



LIFE Project Number
LIFE16 NAT/EE/000710

Final Report
Covering the project activities from 01/07/2017 to 31/12/2021

Reporting Date
31/03/2022

LIFE PROJECT NAME or Acronym
EstBatLIFE

Data Project

Project location:	Estonia
Project start date:	01/07/2017
Project end date:	31/12/2021
Total budget:	972 395 €
EU contribution:	583 437 €
(%) of eligible costs:	60%

Data Beneficiary

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This table comprises an essential part of the report and should be filled in before submission

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Package completeness and correctness check	
Obligatory elements	✓ or N/A
Technical report	
The correct latest template for the type of project (e.g. traditional) has been followed and all sections have been filled in, in English <i>In electronic version only</i>	✓
Index of deliverables with short description annexed, in English <i>In electronic version only</i>	✓
Mid-term report: Deliverables due in the reporting period (from project start) annexed Final report: Deliverables not already submitted with the MTR annexed including the Layman's report and after-LIFE plan Deliverables in language(s) other than English include a summary in English <i>In electronic version only</i>	✓
Financial report	
The reporting period in the financial report (consolidated financial statement and financial statement of each Individual Beneficiary) is the same as in the technical report with the exception of any terminated beneficiary for which the end period should be the date of the termination.	✓
Consolidated Financial Statement with all 5 forms duly filled in and signed and dated <i>Electronically Q-signed or if paper submission signed and dated originals* and in electronic version (pdfs of signed sheets + full Excel file)</i>	✓
Financial Statement(s) of the Coordinating Beneficiary, of each Associated Beneficiary and of each affiliate (if involved), with all forms duly filled in (signed and dated). The Financial Statement(s) of Beneficiaries with affiliate(s) include the total cost of each affiliate in 1 line per cost category. <i>In electronic version (pdfs of signed sheets + full Excel files) + in the case of the Final report the overall summary forms of each beneficiary electronically Q-signed or if paper submission, signed and dated originals*</i>	✓
Amounts, names and other data (e.g. bank account) are correct and consistent with the Grant Agreement / across the different forms (e.g. figures from the individual statements are the same as those reported in the consolidated statement)	✓
Mid-term report (for all projects except IPs): the threshold for the second pre-financing payment has been reached	N/A
Beneficiary's certificate for Durable Goods included (if required, i.e. beneficiaries claiming 100% cost for durable goods) <i>Electronically Q-signed or if paper submission signed and dated originals* and in electronic version (pdfs of signed sheets)</i>	✓
Certificate on financial statements (if required, i.e. for beneficiaries with EU contribution ≥750,000 € in the budget) <i>Electronically Q-signed or if paper submission signed original and in electronic version (pdf)</i>	N/A
Other checks	
Additional information / clarifications and supporting documents requested in previous letters from the Agency (unless already submitted or not yet due) <i>In electronic version only</i>	✓
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**signature by a legal or statutory representative of the beneficiary / affiliate concerned*

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1. List of key-words and abbreviations

AB	Associated beneficiary
AC	Advisory Committee
CB	Coordinating beneficiary
EC	European Commission
EHR	Ehitisregister (<i>National Building Register</i>)
ELF	Eestimaa Looduse Fond (<i>Estonian Fund for Nature</i>)
ELM	Eesti Loodusmuuseum (<i>Estonian Museum of Natural History</i>)
ESS	Electronic Surveillance System
ETS	Estonian Theriological Society
EU	European Union
EUROBATS	Agreement on the Conservation of Populations of European Bats
KEA	Keskkonnaamet (<i>Environmental Board</i>)
KEM	Keskkonnaministeerium (<i>Ministry of Environment</i>)
KKI	Keskkonnainspektsioon (<i>Environmental Inspectorate</i>)
KPI	Key Project-level Indicators
MKA	Muinsuskaitseamet (<i>National Heritage Board</i>)
NGO	Non-governmental organisation
PR	Public relations
RMK	Riigimetsa Majandamise Keskus (<i>State Forest Management Centre</i>)
SA	Sihtasutus (<i>Foundation</i>)
SC	Steering Committee
USS	USS Security Eesti AS
VAT	Value added tax
VR	Virutal Reality
WG	Working group

2. Executive Summary

The Pond Bat, *Myotis dasycneme* (Annex II, IV of the EU Habitats Directive) is threatened species in Europe. During the 20th century the population of that species has declined considerably across the EU, especially in the boreal part of species distribution range. One of the main reasons of this drastic decline has been reduction of safe winter roosts - underground habitats have either been destroyed or the disturbance level has risen due to high visitor flows. Due to small size and long hibernation, the awakening during the hibernation, followed by the loss of energy, often proves fatal for bats. The most significant wintering sites of the Pond Bat for the whole boreal region are located in Estonia and there may hibernate almost half of the boreal population of that species. Therefore, the conservation activities in Estonia play crucial role for the whole EU population of Pond Bat. The overall goal of the project was to safeguard the wintering habitats of Pond Bat in four most important sites in Estonia, improving conditions of these underground habitats and raising awareness in order to reach successful conservation of the species. Project works were concentrated on following sites that are also part of Natura 2000 network: Piusa, Ülgase, Vääna-Posti and Vääna (Humala).

During the project period (2017-2021), in order to minimize uncontrolled human visitation into the underground wintering habitats, in four sites, 27 locations (around more than 40 entrances) there were set altogether almost 2,5 km of welded metal fences with height of 1,5 to 2 m and at least one locked gate in every fenced location. All entrances in project sites were also taken under temporary video-surveillance during the project in order to test how the measures (fences and surveillance together) will change the visitor load. It resulted already more than 90% reduction in uncontrolled human visitation in all sites by the end of the project. After testing of measures, 20 locations out of 27 were selected where permanent security surveillance after the project should be set. Other 7 locations were either too small for human access or so hardly accessible that there has never been any human entrance. For that reason, as permanent security systems needed cabled electricity, there was set up about 3 km of new electricity infrastructure and permanent security systems that will react to intruders by sending message over the mobile network to the bat-researchers and that running costs are very low. Such systems will be kept working also after the project as well as maintenance of fences.

To improve wintering conditions there was foreseen that in Piusa a critical location with danger of collapsing roof will be secured and in Vääna (Humala) there will be re-closed the vertical shaft that was cleaned from trash few years ago, but causing now temperatures under zero and wind in bat wintering tunnel that leads to bats freezing to death. To solve these problems following measures were taken. 24 m long and 2 m in diameter rounded culvert was placed into that tunnel location in Piusa. Just about one month after installing that culvert, Pond Bats were monitored to fly through it, so it started to work for a species almost immediately. In Vääna (Humala) it was discussed with stakeholders and closing of the shaft was done so that tunnels could still be used both by bats and also by humans during the time when bats are not wintering. 4,5 m long and 1,4 m in diameter culvert was installed at the bottom of vertical shaft and it was filled above with at least 2 m thick sand layer so that horizontal access remained through whole tunnel under the shaft. Both mouths of the culvert were closed with wind-proof doors, so that it allowed to keep wind and cold out and temperature in horizontal tunnel above zero degrees.

For raising public awareness, it was planned in the project that one big interactive exhibition will be held; one online nature-camera will be set into wintering site of Pond Bat; at least 20 nature guides will be trained; at least 24 Bat Nights will be organised; voluntary camps in three sites out of four will be organised for at least for 100 volunteers; Bat Interest Days will be held

for local stakeholders and public campaign will be done together with Estonian Theriological Society. Also web page was planned to be set and at least two Estonian experts attendance in EUROBATS AC meetings was planned as well as study tour for Estonian experts to Netherlands was planned to share experiences on Pond Bat with Ditch colleagues.

All these public awareness elements were well fulfilled during the project and many of them also with larger volume than planned. Instead of only one interactive exhibition that was held in Museum of Natural History of Estonia and named „Terribly Adorable Bat“ and despite of COVID-19 rules was very popular, there was also three more public exhibitions produced. One of them was poster exhibition „Superpowerful Bat“, held in central park of Tallinn and made so that it can travel after the project and that has been already travelling in larger cities in Estonia (Tartu, Narva) during the project and is planned to go on to other cities after the project. Second was a copy of that poster exhibition that was made for Piusa Visitor Centre and put up there as permanent exhibition. Third is a photo exhibition about bats and bat research that is set up in Museum of Natural History of Estonia and will also go to travel around Estonia after the project. All these exhibitions have been already very popular and had highly rated – two of them did get prize in 2020 by the Estonian Museum Association as the exhibitions with best marketing.

Instead of one online nature camera, a system of two cameras was elaborated. One camera is showing close-up of wintering pack of Pond Bats and other overall view of caves with flying bats. Such camera system has been working during two winters in Piusa and is planned to be set up into all other three project sites after the project. Instead of training 20 nature guides 43 of them were trained and it is planned that if possible there will be at least one more training after the project. 24 public Bat Nights were held as planned. 8 voluntary camps were held for more than 140 volunteers and about 25 tons of trash was collected around entrances of the wintering sites. Bat Interest Days with more than 40 participants at every event has been held for stakeholders from the area of all project sites. Bats were the Animals of the Year in 2020 and during that year a lot of public events and articles were produced in Estonian media as part of the campaign held in cooperation with Estonian Theriological Society. Project web page is working in three languages and will remain as bat web page under ELF main web page. Information boards are set in all project sites. Information folder with educational topics on bats, Layman's Report and other reports were produced and distributed. Project bat experts did attend all EUROBATS AC meetings held during the project time and it is planned that they also try to go on with that attendance as well as participation in working groups of AC.

Together with Environmental Board of Estonia it is planned to go on with most of project activities also during the After-LIFE period. Justification of After-LIFE plan (for years 2022-2026) and Estonian National Bat Conservation Plan for years 2022-2026 will be done during the year 2022. For that reason and to keep project activities still running ELF has successfully applied for funding from Estonian Environment Investment Centre for two years' project (2022-2023) that will cover both keeping security systems running and maintain all fences and gates as well as have meetings with state institutions to set up handing over fences and security systems and fix all needed activities in final version of Bat Conservation Plan. Altogether an estimated minimum budget for project activities to be also running during After-LIFE period is about 72 150 – 81 200 EUR (about 10 times less than was project budget).

3. Introduction

An overall objective of the project was to improve the Pond Bat (*Myotis dasycneme*) habitats in Estonia. The Pond Bat (Annex II, IV of the EU Habitats Directive) is threatened species in Europe. During the 20th century the population of Pond Bat has declined considerably across the EU, especially in the boreal part of distribution range. One of the main reasons of this drastic decline has been reduction of safe winter roosts - underground habitats have either been destroyed or the disturbance level has risen due to high visitor flows. The most significant wintering sites of the Pond Bat for the whole boreal region are located in Estonia, therefore the conservation activities in Estonia play crucial role for the whole EU population of Pond Bat. The previous attempts of managing the visitor flows or prohibiting the entrance to the underground sites were unsuccessful as the placed grilles either had proved to be inappropriate for bats, had been destroyed or removed. It proves the need for awareness raising and community involving conservation activities.

The objectives of the project did concentrate on the improvement and protection of four most important hibernation sites of the Pond Bat, in Estonia, following Natura 2000 sites (Figure 1): Vääna (Natura 2000 site code: EE0010125), Vääna-Posti (EE0010175), Piusa (EE0080621), Ülgase (EE0010116). In all of the sites the conservation goals were involving the Pond Bat conservation and its wintering habitats' improvement activities.

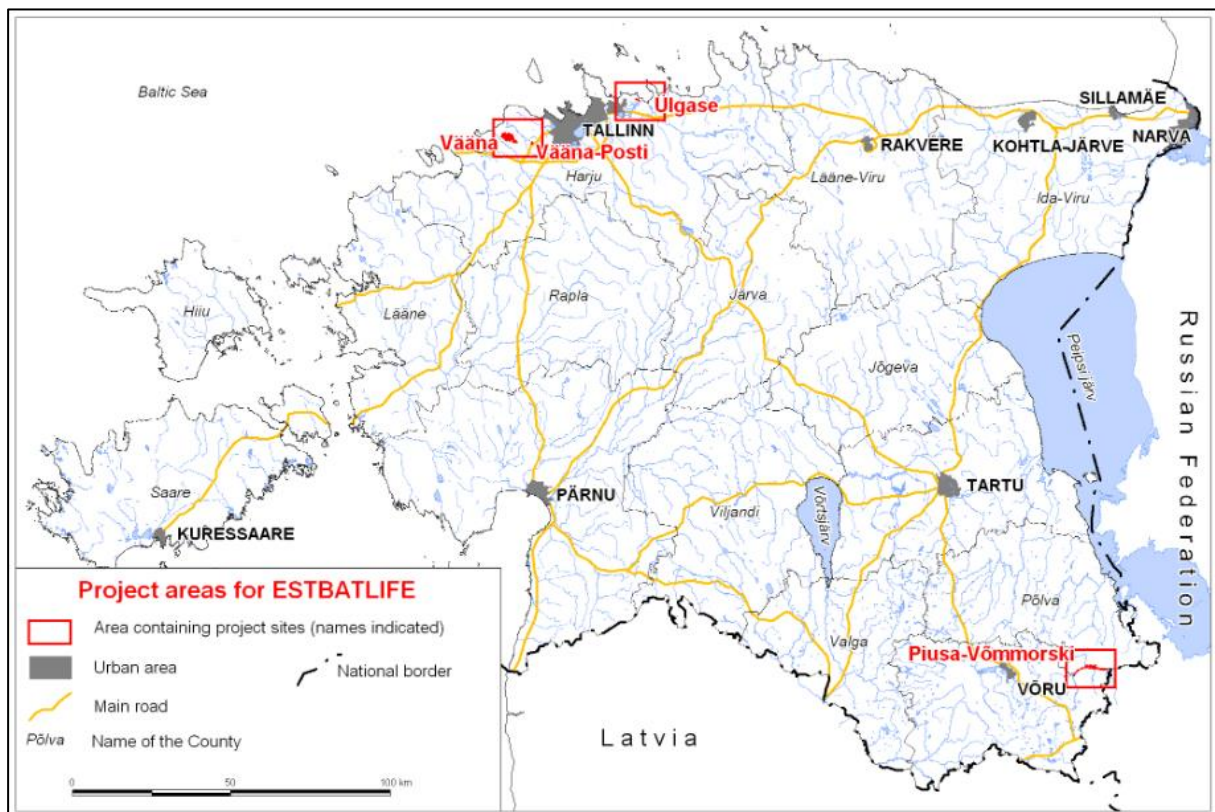


Figure 1. Project areas location in Estonia.

