
10.000 leaflets in Slovenian, Croatian, English, French, German and Italian languages printed and distributed.	C6	Completed, exceeded: 16.100 leaflets were printed and distributed.	C6-42_Deliverable_MR2
20.000 info cards in Slovenian, Croatian, English, French, German and Italian languages printed and distributed.	C6	Completed, exceeded: 22.000 info cards were printed and distributed.	C6-43 and C6-44_Deliverable_MR2
Project “bear friendly honey” and “bear friendly farming” signs developed.	C6	Completed	C6-20_Deliverable_MR1
1.000 leaflets in Croatian and Slovenian promoting the use of “bear friendly honey/farming” sign printed and distributed among farmers.	C6	Completed	C6-12 and C6-13_Deliverable_MR1
10.000 leaflets in Croatian and Slovenian promoting buying “bear friendly honey/farming” signed products printed and distributed among consumers.	C6	Completed, exceeded: 20.000 leaflets promoting buying bear friendly products were printed and distributed.	C6-41_Deliverable_MR2, C6-53 and C6-54_Deliverable_FR

EXPECTED RESULTS	Action	Achieved results	Annex
20 000 stickers and miniature leaflets of “bear friendly honey/farming” sign in Croatian and Slovenian printed and distributed to farmers that are part of the projects programme for prevention of human-bear conflicts to be placed on the farmers’ produce.	C6	Completed, exceeded: 77530 bear friendly stickers and miniature leaflets were produced	C6-40_Deliverable_MR2
1 thematic study tour for journalists organized.	C6	Completed	C6-46, C6-47_Technical_MR2
Participation at minimum of 2 fairs of agriculture and food industry.	C6	Completed, exceeded: we participated in 4 agriculture/food and tourism fairs.	C6-48_Technical_MR2, C6-58_Technical_FR

Action C.7: Supplemental feeding of bears with carrion

Year-round artificial feeding of brown bears has a longstanding tradition in Slovenia. The main feed types used were maize and carrion, until 2004 when feeding livestock carrion was banned. This was accompanied by strong public concern, due to the general belief that carrion is more attractive to bears, therefore more effective for diverting bears from settlements. The main goal of this action was to evaluate the efficacy of feeding bears carrion to reduce human-bear conflicts. Within the action A5, we selected 22 existing feeding sites inside bear core area in Slovenia while taking into account the availability of wildlife carrion (mostly from red and roe deer; Annex A5-1 and A5-2_Deliverable_MR1) to conduct a 2 yearlong controlled feeding experiment (C.7, main results published in *Annex D1-4_Deliverable_FR: Feeding site use and food type preference of brown bears in Slovenia*). In the years 2016 and 2017, in cooperation with hunting clubs, we supplied feeding sites interchangeably with maize and wildlife carrion such as roadkill and game offal, to test the assumption that bears prefer carrion. Simultaneously, camera traps were set up to record bear presence at feeding sites 24/7/365. A total number of ≈ 240.000 images have been recorded, and every third (totally 77427) image was analysed, which included 14168 images of bears visiting the feeding sites and ≈ 60.000 images of 24 other species of mammals and birds (additionally published in Annex C7-1_Technical_FR). Moreover, we tested whether bear counts derived from camera trap data were comparable to traditional count data from high stands, which have been performed three times a year since 2004 (brown bear monitoring on permanent counting sites). To safely store the large amount of data collected and make it available for analysis, we purchased an external data server with 10 TB of capacity – this additional equipment was bought from the savings in equipment in the action C1.

Bear presence tended to be higher at carrion feeding sites (2.02% of time with bear presence) than maize feeding sites (1.51% of time with bear presence). All feeding sites were used more in the year 2017 (1.90% of time with bear presence) when compared to the year 2016 (1.59% of time with bear presence). The informative interaction between the food type carrion and the year 2017 suggests that a major part of this effect results from the higher use of carrion feeding sites during the year 2017, a year with poor natural food availability. Females with cubs behaved similarly to other bears and used carrion feeding sites increasingly in 2017. In general, feeding site use was highest during the summer months and peaked between 9 pm and 10 pm on a daily basis. Cohen’s kappa values for comparing camera trapping data and count data from high stands indicate a moderate agreement between the datasets. In 2017, natural foods were scarce, and this may have triggered the higher use of carrion feeding sites during this year.

Artificial feeding remains controversial and should only be practised when its desirable effects prevail, which include diverting bears from human settlements, monitoring and baiting for hunting, in the frame of adaptive management approach. Carrion plays an important role in food webs and we suggest we provide wildlife carrion when it is readily available and can be transported to feeding sites without considerable effort. Bears may profit from this particularly during years when natural food sources are scarce, perhaps also resulting in decreased conflicts with humans.

EXPECTED RESULTS	Action	Achieved results	Annex
20 existing feeding sites supplied with carrion from wild ungulates for one year; through other actions this will also enable us preparation of management guidelines and acquisition of video footage for demonstrative and educational purposes.	C7	Completed and overachieved; 22 feeding sites supplied	N/A
Local hunting managers involved in supplemental feeding with wild ungulate carrion and acquainted with importance of carrion for bears and other scavengers.	C7	Completed – members of local hunting clubs participated in the activities	N/A

Action C.8: Internet-based population-level monitoring geo-database

An internet-based monitoring geo-database at the transboundary level (MBase portal) has been developed in this action (Annex C8-34_Deliverable_FR MbaseManual). Web page domain and online access is <https://portal.mbase.org/>. Its server is situated at the premises of project coordinator (SFS).

Technical realization of the geo-database and associated data-entering modules was entrusted to external assistance through a first public tender, where Geodetic Institute of Slovenia (GIS) was selected. Development of the geo-database concept was coordinated through a series of meetings between GIS and Slovenia forest service (SFS) and/or Biotechnical faculty. However, we were faced with bugs and disadvantages in the programming code throughout the period (both, after the testing phase and the first trial release), and fixing them was extremely costly in terms of invested time and finances. Namely, the external assistance could not guarantee the stability of program and continuity of the programming staff (the developing project grew more and more complicated, causing unforeseen obstacles in the stability of the product), which caused delays in the developing and reparation phases. We cancelled the contract with the initial programming company and, through a second public tender, another company was chosen (Mastersoft d.o.o). We were then able to proceed with a more consistently appointed staff in repairing bugs and updating the whole portal as one entity. Being aware that such widely based portal of international dimensions is a lively thing, very flexible and continuously in need of administrative supervision and adjustments, our aim was adjusting the program to a degree where its functionality would be self-driven and self-maintaining as much as possible.

In addition, the portal has been substantially modified in the last year in order to make it more user-friendly and functional for administrators of all data modules and to enable data-entering by a wider group of users. Some of the “dead-ends” in the previous programming code were substituted with other functionalities.

Despite some delays in terms of widespread promotion of the database due to extensive database reparations, all foreseen tasks in this action have now been carried out successfully. Altogether, almost 200.000 data entries were uploaded to the MBase portal by the end of the project. Data derive from all four project countries and cover the time period from 1981 to 2019. The majority of data entries covers the last decade. Specifically, at the end of the project there were: 10.407 data points on damages, caused by bears on human property; 909 data points on interventions, when people in distress due to bears called intervention group for help; 2.154 data points on bear removal (mortality and live-capture); 5.382 data points on collected genetic samples, which were analysed in the laboratory; and 174.054 geographical locations of live-captured bears that were equipped with VHF- or GPS-telemetric radio-collars. In addition, there were 3.207 successfully genotyped bear genetic samples inserted into the portal, with 1.133 unique animals identified. At the end of the project there were 1471 user accounts created on the MBase; out of this, 464 users were using the portal more or less regularly. In this regard, the foreseen metric “accessed at least 1000 times” is redundant, as the database measures a separate access each time that it has to refresh the query (or pressing a button), which in terms of database access can mean also a 1000 times per minute/hour (or day). This metric, thus, has no direct connection to users’ metric. The visual interface of the data filtering mask is illustrated in Annex C8-5 (Annex C8-33_Technical_MR2).

The MBase portal is now a platform for fast uploading of both past and most recent data. Data exchange between institutions and countries is easily applicable and the interactive portal enables quick filtering according to users’ needs. The portal represents a main vehicle for transboundary collection and dissemination of all bear-related biological and management data. Non-partner institutions use the MBase, as well, which is a promising sign for long-term functioning of the portal. In Slovenia, Environmental agency is responsible for dealing with damage compensations for damage cases caused by protected wildlife. They expressed their interest in our geo-database, and, through a

series of meetings (Annex C8-26 to C8-28_Technical_MR1), we discussed details of their access to the geo-database through user accounts.

Personal accounts and different user roles enable high levels of security and user management (for example, an article gallery was created for easy and controlled access and is interactively presented for different user roles: Annex C8-36_Technical_FR UserInterface). Further on, project partners signed a “Data Sharing agreement” (Annex C8-38_Technical_FR), where we, among others, agreed on Terms of Use (public can view/access the data, but must ask for permission, if desiring to use it), defined data ownership (each contributor remains the owner of the data), and envisioned transferability of such data exchange to other countries, projects, management models or species. Each data entry has its own Licence, agreed by all partners. Data contributing institutions or management authorities can view geo-referenced data precisely, while general public browses through “grid data” (i.e., data are visualised, for instance, in 4, 9 or 25-m2 quadrants). The MBase portal demonstrates an effective solution for paving the way towards transboundary cooperation in order to improve the management of a large carnivore. It will also serve as a good example of transferability to management of other protected species.

In cooperation with Action C.5, two sub-pages of the geo-database for presenting collected genetic samples of brown bears were set up in the first part of the project. Setting up those two pages contributed significantly to effectively carrying out the field work of the non-invasive genetic sampling of brown bears in Slovenia and Croatia in 2015. The most important role of both sub-pages was to provide instant feedback to volunteers collecting genetic samples and, consequently, increase success of sample collection within Action C.5. Moreover, the MBase is a repository for a strictly controlled access to software for simulations for bear population dynamics modelling within Action C.9. MBase portal thus proved as an irreplaceable environment and a fully compatible starting point for easy development of additional functionalities and software.

Tablet computers bought within the project were regularly used for application development by the project and SFS personnel. The educational seminar on how to use the MBase portal and tablet computers was carried out (Annex C8-37_Technical_FR). Tablet computers are currently in regular use by SFS personnel.

Ten SFS field inspectors received tablet computers in order to enter data during their daily field tasks directly into the portal (an example: Annex C8-35_Deliverable_FR MobileManual) through mobile applications (Annex C8-25_Technical_MR1 Tablet Computer). More SFS field inspectors will receive tablet computers in the next period; 20 additional tablets were already purchased with national funds, thus directly transferring the project output, as the national system recognised a benefit of this practice. The final aim is that SFS transfer its entire system of collecting field data through paper forms to electronic entering of field checks directly into MBase, which means a direct sustainable legacy of the project efforts. The number of data entries is growing daily, and the MBase portal will continue to be supplied with data entries after the project concludes.

DELIVERABLE	Action	Expected	Progress	Annex
Working Internet-based population-level monitoring geo-database	C8	31.05.2015	Issued 2015, Completed 2019	C8-34_Deliverable_FR, accessible online
Mobile software for accessing the database	C8	31.05.2016	Issued 2016, Completed 2019	C8-35_Deliverable_FR, accessible on tablet computers

MILESTONE	Action	Expected	Progress	Annex
Internet-based population-level monitoring geo-database online and operational	C8	25.05.2015	Issued 2015, Completed 2019	C8-34_Deliverable_FR; accessible online

EXPECTED RESULTS	Action	Achieved results	Annex
Developed Transboundary Monitoring Geo-Database software.	C8	Completed. Now easily transferred to other wildlife species, institutions and conservation challenges.	C8-34_Deliverable_FR; accessible online
Operational Transboundary Monitoring Geo-Database accessible to managers, researchers and general public with different levels of data access.	C8	Achieved. Data access is controlled through different view grids, articles in the gallery, roles and permissions.	(N/A) online access
At least 50 registered users.	C8	Exceeded; 1471 user accounts, 464 users more or less regular	N/A
At least 1.000 genotype data points entered.	C8	Exceeded; 3207 genotyped bear samples	N/A
At least 1000 bear damage data points entered.	C8	Exceeded; 10407 data points	N/A
At least 300 bear mortality data points entered.	C8	Exceeded; 2154 data points	N/A
At least 5000 GPS telemetry points entered.	C8	Exceeded; 174054 data points	N/A
Database accessed at least 1000 times.	C8	N/A (*Database measures a separate access each time that it has to refresh the query, which can mean a 1000 clicks per minute, hour or day...)	N/A
At least 10 damage inspectors on SFS equipped with tablet computer.	C8	Achieved.	C8-37_Technical_FR
Educational seminar how to use the portal and tablet computer for SFS damage inspectors carried out.	C8	Completed.	C8-37_Technical_FR

Action C.9: Brown bear population size and management scenario modelling system

We produced an Internet-based bear population size and management scenario modelling system available to managers and researchers (report, Annex C9-2_Deliverable_FR). As the mathematical “back-end” model, we used the population dynamics model developed within C.5 (annex C5-13_Deliverable_FR). We then programmed a population simulation system, which will be updated yearly after the project ends with new empirical data (recorded bear mortality, new population dynamics data etc.). For the user interface front-end, we programmed an Internet-based application that produces model-based estimations of bear population size in periods between genetic-based estimates. Even more importantly, it allows managers to test different bear mortality scenarios according to weight classes of bears, separately for Slovenia and Croatia (simulating actual management decisions). The simulation system then produces predictions of future population dynamics based on the proposed management. This allows managers to better understand possible outcomes of the considered management decisions (as well as their uncertainty), both within their country and at the transboundary level.

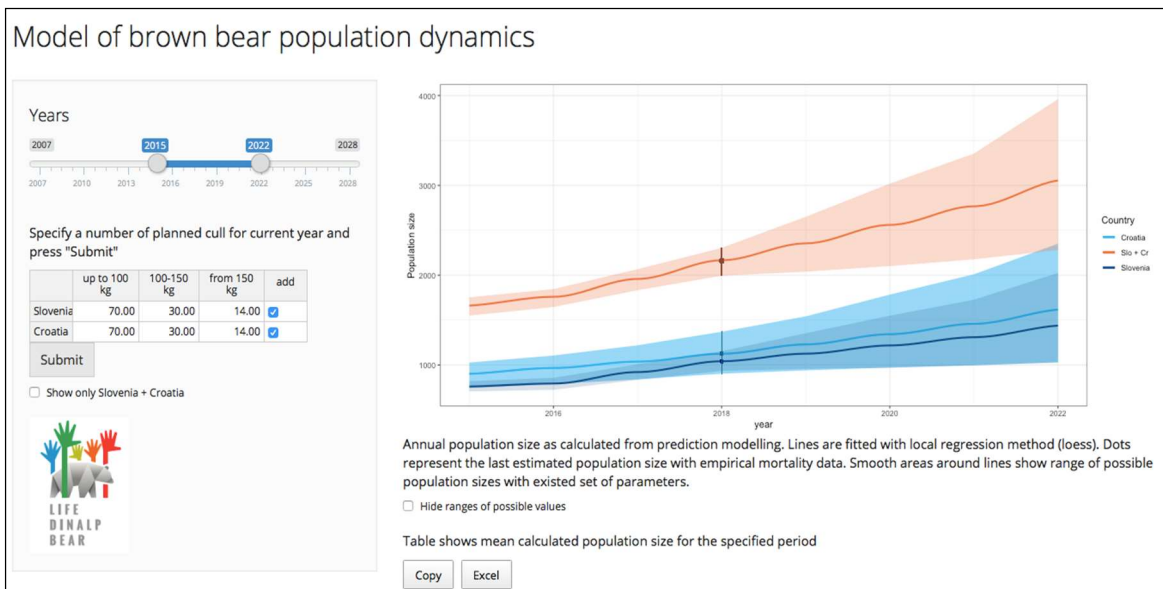


Figure 1: Internet-based population size and management scenario modelling system, web user interface.

The application (deliverable), along with a friendly user manual (Annex C9-1_Deliverable_FR), is available through the geo-monitoring database (portal.mbase.org). Since modelling results are easily misunderstood and misinterpreted, particularly for a difficult-to-manage species like the brown bear, its use is restricted to managers and researchers that have applied for access. Since it is the first tool of its kind that we’re aware of, the application has considerable demonstration value. The approach can be transferred to other species and/or populations, it improves transboundary cooperation in bear management, and promotes conservation and sustainability in management of our brown bear population.

DELIVERABLE	Action	Expected	Progress	Annex
1 report describing the brown bear management scenario modelling system software.	C9	10.10.2018	Completed 2019	C9-2_Deliverable_FR
1 user manual for the brown bear management scenario modelling system software	C9	10.10.2018	Completed 2019	C9-1_Deliverable_FR
Brown bear population size and management scenario modelling system software	C9	10.10.2018	Completed 2019	C9-2_Deliverable_FR, accessible online with password

MILESTONE	Action	Expected	Progress	Annex
Brown bear population size and management scenario modelling system software operational	C9	10.10.2018	Completed 2019	C9-2_Deliverable_FR, accessible online with password

EXPECTED RESULTS	Action	Achieved results	Annex
Developed brown bear population size and management scenario modelling system software, integrated into the project web page.	C9	Completed. The population simulation modelling system is completed and available to managers and researchers. As far as we know it's the first such easily-accessible system developed and has considerable demonstration and transferability value. It is agreed that it will continue to be updated with new knowledge and data after the project concludes.	C9-2_Deliverable_FR, accessible online with password
1 user manual for the brown bear management scenario modelling system software.	C9	Completed	C9-1_Deliverable_FR
1 report describing the brown bear management scenario modelling system software.	C9	Completed	C9-2_Deliverable_FR
Brown bear management scenario modelling system software used in production of at least one yearly brown bear management plan in Slovenia and Croatia.	C9	Modelling system developed within the project and underlying the software was used for the management plan for Slovenia for 2019 and is included in the document.	N/A

Action C.10: Establishment of two intervention groups

The action's goal to establish two Bear Intervention Groups (BIG), one in Croatia, and one in Italy. For Croatia, we planned to establish a BIG which is specialized for intervention on highway Rijeka–Zagreb to avoid accidents involving bears. In Italy the establishment of BIG was planned for Regione Veneto, the only Italian project area where BIG was not already formally established and active.

1. BIG in Croatia (responsible beneficiary ARZ):

Croatian Emergency Response Team for highway Rijeka - Zagreb (HBIG - Bear Intervention team for Highway Rijeka – Zagreb) was established by ARZ management decision on 21st October 2015 and it is comprised of nine members (Annex C10-2_Technical_MR1). The protocol for its work has been produced (Annex C10-1_Technical_MR1) according to the original schedule and is prepared for Emergency Team intervention actions. The preparations of the emergency team also included training of its members and road workers. The members of the intervention team are equipped with protective clothes and other equipment (binoculars, night vision monocular, pickup car etc.) that is used for monitoring and interventions on the motorway.

During an intervention, members of the intervention group are required to comply with the applicable legislation of the Republic of Croatia and the Protocol for the Intervention Group for the brown bear on the Rijeka-Zagreb. In case of appearance of the bear in the area of motorway sections A1, A6 and A7 managed by Autocesta Rijeka - Zagreb d.d. (sections from Zagreb to Rijeka and from Rijeka to Rupa), the operator in the traffic control centre should immediately call the two nearest members of the Intervention Response Group and Coordinator by the phone, in accordance with the protocol for handling intervention group to bear on Highway Rijeka – Zagreb.

The Department for Gamekeeping and Environmental Protection from Karlovac University of Applied Sciences (VUKA) was contracted for external assistance for C10 action (Expert for training of highway emergency team and Local expert's assistance for bear issues related to interventions of Highway emergency team). In collaboration with Croatian Project members (experts from VEF [Faculty of Veterinary Medicine, Zagreb] and ARZ), they conducted training of highway road-men and patrol officers and intervention team members on 9th July 2015 and 8th June 2016 (Annex C10-14_Technical_FR). Experts from Karlovac University of Applied Sciences also assisted in preparing the Protocol with guidelines and procedures that assure legality and adequacy of any undertaken action. Permanent employees and engaged local experts by VUKA are members of the intervention team along with those from ARZ or Highway maintenance company (HACONC).

The Emergency Response Team for highway Rijeka - Zagreb had its first intervention on 5th November 2015, when the bear was wandering on the motorway area inside the wire fence. After trying unsuccessfully to expel the bear from the fenced area of the motorway, it was decided to eliminate the bear, and that was carried out successfully (Annex C10-3_Technical_MR1, report from intervention). No future interventions were needed due to successful implementation of all measures in action C4.

As requested by the Commission in the 2nd letter, the protocol has been updated. The possibility for tranquilizing bears has been added.

Since there was no bear occurrence on Rijeka – Zagreb motorway, there was no need for intervention by HBIG of Croatia in the period from 6th November 2015 to the project's conclusion in 2019. In 2017, the members of the HBIG collaborated in the bear monitoring in vicinity of the motorway. The training and refresher course for HBIG members were held on 22nd of May 2018 and on 17th June 2019 (Annex C10-15_Technical_FR) by experts from Karlovac University of Applied Sciences, department for nature protection (VUKA). The same experts prepared the report: Study of wildlife roadkill on Rijeka – Zagreb motorway for period from 2016 till 2019 (Annex C10-16_Technical_FR).

