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FINAL Report
Covering the project activities from 01/01/2010 to 31/12/2013

Reporting Date
31/03/2014

LIFE+ PROJECT Acronym
SloWolf



Univerza v Ljubljani



Project Data

Project location	Southern Slovenia – Dinaric region
Project start date:	01/01/2010
Project end date:	31/12/2013 Extension date: -
Total Project duration (in months)	48 months
Total budget	€ 1,017,773
Total eligible budget	€ 1,017,773
EU contribution:	€ 721,850
(%) of total costs	70.92
(%) of eligible costs	70.92

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2 Executive Summary

Wolf, a highly controversial large carnivore species, hated by some and loved by others lives across the mosaic made of natural and cultural landscapes of Slovenia. The natural landscapes made primarily of forests which represent a high quality habitat for wolves are well preserved in Slovenia and create an excellent base for successful long-term conservation of wolves. The main challenge thus lies in reconciliation of human activities and interests with the goals of wolf population conservation.

The goal of the project was to facilitate long-term conservation of wolves, their prey base and their habitats in Slovenia, and their co-existence with humans. We wanted to provide a solid base for efficient conservation and management by establishing of an effective, science-based national surveillance of wolf population conservation status. To efficiently include wolf conservation and management into national legislation, we have produced a Management Action Plan based on scientific knowledge about the population and its habitat that would implement wolf monitoring data. We wanted to ensure a solid prey base and decrease the hunter-wolf conflicts through improvement of the previous management practices of wild ungulate species in a manner that would take into account the requirements of wolves and other large carnivores. Since humans, their activities and their tolerance are the most important factors for wolf conservation, we've made an effort to understand the attitudes of various interest groups and general public towards wolves, and include them into the wolf management. Also, we've actively involved hunters as the most important interest group into the wolf monitoring and conservation to both promote understanding of the ecological importance and impact of the wolf, as well as to reduce illegal killings. We have created a network of hunters and other volunteers that can competently participate in wolf population monitoring activities. We have worked to reduce damages of wolves to agriculture, improve coexistence between agriculture and wolves on the local level and raise public awareness and knowledge about wolf conservation issues. The project became the most visible Slovene LIFE project in the media.

2.1 Administrative part

The project was implemented by coordinating beneficiary University of Ljubljana where Biotechnical and Veterinary Faculties participated. Associated beneficiaries in the project were Slovenia Forest Service, the main public body for the implementation of management activities with regards to management of the wolf population and Dinaricum Society, an NGO with extensive experiences in involving volunteers in wildlife populations monitoring. When required, external assistance was used.

2.2 Technical part

We have established and implemented a complex, science based surveillance of wolf population conservation status. It was organized into yearly monitoring sessions based on wolf biology. We have carried out three surveillance sessions which have provide both know-how for long-term population monitoring, as well as the first solid data about Slovenian

wolves. Population size and reproductive success were monitored using non-invasive genetic sampling. Habitat use and preying rate were monitored using GPS-GSM telemetry and habitat modelling. Health status was assessed through examinations of dead wolves. Number and distribution of wolf packs and number of litters were monitored by snow tracking and howling tests. All gathered data and results were integrated and publicly accessible through an Internet-based Wolf Monitoring Portal as well in a form of yearly monitoring reports available on project website. We have produced a Wolf Action Plan using participatory approach in collaboration of all interest groups through a series of facilitated workshops. We have assessed the natural prey base for wolves in Slovenia through combination of hunting bag analyses, field work (pellet counts) and GIS modelling. We have examined the extent and nature of damages wolves do to agriculture through analysis of past damage reports, taking into account circumstances and spatial characteristics of the damage sites. The results of the analysis were used in improving of damage prevention and recommending improvements in damage compensation system. We have identified locations with a higher potential for conflicts ("hot spots"). We have analysed the existing farming systems in wolf range and prepared best practice recommendations. In this regard, we have compared economics of farms with damages and farms without damages and assessed the impacts of wolf damage. We have prepared recommendations, and used them to educate agricultural advisory service personnel. We have produced survey of attitudes of the general public, hunters and sheep farmers towards wolves and their knowledge about the species through use of structured questionnaires. Their responses were analysed and used to produce communication recommendations and to evaluate success of the project educational activities at the end of the project. We have produced prey species management guidelines that include the requirements of wolves. Representatives of different interest groups were included in the process, where this sensitive issue was dealt with through a series of facilitated workshops. We have involved hunters and other volunteers into surveillance activities through active participation in a large scale opportunistic and small-scale intensive non-invasive genetic sampling, howling, snow-tracking and transect counts. We have improved inspection of damages caused by large carnivores through organization of seminars for damage inspectors, production of a damage inspection manual and improvement of damage inspectors' equipment. We have demonstrated "best practice" examples of livestock protection against wolf attacks at 13 "hot-spot" locations (locations with frequent wolf attacks). Locations were monitored using video surveillance to obtain video footage for demonstration of the principle. We have used this to educate employees of the Agricultural Advisory Service about effective livestock protection measures against wolf attacks and best agricultural practices in presence of wolves. Two seminars were organized. Both the "best practice" pastures and the results of the analysis of farms with and without wolf damages were used as examples. We have intensively promoted coexistence of wolves and agriculture through educational brochures and a leaflet about effective protection measures against wolf attacks. The brochures were distributed by the Agricultural Advisory Service to livestock farmers in wolf range and directly to farmers in workshops and other project events. We have implemented a targeted public awareness and education campaign based on knowledge-gap analysis provided by the attitude and knowledge survey. Brochures, posters, T-shirts and a short educational film about wolf conservation were produced and distributed. Project team member extensively communicated with media and participated with different authors of documentaries, children's book and an exhibition. An educational kit for schools including the film, poster, PowerPoint presentation, manual for teachers and quizzes for testing of wolf knowledge was produced and distributed to biology teachers. A seminar about wolf biology and conservation issues was organized for biology teachers. Four issues of a yearly bulletin about the project were prepared. We have provided

education of hunters in the wolf range through a series of lectures about wolf biology and conservation.

Summary of achieved results:

- Efficient, science-based surveillance of wolf population conservation status implemented. Produced “Yearly conservation status surveillance session reports” (3 within the project) that are used for wolf management and include:
 - population size estimate,
 - estimated number of wolf packs
 - estimated number of litters
 - number of detected individuals through genetics (minimum pop. size)
 - wolf population health report
 - habitat use models and report
 - analysis of livestock damages done by the telemetrically monitored wolves
- Popular articles reporting wolf conservation status published in a hunting magazine for each yearly surveillance session (3).
- Wolf Monitoring Portal – a central repository of all monitoring data and analyses, freely available to public and managers (with limitations regarding GPS telemetry data to ensure safety of monitored wolves).
- Efficient Wolf Action plan, produced and revised in cooperation of interest groups and based on conservation status data. Accepted by competent authority, printed and distributed.
- Assessment of wolf prey base (maps of prey availability (5), database (1) and maps of relative prey abundance (5), evaluation of dietary needs of wolves –report (1), prey species simulation models, management recommendations document (1).
- Report about causes of livestock damages and guidelines for damage prevention (1), maps of damage “hot spot” areas (4), map of possible damage hot-spots in case of wolf population expansion (1), management recommendations (1).
- Financial analysis of case study farms (costs of damage prevention vs. costs of damage compensation) – report (1), management recommendations for best practices – report (1).
- Report about attitudes of the general public, hunters, sheep farmers and high school students towards wolves (1).
- A detailed plan for integration of large carnivores’ requirements into management of prey species (wild ungulates) based on of consensus of all interest groups (1 document).
- Approximately 5000 hunters organized in 108 hunting clubs were involved into collection of non-invasive genetic samples for wolf monitoring in each yearly monitoring session. In total, over 1000 non-invasive wolf samples were collected.
- Overall 2429 individual volunteer participations in wolf monitoring activities were recorded.
- We have improved the damage inspection system. Two seminars for damage inspectors organized, all of the inspectors from wolf areas were attending each time.

- A handbook for practical damage inspection and assessment of large carnivore damages to livestock, distributed to damage inspectors.
- Agriculture Advisory Service personnel was educated in best practice damage prevention measures in two seminars.
- Damage prevention best practice examples were demonstrated at damage hot-spots with monitoring of effectiveness. Educational and promotional material for Agricultural Advisory Service personnel and farmers was produced and disseminated. Report was produced (1). Articles (4) about good practice of wolf damage protection published in agricultural magazine.
- Public awareness raising and educational campaign about wolves. Content designed using knowledge-gap analysis and targeted at the most influential interest groups:
 - 6000 brochures produced and distributed.
 - 1000 posters about the project produced and distributed.
 - 500 copies of the produced documentary films + multimedia presentations.
 - 1000 T-shirts with project logo
 - 50 educational kits for high schools produced and distributed to biology teachers
 - Seminar for biology teachers prepared and carried out.
 - Yearly bulletin of the project – 4 x 700 pieces – produced and distributed.
 - Intensive cooperation with media.
- 5 workshops for farmers in wolf range about wolf damage protection and best practice livestock farming carried out, 6000 damage protection brochures distributed through Agricultural Advisory Service.
- Series of lectures for hunters and general public about wolf biology and conservation carried out in the wolf range.
- Project web site for promotion of wolf conservation, the project and Life+ programme set up and operational from the 7th month of the project onwards.
- Produced Layman's report in English and Slovenian.
- Thematic conference for international networking organized and proceedings produced.

2.3 Financial part

Project's total expenditure including overheads was 1,029,110 €. The budget has consisted of EU contribution of 721,850 € (70%), contribution of the coordinating beneficiary of 57,617 € (6%), contribution of the associated beneficiaries of 9,643 € (1%) and contribution of the Ministry of Agriculture and Environment of 240,000 € (23%).

3 Introduction

Wolf, a highly controversial large carnivore species, hated by some and loved by others lives across the mosaic made of natural and cultural landscapes of Slovenia. The natural landscapes made primarily of forests which represent a high quality habitat for wolves are well preserved in Slovenia and create an excellent base for successful long-term conservation of wolves. The main challenge thus lies in reconciliation of human activities and interests with the goals of wolf population conservation.

The goal of the SloWolf project was to facilitate long-term conservation of wolves, their prey base and their habitats in Slovenia, and their co-existence with humans. We wanted to provide a solid base for efficient conservation and management by establishing of an effective, science-based national surveillance of wolf population conservation status. To efficiently include wolf conservation and management into national legislation, we produced a Management Action Plan based on scientific knowledge about the population and its habitat that would implement wolf monitoring data. We wanted to ensure a solid prey base and to decrease the hunter-wolf conflicts through improvement of the existing management of wild ungulate species in a manner that would take into account the requirements of wolves and other large carnivores. Since humans, their activities and their tolerance are the most important factors for wolf conservation, we made an effort to understand the attitudes of various interest groups and general public towards wolves, and include them into the wolf management. Also, we to actively involved hunters as the most important interest group into the wolf monitoring and conservation to both promote understanding of the ecological importance and impact of the wolf, as well as to reduce illegal killings. We worked to reduce damages of wolves to agriculture, improve coexistence between agriculture and wolves on the local level and raise public awareness and knowledge about wolf conservation issues.

The project area extends over the entire wolf range in Slovenia and includes four large, connected SCI sites that list the wolf as a classification species with total surface of 222,906 ha. In the project area are also six large SPA sites that partially overlap with the listed SCI's, and 17 smaller SCI sites. The area is recognized as Ecological Important Area and as the Designated Core-area of Large Carnivores in Slovenia (ID.Nr. 80000). Part of the project area (Cerknica Lake, Menišija plateau, Krim Hills, Javorniki Mts.) has a status of a regional park – Notranjska Regional Park. Part of Snežnik plateau, including the peak Veliki Snežnik, is designated as a botanical reserve. The project area also contains a number of forest reserves, as well as several well-preserved virgin forests stands.

The species targeted by the project is wolf (*Canis lupus* Linnaeus, 1758; order Carnivora; family Canidae). It is listed in The Habitats directive (93/43/EEC) on the conservation of natural habitats and of wild fauna and flora (21. 5. 1992) in Annex IV (Animal and plant species of Community interest in need of strict protection). Main threats to the wolf conservation directly targeted by the project were: (1) inadequate management of the wolf population due to insufficient knowledge about the population conservation status; (2) deterioration of prey base due to deficiencies in prey species management; (3) a growing conflict spiral because of the wolves' damages to livestock, louder and louder calls for higher carnivore culling quotas and tensions caused by high costs of damage compensations; (4) negative attitudes of hunters caused by competition with wolves for the prey/hunting species; (5) negative public attitudes towards wolves amplified by sensationalistic media reports; (6) infectious and parasitic diseases transferred between domestic and wild canids and (7) wolf habitat fragmentation caused by traffic infrastructure.

4 Administrative part

4.1 Description of the management system

The coordinating beneficiary, **University of Ljubljana** is Slovenia's oldest and largest university, with a long standing record of excellence in research and education, over 50,000 students and over 5000 employees. Its member faculties have been involved in numerous projects, both national and EU, and have sufficient expertise and resources for coordination and management of even the largest and most difficult ones.

The project was coordinated by the Biotechnical Faculty, more precisely the departments of Biology, Forestry and Agronomy. All three departments, but especially Biology and Forestry, have long been on the forefront of large carnivore conservation in Slovenia, providing support for managers in decisions regarding these difficult-to-manage species and pushing for a hard scientific basis in conservation-related decision making. Also participating was the Veterinary Faculty with its specific expertise in animal health related issues.

Associated beneficiary **Slovenia Forest Service** is the main public body for the implementation of management activities with regards to management of the wolf population. Slovenia Forest Service is implementing basic population monitoring activities and yearly informs the decision-makers about the findings. Experts from the Slovenia Forest Service carry out evaluation of damages caused by wolves for the competent Ministry. Slovenia Forest Service also regularly participates in large carnivore conservation projects.

Associated beneficiary **Dinaricum Society** brings together people who have passion for conservation, including many experts from various fields. Their activities include implementation of public awareness projects related to large carnivore conservation, participation in consultation processes for the decision-makers, organization of conservation activities for volunteers.

Partnership agreements were signed at the beginning of the project and submitted to the EC with the Inception Report. **Co-financing agreements** with MOE and MAFF (currently together within MAE) were also signed and provided with the Inception report and the Mid-term report, respectively.

Representatives of all three beneficiaries were active members of the project steering group as shown in the **organigramme** below.

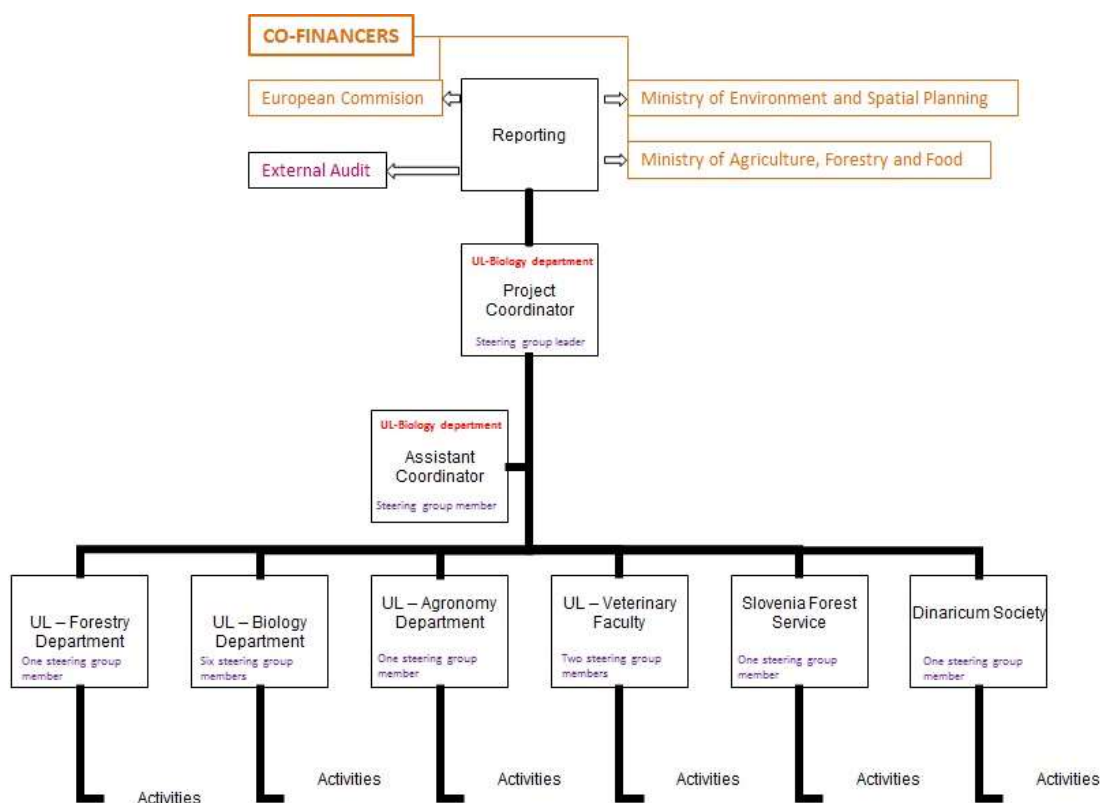


Figure 1: Organigramme.

All major decisions within the project were discussed among the project steering group members. The steering group meetings were organized on a regular basis. There were 11 general steering group meetings during the project. At the meetings, responsible persons presented the progress of their tasks and results, fulfilment of the planned actions was evaluated and plans made for the upcoming activities. Occasional constraints were also discussed and solutions agreed (Annex 7.1.1. – relevant lists of participants, others were provided as annexes in previous respective reports). When necessary, external experts were invited to participate in the meetings (e.g. representatives of Croatian State Institute for Nature Protections and of the Faculty of Veterinary Medicine in Zagreb – participant list provided in the mid-term report).

Project coordinator, Aleksandra Majić Skrbinšek was temporarily replaced twice during the project due to the maternity leave – first time by Anamarija Žagar and secondly by Irena Bertoncelj. External monitoring team was informed timely about the changes and project did not suffer any fall-backs due to the personnel change.

The project steering group also communicated using the **Google group application**. During the project implementation 766 discussion threads were started within this group (Annex 7.1.2. – print screen of the google groups).

Besides project steering group meetings, there was a series of **smaller meetings** targeted at specific actions or deliverables (relevant lists of participant provided within the technical description of each action).

The project itself was organized into five main phases as shown in the below **diagram**. The foundation for the project implementation was the **technical, administrative and financial management and coordination** of the project. It ensured that the project was implemented according to the plans, following the rules defined in the grant agreement and within the foreseen budget. The three “columns of the project” consisted of **preparatory activities** which were necessary prerequisites for the implementation of the concrete conservation

actions and/or dissemination activities as well as for evaluation of project success. A notable preparatory activity, designed to ensure a long-term use of project results and knowledge was development of the first national wolf action plan (Action A2). **Concrete conservation actions** directly addressed the threats to the conservation of the wolf population in Slovenia, while the third “column” represents the **evaluation phase** of the project, purpose of which was assessment of success of project implementation with regards to expected results and outputs.

An important and overarching phase of the project was related to **dissemination and awareness raising** activities. This phase was equally important throughout the duration of the project and closely related to all other phases of the project.

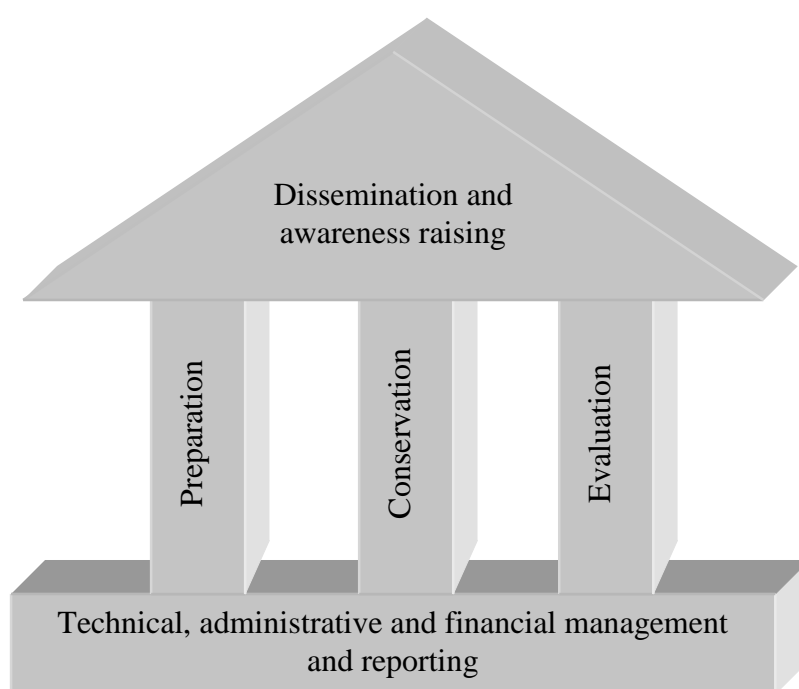


Figure 2: Phases of the project.

4.2 Evaluation of the management system

Cooperation among the **beneficiaries**, as well as with the **competent authority**, has been excellent throughout the entire duration of the project. As a result the well-coordinated project with good cooperation among all beneficiaries ensured that the project objectives were reached and all of the expected results and more achieved during the project. However, the partnership for the wolf conservation could perhaps have been even more efficient if Slovenia Hunters Association was involved in the project as an associated beneficiary as opposed to being subcontractors. The same goes for the Chamber of Agriculture and Forestry of Slovenia and its agricultural advisory service.

A representative of the LIFE **external monitoring team**, Mr. Mitja Kaligarič visited the project 5 times. On two occasions together with the representatives of EC. Last visit to the project was completed on 09/10/2013 (Annex 7.1.3. – list of participants; lists of participants for previous monitoring visits were provided with previous respective reports). Short reports

containing updates on the project implementation were submitted on a monthly basis to the external monitoring team via e-mail. Feedbacks received from the external monitoring team and the EC were always taken into account and helped improving the quality of project results considerably.

5 Technical part

5.1 Technical progress

5.1.1 Actions A: Preparatory actions, elaboration of management plans and/or action plans

THE LIST OF DELIVERABLES AND MILESTONES FOR ACTIONS “A” AS DEFINED IN THE GRANT AGREEMENT AND STATUS OF FULFILMENT

Name of the Deliverable	Code of the action	Deadline	Fulfilment
DELIVERABLES			
Prepared protocols and guides for surveillance of conservation status activities	A1	1/7/2010	Completed
1 report: how and why the damages happen, and the guidelines for damage prevention	A4	1/10/2010	Completed
2 digital maps showing areas where conflicts with agriculture are more likely	A4	1/10/2010	Completed
1 digital map showing the areas where spatial expansion of the wolf is bound to cause problems with the agriculture.	A4	1/10/2010	Completed
1 management recommendations – summary report with the guidelines for damage prevention and actions to be taken.	A4	1/10/2010	Completed
Management recommendations - summarized results of case study analyses with recommendations for actions to be taken to implement best practices, 1 report	A5	1/4/2011	Completed
1 report containing statistically analysed results prepared, published on the project web-page and passed on to the decision-makers.	A6	1/7/2011	Completed
National Wolf Action Plan	A2	1/10/2011	Completed
1 report - evaluation of the dietary needs of the wolves in Slovenia (predation rates, species spectrum and sex/age structure of the prey.	A3	1/10/2011	Completed
1 report - analysis of prey species population models and habitat (simulated effects of different management scenarios with and without carnivore presence on dynamics and sizes of prey species populations).	A3	1/10/2011	Completed
Management recommendations - summarized results of research and models with an emphasis on management implications and actions to be taken (guidelines for Action C.2).	A3	1/10/2011	Completed
MILESTONE			
Wolf Action Plan produced	A2	31/10/2011	Completed

5.1.1.1 Action A.1: Establishment of methods for the surveillance of wolf population conservation status

This action was planned as a set of preparatory activities for starting the implementation of the complex wolf population surveillance (Action C.1) and has lasted for the first 6 months of the project. Study designs of the first cycle of the surveillance activities were prepared. Protocols and guides for collaborators in surveillance activities were prepared and finished (all Annexes were provided with the Inception Report). Training of wolf

howling for volunteers was organized together with presentation of the goals and protocols of wolf howling survey at UL on 25 August 2010. Maps and census sheets for howling tests were prepared and printed before the 23 August 2010 when first surveillance session with howling started. Cooperation network between institutions responsible for wolf monitoring was established by organizing workshops and session meetings with representatives of participating hunting clubs, volunteers from DS and SFS personnel. This action was completed as planned.