Specific objectives of the project were as follows:

1. To secure the most important hibernation sites from uncontrolled visits.
2. To reduce the visitor flows during the hibernation period in the most vulnerable habitats.

3. To stop degradation of habitats caused by low temperatures, draught and collapsing.
4. To involve volunteers, private companies and local communities into cleaning the caves and surroundings, especially the swarming areas.
5. To improve the protection of target species by making the policy recommendations for management plans of Pond Bat and protected areas.
6. To raise public awareness internationally, nationally and locally – to influence the public attitude towards safeguarding of bat populations, as well as to improve understanding of current nature conservation issues, species of EU importance and Natura 2000 network.
7. To present project results on national and international scale in order to share, spread and gain knowledge regarding habitat requirements and ecology of boreal Pond Bat population.
8. To use innovative approach with bat cameras and attractive exhibitions for general public.

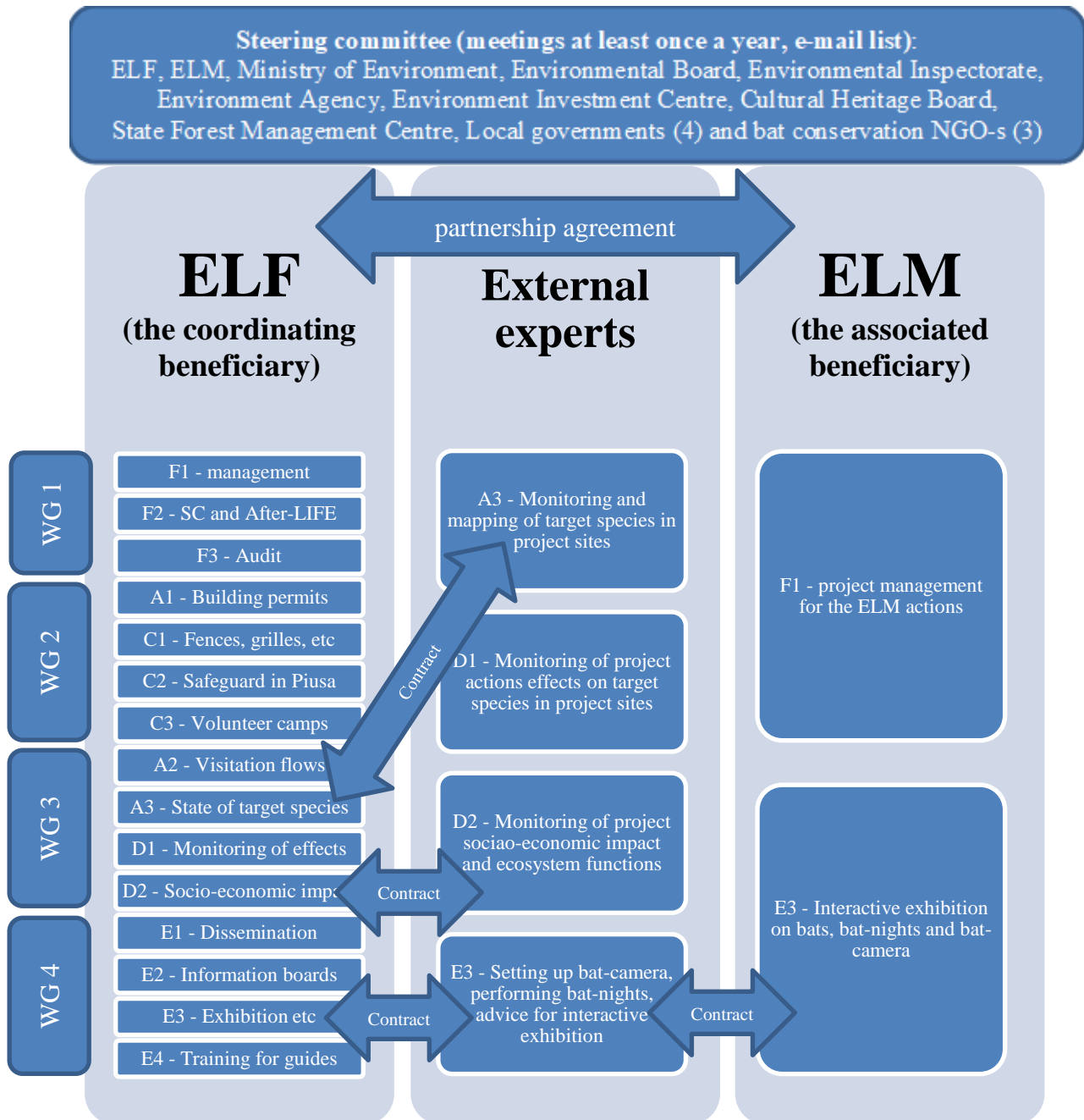
The activities of the project were expected to improve significantly the conditions of wintering sites of the boreal population of Pond Bat (*Myotis dasycneme*) in four project sites that cover by estimations about 95% of the population in Estonia (that is about 45% of the total boreal population of this species). While we did expect considerable rise in bat numbers as a result of the project activities, this can be expected to become clearly observable in no less than 10 years, exceeding the period that is foreseen for assessment of the project results. Expected change in numbers of hibernating bats: after the project: 10% increase in all project sites; 10-20 years after: Ülgase 4-fold increase in bat numbers, Vääna-Posti 2-fold increase in Pond Bat numbers; Vääna (Humala), numbers difficult to predict, target was that the cave temperature will stay above zero during the whole bat hibernation period and it has been so for all four winters during the project. After the project ends, we did also expect reduced visitors' flows during the hibernation period - by 75% compared to the base level of project start and at the end of the project we can say that it has been reduced even more – by 90 to 99% in all project sites.

Measures we did use for active protection of Pond Bat hibernation sites in project were by our knowledge never used before in such combination. There were several cases of using grilles or fences for closing cave entrances, but never in combination with ESS. Due to usage of ESS, type of fences can be much more cost-effective, as they are more as an obstacle with informative signs on them than separate security construction. As ESS we used were standard systems used also for security watch for warehouses and building sites, such combined system can be easily transferred into any other country for similar bat cave security or used also for security watch of any other important site of protected species in Estonia, for example sites of very fragile protected plant species or fragile habitat plots.

Knowledge rising and networking were an essential part of the project. Interactive exhibition in Estonian Museum of Natural History during the year 2020 that is dedicated as a Bat Year in Estonia, having Pond Bat as an animal of the year together with all other 13 bat species, has a lot of hands-on innovative elements, starting from bat sound and wintering conditions perception and ending with virtual reality flight as a Pond Bat out from the hibernacula. Project socio-economic context lies also in a possibilities bats will give for local tourism developers – Bat Nights and voluntary camps held during summer will educate people on bats and their life around a year. Training of nature guides on most important issues concerning bats and people is giving them good basis for holding such Bat Nights as well as voluntary camps locally all over Estonia in future. One of the topics in training as well as in stakeholder meetings we held is bats role in ecosystems and their importance on keeping our environment healthy. People start to understand that if they have bats in their households, they have well balanced biodiversity around their home and we worked along in project to give people guides how they can keep that balance.

4. Administrative part

Project had two partners – ELF as a coordinating beneficiary and ELM as an associated beneficiary. Partner agreement was signed on 26/01/2018 and submitted with the Progress Report 1. ELF hired all necessary staff by the end of the year 2017 and associated beneficiary, ELM by the end of the year 2018. Project had following management structure:



From coordinating beneficiary's side, project manager has initiated project team and SC during October-December 2017. Three SC meetings has been held always at the same date – 29th of January every year since 2018. Project team consisted 25 persons in total from 7 institutions. WG-s have had many working-meetings during the project that were not necessarily always protocolled. Every-day work was going on by e-mails, skype and social media. WG1 dealt with

project management (F actions) and had 7 members; WG2 dealt with nature conservation actions (A1, C1, C2, C3) and had 6 members; WG3 dealt with monitoring (A2, A3, D1, D2) and had 6 members; WG4 dealt with dissemination and awareness rising (E actions) and had at least 10 members, but usually more, as different sub-actions needed additional members. During 2020 as the year when bats were mammals of the year in Estonia separate WG was formed for following all PR issues as well as activities regarding bats in Estonia. That WG had 11 members (three project managers (ELF, ELM and ETS), four bat experts (ELF, ELM and two ETS), two PR coordinators (ELF and ELM), ELF PR assistant and representative of KEA). That, so called WG of the Animal of the Year had since start of the 2020 meetings on monthly basis (sometimes by electronic means, zoom or skype) and active daily discussion on skype chat as well as in FB chat.

During the first half of the year 2019 ELM was working out the conception and visual identity of the exhibition. Several meetings were held separately in ELM own WG and by the end of the April 2019 ELM had worked out the first conception and in May 2019 opened public procurement procedure. After the winner was selected several meetings were held to discuss the conception and visual identity with the company. ELM has long experience on arrangements of modern, interactive exhibitions in Estonia and as one of the leading nature museums in country it has been irreplaceable for the project, especially for public relations visualisation.

Project management and cooperation as well as communication between two project beneficiaries has been smooth and good. Despite of small changes in teams, there has not been any administrative problems. ELM has performed its actions mainly ahead of time and with good quality. Also the overall working plan has been mainly followed. Delays in performing some actions by ELF have been either due to periodic overload of key team members for these actions, like project leading expert for A2 and A3 and project PR coordinator for actions E1 and E2 or due to unforeseen time consuming preparatory work, as A1 for actions C1 and C2.

There have been five monitoring meetings with project Monitoring Team during the project: first on 18/04/2018 in Tartu with visit to Piusa project site on 19/04/2018; second on 11/06/2019 in Tallinn with visit to Vääna-Posti project site on 12/06/2019; third on 25/02/2020 in Tallinn with visit to Vääna (Humala) project site on 26/02/2020 together with bat monitoring there; fourth in virtual meeting platform Zoom on 17/02/2021 with visit to Piusa project site on 26/02/2021 and fifth on 16/12/2021 in Tallinn with visit to Ülgase project site on 17/12/2021 (look memos in Annex 14). Monitoring Experts are from NEEMO EEIG – ELLE. On the first and the second meeting the Monitoring Expert was Luule Sinnisov, on the third and fourth Katrin Ritso and on the fifth Peep Mardiste. On the third meeting also Monitoring Expert Inta Duce from NEEMO EEIG – ELLE Latvian office was present and on the fourth visit virtual meeting Anita Fassio from CINEA was also present. From project side both partners project managers as well as ELF financial manager, PR coordinator and leading bat expert has been present in all visits. All these meetings have been very constructive and lot of issues have been clarified for project team from them. Feedback letters after these meetings have been very useful for project management. Due to the change of ELF office and therefore also juridical address in autumn of 2019, there has been need for amendment request to the Grant Agreement. With kind help of Monitoring Team all relevant documents were prepared and changes made also in e-proposal system and request was sent out in April 2020. ELF also submitted an application for project prolongation for six months period (until the 31/12/2021) in April 2021, three months before official end date of the project. Main reason for that application was time consuming process of establishing electricity infrastructure in all project sites for setting up more sustainable ESS than temporary one tested during the project. This application was approved by CINEA and prolongation until the end of the year 2021 was accepted.

5. Technical part

5.1. Technical progress, per Action

5.1.1. Action A. Preparatory actions, elaboration of management plans and action plans

5.1.1.1. Action A1. Technical designs and building permits of project sites (completed)

Foreseen start date: 01/10/2017 Actual start date: 11/09/2017

Foreseen end date: 31/05/2021 Actual end date: 17/12/2021

Deliverables (documents between 30/04/2020 and 31/12/2021) are given in Annex 1.

As a preliminary step for this action bat experts of the project, together with a project manager and other members of ELF project team discussed in detail all foreseen construction works within project and decided preliminarily what kind of construction would be feasible in every single project site for every construction action. It was done during late 2017 and early 2018 in a form of different discussions in smaller groups. Leading bat expert of the project, Lauri Lutsar tested also temporal grilles (with a design as suggested by EUROBATS) in Ülgase project site in October and November 2017. He reached a decision that grilles, no matter of type, are still substantial obstacle for bats to enter or fly out from the hibernacula and therefore they should be avoided as much as possible.

On a basis of decisions, project manager compiled preliminary documentation on conservation actions in every project site, including reflections to technical design, so called planning documents. This preliminary documentation was delivered in Annex 1 of the Progress Report and explanatory documents in Annex 1 and 12 of Mid-term Report. Outcome of discussions with state authorities and local municipalities was that these construction works do not need building permit and a construction project. They can be done on a basis of simple building note and construction sketch to be coordinated with authorities and entered into EHR.

Finalisation of technical design documentation and construction drawings was decided to be done at the same time of the selection of construction firms, in cooperation with builders, to reach most useful solution. Therefore, all A1 activities were foreseen to be performed closely together with all construction work in project and deadline also set accordingly to 31/05/2021.

During 2019, on a basis of planning documents, fencing companies were asked for comparable bidding separately for each project site – Vääna-Posti (bidding 3-15/04/2019), Vääna (Humala) (bidding 29/05/2019 – 26/08/2019, because of the low interest bidding was repeated three times: 29-30/05/2019; 19/06/2019: 11-12/07/2019) and Piusa (bidding 7-18/10/2019). For Ülgase site, as its geodetic conditions are most difficult, it was postponed and performed in summer 2020. Only after getting construction sketch from fencing company that had best bid, coordination of building documentation and preparation of building note was possible. Project manager prepared fence location drawings, attached them construction sketch and coordinated them with authorities (KEA, RMK and MKA) and private landowners (Vääna-Posti: 4 private owners + 2 state authorities; Vääna (Humala): 3 private owners + 2 state authorities; Piusa: only 2 state authorities and Ülgase 2 private owners + 2 state authorities). After that project manager compiled a construction note in web based EHR and asked municipalities to note it officially. These official building notes that according to Estonian legislation gave green light for fence building action were issued as follows: Vääna-Posti 8/07/2019; Vääna (Humala) 7/10/2019; Piusa 2/01/2020 and Ülgase 9/11/2020.

