LIFE Project Number
LIFE14 IPE/FI/000023

Final Report
Covering the project activities from 01/01/2020[1] to 30/9/2022 corresponding to Phases 1-3

Reporting Date[2]
27/01/2022

LIFE PROJECT NAME or Acronym
FRESHABIT LIFE IP

Project Data

Project location:	FINLAND
Project start date:	01/01)2016
Project end date:	30/09/2022
Total budget:	19 960 476€
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Data Beneficiary

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[1] Project start date
[2] Include the reporting date as foreseen in part C2 of Annex II of the Grant Agreement

Package completeness and correctness check

perjantai 14. helmikuuta 2020 13.38

This table comprises an essential part of the report and should be filled in before submission. The evaluation of your report may only commence if the package complies with all the elements in this receivability check. The evaluation will be stopped if any obligatory elements are missing. All elements are expected in electronic version only.

Obligatory elements	**✓ or N/A**
Technical report	
The correct latest template for the type of project (i.e. integrated project) has been followed and all sections have been filled in, in English.	x
Index of deliverables with short description annexed, in English.	x
Interim report: Covers the phase concluded; Deliverables due in the phase being reported on (or due in previous phase(s) and not yet submitted) annexed. Final report: Covers the entire project duration (see instructions on exceptions to this in next page); Deliverables not already submitted with the Interim reports annexed including the Layman's report and after-LIFE plan. Deliverables in language(s) other than English include a summary in English.	x
Financial report	
The reporting period in the financial and technical reports is the same; the period corresponds to the duration of the phase being reported on. For the Final report, an additional consolidated financial statement covering the entire project duration is included. In the case of corrections / changes to costs submitted in a previous period: • An updated financial statement for the previous period is provided with the changes highlighted in a different colour; • The difference (+ or -) per cost category is included in the financial statement of the new period in the related cost category at the bottom in one single line 'changes to financial statement XX/XX/XX – XX/XX/XX'; • The auditor has validated the changes (if needed); • Explanations on the changes are provided in section 9 of the technical report.	x
Consolidated Financial Statement with all 5 forms duly filled in and signed and dated. *Preferred: electronic version signed with a Qualified Electronic Signature + full Excel file* *Alternatively, a pdf of the blue-ink signed* consolidated financial statement + full Excel files (the originally signed document should be kept by beneficiary in case of future audit).*	x
Financial Statement(s) of the Coordinating Beneficiary, of each Associated Beneficiary and of each affiliate (if involved), with all forms duly filled in. The Financial Statement(s) of Beneficiaries with affiliate(s) include the total cost of each affiliate in 1 line per cost category. *Preferred: electronic version signed **by each beneficiary** with a Qualified Electronic Signature + full Excel files.* *Alternatively, a pdf of the blue-ink signed* financial statement(s) + full Excel files (the originally signed documents should be kept by beneficiary in case of future audit).*	x
Names and other data (e.g. bank account) are correct and consistent with the Grant Agreement / across the different forms, and amounts are consistent across the different forms (e.g. figures from the individual statements are the same as those reported in the consolidated statement).	x
Beneficiary's certificate(s) included for beneficiaries claiming 100% cost for durable goods. *Preferred: electronic version signed with a Qualified Electronic Signature* *Alternatively, a pdf of the blue-ink signed* beneficiary certificate(s) (the originally signed documents should be kept by beneficiary in case of future audit).*	x
Certificate(s) on financial statement (if required, i.e. for beneficiaries with EU contribution ≥ 750,000 €) once the cumulative amount of payment requests reaches 325,000 €).	x

Preferred: electronic version signed with a Qualified Electronic Signature *Alternatively, a pdf of the blue-ink signed* certificate(s) on financial statement (the originally signed documents should be kept by beneficiary in case of future audit).*	
Other checks	
Clarifications and supporting documents requested in previous letters from the Agency.	N/A
This table, page 2 of the Interim / Final report, is completed - each tick box is filled in.	x
**original signature by a legal or statutory representative of the beneficiary / affiliate concerned*	

Instructions:

Please refer to the General Conditions annexed to your Grant Agreement for the contractual requirements concerning an Interim/Final Report.

The first Interim Technical Report shall report on progress from the project start-date; the following Interim Technical Reports shall detail progress during the Phase reported although where necessary a consolidated assessment of progress since the start of the project may be required, in particular when discussing the project's contribution to the targeted Plan / Strategy and progress towards the attainment of the project objectives. Final Technical Reports shall report on progress from the project start-date, except for sections 6.3 and 9.4 which may refer only to the final phase (in addition section 8 is not applicable to them).

Interim Reports must be submitted to the Agency as indicated in the Annex II. The Final Report must be submitted to the Agency no later than 3 months after the project end date.

Please follow the reporting instructions concerning your technical report, deliverables and financial report that are described in the document "Guidance on how to report on your LIFE 2014-2020 projects", available in the Reporting section of the LIFE website. Note the specific guidance given for financial reporting at the Final report stage.
Please download the guidance anew with each report to ensure you have the latest version as it is regularly updated. Additional guidance concerning deliverables, including the layman's report and after-LIFE plan, are given at the end of this reporting template.

Regarding the length of your report, try to adhere to the suggested number of pages while providing all the required information as described in the guidance per section within this template.

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List of key-words and abbreviations

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AB = Associated beneficiary
CB = Coordinating beneficiary
FD = Floods Directive
FH = FRESHABIT LIFE IP
FPM = Freshwater Pearl Mussel
GwD = Groundwater Directive
HBD = Habitats and Birds Directives
HD = Habitats Directive
PAF = National Prioritised Action Framework for Finland
TWG = Thematic Working Group
WFD = Water Framework Directive

Project beneficiaries
DocArt = DocArt Ky
ELY-centre(s) = the Centre(s) for Economic Development, Transport and the Environment
EPOELY = Centre for Economic Development, Transport and the Environment in Etelä-Pohjanmaa
ESAELY = The Centre for Economic Development, Transport and the Environment, South Savo
FANC = Finnish Association for Nature Conservation
GTK = Geological Survey of Finland
JAMK = JAMK University of Applied Sciences
JYU = University of Jyväskylä
KESELY Centre for Economic Development, Transport and the Environment for Central Finland
LAPELY = Centre for Economic Development, Transport and the Environment for Lapland
LSPHä = Etelä-Hämeen luonnonsuojelupiiri ry
LSPKe = Suomen luonnonsuojeliiton Keski-Suomen piiri ry
LSPPo = Suomen luonnonsuojeluliiton Pohjanmaan piiri ry
LUKE = Natural Resources Institute Finland
LUVY = Länsi-Uudenmaan Vesi ja Ympäristö ry
MH_LP = Metsähallitus Parks & Wildlife Finland
MH_MT = Metsähallitus Metsätalous Oy
MoE = Ministry of Environment
N2000 = Natura 2000
NoM = Finnish Society for Nature and Environment (Natur och Miljö)
OU = University of Oulu
POKELY = The Centre for Economic Development, Transport and the Environment, North Karelia
POSELY = Centre for Economic Development, Transport and the Environment in North Savo
ProPuru = Pro Puruvesi ry
Raase = Raseborgs stad / Raaseporin kaupunki
Saari = Saarijärven kaupunki
SMK = Finnish Forest Centre
SYKE = Finnish Environment Institute
UHEL_LBS = University of Helsinki, Lammi Biological Station
VARELY = Centre for Economic Development, Transport and the Environment for Southwest Finland
Vatten = Vattenfall Oy
VVK = Vanajavesi Foundation
WWF = Maailman Luonnon Säätiö - World Wide Fund for Nature, Suomen rahasto

Other key stakeholders:
MoAF = Ministry of Agriculture and Forestry
MEE = Ministy of Employment and the Economy
VNK = Prime Minister´s Office Finland

1. Executive Summary

tiistai 7. tammikuuta 2020 15.05

Introduction

Freshwater habitats are among the most threatened habitat types globally. Freshwater habitats are altered for human use such as land reclamation, water borne traffic and hydropower production, and further degraded by eutrophication and hydromorphological changes in water bodies and their catchments. Because freshwaters are dependent on the properties of their catchments and form a network, any freshwater body needs to be treated as a part of a larger entity. Additionally, changes in climate pose further risks for freshwater conservation status via changes in evapotranspiration and the growing demand for freshwater resources, as well as through changes in nutrient leaching and habitat suitability. Despite of the fact that northern Europe includes also pristine natural areas, most of the threats observed at global level are visible and obvious also in Finland.

Figure 1.1. Freshwaters are dependent on the properties of their catchments and form a network.

FRESHABIT LIFE IP (2016-2022) was the first Integrated LIFE project in Finland and the largest freshwater nature project thus far with a budget of ~20 M€. Project consortium consisted of 31 beneficiaries across different water and environment related sectors (water protection, nature conservation, forestry) in Finland. Using freshwater issues as a platform for testing cross-sectoral co-operation, we developed and demonstrated ways to implement the PAF for Finland. The project was planned based on the PAF FI 2014-20, but we included the lessons learnt into the updated PAF for 2021-27, and structured the project aims according to the current PAF FI 2021-27 in the final phase of the project. FH along with its' complementary projects addressed the linkage between the Habitats Directive (HBD) and Water framework directive (WFD) by operating inside or in the catchment areas of selected N2000 sites with water bodies included in the WFD. Actions implemented were strongly linked to the River Basin Management Plans for the years 2015-2021, in addition to implementing the national PAF. The main objective of FH was to enhance the improvement of the ecological and conservation status, and biodiversity of Natura 2000 freshwater habitats and species during and after the project.

Target regions of Freshabit LIFE IP:

1. Naamijoki
2. Ostrobothnia rivers: Ähtävänjoki, Isojoki
3. Vanajavesi

2. Ostrobothnia rivers: Ähtävänjoki, Isojoki
3. Vanajavesi
4. Koitajoki
5. Puruvesi
6. Central Finland: Etelä-Konnevesi, Päijänne, Saarijärven reitti
7. Karjaanjoki
8. Southwest Finland: Karvianjoki, Kiskonjoki.

Figure 1.2. Freshabit LIFE IP operated in 12 catchment areas arranged into 8 administrative project regions across Finland, and the project consortium consisted of 31 beneficiaries across different water and environment related sectors (water protection, nature conservation, forestry) in Finland.

Implementation of the PAF FI 2021-27 in the project

1 Horizontal measures and administrative costs related to Natura 2000

In order to improve the conservation status of freshwater species, habitats and ecological status of water bodies, we need actions on the catchment level, and cross-sectional cooperation among different administrative and operational actors and institutes. Freshabit enhanced the cooperation between different stakeholders within the public sector and most importantly between public, NGO and private sectors around freshwater issues. FH built up new coordination structures, models and networks for integrated planning, implementation and monitoring schemes for directives related to freshwater management in regional and national level, that are the long-lasting results of the project.

Management models and networks were piloted on eight regional networks of N2000 sites. Participatory approaches and methods have been developed to promote stakeholder engagement in site and regional level. Beneficiaries of FH have been active in planning the next River Basin Management Plans for the years 2021-27, and updating the PAF FI 2021-27. During the first two phases FRESHABIT progressed from plans to implementation of all concrete restoration actions in most project regions. These actions have already improved the state of streams, rivers, lakes, peatlands, and catchments of target water bodies. The concrete actions were finalized in the third phase. The implementation of Regional Water Protection Plans created in some regions continues after the project.

Examples of new methodologies and policy implications

- Our integrated catchment area planning action A1 has boosted the cooperation between actors involved in the assessment of nutrient loading from forested catchment areas and generated development of many new related modelling approaches,

- We produced and documented the operational model for the integrated multi-stakeholder planning for catchment area management of N2000 areas,
- Evaluation of ecosystem services and socio-economic benefits were being developed for freshwater habitats,
- The concept of the PAF has been made known to politicians and the public with concrete examples, such as using N2000 targets for raising money for building fish passes and catchment area restoration.

2a Natura 2000 site-related maintenance and restoration measures for species and habitats

In the freshwater section E 2.8 of the PAF FI 2021-27 headwater streams (HD habitat 3260) and springs (7160) are elevated as priority habitat types, assuming that other freshwater habitat types (streams and rivers, lakes) are largely considered by the implementation of the WFD. In addition, bird lakes and wetlands with a SPA status are addressed in the PAF FI 2021-27 section for other than habitat-related measures. According to our holistic view of management of freshwater bodies, and the fact that the previous PAF FI 2014-20 had been structured following a wider context, we operated in a wide array of freshwater habitats, testing and demonstrating the cooperation networks and method developed in the project for management of selected N2000 sites.

Restoration and maintenance measures results in N2000 sites:

- 752 ha restored peatland within N2000 sites
- 697 km reopened migration routes by constructing fish passes
- 7,4 km restored streams within N2000 sites
- 1 ha improved riparian zone
- 147 tons of removed cyprinid fish in 2 target lakes
- 38 700 ha improved N2000 lake habitat
- Revival of two to four FPM populations by captive rearing, developing methodology and capacity for domestic rearing that will pave the way for the use of similar methods for other populations,
- Ca. 76 ha of important riparian forest areas protected by METSO-program

In addition to the management plans and concrete restoration measures in N2000 sites, we also developed a Purohelmi nation-wide status model for headwater streams, that was finalized as complementary project to Action A5. The model improves the knowledge status of headwater streams considerably, giving a status forecast for more than 100 000 km of streams and thus improving the poor knowledge of headwater streams considerably, which helps in prioritizing for the restoration of streams.

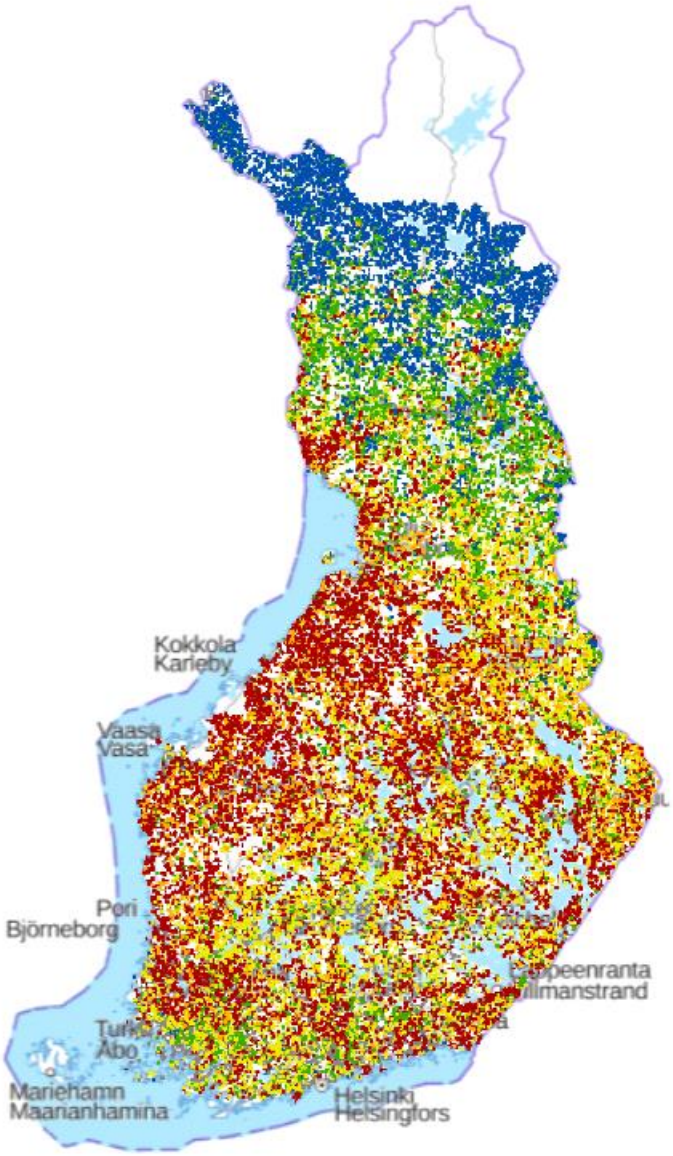


Figure 1.3. The Purohelmi headwater stream status model (2021) provides a forecast for the natural state of streams from severely modified (red) to natural (blue), covering the forested parts of Finland.

2b Additional Green infrastructure measures beyond Natura 2000 (further improving coherence of the Natura 2000 network, including in a cross-border context)

All measures implemented outside N2000 sites have been located in catchments of the target N2000 sites to complement measures implemented within those sites to improve the conservation status of habitats. For example, we restored a total of 17,6 km of streams, that were outside the N2000 site border but within the same stream network as our stream sites in the target N2000 sites. The measures are allocated to their respective N2000 sites in Annex 12.

Catchment area management outside the Natura 2000 network is the main measure for improving all freshwater habitat types. By combining LIFE and complementary funding we have improved water protection in 24 700 ha of catchments around the project N2000 sites, which is a very good start and an encouraging example.

New protected areas purchased or compensated for 144 ha of forest areas adjacent to, or at the catchment area of target N2000 sites. This is a complementary catchment area measure to ensure the status of the freshwater habitats in the target N2000 sites. Targeting forest protection into riparian forests of valuable N2000 water bodies was a pilot measure in the project, and, proven successful, this approach will be continued by other funding beyond the project.

3 Additional species-specific measures not related to specific ecosystems or habitats

Freshwater Pearl Mussel is a priority species in PAF FI 2021-27, with quantitative targets related to

population assessments and rearing to aid in the conservation measures for the species. FH focused on two populations with the aim to revive the viability of those populations by ex-situ rearing of juvenile mussels. As this proved to be much more difficult than expected, we ended up with setting up the first FPM breeding and rearing station in Finland. By the end of Freshabit we had the breeding and rearing facilities working well and the station has been enlarged and now serves the LIFE Revives project (CP004), which continues reviving FPM in Finland, Sweden and Estonia. The quantitative input of Freshabit to priorities related to FPM is rather small, but the qualitative input as a kick-starter for breeding and rearing FPM is huge. We also contributed to bird wetlands (SPA N2000 sites), which are another species-specific target in the PAF FI that is relevant in freshwater habitats.

Species of the HD Annex IV have had an effect on the implementation of Action C8 for bird lake and wetland restoration in many sites. Annex IV species, especially the moor frog are very common in such lakes and wetlands, and typically restoration plans need to be adjusted to secure their habitats and breeding sites. In addition, in places where the moor frog is found, the acceptable time frame for dredging is usually only during September. However, in general Action C8 restorations were carried out, although some modifications to the plans had to be made.

Key achievements and lessons learnt

Freshabit LIFE IP has enhanced the implementation of the PAF FI by increasing awareness of the plan, increasing cooperation between environmental sectors, building capacity for implementing it in national and local levels, providing guidance for participatory planning and implementation of measures in and around N2000 sites, and by demonstrating the implementation in regions across Finland. Lessons learned in the project are visible in many ongoing projects, as well as in preparation of new projects.

Freshabit has contributed to the implementation of the PAF FI in many concrete ways and by building the capacity for full implementation. We have implemented the PAF FI by concrete quantitative as well as qualitative achievements (Chapter 4.1). In terms of capacity building, we have improved the capacity of local and regional actors for implementing large nature conservation projects. At the national level, we have improved the cooperation between national institutes dealing with nature conservation, water protection, and forestry. Furthermore, we have raised awareness for the PAF and updated the plan, enhancing the inclusion of different sectors in the work. Finally, our impressive media coverage and environmental education has raised the awareness of the general public for freshwater conservation. Although no organizational or administrative changes have been made, the result of the improved common understanding can be seen in e.g. preparation for the application for the strategic nature project Priodiversity LIFE.

By combining LIFE and complementary funding we have improved water protection in 24 700 ha of catchments around the project N2000 sites, which is a very good start and an encouraging example. The network of complementary projects to FH grew from 4 M€ and 29 projects to 231 M€ and 103 projects by the end of FH, complementing the project in many ways from concrete site-related measures to method development and research, and utilizing funds from a variety of sources (Taba 1.1). These projects contributed importantly to implementation of the PAF via sharing the similar targets with FH. Most of the complementary projects have been finalized by the end of FH but many continue the work of FH after 2022. The biggest triumph for biodiversity is the national Helmi habitats programme for improving the conservation status of habitats in Finland, run by MoE with a total budget of 42 M€ and duration for 2019-2023. Helmi continues to develop and utilize some of the actions taken up in FH, for example stream and bird wetland restoration.

Table 1.1. A table of the complementary projects of Freshabit LIFE IP summarizing the funding and sources committed, and the types of projects and coordination mechanisms per each pillar in the PAF FI.

Pillar	**Source of funding**	**Amount committed by Final Report**
1. Horizontal measures and administrative costs related to Natura 2000	EAFRD, EMFF, ERDF, other EU, national private + public	49 541 462 €
2a. Natura 2000 site-related maintenance and restoration measures for species and habitats	LIFE, national private + public	84 409 242 €
2b. Additional Green infrastructure measures beyond Natura 2000	EAFRD, EMFF, LIFE, other EU, national public	78 473 709 €

3. Additional species-specific measures not related to specific ecosystems or habitats	EAFRD, LIFE, other EU, national private	18 293 332 €

Having a large consortium of 31 beneficiaries involved in the project was both a richness and a challenge. The richness of such a wide consortium was that each beneficiary had their own network of stakeholders, and these networks were efficiently utilized in communicating about the project aims, PAF FI, and N2000, as well as making things work for our benefit in the implementation of the planned measures. These networks also aided in finding the complementary project. Dissemination of experiences and results of Freshabit has also been very successful as a result of the wide project consortium. One reason for this was involving NGO's as beneficiaries, and another that we encouraged all 31 beneficiaries to communicate as much as possible. We have gained very good media visibility and presented our results in dozens of events, and Freshabit has been a very well-known brand in nature conservation and river basin management contexts.The challenge of a wide consortium is project management, when each beneficiary need guidance and overseeing in meeting with the demands for project management and reporting. In the beginning of the project the management team by the CB was evidently too thin, but we increased the staff in project management in MH_LP towards the end of the project.

Monitoring is one of the biggest challenges for nature restoration projects. In Freshabit we developed indicators in monitoring actions D1, D2, and D5 for monitoring the effects of all relevant concrete conservation actions, and more advanced indicators for selected sites. Even though we invested in planning of a monitoring scheme, and provided guidance for monitoring throughout the projects, monitoring was not fully implemented as anticipated in Freshabit. All beneficiaries did not reserve enough funding for even basic level monitoring, and coordination of the monitoring proved more challenging than expected. An additional challenge to demonstrating the impact of Freshabit is, that responses in nature typically take years, even decades after restoration measures. Some of the actions were implemented at a very late stage of the project, and the responses can only be seen years after the project. Our experiences in monitoring for such a large project have already proven useful for other projects, such as the Helmi habitats programme, and the Strategic Nature Project Priodiversity LIFE, currently in application phase.

Feedback to EC Policy units

Restoration of freshwater and wetland habitats has been done in Finland for decades and the basic methodology for doing it is tested to be successive, although method development is still needed to some extent to improve cost-efficiency. Catchment area management has only quite recently been realized to be equally, if not more important to improve the conservation and ecological status of freshwater bodies. From the policy point of view there is still quite a lot of work to be done for streamlining the environmental policy to other fields. Based on our experiences in Freshabit LIFE IP, our key messages for policy makers at the end of the project are:

- The PAF was a poorly known document in the beginning of the LIFE IP funding, but in Finland and evidently also in other member states the Nature IP funding has raised awareness of the PAF remarkably. However, there is still quite a lot of work to do to ensure the cross-cutting implementation of the PAF. In Finland this will be enhanced in the forthcoming Stategic Nature Project Priodiversity LIFE, if funding is granted.
- LIFE funding is targeted to environmental and climate actions. However, measures are needed in all fields of policy (e.g. agriculture, forestry, industry) to achieve the goals of environmental and climate strategies. LIFE IP funding has been a very good instrument for integrating the aims and strategies of different sectors in projects, and deserves to be continued with increased funding.
- In Freshabit we have worked for easily identifiable common goals by WFD and HBD for freshwater habitats. Such common goals could and should be identified between other policies as well. In general, policy making should be consistent in a way that the field support each other and controversial aims can be ameliorated and perverse incentives avoided. Strategic environmental projects can facilitate this work at the EU and national level.
- In Finland, and probably also in other member states, the Ministry for the Environment is too small a player to promote consistent policy making alone, and the common goals need to be set at the top level. In Finland we aim to do this n the forthcoming Strategic Nature Project Priodiversity LIFE by having the Prime Minister's office involved in the project, hopefully setting a good example for others to follow.


Life
NATURA 2000
FRESHABIT

Relation of Freshabit LIFE IP to PAF for Finland 2021-27

The objectives of Freshabit LIFE IP were:

1. to build up new coordination structures, models and networks for integrated planning, implementation and monitoring schemes for directives related to freshwater management, with emphasis on HBD and WFD, and demonstrate these in eight regional networks of N2000 sites
2. to improve the conservation and management, and sustainable use of freshwater habitats and species and related resources in N2000 sites by enhancing cooperation and commitment among administrative and operational actors towards the common task, and particularly by emphasizing the private – public partnership in implementing the tasks
3. to improve the conservation status and ecological status of freshwater habitats and related species in the eight selected regional networks of N2000 sites by restoration of freshwater habitats and their catchment areas
4. to develop and demonstrate methodology related to assessment, modeling and monitoring of freshwater habitats, species, ecosystem services and cultural heritage under the implementation of HD and WFD
5. to develop and test new biodiversity and ecosystem service indicators which can be used in and reported to both national and international observing systems, serving both monitoring and policy needs (e.g. IPBES, CBD)
6. to enhance sustainable use of freshwater resources by integrating conservation approach to ecosystem based entrepreneurship and improve education, training and awareness raising for natural, cultural and economic values of freshwater habitats.

The priority measures of PAF for Finland 2021-27 are divided under four Pillars following the main topics presented in the PAF:

- 1) Horizontal measures and administrative costs related to Natura 2000
- 2a) Natura 2000 site-related maintenance and restoration measures for species and habitats
- 2b) Additional Green infrastructure measures beyond Natura 2000 (further improving coherence of the Natura 2000 network, including in a cross-border context)
- 3) Additional species-specific measures not related to specific ecosystems or habitats.

The relation of Freshabit LIFE IP Actions and Complementary projects (listed in Annex 1) to project objectives and PAF Pillars is presented in the table below. Analysis of the impact of project Actions and complementary funding on implementation of the pillars is given in chapters 4 and 5.

Pillar	Action group	Freshabit LIFE IP objective	Description of activities	Supporting Actions within Freshabit	Supporting Complementary Projects
1. Horizontal measures and administrative costs related to Natura 2000	1.1 Site designation and management planning	2	Land purchase and compensations for nature reserves within and beyond N2000 (METSO and Helmi)	C10	CP088-90
1. Horizontal measures and administrative costs related to Natura 2000	1.1 Site designation and management planning	1, 2	Site management planning: NATA assessments, strategic management plans, regional water protection and management plans	A4, D6	CP010, CP051-52, CP064, CP069, CP079, CP082, CP088-90

1. Horizontal measures and administrative costs related to Natura 2000	1.2 Site administration and communication with stakeholders	1, 2	Participatory approaches to promote stakeholder engagement; e.g. site and regional level management planning	A3, A4, A10, F2	CP010, CP027, CP031-32, CP035, CP064, CP079, CP082
1. Horizontal measures and administrative costs related to Natura 2000	1.2 Site administration and communication with stakeholders	1, 2	Communication between stakeholders; assessment of water protection measures and ecosystem services, streamlining methods	A1, A2, A8, A10, D3, E10, F3	CP010, CP022, CP027, CP030-33, CP035, CP064, CP079, CP082
1. Horizontal measures and administrative costs related to Natura 2000	1.2 Site administration and communication with stakeholders	2	Development of national PAF-work coordination and communication	D6	-
1. Horizontal measures and administrative costs related to Natura 2000	1.2 Site administration and communication with stakeholders	1, 2	Project coordination by national and regional steering groups and thematic working groups	F1, F2, F3	CP099
1. Horizontal measures and administrative costs related to Natura 2000	1.3 Monitoring and reporting	1	Harmonization of reporting systems of habitats among HBD and WFD	A9	-
1. Horizontal measures and administrative costs related to Natura 2000	1.3 Monitoring and reporting	4	Development of assessment and monitoring methods for stream and lake habitats	A5, A6	CP011, CP014, CP071, CP074, CP076
1. Horizontal measures and administrative costs related to Natura 2000	1.3 Monitoring and reporting	4	Methodological development and testing of Earth observation methods	A2, A6	CP039, CP041, CP093
1. Horizontal measures and administrative costs related to Natura 2000	1.3 Monitoring and reporting	1, 4	Development of monitoring approach to freshwater restoration	A10, D1, D2, D5, D7	CP011, CP039, CP061, CP069, CP071, CP084, CP094, CP096
1. Horizontal measures and administrative costs related to Natura 2000	1.4 Remaining knowledge gaps and research needs	4	Mapping of species and habitats: new methods for field assessment and modeling of the status of stream and lake habitats	A5, A6	CP011, CP072-76, CP093
1. Horizontal measures and administrative costs related to Natura 2000	1.5 Natura 2000-related communication and awareness raising measures, education and visitor access	6	Visitor access to and visitor management in Natura 2000 sites	C11	CP012-13, CP019, CP028, CP038, CP059, CP065
1. Horizontal measures and	1.5 Natura 2000-related	6	Communication promoting the	A11, E1-9	CP012, CP019, CP028, CP030

administrative costs related to Natura 2000	communication and awareness raising measures, education and visitor access		values of Natura 2000 network		CP028, CP030, CP064, CP082, CP099
1. Horizontal measures and administrative costs related to Natura 2000	1.5 Natura 2000-related communication and awareness raising measures, education and visitor access	2	Developing new economic goods out of freshwater resources	A7	CP028, CP059, CP065
1. Horizontal measures and administrative costs related to Natura 2000	1.5 Natura 2000-related communication and awareness raising measures, education and visitor access	5	Developing new biodiversity and ecosystem service indicators	A2, D3, D4	CP096
2a Natura 2000 site-related maintenance and restoration measures for species and habitats	2.3a Bogs, mires, fens and other wetlands	3	Restoration of bogs and mires	C1	CP001, CP003, CP005, CP088-90,
2a Natura 2000 site-related maintenance and restoration measures for species and habitats	2.6a Woodlands and forests	2	Protection of riparian forests (METSO)	C10	-
2a Natura 2000 site-related maintenance and restoration measures for species and habitats	2.8a Freshwater habitats (rivers and lakes)	3	Restorations of springs, streams	C3, C4, C5, C6, C12	CP001-2, CP006-6, CP062-63, CP066-67, CP083, CP088-90, CP095, CP101
2b Additional Green infrastructure measures beyond Natura 2000 (further improving coherence of the Natura 2000 network, including in a cross-border context)	2.3b Bogs, mires, fens and other wetlands	3	Restoration of bogs and mires	C1	CP005, CP088-90
2b Additional Green infrastructure measures beyond Natura 2000 (further improving coherence of the Natura 2000 network, including in a cross-border context)	2.6b Woodlands and forests	2	Protection of riparian forests (METSO)	C10	-
2b Additional Green infrastructure measures beyond Natura 2000 (further improving coherence of the Natura 2000 network, including in a cross-border	2.8b Freshwater habitats (rivers and lakes)	2	Restorations of springs, streams, catchment area restoration, buffer zones	C1, C2, C4, C6, C12	CP005-6, CP021, CP032, CP040, CP046-58, CP062-63, CP066-67, CP070, CP083,

context)					CP088-90, CP095, CP101, CP103
3. Additional species-specific measures not related to specific ecosystems or habitats	3.1 Species-specific measures and programmes not covered elsewhere	3	Conservation of the Freshwater pearl Mussel by breeding and rearing	C9	CP004, CP098
3. Additional species-specific measures not related to specific ecosystems or habitats	3.1 Species-specific measures and programmes not covered elsewhere	3	Restoration of bird wetlands and active control measures of invasive alien predators	C7, C8	CP001, CP042, CP088-90

3. Administrative part

tiistai 7. tammikuuta 2020 15.16

(maximum 3 pages)

Coordinating beneficiary (CB)

MHLP has been the CB of the project. There have been three project managers in the project: Pauliina Louhi 1/2016 - 4/2018, Viliina Evokari 8/2018 - 12/2021 and Jari Ilmonen 1/2022 - 12/2022. Jari has been involved in the project since the preparation as a freshwater specialist and has steered it successfully to the end.

Though MHLP has been the CB in several traditional LIFE projects, the integrated projects concept was new to us in 2016. After facing administrational challenges in the first phase, it was evident that the CB did not have enough resources to manage such a massive project as FH and in the beginning of 2019 a planner was hired to assist the project manager in project reporting and other vital project management tasks. The management has continuously improved. In 2nd and 3rd phase the management has been fluent but laborious.

MHLP has grown with the task and is far better prepared for coordinating large strategic projects than on the beginning of FH. MHLP is currently coordinating also another Nature IP, Biodiversea LIFE IP (2021-29), and is applying for a Strategic Nature Project, and the lessons learned in FH are directly utilized in these projects. The coordination of traditional LIFE projects has also been boosted, as most of those coordinated by MHLP currently have at least one full-time project planner to help the project manager in administrational duties.

The cooperation between the coordinating/associated beneficiaries

Following means have been used to communicate within the project consortium:

1) *Project Management Core Team* was set up of the biggest beneficiaries: MHLP, SYKE, LUKE and SMK (2-3 members each). The core team has had 9-10 meetings annually. The Core Team has been the backbone of the project, discussing project progress and all major challenges, and project implementation in the regions (see bullet 5).
2) *Regional coordinators* were nominated to all eight target regions. Their responsibility was coordinating the regional actions. Monthly meetings together with the CB and regional coordinators were launched in the end of 2018 improving the internal communication of the project.
   The coordinators were: 1) Naamijoki: Esa Härkönen/Mika Puustinen (MH LP); 2) Pohjanmaan joet: Erika Raitalampi (EPOELY); 3) Lounais-Suomi: Pinja Kasvio/Tapio van Ooik/Katarina Pessa (VARELY); 4) Karjaanjoki: Juha-Pekka Vähä (LUVY); 5) Vanajavesi: Eeva Einola (VVK); 6) Keski-Suomi: Saija Koljonen (SYKE); 7) Koitajoki: Hannu Luotonen/Tiina Käki (POSELY); 8) Puruvesi: Pekka Sojakka (ESAELY). Coordinator changes in some regions posed some challenges in regional coordination, and it would be optional to have one person running the project from start to end.
3) *Annual F2F project meetings* have been held five times. F2F meetings could not be arranged in 2020-2022 due to COVID 19-restrictions so a webinar was organised instead in 2020. In every meeting, there have been 40-50 participants and almost all beneficiaries have been present. The programme have included financial and administrative guidance, thematic working group meetings, communications, current topics and half day field trip to see project actions. Since the amount of beneficiaries is so large, these face to face meetings have been vital for common discussions and internal communication. Therefore the COVID years did damp the team spirit somewhat and the unity of the project tended to fade a little towards the end.
4) *Thematic Working Groups were e*stablished around
   - communication and education
   - environmental modelling and water basin restoration
   - environmental and socioeconomic monitoring
   - inventory of lakes and streams
   - stream habitat restoration (including actions involved with freshwater pearl mussel)
   - bird wetland habitat restoration.

   Thematic working groups had participants from each relevant region, as well as the Core team, and they provided a good channel for knowledge sharing between project regions. Thematic working groups have been highly important in bonding together all 8 regions as one large LIFE IP-project. Most of these group met once or twice a year, and some of them even more often depending on actions needed. During the course of the project, however, it became evident that the thematic group for inventory of streams and lakes had little value as the respective actions

were not dependent on each other, and the group was discarded in the third phase. The other groups were more relevant, especially the groups for stream and bird wetland restoration.

5) *Regional steering committees* were set up, and meetings were arranged via Teams and F2F to discuss project implementation, reporting, monitoring and impacts in each region. All the beneficiaries of the region have participated in the meetings. Members (1-2) from the Core Team were also assigned in each regional steering committee. This proved successful in facilitating the communication between regions and project management.
6) *CB-AB meetings* were arranged with every beneficiary in the last phase. In the meeting the progress of the actions and budget of the CB were discussed. In Dec 2021 - Jan 2022 we arrange face-to-face meetings in each region, involving the CB management team and members of the Core Team, and representatives of regional AB's. During the meetings we collected data for the Final Report, After LIFE plan, and socio-economic impacts of the project and discussed project implementation and value. The timing for these meeting ca. 9 months before the end of the project was very good and we collected useful material for the FR.
7) *Financial reporting info hours* have been arranged annually to all beneficiaries to guide in filling of the Financial sheets and give information about audits etc. These meetings have been both necessary and useful, and the capability for financial reporting has improved fundamentally during the project.
8) *E-mails, phone, and one on one meetings* have been in constant use when beneficiaries have needed extra help.

Partnerships and their added value

The beneficiaries involved in this project implement the PAF in many ways in Finland. The partnership is exceptionally wide including governmental organisations, research institutions, cities, companies, water protection associations and environmental NGO´s. National research institutes, such as SYKE and Luke, provide guidance and monitoring for the PAF priority measures for all habitats. ELY centres and SMK implement the measures, and associations participate in implementation and communication. Local water protection associations implement the water-related measures in their own area. Though management of such a large consortium is sometimes taxing, the benefits exceeds the burden. The implementation of catchment area management of N2000 sites requires collaboration between several stakeholders, but SMK is a key player in privately owned forest areas. Our diverse consortium has shown its force e.g. in communications (over 500 media articles) and complementary funding (231M€).

One concrete example for the efficiency of the project network is in rivers Karjaanjoki and Kiskonjoki (Lounais-Suomi), where the ecosystem integrity has been broken for several decades by hydropower dams. There have been several attempts to improve the co-operation between local stakeholders in previous decades but without success. In both regions, it has been recognized that FH has acted as a long-needed facilitator to go forward in the otherwise locked situation. The funding from EU was a positive sign of trust to other investors to fund the actions needed in their own area. We could also reconcile between different priorities, such as considering the potential cultural heritage values in the construction phase in a way that was acceptable for all. Without FH, the fishways would have not been constructed in upcoming years.

A social network analysis survey made in 2018 shows that the collaboration between beneficiaries is an active web (Figure below). Threads mark the identified connections between beneficiaries, and the size of the circle the relative importance of the beneficiary. The role of the Core team (MH_LP, SYKE, LUKE, SMK) is clearly central. Communication between beneficiaries working in different regions has been rather low, which is something that should be developed. We see that he best way to do this is to have more F2F events. It is also noteworthy, that the role of MoE, the Ministry coordinating the implementation of the PAF, was considered very minor in the analysis. This is discussed further in chapter 4.5.

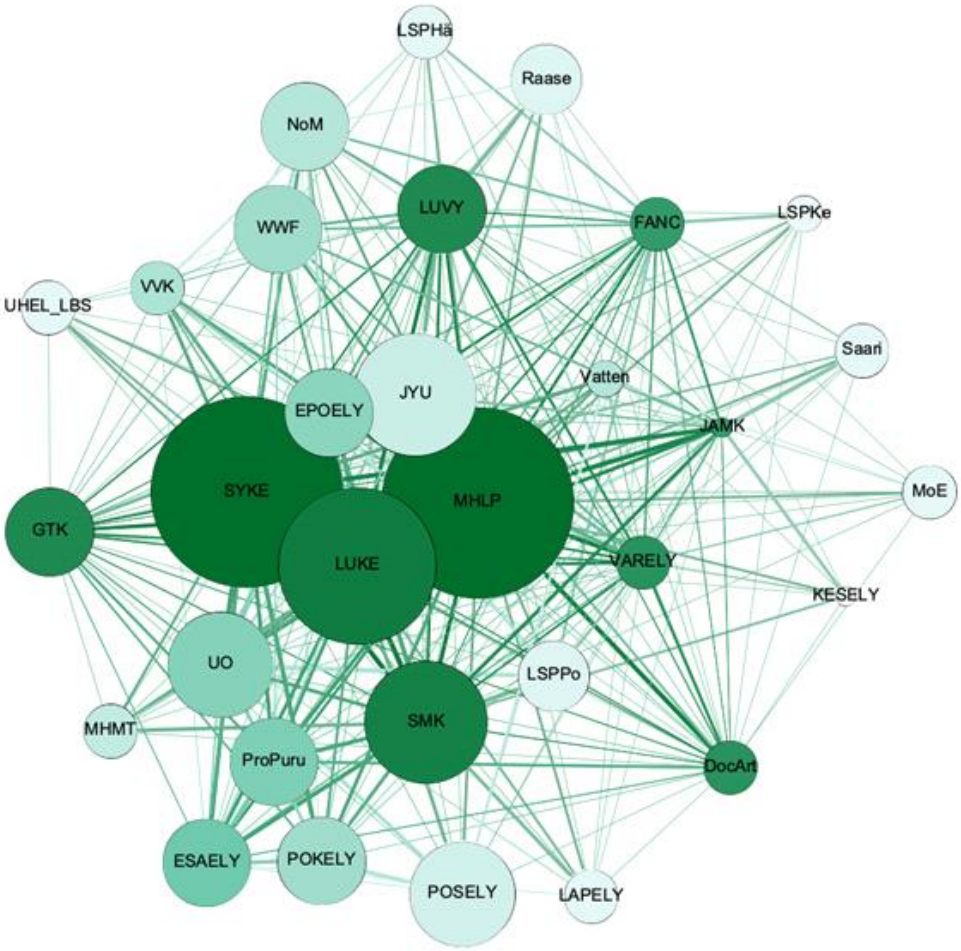


Figure: The visualisation from the social network analysis shows an overview of the frequency of collaboration among beneficiaries.

Stakeholder involvement

FH stakeholders include national authorities, research institutes, environmental organizations, interest groups and other associations both in national and regional/local level, and universities. We have beneficiaries from all types involved in the project. Other main stakeholders have participated either in the project steering committee at the national level or one of the eight steering committees at the regional level. The project steering committee consists of representatives of the most relevant ministries, from each of the organizations in core group and target areas, and other national stakeholders. Stakeholders have shown great interest towards FRESHABIT -project. This committee has met 1-2 times annually (8 times in total), and the committee reviewed and accepted a preliminary version of the FR in the beginning of December 2022. See Action F2 for more details.

Each region (8 pcs) has established their own Regional Steering Committee (F2) to ensure the fulfilling of project objects and stakeholder involvement at the regional level. The meetings have been held 6-12 times depending of the needs of the target area. Regional steering committees consist of regional associated beneficiaries, and other relevant regional authorities, universities, major regional co-financers for LIFE-IP itself and complementary projects. The 1-2 representatives of core team have also regularly taken part to the meetings of Regional Steering Committees.

