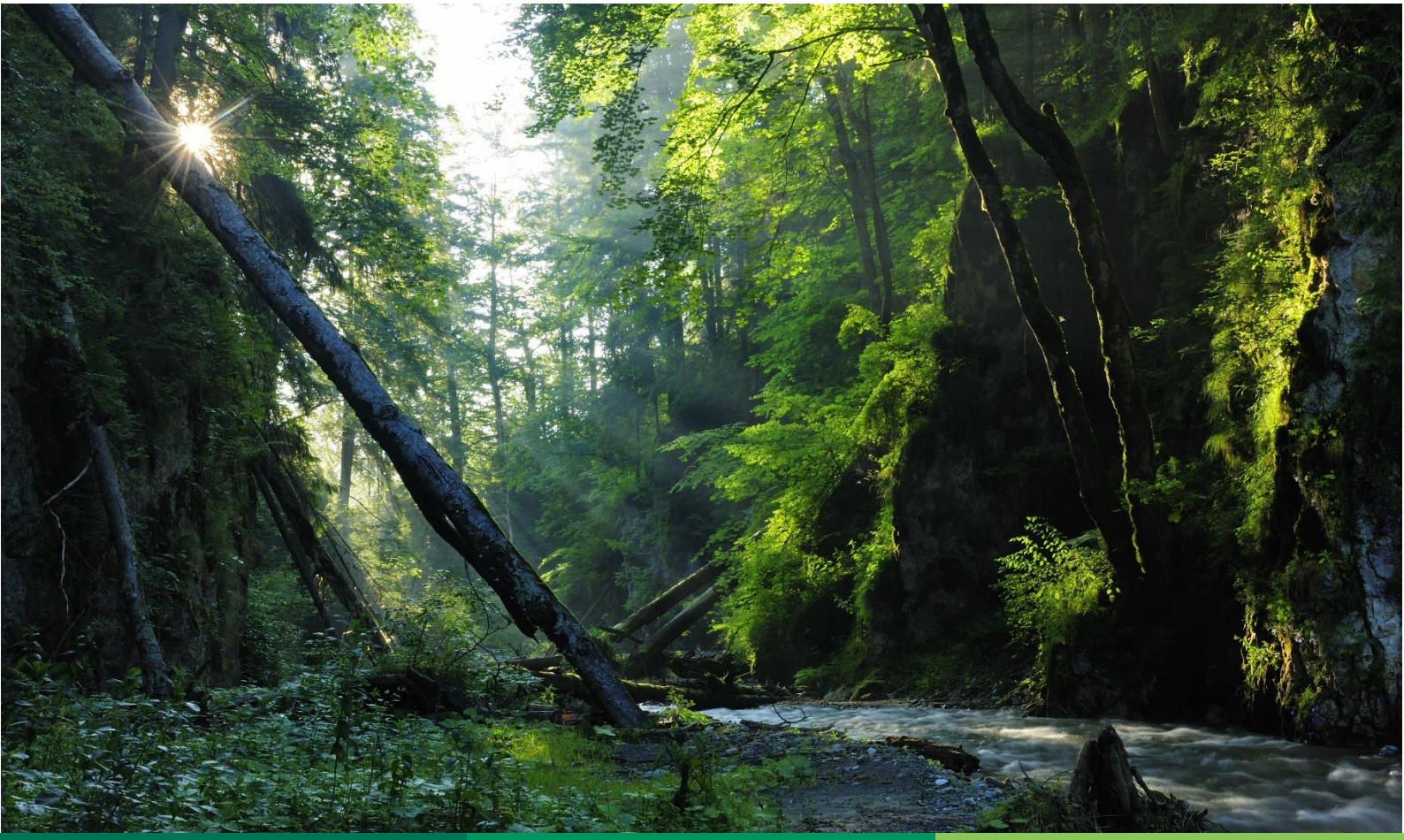
CARPATHIA®
European Wilderness Reserve



LIFE11/NAT/RO/823

Final report

COVERING THE PROJECT ACTIVITIES FROM 01/08/2012
TO 31/07/2018

31/11/2018

LIFE11/ NAT/RO/823

FINAL Report

COVERING THE PROJECT ACTIVITIES FROM 01/08/2012 TO 31/07/2018

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Ecological restoration of forest and aquatic habitats in the Upper Dâmboviţa Valley, Munţii Făgăraş

Project Data

Project location	Romania
Project start date:	01/08/2012
Project end date:	31/07/2018
Total Project duration (in months)	72 months
Total budget	5,835,248 €
Total eligible budget	5,835,248 €
EU contribution:	2,917,624 €
(%) of total costs	50 %
(%) of eligible costs	50 %

Beneficiary Data

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1. Contents

2. Executive summary

The LIFE11_NAT_RO_823 project has been part of the CARPATHIA project, which aims to create a world-class wilderness reserve in the Southern Romanian Carpathians, large enough to support significant numbers of large carnivores and to allow evolutionary processes to happen. This LIFE+ project has had as principal objective the implementation of restoration measures in a 20,000-ha part of the ROSCI0122 Munţii Făgăras Natura 2000 site. Within the project, four major conservation objectives have been tackled:

- Restoration of the original forest composition on clear-felled areas;
- Restoration of the forest floor on badly eroded skidding tracks;
- Rejuvenation of spruce monocultures with tree species, which restore the original forest composition;
- Restoration of alluvial forests

The project has successfully been coordinated and implemented by Foundation Conservation Carpathia, a registered non-profit organisation under Romanian laws. With two exceptions, all objectives have been achieved and for most conservation activities, FCC has even exceeded significantly the proposed results.

The most important difficulties in implementing the various activities was the repeated change of government officials and the reluctance of some of the regional/national authorities to adapt new ways of land management, which are different from the classical forestry as it had been executed over the last 50 years.

Preparatory Actions

Within the context of this project, we have implemented six preparatory actions, which in principle are assessments and inventories and have laid the ground for the detailed planning of the conservation activities:

- Inventory of pristine forests
- Assessment of original tree composition and inventory of regeneration on purchased clear-cuts;
- Establishment of a tree nursery;
- Inventory of areas affected by soil erosion on clear-cuts;
- Riparian habitat assessment and restoration planning with a special focus on alluvial forests
- Inventory of the status of the aquatic eco-system and preparation of a restoration action plan of the upper Dâmboviţa River;
- An assessment of the riparian alluvial forests;

The activity "Expansion of assessments of virgin and alluvial forests from the upper Dâmboviţa valley to the overall Natura 2000 site ROSCI0122 Munţii Făgăras" could not be done and was skipped through an amendment since the administrators of the Munţii Făgăras Natura 2000 site as subcontractors weren't able to create the necessary capacity for this activity.

Forest Purchase

According to the project contract, FCC was supposed to purchase a total of 1,600 ha, namely 200 ha of natural (virgin or semi-virgin) forests for full protection, 400 ha of clear-felled areas for restoration, and 1,000 ha of managed forests for partial conversion into natural tree species composition. During the course of the project period, we purchased a total of 1,783 ha, out of which 140 are not eligible since the land book registration has not been terminated (but their restoration and conservation could already be secured), but 1,643 ha are now registered in the land book with the specific mention of "for conservation only". Amongst them are 294 ha of natural forests, 488 ha of clear-cuts (359 ha fully eligible), and 1,001 ha of managed forests (990 ha eligible).

Conservation Actions

We have surveyed all clear-cuts and have produced technical plans for the restoration of the skidding tracks and regeneration plans for the restoration of the forest cover. In summer 2013, we started with erosion control work and have restored the forest floor on 16.88 km of eroded tractor tracks, almost 7 km more than we were supposed to do according to the project plan. We also replanted over 1.1m saplings on 404 ha of clear-cuts in the frame of this project, more than 11 times more and more than 200 ha additional to the original project plan.

In respect to rejuvenation of managed forests we treated 405 ha of spruce monocultures (we had 400 ha in the plan) and planted over 62,000 saplings (with 40,000 saplings being planned). This activity was a bit tricky as forests management plans usually do not allow these kind of interventions (rightly in order to prevent overuse of forests in younger age), but due to the support of the Faculty of Forestry at the Transylvania University Brasov, we could run this activity as a scientific experiment.

The project foresaw the restoration of alder galleries along 20 km of water courses. The results exceeded expectations and we actually restored this priority habitat on a river length of 23.14 km.

Our fifth conservation action, which was to rehabilitate tributary streams and to create connectivity for the aquatic fauns on 17.7 km along the upper Dâmboviţa River, wasn't possible to fulfil. At the beginning, bureaucratic hurdles lead to a massive delay of this activity, which required an amendment of the contract to gain an additional year, but when we were close to being able to finally start implementing the activity, the law changed in the last moment and it became impossible for us to implement any work on the river structures anymore. As alternative activity, we organised a national workshop about river connectivity and activities needed in Romania to comply with the EU Water Directive.

Monitoring Actions

During the second half of the LIFE project, we started to develop a monitoring system to oversee the effects of the conservation activities. We also initiated the monitoring of indicator species to understand long-term effects of the re-wilding process. However, this will of course demonstrate the effects only over the next decades, once the forest structure, the portion of dead wood, or the species composition will have changed.

We have also monitored socio-economic parameters, which help us to understand and demonstrate the impact of the changes from an unsustainable extraction economy to a non-extractive, sustainable economy in terms of revenues and jobs for local people. Revenues from forestry have increased over the project period despite the fact that a significant part of the forests in Dâmboviţa Valley have been taken out of production due to increased salaries and a strong increase in timber prices, but the growth of the non-extractive sector (eco-tourism and conservation income) was by far higher and the trend goes clearly in the direction to a non-extractive economy.

Networking and Dissemination

In the frame of our LIFE+ project we have developed a network with other areas and projects: FCC staff has been on several visits to National Parks Kalkalpen and Gesaeuse/Austria, who work on similar restoration issues as we do (transformation of spruce monocultures back into natural mixed forests and the dismounting of river structures). As well, we have received visits from representatives of other LIFE projects and have visited similar conservation projects in Chile and Argentina.

In respect to our outreach activities, we have not done a lot of activities during the first part of the project in order to keep land prices at an acceptable level. However, throughout the second part of the project we started

to develop an active communication programme and got a high number of media articles about our project and especially about the restoration work in the frame of the LIFE project. This has been accompanied by a number of site visits of local, regional, national, and international groups, and workshops for local stakeholders.

We also produced within this LIFE+ project a wilderness guide with map for adults and for children (total 7,500 copies), which we distributed to all guesthouses in the area and to other interested persons.

A project website is online since September 2012 and we post regular updates about our activities.

Prospects

The overall project is expected to have a long-lasting effect through the creation of a National Park on a total of over 200,000 ha on the Făgăras Mountains with several strictly protected core areas. But the LIFE+ project supports already now the conservation of a number of priority habitats such as acidophilous Picea forests (9410), *Pinus mugo-Rhododendron myrtifolium* associations (4070*), Luzulo-Fagetum beech forests (9110), and Alluvial Forests (91E0), as well as a number of terrestrial and aquatic priority species.

Yet, the LIFE+ project had also important policy related benefits, both internally as it triggered additional funding for further forest purchase through the FCC donors and significant follow-up funding as we could demonstrate best practice examples of restoration, which is a pioneering process in Romania.

Finances

The standard statement of expenditure has been used to follow the evolution of the costs. Total costs incurred during the project period exceeded the original budget by 21%, which is mainly due to higher spending in the Land Purchase category where FCC took on extra expenditures of over 1.16 million € to achieve the project goals. The prolonged project duration and a higher effort needed to implement some of the actions also led to overspending in the Personnel and Consumables category. Some discrepancies were found between the summary of costs per action statement and the summary of costs per action set out in the grant agreement, especially for maintaining the nurseries, erosion control, and replanting. From the total costs incurred for this project, we consider 5.41 million eligible, which represents 97.8% of the budgeted costs. The underspending is due to the non-implementation of action C.5, the modification of the dams.

The LIFE+ project has been – as the overall FCC finances – regularly audited and financial reports have been approved by the auditors.

3. Introduction

The Făgăras Mountains are one of the most spectacular alpine landscapes in the Romanian Carpathians and at the same time some of Europe's ecologically most valuable, un-fragmented woodlands. The upper Dâmbovita Valley, is part of the Natura 2000 site Munţii Făgăras (ROSCI0122) and is, due to its size, remoteness, and its relatively original state, important for biodiversity conservation (see Project location map in the Maps annex). The integrity of this ecosystem, however, is threatened by uncontrolled logging. FCC aims to protect remaining wilderness and to return managed forests back into their natural state. The main objectives of this LIFE project are (1) to save the remaining natural forests by purchasing them, (2) to accelerate re-wilding processes on clear-felled areas and managed forests, if tree composition has been severely altered, (3) to restore the riparian vegetation along the watercourses and to rehabilitate the aquatic eco-system of the Dâmboviţa basin, (4) to reduce the negative impact of man-induced erosion on clear-cuts, and (5) to inform the general public about the Natura 2000 site and required conservation measures.

Main targeted habitats are acidophilous Picea forests of the montane to alpine level (9410) with some *Pinus mugo – Rhododendron myrtifolium* associations (4070*) in the sub-alpine and alpine areas, and Luzulo-Fagetum beech forests with *Abies alba* and/or *Picea abies* (9110). 91E0* Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* also occur all along the watercourses of the Dâmboviţa basin. Important indicator species include *Picoides tridactylus*, *Dendrocopos leucotos*, *Ficedula parva*, and *Bonasa bonasia*, and *Barbus meridionalis*, *Cottus gobio*, and *Lutra lutra* in the aquatic systems.

Until the early days of the last century, much of the Southern Carpathians remained in its original state due to the lack of accessibility of the long valleys and the steep slopes. After this, forests were cut and spruce as a light-dependent species often took over and replaced the mixed mountain forests. After the nationalisation of all forests in the early 1950s, first forest management plans were elaborated, and the NFA continued to convert beech and mixed mountain forests into spruce plantations. With the forest restitution starting from 2004, the situation changed dramatically, as most people, who got forests back, wanted to turn them into cash as fast as they could. The results are huge clear-cuts, especially on those areas that have been restituted in the first years. Over 2,500 ha of forest have been destroyed in the first years after the restitution began. Since 2009, the rate of deforestation has decreased significantly due to the fact that FCC and its partners have purchased most of those forests that came on the market. Other conservation problems include the loss of last virgin forests through exploitation after forest restitution, the replacement of ecologically important tree species through spruce monocultures, and the interruption of the water course through dams and river training structures.

For most of the last decades local peasants have had little economic advantage of the forests in the Dâmboviţa Valley. With the restitution of forests, many locals received forests formerly owned by their ancestors, to whom they had little relation. The overcutting that followed is something most people dislike and consequently, most locals welcomed our initiative. Especially as we employ local rangers and foresters, and as local communities see our restoration work, we generally have support for our project.

The expected long-term effects of this initiative are the creation of a National Park on a total of over 200,000 ha with the valleys around Iezer and Păpuşa Mountains being one of the strictly protected core areas. Only in this part of ROSCI0122, over 10,000 ha of forests will return into natural habitats. Our project also targets wildlife conservation and has so far created 36,000 ha of hunting free area and will soon get over 70,000 ha of wildlife protection zone.

4. Administrative part

4.1 Description of the management system

Working method and project phases

CARPATHIA Restoration was coordinated solely by Fundaţia Conservation Carpathia (FCC) and all project activities were implemented directly by FCC staff or subcontracted entities, such as SC ACHE ENA FOREST SRL and SC UNO TRADING SRL (replanting), Societatea Ecologica Aquaterra (aquatic surveys), SC ALFRID SRL (water engineering specialist), MILVUS Group (bird monitoring), Kosiry Forest and Mari & Mada Company SRL (spruce conversion), SC ProPark SRL (national river connectivity event). FCC core staff had regular meetings with subcontractors and took all strategic decisions, also the administrative management was carried out by FCC under the supervision of the project coordinator.

Essentially, this LIFE project, consisted of four different phases:

Evaluation phase

Many conservation activities required surveys or field studies to understand the quantitative and geographical aspects of a conservation problem. We conducted these activities during the first year and a half of the project duration. Main activities here were the aquatic survey (A.6), various forest and clear-cut surveys (A.1, A.2, A.5), and the creation of tree nurseries (A.3).

Planning phase

Evaluation was consequently followed up with detailed planning once the requested information existed. These plans were often of technical nature including plans of necessary equipment and manpower (e.g. A.4), or the geographical identification of the measures. For some activities, this planning phase was only a matter of a few months, for other activities it took very long (e.g. A.6 due to the bureaucratic problems related to the removal of the dams). Main activities were the restoration plans for the aquatic and the forest habitats.

Implementation phase

Once we had all parameters, that define the necessary conservation measures, we started with the implementation of the activities on the ground. This was the longest phase and went over several years. Some of these actions turned into ongoing activities (e.g. the clear-cut replanting, the spruce forest conversion, or community outreach) and will continue as long as there is funding from other resources available.

Monitoring phase

Once a conservation activity was finished, monitoring schemes were implemented to demonstrate the long-term effects of these measures. The best example is the monitoring of planted saplings in respect to their survival, or the re-occurrence of erosion on restored tractor tracks (D.1, D.2). Monitoring started immediately after the implementation of an action in a specific area will continue beyond the duration of this project since replanting, as one example, requires at least 5 years of monitoring until the regeneration can be considered secured.

These project phases often overlapped significantly and were at times interlinked. In the four major activity clusters (protection of natural forest - restoration of natural forest ecosystems on clear-cut areas including erosion repair - restoration of alluvial alder forests – restoration of natural forests) each activity was part of one

or several phases. For a good work flow, we elaborated action plans for each action and held regular meetings to analyse and decide about the most efficient ways to implement them.

Project beneficiary and working groups

With signing the contract, the project core staff (Mihai Zotta, Christoph Promberger, and Barbara Promberger-Fuerpass) developed the project steering and implementation group. Initially, this group was made up of staff of SC BCP Wild Life Ltd, as the coordinating entity, and field staff from FCC. BCP Wild Life was represented by Barbara Promberger-Fuerpass (overall project manager) and Christoph Promberger (financial-administrative manager and forest purchase), Marius Ursaciuc (primary accounting, organisation of documents) and Daniel Ungureanu (project coordination assistant). From FCC, Mihai Zotta, MSc in forestry, was appointed as director of operations, Ion Cretu, MSc in forestry, as assistant to Mihai Zotta, Ioana Savulescu, lawyer and legal adviser for all the contracting, and a year later, Madalina Duicu (formerly Gavrilita) joined FCC as the new economic director. Although some persons joined the team at a later stage, the core team remained the same. However, as of 2015, the board of FCC decided that Barbara and Christoph Promberger could not continue to work as external project leaders, but were requested to work as full employees of FCC and as a consequence, all coordinating staff were employed directly by FCC.

Within the steering group, we had regular meetings, but on even more regular terms skype conferences plus daily telephone conversations. Mihai Zotta and Ion Cretu met usually every Monday with the field staff to discuss and coordinate field activities. Daniel Ungureanu helped to coordinate and supervise field activities, prepared time sheets, and assured permanent coordination with the project management and the field activities. Marius Ursaciuc met twice a month with all project staff to collect financial statements and to prepare the primary accounting. Every one or two months, we organised staff meetings and provided specific information on different relevant topics regarding protected areas, the Natura 2000 network, and other topics relevant for conservation. Also, we introduced the action-based time-sheet system besides the usual general time recording for each employee.

We invited and talked to administration representatives and experts, and encouraged them to become members of the FCC consultative group. This included staff from the Ministry of Environment and Climate Change, staff or regional environmental agency and the regional Forest Guard, experts in forest planning, and local authorities. People were appointed and a first information meeting with the consultative council was held on March 15th, 2013 on which we informed the council members of the overall goals and objectives of the FCC project and the structure of the LIFE+ project with its particular activities, possible road blocks, and opportunities for local people. On January 22nd, 2014 we organised a second meeting of the consultative group; due to the unstable political situation, however, part of the original members was not in their positions anymore and had been replaced, so we had to explain the project again from the beginning. Following meetings were very poorly attended, the effort for people from Bucharest to travel for a meeting 3 h one way obviously was not high enough (and so was it for local stakeholders for meetings in Bucharest). It seemed to us that this was not the best way to assure an information flow with the various stakeholders. For this reason, we decided to rather go for one-to-one meetings and thus kept close relationships. Consequently, project core staff tried to keep good relations with representatives of the responsible ministries, the local town halls, county council, or the forest guard during the project period. This resulted in a cooperation agreement between the Ministry of Forests, Waters, and Fisheries and FCC. Unfortunately, governments changed constantly over the years (just in 2017 we faced three different governments) and keeping a permanent close relationship with the decision makers was almost impossible.

With our land agent Mr. Horatiu Hanganu we have had a series of meetings to identify particular areas of interest for purchase, identify land owners and registration status, and execute expert calculations. Starting from summer 2013, we usually could not apply these calculations anymore as people wanted to negotiate directly with us. Mr. Hanganu then got us in contact with the owners to negotiate sale and price with them, assisted the owners with the registration process and elaborated for each property we purchased a report including information both from the field and from the restitution process.

Christoph Promberger and Mihai Zotta were responsible for communication with the various Ministries and the local and regional authorities. We managed to get a good working relationship throughout most of the project period with the Department of Waters, Forests, and Fisheries, however had to face that there was little to no interest in biodiversity conservation on the side of the Ministry of Environment during most of the project period (with exception of the technocrat government during 2016).