Building notes and documents attached to them, including construction sketches for all project sites are deliverables under Action A1 covering both “Technical design documentation” and “Construction drawings and building permits” and are found in Annex 1. These documents as well as the construction works of fencing were ready by 11/12/2020.

Other package of documents under Action A1 were these that were needed in preparation and confirmation of the electricity infrastructure construction in all project sites. Although in project application it was not specified what ESS should be we wanted to be sure that ESS will be most cost-effective also for AfterLIFE period and therefore it was needed to test effectiveness of ESS with fences before starting to set up permanent electricity infrastructure. It was decided to use temporary ESS for testing period and in discussion with possible security companies we resulted to off-grid system with video surveillance cameras. As testing of ESS effectiveness together with fences was only possible after fences were in place, the testing period appeared to be 1/01/2020 to 1/01/2021. By the end of 2020 it was obvious that ESS together with fences is more effective for getting human visits into wintering sites under control than only fences and much more effective than without any obstacles at all. There was held a meeting on that issue with state authorities (KEA, KEM, KKI and RMK) on 11/12/2020 where it was decided that ELF will try to set up as much as possible permanent electricity infrastructure for project sites and elaborate most cost-effective ESS on a basis of that to alter the nature conservation running costs in all project areas. As construction of such permanent electricity infrastructure with all preparatory documentation (technical drawings and approval) is quite time consuming and could not be done within six months that was left until the end of the project, it was decided also that ELF will apply for project prolongation until the end of 2021. Although we assumed that electricity infrastructure technical drawings might be ready by 31/05/2021, it did take somewhat more and they were finalised by 2/08/2021. These technical drawings were basis for infrastructure construction, but we also did need audit report after the construction that approved for us that infrastructure is built according to all requirements set for such infrastructure. As we did also count these audit documents as a documentation needed for construction, but as these documents were only possible to obtain after infrastructures were built, we had to postpone final deadline to the date when all these infrastructures were confirmed and handed over to ELF, that was 17/12/2021. All documents related to electricity infrastructure establishment in project sites are deliverables under Action A1 covering both “Technical design documentation” and “Construction drawings and building permits” and are found in Annex 1.

In preliminary planning document compiled by project manager was also described the need for safeguarding work against collapsing roof of rear section of the tunnel in Piusa project site. There was also already mapped a location of the section and described a problem that should be solved. Construction site was inspected by project team together with project monitoring expert from NEEMO EEIG – ELLE on 19/04/2018. Agreement was received from the mining company who is renting the state land parcel from where goes the entrance into construction site. Construction site was also inspected with KEA and RMK as well as with possible engineering bureau OÜ J.Viru Markšeideribüroo on 9/07/2019 before asking for comparative bid for underground measurements for construction site. As there are very few engineering bureaus in Estonia that offer underground measurements services, three such possible bureaus are asked for bidding, but two of them refused (TalTech directed question to OÜ Inseneribüroo Steiger and the latter after reading details of the work, refused). OÜ J.Viru Markšeideribüroo was contracted on 15/08/2019 and underground measurements together with 3D model of the tunnel system was finalised by 22/11/2019.

5.1.1.2. Action A2. Evaluation of visitation flows (completed)

Foreseen start date: 01/10/2017 Actual start date: 15/09/2017

Foreseen end date: 31/03/2019 Actual end date: 26/06/2019

Deliverable: “Report on the seasonal visitation flows in project sites” was delivered with the Mid-term report.

Equipment for a visitor counting was not purchased, as it appeared that relevant counters (census mat) are not in a market anymore (and also out of production), but we found needed number of relevant type and free of charge available counters from Estonian state institutions (KEA and RMK) and did set them up in all project sites. It caused no costs for the project. We had small setback when one of the counters was found by illegal visitors and destroyed in Ülgase site (before ESS was set there), but as we had also second counter still working there, it did not cause any problem in visitor counting and also not any financial setback for a project.

Project leading bat expert Lauri Lutsar is on a regular basis checking counters on sites and downloads data from them. He also prepared a report. Time he has to spend for these site based downloads has been somewhat underestimated and therefore he spent slightly more days for that action than was allocated, but we justified that over-spending during action D1.

Due to the need to get seasonal visitation flows there was a need to count in all project sites during all four seasons. As we started counts in all sites in January-February 2018 (it took some time to find relevant counters as we did not find them in a market), counted until the January-February 2019 and analysis of the data took time because of bat monitoring still going on in March and data processing in April, the full report for all seasons and all sites was prepared with delay and was finalised as well as uploaded into project website on 26/06/2019. Report is available here: <https://elfond.ee/nahkhiired/projektist/aruanded>. Still, the delay in preparation of the report on the seasonal visitation flows in project sites did not affect timing and quality of the other related project actions (especially C-actions).

5.1.1.3. Action A3. Evaluation of state of target species in the project sites (completed)

Foreseen start date: 01/10/2017 Actual start date: 14/09/2017

Foreseen end date: 31/03/2019 Actual end date: 31/03/2019

Deliverable: “Report on the counts” was delivered with the Mid-term report.

First winter (2017/2018) counts were done in February-March 2018, in time in all project sites by four bat experts: Lauri Lutsar as leading expert together with contracted experts Matti Masing, Oliver Kalda and Rauno Kalda. Second winter (2018/2019) counts were done in February-March 2019, in time in all project sites by three bat experts: Lauri Lutsar as leading expert together with contracted experts Oliver Kalda and Rauno Kalda.

Both winter counts were successful. Data was processed and report was compiled in time by 31/03/2019. Public upload into web-site took some time, because report had to be re-designed, taking out too precise data on bat locations. Such data is not allowed to be publicly available in Estonia, as bats are II category protected species in Estonia, and our nature conservation law does not allow publishing exact locations of such species in media. Therefore, public version is available in web since 26/06/2019.

Report is available here: <https://elfond.ee/nahkhiired/projektist/aruanded>.

5.1.2. Action C. Conservation actions

5.1.2.1. Action C1. Restriction of human access to the hibernacula (completed)

Foreseen start date: 01/07/2018 Actual start date: 02/07/2018

Foreseen end date: 30/06/2021 Actual end date: 31/12/2021

Deliverable: “Report on the restrictions to the entrances of hibernation sites of all four project sites” is given in Annex 2.

According to the project application and specification during the Action A1 it was foreseen that all entrances in every project site should have fences around and these fences should have ESS to prevent any illegal entering into wintering caves of the bats during the time when it is prohibited. For that purpose, separate construction works were ordered in every project site for fencing, for setting up electricity infrastructure and for setting up ESS systems.

In Vääna-Posti site totally about 200 m long and 1,5-2 m high welded panel fence was built around all 4 entrances (separate places) by 5/09/2019. For ESS a new permanent electricity connection point was established on private land with agreement by the private owner and all four entrances were equipped with both electrical panel and switchboard for ESS. Full system of fences in combination with ESS basing on grid-electricity (totally more than 1,5 km of electricity cables were installed) and sending sms-messages to bat expert when anyone is trying to climb over the fence or the gate was operational by 22/12/2021. Since set up the fences until today there has been only one incident with one person intruding over fence into the area around entrance (Photo 1). Visitor flows are reduced already more than 99% compared with visitor counting during the first year of the project.



Photo 1. Example of the ESS (video surveillance photo) and welded fence working together in Vääna-Posti project site. Photo is showing the only incident appeared in Vääna-Posti between November 2019 to December 2021.

In Vääna (Humala) project site about 350 m long and 1,5-2 m high welded panel fence was built around all 9 entrance areas (ca 15 entrances) by 16/12/2019. Setting up permanent electricity connection appeared to be so expensive that it did not fit to the budget. Despite of that, video surveillance for four most important entrances is set in that project site. Security company Forus is hired for security work since 30/12/2019 until 31/12/2021. Security system is still off-grid version, but as ESS basing on permanent cable grid-electricity was set in all other project sites and it minimised permanent costs, it is still possible to keep off-grid ESS in Vääna (Humala) for four most important entrances. Since set up of fences until today there has been two incidents when five people climbed over the fence and entered into underground system. Visitor flows are reduced already more than 99% compared with visitor counting during the first year of the project.

In Piusa project site about 1250 m long and 1,5-2 m high welded panel fence was built around all 8 entrance areas (ca 15 entrances), 7 of them by 10/07/2020 and last one by 3/11/2020. Also permanent electricity infrastructure was set up in 2021 and 5 entrances that are under highest illegal visitor pressure, were equipped with both electrical panel and switchboard for ESS. Full system of fences in combination with ESS basing on grid-electricity (totally about 1,2 km of electricity cables were installed) and sending sms-messages to bat expert when anyone is trying to climb over the fence or the gate was operational by 21/12/2021. Since set up of fences until today there has been very few incidents when people climbed over the fence and entered into underground system. Visitor flows are reduced already more than 97% compared with visitor counting during the first year of the project.

In Ülgase project site totally about 300 m long and 1,5-2 m high welded panel fence was built around all 6 entrance areas (9 entrances) by 11/12/2020. For ESS a new permanent electricity connection point was established on private land with agreement by the private owner and all 6 entrance areas were equipped with both electrical panel and switchboard for ESS. Full system of fences in combination with ESS basing on grid-electricity (totally more than 1,5 km of electricity cables were installed) and sending sms-messages to bat expert when anyone is trying to climb over the fence or the gate was operational by 23/12/2021. Since set up the fences until today there has been only five incidents when people climbed over the fence and entered into underground system. Visitor flows are reduced already more than 99% compared with visitor counting during the first year of the project.

5.1.2.2. Action C2. Safeguarding the collapsing caves (completed)

Foreseen start date: 01/04/2019 Actual start date: 15/06/2019

Foreseen end date: 30/09/2019 Actual end date: 08/10/2020

Objective was: to stop degradation of probably the best part of all wintering habitats of bats in Estonia and perhaps also in Boreal region caused by danger of collapsing roof. That best part is a rear tunnel sub-system of the largest cave system in Piusa where exists only one entrance through tunnel that has dangerously collapsing roof and there was a strong probability that collapsing will close the tunnel. Decision was to bring a large and strong enough culvert into that tunnel. As the underground measurements in order to make preparations for safeguarding work took more time than expected and they were finalised by 22/11/2019, it was not possible to start the construction in the same year, because bats were already in caves. Therefore, the work was postponed to 2020 with new deadline by 30/09/2020. During the spring and early summer of 2020 there were going on discussions with possible construction companies to find out the best possible solution for that collapsing avoidance work. By the end of July 2020 an agreement was reached with company and after having work details and documents also coordinated with Environmental Board as protected area manager, installation of culvert was done in September and finalised by 8/10/2020. In total 4 strengthened plastic culvert tube elements, each with 6 m in length and 2 m in diameter were installed into that rear tunnel (Photo 2), more than 300 m off that entrance from where it was possible to enter with culverts. It made all together 24 m long culvert, more than was the total length of the collapsing tunnel. Such culvert type is especially foreseen to withstand large volumes of soil as well as strong hits. Video surveillance of these culverts did show that all bats, also Pond Bats did use culverts very quickly and they all flew through the culvert already during the winter just after installing work (culverts were installed in September and in November did bats already use them).



Photo 2. Installation of culvert element into rear tunnel of the Piusa largest cave system.
Photo by Lauri Klein

5.1.2.3. Action C3. Cleaning and filling caves, organising volunteer camps (completed)

Foreseen start date: 01/04/2019 Actual start date: 08/10/2018

Foreseen end date: 30/09/2020 Actual end date: 20/09/2021

Deliverable: “Report on removed waste” is given in Annex 3.

This action contained two different sub-actions: filling one vertical shaft in Vääna (Humala) site in order to avoid low temperatures in bat hibernacula and organising volunteer camps in three project sites in order to clean area around bat hibernacula entrances from trash.

Filling of one vertical shaft (6-8 m in diameter and ca 10-11 m deep) at Vääna (Humala) project site was initially planned to be completed during the summer 2019, but was postponed to 2020, because of clarification need with plans of landowner, Estonian Defence League, whose cooperation partner – Riigikaitse Rügement – has been using underground tunnels also for military education purposes. The work was postponed even one more year, but reason for that was not only clarification of the plans of landowner, but also land ownership clarification, as that land parcel, where vertical shaft is, was state land without specified ownership, but Harku municipality did apply it for themselves and for the year 2021 it was clear that the land parcel was handed over to Harku municipality. Discussions during the winter of 2020 and spring of 2021 lead to result that it was decided to install similar culvert as in Piusa also into the bottom of the vertical shaft in Vääna (Humala), close its mouths with wind-proof doors and cover it on top in the shaft with sand or gravel, so that there will not be any cold air in-blow into the tunnel below. Same construction company that installed culvert in Piusa did also work in Vääna (Humala) and by 20/09/2021 was culvert with length of 4,5 m and diameter of 1,4 m installed and covered with 2 m thick sand layer on top (Photo 3).



Photo 3. Culvert element and sand to be put on top of it waiting to be installed close to the vertical shaft in Vääna (Humala site). *Photo by Lauri Klein*

All together 8 voluntary camps were organised during the project. First two volunteer camps were done already on 18/10/2018 in Vääna-Posti project site. These camps were both less than one day camps on same site. One camp, five hours, was for cleaning the site with 20 volunteers and other camp, three hours, was for filling illegally made cavity between two tunnels with five volunteers. During 2019 altogether five one-day camps were organised: Vääna-Posti – cleaning area from residual waste 5/05/2019 (22 volunteers, look Photo 4), 2/06/2019 (20 volunteers) and 19/10/2019 (23 volunteers). Three times 10 m³ trash container and once 15 m³ container was filled with trash. Total amount of removed waste is ca 45 m³, with weight ca 20 tons. Ülgase – cleaning area from residual waste was carried out on 27/04/2019 (20 volunteers) in cooperation with locals – Ülgase village society. Vääna (Humala) – cleaning area from residual waste in cooperation with local people was carried out on 8/10/2019 (15 volunteers). Total amount of removed waste ca 15 m³, with weight ca 2,5 tons. We had very good cooperation with all three local municipalities on organising all these camps as well as with local people and landowners. From Saue Municipality we even got separate financial support to cover expenses of one container and partly also other. Last voluntary camp was held in 3-5/07/2020 in Soomaa, Karuskose, where 16 volunteers did build bat boxes and these boxes were later on put up for bats in many places all around Estonia and volunteers promised to monitor them and send data if bats will start to use them. All voluntary camps were very popular and people asked for them very early every year, so it shows that bats popularity has risen in Estonia that was also one objective of the project.