Figure 3 (left and right): Presentation of protocols and goals of the wolf monitoring with howling for volunteers at University of Ljubljana on 25 August 2010.

5.1.1.2 Action A.2: Elaboration of wolf population action plan



Figure 4: Facilitated workshops for Wolf Action Plan

We organized five all-day workshops and invited all interest groups involved in wolf management in Slovenia as well as wolf experts from Croatia (Lists of participants provided as annexes with the Mid-term report). Project members have held two meetings devoted to organization of implementation of the workshops (List of participants provided as annexes with the Mid-term report). At the first workshop (28th of January) the biggest challenges of wolf management were determined and priorities for each challenge were set. On the second and third workshop (3th and 4th of February),

long-term and specific goals for each challenge were defined, while the last two workshops were devoted especially to the topic of wolf damages to livestock, which was recognized as top priority challenge regarding wolf management in Slovenia (Reports from the workshops provided as annexes with the Mid-term report). Sheep breeders were additionally invited to the last two workshops to ensure all different point of views were considered. The Action Plan proposal was prepared as planned and passed on to the MAE. There it has undergone through the interdepartmental revision and was published on the MAE web page on Nov. 9th 2012 with an invitation to the wider public to send their comments until Dec. 10th 2012. Action Plan was formally accepted by the Government on Feb. 6th 2013 and published on the Ministry's web page:

http://www.mko.gov.si/fileadmin/mko.gov.si/pageuploads/podrocja/velike_zveri/akcijski_nacrt_upravljanja_volk_2013_2017.pdf

Although the proposal was prepared in time and available on the project web page, we have proposed to postpone the printing of the Action plan until it is accepted by the Government. We believed that having a hard copy of the accepted Action plan (instead of a proposal) would be of better use to experts and managers (Annex 7.2.2.1. – Printed version of the Action Plan).

5.1.1.3 Action A.3: Assessment of wolf natural prey base in Slovenia, identification of the needs for specific actions and preparation of management improvements

An assessment of the natural prey base for wolves in Slovenia was done through combination of hunting bag analyses, field work (pellet group counting) and GIS and population modelling. Field work for the estimation of the prey densities with faecal pellet group count method has started in April 2010. Sampling plots were set in three research areas and cleaned of all faecal pellets. In June and August, the plots were visited for the first time, pellet groups counted and plots cleaned. We continued with the activity and sampling plots for pellet-group counting were visited for the fourth time and cleaned in early November 2010, after leaf fall and prior to first snowing. After the snow-melt, in April 2011, pellet-groups were counted for the last time. In this manner we obtained the maximum accumulation time possible, since the pellet-group decay is slowest during winter months. All together, we have visited 240 sampling plots for 5 times in 3 study areas, each sampling session lasted 10 days. By sampling on a year-round basis we were able to obtain data to estimate spring, summer and winter densities of all ungulates representing main wolf prey species. Seasonal migratory behaviour is typical for ungulates in temperate zone and considering seasonal changes in ungulate distribution makes the method of pellet-group counts better and more accurate. We did not use winter linear transect counts method as planned in project application, because with the implementation of extended pellet-group count method and new available maps and data of local density indices for all indigenous ungulates in Slovenia, this was no longer needed (letter to EC provided as annex in the mid-term report).

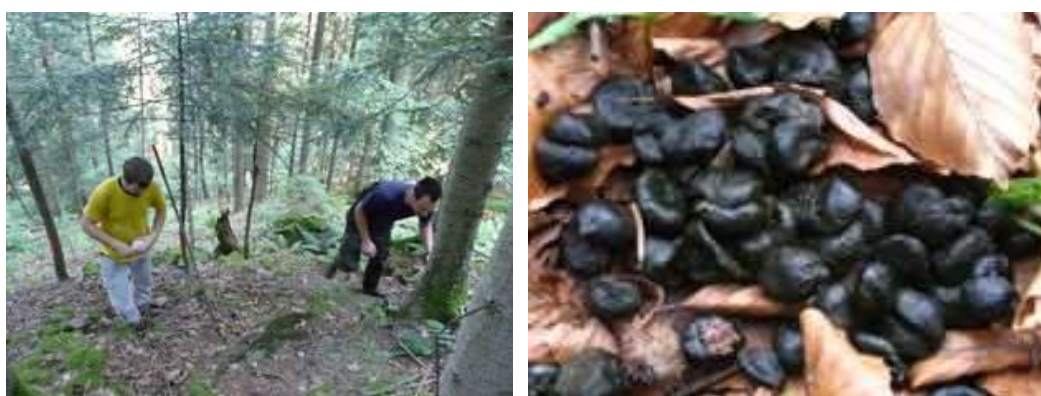


Figure 5 (left): Cleaning of fecal pellet groups in a sampling plot.

Figure 6 (right): Roe deer feces (fecal pellet group).

In the end, several methods were used to assess natural prey base for wolves and to estimate impacts of wolves and humans on ungulate population dynamics and structure. Evaluation of the dietary needs of wolves in Slovenia was made based on wolf scat analysis and remains of found prey from previous studies. Maps of availability of each prey species (red and roe deer, chamois, wild boar) and map of cumulative prey base

biomass were prepared based on extended pellet-group count method and existing database of culled or killed ungulates. Series of red deer population models were produced, simulating the effects of wolf predation rates and management scenarios on sex/age structure and growth rate of red deer population. Based on these, recommendations for the improvement of management of wild ungulate species were prepared. This action was successfully completed with all deliverables of this action gathered in the report “Estimate of the natural wolf prey base and recommendations for management with wolf prey species” (provided as annex with the progress report on 30/01/2013.) which is available on the project website.

5.1.1.4 Action A.4: Assessment of damages caused by wolves to agriculture

The extent and nature of damages which wolves do to agriculture was assessed and the report finished as planned. We have analysed all registered wolf damage cases since 1994 until 2009. The report includes six digital maps with the spatial presentation of the damages during the analysed time period. A habitat model for the potential wolf population expansion was developed, including a map of areas where conflicts with agriculture are more likely to occur today as well as in case of spatial expansion of the wolf population and spatial expansion of the sheep breeding (Report with digital maps and management recommendations provided as annex in the mid-term report).

5.1.1.5 Action A.5: Analysis of existing farming systems in wolf areas and preparation of best practices recommendations

The action has been implemented and finished as planned with the final report (provided as annex with the mid-term report). The report presents the results from the general analysis of the 264 farms in the wolf area which were surveyed parallel to the implementation of the action A6 (questionnaire for sheep farmers - damage prevention provided as annex in the mid-term report). The obtained results show, that the farmers use the farming systems which are optimized to existing agricultural production techniques and not to the coexistence with wolves. In the next step we selected 46 farms for more detailed farming system and economic analysis on linkage between existing farming systems and wolves attacks. The obtained results show that within the existing farming systems we can't identify those who are more or less appropriate from the prevention against the wolves' attacks point of view. It is much more significant, how well the farmers perform all the necessary measures within the existing farming systems. The financial analysis revealed that the existing damage compensation payment do to certain extent satisfactory compensate the damages of killed or injured sheep and goats bred for meat. When the animals are kept for dairy production this is not the case. Results of the analysis were the foundation for the management recommendations and the selection of the hot-spot locations in action C6. The data collected within this action was further used in a diploma thesis thus providing additional detailed insight into farming systems in wolf areas (graduation thesis – Annex 7.2.2.2.).

5.1.1.6 Action A.6: Analysis of attitudes of the general public, hunters and sheep farmers toward wolves and preparation of management recommendations

The aim of this action was to conduct a quantitative survey of attitudes of the general public, hunters and sheep farmers towards wolves and their knowledge about the species. Three different questionnaires have been prepared and printed: 400 copies for sheep farmers, 1300 copies for hunters and 2000 copies for general public (Annexes submitted with the Inception Report). Questionnaires for hunters and general public were sent by post to a sample of potential respondents (n=3300). A special project post stamp was produced with the purpose to increase response rates (Annex submitted with the Inception Report). To make the data more accurate we have enlarged the sample size of general public from planned 1200 to 2000 questionnaires which required a relocation of the finances within action A.6 – from “external help” to “consumables”. We relocated approximately 3.000 €. The total budget of action A.6 has not changed.

The return rate of the mailed questionnaires was 30.6 % for general public and 32.5 % for hunters. Sheep farmers were interviewed personally by visiting them at their home. We interviewed the total of 256 sheep farmers. The results were entered into a database and analysed. A report, including also communication recommendations was prepared (provided as annex in the mid-term report). Two short reports of the work on this action have been published on the project web page (<http://www.volkovi.si/en/blog/149-slovenska-javnost-je-ohranitvi-volka-naklonjena>; <http://www.volkovi.si/en/blog/100-anketiranje-rejcev-drobnice-na-terenu-je-uspeno-zakljueno>, blog). Preliminary results of the action were presented on the first workshop for the development of the National Wolf Action Plan on 28/01/2011 (PowerPoint presentation provided as annex with the mid-term report).



Figure 7: Interview of a sheep farmer on 31/8/2010 (photo: Interview no. 193)

5.1.2 Actions C: Concrete conservation actions

THE LIST OF DELIVERABLES AND MILESTONES FOR ACTIONS “C” AS DEFINED IN THE GRANT AGREEMENT AND STATUS OF FULFILMENT

Name of the Deliverable	Code of the action	Deadline	Fulfilment
DELIVERABLES			
Handbook for recognition of damages done by large carnivores on livestock and practical damage inspection, printed and distributed among the damage inspectors.	C4	Planned: 1/10/2010 Actual 1/4/2011	Completed
Article presenting results from monitoring actions in Slovenian hunting magazine “Lovec”	C1	15/12/2011	Completed
Yearly surveillance session report	C1	15/12/2011	Completed
A detailed plan (1 document) with respect to integration of the large carnivores’ requirements in prey species (wild ungulates) management – 1 report	C2	1/10/2012	Completed
Report on the monitoring of effectiveness of protection measures.	C6	1/10/2012	Completed
Popular article about the “good practice” example in an agricultural magazine.	C6	15/12/2012	Completed
Article presenting results from monitoring actions in Slovenian hunting magazine “Lovec”	C1	15/12/2012	Completed
Yearly surveillance session report	C1	15/12/2012	Completed
A habitat model for the wolf in Slovenia (1 digital map of suitable habitat for the wolf in Slovenia)	C1	1/7/2013	Completed
Article presenting results from monitoring actions in Slovenian hunting magazine “Lovec”	C1	15/12/2013	Manuscript submitted to the magazine
Yearly surveillance session report	C1	15/12/2013	Completed
MILESTONES			
First yearly surveillance session report produced	C1	30/6/2011	Completed
Anti-predator protection set up at selected hot-spots	C6	31/5/2012	Completed
Second yearly surveillance session report produced	C1	30/6/2012	Completed
Third yearly surveillance session report produced	C1	30/6/2013	Completed

5.1.2.1 Action C.1: Establishment of surveillance of wolf population conservation status

We established a national surveillance system for conservation status of the wolf population. It includes governmental institutions concerned with nature protection, wildlife management and agriculture, as well as academic institutions and non-governmental organizations. The goal was to achieve synergy of these organisations and tap into the potential of an interdisciplinary approach.

All surveillance activities were organized into yearly surveillance sessions designed to include one wolf reproductive season. Session period was defined from July 1 of the first year until June 30 of the next year. Three yearly surveillance sessions were planned. (2010-2011, 2011-2012 and 2012-2013).

Three yearly surveillance session reports were produced (Annex 7.2.2.13. – Third yearly report, previous were submitted with mid-term and progress reports). The report describes the methods and the data collected. Thorough analysis of the collected data has been

performed in the third yearly report that overviews results from all the three surveillance sessions. We divided the methods for assessment of wolf conservation status into four groups with regard to methodology, with one additional set of activities for organization and presentation of the collected data – Web Portal, which results we are presenting under five separate “*Points*”:

Point 1 (Field-collected spatial and demographic parameters for surveillance of the wolf population):

In three subsequent yearly surveillance sessions, “Howling test sessions” took place at the end of August beginning of September 2010 to 2012. During three to six night sessions 1944 to 3297 series of simulated howling were systematically performed in a 3x3 km “howling” grid in the project area. We got up to 13 responses of territorial wolves or pups, of which in five to seven packs we were able to confirm the presence of pups yearly (Figure 8).

In August 2010 we started with the first session of howling survey. Volunteers were trained and study design prepared (see Action A1). The final result of the session was: six litters detected and additional seven territorial howling responses of adult wolves obtained. In August 2011 we performed the second howling tests session. During six nights, 1944 series of simulated howling were performed in the project area. We detected 9 responses of territorial wolves, of which in 7 packs pups were detected. In August 2012 we conducted the third howling survey. We detected 9 wolf responses; 5 litters were detected and additional 4 territorial wolf responses were obtained. The average number of six detected litters in the all three years represent a minimum number of litters yearly occur in Slovenia, however according to genetically detected packs we can expect 8 to 10 potential reproduction events/litters. With six litters we can expect that about 32 wolf pups is born in the population yearly (4.2 to 6.4 cub born / litter, Mech and Boitani 2003). It is necessary to emphasize that the wolves pup mortality is significant, and based on data from foreign studies on average up to one third to one half (6-48%; Mech 1970) of the born pups survive until the end of their first winter. Performed “howling sessions” proved to be one of the most useful tools since the criteria of verified reproduction is one of the important parameters defining current conservation status of the wolf population. The method has been adopted by a revised Action plan for the wolf (Action E.6) and proposed to be upgraded with DNA-analysis of pups from scats collected at rendez-vous sites.

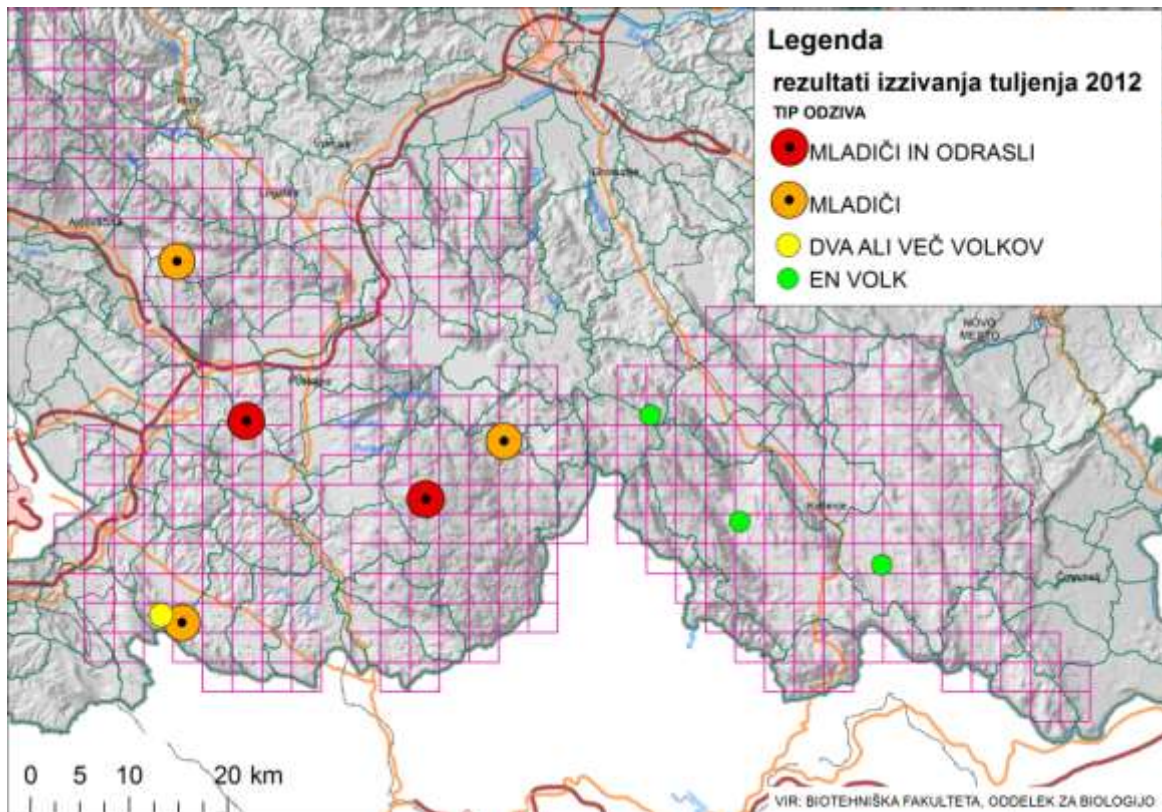


Figure 8: Example of wolf howling surveillance results in 2012. Red circles representing-pups and adult responses, orange circles-pups responses, yellow circles-two or more adult wolf responses, green circle-single adult wolf responses.

Winter seminars for snow tracking were organized for volunteers in winters 2010/11, 11/12 and 12/13, and for hunters, 30 seminars were organized every January, where also results of previous years were presented. On 48 of 85 field days wolves were tracked in 224 tracking groups and altogether 78 urine and 96 scat genetic samples were collected, 12 prey remains were found. Overall in 989 volunteer-days during all winter tracking sessions 229 km of forest roads and tracks was checked, and 171 km of wolf tracks were followed. During the all three winter snow-tracking sessions a minimum number of 1 to 7 wolves was tracked in a single tracking transect, however mostly a minimum of 1 to 3 wolves were estimated in a track during the transects.



Figure 9: Collecting urine (non-invasive genetic) sample during snow-tracking session.

Determining number of animals in a pack (family group) from snow tracking might seem to be simple and straight-forward. However, our experiences show that this is a rather tricky task, depending on several characteristics of wolf pack travelling. One is that wolves when travelling in snow, especially in deep snow, move in single file, carefully stepping in each other's foot prints, presumably to save energy. When tracking a short distance it is usually impossible to tell how many wolves have moved in the track, sometimes even seven wolves travelling together can make it look like just one or a couple has moved there. To avoid underestimation of group sizes, the "monitoring directions" therefore strongly recommend the trackers to follow the track for a minimum of two to three km to get a reasonable probability to reach sections of the track where the group has fanned out enough to disclose their number. Also tracking in the same territory should be done repeatedly each winter to further minimize this bias. A second characteristic which caused a worse problem is the tendency of a pack to frequently split up in subgroups. This tendency is believed to increase with the progression of the winter. The pattern of group sizes was varying in both directions over time, down and up again repeatedly, as well as some simultaneous trackings of different subgroups in the same territory, indicate that there is a constant splitting up and re-uniting again, and not just groups becoming smaller due to a progressing winter mortality. Another problem that arises together with ongoing climate change (warm winters) is a great variability in winter conditions (snow cover duration) that prevent continuity and comparability of the effort and results between years. Even if there is snow cover long enough, it is often "postponed" into late winter-early spring. However during this period the problem of pups starting to disperse and thereby breaking up the rather stable state of the population composition during winter and increasing the risk of double-counting.

Due to these problems and rather low cost-benefit snow tracking was not recommended as a priority method for obtaining pack-size data in the future (Action plan revision, Action E.6). However, scats and carcasses found, territorial scent markings and oestrus bleedings recorded, present also a substantial part of non-invasive samples for DNA-analysis and contribute to nutrition and predation studies on wolves.

Point 2 (Examination and analysis of dead wolves):

Examination and analysis of dead wolves" was evaluation of wolf health status and their physical condition. Wolves are subjected to a number of injuries and various diseases due to their lifestyle. For the assessment of wolf general health status standard diagnostic techniques were applied and when indicated special diagnostic tools were used as well.

From 2010 to 2013 we have examined in total 35 animals out of which 30 animals were harvested according to legal removals, 3 animals died as a consequence of car collision and 2 animals died due to other causes.

Using the results of our study the medical conditions of wolves can be roughly divided into five groups namely parasitic diseases, diseases of skin, inflammatory diseases, trauma and zoonoses. Parasitological infestation of various grades was confirmed in all examined animals. In total nine types of pulmonary, intestinal and muscle parasites were recovered. Four animals were suffered severe skin lesions diagnosed as bacterial dermatitis and/or sarcoptic mange. Both conditions were painful and significantly affected animal's immunity subsequently. While unprotected by adult wolves in the den, one female pup was killed probably by a fox. Three animals died due to massive internal bleeding and severe injuries of internal organs as a consequence of collision with a vehicle. One of

these wolves was the GPS collared alpha female that was just few days prior to parturition having seven fetuses in the uterus. In one female wolf the cause of death could not be determined reliably due to incomplete sample. Visible damage on the carcass may result from bites, with additional investigations; we excluded mechanical damage or shot gun injury. The presence of *Trichinella* spp. larvae were confirmed in muscle tissue of four animals and one case of *Oslerus osleri* which is typical for domestic dogs, but very rarely found in wolves. Brain tissue of all wolves was negative for the presence of rabies virus and parvovirus antigen.

Necropsy, as the main method of investigation has revealed some of the characteristics of wolf's life from a medical point of view. These results can be important because they represent the first information about the medical condition of wolf population in this region.



Figure 10: Severe skin lesions in adult male due to sarcoptic mange. The hair covered only head, chest, and partly legs.



Figure 11: Wolf lungs. Parasite *Oslerus osleri* in trachea

Point 3 (Conservation genetics status of the wolf population using non-invasive genetics):

Study design and study goals

Genetic monitoring of wolves in Slovenia was designed as a "robust design" mark-recapture study with three annual sampling seasons. Within each sampling season we are assuming demographic closure of the population, which enables robust abundance estimates. Between seasons we assume the population to be demographically open (immigration/fecundity, emigration/mortality), which enables us to estimate population dynamics. Each sampling season is designed to include only a single generation of offspring (Jul 1 - Jun 30 next year) to achieve the best possible demographic closure.

Sample collection

We have been collecting noninvasive samples of wolves for three yearly sampling sessions, over the entire wolf range in Slovenia. Noninvasive genetic samples are genetic material that is left in the environment by the animal. We collected wolf scats, urine in snow and saliva around bite wounds on killed natural prey or livestock. We use this material to extract DNA, which is then used to produce an individually-specific genotype of the animal, genetically "marking" the animal. We are then able to reliably recognize this animal whenever we meet its DNA again - upon finding another sample, capture for telemetry, or on detection of mortality.

Three yearly noninvasive sampling seasons took place from June 2010 to July 2013 when scats, urine in snow and saliva from bite wounds were collected. Samples were collected by project employees, volunteers, hunters and professional hunters of Slovenia Forest Service (SFS). Most of the saliva samples were collected at damage cases by damage inspectors of SFS. The field protocols for collecting saliva samples were developed during the first year of the project (as reported in the Inception report) and are since July 2013 routinely implemented at inspection of every reported damage case in the wolf presence area in Slovenia to identify the predator species if the identification from field data is unclear. More than 7000 sampling tubes and around 2000 swabs were distributed to the field.