Involving the relevant stakeholders at the policy-making level has been a challenge. We have approached ministries and other stakeholders responsible for different funding sources, but the impact in the national level has not been as big as we had hoped for. Locally FH has been seen as a very efficient booster for attracting complementary funding, however. For example, funding from the national source for fish passes was directed to FH target sites by MoAF, when it became evident that the fish passes were likely to be completed by sufficient funding. Coordination between funding sources has also improved in benefit for future projects (see chapters 4.4-4.5).

Having both a national and several regional steering committees has enhanced the visibility of FH and awareness-raising for PAF considerably. In the end of the project a one day seminar was organised to disseminate the project results to key stakeholders. There were ~170 participants in the seminar,

including ca. 120 virtual participants. Members of the steering committee and most relevant other stakeholders were invited in the live event at the House of the Estates in Helsinki.

Complementary Projects

A large project consortium has been an asset in the launching of new complementary projects. The process has been quite organic and resulted in impressive amount of 103 complementary projects. Most complementary projects have emerged from identified needs by one or several beneficiaries. The CB has been responsible for overall monitoring of the complementary projects. Usually, at least one of the FH beneficiaries has been a partner in the complementary project, ensuring communication and cooperation between the projects.

The sheer amount of complementary projects makes it challenging to monitor. The requirements for reporting the complementary projects have substantially increased in the final phase of the project, including information that has not been collected during the implementation of the project. Also the concept of complementary projects and their linkage to the LIFE project has evolved since the application phase. Therefore we have had to apply the guidance to meet the data that has been collected (see chapter 5).

Communication with the Agency and Monitoring team

There have been quite a lot of changes in the project monitoring. In the beginning of the project, NEEMO-representative Sonja Jaari was assigned to be our technical monitor, and Katja Lähdesmäki as our second monitor. Since late 2017, Milka Parviainen took over the first-hand monitoring of our project. In January 2019 Sonja Jaari returned and Camilla Strandberg-Panelius started as our second monitor. In addition, IP projects have been handed over from DG Envi to EASME in February 2018 and the again from EASME to CINEA in April 2021. From our point of view, the communication has functioned well between us and the project monitor. She responds to contacts fast and is always willing to make queries to CINEA in case she doesn´t have answers available. Sometimes it has been, however, a bit challenging to get prompt responds from CINEA. FRESHABIT has had 11 monitoring missions between 2016-2022. These monitoring missions have been very informative and given an excellent opportunity to discuss the problems or uncertainties encountered, especially when CINEA has been present. During most missions we have also had the chance to review the implementation of the project in the field. Yearly missions are a very good way to communicate between the project and the Agency.

Overall, we are happy to report and explain how we have spent the 12 M€ received from the commission. However, being among the first LIFE IP projects we have also had to pay some extra effort for the evolving guidance by the Agency. In the IP seminars and platform meetings there has been a lot of talk about IP projects being more flexible and less bureaucratic than traditional LIFE projects. We feel that these words have not fully turned into practise, as the IP's have been treated like traditional projects in many cases considering administration and reporting. Sometimes when asked for clearer guidelines we have received more reporting requirements instead. Seeing the big picture behind the minor details we need to give in the reporting has been challenging at times. However, during the course of FH, many things have evolved positively. For example, adopting the Pillar approach to monitor the implementation of the relevant plan in 2020 has been a very good improvement.

The changes in administrative issues due to amendments to the Grant Agreement

New associated beneficiary Metsähallitus Metsätalous Oy was incorporated to the project since April 15, 2016 in Amendment No. 1. This change was due to the new Act on Metsähallitus, which came into force on April 15, 2016. There were no changes in the overall project costs, because the budgetary share of the new associated beneficiary was taken from the budget of Metsähallitus Parks and Wildlife Finland.

Challenges and lessons learned from project management

Building of functional communication channels in such a big project has taken time and has not been fluent in all cases. Collecting information from CBs for reporting and monitoring is always a challenge and laborious task when there are 31 beneficiaries from different kinds of organisations. In the beginning of the project we struggled to find a common workspace available to all beneficiaries, but this was solved in a satisfactory way using an external sharepoint service by MHLP.

We have learned that most effective way to communicate and collect information about project progress is having F2F meetings. Also we have invested in good guidance (documents, virtual infos, regular meetings). In the end, we're lucky to say that project management have been mostly fluent and most of the AB's reply to CB's requests well on time.

The positive side of having many beneficiaries of variable size and mission is that they have all brought their own networks along in implementing FH. This has made it easier for us to distribute the methods and messages of FH. Beneficiaries have also boosted our communication a great deal, having contacts and approved status locally. A very good example of local awareness raising is Pro Puruvesi, which focused on media in their region, resulting into an impressive 40% share of all FH media attention (see Action E1).

Our initial approach to invite regional proposals for FH in the application phase was also a success in some sense, although reviewing and evaluating the proposal was a huge task. The result of this approach was, however, that all project regions were based on actual need realized at the regional level. We have encouraged the approach for asking for proposals from pre-selected actors or regions for other projects prepared during 2016-22.

Audit costs were hugely underestimated on our behalf in the application. We did not realize that the audit was to be made after each phase, and the initial sum for one audit for too low, too. By the end of the project, ~100 000 € of Freshabit budget has been used for the audits. Auditing has become smoother, however, as a result of improved guidance and support to financial reporting from the CB to ABs.

We can conclude, that implementing FH among the first LIFE IPs has been a learning process for both FH beneficiaries and the Agency. Guidance for project implementation and reporting has evolved many times during the project, which has been frustrating and time-consuming at times. In the end it seems that both sides are content, however, as new IPs have been applied for and initiated, and the Agency has launched a new format for Strategic Nature Projects.

4. Project impact and analysis of contribution to implementation of the Plan

torstai 22. syyskuuta 2022 10.03

Summary and a roadmap to implementation of the PAF FI 2021-2

An analysis of the project implementation to the PAF FI is given in this chapter, covering the quantitative and qualitative environmental benefits, socio-economic benefits, replication/transferability aspects and capacity building elements of Freshabit LIFE IP. The PAF FI was updated during the project, and all reflections at the end of the project are made to the current PAF FI 2021-27.

First, we present **a roadmap of the full implementation of the PAF FI 2021-27** based on Freshabit results, current strategic framework and the most relevant ongoing projects in Finland.

Background:

- **Freshabit LIFE IP** (2016-22) has implemented a small portion (<5%) of the defined quantitative targets of the PAF FI 2021-27, concentrating on freshwater habitats and their catchment areas,
- **Biodiversea LIFE IP** (2021-29) aims to enhance the protection of marine nature and promote the sustainable use of natural resources in the marine and coastal areas of Finland,
- **Capacity building and guidance** provided by Freshabit will be utilized in forthcoming projects and other national implementation,
- **Projects after Freshabit** will build upon and continue the implementation regionally (TRIWA LIFE, 2023-30), thematically (LIFE Revives, 2021-29; Biodiversea LIFE IP, 2021-29), or by using a wider strategic approach (Priodiversity LIFE, 2024-31 [*in application phase*]),
- **The Helmi habitats programme** is the most important current national funding source for habitat restoration (peatlands, forests, bird wetlands, agricultural habitats, head water and shore habitats) up to 2030, but is dependent on budget allowances by each government,
- **PAF is updated** every 6 years,
- The **EU BD strategy** for 2030 accompanied with proposed regulation, and the **CBD COP15 framework** for 2030 apply additional pressure on nature conservation with wider targets than those included in the PAF FI 2021-27,
- Responding to the international strategies requires **increasing the national funding, and more efficient use of EU funding for nature**,
- **National implementation** is dependent upon the goals set for each reign period of the Finnish Government, and the yearly budgets by the Finnish Parliament, while projects run mostly independently of the state budget, but usually implement rather limited selections of the strategies,
- Pressure will be put on the **forthcoming governments** for securing the resources for full implementation of the PAF FI and the international strategies.

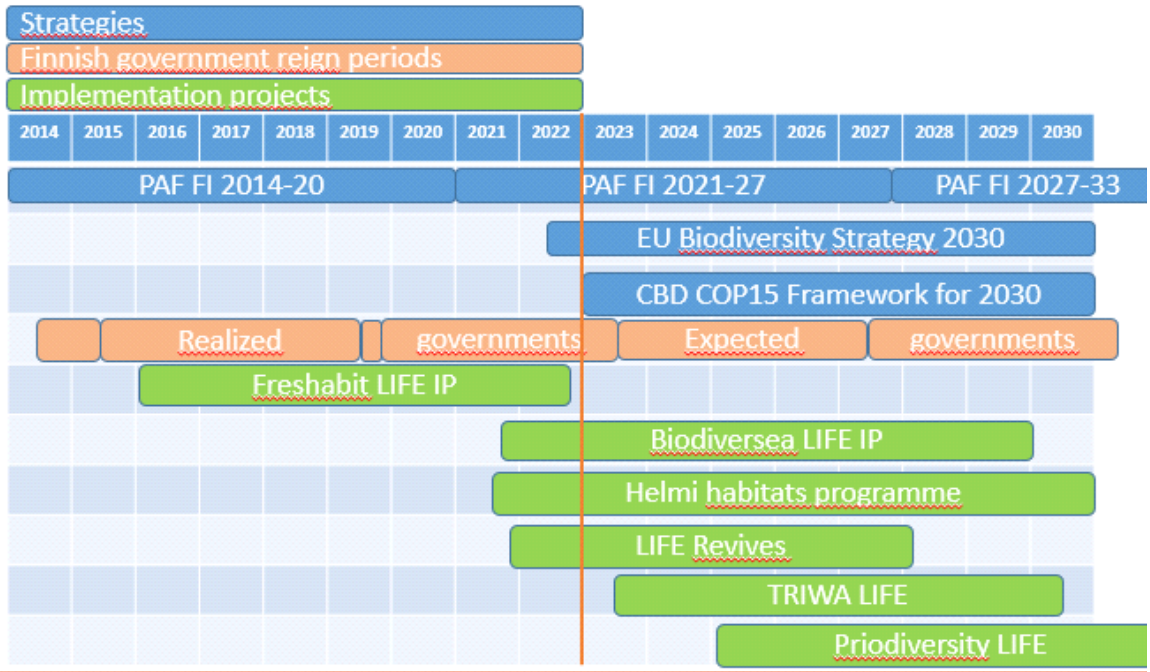


Figure 4.1. A roadmap and a timeline for strategies, governmental reign periods, and the most important projects implementing the PAF FI during 2014-2030.

4.1 Environmental benefits

4.1.1 Direct/quantitative environmental benefits

The linkage of Freshabit Actions and objectives and complementary projects to the priority themes (Pillars) in the PAF FI 2021-27 is outlined in chapter 2. The quantifiable results of the project are summarized below by Action and separated between impacts inside or outside Natura 2000 sites in the project. The results are also presented for each N2000 site in Annex 12. Those actions that have been implemented outside N2000 sites are in the catchment areas of target N2000 sites, and have been allocated to the respective site in Annex 12. The quantitative achievements of Freshabit are presented and discussed below following the pillars/thematic chapters of the PAF.

Pillar 1 (chapter E 1): Horizontal measures and administrative costs related to Natura 2000

- A3+A4: plans for future implementation in Natura 2000 catchments for 236 450 ha
- A6: 55 ha inventorized lake habitat within N2000 sites
- C10: 41 ha protected riparian forest within N2000 sites.

We have made management plans for five N2000 sites following the normal procedure of participatory planning (deliverables A4.1.1, A4.3.1-3, A4.5.2), and one NATA assessment (additional output D7.3). There are no quantitative goals for these in the PAF, but they are tools in the site management and assessment that need to be updated. All available NATA assessments have also been utilized in impact assessment of the project in deliverable D7.1 (Impacts of restoration actions on the ecological status of water bodies and on the conservation status of Natura 2000-sites in Freshabit LIFE IP -project). Management of N2000 sites is statutory and each site is assigned to either Metsähallitus or one of the regional ELY-centres.

Regional water protection plans (RWPP) prepared in Freshabit Action A4 are wider than management plans for Natura 2000 sites. Management plans are typically made for single N2000 sites and they comprise actions that are targeted within the N2000 site. In RWPP's the scope is wider, encompassing and reconciliating for land use and other activities in the catchment are on the target N2000 site, such as e.g. regulations for fishing in a given catchment (see A4.5). The process of preparing the plan is participatory in a similar manner as the N2000 management plans. RWPP's were made for four N2000 sites, some comprising management plans as part of the outcome (deliverables A4.1 for Arvajan reitti, A4.2 for Karjaanjoki, A4.4 for Saarijärven reitti, A4.5 for Isojoki). The implementation of the RWPP's is coordinated jointly by the regional ELY centres and SMK, utilizing available funds for nature conservation, river basin managements, and sustainable use of forests.

Biotope inventories are generally prioritized for terrestrial and marine habitats, but not freshwater

habitats in the PAF FI chapter 1.4. However, we consider the habitat assessment and monitoring methodology developed for lake habitats in Action A6 useful for the general assessment and monitoring of N2000 network. Our results provided new information and a monitoring method on lake habitat type 3110. The process, results, and potential for wider use are documented in deliverables od Action A6, and collected as an ArcGIS Online storymap under deliverable A6.2.1.

Land purchase or compensation is something that is needed to ensure the conservation of privately-owned areas within the N2000 network. We have protected 41 ha of such sites in the project, while the total need foreseen in the PAF is ca. 200 000 ha. However, our Action C10 was a pilot for targeting measures by the Forest Biodiversity Programme for Southern Finland (METSO) to riparian forests of valuable freshwater habitats, and we had very positive experiences in involving the local forest management associations. As an experiment targeted on riparian forest, the results were very positive for future implementation. Continuation of this measure is foreseen by ELY-centres, and METSO funding targeted to riparian forest protection has become recently available.

Pillar 2a (chapter E 2): Natura 2000 site-related maintenance and restoration measures for species and habitats

- A5: 48,9 km inventorized streams within N2000 sites
- C1: 752 ha restored peatland within N2000 sites
- C3: 697 km reopened migration routes by constructing fish passes
- C4+C6: 7,4 km restored streams within N2000 sites
- C5: 1 ha improved riparian zone
- C8: 147 tons of removed cyprinid fish in 2 target lakes
- C1-8: 38 700 ha improved N2000 lake habitat by C actions.

In the freshwater section E 2.8 of the PAF FI headwater streams (HD habitat 3260) and springs (7160) are elevated as priority habitat types, assuming that other habitat types are largely considered by the implementation of the WFD. For headwater streams the generally poor level of knowledge is pointed out, and the amount of 1 000 km of streams is proposed to be inventorized within the N2000 network. Restoration goal for PAF FI 2021-27 is 150 km of streams within the N2000 network. We have implemented ca. 5% of the inventory goal in Action A5 and 5% of the restoration goal in Actions C4 and C6 in Freshabit. However, the Purohelmi nation-wide status model for headwater streams, that was finalized as complementary project to Action A5. The model improves the knowledge status of headwater streams considerably, giving a status forecast for more than 100 000 km of streams and thus improving the poor knowledge of headwater streams considerably, which helps in prioritizing for the restoration of streams. Also, given that the Helmi habitats programme (CP088-90) has a goal of restoring of further 200 km of streams within conservation areas by 2030, it seems that the goals for conservation areas can be reached, if resources for Helmi are secured.

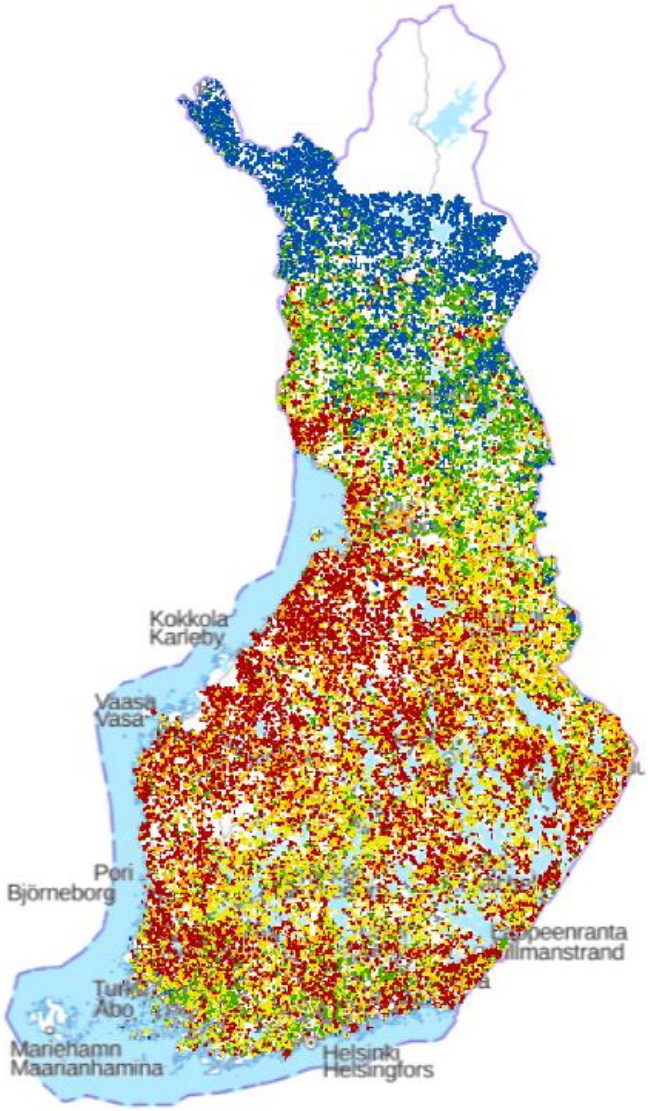


Figure 4.2. The Purohelmi headwater stream status model (2021) provides a forecast for the natural state of streams from severely modified (red) to natural (blue), covering the forested parts of Finland.

We had six target N2000 lakes that are protected for other values than birds. These are influenced by their respective catchments and need measures in the lake as well as catchments to maintain or improve their ecological status. In the Naamijoki region, the water level in two lakes has been raised as part of the hydrological restoration of the headwater section of Naamijoki, and Vaattojärvi has been managed for symptoms of eutrophication by mowing and fishing. In Pohjanmaan joet region the water level in one lake was also raised as part of a hydrological restoration in the headwaters of the Isojoki river. We also included four larger lakes as an impact area for our actions to improve or maintain their ecological status and conservation status as HD habitat types and N2000 sites, and all these lakes require more actions in their catchments. Lake Rutajärvi in the N2000 site FI0900074, and lakes Kukkia (FI0328004) and Ormajärvi (FI0325002) in the Vanajavesi region have rather large catchments and our measures have a relatively small impact on their current ecological status. Lake Puruvesi was a single target region in our project, and is considered to be mostly in good or excellent ecological status. However, yearly algal blooms and excessive reed growth and sedimentation in the bay areas have raised concerns about deteriorating ecological quality and conservation status, even though the central areas are still in excellent status. Our actions aimed to stop this trend, but as all problem areas could not be addressed in one project, more actions are demanded. To conclude, especially the four largest lakes considered as impact areas for FH measures cannot be considered ready, but the work has been started and will be carried in other projects. Declining status trends for large lakes cannot be reversed quickly. Measures and impacts on these lakes are dealt with in deliverable D7.1.

The other Actions can be considered as supplementary to the targets to improve the water quality in the forthcoming planning period 2021-27 for the implementation of WFD in Finland. Peatland restoration in Action C1 also implements the priority measures set for peatlands in PAF FI E 2.3.

Pillar 2b (chapter E 2): Additional Green infrastructure measures beyond Natura 2000

- A5: 85 km inventorized streams outside N2000 sites
- C2: 24 700 ha restored catchment outside N2000 sites
- C4+C6: 17,6 km restored streams outside N2000 sites
- C10: 144 ha protected riparian forest outside N2000 sites.

All measures implemented outside N2000 sites have been located in catchments of the target N2000 sites to complement measures implemented within those sites to improve the conservation status of habitats. The measures are allocated to their respective N2000 sites in Annex 12.

As explained above, headwater streams are a priority habitat in the PAF FI freshwater section E 2.8. Inventory target for streams is 3 000 km and restoration target 1 000 km outside the N2000 network. In Freshabit we have implemented 2,8% and 1,8% of these targets, so a lot remains to be done outside the N2000 network. These results are understandable, however, regarding that Freshabit was a Nature LIFE project targeted on N2000 sites, and the main work for targets outside N2000 network needs to be done by other funding. During 2016-22 another 1095 km have been inventoried outside N2000 sites by complementary funding, based on the data in the SAKTI system maintained by Metsähallitus. The Helmi habitats programme (CP088-90) has a goal of restoring of further 400 km of streams within conservation areas by 2030, but still other funding is needed to fulfill the target. In addition to Helmi, funding from especially sources related to fishery management is available for stream restoration (e.g. EMFF, national funding by MoAF).

Catchment area management outside the Natura 2000 network is the main measure for improving all freshwater habitat types in the forthcoming planning period 2021-27 for the implementation of WFD in Finland, and catchment area management is of utmost importance also for marine habitats. A goal for 1 000 ha of catchment area restoration for headwater streams is presented as a prioritized measure in PAF chapter E 2.8, and the whole package of additional measures in river basin management plans of the WFD is also included in the priority measures for freshwater habitats. By combining LIFE and complementary funding we have improved water protection in 24 700 ha of catchments around the project N2000 sites, which is a very good start and an encouraging example. The management plans and regional water protection planes conceived (A3+4) are demonstrations of the multi-stakeholder planning for catchment are management of N2000 areas, documented in Action A10, will help in planning and implementation of catchment area restoration.

In addition, we have purchased or compensated for 144 ha of forest areas adjacent to, or at the catchment area of target N2000 sites. This is a complementary catchment area measure to ensure the status of the freshwater habitats in the target N2000 sites. All sites are under permanent protection targeted on forest habitats, but protecting also the adjacent freshwater habitats from negative effects by forestry measures.

Pillar 3 (chapter E 3): Additional species-specific measures not related to specific ecosystems or habitats

- C7: 1036 ha improved bird lakes and wetlands
- C9: Two populations of Freshwater Pearl Mussel saved from immediate extinction by rearing

Bird wetlands and lakes have been set as one priority for the species perspective in chapter E 3.1.2 of the PAF FI. The measures for bird wetland restoration are often recurring. The total area of the bird wetlands included in Natura SPA-network group to be improved in PAF FI 2021-27 is 84 611 ha. We have improved the status of bird wetlands and lakes in 11 N2000 sites covering 1 036 ha, which is 1% of the target. In addition to direct restoration measures, incoming water quality has been suggested to be improved by constructing 900 ha of multifunctional wetlands in the catchments, and we have completed 180 ha in the catchments of target bird wetland N2000 sites. National funding has become available in the Helmi habitats programme (CP088-090), and there are plans to restore ca. 80 bird lakes by the year 2024, and 200 by the year 2030, which covers ca. 95% of the need indicated in the PAF FI 2021-27. Measures and impacts on these lakes are dealt with in deliverable D7.1.

Freshwater Pearl Mussel is a priority species in PAF FI chapter E 3.1.1, with quantitative targets related to population assessments and rearing to aid in the conservation measures for the species. In Freshabit we focused on two populations with the aim to revive the viability of those populations by ex-situ rearing of juvenile mussels. As this proved to be much more difficult than expected, we ended up with setting up the first FPM breeding and rearing station in Finland. By the end of

Freshabit we had the breeding and rearing facilities working well, albeit a number of difficulties was met during the set-up phase, and the two primary target populations were revived by thousands of juvenile FPM. The station has been enlarged and now serves the LIFE Revives project (CP004), which continues reviving FPM in Finland, Sweden and Estonia. Two additional rearing stations are proposed to be set up in PAF FI. Rearing of FPM in Action C9 was complemented by stream habitat restoration and fish passes in Actions C3 and C4. The quantitative input of Freshabit to priorities related to FPM is rather small, but the qualitative input as a kick-starter for breeding and rearing FPM is huge.

4.1.2 Qualitative environmental benefits

Based on the latest available (2013-18) Article 17 report for the Habitats Directive, the status of all freshwater habitat types remains at an unfavourable level in the boreal biogeographical region of Finland. The trend for all freshwater types is constant, so no real improvement is expected for the next reporting season (2019-24), which covers half of the operating period of Freshabit. The reasons for this are, that land use changes in the past decades have been massive, and their effects cannot be cancelled within a few years, or even decades. Turning the trends toward approaching favourable conservation status also demand big changes in land use and management outside conservation areas. In Freshabit the largest areal coverage of conservation measures was achieved outside N2000 sites, aiming to improve the water quality in the target N2000 water bodies, thus providing a good example and demonstration of catchment area measures for Natura 2000. We provided pilot cases and guidance (e.g. deliverable A10.2) for measures taken outside N2000 sites in Freshabit, and the Regional water protection plans prepared in Freshabit Action A4 provide plans ready for implementation for four catchments. Moreover, improvement of catchment area water protection in an increasing topic of discussion, e.g. by changing the harvesting processes in forestry. To summarize, the trends for habitats turn slowly, but positive changes can be seen. As serious goals are being set internationally (CBD COP15 and the EU regulation on restoration), this demands actions and funding from the government.

The conservation status of the Freshwater Pearl Mussel remains bad in both Boreal and Alpine regions of Finland. Only a few of the known ca. 120 populations are viable, judging by the available information. Problems in breeding are related to decreased populations of host fish, and poor quality of stream water quality and benthic substrate. Reversing these threats demands large-scale actions improving the connectivity of stream networks, as well as catchment and habitat restoration to improve the conditions for especially juvenile mussels. In Freshabit we have implemented such measures and shown, that complementary funding from various sources can be utilized for improving the status of streams and rivers, as shown especially in the Karjaanjoki target region. In addition, launching the first national FPM breeding and rearing station during Freshabit was a huge leap forward in FPM conservation. FPM is generally viewed positively as a species, having an extraordinarily long life-span, interesting life cycle, and providing ecosystem services. In addition, migratory fish are generally valued highly by laymen, providing concrete added value to struggles to save the FPM populations by reviving migratory fish stocks. Thus, in general, the set-up is positive for FPM conservation, but much remains to be done in terms of habitat and migratory fish conservation measures.

It is noteworthy, that the Annex IV species frequently occurring in lake habitats in need of restorations, i.e. the moor frog (*Rana arvalis*) and the darter (*Leucorrhinia* spp.) species are in favourable conservation status. These species generally benefit from eutrophication and readily colonize new suitable habitats, such as shallow lake bays taken over by common reed, or artificial wetlands. Being common and strictly protected, these species often demand additional efforts for planning and implementing conservation measures in N2000 sites. Practices how to reconcile between needs for habitat and species protection tend to vary between regions in Finland. In Freshabit we have shown that these species can benefit from restoration measures and provided guidance (deliverables A6.2.3, C7.1), aiming to improve the implementation of freshwater conservation measures in the future. Our results have shown that bird wetland restoration should be considered positive to the species instead of a potential threat, and we will continue disseminating these results, aiming to streamline the permit application processes for bird wetland restoration.

Current status of many waterfowl and shorebird species is alarming. Their populations have decreased remarkably in the last decades in Finland and many of them have high red list status. Main reasons for this are connected to both the decrease of suitable wetland habitats and the deterioration of their habitat quality in the remaining breeding habitats. Many of the still suitable shore habitats and wetlands for wetland birds require continuous, annually recurring actions due to

eutrophication-caused overgrown by the reed, bushes and water plants as well as one-of measures to increase open water area. In addition to habitat deterioration, increasing numbers of invasive alien predators, mink and raccoon dog, reduce the breeding success dramatically in many places. Some of the lakes valuable for waterfowl also need manual removal of fish biomass, and catchment area measures to improve the water quality and slow down eutrophication. We have implemented such measures in Freshabit, especially in the Vanajavesi target region with LIFE funding complemented by funding from other sources, and positive responses of waterfowl to restoration can be seen. Much wider activity is needed, however, to reverse the current trends. The Helmi habitats programme (CP088-90) tackles most of the remaining needs for bird wetland restoration. Hunting for invasive alien species is continued in e.g. the SOTKA project to complement bird wetland restoration measures implemented in Helmi, and in Biodiversea LIFE IP in the archipelago of the Baltic Sea to secure the populations of the waterfowl nesting in the archipelago.

Qualitative outcomes of the project were discussed with each beneficiary, as well as the national and regional steering committees during the last project year. A general overview is, that the benefits of nature conservation and Natura 2000 sites as potential source of funding for e.g. water protection measures and improvement of migratory fish stocks have become evident for stakeholders and laymen, improving the reputation of Natura 2000. Freshabit has also promoted the PAF consistently throughout the project, and, as a result, PAF is generally well known and accepted among national administration and governmental institutions. The current PAF FI 2021-27 has been constructed by a much wider consortium than the previous one, and the document is generally seen as a usefol tool for prioritizing for nature conservation.

Freshabit was viewed as a developing and capacity-building project for especially the smaller ABs (e.g. VVK, LUVY, ProPuru), whose capability for working in large EU-funded projects has increased considerably. Working actively as a partner in such a large project has also raised their status and appreciation in their respective regions, and strengthened their local and regional cooperative networks for further measures and projects. On the other hand, those local ABs are closer to laymen than large national partners, and they have been able to spread the message on the benefits of Natura 2000 among the common people. For example, the AB ProPuru had an impressive amount of media attention in the Puruvesi target region (see Action E1). Bigger ABs, especially SYKE, Luke and SMK have increased their cooperation and the benefits of such a long project include joint improvement of catchment loading models implemented in action A1. Earlier, these institutes have approached forests from different points of view, SYKE being more conservation-oriented and Luke and SMK focusing more on forests as natural resources. Discussions and presentations within the PAF monitoring group, and national and regional steering groups have also increased understanding of the importance and potential benefits of implementing the PAF. These results realize in improved cooperation and project applications up to the ministerial level, as discussed further in chapter 4.5.

Regarding policy areas beyond the Habitats and Birds Directives targeted in the PAF, Freshabit has had the strongest linkage with the WFD, which is also linked to the priority measures for aquatic habitats indicated in PAF FI. FH actions have been strongly linked to the River Basin Management Plans for the years 2015-2021, in addition to implementing the national PAF. Concrete mutual benefits include the reporting tool for HD reporting (action A9), multi-stakeholder planning processes for catchment area of N2000 sites (Actions A4 and A10), streamlined monitoring indicators and methodology (Actions A10, D1, D2) and impact assessment (D7), as well as concrete conservation measures to improve the status and integrity of N2000 water bodies (Actions C1-C8). In addition, we approached the rather common challenge of how to deal with HD Annex IV species by guidance (deliverable A6.2.3 and C7.1).

Freshabit measures are also directly linked to climate change adaptation policy. Foreseen changes in climate pose further risks for freshwater conservation status via e.g. changes in evapotranspiration. Increased seasonality of rainfall may result in severe droughts and flooding. Climate-induced changes in soil and runoff processes are also expected to increase leaching of nutrients and carbon as humus from catchment areas, particularly during the winter season. This threatens maintaining the status of those water bodies, which are currently in good ecological status. Furthermore, changes in species distributions and migration patterns are foreseen due to changes in temperature regimes and lake stratification patterns. Particularly freshwater species dependent on cold water conditions (e.g. salmonid species) are threatened. All of the threats mentioned above have been mitigated in FH target sites by improving the water retention capacity of catchments with catchment area restoration measures, and by stream channel restoration (actions C1-C6). In addition, the currently visible impacts of climate change on ecosystems have been specifically assessed using long-term ecosystem data in action D3, and changes in runoff and

loading from catchment areas in changing climate conditions has been modeled and demonstrated in Actions A1 and D3. The challenge of mitigating for the effects of climate change is, however, huge, and demands measures in land use and planning in all catchments. This challenge is acknowledged and lots of research as well as concrete measures are currently done. One of the challenges is e.g. balancing between the impacts of peatland restoration on biodiversity, water quality effects, and greenhouse gas emissions, which needs clear targets and prioritizing for restoration projects (see Kareksela et al. 2021).

Synergies with other EU policies than those mentioned above are best highlighted by links established by complementary funding. Complementary projects funded by EAFRD, EMFF, and ERDF sum up to more than 16 M€, being mostly development projects related to especially agriculture, food and fisheries, and forest policies (see Chapter 5 and Annex 1). Services and resources provided by healthy freshwater habitats are linked to these policies, e.g. food and freshwater for humans, and recreational and other cultural services, and, on the other hand, are influenced by land use. Complementary projects under these topics aim to e.g. develop forestry methodologies and support sustainable tourism in freshwater environments.

4.2 Economic and social benefits

In terms of social and economic benefits to society, FH has benefited many contractors and employed a remarkable amount of people. The value of external assistance is 5,94 M€, most of which has been paid to contractors working for the conservation measures on our sites all over the country (e.g. catchment area restoration, building of fish passes, lake restoration). The project has employed a total of 498 persons, with a total amount of work exceeding 170 working years (based on 8 hours daily working time and 220 working days per year, 304 824 working hours in total). The value of declared costs is 10,56 M€. Turned into Full Time Equivalent (FTE), the amount of work sums up to 25,66 FTE jobs created by the project. Considering only additional staff, 220 persons, the number is 15,53 FTE jobs. All the people hired for the project have been qualified for project management, financial administration, or concrete conservation measures. These are impressive figures, which have been communicated actively in the last year of the project. These figures provide good data for the discussion on the costs and benefits of the proposal for the regulation on nature restoration by EU in 2022.

We asked more than 40 experts working for FH to evaluate the impact of conservation measures on ecosystem services, and got interesting results (deliverable D4.9). In general, provisioning services were estimated to be less impacted by our measures than regulating or cultural services. Direct provisioning services, such as increased stocks of migratory fish for fishing were not expected to realize immediately, but within a long time frame. Identified regulating services included those related to increased or supported biodiversity, and improved functioning of ecosystems as a result of restoration measures. To summarize, the experts viewed the indirect ecosystem services (e.g. cultural or recreational values, biodiversity) to be more impacted than direct values (e.g. fish stocks or other resources) by project actions. The approach of interviewing project experts for impacts on ecosystem services can be recommended for the socio-economic impact assessment of other projects as well, perhaps extended to stakeholders and laymen.

Land owners and other stakeholders were involved in the management planning and regional water protection planning processes in actions A3 and A4. Most of the measures planned were viewed positively, but some concerns were also raised. For example, stream and catchment restoration measures were feared to increase the risk of flooding in areas used for forestry of farming, or lead to restrictions for land use if red-listed species spread into new areas. However, face-to-face meetings with local landowners and other stakeholders were considered important in disseminating correct facts about planned measures and successful in resolving potential conflicts in project areas by discussion.

We also asked locals and visitors about their perception of the water quality and willingness to pay for maintaining or improving it. In the Keski-Suomi target region only 10,5% of the responders were ready to pay themselves for improved water quality, and most considered that the state should cover the costs (deliverable D4.5). On the other hand, significant indirect economical inputs were detected in the Puruvesi region, which is a very important area for recreational visits (deliverable E7.11). The total value of recreational visits in Puruvesi was considered worth 4,37 M€, and improving the percepted water quality would increase the value by 1-2 M€, and declining water quality would decrease the value by 1,5 M€. In addition, the value of the real estates in the shores of Puruvesi was estimated worth 365-390 M€, and deteriorating water quality could decrease the value ca. 20 M€. Consequently, the residents and visitors in Puruvesi would be willing to pay more than 80 €/year to support measures for improving or maintaining the water quality. These cases demonstrate the monetary value of water quality and recreational use, which is often difficult to monetarize, and highlight the potential economic impacts of nature conservation measures.

In addition to those examples presented above, or those in the full report for socio-economic impacts of the project, it can be summarized that freshwater environment is generally viewed as a valuable asset, and, consequently, freshwater conservation is generally viewed in a positive way among laymen. We have assessed the potential for economic benefits in some of our target areas by questionnaires and modeling, but it can be generalized that the values assessed are likely to be repeated in other sites in a similar magnitude. Socio-economic benefits of Freshabit are fully covered in Annex 4 to the FR (deliverable D4.6).

4.3 Innovation, demonstration, replicability, transferability, cooperation and transboundary effects

We developed an integrated multi-stakeholder planning for catchment area management of N2000 sites based on earlier examples and experiences, e.g. in the WFD River Basin Management and N2000 site management planning processes. ELY Centres or MH_LP are mostly in charge of these processes, and the novelty of our approach lies especially in the improved cooperation between water authority, nature conservation, and forestry sectors, and in extending the planning for N2000 sites in their catchments. Besides the ELY Centres and MH_LP, however, also local water protection associations (VVK, LUVY, ProPuru) took stronger roles than earlier or even lead in the processes, enhancing their capacity for such processes in future projects.

We applied and demonstrated the model of participatory planning in all FH target regions, applied the planned measures in Actions C1-12, produced plans for future implementation in Actions A3 and A4, and, finally, documented the approach in deliverables A10.2 and E1.1.3. The process starts with gathering all the necessary baseline information, defining problems and clear targets, needed measures and sufficient monitoring to evaluate the impacts of the measures (Fig. 4.3). All the relevant stakeholders (e.g. land owners, local businesses dependent on the regional resources, water, nature and forestry sectors) are contacted at the earliest convenient stage and kept informed through the process. This approach considers both the obligations by the Nature Directives and WFD, and considers land use in the green infrastructure areas in the catchments of the N2000 sites. The guidance especially stresses the potential special needs for data and surveys that come with the N2000 status. Furthermore, protocols and model chains developed in Actions A1 for forestry and A2 for ecosystem services supplement this approach. In deliverable D3.3 the aspects of modeling for the impacts of catchment-oriented loading on ecosystem services and local population of the Freshwater Pearl Mussel was completed, showing how the modeling approaches can be combined for species protection. Lessons learnt in Freshabit will be a major asset in future projects. For example, the collaborative planning for catchment-scale management plays a major role in the strategic nature project Priodiversity LIFE, which is in the application phase.

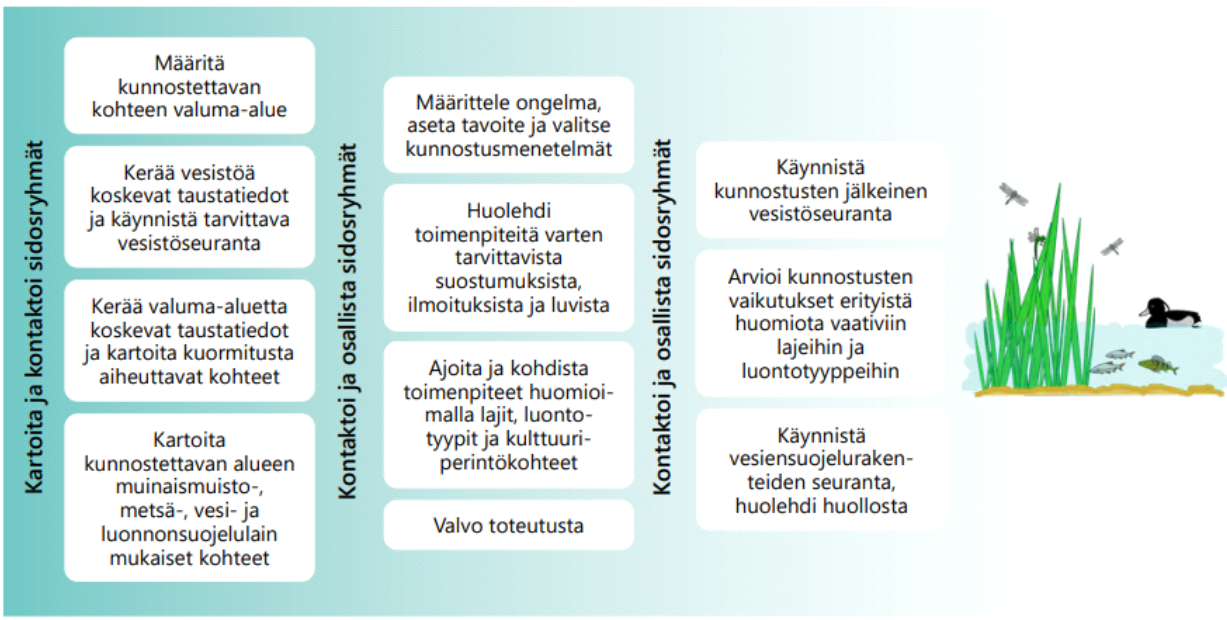


Figure 4.3. Simplified description of the process of the multi-stakeholder planning for N2000 catchments from Deliverable E1.1.3 (in Finnish only).

Enhancing the use of environmentally friendly hydropower in actions A8 and E10 was another novelty to be concerned in funding of the conservation of freshwater habitats. Public attention of the impacts of renewable electricity production, including hydropower, on biodiversity has been increasing, and EKOenergy has aimed to utilize consumers' interest in the environment to

encourage them to do more for the climate and river ecosystems. In Finland, however, EKOenergy-labelled hydropower has not been a successful product thus far, as wind and solar power with the same label have been more popular and easier to label. The European energy crisis launched by the consequences of the Russian invasion to Ukraine may also slow down the development towards more ecological hydropower, as all existing energy production plants can be seen necessary to supply for the national need. However, positive signs are also visible, as several redundant hydropower plants have been demolished or agreed to be demolished in the recent few years.

Most of our concrete conservation actions were done using best-practice restoration methods, that are working well and need no major modifications. Alternative ways to restore streams with simple input of large wood was tested in Action C6. The approach is more straight-forward than the more common best-practice methods, involving only felling of trees with branches into the streams, instead of the more common addition of wooden structures along with stones and/or spawning gravel. As assumed, large wood material in the streams was shown to promote natural self-restoration of the stream channel, in addition to providing substance and increasing the retention capacity of the stream. Impacts on biodiversity were mixed, but the time-frame after the restoration measures was too short for most biological responses. Monitoring is carried on in many of the sites by available resources, especially in the fish pass sites where further measures to improve the upstream and downstream migration may be needed.

The action C10 aimed to test and implement targeting the METSO forest conservation program in riparian forests with high biodiversity values. Permanent protection of the riparian forest of valuable water bodies can have strong positive effects both in the freshwater ecosystems and in the riparian freshwater dependent ecosystems with high biodiversity values. The promoting worked very well; it has gained wide support and in total 194 ha in 38 real estates have been protected either by purchase or compensation for permanent conservation area. This is planned to continue in forthcoming nature projects as well as by the national METSO funding.

In terms of replication and transfer, the achievements documented and described above provide examples that can be replicated in freshwater-related projects or transferred in other environments with similar issues. For example, we have had active interaction with other IP projects as well as traditional LIFE projects, resulting to shared practises and approaches, and in the best cases, direct continuum in future projects. LIFE Revives is a very good example of replication, continuing FPM breeding and rearing in the facilities set up by Freshabit. Also, Priodiversity LIFE has built on the stakeholder involvement processes of Freshabit already in the application phase. Cooperation in implementing the Nature Directives and WFD can be directly utilized in any area where the EU policies are viable, and applied where other similar policies are in place. Our demonstrated experiences how funding for multiple sources can be used for working with N2000 are also valuable examples. For example, the modeling approaches have been further tested and developed by complementary funding, e.g. the forest loading models by CP035 and CP039, and the national model for stream habitat integrity in Action A5 was finalized in CP089. Furthermore, complementary projects were also used to supplement the LIFE Actions in the target sites, by complementary restoration measures or monitoring. In addition, the efforts for collecting funding for implementation of fish pass projects initiated by LIFE funding provide encouraging example to other similar projects. On the other hand, Vattenfall showed a good example to other power companies in using LIFE funding for fish pass construction, while investing most of the necessary funding themselves.