Photo 4. Volunteers of the camp in Vääna-Posti on 5/05/2019. *Photo by Kirke Raidmets*

5.1.3. Action D. Monitoring of the impact of the project actions

5.1.3.1. Action D1. Monitoring of the effects of project actions on target species and visitation flows (completed)

Foreseen start date: 01/04/2019 Actual start date: 01/04/2019

Foreseen end date: 30/06/2021 Actual end date: 31/12/2021

Deliverables: “Terms of reference for the monitoring of target species and human visitation” is given in Annex 4 and “Report of the effect of conservation measures on target species and on visitation” is given in Annex 5.

Terms of reference for monitoring of bats, human visitation flows and temperature conditions in Vääna (Humala) and measures taken against collapsing cave roof in Piusa was compiled by project leading bat expert Lauri Lutsar by 31/01/2020 and was given as Annex 11 of the mid-term report, but as it is updated it will be given as Annex 4 also hereby. Monitoring of bats was first time done according of these terms of reference in winter 2019/2020 and then followed in winter 2020/2021.

Bats were monitored in all project sites in all four winters during the project, but effect of project nature conservation measures on wintering populations cannot yet be detected as bats are not reacting so fast. Monitoring is planned to go on also after the end of the project. Results of bat counts are given in table 1.

Table 1. Wintering population size of the Pond Bat and all bat species together as counted in the monitoring activities in project sites during the LIFE project.

Project site	2018	2018	2019	2019	2020	2020	2021	2021
	Mdas*	Bats in total**	Mdas	Bats in total**	Mdas	Bats in total**	Mdas	Bats in total**
Piusa	722	3109	593	3004	671	3499	723	3355
Ülgase	36	208	43	270	40	237	41	204
Vääna-Posti	96	571	78	493	100	515	78	426
Humala	33	352	27	332	20	374	23	377
TOTAL	887	4240	741	4099	831	4625	865	4362

*Mdas – Pond Bat (*Myotis dasycneme*) individuals; **Bats in total – all bat individuals together.

Human visitation counters are in place in all sites and counting. Leading bat expert Lauri Lutsar is taking data from counters and he is also keeping record on incidents appearing on ESS. Visitor load in numbers is given in table 2.

Table 2. Results of human visitor load monitoring in project sites, numbers in table show number of human visitors.

Project site	2019	2020	Change, %	2021	Change, %
Piusa	36	42	+16,7	1	-97,3
Ülgase	548	50	-90,9	5	-99,1
Vääna-Posti	140	1	-99,3	1	-99,3
Humala	1700	7	-99,6	1	-99,9
TOTAL	3054	100	-96,7	8	-99,8

Suggestions for the amendments of the management plans and protection rules of Pond Bat at project sites according to the data from the A2-A3 actions are given in AfterLIFE plan.

5.1.3.2. Action D2. Monitoring of the project's socio-economic impact and ecosystem functions (completed)

Foreseen start date: 01/07/2017 Actual start date: 12/09/2017

Foreseen end date: 30/09/2021 Actual end date: 15/12/2021

Deliverables: “Preliminary report on socio-economic impact” is given in Annex 6; “Preliminary report on ecosystem functions” is given in Annex 7; “Final report on ecosystem functions” is given in Annex 8 and “Final report on socio-economic impact” is given in Annex 9.

In order to rise positive attitude towards bats and inspire more people to be active in bat protection, it is very important that as much stakeholders as possible and especially those who are living or are active in close vicinity of bat hibernacula are met during the project. Therefore, meetings with stakeholders and landowners were foreseen to be organised.

The first such meeting (called as Bat Interest Day) was held in Piusa Visitor Centre on 28/09/2019. It was also a celebration of 70-year anniversary of bat research in Piusa. Stakeholders invited there were nature guides (active in Piusa Visitor Centre) and tourism developers in South-Estonia, but also students and school children from local schools. All together there were 40 participants and 7 presentations were given, including one by KEA.

The second such Bat Interest Day was held in Vääna Manor House on 17/11/2019. It was meant for stakeholders both around Vääna (Humala) and Vääna-Posti sites, as they situate quite close to each other and latter one is also very small. People were present from local communities, municipalities, several landowners as well as representatives of nature protection societies. Some people were also interested on military history, as both these bat hibernacula are in old military constructions that are at the same time registered as National Heritage sites. There were more than 40 participants and 5 presentations were given, including by KEA. Special voluntary survey with anonymous questions to bat researchers was done during the Bat Interest Day that once more raised strongly the specificity of military issues around these sites.

The third such meeting was due to COVID19 pandemic held virtually on 27/08/2021 for Ülgase project site stakeholders. All together there were more than 40 participants and 5 presentations were given, including one by KEA.

Socio-economic impact of the project and public attitude change towards bats can also be evaluated on a basis of a lot of media presentations and articles that are in more details given under E actions. Also the fact how popular are both volunteer camps and Bat Nights (detector trips) does show high positive interest towards bat life in Estonia. On a basis of Bat Interest Days results, voluntary camp outcomes, training of nature guides and discussions in municipalities as well as with some special stakeholders, final report on socio-economic impact was compiled by project manager (Annex 9).

Ecosystem functions related to bats were also discussed several times among bat experts of the project. Final report on ecosystem functions is available as Annex 8.

5.1.4. Action E. Public awareness and dissemination of results

5.1.4.1. Action E1. Dissemination planning and execution (completed)

Foreseen start date: 01/07/2017 Actual start date: 25/09/2017

Foreseen end date: 30/06/2021 Actual end date: 31/12/2021

Deliverables: “Project website” was delivered with Progress report; “Report on the replication of innovative solutions” is given in Annex 10; “Layman's report” is given in Annex 11.

E.1.1 Dissemination plan, networking with other projects and EUROBATS experts

E.1.1.1 Study tour to Netherlands

Study tour to Netherlands was commenced on 20-30/08/2018. During the study tour we met bat experts and Pond Bat hibernacula in Netherlands. Several discussions were done on following issues: grilling and fencing of hibernacula, bats in houses, summer colonies of bats, bat boxes, bat migration, bat monitoring, ultrasound detectors etc. Study tour was very successful and gave a lot of practical input on measures for securing wintering sites. Objectives of the activity were fully reached and feedback was very good. Memo of the study tour is available here: <https://elfond.ee/nahkhiired/projektist/aruanded>

E.1.1.2 EUROBATS Advisory Committee annual meetings

First annual meeting during the project time was held in Tallinn, Estonia from 14/05/2018 to 17/05/2018 and due to the cost savings from Estonian experts' attendance this time it was possible to use that amount to promote networking and to present project through organising an excursion for meeting participants on 13/05/2018 to the project site in Ülgase. Special leaflets about project were produced as well as project roll-ups in two languages. Two of the project experts also attended the meeting for full period.

Second meeting was held in Skopje, North-Macedonia from 1/4/2019 to 5/4/2019. As the overall costs for one person was almost same amount than according to the application was foreseen for two persons and AC location was outside EU we asked and got permission to send one expert this time. As a result, project leading expert Lauri Lutsar attended that meeting with project expenses, together with Kaja Lotman who was a representative from KEA and whose attendance costs were covered by Estonian Government. We do evaluate that objectives of attending that meeting were met as project expert did participate in many working groups relevant for the project as well as did have networking discussions with colleagues from Latvia.

Third meeting was preliminarily foreseen to be held in Sarajevo, Bosnia-Herzegovina from 25/4/2020 to 29/4/2020, but it was postponed due to COVID-19 pandemic. Finally, that meeting was held virtually on 30/04/2021. Six persons attended from Estonia: Lauri Klein, Lauri Lutsar, Kaja Lotman, Rauno Kalda, Oliver Kalda and Maris Pärn.

E.1.1.3 Final event of the project

Due to the COVID-19 pandemic we organised final conference of the project only virtually. Still, that conference was held in both Estonian and English language and with synchronic interpretation. There were colleagues attending from Latvia, Netherlands and EUROBATS and Latvian colleagues also had a presentation about Pond Bat hibernation in Latvia. Final conference of the project was held on 26/11/2021 with more than 40 participants and it is publicly available for review here: <https://elfond.ee/nahkhiired/lopuseminar>

Action E.1.2 Development of the Dissemination Pack

E.1.2.1 Website

Website, <http://elfond.ee/nahkhiired> was published with short delay by 29/1/2018 in Estonian language and translated to English and Russian during February 2018: <http://elfond.ee/bats> and <http://elfond.ee/letuchie-myshi>. Website has had more than 76 000 visits since publishing. Estonian version has had more than 58 000 visits. Russian version more than 16 000 visits and English version about 2000 visits. In 2020 number of visits has risen substantially. Website has already photos and videos on bats in uploaded. It also has section for reports (<https://elfond.ee/nahkhiired/projektist/aruanded>), where project reports are uploaded for public use. Website has also questions and answers section (<https://elfond.ee/nahkhiired/kkk>), where anyone can find information on bats or direct questions to bat researchers. There is also a link to the online Bat Camera in web (<https://elfond.ee/nahkhiired/nahkhiirekaamera>) and to information leaflets on bat issues as well as Layman's report for teachers and nature guides, (<https://elfond.ee/nahkhiired/opimapp> and <https://elfond.ee/nahkhiired/laymans-aruanne>). Online Bat Camera stream is available in ELF Youtube channel since mid-February 2020 and since then it has been watched more than 65 000 times. It is accessible also from <https://looduskalender.ee/n/en> and there is active forum of nature camera watchers, accessible here <https://www.looduskalender.ee/forum/>. Most of Estonian bat experts as well as project manager are actively participating also in Facebook group "Nahkhiiresõbrad" ("Friends of Bats") that unites most of Estonian bat friends and where many actual issues concerning bats are daily discussed. That group was established on 17/07/2010 and it has currently 1082 members. Compared to planned amount of visitors in web and for Bat Camera as well as other public awareness indicators (look KPI chapter), we have exceeded almost all of these planned goals. Also the feedback reactions by users have been only positive. Overall estimated cumulative number of all media clicks into project related media publishing since project start is 7 270 258 (within first three months of 2020 has been 2 300 000 of it that is huge, compared to that whole year of 2019 was 3 300 000). With social media we have reached the users 186 425 time since the start of the project (first three months of 2020 we have same number of reaching than within 9 months during 2019).

E.1.2.2 Layman's Report

We had a long discussions and brainstormings about a form of the Layman's Report and finally we decided to use a so called pocket format leaflet folder form that also can be used in outdoor. Idea was to produce something useful also for the future and we decided to print half of the leaflets on a basis of project activities, so that one side is showing situation before and other side after project. Other half of the leaflets can be used as field guide to determine Estonian bat species. There is species-based data that helps people to detect bat species – drawing of bat, its measures, habitat, food and sound. First time in Estonia that data is also containing sonogram of bat sounds. Layman's Report that was printed in 1000 pc and distributed to nature centres, nature schools and bat-amateurs, is also available both in Estonian and English languages here: <https://elfond.ee/nahkhiired/laymans-aruanne> and in Annex 11

E.1.2.3 Report on the replication of innovative solutions

As project had very much activities that were never and nowhere before done, there was a lot of brainstorming for how to solve the actions. All these different solutions that were outcomes of these brainstormings are written in Report on the replication of innovative solutions that is available hereby in Annex 10.

5.1.4.2. Action E2. Elaboration of project information boards and information materials (completed)

Foreseen start date: 01/07/2018 Actual start date: 01/09/2018

Foreseen end date: 30/06/2020 Actual end date: 26/05/2021

Deliverable was given in Mid-term Report

Four information boards about LIFE-project were produced – one into each site – deadline was 31/05/2019, but it took more time and finally all information boards were completed by 26/05/2021. Collection of the content material for the information boards started in December



2018. It took some time to discuss content with all stakeholders and first two information boards in three languages (Estonian, English and Russian) were printed by 21/02/2020. Last two information boards were printed and installed during the last project year, 2021, but were still ready before the final event of the project.

Information materials (1000 pc) – deadline 01/03/2020 – a folder with information on both sides that can be used also in outdoor conditions was compiled by project bat expert Rauno Kalda and edited by other experts during February 2020. The folder contains five A4 laminated, richly illustrated and separately usable weather-proof sheets. Folders (200 pc, all together 1000 sheets) were sent to printing office on 28/02/2020 and were ready on 05/03/2020. LIFE logo and disclaimer are set on the folder cover. Although that due to the COVID-19 pandemic we have not yet had possibility to distribute these folders to Nature Education Centres, we have already got lot of positive feedback on the pdf-material available in project web site and know that teachers are already using that folder for their biology classes.

Photo 5. Information board with wooden path in Ülgase project site. *Photo by Lauri Klein.*

5.1.4.3. Action E3. Public events and exhibitions (completed)

Foreseen start date: 01/10/2018 Actual start date: 31/10/2017

Foreseen end date: 31/12/2020 Actual end date: 31/12/2021

Deliverable was given in Annex 4 of the mid-term report.

24 Bat Nights were held during the project. 14 of them were done during 2018-2019: 4 in relation with celebrating Republic of Estonia 100-year anniversary and Nature Day of Estonia at 18/08/2018 (Tallinn, Tartu, Narva, Haapsalu); one at the volunteer camp managers training of ELF in Kauksi 18/05/2019; 3 in relation with celebrating Natura 2000 Day and International Biodiversity Day at 21/05/2019 (Tallinn, Tartu, Võru) – articles were also published about nights in Tallinn and Võru; one in relation with biodiversity monitoring marathon in June 2019; 2 in Seto folk festival at 28-29/06/2019 in Värskä and 3 in relation with celebrating International Bat Night and Nature Day of Estonia at 17/08/2019 (Keila-Joa, Viljandi and Iisaku). 10 Bat Nights were done during 2020: 2 in Soomaa during the volunteer camp at 3/07/2020; 3 in Kuressaare, Saaremaa Island and one in Pärnu at 13/08/2020 in relation with celebrating 110-year anniversary of Estonian Nature Conservation; one in Paide at 14/08/2020 in Festival of Ideas; one in Haapsalu at 25/08/2020 and two in Tallinn Zoo at 25/08/2020 – last three Bat Nights were especially dedicated to the 30-year anniversary of EUROBATS agreement in Europe. All four bat experts active in project were acting as guides in these Bat Nights. Usually about 20 to 30 people were attending one Bat Night, so it means that all together ca 480 to 720 people has got better knowledge on bats through attending Bat Nights. Feedback on the Bat Nights have always been very positive and people are asking if there will be Bat Nights also next year.