2. BIG in Veneto (responsible beneficiary RVEN):

There were administrative and political issues in Veneto during 2015, so this part of the milestone was postponed to January 2016 according to the new schedule proposed during the coordination meeting held in Ljubljana on 10 December 2015. The Bear Emergency Team (“Squadra Intervento Orso del Veneto”) was officially established by approving Decree nr. 2 of 26.01.2016 (Annex C10-6_Technical_MR1): with this act, the regional Operative Protocol for Bear Emergency Team in Veneto, approved by resolution of the regional council nr. 2236 of 03.12.2013 in the frame of the C4 action of previous LIFE project “Arctos” (LIFE 09 NAT/IT/000160 “Arctos”) and of the national bear Action Plan for Central-East Alps (PACOBACE) became operative; in the Decree, the personnel from national Forest Service (Corpo Forestale dello Stato – CFS, now Carabinieri Forestale) and Provincial Policies (CPP) of Belluno, Treviso, Verona and Vicenza is nominated and authorized to participate in the training courses organized in the C10 action.

The first training course was held in Paluzza (UD) from 4 to 8 April 2016, based on a detailed three-day program including theory, field practice, a final exam, and certificate issuance. The course was attended by a total of 70 people, including BIG members of Friuli Venezia Giulia Region, Lombardy Region and of Autonomous Province of Trento (Annex C10-8_Technical_MR1; official photo of the course group: Annex C10-11_Technical_MR1).

As the presence of bears in Veneto from 2016 onwards was extremely low and sporadic, as documented in the Annual Population Status reports, the Veneto BIG did not carry out any interventions during the duration of the project. The BIG staff has however actively collaborated, both in 2017 and in 2018, in the distribution and verification of preventive measures purchased in the frame of C2 action, and in the monitoring of large carnivores and assessment of damage cases (caused mostly by wolves, which are thriving throughout the Region from 2016 onwards).

The goal of the action - fully operational intervention team with all the equipment - was fully achieved by the end of the Project, with the completion of the training and equipment of the Veneto BIG:

- The second 4-day training course was divided into two parts: the first part, held on 9 and 10 May 2019, respectively in Montecchio Maggiore (VI) for staff from Vicenza and Verona, and Cesiomaggiore (BL) for staff from Belluno and Treviso, on the assessment of damages with the involvement of the veterinarians of the Regional Health Service (Annex C10-17_Technical_FR: the program; Annex C10-18_Technical_FR: signature sheets); the second part, held in Longarone (BL) on 18 and 19 June for the whole Team, focused on capture and monitoring techniques, with practical exercises with the equipment provided for the BIT (Annex C10-19_Technical_FR: the program; Annex C10-20_Technical_FR: signature sheets; Annex C10-21_Technical_FR final group photo);
- The equipment for the BIG was completed with the purchase, on the basis of suggestions and models provided by the Trento BIG, of the equipment necessary and not yet available for capture of bears and management of emergency situations: tube trap fully equipped; Aldrich’s snares modified according to the "Trento" model; radio trap alarms and equipment for handling bears, as well as supply of rubber bullets for deterrence. The equipment was purchased before the training course in Longarone, which was mostly dedicated to the use of this equipment (Annex C10-22_Technical_FR exercise with the tube trap).

Members of the Veneto BIG participated in various training meetings in the frame of Action E2 (Kuterevo CRO, Casteller TN, Masun SLO), and stand in constant contact with the other Italian BIGs, in particular from Trento and Friuli, from whose greater experience they can improve their own preparation.

Although the current low presence of bears in Veneto has made it unnecessary to implement concrete interventions during the Project, the Veneto BIG, in accordance with the C10 action's goal, is now fully trained and equipped to handle emergency situations and any problematic bears that should appear from now on (which obviously cannot be foreseen). Periodic exercises will be organized to keep the training up to date, at least once a year, possibly in collaboration with other Italian BIGs. The Veneto BIG staff also continues to guarantee the monitoring of large carnivores and the assessment of damages.

MILESTONE	Action	Expected	Progress	Annex
Established emergency team in Veneto and Croatia (highways).	C10	1.12.2015	Achieved in October 2015 (Croatia) and January 2016 (Italy, Veneto)	HBIG: C10-1 and 2_Technical_MR1 VBIG: C10-4 and C10-5_Technical_MR1

EXPECTED RESULTS	Action	Achieved results	Annex
Establishment of BBET with two subdivisions in the region Veneto (Italy). Well-trained, operational Brown bear emergency teams established in Veneto region ready for rapid response, equipped with specific equipment (tube traps, tranquilizer rifles, radio collars, veterinary material, etc.).	C10	Completed	C10-6_Technical_MR1, C10-14_Technical_FR
Organization of training courses (2 courses of 4 days) for provincial and CFS officials of Veneto (40 participants) in Tolmezzo.	C10	Exceeded: 1° training course attended by 70 people, 2° training course attended by 133 (first part) and 40 (second part) people	C10-7 and 8_Technical_MR1 C10-17 to C10-21_Technical_FR
Established, trained and technically well-equipped (nets for wildlife, night vision monocular, binoculars, protective equipment and consumables...) Highway brown bear emergency team in Croatia.	C10	Completed	C10-1 and 2_Technical_MR1
Organization of training courses for highway emergency response team (four training courses in four years).	C10	Completed.	C10-14_Technical_FR C10-15_Technical_FR

Action D.1: Monitoring of bears exhibiting conflict behaviour and effectiveness of mitigation measures in conflict hot-spot areas

The purpose of the action was to monitor the effectiveness of mitigation measures in conflict hot-spot areas and bears exhibiting conflict behaviour. Key deliverables of this action were 3 in-depth analyses.

Within the first analysis we studied the efficiency of conflict mitigation measures with suggestions for improvements and prepared an assessment of transmission of conflict behaviour from mother bear to offspring (annex D1-2_Deliverable_FR). In the report we analysed habitat selection, conflict behaviour, use of anthropogenic food sources for bears living in conflict hot-spots. Fieldwork in the preparatory phase has been carried out in Slovenia. We checked 125 points visited by bears equipped with radio collars. Additionally, we checked 65 points randomly selected within bear's home range in the past 14-21 days but not visited by bears and 9 day-beds used by bears - there we collected bear faeces. Altogether we have visited 199 points for the analyses of bear habitat selection. We collected 150 bear's faeces that have already been analysed and used in one finished Master's theses and one Bachelor's theses in its final stages. All results are presented in the final report.

The second report (Annex D1-3_Deliverable_FR) summarizes the activities carried out by the Settore Grandi Carnivori – Servizio Foreste e Fauna of the Provincia Autonoma di Trento. Within it we described and analysed the presence of problem bears within the population. We also outlined the verification, efficiency and usefulness of the prevention works system activated by the Autonomous Province of Trento for damage reduction and conflict mitigation. We compared four different quality standards with camera traps (bad fence conditions and no electricity, good fence conditions but no or very low electricity, bad fence conditions but enough electricity, good fence conditions and appropriate electricity). The recorded videos show a functional prevention work and the behaviour of bears when approaching electric fences (even females with cubs). Videos are currently used to show to breeders and beekeepers how works may provide good prevention standards and how, at the same time, the fence can be easily crossed if missing appropriate maintenance.

The third report (Annex D1-4_Deliverable_FR) covers feeding site use and food type preference of brown bears in Slovenia. Analysed data was gathered within the action C7. Important finding of this report is the fact that the bears in some years prefer food from animal origin. Part of the data has been used in an internship report of a Bachelor student, focusing on the visitation of target and non-target vertebrate species at the monitored feeding sites. Additionally, the results of the report were upgraded and published as a scientific paper in the European Journal of Wildlife Research. Another paper was prepared on the food preference on feeding sites and is in the process of revision. Another part of the data was used for a Master's thesis, focusing on the social avoidance between female bears with cubs and dominant males, which is still in progress.

For the purpose of analysis described in the reports bears were equipped with radio collars. Overall, 25 bears (21 different) mostly problem bears have been captured and equipped with GPS/GSM collars. We collected over 69,345 localizations. The annex D1-1_Technical_FR (table accessible on <https://docs.google.com/spreadsheets/d/1qLUxMB094Hev9I7UDRUakkuXfhlqg2zxBDfExBYxQhA/edit#gid=0>) summarizes main information on bear equipped with GPS collars. Various data showing causes of human-bear conflicts (e.g. types of anthropogenic food that attracts bears to the human settlements) has been gathered. The data was used in communication mainly to show the importance of implementation of nonlethal measures for conflict mitigation. New captures are planned in PAT for next years to get the information needed for the management decisions – they refurbished the collars and bought some new ones to be prepared for situations when monitoring is of utmost importance.

The team of PLI has been involved in capture attempts in the north-eastern Friuli region since the beginning of LIFE DINALP BEAR project. Two collars have been refurbished but unfortunately no

bear was caught so far. Capture of bears in this region was replaced with capturing bears in other parts of the project area.

DELIVERABLE	Action	Expected	Progress	Annex
1 report on effectiveness of supplemental feeding with carrion in comparison with feeding only with corn and fruits.	D1	01.07.2018	Completed 2018	D1-4_Deliverable_FR
1 report on habitat selection, conflict behaviour, use of anthropogenic food sources for bears living in conflict hot-spots	D1	30.06.2019	Completed 2019	D1-2_Deliverable_FR
1 report on effectiveness of conflict mitigation measures with suggestions for improvements and an assessment of transmission of conflict behaviour from mother bear to offspring.	D1	30.06.2019	Completed 2019	D1-3_Deliverable_FR

EXPECTED RESULTS	Action	Achieved results	Annex
At least 22 bears equipped with GPS collars and monitored up to one year, including two potentially problem bears equipped with GPS collars with video camera.	D1	Completed. We captured more bears that we aimed for, but in Veneto and FVG regions we were not able to catch promised 4 bears due to low number of present bears and some administrative obstacles.	D1-1_Technical_FR
1 report on habitat selection, conflict behaviour, use of anthropogenic food sources for bears living in conflict hot-spots.	D1	Completed.	D1-2_Deliverable_FR
1 report on efficiency of conflict mitigation measures with suggestions for improvements and an assessment of transmission of conflict behaviour from mother bear to offspring.	D1	Completed.	D1-3_Deliverable_FR
1 report on effectiveness of supplemental feeding with carrion in comparison with feeding only with corn and fruits.	D1	Completed.	D1-4_Deliverable_FR
At least 100 entries of genetic data at conflict sites and at least 50,000 locations of GPS-tracked bears entered in Geo-portal.	D1	Completed.	(N/A) online access (C8)
Various material (telemetry data, genetic data, results from bear diet analysis, video footage etc.) showing causes of human-bear conflicts (e.g. types of anthropogenic food that attracts bears to the human settlements) and effectiveness of non-lethal conflict mitigation measures available for educational campaigns in E actions.	D1	Completed.	Used in different project publications, presentations, etc.

Action D.2: Evaluation (monitoring) of the effectiveness of mitigation measures implemented to prevent traffic related bear mortality

A) The effectiveness of implemented mitigation measures on roads in Slovenia (ERICo)

We made some modifications to this action. We did not buy one round o'clock video surveillance systems, since they are less effective than photo-traps. We improved the action and bought photo-traps. These allowed us to have a longer surveillance period, since the batteries are long-lasting and the disk was filled only with pictures when an event occurred (animals or people trigger the sensor). We prolonged surveillance time in second monitoring from foreseen three weeks to several months.

First, video surveillance in Slovenia was done on two road sections at Jasnica and Ortnek before acoustic deterrents and dynamic signalisation were set up in autumn 2015. We managed to record different wildlife, including brown bear. Afterwards, the first yearly report on the effectiveness of deterrents and dynamic signage was prepared (Annex D2-2_Deliverable_MR1). The second video surveillance started on 17th March 2016 and lasted until the 12th September 2016. It was again set on two road sections at Jasnica and Ortnek near Kočevje. This time we also managed to record different wildlife, including brown bear. All material of both video surveillance was thoroughly checked and only pictures with wildlife were selected and saved. Additionally, to see the effectiveness of the dynamic signage, the speed of the cars approaching the dynamic signs was regularly monitored and saved (both on time when the signs are ON and on time when signs are OFF). At the end of the year, a new report was prepared (Annex: D2-7_Deliverable_MR2). In third year, video surveillance conducted from April 4 until August 8 2017. At the same time, the speed of vehicles which pass activated/inactivated dynamic signs was monitored. The observed reduction of vehicle speeds confirmed the positive impact of activated dynamic signs on drivers' behaviour. Afterwards, the report regarding effectiveness of mitigation measures was prepared (Annex: D2-8_Deliverable_MR2). The next video surveillances started on March 2016 and August 2017 (Annex: D2-9_Deliverable_MR2).

Again, in the year 2018, we continued to monitor the animal presence near the dynamic traffic sign sensors. This year we focused on the third location, Turjak. The filming period lasted from 23rd March to 5th May 2018 and from 14th June to 30th July 2018. With the IR camera traps, we recorded large numbers of individuals of different wildlife species in the direct vicinity of the road section where the third dynamic traffic sign was placed. Unfortunately, they did some timberwork at the filming location. Therefore, we recorder only a few animals in the second filming period. The following wildlife species were observed/recorded at Turjak in 2018: brown bear, roe deer, wild boar, red fox, European badger, marten, European hare and squirrel (Annex D2-10_Deliverable_FR). At the same time the speed of vehicles, which pass activated/inactivated dynamic signs was monitored on the third location, Turjak. At the end of July, the report regarding effectiveness of mitigation measures was prepared (Annex: D2-11_Deliverable_FR). In the year 2019, we continued to monitor the animal presence near the sensors of dynamic traffic signs. IR camera traps were placed at Turjak and Jasnica near sensors in the two-month period from 4th April to 2th May 2019 and from 11th June to 2nd July 2019. The following wildlife species were observed/recorded: brown bear, red deer, roe deer, red fox, European hare and squirrel (Annex: D2-12_Deliverable_FR). Afterwards, the final report regarding effectiveness of mitigation measures was prepared (Annex: D2-13_Deliverable_FR). We determined that at all locations (Jasnica, Ortnek and Turjak) speed of vehicles passing the active dynamic signs was significantly lower in comparison with average speed of vehicles passing the inactive dynamic signs. The reduction of speed was app. 8 km/h. The observed reduction of speed of vehicles in years 2016-2019 confirms the positive impact of activated dynamic signs on drivers' behaviour.

B) The effectiveness of implemented mitigation measures on highways in Croatia

In Croatia, five brown bears were captured near highway A6 in May and June 2015 and they were equipped with GPS telemetry collars – one of them took the collar off after a few days so the tracking

was done for four bears (Annex D2-3_Technical_MR1). Movements of these bears were monitored as published in the first project bulletin. A poster on the bear movement across the highways was prepared for the 24th International conference on bear research and management in Alaska in June 2016 (Annex D2-5_Technical_MR1 and Annex D2-6_Technical_MR1). GPS telemetry data, obtained from four male bears captured and equipped with radio-collars, showed that during 167 bears crossed the highway 69 times in total from the period between May 20th to November 3rd. Monitoring with cameras was done in three different periods: 1.) In September/October 2015 and in April 2016 there were four cameras set-up for photo- and two for video surveillance by Zagreb–Rijeka motorway to capture bears next to the electric fence. There were no bears captured on these spots, so the cameras were removed after four weeks on the field. 2.) It was decided to set up cameras in the woods near the motorway at locations where it was expected that bears would be captured by cameras. From July to the end of August 2016, three cameras were set-up in the area Vrata/Fužine and three cameras in the area Vrbovsko/Bosiljevo. There were a number of bears on the photos from both locations, and some of them probably were the ones that were previously collared, which was estimated by their appearance. 3.) In July 2017 all four cameras for photo and two for video surveillance were set-up along the highway covering one jump out ramp and wildlife crossing over highway. The cameras remained in the positions until April 2019, with periodical checks of photos captured and batteries changed. All together several thousand photos have been taken and more than five hours of video, of which only small number capture wildlife. To conclude: since the beginning of the Project a number of bears have been captured by several cameras in the woods near motorway and one was captured on the camera on the wildlife crossing over the highway, and no bears have been captured near the electric fence placed along the highway. It was concluded that bears do use the available objects as crossing structures and that the enforcement of the fence could prevent the remaining unwanted situations of bears on the high-speed highway. The work was done by ARZ and FVM.

DELIVERABLE	Action	Expected	Progress	Annex
Yearly report on the effectiveness of deterrents and dynamic signage (1)	D2	31.12.2015	Completed 2015	D2-2_Deliverable_MR1
Yearly report on the effectiveness of deterrents and dynamic signage (2)	D2	31.12.2016	Completed 2016	D2-7_Deliverable_MR2
Yearly report on the effectiveness of deterrents and dynamic signage (3)	D2	31.07.2017	Completed 2017	D2-8_Deliverable_MR2
Yearly report on the effectiveness of deterrents and dynamic signage (4)	D2	31.07.2018	Completed 2018	D2-11_Deliverable_FR
Picture and film material for the web site and brochures	D2	30.05.2019	Completed 2019	D2-1_Deliverable_MR1, D2-9_Deliverable_MR2, D2-10_Deliverable_FR, D2-12_Deliverable_FR
2 Reports for Slovenia and for Croatia of the effectiveness of implemented countermeasures (statistics)	D2	30.06.2019	Completed 2019	For Slo: D2-13_Deliverable_FR For Cro: D2-16_Deliverable_FR
Report on the brown bear movement across or over the highway Rijeka-Zagreb	D2	30.06.2019	Completed	D2-14_Deliverable_FR
Report on the effectiveness of electric fence, jump-out ramps and exit doors	D2	30.06.2019	Completed 2019	D2-15_Deliverable_FR

MILESTONE	Action	Expected	Progress	Annex
Final report on the effectiveness of implemented countermeasures	D2	30.06.2019	Completed 2019	For Slo: D2-13_Deliverable_FR For Cro: D2-16_Deliverable_FR

EXPECTED RESULTS	Action	Achieved results	Annex
4 Reports on the effectiveness of implemented measures on state roads in Slovenia (results of the filming).	D2	Completed.	D2-2_Deliverable_MR1 D2-7_Deliverable_MR2 D2-8_Deliverable_MR2 D2-11_Deliverable_FR
2 Reports on the effectiveness of the jump-out ramps, exit doors and electric fence and influence of the later on the behaviour of both bears and drivers (results of the filming).	D2	Completed.	D2-15_Deliverable_FR
1 Report on brown bear movement around or over the highway Rijeka - Zagreb with the evaluation of the effectiveness of the implemented measures - the confirmation and demonstration of the best practice method.	D2	Completed	D2-14_Deliverable_FR
2 Final reports (one for Slovenia and one Croatia) of the effectiveness (confirmation) of implemented measures as appropriate countermeasures for reducing traffic-related mortality of brown bear on state roads, railways and highways, respectively – the confirmation and demonstration of the best practice method.	D2	Completed.	For Slo: D2-13_Deliverable_FR For Cro: D2-16_Deliverable_FR

Action D.3: Project visibility and public acceptance of bears and bear management

The purpose of this action is to evaluate project dissemination and public awareness results. Implementation of the action was planned for beginning of 2018, however we believed it was more productive and helpful to carry out content analysis of the media articles throughout the duration of the project – as they are published. Therefore, we started with this part of the action at the beginning of the project. We have prepared Guidelines for media clipping monitoring to carry out this activity in coordination with countries (Annex D3-1_Technical_MR1 Guidelines for media clipping). Additionally, we have prepared an excel form and agreed on the methodology for implementation of the media content analysis. During the project we have recorded and evaluated 3702 media pieces (Annex D3-2_Technical_FR: updated Media clipping and content analysis database), which is significantly more than the planned 60 clips. Content analysis of the collected media clips show that the project was mentioned in approx. 10 % of media clips. On average media portrayed the project in a positive way and media pieces that mentioned the project have consistently portrayed bears in a more positive way than overall, suggesting that the project was being presented as a solution-provider by the local media.

A quantitative attitude survey was implemented in the final year of the project. In total we have analysed 2297 completed questionnaires (planned 2000). The results show that public support for bear conservation remained high, although the tolerance for human-bear conflicts has decreased in the Alpine region (Italy, Slovenian Alps) which can be explained by the increased number of bears in those areas. A press release was prepared and issued to disseminate the preliminary results of the survey.

In addition to media content analysis planned in the project, we used the opportunity to work with a student Borut Kokalj at the UL. He completed his thesis (Annex D3-3_Technical_MR2, thesis) by analysing 804 Slovenian media articles on bears and found that after the introduction of genetic molecular methods for estimating population size, population size and culling of bears stopped being the main topic. The media interest has shifted attention to human-bear conflicts. He also found that the negative reporting about bears was considerably more present during local elections campaigns.

Annex D3-2_Technical_FR:

<https://docs.google.com/spreadsheets/d/18i3tbgPqEIS6rTC39ktmrBZ3mmr7b4EWkhvdepG7jic/edit?ts=5d9b4f13#gid=0>

DELIVERABLE	Action	Expected	Progress	Annex
Final report of the action	D3	01.06.2019	Completed 9/2019	D3-4_Deliverable_FR

EXPECTED RESULTS	Action	Achieved results	Annex
Documented change in public tolerance of bears and interpreted with regards to the effectiveness of the project activities.	D3	Completed.	D3-4_Deliverable_FR
Quantitative public attitude survey carried out using the same methods as in the beginning of the project.	D3	Completed with a larger sample than planned (planned 2000, obtained 2297).	D3-4_Deliverable_FR
Content analysis of at least 60 newspaper articles carried out.	D3	Completed and far exceeded. We've collected and analysed 3702 media clips instead of planned 60.	D3-2_Technical_FR, D3-4_Deliverable_FR
Report produced.	D3	Completed.	D3-4_Deliverable_FR

5.2 Dissemination Actions

5.2.1 Objectives

The project's dissemination plan includes two main objectives:

1. Dissemination of human-bear coexistence and best practice examples of human-bear conflict mitigation activities from the project results.
2. Dissemination through education and information of key target groups (hunters, damage inspectors, farmers, teachers, workers in tourism) to raise awareness about bear value and conservation to ensure long-term coexistence.