We did not have direct transboundary effects in FH, but we did have several complementary research projects (e.g. CP008, CP045, CP039, CP041) which were international, sharing our experiences and data to partners from Europe to North America. Three complementary projects for FPM working with the Nordic-Baltic states and Russia have utilized our experiences in FPM conservations. In addition, we have communicated and shared knowledge with a number of other LIFE IP and traditional LIFE projects, resulting in improved knowledge in both ends. Being among the first six IP projects to start, and the first one to submit the final report, we have been keen on sharing our experiences to other IP projects in all development stages.

4.4 Policy implications and feedback

Implementation of PAF and other legislation

The PAF for Finland was revised during FH, resulting to a better structured plan with clear targets and indicators. The updating process also involved stakeholders and relevant actors for implementation of the PAF. These facts, backed up by the consistent promotion of the PAF FI done by the project (e.g. seminars organized in Action D6) have raised awareness for the PAF

considerably and paved the way for full implementation of the plan. Calculations for needs for conservation measures in the PAF FI have already been utilized in planning for the Helmi habitats programme (CP088-090), the most important effort towards nature conservation measures in Finland so far. Furthermore, FH has been the first project to truly test and assess how complementary funding from national and EU sources can be used to supplement the implementation of the N2000 network.

We have worked consistently in the boundary between the implementation of the Nature Directives in freshwater habitats and the WFD, streamlining methods (e.g. for reporting and monitoring in Action A9 and A10) and presenting solutions to potential challenges (e.g. in Action A10). By assessing the vulnerability and the long-term ecosystem impacts of climate change and air pollution at the remote pristine Natura 2000 sites using long-term ecosystem data we also contribute to implementation of both the climate and the REACH regulations (deliverables D3.2, D3.4 and D3.5).

Finally, the dissemination materials and activities and related training (e.g. Actions A1, A2, A10, E1, E2, E5), and environmental education (Action E7), and the super-popular documentary series produced in Action E6 are likely to leave a permanent interest for the importance of freshwater habitat and species conservation to us all. In addition, active dissemination on the socio-economic impacts of FH provides relevant material for the current discussion on the implementation of the proposal for the regulation on nature restoration by EU in 2022.

Bottlenecks and barriers

Throughout the project the involvement and commitment of the ministries in charge of implementation of the Nature Directives and the WFD has been a challenge (MoE and MoAF). The ministries have their set goals within each reign period of the Finnish Government. Even when FH has been implementing the PAF FI, of which MoE is the prime responsible party, it has been viewed as a project where MoE can invest little effort (see e.g. the visualisation from the social network analysis in chapter 3). It has been even more difficult to influence the priorities of the MoAF in other than straight-forward practical issues, such as complementary funding for fish pass initiatives of FH. However, updating the PAF FI, preparing for the Helmi habitats programme, as well as preparing the application for a new Strategic Nature project has increased cooperation between the two ministries. FH has been involved in all processes mentioned above, and we have thus influenced in future implementation of the plan considerably.

One evident bottleneck for nature conservation projects if the long processing time needed for applications for the environmental permits for restoration. Especially when fish passes are to be constructed, water level raised, significant amounts of benthic substrate dredged, or HD Annex IV species found in sites to be restored, the permit application process is labourous and takes years. The process can be streamlined by careful inventories in the planning phase, as we have documented in related guidance. However, the permit application process for projects targeted to nature conservation measures in conservation areas could be further streamlined to ensure implementation.

EU added value of the project and its actions

In the application phase for Freshabit our targets were tied to the previous versions of the PAF FI (2014-20), and the EU Biodiversity strategy. Both have been revised in phase 3 of FH. As described above and in other chapters, FH serves implementation of the revised, better structured PAF FI 2021-27 well. Target 1 of the previous EU Biodiversity Strategy aimed at full implementation of HBD by four Actions: 1) completing the establishment of the N2000 Network and ensuring good management, 2) ensuring adequate financing of N2000 sites, 3) increasing stakeholder awareness and improving enforcement, and 4) improving and streamlining reporting. We have implemented these aims well by our management planning in Actions A3 and A4, impressive amount of complementary funding, participatory multi-stakeholder planning processes demonstrated and documented, and streamlining for reporting for HD and WFD. Furthermore, as the new PAF FI 2021-27 is better structured and more coordinated with regard to other strategies, we expect that the strategies work much better for similar goals as earlier.

The new EU Biodiversity Strategy for 2030 includes actions for four themes:

1) Establishing a larger EU-wide network of protected areas on land and at sea
2) Launching an EU nature restoration plan
3) Introducing measures to enable the necessary transformative change
4) Introducing measures to tackle the global biodiversity challenge.

Of these, FH has already had input for especially actions 2 and 3. Calculations made for the

prioritized measures in the updated PAF FI can be used to assess sites and costs the restoration plan in action 2, and our experiences guidance in implementing the plan. Furthermore, increased capacity for cooperation for environmental conservation helps in implementation of the Strategy (see chapter 4.5).

Implementation of the fish passes in FH can be considered as a pump priming effect. LIFE funding has been used as seed money to initiate construction of fishways successfully in cases, where the situation has been locked for decades. LIFE funding has brought together consortia, which have collected the necessary additional funding and finalized the planned fish passes. Similar examples can be seen regionally. For example, in the Puruvesi region FH attracted other projects, such as Operandum (CP039; Horizon project OPERANDUM works with tools and methods for the validation of Nature-Based Solutions in order to enhance resilience in European rural and natural territories by reducing hydro-meteorological risks) during the course of FH, and additional national funding to continue actions in the area after FH (see Action C2). Furthermore, FH has initiated processes that are continued in recently started other projects, such as LIFE Revives (CP004) and TRIWA LIFE (CP005).

4.5 Capacity building, sustainability and other comments on impacts, barriers, challenges and lessons learned

Capacity building and sustainability

Freshabit has contributed to the implementation of the PAF FI in many concrete ways and by building the capacity for full implementation. As described above, we have implemented the PAF FI by concrete quantitative as well as qualitative achievements (Chapter 4.1). In terms of capacity building, we have improved the capacity of local and regional actors for implementing large nature conservation projects. At the national level, we have improved the cooperation between national institutes dealing with nature conservation, water protection, and forestry. Furthermore, we have raised awareness for the PAF and updated the plan, enhancing the inclusion of different sectors in the work. Finally, our impressive media coverage and environmental education has raised the awareness of the general public for freshwater conservation. Although no organizational or administrative changes have been made, the result of the improved common understanding can be seen in e.g. preparation for the application for the strategic nature project Priodiversity LIFE. Specific Actions implemented to enhance the implementation of the PAF FI include especially: A1, A2, A4, A7, A9, A10, D4, D6, and E1-10 (see chapter 6.3 for details).

The sustainability of the results and continuation of the measures of Freshabit seem secured based on our achievements with regards to capacity building achievements described above, and emerging trends in the society. For example, even with the current energy crisis, solutions ranging from fish passes to demolishing dams are being implemented to improve integrity of the stream network ecosystems in Finland. The Helmi habitats programme has ambitious goals for 2030, and Finland is applying for a new Strategic Nature Project. The relevant ministries for implementation of these tasks have their goals and budgets set within the frame for each reign period of the Finnish Government, which decreases the long-term predictability of the progress even when those partners implementing the measures are willing. However, EU urges implementation of the Biodiversity Strategy, which implies international pressure.

Concrete examples of project sustainability include, in addition to the Helmi habitats programme, many other complementary projects. For example, the Finnish Ecosystem Observatory (CP096) will continue development for the monitoring and evaluation of the state of ecosystems. New traditional LIFE projects (e.g. CP005) continue the measures started in FH, and the new Strategic Nature Project aims to raise cooperation and implementation of the PAF FI into the next level. In addition, fish passes built in the project are long-term investments, and agreements for 30-year maintenance for the water protection structures have been made in Action C2.

After LIFE plan

We have identified, in addition to continuation of individual Actions, three main themes that need further development after FH in order to achieve the full implementation of the PAF FI: Monitoring, networking, and improving the status of the habitat types (for further details, see Annex 3, the After LIFE plan). Monitoring is repeatedly discussed with respect to restoration and management of nature. The monitoring measures applied are often inadequate for detection of responses to conservation measures, as is the time-frame of most projects, because the impacts may take a decade or longer to show. We have identified needs and proposed measures to improve the status of monitoring for the impacts of restoration and conservation measures, including additional funding and platforms for the monitoring data. Cooperation and networking was implemented in FH in many levels, all of which should be continued. For the national level, cooperation of institutes should be

supported by the governmental level. Additional funding could facilitate the work in the regional and local level, where resources for networking may be low or missing. Improvement of the status of habitat types needs public adequate data for the habitats, as well as education of laymen for increased appreciation for nature conservation. In addition, as the trends of species and habitats are dependent on large-scale changes in land and resource use, all concrete actions need to be continued after FH. The priority themes identified, proposals for solving them, and continuation of individual Actions are presented in detail in the After LIFE plan.

The continuity of Freshabit measures and approaches should be guaranteed by ongoing trends, programmes and project preparations, even if the national budget is set yearly and the priorities are based on governments that change every four years (see the summary and Fig. 4.1). Freshabit LIFE IP conceived 231 M€ of complementary funding, 100 M€ of which is from the national Helmi habitats programme. Helmi is supposed to be continued until 2030 with a total estimated cost of over 600 M€. The total estimated costs for PAF FI 2021-27 are 6 037 M€. The costs for the EU restoration regulation and targets set by COP15 are still unknown, but the pressure on nature conservation and restoration is high. A conservative estimate for the resource needs for the next 5 years after Freshabit is 500 M€.

Continuation of project resources and outcomes

The complete staff needs for implementing the PAF FI have not been assessed. More than half of the project staff has been non-additional (278/498 persons), which strongly supports the utilization of project outcomes and continuation of PAF implementation in Finland. The beneficiaries involved in the project are central in PAF implementation. For example, MoE coordinates the plan. MH_LP, SMK and the ELY centres implement it at the governmental level, research institutes such as SYKE and Luke support the implementation with research and guidance, and NGO's such as LUVY, VVK, FANC, WWF, NoM at local and regional level. All these beneficiaries are also active in communication, and thus the dissemination of the results and key outcomes of FH are guaranteed. New projects are typically built on experiences from the previous ones, and the lessons learnt in FH have already been taken up in numerous new complementary projects (e.g. LIFE Revives, Biodiversea LIFE IP), and they are also utilized in the preparation for the new Strategic Nature Project in Finland which is in the application phase. Concrete example of the continuation of experienced project staff is, that all the additional staff hired to MH_LP for the management of Freshabit are involved in Hydrologyy LIFE and preparation for the Priodiversity LIFE.

The new strategic nature project in the application phase, Priodiversity LIFE, has a completely new concept and it will cover all terrestrial and freshwater habitats. A good share of Freshabit project beneficiaries continue their collaboration (MHLP, MHMT, ELY, SYKE, LUKE, SMK, FANC, WWF, MoE) in Priodiversity. This will allow for efficient utilization of the lessons learnt in Freshabit. For example:

- The success story of complementary funding of Freshabit will be taken a step further by establishing a biodiversity funding hub in Finland
- Prime Minister's office, Ministry of Finance and Ministry of the Environment have committed to improving biodiversity policy coherence and mainstream biodiversity issues in different policy sectors
- Based on the experiences of Freshabit, the PAF process in Finland needs to be improved. The bottlenecks of PAF implementation will be analyzed, methods for BD funding will be developed and collaborative planning will be used in the next update.
- Freshabit piloted the marketing of METSO forest conservation program in riparian forests with high biodiversity values. Priodiversity LIFE will continue and expand this work to herb-rich forests and sun-exposed habitats.

The major pieces of equipment purchased with project funding will be utilized efficiently in monitoring of Freshabit actions and implementation of complementary projects. LUVY has purchased a monitoring device that will be used to monitor for the migrating fish in the Mustionjoki fish passes, and measuring devices and electric fishing device for monitoring the habitat and host fish population for the FPM in Mustionjoki. Likewise, Luke has purchased equipment for monitoring of the fish migration in the Saarijärven reitti fish passes after the project. GTK updated their sidescan sonar equipment before conducting field work in Päijänne in 2018, and the device is further used in acoustic surveys of freshwater and marine habitats. In addition, VVK, SMK, and FANC have bought field computers for nature conservation field work within and beyond Freshabit.

To conclude, Freshabit LIFE IP has enhanced the implementation of the PAF FI by increasing awareness of the plan, increasing cooperation between environmental sectors, building capacity for implementing it in national and local levels, providing guidance for participatory planning and implementation of measures in and around N2000 sites, and by demonstrating the implementation

in regions across Finland. Lessons learned in the project are visible in many ongoing projects, as well as in preparation of new projects. Even though the priorities and budgets are set for four years at a time for each reign period of the government, we can influence the priorities by bottom-up processes, such as repeating the key messages and highlighting the needs for development, applications for new projects, and wider inclusion of national and international funding sources, private funding included.

5. Implementation of the complementary actions

torstai 22. syyskuuta 2022 10.05

5.1 Coordination mechanism(s) established with other funds

The PAF monitoring group and the events organized in Action D6 have been useful in promoting the concept of complementary funding. Within the group we involved a variety of stakeholders working with different funding sources, which enabled discussions on coordination for mutual benefits. We have also had direct discussions with MoAF considering EMFF and CAP. During the project the raising awareness of the concept of complementary funding for nature has facilitated discussions also in other groups, e.g. the Finnish biodiversity strategy monitoring group.

The PAF monitoring group set up in the project was an interesting experiment, but not the best possible way to coordinate between funds. Being a project-related group it did not reach a very high-level status in the national administration of different EU funds. We did, however, manage to communicate the idea of complementarity between funding sources, which is likely to bear fruit in the future. At the end of the project, we considered among the PAF monitoring group that involving the cooperation and complementarity between funds is best carried on in existing groups, such as the monitoring group for the Finnish biodiversity strategy. In addition, in the preparation for a strategic nature project for 2024-31, Priodiversity LIFE, the state government has been far better involved than in any earlier project, and coordination for the implementation of the PAF FI, complementary funding included, seems to be improving significantly.

Many projects have raised from direct needs of our beneficiaries. In some cases Freshabit has been approached in the planning phase of a complementary project, and we have provided supporting letters for project applications, when necessary. Beneficiaries have been directly involved in all complementary projects, which has ensured the coordination between projects (e.g. CP037, CP088). We have also been involved in research and innovation projects, where the linkage between projects has been ensured in the application phase (e.g. CP039, CP102). Finally, continuation of Freshabit actions has been ensured in the planning and application phases of several new nature conservation projects (e.g. CP004, CP088-90).

5.2 Summary status of the complementary actions

In the application phase we had a modest list of complementary projects (worth ~4.3 M€). Within seven years we have been very successful in leading relatively large funds towards freshwater management and nature conservation, and the total amount is more than 50 times higher at the moment (231 M€) and 11 times higher than the LIFE IP funding. Several complementary projects have just started in phase 3, and they will be running for several years after Freshabit. By far the largest contribution to the complementary projects thus far is the national Helmi programme for biodiversity, running until 2030. We are also applying for a Strategic LIFE Nature project. Furthermore, the road has been paved for cooperation between LIFE and other funding sources for the benefit of Natura 2000 and human well-being, and we expect such cooperation to increase in the future. However, it is apparent, that LIFE is still the most important EU funding source for nature conservation and restoration projects and we need to enhance the cooperation between funds at the highest possible levels.

The complementary projects for FRESHABIT complement the IP actions locally, nationally or thematically. Complementary projects have been conceived since the early stages of the planning of Freshabit, and new projects still emerged in phase 3. Complementary projects have been presented as case examples in monitoring visits, and a general overview of the types of complementary projects was presented in monitoring visit in Vaasa 12 June 2019. Reporting for the complementary projects has evolved during 2016-22.

We have 102 complementary projects to Freshabit LIFE IP with a total budget of over 230 M€. Funding comes from various EU and national sources (Fig. 1). Currently the national public funding is at a very high level due to the Helmi habitats programme, and it is likely to decrease in the forthcoming years. We have assessed how all projects relate to the priority themes, or pillars, in the PAF FI 2021-27, and the main objectives of Freshabit. Many of the complementary projects address several pillars or objectives simultaneously. We have, however, placed each project under one pillar, but listed more than one objective, if necessary. The complete list of complementary projects is submitted in Annex 1.

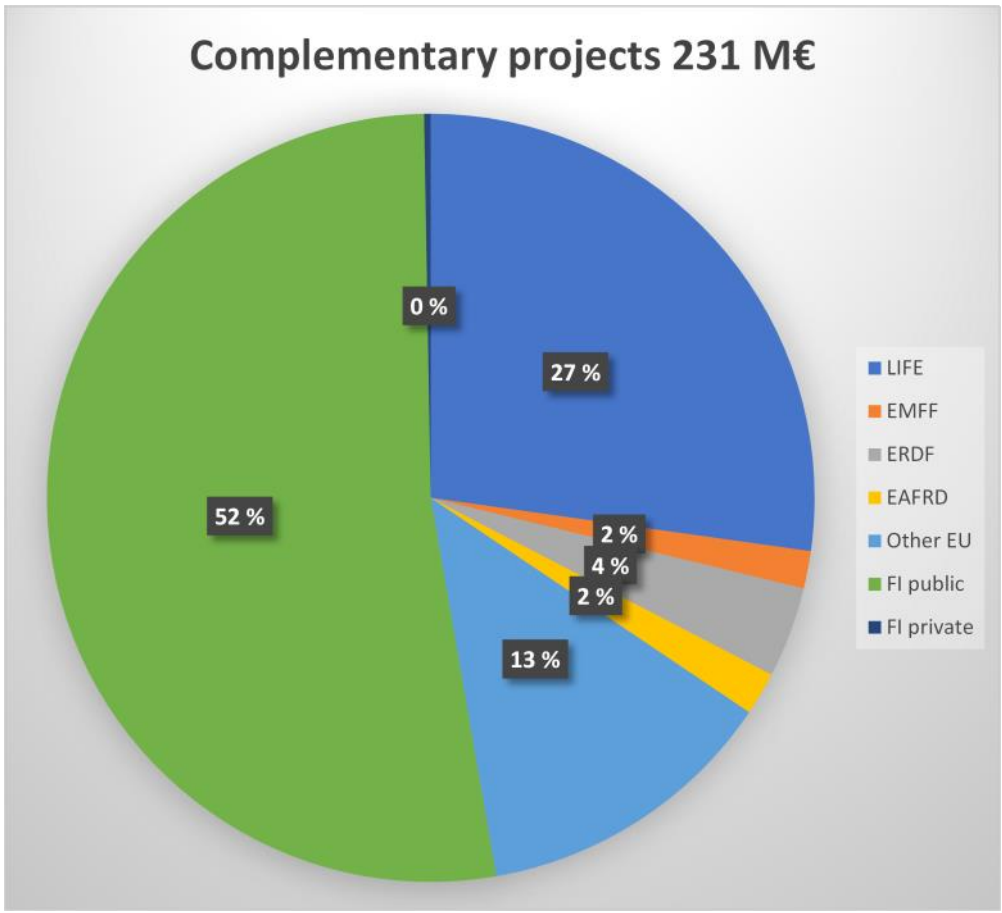


Figure 1. Distribution of funding sources for the complementary projects of Freshabit (Note: the private funding is ca. 644 000€, contributing 0,003% of the whole sum of complementary projects.

We present the fundamental details for each complementary project in Annex 1, and address how they relate to Freshabit objectives and Actions, and pillars of PAF FI. We have not kept a log of communication with each 102 projects, so such details are not presented. However, in Annex 1 we list the responsible beneficiary for each complementary project. All complementary projects of Freshabit involve at least on Beneficiary of the project, and in fact most are coordinated by a Beneficiary. These included LIFE projects (e.g. Hydrology LIFE/MH_LP), large research and innovation projects (e.g. Finnish Ecosystem Observatory FEO/SYKE), and habitat restoration (e.g. Helmi habitats programme/MoE) or water protection (e.g. several Kemera projects/SMK) project. Thus the coordination between projects comes naturally. Complementary projects have also been assessed in regional and national steering groups of Freshabit.

Table 5.1 *A table of the complementary projects of Freshabit LIFE IP summarizing the funding and sources committed, and the types of projects and coordination mechanisms per each pillar in the PAF FI. Comparison to the application is not presented, as the pillar approach was not invented in the application phase.*

Pillar	Source of funding	Amount committed by Final Report
1. Horizontal measures and administrative costs related to Natura 2000	EAFRD, EMFF, ERDF, other EU, national private + public	49 541 462 €
2a. Natura 2000 site-related maintenance and restoration measures for species and habitats	LIFE, national private + public	84 409 242 €
2b. Additional Green infrastructure measures beyond Natura 2000	EAFRD, EMFF, LIFE, other EU, national public	78 473 709 €
3. Additional species-specific measures not related to specific ecosystems or habitats	EAFRD, LIFE, other EU, national private	18 293 332 €

5.3 Discussion on the contribution of complementary actions to the implementation of the targeted plan

Raising awareness for the PAF and complementary funding has been a success story in Freshabit, and it is fair to say that we have been **building the capacity** for similar large projects with complementary funding in the future. We have been presenting this theme in numerous meetings and seminars, making the PAF known among stakeholders. The concept of complementary funding has been realized in many levels of the society, which has been accomplished by both Freshabit and the complementary projects. Most of the benefits of the complementary projects for the implementation of PAF are qualitative, but in many cases also quantitative. Freshabit beneficiaries and stakeholders have had direct **benefits from additional funding** in all of our target regions. Contribution of the complementary projects to the implementation of the PAF FI is summarized below by each priority theme (pillar) of the PAF. Summary of funding per pillar is presented above in Table 5.1, and the complete list of projects in Annex 1.

In total 60 complementary projects worth of 49,5 M€ are mainly contributing to priority theme 1 (Horizontal measures and administrative costs related to Natura 2000) of the PAF FI. These include national (e.g. CP015-16) and international (e.g. CP008, CP035) research and innovation projects, development of networks (e.g. CP027, CP031), promotion of wellbeing from nature (e.g. CP012, CP030), and many projects enhancing the water protection measures in forest management (e.g. CP033, CP043). By producing new knowledge and guidance, and educating entrepreneurs and land owners, the **policy implications** of these projects are clear. Training projects, as well as commonly planned projects for nature and water protection, and projects aiming at reconciliation between nature conservation and land use (e.g. CP010, CP099) also enhance the **capacity building** impact of Freshabit considerably.

Ten projects worth of 84,4 M€ contribute directly to PAF FI priority theme 2a (Natura 2000 site-related maintenance and restoration measures for species and habitats) and have direct **environmental benefits** in conservation areas. These include three EU LIFE projects, one of which is, however, working in Sweden. LIFE funding is the primary source for nature conservation measures in conservation areas, which are mostly also Natura 2000 sites. National public funding under theme 2a has been available to some local conservation projects, and the largest proportion comes from the Helmi habitat programme (CP088-90). The Helmi programme has thus far secured 100 M€ for nature conservation for 2021-23, but has targets until 2030 and considerably more funding is needed to fully implement the programme. Measures are implemented in both conservation areas and the green infrastructure areas, and the division of the whole programme between themes 2a and 2b is rather arbitrary. The private funding for measures in conservation areas has been low, comprising one project directly linked to Freshabit measures in the Kiskonjoki catchment (CP101).

For nature and water protection measures outside conservation areas (theme 2b Additional Green infrastructure measures beyond Natura 2000) we have raised complementary funding in 22 projects worth of 78,1 M€. Besides the Helmi habitats programme, the most significant amount of funding comes from the Kemera funding targeted to water protection measures in the catchments of Freshabit target areas. In total 15 660 ha of improved water protection around Freshabit target water bodies has been secured during the project by complementary funding. Catchment area restoration is a fundamental measure having direct **environmental benefits** in the receiving water bodies. Catchment area restoration is often the prerequisite for any water body restoration, influencing the most common causes for deterioration (eutrophication, overgrowth) directly. Besides those presented above, complementary projects under the 2b also include local complementary restoration projects (e.g. CP070, CP077). Worth mentioning is also the NOUSU programme for improving conditions for migratory fish (CP095), which has supported several of our measures in the project regions.

Complementary funding also provides additional **funding to improving the conservation status of species and habitats** (theme 3 Additional species-specific measures not related to specific ecosystems or habitats). All five complementary projects listed under theme 1 in Annex 1, worth of 18,3 M€, are related to the Freshwater Pearl mussel, which is one of the key biodiversity indicator species in rivers and streams, and in desperate need of actions for improving the species' conservation status. Four of those projects have ended already, but LIFE Revives continues directly the FPM conservation measures started in Freshabit until 2027. In addition to those five project listed measures in theme 3 are also implemented in the Helmi habitat programme. Additional FPM-related measures are implemented in Helmi, and there are targets to rehabilitate 80 bird wetland sites.

It should be noted, that the guidance for the concept of and monitoring for complementary projects has changed during the project. At the end, we were faced with reporting needs that we have not collected data for during the project. Therefore we have had to apply the guidance to meet the data that has been collected.

6. Evaluation of Project Implementation

6.1 Methodology applied

Freshabit aimed to develop new methodology and indicators for assessing and monitoring the status of freshwater habitats, and utilize existing models to control loading from forested catchments more efficiently. FH included virtually all relevant parties in Finland that can address these issues, and by improving multisector co-operation we developed new model frameworks and operational models that are long-lasting results of the project. In project implementation the biggest advantage has been large networks of experts and authorities, who in turn have their own networks outside the project. On the other hand, a large number of Beneficiaries was also a challenge to project administration.

In Action A1, national integrated model (NIM) systems for assessing loading from forestry has been developed and tested in selected target areas of the project. The work was mostly based on existing models, that were updated and collected into a model chain that can be applied anywhere. Many new publicly available web-based tools have also emerged from the action. Furthermore, in Action A2 an integrated model chain was developed to allow quantification of freshwater ecosystem services and assessment of loading scenarios from agricultural practices. The success of these modeling approaches is based on long research and knowledge-base and enhanced cooperation among FH Beneficiaries. The development of the model approaches does not end with FH. Having major authorities and operators working in the forestry sectors on board in FH we can ensure that the model and new knowledge is spread directly into concrete action in the field. New methods are already applied in practical forestry. The Finnish Ecosystem Observatory (FEO; CP096) complementary project will continue on working with the ecosystem service assessment.

On the other hand, completely new methodology was developed in Actions A5 and associated complementary projects (CP011 and funding from Helmi habitats programme CP088) for stream habitat, and A6 for lake habitat assessment. The biggest challenges for implementing these actions were the underestimated resourcing of experts and in some cases also the availability of GIS data. Within Freshabit we were able to create an initial model that identified the most important variables that ccould be used to predict the status of headwater streams, but we did not have the data to apply the model nationally. We discovered that the available digitized stream channel network covered only half of the headwater streams. Furthermore, a 2-by-2 m elevation model was not available for the whole country until 2021. By complementary funding we could finally complete the action in 2021, resulting to a nation-wide GIS data source for prediction of the status of headwater streams in forested catchment. Due to the fact, that the inventories available for model building were from forested catchments, the model still need new data and further work to be fitted in agricultural landscape. In Action A6 underwater surveys on geological structure, fish breeding habitats, submerged vegetation, and cultural heritage were carried out 2016-2018 as planned, but the delivery of the results was considerably delayed, mostly due to limited human resources. The action was finished in 2022.

The concrete conservation actions were mostly implemented using available best practice methodology, except for Actions C6, which is demonstrative stream restoration using new approaches, and C9, where we had to take on the breeding and rearing of FPM from scratch. The best practice actions were completed successfully and mostly in the expected schedule. Delays occurred by e.g. prolonged processing of the environmental permits for raising the water table in action C7, but the last two sites were completed in March 2022. We have had, however, some delays regionally in certain actions. In some cases we shifted implementation of the actions towards complementary projects, if for some reason implementation by LIFE did not proceed as expected. For example, in the Koitajoki region the catchment area restoration activities by POKELY had executable plans, but implementation was not vompleted as planned by LIFE due to limited resources for regional project coordination. In Kiskonjoki and Karjaanjoki regions we had to modify the geographical implementation to some degree to other parts of the river system as anticipated, due to available resources or the willingness of the landowners. In Kiskonjoki

the stream restoration measures were successfully implemented by complementary funding, and in Karjaanjoki most of the stream restoration was implemented in the upper reaches of the Karjaanjoki catchment.

Demonstration method for stream habitat restoration in Action C6 aimed at testing a cost-effective restoration method for increasing stream biodiversity. As traditional methods are mostly aiming to enhancing the salmonid juvenile habitat by adding rock material (boulders, spawning gravel), the object in Action C6 was in restoring the bottom-up functioning of communities and thereby having effects in higher groups of biodiversity and ecosystem functioning. In practice, this means adding high amount of natural large wood into the stream channels, and thereby effectively increasing the retention capacity of streams. In guidelines for active forest management advice for removing all large wood from streams channels is still given. Thus, the whole idea of adding large wood into streams is controversial to traditional thinking of private landowners in Finland. Yet, with the help of good justifications, discussions, and local relationships, we have managed to get private landowners to do the adding of wood into the streams by themselves. As a result of C6, we did find out that the retention capacity and the diversity of benthic macroinvertebrates increased as a result of natural wood addition, but surprisingly bryophyte cover and juvenile trout density was not responding positively to the treatment. A delay in response is one possible explanation for that (time-scale of monitoring discussed later).

Immediate conservation acts for the freshwater pearl mussel in action C9 aimed at rescuing two to four of the most endangered FPM population in southern Finland using captive rearing. Captive rearing had not been used prior to this project in Finland for rescuing FPM populations, but the need to do so is urgent for many populations. We had to start the first breeding and rearing experiment in Finland when we realized, that the target FPM populations were not able to breed in the wild anymore. In August 2019, after two years of facilitation in the Konnevesi rearing station and one winter in initial rearing we sent the first batch of glochidia into the Norwegian rearing station. We also kept glochidia in Konnevesi for our own rearing trial. In this case, with prompt decisions and co-operation among beneficiaries, we were be able to finish this action as initially planned and within the project period. Without such effectively working network, this opportunity had never taken place. Also the agreement of the Commission for all the changes in this action helped us to save the Action, and hopefully also the FPM populations. Freshabit initiated captive breeding and rearing of FPM in Finland, and now it is carried out in LIFE Revives (CP004) and other forthcoming projects.

Monitoring is one of the biggest challenges for nature restoration projects. Traditionally, too little attention is being given to monitoring and quite often it´s not done at all. In Freshabit we developed indicators in monitoring actions D1, D2, and D5 for monitoring the effects of all relevant concrete conservation actions, and more advanced indicators for selected sites. Indicators were developed for technical purposes to monitor the functional success of structures (e.g. effectiveness of dams and water protection structures) or the amount of material used (e.g. gravel, stones or wood added to streams), and for ecological functioning and biodiversity responses. We also defined a basic level, that is applicable in all normal monitoring, and an advanced high-intensity level, which could be used for more extensive monitoring on the demonstrative actions. The purpose of this multi-level monitoring was to provide reliable information on effectiveness of actions implemented to the degree deemed necessary, but also to improve the way how monitoring is nowadays done in Finland.

Even though we invested in planning of a monitoring scheme, and provided guidance for monitoring throughout the projects, monitoring is still one of the big challenges of nature restoration project. Currently, there is a lot of discussion but not a full plan on implementation of monitoring in the Helmi habitats programme, the biggest investment for nature restoration so far. Monitoring was also not fully implemented as anticipated in Freshabit. All beneficiaries did not reserve enough funding for even basic level monitoring, and coordination of the monitoring proved more challenging than expected. An additional challenge to demonstrating the impact of Freshabit is, that responses in nature typically take years, even decades after restoration measures. Some of the actions were implemented at a very late stage of the project, and the responses can only be seen years after the project.

6.2 Dissemination

Dissemination of experiences and results of Freshabit has been very successful (see technical part for E-actions). One reason for this was involving NGO's as beneficiaries, and another that we encouraged all beneficiaries to communicate as much as possible. We have gained very good media visibility and presented our results in dozens of events, and Freshabit has been a very well-known brand in nature conservation and river basin management contexts since the early days of the project. In some cases it has been challenging to get the project quoted correctly in the press. In all printed products we have been able to include the logos and disclaimers.

In addition to general nature and water protection communication, we have managed to improve the brand of the PAF FI, which was generally a very poorly known document at the beginning of the project. The PAF FI has been discussed in many occasions and it has been updated during the projects, and at the end of Freshabit it seems to be a relatively well-known document among relevant authorities. We have also branded the N2000 network positively. The positive side is, that instead of being a restricting conservation tool. N2000 can also help to raise money for water protection related issues outside N2000 sites, as we have shown.

In the political level our achievements are perhaps best perceived in preparation for new projects, which benefit from the experiences gained in Freshabit. The Strategic Nature Prpject application Priodiversity LIFE is perhaps the best indicator of this, as we have managed to include a wider array of national authorities in the application than in any previous project.

6.3 Technical implementation

The technical implementation of the project is reported action by action.

ACTION A.1: Development of national integrated model for river basin management

Beneficiary responsible for the implementation:	SYKE
Other beneficiaries involved:	LUKE, SMK, MH_MT, UO
Foreseen start date: April 1st 2016	Actual start date: April 1st 2016
Foreseen end date: June 30th 2022	Actual end date: Sept 30th 2022

In the Action A1, national integrated model systems for assessing loading were developed, and their use and outcomes demonstrated using data from selected target areas of the project. The National Integrated Model (NIM) is a description of data flow from information sources to models and between models to support decision-making. It is a 'family of different modelling tools' to be deployed in forested areas. It provides information for planning forest operations and presents the means and measures to enable the good status of the receiving water body.

The activities

As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
Task 1. Development of integrated national modelling tool (FEMMA-VEMALA-LLR) VEMALA, LLR, FEMMA and KUHA models will be linked into an integrated model chain to estimate loading from agricultural and forestry and further to create a tool to steer agricultural and forestry actions and related water protection measures to reduce loading into watercourses. The methodology will be developed and necessary databases compiled in Action A1 during years 2016-2018	The national integrated model chain was developed and the necessary databases compiled as expected. The approach was tested in target area Puruvesi. Testing was done to estimate the capability of the NutSpaFHy model approach to calculate nutrient load caused by final felling based on actual forest inventory data. The work focused also to the climate variables and estimating effectiveness nature based water protection solutions (NBS), such as continuous cover forestry and extended buffer zones in a complementary project. This task was successful because we had the key players from private and state forestry, as well as research institutes involved in the Task as Beneficiaries.	SYKE
Task 2. Integration of new routines for hydrological modelling Task 2 introduces a physical based, spatially distributed hydrological model software HydroGeoSpere (HGS) to study the runoff generation processes and water retention capacities in more detail than models used for Task 1. This enables a physically more realistic description of water flow processes in the studied catchments.	Impact of peatland restoration on runoff processes and water retention capacity was selected as a modelling case for detailed hydrological modelling. This first application of HGS modelling was run in Eenokinneva study site (11.4 ha) in Lauhanvuori National Park, Karvianjoki catchment. The groundwater-surface water processes were successfully modelled, allowing us to simulate the improved water storage capacity after peatland restoration. HGS model requires massive resources for data collection and detailed monitoring data before and after actions. The required data was not available for Puruvesi area (target area in Task 1). This was reason why the role of the groundwater in Puruvesi lake water quality was studied by collecting water samples and running specific measurements (seepage velocity) instead of HGS modelling. The nutrient rich Ristilahti sub-catchment was selected based on VEMALA simulations in the task 1. Because VEMALA cannot consider nutrient load associated to groundwater input, the field campaigns provided essential information on nutrient sources to the lake highlighting the importance of model development. These results are reported in deliverable D3.1 Relatively little funding from Freshabit has been available for this task, so this work has also been funded the complementary project Hydrology LIFE (LIFE16 NAT/FI/000583, 2017-2021). The integration VEMALA and HGS models were finally tested in Olvassuo peatland (Hydrology LIFE study site) where all required data was	OU

	available (acronym WSFS used for VEMALA in deliverable A1.3.2). Both models were successfully applied in the Olvassuo area and a fully integrated hydrological HGS model was used to assist model chain development by improving groundwater component in VEMALA. Overall, the VEMALA model produced better results than the HGS model, primarily because the HGS model was not calibrated; hence, comparing the two models under these conditions was unrealistic. However, we have learned how powerful and realistic three-dimensional hydrological models can be, and we are aiming to enhance our simple VEMALA model into a more physics-based one by integrating other three-dimensional models, such as MODFLOW, or by improving its conceptual equations. The work eill be carried on by OU and SYKE in forthcoming projects. As a collaboration of these two projects and also WaterPeat project (funded by Water JPI call 2018) the large open database for physical properties of peat was produced to fill the data gap related to peatland dominated catchment models. The data demand for HGS modelling was initially not integrated in the monitoring schemes of the regional Beneficiaries, nor was there a resource budgeted for this for any other Beneficiary. Due to this failure of coordinating the task in the application phase, we could not implement the task as originally planned. Fortunately, however, the integration of models could be tested by complementary funding, and this had no implications to other Actions.	
Task 3. Assessment of cost-effectiveness of measures In this task existing tools such as the KUTOVA-tool are further developed to calculate more properly the costs and efficiency of water protection measures. KUTOVA will be integrated into the national modelling framework.	KUTOVA model was replaced by a simpler KUHA computing system, as reported in IR1 in deliverable A1.1. The preliminary cost efficiency calculation was estimated for the Puruvesi pilot area (Ristilahti) with the KUHA model.	SMK

The results

Expected results	Achieved results	Status	Beneficiary responsible
Demonstration of model and tool performance at selected test sites	Piloted in Puruvesi area, documented in deliverable A1.2 and additional output A1.4 Malliperheen sovellus Puruveden vesistöalueelle. The promotion of the introduction of spatial data sets produced by modeling tools, e.g. by training landowners and operators in the area so that the information contained in the data and models can be utilized to make decisions on the use of forests and also to implement appropriate water protection methods. It is clear that model sharing brings significant added value to the design of water management compared to the results of a single model.	Completed in Phase 2	SYKE
Project reports and publications documenting tools and applications	Published in deliverable A1.1 and additional output A1.5 Kansallisen valuma-aluemallin toteuttamissuunnitelma and A1.6 Kansallisen valuma-aluemallin tiedonkeräyssuunnitelma. The National Integrated Model (NIM) is a description of data flow from information sources to models, between models and finally to support decision-making. It is a 'family of different modeling tools' to be deployed in the forested areas. It combines the estimates of loading of nutrients and sediment from the terrestrial part of the catchment with the ecological status of the receiving water body. It provides information for planning water	Completed in Phase 2	SYKE

	protection on forest operations and presents the means and measures to enable the good status of the water body. The 'model family' NIM suits best for the calculation of water, sediment and nutrient fluxes from the terrestrial part of the catchment to the receiving water body in forested areas. It also includes a tool to estimate the ecological status of the water body (see figure below and the model descriptions in the literature part). In this report, the data needed for applying the national integrated model is described including the open www-links for information retrieval. All major input variables are described and the open access of the data is presented.		
Demonstration of model application for creating feasible action scenarios for achieving good ecological state in water bodies under Natura 2000 network (D3)	Work for modelling and comparing different future climate scenarios and effectiveness of the water protection measures was completed in Action D3 for catchments in Koitajoki and Puruvesi regions. Work was done together with the complementary EU Horizon 2020 project Operandum (*Open air laboratories with nature based solutions to manage environmental risks*). The two projects were mutually supportive as they both intended to produce different climate scenarios and to assess the impact of different forestry measures and water protection methods. Scenario runs were modeled in both normal and exceptionally rainy years with NutSpaFHy model. Modeling assumed e.g. two alternatives (1) no felling and (2) all possible fellings within one day. In this way, extreme situations could be identified. D3.5 Report on the effect of climate change and actions in forestry and agriculture on the water quality in Koitajoki and Puruvesi was published 27.5.2021	Completed in phase 3	SYKE

Output

Deliverables

Code	Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable	Delivered
A1.1	Report on national integrated model for river basin management	31.12.2017	31.12.2017	SYKE	ArcGIS Online map journal: FRESHABIT LIFE IP -valuma-aluekunnostukset ja mallinnukset	IR2
A1.2	Application of national integrated model for river basin management	31.12.2018	31.3.2019	SYKE	ArcGIS Online map journal: Metsän hakkuuskenaarioiden vaikutukset ravinnehuuhtoumiin	IR2
A1.3	Application of improved detailed hydrological model linking groundwater and surface water in brook and wetland restoration	30.9.2022	30.09.2022	SYKE, OU	A1.3.1 Menberu M. W.,Ronkanen A-K., Marttila, H. and Kløve, B. 2019: The effects of drainage and restoration on the hydrological processes of the Eenokinneva peatland: results from monitoring and HGS modelling in Freshabit Life project (Oulun yliopisto, pdf, 4 206 kb) A1.3.2 Päkkilä, L., Menberu, M., Autio, A., Marttila, H., Ronkanen, A.K., Veijalainen, N. & Huttunen, M. 2022: Application of Improved Detailed Hydrological Model: Linking Groundwater and Surface Water in esker-peatland hydrological	FR

					formation (Oulun yliopisto, pdf (3 259 kb)	

Additional output

Code	Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable	Delivered
A1.4	Background report for Deliverable A1.2	NEW	30.6.2017	SYKE	Tattari, S. & Leinonen, A. 2017: Malliperheen sovellus Puruveden vesistöalueelle	IR1
A1.5	Background report for Deliverable A1.1	NEW	30.6.2016	SYKE	Tattari S., Finér L., Leinonen, A. & Riihimäki, J. 2016: Kansallisen valuma-aluemallin toteuttamissuunnitelma	IR1
A1.6	Background report for Deliverable A1.1	NEW	31.12.2016	SYKE	Tattari, S. & Finér, L. 2016: Kansallisen valuma-aluemallin tiedonkeräyssuunnitelma	FR

Milestones

Milestone	Foreseen date in GA	Actual date	Beneficiary responsible
Detailed plan for national integrated model for river basin management ready	30.6.2016	30.6.2016	SYKE
Database for integrated modelling of national integrated model for river basin management ready	31.12.2016	31.12.2016	SYKE
First applications on national integrated model for river basin management pilot areas to be applied ready	30.6.2017	30.6.2017	SYKE
First application of improved detailed hydrological model linking groundwater and surface water in brook and wetland restoration (Eenokinneva)	30.9.2021	5.11.2019	OU

Continuation of the action after the project

Also in the future the combination of models from different organizations requires a project to promote the coordinated utilization of developing forest family models, unless other solutions can be found. SYKE, LUKE, and SMK are responsible for development of models, and SMK and Metsähallitus together with forest companies and local entrepreneurs on application of these models. The coordination of model development would be best continued by steady funding and steering by MoAF. During Freshabit detailed data on forestry were provided to SYKE by Metsähallitus and SMK, but in the future there should be a separate agreement to update the material annually. To some extent, the sharing of models will continue in the Horizon 2020 project Operandum, but it is important to agree that cooperation will continue after these projects. In the future, it would also be good to develop an operating system where data and model results would be transferred more or less automatically. The results of comparison between HGS and VEMALA indicate, that constant refining of the current models is necessary.