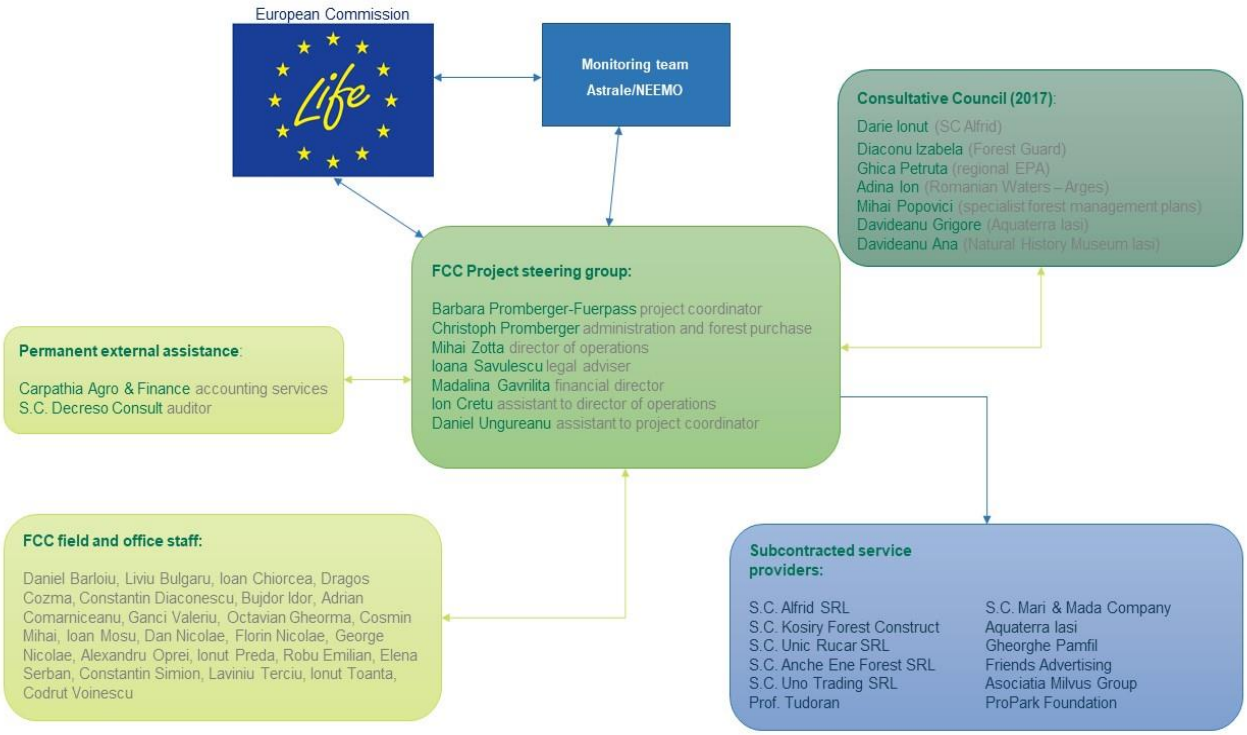

Fig. 1 Organigramme of project management and organisation

Amendments to the grant agreement

Three requests for amendment of the Grant Agreement were submitted to the European Commission. The first was submitted in December 2014 and included

- the direct employment of the managers of the project
- the purchase of two excavators and its budgetary implications
- the elimination of action A.7
- The request was granted and signed in March 2015 as Amendment No 2 to the Grant Agreement for the project for the budget modifications and the eliminated Action A.7. (Amendment No 1 was a supplementary agreement with modifications in the Common Provisions issued by the EC in 2012.)
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- The second request was a prolongation request submitted in November 2016 and applied for an extension of the project duration by one year, until July 31st, 2018. This request was granted and signed in March 2017 as Amendment No 3 to the Grant Agreement.

Due to the problems with Action A.6, we submitted another modification request in December 2017 and a revised version of it in March 2018, which proposed alternative measures to Action C.5. However, after careful consideration, the Commission decided that the proposed modifications did not require a formal Amendment. Instead, the modifications in the notification submitted in May 2018 were accepted in June 2018.

Other complementary projects

The LIFE project has triggered a series of supplementary actions for restoration measures in the Fagaras Mountains and has given us the experience and confidence to execute such projects on a much wider scale. Since the beginning of the LIFE project, we have had the following projects that were managed in parallel:

- **Fondul ONG (NGO Fund - Norway Grants):** 137,279 Euro grant (with 15,000 Euro own co-financing) for a 14-month period starting from March 2015 to restore the natural forests on a surface of 100 ha by replanting a total of 19 ha and to resolve erosion problems on at least 9.5 km of tractor tracks
- **MedLife:** 30,000 Euro sponsoring for a campaign between autumn 2017 and autumn 2018 of Romania's largest chain of private clinics including the full restoration of 10 ha of clear-cuts.
- Fondazione Foresta Futura: 60,000 Euro grant in March 2018 for restoration of 20 ha of clear-cuts throughout 2018. This Italian foundation pledged us to continue financing 20-25 ha of clear-cuts p.a. if the replanting in 2018 would work well (what it did)
- **Endangered Landscapes Programme:** A total grant of 5m $US for restoration and re-wilding work in the south-eastern Fagaras Mountains through the Endangered Landscapes Programme, funded by Arcadia, a charitable fund of Lisbet Rausing and Peter Baldwin. Activities under this programme include the restoration of 350 ha of clear-cuts, the re-establishment of the natural riparian vegetation on at least 40 km of rivers, the conversion of spruce monocultures on at least 200 ha, and the restoration of alpine grasslands on 200 ha. The project foresees also major activities in respect to wildlife conservation with reintroductions of missing species and the implementation of measures to mitigate wildlife-human conflicts.
- **Mossy Earth:** This organisation has offered to raise funds for FCC's restoration programme. With their first steps in 2018, they have raised 3,000 Euro, but intend to raise in excess of 200,000 Euro p.a. starting with 2019.

- **LIFE:** FCC has submitted a second LIFE application to implement conservation actions on at least 50,000 ha in the Fagaras Mountains, including at least 500 ha of clear-cut restoration and 300 ha of restoration of alpine grasslands. We have submitted a project concept and were invited to submit a full proposal until the end of January 2019.

4.2 Evaluation of the management system

Our management system seemed to work well, as most problems encountered were due to unforeseeable external causes (weather phenomenon, delays in restoration and sale procedure, forest management planning issues, bureaucratic hurdles); those who appeared due to internal mistakes were taken care off by analysis and change of implementation strategy and could usually be resolved in short time.

We had a principal agreement and partnership with the Ministry of Environment signed in summer 2011, but due to the nature of politics in Romania, responsible Ministers and officials have been exchanged several times since then. Nevertheless, we managed to develop this agreement in a more specific cooperation agreement, which was signed with the Department of Water, Forests, and Fisheries (DAPP) in February 2014 and, after the next change in government, was taken on by the new leading team. After this, we had varying relations with the various ministries, always depending on whether the Minister was interest in what we were doing or had a differing agenda.

This issue of ever-changing officials is also reflected in the composition of our Consultative Council. We had initial acceptance from the persons listed in the Inception Report, but a fair number of them changed over time due to political reasons or due to elections. Some of the members of the CC sent representatives on the following meetings, so the overall situation was unsatisfying because we started discussions on the council meetings every time from the beginning. This caused us to switch our focus from CC meetings to direct one-to-one contacts.

We had been in permanent contact with the monitoring team around Mrs. Ioana Lucaciu, had annual visits from them, delivered the Inception Report, the Midterm Report, and the Interim Reports in time, and answered outstanding questions to the Commission. We also had the opportunity to update Mr. Angelo Salsi, Head of Unit of **LIFE Nature** (DG ENV E3), on two occasions directly about our project activities. Mr. Francois Delcueillerie, Technical desk officer from Directorate D, visited the project in July 2018 and gave us the possibility to present all project activities and discuss a variety of conservation issues around this LIFE project.

5. Technical part

5.1. Technical progress, per task

Action A.1 Inventory of pristine forests

To identify the remaining natural and semi-natural forests in our project area, we selected and digitized all areas which could potentially contain virgin forests. During the originally planned subsequent image analysis we encountered a variety of problems, both technically as well as reliability issues with the sub-contractor, which is explained in detail in our mid-term report. Since we were lacking a remote sensing methodology to survey a large area, we eventually did a physical verification of all purchased areas that potentially contain virgin or semi-virgin forests by collecting data on tree ages, signs of anthropic influence, occurrence of dead wood, diameters, height, structure and composition of forests, etc. and delimitating the virgin areas with the help of a performant GPS. This analysis was compiled in a report, delivered on September 11th 2014, and resulted in a total of 294 ha of identified virgin and semi-virgin forests within 19 purchased forest lots.

In addition, we identified all areas in the entire project area that potentially contain natural forests from data in the forest management plans, and throughout summer 2015 FCC forest technicians physically verified the resulting lots, with a focus on areas that had not yet been purchased by FCC. Such we have identified another 334 ha of virgin forests and 274 ha of semi-natural forests, out of which 11.3 ha did already get purchased as part of a larger contract. About 462 ha of these forests are in the property of four different landowners' associations, which are managing larger forest areas strictly for timber production, the rest is owned by private individuals, which we have identified (see annex of Virgin forest inventory, delivered in its final version with the Interim Report 2016). This data is also very valuable for FCC's overall purchase strategy and will stay in its focus for future acquisitions.

Though based on a different methodology – physical verification rather than remote sensing – we finally have obtained a detailed GIS based map of the spatial distribution of over 900 ha of virgin (608 ha) and semi-virgin (294 ha) forest patches in the project area (see Map annexes A.1), and consider this action as completed.

Fig. 2 Virgin Acidophilous Picea forests of the montane to alpine level in the upper Valea Vladului

Action A.2 Assessment of original tree composition and inventory of forest regeneration on clear-felled areas

In a first step we digitized all clear-felled areas from satellite images obtained in August 2011. In order to understand the forest composition in our study area prior to any cuttings, we obtained the earliest archived management plans for this area from the 1950ies. This turned out to be more difficult than expected as they were distributed in different forest services and some management units were even lost. Based on the still existing maps that we digitized, and tabular and descriptive data from this first management plans we created a digital database in our GIS that allowed us to analyse the original forest composition on every lot (clear-felled or managed forests) that was subject to the following conservation actions.

The two maps below clearly show the alteration of the forest composition in the Upper Dâmbovita area towards a higher proportion of coniferous (spruce) forests (in dark green) from the 1950ies to 1996. Larger versions of these forest composition maps have been delivered with the mid-term report (Annex B).

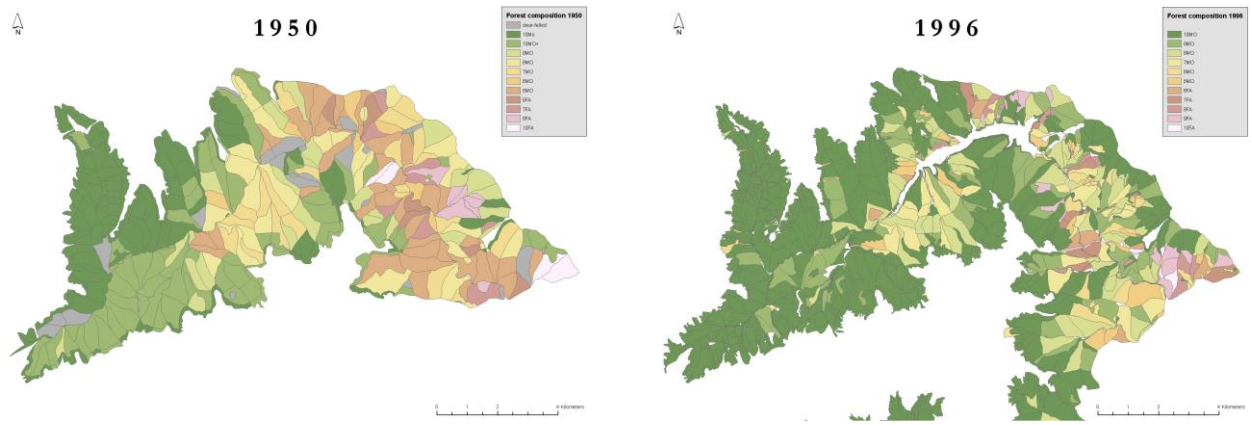

Fig. 3 Changes in forest composition in the past 100 years. MO = Spruce FA = Beech

In a second step, we evaluated the state and quality of regeneration on clear-felled areas. According to the Romanian forestry guidelines for regeneration inventories, we installed sampling plots of 400 m² based on a 100 x 100 m grid to ensure a comprehensive evaluation (3 - 4 % of the surface) on the whole clear-cut area. All of the clear-felled areas we acquired within this project, underwent such an inventory, immediately after the purchase. For each surveyed lot, our forest engineers calculated the existing regeneration, the current species composition and the surface covered by a sufficient number of saplings. Further, we included the information on the original forest composition (from the first management plans from 1950'ies), aspects of the neighbouring forests, and information on the natural type of forest ("tip de statiune" and "tip de padure" in the management plan) to evaluate the natural species composition and to calculate the number of saplings for replanting.

The document "A.2 Regeneration guidelines" as submitted with the 2017 Interim Report, provides all details on inventory and analysis, and also presents the description of the regeneration situation and the proposed regeneration scheme, including the calculated number of saplings for each unit of clear-cut. We included all this data into our GIS data base, which helped to visualise the state of the current regeneration and to highlight the replanting necessities in the different lots, in order to secure the regeneration of natural forests. The

deliverable maps in their final version are attached again in the Annex (maps A.2 in the Map section of the Annex).

The progress in this action was mainly limited by the difficulties encountered with the purchase of additional forests, otherwise the work was conducted according to plan and has delivered all the required information needed for the follow-up activities (C.2, C.4). As we kept purchasing clear-cuts to compensate for lots that were likely not to become eligible by the end of this project, we provided yearly updates of the regeneration guidelines and the maps on regeneration density, composition and replanting scheme of the inventoried areas.

The procedure elaborated within this LIFE project became the standard work flow for purchasing, inventorying and replanting clear-felled areas within the entire CARPATHIA project area and was followed during the restoration of another 300 ha of clear-cuts.

Fig. 4 Clear-felled area in Tamas

Action A.3 Creation of a nursery

In order to obtain different growing conditions, we split the nursery in several locations. One is situated on a meadow next to our field station in the village of Şirnea (total ca. 2.200 m²), a second in the lower Dâmboviţa Valley near Valea lui Ivan (6,000 m²) and a third in the village of Bădeni (700 m²). A major problem with creating the nursery was that the soil quality in the valley was rather poor and too sandy or stony. To improve the conditions, we had to bring in topsoil which we evenly distributed before seeding. On top we built a 40 m² greenhouse for easier and faster cultivation of some saplings.

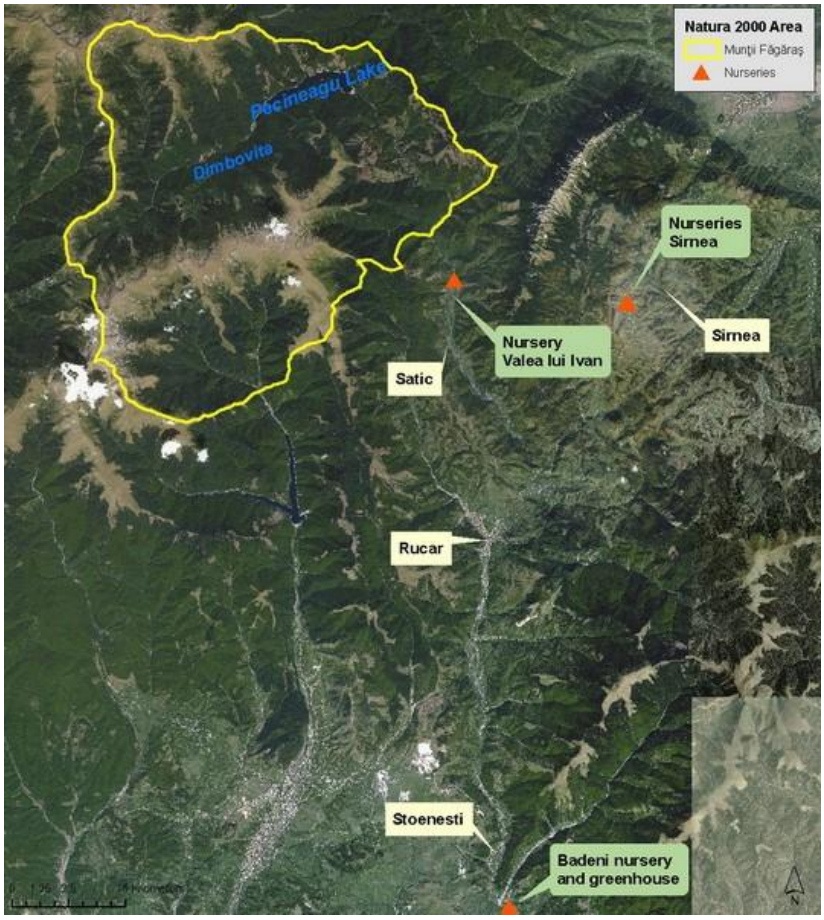

Fig. 5 Location of nurseries

As explained in the mid-term report, we originally planned to plant a relatively small number of saplings (116,000) on the clear-cuts in order to introduce those species that are missing and let then nature take its course. However, although all our land-holdings are designated for re-wilding towards non-commercial forests, we still have to follow the Romanian technical forestry norms ("Norme tehnice silvice") for replanting of forests and needed to establish a much higher number of saplings (appr. 1.2 mio saplings) in our regeneration guidelines.

Though it was not originally foreseen, we decided to also grow spruce saplings in our nurseries, as it turned out that spruce was also needed for the reconstruction of the natural forest habitats, especially in areas above 1,450 meters where the original forest composition is dominated by spruce (up to 90% in higher altitudes). An unexpected high portion of clear-cuts purchased during this project was also located in higher areas. Also, in lower areas, between 1,200 to 1,450 meters, spruce has a progressive presence in the natural forest from 10-20% to 30-40%.

In total we managed to produce 454,000 saplings in our nurseries, four times of what was originally foreseen. Out of these, we planted 373,600 saplings during the campaigns between 2014 and 2018, while the remaining plants will still remain in the nurseries to be planted once they are big enough and will ensure that die-backs can be dealt with immediately.

Table 1. Status of sapling production in the CARPATHIA nurseries.

Species	Surface (m²)	Produced in nursery	Planted from nursery	Remaining in nursery
Alder	13	410	410	0
Ash	135	8,951	8,900	0
Beech	1,350	27,272	25,700	0
Elm	93	560	170	357
Fir	2,266	108,003	90,000	14,590
Rowan	35	7,510	7,420	0
Spruce	4,286	259,750	200,000	57,474
Sycamore	408	41,280	41,000	0
Yew	10	0	0	0
Total	**8,596**	**453,680**	**373,600**	**72,421**

The development of the saplings per species in the nurseries has been presented in detail in the mid-term report and the yearly interim reports. In general, this action has worked out very successfully, there are however some difficulties we encountered over the years:

1. The nurseries need a lot of attention to cope with changing weather conditions, weeding, watering, and setting up shades, which is also reflected in the amount of human resources allocated to this activity.

2. While some species (sycamore, fir, spruce, and ash) are doing quite well, others turned out to be rather difficult to grow at all or in sufficient numbers in the nurseries. For producing beech saplings for example, very little practical experience exists in Romania. The production in 2013 was affected by a lack of snow in winter and late frost in spring. In addition, the natural fructification of beech trees in the years 2014, 2015 and 2017 was extremely low or almost inexistent in the project area and therefore we could collect only late in 2016 a decent quantity of seeds for the nurseries.

Despite the difficulties, we conclude that it is very important to have own saplings in nurseries, because climate change is making the time window in spring and autumn, when planting is possible, narrower from year to year. In addition, the period between taking the saplings out from the nursery till the moment of transport and planting needs to be as short as possible to avoid a loss of saplings in the plantations. Only in own nurseries the entire process of manipulating the saplings can be kept under control and such further losses in plantations can be minimised.

When analysing the impact and efficiency of the nurseries, following factors need to be taken into consideration:

- nurseries are installed to be functional for a longer period of time, preferably over 10 years, and such costs are decreasing over time;
- own staff and also local labourers increasingly gained experience, which also reduced the costs over the years;
- in our nurseries, all saplings produced follow „highest eco-standards”: no chemicals were used against weeds or parasites, which lead to an increase in labour costs by at least 25%. This also

increased the risk of losing a bigger number of saplings, but on the other hand, the organic saplings are better adapted and healthier, with no secondary effects on tree health in the future (the micro-flora and fauna associated with the saplings and their roots remains unharmed);

- a mechanised treatment of the weeds was also not considered in our nurseries in order to train and employ a number of 15-20 local workers, especially women, specialised in creating and maintaining the nurseries. This had a very positive impact on the local community and was also a way to spread the information about the LIFE project activities. Manual weeding was also better for the saplings as the plants and the roots were less injured during the process. This will positively affect the future forest, as it is known that injures at young stage are opening gates for fungi's and bacteria. So, despite the overall higher direct costs for maintaining the nurseries (about 30%), the benefits for the local communities and for the project are compensating this disadvantage by far.
- saplings extracted directly from natural regeneration have a significantly higher percentage of losses in plantations beyond the first years;
- based on the example and experience gained in FCC's local nurseries, there is an increasing demand in the local communities to develop conservation entities (e.g. private nurseries that can deliver saplings to restoration projects), which will further increase employment rates and awareness for protected areas in the region;

Taking all these factors into account, we conclude that the impact and the efficiency of creating and using own nurseries in restoration projects is very positive. The costs per sapling and species produced in our own nurseries is presented in the table below.

Table 2. Costs (in Euro) of saplings produced in own nurseries versus purchased saplings

Costs [€]	Beech	Fir	Sycamore	Rowan	Ash	Elm	Spruce
Purchase	0,14	0,20	0,14	not available	not available	not available	0,14
CARPATHIA	0,32	0,18	0,21	0,004	0,23	2,16	0,07

While costs for beech and sycamore saplings from our own production are more than or almost double, fir and spruce can be produced by far cheaper. But it is especially for the criteria mentioned above, that we highly recommend to establish own nurseries and to develop the necessary expertise within forest restoration projects. Within the CARPATHIA project, we have in the meantime enlarged the surface of our nurseries and will keep producing saplings for other restoration sites in our project area.

Fig. 6 Nursery in Valea lui Ivan

Action A.4 Inventory of areas affected by soil erosion

We started by digitizing the clear-felled areas and all their logging and skidding tracks that could be identified from our 2011 WorldView2 satellite images. Such we already got an impression about the density of destroyed forest floor per surface. After that, all these clear-cut areas underwent a detailed survey where we measured depth and length of rills, soil type, inclination, and exposition, and where we also tried to judge whether there is sufficient wooden material and soil around for the later restoration work. Since early on in the project period it was unclear, which clear-cuts we would end up buying, we included the entire clear-felled area of almost 1,200 ha into the assessment, instead of the 200 ha or 10 km as originally proposed. Such, we collected data on a total of 106 km of skidding roads (see Erosion maps 1 to 3 in Annex C of the mid-term report).

Basically, we identified two types of erosion problems in the field – landslides and ditches. With a total surface of 3 ha, landslides represent only a very small portion of the whole area. Ditches and trenches, however, occur on a length of more than 28 km, representing 27% of the total length of the skidding tracks. According to slope and depth of the ditches, we proposed two main intervention measures. On slopes smaller than 30°, ditches shall be filled with logging residues, stones or soil to a maximum height of 1 m to slow down or even stop erosion. On slopes steeper than 30°, wooden fences should be built every 10 to 10 m, to make sure logging residues aren't taken down the hill by gravity and the force of water. In addition, if ditches are deeper than 0.5 m, every second fence installation will consist of a double fence filled with soil and residues. After filling the ditches and trenches, work that will be done manually, the sides of the skidding roads have to be reshaped with the help of a small excavator, to make the whole landscape look natural again and to destroy the channel network that was created. In a final step, saplings from native species have to be replanted on a 20 m radius around the ditches.