Dissemination of coexistence and best practice examples is being implemented through different activities and outputs: 1) events (meetings, lectures, seminars, workshops, photography contest and exhibition); 2) publications (leaflets, brochures, posters, etc.); 3) promotional and educational material (fleece jackets, caps and other promotional materials, didactic educational kits, interactive terminals – info points etc.); and 4) working/communicating with/through media (popular articles, press releases, interviews, TV broadcasts, documentary clips, web-pages, social media).

Deliverables (publications, info-boards, info-points, etc.) were distributed and used during project meetings, presentations, lectures, networking and other events. All deliverables carry LIFE, Natura 2000 and project logo. Websites, FB, and Twitter profiles are fully functioning, and all deliverables, reports and other outputs are available to wider audience in Slovenian, Italian, Croatian, German and English language.

5.2.2 Dissemination: overview per activity

List of deliverables per action:

E1	Project fleece jackets, wool caps and stickers
E1	Leaflets How to behave in bear areas (Leaflet 1)
E1	Yearly bulletin (1 st issue)
E1	Yearly bulletin (2 nd issue)
E1	Yearly bulletin (3 rd issue)
E1	Yearly bulletin (4 th issue)
E1	Yearly bulletin (5 th issue)
E1	Leaflets Anthropogenic food sources and bears (Leaflet 2)
E1	Brochure about bears
E1	Educational posters about the project and about bears
E1	Roll-ups
E1	Bear educational kit
E1	Exhibition cards (not planned beforehand)
E1	Role-playing game Play decide (not planned beforehand)
E1	Leaflet about bear-vehicle collisions
E1	Information boards
E1	Bear footprint models
E1	Other promotional materials (pens, pencils etc.)
E1	Livestock guarding dogs handbook
E2	Practical handbook for managers how to deal with human bear conflict printed and translated to I, A, CRO and SLO
E2	Fieldguide for investigating damages
E3	11 indoor and outdoor info stands (5 in Slovenia and 6 in Croatia) installed and interactive terminals with special software set up

E4	15 photographs purchased for dissemination materials
E6	Layman's report

The overview of all activities and outputs is presented in the Table: Summary of the dissemination plan.

Table: Summary of the dissemination plan.

Action	Activity /Output	Responsible beneficiary	Deadline	Plan	Done / Implemented	Implementation status	Reactions
E1	Project visual identity	UL	30/6/2019	Development of PVI	Developed	Done	Used regularly in project activities
E1	Project fleece jackets, wool caps, stickers	UL	1/12/2014	780 fleece jackets, 500 wool caps, 10.000 stickers, other gadgets	Done + 56 softshells for project group with LIFE and Natura 2000 logos	Done	Distributed among project team, external collaborators, hunters, volunteers, farmers, scouts
E1	Leaflet 1 – How to behave in bear areas	SFS	1/2/2015	18.000	Printed 34.000 copies SLO: 7000+6000 CRO: 7000 ITA: 2000+3000 GER: 2000+2000 +5000 ENG	Done	Being distributed to libraries, municipalities, tourist offices, national parks, etc.
E1	Bulletin 1	SFS	15/11/2015	3200	3200 (800 in 4 languages)	Done	Distributed to target groups, libraries and interest. individuals
E1	Leaflet 2 – Prevention of bear access to anthropogenic food sources	SFS	1/3/2016	18.000	18.000 + 1000 extra ENG	Done	Being distributed to local communities, municipalities, libraries, etc.
E1	Brochure about bears	SFS	31/3/2016	12.000	12.000 + 2000 extra SLO + 1000 ENG	Done	Being distributed among libraries, museums, project area municipalities, national parks etc.
E1	Bulletin 2	SFS	15/11/2016	3200	3200 (800 in 4 languages)	Done	Distributed to target groups, libraries and interest. individuals
E1	Educational posters about project and about bears	UL	31/1/2017	2000	2000 (in SLO; CRO and ENG in 6 different versions) + extra 3000 SLO + 20 CRO	Done	Being distributed within project events, networking, etc.
E1	Photography competition – award ceremony	UL	30/5/2017	Competition + ceremony set up in 6 localities (SLO, CRO, AUT)	Competition + ceremony + exhibition 10 locations	Done	34 authors from EU participated in the contest, ceremony visited by 64 invitees, exhibition seen by 25.000 visitors.

Action	Activity /Output	Responsible beneficiary	Deadline	Plan	Done / Implemented	Implementation status	Reactions
							Exhibition replicated by ZOO Zagreb (Cro).
E1	Information boards	ARZ	1/7/2017	12 (CRO)	12 produced and installed	Done	All 12 information boards installed in town of Vrbovsko and along Rijeka – Zagreb highway
E1	Leaflet 3 – Prevention of bear-vehicle collisions	ERICo	1/7/2017	18.000	18.000	Done	Distributed to road managers, hunting and mountaineering clubs, on different events.
E1	Bulletin 3	SFS	15/11/2017	3200	3200	Done	Distributed to target groups, libraries and interest. Individuals.
E1	LGD breeders handbook	SFS	31/12/2017	2000	2000	Done	Being distributed to local inhabitants, owners of LGD dogs, farmers, students, schools etc./
E1	Bulletin 4	SFS	15/11/2018	3200	3200	Done	Distributed to target groups, libraries and interest. Individuals.
E1	Bulletin 5	SFS	30/6/2019	3200	3200	Done	Distributed to target groups, libraries and interest. Individuals.
E1	1 meeting with members of other LIFE projects	UL	30/6/2019	1 meeting	3-day communication workshop organized together with LIFE Lynx project, workshop proceedings prepared	Done	3-day communication workshop together with LIFE Lynx project, work, workshop proceeding sent by e-mail
E1	30 educ. bear kits for scout organizations	UL	30/6/2019	30 kits	49 bear kits prepared and 151 bear footprints produced	Done	Distributed to schools, scouting organizations, and other environmental org.
E1	Meetings with scouts and pro environmental organisations	UL	30/6/2019	Several meetings	21 meetings with scouting organizations	Done	Meetings organized together with implementation of workshops and project presentation.
E1	35 2-hours lectures for hunters	UL	30/6/2019	35 lectures	63 meetings with hunters in the project area	Done	Presentation and informing about the project, non-invasive genetic sampling and results (number of bears) for 892 hunters.

Action	Activity /Output	Responsible beneficiary	Deadline	Plan	Done / Implemented	Implementation status	Reactions
E1	23 local events of the effective non-lethal mitigation measures	UL	30/6/2019	23 events	83 events	Done	30.596 visitors of the events, fairs, presentations, etc.
E1	60 workshops for school children	UL	30/6/2019	60 workshops	77 workshops	Done	1535 school children (6-18 years old)
E1	150 x 2 different models of footprints of bear front and back foot	UL	30/6/2019	150 x 2 models	Footprints collected. 151 bear kits with a bear foot prints produced	Done	Distributed among schools, scouting organizations and other environmental org.
E1	15 short briefs about project activities and outputs	UL	30/6/2019	15 briefs	E-news mailing list, 28 e-news (briefs) sent	Done	E-mails sent to 118 subscribers on project news until and 321 subscribers to project conference IBA news (altogether 28 e-news sent)
E1	Pencils (1000 psc), pens (1000 psc) notebooks (1000 psc), folders (1000psc) and blocks (240 psc) with print	UL	30/6/2019	Pencils (1000), pens (1000) notebooks (1000), folders (1000) and blocks (240)	Pencils (1000), pens (1000) notebooks (1000), folders (1000) and blocks (240)	Done	Distributed to project members, key stakeholders and others on project events.
E1	Roll- ups	UL	30/6/2019	5 project roll ups	5 project roll-ups (2 about the project (SI, EN)), 1 about bear-friendly, 1 about Discover Dinaries and 1 about IBA conference + 1 extra about project in ITA	Done.	On all project events
E1	Exhibition cards	UL	30/5/2017	300 copies (slo/eng language)	300 copies	Done	Distributed to photography contestants and to exhibition visitors
E1	Social game Play decide	UL	28/2/2017	0 completes	9 completes	Done	Distributed to decision-makers, scouting organizations, environmental organizations, ZOO and ZRSVN personnel.
E1	Handout	UL	10/10/2017	0 copies	500 copies in SLO	Done	Distributed on different project events.
E2	Bear emergency team protocol with recommendations for actions to be undertaken in different conflict cases	SFS	1/8/2017	Implementatio n into national protocols	written and sent to national authorities/ BIGs to be implemented	Done	/
E2	Handbook for managers – How to deal with human bear conflicts	SFS	15/12/2015	1000	1140 copies	Done	Handbook distributed to damage inspectors, BIG members and other interested groups.

Action	Activity /Output	Responsible beneficiary	Deadline	Plan	Done / Implemented	Implementation status	Reactions
E2	Handbook for inspection of damage cases	SFS	30/3/2017	Updated and printed	Published in five languages (eng, slo, cro, ita, aut)	Done	We have been distributing the Handbook to damage inspectors, officials, national entities and other interested groups.
E2	Seminar for damage inspector	SFS	30/6/2019	1 seminar	3 seminars held in June 2017	Done	/
E2	Seminar for agricultural advisors	SFS	30/6/2016	1 seminar	1 seminar in 2018	Done	/
E2	2-days training camps for the Croatian, Slovenian and members of the Trento intervention team	SFS	30/6/2016	2 training camps	2 two-days training camps in Kuterevo, CRO (2018) and Mašun, SLO (2019)	Done	/
E2	One day training camps organized (members of RVEN intervention team present)	SFS	30/6/2019	3 training camps	3 training camps held (Trento 2016, 2018, Tarvisio 2017)	Done	/
E3	11 indoor and outdoor info stands (5 SLO and 6 CRO) installed and interactive terminals with software set	UL	1/7/2016	11 stands (SLO 5, CRO 6)	11 stands (SLO 5, CRO 6)	Done	SLO: 4 movable indoor info-points were placed in 4 new frequently visited locations where they will stay permanently (the same in ZOO Ljubljana) – contract and annex signed. CRO: all 6 info points will remain on first locations (frequently visited).
E4	Web-page, Facebook profile, Twitter	SFS	31/12/2014	Set up	Set up	Operative and fully functioning	WP: 65.244 users, 435.859 page views; FB: 2.172 followers; Twitter: 222 followers.
E4	15 photos for dissemination materials purchased	SFS	30/6/2019	15 photos	Photos purchased	Done	Photos included in various dissemination materials, web-site, Facebook, Twitter, etc.
E5	First press conference	SFS	2/5/2015	Organization	Press conference in Bosiljevo, CRO	Done	All key Croatian media attended the press conference
E5	Second press conference	SFS	2/5/2016	Organization	Executed in October 2016 in Slovenia	Done	Many national and local media reported the content of press conference
E5	Third press conference	SFS	2/5/2017	Organization	Executed in May 2017 in Slovenia	Done	Many national and local media reported the content of press conference

Action	Activity /Output	Responsible beneficiary	Deadline	Plan	Done / Implemented	Implementation status	Reactions
E5	Fourth press conference	SFS	2/6/2018	Organization	Executed in October 2017 in Slovenia. There was a fifth press conference organised in Slovenia in February 2019.	Done + executed an additional one	The news of both press conferences was reported nation-wide, in majority of national and local media.
E5	At least 30 press releases for media	SFS	30/6/2019	30 press releases	32 press releases issued	Done	16 in Slovenia, 8 in Italy and 8 in Croatia
E5	At least 25 popular articles on bears published in media targeting local inhabitants, hunters or/and farmers	SFS	30/6/2019	25 articles	49 popular articles published	Done	34 published in SLO, 5 in CRO, 5 in ITA, 1 in AUS and 4 in an international magazine. 11 articles for hunters, 2 for beekeepers, 4 for farmers, 16 published in local/regional magazines, 4 in damage prevention magazine, 5 in media for specialised naturalistic audience, and 7 in national or other media, (targeting wider public).
E5	Regular communication with most important media and journalists covering environmental topics	SFS	30/6/2019	Regular communication and interaction	3702 media items gathered about bears, released through internet, printed media, TV and Radio in the project area. Regularly participating in interviews or providing objective information.	Done	In 2015, we responded to misleading information about the project, published in the Slovenian magazine for livestock breeders, Drobница. We are regularly contacted by journalists for taking part in interviews, TV and radio or explanation of a current bear hot-topic / event or providing objective data and photo material.
E6	Layman's report	SFS	30/6/2019	4500 copies	1000 copies in SLO, CRO, AUS and ITA (each) and 500 copies in ENG	Done	We have been distributing the Report to different interest groups, stakeholders and people involved in project activities.

Action E.1: Public awareness raising and education campaign about bears on national and local levels

The aim of this action is to develop and implement a targeted communication campaign.

Project visual identity (PVI) (Annex E1-3 to E1-9_Technical_MR1) was developed in cooperation with the project team and graphic design company. Based on PVI different products were produced and distributed among key stakeholders, decision makers, local community representatives and other project collaborators:

- fleece jackets (Annex E1-10_Deliverable_MR1),
- caps (Annex E1-11_Deliverable_MR1),
- promotional stickers “Bear me in mind” (Annex E1-12_Deliverable_MR1),
- small gadgets (Annex E1-14_Technical_MR1, E1-134_Technical_MR2),
- softshell jackets (produced in 56 pcs and distributed among project group (Annex E1-13_Technical_MR1).

Distribution of promotional materials is available in excel (Annex E1-143_Technical_FR).

Leaflet “How to behave in bear areas” was printed in different language versions:

- EN (6.500 copies, foreseen only in el. version),
- SI (11.500 copies, foreseen 7.000 copies),
- CR (7.000 copies),
- IT (5000 copies, foreseen 2.000 copies),
- GE (4.000 copies, foreseen 2.000 copies),
- 16.000 additional copies to the foreseen quantity printed (Annexes E1-15 to E1-19_Deliverable_MR1) and distributed to different project target groups (Annex E1-143_Technical_FR).

Since a major share of the copies has been handed out, an open file version of the leaflet, agreement and instruction for reprinting (Annex E1-129_Technical_MR2) have been prepared for organizations, which are interested in printing additional copies with their own funds. Within C6 action, additional leaflets were printed with logotype Discover Dinarics (Annex E1-50 and E1-51_Technical_MR2).

Project bulletin “Life with bears” was produced in 5 issues:

- 1st issue was produced in November 2015 (Annexes E1-20 to E1-24_Deliverable_MR1).
- 2nd issue was made based on a special meeting to brainstorm the topics of the next issue (Annex E1-83_Technical_MR2), (Annex E1-52 to Annex E1-56_Deliverable_MR2).
- 3rd issue was published (Annex E1-57 to E1-61_Deliverable_MR2) and distributed as first two issues,
- Together with bulletin #4 (Annex E1-136_Deliverable_FR) and #5 (Annex E1-137_Deliverable_FR) 16.000 copies were printed and distributed to libraries, key stakeholder and on project events (Annex E1-143_Technical_FR).

Brochure about the brown bear:

- developed in English (available in el. version),
- printed in SI (5.500 copies), CR (4.000 copies), GE (2.000 copies), IT (2.000 copies) and EN (1.500 copies) (Annex E1-25 to E1-29_Deliverable_MR1) and distributed (Annex E1-143_Technical_FR).

Educational poster:

- Produced in 300 copies (dim 100 x 70 cm) in Slovenian (Annex E1-30_Technical_MR1) in 2015.
- Redesigned in 2017 (changing a poster’s photo), printed in two versions in SI, CR and EN language (Annex E1-62 to Annex E1-76_Deliverable_MR2).
- Smaller foldable posters designed in 2017 (could serve as a leaflet), three versions printed in SI, CR and EN language (Annex E1-62 to Annex E1-76_Deliverable_MR2).

Photos for both versions of posters were donated by photographic contest participants (described later). Altogether 5020 copies of posters were printed (3020 additional ones) and many were already distributed (Annex E1-143_Technical_FR). Posters contain messages how to avoid conflict with bear.

- In Italy, some hundreds of project promotion posters were printed with PAT funding (Annex E1-31_Technical_MR1).

Project roll-ups:

- designed and produced in SI and EN (Annex E1-32_Technical_MR1, E1-33_Technical_MR1),
- IT version also produced although not foreseen (Annex E1-77_Technical_MR2),
- two roll ups about bear-friendly products and Discover Dinarics (Annex E1-78_Technical_MR2) and
- one roll-up presenting 26th IBA conference (Annex E1-145_Technical_FR).

Leaflet “Anthropogenic food sources and bears”:

- Developed and printed in SI (9.000 copies), CR (5.000 copies), GE (2.000 copies), and IT (2.000 copies) language (Annexes E1-34 to E1-37_Deliverable_MR1) plus 1000 additional copies in EN (Annex E1-38_Deliverable_MR1).
- At least three meetings organized to design the concept of leaflet development (Annex E1-84 to E1-86_Technical_MR2).
- Developed with a help of schools from bear area where several bear or wolf conflicts occurred in the past: students contributed their drawings and songs (Annex F2-64_Technical_MR1). Leaflets were then distributed to different target groups (Annex E1-143_Technical_FR).

Bear educational kit (Annex E1 – 90):

- Bear footprints have been collected for development of the kit.
- 40 sets of kits were produced out of polyurethane (Annex E1-79_Technical_MR2).
- 10 soft mould sets (Annex E1-80 and E1-81_Technical_MR2) made and 103 boxes printed (Annex E1-82_Technical_MR2) in which footprints were packed.
- Educational handbook, working sheets and presentations for teachers (Annex E1-87 to E1-89_Technical_MR2) were prepared on USB key as part of the educational bear kit.
- 49 pcs of full packed kits were distributed to schools, scouting organizations and additional 102 pairs of front and back footprints were distributed within 21 events or workshops for scouting or tourism organizations (Annex E1-111_Technical_MR2) and 76 workshops for schools were organized in SI and CR (Annex E1-142_Technical_FR). We’ve received many additional requests for workshops from schools or kindergartens.
- Before implementing workshops, two meetings were organized, first among Slovenian partners and later together with Croatian (Annex E1-91 and E1-92_Technical_MR2).
- Triglav National Park (Annex E1-103_Technical_MR2) hosted two bear workshops with their visitors in order to recruit their staff in conducting workshop.

The main goal of the workshops and educational bear kit is to demonstrate to teachers and head of scouting organizations, what and how to deliver new information and knowledge to younger generations. During the project interest of learning about large carnivores and project workshops increased, therefore we continue organizing workshops within other projects (LIFE Lynx and Interreg Carnivora Dinarica).

Within cooperation with schools, we’ve surveyed (not planned within the project). Besides students’ attitudes towards and knowledge about bears also the effectiveness of the instructions has been evaluated. The results will be published in a scientific magazine. The survey results can be used for planning future activities for schools.

Play decide about large carnivore management (Annex E1-93_Technical_MR2):

- a role-playing game initially used within the project LIFE WOLFALPS, adapted and translated,
- game was played and tested by Slovenian environmental association Dinaricum (Annex E1-94_Technical_MR2), presented to and played by high school students and scouts,

- Nine copies of the game were produced was donated to organizations responsible or interested in large carnivore management (Annex E1-143_Technical_FR).

E-news:

- subscription form was placed on the project webpage (Annex E1-39_Technical_MR1), the link to this form was sent to hunters within bear genetic sampling activity and to other key target groups through direct e-mail,
- first three issues of e-news were sent to 218 subscribed e-mail contacts of institutions responsible for large carnivore management, hunters, farmers, beehive owner associations and other interested individuals until February 2016 (Annex E1-49_Technical_MR1, E1-40 and E1-41_Technical_MR1),
- later on, six of them covered news about on-going project activities, photography contest and exhibition and were sent to 351 e-mails (Annex E1-95 to Annex E1-100_Technical_MR2), average open rate of e-news is 50 %,
- two e-news (Annex E1-101 and Annex E1-102_Technical_MR2) were sent about upcoming project – IBA conference “Life with bears” to a new list of contacts – (inter)national bear experts, managers and project partners. The list consists of 97 e-mails.
- In May we’ve send a new subscription e-mail (GDPR regulations) and fortunately our contact base did not decrease significantly. Altogether, 28 e-news (Annex E1-140_Technical_FR) were sent each time to the list of contacts ranging from of 50 to 339 contacts (Annex E1-143_Technical_FR).

FINDING BEARINGS and LIVING WITH BEARS:

- photo contest organised in March 2017,
- application form, Terms and conditions and Parental consent were prepared specifically (Annex E1-107 to E1-109_Technical_MR2),
- international jury of 3 judges selected 3 winning photos (Annex E1-104_Technical_MR2),
- first prize: a gift certificate for Discover Dinarics 3-day study tour (Annex E1-105_Technical_MR2) in September 2017 and bear friendly products valued 50 EUR (Annex E1-106_Technical_MR2),
- second and the third prize: bear friendly products valued 100 EUR and 50 EUR,
- all submitted photographs were on display in the website gallery during the contest, visitors of the website were able to vote for their favourite image (in the Annex E1-104_Technical_MR2) and thus the winner of the public has been selected,
- 4 winning photos and other 30 images selected by the jury were on display as part of a travelling exhibition showcased in Slovenia and neighbouring countries.
- on May 25th 2017, Museum of Natural History Slovenia hosted the public award ceremony with presentation about bears and visitors “bear friendly” banquet; the event was promoted on the project website and invitations were sent (Annex E1-110_Technical_MR2),
- all selected authors received project’s fleece jackets, hats and special photography cards with exhibited photos and basic information about the exhibition and the project (Annex E1-130_Technical_MR2),
- exhibition with basic information about the project and importance of bear conservation (Annex E1-115_Technical_MR2) was displayed on 10 locations (invitations sent – Annex E1-112 and E1-113_Technical_MR2, E1-117 and E1-118_Technical_MR2 and exhibition photos – Annex E1-119_Technical_MR2) on the project area and was visited by at least 25,339 people.
- for additional promotion of the exhibition, promotional banners were prepared (in SI, CR, GE, EN language) (Annex E1-114_Technical_MR2) for the project website,
- Project LIFE Slovenia prepared and shared invitation (Annex E1-116_Technical_MR2) on their FB about our project and project LIFE SloWolf that joined “bear” exhibition with publications and documentary film,

- exhibition on the Ministry was visited by at least 580 unique visitors in more than two months,
- before moving exhibition to Croatia, we prepared instructions for venue selection and handling of the photographic exhibition in Slovenian and English (Annex E1-120 and E1-121_Technical_MR2),
- for the exhibition, cards with a photo author's name and title of the photos in four languages were prepared (SI, CR, AT, EN) (Annex E1-122_Technical_MR2),
- the official opening of the exhibition in Croatia was at Faculty of Veterinary Medicine (Annex E1-123_Technical_MR2).
- ZOO Zagreb made a replication of the project photo exhibition and is on display permanently (Annex E1-138_Technical_FR).
- After the end of the project, printed exhibition photos were given to local organizations that are involved in local tourism activities or are frequently visited locations in order to continue to promote coexistence with bears and the project.