The first monitoring season was from 26 Jun 2010 until 30 Jun 2011, the second from 1 Jul 2011 until 30 Jun 2012, and the third from 1 Jul 2012 until 30 Jun 2013. Several hundred people were involved in the sample collection: project staff, volunteers, Slovenian Forest Service employees, and hunters of the Slovenian Hunting Association. During the second season (January 2012) we organized 10 meetings with representatives of 108 hunting clubs from the wolf area (in partnership with the Slovenian Hunting Association), where we presented the results of the first season and asked for further cooperation. We organized similar meetings during the second season, in February 2013, where we presented population monitoring results with an emphasis on genetic monitoring (reported in Action D.3).

DNA extraction and genotyping

When working with noninvasive genetic samples that have typically very low quality and quantity of DNA, one must observe very strict contamination prevention protocols. All DNA extraction and PCR setup is done in a dedicated laboratory for noninvasive genetics, which is physically separated from the areas where tissue samples and PCR products are being handled. We have established a one-way flow of material between laboratories and strictly limited movement of personnel, ensuring that high-quantity DNA or PCR products

never enter the critical parts of the analytical workflow. When laboratory is in use, all working surfaces are daily decontaminated by 10% bleach.

The sheer number of samples processed in the project requires effective logistic solutions to ensure sample tracking and data quality. All sample and genetic data was handled in a relational database. Samples were tracked with 2D barcodes so that manual data entry was minimized. Sample arrangements were photo-documented at each critical analysis step, and barcodes automatically read from the photographs. We also video-documented critical pipetting steps to enable resolution of possible problems.

Genotyping of each analyzed sample was repeated at least twice and up to eight times, so that we could ensure 99% genotype accuracy of each sample (estimated with a maximum-likelihood statistical procedure). We use a panel of 8 microsatellite markers for individual ID and a sex-ID locus, which provides enough resolution to reliably differentiate different individuals while providing some redundancy for non-amplifying markers and flexibility to include the possibility of a low-level genotyping error in individual identification.

We took the best sample of each identified individual and amplified them on additional 24 loci and another sex-ID locus to verify sex assignment. Four of these loci were not reliable and were removed from the downstream analyses, ending-up with a highly- informative panel of 32 polymorphic microsatellite markers and two sex-ID markers. With this amount of genetic data and the high number of individual included in the study, we have one of the best, most information-rich databases about genetics of a wolf population ever produced.

Since the markers we used amplify in multiple canid species, we generated a reference database of allele frequencies for all canids in the study area at 8 individual ID loci. We included foxes (*Vulpes vulpes*), dogs (*Canis lupus familiaris*) and jackals (*Canis aureus*). We collected and analyzed 85 tissue reference samples of wolves, 11 tissue samples of foxes, 27 tissue samples of jackals and 8 buccal swabs and 39 hair samples of dogs.

Genetic diversity estimates

We estimated the main genetic diversity parameters for each marker - observed and expected heterozygosity, allelic diversity and effective number of alleles. We also estimated the information content in each markers for the purposes of individual identification.

Detection of wolf-dog hybrids and analysis of wolf-dog hybridization in our landscapes

Wolf and dog are closely related species, with hybridization between them frequently being recognized as a very important threat for wolf conservation. We genotyped 54 reference dogs and 369 wolves, both reference and presumed, and hybrids. We obtained genotypes of 245 individuals from Croatia through networking with Veterinary faculty of University of Zagreb (dr. Josip Kusak, dr. Đuro Huber).

We estimated hybridization using Bayesian clustering algorithm implemented in program "STRUCTURE". We used program "HybridLab" to simulate hybridization of reference dogs and reference wolves to obtain thresholds for determination of pure wolves, pure dogs, F1+F2 hybrids, and wolf/dog backcrosses. Besides the Dinaric wolves we also included samples of two wolves from Mongolia and one wolf from captivity of unknown

origin to get an idea how an immigrant from a different population wolf be classified. We analysed the result in a geographic information system (GIS) to understand the wolf-dog hybridization in a spatial context.

Species identification at damage cases

The predator species that caused a livestock damage can't be always reliably determined from field data. We designed a field and laboratory protocol for predator species ID at livestock damages. We trained SFS damage inspectors how to collect predator saliva samples from bite wounds, and provided them with adequate sampling materials and tools. We used the allelic database for species ID constructed with reference genotypes of possible canid species, and checked the predator genotype against this database. The results were later re-checked with Bayesian clustering ("STRUCTURE") that we otherwise used for identification of hybridization.

Population abundance estimates

Even with high-intensity sampling we can't expect to obtain a genotype of every last individual. For this reason we estimated wolf abundance using mark-recapture modelling, to enable an estimate of the number of animals that our sampling "missed". We used various methodological approaches - some modern models (Capwire, Huggins, Huggins Heterogeneity), as well as some "classic" (Mh-Chao, Jackknife). We prioritized the models robust to capture heterogeneity, which can be expected considering the characteristics of the species and the study area.

All methods provided very similar results, and we used the Capwire model for the final estimates since it is very robust, fits well with our data collection process and provides narrow confidence intervals.

We estimated maximum abundance for each season, but then used other data (mortality, parentage) to estimate the derived within-season estimate (minimum) for population dynamics. The maximum estimate that includes all fecundity and no mortality is provided as "October" estimate, and the minimum estimate before reproduction but after mortality as "March" estimate. Through networking with Croatian colleagues (dr. Josip Kusak, dr. Đuro Huber) we obtained also samples from the area in Croatia covered by transboundary packs, which improved the total estimates considerably.

Pedigree reconstruction, estimates of population dynamics parameters and connectivity along Dinaric mountain range

We reconstructed pedigrees of individual animals using Bayesian parentage/sibship analysis implemented in program COLONY. The program also allows for inclusion of expected genotyping errors in parameterization (expected with noninvasive samples and a high number of markers).

We used the results to determine social structure and pack dynamics, estimate reproduction and immigration (as we were able to differentiate between the wolves born in the study area and immigrants), and estimate undetected mortality/emigration. Due to computing intensity of the task we used a high-power computer of the Faculty for Machine Engineering, University of Ljubljana (768 processor cores). The analysis was run in 10 parallel Markov chains, and the results were cross-checked for consistency. We also checked alignment with real-life known pedigrees whenever possible.

We were able to also include the genotypes of 245 wolves from Croatia, provided by our Croatian colleagues (dr. Josip Kusak, dr. Đuro Huber), and analysed the results in a GIS to understand connectivity of our wolf population in a spatial sense.

Results

Sample collection

We altogether analysed 1703 noninvasive samples, and obtained 517 useful wolf genotypes. Many samples were discarded because of low DNA quality, wrong species (dog, fox) or mixed samples (especially in saliva and urine samples). Still, we managed to get an excellent recapture rate at the project level (on average 4.7 captures per animal)

Genetic diversity and probability of identical genotypes in different animals

Genetic diversity data is provided in Table below. The population's genetic diversity is relatively high ($A=7.32$; $H_e=0.70$). The marker system we used is more than sufficient for reliable individual identification in our study. The probability of two unrelated individuals having an identical genotype is 1:680 000 000, while the same probability for siblings is 1:1164. Whenever in doubt (e.g. poor amplification on several loci), we expanded the analysis with additional five markers.

Table 1: Genetic markers, genetic diversity and probability of identity analysis. A - allelic diversity; Ae - effective number of alleles; Ho - observed heterozygosity; He - expected heterozygosity; PI - probability of identity; PIsib - probability of identity for siblings; PI-c - cumulative PI for a multi-marker system; PIsib-c - cumulative PIsib for a multi-marker system.

Marker	A	Ae	Ho	He	PI	PIsib	PI-c	PIsib-c
C20_253*	7	5,11	0,79	0,80	0,07	0,36	0,0669	0.3648
C09_250*	8	4,80	0,79	0,79	0,07	0,37	0,0050	0.1360
CPH5*	6	3,65	0,70	0,73	0,12	0,42	0,0006	0.0566
Cxx_121*	8	3,45	0,67	0,71	0,12	0,43	0,0001	0.0241
FH2010*	7	3,24	0,68	0,69	0,15	0,44	1,05E-05	0.0107
CPH12*	5	3,06	0,67	0,67	0,17	0,46	1,77E-06	0.0049
CPH9*	7	2,64	0,58	0,62	0,18	0,49	3,26E-07	0.0024
CPH7*	5	2,62	0,58	0,62	0,21	0,49	6,81E-08	0.0012
FH2137	12	8,59	0,88	0,88	0,02	0,31	1,68E-09	0.0004
AHT137	11	5,99	0,83	0,83	0,05	0,35	8,09E-11	0.0001
REN247M23	7	5,96	0,83	0,83	0,05	0,35	4,05E-12	4.39E-05
Cxx_123	8	5,67	0,81	0,82	0,05	0,35	2,18E-13	1.54E-05
CPH2	10	5,28	0,80	0,81	0,06	0,36	1,31E-14	5.55E-06
FH2004	11	4,42	0,62	0,77	0,08	0,38	1,06E-15	2.13E-06
FH2848	6	4,12	0,74	0,76	0,10	0,40	1,05E-16	8.44E-07
REN169D01	9	4,04	0,78	0,75	0,10	0,40	1,06E-17	3.37E-07
AHTk253	8	3,88	0,72	0,74	0,11	0,41	1,15E-18	1.37E-07
AHTh171	7	3,71	0,75	0,73	0,11	0,41	1,32E-19	5.67E-08
VWF	6	3,71	0,71	0,73	0,12	0,41	1,53E-20	2.35E-08
FH2088	8	3,60	0,71	0,72	0,12	0,42	1,85E-21	9.83E-09
INU030	6	3,57	0,71	0,72	0,12	0,42	2,22E-22	4.13E-09
CPH4	6	3,46	0,73	0,71	0,13	0,43	2,89E-23	1.77E-09
INU055	6	3,16	0,66	0,68	0,15	0,44	4,22E-24	7.85E-10
INRA21	6	2,98	0,62	0,66	0,17	0,46	7,32E-25	3.62E-10
CPH22	4	2,89	0,60	0,65	0,18	0,47	1,35E-25	1.70E-10
REN54P11	6	2,72	0,64	0,63	0,17	0,48	2,26E-26	8.09E-11
REN169O18	9	2,72	0,58	0,63	0,17	0,48	3,83E-27	3.85E-11
FH2054	7	2,60	0,65	0,62	0,18	0,49	6,95E-28	1.88E-11
REN162C04	8	2,22	0,54	0,55	0,25	0,54	1,70E-28	1.01E-11
CPH6	9	2,06	0,50	0,52	0,26	0,56	4,51E-29	5.64E-12
FH2096	4	1,70	0,36	0,41	0,40	0,64	1,79E-29	3.63E-12
Average	7,32	3,79	0,68	0,70	Individual ID: 6,81E-08 0,0012			

* Markers used for individual ID

Identification of predators causing livestock damages

We collected samples from damage cases throughout the monitoring period within the SloWolf project. We selected a subset of damage cases that were either a) considered caused by wolf but interesting because of their spatial/temporal location (within the general noninvasive sampling context), or b) where SFS inspectors indicated problems with identification of the predator. After the monitoring period finished (30 June 2013), SFS and the competent ministry decided to continue with genetic sampling of “problematic” damage cases, and the action remains routinely implemented within the Slovenian wolf management.

During the project we collected samples from 441 damage cases (751 samples, on average 2 samples per damage case). We analysed 452 samples from 223 damage cases. We successfully genotyped 202 samples (49.3%), and resolved 135 damage cases (60.5%). In the course of the project we improved the sample collection protocol, and now we can reliably resolve nearly all large damage cases (where a collection of at least 4 samples is possible), and approximately 60% of cases where a single animal was killed.

We identified wolves in 117 (86.6%) resolved damage cases, jackal in 1 (0.007%) damage case, foxes in 7 (5.2%) damage cases and domestic dogs in 10 (7.4%) cases. Foxes were present in other damage cases, but in the cases reported here they were identified from the killing wounds.

Population abundance estimates

The results are presented in Figure 12. The "October 2010" estimate for the first season (maximum number - after reproduction, before mortality) for the wolves in Slovenia and the part of Gorski Kotar (Croatia) with transboundary packs is 47 wolves, with 95% confidence interval (CI) 46 to 51. Considering the locations of samples of individual animals and pedigree reconstructions, we estimate that 19 of these wolves resided in the transboundary packs. To obtain an estimate only for Slovenia, which is required for management purposes, we counted 1/2 of these wolves as Slovenian and 1/2 as Croatian.

In this manner we estimate that in October 2010 there were 39 (34-42 95% CI) wolves in Slovenia. Similarly, we estimated for the second season (October 2011) that there were 51 (49-54; 95%CI) animals in the entire study area, and 40 (38-43; 95% CI) animals in Slovenia alone. For the third season (October 2012) we estimate 54 wolves in the entire study area (53-62; 95% CI), and 46 (45-55; 95% CI) only for Slovenia.

During the third season we obtained only a few samples from Croatia, which and the total abundance was probably underestimated. This is also indicated by the data on missing and newly detected animals.

We produced a robust, objective abundance estimate for wolves in Slovenia. The abundance is lower than what has been estimated before project SloWolf. However, the number of wolves remained nearly identical through all three years of intensive monitoring, indicating numerical population stability of this part of the Dinaric wolf population.

Pedigree reconstruction, estimates of population dynamics parameters and connectivity along Dinaric mountain range

Pedigree reconstructions obtained with different Markov chains with different parameters/starting points provided nearly identical results. The estimated population dynamics is shown in Figure below.

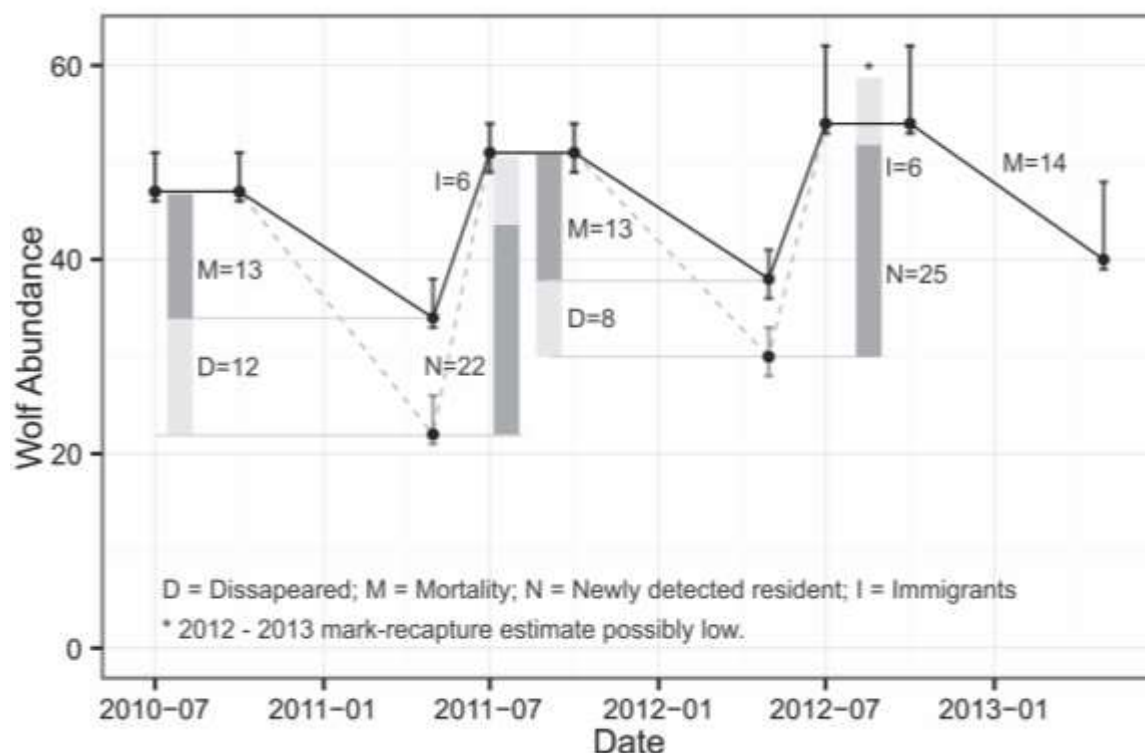


Figure 12: Wolf abundance estimates for the entire study area (Slovenia + transboundary packs in Gorski Kotar, Croatia). Annual fluctuations have been calculated by subtracting detected mortality (solid line) or "missing" wolves, not detected in the following season (dashed line), respectively. Since only one wolf missed in the second season reappeared in the third, we can reasonably assume that the majority of "missing" wolves either died or emigrated from the area. We used pedigree reconstruction to differentiate between resident wolves and their offspring, and wolves that recently immigrated in the area.

About 38% of wolves in Slovenia live in transboundary packs. Every year approximately 56% of new wolves (two-season average) appear in the area: 45% through reproduction in resident packs, and 11% through immigration. Additional to the detected mortality, which was on average 13.3 individuals (~26%) per year for the three-year monitoring period (for the entire area, Slovenia + transboundary pack areas in Croatia), wolves "disappear" from the area through emigration and undetected mortality. On average 10 wolves (~21%) went missing in each of the two seasons when this estimate was possible, which included 3.5 reproductive wolves (~26%). Each year also 1-2 reproductive wolves (~8.5%) died. This makes the annual removal of reproductive wolves (death or emigration caused by death of the wolf's partner) on average ~29%.

The results show that while the abundance fluctuates considerably at the annual scale, it seems very stable from year to year. This is expected according to the species biology, where high (and frequently undetected) mortality follows dispersion of young animals, while survival of reproductive wolves is high. However, the possibility of poaching

should not be discounted, since it is certainly present in the area, but very hard to quantify with the current data. Wolves on the other hand have a very high reproductive potential to rapidly compensate for the losses.

More important than total mortality is disappearance of reproductive wolves, which can lead to local extinctions in a certain area. Although it seems that such "holes" are filled rapidly, we were able to witness a local extinction at the area of Menišija (south of Ljubljana) in 2011-2012 season. This shows that extreme caution is warranted in any management intervention since any mortality in the low abundance we have can rapidly cause a temporary local extinction.

Geneflow along Dinaric mountains.

The pedigree analysis provided us with an unprecedented insight into geneflow along the Dinaric Mountains (Figure 13). We can see that spatial fragmentation is not an issue for this species, and that the intensity of geneflow is high.

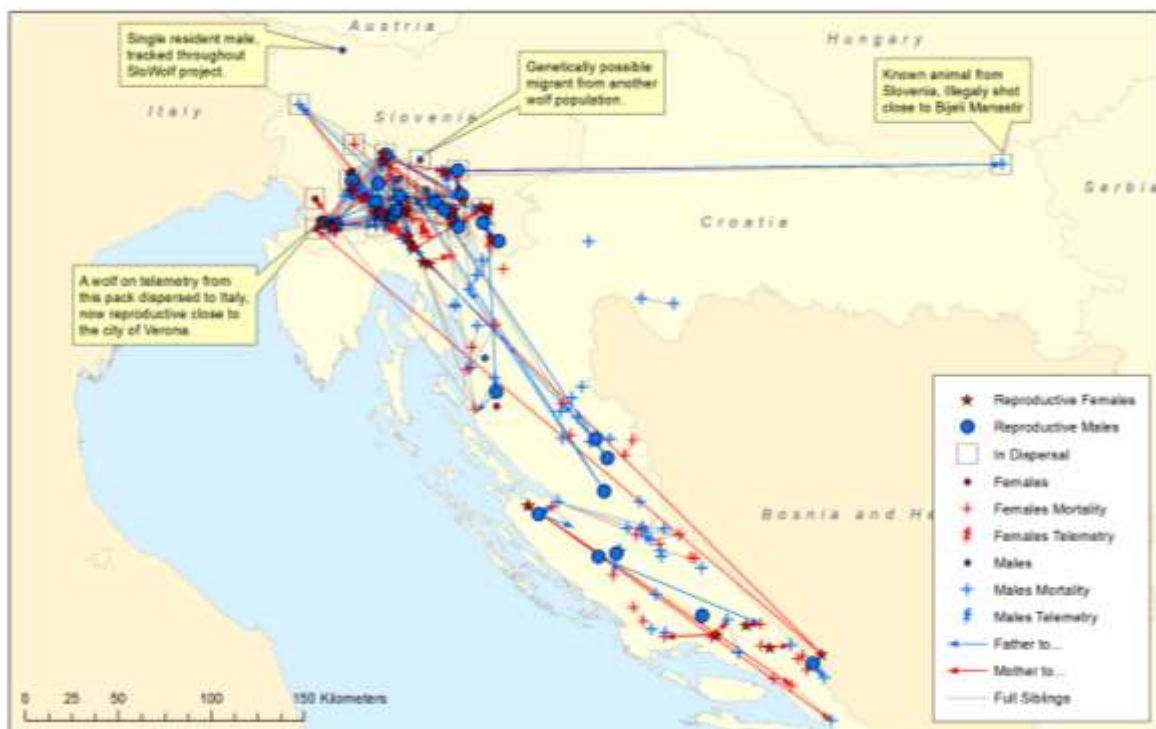


Figure 13: Geneflow between wolves in Dinaric Mountains. We can observe very long dispersals (e.g. the wolf in the SE was actually tracked in its birth pack in Slovenia prior to dispersal) and high connectivity.

Sampling intensity in Croatia is much lower than in Slovenia, and spread-out over a long time period (1995 - present). Nevertheless we detected a considerable number of family relations, which indicates a constant movement of animals in both directions along the mountain range. This additionally stresses the need in transboundary collaboration and population-level management as the Dinaric countries actually share a single, well-connected population.

Analysis of wolf-dog hybridization in Slovenia and NW Dinaric Mountains

The analysis provided a clear differentiation between wolves and dogs, and also a reliable detection of F1 and F2 hybrids. We didn't detect any dog - hybrid backcrosses, but we observed that wolves from other populations can be detected as pure wolf - hybrid backcrosses. The results are presented in figure 14.



Figure 14: Analysis of wolf - dog hybridization in the NW Dinaric Mountains. The absence of F1 and F2 hybrids in the north indicates that the three animals with a different genotype (wolf-hybrid backcross) are likely immigrants from another wolf population or animals escaped from captivity. There is no hybridization in the north, however this problem seems quite urgent in southern Croatia in Dalmatia.

We didn't detect any wolf-dog hybridization in Slovenia. We did detect 3 animals (2 in Slovenia, 1 south of Zagreb in Croatia) in the northern Dinaric Mountains classified as possible wolf-hybrid backcrosses. The same result was observed for the three individuals originating from other wolf populations we included in the analysis, and considering the complete lack of detected hybrids outside of Dalmatia it would seem that immigration from another wolf population (or escape of captive animals) is the most likely explanation. This hypothesis remains to be confirmed through collaboration with other laboratories.

Wolf - dog hybridization is a considerable problem in Dalmatia. Ecological circumstances there are considerably different than in the rest of the area, with very low forest cover and practically zero natural prey. The wolves appeared there during 1990s. They feed mainly on livestock, causing considerable damages and very low tolerance among local people. They are often shot on sight, with poachers frequently hanging the carcass on a visible place (e.g. a traffic sign). This high mortality and high contact with humans create ideal conditions for hybridization, but the exact drivers of the process still remain to be studied.

To conclude, genetic study was a critical part of the SloWolf project, and an overwhelming success. While the main goal has been estimating wolf abundance, which was often a critical issue in wolf conservation in Slovenia, the project results go well beyond that goal. What we are showing in this report are only summary of the findings; the study provided pack-level, or in many cases even individual-level understanding of our wolves.

The project provided everything needed for continuous genetic monitoring of Slovenian wolves: a robust, objective estimate of the current status and the know-how to efficiently continue with this type of monitoring in the future.