ELM purchased weatherproof high quality bat camera and the camera has been tested by the person who has set up almost all of the online web based nature cameras in Estonia. Camera system past testing and calibration during winter period of 2017/2018, was accepted and purchased in May 2018. Camera was tested in Piusa caves during the winter period of 2018/2019 and then it was also set first time up as online, but not yet published. Several video clips have already been recorded. The camera has been open for public viewing during last two winters (2019/2020 and 2020/2021), showing online video of Pond Bats wintering in Piusa hibernacula. Camera was first showing only close-up of hibernating Pond Bat set. In February 2021 camera system was updated with second camera and now there is online capability to show both close-up and overview of hibernating Pond Bats.



A positive feedback and many discussions were initiated in online forum by watchers all over the world. Camera has been watched more than 62 000 times.

Photo 6. Screenshot of project bat camera image from 16/02/2020 when hibernating Pond Bats changed their position and did fly around in Piusa cave.

In preparation of interactive exhibition, ELM also purchased a professional photo-camera for taking high quality bat photos that later ended with especial Photo exhibition of bats and bat researcher photos. Also several local nature photographers were contacted to raise their awareness of the project and to encourage them to take photos of bats. ELM purchased 3 computers for projecting digital data (sound and visuals) and interactive programmes at the exhibition. Besides computers, data projectors and speakers were used at the exhibition.

In cooperation with Estonian Theriological Society the Pond Bat and other bat species are put up for the mammal of the year 2020. There have been held a lot of different events during January and February 2020 already. Opening of the Bat Year in Estonia was at 30/01/2020 in Tallinn Zoo and it had highest number of participants since the start of the celebration of Animal of the Year in Estonia more than 10 years ago. Since then many articles, TV-interviews and movies as well as discussions in radio stations has been done. All project bat experts have been involved in that. Team of the mammal of the year was communicating daily and had monthly meetings. All communication means were daily in use, starting from phone-calls and ending with skype or zoom meetings. We have got very much positive feedback through many channels and number of people calling to bat experts or posting information on bats in their houses has been increased a lot compared to what it was before. Even in time of the COVID-19 pandemic and its connection to bats has not been turned overall attitude negative – always there are much more positive than negative reactions.

Preparation of concept of interactive exhibition of Night Flyers – Bats with a title as “*Terribly Adorable Bats*” has started with very first brainstorming lead by the ELM ahead of schedule in summer 2018 and was finalised also ahead of schedule by 01/05/2019. The concept of the exhibition was given in Annex 10 of the mid-term report. In May 2019 After ELM had worked out the first concept it opened public procurement procedure for production of the exhibition. ELM, as state institution, has its own public procurement policy, which follows regulations of the Government of Estonia. Public Procurement notice was published on-line in the central Public Procurement Register. Contract with winner of the procurement, Produktsioonigrupp OÜ, was for the exhibition production signed on the 01/07/2019. The lighting of the exhibition was put up also by the same company. They had the best overview which exhibit to highlight. The animations and interactive parts of the exhibition were produced by Frost FX. They also produced exhibition themed VR movie, which was made as an extra opportunity for the visitors to experience the mysterious lives of bats. The VR movie is not included in this project’s budget and was made with museum’s own financial resources. ELM used some scientific consultation from Elustik OÜ to be sure that the data presented at the exhibition was correct.

Opening event of the exhibition was held on 13/02/2020. Before the opening of the exhibition halls were renovated. 71 invited guests that were related to the project attended the opening event. Exhibition was planned to be open until the end of the year 2020, but due to the COVID-19 pandemics it was decided to be kept open much longer and now it will be kept open until the end of the 2022. Feedback to the exhibition and all events connected to that have been very good. All the texts shown at the exhibition were edited and translated into Russian, English and Finnish. An audio guide was recorded in every language. ELM has concluded the contract with the educational specialist and the educational programmes are ready to use. ELM also prepared an extra poster exhibition about bats with title “*Superpowerful Bat*” that was ment to be an advertisement for a main exhibition and it was open in September to December 2020. This exhibition was set to a central park of Tallinn and after it was removed there it started to travel all around Estonian largest cities, has been already in Tartu, Narva and Valga. Copy of that poster exhibition was produced and put up into guest centre in Piusa as a permanent exhibition.

5.1.4.4. Action E4. Field training for tourist guides for bat-friendly tours (completed)

Foreseen start date: 01/01/2020 Actual start date: 01/02/2020

Foreseen end date: 30/06/2020 Actual end date: 09/07/2020

Deliverable “Training programme for the tourist guides” given in Annex 12

Preliminary programme of the training is delivered as an Annex 6 of the mid-term report. Formalized final programme is in Annex 12 hereby. Preparations of the content of training started already in January 2020. Due to the COVID-19 pandemic rules the theory training was done as electronic training over the web on 21/05/2020 (50 participants and 2 bat-experts as trainers) and practical training was held as two separate training sessions, one for North-Estonia (in Vääna (Humala) site and in Keila-Joa Park) on 16/06/2020 (27 participants and 2 bat experts as trainers) and one for South-Estonia (in Piusa site and in Võru town) on 30/06/2020 (23 participants and two bat experts as trainers). Both practical training sessions were containing visit to wintering site of bats and training how to behave there; watching the documentary movie on bats life and conflicts with human life (with comments by Estonian bat expert) as well as training how to use ultrasound detectors and how to organise Bat Night, including guided tour within it. All participants of the training did get a certificate (all together 43 such certificates were issued) that they have passed especial training and are bat-friendly nature guide.



Photo 7. Some of the participants of local nature guide training session in South Estonia, in Piusa Guest centre. *Photo by Lauri Klein*

5.1.5. Action F. Project management

5.1.5.1. Action F1. Project management (completed)

Foreseen start date: 01/07/2017 Actual start date: 24/09/2017

Foreseen end date: 30/06/2021 Actual end date: 28/02/2022

Project has two partners – ELF as coordinating beneficiary and ELM as associated beneficiary. Partner agreement was signed on 26/01/2018. By the end of the year 2018, associated beneficiary, ELM had hired all necessary staff.

ELF hired executive committee that includes six employees with full or part-time work-load: project manager (Lauri Klein), project assistant (Aili Saluveer since start until July 2018, replaced with Kärt Mell starting in Sept. 2018), project financial manager (Kadri Kalmus), PR coordinator (Mariliis Haljasorg since start until April 2018 and replaced with Kertu Hool after that), communication assistant (Laura Oro since project start and replaced with Raul Kübarsepp in November 2019), project leading expert (Lauri Lutsar, since Sept. 2017). Project manager was contracted on 24/09/2017. Until the end of 2017 he worked on partial (0,5) time, from 01/01/2018 to 31/03/2021 on full time and from 01/04/2021 to 31/12/2021 partial (0,7) time and from 01/01/2022 to 28/02/2022 partial (0,5) time. Agreements with the project team members were obtained during October-November 2017 and first meeting of full team (25 persons) was arranged on 21/12/2017. Project assistant has been maintaining technical documentation, contracts, assisting project manager in organisation of meetings and taking care of the office for the project staff. Project financial manager is involved in financial planning of the project, controls expenditure documents and provides financial reports of the project. Doing so, she is also providing assurance that project expenditures are in line with LIFE, EU and national provisions. She also has checked financial correctness of associated beneficiaries' financial reports and provided answers for relevant enquiries. PR coordinator together with communication assistant have established project web site and are keeping it alive. Articles and press-releases as well as news for social media have been prepared with assistance of PR coordinator and her assistance. PR coordinator is also responsible for the overview of media coverage and relevant statistics. In order to fulfil all project actions so that they are best for a target species – Pond Bat – project leading expert as a part-time paid employee was recruited from the staff of ELF. He is assisting project manager with content issues and is involved in all these actions that are directly dealing with target species (all other than F-actions currently). Beside of the leading expert, three more bat experts (Matti Masing, Oliver Kalda, Rauno Kalda) are contracted with separate contracts when needed. These experts are known and educated bat experts in Estonia.

ELM hired an executive team to manage actions foreseen to be done by associated beneficiary. Team consists of seven employees with full or part-time work-load: project coordinator (Laura Pärtel (changed to Laura Reinurm in February 2020 due to marriage) since start of the project until March 2020, replaced with Madli Karjatse starting in 13/04/2020 and replaced with Egle Hecht in 12/10/2021), project manager for national contribution and financial issues (Nelly Orissaar), PR coordination (Kätlyn Metsmaa), Ulla Männi (exhibition curator), Lennart Lennuk (exhibition curator and bat expert), Tiiu Liimets (contact person of exhibition educational materials), Sander Olo (technical expert for exhibition). ELM also hired taxidermist for taxidermical work for the exhibition as well as making the realistic forms of bats. All the work is visible at the exhibition. Also specialist of the environmental education for working out the educational programme was hired. The programme mainly focuses on students, but there is material for other visitors too.

Performance Indicators were entered into KPI web-based database in January-February 2018. Progress Report was compiled and delivered in time on 31/10/2018 and Mid-term Report was compile and delivered in time on 30/04/2020. Amendment request for project prolongation for

six months was submitted by ELF on 29/03/2021. That request was approved by CINEA on 21/06/2021. According to that request new end date for all project actions was set as 31/12/2021 with possibility to compile final report still during the period 01/01/2022 to 31/03/2022.

ELF has had a long consideration process on what kind of 4x4 fieldwork car is needed for the project and also considered possibility to repair an existing old car, but at the end had a decision still to purchase newer, but still used car and has purchased such car on 24/10/2018. This car has been very useful in many conservation actions during project already. We have used it for much more action than expected in application. Car has been in use for almost all actions, but has been irreplaceable for A and C actions. As the price of the car was less than expected in application, ELF did also purchase a laptop computer for a leading expert for a bat sound and video analysis needed for actions A3, D1, D2, E3 and E4.



Photo 8. Project fieldwork car with project leading bat-expert Lauri Lutsar in action in Vääna-Posti project site – preparation of installing electricity cable into wintering site in autumn of 2021. *Photo by Lauri Klein.*

5.1.5.2. Action F2. After-LIFE plan and steering committee meetings (completed)

Foreseen start date: 01/09/2017 Actual start date: 29/01/2018

Foreseen end date: 30/06/2021 Actual end date: 29/01/2021

Deliverable: After-LIFE plan is given in Annex 13

SC was formed during November – December 2017 and four SC meetings were arranged on annual basis (29/01/2018, 29/01/2019, 29/01/2020 and 29/01/2021). There were 25 persons from 16 institutions in SC. Between SC meetings project WGs did work with SC members bilaterally when needed. All SC meetings were protocolled and memos were produced.

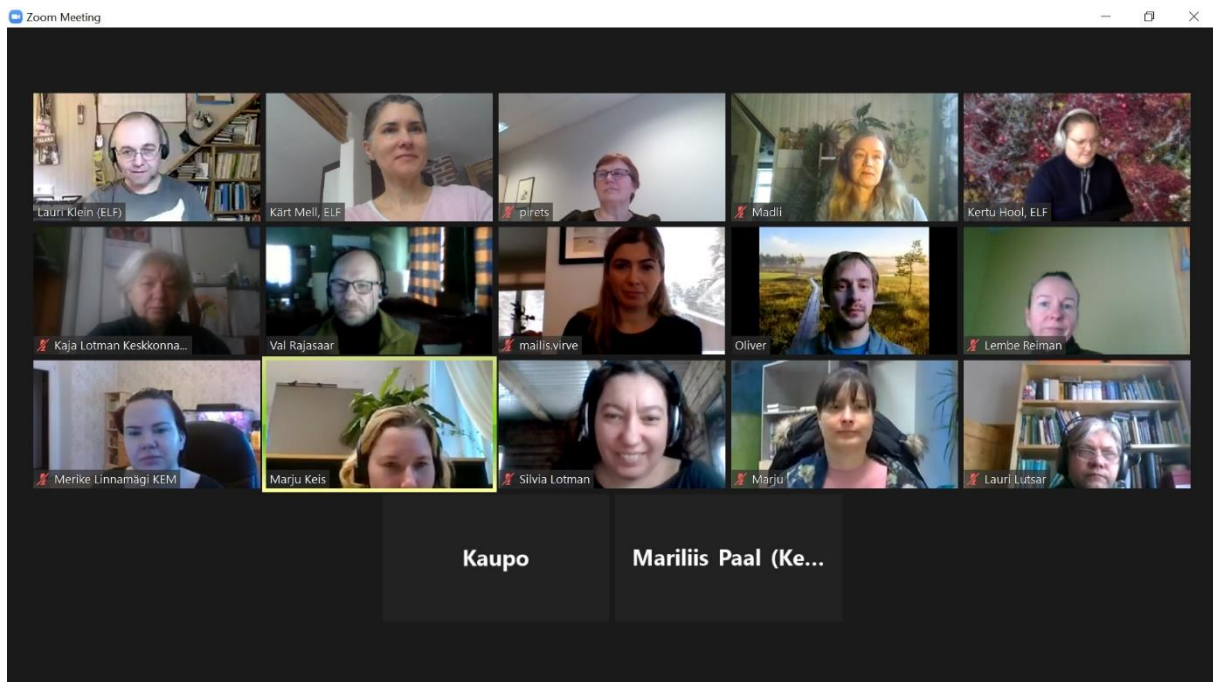


Photo 9. Fourth SC meeting held in ELF Zoom meeting room on 29/01/2021.