Leaflet about Prevention of bear-vehicle collisions:

- produced in SI (Annex E1-124 and E1-125_Deliverable_MR2) and CR (Annex E1-126 and E1-127_Deliverable_MR2) covering basic information about the topic and specifics in each country: each national partner prepared its own leaflet (graphically similar) in national language and in English, altogether 18.000 copies which were distributed (Annex E1-143_Technical_FR).

Local events:

- organized in order to disseminate and inform key target groups about the project, its purpose and to raise awareness about human-bear coexistence,
- 86 events were implemented independently or in cooperation with other organizations such as Hunting association of Slovenia, mountaineering clubs, scout organizations, etc. for local inhabitants, students, farmers, general public, etc. (Annex E1-42_Technical_MR1, E1-48_Technical_MR1, E1-131_Technical_MR2 and E1-143_Technical_FR),
- project handout was additionally prepared in SI (Annex E1-128_Technical_MR2) in 500 copies and in CR (Annex E1-132_Technical_MR2), mostly distributed on info point official openings (Action E3).

Hunters:

- one of the most important interest groups involved in bear conservation,
- approached through project genetic sampling presentations (Action C.5) followed by discussions,
- the report (Annex E1-43_Technical_MR1) version 1.0 from 8 meetings with hunters (Annex E1-44_Technical_MR1) was prepared and updated with hunters' interest, dilemmas, disagreements and expectation,
- in Croatia, 48 project presentations and meetings were held with hunting right leaseholders (Annex E1-45_Technical_MR1) and in Italy another 7 events were organized (Annex E1-143_Technical_FR).

The LGD breeders' handbook:

- produced in SI, CR and IT language in 2000 copies (Annex E1-139_Deliverable_FR), was distributed within 26th IBA conference, workshop for LGD's breeders and owners, SFS officials and other project event visitors (Annex E1-143_Technical_FR). This deliverable had some delay (explanation was provided in Midterm report 2018).

Information boards:

- 6 were installed in the core area of the project in town of Vrbovsko (Annex E1-133_Deliverable_FR) - five small ones 1 x 1,5 m landscape and one big 1,8 x 2 m portrait,
- Remaining 6 were installed with a delay (in spring 2019) on the resting points along Rijeka – Zagreb motorway – 3 at Draganić and 3 at Ravna Gora resting points (Annex E1-144_Deliverable_FR).

Communication workshop

On 4th project year, we have organized 3-day workshop entitled “Communication in large carnivore conservation and management” in Ljubljana. The workshop was implemented together with 2-day communication workshop foreseen in LIFE Lynx project. Other (non)LIFE projects and large carnivore experts were invited to share their experience and knowledge among other participants. Two days were planned for presentations and discussions, and one day for facilitated workshop. Workshop proceedings are written in the report (Annex E1-141_Technical_FR Workshop proceedings) and were shared with participants.

DELIVERABLE	Action	Expected	Progress	Annex
Project fleece jackets, wool caps and stickers	E1	1.12.2014	Completed 2014	E1-10 to E1-12_Deliverable_IR
Leaflets about proper human behaviour in bear areas (Leaflet 1)	E1	01.02.2015	Completed 2015	E1-15 to E1-19_Deliverable_MR1
Yearly bulletin (1st issue)	E1	15.11.2015	Completed 2015	E1-20 to E1-24_Deliverable_MR1
Leaflets about prevention of bear access to anthropogenic food sources (Leaflet 2)	E1	01.03.2016	Completed 2016	E1-34 to E1-38_Deliverable_MR1
Brochure about bears	E1	31.03.2016	Completed 2016	E1-25 to E1-29_Deliverable_MR1
Yearly bulletin (2nd issue)	E1	15.11.2016	Completed 2016	E1-52 to E1-56_Deliverable_MR2
Educational posters about the project and about bears	E1	31.01.2017	Completed 2017	E1-62 to E1-76_Deliverable_MR2
Information boards	E1	01.07.2017	Completed 2019	E1-133_Deliverable_MR2, E1-144_Deliverable_FR
Leaflets on prevention of bear – vehicle collisions related bear mortality (Leaflet 3)	E1	01.07.2017	Completed 2017	E1-124 to E1-127_Deliverable_MR2
Yearly bulletin (3rd issue)	E1	15.11.2017	Completed 2017	E1-57 to E1-61_Deliverable_MR2
LGD Breeder handbook	E1	31.12.2017	Completed 2019	E1-139_Deliverable_FR
Yearly bulletin 4th issue	E1	15.11.2018	Completed 2018	E1-136_Deliverable_FR
Yearly bulletin 5th issue	E1	30.06.2019	Completed 2019	E1-137_Deliverable_FR

MILESTONE	Action	Expected	Progress	Annex
Photography competition - award ceremony	E1	30.05.2017	Completed 2017	E1-104 to E1-106_Technical_MR2

EXPECTED RESULTS	Action	Achieved results	Annex
Improved public attitudes toward bear and bear management	E1	The public support remained high, the tolerance for human-bear conflicts has decreased in the Alpine region	D3-4_Deliverable_FR

EXPECTED RESULTS	Action	Achieved results	Annex
Improved knowledge of all important interest groups about bears, bear management, ways of the human and bear coexistence and about damage preventive measures	E1	Not achieved: in Dinarics and Alpine part knowledge about bears remain the same.	D3-4_Deliverable_FR
Creation of objectively informed public which can critically assess gained information and can participate in different bear management issues	E1	Not achieved: in Dinarics and Alpine part knowledge about bears remain the same.	D3-4_Deliverable_FR
Promotion of bear value, the project and LIFE programme	E1	Exceeded: Promotion through numerous public events, workshops for schools, events for hunters, networking events, numerous media reporting - clips, etc. In average the biggest increase in public that have heard about the project was in Italy, followed by Slovenia. In Austria it remains the same, whereas in Croatia fewer people have heard about the project. For promotion of bear value - close to 90.000 products were labelled with bear-friendly label and 70 ambassadors joined the scheme bear-friendly to promote bear value and conservation.	D3-2_Technical_FR, D3-4_Deliverable_FR, E1-135_Technical_FR, F2-1_Technical_FR, bear friendly ambassadors: goo.gl/5sPBuQ
1 meeting with members of other LIFE/LIFE+ projects to share experience and knowledge about information and project material dissemination	E1	Completed.	E1-141_Technical_FR
Project visual identity developed	E1	Completed.	E1-3 to E1-9_Technical_IR
30 educational multifunction 'bear' kits for scouting organisations (Slo, Cro and Aut)	E1	Exceeded: 102 educational kits distributed to scouts	E1-79 to E1-82_Technical_MR2, E1-89, E1-90, E1-93, E1-94, E1-111_Technical_MR2
35 two-hour lectures with round-tables for hunters (all participating countries)	E1	Exceeded: 63 events for hunters implemented instead of 35 planned.	E1-43 to E1-47_Technical_MR1, E1-135_Technical_FR
23 local events of the effective non-lethal mitigation measures organized (all participating countries)	E1	Exceeded: 83 public events implemented instead of 23 planned.	E1-135_Technical_FR
Photography competition and exhibition set up on 6 different localities in Slo, Cro and Aut	E1	Exceeded: Photography contest implemented, exhibition set up on 10 different locations instead of	E1-104 to E1-123_Technical_MR2, E1-130_Technical_MR2, E1-138_Technical_FR

EXPECTED RESULTS	Action	Achieved results	Annex
		6. Produced exhibition photos donated to organizations that promote bear conservation and will be exhibited in their facilities. Photo exhibition replication was done by ZOO Zagreb to be on display permanently.	
60 workshops for school children (Slo and Cro)	E1	Exceeded: 77 workshops conducted (planned 60). Schools will use educational 'bear' kit within their regular activities - continuation of activities.	E1-87, E1-88, E1-91, E1-92_Technical_MR2, E1-142_Technical_FR
18 000 leaflets about bears, proper behaviour in bear areas and instructions in case of human-bear encounters (all participating countries)	E1	Exceeded: printed 34.000 copies of leaflet (planned 18.000), reprinted by local organizations and project partners.	E1-15 to E1-19_Deliverable_MR1, E1-50, E1-51, E1-129_Technical_MR2
18 000 leaflets about mitigation measures for prevention of traffic related bear mortality (Slo and Cro)	E1	Completed.	E1-124 to E1-127_Technical_MR2
18 000 leaflets on how to prevent bear from accessing anthropogenic food sources (all participating countries)	E1	Exceeded: additional 1000 copies printed in English (not foreseen). Leaflet developed in collaboration with primary school from the bear area.	E1-34 to E1-38_Deliverable_MR1, E1-83 to E1-86_Technical_MR2
12 000 brochures about bears (all participating countries)	E1	Exceeded: additional 3000 copies printed in Slovene and English (altogether 15.000 copies produced).	E1-25 to E1-29_Deliverable_MR1
150 x 2 different models of footprints of bear front and back foot (Slo, Cro and Aut)	E1	Completed.	E1-79 to E1-81_Technical_MR2
2 000 thematic educational posters (Slo and Cro)	E1	Exceeded: additional 3020 posters printed (altogether 5020 copies). Widely distributed to schools, scouts, hunters, touristic agencies etc.	E1-30, E1-31_Technical_MR1, E1-62 to E1-76_Deliverable_MR2
16 000 of yearly project bulletin (all participating countries)	E1	Completed.	E1-20 to E1-24_Deliverable_MR1, E1-52 to E1-61_Deliverable_MR2, E1-136_Deliverable_FR, E1-137_Deliverable_FR
780 fleece jackets, 500 wool caps, 10 000 bear stickers and other small gadgets(pencils, pens, notebooks, folders and blocks) (all participating countries)	E1	Completed.	E1-10 to E1-12_Deliverable_IR

EXPECTED RESULTS	Action	Achieved results	Annex
2 000 LGD breeder handbook (Slo, Aut and Ita)	E1	Completed.	E1-139_Deliverable_FR
12 information boards (Cro)	E1	Completed.	E1-133_Deliverable_MR2, E1-144_Deliverable_FR
15 short briefs about project activities and outputs	E1	Exceeded: 28 e-news sent (foreseen 15) to public following the project and IBA project conference delegates - approx. 340 contacts.	E1-39 to E1-41_Technical_MR1, E1-49_Technical_MR1, E1-95 to E1-102_Technical_MR2, E1-140_Technical_FR

Action E.2: Education of officials working with human-bear conflict cases

The purpose of this action was to improve the knowledge and skills of the officials working with human-bear conflicts (wildlife managers, damage inspectors, bear intervention group members); these officials are the most important source of information for local communities as they are involved in assessing and preventing human-bear conflicts, and they generally receive trust from local people.

Several working meetings and workshops for officials were organised within the project:

- In March 2015, a meeting for leading damage inspectors and members of bear intervention groups was organised,
- In June 2015, a workshop for damage inspectors and agricultural advisors was organized,
- In June 2017, a series of three seminars for local damage inspectors in Slovenia was organized, including practical presentation of various measures of protecting property from bear and other carnivores' attacks, and techniques for monitoring if/when the measures are used correctly,
- In October 2018, an international workshop with agricultural advisors was held in Slovenia, where practical knowledge about damage prevention was exchanged between different institutions/countries (Annexes E2-22 and E2-23_Technical_FR).
- In August 2015, two lectures were held (Kočevje, Mašun) for the regional Slovenian damage inspectors and bear intervention group members, where we informed them about the correct procedures of genetic sampling on the damage cases. These two events turned into annual meetings, and now lectures are being held for SFS officials in both Notranjska and Kočevska regions every August. These annual meeting are designed to inform SFS officials on the progress of ongoing project actions and provide practical training for the correct procedures of genetic sampling, damage evaluation, communication with farmers and other stakeholders etc. (Annex E2-21_Technical_FR).

The Guidelines for bear intervention groups (Annex A1-3_Deliverable_MR1) were translated to Slovenian language and adjusted to fit the national legislation and organisation of BIG (Annex E2-15_Technical_MR2). Before the implementation, the protocol was discussed with members of Slovenian BIG about possible improvements to the document. Altogether we organized 3 one-day and 2 two-days training camps for the members of the BIGs. One-day training camps were organized in Trento, ITA (2016, 2018) and Tarvisio, ITA (2017), and two-days training camps in Kuterevo, CRO (2018) and Mašun, SLO (2019) (Annexes E2-19_Technical_MR2, E2-20_Technical_MR2, E2-24 to E2-26_Technical_FR). Participants from Croatia, Slovenia, Austria, Friuli, Veneto and Trentino attended the training camps.

In 2015, an expert for human-bear conflicts, Seth Wilson, was hired to prepare a practical »Guidebook to Human-Carnivore Conflict«, which focuses on strategies and practical tips for effective communication and collaboration with communities in order to address conflicts with large carnivores. The guidebook was translated into languages of all four participating countries and printed (Annexes E2-4 to E2-8_Deliverable_MR1). In June 2016, Wilson held a meeting in Trento (Italy) to explain the main contents of his Guidebook to local field personnel involved in bear management.

In 2019 »A Field guide for Investigating Damages Caused by Carnivores« was published in five different languages (English, Slovene, Italian, Croatian, German) (Annexes E2-27 to E2-31_Deliverable_FR). The field guide focuses on correct procedures of damage inspectors when they arrive on the scene of damage they suspect is caused by carnivores.

DELIVERABLE	Action	Expected	Progress	Annex
Practical handbook for managers how to deal with human bear conflict printed	E2	15.12.2015	Completed 2016	E2-4 to E2-8_Deliverable_MR1
Handbook for inspection of damage cases printed	E2	30.03.2017	Completed 2019	E2-27 to E2-31_Deliverable_FR

EXPECTED RESULTS	Action	Achieved results	Annex
Seminar combined with field excursions for the damage inspectors carried out.	E2	Completed. The number of planned seminars was exceeded. It continues as an annual education event in Slovenia.	E2-1 to E2-3_Technical_MR1, E2-10 to E2-14_Technical_MR2, E2-21_Technical_FR
Seminar combined with field excursions for the agricultural advisors carried out.	E2	Completed. One of the seminars also had international outreach.	E2-2_Technical_MR1, E2-22_Technical_FR, E2-23_Technical_FR
2 two-days training camps for the Croatian Slovenian and members of the Trento intervention team carried out.	E2	Completed. Training camps were organised in Trentino (2016, 2018) and Tarvisio (2017).	E2-19_Technical_MR2, E2-20_Technical_FR, E2-25_Technical_FR
3 one day training camps for existing and newly established intervention group members organized.	E2	Completed. Training camps were organised in Kuterevo (2018) and Mašun (2019).	E2-24_Technical_FR, E2-26_Technical_FR
Practical handbook for managers how to deal with human bear conflict printed and translated to I, A, CRO, SLO.	E2	Completed.	E2-4 to E2-8_Deliverable_MR1
Updated handbook for damage case inspectors produced within Life SloWolf project printed and translated to I, A, CRO, SLO.	E2	Completed.	E2-27 to E2-31_Deliverable_FR

Action E.3: Info-points in human-bear conflict hot-spots

The main goal of this action is to inform and interact with local public and visitors of the bear areas with information about bears and the project. 11 interactive info-point terminals were set up in bear hot-spot areas in Slovenia and Croatia. A few meetings were organized in order to prepare technical documentation for the public procurement in Slovenia and two additional meetings were held to discuss details about software development. The exterior of the device was designed (Annex E3-3_Technical_MR1) and software developed (Annex E3-4_Technical_MR1). Content was prepared in English (Annex E3-5_Technical_MR1), Slovenian (Annex E3-6_Technical_MR1) and Croatian (Annex E3-7_Technical_MR1) and includes a wide range of bear related topics including bear biology, ecology, threats to the population and advice on how to avoid potential human-bear conflicts. It also includes information about the project. A simple game (pairs) and quiz were developed (Annex E3-8_Technical_MR1).

In Slovenia, 5 interactive info-points were set up:

- four indoor terminals (Annex E3-9_Technical_MR1) in Kočevje, Rakitna, Cerknica and Pivka,
- one outdoor terminal in Ljubljana ZOO, next to the bear enclosure, is permanently installed. At Ljubljana ZOO we organized opening event with workshops (300 visitors participated) about brown bear for ZOO visitors (Annex E3-15_Technical_MR1). The event was implemented as a part of the European Green week. A press release was prepared in cooperation with Ljubljana ZOO (Annex E3-16_Technical_MR1).

From January until April 2018, four mobile info points were moved to new locations in the bear area where they will stay permanently. These locations are highly visited and are in all Slovenian regions where bear is present - Museum of Natural History in Ljubljana (Annex E3-28_Technical_MR2, Annex E3-33_Technical_FR), Infocenter Bled in Triglav National Park (Annex E3-29_Technical_MR2, Annex E3-34_Technical_FR), bear-friendly Bearlog hostel in Kočevje (Annex E3-31_Technical_FR) and TIC Lož in Stari Trg pri Ložu (Annex E3-32_Technical_FR). We also signed an annex to the contract with ZOO Ljubljana (Annex E3-35_Technical_FR). Before the end of the project, a final check and maintenance of all five info points was completed. Organizations responsible for the info points have added some content that is connected to large carnivore or their habitats.

In Croatia info points were installed with a delay, but the opening was widely promoted and successful:

- two indoor info points are set at resting stops in Marche, Ravna Gora and INA, Vukova Gorica. Their presence enables highway travellers to acquire accurate data in a modern, amusing and simple way, and to gain further appreciation of the area and nature they are passing through,
- four indoor info points were installed with an official opening at National park Plitvička jezera, National park Sjeverni Velebit, National park Risnjak and Natural History Museum Rijeka at town of Brod na Kupa. The latter location's opening event was broadcasted on Croatian National Television (Annex E3-25_Technical_MR2). For all four info points, agreements with locations were signed.

DELIVERABLE	Action	Expected	Progress	Annex
11 indoor and outdoor info stands (5 in Slovenia and 6 in Croatia) installed and interactive terminals with special software set up	E3	01.07.2015	Completed 2016	E3-36_Deliverable_FR

EXPECTED RESULTS	Action	Achieved results	Annex
11 indoor and outdoor info stands (5 in Slovenia and 6 in Croatia) with installed interactive terminals will be set up	E3	Completed.	E3-36_Deliverable_FR
Special interactive info-point software developed	E3	Completed.	E3-4 to E3-8_Technical_MR1

Action E.4: Project website and Facebook profile

The goal of this action was to spread precise and accurate information about the project, activities, implemented measures, and project outputs through the internet by using our project webpage and social media, i.e. Facebook and Twitter. We published objective news, which accurately informs the wider public about bears, conservation and management in the project area. We also published news encouraging tolerance towards co-existence and promoting results of the project work.

The project webpage <https://dinalpbear.eu/> was set up in 2014 and is available in languages of all project beneficiaries (Slovenian, Croatian, Italian, German) and in English. News was always published in English and at least in one other language, and the news that concerned all project countries was published in all five languages. The webpage also contains all project outputs, so the visitors to the page can download all project reports, informative publications, popular articles, press releases for media, and other bear- and project related publications. The most frequently asked topics are presented on the home page in side banners, providing immediate access for viewing with no need for the viewers to search for desired content. These side banners are regularly updated and switched to meet the needs of the public searching for relevant information in a certain period.

All three media channels were constantly updated with project news, photos, links and post shares. Actually, the news was updated more frequently than foreseen: not only once per month, but at least once per week (most of the time we published two news items per week).

The web page became extremely useful when executing the international photographic contest in spring 2017 (Action E.1). We created a special sub-site with a plug-in that enabled us to smoothly organise a photographic competition: participants from all over Europe could register, submit their photos and follow the voting directly through the project web page. In addition, the plug-in enabled voting by the general public.

For more specialised topics that targeted a defined public and were aiming to deliver specialised news, we produced separate, dedicated webpages:

- Web-page <http://www.discoverdinarics.org/> in the frame of “Ecotourism” action (C.6), was created in order to promote bear-friendly practices, products and service, and to promote Guidelines for responsible bear-related ecotourism.
- Web-page <https://lifewithbears.eu/> helped with the entire organisation of the international 26th IBA conference (description of the project and countries, on-line forms for applications and submitting presentations, registering for topics and workshops, interactive programme and up-to-date registrations). Primary project web page and Twitter profile were widely promoted through it.
- Portal SAFE GRAZING (set in Slovenian <https://www.varna-pasa.si/> and English <https://www.varna-pasa.si/en/>) is a platform that gathers all necessary information about damage prevention measures in one place. It contains best-practice examples and jurisprudential frame for appropriate reactions, informs about administrative procedures that need to be undertaken when facing a damage case, describes all protected species that can cause damage on human property and much more. It was prepared especially for people looking for practical information about appropriate damage prevention concerning large carnivores, instructions on how to prevent bear habituation, and safety guidelines for encounters with bears.