Point 4 (Surveillance of individual wolves using GPS-GSM telemetry)

During the project we captured 12 wolves. Seven of them were equipped with GPS/GSM collars and monitored with telemetry (Table 3). The other five wolves were too young and we released them without collaring in order to avoid any problems with the collar during their growth. Among the seven collared wolves there were four males and three females, including two breeding females. Although eight wolves were planned to be equipped with GPS collars, the realized seven wolves is a great success for telemetry studies of elusive animals like wolves.

Table 2: Information about captured and collared wolves within the project. Age and weight measurements refer to the time of capture.

WOLF	SEX	AGE	WEIGHT	PACK	POSITION IN THE PACK
BRIN	male	3 years	38 kg	Slavnik	subordinate male
VOJKO	male	5 years	40 kg	Vremščica-Nanos	subordinate male
SLAVC	male	2 years	40 kg	Slavnik	subordinate male, later dispersed and became alpha male in a new pack
LUKA	male	1 year	26 kg	Gotenica	subordinate male
TONKA	female	6 years	33 kg	Vremščica-Nanos	breeding alpha female
TIA	female	2 years	30 kg	Rog	subordinate female
JASNA	female	4 years	35 kg	Gotenica	breeding alpha female

The fates of the GPS-collared wolves are presented in Table 4. Although collars were scheduled to last for 58 weeks (406 days), the average monitoring time was 204 days. Shorter monitoring time was due to mortality and/or lost signals of monitored wolves. One wolf dispersed to Italy and there survived until the drop-off mechanism of the collar activated and in 2013 established new reproductive pack with a territory in Lessinia Natural Park, Italy. One alpha female wolf was still being monitored during the time of preparation of this report (25.3.2014).

The first wolf collared in the project in 2010 was a subordinate male named “Brin”. He was a member of his natal transboundary pack “Slavnik” and he stayed with this pack until being legally shot six months after collaring.

In 2011 three wolves were equipped with collars. Subordinate male named “Vojko” was member of his natal pack “Vremščica-Nanos”. We lost his signal after three and a half months inside his home range. Since GSM and VHF signals were lost simultaneously, although they have separate batteries and according to the informal information we received, we suspect that he was illegally killed and his collar destroyed.

Table 3: Fates of collared wolves and time of monitoring.

WOLF	DATE OF CAPTURE	FATE	DURATION OF MONITORING
BRIN	13.4.2010	20.10.2010 legally shot	190 days
VOJKO	6.5.2011	26.9.2011 signal lost, probable poaching	143 days
SLAVC	17.7.2011	emigration to Italy in December 2011; 27.8.2012 successful drop-off activation; survived till 2014	407 days
LUKA	27.8.2011	15.5.2012 signal lost (car collision, probably still alive)	262 days
TONKA	18.5.2012	18.9.2012 collar lost (died in vehicle collision 10.6.2013)	123 days
TIA	5.7.2012	22.9.2012 legally shot	79 days
JASNA	15.8.2013	collar still active (on 25.3.2014)	223 days

Subordinate male named “Slavc” was in the beginning of his monitoring member of his natal pack “Slavnik”. In December 2011, five months after collaring, he left his natal pack and dispersed. During dispersal he crossed entire Slovenia, large part of Austria and the Italian Alps before settling in the Lessinia Regional Park in Italy, where he, together with a female from Italian population named “Juliette”, established the first wolf pack in that region. Dispersal lasted 100 days during which this wolf overcame several anthropogenic and natural barriers such as highways, railways, urbanized and cultivated areas, river dams, large rivers and mountain ridges (Figure 8). The total consecutive straight line distance between his locations was 1176 km and the straight line distance between natal and new home range approximately 200 km. We monitored wolf “Slavc” with telemetry until 27th August 2012 when drop-off system in his collar activated as scheduled and we were able to retrieve the collar. A manager from Lessinia Natural Park informed us that currently “Slavc” is still alive and in 2013 first litter was born to the newly established pair. Thus this is the first recorded case of reproduction between wolves from Italian peninsula and Dinaric-Balkan populations. Due to great distance travelled and first recorded re-colonization of this part of the Alps by the wolves the monitoring of “Slavc” received considerable attention by the public and media. Monitoring of its dispersal also led to tight collaboration among wolf researchers in Slovenia, Austria and Italy and improved the networking among institutions of these three countries.

In total we obtained 10009 (8552 successful) GPS locations from collared wolves as planned (cca. 8000-10000 fixes), on average 1221 locations per wolf. The average GPS fix success rate was 85% with a range from 76 to 96% for each collar. The average home range size of wolves in Slovenia estimated with 100% minimal convex polygons was 403 km² with a range 259–560 km².

It has to be noted that several wolves have been monitored only for a few months, thus the annual home range sizes would likely be larger. Nevertheless, high sampling density and accuracy of the GPS locations gave us a good understanding of home range sizes and movements of wolves in Slovenia, which is comparable with results from other regions with similar environmental conditions.

Large number of GPS telemetry data together with other data on signs of wolves presence (non-invasive genetic samples; urine, scats, damage cases on livestock) enabled us to build a habitat suitability model for wolves in Slovenia (part of Revised Action plan; Action E.6, Yearly report).

Table 4: Telemetry data collected and home range sizes of collared wolves (estimated with 100% convex polygons).

WOLF	DURATION OF MONITORING	SUCCESSFUL GPS LOCATIONS	GPS ATTEMPTS	FIX SUCCESS	HOME RANGE
BRIN	190 days	1323	1384	96%	422 km ²
VOJKO	143 days	922	1063	87%	550 km ²
SLAVC	407 days	2445	2793	88%	442 km ²
LUKA	262 days	1375	1674	82%	560 km ²
TONKA	123 days	701	918	76%	266 km ²
TIA	79 days	447	545	82%	259 km ²
JASNA	108 days	647	768	84%	320 km ²
TOTAL	1427 days	8552	10009		
AVERAGE	204 days	1221	1430	85%	403 km²

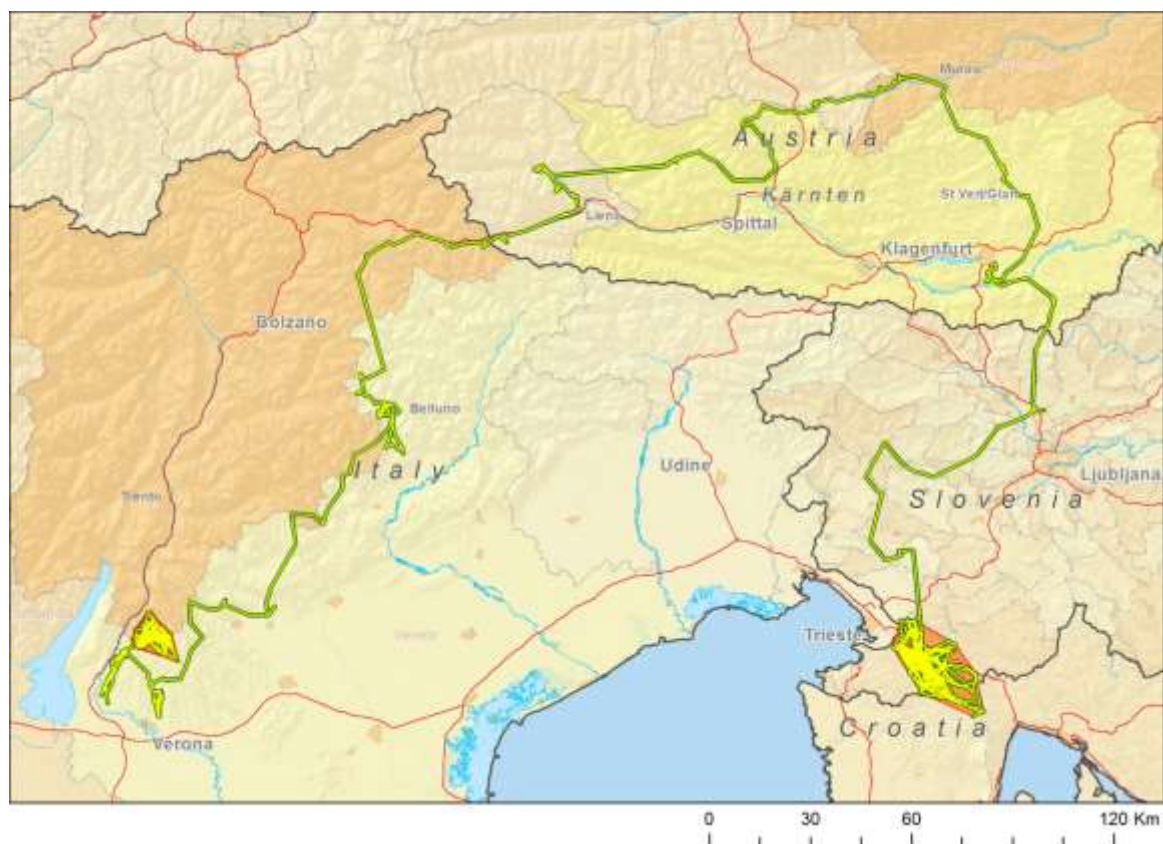


Figure 15: We obtained 2445 successful GPS locations from collar of male “Slave”. His home range while staying with the natal pack “Slavnik” measured 442 km². During his dispersal he walked over 1000 km (red). His home-range size after he settled down in Lessinia was estimated to 117 km².

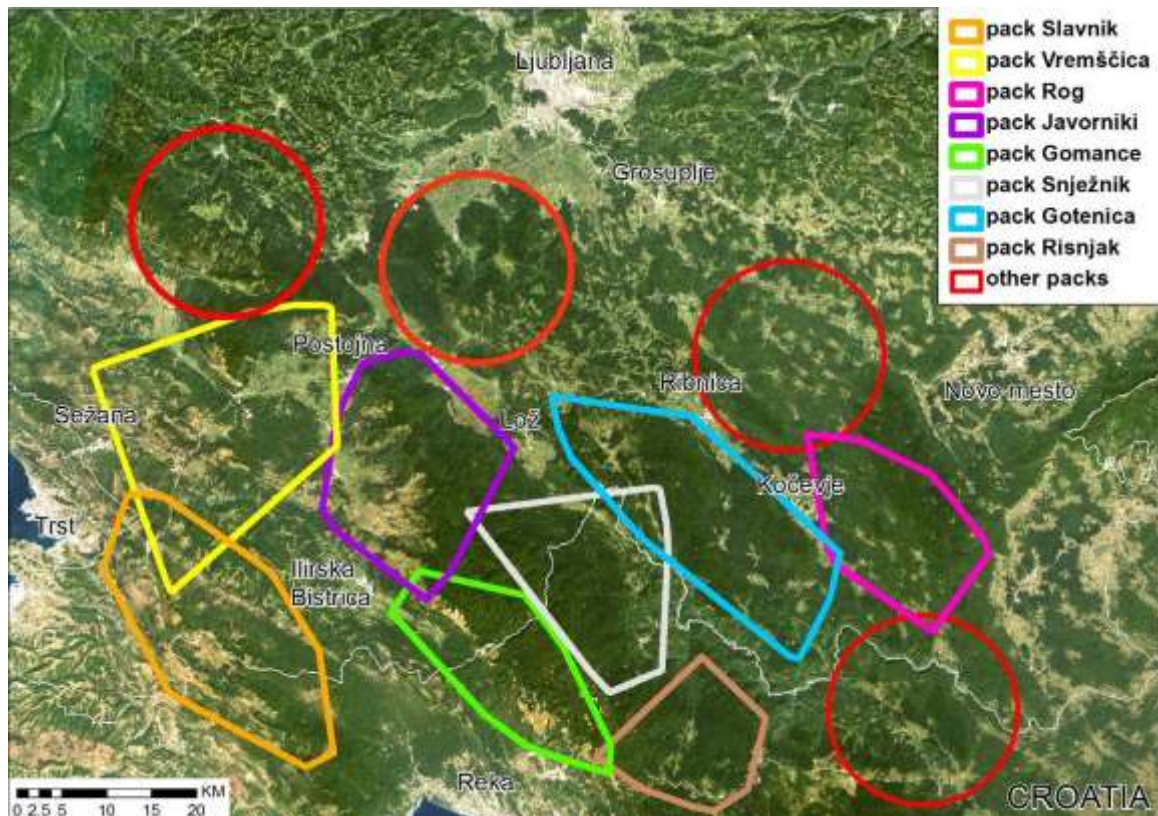


Figure 16: Map of distribution of wolf territories in Slovenia and neighbouring part of Croatia based upon data collected within SloWolf and other projects. Red circles represent approximate territories of packs that were not monitored with telemetry, but detected with other methods (size of circles correspond to average home-range size of packs monitored with telemetry).

Using telemetry data we developed a habitat suitability model for the Wolf in. For the model we used multivariate logistic regression approach and generalized linear model (GLM). While selecting environmental variables, we avoid the use of a large number of variables that are not directly related to the biology of wolves and thus increased the biological meaning of interpreted model. In a global model, we included 12 variables that are related to distribution, amount, fragmentation (R1km , R3km , R9km) and distance from the forest and from open areas, relief variables, altitudes, slope, distance from anthropogenic structures (roads , settlements) and relative densities of ungulates. After the assessment of all the model candidates, we used different approaches to select the best final model. For the minimal adequate model, we considered the model with the lowest AIC(Burnham in Anderson, 1998), in the case of identical AIC, the model with the smallest number of variables .

The most successful model was described by three parameters, which best explain the variance in habitat use of wolves. These were distance to settlements, distance to the forest and forest fragmentation (R9km) (Figure 10).

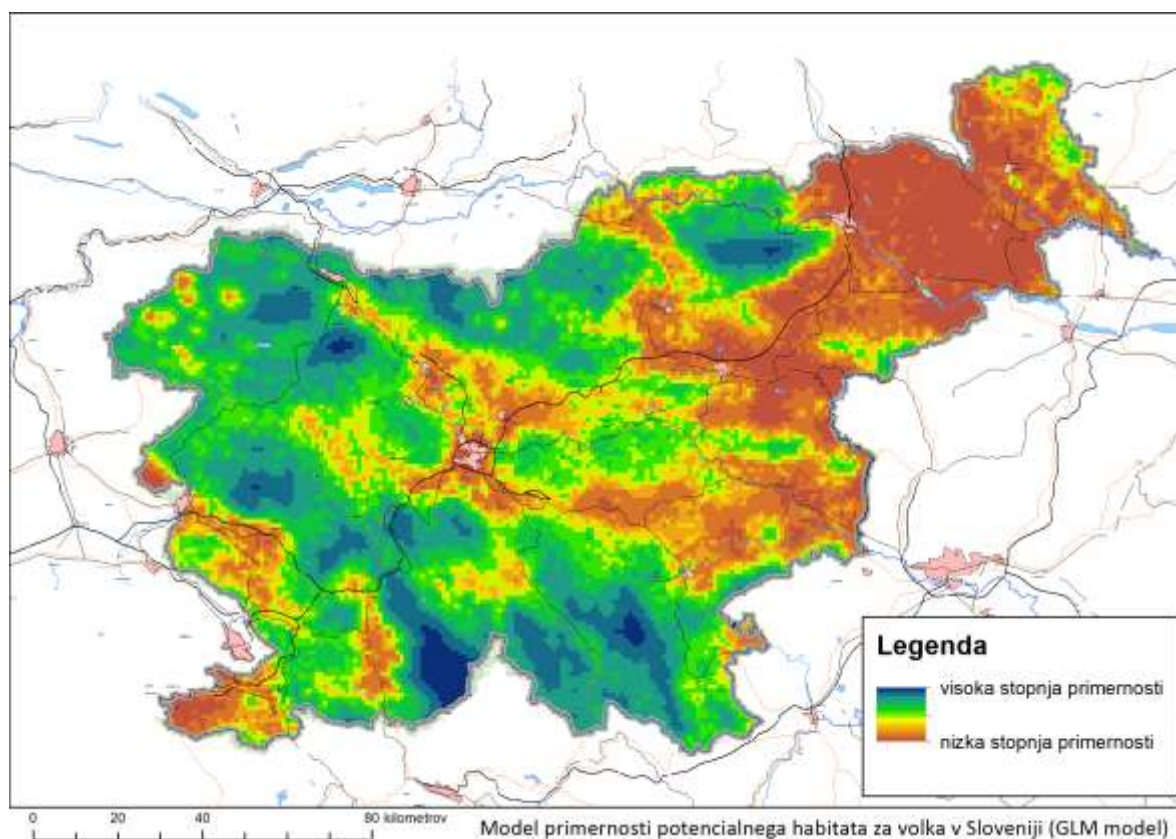


Figure 17: Habitat suitability map for the Wolf (*Canis lupus*) in Slovenia

In total we found 83 wolf prey remains, which is less than predicted goal (100-150). This was the consequence of short duration of monitoring of collared wolves (204days) due to their unexpectedly high mortality rate. Nevertheless, we consider the collected sample adequate for estimating prey use of wolves in Slovenia.

Since probability of detecting potential kill site using telemetry data (GPS location cluster analysis) and finding prey remains in the field depends on the size of the prey, these results probably underestimates the proportions of smaller prey. For this purpose use of scat analysis gave us more reliable results and analysis of found prey remains is most useful for determining the proportion and demographic structure for larger prey. Therefore additionally wolf diet was studied in the project area, occupied by 8 to 10 packs between 2010 and 2012 using indirect method of scat analysis of 475 scats. Pack affiliation was determined for all sampled scats using telemetry data on wolf's territories and/or genetic information on parentage analysis. (Yearly session report on surveillance of wolf population in Slovenia - Third session year).

Table 5: Structure of prey species in found wolf prey remains.

Scientific name	English name	n	%
<i>Capreolus capreolus</i>	European roe deer	31	38%
<i>Cervus elaphus</i>	Red deer	50	60%
<i>Sus scrofa</i>	Wild boar	1	1%
<i>Vulpes vulpes</i>	Red fox	1	1%
TOTAL		83	100%

Table 6: Sex and age structure of found prey red deer that were predated by wolves.

	males	females	unknown	TOTAL	%
0+	4	4	15	23	52%
1+	1	5	1	7	21%
2-5+	2	0	0	2	6%
6-9+	1	0	0	1	3%
>10+	0	6	0	6	18%
Adults of unknown age	0	3	2	5	
Adults total	4	14	3	21	48%
Unknown age	0	2	4	6	
TOTAL	8	20	22	50	
%	31%	77%			

Wolf diet from northern Dinaric wolf population was studied in an area of 5800 km² occupied by 8 to 11 packs between 2010 and 2012 using indirect method of scat analysis. Pack affiliation was determined for all sampled scats using telemetry data on wolf's territories and/or genetic information on parentage analysis. We assessed variation in diet composition of main wild ungulate prey species (roe deer (*Capreolus capreolus*), red deer (*Cervus elaphus*) and wild boar (*Sus scrofa*)) and livestock between packs or groups of adjacent packs in three regions (Kočevska, Notranjska and Primorska regions). Relations between wild ungulate densities, small cattle (sheep and goat) abundances, wolf's diet and livestock depredation rates were analysed. National statistical data on small cattle and land-use were used to calculate small cattle availability for particular wolf pack or regions. Diet composition was compared between livestock grazing (Apr, May – Oct, Nov) and non-grazing (Oct, Nov – Mar, Apr) seasons as well as between three periods in relation to pup-rearing period and subsequent pack mobility (early pup-rearing period May-Aug, late pup period Sep-Dec, nomadic period Jan-Apr). Among wild prey species, cervids (red deer and roe deer) and wild boar, were the main prey of wolves in all studied packs ranged from 78 % to 98 % (F.O.) in their diet. However there was largest variation of cervids in their diet between packs ranged from only 35 % to over 83 %. Wild boar ranged from 17 % to 39% in overall diet between packs or pack groups. There was a

positive correlation between red deer densities and amount of cervids in the wolf diet. Wolves preyed on wild ungulates more in Kočevsko and in Notranjska region than in the Primorska region; the contrary was the case for livestock. Livestock (sheep and goats in 99 %) represented 1.9 % to 22.2 % in the diet of particular wolf pack. In two packs studied in Primorska region, small cattle occurred in high proportions 12.9 % and 22.2% despite comparable overall wild ungulate densities to the other two regions, but with lower red deer density. We were interested which environmental factors influence this great variation in feeding upon small cattle. Therefore we developed prediction model which revealed the most important environmental factors that influence feeding on small cattle is a density of red deer (Third yearly session report). Besides red deer, the density of roe deer and average abundance of small cattle in the wolves' territories explained substantial part of the feeding variance.

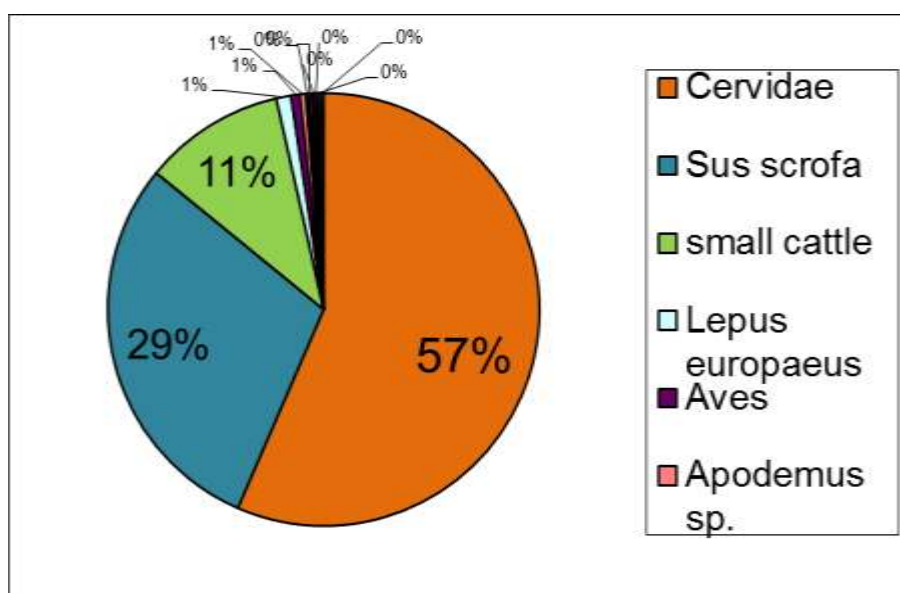


Figure 18: Structure of prey species in wolves diet from scat analysis

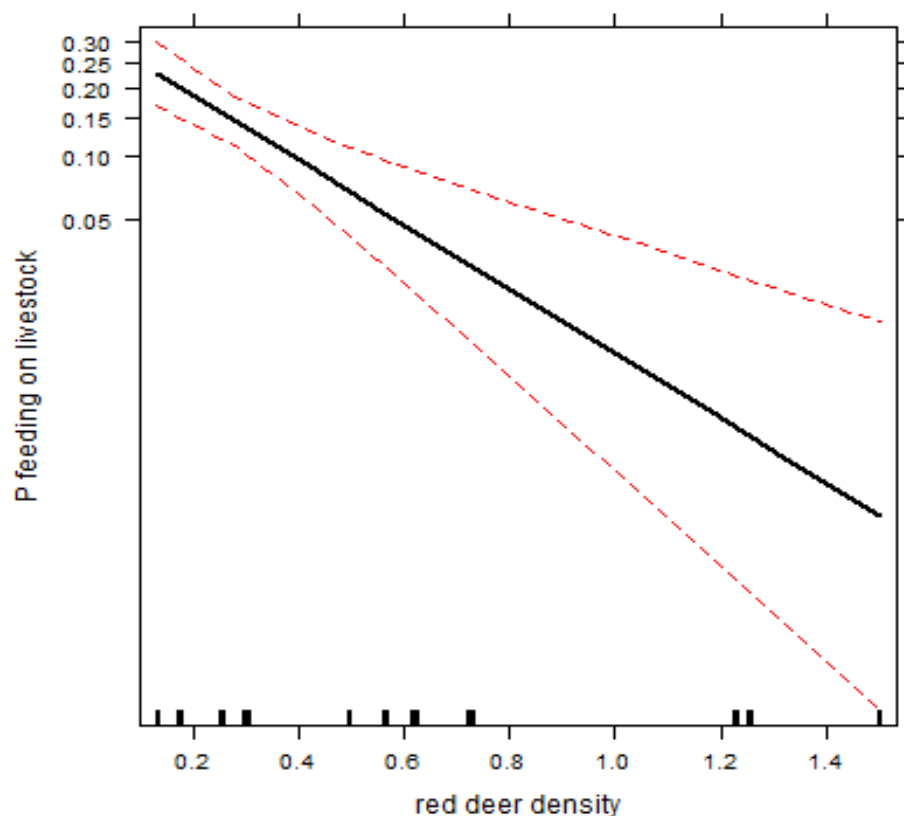


Figure 19: Effect of relative red deer density in wolf's territories on probability of feeding on small cattle (livestock)

Generally, a telemetry surveillance of wolves proved to be very successful, since a high resolution spatial data about wolves' movements and distribution of packs were obtained. Additionally, during capturing wolves, large proportion (over 60%) of non-invasive samples (scats) were collected that were used for DNA analyses as well as a large sample of prey remains and scats for nutrition-predation analyses were collected. Combination of several methods improved the results of a wolf monitoring system un-proportionally, thus allowed to obtain one of the best insights into wolf population status in Europe.