The whole progress of the inventory conducted by FCC staff went smoothly and the final version of the technical plan (deliverable) was submitted timely with the mid-term report in May 2014 ("Erosion inventory and restoration plan" in Annex C of the mid-term report). It provides next to the analysis and severity maps, a detailed calculation of the manual and mechanised workloads, the amount and type of fences needed, and the surfaces for replanting for each of the areas impacted by erosion problems. We keep using this plan as valuable guidelines for restoring the tracks and soil on additional clear-cuts purchased outside LIFE and also published it on our website to be used by other projects.

Fig.7 Erosion on skidding tracks in the P. Incurcat area

Action A.5 Riparian habitat assessment and restoration planning with a special focus on alluvial forests (91E0*)

After digitizing the alluvial forests that could be identified on the satellite images, as well as areas where alder galleries were replaced by spruce, FCC foresters verified the situation in the field and got a first overview about distribution of alder galleries, spruce dominated forests, possible reference areas, and areas that are artificially kept open and could be replanted. We then sub-contracted Societatea Ecologica Aquaterra (SEA) for a detailed assessment of the riparian condition of the Dâmbovita River and some tributaries, including a detailed restoration plan and the elaboration of a future monitoring scheme.

Unfortunately, we faced some difficulties with this action which lead to a delay of 8 months until we received the final version of the assessment. This was due to a prolonged field survey (field work was very time-consuming), and partially obviously to time constraints because of other obligations of the experts. Most annoyingly though we could not accept the final report since we found some inconsistencies in the data compared to what we knew from our own field experience and the pre-study. During some meetings with the experts we discovered that the cause of the problem was a mess in the GPS data collection, so we insisted in re-visiting all the polygons to ensure a correct representation of the geographically linked information.

A total number of 273 polygons (227 ha or 58.7 km watercourse versus 100 ha and 20 km as proposed) were inventoried for following parameters: structural and distribution data (percentage in the composition and area of the main tree species, age, type of association, percentage of opened areas – without trees and land with a dense grass layer); negative impact data (anthropogenic, biotic, and abiotic factors). Data analysis revealed that 5.5 % of the total habitats are in a favourable conservation state, which translates into an area of 12.43 hectares. From amongst these habitats, an area of only 1.8 ha can be considered natural and in very good conservation state, where no restoration or improvement work shall be undertaken. The proportion of the total area occupied by the principal tree species (grey alder – *Alnus incana*, willows – *Salix capraea*, *Salix fragilis*) is 24 %, or 54.1 ha. The rest of the studied area is comprised of species not natural to the riparian habitats (105 ha) and openings inside the riparian forests (areas without trees and land with a dense grass layer, mainly due to livestock grazing by locals) on 47.6 ha. The report (deliverable), including all relevant maps, was delivered with the mid-term report in May 2014 ("Riparian habitat assessment final report " in annex D of the mid-term report).

Recommendations for the ecological restoration of riparian habitats in a non-favourable conservation state, given in the report include the protection of all the existing grey alder and willow populations (including grey alder and willow saplings/seedlings) and the extraction of the non-natural species (spruce) as much as possible. In addition, it is necessary to create the appropriate conditions for planting saplings and sowing seeds of the naturally occurring species, as well as improving the situation for natural regeneration. This can be achieved by loosening up the soil in areas where the invasive species are extracted, as well as in openings, where the soil is covered with a dense grass layer, mainly due to livestock grazing.

Based on the mapping results within the study, we assessed the ownership structure of these areas (“Riparian gallery inventory – Internal Assessment” in Annex D of the mid-term report), in order to evaluate the possibilities of applying the ecological restoration measures in degraded habitats throughout Dâmbovița Valley, as recommended in the technical part of the report. Out of the total 227 ha of studied riparian forests, an area of 58 ha is currently in the ownership of FCC and project partners, which translates into a total length of 21.7 km of watercourse.

To ensure that all the ecological restoration measures follow the Romanian forestry regulations (Romanian Forest Code and technical norms), we stipulated these in the official forest management plans wherever feasible.

Due to the delay of this activity we had to postpone the start of Action C.4 by a year to autumn 2014, which luckily did not affect the completion of the restoration action within the project period.

Fig. 8 Destroyed riparian habitat with spruce plantations along the Upper Dâmbovita River

Action A.6 Inventory of the status of the aquatic eco-system and preparation of a restoration action plan

This action was meant to deliver two main outputs:

- an assessment of the ecological state of the Dâmboviţa River, including GIS based maps illustrating distribution and abundance of indicator species and information on location and state of all secondary dams and other river regulating structures, as well as recommendations to restore function and ecological condition of the water system
- a feasibility study for the modification of the hydraulic structures in the Upper Dâmboviţa River, a technical plan for the proposed measures and all the approvals for the agreed interventions

For the **assessment of the ecological state** of the Dâmboviţa River, we sub-contracted again SEA and faced a delay of 4 months compared to the scheduled deadline due to the sub-contractor's involvement in other field projects and a longer revision process. Eventually, the final version (deliverable), including all maps and clear restoration recommendations, was delivered to the EC with the mid-term-report in May 2014 ("Inventory of aquatic eco-system final report " in Annex E of the mid-term report).

A total of 12 aquatic habitats were identified, out of which 5 are of high conservation value, including the Natura 2000 priority habitat *7220 Petrifying springs with tufa formations. Water analysis revealed low turbidity and a slightly acid pH value in some areas due to both, natural and anthropogenic factors. Dissolved oxygen levels in the Dâmboviţa River are very good, yet the presence of organic matter coming from woody debris on the slopes limits the oxygen saturation capacity. Also, the micro-biological analysis showed an increased number of bacteria colonies and high nitrate levels in some parts of the river, indicating the presence of some organic pollution sources, originating from forestry and grazing.

The fish community of the Upper Dâmboviţa River consists of brown trout (*Salmo trutta fario*) and European bullhead (*Cottus gobio*), that are common almost along the entire river, and Common minnow (*Phoxinus phoxinus*) and Mediterranean Barbell (*Barbus meridionalis petenyi*), that are present only below the Pecineagu dam. However, trout stocks are low, and the lack of adults indicates that increased fishing, both legally and illegally, is a major threat. Another factor that impedes the development of a healthy unaffected fish population, is the presence of concrete dams, built for adjusting the river flow. These dams cause a severe habitat fragmentation by blocking the micro-migrations of trout and bullhead, which are crucial for foraging and breeding. From an ecological point of view, aquatic habitats in the Dâmboviţa basin show a very high biodiversity, based on a rich phytoplankton, the trophic source for several consumer levels.

Although the entire area is uninhabited, economic activities are taking place and affect to some degree the ecological balance of the aquatic system. Especially deforestation alongside riverbeds and bad exploitation practises destroy the natural vegetation. Clearings, followed by heavy rains, lead to erosion and wash the mull into the water, resulting in changes in water acidity, reduced transparency and oxygen concentration, and increased concentration of ammonia and hydrogen sulphide.

Besides habitat fragmentation, the dams also alter the species composition of the system, since deposits of silt and organic matter upstream of a dam affect the chemical characteristics of the water. Also, installing sheep pens close to the river results in an impairment of water quality as the manure is getting washed away.

The field inventory and **technical expertise of the hydro structures**, as well as the technical restoration recommendations (including a primary feasibility study) for the 17.7 km of river course, were finished in their first version on the 25th of June 2014, by SC ALFRID SRL, a company specialized in Water engineering, facing a delay of 7 months. The report describes measures for 29 water-regulation structures along the upper part of the Dâmboviţa Valley and includes all the measurements and recommendations for measures to be applied in order to help up-stream fish migration. The report (deliverable) with an English summary was delivered with the Interim Report in June 2015 ("Technical report EN summary " and " Technical Report ALFRID" in Annex B of the Interim Report 2015).

In a next step, we organised a workshop and field visit with representatives from RNP (departments of investments and department of protected areas), who is actually administrating the dams, EPA Arges, Romsilva Arges and SC ALFRID SRL, to discuss best solutions for each dam on-site. Based on this meeting and incorporating the views of the RNP representatives, SC ALFRID SRL finalised the project proposal (including already all the necessary geological studies) for the DALI approval (DALI = Documents of Approval for Intervention Work, also attached in Annex B of the Interim Report 2015), necessary to obtain all the permits.

Up to this point, the progress was straight forward and predictable, but when it came to obtaining the approval for the modifications of the dam, we encountered major roadblocks. The legal issues stated by the authorities, and the difficulties during the communication with the Ministries are explained in detail in the Interim Report 2015 and our letter to the EC on March 18th, 2016. Thinking we are facing only a major delay and having resolved all legal issues, led us to request an extension of the project duration by one year to July 31st, 2018 (amendment request submitted on November 23rd 2016 and accepted on March 13th 2017).

Unfortunately, we have not managed to obtain the final building permit to implement action C.5, due to the fact that FCC has no legal basis to request the building permit after a late modification of the construction law nr. 50 came into force on July 15th, 2017. The entire progress and the legal constraints for the implementation of the technical plan were fully outlined in the Interim Report 2017 and our letters to the EC from December 10th, 2017 and March 19th, 2018. In the later, we also proposed some alternative measures, which were accepted in its version from May 21st, 2018 (acceptance notification received by email on June 6th, 2018) and consisted of arranging a national event that focuses on the issue of habitat restoration and connectivity of the respective aquatic eco-system, bringing together the key actors and interest groups in relation to this and providing a framework for sharing experiences with other similar projects and initiatives. Moreover, we wanted to present to a wider audience (including the relevant state authorities) the efforts and results of the project, in this respect, as a way to increase the chances for further engagement towards the initially proposed objective.

The event was undertaken under action E.2 and outcomes are presented there.

Action A.7 Expansion of assessments of virgin and alluvial forests from the upper Dâmboviţa valley to the overall Natura 2000 site ROSCI0122 Munţii Făgăras

This action was dedicated to identifying the remaining virgin and alluvial forests in the entire Făgăras Natura 2000 site and to stipulate their full protection in the management plan or, in the case of alluvial forests, to identify where restoration measures are necessary. We initially proposed to subcontract the administration of the Natura 2000 site for the surveys, but, as outlined in the mid-term report, despite their initial promise to hire 20 field rangers, they were lacking the funding to hire these people. The site administrators, however, signed a project in the frame of the POS Mediu funding programme to elaborate a management plan, which included the identification of alluvial forests as a priority habitat, but not the mapping of virgin forests.

Regarding the identification of virgin forests in all of the Făgăras Mountains the initial plan was to wait for the results of action A.1, which was supposed to generate the necessary methodology based on remote sensing. As explained in the mid-term report, this has not happened and therefore we were lacking a valuable methodology for a large area survey. The proposed physical verification of potential natural forests based on forest management plans, is extremely time-consuming and since the Natura 2000 administration did not have field personnel, there was no way to implement this activity and gain useful and reliable data. Initiatives to become directly involved in the administration of the entire Natura 2000 site Munţii Făgăras was dismissed by the Ministry of Environment for legal reasons as explained in full detail in the mid-term report and the first amendment request. At the same time, an independent initiative of the Prague University under the lead of Prof. Miro Svoboda, has done mapping of old-growth forests in the Carpathians, specifically in the Făgăras Mountains. We contacted them and have learned that they have good data about age and structure of forests, through which they have verified old-growth forests in the field.

In our Amendment request from December 3rd, 2014, we therefore proposed to skip action A.7 as information about alder habitats would become available through the habitat assessment in the frame of the POS Mediu project and about virgin forests through the Czech initiative. Such, this information could be included into the overall Natura 2000 management plan, which was also the objective of action A.7. The request was granted in the letter from the EC from February 10th, 2015.

The Management Plan for the Natura 2000 site Munţii Făgăras has been approved by the Ministry of Environment, Waters, and Forests on June 16th 2016 and came into force in September 23rd 2016 (Ministerial Order nr. 1156/2016). We have ensured that all our identified virgin (902 ha, out of which 294 ha purchased within this LIFE project) and alluvial forests were included in the MP, and have worked together with the Czech University of Life Sciences (Dr. Miroslav Svoboda), so their data about identified primary forests in the Făgăras Mountains (12,914 ha) could be included as well (map "A.7 Anexa 17_30 Distributia padurilor virgine" annexed in Interim Report 2017). In the frame of the POS Mediu project, the contract for habitat mapping included the identification of alluvial forests as a priority habitat. In addition, all proposed FCC properties (all forests purchased before June 2016) have been accepted as pilot non-intervention areas in the MP of the Natura 2000 site Munţii Făgăras (provisions about non-intervention areas are mentioned in the MP under special objective OS12-page 355, measure MS47 and in the map "A.7 Anexa 17_33 Zone pilot non interventie in paduri" annexed in Interim Report 2017). Forests purchased after the approval of the MP (300 ha) will be proposed for inclusion as non-intervention zones at a later stage, but not later than 2020. A map showing all areas already included into the MP as non-intervention zones and those forests purchased within this LIFE project is presented below and as Map A.7 in the Maps section of the Annex).

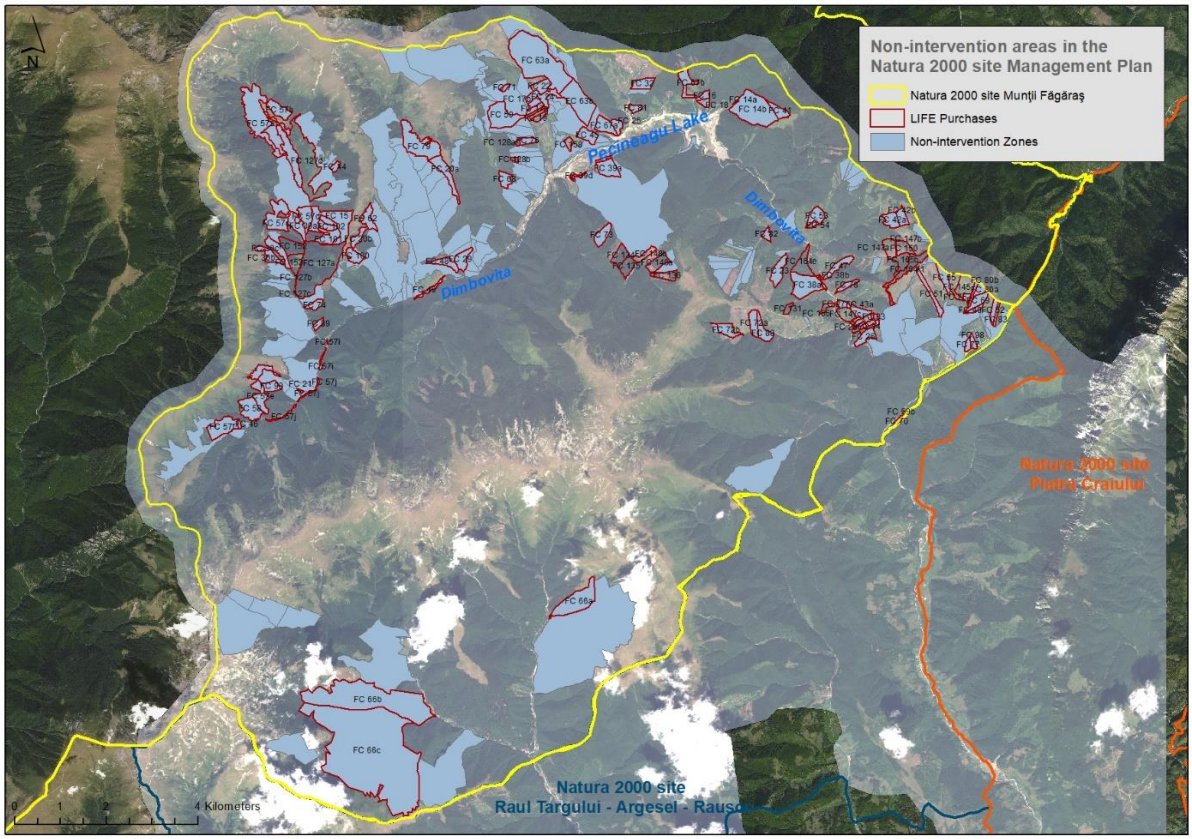

Fig. 9 Non-intervention zones (4,731 ha) proposed by FCC and included into the Management Plan of the Natura 2000 site Munţii Făgăras. Forests purchased within this LIFE project are outlined in red.

As requested, we made a brief assessment of the management measures described in the Natura 2000 MP for the forest habitat types addressed in our project.

9110 *Luzulo-Fagetum* beech forest habitat

The conservation measures for 9110 *Luzulo-Fagetum* beech forest habitat mentioned in the MP are described as Special measure MS38 - Preservation of current conservation status of 9110 *Luzulo-Fagetum* beech forest habitat (page 346). Forest logging without replanting or natural regeneration were identified as a high present pressure and a medium future threat for this habitat, while roads and trails, touristic activities (including possible ski slopes), mushroom picking and forest fires are considered medium threats.

The most important actions proposed under this measure are:

- Progressive harvesting of coniferous species or other species found on over 20% of the area or replacement of coniferous trees with beech after exploitation age is reached, when spruce is over 80% of the forest plot;
- Avoiding spruce and pine planting, when habitat is favourable for beech trees;
- Harvesting and transporting (dragging) trees and logs in the forest is to be avoided on steep slopes;
- When natural regeneration is not possible on steep slopes, planting native species is recommended;
- Natural regeneration will be supported, especially using local seeding trees;
- Livestock grazing in the forest is forbidden;

- Motorised vehicle access for entertainment is not allowed;
- 3 - 5 dying trees/ha will be maintained as habitat for birds and insects; also 5 - 7 old trees/ha (over 80 years) will be maintained in the forest plot after the last logging intervention;

91E0* Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)

Also for this habitat type, forest logging without replanting or natural regeneration was identified as a high current risk and a medium future threat, while the development of water regulation and water capturing structures, roads and trails, and increasing touristic activities are considered medium threats.

The conservation measures for 91E0* Alluvial forests mentioned in the MP are described as Special measure MS34 - Preservation and improvement of current conservation status of 91E0* Alluvial forest habitat (page 339).

The most important actions proposed under this measure are:

- Avoiding substitution of *Alnus* tree species with other species;
- Forest plots with different composition will be managed to return to a more natural composition of the habitat type;
- Local seeds will be used for the regeneration of 91E0* habitat;
- Any infrastructure work will be planned considering the protection of 91E0* habitat;
- Flood protection infrastructure with potential negative impact are forbidden;
- New forest management plans will consider 91E0* habitat in distinct forest parcels in order to be managed accordingly;
- Motorized vehicle access for entertainment is not allowed;
- Planning and executing of projects and investments will not be allowed if there will be a decrease in 91E0* habitat area;

9410 Acidophilous Picea forests of the montane to alpine levels (*Vaccinio-Piceetea*)

With 45.000 to 46.000 ha this is one of the largest habitat types in the Natura 2000 site. Its conservation status is considered unfavourable, with forest exploitation and the infestation with bark beetles as highest current pressure and future threats. Roads and trails, touristic activities (including possible ski slopes), mushroom picking and forest fires were identified as medium pressures and threats. The conservation measures for this habitat mentioned in the MP are described as Special measure MS42 - Improvement of current conservation status of 9410 Acidophilous Picea forest habitat (page 352).

The most important actions proposed under this measure are:

- A maximum of 2,500 - 3,000 saplings/ha will be used for regeneration of the habitat and best use shall be made of naturally occurring seeds;
- Applying high intensity forest management in young forest stands;
- Identification and prognosis of xylophagous insects will be thoroughly executed; methods of extermination of the insects will be biological or integrated, preventing large scale spreading of the phytopathogenic agent;
- Other species than specific to the area will not be planted, even when regeneration of indigenous species is difficult, e.g. on steep slopes;

- Livestock grazing in the forest is forbidden;
- Motorized vehicle access for entertainment is not allowed;
- Cumulative development of new plans/projects/infrastructure will not exceed 5% of 9410 habitat's coverage;

On FCCs request, a separate management measure was introduced to allow and enhance natural processes in forest habitats through the protection of areas under a pilot non-intervention regime (MS47, page 355). In these areas, all human activities are restricted, with the exception of biodiversity research, interventions that initiate a recovery of the natural forest type in the case of spruce monocultures and clear-cuts based on scientific studies and for a limited period of time, eco-tourism, and activities for public health and security. The main goal with these areas is to maintain (in the case of virgin and semi-virgin forests) and to increase the conservation status of this natural capital of community interest. Out of the **4,731 ha FCC properties** included as non-intervention areas, **1,343 ha** were purchased within this LIFE project.

Virgin forest in the Upper Valea Vladului

Actions B Forest Purchase - general considerations

As explained in much more detail in the mid-term report and its revisions, we encountered some problems with the purchase of forests and had to adapt our plans several times:

- When we submitted the project proposal in summer 2011, a large portion of the upper Dâmboviţa Valley was in the restitution process. During the period between submission of the proposal and the start of the project in August 2012, a substantial amount had already been restituted and the new owners wanted to sell immediately. Consequently, the CARPATHIA project purchased ca. 750 ha to avoid clear-felling of these forests through logging companies and to save them for conservation. Yet, these surfaces were not available anymore for purchase in the frame of this LIFE+ project.
- The largest individual land owner in the upper Dâmboviţa Valley with 900 ha expressed initially her interest to sell her forests (or at least the largest part of it) to FCC, but had a number of litigations amongst family members and eventually decided to not sell the forests at all for the time being.
- An inventory in the Romanian land registry stopped land title certification for a certain period, which caused delays.
- A number of political disputes within Rucar commune resulted in delayed restitution processes for certain land owners, who were not part of the “political establishment” and consequently had to go through court procedure to obtain their property tit.
- Until 2012, a high percentage of restituted landowners came to us and wanted to sell. In the years thereafter, landowners had less pressure to sell and consequently we had to accept prices, which were considerably higher than in the first years. At the same time, we had to deal with many small properties, which took time in terms of purchase negotiation, time spent at notary, and registration process.
- Many of the pre-contracts signed with the owners could not be finalised into eligible sales contracts due to the fact that the owners could not register their land in the land registry.

For all these reasons, forest purchase has been much more difficult than initially envisaged and as experienced throughout the project period. The problems appeared step-by-step, and we constantly had to adapt our strategy, identify alternative owners, negotiate with them, and accept delays due to legal procedures. Such, the forest purchase in actions B.1, B.2 and B.3 progressed slowly, but eventually we managed to purchase a total of 1,791 ha, out of which we consider **1,643.38 ha** eligible according to the Common Provisions (see Annex B.1_3 List of purchased forests). For all purchases it is mentioned in both, the contract (declaration on the last page) and the land registry, that this land is designated purely for conservation. For contracts signed until November 5th, 2012 we made separate declarations that also specify a transfer to another similar organisation in case of dissolution of FCC. After that date, both statements are directly included in the contract text, and not as separate declarations.