By the end of the project, we had published 303 news articles on the project webpage, which means on average 5 articles per month. In the last month of the project, 2.200 persons visited our webpage, with 2.700 sessions being opened. The average session duration was 1 minute and 20 seconds in that month (Annex E4-2_Technical_FR Channel examples and page statistics).

Regarding the whole duration of the project (time period considered is from 1st January 2015 to 30th June 2019), we found: our web page was mostly visited by 30 to 120 active users daily, from 300 to 700 users weekly, and around 1.700 monthly. However, when publishing certain hot-topic-news stories, the web-page would be visited by more than 200 active users in a day, and the number reached more than 300 daily users a few times per year (a maximum of 498 users on 19th January 2017 and 397 on 3rd July 2018).

Overall, the web page was visited by 65.244 users (12,4 % of returning visitors and 87,6% of new visitors), with 98.914 sessions being opened and 435.859 page-views. On average, 4,41 pages were opened per session, with an average session duration of 2 minutes and 6 seconds. 40,9% of users came from Slovenia, 12,0% from USA, 7,9% from Italy, 7,5% from France, 4,8% from Croatia, 3,0% from Germany, following by UK, Canada, Serbia and Austria. Most of the users (52,7%) used Windows as their operational system on their computer for accessing project webpage, followed by Android with 26,6%, iOS with 12,7%, and Macintosh with 5,6%.

Our Facebook profile @dinalpbear had 2.172 followers and received 2.091 likes by the end of the project. These numbers are still growing after the end of the project. Mostly, our posts reach from 600 to 1500 people; however, the most interesting posts have reached 1.500 to 4.000 people (with a maximum of 15.028 reaches on 6th October 2017 and 10.749 reaches on 17th June 2019), receiving from 35 to 83 likes and from 18 to 59 shares. The most interesting posts were those about the genetic estimate of bear population size, livestock guarding dogs, meetings with farmers and dog breeders, livestock protection measures, bear captures for GPS-telemetry purpose, photographic exhibition, bear-proof measures, bear-friendly label, and our publications regarding ecotourism.

We published 344 tweets on project Twitter profile @DinalpBear. It is followed by 222 followers and is following 217 profiles. All posts are written in English, which is the main language used by Twitter.

Our information channels for interacting with the public will remain used also after the conclusion of the project, as we are very satisfied with the outcome. Actually, 6 news items were already published on the webpage in the summer period after the end of the project, while 14 posts were added in the same period on Facebook profile and 10 on the Twitter profile. The public recognises our channels and perceive them as a good source of up-to-date information regarding bears and conservation. Our media profiles demonstrate of an efficient means of sharing information and will be a good example of transferability to our future work, as we will continue using them for all kinds of information regarding large carnivore management and conservation.

MILESTONE	Action	Expected	Progress	Annex
Working Web Page and Facebook profile	E4	31.12.2014	Completed December 2014	N/A; online

EXPECTED RESULTS	Action	Achieved results	Annex
- Project website set up and working by the 7th month of the project and regularly updated with new information at least once per month, including a sub-site about damage prevention measures	E4	Achieved. The number of monthly updates was exceeded - on average we published 5 posts per month. We set up a separate, new web-page for damage prevention issues.	N/A; online
- Facebook profile and Twitter set up and working by the 7th month of the project and regularly updated with new information at least once per month	E4	Achieved. The number of monthly updates was exceeded - on average we published 5 posts per month.	N/A; online

Action E.5: Working with media

By pro-active cooperation with all kinds of media, we ensured objective and accurate information in media. We continuously informed the public about project activities and actively promoted our actions, implemented measures and project results, with the ultimate aim of promoting human and bear coexistence in fragmented and cultural landscapes. To achieve this, we produced press releases, organized press conferences for media, and wrote popular articles for hunting, agriculture, beekeeping, local and other magazines/journals/ newspapers.

We organised **five press conferences** (Annex E5-53_Technical_FR): 1 in Croatia (Annex E5-11_Deliverable_MR1, topic: decreasing human-bear conflicts by implementing measures for traffic mortality mitigation) and four in Slovenia. Three of these were organised by the project coordinator (Annexes E5-54 to E5-56_Deliverable_MR2), covering the topics of using bear-proof compost- bins, using garbage bins and genetic estimate of the bear population size. One was organised by University of Ljubljana (Annex E5-70_Deliverable_FR) about controversial societal issues regarding science-based brown bear management in Slovenia. All press conferences received substantial participation from all key media players and were always reported on national television and by journals and newspapers.

We issued **32 press releases** (30 foreseen). They are all listed in the Annex E5-10_Technical_FR, where direct links and content descriptions are also provided. Croatian and Italian partners issued eight press releases each, and Slovenian partners produced 16. We covered a wide range of topics in our press releases, as we aimed to inform the public on all crucial achievements of the project. We reported on: the non-consumptive use of bears in eco-tourism, dynamic signs and acoustic deterrents in traffic, info points, bear-proof compost bins, potential problems caused by technical obstacles along Slovenian-Croatian border, capturing bears for GPS-collaring, management decisions for bear population in Italy and Slovenia, collecting non-invasive genetic samples, bear population size estimate in Slovenia and Croatia, livestock guarding dogs, considering bear habitat in spatial planning decisions, public attitude surveys, and more. We thoroughly reported about press releases in Annexes E5-1 to E5-8_Technical_MR1, E5-25 to E5-29_Technical_MR1, E5-42 to E5-52_Technical_MR2. Press releases in Annexes E5-71 to E5-78_Technical_FR are new additions.

A powerful communication channel is popular articles published in national and local newspapers and journals with targeted public. We published **49 popular articles** (foreseen 25; we exceeded the planned number of publications before the MR2) in a wide variety of media outlets. Slovenian partners produced the majority of publications (36), five were published in Croatia, seven in Italy and one in Austria. We listed all popular articles thoroughly in Annex E5-9_Technical_FR. We reported articles in Annexes E5 from 15 to 24 in MR1, E5 from 30 to 39 in MR1, E5-41 in MR1, E5 from 60 to 69 in MR2, A2 from 7 to 10 in MR2. Newly documented popular articles can be found in the Annexes E5 from 79 to 92_Technical_FR.

The topics we wrote about in articles covered topics in bear biology and ecology, prevention of human-bear conflicts, project activities, bear population management and monitoring, human-bear coexistence, ecotourism, attitudes and beliefs about coexistence etc. Importantly, we addressed controversial topics that surfaced every now and then in the public and politics, thus expressing our professional opinion, clarifying information, and counteracting anecdotes spreading in the public.

Articles that targeted specific audiences include: 11 for hunters, 2 for beekeepers, 4 for farmers; 16 in local or regional magazines for wider local public, 4 in damage prevention magazine, 5 in media for specialised naturalistic audience, and 7 in national or other media, all of these targeting wider public.

Furthermore, we closely followed articles and news regarding bear and the project; our main aim was a quick reaction to mediate any misleading or biased news published by journalists. In 2015 we actually

published a “demanti” (Annexes E5 from 12 to 14 in MR1). However, we discovered a more efficient and more promising way for acquiring trust of journalists in the long-term was a direct phone call and a person-to-person dialogue with the media editor and the journalist; this was the best way to quickly decrease the frequency of non-verified or misleading information in the media. In case any doubtful, unverified or biased news was published, we established a personal contact and took our time to discuss the issue with the journalist. In this way, we reacted quickly and consequently ensured more objective covering of bear issues, which was a very important factor for creating and maintaining a positive attitude towards bear and human-bear relations. By the end of the project, we maintained regular communication with the most important media and journalists covering general and environmental topics. We were regularly contacted by journalists themselves to take part in interviews, TV-broadcasts, radio shows or public confrontations about certain hot-topic (more in the Action D3 for clipping). Due to established positive relationships, journalists contacted us for expert explanations in events linked to bears or other large carnivores. Moreover, recognised foreign journalists and film and documentary-makers (from France, Germany, Austria, Switzerland) contacted us and we hosted them several times (some examples of “print-screens” and internet links in the Annex E5-93_Technical_FR Hosting foreign documentarists & journalists) for reporting, TV broadcasts or documentary production about Slovenian bears, coexistence and management, in order to provide an example to other European countries.

Based on project experience, we demonstrated that personal contact with editors and foreign and domestic journalists is productive, positive, and efficient, and we will transfer this knowledge to our future work. Replicability of efficient practices can be seen already, as we continue cooperating with journalists after the project’s completion: we have already published two additional popular articles. One covers implemented measures for encouraging coexistence, targeting local/ rural public, and one is in an international magazine for specialised naturalistic and decision-making audience about a best practice example, how a “bear friendly” labelling promotes coexistence. Maintaining positive relationships with the media provides a best-practice transfer of knowledge and information to interested public both nationally and internationally.

MILESTONE	Action	Expected	Progress	Annex
First press conference organized	E5	02.05.2015	Completed 2015	E5-11_Deliverable_MR1
Second press conference organized	E5	02.05.2016	Completed 2016	E5-54_Deliverable_MR2
Third press conference organized	E5	02.05.2017	Completed 2017	E5-55_Deliverable_MR2
Fourth press conference organized	E5	02.06.2018	Completed 2017	E5-56_Deliverable_MR2

EXPECTED RESULTS	Action	Achieved results	Annex
At least 4 press conferences organized.	E5	Exceeded (5)	E5-11_Deliverable_MR1, E5-54_Deliverable_MR2, E5-55_Deliverable_MR2, E5-56_Deliverable_MR2, E5-70_Deliverable_FR

EXPECTED RESULTS	Action	Achieved results	Annex
At least 30 press releases produced for media.	E5	Exceeded (32)	E5-1 to E5-8_Technical_MR1, E5-25 to E5-29_Technical_MR1, E5-42_Technical_MR1, E5-43 to E5-52_Technical_MR2, E5-71 to E5-78_Technical_FR
At least 25 popular articles on bears published in media targeting local inhabitants, hunters or/and farmers.	E5	Exceeded (49)	E5-15 to E5-24_Technical_MR1, E5-30 to E5-39_Technical_MR1, E5-41_Technical_MR1, E5-60 to E5-69_Technical_MR2, A2-7 to A-10_Deliverable_MR2, E5-79 to E5-92_Technical_FR
Regular communication with most important media and journalists covering environmental topics, especially after publication of any misleading information.	E5	Achieved. We have networks of national journalist, and also networks outside the project area.	An example: E5-93_Technical_FR

Action E.6: Layman's Report

In this action we produced a report for general public which includes information about the project, its background, and our objectives to improve the coexistence with bears. Our activities and the results were presented in an approachable and easily understandable way.

Beside English, the Layman report was translated into Slovenian, Croatian, German and Italian language (Annex E6-1_Deliverable_FR). It is available in print and online, and it will be distributed by all the partners to international colleagues, media and general public after the project concludes as a final summary of our project activities.

DELIVERABLE	Action	Expected	Progress	Annex
Layman's Report	E6	30.06.2019	Completed	E6-1_Deliverable_FR

EXPECTED RESULTS	Action	Achieved results	Annex
Good knowledge of the project outputs and lessons learned among all the interested parties.	E6	Completed. All the activities, outputs and recommendations included in the descriptions of the activities.	N/A
Produced and distributed report in paper and electronic format (in Slovenian language 1.000 copies), in Croatian language 1.000 copies, in Austrian language 1.000 copies, in Italian language 1.000 copies and in English language 500 copies.	E6	Completed.	E6-1_Deliverable_FR

Action F.1: Coordination and administration of the project by the coordinator and the project steering group

The final goal of the action was a well-coordinated project with good cooperation among all the partners that will reach objectives and produce all of the expected results (including all reports) according to the deadlines.

For achieving this goal, all partnership agreements with project partners have been prepared by the coordinating beneficiary and signed. The coordinating beneficiary has organised, or gave the initiative to organise, 10 steering group meetings (out of 10 foreseen in the project). The progress of the project has been assessed during these meetings and open questions and strategic actions discussed. Project team at CB helped with advice, guidelines when needed, and communicated with the External Monitoring Team in case of open questions.

Action F.2: Networking with other LIFE and/or non-LIFE projects

The purpose of this action is exchange of knowledge and experiences to enhance the results of our project. We have started with the implementation of this action as planned. The action has been completed successfully, and the extent of networking activities has been greatly exceeded. In addition to what was carried out within other actions, our project has been presented through 111 oral presentations at different events (planned 10), and members of our project team have attended an additional 40 workshops or meetings where they actively participated in discussions. We have organized additional workshops for school children and networked with other LIFE projects on 38 different occasions. Five university theses were completed in collaboration with our project team, and collaboration has been initiated with the "Laboratoire d'Ecologie Alpine" in Grenoble, France.

Both planned **experience exchange trips** have been carried out:

- first, in June 2015, when project team members visited the Association for Biological Diversity Conservation (ACBD) in Lepsa, Romania, which coordinated the URSUSLIFE project and now coordinates the WOLFLIFE project (Annex F2-13_Technical_MR1 Report from experience exchange trip to Romania)
- the second exchange trip was carried out from 18th to 23rd of September 2017 when the project team visited the Apennines and learned more about implementation of following LIFE projects: LIFE EX-TRA, LIFE+ Praterie, LIFE+ Mirco Lupo, LIFE Arctos, LIFE Coornata, LIFE Antidoto and LIFE Pluto (Annex F2-104_Technical_MR2 Report from experience exchange trip to Italy).

In addition to the two planned trips, an additional two were carried out with previous approval by the EC or notification to the monitor of the project:

- Pyrenees bear project in May 2019, to learn from the Bear Team from the French National Hunting and Wildlife Agency "Office National de la Chasse et de la Faune Sauvage", Agency's technical unit from Regional directions (Toulouse in this case), Spanish team of the LIFE Pinos project, Generalitat de Catalunya and Conselh Generau d'Aran. The exchange trip was of great importance, especially to the PAT team, as the situation in Italy with recolonization is similar to that in France and Spain. Italian and Slovenian partners learned a lot about management and field work (Annex F2-153_Technical_FR, Annex F2-154_Technical_FR Program, report, pictures from experience exchange trip to Spain and France).
- Greek LIFE projects (LIFE PRIMED, LIFE ForOpenForests, LIFE NATURA THEMIS, LIFE AmyBear and LIFE SAFECROSSING) were also visited in May 2019 to learn about the preventive measures implemented on roads and protecting human property. The project team was summoned three times by the EC to liaison with the Greek projects dealing with similar activities regarding these preventive measures. Exchange visit to Greece provided insight into the successful implementation of measures on the roads in Kastoria and Florina in previous and active LIFE projects, the system of breeding and distribution of livestock guarding dogs in these parts of Greece, and preventive measures to keep the bears away from human settlements (Annex F2-169_Technical_FR Report from experience exchange trip to Greece).

The details on the abovementioned activities and references to further annexes can be found in the updated Annex F2-1_Technical_FR: [Networking register](#).

Thematic conference

With previous approval from the EC, we submitted a bid to host 2018 International Conference on Bear Research and Management in collaboration with the International Bear Association (Annex F2-2_Technical_MR1 IBA conference proposal) as the project's thematic conference. Following positive evaluation by the IBA council (Annex F2-3_Technical_MR1 E-mail message from the IBA president),

we proceeded with the organization. The conference was held in Ljubljana from 16th to 21st of September 2018. A conference website: www.lifewithbears.eu was prepared for the occasion (Annex F2-133_Technical_FR Screenshots). To promote the event, we collaborated with Tourism Ljubljana office to produce “Save the date” leaflet (Annex F2-86_Technical_MR2). The production was free of charge for the project and 400 copies were printed. The leaflet was distributed to the participants of the 25th International Conference on Bear Research and Management that was held in November 2017 in Quito (Ecuador). The conference in Quito was attended by our project team member with previous notification to the project monitor. In addition to distributing the leaflets, she held a presentation at the closing ceremony to further promote our event and the first meeting of the conference program committee was held there. In Ljubljana, we hosted 266 participants from 42 different countries. There were 88 oral presentations and over 90 poster presentations. Project team contributed with 14 oral presentations and organized one of the four workshops available to the conference participants (Annex F2-134_Deliverable_FR Book of abstracts). A bear-friendly market was organized for the participants to promote activities from Action C6. Travel fellowships were awarded to 17 invited speakers or participants from Balkan countries. Participants were given a promotional cotton bag, t-shirt and printed conference program and certificate of attendance (Annex F2-135_Technical_FR).

Thematic workshops

- Workshop “Value of bears and how it shapes social carrying capacity” was carried out on 29/05/2018 in Ljubljana. Workshop report (Annex F2-136_Deliverable_FR) outlines recommendations for regulating bear watching activities.
- Workshop “Using molecular genetics in brown bear conservation” was implemented on 21/09/2018, during the IBA conference. Workshop report outlines the new genetic methods and its advantages and challenges (Annex F2-137_Deliverable_FR).
- Workshops “Human-bear conflict prevention” and “Bear feeding: pros and cons” were organized as conference sessions during the IBA conference, however the reports from those were not produced.

DELIVERABLE	Action	Expected	Progress	Annex
Best practice guides (4x)	F2	01.04.2017	partly completed (2/4), 2018; two workshops were organised as conference sessions so there are no best practice guides	F2-136_Deliverable_FR (value of bears) and F2-137_Deliverable_FR (genetics)
Conference book of abstract	F2	01.04.2019	completed 9/2018	F2-134_Deliverable_FR

MILESTONE	Action	Expected	Progress	Annex
2 visits of areas and members of similar LIFE projects on bear conflict mitigation issues	F2	01.01.2016	Exceeded. Foreseen visits completed in 2017, 2 additional in 2019	F2-1_Technical_FR
Thematic conference	F2	01.04.2019	Completed and greatly exceeded as the project hosted 26th IBA conference which lasted 5 days and hosted participants from 42 different countries.	F2-133_Technical_FR, F2-134_Technical_FR, F2-135_Technical_FR

EXPECTED RESULTS	Action	Achieved results	Annex
Successful experience and knowledge exchange with other Life+ and other projects and experts working on brown bear conservation.	F2	Completed and exceeded, 4 knowledge exchange visits organised and multiple meetings/other visits	F2-1_Technical_FR, F2-13_Technical_MR1, F2-104_Technical_MR2, F2-153 and F2-154_Technical_FR, F2-169_Technical_FR
4 thematic workshops organized and four reports with best-practice guides produced.	F2	Partly completed. All four workshops were implemented. Two in an actual workshop format and reports with best practice guides were produced. Two were implemented as conference sessions and no best practice reports were produced.	F2-136_Deliverable_FR, F2-137_Deliverable_FR
1 three-day international thematic conference organized and an electronic book of abstracts produced.	F2	Completed and exceeded, as the project hosted the 26th IBA conference that lasted 5 days and hosted participants from 42 different countries.	F2-133_Technical_FR, F2-134_Technical_FR, F2-135_Technical_FR
2 visits of areas and members of similar life projects on bear conflict mitigation issues	F2	Completed and exceeded, as 4 visits were organized with previous approval from the desk officer or notification to the project monitor.	F2-1_Technical_FR, F2-13_Technical_MR1, F2-104_Technical_MR2, F2-153 and 154_Technical_FR, F2-169_Technical_FR
Attendance of at least 10 independent events to present our project results.	F2	Completed and greatly exceeded, as project team members gave presentations about the project at 111 different independent events instead of planned 10.	F2-1_Technical_FR

Annex F2-1_Technical_FR Networking register can be reached on the following link:

https://docs.google.com/spreadsheets/d/1bD_JX8vPdxmemvTPqeLUBI37owXjphietdnRCIJyQsE/edit#gid=1835318418

Action F.3: After LIFE Conservation Plan

We have produced the After LIFE Conservation plan, which aims to organize the responsibilities and activities that were started within the project and need to be continued after the project ends. The plan describes the main objectives that framed the work done within the LIFE DINALP BEAR project and set the basis of the After LIFE Conservation Plan. It presents the expected long-term effects of the project, which aim to secure population-level brown bear management and further promote human-bear coexistence. The plan defines the main activities used to tackle the threats identified in the project application and outline the direct results that show how these threats were reduced. The plan also includes an extensive evaluation of the project strengths, weaknesses, opportunities and threats, described in a SWOT matrix. The specific measures that will be used to reach the After LIFE objectives are listed and thoroughly described under three distinct chapters that also reflect the three overall goals of the project; transboundary management and monitoring, conflict mitigation and communication and coexistence promotion.

DELIVERABLE	Action	Expected	Progress	Annex
After LIFE Conservation Plan	F3	15.06.2019	Completed 2019	F3-1_Deliverable_FR

EXPECTED RESULTS	Action	Achieved results	Annex
Produced After LIFE Conservation Plan in Slovenian, Croatian, Austrian, Italian and English language in electronic format.	F3	Completed.	F3-1_Deliverable_FR

Action F.4: Independent Financial Audit

The coordinating beneficiary has chosen the external specialized auditing company in 2016 for the purpose of the audit of all financial reports to the European Commission (two mid-term reports and final report). The company chosen in a price quote procedure was KPMG Slovenija, d.o.o. (Annex 7.1-21_MR1 Contract, Annex 7.1-37_MR2 Addendum to the contract no. Z-1/2016). The funds for 3 audits were foreseen in the project because of the length of the project and the large number of partners.

Two intermediate audits were of great importance to assure the correct implementation of Common provisions, Grant Agreement and Partnership Agreements as well as national legislations. The obligatory audit of the final financial report was carried out in August and September 2019.

5.3 Evaluation of Project Implementation

In the beginning of the project, we were aware of the fact that managing large and international partnerships is a challenge. That is why we approached the international team responsibly and demonstrating a good leadership. Through open and enthusiastic approach, a very productive cooperation evolved and we are proud of it. We are sure, that a good international collaboration would have a positive effect on our common long-term efforts in conserving protected species. Not only conservation and management of brown bear in the project area, but also conservation process of other large carnivores would benefit from established international partnership. Already at this very moment, many partners that collaborated in the LIFE DINALP BEAR project joined the forces again within the LIFE Lynx project to help preserve another species.