After-LIFE plan of the project was compiled by the project manager and parts of it have been discussed with SC and state institutions. After-LIFE plan is attached in Annex 13. Main issues that are almost agreed between ELF and state institutions KEA and RMK that are responsible on bat protection at the state level, concern handing over fences and information boards for future maintenance. Also preliminary discussions on continuous monitoring have been done as well as on ELF input into updating of bat conservation plan and management plans of protected areas. Discussions on handing over ESS and electricity infrastructures were unfortunately not ended before the end of the project and these discussions go on in After-LIFE period. ELF applied for funding from Estonian Environmental Investment Centre for two-year project on further safeguarding these four bat hibernacula that were project sites during EstBatLIFE project and that application was approved. It will allow ELF to keep ESS and maintenance of fences running and at the same time negotiations on handing all these elements over to the state institutions is continuing.

5.2. Main deviations, problems and corrective actions implemented

Project was supposed to start on 01/07/2017, but recruitment of the project manager took some time due to summer period and was successful on 24/09/2017. Due to that also some of the milestones were with some delay, but it did not affect an overall success of the project. As the project had a lot of such tasks that were never before similarly implemented, testing periods took a lot of more time than expected in the application. Especially it concerns main objective – take human visitation to the hibernacula under such control that it will minimize negative impact to the wintering population of Pond Bats. There was a need to test what is a result of fencing without and with ESS and also what is most cost-effective combination. It was not wise to start setting up permanent electricity infrastructure before testing of situation with only fences and only off-grid ESS. Another matter that made our work more complicated was that we had possibility to test effectiveness only during the winter months and construction work was only possible to be done at the time when bats were not in caves, mainly during the summer. But usually summer time all construction firms are overloaded and therefore we did not get much responses to our price biddings. Only after testing, by the end of year 2020, it was clear that permanent electricity infrastructure will be needed as most cost-effective solution. Because that work could not have been done during the left 6 months of the project time, there was a need to apply for a prolongation for at least 6 months more.

Preparation for project conservation actions, especially tasks under action A1 have been somewhat rescheduled, due to need for prepare construction drawings together with builders after bidding as such measures foreseen in project were not a standard solutions and needed site-special elaboration by builders. Due to that it was planned that conservation actions at every project site will be described in planning document (that includes also preliminary descriptions and drawings of possible types of conservation means). After these planning documents were coordinated with landowners and authorities, construction companies were tendered asking also construction drawings and only after that it was possible to prepare building notes in EHR that gave finally green light for construction firms for building. Therefore, deadlines for action A1 were rescheduled and set separately for every building action. It was also explained in Progress Report, Mid-term Report and in application for prolongation.

On construction work, following deviations appeared: setting up security culvert in Piusa, that was planned to be ready by 30/09/2019 was completed by 08/10/2020 because of measurement of caves took more time than expected; fencing in Piusa was planned to be ready by 31/10/2019, but was completed by 03/11/2020, because preparation of building note took more time than expected and also one entrance could not be fenced before culvert had been brought in through that; fencing work in Ülgase project site was planned to be ready by 31/10/2019, but as discussions with one land owner took more time, they were completed more than year later by 11/12/2020; closing the shaft in Vääna (Humala) site was first planned to be placed by 30/09/2019 and postponed first one year until 30/09/2020 and then one more year until 20/09/2021, but the reason was mainly on trying to keep as good cooperation as possible with local land owner – Estonian Defence League and its land holder Riigikaitse Rügement – who asked to have human access to be kept under the shaft during the time when bats are not wintering there. It took therefore much more time to elaborate such solution that would be suitable for all parties – land owner, protected area manager, cultural heritage manager and local government.

Some delay appeared also with elaboration and installing of information boards, especially two of them – in Ülgase and in Piusa site. We had preliminary agreement with RMK that in Piusa they will build a wooden stand for information board by their own expenses, so it allows us to

do larger board than in other sites and it was also our hope that then it will be much easier to hand information board over to RMK after the project is ended. But unfortunately it took much more time for them to elaborate that wooden stand and then also appeared that printing office did print wrong information board for us and although they did new printing by their own expenses, it took more time again. In Ülgase the clarification with RMK took again time and therefore we were a bit in delay with setting up information board there.

Some problems appeared also with large differences on expected and actual costs of some actions, but they were solved within the budget, because some other actions appeared to be less costly as expected. All such changes in budget were still not exceeding level of allowed shift between budget lines and therefore also did not change overall budget substantially. Activities that appeared to be much more expensive as expected in application were: cost of construction of electricity infrastructure had largest difference with budget – it was expected to cost about 7500 EUR, but it was more than 57 000 EUR; placement of culvert into Piusa caves was expected to cost 13 050 EUR, but it was 33 384 EUR; security watch in all sites was expected to cost 20 520 EUR, but it was more than 60 000 EUR. On the other hand, activities that appeared to be less expensive than expected in budget were: placement of restrictions (fences or grilles) into all sites was expected to cost 207 500 EUR, but it was less than 140 000 EUR; elaboration of information boards was expected to cost 6000 EUR, but it was more than half of it, a bit more than 2600 EUR; building the staircase in Ülgase was expected to cost 8000 EUR, but as we decided not to build it, because it would have been rising the uncontrolled human visitation that we wanted to avoid, it did cost 0 EUR; from Travel and subsistence budget line we did save more than 10 000 EUR, partly due to the COVID-19 pandemics restrictions and having meetings online.

There have been no problems or difficulties concerning schedule, budget or the overall role of the only associated beneficiary – ELM. Moreover, ELM did tasks even ahead of time and more than was foreseen in application.

5.3. Evaluation of Project Implementation

The main objective of the project was to improve situation in Pond Bat hibernacula so that species wintering population abundance in four project sites will not decrease any more or starts to increase. The objectives of the project concentrated on the improvement and protection of hibernation sites. Project objectives and expected results, their achievement and evaluation of success as well as lessons learned are given in table 3 below.

Selected main problems to be targeted were uncontrolled human visitation in all four project sites, freezing air temperature in Vääna (Humala) site and collapsing roof in rear tunnel section of Piusa site. Methods foreseen to improve situation were as follows:

- For uncontrolled human visitation – fencing/grilling entrances of the hibernacula; setting up ESS for all entrances of the hibernacula; rising public awareness on bat ecology and right human behaviour with bats in every season.
- For keeping habitats around hibernacula entrances natural and suitable for bat swarming – clean surroundings of hibernacula entrances.
- For avoiding freezing air temperature in Vääna (Humala) site – filling the central shaft.
- For collapsing tunnel roof in Piusa – set security culvert into tunnel.

Controlling human visitation with ESS combination with fences seemed to be very effective method, but off-grid ESS appeared to be somewhat expensive. Most cost-effective and sustainable solution appeared to be a fence combination with ESS that has permanent electricity and such sensor system that is least expensive to set and do have as less as possible maintenance need. On the other hand, setting up permanent electricity connection appeared not to be possible for every site – construction of that infrastructure in Vääna (Humala) appeared to be too costly and did not by any means fit the budget of the project. Therefore, in Vääna (Humala) site we did leave ESS to be off-grid, but minimised its costs by minimising number of security locations – only 4 entrances out of 9 that are under strongest pressure by uncontrolled human visitation were left to be under ESS. All other sites were equipped with permanent electricity infrastructure and such security sensors that have very low running cost, but that do inform about intruders by mobile phone network. As fences together with signs on them that very clearly inform about why entering is prohibited and also warn about video-surveillance have already altered human visitation in all project sites more than 90%, we do expect that such situation will also remain after the project end.

Voluntary camps seem to be very cost-effective measure for keeping hibernacula surroundings natural. ELF has long experience in arrangement of such camps and they are very popular, so that people are even ready to pay for participation in such camps.

Against bat freezing it is very important that underground tunnels have closed ends with more stable temperature. In case of existing vertical shafts, filling the shaft with soil material is most cost-effective method to create such situation. In Vääna (Humala) site such filling was done but leaving at the same time still human access through the tunnel below the shaft, by installing culvert there. As that culvert had wind-proof doors that closed its both mouths, it did not affect negatively temperature conditions in hibernacula (these conditions were much better now that was already noticed during the bat monitoring in February 2022 there), but allowed military training centre nearby still to use tunnels for their exercises by the way that do not affect wintering site in time when bats are out of the hibernacula.

Securing collapsing roof, was most cost-effective to do with installing tube-shape culvert into the collapsing section of the tunnel in Piusa (Photo 10). We did successfully install such culvert with diameter of 2 m and length of 24 m into that tunnel and bats started immediately to use it, flying through it.



Photo 10. Bat-camera elements installed to the location in Piusa caves where culvert was later installed and then camera gave proof that bats started to fly through the culvert almost immediately after it was installed. At the upper part of the photo can be seen the hole in the ceiling that is a first part of the collapse that we avoided with installing culvert. *Photo by Lauri Klein.*

Evaluation of all other actions serving other objectives are given in following table. Actions are given by their code from initial application, objectives and expected results by numbers listed above in the current chapter.

Table 3. Evaluation of achievement of the expected results and meeting of the objectives of the project.

Action	Foreseen in the revised proposal	Achieved	Evaluation
A1 – prep. docs.	<p><u>Objectives:</u> To secure the hibernation sites from uncontrolled visits. To reduce the visitor flows during the hibernation period. To stop degradation of habitats caused by low temperatures, draught and collapsing.</p> <p><u>Expected results:</u> Closure and safeguarding of most important hibernacula - total number of underground site entrances affected approximately: 40. Reduced visitors' flows during the hibernation period - by 75% compared to the base level of project start. Significantly reduced temperature fluctuations and draught.</p>	<p>Yes. Achieved for all needed cases. Documentation prepared and building notes in EHR for fencing in Vääna-Posti, Vääna (Humala), Piusa and Ülgase. Needed documents prepared, no building notes needed for security culvert placement in Piusa, shaft filling in Vääna (Humala) and electricity infrastructure instalment in Vääna-Posti, Ülgase and Piusa. All 40 entrances closed with fences and about 30 of them also with ESS. Visitor flows reduced more than 90%.</p>	<p>Objectives met for all cases; deviation appeared with fencing in two sites and underground work (security culvert and filling the shaft). Electricity infrastructure instalment was very successful within such a short time it was allowed (less than a year). Unfortunately, electricity instalment was more expensive than expected and therefore it was unsuccessful in one site. Experiences can be well replicated at least nationally, but perhaps also internationally.</p>
A2 – visitor count	<p><u>Objectives:</u> To secure the hibernation sites from uncontrolled visits. To reduce the visitor flows during the hibernation period.</p> <p><u>Expected results:</u> Closure and safeguarding of most important hibernacula in four project sites - total number of underground site entrances affected approximately: 40 Reduced visitors' flows during the hibernation period - by 75% compared to the base level of project start.</p>	<p>Yes. Visitor number counted for one year in all four project sites. Report compiled and published in web site.</p>	<p>Objective met on fixing baseline number of visitors and trend for all sites. Counting methods (either counting mat or beam-counter etc) used were good in all sites, only one counter in Ülgase was destroyed and caused small drawback, but as there was also second counter in work it did not affect the results. Experiences can be well replicated both nationally and internationally.</p>
A3 – bat count	<p><u>Objectives:</u> To secure the hibernation sites from uncontrolled visits. To reduce the visitor flows during the hibernation period.</p>	<p>Yes. Counting and mapping of bats done in all project sites for two first winters of the project life by four bat experts.</p>	<p>Objective met on counting, even mapping was done that was not foreseen. Baseline and trend fixed for Pond Bat (as well as for other</p>

Action	Foreseen in the revised proposal	Achieved	Evaluation
	<p>To stop degradation of habitats caused by low temperatures, draught and collapsing.</p> <p><u>Expected results:</u> Closure and safeguarding of most important hibernacula - total number of underground site entrances affected approximately: 40. Reduced visitors' flows during the hibernation period - by 75% compared to the base level of project start. Significantly reduced temperature fluctuations and draught.</p>		<p>bat species) population number in all project sites. No substantial drawbacks existing. Experiences can be well replicated both nationally and internationally.</p>
C1 – safe-guard	<p><u>Objectives:</u> To secure the hibernation sites from uncontrolled visits. To reduce the visitor flows during the hibernation period.</p> <p><u>Expected results:</u> Closure and safeguarding of most important hibernacula in four project sites - total number of underground site entrances affected approximately: 40. Reduced visitors' flows during the hibernation period - by 75% compared to the base level of project start.</p>	<p>Yes. Completed for all sites and entrances. Fences placed for Vääna-Posti, Vääna (Humala), Piusa and Ülgase around all 40 entrances (in 27 locations). About 30 entrances (in 20 locations) safeguarded also with ESS. Visitor flows reduced more than 90%. Permanent electricity infrastructure and ESS basing on it is set for 3 sites (Vääna-Posti, Piusa and Ülgase) and off-grid ESS working in one (Vääna (Humala)).</p>	<p>Objectives met and exceeded for all cases; deviation appeared with fencing in two sites. Electricity infrastructure instalment was very successful within such a short time it was allowed (less than a year). Unfortunately, electricity instalment was more expensive than expected and therefore it was unsuccessful in one site. Experiences can be well replicated both nationally and internationally.</p>
C2 – set culvert	<p><u>Objectives:</u> To stop degradation of habitats caused by low temperatures, draught and collapsing.</p> <p><u>Expected results:</u> Significantly reduced temperature fluctuations and draught.</p>	<p>Yes. Completed with small delay in time. Roof collapsing avoided in needed location in Piusa cave with installing 24m long and 2m in diameter rounded culvert into it. Bats are using the culvert well.</p>	<p>Objectives met and exceeded. Bats did take culvert into use quickly and well. Delay in time was due to more time-consuming preparatory work. Experiences can be well replicated both nationally and internationally.</p>