The current results and modeling approaches are already being used in practice, as SMK utilizes the results in guidance for forestry actions in private forests, and Metsähallitus in state-owned forests.

Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification

Task 2 comparison of VEMALA and HGS models implemented in a site of a complementary project instead of Freshabit site. The decision was made when we noticed that not enough data was available in Freshabit sites.	All work implemented in Freshabit sites.	First application of improved detailed hydrological model linking groundwater and surface water in brook and wetland restoration implemented in Freshabit site (Eenokinneva), the full integration of VEMALA and HGS implemented in a site of Hydrology LIFE, where all necessary data was available.	No real impact to Freshabit Actions. Site-specific restoration measures completed as anticipated, and other measurement and modeling approaches applied in Puruvesi. The integration of models was done by cooperation with Freshabit LIFE IP and Hydrology LIFE.	Discussed in monitoring mission in Vantaa 18.5.2021

ACTION A.2: Development of scenario based model and indicator systems for assessing ecosystem services and sustainability

Beneficiary responsible for the implementation:	SYKE
Other beneficiaries involved:	LUKE, SMK, UHEL_LBS, POKELY, ProPuru
Foreseen start date: July 1st 2016	Actual start date: Jan 1st 2016
Foreseen end date: June 30th 2020	Actual (or anticipated) end date: June 30th 2020

The activities

As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
Task 1. Development of an integrated model system for ecosystem service and sustainability assessment in future agri-environmental context	Data collection and methodology development were completed, resulting to an integrated model to quantify main freshwater ecosystem services and assess different loading scenarios from agricultural practices. RUSLE and INCA modelling and Meta-analysis on nitrogen retention by buffer zones were completed. Meta-analysis on phosphorus retention by buffer zones and LCA was finalized in Phase 3 (Deliverable D3.3).	SYKE
Task 2. Development of freshwater indicators of national biodiversity and ecosystem service indicator system	The indicators have been developed and published in the Biodiversity.fi portal https://www.biodiversity.fi/en/habitats/inland-waters/. An extensive update of the biodiversity.fi portal is continued as part of the FEO-project (Finnish Ecosystem Observatory). The portal is the central tool for reporting trends of key indicators to the Convention of Biological Diversity. The results of the FRESHABIT project have contributed to this central activity.	SYKE
Task 3. Assessment of vulnerability and ecosystem impacts at selected N2000 sites using long-term ecosystem data	Data collection for surface water chemistry concentrations and fluxes was completed successfully at selected N2000 sites Hietajärvi and Valkea-Kotinen. Statistical analysis of long-term data and application of dynamic biogeochemical model was completed and the results reported. Additional collection of physical and chemical data from lake water was implemented at site Valkea-Kotinen in 2018-2019. This was done to improve data quality and statistical treatment of the data for the reporting.	SYKE UHEL_LBS
Task 4. Assessment of ecosystem services in biosphere reserves and wetlands	The effects of restoration and land use change on ecosystem services in Koitajoki target area have been assessed and recommendations for natural resources management have been compiled and reported. POKELY has lead a network in Koitajoki area for joint planning and assessment of ecosystem services and land use strategies. This network included all the major land user type including forestry, mining industry, peat industry, tourism and recreation and municipalities. The network convened 2-4 time/year and results presented as an example in Deliverable A10.2 and reported fully in A10.1. The network proved to be very useful for the land use planning of the area and evaluation of the different ecosystem services. Assessment of ecosystem services of project actions was also used in assessing the socio-economic impacts of Freshabit.	SYKE POKELY

The results

Expected results	Achieved results	Status	Beneficiary responsible
Advanced documented integrated model system for ecosystem service and sustainability assessments.	An integrated model chain has been created by linking several models (RUSLE, INCA, meta-analysis), reported in Report on integrated model framework for ecosystem service assessment and sustainability assessment. The integrated model system allows quantification of main ecosystem freshwater services and assessment of different loading scenarios from agricultural practices. The system also allows assessment of impacts on	Completed in phase 3	SYKE

	habitats of sensitive/protected freshwater species (trout, river pearl mussel). The model chain was used for assessing water protection measures in the Karjaanjoki basin where the river pearl mussel is a threatened species. The model chain and its submodels are used also in new assessment and project work of SYKE and Luke and for evaluating impacts of land use measures in different areas.		
Updated national ecosystem service and biodiversity indicator system for freshwaters (biodiversity.fi).	Rivers without barriers indicator was developed and published already in 2017. Two new biodiversity indicators have been developed (Development of lake regulation, Removal of migration barriers), also some existing indicators have been developed further. The indicators have been updated to the Luonnontila.fi. The indicators are updated by SYKE. The biodiversity.fi portal is the central tool for reporting trends of key indicators to the Convention of Biological Diversity.	Completed in Phase 2	SYKE
Demonstration of model and tool performance at selected test sites (see also D3).	• Report on integrated model framework for ecosystem service assessment and sustainability assessment A2.2 completed • Report on the long-term impacts of climate change and air pollutants at the Valkea-Kotinen site (Vanajavesi) D3.2 completed • Report on the application of the integrated model framework for ecosystem service and sustainability assessment at the Karjaanjoki catchment D3.3 completed.	Completed in phase 3	SYKE
Project reports and publications documenting model tools and applications (see also D3).	Following reports have been published : • Hyytiäinen, R. ym. 2017: Uudet sisävesien biodiversiteetti- ja ekosysteemipalveluindikaattorit (pdf 698 kt) • Nikula, A., Tolkkinen, M. & Reinikainen, A. 2017: Puruveden alueen muutokset 1950-luvulta (www.propuruvesi.fi) (A3.26) • Rankinen, K., Usva, K., Lilja, H., Saarinen, M., Valkama, E. & Vähä, J-P. 2018: Report on integrated model framework for ecosystem service assessment and sustainability assessment (pdf, 855 kt) • Wolff, F., Mononen, L., Hyytiäinen, R. & Vihervaara, P. 2019: Assessment of freshwater ecosystem services in the Koitajoki Catchment in North Karelia with associated land use changes and restoration (Suomen ympäristökeskus, pdf, 2 905 kt) • Vuorenmaa & al. 2020: Report on the long-term impacts of climate change and air pollutants at the Valkea-Kotinen site (Vanajavesi) (D3.2.) • Saarinen ym. 2021: Report on the application of the integrated model framework for ecosystem service and sustainability assessment at the Karjaanjoki catchment (D3.3.)	Completed in phase 3	SYKE
Assessment of long-term ecosystem impacts of climate change and air pollutants at selected N2000 sites (indicators, reports, publications, see also D3).	Reports completed: • Report on lake sediment results (Hatakka et al. 2018. Lieksan Iso Hietajärven ja Pieni Hietajärven pohjasedimenttitutkimus (D3.6) • D3.4 Report on the long-term impacts of climate change and air pollutants at the Hietajärvi site (Koitajoki) • D3.2 Vuorenmaa & al. 2020 Report on the long-term impacts of climate change and air pollutants at the Valkea-Kotinen site (Vanajavesi)	Completed in phase 3	SYKE

Output

Deliverables

Code	Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable	Delivered
A2.1	Report on ecosystem service indicators for biodiversity.fi	31.12.2017	1.5.2017	SYKE	Uudet sisävesien biodiversiteetti- ja ekosysteemipalveluindikaattorit	IR1

	portal					
A2.2	Report on integrated model framework for ecosystem service assessment and sustainability	30.6.2018	30.6.2018	SYKE	Report on integrated model framework for ecosystem service assessment and sustainability assessment	IR2
A2.3	Report on ecosystem services in North Karelia Biosphere reserve	31.12.2019	31.1.2019	SYKE	Assessment of freshwater ecosystem services in the Koitajoki Catchment in North Karelia with associated land use changes and restoration	IR2

Milestones

Milestone	Foreseen date in GA	Actual date	Beneficiary responsible
Database for integrated modelling of ecosystem services ready	30.6.2018	30.6.2018	SYKE
ES indicators included in biodiversity.fi portal	30.6.2018	31.1.2019	SYKE
Database for Hietajärvi site (Koitajoki) for the assessment of long-term impacts of global change ready	30.6.2020	30.06.2020	SYKE
Database for Valkea-Kotinen site (Vanajavesi) for the assessment of long-term impacts of global change ready	30.6.2020	30.06.2020	SYKE

Continuation of the action after the project

Developed model systems will be used for assessing future impacts of land use, air pollution and agricultural change by SYKE, Luke and ELY-centres as part of both project work and the derivation of data for formal reporting processes (EU directives). Process descriptions of the models are regularly updated by the users/model developers to implement new knowledge and keep the results relevant for the reporting processes. Biodiversity.fi portal will be used for reporting BD-directive and CBD national reporting. Monitoring and reporting of long-term impacts of air pollution and climate change will continue under EU National Emission Ceilings Directive (NECD). Assessment of ecosystem services will be used for developing national ecosystem accounting.

Core activities of the Action are continued also in the major FEO-project (Finnish Ecosystem Observatory, https://feosuomi.fi/en/) funded by the Ministry of the Environment. FEO brings together scattered activities that support the monitoring of the state of nature and improves elements of monitoring and related research infrastructures where needed. The project advances the utilization and development of observation networks, remote sensing data, analysis algorithms and open data and reporting products for habitat monitoring and reporting. FRESHABIT activities which are continued under FEO include development of the biodiversity.fi portal, and use/development of improved observation networks and analysis algorithms.

The site-based monitoring activities are continued as part of national and international monitoring networks. The data is used for data reporting to the EU WFD, EU National Emissions Ceilings Directive (NEC), and the UNECE Convention on Long-Range Transboundary Air Pollution (UNECE CLRTAP). The sites Valkea-Kotinen and Hietajärvi are also core sites in the development of the European Research Infrastructure eLTER, which currently is being formalized (https://www.elter-ri.eu/).

Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification

ACTION A.3: Preparation and planning for site management and restoration

Beneficiary responsible for the implementation:	SYKE, GTK, MH, SMK
Other beneficiaries involved:	LAPELY, EPOELY, LSPPo, VARELY, LUVY, Raase, VVK, KESELY, Saari, POKELY, ESAELY
Foreseen start date: 1 Jan 2016	Actual start date: Jan 1st 2016
Foreseen end date: 31 Dec 2020	Actual end date: Sept 30th 2022

This action included all the preparatory work needed for restoration of freshwater habitats and their catchments in C-actions. Surveys, plans, and permit applications were made in each project region for all Actions where necessary. Habitat Directive species were inventoried where applicable, e.g. FPM and TRM were surveyed in the stream and river areas, and Moor Frog and other HD Annex IV species in lake sites affected by concrete actions.

The activities

As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
Task 1. Collecting background data for ecological and hydrochemical variables, and cultural heritage. All relevant data will be collected and utilized in all project areas where Actions C1-C9 are executed.	All necessary background data was collected and reported. Two reports were completed in the third phase, 5 reports in total. • Report of data collected from old mine of Aijala in Kiskonjoki • The archaeological values of Kesonsuo area were reported in 2022 • Preliminary investigation for cultural heritage potential of FRESHABIT lakes of Vanajavesi area (2016) • Inventories and background data gathered for habitat restorations in total, and growing juveniles in 6 sites of Ähtävänjoki • Report of nature surveys concerning directive species before restoration actions done in Puruvesi 2016 and 2018 (restrictions and suggestions for action management included)	Several
Task 2. Technical restoration plans and permits The regional associate beneficiaries prepare or buy as external services the general and detailed plans, and, when necessary, applications for legal permits.	• Kiskonjoki: All restoration plans have been made and permits obtained. Permits for building fishways have also been obtained. • Karvianjoki: All restoration plans have been made. • Vanajavesi: All restoration plans were finished on time. Two of the legal environmental permits were obtained during spring 2020. • In Keski-Suomi the wetland restoration plans were finished in schedule (Saarijärven reitti, 3 plans, Päijänne 1 plan). 1 permit for raising water table was obtained in Saarijärven reitti (Peuralampi). Also the restoration plan for peat harvesting area (Haapasuo) is ready. • Karjaanjoki: General restoration plan for tributaries of River Mustionjoki completed. • Pohjanmaa: 1 restoration plan for restoration of the Villamo region, 1 structural plan for restoration of the Villamo region; plans ready for 27 water protection structures with an estimated effect area ca. 3000 ha. Restoration plans for bird wetlands in Isojoki and Ähtävänjoki are finalized. Restoration plan for raising the water table in C7 completed and permit for work granted. • Naamijoki: all plans finished and permits granted. • Puruvesi: All preplanned restoration plans and permits in all 5 target areas has been done. Construction of Jouhenjoki multipurpose wetland needs some planning supplements. Additional runoff control in Ala-Hälvä (target area 5) needs legal permit and detailed restoration plan. • Koitajoki: All promised restoration plans have been finalized.   *Well begun is half done. Restoration plans are essential before actual restoration work can commence.*	Raase, LUVY, VARELY, VVK, Vatten, KESELY, EPOELY, ESAELY, POKELY, MH_LP
Task 3. Survey of HD mussel species in restoration areas In Karjaanjoki, Kiskonjoki, Isojoki,	Karjaanjoki: Inventories of known FPM populations were carried out 2016. 1 population revisited 2019. 1 population was revisited 2020. Surveys of mussels made in the mainstems where restorations carried out. Permits for mussel work were obtained.	EPOELY, LUVY, VARELY,

Ähtävänjoki and Karvianjoki, the HD mussel species will be mapped by diving in larger rivers and streams, or by wading and aquascoping in small streams to prevent disturbance caused by in-stream or catchment restoration.	Kiskonjoki: All surveys of mussels have been made. Karvianjoki: All surveys of mussels have been made. Isojoki: All surveys of mussels have been made. Ähtävänjoki: All surveys of mussels have been made.	MH_LP

The results

Expected results	Achieved results	Status	Beneficiary responsible
Sufficient background data for concrete conservation actions	Collected background data consists of following reports: • A3.23 GTK: Happamien sulfaattimaiden esiintyminen ja ominaisuudet Kiskonjoen – Perniönjoen ja Karjaanjoen vesistöalueilla • A3.32 Linnuston lepäilijälaskennat: Ansionjärvi ja Hattelmalanjärvi (Kanta-Häme) sekä Saarioisjärvi ja Tykölänjärvi (Pirkanmaa) • A3.33 Viitasammakkokartoitukset FRESHABIT LIFE IP -hankkeen kohteilla Hämeessä ja Pirkanmaalla 2016 • A3.27 Suonio, M. Luontoselvitykset Puruvedellä (Savonlinna, Kitee) kevät-kesä 2018. Geofield Tmi. 28 s. • Tmi Geofield: dronekuva-aineistoja luonto-arvo ja niittotarveselvitykseen 4/2018 – 7/2018 • A3.24 Elinympäristökunnostusten suunnittelu Saarijärven reitillä 2017/2018/2019 • Iso Kivijärven kasvillisuuskartoitus 28.7.2020	Completed in Phase 3	GTK, VVK, ESAELY, Saari, LAPELY
Cultural value inventories in Vanajavesi, Koitajoki and Naamijoki	Cultural value inventories are completed in Vanajavesi and Naamijoki. Inventory for Koitajoki was be completed in 2022. • A3.33 Kulttuuriperintöinventointi Kolari 2016, Suur-Teuravuoman alue • A3.34 Kulttuuriperintöpotentiaalin esiselvitys Kanta-Hämeen ja Pirkanmaan järvillä 2016 • A3.43 Arkeologiset selvitykset, Koitajoen valuma-alue, Ilomantsi	Completed in Phase 3	MH_LP, VVK, POKELY
Occurrence of the HD mussel species is sufficiently known in the impact areas of C actions	Surveys of HD mussel species are completed. • A3.28 Survey: Jokihelmisimpukan ja vuollejokisimpukan nykytilan selvitykseen sekä raakkujen siirtoon liittyvät työt Kiskonjoella ja Karvianjoella vuosina 2016 ja 2017 • A3.5 Survey: Jokihelmisimpukka Karjaanjoen vesistössä – historia, nykytila ja pelastamistoimet 2018 • A3.29 Survey: Jokihelmisimpukan nykytilan selvitykseen ja pelastamiseen liittyvät maastotyöt vuonna 2016	Completed in Phase 2	VARELY, LUVY
Restoration/technical plans for Karjaanjoki (1)	Restoration plan for Karjaanjoki is completed. • A3.11 General restoration plan for tributaries of River Mustionjoki.	Completed in Phase 2	LUVY
Restoration/technical plans for Kiskonjoki (2)	All restoration plans for Kiskonjoki are completed. • A3.2.1 Kiskonjoen Kosken ja Hålldamin kalatiet sekä Kosken vanhan uoman kunnostus • A3.2.2 Maisemasuunnitelma Kiskonjoen Koskenkosken kalatiestä	Completed in Phase 1	VARELY
Restoration/technical plans for Vanajavesi (8)	All the restoration plan for Vanajavesi are completed. • A3.14.1 Ormajärven valuma-alueen kosteikko- ja laskeutusallassuunnitelmat • A3.14.2 Kolmen Kukkiaan vaikuttavan laskeutusallaskohteen suunnitelmat • A3.19.1 Hattelmalanjärven kunnostussuunnitelma 19.11.2017 • A3.19.2 Ansionjärven kunnostussuunnitelma 31.3.2019 • A3.19.3 Vanajaveden lintuluodot 22.1.2019 (not public because of protection of personal data) • A3.19.4 Tykölänjärven kunnostussuunnitelman täydennys 15.1.2018 • A3.19.5 Saarioisjärven kunnostussuunnitelman täydennys 30.11.2017 • A3.19.6 Kukkian Rautajärven kosteikkoaluesuunnitelma 2018	Completed in Phase 2	VVK
Restoration/technical plans for Keski-Suomi (5)	Saarijärven reitti: all three management plans have been completed. • A3.21.1 Kilpilammen pinnan nosto • A3.21.2 Ylimen kunnostus • A3.21.3 Peuralammen pinnan nosto. • A3.17 Kivijärven pohjapadon rakentaminen Päijänne: restoration plan of peat harvesting area is completed. • A3.15 Haapasuon turvetuotantoalueen lintukosteikkokunnostus	Completed in phase 3	KESELY
Restoration/technical plans for Pohjanmaa (5)	All of the restoration/technical plans for Pohjanmaa are completed. • A3.1 Villamon patoalueen jokiuoman kunnostus 2016 • A3.30 Isojoen Villamon padon alapuolisen koskijakson luonnonmukainen kunnostussuunnitelma 2016 • A3.8 Blomträsketin lintuveden kunnostus- ja hoitosuunnitelma 2017 • A3.10 Lauhanvuori, Töllinoja restoration plan 2020 • A3.13 Jokisuunlahden lintuveden kunnostus- ja hoitosuunnitelma 2018 • Haapajärven vedenpinnan palauttamissuunnitelma 2018 Isojoki-Lapväärtinjoen vesistöalueen perinnebiotooppikohteiden kartoitus ranta-alueilla 2018 • A3.37 Paholuoman yläosan kunnostussuunnitelma 2017 • A3.38 Lohiluoman kunnostussuunnitelma 2019 • A3.39 Isojoen Lohiluoman kala- ja luonnontaloudellinen kunnostussuunnitelma II 2020	Completed in phase 2	EPOELY, MH_LP, LSPPo

Restoration/technical plans for Koitajoki (13)	Restoration plans are ready for all actions in Koitajoki region. • A3.20.1 Koivuluhdansuo (Viitasuo cons. area) & Viitasuo N2000 peatland restoration plan 2016 • A3.20.2 Mykränsuo restoration plan 2017 • Tahkokangas Kämppäkangas private cons. area restoration plan 2018 • A3.20.3 Puohtiinsuon ennallistamisen toimenpidesuunnitelma 2019 • A3.20.5 Technical plans for Siltasuo • A3.20.4 seven main channels in Kesonsuo • Water protection and restoration plans in A3.18.1 Lähevaara, Kuikkalammin- and Apsonlamminsärkät (Huhus) and A3.18.2 Hattuvaara-Tiitanvaara-Marjovaara privately owned lands are ready. Lähevaara, Kuikkalammin- and Apsonlamminsärkät (Huhus) plan includes restoration for peatlands in privately owned parts of Kesonsuo ravines. A3.18.3 Water protection plan for privately owned area near River Kelsimä, the areas between Mekrijärvi Village and the peat production area of Riihisuo completed in 2020.	Completed in phase 3	POKELY, SMK, MH_LP
Restoration/technical plans for Puruvesi (5)	All restoration/technical plans for Puruvesi are completed. • General plan for water protection measures ready. • Technical and restoration plans for catchment area water protection structure ready (multipurpose wetland and submerged weir in Jouhenjoki/Kirkkoranta) 2016 • Technical plans for dense vegetation removal (Matinniemi 2016 and Ketolanlahti 2018) • Technical plans for fishing management restoration (Haudanalahti 2016/2017 and Savonlahti/Kuonanjärvi 2018/2019	Completed in phase 2	ESAELY, SMK
Restoration/technical plans for Naamijoki (2)	Restoration/technical plans for Naamijoki are completed. • A3.12 Restoration plan for Teuravuoma-Kivijärvenvuoma • A3.12 Plan for increasing the water level of Teurajärvi • A3.22 Kolarin Vaatto- ja Teurajärven kalasto ja suunnitelma hoitokalastusten toteuttamiseksi	Completed in phase 3	MH_LP
Legal permits for actions C3 and C7.	All necessary legal permits received during the project.	Completed in phase 3	Several

Output

Deliverables

Code	Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable	Delivered
A3.1	Technical plan for dam removal, subsequent restoration actions and flood control of the Villamo	31.1.2016	31.1.2016	EPOELY	Villamon patoalueen jokiuoman kunnostus	IR1
A3.2	Fishway plans for Kiskonjoki (Koski, Hålldam)	31.12.2016	31.12.2016	VARELY	A3.2.1 Kiskonjoen Kosken ja Hålldamin kalatiet sekä Kosken vanhan uoman kunnostus A3.2.2 Maisemasuunnitelma Kiskonjoen Koskenkosken kalatiestä	IR1
A3.3	Restoration plan for peatlands in Koivuluhdansuo (Koitajoki)	31.12.2016	31.10.2016	MH_LP	Koivuluhdansuon (Viitasuon luonnonsuojelualueen) ja Viitasuon Natura-alueen soiden ennallistamissuunnitelma	IR1
A3.4	A plan of measures to decrease sedimentation loads and the effect of acid sulfate soils, trough water protection measures in forestry in Ähtävänjoki	31.3.2017	31.3.2017	SMK	Ähtävänjoen vesiensuojelusuunnitelma (Vattenvårdsplan - Esse å)	IR1
A3.5	Report of the historical and contemporary distribution of freshwater pearl mussels in the Karjaanjoki area	31.12.2017	23.1.2018	LUVY	Jokihelmisimpukka Karjaanjoen vesistössä – historia, nykytila ja pelastamistoimet (Combined report A3.5 and A3.7)	IR1
A3.6	Restoration plan for canals at Teuraoja and Kivijärven oja (Naamijoki)	31.12.2017	31.1.2017	MH_LP	Teuravuoma-Kivijärvenvuoman Natura-alueen ennallistamissuunnitelma, new version 2019	IR2
A3.7	Report of the current distribution of freshwater pearl mussels in the Karjaanjoki area	31.12.2017	23.1.2018	LUVY	Jokihelmisimpukka Karjaanjoen vesistössä – historia, nykytila ja pelastamistoimet (Combined report A3.5 and A3.7)	IR2
A3.8	Restoration plan of bird wetlands in Isojoki	31.12.2017	11.10.2017	EPOELY	Blomträsketin lintuveden kunnostus- ja hoitosuunnitelma	IR1

A3.9	Restoration plans for peatlands in Kesonsuo and Mykränsuo (Koitajoki)	31.12.2017	28.3.2017	MH_LP	Kesonsuon Mykränsuon länsiosan ennallistamissuunnitelma	IR1
A3.10	2 restoration plans for peatland restoration in Isojoki	31.12.2017	19.11.2020	MH_LP	A3.10.1 Lauhanvuori, Töllinoja restoration plan A3.10.2 Previous Haapakeidas restoration plan still valid, no need for new restoration plan.	FR
A3.11	General plan for Karjaanjoki river system in-stream habitat restoration	31.12.2018	31.12.2018	LUVY	Mustionjoen sivupurojen kunnostussuunnitelma - Purokunnostusten yleissuunnitelma ja purojen vedenlaatu General restoration plan for tributaries of River Mustionjoki	IR2
A3.12	Plan for increasing the water level of Teurajärvi (Naamijoki)	31.12.2018	4.5.2018	MH_LP	Teurajärven kunnostus	IR2
A3.13	Restoration plan of bird wetlands in Ähtävänjoki	31.12.2018	28.3.2018	EPOELY	Jokisuunlahden lintuveden kunnostus- ja hoitosuunnitelma	IR2
A3.14	Restoration plans for headwater lakes (2) in Vanajavesi	31.12.2018	15.3.2018	VVK	A3.14.1 Ormajärven valuma-alueen kosteikko- ja laskeutusallassuunnitelmat A3.14.2 Kolmen Kukkiaan vaikuttavan laskeutusallaskohteen suunnitelmat	IR2
A3.15	Restoration plan for peatlands in Haapasuo (Keski-Suomi)	31.12.2018	9.1.2019	KESELY	Haapasuon turvetuotantoalueen lintukosteikkokunnostus	IR2
A3.16	Restoration plan for peatlands in Kesonsuo ravines (Koitajoki)	31.12.2018	8.12.2017	MH_LP	Kesonsuon Tahko- ja Kämppäkankaan yksityisen suojelualueen ennallistamissuunnitelma	IR2
A3.17	Restoration plan for wetland (Kivijärvi) in Päijänne, Keski-Suomi	31.12.2019	31.5.2020	KESELY	Kivijärven pohjapadon rakentaminen	FR
A3.18	5 plans for water protection and in-stream restoration measures in Lähevaara, Kuikkalammin- and Apsonlamminsärkät areas, River Kelsimä, the areas between Mekrijärvi Village and the peat production area of Riihisuo and Hattuvaara-Tiitanvaara-Marjovaara areas (Koitajoki)	31.12.2019	30.5.2020	SMK	Water protection and restoration plans in A3.18.1 Lähevaara, Kuikkalammin- and Apsonlamminsärkät (Huhus) A3.18.2 Hattuvaara-Tiitanvaara-Marjovaara privately owned land. A3.18.3 Water protection plan for privately owned area near River Kelsimä, the areas between Mekrijärvi Village and the peat production area of Riihisuo.	IR2
A3.19	Restoration plans for six bird lakes in Vanajavesi	31.12.2019	31.3.2019	VVK	A3.19.1 Hattelmalanjärven kunnostussuunnitelma 19.11.2017 A3.19.2 Ansionjärven kunnostussuunnitelma 31.3.2019 A3.19.3 Vanajaveden lintuluodot 22.1.2019 (not public because of protection of personal data) A3.19.4 Tykölänjärven kunnostussuunnitelman täydennys 15.1.2018 A3.19.5 Saarioisjärven kunnostussuunnitelman täydennys 30.11.2017 A3.19.6 Kukkian Rautajärven kosteikkoaluesuunnitelma 2018	IR2
A3.20	Restoration plans for peatlands in privately owned parts of Kesonsuo ravines and Siltasuo and seven main channels in Kesonsuo in 2019 (Koitajoki)	31.12.2019	3.10.2019	POKELY, MH_LP	Technical restoration plans for peatlands ready A3.20.1 Viitasuo, A3.20.2 Kesonsuon Mykränsuo, A3.20.3 Puohtiinsuo, A3.20.4 Kesonsuon raviinit and A3.20.5 Seven channels in Kesonsuo	IR2
A3.21	Restoration plans for three bird wetlands (Ylin, Peuralampi and Kilpilampi) in Saarijärven reitti	30.9.2020	21.10.2019	KESELY	Restoration plans for 4 bird wetlands completed : A3.21.1 Kilpilammen pinnan nosto A3.21.2 Ylimen kunnostus A3.21.3 Peuralammen pinnannosto plans	IR2
A3.42	Report of data collected from old mine of Aijala in Kiskonjoki	30.9.2021	17.5.2022	VARELY	Riskiarviointi Aijalan kaivos	FR
A3.43	Report of the	30.9.2021	30.9.2022	POKELY	Arkeologiset selvitykset, Koitajoen valuma-alue,	FR

	archaeological values of Kesonsuo area and how they have been taken into account when implementing the restoration actions				Ilomantsi	

Additional output

Code	Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable	Delivered
A3.22	Fisheries management plan for Vaatto- and Teurajärvi	NEW	20.12.2016	MH_LP	Kolarin Vaatto- ja Teurajärven kalasto ja suunnitelma hoitokalastusten toteuttamiseksi	IR1
A3.23	The survey of acid sulfate soils in the Kiskonjoki - Perniönjoki and Karjaanjoki river catchments	NEW	1.3.2017	GTK	Happamien sulfaattimaiden esiintyminen ja ominaisuudet Kiskonjoen – Perniönjoen ja Karjaanjoen vesistöalueilla	IR1
A3.24	Habitat survey for Saarijärven reitti	NEW	13.8.2018	Saari	Elinympäristökunnostusten suunnittelu Saarijärven reitillä	ÏR2
A3.25	Pilot study of transferring mosses at River Ala-Koitajoki	NEW	1.7.2017	POKELY	Sammalkivien siirto Ala-Koitajoen Kuusamonkoskella 2017	IR1
A3.26	Report of changes from 1950`s in five Puruvesi catchment areas	NEW	13.11.2017	ProPuru	Puruveden viiden Freshabit -kohdealueen muutokset 1950-luvulta alkaen	IR2
A3.27	Background species and habitat survey for restoration and management in Puruvesi 2018	NEW	13.11.2018	ESAELY	Luontoselvitykset Puruvedellä (Savonlinna, Kitee) kevät-kesä 2018	IR2
A3.28	Freshwater pearl mussel and thick shelled river mussel survey for conservation actions in Kiskonjoki and Karvianjoki	NEW	20.1.2018	VARELY	Jokihelmisimpukan ja vuollejokisimpukan nykytilan selvitykseen sekä raakkujen siirtoon liittyvät työt Kiskonjoella ja Karvianjoella vuosina 2016 ja 2017	IR2
A3.29	Freshwater pearl mussel survey for conservation actions 2016	NEW	30.1.2017	LUVY, JYU	Jokihelmisimpukan nykytilan selvitykseen ja pelastamiseen liittyvät maastotyöt vuonna 2016	IR2
A3.30	Plan for semi-natural restoration of the rapids below demolished Iso-Villamo dam	NEW	30.6.2017	EPOELY	Isojoen Villamon padon alapuolisen koskijakson luonnonmukainen kunnostussuunnitelma	IR2
A3.31	Monitoring of resting birds in Ansionjärvi, Hattelmalanjärvi, Saarioisjärvi and Tykölänjärvi lakes.	NEW	7.6.2016	VVK	Linnuston lepäilijälaskennat: Ansionjärvi ja Hattelmalanjärvi (Kanta-Häme) sekä Saarioisjärvi ja Tykölänjärvi (Pirkanmaa)	IR2
A3.32	Moor frog inventories in FRESHABIT LIFE IP target sites in Häme and Pirkanmaa regions in 2016	NEW	30.8.2016	VVK	Viitasammakkokartoitukset FRESHABIT LIFE IP -hankkeen kohteilla Hämeessä ja Pirkanmaalla 2016	IR2
A3.33	Cultural heritage survey in the Suur-Teuravuoma area, Kolari municipality 2016	NEW	2016	MH_LP	Kulttuuriperintöinventointi Kolari 2016, Suur-Teuravuoman alue	IR2
A3.34	Preliminary survey for the potential cultural heritage in the lakes of Kanta-Häme and Pirkanmaa region 2016	NEW	29.7.2016	VVK	Kulttuuriperintöpotentiaalin esiselvitys Kanta-Hämeen ja Pirkanmaan järvillä 2016	IR2
A3.35	The history of natural resource use in Koitajoki Ilomantsi	NEW	2019	POKELY	Ilomantsin luonnonvarojen käytön historiaa Koitajoen ympäristön tilan muutosten kuvaajana	FR
A3.36	Monitoring of vegetation in lake Iso Kivijärvi	NEW	2020	LAPELY	Iso Kivijärven kasvillisuuskartoitus 28.7.2020	FR
A3.37	Paholuoma restoration plan	NEW	2017	LSPPo	Paholuoman yläosan kunnostussuunnitelma	FR

A3.38	Lohiluoma restoration plan	NEW	2019	LSPPo	Lohiluoman kunnostussuunnitelma osa 1	FR
A3.39	Lohiluoma restoration plan II	NEW	4/2020	LSPPo	Isojoen Lohiluoman kala- ja luonnontaloudellinen kunnostussuunnitelma osa 2	FR
A3.40	Iron in boreal river catchments: Biogeochemical, ecological and management implications	NEW	9/2021	SYKE	Iron in boreal river catchments: Biogeochemical, ecological and management implications	FR
A3.41	Lepikkokangas in Saarijärvi: Peatland restoration plan	NEW	30.6.2021	JAMK	Lepikkokangas in Saarijärvi: Peatland restoration plan	FR

Milestones

Milestone	Foreseen date in GA	Actual date	Beneficiary responsible
Cultural heritage value inventory ready in Naamijoki and Vanajavesi	31.12.2016	31.12.2016	MH_LP
Restoration plans ready in Puruvesi	31.12.2016	31.12.2016	SMK, ESAELY
Inventory of FPM´s and cultural values in Karvianjoki is ready	31.12.2017	31.12.2017	VARELY
All background data gathered, analyzed, and utilized	31.12.2018	31.12.2018	Several
Occurrences of HD mussel species sufficiently surveyed	31.12.2018	31.12.2018	Several
Restoration plans ready in Naamijoki and Pohjanmaa	31.12.2018	12/2019	MH_LP
Restoration plans ready in Vanajavesi	31.12.2019	31.3.2019	VVK
Restoration plans ready in Koitajoki	31.12.2019	SMK, POKELY 30.5.2020 MH_LP 31.12.2019	POKELY, SMK, MH_LP
Restoration plans ready in Keski-Suomi (30.9.2020)	30.9.2020	31.5.2021	KESELY
All legal permits acquired for C3 and C7 received	31.12.2020	22.6.2021	MH_LP
Archaeological surveys completed in Koitajoki	31.12.2020	30.9.2022	POKELY
Data collected about the risks of old mine of Aijala in Kiskonjoki	30.9.2021	31.1.2022	VARELY

Continuation of the action after the project

No need for continuation of the action after the project.

Modifications (action and/or budget)

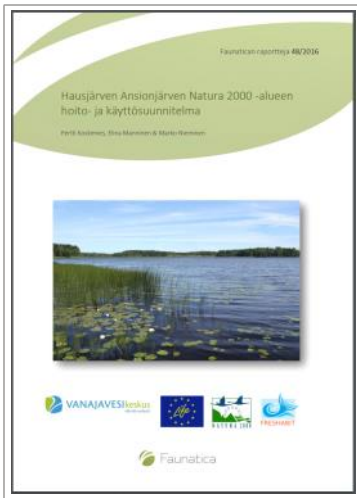
Description/justification	Before modification	After modification	Impact of the modification	Communication about modification
Only one peatland restoration plan was considered necessary to make in the Isojoki catchment by MH_LP. Earlier (2010)Haapakeidas restoration plan was still considered valid, and the restoration has been implemented using that.			No impact. The existing restoration plan was considered valid, and the restoration has been implemented.	
A technical restoration plan (A3) for a peatland restoration for one of the restoration hotspots in the Saarijärvi route	-	A technical restoration plan (A3) for a peatland restoration for one of the restoration hotspots in the Saarijärvi route	An extra peatland restoration in E7	Agreement from Sarunas Zableckis from EASME by email 5.1.2021.

ACTION A.4: Elaboration of site and catchment management plans

Beneficiary responsible for the implementation:	SYKE, MH_LP, SMK
Other beneficiaries involved:	EPOELY, LUVY, LSPHä, ESAELY, KESELY, JAMK
Foreseen start date: 1 Jan 2016	Actual start date: 1 Jan 2016
Foreseen end date: 31 Dec 2020	Actual end date: 15th May 2021

Action A4 built upon the information collected in action A3, and demonstrated the Task "Integrated multistakeholder planning for catchment area management of N2000 areas" in action A10. The action comprised both standard Natura 2000 area management plans (Task 1), and wider catchment area plans, Regional Water Protection Plans around Natura 2000 areas (Task 2).

The activities

As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
Task 1. Elaborating management plans for N2000 areas Management plans are prepared for two Natura 2000 areas in the Vanajavesi region (Ormajärvi-Untulanharju, FI0325002 and Ansionjärvi, FI0305003) and one in the Päijänne region (Arvajanreitti, FI0900101).	Altogether five Natura 2000 management plans were completed within Freshabit (additional to those planned: Lapväärtinjokilaakso, FI0800111 and Hattelmalanjärvi, FI0310007). Management planning for Natura 2000 sites is a previously tested participatory process involving all the relevant stakeholders. The management plans made for Freshabit sites were completed without any significant problems.  	KESELY, VVK, LSPHä
Task 2. Regional water protection plans (RWPP) Regional water protection planning around Natura 2000 areas is demonstrated in Isojoki, Karjaanjoki, Saarijärven reitti and Naamijoki	RWPP's for Arvajanreitti (SMK), Saarijärvenreitti (SMK), Karjaanjoki (LUVY), Naamijoki (SMK), and Isojoki (EPOELY) were completed by 5/2021. Regional water protection plans prepared in Freshabit are wider than management plans for Natura 2000 sites. Management plans are typically made for single N2000 sites and they comprise actions that are targeted within the N2000 site. In RWPP's the scope is wider, encompassing and reconciliating for land use and other activities in the catchment area on the target N2000 site. The process of preparing the RWPP plan is participatory in a similar manner as the N2000 management plans. Important local stakeholders were involved in the planning processes. The RWPP's prepared in Freshabit were focused on the most significant potential threats in the target N2000 catchments. The final plans included traditional printed media as well as ArcGIS Online story maps.	EPOELY, LUVY, SMK

The results

Expected results	Achieved results	Status	Beneficiary responsible
Management plans for 3 Natura 2000 area	All management plans ready (Ormajärvi, Ansionjärvi, Arvajan reitti)	Completed in phase 2	VVK, KESELY, SMK
Regional water protection plans for 4 catchments of Natura 2000 sites (Isojoki, Karjaanjoki, Saarijärven reitti and Naamijoki) (31.12.2020)	All RWPP's completed.	Completed in phase 3	LUVY, SMK, EPOELY

Output

Deliverables

Code	Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable	Delivered
A4.1	Natura 2000 management plan and RWPP for Arvajanreitti (FI0900101)	31.12.2017	5.2.2018	SMK, KESELY	A4.1.1 Arvajan reitin hoito- ja käyttösuunnitelma A4.1.2 Arvajanreitin valuma-aluesuunnitelma	IR2
A4.2	RWPP for Karjaanjoki region	31.12.2017	30.8.2017	LUVY	Mustionjokilaakson vesiensuojelun ja luonnon monimuotoisuuten yleissuunnitelma	IR1
A4.3	Natura 2000 management plans for two sites in Vanajavesi region	31.12.2018	15.3.2018	VVK	A4.3.1 Ormajärven Hoito- ja käyttösuunnitelma A4.3.2 Ansionjärven Hoito- ja käyttösuunnitelma A4.3.3. Hattelmalanjärven Hoito- ja käyttösuunnitelma	FR
A4.4	RWPP for the Saarijärven reitti	31.12.2019	31.12.2019	SMK	Saarijärven reitin alueellinen vesiensuojelusuunnitelma: Metsätaloudelle https://arcg.is/1nezKH0	IR2
A4.5	Regional water protection plan for the River Isojoki - overview + attachments	31.12.2020	15.5.2021	EPOELY	A4.5.1Lapväärtin-Isojoen valuma-aluesuunnitelma - tiivistelmä A4.5.2 Lapväärtinjokilaakson Natura 2000 -alueen hoito- ja käyttösuunnitelma A4.5.3 Kristiinankaupungin-Isojoen kalatalousalueen käyttö- ja hoitosuunnitelmapilotti Lapväärtin-Isojoen alueelle	FR

Milestones

Milestone	Foreseen date in GA	Actual date	Beneficiary responsible
Natura 2000 management planning for Arvajanreitti (FI0900101) started	31.5.2016	1.5.2016	SMK
General catchment area restoration planning for Karjaanjoki region started	31.5.2016	15.6.2016	LUVY
Natura 2000 management plans for three sites in Vanajavesi region started (01.06.2016)	31.5.2016	31.5.2016	VVK
Multifaceted and broad planning for sustainable use and protection of Isojoki river catchment started	30.6.2017	31.5.2017	EPOELY
Regional water protection and management planning for the Saarijärven reitti ready, implementation started	31.12.2017	31.12.2019	SMK

Additional Output

Code	Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable	Delivered
A4.6	RWPP for Naamijoki	NEW	31.12.2020	SMK	Naamijoen valuma-alue suunnitelma: https://arcg.is/185Ky	FR

Continuation of the action after the project

The Regional Water Protection Plans are a concept that can be replicated in other areas by authorities or other actors, such as ELY-centres, Metsähallitus or regional water protection associations that have tools and mandate for catchment-scale planning. Similar multi-purpose catchment-scale processes have already been started outside the project. The RWPP and management plans for N2000 sites serve also beyond the projects as after-LIFE plans.

Implementation of the plans is continued after Freshabit in projects as well as part of other activities of Beneficiaries and stakeholders. SMK has and will arrange training for land owners, entrepreneurs and other active parties in forestry to enhance the water protection measures in N2000 catchments. The planned measures are included in future projects. For example, the TRIWA LIFE starting in 2023 will implement the RWPP for Naamijoki, and in Isojoki region funding application for implementation of the RWPP is being prepared.

Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification

ACTION A.5: Development of assessment methods for headwater habitats

Beneficiary responsible for the implementation:	SYKE
Other beneficiaries involved:	MH_LP, SMK, LUKE, UO
Foreseen start date: Jan 1st, 2016	Actual start date: Jan 1st, 2016
Foreseen end date: June 30st, 2019	Actual end date: June 6th, 2021

In this action, the status assessment methodology for streams was developed and demonstrated using existing data for model building (calibration) and data from pilot catchments for model validation and fine-tuning. The methodology was developed based on results of earlier projects and existing protocols (WFD monitoring protocol) modified for small streams.
The main aims of this task were to find out:

- How good estimation of the hydro-morphological status of streams can be done by GIS-based assessment in comparison to assessment based on field surveys?
- How well do ecological indicators based on applied WFD monitoring protocols correspond to observed (field) or modelled (GIS-based) hydro-morphological status assessment in the streams?
- Should we develop new set of indicators based on predictive modelling?

The activities

As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
Task 1. Collection and analysis of existing data The previously collected stream inventory data will be manually digitized into an ArcGIS database, and all other available data will be gathered for utilization in Tasks 2-4.	All existing standardized survey data from Finland of bryophytes (532 stream sites), macroinvertebrates (569) and fish (546) from headwater streams were collated and their taxonomy harmonized. Stream inventory data from Iijoki catchment area (436 streams) were digitized to GIS format at MH. All existing data were gathered by 12/2016 (MS 1). The survey databases were finalized by 3/2017. Data collection was smooth because nearly all relevant data sources were involved in the project as Beneficiaries.	SYKE, MH_LP, SMK, LUKE, OU
Task 2. Harmonizing existing modeling methods for assessment of headwaters Results of a complementary project ("SmallWBGIS", 2014-2015, finalized in May 2015) will be analyzed for issues that need further development. The possibilities of joint use and harmonization of these results with the analysis model RiverLifeGIS used in the forestry sector to predict erosion risks into streams will be tested and assessed.	GIS analyses for stream geomorphology, delineation of the drainage basins and analyses of land use were done for the 436 streams at the Iijoki river basin by SYKE and MH. Their results were used to further develop the GIS-based assessment method (SmallWBGIS prepared in an earlier PienvesiGIS-project) using the field inventory data. An improved empirical statistical model was built using the Iijoki river basin data, and tested using independent data from the river basin. The model performed well and was able to distinguish near-natural streams from streams that are degraded activities and land use by forestry in our study area. The resulting model still needed fine-tuning and this work was continued by complementary funding, with the aim of national stream assessment modelling method for whole Finland. LIFE resources for the Task were initially underestimated.	SYKE
Task 3. Developing assessment methods for ecological status of headwater streams Assessment methods for ecological status of headwater streams will be developed based on existing biological data collated in Task 1 and GIS data collated in Task 2, including the "SmallWBGIS" model. Assessment systems for headwater streams will be developed using a predictive modelling approach which combine the GIS data	Upstream catchments were delineated for all the collated >1000 biological survey data sites (Task 1). For the sites, catchment characteristics (land use, including forest management history e.g. peatland drainage and clear felling) were calculated by SYKE and forest inventory statistics by SMK. Headwater stream assessment methods were developed for biological quality elements. The work included extensive analysis of the natural patterns in existing biological data sets as well as impact of human activities on the biological status estimates. An empirical predictive model for assessing the stream status using macroinvertebrates was developed by SYKE and OU. An architecture and scripts in R statistical programming environment to apply the model was developed. LUKE developed an assessment method for fishes for headwater streams. The assessment methods were finalized by 6/2018 and reported as part of Stream Assessment Storymap (in Finnish) by 9/2019 and Deliverable Report on the stream habitat assessment methodology by 01/2020. Cooperation between relevant institutes was smooth because they were	SYKE, LUKE

	involved in the project as Beneficiaries.	
Task 4. Demonstrating and validating assessment models in selected pilot areas Stream modeling will be developed and tested in the Iijoki area based on the earlier inventories, and in Natura 2000 sites in the catchments of FRESHABIT project areas Isojoki, Karvianjoki, Kiskonjoki, and Koitajoki. Model results will be validated by field surveys conducted by the method used in the Iijoki area. Field workers will be trained to recognize the HD species and cultural heritage items visible in the field.	A subset of the Iijoki field surveyed streams was used for validating the model, and the predictive modeling approach was developed as far as was possible with available data and resources. In addition, 134 km of streams were inventorized in the headwaters of Isojoki and Karvianjoki rivers in and upstream of 6 Natura 2000 sites, and additional 6 km in the Kyrönjoki catchment outside Natura 2000 sites. Inventories were concentrated on these catchments, where the most intensive stream habitat restoration took place, and where they can serve as baseline surveys for further monitoring of stream restoration. Field surveys were further done by OU and SYKE in 2017 in these areas in the intensive restoration sites where also more detailed monitoring was carried out in C6. Both the refined SmallWBGIS method and the predictive biological assessment methods were validated by fitting the models to sets of impacted sites with known levels of impairment (mainly due forestry activities). The outcomes showed promising results in the power of the methods to characterize the naturalness of streams and to detect anthropogenic impairment of the biology and habitats. The method was further developed into a nationally applied GIS prediction of headwater stream assessment, completed in November 2021 in the complementary Purohelmi -project, building on all existing stream inventory data by the end of year 2020. Resources reserved for the Action were initially too small for achieving the main aims, but fortunately complementary funding was available, and all the aims of this Action were achieved during the project duration.  *A total of 134 km of streams were inventorized in Freshabit.*	SYKE, MH_LP

The results

Expected results	Achieved results	Status	Beneficiary responsible
New public access GIS data from the studied areas	The field inventory data are stored in the GIS database of MH_LP, available for environmental administration, and the results and selected data have been published as a ArcGIS storymap "Uusia keinoja pienten virtavesien tilan arviointiin - Freshabit LIFE IP" in 9/2019.	Completed in Phase 2	SYKE
Documented model system for habitat and pressure identification assessment in streams.	The model system was developed and documented in 1-5/2019.	Completed in Phase 2	SYKE
Demonstration of model and tool performance at selected test sites.	Performance test were run and documented in the report for the model system.	Completed in Phase 2	SYKE
Project reports and publications documenting model tools and applications.	Report of the model system including an excel sheet for modeling stream naturalness were published in 9/2019 and described to wider public in deliverable A5.1 Stream Assessment Storymap (in Finnish). The technical report on stream habitat assessment methodology was completed in 1/2020 and was published Paikkatietopohjaisen purojen tilan arviointimenetelmän kehittäminen, accompanied by and Excel tool for assessing the naturalness of an individual stream with known catchment and stream channel properties Puron	Completed in Phase 2	SYKE

	inventointimalli - laskentapohja.		
Ca. 200 km of field-surveyed streams in 8-12 Natura 2000 sites	134 km field surveyed streams 2017-2018 in or upstream of 6 Natura 2000 sites. Inventories were concentrated on catchments, where the most intensive stream habitat restoration took place, and where they can serve as baseline surveys for further monitoring of stream restoration. Field surveys were further done by OU and SYKE in 2017 in these areas in the intensive restoration sites where also more detailed monitoring was carried out in C6.	Completed in Phase 2	MH_LP

Output

Deliverables

Code	Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable	Delivered
A5.1	Report on the stream habitat assessment methodology	30.6.2019	31.1.2020	SYKE	Report "Paikkatietopohjaisen purojen tilanarviointimenetelmän kehittäminen" published in Sept 2019, describing the basic methodology. Model development was contunued in a complementary project, and finalised in 2021 as a nation-wide model for headwatres stream status based on environmental parameters and GIS-based modeling. Updated results are presented in an ArcGIS Online map journal "Uusia keinoja pienten virtavesien tilan arviointiin - Freshabit LIFE IP"	IR2

Milestones

Milestone	Foreseen date in GA	Actual date	Beneficiary responsible
All existing data gathered, analyzed, and utilized	31.12.2016	31.12.2016	SYKE
Initial models developed for testing	30.4.2018	30.4.2018	SYKE
Field data for model validating collected and stored	31.12.2018	31.12.2018	SYKE
Results available as GIS databases	30.6.2019	13.9.2019	SYKE

Additional output

Code	Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable	Delivered
A5.2		NEW	6.5.2021	SYKE	Pienten virtavesien tilan arvioinnin kehittäminen	FR

Continuation of the action after the project

Much national interest for the stream habitat assessment methodology has emerged since the publication of the A5.1 map journal in September 2019. The importance of stream inventory and restoration has raised increased attention recently and it is thus most likely that a number of projects will continue utilizing and developing the methodology.

The predictive assessment of streams was made applicable to all streams in Finland in a complementary project Purohelmi, funded by the Helmi habitats programme, in November 2021. The results have raised much interest and they can be utilized in the prioritization for stream restoration planning in the Helmi habitats programme, aiming at 600 km of restored

streams by 2030.

By the end of the project it still remains to be seen in which means the results gained by Purohelmi are utilized in stream conservation and status assessment. However, the results are publically available as a GIS service. SYKE is still continuing to improve the usefulness of the results.

The stream inventory methodology, originally developed by MH in the northern Iijoki catchment during late 1990's, has been promoted as a national inventory and monitoring method for stream inventories during Freshabit. It is also a recommended method in the Helmi habitats programme. Consequently, the amount of field-inventorized streams that are digitized in the SAKTI GIS database maintained by MH has increased from 1 660 to 3 660 kilometres during 2016-2022, inlcuding streams inventorized by far mostly by Metsähallitus Parks & Wildlife services, but also ELY- centres and other parties in a small but growing proportion. Inventories are likely to continue at least in the same pace.

Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification

ACTION A.6: Development of survey and assessment methods for lake habitats

Beneficiary responsible for the implementation:	SYKE
Other beneficiaries involved:	LUKE, GTK, MH_LP, JYU, POSELY
Foreseen start date: Jan 1st, 2016	Actual start date: Jan 1st, 2016
Foreseen end date: Dec 31st, 2020	Actual end date: Sept 30th, 2022

In this action, habitat survey and assessment methodology for lake habitats and their biological, hydrological and geological diversity was be developed and demonstrated using selected lakes in our pilot catchments as test sites.

The activities

As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
Task 1. Collection and analysis of existing data and planning the field work All available data will be gathered and analyzed for planning the field work and selecting target areas within the studied lakes for Tasks 2-4.	Completed. The results are stored as a metadata set by JYU and LUKE al all relevant data have been utilized. All the relevant data could be provided by project Beneficiaries, which ensured smooth data collection.	SYKE, LUKE, JYU, MH_LP
Task 2. Littoral zone field surveys and biological sampling Littoral zone field surveys are conducted by observing from a boat using underwater video (drop-down unit), diving, UAV aerial imaging, acoustic surveying, and biological sampling.	Littoral field surveys were conducted in lakes Puruvesi, Konnevesi and Päijänne 2016-18 as anticipated. The field method was developed during the field season 2016, tested and fine-tuned by collecting species-level aquatic macrophyte data in 2017 in Puruvesi and Konnevesi, and applied in Päijänne in 2018. In addition, alluvial shore habitats of Puruvesi Hummonselkä region were investigated by field survey 2017 and specific types were distinguished from aerial images. In addition to the vegetation surveys, Luke inventorized juvenile grayling habitats, and JYU/SYKE benthic macroinvertebrates. The Task was implemented in the planned schedule and manner and division of work between Beneficiaries was successful. However, UAV aerial imaging was considered as a non-relevant method and discarded after the first field working year. Drone imaging is very sensitive to weather. Instead, the possibilities of satellite imagery were studied in Phase 3. The littoral zone field surveys for aquatic vegetation yielded the following results: - Puruvesi; ca. 26 ha surveyed in 22 study areas, with 808 4 m2 plots inventorized for vegetation and benthic substrate. - Konnevesi; ca. 21 ha surveyed in 29 study areas, with 786 4 m2 plots inventorized for vegetation and benthic substrate. - Päijänne; ca. 23 ha surveyed in 37 study areas, with 720 4 m2 plots inventorized for vegetation and benthic substrate.  *Altogether 70 study areas in 3 lakes have been surveyed.*	MH_LP, SYKE
Task 3. Geological lake inventory Geological lake inventories are conducted to provide information on the characteristics of the lake bottom,	Field surveys completed in time, maps and ArcGIS layers delivered by 3/2017 for lakes Puruvesi and Konnevesi. In addition, our budget allowed us to survey also the Päijänne study area in 2018.	GTK

e.g. bathymetry and distribution of different bottom sediments.		
Task 4. Lake habitat modelling Biological data collected in 2016 and older data (from 1990's etc.) are analyzed to find out the areas with biodiversity and productivity. The flow conditions in selected target lakes will be modelled in order to study the connection between regional flow conditions and habitat diversity.	Hydrodynamic model for Lake Puruvesi was defined with validation data assimilated from the floating experiments (citizen science). Lake Konnevesi hydrodynamic model defined and target fish spawning sites modelled using biological data (collected fish larvae samples). Further analyses on spatial overlapping of flow conditions and important areas for biodiversity and productivity were done during 2020-22. These included all the relevant data collected on vegetation, benthic macroinvertebrates, and abiotic parameters. A manuscript was published in June 2022 (Heino et al., 2022). Hydrodynamic models along with results from bathymetric, geology, and vegetation surveys were also utilized in modelling the isoetid vegetation cover for Puruvesi in phase 3 (deliverable A6.3).	JYU, LUKE, SYKE
Task 5. Demonstrating and validating assessment models Based on the data collected in Tasks 1-4, assessment models will be developed and new hot spot areas for habitat assessment, biodiversity, productivity, and cultural heritage will be predicted in Lake Päijänne. The results will be shared in open databases and available open access GIS platforms, and a description report of the process.	In Action A6 we have developed a versatile macrophyte and benthic substrate survey method, which can be used in many kinds of lakes deliverable A6.4). Geological and biological (macrophytes) variability has been demonstrated for three studied lake areas (deliverable A6.1 & A6.2.1). The data collected has been used for a predictive model of vegetation in oligotrophic lakes for further application (deliverable A6.3). A scientific article on data collected in Puruvesi was accepted for publication in June 2022 (Heino et al., 2022). Deliverable A6.2.5 considers taxonomic uniqueness, functional uniqueness and environmental uniqueness and shows how it can be used in guiding conservation planning. The article is based on data on vegetations, benthic macroinvertebrates, and benthic substrate collected from Puruvesi. The results showed, that protecting between one-third to one half of our sampling sites (n=18) sites could help protect up to 70% of the ecological uniqueness of the studied part of Lake Puruvesi, i.e. the most diverse sites regarding vegetation, macroinvertebrates, and geology. The match between the uniqueness values of macrophytes, macroinvertebrates, and abiotic variables was generally low, only 5 sites (28%) were chosen. These results show, that predicting the macrophyte or benthic macroinvertebrate assemblages is difficult, because the assemblages are partially structured by random dispersal events. In addition, it is difficult to obtain large-scale information on the geological variables of the lake in a scale that is meaningful for macrophytes or macroinvertebrates. Deliverable A6.3 documents how satellite imagery can be used to monitor water quality and development of reed-beds, and predict depth and benthic substrate quality in clear-water lakes. Depth and benthic substrate models were created based on available data, i.e. the line transect surveys and acoustic sonar surveys conducted by MH_LP in the study sites, the larger-scale sonar surveys done by GTK, and other available bathymetric data. Based on the depth and benthic substrate models, statistical habitat models were built for four bottom-leaved aquatic plants were developed in Puruvesi; Isoëtes lacustris, Isoëtes echinospora, Littorella uniflora and Lobelia dortmanna. The models were used to predict the occurrence probabilities of the studied species for the studied area, and the whole of Puruvesi. In general, the models' prediction capacity was good. Depth was the most important factor predicting the occurrence of bottom-leaved species. However, as highlighted by Heino et al. 2022, prediction of biotic assemblages based on abiotic variables is difficult. Lake Puruvesi was our most intensively studied studied site, which we used for further development of models. Data collected in Puruvesi was used to develop depth and benthic substrate models, and further habitat models for isoetid vegetation (deliverable A6.3). Overlap of the diversity of macrophytes and benthic macroinvertebrates, and geological variables was studied in two scientific articles based on the data from Puruvesi (deliverables A6.2.4 and A6.2.5). Methodology and results of juvenile grayling surveys (deliverable A6.4.2), and riparian vegetation diversity (A6.2.2) in Puruvesi were also documented. Furthermore, as a policy implication based on our data collected in Action A6 and implementation of lake habitat management in Action C7, we published a guide for reconcilitation between aims for lake habitat management and the strict protection of HD Annex IV species often occurring in eutrophicated areas within oligotrophic lakes. Eutrohphication and the following intensified growth of reeds often occurs in areas, that are originally suitable habitats of the isoetid vegetation characteristic of the oligotrophic HD lake habitat type. To summarize, in Action A6 we have developed a survey methodology for clear-water lakes, that can be used widely when precise observation of macrohytes, depth and benthic substrate is needed, e.g. in N2000 sites. We have developed models for prediction of isoetid vegetation, and demonstrated how satellite imagery can be used to survey monitor water	MH_LP, JYU, LUKE, SYKE

	quality, and assess depth and benthic substrate. We have also studied the relationship between macrohyte, benthic macroinvertebrate, and geological diversity. All these results still need further validation in other lakes.	

The results

Expected results	Achieved results	Status	Beneficiary responsible
New public access GIS data from the studied lakes	The Arc GIS Online map journal delivered as deliverable A6.1, presenting the data and results is available in https://arcg.is/fGm84.	Completed	MH_LP
Documented model system for habitat and pressure identification assessment in oligotrophic lakes, serving as a step for method development in other lake types.	Vegetation types were modeled for Päijänne in 2018 based on results from Konnevesi and Puruvesi 2016-2017. This has been documented as a scientific poster. The PhD thesis planned on the basis of the material collected in A6 has been delayed and could not be finished by the end of the project. SYKE applied the VELMU modeling approach for data collected from Puruvesi, and the models have been documented in deliverable A6.3.	Completed	MH_LP, JYU, SYKE
Demonstration of model and tool performance at selected test sites.	An initial model for prediction of isoetid vegetation was tested in Päijänne areabased on results of field work 2018. In phase 3 we developed the modeling of isoetid vegetation further in Puruvesi, which was our most intensively studied site. Model development was completed and documented on phase 3.	Completed	SYKE, MH_LP, JYU
Project reports and publications documenting model tools and applications.	ArGIS online map journal presenting the data, approach and results available in https://arcg.is/fGm84 (deliverable A6.2.1). The models have been documented in deliverable A6.3, and applications in deliverables A6.2.3-5.	Completed	MH_LP, SYKE
Tasks 1-4 will produce 4-5 scientific article/manuscript till the end of project. Furthermore, one PhD student will graduate in an complementary project.	Three scientific articles published by the end of the project: • Karjalainen et al. (2019) Dispersion of vendace eggs and larvae around potential nursery areas reveals their reproductive strategy. Freshwater Biology, 64 (5), 843-855. • A6.2.4 Tolonen, K.T., Karjalainen, J., Hämäläinen, H., Nyholm, K., Rahkola–Sorsa, M., Cai, Y. Heino, J. (2020): Do the ecological drivers of lake littoral communities match and lead to congruence between organism groups? • A6.2.5 Heino, J. et al. Assessing the conservation priority of freshwater lake sites based on taxonomic, functional and environmental uniqueness. Diversity and Distributions. 2022;28:1966–1978. DOI: 10.1111/ddi.13598 Manuscripts: • Nyholm et al. Habitat suitability modelling for mapping the distributions of macrophyte life-forms in large boreal lakes • Lehtonen et al: Where do the endangered lake-dwelling graylings (Thymallus thymallus) spawn? Characteristics of the sites with fry in Lake Puruvesi, Finland (Luke) • Takolander et al: Transferability of marine SDMs to lakes (working title, based of deliverable A6.3; SYKE). MSc theses: • Lahdenniemi, J. 2019. Ulappa-alueen pohjaeläinyhteisöjen paikallinen vaihtelu ja yhteys ympäristötekijöihin Saimaan Puruvedellä (Spatial variation of pelagic benthic macroinvertebrate communities in Lake Puruvesi). MSc thesis, University of Jyväskylä. 37 pp. • Mäkinen, T. 2019. Ympäristön vaikutus rantavyöhykkeen pohjaeläimistöön Puruveden Hummonselällä. Macroinvertebrate community	Completed	JUY, SYKE

	structure and environmental variables of littoral zone in lake Hummonselkä. MSc thesis, University of Jyväskylä. 42 pp. • Valkonen, S. 2020. Pohjaeläinyhteisöjen vaihtelu Konneveden sublitoraali- ja syvännealueilla. Benthic macroinvertebrate community variation in Lake Konnevesi. MSc thesis, University of Jyväskylä. 39 pp. The PhD thesis planned on the basis of the material collected in A6 has been delayed and could not be finished by the end of the project.		

Output

Deliverables

Code	Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable	Delivered
A6.1	Bottom sediment maps and GIS-layers of the Konnevesi and Puruvesi study areas	31.12.2016	31.3.2017	GTK	Konneveden ja Puruveden toimenpidealueiden pohjanlaatukartat 31.3.2017	IR1
A6.2	Report of spatial diversity in target lakes	31.12.2017	1.5.2018		A6.2.1 ArcGIS online map journal: Järvien kartoitus (A6 deliverable; last updated 2022)	IR2
			31.1.2020	SYKE	A6.2.2 Syrjänen, K., Tuominen, S., Kokko, A., Hellsten, S., Kartano, L. Karttunen, K., Sallantaus, T. & Ilmonen, J. - 2020. Puruveden Hummonselän rantaluontotyypit ja rantakasvillisuus. A6 deliverable. 152 s. (in Finnish with English summary).	IR2
			30.11.2018	SYKE	A6.2.3 Kemppainen, E., Belinskij, A., Hellsten, S., Kartano, L., Mäkelä, S, Ojala, O. & Sammalkorpi, I. 2018. Vesienhoidon ja luonnonsuojelun yhteensovittaminen Puruvedellä – suositukset toimintamalliksi. Suomen Ympäristökeskuksen raportteja 15 | 2018.	IR2
			10.7.2020	SYKE	A6.2.4 Tolonen, K.T., Karjalainen, J., Hämäläinen, H., Nyholm, K., Rahkola–Sorsa, M., Cai, Y. Heino, J. (2020): Do the ecological drivers of lake littoral communities match and lead to congruence between organism groups?	FR
			20.6.2022	SYKE	A6.2.5 Heino, J., Girón, J.G., Hämäläinen, H., Hellsten, S., Ilmonen, J., Karjalainen, J., Mäkinen, T., Nyholm, K., Ropponen, J., Takolander, A. & Tolonen, K.T. 2022. Assessing the conservation priority of freshwater lake sites based on taxonomic, functional and environmental uniqueness. Diversity and Distributions. 2022;28:1966–1978. DOI: 10.1111/ddi.13598	
A6.3	Report of model structure and validation	31.12.2018	30.9.2022	SYKE	A6.3 Ilmonen, J. Hellsten, S., Koponen, S., Väkevä, S., Attila, J., Jokinen, A.P., Takolander, A., Juntunen, J., Kallio, N., Tolonen, K., Virtanen, E., Nyholm, K. & Lensu, A. 2022. Development of survey	FR

					and assessment methods for lake habitats – Case study of Lake Puruvesi Puruveden vedenlaadun ja vedenalaisten habitaattien mal-lintaminen kaukokartoituksen ja maastotutkimusten avulla. Report, 50 pp.	
A6.4	Report on the lake habitat assessment methodology	30.6.2019	30.9.2022 30.9.2022	MH_LP Luke	A6.4.1 Ilmonen, J., Hellsten, S., Kuoppala, M., Suonio, M. & Vertio, L. 2022. Laaksonen, M., A line survey method for submerged vegetation in lakes. Background, results, and quidance for field work. Report, 19 pp. A6.4.2 Hirvonen, E., Keskinen, T., Kolari, I., Koljonen, S., Lehtonen, T., Nyholm, K., Ropponen, J. & Vehanen, T. 2022. Puruveden harjuksen lisääntymis- ja pienpoikasalueet suhteessa erilaisiin rantatyyppeihin. FRESHABIT LIFE IP -projektin lisääntymisaluekartoitus Puruvedellä. Report, 18 pp.	FR
A6.5	Map of the important diversity areas	31.12.2020	30.9.2022	MH_LP	Maps for isoetid vegetation hotspots for Puruvesi are presented in deliverable A6.3. These were considered as important biodiversity areas for the habitat type oligotrophic clear-water lakes (3110).	FR

Milestones

Milestone	Foreseen date in GA	Actual date	Beneficiary responsible
All existing data gathered, analyzed, and utilized	30.6.2016	30.6.2016	SYKE
Geological survey data collected and post processing started	30.9.2016	30.9.2016	SYKE
Maps and GIS-layers of geological survey ready	31.12.2016	31.3.2017	SYKE
First version of diversity model	31.12.2016	31.1.2017	SYKE
All field data for model building collected	31.10.2017	31.10.2017	SYKE
Initial models developed for testing	30.4.2018	30.4.2018	JYU
Final version of diversity model	31.12.2018	31.12.2018	SYKE
Results available as GIS databases	30.6.2019	30.11.2022	MH_LP

Continuation of the action after the project

We have developed survey methodology and models for the characteristic isoetid vegetation of the oligotrophic clear-water lake HD habitat type. We have documented the methodology and analyzed the differences between the developed methodology and the main belt transect method commonly used in monitoring for the ecological status of water bodies. The field survey method has been presented in an aquatic Macrophyte field course arranged by SYKE and OU in August 2021, and we expect that the method will be applied in the future in cases where accurate data is needed, e.g., in assessment and monitoring of N2000 lakes. However, the method needs promoting, and our model approach need further validating. The Freshabit consortium, especially SYKE, MH_LP, and the ELY centres are in good position to promote our methodology in applicable cases for lake assessment and monitoring for, e.g., consultants. Further development of the isoetid vegetation models probably need project funds. Ideas of wider inventories of lake habitats have emerged frequently during the last decade. The methodology developed in Freshabit serves those aims, and project funding will be actively screened for.

Modifications (action and/or budget)

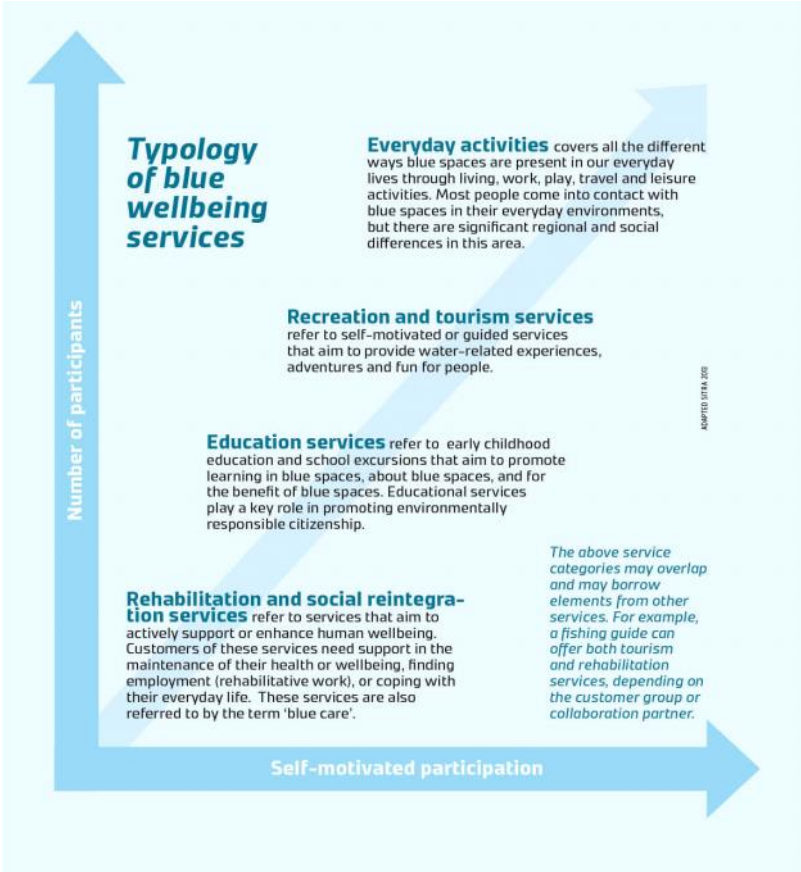
Description/justification	Before modification	After modification	Impact of the modification	Communication about modification
Benthic macroinvertebrate sampling was done as a part of JYU budget, but some of the samples were decided to leave non-identified for further use. During A6 reporting SYKE found that identification of these samples would improve A6 habitat model and decided to transfer budget from travel costs to external assistance to solve this. Three offers were gained in tender and cheapest was selected.			Modification of the budget by SYKE, total amount of 9580 transferred from travel to external assistance.	Internal decision, not significant.

ACTION A.7: Developing new economic goods out of freshwater resources

Beneficiary responsible for the implementation:	LUKE
Other beneficiaries involved:	WWF
Foreseen start date: Jan 1st, 2016	Actual start date: April 1st, 2017
Foreseen end date: Dec 31st, 2018	Actual (or anticipated) end date: Dec 31st, 2019

In this action new goods and services were developed based on the freshwater resources to strengthen the local livelihoods and rural well-being in a sustainable manner. The project produced knowledge and practical tools for a long-term planning and use of the freshwater areas.

The activities

As stated in the GA	Summary of the task progress	Beneficiary responsible
Task 1. Developing new well-being services out of freshwater natural resources of Central Finland The aim is to map the natural resources available for the services as well as demand and supply of the services and to increase the knowledge and capabilities of the entrepreneurs to exploit natural environment in the services and to provide them with information, support and tools to develop new solutions for producing services in Finland	The blue wellbeing services concept was defined for all freshwater environments in Finland. Blue wellbeing services are based on cultural ecosystem services. They can be grouped to everyday services, recreation and tourism services, education services and rehabilitation and social reintegration services according to the number of clients or participants at a time and state of self-motivation of participants (Fig.A7.1). Rehabilitation and social reintegration services can be referred to by the term Blue Care.  *Figure A7.1: Typology of blue wellbeing services.* A handbook of blue wellbeing services was prepared both in Finnish and in English. The handbook demonstrate natural freshwater environments as a source of multiple blue wellbeing services, as well as services´ use, availability and their effects on health, with some examples of the activities and service producers in	LUKE

	this field. A closer look at the demand and supply of the blue wellbeing services and the knowledge and capabilities of the entrepreneurs to create blue wellbeing services for various client groups was taken in two workshops in Central Finland area. Also a pilot project of fishing as a rehabilitative activity for children who need special support in their every-day life was conducted in the study area. New possibilities for services of nature-based tourism entrepreneurs were supposed to be found especially in the underutilized parts of freshwater environments like winter, multi-sensory experiences and services for people with disabilities. Rehabilitative fishing was found a meaningful method.	
Task 2 Compiling information and evaluating sustainability of freshwater fisheries and aquaculture production WWF Finland will collect and compile information on selected freshwater fisheries and aquaculture production. The collected data is used for evaluating the sustainability of freshwater fisheries and aquaculture against international seafood sustainability criteria.	Information of three wild freshwater fish species (smelt, pike-perch and roach and bream together) and one aquaculture species (rainbow trout) were compiled as fact sheets. Information gathered were evaluated by WWF seafood guide criteria. Smelt, roach and bream are considered less-valuable species whose food consumption could and should be increased. The fact sheets could not be used as much as anticipated in events in 2020-2022 due to the covid-19 pandemic, but they will be used after the projects as well.  *Pictures: Information about wild freshwater fish species has been compiled as fact sheets for consumers*	WWF

The results

Expected results	The key achievements, main factors of success and lessons learned	Status	Beneficiary responsible
The potential clients and service providers are invited to the workshop.	Workshops held 28.8.2017 and 3.4.2018.	Completed in Phase 2	LUKE
The project produces a guidebook how to establish Fresh water Green Care service.	Deliverable A7.1 Hyvinvointia luonnonvesistä published in 3/2019	Completed in Phase 2	LUKE
By taking actions for developing type of Blue Care framework in Freshabit platform, will provide knowledge of best practices for other countries to explore these possibilities as well.	Deliverable A7.1 English translation published: Wellbeing from blue spaces: streams in research and good practices	Completed in Phase 2	LUKE
Up-to-date information on sustainability of selected freshwater fisheries and aquaculture production.	Deliverable A7.3 Summaries completed and published	Completed in Phase 2	WWF
Background information and material for communication and outreach actions (3-5 sustainability evaluation reports) for communication and outreach actions conducted under actions E1 and E5.	The relative sustainability of four wild freshwater fisheries (smelt, pike-perch and roach and bream together) and one aquaculture species (rainbow trout, re-circulation aquaculture) were assessed against WWF Seafood Guide criteria (see https://wwf.panda.org/act/live_green/out_shopping/seafood_guides/methodology/). The information was compiled by using existing databases, scientific and technical reports as well as via stakeholder meetings	Completed in Phase 2	WWF

	and on-site visits. The evaluation outcomes and other collected information was used as background material for communication and outreach work conducted under actions E1 and E5. Deliverable A7.3: Four sustainability evaluation reports on selected fisheries/aquaculture practices completed (1. recirculation aquaculture for rainbow trout, 2. freshwater pikeperch ja 3. roach and bream, 4. smelt). Fact sheets based on these reports are reported in E5 (deliverable E5.6). Dissemination is reported in E1.		

Output

Deliverables

Code	Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable	Delivered
A7.1	A guidebook how to establish Green Care –fresh water service and construct the environment suitable for different client groups	31.5.2018	31.12.2018	LUKE	Hyvinvointia luonnonvesistä : Vesiympäristöistä palveluja arkeen, matkailuun, opetukseen sekä sosiaali- ja terveyssektorille Wellbeing from blue spaces. Streams in research and good practices	IR2
A7.2	Report of the experiences gained with future suggestions	31.5.2018	31.5.2018	LUKE	Blue Care – Vesien helmiä : Sinisten hyvinvointipalveluiden kokeiluja ja työpajoja	IR2
A7.3	3-5 sustainability evaluation reports on selected fisheries/aquaculture practices	31.12.2018	15.2.2020	WWF	A7.3.1 Sisävesien kuha - WWF:n kalaoppaan kriteereihin pohjautuva taustaselvitys A7.3.2 Särki ja lahna - WWF:n kalaoppaan kriteereihin pohjautuva taustaselvitys A7.3.3 Kuore - WWF:n kalaoppaan kriteereihin pohjautuva taustaselvitys A7.3.4 Kiertovesiviljelty kirjolohi - WWF:n kalaoppaan kriteereihin pohjautuva taustaselvitys	IR2+FR

Milestones

Milestone	Foreseen date in GA	Actual date	Beneficiary responsible
First workshop for BC and GC actors	30.9.2017	28.8.2017	LUKE
Second workshop for BC and GC actors	31.5.2018	15.4.2018	LUKE
Guidebook for constructing Green Care -fresh water environments for different client groups ready	31.5.2018	31.12.2018	LUKE
Relevant fisheries/aquaculture production selected and information collected	30.6.2018	30.4.2019	WWF
Sustainability evaluation reports ready	31.12.2018	15.2.2020	WWF
Workshop (1-2 pcs) for invited participants: entrepreneurs, public and private sector, social workers, NGOs and other interested actors	31.8.2017	28.8.2017 and 3.4.2018	LUKE
Mapping of the resources, supply and demand ready	30.4.2017	31.3.2019	LUKE

Continuation of the action after the project

Luke: The research and development work of blue wellbeing services has been continued in phase 3 in complementary projects in Luke (e.g. CP091 and 094). The focus of research lies in producing more evidence on health and wellbeing effects and their value for citizens and society. Development work aims to make the blue wellbeing services more familiar to policymakers and in the social and health care sector. The results are disseminated in seminars and meetings, but also for the public in the press and other suitable media, and events aimed at the public.

WWF: Information of the selected species will be shared and distributed to interest groups and to consumers. Importance of the species in question will be highlighted to consumers as a more sustainable option (compared to e.g. imported fish species). Fact sheets based on the evaluation reports will help in informing consumers.

Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification

ACTION A.8: Enhancing climate-friendly electricity

Beneficiary responsible for the implementation:	FANC
Other beneficiaries involved:	
Foreseen start date: 1.1. 2016	Actual start date: 1.1.2016
Foreseen end date: 31.12.2021	Actual end date:31.12.2020

The activities

As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
Task 1. Criteria review for EKO-energy-labelled hydropower The aim of this task is to commit criteria review for EKOenergy-labelled hydropower, using Finland as a case country. We will i) analyze the present criteria of EKOenergy and other existing ecolabelling systems for hydropower, ii) interview national and international specialists in river ecology and hydropower sector and iii) report the results. We will draft the new criteria and collect open comments from specialists.	The criteria for EKOenergy-labelled hydropower was completed in March 2020. It has been translated in 9 languages (English, Finnish, German, Spanish, French, Italian, Dutch, Russian and Turkish). The process included the background study for criteria review of EKOenergy-labelled hydropower (2017), two public consultations (2018) and piloting (2018-2019). 2/5 power plants participating the pilot fulfilled the criteria: Kissakoski plant (Suur-Savon Sähkö), and Pitkäkoski (HSY). The criteria process was successful. The EKOenergy hydropower criteria review included a backround study and two consultations rounds to publicly discuss the draft criteria. The hydropower criteria review included three requirements for EKOenergy-labelled hydropower installations 1) fish migration, 2) water flow and 3) river habitats. The new requirements are in line with EU environmental policy (Water Framework Directive). But as a starting point, each installation must meet the requirements of national laws. However, after the criteria review the EKOenergy-labelled hydropower capacity declined in Finland. It seems that Finnish hydropower business cannot move towards ecologically sound practices before the laws and institutions oblige them. The core of the problem is the confusing legislation and concession system for hydropower installations in Finland. The concessions are ”eternal”. Each installation operates with a concession that has been given according to the law at that moment. Thus a concession can derive from the times of Russian regime (before 1917) or from world war II (when installations were built before permit process was carried out). Thus the permit conditions vary strongly. Very often no fishway or water flow is demanded in concession. Furthermore, if it is demanded, it has not always been put into force. For example, in year 2021 none of the hydropower installations owned by Fortum had fishways at all, and in most cases they are not even demanded in concession. This covers 50% of total 3100 MW hydropower capacity in Finland and the largest units per installation in the country. On the other hand, there was 50 small installations that did not have (as permit condition) any obligations to compensate losses for fisheries – and our Water Act does not allow to attach such obligations to these old concessions. To summarize, the legislative framework in Finland does not allow a voluntary and market-based ecolabel to work properly. To fix the legal basis, in Finland we need to get rid of ” eternal” concessions for hydropower installations (update Water Act), attach demand for fish migration, environmental flow and other mitigation measures to all concessions (update concessions, permit conditions) and put the mitigation measures in force (monitor the permit conditions effectively). When any Finnish hydropower plant is updated with facilities for fish migration, environmental flow and access to river habitats, EKOenergy welcomes them to join. EU has also requested Finland to make this update – with no remarkable progress thus far. FANC is	FANC

	aware of the fact that Commission has started a pilot procedure with Finland, in order to check if Finland has implemented the Water Framework Directive in a satisfactory way. However, environmental NGOs such as FANC have not been involved in the process. We are willing to deliver you more information on the Finnish hydropower industry and legislation as needed.	
Task 2. An approved mechanism for ecological compensation via EKOenergy. The aim of this task is to develop the approved mechanism for ecological compensation via EKOenergy. We investigate the feasibility of the current 'fish passages electricity' concept, analyze the strengths and weaknesses of the present Environmental Fund of EKOenergy, create the River Restoration Fund to replace the earlier 'fish passages electricity' and approve of the new compensation mechanism in EKOenergy board.	The River Restoration Fund (Virtavesirahasto) was re-branded and re-launched in 2018 to compensate environmental impacts caused by hydropower via EKOEnergy. Calls for river restorations projects have resulted in 384 042 € funding for 21 river projects (2018-2021). The development of the fund is based on an analysis made about the strengths and weaknesses of the previous Environmental Fund of EKOenergy During recent years several licensees have switched from selling EKOenergy-labelled hydropower to EKOenergy-labelled wind power which has more public demand. This has led to a decline in the payments to the River Restoration Fund. The majority of EKOenergy-labelled hydropower is now sold in Germany and Sweden where we have financed restoration projects in 2022.	FANC
Task 3 Awareness raising of citizens and consumers about the nature impacts of hydroelectricity and the potential solutions to enhance the current situation We produce an easy-to-understand and illustrative online material for laymen to be published on a web-page, organise a seminar concentrating on experts 'experiences on fish passages highlighting their functionality and significance for enhancing the state of river ecosystems and communicate the nature impacts of hydroelectric power and the potential solutions	A web page Hydropower's nature was launched in 2017 presenting hydropower's impact on nature comprehensively and visually. The website is partially translated in English. In 2020 it was transferred from the EKOenergy website to a separate host and website www.vesivoimanluonto.org due to technical problems. The newest version of Wordpress has faster download-time, better responsiveness and is more suited for various language versions. A seminar on fish passages was organised 6.10.2017 in Helsinki with the focus on fish passages, their functionality and significance for enhancing the state of river ecosystems.	FANC

The results

Expected results	Achieved results	Beneficiary responsible
Sales volumes of EKOenergy-labelled hydropower (Mwh per year)	2013 (start) : 200 000 MWh 2014: 387 000 MWh 2015: 614 000 MWh 2016: 915 000 MWh 2017: 1 136 000 MWh 2018: 923 000 MWh 2019: 415 000 MWh 2020: 223 890 MWh 2021: 222 890 MWh There are several reasons for the decline. • The prices for renewable energy have fluctuated a lot making additional payment to Virtavesirahasto more difficult to market for consumers. Choosing wind and solar EKOenergy are more affordable to consumers, because there is no extra payment to the EKOenergy's River Restoration Fund. • Benefits of hydropower are more complex to communicate than wind and solar	FANC

	• Announcing new hydropower criteria made energy sellers more hesitant to make new contracts with EKOenergy because they were unsure whether their hydropower plants fulfil the new criteria • Several sellers have switched from EKOenergy-labelled hydropower to EKOenergy-labelled wind power. E.g. Fortum.	
Number EKOenergy-labelled hydropower plants (amount)	2013: 5 2014: 10 2015: 15 2016: 25 2017: 27 2018: 29 2018: 30 2019: 27 2020: 24 2021: 20 An approval is valid for 5 years. Several of the old power plants don't fulfil the updated criteria. Some operators have not formally renewed their application. The operator also has to submit the permit of the hydropower plant. – Under the old criteria, we worked with publicly available information and with public consultations.	FANC
Capacity of EKOenergy-labelled hydropower plants (Mw)	2013: 338 MW 2014: 470,22 MW 2015: 562,9 MW 2016: 1149,02 MW 2017: 1194,52 MW 2018: 1775,02 MW 2018: 2415,02 MW 2019: 2640,80 MW 2020: 2627,72 MW 2021: 1981,5 MW	FANC
Fundraising for projects that benefit river ecosystems (euros per year)	2014: 38 743,38 € 2015: 61 410,60 € 2016: 99 066,00 € 2017: 113 648,00 € 2018: 93 304,25 € 2019: 41 510,51 € 2020: 22 389,04 € 2021: 22 288,94 € During recent years several licensees have switched from selling EKOenergy-labelled hydropower to EKOenergy-labelled wind power which has more public demand. This has led to a decline in the payments to the River Restoration Fund. The majority of EKOenergy-labelled hydropower is now sold in Germany and Sweden where we have financed restoration projects in 2022.	FANC
Number of projects that benefit river ecosystems (amount)	<table><tr><th>Riviotsikot</th><th>Summa / Summa</th><th>Kpl</th></tr><tr><td>2016</td><td>60 857</td><td>2</td></tr><tr><td>2017</td><td>68 700</td><td>4</td></tr><tr><td>2018</td><td>130 000</td><td>7</td></tr><tr><td>2019</td><td>67 500</td><td>4</td></tr><tr><td>2020</td><td>41 985</td><td>3</td></tr><tr><td>2021</td><td>15 000</td><td>1</td></tr><tr><td>Kaikki yhteensä</td><td>384 042</td><td>21</td></tr></table>	FANC
Number of hydropower plants that pilot the draft criteria (amount)	5 in Finland (2 led to an approval). In addition, 1 in Norway (approval), 1 in France (did not lead to an approval), 1 in Germany (approval) After the approval of the criteria in 2020, we have approved 5 more hydropower installations: Melk (AT), Beinan Shangzun (TW), Sauveterre (FR), Nemba (IT) and Rygene (NO).	FANC
Revised EKOenergy criteria to be used	The new criteria for EKOenergy-labelled hydropower for piloting	FANC

in Finland and elsewhere in Europe	were published 14.2.2019 as deliverable A.8.1. In 2020 the final criteria were accepted by the EKOenergy Board on 13.3.2020 (deliverable A.8.3.) The criteria has been translated in 9 languages (English – Dutch – Finnish – German – Spanish – French – Italian – Russian – Turkish).	