The project was implemented as planned and in many cases the results were exceeded. In the course of the project, we held ten steering group meetings, where we carefully examined the timetable for each action, pointed out its key steps in the implementation, explained the progress and commented on social, technical, methodological, financial and moral issues that appeared in the process of action implementation. During brainstorming everybody contributed with the ideas and possibilities, until we found the right one for certain circumstances. Solution providing within the whole project group and our constant pro-activity guaranteed efficient problem-solving. In overall, we are proud of our results and positive consequences of our actions are visible within both, the local communities and the national-level decision-making institutions.

In some of the actions we experienced some delays (see actions A3, C3, A2 for detailed description). We prolonged some of the actions to get better results (A7, C1). On the other hand, one action was anticipated (D3), as we recognised the need and usefulness of the media clips content analysis.

Finally, with the aim of reaching the objectives foreseen and enforcing those actions, where we experienced huge positive impact (either social or conservational, either knowledge transfers on all levels: local communities, interest groups, field operatives, decision makers), minor budget changes were undertaken. The adjustments were not considered substantial and we carefully evaluated them in the frame of how beneficial they are for the project implementation and reaching project objectives on one hand and whether they are in line with full project financial scheme on the other hand.

5.3.1 Methodology applied

The project has been always considering, from the project proposal on, the latest up-to-date methodology and approaches. Not only have we been constantly informing ourselves about latest approaches in conservational work to contribute at the most to project results and long-term effects, but we have also established a few methodological advances ourselves (see details below). A very competent project team guaranteed the use of the most advanced technology and methodology, and successfully merged different approaches into a very effective scheme.

In overall, we consider our project a very effective one, as we exceeded majority of expectations and planned outcomes; in some of the actions, planned activities and results were greatly overachieved. In our opinion, a very favourable cost-efficiency is a consequence of many factors, including project management, vision and leadership, effective and motivated human resources, knowledge, expertise and collaboration.

A very important aspect, which we also invested into, was knowledge-exchange and knowledge-transfer, both among partner institutions and among different LIFE- and non-LIFE projects (4 networking visits outside the project area, 111 independent networking events with presentations and lectures). Learning from other best practices, considering lessons learned elsewhere, undertaking best available methodology and acquiring data from already used field methodology guaranteed efficiency

and long-term effect of our actions, and has important positive consequences on our future nature conservation work.

a)

The most complex set of methodologies was used for reaching the objective of implementing transboundary and science-based monitoring of the bear population in the project area, to support transboundary population-level management. A set of actions contributed to producing results, namely C.5, C.8, C.9, together with the support of insights of other actions (A.1, A.6, C.7, D.1). Large scale and transboundary monitoring is a very challenging issue due to national differences and traditional practices. The process of tackling (and consequently resolving) this issue took the whole project duration and proportionally demanded a great deal of project activities, but accordingly some of the most important project outputs were produced, with important long-term effects on brown bear conservation and management.

At first, we harmonised, analysed, reevaluated all the existing data in the project area to produce a common starting point for all the direct conservation measures in the field. To estimate population size (and effective population size), sex structure, distribution range, process of expansion into the Alps and other parameters we used molecular genetic tools. At first, a novel approach was acquiring and coordinating all the volunteers in the field to execute high-intensity genetic sampling simultaneously within the three-month period. A precise coordination of app. 2500 people (that collected almost 5.000 genetic samples) from two countries was needed and automatized programming procedures within the MBase portal (developed in Action C.8) helped a great deal to enter samples, communicate with volunteers and motivate them. Afterwards, cutting-edge genetic methods were used in the laboratory for genotyping. We were the first laboratory in the world to use such methodology in a real-world study. The outcomes were outstanding: next-generation sequencing ensured much higher throughput, reliability and compatibility with much lower costs. In fact, we analysed almost half the samples more than planned. Additionally, we set the standard for much more effective population-level genetic sampling in the future, as predicted in the strategic documents and common population monitoring guidelines (Actions A.6 and C.5).

Then, for the reconstruction of the population dynamics, we used the most up-to-date biologic and statistic tools. We tested conceptually contrasting methods of assessment of population dynamics and estimated their robustness and reliability. Comparison of results allowed us to evaluate the strength of violations of assumptions on estimated population dynamics and produce a robust synthetic final model. The models were also calibrated with “point” genetic estimates, three of which are available for this population up to now. At the same time, we took the opportunity of having developed such reliable models, for estimating additional population parameters, which are of a decisive value for planning future population-level management, and setting management priorities and objectives (e.g., age-specific relative natural mortality, relative fertility, age structure...). These and other population parameters were also used in Action C.9, where we again used the most up-to-date modelling tools to predict future population size under various management scenarios.

Finally, when we produced the Guidelines for transboundary monitoring of brown bears in NW Dinaric Mountains and the Alps, we based our recommendations for optimised monitoring of brown bears on the thorough cost-benefit analysis of different (existing) monitoring approaches. Among these, we analysed also the utility of systematic counting of bears on a network of permanent counting sites for monitoring of the dynamics of brown bear. This method has been also harmonised on the population-level and is now part of the routine management in Slovenia and Croatia. But not only, the outcomes of the utility analysis suggested that population dynamics parameters, derived from this method, can even allow a verification of model-derived annual population size estimates, which represents thus a direct methodological advance in this project.

Further, the monitoring database (Action C.8) has a huge transferability and replicability potential and will certainly continue to be used widely after the end of the project, which increases its cost-efficiency enormously. We will promote it widely in the frame of our future work.

All these and supporting activities, that contributed with the results, were of uttermost importance for shaping the population-level monitoring, presenting thus a direct added value of the project to conservation of this population. The efforts and costs were definitely outweighed by this long-term benefit.

b)

Within the actions that dealt with decreasing human-bear conflicts on a local level (C.1, C.2, C.3, C.4, D.1, D.2) we used the most advanced and efficient approaches available, where such knowledge already existed. Otherwise, we either tested different approaches during the project and made recommendations on the best-practice examples at the end, either we introduced certain methodology for the first time (worldwide, in the project area, or on national level). In supporting actions (A.1, A.3, A.4, D.1, D.2), we collected all the data on the international level for the first time, analysed them and produced, among others, necessary heat maps of the project area, defined hot-spots of the highest conflict rates, and delivered action plans for implementation of different mitigation measures. Afterwards (Action D.1, D.2), we collected the appropriate data and evaluated the efficiency of the used methodology with several in-depth analyses.

For example, in Action C.1 the bear-proof compost bins were designed for the first time and subsequently used in Slovenia for the first time. The result was of extreme success, as due to a very aesthetic design local inhabitants liked using it in their backyards and the demand for distributing them was high. The demand for bear-proof garbage bins exceeded the supply - consequently, we set up some additional bear-proof measures at the end of the project and we continue spreading and promoting these measures through other financial mechanisms. We are pleased that local inhabitants or communities decided to purchase bear-proof compost bins also by themselves, increasing thus the added value and efficiency of the action (in terms of both, decreasing human-bear conflicts and financially). Not only, the compost bins were exported even outside the project area (Switzerland) and other financial schemes (including projects) already foresee distributing the bear-proof garbage- and compost bins. Due to all this, the cost-efficiency of the action improved enormously.

Action C.2 set a high standard and a best-practice example for protection of the livestock against depredation. On the basis of comparing different methods in the project area for the first time, the most effective methods (using high electric nets and livestock guarding dogs decreased almost to zero the damages on livestock and beekeeping for receivers of the equipment) were chosen for insertion into the national damage compensation scheme, producing thus extremely large efficiency of the action in regards to direct costs incurred.

For the first time on the national level, we introduced mitigation measures in traffic for reducing traffic collisions with bears (and consequently with other large mammals, too). We set up acoustic deterrents, dynamic traffic signs and electric fences, exit doors and jump-out ramps on previously identified state roads, highway and railway sections. The traffic mortality was decreased and the mitigation measures represented a good awareness-raising opportunity, that educated the drivers about this issue, and an influence on their changed behaviour was documented (reduced vehicle speed for approx. 8 km/h, when dynamic traffic sign was on). However, setting these mitigation measures is quite costly for the density of human infrastructure taken in the consideration and their maintenance is financially demanding.

Especially in the frame of C.1 and C.2 actions, a direct dialogue with the local inhabitants was taken into place. People that experience a direct conflict with brown bear (farmers, beekeepers, rural inhabitants) need special attention from a qualified and trained person with skills in the appropriate

communication and attitude. From this perspective, our Guidebook on strategies and tips for effective communication and collaboration with communities was a crucial necessity to produce, as a trustful relationship with local inhabitants is a prerequisite of a successful implementation of the prevention measures. Only with skills in listening and approaching people that were experiencing bear damage, we could be effective in proposing solution to them, and thus contribute to problem solving locally at its source.

In the evaluation action D.1 we used, beside other types of data, telemetric locations of radio-collared bears for in-depth statistical analyses. We caught mostly conflict-inducing bears (25 capture events executed), equipped them with GPS/GSM radio-collars and monitored their movement afterwards. In this way, we could evaluate the efficiency of the mitigation measures, thus contributing to favourable cost-effectiveness of the measures. On the basis of accurate, objective, science-based and systematic data, the long-term positive effect of these costs can be expressed. Further on, gaining knowledge on conflict bear behaviour is of great value for raising awareness in the long term. The data gathered was an urgent tool in communication for demonstrating the importance of implementation of non-lethal conflict mitigation measures.

For the first time in the project area, the habitat suitability and landscape connectivity for brown bear was assessed (Action A.3). Using the latest statistic tools in landscape modelling we analysed spatial landscape and environmental data and radio-telemetric locations of brown bears to produce a thorough analysis of spatial connectivity for brown bear in the whole project area. The analysis was crucial for producing guidelines for environmental impact assessment, as only integrating the recommendations into national impact assessment process can guarantee a systemic use of guidelines and ensure a long-term benefit for brown bear conservation and expansion into the Alps. In fact, the Action C.3 ensured that these guidelines were integrated to spatial planning by producing a Handbook and educating spatial planners and other officials. Environmental impact assessments by national entities that included our findings into their official outputs, were already issued, which represents an efficient project contribution to minimise further fragmentation and urbanisation of bear habitat.

c)

We were also introducing a novel approach, when promoting an added value of products and services created by using best practices and encouraging human-bear coexistence (Action C.6). By creating a “Bear friendly” label we experienced an unexpected success that exceeded all our expectations. We have awarded more than 70 applicants with the bear friendly label and almost 90.000 pieces of their products were labelled with the bear friendly sign. Moreover, we were successfully promoting responsible non-consumptive use of brown bear by creating new ecotourism programmes and collaborating with national authorities when regulating effects of ecotourism with appropriate legislation. Success and huge cost-efficiency of the action is reflecting also on a local scale, as satisfying domestic and foreign tourists brings an added value of bears in the eyes of local inhabitants, thus directly increasing tolerance towards human-bear coexistence.

We were also very successful in promoting these approaches outside the project area: we participated in three important international fairs with huge outreach (for example, ITB Berlin has more than 100.000 visitors), where we were promoting our ecotourism practices to foreign touristic agencies, journalists and tourists. We established network of bloggers, influential journalists and interested agencies that used their networks for informing / attracting tourists, all of which importantly increased cost-effectiveness of the action.

d)

Understanding and exploring public attitudes and values of different interest groups is among crucial things, if we want to improve public acceptance of brown bear and successfully promote co-existence. For our attitude surveys (Actions A.2, D.3) we used carefully prepared questionnaires for

implementation in all four countries. Questionnaires were based on the results of the focus group survey, carried out earlier, and were then still tested and adjusted. The target group was local general public in (more) rural areas, thus only communities with fewer than 10.000 inhabitants were included in the sampling frame. We obtained much bigger sample size than expected (namely, 4.577 questionnaires answered in both actions, compared to 4.000 foreseen). After collecting filled questionnaires, an in-depth statistical analyses, including statistical modelling, were carried out. We explored respondents' opinion and beliefs about bears, their support for bear conservation, their tolerance of bears, their support for different management strategies and their attitude towards problematic bear behaviour. Such knowledge of public perceptions and attitudes is crucial, if we are to address key interest groups with appropriate key messages in future informational and educational activities, as well as design efficient conservation actions and acceptable management plans that will further increase public tolerance for co-existence with brown bear.

5.3.2 Results achieved

A table with quantitative and qualitative information on the implemented actions in the frame of comparing and evaluating the project achievements with the objectives in the revised proposal:

Task / Foreseen in the project proposal	Achieved	Evaluation
<p>Establishment of population-level management of brown bears across the Northern Dinaric Mountains and Alps over four neighbouring countries: Croatia, Slovenia, Austria and Italy.</p>	<p>The Common Guidelines for Population-level Brown Bear Management were successfully prepared and agreed among all international partners on 4 meetings and workshops.</p> <p>And not only, they were additionally adopted by the countries outside the project area: through the WISO platform they were adopted for the entire Alps and they greatly support bear management and conservation in Bosnia and Hercegovina.</p>	<p>The goal was greatly overachieved: additionally, extended to entire Alpine area through WISO platform and adopted in BiH.</p> <p>The Common Guidelines represent a crucial step for elaboration and adoption of the revised Management plan at national level - this was the first effort to harmonize bear management at a population level.</p> <p>In Italy, an official note by Italian project partners was sent to the Ministry for the Environment stating the differences between the PACOBACE and the Common Guidelines to be taken into consideration with the next novel of the PACOBACE</p> <p>An Austrian project partner took care that the Common guidelines were incorporated into the national strategic document in Austria already in 2018.</p>
<p>Produced and accepted Management Plans for management of the core brown bear population in Slovenia and Croatia.</p>	<p>With the help of the participatory process, facilitated workshops and meetings with stakeholders and the competent authorities (4 in Slovenia and 5 in Croatia) were carried out in Slovenia and Croatia to implement the Common Guidelines into national strategic documents. Prepared and agreed Management documents were sent to the competent Ministry. After</p>	<p>In CRO the management plan was successfully adopted into national documents in 2019.</p> <p>In SLO the Management Strategy and the Action Plan were successfully prepared (through the participative process), already opened to public commenting by the competent Ministry, and are now in the final stages of being adopted by the Government.</p>

Task / Foreseen in the project proposal	Achieved	Evaluation
	that, workshops for finalisation of the documents were executed in both countries (4 in SLO and 1 in CRO) and the Ministries published the documents to a public commenting. In Croatia, the document was subsequently adopted.	
Establishment of optimized common long-term transboundary, population-level monitoring of bear population in the Alps and Northern Dinaric Mountains.	The guidelines for population level monitoring provide a frame and a solid basis for transboundary collaboration in brown bear monitoring. Cost-benefit analysis of different national methodologies was produced and evaluated, as well.	<p>Population-level monitoring scheme, which compares and evaluates different survey systems used, is crucial for an internationally based monitoring of the population. With the use of genetics, it goes beyond the traditional nation-level schemes: a solid methodological foundation and a best practice example were provided for long-term population monitoring.</p> <p>Cost-benefit analysis evaluated different monitoring methods and provided recommendations.</p> <p>Common online geodatabase contributes to fast and reliable data exchange and supports international cooperation.</p>
Population-level monitoring will secure the science-based data on bear population size and trends.	<p>Extensive genetic sampling with numerous volunteers and next generation sequencing methodology resulted in highest precision of population size estimates. Reconstruction of population size and software for simulation of population dynamics modelling were produced, as well.</p> <p>Results indicated that for the year 2015 there were 1392 (1247-1583) bears in Slovenia and Croatia (minimum yearly number (end-of-the-year size) with 95 % CI) and 1648 (1503-1839) bears as a maximum number (spring 2015).</p>	<p>These data, analyses and results represent an important science-based contribution to population-level monitoring, conservation and management: a solid methodological foundation and a best practice example were provided for long-term population monitoring.</p> <p>From the other perspective, scientific evaluation of different methodologies and subsequent thorough plan for population-level monitoring guarantee the quality of collected data.</p> <p>Methods being harmonized, we can experience also a methodological advance – if combined with other field data, we can get a verification of model-derived annual population size estimates.</p>
The removals of bears in Slovenia and Croatia will be done in the way to secure the long term population stability and viability in respect to the	<p>The population size is increasing.</p> <p>In Slovenia, the increase was 41,3 % in the 8-year period (from 2007 to 2015). The population reconstruction predicted that in SLO the average annual geometric population growth is 4.5 % (CI:</p>	<p>The status of the bear population in Slovenia and Croatia is increasing and the established monitoring systems offer a good overview of its (increasing) trends.</p> <p>Effective population size in NW Dinaric Mts. is (the 2014 estimate) 261.6 (247-277), which is enough to avoid inbreeding</p>

Task / Foreseen in the project proposal	Achieved	Evaluation
absolute numbers, as well as sex and age structure.	3.9-5.2 %) and 5.0 % (CI: 4.3-5.7 %) in CRO.	(long-term population stability is thus secured); but still less than the threshold considered important for preserving evolutionary potential. However, this population is part of a much larger Dinaric-Pindos population, thus also this aspect is secured. At present, only a high-quality monitoring is missing in some of the Balkan countries (south of Croatia and north of Greece).
Conflict rate will stop growing over years and an overall reduction is expected to be at least 10 % in core areas and over 30 % in the selected conflict hot-spots.	<p>Despite a significant bear population growth of the Dinaric population (in both countries, SLO and CRO, the maximum or spring pop. size increased by 30,2 % from 2015 to 2018), the conflict rate and the number of damage cases have not increased.</p> <p>During the workshops at the “hot-spots”, participants’ opinions regarding the implemented measures were surveyed. In total, 61 % of the respondents stated the measures as highly effective. Besides, 61 % of respondents are convinced, that the measures should be used in the long-term and implemented even at the larger scale. Additionally, the incidence of interventions due to bear encounters in settlements or damages to human property (excluded livestock) in the municipalities without and with implemented preventive measures (i.e. “hot-spots”), were compared. In the “hot-spots” the interventions decreased for 4,7 %. The opposite trend has been noted in the municipalities without the prevention measures, where the interventions increased for 2,3 %. It must be noted, that not all the encounters to human settlements are reported - if all of them were consistently reported, the trend should be even more distinct.</p>	<p>Despite the bear population growth, the amount of damages and conflict situations stopped rising and has been even decreased during the project. Therefore, the implemented measures together with the communication activities effectively reduced the conflict rate.</p> <p>The distribution and use of these prevention measures will be continued after the project: a) in the frame of other projects (Interreg SLO-HR410 Carnivora Dinarica); b) local touristic centres are raising funds from bear-watching eco-tourism programs for further implementation of bear-proof garbage- and compost bins to further reduce number of bear approaches to human settlements. Also, local inhabitants already bought bear-proof compost bins by themselves (10 cases) and in three cases these prevention measure has been purchased for use outside the project area (Switzerland).</p>
With preventive measures implemented bear livestock depreations will	In SLO, the livestock depreations by bears decreased in the period after the implementation of	The damages by bears have decreased significantly after using prevention measures, thus these results have huge

Task / Foreseen in the project proposal	Achieved	Evaluation
decrease by at least 20 % and by the livestock breeders, beekeepers or fruit farmers included into this project damages will decrease for at least 80%.	preventive measures. The number of damage cases on sheep decreased by 43 % and the compensated amount paid decreased by 48 % (in the period 2015-2018 comparing to the period 2011-2014). In case of farmers and beekeepers, who received the protection equipment, the average yearly damages decreased by 97,5 % (amount compensated) in comparison to the period before the implementation of preventive measures.	systemic consequences due to demonstrated high efficiency. Measures for damage prevention were already included into national preventive scheme in Slovenia. In Italy, the practices were also funded by the Veneto region itself, as a consequence of obtaining such good results within the project. Also, other projects included these measures within their actions, so these best-practice examples will be continued.
Mitigation measures on traffic routes will decrease bear traffic mortality for at least 30 % overall and at least 50 % on mitigated road and railway sections.	<p>We have implemented protective measures on railways, state roads and highways (dynamic traffic signs, electric fence, acoustic deterrents, exit doors, jump-out ramps).</p> <p>After the implementation of three different mitigation measures on CRO highway, there were no bear casualties recorded anymore.</p> <p>Observed reduction of vehicles' speed in years 2016-2019 for ~ 8 km/h confirms the positive impact of activated dynamic signs on drivers' behaviour in Slovenia.</p> <p>In overall for Slovenia and Croatia, bear traffic mortality was reduced by 25 % in the period 2016-2018 compared to the period 2013-2015, although the bear population size increased in the meantime. On mitigated road and railway sections in Slovenia and highway section in Croatia, bear traffic mortality was altogether reduced by 63 % in the same period.</p>	<p>The implemented systems are working properly and they are regularly checked and maintained.</p> <p>They contribute to decreased traffic-caused mortality of brown bear and to changed drivers' behaviour, which is a prerequisite for long-term decrease of traffic mortality.</p> <p>We consider it a success that the traffic mortality was decreased during the project, despite the fact that the bear population size increased in the same period.</p>
The use of non-lethal solutions will reduce the number of „problem“ bears removed for at least 20 %.	Despite a significant bear population growth, the number of conflict bears removed has not increased.	After the implementation of mitigation measures in Slovenia, there was no increase in the number of removed conflict bears in the 4-year period, comparing to the period before the measure