Since costs for forest purchase were considerably higher than foreseen in the grant agreement, we fully covered all expanses for land purchase, which exceeded the planned costs, with own funds and confirmed this in a declaration sent to the EC together with the revision of the mid-term report. The final version of all the forests purchased within this LIFE project including the current situation and the targeted habitat to be restored as well as the management regime as stated in the Natura 2000 site management plan are presented in the List of purchased forests (Annex B.1_3). Map "B.1_3 Location of purchased forest lots - final" and four zonal maps in the Maps section of the annex give an overview of their location and category. In the electronic version of the annex (Folder: Purchase contracts and justification) we compiled all land purchase documents considered eligible (pre- and final contracts, excerpts of land registries, internal price justifications/explanations for each deal) and individual maps with coordinates.

Action B.1 Purchase of natural forests

Since action A.1 did not particularly identify natural forests in the first years of the project, we purchased all forests which we could get hold of and where we at least assumed that due to its geography (protection belt below alpine areas against avalanches, which have always been left uncut in the history of local forestry and consequently are likely virgin or semi-virgin), due to their appearance, or due to information we had from the Câmpulung Forest Service, forests are likely to be virgin or semi-virgin. Many properties actually comprised forests which include managed forests and forests along the protection belt that could not be purchased separately anyway.

In total we acquired **294 ha**, the majority of it being acidophilous Picea forests (9410) of the montane to alpine level, and some Bushes with *Pinus mugo* and *Rhododendron myrtifolium* (4070*). Such we have purchased ca. 50 % more natural forests than originally envisaged. All 294 ha of forests have been included into the Management Plan of the Natura 2000 site Munţii Făgăras (Annex 17.30 on page 580 of the MP). In addition, we have categorised these areas as "secular forests" in the forest management plans, which means that they can't be cut any longer, even after the end of the current forest management plans in about ten years' time.

We initially estimated an average price of 3,300 Euro/ha for forests that likely are virgin or semi-virgin and throughout the first year we paid actually even less (on average ca. 2,700 Euro/ha). Due to the reasons mentioned above, prices increased over the years and overall the average price of natural forests purchased within this LIFE project went up to 3,680 € per ha.

Fig. 10 Virgin spruce forest (upper part) in Valea Vladului (parcel FC 57a)

Action B.2 Purchase of clear-felled forests

We started to purchase clear-felled areas mainly in the badly hit areas north of Pecineagu Lake and in the areas of V. Richita, Draxin, and V. Stanciului. Though we had purchased more than 400 ha of clear-felled areas already by 2015, we continued to buy also in the following years, since some of the previously acquired forests were still in the form of pre-contracts and there was the risk that full purchase contracts could not be finalised until the end of the project period. This turned out to be a fact and out of the 488 ha of clear-cuts purchased, only **359 ha** could be registered in the land registry and fulfil all the requirements foreseen in the Common Provisions. This means we purchased only 90% of what was originally foreseen, but since the restoration of clear-cut areas in action C.2 was targeted to a minimum of 200 ha and we could also supplement with areas purchased already before the LIFE project, this did not influence achieving our conservation objectives.

In principal, clear-cuts were valued with 500 Euro/ha, but often clear-cuts had a certain percentage of still standing timber, had already some natural regeneration, or have been partially replanted, which is why higher prices were negotiated. The same logic applied to situations where lots were so small that owners would have no incentive to sell as registration costs and taxes might have even exceeded 500 Euro/ha. Therefore, the overall average price for clear-cuts purchased within this LIFE project increased to 1,364 €/ha, yet all extra costs have been covered by FCC.

Fig. 11 Clear-cut area in purchased parcel FC 39a

Action B.3 Purchase of managed forests

Purchasing managed forests was more difficult than expected as already described in the mid-term report. Due to the fact that we were purchasing a lot of larger, managed forests during the period between the submission of the proposal and the approval in order to save them from logging companies and the remaining large private landowners being restricted or undecided because of litigations amongst family members, we were starting to buy smaller properties of up to 30 ha. Luckily, another large land owner in the upper Leresti Valley (still in the 20,000 ha FCC custody area of the Făgăras Mountains Natura 2000 site and just over Păpuşa Mountain), who initially did not show much desire to sell, reconsidered and eventually sold their 542-ha property. In addition, we also managed to get a 176-ha property in Valea Vladului, and could convince another two owners to sell a 112 ha and 130 ha property in Otic Valley and Valea Vladului.

Such we acquired a total of **990 ha** of forests eligible in this category, for another 11 ha we didn't manage to finalise the sales contracts and the entries into the land registry prior to the end of this project. With 99 % of the envisaged area purchased and already having overspent the budget for land acquisition on our own expenses, we consider this action fulfilled.

Prices for managed forests have been initially negotiated based on two benchmarks: The average price that we had paid previously for managed forests (2,700 €/ha), and a calculation of the value based upon a Ministerial Order, if the state purchases forests. During the first year of land acquisition we have managed to keep prices even below the set average, but once we had to approach owners that did not have any pressure to sell their properties, we had to accept higher prices in the negotiations and – once we had accepted these higher prices, other sellers asked for these prices as well. For this reason, the average price of 3,469 €/ha is considerably above our initial plans, but all extra costs have been covered by FCC.

Fig. 12 Spruce monocultures in forest parcel FC 165b

Action C.1 Restoration of forest floor on eroded skidding tracks

Based on the technical plan for erosion control, this activity started as planned in the second half of May 2013. Originally, the actual work was supposed to be subcontracted to a specialised company, but we proposed a modification to the plan to conduct the work with our own FCC staff and additional local labour force. This proposal was accepted in the reply letter to our inception report in June 2013, as well as the modifications of the spending, which included the lease/purchase of a small excavator needed to fill up the ravines.

Throughout summer and autumn 2013, our teams of rangers with the help of seasonal employees cut parts of logs, which remained from the clear-cuts, and filled the gullies and ravines, which had been washed out of the tractor roads in the first two sites in Pârâul Mănăstirii and Podul Încurcat. A fair number of small trees, which grew in the vicinity of the skidding tracks were re-planted in the middle of the covered tracks and the results seemed very good, even the heavy rains in April and the second half of May 2014 have had no effects and have not caused new erosion.

The speed of the action, however, was limited by the low capacity of the mini-excavator (though such a small machine was needed for the steep slopes where heavier excavators could not have worked on safely). At the same time, action A.4 revealed that there are more than the originally planned 10 km of tracks where the erosion situation needed intervention and we were aiming to work on all the clear-felled areas we purchased through LIFE. Therefore, we proposed to buy a second, larger 1.8-ton excavator for multiple purposes (mainly C.1 and C.5, but also in support of C.4) in our request for Amendment of the Grant Agreement, which was accepted on Feb 10th, 2015.

Such we could speed up the progress and worked very efficiently with two teams; each restoration team being made up of an excavator operator and a chainsaw operator working together all the time and the manual work being done just ahead of the excavator. During the following planting period, all tracks very replanted with the appropriate species composition, accumulating to a total of 32,580 saplings.

Fig. 13 Small excavator filling up ravines in Podul Incurcat

Altogether, within this LIFE project, we have fully restored **16.88 km of skidding tracks**, translating directly into 8.44 ha of forest habitat (less than 1 ha of 9410 Acidophilous Picea forests, 1,000 sqm of 91E0* Alluvial Forests, rest 9110 *Luzulo-Fagetum* forests), which is far more than we had envisaged at the beginning of the project (10 km). For this, a total of 2,159 excavator-hours and 6,626 l of fuel were used. The location of all repaired skidding tracks can be seen on map C.1 Erosion control in the Maps section of the Annex.

Apart of a slow progress in the beginning (instead of finishing by the end of 2014 as originally scheduled, we continued working until the end of 2016) and the harsh weather conditions, which made it sometimes very demanding to work with the excavators in the steep slopes, this activity worked smoothly and we gained valuable practical experience that we could already transfer to other areas: between 2015 and 2016 we could restore another 9.9 km of skidding tracks in the frame of a NGO programme of the EEA and Norway Grants Fund on clear-cuts in the vicinity of the LIFE areas (EEA Grant restoration sites included in the map below) and we intend to continue this work whenever we purchase forest lots that have erosion problems. A manual, based on and relating to the experiences gained within this LIFE project, was produced within the EEA and Norway Grants project and is annexed in its electronic version (C.1 Manual eroziune EEA).

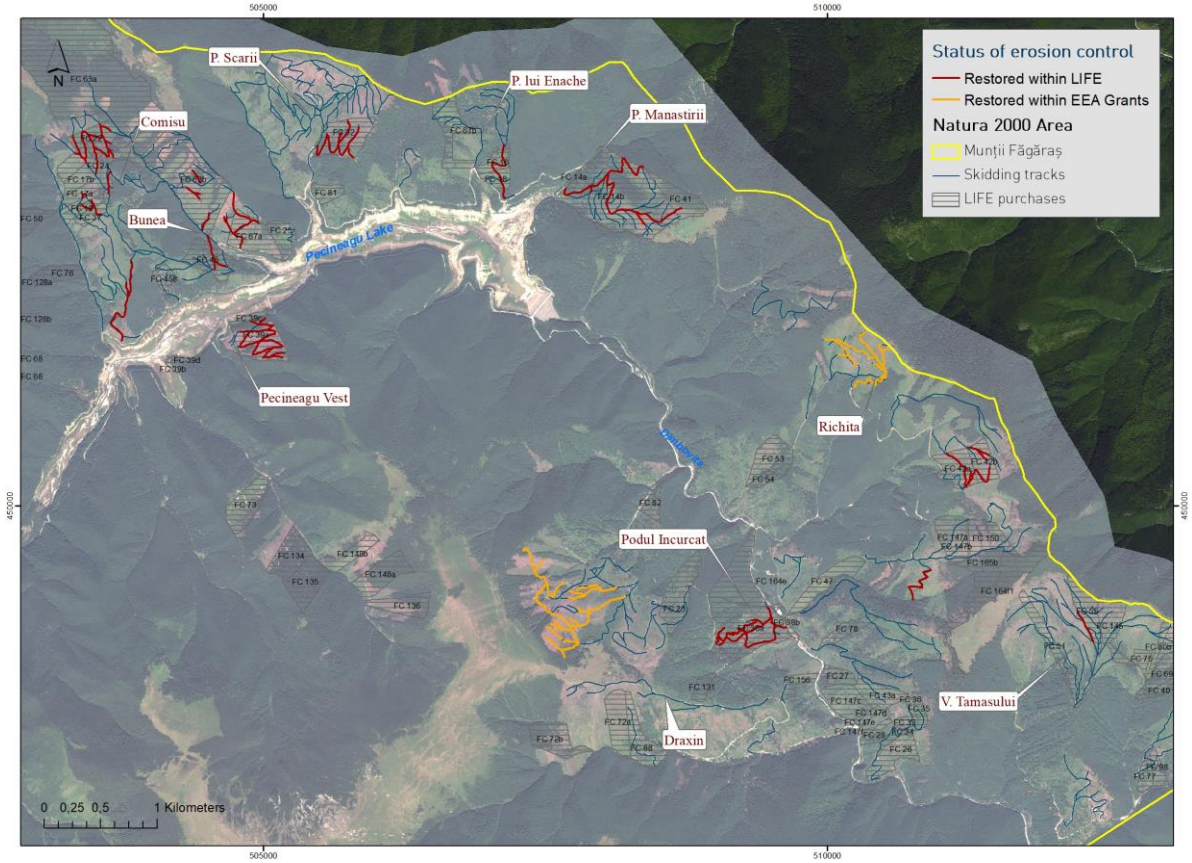

Fig. 14 Skidding tracks restored within this LIFE project (red) and a follow-up project funded by the EEA and Norway Grants (orange).

Action C.2 Plantation of original tree species on clear-cuts

The majority of the replanting activities was scheduled for 2015 – 2017, once the saplings from the nurseries were large enough to be replanted. However, beech and fir could be rooted easily from nearby forests in ownership of one of the CARPATHIA project entities, where natural regeneration occurred in high densities, and could be replanted by FCC rangers on some clear-cut areas already in 2013 and 2014 without any problems. Such we rooted and replanted a total of 30,000 beech and 6,500 fir saplings on 40 out of the 58-ha clear-cut in Pârâul Mănăstirii.

In autumn 2014 we organised the first small planting campaign with 14 workers that worked a total 73 man-days to cover an area of almost 2 ha on the clear-cuts of P. Mănăstirii and P. Încurcat, mainly along the tractor roads, where we restored the forest floor. Between March and May 2015, interrupted several times by challenging weather conditions, we organised the first big planting campaign, increasing the work force to between 64 and 116 people, a combination of our own team and daily workers recruited from the neighbouring villages. Organising this was quite a challenge as people were all hosted in a field camp to reduce time and costs for travelling, but also very rewarding: in 1.054 man-days we could plant a total of 179,850 saplings, covering 45 ha of clear-cuts.

In order to increase the work force for re-planting clear-cuts, we sub-contracted a company to work in parallel with our own staff, a modification to the original plan accepted in the Amendment to the Grant Agreement in February 2015. The contracted planting company SC ACHE ENA FOREST SRL used about 40 workers (840 man-days) to cover the designated 37.65 ha, and planted a total of 150,600 saplings in 5 different lots. The company resigned from the contract in February 2016 due to VAT issues, so the replanting in 2016 was done solely by FCC and daily labourers and only in March 2017, we subcontracted another planting company, SC UNO TRADING SRL for planting 70,000 saplings.

We continued with replanting campaigns every autumn and every spring and with the experience gained, we could handle the logistics of these events easier each time. Typical interruptions and problems encountered were due to harsh weather conditions (heavy rain or cold spills) or difficulties in finding and purchasing sufficient saplings of the required species, but all could be resolved and overall, though this action was using a high proportion of FCCs capacities, the replanting activities progressed smoothly and were very successful.

In total, we have planted within this LIFE project **1,126,060 saplings** and restored **404 ha of clear-cuts**, which is by far more than we originally envisaged (96,000 saplings/200 ha). The total number and distribution of species during the LIFE re-planting campaigns is presented in the table "C.2 Plantation of original species on clear-cuts", the planted areas and which of the clear-cuts were bought within this LIFE project can be viewed on Map C.2 in the Maps section of the Annex. A total of 342 ha of 9110 Luzulo-Fagetum forests and 62.5 ha of 9410 Acidophilous Picea forests benefitted from this conservation action. In addition, the successful replanting campaigns within this project have triggered funding for further replanting (another 300 ha throughout the past 3 years and at least another 200 ha for the next few years).

Action C.3 Rejuvenation of managed forests/ecosystem restoration

Already from the start, this activity faced a short delay due to the fact that our restoration methods (opening up small pockets in the spruce-monocultures and replanting them with the natural specie composition), which we proposed in the forest management plans immediately after we had bought a lot, were not accepted by the Forest Control Inspectorate, fearing this would open the doors for others to start cutting commercially in 60-90-year-old forests. As explained in more detail in the mid-term report, on the advice of the State Secretary in the Department for Waters, Forests, and Fisheries, we undertook an experimental study to execute such cuttings in the forest. This study was finished by Prof. Tudoran, from the Brasov Faculty of Silviculture and Forest Engineering, in October 2014 and eventually this kind of intervention got approved for the first time in Romania and we received all the authorisations to start tree selection and cuttings.

During the evaluation and planning phase, however, we also realised that with logging trees in small pockets to open up spruce forests, we fell into a technical activity ("forest exploitation") that FCC legally couldn't execute. To overcome this problem, we subcontracted this work to an authorized company that was supposed to work under our strict supervision, while we implemented the work scheduled under action C.1 with our own team. This slight budget modification was communicated to the Commission with the Inception report.

FCC personnel started marking the trees selected for cutting in summer 2014, and after a public auction subcontracted the local harvesting company SC UNIC RUCAR SRL, an authorised logging company, for the entire surface of 400 ha proposed to be restored. Cuttings started in January 2015 on 75 ha to create space and light for broadleaves and silver fir trees, which were planted shortly after. In autumn that year though, SC UNIC RUCAR SRL resigned, as profits were too little. In January 2016, a new company took over the contract for the remaining cuttings, namely SC KOSIRY FOREST CONSTRUCT SRL-D, but they as well faced delays due to difficulties in getting the new authorisation from the Environmental Protection Agency. Progress was overall slow and by mid-April 2017 the company requested to resign from the contract due to internal financial problems and recurring difficulties to find trained work force. At that point the work was implemented on 304 ha. We started a new auction in July 2017 and signed with the 3rd harvesting company for this project activity, SC MARI&MADA COMPANY SRL, for implementing cuttings on about 43 ha.

Due to all these recurrent problems with the companies not fulfilling their contracts and the resulting delays, we decided to organise our own small harvesting team within FCC as a back-up and a support for finishing this activity. Thus, AOSC (Asociatia Ocolul Silvic Carpathia) – the authorised forestry service created and managed by FCC – applied for a permit to do the cutting activities and based on a delegation, FCC placed its personnel (workers) at the disposal of AOSC, in order to comply with the legal requirements.

The Târgului basin was favoured as starting point for the conversion work over the Upper Dâmboviţa valley due to the fact that this was a larger property that already had a forest management plan approved, in which the planned interventions could be incorporated, while with the properties in Dâmboviţa we had to go through the whole process of getting new forest management plans approved. Though the Târgului basin was not explicitly mentioned in the original proposal as we believed there will be plenty of managed forests for sale in Dâmboviţa alone, the area is part of the same Natura 2000 site and, as mentioned in our letter from October 24th 2014, does not stand isolated, but is well connected to other purchases within our larger initiative (and updated map of all FCC purchases can be found as A.0 FCC Land purchase in the Maps section of the Annex).

Fig. 15 FCC staff cutting logs in smaller pieces to be left in the forest

In the three years after the start of this activity, we managed to initiate the process of rejuvenation in managed forests on a total of **405 ha,** all part of the 9110 Luzulo-*Fagetum* forests habitat type. This included the marking and cutting of 35,367 spruce trees, which enhances the light conditions on the forest floor for the planted saplings (see C.3 Spruce conversion in the Annex). The resulting openings were replanted with **62,050 saplings**, out of which 49,100 beeches, 7,950 silver fir, and 5,000 sycamores. In some areas where we cut spruce, some natural regeneration was already coming up and no replanting was needed for the time being. In addition, we intervened with cuttings in the spruce forests around the Pecineagu Lake and in Tămaş valley, where we initiated the conversion from spruce-dominated habitats to alder habitat (91E0* Alluvial forests) on **18.87 ha**. The map "C.3 Conversion of spruce monocultures" in the Maps section of the Annex shows the locations of the intervention areas for both restored habitat types.

Lessons learned

For the conversion of spruce-monocultures, the lessons learned can be grouped into three categories:

1. Legal constraints

- The forest plans of the chosen forest areas have to exist and have to be legally approved.
- The proposed reconstruction activities have to meet the requirements of the forest management plans (FMP) in place. Reconstruction activities are somehow considered pilot projects in Romania, since normally, it is foreseen that spruce forests, even if they are artificial ones, should remain as monocultures to produce timber.
- A scientific study has to be conducted in order to propose a different approach to the existing FMPs and the study has to be approved by the special Commission inside the Ministry in charge of forests. Existing and approved FMPs cannot be changed in the period of their legal existence but the study can justify certain reconstruction activities performed within the limits of the previsions of the FMP. Based on the study, the future FMPs can be improved in order to obtain a more efficient forest conversion to more natural stands.

2. Practical issues regarding forest stands

- The most effective change can be done in young stands, starting with young plantations and till the age of 70 years (the age limit of the thinning interventions). In this age range, the volumes of the allowed interventions in the forests are more flexible within the FMP, but also the forest stands are adapting much easier to the changes.
- Thinning has to be performed in a way that ensures the still existing deciduous tree species can be saved and supported by creating space and better light conditions around them.
- Some of the spruce trees in the stands will always remain.
- Planting of young saplings in the forests is effective with beech, fir, sycamore, while in the mountain areas the best results were obtained with beech.
- After a period of 5 years more interventions have to be made in the planting areas to bring more light into the forest.

3. Practical issues regarding working teams

- The best results with the interventions in spruce monocultures were obtained with our own FCC workers, who had a better understanding of the job to be done and the entire context.
- Local logging companies did not fully understand the meaning of the interventions. There were a lot of changes in the working teams and especially when logs were to remain in the forest and had to be debarked, it was difficult explain the importance of it.

A detailed account of this activity is presented in the annex as document "C.3 Manual for Spruce monoculture conversion" (bilingual).

Action C.4 Restoration of riparian galleries

This activity started with a delay of one year due the issues with the habitat assessment as mentioned under Action A.5. In a first step, we made sure the proposed restoration measures (opening up pockets in the misplaced spruce-monocultures) were stipulated in the forest management plans and started with preparing the soils for replanting and installing fences, where necessary. The approval of the forest management plans took a long time and therefore the majority of the work (82 %) was implemented by FCC staff in 2016 and 2017.

Depending on the location, the interventions undertaken could be a combination of

- marking and cutting spruce trees (26.2 ha),
- planting saplings (16.73 ha; especially on meadows or clear-felled areas, where no cuttings were needed),
- aerating the soils with a small excavator and sowing seeds (7.57 ha), and
- installing fences as temporary defence against livestock and patrolling the areas to prevent grazing.

In total we such initiated the restoration of **91E0* habitat** on a river length of **23.14 km** (116% of our initial objective), which represents almost **46 ha**, where the conditions could be improved significantly and a new alder forest will be established over the years. In our initial proposal we estimated approximately 100 ha to benefit from these restoration actions, but the areas along the shores are quite narrow and though we have covered more than 20 km along the river, the resulting surface is significantly smaller than originally envisaged. Altogether, we planted **54,111 saplings** (almost 78% alder, 20% ash, 2% willow) and sowed 4 kg of alder seeds. Annex "C.4 Alder restoration sites" summarises this activity from its beginning, with the river length and areas covered and the number of saplings planted in each property, while map C.4 shows their locations. The work took place not only on areas purchased within this LIFE project, but also on properties already in ownership of FCC and its partners.

The interventions followed the recommendations as outlined in the habitat assessment under action A.5 wherever feasible in terms of ownership situation and possibilities within the forest management plan. Our internal assessment (submitted with the mid-term report) revealed that the ecological restoration measures in degraded habitats could be applied on a total of 58 ha, which were in the ownership pf FCC and its partners. The extraction of the non-natural species (spruce) as much as possible and creating the appropriate conditions for planting saplings and sowing seeds of the naturally occurring species, as well as improving the situation for natural regeneration were the most important activities.

There were forest parcels, however, were only the lower part of the forest nearby the river was intersecting the alder habitats. After the initial planning, we came to the conclusion that the volume to be extracted in the whole parcels (trees were marked as required on forest regulations in thinnings on the entire area) were much bigger than the needs to reconstruct the alder galleries, representing only 5-10% of those parcels' surface. Due to the risk of damaging the riverbanks with logging, this technical solution was dropped and only planting of trees was performed.