Point 5 (Wolf Monitoring Portal):

The Wolf Monitoring Portal has been developed with external assistance and has passed through the test phase and is currently available and used by the project partners. The database is being filled with different wolf-related data (genetic samples, damages to livestock, telemetry data, howling survey data, snow tracking data).). It has 66 registered users with 3899 entries of signs of wolf presence. The portal is now available at <http://portal.volkovi.si> and is integrated within the project website. Manual for users has been prepared and is available online (Annex 7.2.2.12. – manual). Overall this part of the C1 action has been completed successfully.

5.1.2.2 Action C.2: Improvement of management of wild ungulate species

To improve management of ungulates we conducted 6 workshops of which the first two on 29th and 30th Nov. 2011 (participant lists submitted as annexes with the progress report) where we discussed the broader relation between wild carnivores their prey and forest habitats (Book of abstracts provided as annex with the progress report). On the third and



Figure 20: Workshop discussion in progress.

fourth workshop (participant lists provided as annexes with the progress report), where hunters and managers were present, we discussed the problems they see especially in roe and red deer management, in the areas where wolf is present. The fifth meeting was organized only among managers from SFS (list of participants provided as an annex with the progress report) where concrete requirements for prey species management were produced on the basis of the results of previous workshops. All workshops were very constructive and raised many important issues which in our opinion had to be negotiated further among all stakeholders. We therefore prepared draft management recommendations (provided as an annex with the progress report) which were discussed at the additional (sixth) meeting on 29.1.2013 (list of participants provided as annex with the progress report) and the final version was circulated among stakeholder and posted on the web-page in early February 2013 (Annex 7.2.2.3. – Final version of the recommendations). Written instructions were integrated into yearly hunting management plans for 2013 and are being implemented. We can therefore consider this action as completed very successfully within the predicted budget.

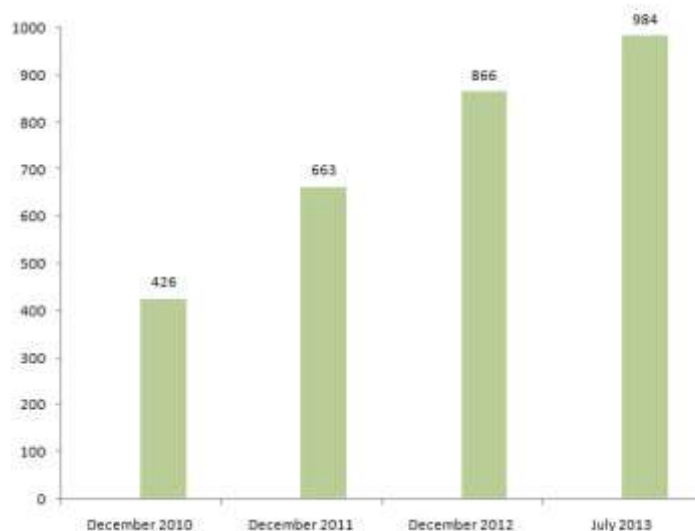
5.1.2.3 Action C.3: Involvement of hunters and volunteers in the wolf population monitoring activities

During the project hunters and other volunteers were included in different activities; they were included in different seminars, wolf howling surveillance activities, snow-tracking sessions and non-invasive sample collection, as described in action C1. Instructions for volunteers were prepared, printed, distributed and published on Life+ SloWolf website www.volkovi.si. Material for non-invasive sampling was distributed on field.

We finished with activities for volunteers of this action at the end of July 2013. Altogether 2429 individual volunteer participations were included in wolf surveillance activities: 984 volunteers interested in wolf research were registered in our database and regularly invited

to educational seminars and to participate in field surveys, 891 volunteers and hunters attended educational seminars, 453 took part in winter snow tracking, 245 in summer wolf howling monitoring.

Figure 21: Number of hunters and other volunteers that expressed an interest in participating in wolf population monitoring activities recorded in our database from 2010-2013.



During summers 5 seminars for volunteers for summer wolf howling surveillance were organized and attended by 196 participants. Summer wolf howling surveillance was done in 3 seasons by 245 volunteers. With their inclusion it was possible to monitor an area up to 3384 km² in one day.

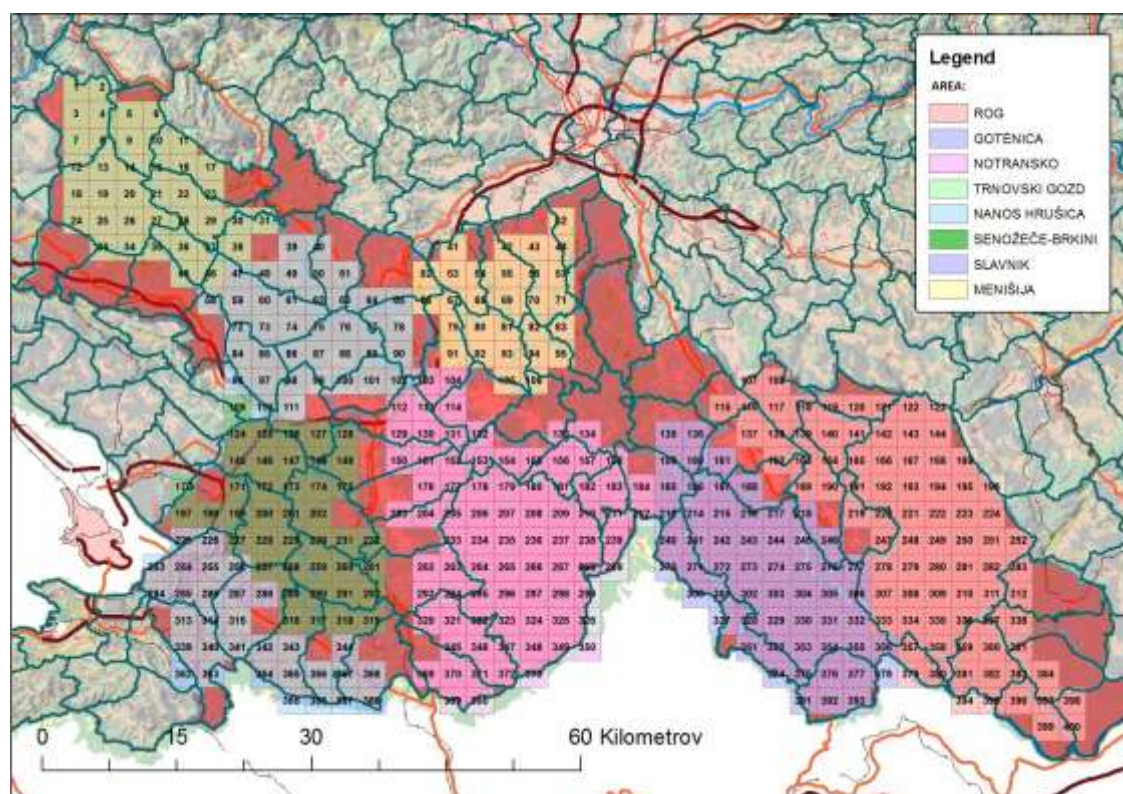


Figure 22: Total area of 3384 km² for wolf howling surveillance was monitored at once in summer 2012 by 120 volunteers in 65 groups.

There were 65 winter snow-tracking sessions organized, 7 in season 2010/11, 24 in 2011/12, and 4 in 2012/13 what exceeded our expectations. Altogether 453 volunteers and hunters were included and 20 winter seminars were attended by 359 volunteers and 336 hunters. In winter minimum of 2230km of forest roads were checked, 171 km of wolf tracks were followed and 185 genetic samples were found. All involved volunteers received a promotional T-shirt. Drink, food and cost for petrol were refunded only in summer howling activities and on winter snow tracking 19.1.2013, where almost all wolf area was covered in one day.



Figure 23: Area of winter snow tracking. 2/3 of it were covered by 74 participants in 31 groups on February 19th 2013. They tracked 5 different wolf packs.

Activities of this action were organised in modified time schedule and more extended work – it was carried out almost throughout the whole year on the same planned budget. Collaboration with

interested and trained volunteers was used to improve coverage of study area, although it is often difficult to coordinate such large groups of volunteers at once, especially in winter activities, when large varieties in snow and weather conditions exist. Hunters' response was lower than expected but overall, we are surprised about large interest of volunteers, participating in these actions in previous months and years, about their big involvement and interest, exceeding all our expectations. All annexes relevant to the implementation of this action were provided with the previous reports.

Table 7: Summarization of summer activities for hunters and volunteers from 2010-2012 (Vol-volunteers, Hu-hunters, SFS-Slovenian Forest Service personnel, SloW-SloWolf project members).

Summer activities:	Period	Nr.of days	Nr. of volunteers	Area (Nr. of quadrants 3X3 km ²)	Nr. of howlings	Nr. of howling sessions	Litters detected	Territorial howling responses of adult wolves	Participants
Summer wolf howling surveillance 2010 -2012		18	245	860	2506	7432			Vol,SFS,SloW
Summer wolf howling surveillance 2010	30.8-7.9.2010	9	65	272	740	2191	6	7	Vol,SFS,SloW
Summer wolf howling surveillance 2011	17.8-25.8.2011	6	60	216	650	1944	7	2	Vol,SFS,SloW
Summer wolf howling surveillance 2012	16.-19.8.2012	3	120	372	1116	3297	5	4	Vol,SFS,SloW
Educational seminar for volunteers for summer wolf howling surveillance 2010-2012		5	196						Vol
Educational seminar for volunteers for summer wolf howling surveillance 2010	July 2010	1	20						Vol
Educational seminar for volunteers for summer wolf howling surveillance 2011	22.7. and 9.8.2011	2	85						Vol
Educational seminar for volunteers for summer wolf howling surveillance 2012	25.7.2012 and 6.8. 2012	2	91						Vol
Unformal volunteers meeting 2011	18.9.2011	1	40						Vol, SloW
Unformal volunteers meeting 2012	24.9.2012	1	30						Vol, SloW
Registered volunteers in Database December 2010	December 2010		426						Vol
Registered volunteers in Database December 2011	December 2011		663						Vol
Registered volunteers in Database December 2012	December 2012		866						Vol
Registered volunteers in Database July 2013	July 2013		984						Vol
Summer activities:		30	511	860	2506	7432			

Table 8: Summarization of winter activities for hunters and volunteers from 2010-2013 (Vol-volunteers, Hu-hunters, SFS-Slovenian Forest Service personnel, SloW-SloWolf project members).

Winter activities:	Period	Nr. of days/ winter snow tracking days	Nr. of days when signs of wolves were found	Nr. of Vol	Nr. Of groups	Approximate minimum length of forest roads checked (km)	Approximate length of wolf (<i>Canis lupus</i>) tracks followed (km)	Nr. of scat genetic samples	Nr. of urine genetic samples	Nr. of genetic samples	Participants
Winter snow tracking 2010-2013	5.2.2011-21.3.2013	65	48	453	226	2230	171	81	104	185	Vol,H,SFS,SloW
Winter snow tracking 2010/2011	5.2-30.3.2011	7	7	37	28	375	10	3	8	11	Vol,H,SFS,SloW
Organised group snow trackings 2010/2011	4.3-30.3.2011	3	3	57	24	375	10	3	8	11	Vol,H,SFS,SloW
Individual-local winter snow trackings 2010/2011	5.2.-4.3.2011	4	4	10	4	?	?	?	?	?	Vol,H,SFS,SloW
Winter snow tracking 2011/2012	21.12.2011-1.3.2012	24	17	134	63	771	25,5	36	32	68	Vol,H,SFS,SloW
Organised group snow trackings 2011/2012	9.2.2012-29.2.2012	7	5	111	25	?	?	24	17	41	Vol,H,SFS,SloW
Individual-local winter snow trackings 2011/2012	21.12.2011-1.3.2012	16	12	24	19	?	?	12	15	27	Vol,H,SFS,SloW
Winter snow tracking 2012/2013	7.12.2012-21.3.2013	34	24	282	135	1084	135,5	42	64	106	Vol,H,SFS,SloW
Organised group snow trackings 2012/2013	7.12.2012-17.3.2013	11	9	202	83	832	67	23	56	79	Vol,H,SFS,SloW
Individual-local winter snow trackings 2012/2013	14.12.2012-21.3.2013	21	11	59	30	252	19,5	19	8	27	Vol,H,SFS,SloW
Organised snow tracking from SFS 2012/2013	9.2.2013-24.2.2013	4	4	21	21	?	49	?	?	?	SFS
Seminar for Hu for winter snow tracking 2010-2013	2.11.2010-11.1.2012	20		359							Hu
Seminar for Hu for winter snow tracking 2010	2.11-4.11.2010	10		112							Hu
Seminar for Hu for winter snow tracking 2012	9.-11.1.2012	10		105							Hu
Seminar for Hu for winter snow tracking 2013	29.1-31.1.2013	10		142							Hu
Seminar for Vol for winter snow tracking 2010-2013	6.1.2011-15.1.2013	5		336							Vol
Seminar for Vol for winter snow tracking 2010/2011	6.-12.1.2011	3		258							Vol
Seminar for Vol for winter snow tracking 2011/2012	20.12.2011 and 15.1.2012	2		61							Vol
Seminar for Vol for winter snow tracking 2012/2013	15.1.2013	1		17							Vol
Winter activities summary:		90	48	1148	226	2230	171	81	104	185	

5.1.2.4 Action C.4: Improvement of wolf damage inspections and training of inspectors for recognition and evaluation of large carnivore damages to agriculture

The aim of this action is to improve inspection of damages caused by large carnivores. In November 2010 we successfully carried out the first seminar for damage inspectors, which have taken place on the Veterinary Faculty in Zagreb, Croatia. In the first part of the seminar experts on large carnivore damages gave us lectures how to distinguish damage cases done by different wild animals and which for human dangerous diseases wild animals can have. The second part of the seminar has taken place in the anatomization room, where gathered knowledge has been tested on carcasses of animals killed by the wolves. The seminar was attended by 55 damage inspectors (Lists of



Figure 24: Training of inspectors for recognition and evaluation of LC damages

participants provided as annex in the mid-term report).

Handbook for recognition of damages done by large carnivores on livestock (deliverable provided as an annex in the mid-term report) with damage inspection protocols has been finished and distributed among damage inspectors. This part of the action started as planned, but was prolonged. It was planned that the handbook will be finished and distributed 01. 10. 2010, but was finished and distributed in April 2011 as planned in the prolonged date, which was previously approved by the EC.

The second seminar was organized on 18.10.2012 in Slovenia and attended by 67 damage inspectors and MAE members (List of participants provided as annex in the progress report). The main topic was damage prevention. We invited 2 foreign experts, Umberto Vesco from Italy and Daniel Mettler from Switzerland to present the situation in their countries. SloWolf members presented successful implementation of damage prevention measures at selected wolf damage hot-spots (Action C.6). In the second part of the seminar we visited 2 best-practice farms included in action C.6.

All damage inspectors are equipped with a GPS and a photo camera all damage cases are georeferenced and photo documented. This action was completed as planned with a significant improvement in the work of damage inspectors as the main result.

5.1.2.5 Action C.5: Training of agriculture advisory service in damage prevention measures

Damages to the livestock are one of the most important causes of human-wolf conflict and preventing damages is very important for improving coexistence between wolves and agriculture. However, effective methods to prevent livestock depredations have been forgotten. Agriculture Advisory Service advisers work closely with farmers and give advice to farmers about best practice in agriculture. However, advisers sometimes lack the expertise about the effective prevention of large carnivore damages. This action was aimed to educate the advisors about the results of best practice implemented during the project (Action C.6).

The first training seminar for employees of the Agriculture advisory service was carried out on 6.12.2011 (Annex submitted in Progress Report) comprising eight lectures about objectives of SloWolf project, information about wolves and analysis of damages caused by wolves (Action A.4). Slovene Chamber of Agriculture and Forestry, presented their view on damages caused by wolves and representative of MAE presented modification of Rules on the appropriate manner of protecting property. The seminar emphasized the use of guarding dogs and portable electric fences for night enclosures as the most effective methods for damage prevention. After the seminar, participants visited hot spot farms where best practice damage prevention measures were implemented within action C.6.

The second seminar was organised on 12.9.2013 (Annex 7.2.3.1. - List of participants) in the final year of the project in order to present the excellent results of the best practice for prevention measures of wolf attacks on sheep (Action C.6). Seminar was organised in Auber, a village within wolf habitat in order to enable easier access of local agriculture advisors. We presented the analysis of effectiveness of prevention measures and the lessons learnt about the use of guarding dogs and portable electric fences for night enclosures. Slovene Chamber of Agriculture and Forestry, presented their view on damages caused by wolves and MAE presented their suggested solutions for preventing wolf depredation and for future damage payments. Participants were also shown video footage recorded by infrared cameras on the pastures (Action C.6), demonstrating the importance of proper setting and maintenance of high electric netting. All PowerPoint presentations from both seminars are available on the SloWolf project webpage. In the afternoon the participants visited a nearby farmer who implemented damage prevention measures donated in Action C.6.

Moreover, in addition to foreseen activities and in cooperation with the Chamber of Agriculture and Forestry of Slovenia we prepared an informational leaflet (Annex 7.3.3.1.) of effective sheep protection measures against wolf depredation, which was distributed by agriculture advisors to sheep breeders in the field. This was completed with no additional cost to the project. Overall, this action was completed as planned with agriculture advisor educated and increased cooperation of project partners with Agriculture advisory service which resulted in an additional deliverable. For future similar activities additional budget to cover participants travel costs would also be recommended as this would help to increase the number of participants at the seminar.

5.1.2.6 Action C.6: Best practice demonstration of damage prevention measures at selected wolf damage hot-spots

Action C.6., Best practice demonstration of damage prevention measures at selected wolf damage hot-spots has started in February 2011 and the beneficiary estimates that 100% of the work has been done.

Based on results of the action A.4., Slovenian Forest Service damage inspector's suggestions and sheep breeder's motivation to cooperate with us, hot spots to be equipped with damage prevention measures were selected. Livestock guarding dog experts were found and hired in March 2011. Overall, 16 different hot spots, out of originally planned 4 were equipped with high electric nettings, livestock guarding dogs or both types of prevention (Contracts with breeders were provided with the mid-term and progress reports), which is more than planned in project application. Overall, 13 livestock guarding dog pups out of originally planned 8, were donated and with the financial help of Slovenian Forest Service, 13 electric netting sets, out of originally planned 4, were donated to 10 different sheep breeders.

Electric nettings effectiveness was monitored directly on the field and through telephone contacts. Two sheep breeders did not use the electric fences as agreed in the contract and the nettings were moved to a different location. Dogs were monitored on a monthly basis by dog experts to control their physical and behavioral development, raising conditions as well as the sheep breeder's behavior towards the dog. Moreover, weekly phone contact was maintained with all sheep breeders. Intensive monitoring resulted in more than 200 reports about each dog development. Three dogs were separated from sheep and transferred to a new home: two showed excessive play behavior with young lambs resulting in injured and killed lambs while the other had a tendency to roam away from the flock.



Figure 25: Examples of warning signs erected at pastures with sheep guarding dogs.

Infrared cameras Uway NT50B were purchased to monitor potential large carnivore presence on hot spot pastures. We have gathered more than 40 GB of night shots, mostly recording brown bears entering the pasture due to lack of electric power in the electric nettings or other inappropriate use. The recorded shots were used to make a video footage demonstrating the importance of proper setting and maintaining of protection measures (Annex 7.3.3.2. – video on electric fences).



Figure 26: Electric fence erected in a pasture.

A popular article about good practice examples was published in the agricultural magazine (provided as annex in the progress report) and power point presentation about good practice examples were made for Agriculture Advisory Service (C.5) as well as for education of sheep breeders in the wolf area (D.2). With EC approval, the action report was postponed from 1st October 2012 to 28th February 2013, enabling us to report about reductions in wolf damages on hot spots for two whole grazing seasons, 2011 and 2012 (Annex 7.2.2.4. - Report). Overall, this action has been accomplished with results that overcome our expectations since we managed not only to demonstrate the best practice in damage prevention but also to considerably reduce the amount of wolf-caused damages. Already in the first two years these protection measures were in use, the compensations for wolf attacks paid to those farmers were nearly 200,000 € less than if damages remained at the previous levels, which comes close to covering the entire Slovenian co-funding contribution to the project. The key to success was the correct and consistent use of the protective measures.

5.2 Dissemination actions

5.2.1 Objectives

5.2.2 Dissemination: overview per activity

THE LIST OF DELIVERABLES AND MILESTONES FOR ACTIONS “D” AS DEFINED IN THE GRANT AGREEMENT AND STATUS OF FULFILMENT

Name of the Deliverable	Code of the action	Deadline	Fulfilment
DELIVERABLES			
Yearly bulletin of the project – 700 pieces – produced and distributed.	D1	15/12/2010	Completed
6000 brochures produced and distributed	D1	1/4/2011	Completed
1000 posters about the project produced and distributed.	D1	1/7/2011	Completed
1000 T-shirts with project logo	D1	1/10/2011	Completed
6000 brochures about damage prevention measures.	D2	1/10/2011	Completed
Yearly bulletin of the project – 700 pieces – produced and distributed.	D1	15/12/2011	Completed
500 copies of the produced documentary films + PowerPoint presentation.	D1	1/10/2012	Completed
Yearly bulletin of the project – 700 pieces – produced and distributed.	D1	15/12/2012	Completed
50 educational kits for high schools produced and distributed to biology teachers	D1	1/7/2013	Completed
Yearly bulletin of the project – 700 pieces – produced and distributed.	D1	15/12/2013	Completed
Layman’s report	D5	15/12/2013	Completed
Proceedings of the thematic conference	D6	15/12/2013	Completed
MILESTONES			
Project web site produced	D4	30/06/2010	Completed
Seminar about wolf conservation for teachers organized	D1	16/12/2012	Completed

5.2.2.1 Action D.1: Public awareness and education campaign about wolves on national and local levels

For this activity the responsible beneficiary was University of Ljubljana. The aim of this action was to run a targeted public awareness and education campaign based on knowledge-gap analysis provided by the attitude and knowledge survey (action A.6). The campaign started with development of the project **graphic design identity** (project logo, letter head, ppt template, ect.) and its promotion (presented in the Inception report). SloWolf logo together with LIFE and Natura 2000 logo were used on all promotional, educational and information materials and also on durable goods (car, GPSs, wolf collars, computers etc.). Campaign started as a promotion of the project goals and planned activities and involvement of the volunteers in C action activities. Four motives for the **T-shirts** (annexes provided in the Midterm report) were developed and produced for project promotion purposes and distributed to volunteers (two different motives for wolf howling sessions and winter snow tracking), hunters, farmers and project staff (project steering group and coo financers).