Action	Foreseen in the revised proposal	Achieved	Evaluation
C3 – filling shaft, volunt. camps	<p><u>Objectives:</u> To stop degradation of habitats caused by low temperatures, draught and collapsing To involve volunteers, private companies and local communities into cleaning the caves and surroundings, especially the swarming areas</p> <p><u>Expected results:</u> Significantly reduced temperature fluctuations and draught. Involvement of volunteers into management actions and thus creating better understanding and commitment for nature conservation efforts in Estonia: 6 volunteer camps with approximately 100 participants are to be organised.</p>	<p>Yes. Achieved both for volunteer camps and filling the shaft. 8 camps with more than 140 volunteers altogether. Almost 25 tons of trash was transported to landfills. Central shaft filled in Vääna (Humala) site with installed culvert on the bottom of shaft and at least 2m sand layer on top of it. Both culvert mouths closed with wind proof doors. Temperature close to both mouths of culvert is stable and above the zero and no wind appeared during the winter.</p>	<p>Objectives met and exceeded. Voluntary camps and involvement of local people – involved in all three project sites where camps were held with higher number than expected. Temperature and humidity is stabilized in Vääna (Humala) tunnel system during hibernation period and no wind appears. Experiences can be well replicated both nationally and internationally.</p>
D1 – monit. effect	<p><u>Objectives:</u> To secure the hibernation sites from uncontrolled visits. To reduce the visitor flows during the hibernation period. To stop degradation of habitats caused by low temperatures, draught and collapsing. To improve the protection of target species by making the policy recommendations for management plans of bats and protected areas.</p> <p><u>Expected results:</u> Closure and safeguarding of most important hibernacula in four project sites - total number of underground site entrances affected approximately: 40. Reduced visitors' flows during the hibernation period - by 75% compared to the base level of project start. Significantly reduced temperature fluctuations and draught. Suggestions and directions for the conservation management authorities to improve the conservation of the Pond Bat habitats.</p>	<p>Yes. Monitoring programme is compiled, containing method that is same as for actions A2 and A3. Input was given to the Action Plan for Bat Protection in Estonia for years 2022-2026. All project sites are also included in state environmental monitoring programme. First results on bat monitoring in project sites does not yet show any trend in population change, but it is logical, because bat population change takes time and cannot appear so quickly. Visitor counting does show very quick and big reduction – during the hibernation period there has been more than</p>	<p>Objective met and exceeded. Quick and strong success towards reaching expected results. Both, visitor counters and ESS material does show strong effect of combined system – fences with ESS. There have been no intruders for last two winters in one of the sites and very few (less than 10) in other sites. Input has also been given to the Action Plan for Bat Protection in Estonia for years 2022-2026, but practical handover of activities to the state responsible institutions should still be done during after LIFE period.</p>

Action	Foreseen in the revised proposal	Achieved	Evaluation
		90% less visitors compared to the base level of project start.	
D2 – monit. socio- econ. and eco- system	<p><u>Objectives:</u> To raise public awareness internationally, nationally and locally. To present project results on national and international scale.</p> <p><u>Expected results:</u> Suggestions and directions for the conservation management authorities to improve the conservation of the Pond Bat habitats. Project will reach 50 000 people by its public exhibitions, information materials, directions for dealing with the "bats-in-houses" issues, public events, online bat-watching forums. Project will make significant contribution to the further management and restoration of EU protected bat species in Estonia and other EU countries by sharing the experiences gained and lessons learned on the international scale in EUROBATS meetings and work groups.</p>	<p>Yes. Stakeholders from all four project sites met in especial meetings – Bat Days – that were very popular. Two basic reports were compiled – one on socio-economic and other on ecosystem topics related to bats in Estonia. At least four bat experts did attend at least one EUROBAT AC meeting and leading expert three times, all possible such meetings that were held within lifetime of the project. Interactive exhibition as well as Bat Year events and online Bat Camera were very popular, like also Bat Nights held.</p>	<p>Objective met. Public awareness has been risen highly at local and national level. Although half of the project lifetime was at the time of COVID-19 pandemic and bats with that frame were not in the best light, project actions (especially events during the year 2020) were extremely successful to turn people attitude to positive side towards bats and knowledge was substantially risen. Internationally the knowledge sharing was not so active, but at least with Latvian and Dutch colleagues it was remarkable.</p>
E1 – net- work, disse- min.	<p><u>Objectives:</u> To raise public awareness internationally, nationally and locally. To present project results on national and international scale.</p> <p><u>Expected results:</u> Project will reach 50 000 people by its public exhibitions, information materials, directions for dealing with the "bats-in-houses" issues, public events, online bat-watching forums. Project will make significant contribution to the further management and restoration of EU protected bat species in Estonia and other EU countries by sharing the experiences gained and lessons learned on the international scale in EUROBATS meetings and work groups.</p>	<p>Yes. Study tour to Netherlands was commenced. 3 EUROBATS AC meetings were attended (there were only 3 as one was postponed due to COVID-19 pandemic). Project website has had more than 75 000 and web-camera more than 65 000 visits during the project. Report on replication of innovative solutions and Layman's report were produced, latter one also as printed version. Final seminar of the project has been successfully held (due to COVID-19 only virtually)</p>	<p>Objectives met. Very successful study tour gave good knowledge on grilling and fencing. Expert participation in EUROBATS AC working groups have been giving good opportunity for networking with colleagues from other countries, incl. Latvia. Project website and web-camera stream were very popular. Layman's report has been also very popular. Project results were presented in Final seminar also to the Latvian,</p>

Action	Foreseen in the revised proposal	Achieved	Evaluation
		and had international scope, having both presenters and participants also outside Estonia and interpretation into English.	and Dutch colleagues as well as for Secretariat of EUROBATS.
E2 – info-boards, info-folder	<p><u>Objectives:</u> To raise public awareness internationally, nationally and locally. To present project results on national and international scale.</p> <p><u>Expected results:</u> At least 20 local tourist guides and grass-root organisations are trained for noticing and considering the bat issues. Project will reach 50 000 people by its public exhibitions, information materials, directions for dealing with the "bats-in-houses" issues, public events, online bat-watching forums.</p>	<p>Yes. Information boards in three languages set to all four project sites. To Piusa larger than normally and to Ülgase with especial wooden path in front of it. Information folder printed for outdoor teaching purpose and distributed to nature guides and green schools all over the Estonia. Same material is freely downloadable from project website.</p>	<p>Objectives met. All information boards had some delay, but finally they all were complete and well in place. In Piusa and Ülgase it took even a bit longer than in Vääna-Posti and Vääna (Humala) . In latter there was also an incident that first plastic board was vandalized, but it was changed then to metal one as also for Ülgase where threat for vandalism is higher. Information folder with five most important bat issues for outdoor training was successfully compiled and distributed.</p>

Action	Foreseen in the revised proposal	Achieved	Evaluation
E3 – bat-nights, bat camera, campaigns, exhibition	<p><u>Objectives:</u> To raise public awareness internationally, nationally and locally. To use innovative approach with high-resolution bat cameras and attractive exhibitions for general public.</p> <p><u>Expected results:</u> Project will reach 50 000 people by its public exhibitions, information materials, directions for dealing with the "bats-in-houses" issues, public events, online bat-watching forums.</p>	<p>Yes. All planned 24 Bat Nights were done in many places and occasions all over the Estonia – more than 700 people were educated through that. Bat-camera has been working in Piusa caves already three winters and is popular (more than 65 000 looks to online camera page and popular forum attached). Bats were announced as the animals of the year 2020 with ETS and campaign was very popular. Interactive Night Flyers exhibition “Terribly Adorable Bat” was set up and opened at 13/02/2020 in ELM and it will be open until the end of 2022. Two more exhibitions were produced – outdoor poster exhibition “Superpowerful Bat” talking about bats superpowers and been out in central park in Tallinn, Tartu and Narva already and moving along in larger cities of Estonia; photo exhibition about bats and their researchers has been set up in ELM.</p>	<p>Objectives met and exceeded. Bat Nights were very popular and always there were more people who wanted to attend than we had possibility to allow. Online bat-camera was very popular also internationally through actively used forum attached to it and it is planned to be set up into one of the project sites every winter also in future. Night Flyers exhibition has been already evaluated as very innovative, especially its virtual reality part where exhibition visitor can be a Pond Bat in hibernacula and fly out of it to summer habitats. That exhibition got also highest award of the exhibitions of the year in 2020. As bats were the animals of the year 2020 in Estonia we succeeded to be in media with articles and TV as well as radio interviews almost every week during that year.</p>

Action	Foreseen in the revised proposal	Achieved	Evaluation
E4 – training guides	<p><u>Objectives:</u> To raise public awareness internationally, nationally and locally.</p> <p><u>Expected results:</u> At least 20 local tourist guides and grass-root organisations are trained for noticing and considering the bat issues.</p>	<p>Yes. Local guides from all project sites areas were trained and all together 43 certificates were issued. Training had two parts – theory and practice. First one, theory was held virtually because of the pandemic, having 50 participants and practical sessions were held separately in North- (with 27 participants) and in South-Estonia (with 23 participants).</p>	<p>Objectives met and exceeded. More than double number of nature guides were trained. Despite of COVID-19 pandemic we succeeded to arrange very popular training sessions. Also issuing especial certificate for nature guides was not foreseen before, but it seemed to be very needed and useful for nature guides.</p>

5.4. Analysis of benefits

5.4.1. Environmental benefits

Nature conservation activities in Estonia have according to our knowledge never before been done with a help of security company. Also such combination – fencing with ESS has never been used for any of nature protection purpose. Results with such combination show that it is very effective and as we have involved also KKI into that work they also see already how such system will help them.

Most beneficial results for the project and its objectives achieved are fences with ESS set up around all entrances to the hibernacula in all project sites. These direct nature conservation measures have resulted already to strong decrease in human visitation into hibernacula. Although the bat counts in hibernacula did not yet show any substantial change, but just a normal fluctuation, it is normal, as population numbers do not react so quickly. At the same time numbers of human visitation counted in all project sites hibernacula did show very rapid reduction – in all sites more than 90% compared to what it was during the first winters of the project, before any measures were taken. So, it is quite obvious that fences with signs and information boards in combination with ESS are keeping people away. It is also interesting to note that incidents number that needed security company Forus to send guards to the site was very low after fences were installed. At the same time in these sites where we had only ESS set without fences these numbers were at least ten times more, but it was still at least ten times less than without any measures before the project. So, it shows how effective such combination – fences with ESS is.

On the other hand, ESS without permanent electricity connection is very expensive, due to frequent maintenance need, but fences without ESS are not secure enough. We did have one incident during the project when someone tried to steal the fences and succeeded to demolish half of the fence around one entrance before security patrol with police appeared. Unfortunately, that person was not caught, but fortunately he did not take fences with him, so we had possibility to repair the fence. But it shows that there should exist an ESS together with fence also for purely to keep fences there. As it is usually quite difficult or even not possible to set permanent electricity connection into natural sites, therefore it is very crucial to make close cooperation with local stakeholders, who are active or own the land at or close to the sites. Educating them and perhaps in future also contracting may give the possibility to set up off-grid video surveillance systems that are online visible also to them and allow them react quickly.

We have also noticed that many landowners whose land appears to be on nature reserves, are much more cooperative than expected and one simple way to protect entrances of hibernacula would be to help landowners to set up private land signs to their land and close roads leading to the entrances. Such cooperation could also become a nature conservation standard and can be replicated everywhere around the country.

5.4.2. Economic and social benefits

In many ways during the project we have performed economic benefits. First of all, combining fencing with ESS allowed us to use standard welded panel fence instead of very expensive forged iron fence that is stronger, but many times more expensive and without surveillance it is also vandalized, as we saw in study tour to Netherlands. Secondly we managed to use existing visitor counters. Arranging voluntary camps, local stakeholders came to help with their own machines and good relationship with them allows us to plan their recruitment in future for local surveillance of the sites. In bat counts and mapping we started first time to use long distance laser measurement

with special handheld device. That technique saved time for bat researchers. For public awareness rising is very much helping a bat-camera system that was elaborated as part of the project and set online in YouTube channel. Such way we showed people what happens in caves in winter and they had no need to go there for look themselves.

Although it was planned to train at least 20 nature guides we trained more than 40. For training of nature guides we have selected especially local guides from the project site regions and actually create future job for them. Besides of local organised naturalists, we have also involved some French biology students as volunteers helping us in camp organisation, bat counts and visitor counting. In two project sites – Vääna-Posti and Vääna (Humala) we do open gates in fences for public access during the summer, so that people can visit underground tunnels during the time when bats are not there. We do plan similar possibility also for Ülgase that currently is closed all year around, but where in summer bats are not as vulnerable as during winter.

5.4.3. Replicability, transferability, cooperation and innovation

Combination of physical obstacle usage with video surveillance is not new, but is not much used in nature conservation. As there are several similar standard combinations used in other human activities, for instance construction site protection with temporary fences and temporary video surveillance, it allowed us to justify one of such systems to nature conservation use. Such combination appeared to be very effective in controlling human visitation to hibernacula. As we have tested it now and made it more cost-effective during the project, it can be used in other similar nature conservation cases where uncontrolled human access should be taken into control. Therefore, the method has a good potential for replication in the same sector at the local and also EU level. We estimate project's likelihood of replication to be quite high, but it will still be rather policy dependant than market-driven.

We have also ourselves transferred existing technology into our project use – bat-camera system is using camera type that normally is used to detect car numbers in nearly dark situation. That was the best camera type in market to be used for complete darkness in caves, giving still quite clear image for online use.

In preparation of Night Flyers exhibition many innovative techniques have been used to set up hands on possibilities for visitors. Best of them seems to be very well done virtual reality clips that allow users to feel yourself as Pond Bat in hibernation cave, being upside-down, going to fly and fly out from the cave to summer habitats.

Cooperation seems to be basis for success in many actions of the project. We have had good cooperation with local stakeholders both in voluntary camps as well as security guarding the sites. We have had good cooperation with local municipalities in preparation of documentation for EHR. We have had good cooperation with fence builders to find out best solution for fencing in every project site. Cooperation with Saue municipality resulted to small separate contract with them on cleaning Vääna-Posti site from Soviet time and other residual waste even from larger area than was needed for the project, but still being within boundaries of protected habitat of bats.

5.4.4. Policy implications

We have noticed many weaknesses in national legislation that do not allow smoothly safeguard bats life, including Pond Bat. First such obstacle is about type of protection we have in Vääna (Humala)

site. It is limited-conservation area that does not clearly allow to set up prohibition for human access for a certain period of the year. Although it states that species or habitat should not be affected, it is not clear for visitors what they are allowed to do and what not. Within AfterLIFE plan we will make suggestions to change protected area type there, to make it more clear.

Also appeared that there is too much bureaucracy and also lot of un-clarity on a way to perform practical nature conservation by third party. It should be eased up, because there are lot of local people and stakeholders who would do much more for nature conservation if it would be easier in preparatory and documentation phase.