Task / Foreseen in the project proposal	Achieved	Evaluation
	<p>Comparing the periods 2011-2014 and 2015-2018, the bear population size in Slovenia increased for roughly one fifth. At the same time, the absolute number of conflict bear removals remained the same (38 conflict bears removed in the period 2011-2014 and 37 in the period 2015-2018).</p>	<p>implementation, although the bear population size increased for approximately one fifth in the meantime.</p> <p>We believe that maintaining that conflict rate, which has lethal consequences, at the same level despite population growth, is a reasonably good achievement of the project. We are very satisfied with such outcome and we feel we fulfilled the foreseen task from the project proposal. Likely, if the population size had remained the same, the number of conflict bears removed would have decreased as proposed.</p> <p>The high efficiency of these mitigation measures is reflected also in huge interest of other institutions and projects for transferring our best-practice examples into their own work.</p>
<p>Bear eco-tourism is developed with at least 10 bear friendly products, 30 events of ecotourism with at least 10 tourists per event.</p>	<p>We have awarded more than 70 applicants with the bear friendly label in Slovenia and Croatia, producing more than 100 different bear friendly products and services. 77.530 bear friendly stickers and miniature leaflets were produced to label bear friendly products, close to 90.000 pieces of their products were labelled with the bear friendly sign.</p> <p>We carried out many events for promotion of guidelines for responsible ecotourism and bear friendly label, including study tour for journalists and tour operators, educational seminars for tour guides, lectures, programs for ecotourism trips, we have participated at 4 fairs related to tourism, including ITB Berlin, which has more than 100.000 visitors. Altogether, we participated in 37 different events, reaching approximately 1.300 people. Ecotourism portal was advertised in Bradt Travel Guide (52 European Wildlife Weekends),</p>	<p>There was much higher interest from the local public for the bear friendly label than previously anticipated. According to the questionnaire for the users of the bear friendly label (n=34), more than 90% notes positive or very positive customer responses to the label, nearly all of them explain the bear friendly concept to the customers, which raises awareness about bear conservation and coexistence issues among their customers (local inhabitants and foreign visitors). More than 90% of the current users will continue to use the label after the project and the label will be transferred also to other large carnivores within other projects. The aspect of public attitudes that has considerably increased in the Dinarics is value of bears for local economy (non-consumptive uses of bears). In Croatia and Slovenia Dinarics, the respondents scored respectively 45% and 9% higher on average on this attitude index at the end of the project than in 2016.</p> <p>Guidelines for responsible use of bears in tourism were one of more important action outputs. They were used by The Ministry of Environment and Spatial Planning in the process of preparation of legal regulation of wildlife watching. Our action therefore</p>

Task / Foreseen in the project proposal	Achieved	Evaluation
	<p>which is sold in 70 countries around the world.</p> <p>To promote bear friendly products and ecotourism portal more than 60.000 different publications were printed and distributed.</p>	<p>had direct impact on policy implementation.</p>
<p>Media reports on bears in the project area become more positive towards bears and at least 70 reports connected with the project will be published.</p>	<p>The attitude of media was evaluated by analysing 3702 media pieces (foreseen 60 pieces).</p> <p>356 media reports mentioned project (foreseen 70). All these media pieces expressed positive sentiment about the project (on average for all the project years: 3,76 (on the scale from -5 to +5)).</p> <p>Coverage about bears during the project became on average increasingly positive towards bear conservation. The average for the first 2 years of the project was -0.19 (mostly negative reporting) and for the last 2 years of the project it was 0.80 (mostly positive, both on -5 to +5 scale).</p>	<p>The project outreach is very successful in overall, as the media clips about the project were regular and frequent. On average media portrayed the project in a positive way and media pieces that mentioned the project have consistently portrayed bears in a more positive way than overall, suggesting that project was being presented as a solution provider by the local media.</p> <p>Targeted visibility of the project in the media was overachieved by over 5-fold. Furthermore, reporting about bears during the project became on average increasingly positive and it actually changed from mostly negative sentiments about bears to mostly positive in the second half of the project.</p>
<p>Wardens and other technicians of public bodies receive adequate training in bear monitoring, damage assessment and damage prevention using non-lethal measures.</p>	<p>We organized meetings, workshops and trainings for regional damages inspectors, agricultural advisors, provincial officials and instructed the attendants how to use, control and inform people about effective damage prevention measures (16 educational seminars altogether).</p> <p>Intervention team members were regularly trained, too (altogether 3 one-day training camps and 2 two-day training camps carried out). Public body officials were informed and trained annually in bear monitoring, damage assessment and damage prevention measures. Within the establishment of emergency teams in Croatia and Italy, trainings for highway patrollers, intervention team members and provincial officials were carried out.</p>	<p>After the successful organization of trainings in three countries, we recognise the intervention team members, damage inspectors and public-body officials as instructed and well prepared professionals, with solid knowledge about how to react and interact with people in different intervention and conflict cases.</p> <p>The number of planned seminars was even exceeded (16 executed, 2 foreseen) and one of the seminars also had international outreach.</p> <p>Due to high interest and efficiency the practice was transferred into the SFS (coordinating beneficiary) system, so the workshops will continue on annual basis after the project.</p>

Task / Foreseen in the project proposal	Achieved	Evaluation
2 new brown bear emergency teams established and active.	Two new emergency teams were established and trained: Bear Intervention team for highway in Croatia and brown bear intervention team in Veneto, Italy.	The emergency teams are trained, active and responsive. In Croatia, the ARZ team successfully carried out one intervention on the highway.
Increased awareness on bear biology in public and schools.	<p>77 workshops about bear biology and conservation for schools, kindergartens, scouting and environmental organisations were carried out, in which 1.535 students, 396 scouts and 4.500 visitors of scout events participated. 49 pcs of bear educational kits and 102 pcs of footprint plasters were distributed.</p> <p>83 public events about the project and bears were carried out with at least 30.596 visitors.</p> <p>More than 25.000 local inhabitants and general public visited traveling exhibition on 10 locations in the project area.</p> <p>12 information boards were set up on frequently visited locations in Croatia.</p> <p>3 leaflets (18.000 - 34.000 copies), 1 brochure (15.000 copies), educational posters (5.020 copies) and roll-ups (6 pcs) were produced in high quantities.</p>	<p>We evaluate project awareness raising activities for general public, schools and pro-nature organizations successful and efficient: enthusiasm and involvement of the participants was extremely high, teachers' interest for workshops and bear educational kits were high even after the project ended. The promotion materials were always in high demand on project events and workshops - the quantity of printed publications (103.220 copies) was almost once higher than foreseen (63.200 copies). With more than 230 very productive awareness-raising workshops, meetings, and other presentations and events, and a lot of distributed informative material, we are certain that we reached a significant amount of people, who actively participated (interactive and carefully prepared workshops, raising questions, opening debates). We did not however document improvements in bear biology knowledge among the general public in the public attitude survey. This is probably due to the fact that project dissemination activities focused predominantly on the coexistence issues (which was also the main goal of the project) and not so much on bear biology.</p>
Increased awareness on causes for bear-human conflicts and solutions among management authorities, stakeholders and general public.	<p>We carried out many activities for increasing awareness on many levels – directly on the field to local people when introducing conflict prevention measures; to wider public through printed and electronic publications (3 leaflets, brochure and posters) and through targeted events; to municipal authorities when setting ground for certain measures for conflict reduction; to management authorities and officials through targeted meetings (for producing population-level management plan and national strategic documents, presenting project achievements</p>	<p>In the Alpine regions of the project area, bears are present in low densities. In some of those areas both the density and the number of bears has increased considerably during the project. Residents in those areas showed less tolerance of human-bear conflicts according to the tolerance of human-bear conflicts score measured in the public attitude survey (decrease by 38% compared to the beginning of the project), while in the Dinarics the respondents scored higher on this index (on average 11% higher). We can hypothesise that the Alpine general public is now perhaps more aware of the human-bear conflicts but is not as willing to adapt to coexisting with bears. Support</p>

Task / Foreseen in the project proposal	Achieved	Evaluation
	<p>for transfer of best practice into national system, informing with objective information and scientific facts when adopting legislation changes, consulting in case of important events etc.)</p> <p>3 leaflets (18. 000 - 34.000 copies), 1 brochure (15.000 copies), educational posters (5.020 copies) and roll-ups (6 pcs) were produced in high quantities.</p>	<p>of lethal control of bears as a solution to human-bear conflicts has considerably increased in the Alps (70% increase) and decreased in the Dinarics (30% decrease). All groups acknowledged the usefulness of damage prevention, garbage management and education to control human-bear conflicts.</p>
<p>The knowledge and attitude scores of local inhabitants will increase by at least 10 % from the first poll.</p>	<p>The aspect of public attitudes that has considerably increased in the Dinarics is value of bears for local economy (non-consumptive uses of bears). The respondents scored 45 % and 9 % higher on average on this attitude index at the end of the project than in 2016, in Croatia and Slovenia Dinarics, respectively.</p>	<p>Public support for bear conservation was high throughout the project area and remained high until the end of the project.</p>
<p>Spatial requirement of bears are taken into account in environmental impact assessment studies, protecting key areas for connectivity.</p>	<p>Habitat connectivity maps for habitat patches and blocks of habitat patches for brown bear in project area were prepared. Agency of Republic of Slovenia for Environment is at this moment including these maps into Conservation Atlas of Slovenia, which is obligatory considered at environmental impact assessment studies.</p> <p>The "Handbook for integrating the bear habitat suitability and connectivity to spatial planning" was written in English, Slovenian and Croatian language and distributed to 94 attendees (spatial planners and decision makers) of two educational seminars in Ljubljana (SLO) and Zagreb (CRO). Institute of the Republic of Slovenia for Nature Conservation adopted the handbook guidelines and they will be used in their future consents and expert opinions related to planned infrastructure and objects in natural habitats.</p>	<p>Adoption of both project results by the National Agency is a key achievement that guarantees the use of this knowledge and outputs in future environmental impact assessment studies. In this way, the bear habitat requirements are taken into consideration and key areas for preserving connectivity will be protected.</p> <p>Both, the maps of bear habitat connectivity and the handbook for spatial planning, have already been taken into consideration in case of Guidelines for providing migration corridors of large carnivores and other large animals in the highway section Vrhnika - Postojna, coordinated and prepared by DARS d.d., state's company responsible for building, managing and maintaining highways and motorways in Slovenia.</p>

Task / Foreseen in the project proposal	Achieved	Evaluation
Feeding with wild ungulate carcasses in the bear core area is established and large part of carcasses remain in the ecosystem, thus preserving natural cycles.	22 feeding sites in 11 hunting areas within bear core area were selected on the basis of wild ungulate carrion availability and bear density. For much of the bear core area, 32 kg per km ² of wild ungulate carcasses likely stayed in the environment and thus preserved natural cycle.	The effectiveness and usefulness of using available carrion from traffic mortality and as hunting activity leftovers was evaluated: In years of poor natural protein-rich food availability, carrion is a good attractant to feeding sites and thus enhances time bears spent away from settlements. After evaluating the benefits and risks related to carrion use on feeding sites, the following recommendation is given: Recycling road kill and game offal enriches the ecosystem, since carrion is an important food source for a number of scavenging species. Wildlife carrion may therefore be provided to feeding sites, in particular during years, when natural protein-rich food is scarce; when it is readily available (e.g. during the hunting season, road kills); and if transport costs to feeding sites are low.

5.3.3 Visibility of project results

The most visible project results, which have resulted in immediate measurable outcomes, were connected to conflict and damage prevention, population surveillance and data sharing. Measures to prevent human-bear conflict were implemented in Slovenia, Croatia and Italy; access to anthropogenic food sources was prevented with 26 bear-proof garbage containers at Croatian highway Rijeka-Zagreb, 143 garbage bins and 100 compost bins at identified conflict hotspots in Slovenian countryside, and 175 electric fences and 72 livestock guarding dog pups were distributed to farmers in Slovenia and Italy. By now, these prevention measures have been already included into other projects for distribution or interested local inhabitants purchased bear-proof compost-bins by themselves. Moreover, the Slovenian system of co-financing the damage prevention measures adopted the good practice of distributing high electric fences and now offers substantial financial help to farmers who suffered damage by carnivore depredation, which has crucial long-term benefits for human-bear coexistence. As a result of the implemented prevention measures, the number of conflicts in hotspots, the number of removed problem bears and the number of livestock depredations and other bear-caused damages to human property have not increased, despite a significant bear population growth of the Dinaric population (in Slovenia and Croatia, the maximum or spring pop. size increased by 30,2 % from 2015 to 2018). In Slovenia, the livestock depredations by bears decreased in the period after the implementation of preventive measures by 43 % (in case of farmers and beekeepers, who received the protection equipment, the average yearly damages decreased by 97,5 % in comparison to the period before the implementation of preventive measures). Reducing traffic mortality of bears in Slovenia and Croatia by 25 % (and by 63 % on the mitigated sections), despite increased bear population size, was achieved through alerting drivers with dynamic traffic signs and warning wildlife with acoustic deterrents at problematic sections of regional roads and railways, diverting animals from highways with electric fences or helping them exit the motorway area with jump out ramps and exit doors. Intervention groups operate under a new, common protocol in Slovenia, Italy and Croatia and effectively deal with the issues related to “problematic” bears. Data sharing by using the online geo-database (“Mbase”) has provided fast, reliable and coordinated data exchange – more than expected accesses of the database had already been detected during the first period of the project. Genetic

monitoring of the bear populations provided immediate results about the status of the Northern Dinaric-SE Alpine bear population. The impact of communication activities was evident through the evaluation of media pieces, which showed, among other things, that the project was presented as a solution-provider.

We expect some results of the project to gain visibility only after a certain time period after the end of the project. The established network of professionals in four participating countries should produce benefits in the long term, especially considering further transboundary coordination of bear management, data- and good practice exchange. The guidelines for transboundary management and monitoring and their inclusion into the national strategic documents still only exist in paper format; the upcoming period of active bear management will show to what extent the guidelines will actually be implemented. The participatory approach used in compiling the monitoring and management guidelines proved rewarding, so it will continue to be used in the future drafting of strategic documents. When additional data will be uploaded to the “Mbase” and used for further management purposes, the outreach and the practical usefulness of the established database will be evident. Preventing further fragmentation and maintaining habitat connectivity in the Northern Dinarics and SE Alps will be based on the guidelines from the “Handbook for integrating the bear habitat suitability and connectivity to spatial planning”. The impact of promoting the value of bears through communication and the effect of improvements made to bear friendly tourism on local economy and people’s acceptance of bears should be measured and evaluated over a longer time frame. The upcoming interventions will show, if the conflicts are being solved in a more efficient way, while we expect the implemented prevention measures to keep the level of conflicts at least at the level, detected by the end of the project. Further implementation and communication of such measures will be promoted through after-life activities, which we expect to result in further decrease of human-bear conflicts. The educative and awareness raising activities, together with the results of conflict prevention measures, will yet show the long term effects on human attitudes, while we will further promote human-bear coexistence through existing online portals, communication channels and networks of journalists. The target groups, which were trained to collaborate in bear monitoring, damage assessment and damage prevention will continue to use the knowledge during their regular work and will thus positively influence the human-bear coexistence in the long term.

5.3.4 Effectiveness of the dissemination

The project dissemination activities have been outstanding. In many cases, we have produced and distributed more copies of educational materials than foreseen (e.g. 203.630 leaflets, 5.020 posters, 102 educational kits, 90.000 bear-friendly labels, ...) and we have exceeded the planned activities for project promotion through 268 workshops, 121 public and networking events, 114 media reports, etc. (especially within action E.1; see chapter 5.2.2 for more details). Communication activities related to concrete conservation actions were of paramount importance to raise awareness about the newly available programs and technologies developed within the project. For example, the interest and demand for project products, e.g. the bear-proof compost bins or the bear-friendly label, is growing fast among the local communities in the Slovenian Dinarics. Additionally, the outreach of some dissemination actions was evident through activities that were undertaken **independently of the project framework**; a reproduction of the photographic exhibition was made by ZOO Zagreb, some organizations expressed interest in reprinting certain leaflets and posters so we provided them with instructions and an agreement for use, and importantly, surveys were conducted in schools to assess the effectiveness of educative activities and the results of the study are being published in a scientific journal. The project activities also received **significant attention from students**, resulting in 8 completed graduate theses solely at University of Ljubljana. Besides publishing a double amount of popular articles than foreseen in a wide array of media outlets, the project team members have co-authored 9 **peer-reviewed scientific papers** as a side-result of the project activities (with some

additional still in the review process). Our **project webpage and social media were highly active** online channels for communicating objective, up-to-date news about the project progress, on average publishing five posts per channel per month. We even created two separate webpages to communicate bear-friendly practices (www.discoverdinaries.org) and damage prevention (www.varna-pasa.si), which have already gained significant attention (actions E.4 and C.6; see chapter 5.2.2 for more details).

We have exceeded all expected results related to press (action E.5). **We have become a recognized international group of experts** and have regularly contacted or have been contacted by journalists for bear-related professional explanations. Media has reported about our project at least 3.702 times. We have built a positive relationship with national and international recognized journalists and TV broadcasters, including a handful of foreign (documentary) filmmakers. We are maintaining the **positive relationship with the press** also after the project and thus ensuring a continuation of best-practice knowledge transfer to both local and general publics. Last but not least, we have promoted, presented and made our project globally visible through **hosting the 26th International Conference on Bear Research and Management**. The conference offered a venue for more 178 oral and poster presentations from participants from 42 different countries and undoubtedly it has been the most fruitful networking event, not just for the project team but also for the international scientific public working with bears.

Many dissemination activities were improved based on experience of their implementation during the project and will serve as a strong foundation in other large carnivore-related projects. However, except the scientific evaluation of our communication efforts in schools and the above mentioned scientific publications, the **effect of our dissemination activities remains unquantified** – while it is also an arduous task to measure this effect. Their impact is thus only interpreted through the team members' practical experience in the field. Despite having reached a wide array of people (hunters, farmers, LGD breeders, local communities, touristic workers, international scientific community, children and youth, scouts, wildlife managers, intervention team members, damage inspectors, spatial planners, photographers, park rangers, decision-makers and many others), **we have not directly addressed the animal protection NGOs**.

In 2019, some **NGOs filed an appeal to the legal document allowing the bear cull** for the 2018/2019 with the main argument that the lethal means used in bear management in Slovenia are not following the **Habitats Directive** (brown bear as a species listed in Annex 4 of the Directive). The Administrative Court of the Republic of Slovenia partially ruled in favour of the appeal which resulted in the culling of bears being stopped. Strong population growth despite regular culling quotas and at the same time a stop to the regular culling were the trigger for a strong protest. Opposition formed especially among some local inhabitants and farmers, and was followed by protests, petitions and strong sensationalistic media support. It needs to be taken into account that culling of bears has a strong tradition in Slovenia and despite regular culling quotas for more than 50 years, the population growth in that time was significant. The happening gained political attention and the government issued an Intervention law, which enabled legalizing bear (and wolf) cull following the structure foreseen for the 2018/2019-time frame.

The result of all these extreme oppositions was a strong division of (a part of) Slovenian public. Besides the obvious social consequences, the division also caused the **delay in the adoption process** of the brown bear strategy and action plan in Slovenia as a large number of stakeholders took part in the process and filed more or less extreme comments on the documents put in public debate. What is most important for us, **the public reactions and the political outcomes of these events backfired our efforts on promoting human bear coexistence from the past 5 years**. The positive attitudes that have been created and the relationships that have been built now seem at stake.

In a strongly fragmented habitat, like the Dinarics and the North-Eastern Alps, the tolerance of the people is needed for the existence of large carnivores. Not just seeing them as an added value of the environment, but also having the possibility of regulating their numbers and sometimes conflict behaviour is crucial for the local inhabitants to tolerate the growing number of large carnivores. The scientific and expert community in Northern Dinaric mountains agree that the lethal control of bear population is necessary for suppressing the level of conflict and thus increasing the acceptance of bears in the long term. Therefore, it is important to rethink the European and national legislation so that it would allow regular culling quotas being issued, provided that at the same time the bear population stays in favourable conservation status. Following our experience, bear conservation under **Habitats Directive in the Annex 5** would be more appropriate for long term conservation of the bear population in the Northern Dinaric mountains.

Conservation projects, such as LIFE DINALP BEAR, are extremely important for implementation of preventive measures (protection measures for human property, educational activities, awareness raising) and it should be recognized that such projects are crucial for promoting sustainable coexistence of large carnivores and people. But it is the politics and the regulations (national and EU) that must also take into account the fragile balance between co-existence and hostile attitude towards large carnivores that might result in total eradication if not handled appropriately, using whatever possible means available.

5.4 Analysis of long-term benefits

1. Environmental benefits

a. Direct / quantitative environmental benefits

The LIFE DINALP BEAR project objectives contributed to the implementation of the **Habitats Directive** as the project focused directly on ensuring the long-term conservation of brown bears, a priority species of Community Interest listed in Annexes II and IV of the HD (92/43/EEC). Project activities also targeted the **Natura 2000** sites designated for brown bears in Slovenia, Croatia and Italy. These are priorities set out in Annex III of the LIFE Regulation.

Bears have large home ranges that typically encompass habitat within and outside the Natura 2000 network. Given that the life history requirements of brown bears encompass a large area, it was necessary for our project team to work at the correct biological scale and match our project actions to those external threats that bears face across a given landscape. For example, human-bear conflicts tend to occur in the vicinity or within human settlements that are usually outside of Natura 2000 sites. Therefore, it is crucial to understand that many measures need to be taken outside of Natura 2000 sites and reflect a holistic approach to bear conservation and management across the Nature 2000 network. For effective conservation of brown bears, it is crucial to address other EU policies that may have an impact on the areas of bear presence. Members of LIFE DINALP BEAR project were therefore actively engaged in agricultural policy, waste management, and road safety:

- We were actively involved in creating 2 policy measures: protection of livestock with electric fences and livestock guarding dogs. We accomplished this by working through the Ministry of Agriculture, Forestry and Food programs, and integrating our efforts within the EU's rural development policy under the **European Agricultural Fund for Rural Development (EAFRD)** that focused on improving the competitiveness of the EU farming sector.
- We worked closely with waste management companies and local authorities under the C1 action to actively secure household and residential attractants by providing bear proof garbage bins for communities within bear conflict hotspot areas. These activities highlighted the need to sort all waste and ensure proper storage before disposal—an important way our project contributed to the **7th EU Environment Action Programme**.