The **brochure “Wolves in Slovenia”** (annex provided in the Midterm report) was prepared in 6000 copies and as planned distributed on different project events and presentations to general public (2161), hunters (1055), schools - children, youth, teachers, students (670), livestock owners (546), project volunteers (314), libraries (130) and other interested parties (609). The remaining 500 copies will be distributed within After LIFE activities.

All four issues of the project **bulletin “Volčja sled”** (“Wolf track”) were prepared and distributed in 700 copies (Annex 7.3.3.3. – third and fourth issue of the bulletin; first issue provided as annex with the mid-term report and second issue with the progress report). The bulletins contained short articles about project activities and upcoming events. In every issue few of the project members expressed their attitudes toward wolf and how they feel working for the project. In the last issue we took opportunity to thank all the people involved in the project activities as an important part of the successful implementation of the project activities. Bulletin was mostly distributed to the libraries in the wolf presence area and to the project interest groups (hunters, farmers, decision-makers, foresters etc.) within project activities.

We designed and printed 1000 copies of the **project poster** (in two motives) carrying facts about wolf and main project messages (annexes provided in the Midterm report). They were distributed to school teachers and children within seminar for schools and to hunters and general public from the wolf presence areas on the documentary movie evenings and public presentations of wolves. We additionally designed and printed **two larger** (100 cm x 200 cm) **posters** including summary contents of the brochure with no additional costs to the project (annexes provided in the Midterm report). The posters were used in promotional display at a hunter’s fair in Gornja Radgona in April 2011.

Educational documentary film about wolves and main project activities (national wolf action plan workshops, educational lectures for damage inspectors, volunteers participating in the winter snow tracking, wolf howling sessions with hunters and volunteers, GPS-GSM telemetry field work and best-practice demonstration measures, etc.) was produced in the final project year (annex 7.3.3.4. – documentary on DVD). With the EC permission this 27 min long popular documentary movie entitled “Za volkovi” (“Following wolves”) was postponed twice in order to include as much project material as possible. The movie is in Slovenian and covers key information on wolf biology and its complex management. It was produced in 500 copies on DVD and about 400 copies have been distributed to project partners, libraries, media (all important national and private TV media companies) and interested individuals. As planned the movie was broadcasted six times within movie evenings for general public - Slovenian catholic Girl Guides and Boy Scouts Association, at libraries Grosuplje, Kočevje and Ribnica (located in the area of wolf presence), House of Experiments in Ljubljana and University Botanic Gardens Ljubljana. It was additionally broadcasted as a part of the lectures for hunters (action D.3). The number of visitors of the movie evenings exceeded project expectations (annex 7.2.3.2. – combined lists of participants). Due to the delayed production of the movie and its technical adaptation to TV standards (annexes 7.1.4. – e-mail correspondence with the TV company) it will be broadcasted on the national TV after the end of the project. The film is also available on Youtube (<http://www.youtube.com/watch?v=qW9kQsHbyMU>) The TV premiere will be promoted through project website and FB profile.

Unplanned but welcome, a documentary about the wolf Slave was prepared within German BR production and was broadcasted in February 2014: <http://www.br.de/fernsehen/bayerisches-fernsehen/programmkalender/sendung-475772.html>.

Another documentary movie about migrating wolves in Europe is in production. It will present three independent wolf stories in Europe of which one will be about wolves Slave and Julia. In both productions project members participated with the project data and expertise (annex 7.3.3.5. – movie trailer).

As a part of the educational tool kit the movie was prepared together with other educational materials for **school seminar about wolves**. Seminar for biology teachers was held at Biotechnical faculty in the end of the last project year. Participating 30 teachers (annex D.1.14 - List of participants) were first introduced to the project, its activities and wolf biology. Within the seminar the teachers visited the Slovenian ZOO where they had opportunity to observe large carnivores (lynx and brown bears as well) in captivity. The ZOO's role in animal research and conservation was presented to them under guidance of the head educator at the ZOO Ljubljana. Second part of the seminar was devoted to the introduction of didactic materials to the teachers. Teachers were actively engaged in learning about proposed activities for the students and they had the opportunity to discuss the didactic value of the materials for school setting. Finally, the teachers were presented the importance of including socio-scientific issues into modern biology instruction. Lecturer of biology didactics and graduate student (pre-service teacher) of biology led the second part of the seminar. In the end of the seminar teachers received **educational tool kit** containing an electronic teacher's handbook with worksheets for students and assessment sheets, PowerPoint presentation about wolves (annex 7.3.3.6. - PowerPoint presentation, annex 7.3.3.7. – handbook and assessment sheets), educational film about wolves, brochure Wolves in Slovenia and posters about wolves and the project (both provided as annexes in the mid-term report). All the materials were recorded to the USB key and are also available for download on the project website under tab Publications. Educational material focuses on several topics of wolf biology and conservation and they are aligned with middle and high school biology curricula as well. Therefore, they enable biology teachers to use this charismatic species as a model organism for biology lessons about animal structure and function, animal behaviour, cytology, genetics, ecology and human-wildlife conflicts. Participating teachers expressed high satisfaction with the seminar. The teachers evaluated the seminar with average 3.8 point (on the 4-point scale) (annex 7.2.2.5. – questionnaire, annex 7.2.2.6. – evaluation responses) In addition, workshops for high school students were conducted as well. Around 400 high school students participated who also evaluated prepared education materials. For that purpose, we prepared questionnaires where we assessed students' knowledge and attitudes toward large carnivores of Slovenia. Results will be presented in three graduation thesis. In January 2014 teaching materials will also be presented at the educational conference organized by Faculty of Education, University of Ljubljana.



Figure 27: Educational kits for teachers were packed into tubes with project label.

After releasing the project web-page (Action D.4) the first press release was prepared and sent to the list of media contacts. This list was regularly updated and till the end of the project it consisted of 203 media contacts. PR responsible in close cooperation of all project members prepared 22 **press releases** of which one was published in January 2014, 10 **short statements** for two project press conferences and one press release in Italian language for Italian media. The latter was about wolf Slave who in search for his territory crossed four European countries and finally settled in Italy (annex 7.3.3.8. – combined all press releases and short statements). Each press release was sent additionally to the **list of interested** individuals, NGOs (associations of hunters, livestock owners and other farmers, environmentalist) and representatives of the ministries and their agencies. We also uploaded them on the project website (tab “press release”), published under news section and sent to the Google group Dinaricum (project partner), whose members were involved in project wolf monitoring activities as volunteers (action C.3). Project members organized two **press conferences** and participated in another two of them. They were highly visited by the media, interest groups’ representatives, decision-makers (ministries and other organizations managing large carnivores), international scientific public and other parties. Each press release and conference was followed by high number of posts on internet and on TV, radio and newspapers as well. The main purpose of press release and organization of press conference was not only the project promotion and public presentation of the project results but also to raise public awareness of the wolf management complexity. In this way a lot of positive attention has been drawn to wolves and wolf conservation in the media. Within four year project period there were 361 internet media, 140 print, 22 radio and 32 TV clips. Articles, interviews, short project news were published in national and local media and several television and radio interviews have been made (annex 7.3.3.9. – List of media work, annex 7.3.3.10. – media clips). We recognize publishing news in local media and media that targets specific audience crucial when targeting wolf management primary interest groups such as livestock owners and hunters. In the first year of the project we made an agreement with hunting magazine “Lovec” to monthly prepare short articles about the project activities. In four years 21 short news and eight 3-6 pages long articles were published. Articles covered topics about the project SloWolf, wolf genetics, hunters’ support for wolf conservation in Slovenia, results of the wolf monitoring, etc. (see the List of media work). The project group prepared also articles about effective damage prevention measures and livestock owners’ experience with donated materials (action D.6) for the newspapers “Drobnica” targeting sheep and goat farmers and “Kmečki glas” targeting farmers. In the third project year undergraduate student Lara Kastelic prepared her **graduation thesis about media content analysis of wolves in Slovenia from year 2008 to year 2011** (annex 7.2.2.7. – graduation thesis). The results have shown the significant increase in media coverage of wolves already after the first year of the project.

Timely response on false media reports was identified as absolute necessary activity of public awareness raising. Therefore, two letters with démenti to media was prepared and published in daily newspaper with the highest circulation in Slovenia and main newspaper targeting farmers as a reply on the article with false and misleading information about the wolf management (7.3.3.11. and 7.3.3.12. - letters with démenti).

Lack of public interest and knowledge about wolves can present the potential threat to their conservation. We are aware that informed public creates an important stakeholder in decision-making process and can be capable of rational decisions in wolf management. That is why a

high number of **presentations of the project and wolves** were carried out for hunters (see action D.3) and general public. **Notice board about wolves in Slovenia** and about the project was prepared and installed on the educational trail in Mašun (annex 7.3.3.13. – photo) as well. When designing the notice board we used the official national guidelines for the Natura 2000 notice boards.

The project was also presented through additional activities as participation in EC **promotional event called “Biotska raznovrstnost, v tem smo skupaj”** (see link: www.vtemsmoskupaj.eu). The event about biodiversity was organized in Ljubljana in March 2011. Next month we participated with promotional corner on **annual hunting fair “Lov”** in Gornja Radgona through which we presented the project and disseminate project promotional and educational materials. The fair visitors were mostly hunters which represent the most important interest group in wolf management. We participated on annual events “Let’s play science” and “Week of forests” with **two workshops for children** (<http://www.volkovi.si/en/blog/230-delavnice-igrajmo-se-znanost> and <http://www.volkovi.si/en/archive/279-predstavitev-projekta-slowolf-na-tednu-gozdov-2013>).

Through role-playing we demonstrated the wolf monitoring method telemetry, children were recognizing footprints of the animals that live in Slovenian forests, we presented stories about each radio-collared wolf and gave basic information about wolf biology. **Illustrated book for children** about the story of the wolf Slavc (annex 7.3.3.14. – children’s book) was prepared in participation with the project members. The book is available also on the web bookstore: <http://www.buca.si/index.php?nav1=knjigarna&nav2=izdelek&id=3248>.

In March 2013 project was visited by dr. Joao Pedro Silva in order to prepare **an article for LIFE Focus issue** dedicated to conservation of large carnivores (annex 7.3.3.15. – article). We organized the meeting (on which the director of Slovene Hunting Association was present as well) (annex 7.2.3.3. – list of participants) and demonstration of good practice protection measures of sheep breeders who use the electric fences and LGD donated within the action D.6. We distribute this thematic issue of LIFE Focus on the SloWolf international conference in September 2013, together with other scientific materials that were disseminated and exchanged among large carnivore experts and other visitors of the conference.

On the LIFE’s 20th anniversary SloWolf project participated in a **photo completion and a competition to sum up, in 20 words or less, what LIFE means to the LIFE project members**. In each, three members sent their photos and statements. One of the sent photos was chosen for the final selection (but did not win) (annex 7.3.3.16. – photo). The main LIFE’s 20th anniversary event in Slovenia was organized by the Ministry of Agriculture and Environment, the second was **the opening of the exhibition about the grey wolf in Slovenia entitled “Twiggy in Bistra”** (7.3.3.17. – invitation) which was organized by the Technical Museum of Slovenia but the contents were prepared in close cooperation with the project members. The exhibition was an opportunity to celebrate anniversary of EU program LIFE, Habitat directive and Natura 2000.

In May 2013 project members were invited by **Faculty of Law** students and their mentors to consult the wolf legal protection in Slovenia: <http://www.pf.uni-lj.si/ob-studiju/pravna-klinika-za-varstvo-okolja/>. In October the same year, project coordinator presented recommendations for wolf management in Slovenia to the **Slovenian National Assembly** (annex 7.2.2.8. – recommendations).

Products of this broad action have been produced and the activities carried out as planned. Updates were regularly published on the project website. Many additional activities have arisen while working closely with people involved in the project. We saw this as an opportunity to upgrade and to improve planned campaign. High numbers of participants in workshops for national wolf action plan (action A.2) and volunteers involved in winter snow tracking (action C.1) indicates increasing public interest to participate in wolf management and project activities. Furthermore, increasing media interest in wolf conservation issues, building up new partnerships with journalists, their compliments in the end of the project is an opportunity we need to take to continue with intensive work based on good practice examples of communication when running other public awareness campaigns, also for the other charismatic species such as brown bear and lynx. Within the action E.2, part of the evaluation of the impacts of the project activities on public attitudes toward wolf was also evaluation of the success of the campaign. Its overall goal was to improve public attitudes toward wolves through awareness raising and education activities. Report of the action E.2 shows that although attitudes have remained stable, public have more exact knowledge of actual wolf-caused damage and wolf population size which are often the sources of conflict. Since knowledge affects attitudes we believe that well informed public will form more positive attitudes toward wolves in the future, have better understanding of the wolf role in ecosystem and complex nature of wolf management. But most importantly will recognize the importance of coexistence of wolves and humans for the long term wolf conservation.

5.2.2.2 Action D.2: Promotion of coexistence of wolves with agriculture

The activities of this action were closely linked to several activities of C.5 (Training of agriculture advisories) and C.6 (Best-practice examples) actions. Educational-promotional printed materials about the use of the electric fences and livestock guarding dogs for damage prevention were developed and printed (3000 pieces of each). The brochures were presented in the progress report. In the second part of this action five workshops for farmers were organised and implemented in the project area. Lists of participants for the first four workshops were presented with the progress report. The last workshop was organized on 29th of March 2013 (Annex 7.2.3.4. – List of participants). The participants were educated about proper care and training of livestock guarding dogs.



Figure 28: Participants of a workshop.

5.2.2.3 Action D.3: Education campaign on wolves for hunters in wolf areas

The aim of this action is to provide education for hunters and for the general public in the wolf range through a series of lectures about wolf biology, role in the ecosystem and conservation. It was also aimed at encouraging hunters to participate in the wolf surveillance activities of the project.

In collaboration with Slovenian Hunters Association we organised: 11 lectures for hunters in December 2011 (112 hunters attending the lectures, reported in the mid-term report), 10 lectures in January 2012 (105 hunters attending, reported in the progress report) and 10 lectures in January 2013 (142 hunters attending; Annex 7.2.3.5. Combined lists of participants). These lectures included general information on wolf biology and aims and activities of SloWolf project. In 2012 and 2013 we also presented first results of the project population estimates which were of great interest to hunters (Annex 7.3.3.18. – invitation; Annex 7.3.3.19. – PowerPoint presentation). Hunters were encouraged to participate in the population surveillance activities: winter tracking, collection of non-invasive genetic samples and howling (actions C1 and C3). This project introduced a new methodology also to hunters which is a good basis for future cooperation as we expect higher motivation of hunters in future projects due to excellent results achieved during SloWolf project. These results were recognised by hunters as an important part of efficient conservation management. SHA prepared a short report summarizing the attendance of hunters at the lectures (Annex 7.3.3.20. – SHA report).

In addition, three lectures on final results of SloWolf project were organised in December 2013 in Pivka (3.12.2013; 29 hunters attending; Annex 7.2.3.6. List of participants), in Kočevje (4.12.2013; 53 hunters attending; Annex 7.2.3.7. List of participants), in Novo Mesto (5.12.2013; 19 hunters attending; Annex 7.2.3.8. List of participants). In total 460 hunters were educated on wolf biology and conservation. At these lectures the documentary film produced in Action D1 entitled “Za volkovi” was also shown.

In order to raise awareness of general public on the issues of wolf conservation a total of 5 lectures were organised in Ig (12 attendants), Ljubljana (17 attendants), Logatec (38 attendants), Postojna (30 attendants) and Novo Mesto (73 attendants, Annex 7.2.3.9. List of participants), total of 170 participants. These activities were complemented by public projections of the documentary film produced in Action D1 on wolves entitled “Za volkovi” at six locations in November and December 2013 (Action D1). In addition our colleague dr. Miha Krofel was invited by Tedx talks to give a talk on wolves in Slovenia. In the Tedx session in Ljubljana this talk was selected as the best talk and is freely available on youtube (<http://www.youtube.com/watch?v=PH0ppQEjgfl>).

Overall we estimate this action was successfully completed according to the plan. High interest of general public reflected in high numbers of volunteers who participated in project activities (action C3). Better knowledge and understanding of wolf biology among hunters should contribute to better acceptance of wolves by hunters.

5.2.2.4 Action D.4: Project website

This action was planned to set up and monthly update the project website which will provide information about the project objectives, progress of the project and final results.

Project web site was set up and published on 30 June 2010 on the web address: www.volkovi.si. The website includes information about LIFE+ program and links to relevant sites, information on the project objectives, progress of the project and final results of each action. The web site also provides information about the species and project area, contact information and links to all the partners.

Throughout the project we published the progress of the project's activities in news (total of 60 posts) and blog sections (total of 112 posts). We also uploaded 47 project publications and 30 other publications related to wolves in Slovenia. Following the comments of EC on Progress report several of the project colleagues invested considerable effort into translating all the main themes on the project website to English. All main themes except Blog (which is mainly dedicated to Slovene volunteers and interested individuals) are now translated to English.

The website is received wider attention on a national and international level (Annex 7.3.3.21. –Google Analytics report). Throughout the project duration the website was viewed more than 300,000 times with a total of over 80,000 visitors. Approximately a half of those were returning visits, so in terms of unique visitation over 40,000 people saw the website. The majority of visitors were from Slovenia (84%) followed by Italy (6.5%), Spain (1.4%), Croatia (1%) and 99 other countries. Website was equally visited by men and women with most of the visitors between 18-34 years old (61%). On average the duration of visits was just under 3 minutes.

As website is a passive communication medium we also set up a Facebook (FB) account of the project (SloWolf Projekt) which received in total 1236 “likes”. We used FB for communicating new project developments, actions taken and planned events. FB was also used to promote our website - we pasted links to news and articles published on the website. It proved as very useful especially for communication with volunteers about planned activities. Sometimes our posts stimulated debate therefore it also served for education and increased interest of the civil society.



Figure 29: SloWolf project FB page.

Furthermore we created an additional website for SloWolf thematic conference www.conference.slowolf.si which was dedicated entirely to Wolf Conservation in Human Dominated Landscapes Conference (see Action D6) and includes topics: Abstract submission, Registration, Topics and Schedule, Venue and Accommodation and Important information. This website includes online abstract submission and registration forms and gives information on conference program, conference venue, how to get there, accommodation and social

events. After the conference we published 17 presentations of authors who agreed with publication (these are also published on the main project website).

5.2.2.5 Action D.5: Layman's report

We've prepared and printed Layman's report which summarizes the results of the project both in English and Slovenian languages (500 pcs of each; Annex 7.3.1. – Layman's report).

5.2.2.6 Action D.6: Networking through organization of a thematic conference

The goal of our international conference entitled *Wolf Conservation in Human Dominated Landscapes* was to share knowledge and experience in order to increase effectiveness of wolf conservation, improve cooperation, and promote transition from country-based management towards management at the level of populations.

The conference took place between 25 and 27 September in Postojna, Slovenia. The target audience of the conference were wolf researchers, experts and managers, as well as students with interests in wildlife management and conservation. Conference attracted 180 participants from 22 countries. Conference was opened by the Slovene minister of environment and agriculture Mr. Dejan Židan and by the Commissioner for Environment dr. Janez Potočnik (via video-talk).

The main conference topics were: wolf socio-biology and ecology, population monitoring, genetics and molecular ecology, conflict mitigation and resolution, wolves and human attitudes. We received 62 abstracts of which 33 were accepted for oral presentations and further 29 for poster presentations. All abstracts were included in a printed and electronic Book of abstracts (Annex 7.3.3.22. : book of abstracts) which was distributed to conference participants. On the second day two targeted workshops were organised entitled "Using layman-collected data in population monitoring – challenges and opportunities" and "Sustainable hunting of wolves – destructive for an individual, but beneficial for the population? Pros, cons & solutions." In the conference folder participants also received Life Focus publication "LIFE and human coexistence with large carnivores". All information about the conference including the Book of abstracts and PowerPoint accompanying oral presentations are available on the conference website <http://www.conference.slowolf.si/>

This conference contributed greatly to the networking of different wolf projects all across Europe and even beyond. With Italian LIFE project WolfNet, which is organising a conference in November 2013, we established a common European wolf forum and there was an exchange of representatives between the two projects. Conference received notable attention from the Slovene press and was mentioned in several daily newspapers.

For future projects we would also suggest organisation of meetings for wildlife managers and other stakeholder groups with workshops related to specific management issues. This would enable networking among wildlife managers and other stakeholders and exchange of best practice among European countries.

In order to organise this event the project team met on two meetings (Annex 7.2.3.10 and 7.2.3.11. - List of participants). Project team was assisted by 10 volunteers who helped with logistics at the conference. We also managed to attract several sponsors and donators which allowed us to provide the participants with extra hospitality without any extra cost to the project. We estimate this action was extremely successful and surpassed the expectations outlined in the application.

Other main networking activities which were not foreseen in the project but were still carried out were:

- Project presentations at international meetings abroad (Hungary, Italy, Germany, Netherlands, Spain, Portugal, Canada, USA).
- Project presentations outside the project area (Ljubljana, Maribor).
- Cooperation with experts abroad – telemetry of wolf Slavc (Italy, Austria).
- Cooperation on the 20th anniversary of LIFE programme and HD – Technical Museum Bistra (exhibition „Tvigi in Vid iz Bistre“), MAE (exhibition, brochure, participation at the organised event).
- Cooperation with foreign universities – University of Zagreb (exchange of telemetric and genetic data), Memorial University of Newfoundland (MSc student Jasna Mulej), University of Idaho (Maja Jelenčič, genetic lab).
- Visits of foreign experts (Italy, Germany, Croatia, USA).
- Student exchange within ERASMUS.
- Cooperation with ARD - Bayerischer Rundfunk TV station during a filming of documentary on wolves.
- Workshops for children at the Slovenian Forestry Institute
- Research camp for biology students.
- Cinema Dvor – preparation of brochure for film “Entrelobos” promotion and lecture after the premiere.
- Cooperation with MAE in preparation of actions for rural development 2014-2020.
- Cooperation with Slovene Chamber of Agriculture and Forestry in preparation of Brochure on protective measures.
- Towards the end of the project an intensive cooperation and networking was formed with the Italian colleagues involved in the LIFE12 NAT/IT/000807 WOLFALPS project. Knowledge and experiences gained in our project are directly being used and further upgraded within the WOLFALPS project.

5.3 Evaluation of Project Implementation

Overall evaluation of the project was carried out within the action E2: Overall evaluation and monitoring of the project conservation achievements. All project actions were evaluated with respect to the project objectives and findings are presented in a report (Annex 7.2.2.9. - Report). In addition, a follow-up survey of public attitudes toward wolves was carried out in order to assess the effectiveness of public information and awareness raising campaign. Both findings from this survey and evaluations of project actions allowed us to create a detailed summary of lessons learned. A MSc thesis entitled “The impact of a wolf conservation project on attitudes of the public, hunters and farmers toward wolves in Slovenia” to no extra costs to the project (Annex 7.2.2.11. – MSc thesis Jasna Mulej).