Output

Deliverables

Code	Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable	Delivered
A8.1	Report an EKOenergy - labelled hydropower. A background study for the criteria review	31.12.2017	26.11.2017	FANC	EKOenergy hydropower criteria review: Background Study	IR1
A8.2	Website on nature impacts of hydroelectricity and their potential solutions	31.12.2017	29.12.2017	FANC	Vesivoiman luontovaikutukset ja niiden korjaaminen	IR2
A8.3	Revised criteria for EKOenergy-labelled hydropower	31.12.2020	13.3.2020	FANC	EKOenergiamerkin kansainväliset kriteerit - Vesivoimalla tuotettu sähkö p.11	FR

Milestones

Milestone	Foreseen date in GA	Actual date	Beneficiary responsible
Seminar on fish passages to public	6.10.2017	6.10.2017	FANC
Background study for the hydropower criteria review completed	30.11.2017	26.11.2017	FANC
Launching website on nature impacts of hydroelectricity and their potential solutions	31.12.2017	31.12.2017	FANC
Draft of revised criteria, procedure and documentation for EKOenergy-labelled hydropower	31.3.2018	31.3.2018	FANC
Launching River Restoration Fund	30.6.2018	26.11.2018	FANC
Piloting the new hydropower criteria, procedure and documentation in five hydropower plants in Finland	31.12.2019	30.06.2020	FANC
Revised criteria accepted by the EKOenergy board	31.12.2020	13.3.2020	FANC
Collecting feedback and amendments to the criteria draft	31.12.2018	21.2.2018	FANC

Continuation of the action after the project

EKOenergy will continue to promote the hydropower criteria both in Finland and in other European countries. The revised criteria for hydropower are very important tool for the EKOenergy ecolabel in communicating about renewable energy that takes into account not only climate but also biodiversity. Success stories will inspire energy companies and consumers to use EKOenergy-labelled hydropower and help finance the River Restoration fund.

The volumes of sold EKOenergy-labelled hydropower dropped considerably after the approval of our new criteria (completely compensated by a large increase in the volumes of EKOenergy-labelled wind and solar). In 2021 and 2022, the volumes of EKOenergy-labelled hydropower started growing again, mainly in Sweden and Germany. The River Restoration Fund will make a 60,000 € grant for a project in Sweden in 2022.

EKOenergy label has a growing income, is not dependent on external funding, and will

recruit additional staff in 2023. The many concrete achievements continue to inspire other energy companies and consumers to use EKOenergy-labelled electricity.

Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification

ACTION A.9: Harmonisation of reporting systems of habitats among HBD and WFD

Beneficiary responsible for the implementation:	SYKE
Other beneficiaries involved:	MH_LP
Foreseen start date: Jan 1st, 2016	Actual start date: Jan 1st, 2016
Foreseen end date: Dec 31st, 2020	Actual end date: May 10th, 2021

The action is targeted to HD and WFD freshwater habitats and their species, which serve as indicators in the assessment for both Directives, and some of which are also species protected by HBD.

The activities

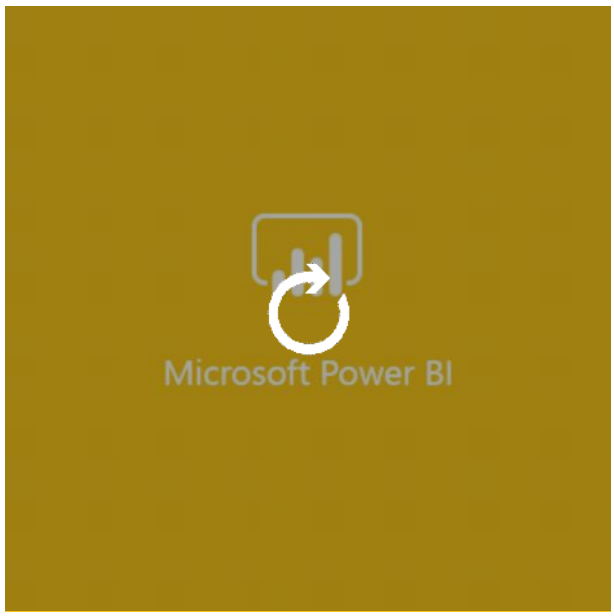
As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
Task 1. Data for Reporting Data used for reporting under HBD, Marine Strategy Framework Directive (MSFD) and WFD are identified and documented. A workflow is developed to convert up-to-date data from databases of MH so that it can be used for reporting under both directives. Technical solutions (i.e. interoperability and interfaces) for shared use of data are created in relevant databases.	The data used for reporting and their interoperability have been identified and reported. Reporting for HD in 2019 was mainly done using the data collected for WFD. However, all the technical solutions were not ready at this stage and manual work still dominated the workflow. The water body database for Finnish River Basin Management has been under reconstruction for years, and is being tested in the end of 2019 during official reporting. Detailed information of workflow, data sources and usability of data was compiled to additional report prepared for database developer. This renewed database will include the HD habitat information for each water body.	SYKE
Task 2. Data for planning processes; River Basin management (WFD), Programme of measures (MSFD) and Management of Natura 2000 Network (HBD) Data used for relevant planning processes under HBD, Marine Strategy Framework Directive and Water Framework Directive are identified and documented. A workflow is developed that ensures relevant and up-to-date information is at hand in relevant planning processes together with the modelling data. Technical solutions (i.e. automated summaries, maps and tables) will be created to ensure that planning processes have all information available for their use in the most suitable format.	The deliverable linked to the task was produced in due time. Technical solutions were delayed due to national processes of development of the water body databases. Therefore team produced separate detailed report of workflow, data sources and usability of data. The technical solutions will be ready and tested by the end of 2020 and reported including maps and other solutions in detail. Due to the delay in the development for the database on water bodies (VEME) the Action was delayed and the technical solutions were not available for the reporting in 2019. However, the solutions were developed and are available for the next reporting period.	SYKE

The results

Expected results	Achieved results	Status	Beneficiary responsible
Functioning interoperability between the databases VEMU*, POVET* and a database for Natura 2000 data.	Functional interoperability was established by harmonizing classification systems, creating workflow and links between VEME* and HD-reporting demands. Reporting of directives was done by using guidance describing workflow, data sources and usability of data. The approach has been reported in deliverables A.9.1-4. The VEME database was tested for interoperability and data flows by 05/2021. **VEMU is the old version of the database for WFD water body management in Finland, VEME is the new database since 2021. POVET is the database for management of classified groundwater aquifers.*	Completed 10.5.2021	SYKE
VEMU, POVET and Natura 2000 database will feed up-to-date and relevant information to the modelling process (action A1) and planning processes.	A1 modelling process is supported by relevant information of VEMU, POVET and Natura 2000 database. The approach has been reported in deliverables A.9.1-4.Results of development are	Completed 10.5.2021	SYKE

reported in draft format and further in final format by the end of 2020 (Keränen et al. 2020; deliverable A.9.5) and utilized in the developing project of the VEME database for Finnish River Basin Management. Altogether six Power BI reports were built for porocessing the the data in the VEME database. These reports give information of the surface area or length, and the structure and function of the HD freshwater habitats.

Power BI ; link to the reporting system.



Output

Deliverables

Code	Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable	Delivered
A9.1	Document recording the common data and links between reporting under HBD, WFD and MSFD	31.12.2016	31.1.2017	SYKE	Luonto-, lintu-, vesipuite- ja meristrategiadirektiivien raportoinneissa käytettävien aineistojen yhteiskäyttö nykyisin ja suuntaviivat yhteisille rajapinnoille tulevaisuudessa	IR1
A9.2	Document describing the method ensuring interoperability of the databases VEMU, POVET and a new database for HBD data	31.12.2016	31.1.2017	SYKE	Luonto-, lintu-, vesipuite- ja meristrategiadirektiivien raportoinneissa käytettävien aineistojen yhteiskäyttö nykyisin ja suuntaviivat yhteisille rajapinnoille tulevaisuudessa	IR1
A9.3	Document recording the relevant data for planning processes and modelling supporting those processes	31.12.2017	22.12.2017	SYKE	Luontodirektiivin sisävesiluontotyyppeihin liittyvät aineistot ja niiden tuominen osaksi vesienhoidon ja merienhoidon suunnittelua ja niitä tukevaa mallinnusta	IR1
A9.4	Document describing the workflow that feeds relevant data into modelling and planning processes	31.12.2017	22.12.2017	SYKE	Luontodirektiivin sisävesiluontotyyppeihin liittyvät aineistot ja niiden tuominen osaksi vesienhoidon ja merienhoidon suunnittelua ja niitä tukevaa mallinnusta	IR1

Milestones

Milestone	Foreseen date in GA	Actual date	Beneficiary responsible
Common data used for reporting under the different directives are identified	31.12.2016	31.1.2017	SYKE
Data used in planning processes under the different directives are identified	31.12.2016	31.1.2017	SYKE
Results will be utilized in the HBD and WFD reporting process for 2013-2018	31.12.2019	31.12.2019	SYKE
Technical solutions for shared use of data are ready	31.12.2018	30.5.2020	SYKE

Additional output

Code	Additional output	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable	Delivered
A9.5	Additional document describing workflow, data sources and usability of data including dynamic links and maps.	NEW	31.1.2020	SYKE	Harmonisation of reporting systems among HBD and WFD-Luontodirektiivien ja Vesipuitedirektiivin raportointien aineistojen yhdenmukaistaminen.	IR2
A9.6	Milestone A9. Technical solutions for shared data to be used in HBD and WFD reporting	NEW	10.5.2021	SYKE	Luontodirektiivin ja vesipuitedirektiivin raportoinnissa käytettävän yhteisen aineiston tekniset ratkaisut	FR

Continuation of the action after the project

Detailed description of databases, data sources and classification rules enables proper linkages between Natura-databases were described in project. Detailed instructions how to use data system were utilized and as a result, next reporting of nature directives will be smoother and more automated using the Power BI reports.

Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification
MoE decided to renew VEMU system and develop a new VEME-dataportal. It has caused some delay and it was not possible to create automated reporting. Instead detailed description of data sources and their linkages were established and reporting of HBD directives was based on that.	Technical solutions (i.e. automated summaries, maps and tables) will be created to ensure that planning processes have all information available for their use in the most suitable format.	Technical solutions are described and established by using PowerBi-application importing the necessary data. Output format for HD-reporting has been created.	Reporting was more time demanding and therefore also costs were higher during second phase of project. Final development of the application during place during third period of project.	Renewal of VEMU-system started in the beginning of 2019 and consequences were reported to main beneficiary immediately.

ACTION A.10: Writing up practical recommendations and/or national guidance

Beneficiary responsible for the implementation:	SYKE
Other beneficiaries involved:	MH_LP, SYKE, SMK, UO, POKELY
Foreseen start date: Jan 1st, 2019	Actual start date: May 1st, 2017
Foreseen end date: Sept 30th, 2022	Actual end date: Sept 30th , 2022

Operational approach for multi-stakeholder planning for catchment are management of N2000 areas was produced as a final output of project. Guidelines for restoration monitoring have been published. The operational model for reconciliation of the use of natural resources, other livelihoods, increasing water and nature protection activities was produced as a regional case-study.

The activities

As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
Task 1. Integrated multi-stakeholder planning for catchment area management of N2000 areas. We produce and document the operational model for the integrated planning.	The multi-stakeholder planning process was constantly tested in FRESHABIT target areas. The report 10.2 summarized the process. The main factor of success for this Task was the diversity of beneficiaries, stakeholders, and project regions. We gained a lot of good material for the report from beneficiaries. Both national and regional cooperation networks, as applied in Freshabit, were considered extremely important for nature conservation in the future.	SYKE
Task 2. National guidance with practical recommendations for monitoring stream and lake restoration measures. Guidance for monitoring will be produced based on the principles being developed by SYKE and tested in FRESHABIT D actions.	Guidelines for monitoring were provided during first phase and processed as a published deliverable in the third phase. General guidelines for monitoring of freshwater habitat restoration actions were published in 2020 (Koljonen ym. 2020; an internal report + published version) to serve future projects. Internal project report was written for learning on the experiences in more detail. Monitoring is still one of the bottlenecks of large restoration projects and programmes. Resources tend to be directed mostly into implementing restoration actions rather than monitoring. In addition, the timeline of a project, even a rather long one as Freshabit was, is usually too short to detect ecological impacts of restoration actions. Recommendations for future are presented in the After LIFE plan.	SYKE
Task 3. Recommendations for considering restoration as an option for the after-production use of industrial areas. Using experiences from the Koitajoki project area, possibilities for restoration or nature-like amelioration for such areas, and the benefit such action causes to nature and its' ecosystem services, will be considered and documented in a report.	The issue has been established in the regional working group and Koitajoki-Koitere forum in year 2017.The regional working group comprised, for instance, the representatives of forestry, mining industry, peat industry, local residents and tourism. The forum was open for public with a focus on sustainable use of natural resources is in focus. Operational model for increasing water and nature protection activities (restoration activities) has been developed in use of natural resources. Reconciliation the use of natural resources and other livelihoods (e.g. tourism) was also covered by the group. The final report of the Task describes the operational environment of the catchment area, the collaboration model that was founded within the project and experiences during the process. The report lists successes during the process as well as challenges that were encountered and presents a compilation of development needs and possibilities. The cooperation implemented and reported for Koitajoki region provides a good example of how conservation and land use need to be reconciliated at the local or regional level.	POKELY

The results

Expected results	Achieved results	Status	Beneficiary responsible

3 reports that summarize the experiences and developed methodology for catchment area planning in FRESHABIT	In total five reports (deliverables A10.1-5) were produced in phase 3, documenting the integrated multi-stakeholder planning for catchment area management in national and regional levels, and monitoring methods for freshwater habitat restoration.	Completed	SYKE
Information on catchment area approach actively disseminated and relevant stakeholders (e.g. water managers, authorities, forestry and agricultural advisors trained)	Catchment area approach has been promoted in target regions when making plans for concrete actions and related stakeholder events. During the final year of the project the concept of integrated multi-stakeholder planning for catchment area management has been presented in several occasions, such as the final seminar of the project 15.9.2022.	Completed	SYKE

Output

Deliverables

Code	Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable	Delivered
A10.1	Report for considering restoration as an option for the after-production use of industrial areas	31.12.2019	31.8.2022	POKELY	Yhteistoimintamalli luonnonvarojen käytön, elinkeinojen ja ennallistamisen alueelliseen toteuttamiseen - Kokemuksia Koitajoen valuma-alueen yhteistyöryhmästä ja Koitajoki-Koitere foorumistaThe operational model for reconciliation of the use of natural resources, other livelihoods, increasing water and nature protection activities (restoration activities) - the experiences of the regional working group and Koitajoki-Koitere forum.	FR
A10.2	Report of the integrated multi-stakeholder planning for catchment area management of N2000 areas	30.9.2022	30.9.2022	SYKE	Restoration and water protection of aquatic ecosystems at Natura 2000 sites: framework for planning - Report of Finnish Environment Institute published in 9/2022.	FR
A10.5	National guidance with practical recommendations for monitoring stream and lake restoration measures	30.9.2022	30.9.2022	SYKE	National guidance with practical recommendations for monitoring stream and lake restoration measures - lessons learned in Freshabit-project - An article published in 12/2022 in the Vesitalous magazine.	FR

Additional output

Code	Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable	Delivered
A10.3	Additional report of monitoring methods of restoration actions in Freshabit	NEW	31.1.2020	SYKE	Koljonen, S., Sammalkorpi, I., Hellsten, S. & J. Ilmonen. 2020. Monitoring water course restoration. Vesistökunnostusten seurantojen toteuttaminen. Deliverable A10. 14.p.	IR2
A10.4	Additional guidance of monitoring methods of restoration actions serving other restoration projects	NEW	30.4.2020	SYKE	Koljonen, S., Sammalkorpi, I., Vilmi, A. & S. Hellsten. 2020. Vesistökunnostusten seurantojen toteuttaminen - Report of Finnish Environment Institute.	FR

Milestones

Milestone	Foreseen date in GA	Actual date	Beneficiary responsible
Preliminary guidelines for monitoring available	31.12.2018	31.12.2018	SYKE
Timely delivery of results from action A1	31.12.2018	31.12.2018	SYKE
Timely delivery of results from action A3	31.12.2018	31.12.2018	SYKE
Timely delivery of results from action A4	31.12.2020	15.5.2021	SYKE

Continuation of the action after the project

In the end of 2022 the concept of catchment area approach is well acknowledged, as well as multi-stakeholder planning. There are a number of national initiatives acknowledging these approaches, such as the "Helmi" funding programme for habitat conservation, "Vesienhoidon tehostamisohjelma" for enhancing the implementation of river basin management, and "SOTKA" for helping declined waterfowl populations. FRESHABIT is often used as a good example in the communication of all these initiatives. FRESHABIT provides practical guidelines and shared experiences for monitoring actions in future restoration projects as reports and articles. Several new projects in progress or in application phase have already utilized our experiences, and the approach will aid in implementing the EU regulation for restoration and the COP15 targets for restoration (see chapter 4).

Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification
In the beginning of 2020 several large restoration programmes (Vesienhoidon tehostamisohjelma, Helmi, Sotka) started and there were an urgent need for monitoring guidelines.	Original plan was to publish final guidelines 2022	Preliminary guidelines 2020, additional guidelines serving other programmes mid 2020 and final guidelines 2022.	Better support for other restoration programmes	Preliminary guidelines are distributed via Freshabit networks.

ACTION A.11: Composing general communication plan for the project

Beneficiary responsible for the implementation:	MH_LP
Other beneficiaries involved:	SYKE, LUKE, SMK
Foreseen start date: Jan 1st, 2016	Actual start date: April 1st, 2016
Foreseen end date: March 31st, 2016	Actual (or anticipated) end date: Sept 30th, 2021

The general communication plan for the whole project, which will be updated at the beginning of each year.

The activities

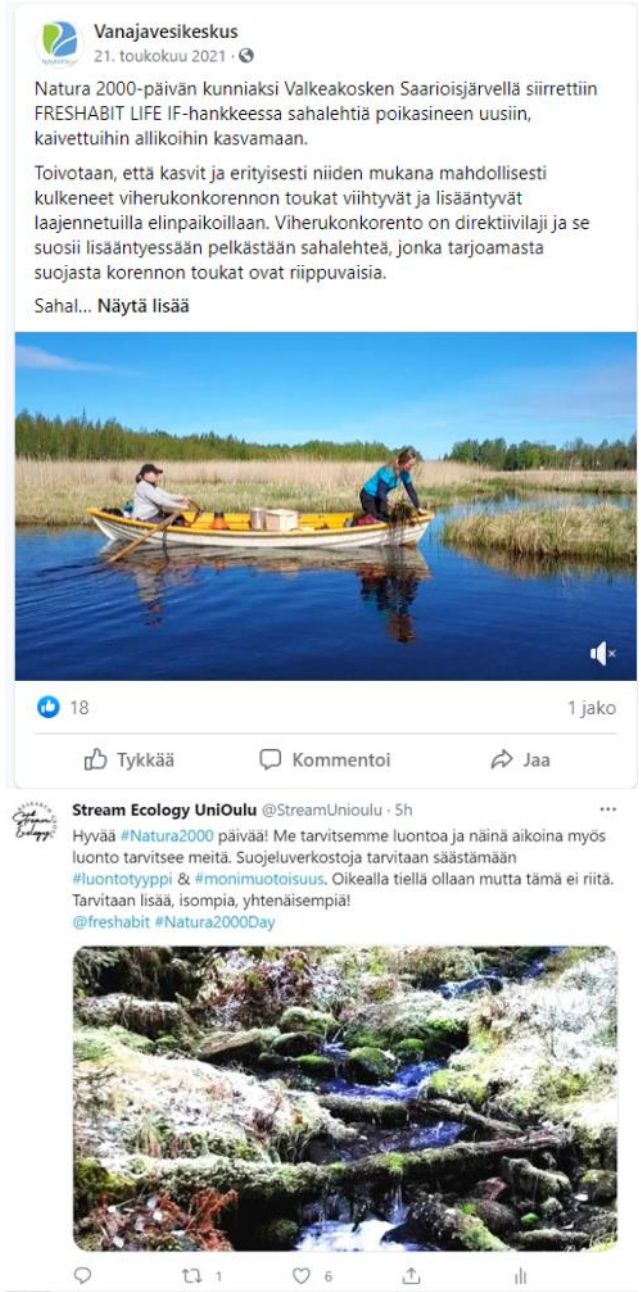
As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
Project communication plan is prepared at the beginning of the project by the project manager and communication officers of the core team, beneficiaries involved with the communication actions and the leaders of the project areas.	The communication plan for the whole project was prepared in the beginning of the project and updated in the middle of the project. It includes the main messages of the project aims and necessary information on united communication for all beneficiaries to use. It has also main stakeholders identified and listed.	MH_LP

The results

Expected results	Achieved results	Status	Beneficiary responsible
Accurate, effective and long-lasting communication throughout the project	Communication plan completed 30.6.2016 and updated 7.10.2019. See media monitoring	Completed	MH_LP
Increase in stakeholders and public awareness towards conservation of N2000 sites	On the Natura 2000 day 21.5.2021 we had a social media campaign. Altogether 13 beneficiaries made 21 posts on social media.	Completed	All


LuontoTyypit
21. toukokuuta 2021
Mainiota Natura 2000 -päivää!
42
107
Suomen kansallispuistot
21. toukokuuta 2021
Mitä mainiointa Natura 2000 -päivää!
Natura 2000 -verkosto on huikea saavutus, joka turvaa eri luontotyyppien säilymisen Euroopassa.
Sisävesien suojeluun keskittyvä Freshabit LIFE IP -hanke toimii 42 Natura-alueella.
Kunnostuksista hyötyy 107 luonto- ja lintudirektiivin lajia.
Kunnostuksia tehdään valuma-alueilla, virtavesissä, soilla, lintuvesillä ja järvillä.
Lue lisää tarinakartasta https://www.metsa.fi/projekti/freshabit/
Kuvat: 1) Raakku, Jari Ilmonen 2) soiden ennallistaminen, Maarit Simila.
#lifeprogramme #freshabit #natura2000
Kaarina Heikkonen ja 13 muuta
Tykkää
Kommentti
Jaa


Etelä-Pohjanmaan ELY-keskus
@EPELYkeskus
Tänään vietetään #Natura2000 -päivää! Tutustu Natura 2000 -verkostoon ja lähialueemme kohteisiin Etelä-Pohjanmaan ELY-keskuksen Instagram-tarinoissa! #FRESHABIT
instagram.com/epelykeskus/
FRESHABIT Pohjanmaa @FHPohjanmaa · 12min
#Ähtävänjoki aina Evijärveltä suiston padotulle Luodon- ja Öjanjärvelle saakka kuuluu #Natura2000 -verkostoon. #FRESHABIT Life IP -hankkeessa yhteistyössä #Ähtävänjokirahasto'n kanssa on tavoitteena palauttaa joelle uusi raakkusukupolvi. #Natura2000Day @EPELYkeskus
12.35 ip. · 21. toukok. 2021 · Twitter Web App



In stakeholder and laymen communications we have emphasized, that in this case and similar upcoming projects (e.g. strategic nature projects, traditional LIFE projects) focusing on N2000 sites the funding for N2000 also benefits the ecosystem services and livelihood of the surrounding areas. Freshabit and complementary funding has been raised as a positive example.

Output

Deliverables

Code	Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable	Delivered
A11.1	Communication plan for the FRESHABIT	31.5.2016	30.6.2016	MH_LP	11.1.1 FRESHABIT LIFE IP -hankkeen viestintäsuunnitelma 2016 11.1.2 FRESHABIT LIFE IP -hankkeen viestintäsuunnitelma 2019	IR1, IR2

Milestones

Milestone	Foreseen date in GA	Actual date	Beneficiary responsible
Communication plan for the FRESHABIT composed	31.5.2016	30.6.2016	MH_LP
Effective communication carried out throughout the project	30.9.2022	30.9.2022	MH_LP

Continuation of the action after the project

No need for continuation of the action after the project.

Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification

ACTION C.1: River basin management

Beneficiary responsible for the implementation:	SMK
Other beneficiaries involved:	MH_LP, POKELY, KESELY
Foreseen start date: 30.9.2016	Actual start date: 30.6.2016
Foreseen end date: 30.9.2022	Actual end date: 30.9.2022

C1 included actions that improved the water protection in the catchment areas of N2000 water bodies. In tasks 2 and 3 the measures also directly enhanced biodiversity in the restoration areas. Within task 1 the actions by SMK are similar to those in C2, and they are largely implemented by complementary funding, even though planning is done with LIFE funding. The full implementation of C1 and C2 in phases 1-2 for SMK is presented in a table under action C2.

Peatland restoration in the Koitajoki region.

The activities

Task	As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
Task 1	*Restoration of catchment areas* Restoration of Ala-Koitajoki catchment area covering an area of 3 368 hectares and Naamijoki an area affecting app. 500 ha. The actions consist of app. 30 water protection measures.	SMK had a special approach for implementing C1 and C2. SMK utilized both LIFE funding and complementary funding in C2 catchment area actions. The KEMERA complementary funding used for C2 is national funding for sustainable forestry, e.g. enhancing water protection, that is applicable on private-owned forestry land, and SMK is the authority that grants this funding. The numbers and impact area of water protection structures for catchment area restoration in C1 and C2 are presented in table C2.1 under Action C2. Koitajoki: Catchment restoration measures were concentrated in the catchment of Ala-Koitajoki to support the habiotat restoration for land-locked salmon in Action C4. In privately owned parts of Ala-Koitajoki the measures were implemented by complementary Kemera-funding (SMK) with a total impact area of 2400 ha (see C2). POKELY aimed for improvement of the water protection in two sub-catchments of 1300 and 770 ha. According to the surveys and plans made, in the end in the former only	SMK, POKELY

		stream restoration was considered necessary in the lower part of the catchment (220 m restored in Action C4). Landowner, the forest company Tornator implemented also supplementary restoration of the stream channel. In the other sub-catchment, implementation was seen necessary to be focused on the upper reach of the stream, where erosion was particularly high. Structures to prevent erosion have an impact of 270 ha in the sub-catchment. Thus the total area of catchment with improved water protection Ala-Koitajoki is ca. 2670 ha, instead of 3368 ha foreseen at the application phase. In total, the implemented catchment area measures complement the other conservation measures for the salmon done in Ala-Koitajoki well. Naamijoki: 164 structure implemented with impact area of 2685 hectares and the goal was exceeded (SMK). The action has been implemented better than anticipated in Naamijoki region. Catchment area restoration is implemented through many phases. Assessment of potential sites and plans for measures to tackle the observed problems come first, but in the end the implementation also depends on the approval of land owners and available contractors to finish the job. SMK is well-prepared for implementing water protection measures with the Kemera funding.	
Task 2	*Restoration of former peat harvesting area* Restoration of a former peat mining area right next to a valuable peatland Natura 2000 site (Haapasuo-Syysniemi-Rutajärvi-Kivijärvi, FI0900074), and draining into the Päijänne project area, is restored by rewetting.	The task has been completed as far as it was planned to do within Freshabit. KESELY has constructed nesting islets in 2021 and 2022, and NEOVA (formerly VAPO) has completed the dam for raising the water table to the desired level in late 2022. The construction works for the site are thus finished within the project, but the water table will take some years to settle to the desired level. First results have been promising, as black-headed gull have colonized the islets in 2021 and 2022, when the water level was rising. The site had to be drained, though, for final construction of the dam structures in 2022.	KESELY
Task 3	*Peatland restoration* Peatlands are restored in four project areas: • Naamijoki 140 ha • Isojoki 120 ha • Karvianjoki 30ha • Koitajoki 969 ha	Naamijoki: Completed (79 ha). The area in need of restoration in Teuravuoma N2000 site was smaller than anticipated at the application phase. Isojoki: Completed (140 ha) Karvianjoki: Completed (40 ha) Koitajoki: Completed, 618 ha implemented by LIFE funding, of which MH_LP has implemented 493 ha. POKELY has restored peatlands in an area that is close to a peatland restoration area by MHLP and directly in connection with the spawning areas of the densely-rakered whitefish, *Coregonus lavaretus f. nilssoni* in the Koitajoen alue N2000 site. Thus these restoration sites together improve the situation in the spawning areas. For the part of POKELY, only 125 ha was done by LIFE funding, and thus far another 321 ha has been completed by other available funding, and more funding for restoration in the area has recently become available. POKELY had shortage of staff for coordinating the actions, and as a result did not quite reach their goals for catchment area restoration (task 1 and 3) in Koitajoki region.	MH_LP, POKELY

The results

Expected results	Achieved results	Status	Beneficiary responsible
App. 4 060 ha of catchment area in Koitajoki (3 560 ha) and Naamijoki (500 ha) rehabilitated to the necessary degree	Total: 5355 ha of catchment area restoration implemented. Koitajoki: The total area of catchment with improved water protection Ala-Koitajoki is ca. 2670 ha, of which SMK has implemented 2400 ha and POKELY 270 ha.	Completed	POKELY, SMK

	Naamijoki: 164 structure implemented with impact area of 2685 hectares and the goal was exceeded (SMK). - Naamijoki LIFE funding (SMK): 91 water protection structures - Naamijoki complementary KEMERA (SMK): 73 water protection structures Two more sites will be completed after Freshabit with complementary Kemera funding.		
App. 1 259ha of peatland habitats in protected areas and areas affecting them restored.	Total: ca 877 ha of peatland restoration in N2000 sites implemented. POKELY has complementary projects running in the Koitajoki area, and an additional 321 ha has already been completed. Naamijoki: 79 ha Isojoki: 140 ha Karvianjoki: 40 ha Koitajoki: 618 ha	Completed	MH_LP, POKELY,
One former peat harvesting area of 50 ha restored into a bird wetland in Haapasuo	NEOVA (formerly VAPO) has agreed to the implementation of the action, and KESELY has constructed nesting islets in 2021-22. NEOVA has built the dam for raising the water table to the desired level. Actions have been completed within the project, but the water table will take some years to settle to the desired level.	Completed	KESELY

Output

Milestones

Milestone	Foreseen date in GA	Actual date	Beneficiary responsible
50% of the peatlands restored at Koitajoki	31.12.2017	30.9.2017	MH_LP
50% of the catchment area restoration at Koitajoki completed	31.12.2018	31.12.2021	SMK, POKELY
Peatlands and banks restored at Naamijoki	31.12.2019	30.3.2022	MH_LP
All peatlands (969 ha) restored at Koitajoki. In total 618 ha implemented by LIFE funding, of which MH_LP has implemented 493 ha. In addition, POKELY has restored 125 ha by LIFE and 321 ha by complementary funding.	31.12.2020	30.9.2022	POKELY, MH_LP
Peatlands (150 ha) restored at Isojoki and Karvianjoki	31.3.2021	31.12.2019	MH_LP
Former peatland harvesting area (50 ha) restored	30.9.2021	30.9.2022	KESELY
Catchment area restoration completed affecting 3 560 ha at Koitajoki. All anticipated sub-catchments were included in the planning process. Actual need for implementation was less than expected, and the total area of catchment with improved water protection Ala-Koitajoki is ca. 2670 ha	30.9.2021	30.9.2022	POKELY

Continuation of the action after the project

See C2.

Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification
In the amendment for Phase 3 we described how SMK uses both LIFE and complementary funding for the implementation of water protection structures and catchment area restoration in C2. However, the same approach applies for SMK actions in C1, too, as is already described in the description for C1. The implementation for phases 1 and 2 is described in a table in action C2.			No impact.	Discussed during the monitoring visit 25-26 February 2020.

ACTION C.2: Controlling environmental loading

Beneficiary responsible for the implementation:	SMK, MH_LP, POKELY, ESAELY, VVK, LUVY
Other beneficiaries involved:	SYKE
Foreseen start date: 6th of June 2017	Actual start date: 1st of January 2017
Foreseen end date: 30th of September 2021	Actual end date: 30th of September 2022

The action included water protection structures constructed in the key locations of catchment, where their impact is maximal and building is cost-efficient. Water protection structures implemented in this action are in many cases large (e.g. wetlands, floodplains and overland flow areas), and affect several landowners. In channels, where erosion was observed during field work, erosion prevention was done by chains of submerged weirs or enforcement of the banks with rocky materials. Peak runoff control were also used in conjunction of sedimentation ponds to reduce sediment loads. Another tool in the toolbox is reverting small channelized headwater rivulets and streams to their original locations, if the channels have been dredged and moved. Action also includes the marketing of buffer zones for critical landowners in Karjaanjoki region, and experimenting a compensation scheme in Puruvesi region. The Action complements Action C1, and for SMK the results for both C1 and C2 are presented in table C2.1.

A water protection wetland in the Puruvesi region.

The activities

As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
The target sites to implement several water protection measures are Rivers Naamijoki (conversion of canals into wetlands along 5km), Karjaanjoki (promotion of buffer zone establishment along the critical parts of the river, using established wetlands and other structures to convince other landowners of the benefits of water protection structures), Isojoki (water protection for two catchment areas covering >8 000 ha in total, measures targeting forestry), Koitajoki (measures targeting forestry, 2500 ha impact area), and also the areas of Vanajavesi (targeting both agricultural and forestry loads, sedimentation ponds on 4 sites, chains of submerged weirs on 2 sites, erosion control structures on 3 sites), Saarijärven reitti (250 ha impact area, targeting loading by forestry) and Puruvesi (targeting both agricultural and forestry loads, 5 950 ha impact area).	SMK had a special approach for implementing C1 and C2. SMK utilized both LIFE funding and complementary funding in C2 catchment area actions. The KEMERA complementary funding used for C2 is national funding for sustainable forestry, e.g. enhancing water protection, that is applicable on private-owned forestry land, and SMK is the authority that grants this funding. The numbers and impact area of water protection structures for catchment area restoration in C1 and C2 are presented in a table C2.1. In Isojoki, Saarijärven reitti and Koitajoki catchments the implementation of water protection was done completely by complementary funding, whereas in Naamijoki and Puruvesi both LIFE and complementary funding were used. The results achieved by complementary Kemera funding within the FRESHABIT project time frame are listed in table C2.1. However, that the complete implementation for the complementary Kemera projects, that have been contracted and have a set deadline are included as achievements of the Freshabit LIFE IP project. SMK prioritized the FRESHABIT target regions for enhancing water protection during the project period, and hence it is feasible to include the additive input by complementary KEMERA funding in the goals of this Action. MH_LP completed the conversion of canals into wetlands along 4 km in Naamijoki in March 2022. This action was linked to actions C1 and C7 in the area. LUVY has promoted the establishment of buffer zones and wetlands for water quality protection in Karjaanjoki with some positive results. However, the results have been weak, as the land owners have not been enthusiastic about additional water protection measures. One	POKELY, SMK, ESAELY, MH_LP, LUVY, VVK

	wetlands was built as planned within the project, but the construction was funded by the land owner. No data is available on water protection measures implemented outside the project. According to the results of the survey of catchment loading to Mustionjoki FPM habitats (Deliverable D3.3), the buffer zones will not protect the reiver water quality as much as anticipated. It seems that most loading comes via the submerged draining system, and the hotspots for erosion are fields next to forested areas. Thus, focus should be placed on such sites and measures either preventing the erosion or stopping it before entering the river, e.g. by wetland structures at the end of the drainage pipes. A general plan for the Karjaanjoki catchment water protection was made in Deliverable A4.2., and it will be utilized in improving the water protection by LUVY. VVK has implemented the planned water protection measures in 5 sites to complement measures implemented for bird wetlands in C7.	
At Puruvesi we will also test a new compensation system for landowners. The estimated area covered by the compensation is 20 ha and the costs 30 000€.	The budget for paying the one-off compensations was 30 000 € and estimated compensation area was 20 hectares. Realized compensation amount is 12 219 € with a total area of 10,5 hectares. As a precondition for paying the compensation a contract with landowner was made. The number of contracts was 11 pcs and the average amount per hectare was 1164 €. This includes compensations paid both for agricultural area and forestland. The compensation was needed mainly for structures spanning over larger area, such as wetlands. Smaller structures, such as bottom dams, sedimentation basins and repairing eroded channels did not mainly require paying compensation. The area where compensation is actually needed is less than anticipated. Compensation paid per hectare is in the line with original estimation. It can be concluded that the ability to pay compensation for financial losses caused by building water protection structures is important tool to ensure that the structures can be located in the most suitable and beneficial areas of the watershed. The compensation is most needed with wetlands and locations with other land use than forestry, especially agriculture. It should be also noted that paying the compensation in every case was not found necessary. The guideline (deliverable C2.1) and the procedure developed during the project for paying the compensation was found workable. As proof of that, the guideline was also adapted in paying compensations in nature management projects funded based on the Act on the Financing Sustainable Forestry (34/2015).	SMK

The results

Expected results	Achieved results	Status	Beneficiary responsible
At Koitajoki, ca. 20 hectares of wetlands and vegetation flooding areas and other water protection structures, impact area of ca. 2400 ha	Results for SMK presented in table C2.1. In total 82 structures and 17,2 ha of wetlands agreed to be implemented by 12/24 with complementary funding, total impact area 2400 ha. The target will reached.	Completed	SMK
At Isojoki area measures are directed to 2 catchment areas, total impact area > 8000 ha	Results for SMK presented in table C2.1.In total 204 structures and 1,3 ha of wetlands agreed to be implemented by 3/24 with complementary funding, total impact area 8830 ha. The target will be exceeded.	Completed	SMK
At Puruvesi, app. 20 hectares of restored floodplains with several water protection measures constructed and 55 units of other water protection structures (sedimentation pits, peak runoff control etc.) constructed, compensation scheme implemented on 20 ha of privately owned areas to guarantee the long term sustainability, impact area of ca. 5 950 ha	Results for SMK presented in table C2.1. SMK has implemented 43 water protection structures and 19 ha of wetlands and surface flow areas by the end of the project with LIFE funding. The impact area of these is 5 480 ha. According to agreed contracts this is to be increased into 102 structures and 29 ha of wetlands with complementary funding by 3/2026 with a total impact area of 8600 ha. The target will be exceeded. Information on all the structures by SMK has been published as an online story map. In addition POKELY and ESAELY have implemented the following structures: ESAELY: • Ristilahti area: the improvement and the enlargement of the old water protection structures, 2,01 ha of wetland and 2 other water protection structures • Myllypuro-Särkänjoki, restoration of mire and prevention of erosion (6 ha) • Poronniemi: 0,68 ha, wetland • Jouhenjoki: Multipurpose on-site wetland 2,7 ha including 3 upstream/downstream submerged weirs constructed with 1700 ha of impact area (discharge effectiveness 12-15 %), Jouhenjoki wetland has not worked as expected and has been fixed two times to improve the performance. NOTE: This includes 790 ha of the impact area also reported by SMK in table C2.1. • Hamalosuo: 2,2 ha. POKELY:	Completed	SMK, ESAELY, POKELY

	• Ristilahti area, Haukolanjoki sub-catchment: renovation and reinforcement of wetland 0,86 ha • Ristilahti area, Haukolan lahti: Improvement of the water protection measures of a 28 ha area of agricultural area at the lake shore. Ca. 3,8 ha of wetlands and surface flow areas supported by renovation of the pumping station and other structures. The field area is separated from the lake by dykes and drainage is assisted by pumping. In addition a water protection wetland of an adjacent small catchment improved and enlarged from 1,2 to 2,3 ha.		
At Naamijoki conversion of canals into wetlands along 5km at Teuraoja, Kivijärvenoja, impact area of ca. 850 ha	Completed in 2022. Canals rehabilitated along 4 km at Teuraoja and Kivijärvenoja, with immediate estimated impact area of 139 ha. The estimated impact area is calculated for the surrounding peatland area around Alainen Teuraoja and Kivijärvenoja, which are the outflow streams of the two lakes where the water level was raised. In the application phase four lakes were foreseen to be raised to their natural level, but during the planning stage surveys it became evident that two of those were in their natural level and did not require changes in water level. The estimates for the impact area of the action were coarse and considered all four lakes. The aim of the impact was not in improving the water protection above the outflow streams, but in and immediately around the stream channels, where heavy erosion was the problem. The action complements actions C1 and C7 to improve the status of Naamijoki below the actions..	Completed	MH_LP
At Karjaanjoki marketing and promotion of buffer zones and wetlands or other water protection structures will result to establishment of structures along the critical parts of the river.	Marketing of buffer zones and wetlands one-to-one on phone (5 land-owners) and face-to-face (25 land-owners), organizing four seminars to local land-owners (15-25 participants in each). Following this, one wetland site with drainage area of 14.7 hectares was planned in detail in co-operation with land-owner. After discussions with land owner, and after amending C2 to include construction costs eligible, the land-owner decided to construct the wetland by himself with funding from state (project helped to obtain complementary funding).	Completed	LUVY
Compensation made to 5-10 landowners (20 ha) at Puruvesi for allowing and securing actions on their land	Compensation contract made with 10 landowners, for 10,5 hectares and paid 12 219 €. Guide for paying compensations ready.	Completed	SMK
Sedimentation ponds on 4 sites, chains of submerged weirs on 2 sites, and erosion control structures on 3 sites established in Vanajavesi	Two chains of submerged weirs completed at Ormajärvi (2018) Sedimentation ponds at Ormajärvi (Kyynäröjärvi) (2019) other erosion control structures (comb-shaped wetlands, restored meandering brooks) established at Kyynäröjärvi (2019). Sedimentation ponds established at Tykölänjärvi (2019). Ansionjärvi two sedimentation ponds established (2020). Three sedimentation ponds in Kukkia and Rautajärvi wetland completed in February 2022. Two more sedimentation ponds in Kukkia were completed 25.8.2022	Completed	VVK

Table C2.1: The numbers and impact area of water protection structures for catchment area restoration in C1 and C2 in FRESHABIT target regions by 09/2022.