In addition, we intervened on a total of 2.55 ha and 3.04 river km that were not assessed in the original study, but where we realised during field work that the interventions (mainly replanting alder) would benefit the habitat.

The impact of these reconstruction activities on the alder galleries can already be seen in the field:

- In areas were alder was planted, the growth-rate in height is very fast, more than 30-50 cm per year

- because of the supplementary protection measures (fences, interdictions for grazing) in and nearby planted areas, natural regeneration of alder and associated species is coming back very fast
- in the upcoming new forest management plans, the alder galleries will be included as distinctive forest parcels and this will ensure their long-term protection

Lessons learned

The process of eliminating spruce trees from the alder gallery zones has to continue, the best option being to eliminate trees from the newest regeneration. The long-term survival of the alder galleries will also depend on the necessary interventions in the surrounding spruce monocultures, as the fast-growing spruce trees affect the light conditions for the alder galleries, especially in narrow valleys. Therefore, the reconstruction of the natural forest type in the vicinity of an alder gallery should be taken into consideration too to improve the success of measures taken in this priority habitat.

Fig. 16 Grey alder habitat in the Upper Dambovita

Action C.5 Rehabilitation of tributary streams

The planned intervention on the dams of the Upper Dâmboviţa River system, has been causing serious problems from the beginning and was already the reason for a prolongation of the project end date by one year. Despite a huge effort, we have not managed to obtain the final building permit to implement this action, due to the fact that FCC has no legal basis to request the building permit after a late modification of the construction law, as illustrated in detail already under Action A.6. As a consequence, this action could not be implemented as planned in the frame of this LIFE+ project.

Consequences on project objectives

Non-implementation of Action C.5 does have consequences on the third of our five initial project objectives, which is "*to restore the original riparian vegetation along the watercourses and to rehabilitate the aquatic eco-system of the Dâmboviţa basin in order to allow upstream fish migration that has been interrupted for several decades.*".

While the restoration of the riparian vegetation as foreseen in Action C.4 and also monitored under Action D.4 are going well, and we are improving the overall state of the aquatic system by restoring eroded areas and replanting clear-cuts (C.1 and C.2) to reduce pollution of waterways, we cannot ensure un-interrupted fish migration in the frame of this project. However, as confirmed in the fish monitoring carried out within this project, the Upper Dâmboviţa River is generally in a good condition based on the European Fish Index (EFI+), which puts the sectors above the Pecineagu Lake in class II out of five quality categories. This proves that it is still possible to maintain habitat quality and to enhance the aquatic biodiversity by small interventions such as reforestation of the river basin and restoration of the vegetal cover along the banks, as is happening already in this project.

Alternative measures

We also proposed some alternative measures to contribute to our initial project objective, dedicated to bringing together key actors and interest groups in relation to habitat restoration and connectivity of the respective aquatic eco-system. By presenting the efforts and results of this LIFE project to a wider audience in the frame of a national event, we hoped to trigger solution-oriented discussions about river connectivity in Romania and to increase the chances for further engagement towards this conservation problem. These measures were accepted in a notification by email in June 2018; the event was undertaken under Action E.2 and outcomes are presented there.

In addition, we intend to pursue this problem also in the future and will try to find funding and solutions for implementing these works at a later stage.

Action D.1 Monitoring of forest floor on eroded skidding tracks

Monitoring the state of the erosion repair work started in 2015, after the first year of implementation, by walking along the repaired ditches and noting any kind of irregularities. In general, we verified the areas every year shortly after each snow-melt in March and April and later in summer, after torrential storms. Overall, our efforts to halt erosion were very successful. Only on the upper part of P. Mănăstirii we found one incipient gully, which we counteracted already after the first year by installing an additional fence that diverted the water course along the slope.

In 2017 we revisited all reconstruction sites again and despite some rougher weather conditions - large amount of snow during winter that melted rapidly during March/April - no serious signs of soil erosion fall-backs on the restored forest floor could be found, neither on the older intervention sites (FC14b, FC38a), nor on the newer ones (FC39a, FC67a, FC32, FC17a, FC19, FC37, FC22, FC24, FC42a/b, FC55, FC16, 18). A clear sign that the former land shape was restored correctly, with enough inclination and fences to divert any potential new temporary water streams.

We also sampled water to check for water turbidity in the summer months after some rainfall, the results are given below in NTU (Nephelometric Turbidity Unit). The 2018 values are all very low, the European standard for turbidity in drinking water states that it must be no more than 4 NTU, ideally below 1.

Table 3. Water turbidity in different restoration sites (in NTU)

Location	2015	2016	2017	2018
Pârâul Încurcat	28.1	5.52	3.08	3.46
Pârâul Tămaş			0.37	0.98
Pârâul Richita			0.91	1.75
Valea Comisului		0.78		0.82
Valea Bunii		2.9		0.91
Pârâul cu Scări			1.06	1.11
Pârâul Mănăstirii	5.3	1.21	0.96	1.91

At the same time, we are monitoring the recovery progress via fixed-point-photography and have established 8 sites that we will continue to monitor also in the future. Below an example from the Pârâul Încurcat area, where the excavator covered the tracks with soil in 2014 and everything is covered now in saplings, bushes and grass. More areas are shown in the technical annex ("D.1 Fixed-point photography on repaired skidding tracks".

Overall, we are quite pleased with the situation, no serious damage on the restored forest floor was identified, and all stabilisation fences are in place. Vegetation is recovering in general on all restored areas, covering already 60-70% of the mobilised soils, which will further improve the diversion of water courses along the slopes. We expect full rewilding of all the intervention sites within the next few years.

2014 *2018*

Fig. 17 Monitoring the recovery progress on restored skidding tracks via fixed-point-photography

Action D.2 Monitoring of forest regeneration and rejuvenation

We started with monitoring the replanting success on each forest lot usually one year after the replanting has taken place, using the same methodology as in the original regeneration survey (action A.2), counting saplings for each species and estimating their average height. The results have been described in detail in earlier reports and especially in the Interim report 2017. In 2018, we faced a quite unusual spring season with a lot of snow in March followed by a very warm and dry April, which made it hard for the saplings to survive, but the rainy season in May and June saved the plantations and limited losses.

We revisited and analysed all LIFE plantation sites again in September/October 2018, after the grass was cut around the saplings. Due to the rainy June, the grasses in several areas grew more than 1 m in height and threatened to suffocate the saplings, which made interventions necessary on 195 ha of the planted areas. In 2018, these activities were financed by private funds dedicated to ensure the continuity of the forest restoration in the Făgăras Mountains. Almost 878 work days were needed to complete this activity, 40 local forest workers were involved.

Looking at the entire range of plantations within this project in the period between 2014 and 2018, there are only few places where we registered significant losses. In the higher altitudes of UA 103B - FC145 (Tămaş valley) for example, 40% of the spruce saplings were affected by the warm and dry spring season. Overall, in this parcel, taking into account the entire range of species, the success rate is about 70%. Most of the losses we recorded in areas with rocky substrate close to the surface and clear-cuts that are facing to the South-East, where the sunlight in combination with prolonged dry periods affected especially the more sensitive saplings such as fir and beech. In case of spruce, also the quality of the saplings (transport conditions, nonadaptation) might be an important factor. On 87% of the replanted areas, we have a success rate of at least 80%, which is totally acceptable for replanting activities, on 111 ha the survival rate of the saplings is even above 90% (see "D.2 Replanting success on clear-felled areas" in the Maps section of the Annex). Clear-cuts, where the die-backs are 30% or more, will undergo a round of supplemental planting of saplings in spring 2019:

Table 4. Replanted clear-cuts with die-backs of 30% and more

Area	UA	Year of planting	Property code	Surface [ha]	Problem encountered	Success rate [%]	Measures to be taken
Draxin	12	2017	72B	2.9	Dry spruce and fir saplings	65	Completions in spring 2019 with fir and spruce
Draxin	134	2017	26	7.9	Some beech saplings missing, rocky soil, very sun-exposed area	70	Completions spring 2019, some natural regeneration occurred
Stanciului	129	2015	78	3.8	Some beech saplings missing, almost 1 ha rooted by wild boars in autumn 2017	70	Completions with beech in spring 2019, in the lower affected area
Stanciului	125	2015	47	3.5	Dry beech saplings (sunny area), 0.5 ha affected by boars	70	Some natural regeneration is coming back
Tămaş	103B	2018	145	4.3	Some spruce saplings died in the upper area	70	Completions with spruce, beech, and rowan 2019
Bunea	76	2017	63A	4.2	Fir saplings affected from draught	70	Completions with beech and fir saplings in 2019

The yew saplings we reintroduced into the area are all still alive, although, as we already mentioned in the last report, they had a hard time to adapt to the new conditions due to their older age. About 50 % of all the yew saplings we planted still show some signs of stress (5-20% of their foliage is reddish), but their state seems to be constant, which makes us optimistic that they will survive and fully recover in the next years.

Regarding monitoring in action C.3 – Rejuvenation of forest ecosystem, we have concluded, as mentioned in earlier reports, that the classic sample plots (circular plots in a grid system) don't work here. That is because the lots, where cuttings were applied, are distributed very randomly – sometimes narrow shaped stripes (a couple meters wide) through the spruce forest and sometimes cuttings concentrated around existing broadleaves. Therefore, we decided to walk through and check saplings, then estimate a percentage of die-backs for each property parcel. The loss of the saplings in the monoculture conversion sites after this year's assessment ranged between 5 and 29 % and is visualised in map "D.2 Replanting success in spruce conversion areas". A loss up to 20% is quite normal and totally acceptable, where the survival of the saplings however is below 75%, we will supplement the missing species in spring 2019.

In the alder plantation sites, we had to face some die-backs after the 2017 replanting session, especially in UA 127 (FC 49), for which we don't really have an explanation for, but we have already counteracted this with another intervention during autumn 2018, when another 3,000 saplings were planted, and will continue to carefully monitor the situation in these lots.

Beyond the complementary replanting measures in 2019, we will still have to take care of the plantations for another 2-3 years till the height and the coverage of the saplings secures a normal forest development. During that time, we will revisit the plantation sites every summer for monitoring and tending operations.

Action D.3 Monitoring of forest habitat restoration efforts – indicator species

Originally, the baseline study on some indicator bird species, Three-toed Woodpecker (*Picoides tridactylus*), White-backed Woodpecker (*Dendrocopos leucotos*) and Red-breasted Flycatcher (*Ficedula parva*), and other forest birds, was scheduled to be carried out in spring 2013. However, due to the start of the POS Mediu programme in Romania, all competent specialists were “booked out” with monitoring contracts for the various protected areas and therefore we started only in 2014 with the baseline survey and continued the monitoring annually between 2015 and 2017 with the ornithologists from MILVUS Group.

The surveys took place annually in the end of May when the ornithologists counted the target species in three types of forests with different management implementations: non-managed forests, coniferous forests, which will be transformed into mixed forests, and clear-felled areas, where forest will be replanted using a natural selection of tree species. The reports for years 2014 to 2016 were delivered with the annual reports, the final results for 2017 are attached in the Annex ("D.3 Bird monitoring final report 2017").

Expectedly, the number of these indicator species (white-backed woodpecker for mature beech and alder forests, three-toed woodpecker for mature spruce forests, red-breasted flycatcher for mature montane beech forests) was quite low due to the fact that the areas surveyed were mostly degraded habitats. The mature mixed and beech dominated forests in the study area were either clear-felled, or in some areas, where the natural vegetation should be a mixed forest, the structure was artificially shifted towards spruce dominated forests. This is expected to change considerably with further restoration of the forest habitats towards a natural tree composition, but obviously this will take time and a long-term monitoring scheme (recommended every 3-5 years) will have to be established to follow population trends. During the surveys of the past years, we also recorded other bird species and some species showed statistically significant population increase or decrease already, which can be attributed to habitat changes. As an example, the Blackbird (*Turdus merula*) presence increased a lot, which is expected as young trees start to reach a certain height in clear-cut areas, offering a suitable breeding habitat for this species.

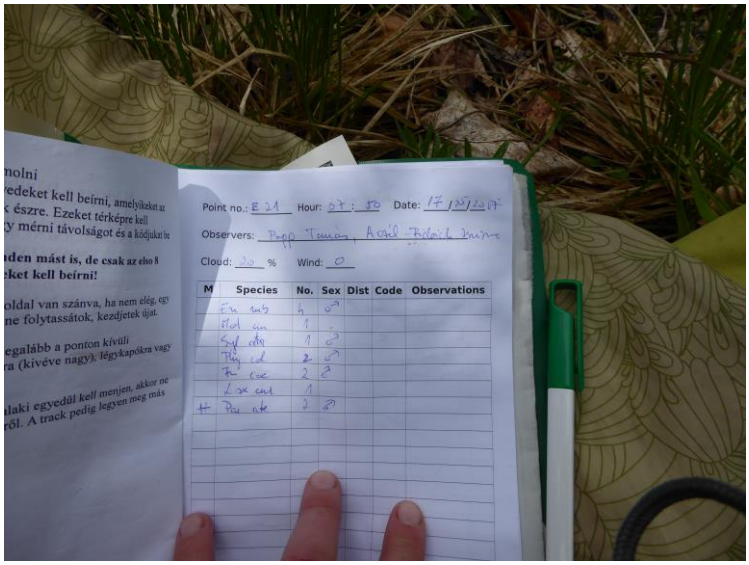

Fig. 18 Monitoring protocols

Within the CARPATHIA project, the monitoring of forest birds is an integral part of a long-term monitoring schedule, funding has already been secured for the next 5 years and will continuously be searched for in the future. In addition, we will try to increase capacity within FCC to cover this with own resources and volunteer programmes.

Action D.4 Monitoring of the aquatic system

There are four components to the monitoring of the aquatic system:

European Otter (*Lutra lutra*)

We conducted the first otter monitoring in February 2013 and repeated it twice each year, usually 1-2 days after a fresh snowfall so tracking was most efficient and meaningful. Each time we covered the shores of over 30 kilometres, from the entrance of Satic village all the way to the end of Valea Vladului, using snow-mobiles and skis. Altogether, the number of otters was quite stable in the area and there seemed to be no real threat to their population at the moment.

There were 3 separate regions with otter evidence in the form of tracks and excrements, indicating the presence of 2-3 individuals and/or family groups along the Upper Dâmboviţa valley: Valea Vladului, the area around the confluence of Dâmboviţa River and Valea Coltilor, and the segment between Valea Tămaş and Valea Draxin, below the dam. We also had a team searching in the Târgului basin, where we found evidence of another family in Valea Batrana. Otter presence data throughout the years was visualised in maps and delivered with every interim report.

Since snow conditions started to get a less and less reliable monitoring tool (e.g. in 2016 we could conduct only one session), we wanted to supplement the winter monitoring with using camera traps in places where we had many tracks during the previous years. We therefore purchased 5 wildlife surveillance cameras and installed them in several known areas of otter presence along the Dâmboviţa River above and below the Pecineagu dam. In summer 2017, we got pictures of an otter just below the dam, but the output of the camera survey was a little bit disappointing. In 2018 we were successful on two different spots below the Pecineagu dam as well as in the Berivoi/Lutele area and captured otters several times between May and June. Most likely, more cameras need to be installed along the river to obtain a better capture rate and to get more information about group sizes and breeding successes. However, FCC has in the meantime acquired a lot more camera traps and we will intensify the trapping effort along the river, to increase the output.

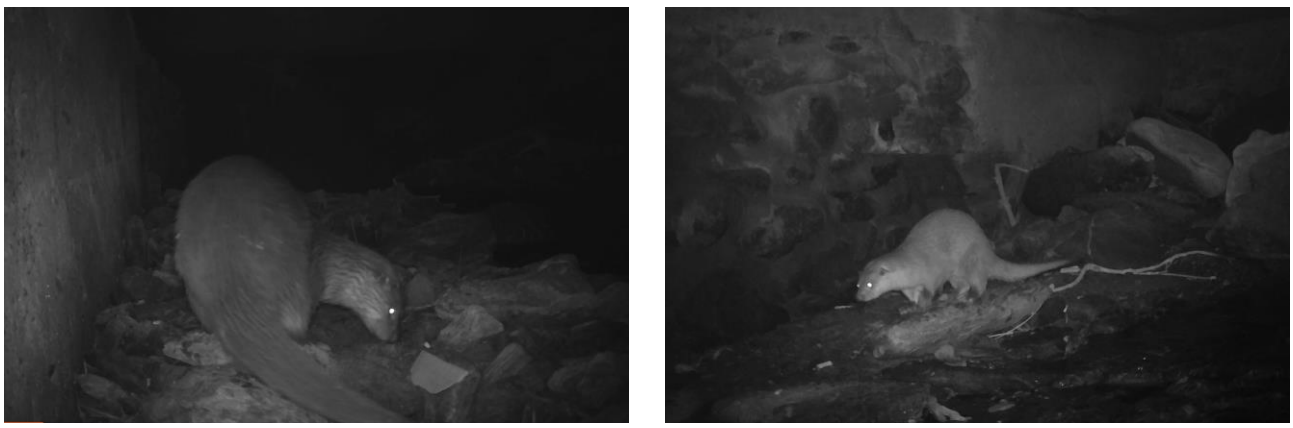

Fig. 19 Otter presence during camera trap monitoring in May/June 2018. Left: P. Baltatu, Right: Draxin

Hazel Grouse (*Bonasa bonasia*)

Monitoring of hazel grouse started in May 2013 and was repeated on a yearly basis until 2017, usually in spring after the snow-melt. We used a predefined set of transects along the entire Dâmboviţa valley and the bigger tributary streams and counted the response of male hazel grouse to hunting whistles. Since overall we got little to no response to the hunting whistles (max 13%), we tried different approaches, such as repeating the surveys in September or trying to do it earlier in the year, e.g. April (suggested in the literature as time periods of high response rates). Response rates, however, remained low throughout the project period.

A low hazel grouse presence was also confirmed by the ornithologists from MILVUS, after their field trips for action D.3. The best area was identified in the Richita valley, a place well known for hazel grouse nesting, while we found a few more tracks and excrements, and got some response to the hunting whistles in the upper part of the Dâmboviţa valley (Comisu/Otic/V. Vladului).

After some further discussions with the ornithologists we came to the conclusion that the hazel grouse is probably not the best species to monitor changes of riparian habitats and we decided to not pursue this in our future monitoring scheme.

Vegetation

To monitor the changes in the vegetation composition of the riparian galleries, we originally installed fixed circular sample plots of 400 m² set at a distance of 50, but eventually swapped to 200 m² plots since we realised during field work that the 400 m² plots are too big in the narrow river shores (so only the areas planted in autumn 2014, which are a little wider, are assessed by 400 m² plots, while all the other segments are assessed on the smaller plots). Including summer 2018 we such sampled a total of 240 sample plots and collected data on alder, fir, willow, and spruce saplings, shrub species like red elder (*Sambucus racemosa*), German tamarisk (*Myricaria germanica*), elm-leaved spiraea (*Spiraea ulmifolia*) and raspberry/blackberry bushes. The specific herb species of the 91E0* habitat, including *Telekia speciosa*, the most important species in the riparian habitats, are not present yet due to degradation of the habitat. After all it is also an indicator species for lack of human disturbance and the scars from the past misuse haven't passed yet. On the other side, species that depend on large water availability (*Equisetum sp*, *Petasites albus* etc.) were identified in all the areas, since they are pioneers in wet habitats. Mature alder trees, which could enhance natural regeneration of alder have only been identified in Berevoiu, FC48. The rest of the areas would have a very slow natural recovery, if we wouldn't have intervened. In some areas, the alder plantations are on former pastures in the riverine zone (eg. FC 31), where grass is still tall – the change over the coming years will be very interesting to observe.

The most common tree species identified (other than alder saplings), were birch and to a lower degree beech, while the most common shrub species was raspberry (*Rubus idea*) and elm-leaved spiraea (*Spiraea ulmifolia*). In terms of herbs, there is a very large diversity with species flowering at different times. In April – June one can observe very large areas in these restoration sites covered with snow drop (*Galanthus nivalis*) around acetous areas near spruce forests, which are common here and a sign of spruce habitats invading alder areas due to plantations. Also, white butterbur (*Petasites albus*) – a specific plant in humid habitats, and Equisetum sp. are common. In late summer, totally different humid habitat species can be found such as, Wild Angelica (*Angelica sylvestris*). Other species have a long living window, like ferns (*Matteucia sp*, *Drypteris sp*), which are also some of the most typical species for an alder habitat. In most alder restoration sites, former pastures, pasture specific weeds are still present and it will take several years for them to even start getting sparse, usually when the existing alder saplings will grow tall enough to cover them.

The data we obtained so far will serve as a great reference and baseline for the following years and we expect to see changes in the composition of the understory vegetation already in a couple of years as alder is a fast-growing species. We intend to revisit the permanent samples plots every three years to see the progress. Since these surveys can be done by FCC staff, no additional funding will be required to continue with the monitoring of the alder habitats.

2016 *2018*

Fig. 20 Development of alder plantations in lot FC 38b

Fish fauna

For the monitoring of the fish-fauna in the upper Dâmboviţa, we sub-contracted Aquaterra Iasi, under the lead of Dr. Grigore Davideanu, for the years 2015 to 2017. Surveys usually took place in August except for 2015 when it happened only in October, due to a considerable delay produced by the Ministry of Environment, Water and Forests issuing the scientific fishing permit.

The fish specialists set up 4 samplings plots on the main Dâmboviţa River and 3 other samplings plots on the most important tributary streams, Otic, Vladului and Tămaş Rivers. Overall 3 species were identified: brown trout (*Salmo trutta*), bullhead (*Cottus gobio*), and Eurasian minnow (*Phoxinus phoxinus*). No Mediterranean Barbel was identified (Barbus meridionalis), a protected species which we hope is still present in Dâmboviţa, but we had no evidence during this study.

Results from the three consecutive years were quite similar, with brown trout being the most dominant species (85 to 86.6%), the species being also the characteristic fish of the montane rivers. In this habitat, the trout finds perfect breeding and feeding conditions and keeps the other two occurring species, bullhead (7 to 10.8%) and minnow (2.9 to 8%), under control as the adults are even preying on them. Results of each monitoring session were delivered with earlier interim reports (2016 and 2017), the results from the 2017 survey are attached in the Annex (D".4 Fish monitoring 2017"), as well as a conclusive report for the three years ("D.4 Fish monitoring summary and conclusions 2015_2017").

The EFI+ score (European Fish Index Plus), as an indicator of the ecological quality of the Dâmboviţa River, showed that the aquatic habitats are in good (= fish community with mild deviations from the reference

structure) to very good condition, but that there is a significant impact from the hydro-technical structures which have changed the river bed and interrupted connectivity. One example was the situation at station 2, where above the dam not a single fish got caught, but below the dam only bigger fish were found that were removing smaller fish.