Table 9: Comparison of the achieved results with the planned objectives:

	EXPECTED RESULTS	ACHIEVED	EVALUATION
A1	Well designed, organized and implemented surveillance of wolf population conservation status in Slovenia. • prepared study designs of the surveillance activities • evaluated protocols and guides for collaborators in surveillance activities • established cooperation network between institutions responsible for wolf monitoring • Wolf Monitoring Portal ready for use	Completely achieved, in addition our design of surveillance became an official wolf population monitoring plan (as part of the action plan accepted by the government in 2013)	Overachievement

A2	<ul style="list-style-type: none"> Action plan elaborated and presented to the wider public. Competent authority accepts the action plan. 1000 copies of the action plan printed and distributed to the authorities, managers, stakeholders. 	Completely achieved	Completely achieved
A3	<ul style="list-style-type: none"> 5 digital maps: maps of availability of each prey species (red and roe deer, chamois, wild boar), map of cumulative prey base biomass for the wolf. Permanent database and digital maps of relative yearly abundances of ungulate species in the wolf core area (Kočevsko and Snežnik-Pivka) obtained from snow-tracking counts integrated into wolf monitoring portal (Action C.1) 1 report - evaluation of the dietary needs of the wolves in Slovenia (predation rates, species spectrum and sex/age structure of the prey). 1 report - analysis of prey species population models (simulated effects of different management scenarios with and without carnivore presence on dynamics and sizes of prey species populations) Management recommendations - summarized results of research and models with an emphasis on management implications and actions to be taken (guidelines for Action C.2). 	Completely achieved, 2 planned reports were joined into 1	Completely achieved
A4	<ul style="list-style-type: none"> 1 report: how and why the damages happen, and the guidelines for damage prevention for the actions D.2 and C.5 2 digital maps showing areas where conflicts with agriculture are more likely. 1 digital map showing the areas where spatial expansion of the wolf is bound to cause problems with the agriculture. 1 management recommendations – summary report with the guidelines for damage prevention and actions to be taken. 	Completely achieved	Completely achieved
A5	<p>Financial analysis of case study farms (costs of damage prevention vs. costs of damage compensation).</p> <p>Management recommendations - summarized results of case study analyses with recommendations for actions to be taken to implement best practices, in a form of a technical report will be presented to the authorities as well as to the interested public.</p>	Completely achieved, instead of planned 30 farms, we've analyzed 250 farms; and a diploma thesis was prepared.	Overachievement
A6	<ul style="list-style-type: none"> Documented attitudes of the general public, hunters, sheep farmers and high school students toward wolves. Surveys carried out. 1 report containing statistically analyzed results prepared, published on the project webpage and passed on to the decision-makers. 	Completely achieved, in addition the report contained recommendations for communication	Overachievement
C1-1	<ul style="list-style-type: none"> Established surveillance of reproductive success of wolves in Slovenia using howling surveys. Established surveillance of the number and spatial distribution of wolf packs and individual wolves in Slovenia using data from snow-tracking. Yearly surveillance session reports (3) – estimation of number, distribution and composition of wolf packs in pilot areas and presence of reproduction events. 3 articles presenting results from surveillance actions in Slovenian hunting magazine "Lovec" Promotion of the species and the Life+ programme through direct involvement of hunters and public (volunteers) in the wolf surveillance effort and the feedback provided by the project team. Yearly surveillance session reports (3) – evaluation of the dietary needs of the wolves in Slovenia and their effects on prey populations (predation rates, species spectrum and social structure of the prey) 	Completely achieved (3 rd article in the magazine Lovec was prepared for publication but not published yet at the end of the project).	Completely achieved
C1-2	<ul style="list-style-type: none"> Examination of 36 wolf carcasses (number estimated on basis of average yearly wolf mortality), included in yearly surveillance session reports: record and analysis of fitness/health status record and analysis of reproductive status and pregnancy rates of female animals, record of food items found in digestive tracts. 	Completely achieved since all known wolf mortality was analyzed (35 carcasses)	Completely achieved
C1-3	<ul style="list-style-type: none"> Established surveillance of the number and spatial distribution of wolf packs and individual wolves in Slovenia using non-invasive genetics. Approximately 330 non-invasive samples analysed per yearly sampling session. Established surveillance of reproductive success of wolves in Slovenia using noninvasive genetics. Three Yearly surveillance session reports within this project, with following results for each session: 	Completely achieved <ul style="list-style-type: none"> Over 1700 non-invasive samples were analyzed, 108 hunting clubs with over 5000 hunters involved in monitoring Involvement of volunteers extended also 	Overachieved

	<ul style="list-style-type: none"> o An estimate of unrecorded wolf mortality in Slovenia, o Estimate of population size, o Estimate of the number of wolf packs, o Estimate of the number of wolf litters, o The number of detected individuals, o Comparison with previous years, trends, management recommendations. • Established non-invasive genetic surveillance of damages attributed to wolves but caused by domestic dogs, corrections of the damage assessments. • Established system for identification and surveillance of “problematic” wolf packs through non-invasive genetic sampling at damage cases and management recommendations. • Produced database of individual genotypes of Slovenian wolves, enabling transboundary tracking of migrating/dispersing wolves. • Promotion of the species and the Life+ programme through direct involvement of hunters and public (volunteers) in the wolf surveillance effort and the feedback provided by the project team (approximately 1000 hunters actively involved in opportunistic sampling, approximately 100 volunteers involved in intensive sampling through snowtracking). 	<p>to howling surveys.</p> <ul style="list-style-type: none"> - Robust, objective and precise estimates of wolf population size produced for three sampling seasons. - Majority of wolves in Slovenia individually identified to enable tracking, and their pedigree reconstructed. - Reproductive wolves identified. - Confirmed wolf pack numbers and spatial structure discovered also in other actions. - Yearly reproduction and mortality estimated. - Separated recruitment through reproduction of residual packs vs. immigration (source-sink dynamics of this part of the Dinaric population). - Analyzed hybridization with domestic dogs. - Established a system for species determination and genetic identification of damage-causing animals. Already implemented in routine management practice. 	
C1-4	<p>Precise movement and spatial use data for 8 wolves of both sexes. Approximately 8,000 – 10,000 GPS locations.</p> <ul style="list-style-type: none"> • A habitat model for the wolf in Slovenia (digital map of suitable habitat for the wolf in Slovenia – required for Action plan revision – Action E.6). • Created maps showing spatial use and homerange size of wolves in Slovenia to be used as educational and promotional material and as basis for wolf management (Action A.2). • Finding of 100 – 150 prey animals as a direct result of near-real-time GPS surveillance data. • Precise understanding of events at damage cases caused by the monitored animals. • Corrected population size estimates, obtained by non-invasive genetics, with regard to spatial movements of wolves. 	<p>Achieved</p> <p>7 out of planned 8 wolves were tracked although additional 5 were captured but they were too young to carry collars, so they were not fitted.</p>	Achieved
C1-5	<p>A database for collection and dissemination of knowledge about wolves and data about their presence, freely available to everyone through a GIS (mapping) web interface (with limitations regarding GPS telemetry data to ensure safety of monitored wolves).</p> <p>Minimum 50 registered users.</p> <p>Minimum 100 entries of signs of wolf presence.</p>	Completely achieved	Completely achieved
C2	<ul style="list-style-type: none"> • Five workshops carried out. • Results of the workshops include a detailed plan (1 document) with respect to integration of the large carnivores’ requirements in prey species (wild ungulates) management in the wolf areas. 	Completely achieved + the recommended changes were included in the game management plans and implemented already during the last year of the project	Overachievement
C3	<ul style="list-style-type: none"> • Organized opportunistic sampling of non-invasive genetic samples of wolves. At least 200 – 250 useable non-invasive genetic samples of wolves collected each year. Approximately 1000 hunters actively involved each year. • One transect count of signs of wolf presence organized each winter. • Five intensive snow tracking weekend sessions organized each winter (for three yearly monitoring sessions), at least 40 non-invasive samples 	Completely achieved + volunteer involvement was extended also to the howling sessions	Overachievement

	found and at least 50 km of wolf tracks recorded.		
C4	<ul style="list-style-type: none"> • Two seminars for damage inspection prepared and carried-out, 30 inspectors attending. • Damage inspectors have better technical, forensic and legal understanding of the damage inspection process, and improved communication skills. • Damage cases are photo documented and georeferenced. • Handbook for recognition of damages done by large carnivores on livestock and practical damage inspection, printed and distributed among the damage inspectors. 	Completely achieved	Completely achieved
C5	<ul style="list-style-type: none"> • “Educators” educated about best practice damage prevention measures. • two seminars carried out. 	Completely achieved + an additional leaflet produced	Overachievement
C6	<ul style="list-style-type: none"> • At least four “hot spot” pastures with most wolf damages to livestock equipped with effective electric fence. • Video footage – comparison of wolf behaviour and attacks before and after implementation of the protection measures. • Power-point presentation about “good practice” examples for the Agricultural Advisory Service personnel. • Report on the monitoring of effectiveness of protection measures. • Popular article about the “good practice” example in an agricultural magazine. 	Completely achieved; 16 hotspots, 13 dogs (originally planned 8) and 13 electric nettings (originally planned 4)	Overachievement
D1	<p>The general expected result is improved coexistence of humans with wolves and as such this action is directly addressing threats no. 3, 4 and 5.</p> <p>Special expected results:</p> <ul style="list-style-type: none"> - Improved public attitudes toward wolves. - Improved knowledge of school children, general public and hunters about the wolves and ways of human-carnivore coexistence. - Positive attention to the wolves and the wolf conservation project in the media. - Informed public which can justly participate in the controversial aspects of wolf management (i.e. social acceptance of wolves as well as compassion with the affected farmers). <p>Quantitatively:</p> <ul style="list-style-type: none"> - 6000 brochures produced and distributed. - 1000 posters about the project produced and distributed. - 500 copies of the produced documentary films + powerpoint presentation. - 1000 T-shirts with project logo - 50 educational kits for high schools produced and distributed to biology teachers - Seminar for biology teachers prepared and carried out. - Yearly bulletin of the project – 4 x 700 pieces – produced and distributed. 	Completely achieved	Completely achieved with overachievement in media work
D2	<p>Increased acceptance of wolves among farmers.</p> <ul style="list-style-type: none"> • 5 workshops for farmers in the project area. • 6000 brochures about damage prevention measures (2x 3000). 	Completely achieved	Completely achieved
D3	<p>Better understanding of wolf biology and conservation, and increased interest of one of the most important interest groups for wolf conservation. The action can possibly produce a decrease in illegal killings.</p> <ul style="list-style-type: none"> • 7 lectures for hunters and 3 for hunters and general public carried out within the Slovenian wolf range. • Minimum 400 hunters from the wolf range will hear the lecture. 	Completely achieved; 34 lectures for hunters (460 participants) and 5 lectures for general public (170 participants)	Overachievement
D4	Website set up and working by the 7th month of the project. Website constantly updated with new information at least once per month.	Completely achieved; in addition we created a Facebook page with high number of followers	Overachievement
D5	<p>Good knowledge of the project outputs and lessons learned among all the interested parties.</p> <ul style="list-style-type: none"> • 1000 reports produced and distributed. • 300 copies of the report in English language produced and distributed. 	Completely achieved (500 copies in each language – Slovenian and English)	Completely achieved
D6	Electronic book of abstracts.	Completely achieved + book of abstracts was also printed and distributed to participants with the sponsors help	Overachievement

E1	Well-coordinated project with good cooperation among all the partners, reached objectives and produced all of the expected results of the project.	Completely achieved	Completely achieved
E2	Report outlining project actions effectiveness with regards to the project objectives.	Completely achieved + MSc thesis “The impact of a wolf conservation project on attitudes of the public, hunters and farmers toward wolves in Slovenia”	Overachievement
E3	Produced revised Wolf Action Plan for the period of 5 years.	Completely achieved, 2 workshop meetings organized instead of 1	Completely achieved
E4	Produced After LIFE Conservation Plan.	Completely achieved	Completely achieved
E5	Audit done, positive audit report.	Completely achieved	Completely achieved

Overall all project actions delivered the expected results but some of the measures implemented in the project are yet to deliver its full results. This is especially the case with the donated livestock guarding dogs, which are now, at the end of the project, just reaching adulthood and becoming ready to independently carry out their tasks.

The project, and with it wolf conservation, became very visible in the media and has been featured in a number of articles in major and local newspapers and magazines, as well as in a number of television pieces on Slovenian National Television and private television stations. The project web page is very visible, and our campaigns attracted a very large number of volunteers. The visibility of the project and the issues connected with wolf conservation has exceeded all our expectations. A major drawback in regards to effectiveness of dissemination was a lack of human and other resources which would allow us to exploit all the opportunities to communicate through media at periods when media were more interested in the project.

5.4 Analysis of long-term benefits

5.4.1 Environmental benefits

5.4.1.1 Direct / quantitative environmental benefits:

We have made considerable progress with regard to one of the main conservation threats to wolves: insufficient knowledge about the population conservation status, which led to inadequate management and conservation actions in the past. At the end of the project we already know much more about the wolf population in Slovenia than we did before the project, thus providing a concrete base for management decisions, and also showing to the various interest groups that previous estimates and opinions about the size of the wolf population were exaggerated. As a result culling of wolves in Slovenia was reduced and in the season 2013/2014 completely omitted as a management option.

The attitudes of humans, and also the country's budget for nature conservation, are considerably impacted by damages wolves do to agriculture. A significant progress has been done on that front. Possibly the most important has been the realization that the vast majority of damages are paid to a very small number of livestock breeders, which showed that the problem of wolf damages, which seemed uncontrollable and growing out of all proportions, should be a relatively simple one to solve. We demonstrated this in our “best practice

examples”, where at some of the most problematic spots the damages were considerably decreased. One of the sheep farmers claims that since he started using the electric fence, the damages on his farm decreased to only 7% in comparison to the previous year. This has reflected also in the amount of compensations paid. Already in the first two years these protection measures were in use, the compensations for wolf attacks paid to those farmers were nearly 200,000€ less than if damages remained at the previous levels, which comes close to covering the entire Slovenian co-funding contribution to the project. While our activities directly decreased both the number of wolf-human conflicts and the financial consequences of these conflicts, with possibly important consequences for tolerance of humans towards this species, we feel the demonstration value of these examples to be of even higher importance for future of wolves in our landscapes.

5.4.1.2 Relevance for environmentally significant issues or policy areas

We consider an important achievement that we managed to get all stakeholders to participate in drafting of a Wolf Action Plan, effectively starting a dialogue regarding this conservation issue where no dialogue existed before. The Action Plan, now that it has been adopted by the Slovenian Government, should provide a firm foundation for wolf conservation and management.

Our analysis of damage compensations paid and the effectiveness of our best practice examples in reducing wolf damage to livestock have started a discussion regarding a change of the damage compensation policy. An expert group (which also includes members of the SloWolf project team) was formed with the mandate to draft new legislation governing this issue. If the recommendations that we proposed through the project and which are demonstrated in the best practice examples would be followed, we believe that currently unacceptably high wolf damages could be reduced to an acceptable level. This should reduce the conflicts with agriculture and further increase “social carrying capacity” for wolves, effectively enabling a larger, less disturbed wolf population in our landscapes. On the opposite side, we demonstrated ineffectiveness of the recently present culling practices for reduction of conflicts with agriculture.

5.4.2 Long-term benefits and sustainability

Science-based monitoring of a populations’ conservation status is a basic prerequisite for long term conservation of a species. Within the project a monitoring system was carefully set up and introduced into the management system. Detailed plan for implementation of the monitoring was prepared and has become a part of the wolf action plan which was accepted by the government in Feb. 2013. This action plan was also revised in 2013 to further include the experiences and knowledge gained in the project (Annex 7.2.2.12. – E3 Revised Action Plan), thus ensuring that all of the project outlooks and recommendations were carefully incorporated in this official governmental document.

Besides that and largely based on the revised action plan, an After – LIFE Conservation plan was developed (Annex 7.2.2.10. – E4 After – LIFE Conservation Plan). Both documents identify in detail goals and objectives as well as what actions are to be implemented in the years that follow the end of the project, who is responsible for implementation of each of the tasks, how much financial resources is needed and where it comes from as well as timeframe and deadlines for implementation of the tasks.

Besides population monitoring a series of tasks and adjustments of the previous system were developed for the topic dealing with damage prevention and damage compensation system. Already during the project, the improved system proved to be effective in reducing the number of damage cases and the amount of compensations paid. Activities are foreseen also for managing other important issues such as: prey species management, institutional cooperation, transboundary cooperation, illegal killings of wolves, etc.

5.4.3 Replicability, demonstration, transferability, cooperation

Many solutions and approaches taken in the project can be transferred to or replicated in other nature conservation and resource management issues.

The human-dimension approaches used to manage a building conflict between opposing interest groups, bringing them to participate in production and support a conservation-oriented Wolf Action Plan, can be applied to arrange of other issues where a solution for building conflict over a conservation or natural resources issue needs to be resolved. As opposed to the top-down approaches typically used in such cases (e.g. a political or expert team proposes a solution that nobody agrees with), participation of all stakeholders from the beginning of the process helps to build trust, and to provide final solutions that are supported in the field and have a chance to actually be put in practice.

The methods and monitoring concepts we used for monitoring of wolves can be efficiently transferred not only to other populations, but also to other species. While such longitudinal, multi-method surveys are being applied elsewhere, they are exception rather than practice. A typical approach are one-shot, unconnected actions that provide short-time solutions to specific, partial problems but miss the big picture. Comprehensive, detailed monitoring seems costly when first applied. However, since there is a considerable potential for optimisation, such approaches can be ultimately considerably more cost-effective than one-shot activities while providing a considerably higher data quality.

The methods developed and used in the genetics part of the project have potential beyond wolf conservation. The tools we perfected can have a number of applications in a variety of fields, from wildlife forensics, crime scene investigation, and also (since they can all be transferred to domestic dogs) in veterinary medicine and livestock breeding. In fact, we have already worked on cases where we helped-out human forensics in solving wildlife crime (wolf poaching, bear poaching, determining origin of wild animals illegally kept in captivity) and management issues (misreporting of individual sex in traffic mortality of game species). Frequently the genetic tools are the only path to solving a number of difficult questions, and can be applied to a wide spectrum of problems.

5.4.4 Best Practice lessons

Non-invasive genetic sampling and state-of-the-art mark-recapture modelling was used for population size and dynamics estimates (C.1). GPS-GSM telemetry and habitat modelling in GIS was used to assess spatial requirements of wolves, habitat availability and impacts of traffic infrastructure caused habitat fragmentation (C.1). Entire monitoring effort was organized into cycles corresponding to wolf biology (C.1).

Human dimension aspects of wolf management was strongly included into all appropriate management and conservation actions (A.2, A.6, C.2, D.1, D.2). Participatory approach was

used for framing of the National Wolf Action Plan (A.2) and adaptation of the current prey species (wild ungulates) management (C.2). The final results (Action Plan and Management Guidelines) were achieved through a series of facilitated workshops with all interest groups, and based on consensus between them. Such plans are as a rule easier to implement in the real life thus initial effort to facilitate the dialogue among stakeholders is worthwhile.

Bottom-up approach was used to improve livestock protection and decrease wolf damages by providing examples and explaining benefits of anti-predator protection and large-carnivore adjusted agricultural practices (A.5, C.5, D.2). We also reached to the farmers through the organization that is in charge of improvement of agricultural practices and education of farmers, the Agricultural Advisory Service.

The public awareness and education campaign (D.1) was based on previous survey and analysis of attitudes and knowledge of interest groups and general public about wolves (knowledge-gap analysis), and specifically targeted the areas that would have the greatest impact on the attitudes towards wolves. Target groups are specifically selected for the campaign to have the largest possible long-term impact.

Hunters, as potentially the most influential interest group, were directly included in wolf monitoring and conservation on a large scale (108 hunting clubs with over 5000 members were directly involved in non-invasive genetic monitoring in each monitoring year) to change improve their awareness and interest, and increase knowledge (C.1, C.3).

5.4.5 Innovation and demonstration value

Damage “hot-spots”, locations that suffer a large amount of wolf attacks on livestock, were selected and anti-predator protection measures were installed (C.6, C.5, D.2). These locations were monitored using video surveillance to provide direct demonstration of effectiveness. Results were presented to farmers and the Agricultural Advisory Service at lectures, seminars and workshops.

Economics of different farming practices with and without carnivore damages was analysed and the impact of wolf damages with regard to farming practice assessed, demonstrating the benefits of wolf-friendly farming within the wolf range (A.5, C.5, D.2).

Effectiveness of anti-predator livestock protection measures was directly demonstrated through near-real-time GPS-GSM telemetry of individual wolves, as their movements with regard to protected and unprotected pastures was very precisely monitored (C.1).

An open, Internet-based informational infrastructure for collection and dissemination of knowledge about wolves was developed (the Wolf Monitoring Portal). It provides a central repository of knowledge and data about the wolf in Slovenia, and is freely accessible to the public (with limitations on GPS telemetry data for obvious reasons of safety of the monitored animals). The main part is a database of signs of wolf presence and other knowledge about the species. The database can be accessed through a GIS-based (mapping) world-wide-web interface and allows entry of data about signs of wolf presence (also to the wider public interested in wolf conservation) as well as dissemination of data and results. It is based completely on open-source software (Linux, MySQL, Apache, MapServer, PHP).

5.4.6 Long term indicators of the project success

Proposed quantifiable indicators to be used in future assessments of the project success:

- Conservation status of the species including the size of the population, its vitality, genetic diversity and area of presence.
- Number of damage cases and amount of compensations paid.
- Continuous monitoring of the population according to the standards set up in the project and defined in the wolf population action plan.
- Maintained positive attitudes toward wolves and its conservation among the inhabitants of wolf area.

6 Comments on the financial report

6.1 Summary of Costs Incurred

Due to the complexity and extent of the project, as well as unforeseen costs, there has been a minor discrepancy in costs by category. In total, the planned goal has been fulfilled.

The biggest difference is reflected in personnel costs where the approved costs have been exceeded for 37,701.95 €. Differences occurred due to reduction of external assistance to a minimum (the difference of approved costs for the 21.327,14 €), involvement of internal personnel and following the recommendations of European Commission.

The approved travel costs to 96,089 € have also not been achieved. The difference in amount of 14,961.13 € originates from fuel costs for the car purchased exclusively for the project. According to your letter on 7.11.2013 fuel costs had to be reported under consumables cost category, however we have foreseen them under travel and subsistence in the activity plan.

According to your letter on 16.11.2010 and 7.11.2013 all the paid costs of durable goods are included in the table of expenditure. The costs of durable goods are eligible at 100% on the condition that the equipment is intrinsically connected with implementation of the project and used to a significant degree within its duration (article 25.9 of the Common Provisions). The coordinator beneficiary and associated beneficiaries assigned a mutual agreement according to article 25.9 of the Common Provisions, in which is agreed that such eligibility shall be subject to the coordinating beneficiary and associated beneficiaries undertaking to continue to assign these goods definitively to nature conservation activities beyond the end of the project co-financed under LIFE+ Nature and LIFE+ Biodiversity. The difference in the costs of durable goods in value of 5.267,74 € has been shifted to other costs, according to your approval of minor budget modification from 5.600 € to 10.000 € due to higher costs for car insurance and maintenance (your letter on 16.11.2010). See table below.

PROJECT COSTS INCURRED			
Cost category	Budget according to the grant agreement*	Costs incurred within the project duration	%**
1. Personnel	563,670	601,371.95	106.7
2. Travel	96,089	81,127.87	84.4
3. External assistance	129,270	107,942.86	83.5
4. Durables: total <u>non-depreciated</u> cost			
- <i>Infrastructure sub-tot.</i>			
- <i>Equipment sub-tot.</i>	83,491*	82,623.26	99.0
- <i>Prototypes sub-tot.</i>			
5. Consumables	77,943	86,434.09	110.9
6. Other costs	10,000*	10,001.18	100
7. Overheads	57,310	59,609.00	104
TOTAL	1,017,773	1,029,110.21	

*The Commission has officially approved a budget modification, allowing the increase of the other costs from 5.600 € to 10.000 € (answer EC from 16.11.2010). In order to avoid the overdrawing of funds approved by the grant agreement, the expenses of durable goods (equipment) were accordingly reduced.