Regulation of any underground action is also not very well set in Estonia. Also ownership of underground facilities is not clear. We asked juridical help on that from Estonian Environmental Law Centre and got unfortunate clarity that static underground elements also belong to the owner of land above them. So, also wintering bats may be treated as a property of the land owner above them. Therefore, it is very important to keep good cooperation with private landowners above underground hibernacula and compile as clear as possible amendments for protection rules of protected sites where hibernacula are.

One of the best practice lessons during the project is certainly ELF cooperation with local stakeholders (private-private cooperation) and also cooperation between KKI and Forus (public-private cooperation). We would certainly like to promote more public-private cooperation in nature conservation, as we have seen a lot of voluntary interest by local landowners and other stakeholders in performing nature conservation. Controlling human access to hibernacula that are on private land helps also private owners to control human access to their property.

Other such best practice might be a combination of military defence, national heritage and nature conservation so that it will be win-win for all of them. As one of the project sites is on the private land, owned by state military organisation Estonian Defence League and maintained currently by private military organisation Riigikaitse Rügement and hibernacula is in historical military object that is at the same time national heritage site, there is a combination of different interests. Still, these interests can be combined, as there is one common part in them – public presentation and training. Combined nature trips and voluntary camps could be easily organised, so that all three stakeholders will gain from them. For that reason, we did train some of the people of these military organisations to act also as bat-friendly nature guides.

6. Key Project-level Indicators

Most of the key project-level indicators (KPI) show that project has been very successful. For project setting, area/length and population based indicators it can be noticed that all expected underground wintering tunnels are secured – as none of the wintering tunnels (0 km) were secured before the project, after the project expected result is reached, there is all together 26 km of tunnels secured through controlled visitation with all entrances fenced and under security surveillance. Before the project we expected that we can influence at least 2000 persons who are way or other connected to the four hibernacula we did secure during the project. Number of such people before the project was 0 and taking into account our very successful and popular online web-camera that did show Pond Bats hibernation in Piusa caves, we have influenced 30 times more people than expected – at least 60 000 persons have been influenced by the end of the project. Result for influencing people on awareness raising on Pond Bat in the whole Estonia has been also very successful. Expectation was that at least 60 000 persons will be influenced by the project awareness raising activities, but due to all of the articles, interviews, exhibitions and campaigns we can quite surely say that at least 1,3 million people in Estonia have been influenced that is more than 20 times more than expected.

Estimation of the total length of the Pond Bat hibernacula that is suitable for wintering of that species was before the project 26 km and it was expected that all of that remain still suitable – result after the project is reached, all of that length is still suitable and due to safeguarding actions during the project even with much better conditions. Also first counting of wintering Pond Bats does show that there is a slight rise in numbers already – before the project it was about 760 individuals and after it is almost 865 individuals. Still, that number will start to show a real population reaction not before 5 to 10 years after the project end, as bats do not react so quickly. Overall species trend for Pond Bat in Estonia was unknown before the project and was expected to be stable after the project and so it is. Same with species status of Pond Bat – it was unfavourable-inadequate (UI) before the project and was expected to be favourable (FV) after the project and so it was reached.

Before the project there were directly involved with bat protection in project sites about 5 persons and we expected that we reach 25 persons to be involved after the project. Taking into account our very successful nature guide training we can say that this number is after the project at least three times more than we expected to reach, we have at least 75 persons involved now, about 40 of them are nature guides from the area of the project sites and others are either volunteers, bat experts or employees working in state institutions or in local governments and in ELF. Before the project there was only ELF actively involved as NGO dealing with bat protection in the project sites in Estonia and we expected that we can involve at least 3 more NGO-s by the end of the project. As a result of very successful activities during the project we did reach much more – by the end of the project we can say that at least 10 NGO-s are involved in bat protection and safeguarding in the project sites: 3 in Vääna (Humala), 2 in Vääna-Posti, 2 in Ülgase and 3 in Piusa. That estimation does still not take into account all NGOs involved in awareness raising, so, the result might be even bigger number.

Awareness raising on Pond Bat in Estonia through website has also been very successful. ELF bat website has been undoubtedly most popular among all sub-sites under ELF main website. It also applies to the Russian and English version of that sub-site. There was no bat website within ELF website system before the project and therefore also a number of individuals and unique visits was zero. We did expect that we reach about 15 000 individuals and 7500 unique visits by the end of the project but both of these numbers were exceeded highly – more than

76 000 individuals and more than 60 000 unique visits. Also the average duration in minutes that people stay on the bat webpage has been longer than expected, instead of 1 minute it has been about 1,35 minutes. Number of publications we did expect to be available either as printed versions or in digital format publicly downloadable was before project of course 0 and after planned to be at least 5, but we did reach at least double – 10 publications, as follows:

1. Report on the seasonal visitation flows in project sites (digital on website);
2. Report on the counts (digital on website);
3. Projects information leaflet (both digital on website and on paper);
4. Report on the replication of innovative solutions (digital on website);
5. Final report on ecosystem functions (digital on website);
6. Final report on ecosystem functions (digital on website);
7. Report on the restrictions to the entrances of hibernation sites of all four project sites (digital on website);
8. Layman's report (both digital on website and on paper);
9. Report of the effect of conservation measures on target species and on visitation (digital on website)
10. After-LIFE plan (digital on website).

On displayed information we did produce also more than expected – besides foreseen one information board for every project site (4 boards) we also did produce information plates to every fenced area (altogether at least 30 plates) and also two roll-ups (one in English and one in Estonian) with project information and introduction to Pond Bat. During the project we did produce almost three times more print media articles than it was expected – instead of 70 we did reach at least 180 articles (includes all type of printed material in any kind of media, newspapers, magazines etc). Also public awareness raising through public exhibitions was very successful in project – instead of planned one exhibition we did produce 4 of them and three of them will be travelling around Estonia after the project. Same kind of success was with training professionals – we planned to train 20 nature-guides, but did reach training 43 of them.

In economic outputs the project did show that some activities were more expensive than expected, but others also less expensive. For safeguarding hibernacula, we did elaborate such possible combination that set-up costs may be somewhat more expensive (depending on what is already existing in site), as there is a need to construct electricity infrastructure and install security systems, but that will alter running costs more than 10 times per site, compared to set up costs and keep them very low. So, we would calculate that running costs for all security systems for all four project sites, together with maintenance of fences would be around 17 000 EUR for two years (about 8500 EUR per year), but it still includes off-grid security system for one of the sites. The overall cost per year, for all four sites, if all sites would have permanent electricity infrastructure set, might be about 4000 EUR. To cover first two years running costs for safeguarding Pond Bat wintering in all four project sites we have successfully applied for funding from Estonian Environmental Investment Centre. That project for two years (1/01/2022 to 30/11/2023) has total budgets around 22 000 EUR, that covers costs needed to keep all security systems running in all four sites as well as maintain fences and information boards and plates. We have also elaborated a budget for After-LIFE plan (2022-2026) that will cover all needed activities during the five-year period after the project, including also most important public awareness activities. Overall budget of all these tasks to be fulfilled is according to our estimation about 70-80 000 EUR for the whole five-year period. That budget as well as the whole After-LIFE plan should still be discussed with stet institutions and be justified with Estonian Bat Conservation Plan for years 2022 to 2026.

7. Comments on the financial report

7.1. Summary of Costs Incurred

PROJECT COSTS INCURRED			
Cost category	Budget according to the grant agreement in €	Costs incurred within the reporting period in €	%
1. Personnel	358350	346264,86	96,6
2. Travel and subsistence	32700	19575,45	59,9
3. External assistance	343420	326513,01	95,1
4. Durables goods: total <u>non-depreciated</u> cost			
- <i>Infrastructure sub-tot.</i>	34550	90484,30	261,9
- <i>Equipment sub-tot.</i>	74000	74470,26	100,6
- <i>Prototype sub-tot.</i>			
5. Consumables	9100	9379,63	103,1
6. Other costs	56775	39984,45	70,4
7. Overheads	63500	63392,00	99,8
TOTAL	972395	970063,96	99,8

Individual (ELF ja ELM) and Consolidated Financial Statements are given in Annex 14.

7.2. Accounting system

The accounting systems of all beneficiaries allows for separating project expenses from other expenses. This was done using unique codes, which were associated with corresponding expenses (invoices, expense receipts) when registering expenses in the organisations' accounting. All beneficiaries adopted project-based accounting from beginning of the project.

ELF. All the project cost documents include a clear reference to the project – invoices the acronym of the project and project number as follows: EstBatLIFE LIFE16 NAT/EE/000710

Other cost documents (statements of expenditures and travel expenses) were marked with project stamp. Invoices were accepted when the title of the project as well as the financial code were marked on it. After receiving of the invoice, it was checked if there were the correct requisites and the reference to the LIFE project, as well as if it was in accordance with the project budget. Thereafter the invoice was signed by the project manager and approved by Member of Executive Committee. Only after that it is delivered to the accountancy and the payment was carried out. All the project entries in the ledger had a separate object identifier that allowed to see the project income and expenses. The LIFE project object identifier in accounting system in ELF was BAT-LIFE. Employees filled timesheets on daily basis, filling manually an Excel-based reporting sheet. Both LIFE template timesheet and ELF's own were in use. Timesheets recorded both the time spent on given project and total working hours of employee. Timesheets were checked and approved by the Chairman of Executive Committee during the first week of the following month as salaries were being paid by 8th day of the month. All the LIFE project staff members had agreements for the duration of LIFE project. The

original project documentation was kept at the accounting department and in the electronic document management system Folderit. Each year a yearly project budget was prepared and approved to follow the project expenses.

ELM. Unique codes identifying the project costs were in the accounting system. The code for EstBatLIFE costs was L60-18KIK14264. Cost approving procedures: Invoices and expense receipts (here and after cost document) were submitted to the project manager, who did check their accuracy and conformity with project requirements (incl. references to the project - number and acronym). The project manager did enter cost document into the internal document system and accepted it. In this system there was a separate field for project code and it was obligatory to fill it. After that the project accountant submitted the cost document for payment. Working trip order before the trip and report (incl. financial report and cost documents) after the trip were both approved by the director of the Museum. The system was electronic and it had also the obligatory field for project code. In addition, the explanation of the trip consisted project number and acronym. If it was not possible to add to the cost document project references the special project stamp was used. This was usually the case of gasoline bills and bus/train tickets. ELM project coordinator was working with load 0,34 and was filling also timesheets. They were kept manually and approved by the director of the ELM. Timesheets were regularly submitted to ELF financial manager.

7.3.Partnership arrangements

There was only one associated beneficiary and transactions from coordinating beneficiary to them have been done smoothly upon the request and after receiving relevant documentation. According to partnership agreement associated beneficiary delivered financial reports to coordinating beneficiary after every six months. Coordinating beneficiary compiled consolidated cost statement and delivered financial reports with project reports and according to Grant Agreement.

7.4.Certificate on the financial statement

Not relevant because according to updated LIFE rules, none of the beneficiaries are liable for an audit. None of them receives an EC contribution above €750,000.

7.5.Estimation of person-days used per action

Action type	Budgeted person-days	% of person-days spent
All projects when applicable Action A: Preparatory actions	300	93
NAT and CLIMA projects Action B: Purchase/lease of land and/or compensation payment for payment rights		
ENV projects Action B: Implementation actions		
GIE projects Action B: Core actions		
NAT projects Action C – Concrete conservation actions	70	155,2

Action type	Budgeted person-days	% of person-days spent
CLIMA projects Action C: Implementation actions		
ENV and GIE projects Action C: Monitoring of the impact of the project action		
NAT and CLIMA projects Action D: Monitoring and impact assessment	160	113,1
ENV and GIE projects Action D: Public awareness/communication and dissemination of results		
NAT and CLIMA projects Action E: Communication and Dissemination of results	627	60,0
ENV and GIE projects Action E: Project management		
NAT and CLIMA projects Action F: Project management (and progress)	1825	97,3
TOTAL	2982	91,3

INDEX of deliverables

**Technical design documentation (A1) / Construction drawings and building permits (A1)
– Annex 1**

**Report on the restrictions to the entrances of hibernation sites of all four project sites (C1)
– Annex 2**

Report on removed waste (C3) – Annex 3

Terms of reference for the monitoring (D1) – Annex 4

**Report of the effect of conservation measures on target species and on visitation (D1) –
Annex 5**

Preliminary report on socio-economic impact (D2) – Annex 6

Preliminary report on ecosystem functions (D2) – Annex 7

Final report on ecosystem functions (D2) – Annex 8

Final report on socio-economic impact (D2) – Annex 9

Report on the replication of innovative solutions (E1) – Annex 10

Layman's report (E1) – Annex 11

Training programme for the tourist guides (E4) – Annex 12

After-LIFE plan (F2) – Annex 13

Individual (ELF and ELM) and Consolidated Financial Statements – Annex 14

ANNEXES

- Annex 1.** Preparatory documents for C1 action works dated between 30/04/2020 and 31/12/2021. **Part of the deliverables within action A1 - Technical design documentation / Construction drawings and building permits.**
- Annex 2.** Report on the restrictions to the entrances of hibernation sites of all four project sites (*in Estonian*). **Deliverable within action C1.**
- Annex 3.** Report on removed waste (*in Estonian*). **Deliverable within action C3.**
- Annex 4.** Terms of reference for the monitoring. **Deliverable within action D1.**
- Annex 5.** Report of the effect of conservation measures on target species and on visitation (*in Estonian*). **Deliverable within action D1.**
- Annex 6.** Preliminary report on socio-economic impact (*in Estonian*). **Deliverable within action D2.**
- Annex 7.** Preliminary report on ecosystem functions (*in Estonian*). **Deliverable within action D2.**
- Annex 8.** Final report on ecosystem functions (*in Estonian*). **Deliverable within action D2.**
- Annex 9.** Final report on socio-economic impact (*in Estonian*). **Deliverable within action D2.**
- Annex 10.** Report on the replication of innovative solutions (*in Estonian*). **Deliverable within action E1.**
- Annex 11.** Layman's report. **Deliverable within action E1.**
- Annex 12.** Training programme for the tourist guides (*in Estonian*). **Deliverable within action E4.**
- Annex 13.** After-LIFE plan (*in Estonian*). **Deliverable within action F2.**
- Annex 14.** Individual (ELF and ELM) and Consolidated Financial Statements.