- By implementing actions A4 and C4, we improved road safety and helped decrease the number of traffic accidents related to wildlife. These actions supported the **Directive 2008/96/EC of the European parliament and of the council of 19 November 2008 on road infrastructure safety management**.

b. Relevance for environmentally significant issues or policy areas (e.g. industries/sectors with significant environmental impact, consistency with 6th or 7th (as applicable) EU Environment Action Programme and/or important environmental principles, relevance to the EU legislative framework (directives, policy development, etc.)

The project was consistent with **7th EU Environment Action Programme** and directly addressed its objectives 1, 2, 4, 5 and 7.

1st objective of the programme is to protect, conserve and enhance the Union's natural capital. Our project addresses this objective, since it directly contributes to conserving brown bears, an important aspect of mammalian biodiversity in Europe. Additionally, our project facilitated landscape level connectivity across bear habitats and Natura 2000 sites, a value added outcome benefiting many other protected mammals and wildlife living in the region.

2nd objective is to turn the EU into a resource-efficient, green and competitive low-carbon economy. To maintain and improve acceptance of brown bears by local communities, we have invested in green tourism and promotion of practices to encourage the use of bear friendly products. In this way, we are supporting a more localized carbon production footprint by encouraging the use of local products for regional markets. More than 70 applicants were awarded with bear friendly labels. In addition to this we have carried out more than 21 field trips with hunting and tourism organizations to develop bear related tourism packages. All bear friendly products and bear friendly tourism are promoted through Discover Dinarics internet portal and tourist agencies.

4th objective is to maximise the benefits of the Union's environment legislation by improving implementation. Our project directly contributed to the implementation of the Habitats Directive, since the objectives focus on ensuring the long-term conservation of brown bears. Specifically, the project established population-level monitoring, management and conservation of brown bears in the northern Dinaric Mts. and SE Alps, decreased human-bear conflicts through promotion of damage prevention and coexistence, and facilitated natural expansion of brown bears from Dinaric Mts. into the Alps. All of these activities are implemented into Guidelines for Common management of Brown Bear in the Alpine and Northern Dinaric Region and are being integrated or are being phased into national strategic documents.

5th objective is to increase knowledge about the environment and widen the evidence base for policy. A significant part of the project activities increased knowledge about the environment. This new knowledge has been or is in the process of being implemented international and national strategic documents. We also contributed to implementation of this knowledge into other EU policy implementation documents as described in this chapter. We are actively promoting and disseminating the knowledge through communication tools including: popular media, visits to schools, participation at fairs, info points, Facebook, Twitter, project webpage, dissemination of popular publications, promotional materials, and education of key stakeholders (hunters, damage inspectors, agricultural advisors).

7th objective is to better integrate environmental concerns into other policy areas and ensure coherence when creating new policy. Our objective was to implement the use of damage prevention measures into farming practices. We achieved this with education of damage inspectors and agricultural advisors. In addition, we showcased best practice examples – farms protected against bear damage with donated electric nets and livestock guarding dogs. LIFE DINALP BEAR project personnel were actively involved in creating 2 measures (protection of livestock with electric fences and livestock guarding dogs) through which the Ministry of Agriculture, Forestry and Food in Slovenia

is implementing the EU's rural development policy through **European Agricultural Fund for Rural Development (EAFRD)**. In this way we were able to implement important results of the project into agricultural policy in Slovenia

In June 2019 RVEN, after the EC authorization for a modification of the 2014-2020 RDP, Measure 4.4.3 of the Veneto Rural Development Plan was activated, with the provision of 1 million EUR for the period 2019-2020 for investments in preventive measures to help agricultural stakeholders live with brown bears. In this way we were able to make significant new agriculture policy impacts in Italy. Through implementation of the A4 and C4 actions we improved road safety for motorists and improved habitat by making it easier for wildlife passage—important aspects of **Directive 2008/96/EC of the European parliament and of the council of 19 November 2008 on road infrastructure safety management**.

With regards to the **Union Biodiversity Strategy 2020** our project is directly contributing towards reaching:

Target 1 “Fully implement the Birds and Habitats Directive” as it directly addresses a priority species of community interest through actions aiming to improve conservation status of the species, improve management on national and population levels, promote and improve cross-border collaboration in management of the species, promote and improve stakeholder involvement and awareness, improve enforcement of legislation and carefully monitor and report the progress. Through improving conservation status of an apex predator in the ecosystem, our project is contributing towards reaching the Birds and Habitat Directive goals.

Target 2 “Maintain and restore ecosystems and their services”: Preserving brown bears increases complexity in an ecosystem and maintains and increases biodiversity (e.g. seed dispersal), and improves resilience of ecosystems to change, climate or otherwise. Therefore, the conservation of brown bears is important beyond the single species level. Since bears in the Northern Dinaric Mountains are the last large natural population of the western mtDNA lineage, the same lineage as the extinct populations in Western Europe, they are considered the best genetic pool of bears that can serve for future reintroductions in Western Europe and to facilitate restoration of its ecosystems. Besides promoting and improving the knowledge, as well as potential of regulatory ecosystem services related to brown bear, our project also promoted its cultural ecosystem services, primarily those related to education and tourism. This was achieved through close cooperation with main stakeholder groups (i.e. farmers, hunters, local communities) as well as target groups such as school children and visitors to the area (tourists). Another important aspect of the project was to improve habitat connectivity for bears and other wildlife species.

Target 3 “Increase the contribution of agriculture and forestry to biodiversity” was also supported through our project as we were actively working with farmers to improve their land use practices that reduce conflicts with large carnivores, largely through prevention measures. Lastly, the project was coordinated and managed by the Slovenia Forest Service and project personnel and others employees were and will remain in regular contact and in exchange of opinions and experiences—this will create an institutional memory for the LIFE DINALP Bear project extending its reach and sustainability over time.

Target 6 “Step –up action to tackle the global biodiversity crisis” Bears are locally extinct or critically endangered in most western European countries. The main reasons for this are habitat loss and historic eradication resulting from conflicts among bears and humans that lead to persecution and legal or illegal killing of these animals. The bulk of documented human-bear conflicts are associated with agriculture. By collaborating with farmers and beehive owners with installation of proper protection measures within the action C2 and helping local inhabitants setting bear proof garbage bins within the action C1, we reduced the number of conflicts among bears and humans. Consequently, we

helped further the conservation of this endangered species and contributed to preservation of global biodiversity.

As already mentioned in section »a.«, our project also contributed to the implementation of the Habitats Directive (92/43/EEC). In addition, our project directly contributed towards reaching objectives of other relevant policy-related documents, namely: “Guidelines for Population Level Management Plans for Large Carnivores in Europe” and “Key actions for Large Carnivore populations in Europe”, which are also focused into reaching goals of the Habitat directive.

2. Long-term benefits and sustainability

a. Long-term / qualitative environmental benefits

In Slovenia and Croatia, where the conservation status of brown bears is favourable, we implemented measures that improve acceptance of bears and therefore contribute to its long-term conservation. The outlook for brown bears is good at the moment, however public perceptions can change quickly depending on a variety of factors. In the project, we also promoted natural expansion of bears into the Alps and worked with local communities to improve understanding and provide information about the tools that can further human-bear coexistence. Measures that we had promoted in the project are meant to be used also after the project ends and will continue to contribute to long-term conservation of brown bears in the Northern Dinaric Mts. and SE Alps. The following best practices and approaches are listed below:

- To further coexistence between local communities and bears we implemented efficient measures for the protection of human property from bears and this way benefitted the acceptance of this species. Since low human acceptance of bears is recognized as one of the most important threats for bears in Central Europe, it is crucial to address this issue. Our plan is to transfer the measures for protection of human property (e.g. bear resistant garbage cans, bear resistant compost bins, electrical nets, livestock guarding dogs, etc.) into regular practice, which was for example, successfully reached in Slovenia through adjusted waste management in conflict hot-spots and modification of damage compensation system. We also established 2 new bear intervention groups and trained the existing ones to tackle the conflict situations under a common protocol and in a most efficient possible way and thus give local communities a sense of safety. One of the most notable project-related outcomes which will increase the sustainability of the protective measures is establishment of an LGD association in Trentino, Italy. In Veneto, the regional authorities dedicated additional funds for preventive measures to be applied in the field for the protection against large carnivores, during the project and for the period 2019-2020. Our long-term goal is that coexistence with large carnivores becomes part of the local culture;
- To reduce traffic-related bear mortality we implemented measures along traffic corridors (dynamic traffic signs installed along regional roads; acoustic deterrents installed along railroads and regional roads; electric fences, escape ramps and one-way gates installed along highways). We expect that such measures will continue to be improved and used after the project ends and will not benefit just bears but also all other large mammals. In Slovenia, we received a letter of commitment from DARS (company which is maintaining SLO highways) and SZ (the company which is maintaining the railway) stating that they will maintain the installed preventive measures after the project LIFE DINALP BEAR ends. We have signed an agreement with DRSI (the company which maintains the regional road infrastructure) that SFS will maintain the dynamic traffic systems, monitor the results and propose new locations for additional dynamic traffic systems financed from national budgets. ARZ is the company that is maintaining the highway in Croatia and we are proud that they are partner in the project. Through this they are already obliged to maintain the electric fences and other equipment installed.
- To maintain long-term habitat connectivity for brown bears and other wildlife species, we will integrate habitat connectivity into spatial planning required under environmental impact assessments.

We collaborated and provided technical support to decision makers in spatial planning from Slovenian Environment Agency and responsible Croatian public authorities during the project. We will further promote the “Environmental Impact Assessment (EIA) Guidelines” handbook and we expect that it will be used for environmental impact assessment studies in the areas of bear presence.

- To enhance the acceptance of bears in local communities, we developed responsible bear related tourism offers and a bear-friendly label. Within the project, guidelines for the responsible non-consumptive use of bears were prepared as a foundation for both tourist workers and tourists. Throughout the project we have cooperated with the Ministry of Environment and Spatial Planning in Slovenia to develop legally binding regulations that will frame an ethical and sustainable approach to bear watching activities. Based on field experience and expert consultations during a workshop we held, we have prepared a proposal for the regulation of bear watching activities for the Ministry, which was an important step towards transposition of our guidelines into legal documents.

- To improve brown bear management at a landscape scale, we moved beyond national boundaries and implemented »transboundary monitoring, management and conservation of brown bear«, since a population-level approach is a logical and necessary steps for managing large carnivores like bears, whose life history needs (e.g., home ranges/foraging; dispersal, etc.) typically span national borders. We have produced common guidelines for population level management, guidelines for transboundary monitoring and guidelines for bear intervention groups. These guidelines were adopted into regional and national level brown bear management plans thus helping to ensure a comprehensive approach to brown bear management. The project group will also continue holding meetings to ensure transboundary monitoring and management coordination. Through involvement in the WISO (Large Carnivores, Wild Ungulates and Society *Platform*) platform of the Alpine convention, we managed to promote the concepts of transboundary cooperation in brown bear management at an even broader policy level across additional countries in the Alps. In addition to the countries already involved into the LIFE DINALP BEAR project (Slovenia, Italy, Austria and Croatia), Germany and Switzerland have officially supported the guidelines and are planning to implement the them into the national documents in the future. We even managed to involve Bosnia and Hercegovina—an exciting future opportunity that can help improve conservation and management of brown bears along the entire Balkan peninsula.

As mentioned, one of the most important threats to bears in Europe is low acceptance of bears, since the level of social carrying capacity is fragile in the case of large carnivores. Other remaining threats to bear populations, which are not addressed in this project, are existing highways with no appropriate passages for bears (e.g. Slovenia, Italy) and razor wire fences which are being placed along the borders between countries due to the migrant crisis (e.g. Slovenia, Croatia). Both of these threats inhibit natural movements of bears, which in long-term can have serious effect on bear populations.

The continuation of project actions in the years that follow the end of the project is described in section »d.« of this sub-chapter. After-LIFE conservation plan has been produced during the last trimester of the project with the purpose of organization of the responsibilities and activities started within the project that will need to be continued also after the end of the project.

b. Long-term / qualitative economic benefits (e.g. long-term cost savings and/or business opportunities with new technology etc., regional development, cost reductions or revenues in other sectors)

A significant part of the project activities was dedicated to the promotion of measures and tools to prevent damage caused by bears within conflict hotspots. In the long-term, the use of such measures (e.g. bear resistant garbage cans, bear resistant compost bins, electrical nets, livestock guarding dogs, etc.) will help mitigate and reduce conflicts and damage by bears. This will result in long-term cost savings for people living in bear areas as well as reduced costs for damage compensation claims.

Ecotourism is increasingly providing important economic opportunities for local communities in brown bear core areas. We expect that activities connected to ecotourism will continue after the project

ends due to economic benefits connected to bear related ecotourism. The ecotourism web-portal will be upgraded to include other large-carnivore projects further expanding its reach and improving user experiences. We also expect that »bear friendly« labels will continue to bring additional value to products included in this scheme (financial benefits and awareness rising).

Responsible practices of wildlife tourism, developed in the framework of the project, are already opening new possibilities for tourist workers in the core bear area in Slovenia and Croatia. With active promotion through the Discover Dinarics website and bear-friendly label, some small-scale business niches appeared – e.g., guided walks through the bear habitat and photo-hunting of wildlife. The bear-friendly label has enabled local business entrepreneurs to further expand their product market range.

c. Long-term / qualitative social benefits (e.g. positive effects on employment, health, ethnic integration, equality and other socio-economic impact etc.)

Many of the main actors in the project including project beneficiaries and stakeholders came from different backgrounds that traditionally do not necessarily collaborate (e.g. farmers, hunters, researchers, wildlife management authorities).

Our project provided an extraordinary opportunity for different actors to develop social networks and relationships that were expected to positively impact nature conservation in the future, beyond the direct outputs and results of the project.

Project resources were invested into local economy. Production of bear proof garbage and compost bins was handled by the people living in the project area. In addition to providing proper protection of garbage and compost bins we saw an added value in establishment of strong partnerships with local communities that would enable long term collaboration.

d. Continuation of the project actions by the beneficiary or by other stakeholders.

After the end of the project, project beneficiaries and other stakeholders will continue to work on these actions: A6 (the authorities responsible for bear management will update bear management plans and their inclusion into national/regional management systems), C1 & C2 (competent national and local authorities are expected to finance conflict mitigation measures in the areas where human-bear conflicts become a problem in the future), C3 (Environmental Impact Assessment Guidelines will be provided to appropriate national authorities and NGOs involved in nature conservation, who will take care that the guidelines are going to be implemented), C4 (after the end of the project the electric fences, jump-out ramps and exit doors placed along highways will be maintained by ARZ and DARS (Slovenian highway agency), deterrent systems will be maintained by Slovenian Roads Agency and Slovenian railways), C5 (population-level surveillance of brown bears will be continued after the project end and financing will be provided by the competent national authorities in each country), C6 (the ecotourism web-portal will be maintained and upgraded by its developers so that its operation continues and expands), C7 (we expect that the practice of recycling carcasses of road-killed wild ungulates back in the ecosystem will be continued after the project end), C8 (the internet-based population-level monitoring geo-database will be maintained by SFS for at least 5 years after the project ends, SFS will gradually equip all damage inspectors with tablets to ease data collection in the field), C9 (the developer of bear population size and management scenario modelling system will ensure, maintain and update the system for at least 5 years after the project ends), C10 (bear intervention group in Veneto will continue to act for at least 5 years after the project ends, highway BIG in Croatia will continue to act as a part of the highway regular maintenance practice), E1 (workshops for schools in SLO will continue to be implemented by UL and its personnel, using teaching materials developed within the project), E3 (info points will continue to be used for the intended purpose until the end of their useful life by SFS, ARZ, FVM and other organisations involved in bear management), E4 (project website will be maintained for at least 5 years after the end of the project).

3. Replicability, demonstration, transferability, cooperation

LIFE DINALP BEAR project serves as an emerging prototype for other areas, where people co-exist with large carnivores or any other potentially conflict wildlife species. On one hand, we exchanged best practice examples among participating countries within the project group on all levels in all actions. And on the other hand, we were also in regular contact with wildlife managers outside of the project area, as explained in the F2 networking action.

All beneficiaries included in the project took into consideration the replicability and transferability aspects: developing computer software exclusively using the **open source**; using widely and free of charge available **maps for GIS** based applications; using scientific rigour to **document all steps** in project implementation; publishing in scientific journals with **rigorous peer review** processes; actively **promoting and encouraging** opportunities for replication or transfer. We expect that the project will contribute towards enhancing and promoting transferable best practices through utilizing population level approach in addressing a conservation threat, an inclusive stakeholder approach, cutting edge science, especially in the field of conservation genetics, greater data availability and potential for data exchange (population monitoring portal, ecotourism portal), and long-term thinking and planning in management of small populations.

Wildlife/large carnivore managers from other countries such as Switzerland, Germany, Romania and Greece, visited or are interested in visiting the project area and to learn about conflict mitigation measures, measures for reducing traffic-related bear mortality and also join the internet-based population-level monitoring geo-database, established within the project. Until the end of the project we hosted foreign wildlife managers/participants from other projects twice (altogether app 100 participants) with an agenda of one week, combining both presentations of projects and discussion, field trips to preventive measures and meetings with recipients of these measures (LGD breeder, beehive owner, livestock breeder, recipients of bear proof garbage bins/compost bins, tourist workers or hunters offering bear watching). We are planning to keep this format of visits also in the future, for spring 2020 visit from Greek LIFE Amybear project is planned.

Some of the project results are already being used in other countries. Specifically, a research instrument for measuring public attitudes and beliefs about bears and bear management was developed in the project action A2. This questionnaire was used in Bosnia and Herzegovina to collect data on public acceptance of bears – data needed to inform the process of development of first ever national bear management plan in that country. Population level guidelines for brown bear management produced within the action A6 were taken into consideration also in Germany and Switzerland. The handbook for livestock guarding dogs (C2) and the handbook for damage inspectors (E2) will be translated for the purposes of LIFE Euro Large Carnivores project and into Portuguese as they offer valuable advice and highly applicable and transferrable practices for LGD breeders and others interested in LGD or for investigating damage cases in the field.

As shown with the number of visits to the webpage, number of participants of the 26th IBA conference and numerous presentations of project within the project area and outside, the project has high visibility and is recognised as a best practice example in many fields. The transnational monitoring of shared population of brown bears between Slovenia and Croatia is an example to be transferred into European and worldwide practice of monitoring of wildlife.

4. Best Practice lessons

LIFE DINALP BEAR project applies best practices currently available in the field of large carnivore conservation globally by incorporating the most appropriate, cost-effective and cutting-edge approaches and methods to achieve our objectives, including:

- State-of-the-art genetic laboratory methods and wildlife monitoring techniques;
- Modern elaboration of management plans with a participatory approach;

- Novel communication activities and
- Using participatory approaches and proven damage prevention measures when solving human-bear conflicts in conflict hotspots.

During our work on damage prevention one of the important lessons learned is that the proper installation of protection measures must be monitored and controlled regularly from public officials. This is not a common practice yet and we believe that this will need to be changed in many countries across Europe.

5. Innovation and demonstration value

Attractants such as unprotected garbage and compost bins lure bears into human settlements. Poorly protected human property causes damages and conflicts. Regular roadkill on one hand causes higher bear mortality and is dangerous for humans. Fragmented management can be a significant obstacle in long term population level management of the species. Therefore, our project demonstrated that it is possible to:

- a.) **Mitigate human bear conflicts** in conflict hotspot areas using proven damage prevention measures and novel communication approaches;
- b.) **Reduce traffic mortality** of wildlife species using appropriate measures along roads, highways and railroads;
- c.) **Establish efficient transboundary conservation, monitoring and management** of a large carnivore species like brown bear.

We have used innovative approaches and measures in the project:

a.) Bear resistant compost bin was developed for the project and it is first of its kind in the project area. Similar, container housings for large garbage containers (700–1000 L) were developed for the first time in the project area. Smaller plastic garbage cans (120 and 240 L) were adjusted to be bear resistant and were implemented in Slovenia for the first time;

b.) Electric fences, jump-out ramps and exit doors have been implemented along Croatian highways for the first time. In Slovenia, electric fences were implemented along highways and dynamic signs on »black spots« of Slovenian state roads;

c.) Guidelines for transboundary monitoring of brown bears in NW Dinaric Mountains and SE Alps have been written. They are the first known attempt to provide practical implementation strategies for monitoring of brown bears at the level of the population within the EU. Transboundary Guidelines for bear management and conservation in Dinaric region and in the Alps have been written. In addition to four countries involved in the project (Austria, Croatia, Italy and Slovenia), also Germany, Switzerland and Bosnia and Herzegovina showed their interest in preparing common guidelines for brown bear conservation and management. Population level approach for management and conservation of similar wildlife species has rarely been implemented in practice, not just on European level but wider.

We are confident that our innovative measures and approaches will serve as best practice examples to inform others for similar future projects and thus contribute to large carnivore conservation at the global level.

6. Long term indicators of the project success

The long term indicators, which can be used in future assessments of the project success, are conservation status of brown bear in Slovenia, Croatia and parts of Italy and Austria, the area with bear presence in these countries, number of bears in the project area, number of damage cases in selected conflict hotspots, number of traffic-related bear mortalities on selected parts of roads and railroads, number of local producers/service providers included in »bear-friendly« scheme, number of »bear friendly« products registered, number of bear related tourism products sold through ecotourism e-portal, number of visitors on project webpage, and number of likes on project Facebook pages, etc.