6.2 Accounting system

The coordinating beneficiary provide a record of the accounts on a separate cost center SM (380200429) for the financial management of the project "LIFE08 NAT/SLO/000244 SloWolf", according to the instructions to the European Commission. A sub-bank account has also been opened in order to manage funds related to the project. The data are consistent with the financial records.

Approving costs followed the activity plan. The costs approved by project manager, were recorded in the account on a separate cost center.

Timesheets were filled manually, using the model timesheets made available on the LIFE+ website. Timesheets were sent monthly to the project manager for review. The whole documentation is labeled as "LIFE08 NAT/SLO/000244 SloWolf" project, reviewed by the project manager and accounting manager.

6.3 Partnership arrangements

Contracts between coordinating beneficiary (UL) and contracting partners (UL, BF, Department of biology, UL, BF, Department of Forestry and Renewable Forest Resources, UL, BF, Department of Agronomy and UL, Veterinary Faculty) as well as between coordinating beneficiary (UL) and associated beneficiaries (SFS and Dinaricum Society) have been concluded and delivered to EC with the Inception report.

All the partnership arrangements are regulated by contracts between coordinating beneficiary (UL, BF) and associated beneficiaries (SFS and Dinaricum Society). Financial transaction between coordinating beneficiary and associated beneficiaries were implemented in accordance with the Contracts and the Contract with the European Commission. The transactions are evident from the accounts of coordinating beneficiary. The associated beneficiaries enter the information in the financial tables, which were reviewed and merged by the coordinating beneficiary before sending to the European Commission (midterm report, final report).

6.4 Auditor's report/declaration

An independent external auditor was hired to carry out financial audit of the project. The contractor for the SloWolf project was Tatjana Jevševar, auditor, Ekonomsko svetovanje in revizija, Tatjana Jevševar s.p., Gimnazijska cesta 15a, 1420 Trbovlje (Annex 7.1.4.: Independent audit report).

6.5 Summary of costs per action

Following table presents an allocation of the costs incurred per action. An excel version of it is included in the Consolidated Cost Statement for the Project file (the last worksheet) as a part of the Financial Report (see chapter 8).

Breakdown of costs for Actions in Euro (excluding overhead costs)											
Action number	Short name of action	1. Personnel	2. Travel and subsistence	3. External assistance	4.a Infrastructure	4.b Equipment	4.c Prototype	5. Purchase or lease of land	6. Consumables	7. Other costs	TOTAL
A1	Surveillance methods	15.825,69	4.642,11	2.450,00		35,75			1.253,45		24.207,00
A2	Action plan	17.080,00	2.742,80						75,17		19.897,97
A3	Prey assessment	15.689,40	5.105,14	6.313,22							27.107,76
A4	Damages assessment	9.899,34		1.593,16		1.607,50					13.100,00
A5	Farming systems	12.066,96	383,04								12.450,00
A6	Public attitudes	32.575,90	2.132,34	4.039,12					5.378,64		44.126,00
C1	Conservation status	138.312,03	45.505,06	28.876,73		45.758,67			58.431,45	10.001,18	326.669,04
C2	Ungulate management	22.400,00	4.003,43	220,59					137,66		26.761,68
C3	Volunteers					9.809,94			4.482,11		9.809,94
C4	Damage inspectors	44.123,05	6.651,66	11.308,65		11.001,60					77.567,07
C5	Agriculture advisory service	4.946,00	460,34	508,16					22,08		5.936,58
C6	Best practice	105.521,40	3.534,21	15.574,33		11.552,73			331,87		136.514,54

D1	Public awareness	39.450,18	62,40	12.903,73					10.194,56		62.610,87
D2	Promotion of coexistence	6.421,40	123,39	300,00					1.578,00		8.422,79
D3	Hunter education		470,52	6.612,02							7.031,11
D4	Website	19.856,00		2.941,33							22.797,33
D5	Layman's report	4.124,00									4.124,00
D6	Thematic conference	8.698,00	1.634,25	3.219,99					815,55		14.367,79
E1	Project coordination	56.965,00	2.798,23			2.857,07			174,28		62.794,58
E2	Project evaluation	44.764,60	878,95	3.881,83					3.559,27		53.084,65
E3	Action plan revision	2.653,00									2.653,00
E4	After LIFE										0,00
E5	Audit			7.200,00							7.200,00
	TOTAL	601.371,95	81.127,87	107.942,86	0,00	82.623,26	0,00	0,00	86.434,09	10.001,18	969.233,70

A considerable discrepancy present in most of the actions was an increase in incurred costs within the category “personnel” and decreased incurred costs in category “external assistance”. As already explained above, this is due to the fact that some tasks originally planned to be outsourced to the external assistance were carried out by project employees.

Another discrepancy noticeable especially within the Action C1 (Conservation status) is an increase in incurred costs within the category “consumables” and underuse of funds foreseen for travel costs within the same action. This is due to the fact that all travel costs, including the fuel for the project car, were originally foreseen in the category “travel and subsistence”. Fuel costs were later moved to the category “consumables”, in accordance to your letter on 7.11.2013.

Action D6 (Thematic conference) was added later to the project proposal, during the negotiation phase with the EC. It was agreed that the action will be carried out as described in the technical part of the proposal within the budget already foreseen for the implementation of other actions. The conference was therefore organized with minimum necessary costs within the approved budget. The EC was informed about the intended costs for the organization of the conference on July 30th 2013 and the proposed change was approved via e-mail correspondence with the desk officer on August 2nd 2013.

6.6 Other

6.6.1 Mileage on Slovenia Forrest Service

Only one person (Rok Černe) was employed by the project at the associated beneficiary Slovenia Forest Service (SFS). Nevertheless, many other employees from SFS were actively involved into the project. Game wardens employed in SFS were responsible for carrying out some of the population monitoring activities within their hunting grounds. Damage inspectors were educated and were responsible for taking samples of wolf saliva on killed domestic animals, a procedure introduced by the project. Also, people responsible for writing game management plans were involved when designing improvement of game management based on wolf conservation needs. As a result, many SFS employees were actively involved and got a refund for their travel expenses for travels exclusively related to carrying out the tasks

implemented within the project (Annex 7.1.5.: list of SFS employees to which travel costs were refunded from the Life+ SloWolf project sources).

7 Annexes

7.1 Administrative annexes

- 7.1.1. E1 Project steering group meeting list of participants
- 7.1.2. E1 Print-screen google groups
- 7.1.3. E1 list of participants during the monitoring visit
- 7.1.4. E5 Independent audit report
- 7.1.5. List of SFS employees to which travel costs were refunded from the Life+ SloWolf project sources

7.2 Technical annexes

7.2.1 List of keywords and abbreviations used

AB Associated beneficiary
AP Action Plan
CB Coordinating beneficiary
DS Dinaricum Society
EC European Commission
EU European Union
FB Facebook
HD Habitats Directive
MAE Ministry of Agriculture and Environment
MAFF Ministry of Agriculture, Forestry and Food
MESP Ministry of the Environment and Spatial Planning
NA not applicable
SFS Slovenia Forest Service
UL University of Ljubljana
SHA Slovenia Hunters' Association

7.2.2 Technical reports

- 7.2.2.1. A2 Final version of the AP
- 7.2.2.2. A5 Graduation thesis (Sabina Kalin)
- 7.2.2.3. C2 Report with recommendations
- 7.2.2.4. C6 Final report of the action
- 7.2.2.5. D1 Questionnaire for teachers
- 7.2.2.6. D1 Seminar evaluation
- 7.2.2.7. D1 Graduation thesis (Lara Kastelic)
- 7.2.2.8. D1 Recommendations to the National Assembly
- 7.2.2.9. E2 Report
- 7.2.2.10. E4 After-LIFE Conservation Plan
- 7.2.2.11. E2 MSc thesis (Jasna Mulej)
- 7.2.2.12. E3 Revised Action Plan
- 7.2.2.12. C1 portal manual
- 7.2.2.13. C1 surveillance report

7.2.3 Lists of participants

- 7.2.3.1. C5 List of participants at the second seminar
- 7.2.3.2. D1 Lists of participants at film evenings
- 7.2.3.3. D1 List of participants at the meeting with SHA
- 7.2.3.4. D2 List of participants
- 7.2.3.5. D3 Combined lists of participants
- 7.2.3.6. D3 List of participants Pivka
- 7.2.3.7. D3 List of participants Kočevje
- 7.2.3.8. D3 List of participants Novo Mesto
- 7.2.3.9. D3 List of participants Novo Mesto 2
- 7.2.3.10. D6 List of participants
- 7.2.3.11. D6 List of participants

7.3 Dissemination annexes

7.3.1 Layman's report

7.3.2 After-LIFE Communication plan

NA

7.3.3 Other dissemination annexes

- 7.3.3.1. C5 Leaflet on damage prevention
- 7.3.3.2. C6 Video on electric fences
- 7.3.3.3. D1 Project Bulletin (3rd and 4th issue)
- 7.3.3.4. D1 Project documentary film DVD
- 7.3.3.5. D1 German documentary film trailer
- 7.3.3.6. D1 PowerPoint presentation for teachers
- 7.3.3.7. D1 Handbook for teachers
- 7.3.3.8. D1 Combined press releases and short statements
- 7.3.3.9. D1 List of media work
- 7.3.3.10. D1 Media clips
- 7.3.3.11. D1 Letter with dementi 1
- 7.3.3.12. D1 Letter with dementi 2
- 7.3.3.13. D1 Photo of the notice board
- 7.3.3.14. D1 Children's book
- 7.3.3.15. D1 Article in LIFE Focus
- 7.3.3.16. D1 Photo for competition
- 7.3.3.17. D1 Twiggy in Bistra invitations
- 7.3.3.18. D3 Invitation
- 7.3.3.19. D3 PowerPoint presentation
- 7.3.3.20. D3 SHA Report
- 7.3.3.21. D4 Google Analytics report
- 7.3.3.22. D6 Book of Abstracts
- 7.3.3.23. Project photos
- 7.3.3.24. PowerPoint presentations

7.4 Final table of indicators

See: Annex 7.4.

7.5 Previous reports to the EC and its annexes:

7.5.1 Inception report submitted on 27/09/2010

7. Annexes of the inception report

7.1. Partnership agreements (copies of contracts without annexes)

7.1.1. Partnership agreement with associated beneficiary Slovenian Forest Service, signed 12.03.2010.

7.1.2. Partnership agreement with associated beneficiary Dinaricum Society, signed 12.03.2010.

7.1.3. Working agreement between Department of Biology and Department of Forestry and Renewable Forest Resources, signed 03.03.2010.

7.1.4. Working agreement between Department of Biology and Department of Agronomy, signed 03.03.2010.

7.1.5. Working agreement between Department of Biology and Veterinary Faculty, signed 05.03.2010.

7.2. Deliverables

7.2.1. Guidelines for the monitoring of wolf population with howling survey designed for all participants of this activity.

7.2.2. Census sheet for recording data on trials of howling survey and detected replies by the territorial wolves and presence of litters.

7.3. Maps, drawings, technical designs, technical memos etc. as appropriate

7.3.1. Maps for field work of the howling surveys.

7.3.2. Description of the work plan for the pellet count of Action A3.

7.3.3. Maps of registered wolf damages in the period between the years 2003 and 2005.

7.3.4. Maps of registered wolf damages in the period between the years 2007 and 2009.

7.3.5. Questionnaire for sheep farmers.

7.3.6. Questionnaire for hunters.

7.3.7. Questionnaire for general public.

7.3.8. Project post stamp 1.

7.3.9. Project post stamp 2.

7.4. Output indicators

7.4.1. Tables of output indicators.

7.5. Other

7.5.1. List of participants of the meeting of steering group in January.

7.5.2. List of participants of the meeting of steering group in April.

7.5.3. List of participants of the meeting of steering group in June.

7.5.4. List of participants on the educational workshop for attending howling sessions.

7.5.5. List of all coordination meetings.

7.5.6. List of media work.

7.5.7. List of media articles on the Internet.

7.5.2 Mid-term report submitted on 29/09/2011 and revised on 28/10/2011

8. Annexes of the mid-term report

8.1. Deliverables

- 8.1.1. Report of the assessment of damages caused by wolves to agriculture (action A.4) including three digital maps showing areas where conflicts with agriculture are more likely (p. 13 and 18) and two digital maps showing the areas where spatial expansion of the wolf is bound to cause problems with the agriculture (p. 17 and 19). Management recommendations with the guidelines for damage prevention and actions to be taken are embedded in the report as an annex (after p. 33).
- 8.1.2. Report of analysis of existing farming systems in wolf areas (action A.5).
- 8.1.3. Report of analysis of attitudes of the general public, hunters and sheep farmers toward wolves (action A.6).
- 8.1.4. First yearly surveillance session report for season 2010-2011 (action C.1).
- 8.1.5. Handbook for recognition of damages done by large carnivores on livestock and practical damage inspection (action C.4).
- 8.1.6. T-shirt with project logo (photo, action D.1).
- 8.1.7. T-shirt with project logo and motif »I've tracked wolves« for volunteers (photo, action D.1).
- 8.1.8. T-shirt with project logo and motif: »Wolf surveys 2010-2013« for hunters participating in project activities as volunteers (photo, action D.1).
- 8.1.9. T-shirt with project logo and motif – cartoon of a radio-collared wolf representing activities of Action C.1 of the project for project staff members (photo, action D.1).
- 8.1.10. Yearly bulletin of the project – First number »Volčja sled 1« (action D.1).
- 8.1.11. Brochure about wolves »Volk v Sloveniji« (action D.1).
- 8.1.12. Poster with motif 1 (pdf, action D.1).
- 8.1.13. Poster with motif 2 (pdf, action D.1).

8.2. Dissemination materials

Most of dissemination materials were also planned as deliverables and are therefore already listed in the previous chapter (see 7.1.: Annexes 7.1.6, 7.1.7, 7.1.8, 7.1.9, 7.1.10, 7.1.11, 7.1.12 and 7.1.13). Other additional dissemination materials are:

- 8.2.1. Smaller copy of additional informational poster 1 (pdf, action D.1).
- 8.2.2. Smaller copy of additional informational poster 2 (pdf, action D.1).

8.3. Other

- 8.3.1. List of participants of the meeting of steering group on Dec. 13th 2010.
- 8.3.2. List of participants of the meeting of steering group on Jun. 23rd 2011.
- 8.3.3. A screen-print of steering group communication activities using Google group application.
- 8.3.4. Lists of participants of the all-day workshop for elaboration of wolf population action plan on 28th January 2011 (A.2).

- 8.3.5. Lists of participants of the all-day workshop for elaboration of wolf population action plan on 3rd February 2011 (A.2).
- 8.3.6. Lists of participants of the all-day workshop for elaboration of wolf population action plan on 4th February 2011 (A.2).
- 8.3.7. Lists of participants of the all-day workshop for elaboration of wolf population action plan on 17th February 2011 (A.2).
- 8.3.8. Lists of participants of the all-day workshop for elaboration of wolf population action plan on 18th February 2011 (A.2).
- 8.3.9. Lists of participants of the meeting for organization of workshops for elaboration of wolf population action plan and implementation of the action best practice on 29th September 2010 (A.2 and C.6).
- 8.3.10. Lists of participants of the meeting for organization of workshops for elaboration of wolf population action plan on 7th October 2010 (A.2).
- 8.3.11. Reports from the workshops for elaboration of wolf population action plan (A.2).
- 8.3.12. EU Commission letter for Action A.3.
- 8.3.13. Questionnaire for sheep farmers – damage prevention (A.5)
- 8.3.14. PowerPoint presentation of preliminary results of the action A.6 at the first workshop for the development of the National Wolf Action Plan.
- 8.3.15. Lists of participants of the project meeting - noninvasive genetic sampling (C.1)
- 8.3.16. Article in the hunting magazine Lovec that includes map with collected samples
- 8.3.17. Invitation for an educational seminar for volunteers participating in winter snow tracking.
- 8.3.18. Invitation for hunters (sent to hunting clubs) for participating in winter snow tracking and at the educational seminar.
- 8.3.19. Instructions for volunteers for winter snow tracking.
- 8.3.20. Invitation for an educational seminar for volunteers participating in howling sessions.
- 8.3.21. Invitation for an educational seminar for hunters (sent to hunting clubs) participating in howling sessions.
- 8.3.22. Lists of participants of the seminars for damage inspectors (action C.4).
- 8.3.23. Contracts with sheep breeders receiving electric nettings (action C.6).
- 8.3.24. Work report of the guarding dog experts.
- 8.3.25. Press release about the release of project web page www.volkovi.si, 17.08.2010 (action D.1).
- 8.3.26. Press release about workshops for preparation of the wolf action plan in Slovenia, 01.02.2011 (action D.1).
- 8.3.27. Letter of complaint and démenti about miss-informations regarding project published in newspaper for farmers »Kmečki glas«, 10.03.2011 (action D.1).
- 8.3.28. Targeted press release for interested media about a she-wolf ran over with a car near Cerknica, Slovenia, 07.10.2011 (action D.1).
- 8.3.29. Press release for press conference organized by Slovenia hunter society, »PROJEKT SLOWOLF: Varstvo in spremljanje varstvenega statusa populacije volka (*Canis lupus*) v Sloveniji«, 07.12.2010(action D.1).
- 8.3.30. List of media work with clippings (action D.1).
- 8.3.31. Report from the Slovenian Hunters Association (D.3)
- 8.3.32. PowerPoint presentation about the project and activities which include hunters participation
- 8.3.33. Internet page visit monitoring report from Google Analytics (action D.4)
- 8.3.34. Co-financing agreement from Ministry of Agriculture, Forestry and Food

- 8.3.35. Meeting between project group members and colleagues from Croatia
- 8.3.36. Opinion of the Dinaricum Society on the wolf cull planned for this year
- 8.3.37. VAT certificate for Slovenia Forest Service
- 8.3.38. VAT certificate for Dinaricum Society
- 8.3.39. List of participants of the 2nd visit of project monitor
- 8.3.40. Documentaries about wolves in Slovenia "Volk" and "Človek in zver" on DVDs
- 8.3.41. Signatory authorization.
- 8.3.42. Original timesheets
- 8.3.43. Bank reports

7.5.3 Progress report submitted on 30/01/2013

1. Annexes submitted with the progress report

1.1. Deliverables

- 7.1.1. National wolf action plan (proposal)
- 7.1.2. Action A.3 report
- 7.1.3. Article presenting monitoring actions
- 7.1.4. First yearly surveillance session report
- 7.1.5. Action C.2 report
- 7.1.6. Popular article about wolf damage prevention measures
- 7.1.7. Second yearly surveillance session report
- 7.1.8. Brochure on electric netting
- 7.1.9. Brochure on guarding dogs
- 7.1.10. Project bulletin Volčja sled 2

1.2. Dissemination materials

- 7.3.1. Price quote Perušek
- 7.3.2. List of participants of 6th Steering committee meeting
- 7.3.3. List of participants of 7th Steering committee meeting
- 7.3.4. List of participants of 8th Steering committee meeting
- 7.3.5. List of participants of 9th Steering committee meeting
- 7.3.6. List of participants of 10th Steering committee meeting
- 7.3.7. Invitation for exhibition Tvigi in Vid iz Bistre
- 7.3.8. List of participants of C.4 Seminar for damage inspectors 18.10.2012
- 7.3.9. List of participants C.5 Seminar for agriculture advisory service 6.12.2011
- 7.3.10. List of participants D.1 Meeting about educational film on wolves 11.12.2012
- 7.3.11. List of participants D.2 Education for farmers 3.9.2011
- 7.3.12. List of participants D.2 Education for farmers 9.12.2011
- 7.3.13. List of participants D.2 Education for farmers 18.5.2012
- 7.3.14. List of participants D.2 Education for farmers 6.10.2012
- 7.3.15. Report of the Slovenian Hunters Association about workshops for hunters
- 7.3.16. Power Point presentation for hunters
- 7.3.17. Google analytics report for www.volkovi.si
- 7.3.18. List of participants Meeting for organisation of C.2 workshops 4.10.2011
- 7.3.19. List of participants Preparation for the press conference 27.9.2012
- 7.3.20. List of participants Preparation for the press conference 16.1.2012
- 7.3.21. List of participants Evaluation of the press conference 19.1.2012
- 7.3.22. List of participants Meeting about the educational film 13.12.2011
- 7.3.23. Questionnaire for hunters E.2

- 7.3.24. Questionnaire for general public E.2
- 7.3.25. Interviews for farmers E.2
- 7.3.26. SloWolf postal stamp and reminder card for questionnaires E.2
- 7.3.27. List of participants D.3 general public Ig 26.1.2012
- 7.3.28. List of participants D.3 general public Ljubljana 17.5.2012
- 7.3.29. List of participants D.3 general public Logatec 19.4.2012
- 7.3.30. List of participants D.3 general public Postojna 18.4.2012
- 7.3.31. List of participants C.3 Training for howling Ljubljana 6.8.2012
- 7.3.32. List of participants C.3 Training for howling Log pod Mangartom 30.7.2012
- 7.3.33. List of participants C.3 Training for howling Košana 25.7.2012
- 7.3.34. List of participants C.3 Training for snow tracking Ljubljana 12.1.2012
- 7.3.35. List of participants C.2 workshop 29.11.2011
- 7.3.36. List of participants C.2 workshop 30.11.2011
- 7.3.37. List of participants C.2 workshop 9.6.2012
- 7.3.38. List of participants C.2 workshop 11.9.2012
- 7.3.39. List of participants C.2 workshop 11.1.2013
- 7.3.40. Contract for electric netting donation Vadrjal
- 7.3.41. Contract for electric netting donation Belovec
- 7.3.42. Contract for electric netting donation Rutar
- 7.3.43. Contract for a shepherd dog Dimic
- 7.3.44. Contract for a shepherd dog Barbis
- 7.3.45. Contract for a shepherd dog Vadrjal
- 7.3.46. Contract for a shepherd dog Rutar
- 7.3.47. Contract for a shepherd dog Ješelnik
- 7.3.48. Contract for a shepherd dog Kerneža
- 7.3.49. Contract for a shepherd dog Poje
- 7.3.50. Contract for a shepherd dog Sedmak
- 7.3.51. Contract for a shepherd dog Belovec
- 7.3.52. Contract for a shepherd dog Volcic
- 7.3.53. List of media clips, press releases and press conferences
- 7.3.54. List of participants C.2 workshop 29.1.2013
- 7.3.55. Invitation for premiere and SloWolf description in the film brochure
- 7.3.56. Book of abstracts of C2 workshop on management of herbivores (full version on CD)
- 7.3.57. Statement of transport expenses UL-BF
- 7.3.58. Statement of transport expenses SFS
- 7.3.59. Bank statements of interest 1.7.2011-31.10.2012

8. Financial report and annexes

- 8.1. "Standard Payment Request and Beneficiary's Certificate"
- 8.2. "Beneficiary's Certificate for Nature Projects"
- 8.3. "Consolidated Cost Statement for the Project"
- 8.4. "Financial Statement of Slovenia Forest Service"
- 8.5. Financial Statement of Dinaricum Society
- 8.6. Financial Statement of UL
- 8.7. Auditor's report

Report by: Aleksandra Majić, project coordinator
Financial information: Ajda Martinuč
With support of all project team members