Table 5. European Fish Index Scores (EFI+) for the different sampling stations

	Station 1	Station 2	Station 3	Station 4	Station 5	Station 7
2015	0.825	0.825	0.825	0.825	0,882	0.882
	Good	Good	Good	Good	Good	Good
2016	0.843	0.799	0.791	0.883	0.914	0.912
	Good	Good	Good	Good	Very good	Very good
2017	0.835	0.730	0.881	0.799	0.826	0.903
	Good	Moderate	Good	Good	Good	Very good

Fig. 21 Electro-fishing at station 3 (2017)

From an ecological point of view, the age structure is altered (hence the fall in the value of the EFI index) and the lack of juveniles can lead to a dramatic reduction in fish numbers in the future as the longitudinal connectivity of the river is seriously affected and this small population is practically isolated between the dams.

Recommendations

The provisions of the Water Framework Directive require that all measures need to be taken to prevent the reduction of the biological quality of water bodies. Existing hydropower projects affect the river's longitudinal connectivity and biological quality and make it a candidate for the Highly Modified Water Body (HMWB) status. The construction of fish stairs is still necessary, but it solves only partially the access of fish to breeding areas. The stairs that are in use in Europe are intended mainly for salmonids, especially salmon and indigenous trout. At least in some cases, also *Cottus gobio*, which is a weak swimmer, and will not benefit from classical salmonid ladders needs to be addressed.

The afforestation of banks, slopes and the restoration of river vegetation in favour of softwoods, such as *Alnus glutinosa*, *Alnus incana*, *Salix sp.*, and hydrophilic grassy species, have multiple benefits for aquatic fauna: they reduce flow oscillation and turbidity in periods of heavy rainfall, decrease the water temperature (by shading) in the warm season, and allow for a higher dissolved oxygen content. More details, conclusions and recommendations are given in the annexed documents.

Action D.5 Assessment of the socio-economic impact

We updated the assessment of the socio-economic conditions in the villages neighbouring Dâmboviţa Valley with the data from 2017/18 to analyse both, the quantitative and qualitative gain of the two local communities Leresti and Satic, which benefit directly from the activities in the LIFE project and the overall conservation efforts of FCC.

For a brief economic background of the project area, it is worth mentioning that during the pre-restitution period (before 2005), timber and non-timber products were in the ownership of the Romanian State (administrated by the NFA) and there were no conservation or tourism initiatives, so all the economy in the area was based on resource extraction. During the restitution period (2005 – 2009), when the nationalised land was returned to the former landowners, a lot of them transformed forests into fast cash, by selling to logging companies. The economic impact was huge, but very short-lived, and the society per se didn't have a significant benefit. In our survey, we analysed different economic factors between 2012 and 2017, starting with resource extraction activities and finishing with the non-extractive approach.

The income from forestry and hunting jobs has seen a slow increase since 2012 and that is mainly due to minimum wage per capita increase in Romania. The number of jobs remained quite constant over the past years, increasing slightly from 25 in 2012 to 31 jobs in 2017. Jobs in the logging sector are still low standard, companies mostly offer miserable conditions to their employees, who sit in remote areas, in improvised housing, no kitchen, no showers, no utilities for clothes washing, medical care etc.

The income from timber processing has more than doubled since 2012, increasing from 3.6 million to 8.7 million RON in 2016, and dropping a little again in 2017 (7.7 million). The annual harvested volume hasn't increased though over this period. Instead timber and lumber prices have sky-rocketed starting from 2015, due to an imbalance of supply and demand. Official data wasn't provided by any of the authorities we requested from, so we calculated the data indirectly from harvesting volumes. The jobs in this sector are not very good quality either and accurate data regarding the number of employees is impossible to obtain, as such businesses use lots of unregistered workers.

The gain from mushroom and berry picking has been recorded since 2013 and increased since then by a little over 50 % until 2016. The increase is due to a slight increase in prices and a higher consumption, especially in 2016, due to a very good harvest. Calculation was done using the official data from mushroom handling companies and average prices paid to pickers. The number of pickers varied between 130 and 200 during these years. Working conditions are quite hard, due to the rough terrain and changing weather conditions, but pickers do not work under any kind of contract with the handling companies, so no support is offered. In 2017, due to the drought over the entire summer, the amount of mushrooms picked has been very low, the income dropping to 50% of the 2013 value.

The gain from livestock grazing has seen a slight decrease, descending from 1.8 to 1.4 mil RON between 2013 and 2017. Calculation is done using the number of cattle and sheep, the standard milk quantity per season and average market prices. There is a high supply of cheese right now on the markets and moreover city markets have been invaded by lots of factory cheese, even from other countries. Shepherds claim that the income from shepherding is low and relies a lot on state subsidies. Their living conditions are still very low, almost medieval, during the season and as far as we know, no shepherd has his employees registered.

In regard to conservation activities in the area, the only entity providing such jobs is FCC, through its nature conservation projects. The number of projects, as well as the number of people involved has been growing rapidly since 2012, going from 19 jobs in 2012 to 392 jobs in 2017 (including annual temporary jobs for

reforestation, erosion control, nursery maintenance, etc). The gain has also increased fast, from 286,200 RON in 2012 to 3.9 million RON in 2017. The quality of the jobs FCC offers is of a good standard: wages are above average, and technical and safety equipment, transportation, and other types of support are provided.

Tourism has started to develop in our project area only starting from 2006, but not to a satisfactory degree, considering only a handful of guesthouses are profitable. Each year we visited every guesthouse and tried to assess the occupation rate in interviews with the owners. From a total number of 23 guesthouses in 2012, we have reached a total of 21 guesthouses functioning in Dâmboviţa and Leresti valleys in 2016. The number of jobs has increased from 37 in 2012 to 54 in 2017, but no clear data has ever been offered by the owners, we only got hints regarding the amount of bed-nights in the summer and winter holidays. Guesthouse owners also use unregistered workers quite frequently, therefore the figures used are only estimates. However, it is certain that income from tourism has increased over the last 6 years, judging by traffic, new guesthouses built, and statements from owners.

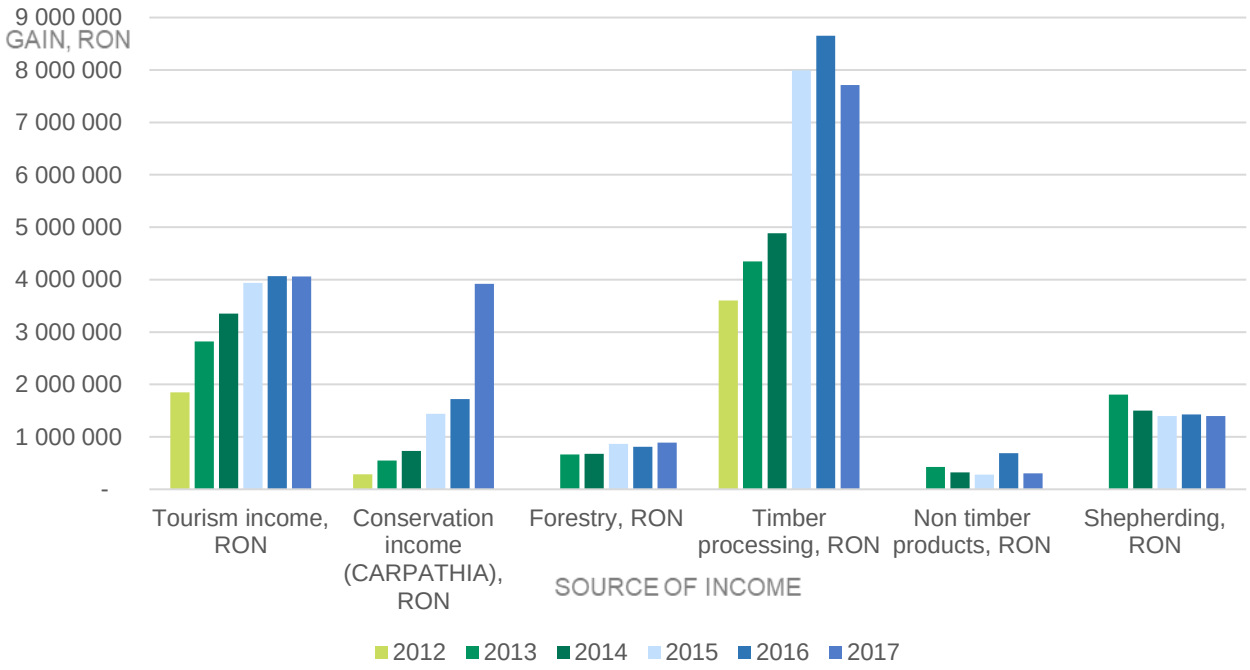

Fig. 22 Development of different income streams in the study area during the project period

Conservation jobs provided by FCC in the area and tourism will keep on developing in the future, also because FCC got involved in building up infrastructure for tourism (e.g. wildlife watching hides, training programme for nature guides). Already in 2016, conservation and tourism made up one third of the total income in the project area. In the long term, we expect a shift from extraction to non-extraction in the land use, in sectors that are growing slowly but in a healthy way. The full assessment of the socio-economic development in the project area is annexed as "D.5 Socio-economic assessment Report 20180731".

Action F.2 Networking with other projects

Throughout the project period, we have networked and established partnerships with a number of organisations:

Austrian National Parks:

Two important areas with extensive experience in problems similar to ours are the Austrian National Parks "Kalkalpen" and "Gesaeuse": Both National Parks implemented similar LIFE projects and had gathered extensive experience, from which we could learn (LIFE05/NAT/AT/000078 and LIFE99/NAT/A/005915). The FCC steering team went on a first excursion in Austria from April 29th to May 4th, 2013, where we learned about spruce forest conversion, the restoration of the Enns and Johnsbach river systems, visited the "Weidendom Visitor Information Centre", and received general information about the NP structure and administration. Especially the removal of forest roads and the conversion of spruce monocultures gave valuable experiences, which we could use for our own restoration activities.

A second excursion took a group of our rangers to Gesaeuse and Kalkalpen Nationalpark from June 2-6th, 2014, where the focus again was on transformation of spruce forests into natural forests and the deconstruction of tractor roads. Our colleagues and new friends from Gesaeuse National Park came for a return visit to the LIFE project CARPATHIA area from August 21st to 24th, 2014, where we could discuss our activities directly in situ.

Jämtland County Administration

The Jämtland County Administration/Sweden, who also run two LIFE projects, contacted us throughout winter 2013 and came between June 2nd and 6th with 30+ members of their environmental and protected areas administration for an exchange of experience and a visit to our LIFE project. It was especially interesting to discuss our forest conversion activities with colleagues who have a Northern perspective and a clear-cut based forestry.

Tompkins Conservation, Patagonia National Parks

During May 23-30, 2014, we received a visit from Doug and Kris Tompkins, who run similar projects of purchasing land, restoring its original nature, and transforming these landholdings into National Parks in Chile and Argentina. From March 24th to April 17th, 2015, the core project team visited three of their conservation sites/National Parks (Ibera Wetlands/Argentina, Pumalin and Patagonia National Parks/Chile), where we learned a lot about land purchase strategies and restoration of degraded habitats, natural tree nurseries, and re-wilding of managed forests.

Endangered Landscapes Programme

Based on the experiences of the LIFE project, we were able to successfully submit a proposal to the Endangered Landscapes Programme, which will start in January 2019. Next to CARPATHIA, 7 other re-wilding and landscape restoration projects are being funded in the frame of the ELP and a close cooperation in-between these projects will happen with annual meetings, webinars, and a permanent exchange of experiences.

5.2 Dissemination actions

Objectives

The dissemination plan for this LIFE project was determined through the general dissemination plan of the CARPATHIA project: Until summer 2013, we kept a low profile as described in the initial project proposal in order to keep real estate agencies and other possible intermediaries away from the area. We only sought contact to the Ministry of Environment and its Department of Waters, Forests, and Fisheries (which was later divided into two separate ministries), some of the relevant regional authorities (ITRSV, EPA), and the local communities. Starting with 2014, when the project had reached a volume which couldn't be hidden anymore, FCC started to communicate its plans publicly.

Next to informing the authorities and the general public, our emphasis was on the local level. Through participation in public meetings, through direct contacts with local stakeholders and through providing jobs and income opportunities we developed multi-layer communication streams with the local communities.

Dissemination: overview per activity

Strategy and Capacity

The initial strategy of the CARPATHIA project was to keep a low profile in order to not raise land prices and create unrealistic expectations about the speed of development. Nevertheless, since summer 2013, we launched more and more information to the general public. Initially, the core team of FCC was responsible for the communication and dissemination for project results, in late 2014 we hired Green Focus, a Bucharest based PR agency, to help us with organising our communication. Between 2013 and 2016 we also had a contract with Bucharest based Friends Advertising, who developed our website. Starting with spring 2018, we now have a strategic partnership with McCann PR, one of the leading PR agencies from Bucharest.

We have also created our own in-house capacity with Angela Pop as the communications director hired in summer 2016, Georgiana Andrei as communications assistant hired in summer 2017, and Dragos Lazarin as graphics designer hired in autumn 2017.

Outreach activities

In a chronological order, this is what our outreach activities have looked like during the project period:

- In autumn 2012, FCC went online with a first website
- FCC participated during August 14th/15th, 2013 in the film "Wild Carpathia", which is a 3 part documentary series showcasing the magnificent landscapes around the Carpathian mountains in Romania and the environmental threat to this wilderness. FCC and the CARPATHIA project have been featured on episode 1 and episode 3 with a special feature on the activities of FCC within the LIFE+ project. The 3rd part of the miniseries has been screened during a big event in Bucharest on October 30th, 2013, to which we participated. The films have been shown in Romania on several TV channels with a total audience of over 1 million viewers and on Travel Channel worldwide in over 110 countries.
- During Oct 3-7, 2013, the project steering group participated in the WILD10 conference in Salamanca/Spain. We presented the LIFE project on this conference to a big audience and furthermore participated in a number of meetings and side discussions with conservationists from all over the world. On this conference, Angelo Salsi from Direcorate General Environment has also

specifically mentioned our project as one of two examples, how LIFE funding can contribute to wilderness protection and restoration.

- On December 11th, 2013, we had a meeting with Mrs. Lucia Varga, Romanian Minister-delegate for Forests, Waters, and Fisheries, to inform about our LIFE project and to explore options for cooperation and wider dissemination. Following this meeting, we developed a protocol of cooperation between FCC and the Ministry, which was signed and presented to the public on a press conference on February 04th, 2014. Several articles appeared in the Romanian press about this event, e.g. http://www.amosnews.ro/dapp-si-fundatia-conservation-carpathia-au-semnat-un-protocol-pentru-refacerea-unor-suprafete-de-fon, http://www.bizlawyer.ro/stiri/tranzactii/protocol-pentru-protectia-fondului-forestier-din-romania, or http://www.romaniatv.net/protocol-pentru-refacerea-unor-suprafe-e-de-fond-forestier-taiate-din-romania_124604.html.
- In late May 2014, we have been invited by HRH, Prince Charles, to present our project activities including the restoration work in the frame of this LIFE+ project. Ever since, HRH keeps contact with FCC to receive updates about our work.
- Throughout late 2014 and 2015 we have cooperating with Green Focus, a Bucharest PR agency, for implementing a media strategy about CARPATHIA and the LIFE project.
- By the end of 2014, the new CARPATHIA website went online
- June 29th, 2015: Field trip with Jeremy Paxman (UK) for an article in the Financial Times;
- July 9th, 2015: Field trip with Digi TV about restoration work;
- September 18th, 2015: Meeting with several Romanian journalists in Satic;
- December 3rd, 2015: Press conference at Hotel Continental, Bucharest, presentation of the CARPATHIA project and the restoration work financed by LIFE;
- January 28th, 2016: Visit of Minister of Environment Cristiana Pasca Palmer to the restoration sites of the project area with >5 TV teams, many articles about FCC;
- February 23rd, 2016: Visit of Minister of Environment Cristiana Pasca Palmer to the project area, helicopter flight all over the Făgăras Mountains to experience the opportunity of a Făgăras Mountains National Park; Mrs. Pasca Palmer was accompanied by a number of TV teams;
- April 6th, 2016: Field trip with Muscel TV and Pro TV ("Romania Te Iubesc");
- April 28th, 2017: Dâmboviţa Valley: ecological educational activities with gymnasium students; nature themed games, LIFE+ nature guides for children
- May 30th/31st, 2017: Brasov, Transilvania University: Celebrating 25 years of LIFE+, meeting and disseminating results together with other LIFE+ project owners from Romania and representatives of the Ministry of Environment - Biodiversity department; field trips to see the implemented actions
- June 7th, 2017: Bucharest, National Library: Organised a flash mob and nature themed games with 80 children. The children have received the LIFE+ guides for nature, printed in the project
- June 7th, 2017: Bucharest, National Library: Photo exhibition with images from the project area
- July 29th, 2017: Public volunteering event: weeding in one of the LIFE+ tree nurseries, 29 participants
- September 9th, 2017: CSR event with Siemens Technology Brasov: Weeding in one of the LIFE+ tree nurseries, 50 participants
- September 16th, 2017: Brasov: Forest parade with different species of saplings taken from a LIFE+ tree nurseries. A children's event, with 50 participants, sprinkled with joy and games related to habitats and environment. The children of the newly created club "The Forest Brotherhood" have promised they will protect nature!
- February 17th, 2018: Rucar, Arges county: Forest carnival, to celebrate with the local community the importance of the forest in every action we do: conservation, growing saplings in our 5 tree

nurseries, replanting, erosion control, scientific research and management of protected areas. More than 300 people from the project area and mayors from 5 communes participated.
- April 24th, 2018: Bucharest, Media event: Sharing the 5 pillars of activity and results of the project;
- July 13th, 2018: Press conference in Leresti: Mihai Zotta presenting the results of the activity
- July 25th, 2018: Dâmboviţa Valley: Visit of François Delcueillerie, European Commission, Directorate-General for Environment, together with Ioana Lucaciu, for the final evaluation of the project, several TV reports on the local level about the visit;
- August 22nd, 2018: Dâmboviţa Valley, Media trip: national and local TV stations, national written press and bloggers visiting Dâmboviţa Valley and seeing the results of LIFE+ project, as well as Făgăras Mountains from a helicopter

While media interest generally was about the wider CARPATHIA project, the LIFE project always played a prominent role in explaining our activities. Journalists usually put the restoration work in the centre of the attention and mentioned the funding through the European Commission and the LIFE project; many of the TV reports also showed the notice boards or other hardware, which had the LIFE and Natura2000 logo on it. We have put LIFE+ and Natura 2000 stickers on all our acquisitions in the frame of this project, however have to complain that the stickers are not UV resistant and bleach out after very short time. Especially bumper stickers don't last more than a couple of months.

Next to the direct media work, we also have been active in the field of social media, however are developing this into a real campaign only now as part of our cooperation with the our new PR agency partner from Bucharest.

Organisational Development

Throughout the lifespan of the LIFE+ project, FCC has undergone some major organisational development. Initially, we had no active dissemination programme and our communication was restricted to some information we gave out on the local level. Over the years, FCC has developed active PR, communications, and community outreach strategies and created capacity for it, way beyond what we had envisaged back in 2011. One of the comments to our initial proposal for this project had been, that we should try to strengthen our dissemination efforts and the list of activities and results actually showed that the project developed indeed much more of these activities, even if not with LIFE+ funds.

With the results of the LIFE+ project, it also makes it much easier now to convince journalists of the integrity and the reality of our activities. During August 20th-22nd, 2018, three weeks after the end of the LIFE+ project, we organised a media trip for national and local TV stations, the national print media, and some of the most influential bloggers of Romania, who visited the Dâmboviţa Valley and could directly experience the results of the LIFE+ project. Prominent and exclusively positive reports in all the major newspapers and the evening news of the all national TV stations were the results of the event, through which we reached over 2.3m people online and almost 2m people on TV.

Reactions and Feedback

During the first years of the CARPATHIA project, lots of locals felt that FCC must have a hidden agenda and that buying forests for protection cannot be real. Once FCC got serious about stopping illegal logging, became a competitor for the so-called "timber-mafia", and stopped the clear-cutting, those who had benefited from this system turned against FCC, spread negative rumours and lies about our work and alienate local communities against our work. Our field excursion to Patagonia, where we met Doug and Kris Tompkins and where we

could get an in-depth view into the activities of Tompkins Conservation, made us understand that this is a process which is typical for such projects but that such negative publicity can be overcome in time. This encouraged us in taking the decision to actively start disseminate information about FCC's intentions and activities. Especially the tangible results of the restoration work, the provision of jobs and income opportunities, and the continuous communication with local stakeholders initiated a process to reverse this negative image and to become a respected partner of the local communities. Our opponents of course haven't given up, but large-scale restoration of clear-cuts and degraded habitats and protecting forests during 10 years of land ownership is an undisputable fact, which makes it harder to successfully spread false stories about FCC.

Action E.1 Production of wilderness guide with map

During winter 2013/14 we started to develop the wilderness guide. During March – May 2014, we wrote the text for the adult and the children's version and collected photos for illustration of the guide. In April 2014, we selected a designer/illustrator from Bucharest and worked on illustrations, the map, and the layout throughout May. By the end of May, the adult version was ready and sent to the printer, the production of the children's version followed shortly thereafter. The map has also been completed and has been printed.

We completed the production of the wilderness guides with map in summer 2014 with a total of 5,000 copies of the adult version and 2,500 copies of the children version. The European Nature Trust, one of FCC's partners, runs an education programme, and was interested to incorporate the children guide into their programme. We also distributed the booklets to local guesthouses that have shown growing interest, and have such given out 4,670 copies for distribution to tourists. The remaining guides were distributed at events and meetings (e.g. LIFE Caravan). The children's version was distributed to schools around the project area, as well as to different NGOs, and a fair number of the copies were spread with the help of The European Nature Trust, within their mobile education program "Wild Kingdom" about wilderness in the schools around the Făgăras Mountains. All brochures, both the adult and the children version, have been distributed until the end of the project period.