	Puruvesi (C2)	Koitajoki (C1 + C2)	Pohjanmaa (C2; Isojoki)	Naamijoki (C1)	Keski-Suomi (C2; Saarijärven reitti)	Total
LIFE funding						
Structures, pcs	43	0	0	91	0	**134**
Wetlands and surface flow areas, ha	19	0	0	1,3	0	**20,3**
Impact area, ha	5480	0	0	1870	0	**7350**
Incurred costs	290 527 €	0	0	240 125 €	0	**530 652 €**
Complementary KEMERA						
Structures, pcs	59	82	204	73	13	**431**
Wetlands and surface flow areas, ha	9,8	17,2	1,9	2,8	1,1	**32,8**
Impact area, ha	3120	2400	8830	815	495	**15 660**
Incurred costs	142 662 €	174 366 €	588 132 €	105 907 €	58 500 €	**1 085 669 €**
Structures (pcs), wetlands and surface flow areas (ha) Implemented by 12/2021	31 pcs/1,4 ha	71 pcs / 13,1 ha	184 pcs / 1,9 ha	73 pcs/2,8 ha	8 pcs / 1,1 ha	**367 pcs / 19,2 ha**
Deadline for implementation	2026/03	2024/12	2024/03	2023/03	2025/03	

Output

Deliverables

Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable
C2.1 Report on the compensation scheme implemented at Puruvesi	31.8.2021	30.9.2022	SMK	Raportti Freshabit Life IP -hankkeessa maksetuista maapohjakorvauksista Puruvedellä.

Milestones

Milestone	Foreseen date in GA	Actual date	Beneficiary responsible
Series of wetlands constructed in Naamijoki	31.12.2018	30.3.2022	MH_LP
Two catchment areas where wide range of actions (wetlands (1-5), methods for water protection (1-5), removing of sediments, and instream restoration) have been executed in Isojoki	31.3.2019	31.3.2019	SMK
Compensation made to 5-10 landowners (20 ha) at Puruvesi for allowing and securing actions on their land	31.5.2021	3.7.2020	SMK
Sedimentation ponds on 4 sites, chains of submerged weirs on 2 sites, and erosion control structures on 3 sites established in Vanajavesi	30.9.2021	25.8.2022	VVK
At least 17 ha of wetlands and vegetation flooding areas built and 55 units of other water protection structures (sedimentation pits, peak runoff control etc.) constructed in Koitajoki	30.9.2021	31.12.2019	SMK
Promotion of water protection structures using those that have been constructed results to increased interest among land owners and increased number of water protection strucures in Karjaanjoki region.	31.8.2021	30.9.2022	LUVY

Continuation of the action after the project

Catchment area restoration is one of the central activities in the River Basin Management Plans for the WFD. In addition, there are plans to restore another 12 000 ha of peatlands nationally in and around conservation areas in the next decade within the Helmi habitats programme. Furthermore, the EU restoration legislation initiative will put more pressures on restoration of habitat and catchments in the future. In general, what was achieved during Freshabit has initiated a lot of activity in all areas and the work will be continued.

Temporary state aid scheme for the financing of sustainable forestry enables granting state aid for nature management projects. Forest management projects can include e.g. funding for restoration of springs and forest habitats along small streams. Projects can also include measures preventing and reducing nutrient leaching to water bodies from forest areas. The current state aid scheme is replaced by the temporary Forestry Incentive Scheme at the beginning of 2024. The new Incentive Scheme includes still state aid for nature management projects, but adds more options for applying aid, which is estimated to increase and diversify the nature management work funded. The Incentive Scheme also in new aid for drafting peatland management plans. The purpose of the plans is to reconcile the growing conditions of the growing stock, the climate and water impacts of peat decomposition and impacts on biodiversity in forest management. These plans shall also include mandatory water protection plan and the assessment of nature values.

Koitajoki:

- A large restoration project has received 1,5 M€ funding for 2022-25 in the Koitajoki region in a project *Koitajoki: Land of Epic Poetry* coordinated by Snowchange cooperative (http://www.lumi.fi/2022/10/historiallisen-suuri-ennallistuskokonaisuus-koitajoelle/). POKELY aims to support the measures by funding from the River Basin Management Planning funds with an equal amount
- MH_LP has plans for appr. 1 000 ha of peatland restoration in the catchment
- SMK will continue water protection measures in the area with the new Metka instrument.

Naamijoki:

- SMK will continue water protection measures in the area in the Naamijoki catchment, as well as elsewhere in Lapland in privately owned areas.

Puruvesi:

- SMK will continue water protection measures in the area in 2-4 sub-catchments.
- ESAELY will continue improving the functioning Jouhenjoki water protection structures. Additional funding of 120 000 € has already been secured for water protection and management in the area.

Vanajavesi:

- Agricultural funds will be applied for to enhance the water protection measures implemented in the area. VVK has granted funds for maintenance of the existing structures. The land owners are generally committed to continuing the measures.

Karjaanjoki

- LUVY will continue promoting and applying for water protection measures in the Karjaanjoki catchment to improve the water quality in especially the Mustionjoki reach. New projects are being developed for reducing the loading from agricultural areas. A general plan for the Karjaanjoki catchment water protection was made in Deliverable A4.2., and it will be utilized in improving the water protection by LUVY.

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification

ACTION C.3: Improving ecosystem integrity

Beneficiary responsible for the implementation:	LUKE
Other beneficiaries involved:	LUVY, Raase, EPOELY, VARELY, Vatten
Foreseen start date: 30th of June 2017	Actual start date: 1st of January 2016
Foreseen end date: 30th of September 2021	Actual end date: 30th of September 2022

Action consisted of restoration of the ecosystem integrity either by i) removing a barrier in Pohjanmaa (River Isojoki), or reconnecting the previously isolated riverine segments by ii) constructing fishways or natural-like side channels in Karjaanjoki (2 pcs.), Saarijärven reitti (2 pcs.), and Kiskonjoki (2pcs.). These fish passes opened in total ca. 700 km of streams for migration. All the planned fish passes have been built, but in Mustionjoki the efforts continue towards solving the last two barriers upstream of those built in Freshabit.

The Billnäs technical fishway in the construction phase (left) and the finished Koski semi-natural bypass (right).

The activities

As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
Action C3 consists of the restoration of ecosystem integrity. The concrete actions of it are either removing a barrier (Isojoki), or reconnecting the previously isolated riverine segments by constructing fishways or or other structures that allow fish migration (Karjaanjoki (2), Saarijärven reitti (2), and Kiskonjoki (2)).	Isojoki: Villamo dam has been removed by 11/2018. Karjaanjoki: Mustionjoki fishways were completed in 2019-20. Mild and rainy winter that caused high water level interrupted work for two months. Saarijärven reitti: Hietama fishway completed and in operation 5/2020. Leuhu fishway completed in 5/2021. Kiskonjoki: Both Koski and Hålldam completed in 9/2021. Planning of the third and fourth fishway in Karjaanjoki took a leap when funding for the planning was secured in the spring of 2021 from the national NOUSU programme and AB Raase and the City of Lohja. Funding is used for specifying the plans, sediment survey and permit application. In September 2022 there were two pending permit applications for the third fish pass in Peltokoski, one for semi-natural bypass by Raase and another for a technical fishway by the power company Koskienergia. The decision is likely to be made in 2023. It is evident, that LIFE funding and the cooperation networks by Freshabit acted as a kickstarter in all three rivers where fish passes were built in the project. Without Freshabit the fish passes would not have been built in this schedule. We were also able to channel a lot of supplementary funding for the fish pass projects, such as funding from municipalities, or the national fishway programme NOUSU by the Ministry of Agriculture and Forestry. On the other hand, Vattenfall funded >85% of the fish passes in Saarijärven reitti and had a very positive attitude towards the Action. The decision to build technical fishways instead of semi-natural bypasses raised some criticism in Mustionjoki and Saarijärven reitti. Semi-natural fish passes provide also	LUVY, Raase, EPOELY, VARELY, Vatten

	habitat, if they have a constant flow throughout the year, and are thus better for the stream nature than seasonally watered technical fishways. Allowing water in the channels is one of the key issues for power companies, however, and the companies usually demand compensation for energy lost. The sites in Kiskonjoki and Mustionjoki were rich with cultural heritage, which had to be accounted for. For nature, the best way would be to remove the barrier altogether, and a semi-natural bypass with a constant flow is a good second option. In all sites the final decision whether to build semi-natural or technical fish passes was made based on careful background surveys and weighing of different values. Increasing costs from the initial planning to final construction stage is typical for fish pass projects. The final costs may be 2-3 times the anticipated costs, as happened in the fish pass projects in Freshabit, too. Good planning and thorough surveys of the environment in the initial planning stage could narrow the gap between costs in the planning and construction phases. We produced practical guidance for other fishway subscribers in deliverables C3.4 and E1.1.1. During 2020-21 more than 3 300 fish have been observed to use the Åminnefors fishway in Mustionjoki, including 12 identified species and 57 individuals of salmon of trout. 896 fish have been observed in the Hietama fishway in Saarijärven reitti, including 30 trout specimens. The Kiskonjoki fish pass will be monitored after Freshabit. Thus promising initial results are available regarding upstream migration, but there are still details to be developed to improve the attractivity of the entrance to upstream migration, and especially to improve the guidance of downstream migrating juveniles into the fish pass instead of the turbine channel, where they may be chopped to pieces.	

The results

Expected results	Achieved results	Status	Beneficiary responsible
One major barrier removal in River Isojoki-Lapväärtinjoki. Within the project the area FPM will be surveyed and any population above the barrier will benefit from the removal of the barrier.	Isojoki: The Villamo dam has been removed and FPM population secured during the process. The impact of this removal has been estimated to be 77 km upstream of Villamo, considering all stream length that is not upstream of a known other migration barrier. This length includes the whole N2000 site Lapväärtinjokilaakso FI0800111.	Completed in Phase 2	EPOELY
Two technical fishways constructed to Saarijärvi watercourse.	Hietama fishway completed and in operation 19.5.2020. Leuhu fishway completed in 4.5. 2021. The impact of these fish passes is up to 530 km upstream of the power plants, considering all stream length that is not upstream of a known other migration barrier. This length includes the whole N2000 site Saarijärven reitti FI0900025.	Completed	Vatten
Two technical fishways constructed to Karjaanjoki	Billnäs fishway and Åminnefors fishway were completed in 2019-20. The impact of these fish passes is up to 45 km upstream of the power plants, considering all stream length that is not upstream of a known other migration barrier. This length includes the whole N2000 site Mustionjoki FI0100023.	Completed	Raase
One natural-like side bypass channel and one fishway constructed to Kiskonjoki	Completed in 2021. The impact of these fish passes is up to 45 km upstream of the power plants, considering all stream length that is not upstream of a known other migration barrier. This length includes the whole N2000 site Kiskonjoen vesistö FI0200083.	Completed	VARELY
Seminars presenting the results to stakeholders and the public: 1-2 per area.	Local stakeholders have been involved in the preparatory phases in each fishway project. At Karjaanjoki, seminars or events for local stakeholders have been organized 2015 (1) 2016 (4), 2017 (3), 2019 (1). Public seminar planned for 2020 was cancelled due to COVID-19 restrictions and will be replaced with a story map in 2022. VARELY has organised seminars or events for local stakeholders during 2016 (2), 2017 (7), 2018 (2), 2019 (4), 2021 (1), 2022 (1) At Isojoki, an event for local stakeholders was organized in 2019 and another in June 2022. Leuhu and Hietama fishways were have been presented in several online events • the media week organised by JAMK in May 2021	Completed	EPOELY, VARELY, Raase, Vatten

	• The lake days organised by Pelastetaan reittivedet ry in 15.8.2021 • Watercourse restoration co-operation group of Central Finland 27.9.2021 The fishway projects have been well visible in local and regional media and raised discussion, as well as hopes for a better future for ecosystems and their services.		

Output

Deliverables

Code	Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable	Delivered
C3.1	Report of migratory fish behaviour and habitat use below hydropower plant in relation to discharge in River Karjaanjoki	31.12.2017	31.12.2017	LUVY	Kalojen DIDSON-kaikuluotaustutkimus Mustionjoen Åminneforsin voimalaitospadon alapuolella / Lohen vaelluspoikasten käyttäytyminen Mustionjoen voimalaitoksilla	IR1
C3.2	Report demonstrating the efficiency of different constructions passing migratory barriers	30.9.2021	28.3.2022	LUVY	Åminneforsin kalatien vaelluskalaseuranta vuonna 2021 D2.2 also covers this issue partly	FR

Additional output

Code	Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable	Delivered
C3.3	Survival and behavior of radio-tagged Atlantic salmon smolts during downstream migration in the River Mustionjoki	NEW	1.12.2017	LUVY	Lohen vaelluspoikasten käyttäytyminen ja kuolleisuus Mustionjoen voimalaitoksilla	IR1
C3.4	Practical guide for fishway subscribers	NEW	14.5.2021	Luke, SYKE	Kalatien tai luonnonmukaisen ohitusuoman tilaajana toimiminen	FR

Milestones

Milestone	Foreseen date in GA	Actual date	Beneficiary responsible
Permits granted for the restoration- and flood control measures in the Villamo area in Isojoki	31.12.2016	6.4.2017	EPOELY
Transfer of the environmental permits and use rights to the state, the last phase completed in Isojoki	31.12.2017	31.6.2017	EPOELY
Tendering for construction is carried out for two fishways in Karjaanjoki	31.12.2017	8.1.2018	Raase
Legal permits for both fishways in Saarijärven reitti	31.12.2018	30.6.2018	Vatten
Environmental permits for Kiskonjoki fishways	30.8.2019	11.12.2019	VARELY
The dam removed and flood control measures completed in Isojoki	31.12.2019	30.11.2018	EPOELY
First fishway has been constructed in Karjaanjoki	31.12.2019	30.11.2019	Raase
Second fishway has been constructed in Karjaanjoki	31.12.2020	31.1.2020	Raase
A fishway and a submerged dam constructed and working in Kiskonjoki	31.12.2020	5.10.2021	VARELY
First fishway completed in Saarijärven reitti	31.4.2020	19.5.2020	Vatten
Second fishway completed in Saarijärven reitti	30.11.2020	4.5.2021	Vatten
All concrete actions completed in Saarijärven reitti	30.9.2021	4.5.2021	Vatten

Specific and technical plans are obtained for third fishway in Karjaanjoki	31.12.2021	30.11.2021	Raase
Report of activities promoting the construction of the 3rd fishway in Karjaanjoki	30.6.2022	5.9.2022	Raase
Captivity reared Freshwater pearl mussels are ready for release to suitable areas in Karjaanjoki	30.6.2022	30.6.2022	LUVY
Environmental permits for third fishway in Karjaanjoki	31.12.2022	Application pending	Raase
Tendering for construction is carried out for third fishway in Karjaanjoki	31.12.2023	Likely, dependent on the schedule for permit application	Raase
Construction of third fishway has started in Karjaanjoki	30.9.2024	Likely, dependent on the schedule for permit application and tendering	Raase

Continuation of the action after the project

After the project LUVY and Raase will continue to pursue mobilizing the required funding to construct the third and fourth fishway. There is a strong common will to solve the migration over the last two dams, but the means are still under discussion (semi-natural vs. technical). In fact, two separate permit applications have been submitted for the third power plant, a technical fishway by Koskienergia 30.8.2021 and a seminatural fish pass by Raasepori 30.11.2021. Decisions are still pending at the end of the project.

All fish passes constructed in the project are still relatively new, and the ecological implications remain to be seen in the future. Monitoring of upstream and downstream migration is continued after the project in all sites, and solutions for safer downstream migration are being developed. In general, there are many prioritized needs for building fish passes in Finland, as shown in the national fishway strategy, and the implementation continues. Recently the removal of dams altogether has raised increased attention, as three of four dams have been removed in the Finnish stretch of Hiitolanjoki River flowing to Lake Ladoga in Russia, end the last is expected to be removed in 2023.

Specific plans for continuation for each Freshabit C3 area:

- Mustionjoki: bypasses over the remaining two dams within the next few years (Raase, LUVY),
- Kiskonjoki: Monitoring for the impact of the new fish passes for 7 years, continuation of removing or bypassing the remaining dams within the next decade (VARELY),
- Saarijärven reitti: monitoring and development of solutions for downstream migration (Vatten),
- Pohjanmaanjoet: supplementary restoration of the river system, no need for maintenance in the current structures (EPOELY).

Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification

ACTION C.4: In-stream habitat restoration

Beneficiary responsible for the implementation:	LUKE
Other beneficiaries involved:	LUVY, EPOELY, LSPPo, VARELY, VVK, MH_LP, POKELY, POSELY
Foreseen start date: Oct 1st 2016	Actual start date: Oct 1st 2016
Foreseen end date: Sept 30th 2022	Actual end date: Sept 30th 2022

This action was part of the catchment-wide restoration measures, but action C4 especially included physical in-stream habitat restoration. In-stream habitat quality is, together with the catchment attributes, basis for the natural and healthy aquatic community. Therefore, restoring in-stream flowing habitats also improves the status of those Natura 2000 areas with problems in the physical structure of stream habitats. Action C4 results in increased restored habitat for freshwater pearl mussel, stream fish populations and other biota. This will improve the natural reproduction of salmonids, FPM, and other aquatic species in the whole river system. Stream habitat restoration was implemented both within and outside N2000 sites in the target catchments.

NOTE: In-stream habitat restoration length implemented in C6 is also reported here, where applicable, as the focus of C6 was on research and development of methodology and not stream restoration *per se*.

A heavily modified stream restored with wooden flow deflectors in the Pohjanmaa region.

The activities

As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
We restore stream areas suitable for freshwater pearl mussel and/or salmonid fishes, essential host-species of glochidia-stage Freshwater pearl mussels (at Karjaanjoki, actions on 25 river sections area and Ähtävänjoki on 3 river sections).	In Karjaanjoki the implementation was focused on the upper reach of the river, upstream of the Mustionjoki N2000 site, where the landowners have been more in favor of stream restoration. In Mustionjoki N2000 site, the best remaining rapids section above the fish passes built in C3 was restored for FPM and its' host fish brown trout. Otherwise the restoration sites were located upstream and outside N2000, supporting brown trout and other stream biota in the whole river system. The total length restored was 6,0 km using tested best practice methods (e.g. addition of boulders and spawning gravel). In Ähtävänjoki all suitable sites for FPM were surveyed. Most had problems with water quality (suspended solids, low pH, etc.) or host fish availability. In the end, only one location was found suitable for FPM and it was restored for restocking the juvenile mussels gained in action C9. The restored stretch is located in the Pölsforsen rapids area, where the most viable current population of FPM still exists. Targeting stream restoration activities is dependent on the willingness of the land and water owners, as well as natural conditions. In Mustionjoki we did not reach a consensus on	LUVY, EPOELY

	restoration of the tributaries within the N2000 site, and efforts were focused in the headwater sections. They do, however, support well the restoration of the whole river system. In Ähtävänjoki natural conditions in the river and tributaries were challenging for FPM, and all efforts were placed on the best available location.	
Spawning areas are restored in Koitajoki where the action aims at improving the spawning habitats in multiple locations on a 24 km stretch for densely-rakered whitefish and on 16 km for *Salmo salar m. sebago*, totaling an area of ca. 8 ha. For densely-rakered whitefish suitable spawning and larval habitats are created with gravel and for *Salmo salar* by transferring aquatic mosses.	Transferring aquatic mosses to improve the spawning areas of the land-locked salmon *Salmo salar m. sebago* has been done in four river sections with a total effective area of 12,25 ha. Stones with attached aquatic mosses have been transferred to these areas, where the aquatic mosses are expected to spread rather rapidly. The planted mosses already provide habitat and shelter for invertebrates and fish, and first results of monitoring have shown that juvenile salmon are more abundant in moss-restored areas. Additional moss transfers were done in the summer of 2021 and the task is completed. The preparation of the improving of the spawning areas for densely-rakered whitefish, *Coregonus lavaretus f. nilssoni* were started in 2016 by building a seine net for removing excess subsurface timber. The net was made by complementary funding and it was tested in year 2019. Sub-surface guidance structures made for timber floating have made the operation more difficult than anticipated, ripping the nets, and it was decided to continue these measures outside the project in cooperation between POKELY, POSELY and the local fisheries region by developing more durable nets and locating the sub-surface obstacles before netting. Thus far, some timber and guidance structures have been cleared from the spawning areas, but work remains to be done in 2023.	POKELY, POSELY
Overgrown (Kukkia and Tykölänjärvi) streams will benefit from dredging and streams with old dams will benefit from reconstruction which takes into account the migration of fish population.	Restoration actions in Tykölänjärvi have been completed and a channel stretch of 600 m has been reconstructed to allow fish migration while also maintaining the lake water level. Murronkulma stream restoration (800m) in the catchment of Kukkia has been completed. The stream restoration actions in Vanajavesi region aimed at supporting the lake or bird wetland restorations. In Tykölänjärvi the outlet stream was restored to maintain the lake water at the desired level. In the Kukkia catchment stream restoration supported catchment area actions to improve water quality.	VVK
In Kiskonjoki (2km at Anerionjoki, Kurkelanjoki, Varesjoki), Karvianjoki (11km at Pukanluoma, Aunesluoma, Peuraluoma, Paholuoma, Myllykeitaanoja-Vesinevanoja, Saunaluoma, Lohipuro, Latikanoja, Kirkkoluoma, Ristilänluoma), and Isojoki (several locations to be detailed in A3) restoration work is focused to the headwaters. Spawning gravel and large woody debris (LWD) will be added to headwater streams.	Kiskonjoki: stream restoration was implemented in shorter length in the main channel, where restoration is more expensive than expected. Only a 500-m stretch of the main channel was restored in the Kiskonjoki N2000 site, comprising the semi-natural bypass and the formerly dried part of the stream channel was restored. However, tributaries of Kiskonjoki river have been restored by complementary projects in 22 locations to support the whole river channel ecosystem. The complementary stream restoration sites were outside N2000, except for one site. They were partially (e.g. material costs) funded by Freshabit LIFE IP funding, and the LIFE and complementary actions supported each other well in Kiskonjoki catchment. Karvianjoki: A total of 3,7 km was restored within and 10,7 km outside the target N2000 sites, all in the target catchments (C4 + C6). Isojoki: A total of 2,3 km was restored within the target N2000 site, comprising the whole Isojoki river system. EPOELY, the coordinator for Isojoki region, targeted some of their stream restoration to N2000 site Karvianjoen luomat, which is partly within their administration. Implementation of stream restoration depends on previous inventories and plans, and often it is not easy to forecast the implementation, if such plans are not available. We adjusted our plans for stream restoration between Isojoki and Karvianjoki catchments based on inventories made during the project. In Kiskonjoki implementation of tributaries was best implemented in complementary actions, as the main measures in C3 were delayed. In total, however, we exceeded the goal for stream restoration.	VARELY, EPOELY. MH_LP
At Karvianjoki and Isojoki LSPPo also organises events for volunteers to attend the restoration of the streams.	LSPPo has organized events in the area, see E7.	LSPPo

The results

Expected results	Achieved results	Status	Beneficiary responsible

Karjaanjoki: 25 in-stream sites within the Karjaanjoki river system will be restored to benefit the FWPM and host species, totaling ca. 5,4 km of stream length. *modified 2020, see below	In-stream habitat restoration work was carried out in 33 stream habitat sections in 13 different streams or river stretches in Karjaanjoki area. In Mustionjoki N2000 site, the best remaining rapids section above the fish passes built in C3 was restored for FPM and its' host fish, brown trout. Otherwise the restoration sites were located upstream and outside N2000, supporting brown trout and other stream biota in the whole river system. The total length restored was 6,0 km.	Completed	LUVY
Ähtävänjoki: 3 sites of potential Fresh water pearl mussel habitat restored, totaling an impact area of ca. 6 ha	Only one of the potential areas was found suitable for restoration for FPM. Others areas have too much suspended solid material in the water or risk of too low pH for juvenile fresh water pearl mussels to survive. Restoration of Pölsforsen was completed in 2021, totaling ca. 0,01 ha.  The restored stretch for FPM in the middle in aerial view.	Completed	EPOELY
Koitajoki: spawning and larval habitat improved, totaling ca. 8 ha	The habitats of *Salmo salar m. sebago* have been improved in four river sections, Lylykoski, Mäntykoski, Tiaisenkoski ja Kuusamonkoski, with a total effective area of 12,25 ha. In addition, 0,2 km of a tributary floving into Mäntykoski was restored to support the local trout population.	Completed	POSELY
Vanajavesi: clearing overgrown streams at Kukkia and Tykölänjärvi, totaling ca. 0,8 km of stream length	The outlet of Tykölänjärvi was restored at 0,6 km length, Murronkulma stream flowing into Kukkia catchment at 0,8 km length.	Completed	VVK
Isojoki: 5,5 km rivers and brooks restored	EPOELY: A total of 2,3 km was restored within the target N2000 site, comprising the whole Isojoki river system.1,2 km (Villamo, Polvenkosket, Pettukylä) was restored in the Isojoki main channel, and 1,1 km in the tributaries. EPOELY, the coordinator for Isojoki region, targeted some of their stream restoration to N2000 site Karvianjoen luomat, which is partly within their administration.	Completed	EPOELY, LSPPo
Kiskonjoki,: 2 km of the river channel restored	River channel restoration with LIFE funding was concentrated in the Koski fishway (C3) area, where 400 m of the old river channel was restored and additional 100 m created as a semi-natural bypass. In addition, river and stream channel restoration was implemented in 22 sites in the Kiskonjoki catchment in complementary projects.	Completed	VARELY
Karvianjoki: 11 km of the river channel restored	A total of 3,7 km was restored within and 10,7 km outside the target N2000 sites, all in the target catchments (C4 + C6).	Completed	VARELY, MH

Output

Milestones

Milestone	Foreseen date in GA	Actual date	Beneficiary responsible
In Ähtävänjoki, 300 m (3 sites) of potential Fresh water pearl mussel habitat restored	31.12.2020	30.9.2021	EPOELY
In Isojoki, 5,5 km restored	31.12.2019	30.9.2022	EPOELY
Vanajavesi area: In Lakes Tykölänjärvi and Kukkianjärvi one inflowing stream in each restored	31.12.2020	28.2.2022	VVK
27 in-stream sites within the Karjaanjoki river system were restored to benefit the FWPM and host species, totaling ca. 6,0 km of stream length.	30.9.2021	30.9.2022	LUVY
In Kiskonjoki, 2 km of the river channel restored	30.9.2021	1.6.2021	VARELY

In Karvianjoki, 11 km of the river channel restored	30.9.2021	30.9.2022	VARELY

Continuation of the action after the project

Stream habitat restoration has been considered as a priority measure both within and outside the Natura 2000 network. It is also a priority action in the Helmi habitats programme, with the aim to restore 600 km of streams by 2030. Streams are also restored for fisheries management to support actions carried out in larger streams, e.g. dam removal or fish pass construction. Thus funding for stream habitat restoration is available from several sources for the foreseeable future.

Stream habitat restoration will be carried out in Freshabit target catchments. LUVY has secured 0,5 M€ funding for projects includin stream habitat restoration in the Karjaanjoki catchment for 2022-24. LIFE Revives will continue restoration in the Karvianjoki catchment. In Kiskonjoki national funding is available and all streams in need of restoration could be restored by 2040.

In general, monitoring for the effects of stream restoration (among other restoration measures) in not at a sufficient level. In Action C6 we showed, that adding large woody debris can enhance organic matter retention and benthic macroinvertebrate diversity in restored streams. Some previous studies have shown, that responses of biota, e.g. fish of bryophyte assemblages to stream restoration may be variable, and may take one or several decades to realize. More systematic and long-time monitoring is needed to better evaluate the impact of stream restoration measures.

Stream restoration may also demand repeated measures or maintenance in some cases. At least monitoring for the function of the structures and habitats created would be necessary in most cases after ca. 5 years from restoration. Such funding is not available, and in general better resources are needed for monitoring.

Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification
Restoration for the benefit of river fauna is feared among property-owners because of its potential and unknown effects on the later 'maintenance of ditches' i.e. drainage and dredging. Many of the water property owners are not 'organized' entities and hence have no obligation to promote 'common benefit'. Restoration of the stream nature has no general social approval among farmers and land owners in the downstream section of Karjaanjoki. In the upper reaches the people are more favourable and thus far the implementation has been concentrated there.	Ten in-stream sites at the Upper Karjaanjoki area and 15 in-stream sites at the Lower Karjaanjoki river system restored to benefit the FWPM and host species, totaling ca. 5,4 km of stream length	Karjaanjoki: 25 in-stream sites within the Karjaanjoki river system will be restored to benefit the FWPM and host species, totaling ca. 5,4 km of stream length.	No financial impact. We will use all available resources for restoring stream habitats where it is possible and useful for the overall targets of the project.	Discussed during monitoring mission 12.6.2019. Amendment was not seen necessary.

ACTION C.5: Improving riparian connectivity

Beneficiary responsible for the implementation:	EPOELY, VVK
Other beneficiaries involved:	
Foreseen start date: Jan 1st 2017	Actual start date: Jan 1st 2017
Foreseen end date: Sept 31st 2021	Actual end date: Sept 30st 2021

The Action C5 concentrated on improving riparian integrity by restoring floodplains and decreasing human-induced sedimentation into rivers in Vanajavesi and Pohjanmaan joet -regions. The Action was somewhat poorly defined in the application phase, and implementation was mostly documented under other Actions. What was left in this Action was the improvement of the habitat around the Villamo dam removal site in Action C3, and water protection measures around the inflow stream to lake Ansionjärvi.

Constructed check dams above the former dam in Villamo, Isojoki.

The activities

As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
Task 1. The management plans of sediment control for water basin of Lake Ansionjärvi in Vanajavesi are executed.	The sediment control measures were completed in May 2022. River Teuronjoki, the major route of water to Lake Ansionjärvi, carries a remarkable sediment load to the lake. Some of that sediment was forming an underwater delta on the mouth of the river, thus accelerating the overgrowing of the recipient lake and reducing riparian connectivity. In action C5 the delta was removed and the sediment was transported to the area situated far enough to prevent the leakage back to the lake. At the same time, fast spreading introduced species *Glyceria maxima* was removed from the delta area.	VVK
Task 2. The flooding risks in River Isojoki area will be decreased by removing the Villamo dam, constructing check dams in large pools upstream of it and a floodplain, and widening of the river channel by replacing the old bridge by a new one with wider span.	All of the restoration- and flood control measures in the Villamo area in Isojoki were completed in 11/2018. The river channel was widened and check dams constructed above the former dam area. Together with the dam removal in Action C3 and restorations in the river channel in Action C4 the Villamo area has been improved considerably for FPM and its' host fish, as well as other stream biota.	EPOELY

The results

Expected results	Achieved results	Status	Beneficiary responsible
Constructing check dams, floodplain and widening of the river channel in Isojoki	The restoration- and flood control measures in the Villamo area in Isojoki completed in 11/2018	Completed in Phase 2	EPOELY
Increased habitat for freshwater pearl mussel and other aquatic biota	Habitat improved in Isojoki main reach actions C3, C4 and C5.	Completed	EPOELY
MS Vanajavesi: water protection measures implemented	Measures completed in Ansionjärvi in May 2022.	Completed	VVK

Output

Milestones

Milestone	Foreseen date in GA	Actual date	Beneficiary responsible
Permits granted for the restoration- and flood control measures in the Villamo area in Isojoki	31.12.2016	4.6.2017	EPOELY
Transfer of the environmental permits to the state as one of the complementary projects	31.12.2016	31.12.2016	EPOELY
Vanajavesi: water protection measures implemented	30.9.2021	31.5.2022	VVK

Continuation of the action after the project

Formulation of this Action in the application phase was a bit vague and mostly similar tasks were implemented under Actions C3, C4, and C7. Riparian linkage to freshwater conservation and restoration is clear, however, and similar tasks are being implemented in many freshwater restoration schemes.

Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification

ACTION C.6: Demonstration methods for stream habitat restoration

Beneficiary responsible for the implementation:	OU, LUKE
Other beneficiaries involved:	EPOELY, LSPPo, MH_LP, SMK, SYKE
Foreseen start date: Mar 1st 2016	Actual start date: Mar 1st 2016
Foreseen end date: Dec 31st 2019	Actual end date: Oct 31st 2021

The aim of action C6 was to improve the current stream restoration methods used in Finland. A substantial amount (1.5 m3 per 100 m reach) of natural large wood (NLW) was added in traditionally-restored streams (stones, spawning gravel etc.) to improve the retention capacity and increase habitat heterogeneity of the forest streams. By this action, we expected to improve the functioning of stream communities from the bottom-up thereby having far-reaching effects on biodiversity and productivity of the entire stream ecosystem. The Action was complemented by extensive monitoring.

Whole trees have been added into a stream in the Pohjanmaa region in the demonstrative stream restoration action C6..

The activities

As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
High amount of large wood will be added in traditionally-restored (i.e. restored by flow detectors to remove human-induced fine sand from streams) streams along with transplanting of aquatic mosses. The objective of this action is to select 8-12 traditionally restored stream sections with length of ca. 300 meters. Large trees with root wads will be placed into half of traditionally restored sites (4-6 sites). Rock-attaching aquatic mosses will be transplanted into same sites from the streams nearby.	In action C6 a substantial amount (1.5 m^3 per 100 m reach) of natural large wood (NLW) was added to six traditionally-restored streams to improve the retention capacity and increase habitat heterogeneity of the forest streams. By this action, we expected to improve the functioning of stream communities from the bottom-up thereby having far-reaching effects on the entire stream ecosystem. The beneficiaries started planning of the C6 in the preliminary meeting at Seinäjoki on 15.3.2016. To assess the effectiveness of NLW in forest stream restoration, we designed a space-for-time -type monitoring scheme including NLW-restored streams (n=6, group 1), traditionally-restored streams (n=7, group 2) and non-restored streams (n=7, group 3) considerably impaired by channelization, sedimentation and habitat homogenization. In addition, seven streams representing the region's least disturbed status were used as reference sites (group 4). This action was implemented mostly in Isojoki basin and Karvianjoki basin headwater streams, but some sites were located also in a proximate Kyrönjoki basin (Figure C6.1). A large number of potential monitoring sites were visited during 2016 and based on collected preliminary background information (water quality, habitat measurements) a final set comprising 27 monitoring sites were selected together with beneficiaries. Medium-sized riparian trees were chopped down into six traditionally-restored sites during August-October 2016 by mimicking natural tree fall. This action was coordinated by EPOELY and SLL and was executed in collaboration with the local landowners. As the riparian forests were owned by private landowners, permissions were asked before the restoration actions and	EPOELY, LSPPo, OU

value of fallen trees was compensated for the land-owners.

We measured an array of key background variables from the group 2-4 streams during 9/2016. These variables included stream width and depth, current velocity, moss cover, amount of large woody debris and bottom substrate composition. The same variables were measured from the group 1 sites in September 2020, four years after the tree overthrow to allow NLW to modify the stream heterogeneity.

Effectiveness of NLW in increasing retention capacities of organic matter and water transient storage was evaluated in September 2017 with two supplementary field experiments. Due to limited resources, this as well as some other subsequent measurements, were conducted in only in 16 streams best representing the status of each monitoring group. The potential of NLW in increasing retention capacity of riparian leaf litter was simultaneously assessed by releasing 300 leaf-mimicking plastic pieces and after 2 h, the proportions of retained pieces by different substrates within 50 m reach were recorded. With these data, we can assess the effectiveness of wood-restoration on organic matter retention capacity along with in different climate-change-induced hydrological scenarios.

More extensive biological monitoring of C6 streams started in 2018 - two years after the NLW-restoration actions. Streams were electrofished by Luke in September 2018-21. An engine powered backpacker electrofishing device was used (Hans Grassl ELT 6011 GI Honda GXV50). Three subsequent electrofishing's were done (3-pass removals) in each stream. Captured fish were anaesthetised for handling with clove oil. Their weight and length was measured. Scale samples were taken for age measurement from brown trout juveniles. After recovery fish were released back to the stream. Carle-Strub (1978*) method was used to estimate the brown trout densities based on 3-pass removals.

**Carle, F.L. and Strub, M.R. 1978. A New Method for Estimating Population Size from Removal Data. Biometrics 34, 621-630.*

OU monitored benthic macroinvertebrate diversity and species composition by sampling 8 replicates on Surber net samples randomly distributed along 50 m sampling section in each stream. Invertebrates were sorted from other organic matter in the lab and at same time the standing stock of fine (<1 mm) and coarse (> 1 mm,) particulate organic matter (FPOM and CPOM, respectively) in each sampling 0.156 m2 quadrat were determined by sieving, drying, combusting and weighing. All invertebrates were identified mostly to species or genus level.

Decomposition of organic matter, a key ecosystem process of headwater forest streams, was monitored using leaf-bag experiments, in which 4 g of white birch (*Betula pubescens*) leafs are incubated in coarse mesh bags allowing entrance of leaf-decomposing organisms (invertebrates and microbes). In addition to total decomposition, microbial decomposition was measured by incubating 2.5 x 8 cm cotton strips and determining the decomposition rate by loss of strip's tension (Tiegs et al. 2013*).

**Tiegs, S. D., Clapcott, J. E., Griffiths, N. A., & Boulton, A. J. (2013). A standardized cotton-strip assay for measuring organic-matter decomposition in streams. Ecological indicators, 32, 131-139.*

Results of the Action showed that (reference to image numbers):

a) Bryophyte cover (%) in the NLW-restored stream remained to the level of non-restored streams, and was considerably lower than in reference and traditionally restored streams

b) NLW-restoration increased markedly organic matter retention capacity (*Figure C6.2-a)*,

c) Consequently, the standing stock of fine (FPOM) and coarse organic matter (CPOM) was the highest in NLW-restored streams (*Figure C6.2-b)*,

d) Macroinvertebrate taxonomic diversity and the rate of organic matter decomposition was at a comparable rate in reference and in both traditionally and NLW-restored streams, all higher than in non-restored streams (*Figure C6.2-c and d)*

e) To our surprise, an improved biodiversity and ecosystem functioning did not translate to success of trout reproducting and actually, juvenile trout densities (ind. a^{-1}) were, on average, lowest in the NLW-restored streams (*Figure C6.2-e)*.

The results indicate, that NLW-restoration can considerably improve the retention capacity of organic material, leading toincreased diversity of benthic macroinvertebrates and elevated decomposition activity in degraded streams compared to traditionally restored streams. However, bryophyte and juvenile trout densities in NLW-restored streams remained low, implying that i) post-restoration, more time is needed for recovery of those groups, or ii) that some other (non-measured) environmental features irrelevant to habitat restoration measures may hamper their recovery. Nevertheless, the results of C6 suggest, that adding NLW restored streams enhances the effectiveness of stream restoration, especially with regard organic matter retention capacity in forest streams.

Results of the Action were reported in the Freshabit final seminar 15.9.2022 (deliverable D1.39), and a scientific article is being prepared.

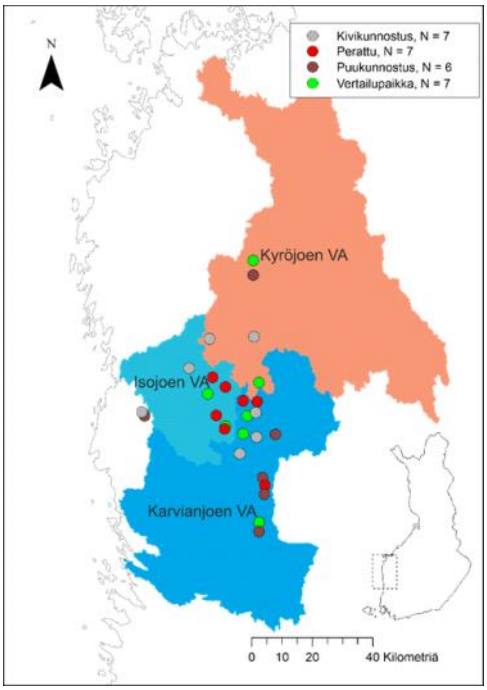


Figure C6.1: Localities of different treatments in action C6.

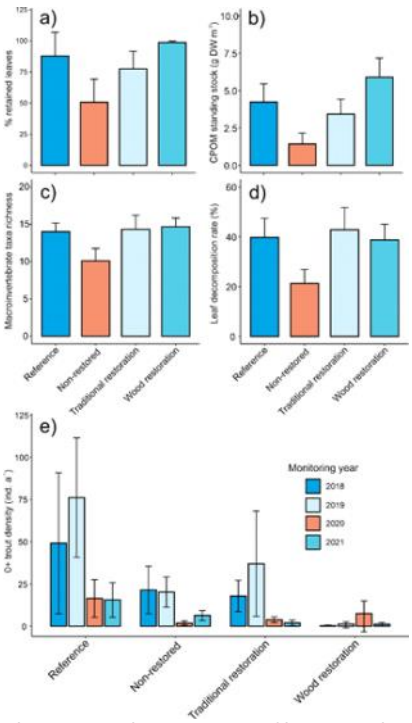


Figure C6.2. The percentage of leaves retained in the stream in the leaf floating experiment (a), the standing stock of coarse particulate organic matter (b), taxa richness of benthic macroinvertebrates (c), the rate of leaf decomposition (d), and the densities of first year (0+) juvenile brown trouts in different post-restoration monitoring years in different stream groups.