Action E.2 Workshops and guided visits

During the project period, we have had a number of excursions, workshops, and guided visits with various groups of people:

- March 15th, 2013: 1st meeting of Project Consultative Group including field excursion
- August 8th, 2013: Guided field trip for local and regional authorities
- August 22nd, 2013: Field visit with the Forest Control Inspectorate and the regional EPA;
- September 23rd, 2013: Workshop on Outdoor-Tourism (together with the Romanian Eco-Tourism Association);
- November 1st, 2013: Guided visit of Adrian-Radu Rey, Counsellor, Chancellery of the Prime Minister, Compartment of High Representative for Sustainable Development;
- November 19-20th, 2013: Meeting and field trip with representatives of the regional Waters Administration and the Ministry of Forests, Waters, and Fisheries
- January 22nd, 2014: 2nd meeting of Project Consultative Group including field excursion;
- November 27th, 2014: 7 representatives from different institutions, such as Ministry of Environment and Climate Change, National Agency for Environment Protection, ITRSV – Forestry Control, National Environment Guard, and Local Environment Protection Agencies visited the project area and the LIFE+ restoration sites.
- December 10th, 2014: Field trip of Şercaia forest district, which is a private forest service neighbouring to the North of the CARPATHIA area. We spent a full day with 15 of their foresters,

gave a general introduction, and visited our tree nurseries, and the restoration sites Podul Încurcat and Piscul Manastirea.

- June 11th, 2015: Meeting of the Consultative Council and consequent field trip to the restoration sites.
- November 17-18th, 2015: Field excursion with participants from different national and natural parks throughout the country: Bucegi Natural Park, Calimani National Park, Cozia National Park, Piatra Craiului National Park, Putna-Vrancea Natural Park and Vanatori Neamt Natural Park. The excursion triggered an experience exchange and resulted in a field trip of FCC rangers to Caliman and Vanatori Neamt Parks in May 2016.
- December 17th, 2015: Field excursion organised in collaboration with Fundatia PROPARK in the frame of their Gala Ariilor Protejate conference. In addition to conservationists from various fields of study and different parts of the country we also invited the local mountain rescue team and the Gendarmerie (Mountain police), who have become strong supporters of the project.
- January 28th, 2016: A delegation of the Ministry of Environment including Minister Cristiana Pasca-Palmer and Secretary of State Viorel Lascu visited the project area to learn about the restoration work in the frame of this LIFE+ project. Several TV stations and Mrs. Pasca-Palmer on her Facebook page reported about this visit.
- May 31st, 2017: Excursion with different participants from the Environmental Guard Brasov, Environmental Protection Agency Brasov, Environmental Protection Agency Pitesti, Jandarmeria Romana and ICAS Brasov (list of participants and separate photos attached in the Annex, as requested in the response to the Interim Report 2107)
- June 16th, 2017: Dâmboviţa Valley, Consultative Committee meeting: Organized the 4th meeting of the Consultative Committee, a group of experts from 7 different institutions - Environmental Protection Agency Arges, SC ALFRID SRL, SC FOREST GRUP PROIECT SRL, Societatea Aquaterra Iasi, Muzeul de Istorie Natural Iasi, Forest Guard Prahova, Romanian Water Authority – ABA Arges-Vedea
- August 2nd/3rd, 2017: Visit of the British ambassador Paul Brummel to the project area, presentation of the LIFE project activities and the restoration sites.
- August 7th - 11th, 2017: Visit of Dr. Tara Duffy from the Northeastern University, Boston/USA. During Dr. Duffys visit we agreed on a partnership with the Northeastern University and starting with 2019, student groups will come every year to the FCC project area to experience the restoration work FCC is undertaking.
- August 17th/18th, 2017: Visit of Dr. Stefan Ottrubay, Chairman of the Esterházy-Foundations and Chief Executive of the Esterházy Corporation (Burgenland/Austria) to the project area with a special focus on the LIFE+ restoration sites. The Esterházy corporation owns 40,000 ha of forests and agricultural land and manages it with high ecological standards.
- May 4th, 2018: A German and Austrian delegation from the world's largest forest certification system PEFC visited the CARPATHIA project and the LIFE+ restoration sites.

During Oct 3-7, 2013, the project steering group participated in the WILD10 conference in Salamanca/Spain, where we presented the LIFE project to a big audience and furthermore participated in a number of meetings and side discussions with conservationists from all over the world.

Workshop on River Connectivity

As mentioned under actions A.6 and C.5, we conducted an alternative measure to the interventions on the water regulating structures, trying to bring together key actors and interest groups in relation to habitat restoration and connectivity of the respective aquatic eco-system. We therefore organised a national event

where we could present the efforts and results of the project to a wider audience (including the relevant state authorities), provide a framework for sharing experiences with other similar projects and initiatives, and trigger solution-oriented discussions about river connectivity in Romania to increase the chances for further engagement towards this conservation problem. Fundatia ProPark was hired to prepare, facilitate and implement this workshop and to summarise the specialist's and stakeholder's views into guidelines for river restoration projects.

Fig. 23 Workshop on river connectivity

The workshop took place on June 13th 2018 with participants from the Ministry of Waters and Forests, the National Water Management Institute, EPA Gorj, Hydrotechnical Faculty, and representatives of different universities and conservation NGOs. The first part of the day was allocated to the presentation of the CARPATHIA Restoration project, based on which discussions started around problems encountered in connection with the modifications of the dams. A representative from the Romanian Water Agency presented their management plans for the water basins and pointed out that in the future these plans have to be better harmonised with conservation plans.

The workshop on connectivity of the rivers has clarified some important issues:

- The range of administrators and owners of the dams in Romania are the Romanian Water Agency if the rivers have basins longer than 5 kilometres (cadastral registrations), NFA if the rivers are smaller and do not have cadastral registrations or the dams were built by this entity in order to reduce torrents or to protect forest roads, Hidroelectrica SA in some cases;
- In almost all the cases the Romanian State, through the Ministry of Finance, is the owner of this type of investments.
- The beneficiary of a project for modification of dams has to be the owner or must have a real type of mandate from the Romanian State (concession mainly for private entities). If he cannot obtain this mandate, he will not be able to get the building permit.
- In the case of state forests, the concession is almost impossible to be obtained. Rental of the dams for modifications may be applied in cases where the Romanian Water Agency is the owner, but they lack internal rules for this at the moment.
- The beneficiary of the project has to be partner with the owner/administrator of the dams from the beginning of the project (even if the beneficiary is a Government Agency other than the Romanian Water Agency).

It was agreed, that a national inventory of the dams affecting the Romanian rivers has to be initiated in order to see the real dimension of this type of problem. The river basin management plans have to be correlated with the protected areas management plans and also have to take into consideration the inventory of the dams affecting the rivers. The legislation for building and the water legislation have to be changed in order to ease the modification of dams, legislation and regulations for types of future dams permitted have to be issued. A working group was initiated at this workshop that will follow up on these issues.

The outcomes of the workshop have been translated into comprehensive guidelines for the restoration of the longitudinal connectivity of rivers in Romania with the aim to help other project initiatives to identify possible obstacles and solutions early on. The guidelines have been uploaded on the websites of Carpathia and ProPark and attached in the annex as " E.2 Manual Conectivitate Rauri".

Action E.3 Notice boards

We have developed and set up notice boards to inform locals and visitors at the entrance into the project area and at every restoration site where we were active.

All permanent and temporary notice boards were produced and set up during the project period:

- Two large general notice boards were installed at the entrance to the area in Satic and in Leresti Valley.
- Five long-term notice boards with several topics about environmental issues (natural forests vs. spruce plantations, riparian alder galleries, history of Piscul Manastirea, virgin forests, alpine meadows and problems) were set up in various locations.
- Nine short-term notice boards about various project activities (nurseries, erosion control, monoculture conversion, etc.) in the specific areas;

The remaining two boards were meant to be used for the modification of the dams, but since this did not happen, we instead installed one information board about the importance of these measures for fish migration. Pictures of the notice boards are attached in the Photo annex E.3.

Action E.4 Website

Before the start of the LIFE project, FCC did not want to have a strong web presence in order to not compromise the ongoing forest purchase. With the beginning of the LIFE+ project we activated the site www.conservationcarpathia.org with a direct link to all LIFE related activities. The site is online since end of September 2012, both in English and Romanian language and contains a general project description and a short presentation of all actions.

In 2014, FCC designed a new website www.carpathia.org, where the LIFE project is a prominent part of our project activities. The description of the LIFE project, with a presentation of all actions and the on-going progress, under the new site http://www.carpathia.org/life-project/ has obtained 3,943 visits, the entire site has reached so far 120,171 visitors. We have also included and updated a download section for the most interesting studies and results. In October/November 2018, we updated and adjusted the CARPAHIA website to our new identity. On the CARPATHIA Facebook page we posted a total of 28 LIFE-related messages, which reached 44,435 people and received 1,449 likes, and 182 shares. The total reach (the number of people who had any content from this page or about this Page enter their screen, including posts, check-ins, ads, social information) reached even over 500,000. We intend to continue and to intensify our social media activity for the follow-up projects and have already a collaboration with a PR company for this matter.

Action F.3 Layman's Report

To facilitate the dissemination of the project results to the interested general public we have produced a Layman's report in the form of a 13-page brochure which is available in English and Romanian language on the Carpathia website www.carpathia.org. The Romanian version of the Layman's report was also printed in 100 copies to be distributed on future events. Since this report was produced after the project end-date, costs incurred are not eligible.

5.3 Evaluation of Project Implementation

Restoration of forests

On clear-cuts, we applied a methodology, which proved useful to achieve our restoration goal towards natural species composition:

- A regeneration and an erosion survey collected information about the status of the clear-cut as described earlier in this report, expert opinion and a look into the old forest management plans gave additional information for the development of a restoration plan. Even throughout the period of the LIFE project, we experienced the effects of climate change, which confirmed our motivation to add adaptation towards climate change to the plans. Overall, the methodology has proven to be a fast and efficient way to include all relevant information into restoration planning and all objectives have been achieved.
- The actual reforestation was mainly done with our own teams of rangers and daily labourer, but we also used a few local companies to increase our capacity and to create additional income opportunities for local entrepreneurs. In principle, our own teams were more expensive, as external companies usually employ workers on minimum salary levels, and usually wouldn't supply necessary safety equipment. In contradiction, we pay both our rangers and the daily labourer we have hired for the work fair salaries and provide necessary equipment. The quality of the work was therefore better with our own teams and we needed to assign some of our staff to the external companies to assure they would stick to environmental standards to safety procedures. In plus, external companies weren't reliable and we couldn't fully count on them doing the job. In conclusion, the strategy to work with own teams was worthwhile, however there is a point in including local companies in the restoration work. Planting itself in spring and in autumn proved successful. Despite partially severe climate conditions with enduring draughts, the overall rate of surviving saplings was high and completely in the range of the normal. The results of this work will be visible only in a decade or two, once the saplings have grown up and form a new forest.
- Due to legal reasons of needing a license for timber cutting, we tried initially to work exclusively with external companies for the conversion of spruce monocultures. As described earlier, we had severe problems with the external companies since they bid for low prices in the auction to win and thereafter couldn't make enough profits, couldn't find qualified workers, or had legal problems. For this reason, we got a license for our own CARPATHIA forest service and took over part of the job. Even if this is more expensive than working with external companies, at least the reliability of the work being done is much larger and a combination of both options seems to be the best solution. The technical methodology used seems to work well, however we need to interfere again in 5-10 years once the older trees will have increased their crowns and will close the gaps again.

Restoration of forest floor

As planned in the initial proposal, we restored the forest floor on eroded tractor tracks by filling up the trenches with left-over timber from the cuttings and covering them with mini-excavators. We had initially planned to work with just one excavator, but since the tracks partially were very steep, we could work only with small excavators for practicality and safety reasons and thus, made initially only slow process due to the low capacity of the machinery. Once we purchased a second excavator by re-designating costs in the LIFE project, and a third one from an NGO Fund grant, which we could use after the end of the NGO Fund project also for the LIFE project, we made good progress and managed to restore tractor tracks on more surfaces than initially foreseen.

The methodology used was very successful and we did not have any erosion problems thereafter on any of the treated areas.

Purchase of forests

Our forest purchase was based on an objective evaluation of the forests in the form of a due diligence report with estimation of the value based on the official formula in case the state would purchase the forests. The report helped us to identify any legal aspects such as the presence of tree stumps, which had been illegally felled and which we thus could mention in the contract and avoid becoming liable for their presence. Price estimations were used as a basis for negotiations and, obviously, different owners reacted differently to the proposed price. We also had to increase our price offers between 2012 and 2017, since market prices increased by 30-40% during this time. We also faced the situation that those who did not sell immediately, requested a higher price in order to sell compared to those who sold as soon as they had the property titles registered in the land book.

Overall, we believe that we managed to purchase the forests for a fair, but reasonable price so that no land owner feels he has been ripped off, but we still managed to purchase almost all forests which were up for sale during the project period.

Restoration of alluvial forests

After the initial problems until our experts had finished the riparian habitat assessment and the restoration planning, we developed a flexible approach to restoration of alluvial forests in respect to status of the current riparian forests, possibility to cause further damage to the river banks by removing existing spruce plantations, and existing natural regeneration. We believe this flexible approach has been successful as it allowed us to always chose the best solution and still assure the recovery of alders. 5 years after we started the planting of alder, some of the stands have already closed the canopy as they are growing very fast and the activity must be considered very successful and with an excellent cost-efficiency.

Rehabilitation of tributary streams

As mentioned earlier, we did not manage to implement this activity due to a disproportionate amount of bureaucracy and a late change in the law, which made this activity impossible. We believe our methodology to have a technical plan elaborated by a specialist company which we knew would likely be accepted by the National Forest Administration (who is the official owner of the dams), and then try to get the authorisations, was the right thing to do. Although the progress was painfully slow, we managed to get to the point where we could have resolved the bureaucratic hurdles, since the project period was extended by one year with an amendment. However, the law was changed thereafter and, consequently, the activity became impossible to be implemented. With the exception of the costs for the technical study and for FCC staff to run around for the approvals, no major costs occurred.

Monitoring activities

During the project period, we monitored indicator species and the effects of the restoration work. Monitoring activities were based on direct observations or on scientific monitoring protocols, especially for the bird monitoring. Otter were initially monitored All monitoring activities were executed as planned and we did not have to change initial plans.

Assessment of the socio-economic impact

Planning this activity initially, we had based ourselves on receiving data from the local tourism entrepreneurs and from the Forest Guard about timber harvest. Unfortunately, this straight-forward methodology didn't work since neither of them delivered us any of this information. For this reason, we had to change our plans and use indirect measures to achieve information, which would still allow us to quantify the economic impact of the increased conservation activities and the replacement of the extractive economy with the conservation minded economy. We feel this activity, should it be repeated elsewhere, the input of a sociologist.

Public awareness and dissemination of results

As the project was in its initial phase during 2011, when we developed this LIFE project plan, public awareness and dissemination wasn't yet high up on our list as we didn't want to spread too much information and thus not to artificially inflate land prices. Consequently, our proposal did not include a large number of dissemination activities, but we managed to do all of them and even to exceed the proposed activities. However, throughout the project period, we increased our public awareness work and by now have even set up our own communications department, have a strategic partnership with ProPark, and work with a national PR agency. In these activities carried out outside the actual LIFE project, we always mentioned and showcased the restoration activities financed by LIFE. We believe our strategy and methodology in this respect worked out well.

Table 6 summarises the various tasks and results achieved against the objectives:

Task	Objectives of the revised proposal	Achieved	Evaluation
A.1 Inventory of pristine forests	To develop image analysis and identify virgin and semi-virgin forests in the project area	Subcontractor didn't deliver image analysis; consequently, analysis was done by direct site visits and 294 ha of virgin and semi-virgin forests in FCC ownership were identified as well as additional 608 ha in property of other owners	Original methodology didn't function, results still achieved
A.2 Assessment of original tree composition and inventory of forest regeneration on clear-felled areas	To produce digitised map of regeneration situation and erosion problems on purchased clear-cuts	Implemented methodology as planned	We have fulfilled this task
A.3 Creation of a nursery	To develop six nurseries with a total production of 116,000 saplings	We developed 3 main nurseries at the edge of the villages of the project area and added about half a dozen of small nurseries directly in the forest under the canopy of old trees. In total we produced 454,000 saplings	Exceeded the planned capacity by a factor of four; costs higher than foreseen as soil along the rivers was very bad and hand weeding due to the non-usage of pesticides took much more time than anticipated
A.4 Inventory of areas affected by soil erosion	To create a digital map and to plan the	We created a digital map for almost the entire project areas and	Exceeded the originally proposed surface and

Task	Objectives of the revised proposal	Achieved	Evaluation
	restoration of 5 km eroded tractor tracks on 200 ha of clear-cuts	produced plans for 1,200 ha of clear-cuts with a total of 106 km tractor tracts	length of tractor tracks by far
A.5 Riparian habitat assessment and restoration planning with a special focus on alluvial forests (91E0*)	To assess the riparian habitat in all water courses of the project area	Despite a delay from the consultant, we got a complete map with assessments of the riparian habitats along all creeks and rivers	We have fulfilled this task
A.6 Inventory of the status of the aquatic eco-system and preparation of a restoration action plan	To produce a GIS based map with indicator species and a technical expertise of the impact of hydro structures including obtaining of building permits	Subcontractor produced GIS based map and restoration recommendations	Got the map with the indicator species, but not the permission to remove/change the dams
A.7 Expansion of assessments of virgin and alluvial forests from the upper Dâmboviţa Valley to the overall Natura 2000 site ROSCI0122 Munţii Făgăras	To produce a GIS based map with all virgin forests and alder galleries in the wider Făgăras Mountains	Administrators of the Munţii Făgăras Natura 2000 site weren't able to take on the job, so instead we skipped A.7 with an addendum to the contract, but collected at least some data from a Czech study and from data elaborated under a POIM grant to the site administrators	Activity was officially skipped, but we were still able to collect quite some information from other sources
B.1 Purchase of natural forests	To purchase 200 ha of virgin and semi-virgin forests	We purchased 294 ha, which were identified as virgin or semi-virgin forests	We actually bought almost one and a half times the amount of virgin forests as had been foreseen
B.2 Purchase of clear-felled forests	To purchase 400 ha of clear-cuts	We purchased 488 ha of clear-cuts, but could register during the project period only 359 ha on FCC	Even if 129 ha are not eligible, we have secured them for future restoration work and had bought sufficiently to implement Activity C.2
B.3 Purchase of managed forests	To purchase 1,000 ha of managed forests	We purchased 1,001 ha of managed forests, but could register during the project period only 990 ha on FCC	We have fulfilled this task
C.1 Restoration of forest floor on eroded skidding tracks	To stop erosion on 10 km of tractor tracks	In the frame of this LIFE project, we restored the forest floor of former skidding tracks on a length of 16.88 km	We were able to restore 70% more skidding tracks than foreseen in the proposal
C.2 Plantation of original tree species on clear-cuts	To replant at least 96,000 saplings on at least 200 ha of clear-cuts	We replanted 1,126,060 saplings on 404 ha of clear-cuts	We planted almost 12 times the number of saplings on double the surface as foreseen

Task	Objectives of the revised proposal	Achieved	Evaluation
C.3 Rejuvenation of managed forests/ecosystem restoration	To cut holes on 400 ha existing spruce monocultures and to replant 40,000 saplings	We rejuvenated 405 ha of spruce monocultures and planted over 62,000 saplings	We overfulfilled this task
C.4 Restoration of riparian galleries	To restore alder galleries on 100 ha or along 20 km of watercourses	We restored alder galleries on a river length of 23.14 km (46 ha)	We were able to restore alder habitats along water courses on 116% of the proposed length
C.5 Rehabilitation of tributary streams	To create connectivity for aquatic fauna on 17.7 km of river length	We could not fulfil this task due to bureaucratic hurdles and then a change in law after the amendment of the contract to gain more time	Task not fulfilled, we proposed alternative action under task E.2
D.1 Monitoring of forest floor restoration on eroded skidding tracks	To get a good overview over the success of the erosion control measures	We have implemented a system of monitoring the erosion control work	We have fulfilled this task
D.2 Monitoring of forest regeneration and rejuvenation	To get an overview about the development of regeneration on the clear-felled areas	We have implemented a system of monitoring the plantations and could immediately replace saplings which died and thus secure the success of the activity	We have fulfilled this task
D.3 Monitoring of forest habitat restoration efforts - indicator species	To achieve distribution and density estimates of the indicator species	Annual surveys of woodpeckers and flycatchers were done from 2014-2017 and gave a good overview over the presence of indicator bird species	We have fulfilled this task
D.4 Monitoring of the aquatic system	To elaborate maps and density estimates of indicator species	We executed annual surveys of otter, hazel grouse, fish fauna, and specific vegetation, and got a good overview over the presence of these indicator species	We have fulfilled this task
D.5 Assessment of the socio-economic impact	To produce a report about how the project changes the economy of land management	We have annually analysed the socio-economic situation and despite the problems of not getting sufficient direct data from tourism and timber extraction we could still get a decent idea of the changes happening due to our project	We have fulfilled this task
E.1 Production of Wilderness guide with map	To produce 5,000 printed booklets (adult version) and 2,500 printed children booklets including a hiking map	We have printed the requested number of adult and children versions of the booklet including the map and distributed them through the local guesthouses	We have fulfilled this task

Task	Objectives of the revised proposal	Achieved	Evaluation
E.2 Workshops and guided visits	To organise several workshops and 10 guided visits	We organised a total of 19 guided visits and workshops about the LIFE project during the project period	We have fulfilled this task
E.3 Notice boards	To mount 2 large, 4 A0 and 10 smaller info boards to inform about the project activities	We mounted 2 large, 5 medium, and 9 small/temporary info-boards about the various activities of the LIFE activities	We have fulfilled this task
E.4 Website	To develop a website with specific information about the LIFE to spread information to the broad public	We have developed initially a specific website just for the LIFE project and later on included a section about the LIFE project in our overall CARPATHIA website	We have fulfilled this task

5.4 Analysis of long-term benefits

Environmental benefits

The project had a series of direct and quantitative environmental benefits. First and foremost, important forest habitats, for which the ROSCI0122 Munţii Făgăras has been created, have been saved or improved, or have been restored with their main tree elements:

9410 Acidophilous Picea forests of the montane to alpine levels with Vaccinium sp. (Vaccinio-Piceetea):

- Although naturally occurring in the Făgăras Mountains only above 1,400 m altitude, these are currently the dominant forests in the Dâmboviţa Valley between 1,000 and 1,850 m altitude, especially the belt close to the tree-line is still partially virgin and the forests usually contain all their original elements. The natural *Picea abies* forests with a good occurrence of rowan (*Sorbus aucuparia*) and various vaccinum species (e.g. *Vaccinium myrtillus*) also serve as excellent feeding and retreat areas for capercaillie (*Tetrao urogallus*).
- Almost all purchased virgin forests are within this habitat type and they would likely have faced logging if FCC wouldn't have purchased them.
- Replanting on clear-cuts over 1,500 m also occurred to a large degree with spruce and rowan in an attempt to restore the original habitat.

9110 Luzulo-Fagetum beech forests

- Originally, the sun-exposed mountain slopes of higher inclinations between 800 and 1,400 m altitude were covered with *Luzulo Fagetum* beech forests with dominating beech *Fagus silvatica* and a varying percentage of the endangered silver fir *Abies.alba*. Many species that are depending on decaying wood habitat and cavities in old trees are associated with this beech forest, such as *Picus canus, Dryocopus martius, Dendrocopos leucotos, Ficedula parva,* and *Ficedula albicollis*. Bats hunt insects in beech forests (*Myotis myotis*) and roost in fissures of old and decaying trees. Also, a number of saproxylic beetles are strongly linked to old growth beech such as *Rosalia alpina* and *Osmoderma eremita*.

- Many of the purchased managed forests have components of Luzulo-Fagetum forests, and by letting them to re-wild, they will turn back to natural Luzulo-Fagetum forests.
- In the forests which have been treated under our spruce monoculture conversion programme, we have also introduced the main tree elements of the Luzulo Fagetum in order to restore this habitat.

91E0* Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)

- These habitats occur all along the watercourses of the Dâmboviţa and Leresti basins on soils generally rich in alluvial deposits that are periodically inundated by the annual rise of the water level with the snow melt or with heavy rainfalls during summer. Next to *Alnus spp.*, mountain ash *Fraxinus excelsior* and Wych elm *Ulmus glabra* should be present in these habitats and the herbaceous layer normally includes rare elements like *Angelica sylvestris*, *Cardamine spp.*, *Rumex sanguineus*, and *Cirsium oleraceum*, which are especially valuable for a variety of insects and butterflies (e.g. *Lycaena dispar*, *Carabus hampei*). Yellow-bellied toad (*Bombina variegata*) and Crested Newt (*Triturus cristatus*) are also numerous in these habitats. Alluvial forests are further used as shelter by European Otter (*Lutra lutra*) and are an important feeding and nesting habitat for many bird species (e.g. *Bonasa bonasia*, *Picus canus*).
- In our restoration activities for this habitat, we have replanted 46 ha on a total length of over 23 km. These areas have formerly been meadows, timber deposits, or had been replanted with spruce monocultures following the major cuttings in the recent decades. This means that on 23 km of mountain rivers the original alluvial habitat has been restored. As alder are a fast-growing species, we see very fast effects and many of the replanted areas have already closed canopy covers from alder.

4070* Bushes with *Pinus mugo* and *Rhododendron myrtifolium*

- This habitat forms the typical plant association of the sub-alpine areas of the Iezer and Făgăras Mountains between 1,600 and 2,200 m. Even though Pinus mugo is protected by Romanian law since 1952, the habitat has come under continuous anthropogenic pressure due to artificial extension of the alpine meadows, overgrazing, and collection for firewood from the alpine livestock camps. Especially on the side of the Făgăras Mountains, the habitat is quite fragmented after shepherds have burned large areas. The habitat plays an important role in protecting the alpine soils from erosion, is an important retreat for chamois *Rupicapra rupicapra* and shelters many birds of the alpine and sub-alpine zone.
- Although this habitat has not been a priority target of this LIFE+ project, we have purchased 5.8 ha of this habitat for full protection. However, during the course of these six years, we have purchased additionally over 100 ha of *Pinus mugo* habitat for full protection.

Besides the listed habitats, our project has also targeted a number of individual species:

- **European Otter** (*Lutra lutra*) are generally present in the Upper Dâmboviţa Valley and have benefitted from habitat restoration measures along the water courses. We have monitored otters annual and could trace a stable population of 2-3 otter families along the Dâmboviţa Valley.
- **Brown bears** (*Ursus arctos*), **wolves** (*Canis lupus*), and **Eurasian Lynx** (*Lynx lynx*) are widely present all over the Natura 2000 site Munţii Făgăras. Bears and wolves, however, have been hunted for trophies using a dubious exception from their full protection to decrease carnivore-human conflicts. Additionally, wolves and lynx suffer from a heavily decreased prey base due to overhunting

and poaching. Although not covered by the LIFE project, our CARPATHIA project has leased hunting concession 21 Dâmboviţa Headwaters in 2011, and in 2017, a second hunting concession 22 Rucar. On both hunting concessions we implemented a strict non-hunting policy (with the exception of reducing wild boar numbers in the direct vicinity of the villages to decrease the level of conflicts with local peasants) and have patrolling intensively with our rangers to prevent any poaching in the area. We have done genetic brown bear monitoring in 2012/2013 in the hunting concession 21 and repeated genetic monitoring of bears, wolves, and lynx on a 100,000-ha area including our project area starting in autumn 2017. We don't have final results from the genetic lab yet, but from camera traps and direct observations, it seems that wildlife numbers from all species have recovered substantially.

- All 30 species of **bats** living in Romania are strictly protected by law, 8 species are also listed in Annex II of the EU Habitat Directive, out of which *Rhinolophus hipposideros* and *Myotis myotis* have been recorded in the forests of the project area. The limestone caves of the adjacent Piatra Craiului National Park are perfect hibernating sites for both species. Implementing a non-intervention policy in the CARPATHIA forests also helps bat species as older trees with cracks and cavities remain in the forest and provide important diurnal shelters and locations for upbringing of the young. Rewilding generally also increases insect populations, which again improves living conditions for bats.
- The **aquatic fauna** in the Dâmboviţa River has definitely suffered from the construction of the hydro-electric power-plant, due to numerous river training structure, sills, and secondary dams that often are insurmountable barriers for upstream fish migration. Since we didn't manage to implement activities in respect to improved river connectivity for aquatic fauna, we couldn't improve this rather bad situation. Still, due to the improvement of alluvial habitats, we managed to improve the situation for brown trout (*Salmo trutta*), and three amphibian species yellow-bellied toad (*Bombina variegata*), the Carpathian newt (*Triturus montandoni*) and great crested newt (*Triturus cristatus*) by restoring 91E0* Alluvial forests with *Alnus spp*.
- There are many **invertebrates** in the project area, which are listed on Annex II of the Habitat Directive and which are indicators for the existence of natural or semi-natural forests with a high proportion of snags and coarse woody debris. Some species of these saproxylic beetles are *Phryganophilus ruficollis*, *Morimus funereus*, *Stephanopachys substriatus*, or *Rosalia alpina*. As we let the managed forests, which we purchased in the frame of the LIFE+ project rewild, dead wood in the forest will automatically increase and saproxylic beetles will have better living conditions.

Long-term benefits and sustainability

Benefits for habitats and species

All mentioned habitats and species will benefit from our ongoing activities in the frame of the CARPATHIA project. FCC is committed to continue with land purchase (a minimum of 3,000 ha over the next 5 years), restoration of clear-cuts (a minimum of 500 additional ha over the next 5 years), conversion of spruce monocultures (at least 300 ha over the next 5 years), restoration of alpine shrubs (at least 300 ha over the next 5 years) wildlife conservation and re-introduction of missing species (European bison, beaver, possibly black grouse), removal of invasive species, and conservation and restoration of alpine shrub habitats. This will continue to happen in the upper Dâmboviţa Valley, the whole Iezer Păpuşa Mountains, and the southern Făgăras Mountains. All these land holdings are in ownership of FCC and have been designated as non-intervention areas of the ROSCI0122 Munţii Făgăras Natura 2000 site and thus, conservation of these areas is secured in the long-term. According to the FCC statutes, we will donate all these landholdings into the patrimony of the Romanian state once it has a national park status according to IUCN standards.

Creating a National Park is an enduring, long, and complex process. It consists of many different steps in a number of fields of activities, from forest conservation and restoration, wildlife protection and reintroduction, community outreach and communications, all the way to creating system of conservation enterprises. Some activities such as restoration of forest habitats can be developed as best practice and then replicated elsewhere, others such as community outreach require a flexible and specific approach and cannot really be developed as replicable best practice activities. However, the overall creation of the Făgăras National Park is a unique and innovative process for Romania since all current National Parks were created without any consultation of local communities, and a lot of lessons can be learned for similar projects.

Threats to habitats and species

Ongoing logging and hunting in the ROSCI0122 Munţii Făgăras and ROSCI0381 Raul Târgului – Argesel – Rausor Natura 2000 sites will continue to happen and to endanger the mentioned habitats and species. Until now, FCC has administrated the Raul Târgului Natura 2000 site and has worked closely with the administrators of the Munţii Făgăras site, but now the National Agency for Protected Areas will be taking over all administrations with the official statement that "some of the custodians of Natura 2000 sites have delayed important investment and infrastructure projects by not approving them". This is a worrying perspective; however, FCC will remain a watchdog in our areas and since FCC will extend its activities in the near future into the wider southern Făgăras Mountains, we will have a larger presence with our rangers at least in this part of Romania.

What actions will be undertaken, when, by whom, what source of finance?

Over the next 5 years, FCC will

- continue to purchase virgin forests in the wider Făgăras area,
- restore natural habitats on at least 100 ha clear-cuts p.a.,
- continue to lease hunting concessions for wildlife protection and management of human-wildlife conflicts as additional hunting areas become available,
- continue to buy managed forests for rewilding or conversion into natural forests where necessary,

FCC has joined forces with a number of additional NGOs (such as ProPark Foundation or the Coalitia Natura 2000) and experts (such as Memorial University, St. John's, Newfoundland/Canada, Conservation Capital, or McCann PR) in order to create the socio-economic conditions for the development of a National Park.

The experiences of the CARPATHIA project have been widely distributed to other NGOs in Romania, especially as part of our participation in the Coalitia Natura 2000, the federation of Romanian conservation NGOs.

These activities will be financed by a variety of different sources and include both public and private funds. FCC has spent a significant amount of resources over the last year into fundraising for the next phase of the CARPATHIA project with the following perspectives:

- FCC receives annual smaller amounts in a range of 30-75,000 € p.a. from various foundations or corporate partners for replanting and restoration of clear-cuts
- FCC has been granted 2.75m € from the Oak Foundation for the period of 2017 - 2022 for restoration, wildlife monitoring, and communication
- FCC has been granted 5m $US from the Endangered Landscapes Programme for restoration, wildlife conservation, community outreach, communication, and conservation enterprise development.

- FCC has been promised from the Wyss Foundation sufficient funds to continue purchasing private forests in the southern Făgăras Mountains
- FCC has submitted a 1.45m € project for the development of conservation enterprises in the Carpathian arch together with partner organisations from several Carpathian countries
- FCC has submitted a project concept for a second LIFE+ project with a total of 26.7m € and has been invited to submit a full proposal

FCC is also in discussions with a series of additional future donors, who would help with financing general operational costs, restoration costs, and additional land purchase. A significant part of the funding has been triggered by the experiences made during this LIFE project, since we could demonstrate active conservation and restoration work to donor organisations, which made them gain trust in our conservation work.

In the medium and long term, the development of conservation enterprises should feed a trust fund through direct revenues and through conservation fees, through which the operational costs for a future Făgăras Mountains National Park will be covered.

Long-term economic benefits

Looking upon long-term economic benefits, we need to distinguish between benefits on a national level such as ecosystem services, and benefits on a more local level.

On a national level, the protection of the Făgăras Mountains in the form of a National Park will lead to a protection of the watershed with flood prevention and a consistent water supply for all communities below the mountains, will have a positive impact upon air quality, and will create a mitigating effect against climate change challenges. A Făgăras National Park as an iconic European Park will also increase the attraction of Romania as a tourism destination and will bring higher revenues from tourism to the state budget.

On a local or regional level, restoration activities create jobs and income opportunities, and forest protection assure better protection of homes from floods, secure a consistent water supply. The creation of a new National Park will offer opportunities to develop eco-tourism activities in the vicinity of the mountains, achieve more funding to build an adequate infrastructure, and better market agricultural products through branding with a natural area.

Once the south-eastern corner of the Făgăras Mountains is being developed in this direction, they can serve as an example and a model for the wider Făgăras Mountains. And once the Făgăras Mountains function as a model for conservation and successful rural development, this example could be replicated on a Carpathian wide level.

Long-term social benefits

In social terms, restoration of the forest habitats will improve the quality of life and will give new perspectives of being able to build a decent livelihood in their own villages. It will also offer interesting opportunities for the younger generation to develop nature-friendly businesses and activities in the service industry, meet visitors, and thus to counteract rural exodus to the big cities.

Reorientation of regional politics towards a conflict resolution-based wildlife management will help local communities to decrease wildlife-human conflicts whilst enjoying a higher wildlife number in their backcountry, which again can be used as an attraction for eco-tourism.

Continuation of project actions

Unlike other conservation NGOs, FCC has a very specific and narrow field of activities, which is centred around creating the Făgăras Mountains National Park. FCC is neither a campaigning organisation, nor an organisation with 3-year activities on a specific topic. For this reason, FCC has a long-term commitment for the conservation and restoration of the Făgăras Mountains based on a long-term master plan.

In the next period, FCC will also enhance the implication of local communities by implementing a community outreach programme. This will enable local communities also to directly participate in the decision-making process.

Fig. 24 Future National Park Munţii Făgăraş?

6. Comments on the financial report

Not included

6.1. Summary of Costs Incurred

Costs incurred by the end of the project accumulate to **7,088,085.30 €**, representing 121% of the total approved budget. This is mainly due to the Land Purchase category, where acquisition costs have exceeded the initial budget by 1,616,552 €. As explained under B.1-3, the additional costs are covered entirely by FCC. This sum includes the land purchased within this LIFE project that is not eligible due to missing final contracts or due to overspent budget. The detailed view of this is presented below, together with an explanation for each budget category.

All the costs reported contain VAT, as the foundation is not entitled to deduce VAT for a non-economic project, according to RAS. A VAT certification for all the project costs has been obtained from the Romanian fiscal authority and is annexed to this report, clearly indicating that the tax for the project costs was not deduced.

The table below summarises the costs incurred compared to the budget as defined in the Amendment No 2 to the Grant Agreement from March 2015.

Table 7. Summary of costs incurred

PROJECT COSTS INCURRED					
		Cost category	**Budget according to the grant agreement**	**Costs incurred within the project duration**	**%**
1.		**Personnel**	710,499 €	805,060.80 €	113%
2.		**Travel**	18,205 €	14,801.27 €	81%
3.		**External assistance**	841,010 €	374,982.57 €	45%
4.		**Durables: total non-depreciated cost**	0 €	0 €	
		Infrastructure sub-tot.	0 €	0 €	
		Equipment sub-tot.	297,660 €	291,081.20 €	98%
		Prototypes sub-tot.	0 €	0 €	
5.		**Land purchase**	3,611,600 €	5,228,151.95 €	145%
6.		**Consumables**	173,402 €	222,297.42 €	128%
7.		**Other costs**	37,400 €	30,032.21 €	80%
8.		**Overheads**	145,472 €	121,677.88 €	84%
		TOTAL	**5,835,248 €**	**7,088,085.30 €**	**121%**

6.2. Accounting system

Accounting system employed

The analytical accounting system of Fundaţia Conservation Carpathia is based on the separation of the financial information to the level of the chart of accounts, between several cost centres of the structure. The entity uses the direct allocation method, which represents the allocation of the cost at the same time in the general chart of the accounts and the cost centre, the unit of the analytical system. All the direct costs are allocated to the LIFE Project and all the documents supporting the distribution of the costs are marked with the Cost Centre Stamp and the LIFE Project Codification Stamp.

Therefore, the financial data can be presented as a total by entity or as a matrix that contains several subdivisions. The subdivision allocated to the LIFE Project is unique: it hasn't been used before and will not be used after the lifetime of the project, and it is identified by the code „2" in the data bases and the codification LIFE NAT RO 823 on the documents.

All the overheads are calculated at the level of 7% of the direct costs, as indicated in the Common Provisions. As also indicated in the Common Provision, the overheads are not identified in the analytical system nor are their supporting documents identified with the project's code. FCC can present the General Overheads of the entity using the General Chart of Accounts. Using this type of registration, FCC is able to provide a complete and distinct financial report containing the Balance sheet and Profit and Loss Account for the Life Project.

The depreciation method used on the Life project it is the Straight-Line Method. This method was chosen for the cost allocation of all the durable goods from the FCC patrimony. The choice of the durable goods depreciation method was made in January 2010, for all the elements of the patrimony, and it has not been changed ever since. The last version of the Financial Manual of the Entity dates from November 1st, 2016.

Procedure of the costs approving and acquisitions

The spending on the LIFE project respects the overall rules for the FCC cost approving procedure. This is managed through a settlement procedure dated from 2013 and revised in 2017. The main rules refer to the delegation of specific acquisitions to a specific person, the establishment of the payment frame through a nominated business card and the double approval of the spending by both the financial manager and the technical manager of FCC.

FCC uses the public acquisition system, according to the law provisions and the internal regulations, approved by the project manager. The public acquisition procedures are based on the national legislation applicable and the corresponding provisions of these rules with the European directives. Thus, the applied and updated provisions of OUG 34/2006 on public acquisitions are used within the Life Project LIFE 11 NAT RO 823.

Due to the legal nature of public acquisitions, both in terms of service agreement and project agreement, especially considering the value thresholds of the acquisitions reportable to the legal provisions (article 9 of OUG 34/2006 in conjunction with article 9 letter c and c1 of the same regulatory document), the acquisitions of FCC occurred mainly through direct attribution.

Considering the updated provisions of OUG 34/2006, until October 22, 2013, FCC has applied the amended and supplemented provisions of the Order of the Minister of European Fund no. 1050/2012, and since October 22, 2013 it has applied the simplified procedures for acquisitions in accordance with the Order of the Minister of European Funds no. 1120/2013.

Procedure of the time sheets recording systems

Tasks and activities for each employee are usually discussed and planned on the first day of each week. All employees of FCC report the actual time allocated to different tasks on a daily basis. A synthetic daily activity report is filled in daily by each team member and centralised as the base to obtain the activity cost. The detailed timesheet for each employee involved in LIFE activities contains all the working time of the person, reported distinctly on LIFE and other projects. The time sheet is printed out within the first week of the following month and signed by the respective employee.

All timesheets are validated by a technical person (nominated trough yearly decisions), before they are certified and signed by the project coordinator, Barbara Promberger-Fürpass.

The project manager might consider to supplement the permanent workforce with temporary workforce, especially for the activities with a seasonal nature (planting, maintenance nurseries, reforestation works). The temporary workflow is contracted with less costs than the permanent workforce as its costs do not contain social charges. The project coordinator is planning the number of temporary staff and assigns the activities where there is a need, under the direct supervision of a designated supervisor.

For employees that were involved in other projects (e.g. POIM), the time allocated to each project is recorded on the same timesheet (see timesheets of Ioana Savulescu-IS and Mihai Zotta-MZ in the electronic version of the Financial Annex, folder: Timesheets).

Document coherence

The costs incurred under the LIFE project can be easily identified, both in the accounting system and in FCC's archive. A separate archive has been created for the project follow up purpose and a set of rules has been in place and adapted for all the project lifespan.

The documents are archived chronologically and by budget category. Also, each document contains a clear reference of the project (the name and the project code) and also the reference in the financial reporting table. This way, each document can be easily identified in the table.

The accounting system has been changed during the lifespan of the project, so the electronic archive of the project is available starting 2014. However, hard copies of all previous statements are available and have been controlled thoroughly during the final audit and the VAT certification.

6.3. Auditor's report/declaration

FCC has contracted an independent auditor to certify the project's financial report together with the project implementation. The contracted auditor is Mr. Nicolae Bajan, administrator of Decreso Consult, authorised through the Romanian Chamber of Auditor under no. 79/01.03.2014, certified to auditing EU funds through authorisation number 234/18.02.2014. The complete contact data are presented in the acquisition contract no. 308/13.07.2016. We insert here the most important: phone number +40746171778; email address decreso@gmail.com

The audit followed the standard report form and is attached in the Financial Annex ("Audit Report LIFE11_NAT_RO_823") as well as a certified translation of the report.

6.4 Summary of costs per action

Not included.

7. Annexes

7.1 Administrative annexes

- Deliverables and Milestones
- Gannt Chart

7.2 Technical annexes

- A.0 List of key words and abbreviations
- A.1 Virgin forest inventory 20160530 - deliverable (submitted with Interim Report 2016)
- A.2 Regeneration guidelines - deliverable (submitted with Interim Report 2017)
- A.4 Erosion inventory and restoration plan - deliverable (submitted with Mid-term report, Annex C)
- A.5 Riparian habitat assessment final report - deliverable (submitted with Mid-term report, Annex D)
- A.5 Internal assessment riparian galleries (submitted with Mid-term Report, Annex D)
- A.6 Inventory of aquatic eco-system final report - deliverable (submitted with Mid-term report, Annex E)
- A.7 Planul de Management al siturilor Natura 2000 Muntii Fagaras si Piemontul Fagaras (submitted with Interim Report 2017)
- A.6 Technical report EN summary " and " Technical Report ALFRID" - deliverable (submitted with the Interim Report 2015, Annex B)
- B.1_3 List of purchased forests 20180731
- C.1 Manual eroziune EEA (only electronic version)
- C.2 Plantation of original species on clearcuts
- C.3 Manual for spruce monoculture conversion
- C.3 Spruce conversion areas
- C.4 Alder restoration sites
- D.1 Fixed-point photography on repaired skidding tracks
- D.3 Bird monitoring final report 2017
- D.4 Fish monitoring 2017
- D.4 Fish monitoring summary and conclusions 2015_2017 - deliverable
- D.5 Socio-economic assessment Report 20180731 - deliverable
- E.2 Guided field trip 20170531 List of Participants (only electronic version)
- E.2 Manual Conectivitate Rauri
- After-LIFE Conservation Plan

Maps

- A.0 FCC Land purchase
- A.0 Project location
- A.1 Distribution of virgin and semi-virgin forests - Dambovita
- A.1 Distribution of virgin and semi-virgin forests - Targului
- A.2 Regeneration composition - deliverable
- A.2 Regeneration density and replanting scheme - deliverable
- A.7 Non-intervention zones
- B.1_3 Location of purchased forest lots_Bunea_Comisu
- B.1_3 Location of purchased forest lots_final

- B.1_3 Location of purchased forest lots_Otic_Vladului
- B.1_3 Location of purchased forest lots_Tamas_Draxin
- B.1_3 Location of purchased forest lots_Targului
- C.1 Erosion control
- C.2 Replanted clear-cuts
- C.3 Conversion of spruce monocultures
- C.4 Alder restoration sites
- D.2 Replanting success in spruce conversion areas
- D.2 Replanting success on clear-felled areas

Purchase documents

- Purchase contracts and justification (only electronic version)

7.3 Dissemination annexes

- Layman's report - deliverable
- After-LIFE Conservation Plan (EN and RO, RO only in electronic version) - deliverable
- Wilderness guide with map - deliverable (submitted with Mid-term report, Annex H and Revision E.1)
- Photos (only electronic version)
- Collection of media articles 2018 (only electronic version)
- Standard presentation (only electronic version)

7.4 Final table of indicators

- Outcomes_final_LIFE11_NAT_RO_823

8. Financial report and annexes (not included)

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