The results

Expected results	Achieved results	Status	Beneficiary responsible
The length of demonstratively restored stream sections through action C6 will be ~600 m.	Six stream sections ca. 100 m long were restored by adding natural large wood. Restoration actions were implemented 7-9/2016, and they are included in the total length of stream restoration reported in C4.	Completed in Phase 1	LSPPo, OU
The monitoring set-up is a space-for-time design, where 6 experimentally restored, 7 traditionally restored, and 7 non-restored impaired and 7 natural reference sections are monitored though phases 1 and 2.	As we are implementing a space-for-time design in our action, no pre-monitoring of sites was carried out. Post-monitoring of concrete actions carried out were started in 2017 and completed in 2020 for other metrics, and 2021 for fish.	Completed	OU, LUKE

Output

Milestones

Milestone	Foreseen date in GA	Actual date	Beneficiary responsible
All necessary stream sites selected and confirmed in field	30.6.2016	15.6.2016	EPOELY, OU
Concrete restoration actions implemented	31.7.2017	31.9.2016	LSPPo
Pre-monitoring of concrete actions carried out	31.8.2017	31.7.2017	OU, LUKE
Post-monitoring of concrete actions carried out	31.10.2019	30.10.2021	OU, LUKE

Continuation of the action after the project

The results of this Action imply that while NWD-restoration can be effective method for conserving benthic invertebrate diversity and especially, improving certain ecosystem functions (e.g. retention of organic matter), the effects of NWD-addition on the fish assemblages were negligible. However, NWD is key component of forest streams and future restoration project should include addition of NWD as an integral part of their restoration method palette. In many cases, restoration impacts become evident after extended period of time and a 6-year FH period may not be sufficiently long for us to see all the positive outcomes of this restoration action.

With regard to monitoring and maintenance of restored streams, the same issues apply as in C4.

A scientific article is being prepared, expected to be submitted by the end of 2022.

Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification

ACTION C.7: Bird wetland habitat restoration

Beneficiary responsible for the implementation:	EPOELY, ESAELY, KESELY, MH_LP, VVK
Other beneficiaries involved:	
Foreseen start date: Jan 1st 2016	Actual start date: Jan 1st 2016
Foreseen end date: Sept 30th 2021	Actual (or anticipated) end date: March 31st 2022

In this action C7 bird wetlands (including small lakes and eutrophicated bays of larger lakes) were managed actively by means that effect the aquatic habitat (tasks 1-2) or the immediate vicinity of the habitat (task 3). Spatial distribution of the action can be seen in a map plot of the implemented monitoring actions (Fig. C7.1).

Mowing in Vaattojärvi lake in the Naamijoki region.

The activities

As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
Task 1. Raising the water table Water table will be raised in project areas Naamijoki (2 lakes), Isojoki (1 lake), Saarijärven reitti (3 lakes) and Päijänne (1 lake) by damming the channelized outlets of lakes that have been earlier lowered.	The Naamijoki and Isojoki cases were completed in March 2022. All other sites were completed in due time and as anticipated. The most complicated issue with cases where raising the water table is needed is the permit application phase. Permit according to the Water Act is obligatory in all projects where the water table is permanently raised. Intensive preliminary surveys and monitoring to assess the impacts are usually demanded for the application. The application processing typically lasts for approximately one year, and if additional demands are made the time-frame within any project normal length may be too short. In addition, weather conditions (e.g. freezing in the winter, excessive flooding) may be critical for implementing the actions. The last of the two lakes to be raised, Lake iso-Kivijärvi in Naamijoki, and Lake Haapajärvi in the Isojoki region were both cases where the permit application process prolonged the implementation of the restoration measures to the degree, that depended on favourable weather conditions for the implementation in the last project winter. This highlights the importance of completing permit application with all necessary surveys as soon as possible within a project.	MH_LP, EPOELY, KESELY
Task 2. Eradication of aquatic vegetation Removal of excess macrophyte biomass will be done by dredging and mowing and removing most dense vegetation in bird lakes and bays in 13 separate lakes or bays in 11 Natura 2000 areas (8 sites at Vanajavesi, 2 sites at Puruvesi, one site at Saarijärven reitti, one site in Naamijoki and one site in Ähtävänjoki).	The planned measures were completed during the project for all sites as anticipated in the planning phase. The division of C7 to different tasks according to the type of activity was not a very good way of formulating the action. Different types of restoration activities tend to be overlapping in bird wetlands and lakes, and it is somewhat arbitrary to divide the activities in different tasks. Dredging and mowing to remove or slow down excessive aquatic vegetation qrowth is generally easier to implement than water level raising in lakes. The measures are usually so extensive that a permit according to the Water Act is necessary. Species inventories are usually a prerequisite for the permit. In Vanajavesi sites the restoration plans had to be adjusted, and in Puruvesi the	VVK, ESAELY, KESELY, MH_LP, EPOELY

	original plans had to be downscaled because of HD Annex IV species living in the action areas. Some localities inhabited by HD Annex IV species had to be excluded from the dredging and mowing areas. The need for careful inventories for HD Annex IV species and assessment of the impacts of restoration activities on their populations is obvious in bird wetland restoration projects. In Puruvesi the aim and focus of the action was protection of the oligotrophic lake habitat than improving the areas as bird wetlands. Also recreational values where considered, as one of the sites was next to the municipality center. Both Mowing sites in Puruvesi were examples of degraded shore areas of the oligotrophic *Littorelletalia* HD lake habitat type (see Deliverable A3.26). There it was hard to see the need for strict protection of HD Annex IV species, which had colonized the areas after eutrophication and reed expansion. We published our experiences and suggestions for future projects regarding the HD Annex IV species in a report (deliverable A6.2.3) and a policy brief (additional output C7.1). Removal of dense vegetation biomass (e.g. common reed *Phragmites australis*, or the invasive alien species *Glyceria maxima*) usually takes several repeats in consecutive years to be a success. In Puruvesi the common reed was mowed in four consecutive years. In Vanajavesi region a floating eathmower was used for massive growths of *Glyceria maxima*. The most of the material was removed from the lake, and some of the material was used to form breeding islets for wetland birds. Additionally, large plastic covers were placed over parts of *Glyceria maxima* vegetation above the mean water level to suffocate the population and form suitable habitat to waders and gulls. Repeated measures were implemented in most of the sites. In Saarijärven reitti region the management of lake Ylin has been documented in a webmap http://arcg.is/0S0eju. The webmap application was utilized for the first time for this kind of purpose. The application is useful because there is no need to mark the borders of worksite on the terrain. The earthmover operator or other management crew are able to see their location in tablet or smartphone in relation to management sites.	
Task 3. Habitat improvement by near-shore actions At Vanajavesi supplementary measures to task 2 are implemented in 7 Natura 2000 sites: building cattle fencing on 1 site, cattle pasturing on 1 site, dredging and digging open water areas on 6 sites, riverbed alteration on 3 sites, nesting islets on 5 sites, other nesting structures on 3 sites, hunting for minor predators (American mink, raccoon dog) on 6 sites, removal of trees on 4 sites, removal of blue-green algae on 1 site, reparation of existing dam structure on 1 site.	In Vanajavesi 7/7 of the intended bird wetlands have been treated with supplementary action along other restoration actions including e.g. dredging and digging open water areas, nesting islets, building of nesting structures, hunting for minor predators (American mink, raccoon dog), removal of trees, reparation of existing dam structure. Some of these measures are similar to those implemented in other regions under Task 2. Hunting for the alien predators demands a permit from the land owner, and usually a special permit if implemented within a nature conservation site. The permits are usually easy to obtain. The task demands a lot of work, usually by volunteers which are only compensated for their travelling costs. To be effective the hunting needs to be consistent and extensive. Motivating the volunteers can be challenging.	VVK

The results

Expected results	Achieved results	Status	Beneficiary responsible
A total of 7 bird lakes in 6 separate Natura 2000 sites restored by raising the water table.	Seven bird lakes in 6 different N2000 sites were restored. Isojoki: Haapajärvi completed in 3/2022 (MH_LP) Keski-Suomi: Peuralampi, Karstulan Ylin,Kilpilampi, and Joutsan Kivijärvi completed, all in separate N2000 sites (KESELY) Naamijoki: Teurajärvi and Iso-Kivijärvi completed in 3/2022, both within the same N2000 site (MH_LP)	Completed	MH_LP, KESELY
A total of 13 bird lakes or bays in 11 separate Natura 2000 sites managed by eradication of aquatic vegetation.	Eradication of aquatic vegetation was implemented in 10 lakes or bays in 9 different N2000 sites. Naamijoki: Mowing in Vaattojärvi 2017, 2018 and 2019 (MHLP), and during voluntary work camp in July 2021 (C12; WWF) Pohjanmaan joet: Mowing in Evijärvi 2018-20 (EPOELY) Vanajavesi: Mowing in Kukkia, Ahtialanjärvi, Ansionjärvi, Tykölänjärvi, Saarioisjärvi. Saarioisjärvi shore pasture was completed 2021. Nesting raft for Tykölänjärvi was completed in 2021 (VVK) Puruvesi: Matinniemi (12 ha) and Ketolahti (24 ha) has been mowed three times. Matinniemi was outside the Puruvesi lake N2000 site delineation. (ESAELY). Saarijärven reitti 1 site completed (KESELY) concerning earthmover work.	Completed	MH_LP, EPOELY, VVK, ESAELY, KESELY
Supplementary management implemented in 8 Natura 2000 sites.	Supplementary management was applied in 8 lakes in 8 Natura 2000 sites: Ahtialanjärvi, Saarioisjärvi,	Completed	VVK

	Tykölänjärvi, Ansionjärvi, Ormajärvi, Vanajanselkä, Kukkia and Hattelmalanjärvi including e.g. dredging and digging open water areas, nesting islets, hunting for minor predators (American mink, raccoon dog), removal of trees, reparation of existing dam structure and a shore pasture. In addition invasive alien predators (American mink, raccoon dog) were hunted in 2022.		

Output

Additional output

Code	Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable	Delivered
C7.1	Policy Brief on lake restoration measures and HD Annex IV species	NEW	22.6.2022	SYKE	Hellsten S., Ilmonen J., Einola E., Sojakka P. & Ruuhijärvi, J.: Vesienhoidon ja luonnonsuojelun yhteensovittaminen – uhkaako vesistökunnostus viitasammakkoa? (pdf 2992 kt)	FR

Milestones

Milestone	Foreseen date in GA	Actual date	Beneficiary responsible
Naamijoki: 3 bird wetlands restored in tasks 1 and 2	30.9.2019	31.3.2022	MH_LP
Ähtävänjoki: 1 bird wetland restored in task 2	31.12.2020	30.8.2020	EPOELY
Puruvesi: 2-3 wetland in bays managed in task 2	30.9.2020	15.8.2021	ESAELY
Vanajavesi: 7 bird wetlands managed in tasks 2-3	31.12.2020	30.9.2022	VVK
Isojoki: 1 bird wetland restored in task 1	30.9.2021	31.3.2022	MHLP
Päijänne: 1 bird wetland restored in task 1	30.9.2021	31.3.2021	KESELY
Saarijärven reitti: 3 bird wetlands restored in tasks 1 and 2	30.9.2021	31.3.2021	KESELY

Continuation of the action after the project

Bird wetlands often demand continuous or at least repeated measures to maintain their value as nesting and resting sites. National funding has become available in the Helmi habitats programme, and there are plans to restore ca. 80 bird lakes by the year 2024, and 200 by the year 2030. In the Vanajavesi region Tykölänjärvi and Ahtialanjärvi sites are already listed in as Helmi sites, and funding is applied for the Vanajavesi N2000 site management. Actions are also continued in other sites in the Vanajavesi region by other sources of funding. Helmi funding has already been used for supplementary restoration measures in the Joensuunlahti- Valmosa site in the Ähtävänjoki catchment.

In Puruvesi the eradication of aquatic plants continues as part of EU water framework directive water protection actions against overgrowth due to eutrophication. Some sites demand repetitive mowing or dredging, and the action and monitoring the impacts needs to be continued outside the project.

Some sites, such as Lake Haapajärvi in Isojoki region and Lake Iso-Kivijärvi in Naamijoki region do not demand repeated measures. They are lakes connected to surrounding peatlands, and the raised water level in the area is supposed to restore the hydrology of the entire system permanently.

Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification

ACTION C.8: Improving trophic web functioning

Beneficiary responsible for the implementation:	LUKE
Other beneficiaries involved:	ESAELY, MH_LP
Foreseen start date: Jun 30th 2016	Actual start date: Jun 30th 2016
Foreseen end date: Sept 30th 2020	Actual (or anticipated) end date: Sept 30th 2021

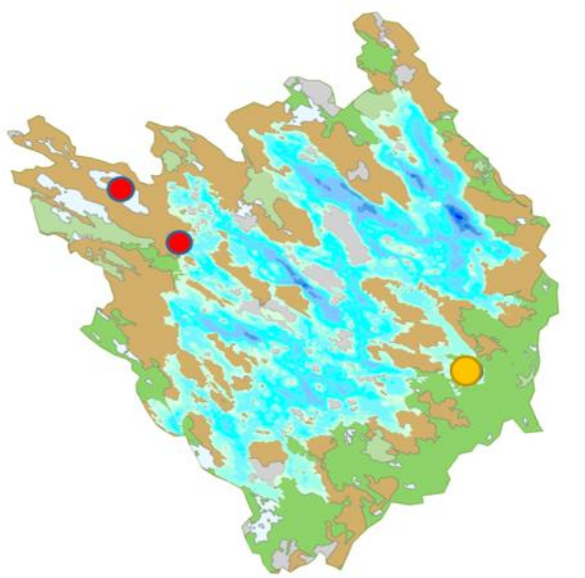
Eutrophication causes increase in lake fish biomass and the fish community often becomes dominated by Cyprinids, e.g. roach and common bream. To slow down the eutrophication, both reducing nutrient loading from catchments and internal loading are needed. This action concentrated on improving trophic web functioning by fishing overpopulated fish (mainly cyprinids) from Lake Puruvesi and from Lake Vaattojärvi as a supplementary measure to those implemented in the catchment areas in C1 and C2.

Catch from lake Vaattojärvi in Naamijoki region.

The activities

As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
The removal of fish is carried out in Puruvesi by removing dense fish stocks spatially in 2-3 selected target areas using fyke-nets and/or seine nets. In one site solid ground guided fish trap is used. The action is carried out in 2016-2020 with the aim of removing 40-50 tons of fish in total.	In Puruvesi, fish management by removal of cyprinid fish have been done several times in 3 selected target areas. Two of these are bays of Puruvesi with clear symptoms of eutrophication, and one is a lake in the catchment. In 2016-2017 the catch was 42 tons using both fyke-nets and seine nets after successful echo sound mapping. In 2018-2019 the catch was aggregated from several short periods mainly from fyke-nets. In total 117 tons of fish have been removed during 2016-21. The estimated removal of phosphorus is 1 ton. To be efficient fish removal needs to be repeated several times. In Puruvesi the commercial and recreational fishing removes more biomass from the lake, but in the bay areas removal of fish with	ESAELY

	little value as food for humans the measure can complement the catchment area actions. The after use of fish biomass is often an issue in fish removal projects. In Puruvesi the catch was mainly utilized by local fur farms (approx.. 70 %) in eastern Finland, composting (approx.. 15 %) and 15 % of total catch ended up to food process. The after use of cyprinid fish as human food resource has raised interest recently (see also A7) and innovations are being developed. To be economically feasible food industry based on cyprinid fish needs a steady supply and logistics that guarantee the material at an affordable price.	
The removal of fish is carried out in Vaattojärvi (in Naamijoki region) by fyke-nets. The action will be carried out in 2017-2020 with the aim of removing of 10-15 000 kg of fish per year.	In Vaattojärvi, fish management by removal of cyprinid fish was repeated four times with a total catch of 28 tons. In the first phase, fyke-nets were found ineffective and therefore in the second phase seine net was used instead. The after use of fish improved during the project. In the first phase the catch was buried in the ground with the permission of the environmental authorities. In the second phase, the catch has been utilized in fur farming and by Järki Särki as canned foods for humans. Järki-Särki is one of the leading enterprises based on fish biomass removal catches of roach (https://www.jarkisarki.fi/in-english).	MH_LP



The fish removal areas in Puruvesi, Lake Kuonajärvi and Savonlahti Bay in the west and Ristilahti bay in the east.

The results

Expected results	Achieved results	Status	Beneficiary responsible
Removal of 40 – 50tn of fish from Puruvesi	Puruvesi: Management fishing catch 117 t. Substantial portion of the total catch was used in food process (mainly larger breams *Abramis brama* and selected roach *Rutilus rutilus)*. Part of the catch has been utilised in fur farms and composting to produce biogas. Most predatory fishes has been removed from catch and released to improve ecosystem balance.	Completed	ESAELY
Organizing management fishing to keep the fish stocks balanced	Naamijoki: Total catch of 28 tons. 2017: 500 kg 2018: 12 500 kg 2019: 10 000 kg of which 2,3 tons used by Järki Särki. 2020: 4 500 kg	Completed	MH_LP
Seminars presenting the results to stakeholders and the general public.	The results have been presented in Puruvesi region for stakeholders and in public seminars, e.g. press releases and Puruvesi seminar in Kerimäki 4.8.2018 and 27.7.2019, Biodiversity and companies seminar 30.11.2021 (D6). Activity and awareness of local water owners and general public towards the benefits of fish removal restoration has been increased due to active presentations. Also interest and possibilities to improve usage of cyprinid fish has been noticed during ongoing project. In Vaattojärvi the results have been presented to regional stakeholders in the regional meetings.	Completed	ESAELY, MH_LP

Output

Milestones

Milestone	Foreseen date in GA	Actual date	Beneficiary responsible
Fish removal at Puruvesi started	31.8.2016	31.8.2016	ESAELY
Fish removal completed at Puruvesi	30.9.2020	31.8.2021	ESAELY
Fish removal at Vaattojärvi started	31.8.2017	31.8.2017	MH_LP
Fish removal completed at Vaattojärvi	30.9.2020	30.9.2021	MH_LP

Continuation of the action after the project

In Puruvesi several contacts and foreplans has been created to continue similar trophic web projects.
Fish removal is also included as a part of EU water framework directive water protection actions to improve trophic web functioning continues locally. There is also an increasing trend in the use of the less valued cyprinid catches for human food. ESAELY coordinates the further actions in Puruvesi. In Naamijoki the local community is applying for funds from LAPELY to continue fish biomass removal.

Fish biomass removal is a potentially significant food source for humans if it can be made cost-effective. There is a common will to do this, and e.g. in Puruvesi the regional university of applied sciences XAMK is developing the after use in several projects.

Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification

ACTION C.9: Immediate conservation acts of freshwater pearl mussel

Beneficiary responsible for the implementation:	MH_LP
Other beneficiaries involved:	VARELY, EPOELY, LUVY, JYU
Foreseen start date: Jul 1st 2016	Actual start date: Jun 1st 2016
Foreseen end date: Sep 30th 2021	Actual end date: Sep 30th 2022

Aims of this Action C9 were twofold: primarily to revive 2-4 of the most vulnerable populations of FPM in southern Finland, and secondarily to consider the welfare of both FPM and TRM in FRESHABIT concrete restoration actions. We aimed for enough surviving mussels in all target rivers to ensure survival of the populations, and, on a longer time-scale, natural reproduction of the populations if environmental conditions permit.

*Identifying river mussels (*Unio *spp.) in a Karjaanjoki river restoration area.*

The activities

Task	As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
Task 1	*Transplanting FPM and TRM in restoration sites* When detected in preliminary surveys for restoration planning (Action A3), FPM and TRM individuals are transplanted from areas where work may disturb then into suitable and safe locations.	Mussel populations have been assessed prior to restoration and mussels have been transplanted when necessary. FPM has been found in the Ähtävänjoki, Isojoki, Karvianjoki and Mustionjoki sites, and TRM in Kiskonjoki, Karvianjoki and Mustionjoki sites. It takes time and skilled resources to find the mussels, but otherwise the task is quite straight-forward. Typically the mussels were moved just upstream of the restoration area, or to side channels and are allowed to recolonize the restoration areas by themselves.	VARELY; EPOLY; LUVY
Task 2	*Capture and transport of FPM larvae* FPM larvae are extracted in ex-situ conditions from female mussels hosted in the Konnevesi Research Station of JYU. Mussels of both sexes, 100-150 in total for each population, are collected in the field and transported to the Research Station. Glochidia from as many as possible individuals are retrieved and taken to the laboratory for infecting the obligate hosts, salmonid fishes. Juvenile mussels are reared in Norway and in Konnevesi Research Station. Local salmonid host fishes from the target rivers are also captured and transported to the JYU laboratory for infection studies.	The capture of the glochidia of FPM from the nature was the greatest set-back in Freshabit, but we were able to overcome that by collecting adult mussels for facilitation. The populations in all four target rivers (Ähtävänjoki, Isojoki, Karvianjoki and Mustionjoki) were in poor condition and not reproducing. As advised by our Norwegian collaborator, we collected adult mussels to facilitate their breeding in the Konnevesi research station by JYU. Adult mussels were taken from Mustionjoki, Ähtävänjoki, Isojoki, and Karvianjoki, 100-150 from each population for captive breeding. For Mustionjoki the captive population was supplemented with additional 60 individuals in 2019. Juvenile mussels from Mustionjoki and Ähtävänjoki were delivered to Norway for rearing in August 2019, and juveniles were also kept in Konnevesi. Getting glochidia from mussels took at least two years of facilitation in Konnevesi. Populations of Isojoki and Karvianjoki started to produce glochidia during the last years of Freshabit (2021-22), and their rehabilitation is contonued in LIFE Revives.	MH_LP, EPO-ELY, LUVY, JYU

Task 3	*Rearing of FPM* The Austevoll mussel rearing farm in Norway will take care of rearing a total of appr. 5 000 young mussels from delivered glochidia. In parallel, the national rearing study in Konnevesi research station (JYU) is carried out with similar aims.	After two years of facilitation the Ähtävänjoki and Mustionjoki mussels produced viable glochidia in autumn 2018. Original plans were changed and the glochidia were kept attached to host fish in the Konnevesi research station. After moulting from the fish appr. 5000 juvenile mussels were transported to Austevoll Norway in May 2019, and a similar amount kept in Konnevesi. Rearing the mussels in two different locations increases the likelihood of success, and in addition gains us experience for rearing FPM in Finland. Rearing in both locations was continued for two years, but a sample of mussels from the Konnevesi batch were taken for an initial restocking trial in Ähtävänjoki and Mustionjoki for a year in 2020-21. The survival in a controlled river rearing experiment in Buddensiek plates was >90% for the Ähtävänjoki mussels, which was encouraging for the final restocking in Task 4. For juveniles restocked from the Mustionjoki population the mortality was high, even >70% in one site, but the juvenile Mustionjoki mussels that were kept in Konnevesi were initially in rather poor condition, and the best individuals had been transported to Norway. Facilitating the adult mussels and rearing the glochidia in the fish has been quite successful, but hosting the young mussels is challenging. During 2020-22 restrictions and delays in the food source (commercial product ordered from Europe or USA) caused problems with nutrition. We also had initially issues with wrong kind of marble gravel in the rearing tanks, releasing toxic substances that increased the mortality. A majority of juvenile mussels reared in Norway were kept in Konnevesi until 2022, but unfortunately they all died in spring 2022 due to malnutrition and problems with water quality. Luckily we had a new batch for reintroduction in September 2022 (see Task 5). Also the mortality of the adult mussels has been high, even over 50%. Based on results of rearing in the natal rivers and monitoring of adult mussels, it seems fair to conclude that the river rearing seems like a viable solution for mussels. The ex-situ facilitation is also promising, and the problems in keeping the juveniles seem to be overcome by autumns 2022.	MH, JUY
Task 4	*Restocking juvenile FPM* After the mussels are transported back to their home river systems, they are kept in gravel in flow-through systems (3 units per population), which is dug down in the riverbank for additional two years.	In the beginning of June 2021 the juvenile mussels reared in Norway were transported back to Finland, 1500 mussels from Ähtävänjoki and Mustionjoki each. Later in June 2021 the first restocking in mesh-covered gravel boxes was done, 1300 mussels in Ähtävänjoki and 200 mussels in Mustionjoki. The rest were retained in Konnevesi, where most of them, however, deceased in spring 2022 (see Task 3). The survival for the ca. 2,5-year old FPM restocked in gravel boxes from June 2021 to June 2022 was >90% in both Ähtävänjoki and Mustionjoki, and growth from ca. 5 mm to over 20 mm, so the rearing has proven successful for the first years. Most of the Mustionjoki juvenile FPM reared in Norway deceased in Konnevesi, but fortunately there was a new batch of glochidia produced in October 2021. Consequently, the second restocking in Mustionjoki was done in September 2022 with ca. 12 000 freshly released juvenile mussels of ca. 0,5 mm length. The restocking events have at this stage have tenfolded the FPM population of Mustionjoki, and increased also the population of Ähtävänjoki. Both populations and the survival of the restocked mussels need to be monitored to see the final success of the mesures. However, at this stage the results are very promising.	MH, EPOELY, LUVY, JYU, VARELY

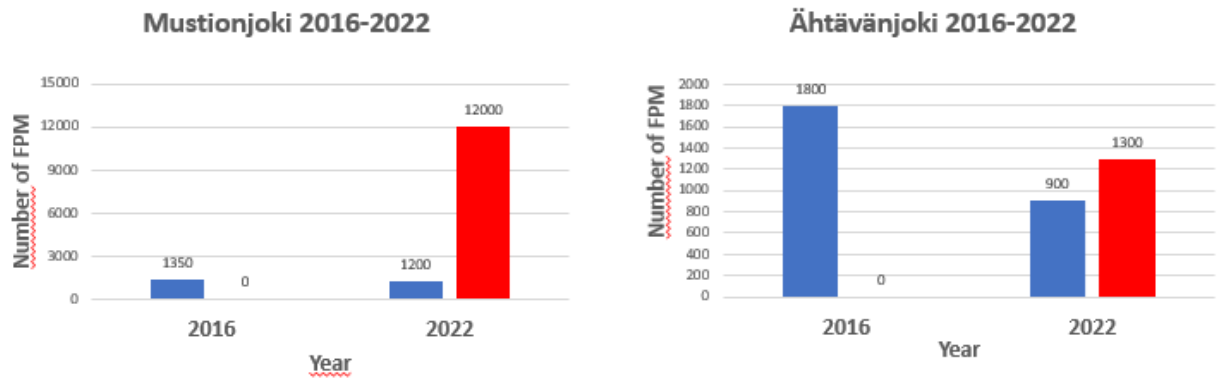


Figure C9.1: The numbers of nature-born adult FPM (blue) and the restocked FPM (red) in Mustionjoki and Ähtävänjoki in 2016 and 2022.

The results

Expected results	Achieved results	Status	Beneficiary responsible
FPM and TRM populations in restoration sites transplanted where necessary.	Mussel populations have been assessed prior to restoration and mussels have been transplanted when necessary.	Completed	EPOELY, VARELY, LUVY
3 000 - 5 000 juvenile mussels bred in the laboratory from each of the 2-4 target populations.	Breeding was successful for 2/4 populations 2018 in Konnevesi laboratory. Juvenile mussels from two populations were transferred to Norway for rearing in 8/2019. In addition mussel rearing is also implemented in Konnevesi as a complementary project. Ca. 1300 mussels from Ähtävänjoki and 200 mussels from Mustionjoki were successfully bred in the facilities in Konnevesi and Norway during 2018-2022. An additional batch of ca. 12000 juvenile mussels were reared from the Mustionjoki population in 2022.	Completed	JYU, MH_LP
Enough mussels survive in all target rivers to ensure survival, and, on a longer time-scale, natural reproduction of the population if environmental conditions permit.	Reared juvenile FPM have been re-introduced to natal rivers 2020-22, ca. 1300 in Ähtävänjoki and 12200 in Mustionjoki, including all the juvenile FPM retrieved thus far. This has increased the number of mussels in both populations considerably (see fig. C9.1), but on the longer term the success remains to be seen. The juveniles restocked during the project could be reproducing in about 20 years at the earliest.	Completed	EPOELY, VARELY, LUVY, MH_LP

Output

Deliverables

Code	Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable	delivered
C9.1	Report of field work related to FPM collection	30.12.2016	31.12.2016	LUVY	Jokihelmisimpukan nykytilan selvitykseen ja pelastamiseen liittyvät maastotyöt vuonna 2016. Freshabit -hankkeen Karjaanjoen kohdealueen raportti	IR1
C9.2	Report on host fish specificity and survival of FPM glochidia reared in captivity, and survival after restocking	30.9.2021	25.1.2023	MH_LP	Report on FPM captive breeding and restocking	FR

Additional output

Code	Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable	delivered
C9.3	Inventory of FPM´s and field work at River Ähtävänjoki	NEW	22.12.2016	EPOELY	FRESHABIT LIFE IP -projektissa tehdyt Ähtävänjoen jokihelmisimpukkaan liittyvät työt vuonna 2016	IR1

Milestones

Milestone	Foreseen date in GA	Actual date	Beneficiary responsible
Adult mussels are collected and transported to JYU laboratory for rearing studies from Mustionjoki and Ähtävänjoki	30.10.2016	30.10.2016	MH_LP, LUVY, EPOELY
Adult mussels are collected and transported to JYU laboratory for rearing studies from Isojoki and Karvianjoki	30.10.2017	31.10.2017	EPOELY, VARELY
Glochidia collected from both primary target rivers (Mustionjoki and Ähtävänjoki)	30.11.2018	30.11.2018	LUVY, EPOELY
Successful rearing of sufficient number of juvenile mussels from both primary target rivers	31.08.2019	31.08.2021	LUVY, EPOELY
Glochidia collected from Isojoki and Karvianjoki	30.11.2019	30.11.2021	EPOELY, VARELY
Successful rearing of sufficient number of juvenile mussels from Isojoki and Karvianjoki	31.08.2019	Isojoki 30.8.2022 Karvianjoki not achieved Both continued in LIFE Revives	EPOELY, VARELY
Restocked juvenile mussels in Mustionjoki and Ähtävänjoki	30.9.2021	30.9.2021	LUVY, EPOELY
Restocked juvenile mussels in Isojoki and Karvianjoki	30.9.2022	30.8.2022 120 000 juvenile FPM restocked in Isojoki, Karvianjoki not successful yet	EPOELY, VARELY

Continuation of the action after the project

A national Committee on the conservation of the Freshwater Pearl Mussel published the Strategy and action plan for the protection of freshwater pearl mussel 2020–2030 in January 2021 (https://julkaisut.valtioneuvosto.fi/handle/10024/162681). National targets and action for the conservation of the FPM are expected to raise more funding and projects, where experiences from FRESHABIT can be utilized. A complementary project to increase the rearing of FPM in Finland has been completed (SALMUS, 2019-22) and a new LIFE Revives (2021-27) project starded.

After the project period, LUVY will continue and pursue mobilizing funding to continue the rescue of Freshwater Pearl Mussels in the Karjaanjoki river system. Monitoring of the survival of the juvenile mussels in the in-situ rearing locations needs to be continued after the project. New funding sources are being searched for continuing the enhancement of the population by ex-situ rearing. National funding is also being searched for maintaining and enhancement of the Ähtävänjoki FPM population by EPOELY.

The FPM populations of Isojoki and Karvianjoki are included in LIFE Revives, where the ex-situ breeding and restoration for their habitats are continued. For Isojoki, the first batch of glochidia released in autumn 2019 were lost, but a new batch from 2021 was successful, and app. 120 000 FPM juveniles were released in Isojoki in August 2022 by LIFE Revives. Glochidia have also been retrieved from the Karvianjoki population in autumn 2021, but they are still being reared in Konnevesi before restocking by LIFE Revives.

Backed up by the conservation strategy and LIFE Revives, the general view for FPM conservation is pretty good for the foreseeable future. However, funding for conservation measures for those populations not involved in LIFE Revives is also needed.

Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification

ACTION C.10: Purchase of land and compensation payments for use rights

Beneficiary responsible for the implementation:	EPOELY, KESELY, VARELY, SMK
Other beneficiaries involved:	
Foreseen start date: Jan 1st 2016	Actual start date: Jan 1st 2016
Foreseen end date: Sept 30th 2017	Actual (or anticipated) end date: May 27th 2021

Purchase for the state and establishing of permanent nature conservation areas at important sites with respect to the protection of headwaters and improving water retention was made in three project regions: Lounais-Suomi (Kiskonjoki and Karvianjoki catchments), Keski-Suomi (Saarijärven reitti catchment) and Pohjanmaa (Isojoki catchment). This action demonstrates how voluntary conservation program METSO can be targeted not only to protect forest habitats, but also freshwater habitats by protection important riparian habitats along headwaters and other parts of the catchment area. The METSO program is a national voluntary-based protection program for increasing the amount and area of protected valuable forest and wooded mire areas in southern Finland.

The activities

As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
At the headwaters of Isojoki the aim is to find at least 10 hectares of forest stands along the brooks that will be restored in the project	In Isojoki target area, an estate of 11,26 ha was purchased for for the state for permanent conservation in 2016, situated nearby the Lohiluoma stream in the headwater catchment of Isojoki N2000 site. It is one of the biodiversity pearls in the development of a pearl necklace connecting Lauhanvuori Natura 2000 site and Lapväärtinjokilaakso site tightly together, and is located between these Natura 2000 sites. The goal in the Isojoki catchment was small and completed already in Phase 1 as a targeted purchase. EPOELY has not been planning to implement his Action in a greater extent.	EPOELY, SMK
At the headwaters and along Kiskojoki and Karvianjoki the aim is to find app. 62 hectares of forest stands that will improve the protection of the Kiskonjoki Natura 2000area which mostly consists of the freshwater habitats but not of the habitats along the river.	VARELY has purchased 34,9 ha for the state and paid compensations for 74,7 ha of permanent private nature conservation areas in the Kiskonjoki and Karvianjoki catchments. In the Karvianjoki catchment 42 ha and in Kiskonjoki 66 ha have been protected. The protected properties have been located along of near to the target water bodies of the project, both inside and outside the existing N2000 sites (Fig C10.1). VARELY has implemented this Action actively and in collaboration with local forest management associations. The knowledge and contacts of these associations have been the key to the success of the action. The associations are closer to the land owners and they have better success than the ELY-centres in contacting the land owners. Current experiences in Freshabit encouraged to continue similar measures after the project.	VARELY
At Keski-Suomi the action will be targeted to the improving of the water retention capacity and increasing water quality of the Saarijärven reitti. This will be done by acquiring at least 50 ha peatlands, mostly pine and spruce mires from the most critical sites along the catchment of Saarijärven reitti.	KESELY has purchased 23,3 ha for the state and paid compensation for another 49,9 ha of permanent private nature conservation area in the headwaters of the Saarijärven reitti target catchment. A majority, 58,5 ha of these are located outside N2000 sites.	KESELY

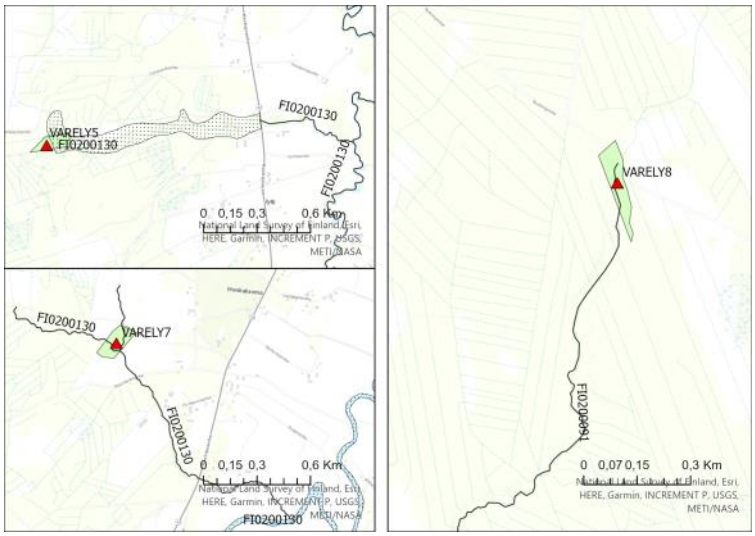


Figure C10.1. Location of three estates purchased to the state in the northern part of the Karvianjoki catchment with respect to N2000 sites.

The results

Expected results	Achieved results	Status	Beneficiary responsible
New permanent nature conservation areas covering app. 120 hectares in 3 project areas.	In total 194 ha in 40 real estates have been protected either by purchase (63 ha, 9 estates) or compensation for permanent conservation area (125 ha, 33 estates).	Completed	EPOELY, KESELY, VARELY,
App. 10 ha at Isojoki (Pohjanmaa) for improving the protection of riparian forests along the river and brook restoration areas	11,3 ha purchased to state.	Completed	EPOELY
28 ha of new METSO protection areas at Kiskonjoki and Karvianjoki catchment areas	In total 103,3 ha completed, of which 28,6 ha purchased to state.	Completed	VARELY
62 ha of new METSO protection areas in Kiskonjoki and Karvianjoki catchment areas	In total 103,3 ha completed, of which 28,6 ha purchased to state.	Completed	VARELY
App. 50 ha of peatlands, mostly pine and spruce mires to increase the water retention and filtering along the catchment area of Saarijärvenreitti (Keski-Suomi)	KESELY has purchased 23,3 ha for the state and paid compensation for another 49,9 ha of permanent private nature conservation area in the Saarijärven reitti target catchment, 73,2 ha in total.	Completed	KESELY

Table C10.1. Table of the estates purchased to the state. Location of the estates is given in Annex 11 with the Doc Number as an identifier, and matching estate numbers can be found in the Land Purchase Database.

FRESHABIT LAND PURCHASE 2016-2022						
Doc Number	Estate number	Land Purchase	Year	AB	Cost (€)	Ha
VARELY1	734-593-1-13	VARELY, Salo, Näsebruk/Latokartanonkoski	2016	VARELY	70 000,00	3,97
VARELY2	609-464-1-197	VARELY, Taunola, Pori Noormarkku/Karvianjoki	2017	VARELY	15 000,00	2,35
VARELY3	214-424-6-35	VARELY, Mauno Mikael Lähderanta/ Land purchase	2017	VARELY	105 000,00	17,4
VARELY4	734-719-1-98	VARELY, Silvannummi, Salo/ Land purchase	2017	VARELY	4 500,00	0,56
VARELY5	99-407-2-148	VARELY, Honkajoki	2018	VARELY	7 200,00	1,3
VARELY7	99-406-5-79	VARELY, Honkajoki	2020	VARELY	12 300,00	2
VARELY8	230-411-3-105	VARELY, Karvia	2020	VARELY	8 000,00	1
EPOELY1	151-403-1-171	Isojoki, Vainio	2017	EPOELY	44 050,00	11,26
KESELY1	226-409-1-338	Karstula, Vahanka	2019	KESELY	28 000,00	23,3
TOTAL	**9 estates**				**294 050,00**	**63,14**

Output

Milestones

Milestone	Foreseen date in GA	Actual date	Benefi ciary

			respo nsible
28 ha of new METSO protection areas at Kiskonjoki	31.12.2017	31.3.2017	VARE LY
3 ha of new METSO protection areas at Isojoki	31.12.2017	31.12.2016	EPOE LY
62 ha of new METSO protection areas at Kiskonjoki	31.12.2019	31.12.2017	VARE LY
10 ha of new METSO protection areas at Isojoki	31.12.2019	31.12.2016	EPOE LY
50 ha new METSO protection areas at Saarijärven reitti	30.9.2021	11.4.2019	KESEL Y
122 ha of new METSO protection areas	30.9.2021	31.12.2019	VARE LY; KESEL Y; EPOE LY

Continuation of the action after the project

The voluntary METSO conservation program is expected to be continued after the project and using it for protection of riparian forests will be increased in the future. Especially VARELY is keen on continuing this in the future, expecting ca. 10 estates protected each year. The action will be continued in Priodiversity LIFE.

Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification
The budget has been overspent by own funding from VARELY. As the task has been progressing very well, we saw no need to suppress it, accepting that some of the costs may be considered ineligible.				

ACTION C.11: Improving visitor facilities

Beneficiary responsible for the implementation:	MH_LP, VARELY, VVK
Other beneficiaries involved:	
Foreseen start date: Jan 1st 2016	Actual start date: Jan 1st 2016
Foreseen end date: Sept 30th 2017	Actual (or anticipated) end date: Sept 30th 2021

In this action, the visitor facilities at three project areas: Puruvesi (MH), Kiskonjoki (VARELY) and Vanajavesi (VVK) were improved.

The activities

As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
The new trail at Hytermä will be app. 1,5 km long and the theme of the trail is the unique cultural history values of this first private nature conservation area in the area. The trail consists of 1 main information board and along the route 3-5 smaller information boards and a table with benches will be erected.	In Lake Puruvesi, the 1,5 km long trail in Hytermä Island was completed in 2018. The newly signed trail at Hytermä was themed based on the unique cultural history values of this first private nature conservation area located in South Savo. One main information board showing the route, facilities, information on Lake Puruvesi, Hytermä and the Freshabit project was developed. Along the route, three smaller target specific information boards were developed.	MH_LP
The existing winter loop trail at Punkaharju will be developed and partially re-routed to enable also summer day use. The trail is app. 5 km long and rerouting requires also building new trail and graveling the path. The trail includes 2 main information boards, signing and 5-10 smaller information signs.	The existing winter loop trail at the research forest of Punkaharju was partially re-routed to enable summer day use and 30 signs along it were erected. The trail is easy, accessible and well-marked, targeted for non-experienced visitors. The Punkaharju summer hiking trail was constructed in 2018.	MH_LP
At Kiskonjoki the recreational facilities at a popular fishing area of Latokartanonkoski will be improved. 4 new wooden stairs from the banks to the riverside will be built and 1 spot will be prepared for canoes to go easily ashore. Also the bridge crossing dam of the mill will be restored, railing of another bridge will be replaced and the dangerous holes in the walls of the mill will be closed with metal mesh to increase visitor security. Furthermore the clearing of the path network of app. 2 km and surrounding areas will be carried out on app. 14 ha.	At Latokartanonkoski 4 new wooden stairs from the banks to the riverside have been built and 2 spots has been prepared for canoes to go easily ashore. Also, stairs to a fifth location and railings along a steep path have been built to increase visitor security. Arrow signs and a big info board with a map was built for visitors to keep on the paths. Furthermore, the clearing of the path network of app. 2 km and surrounding areas has been carried out on ~14 ha area. The clearing included removing alien vascular species such as Himalayan Balsam (Impatiens glandulifera), Red Elderberry (Sambuca racemosa) and False Spirea (Sorbaria sorbifolia).	VARELY
At Hattelmalanjärvi a path to the meadow surrounding the lake will be built in 2020. At Ormajärvi a bird watching tower will be built for improving bird watching 2017-2018. At Saarioisjärvi, Tykölänjärvi and Kukkia the old bird watching towers will be renovated and paths leading to the towers are improved during the third phase.	At Ormajärvi, the bird watching tower was completed in 2018. At Hattelmalanjärvi and Tykölänjärvi,the renovations of bird watching towers and building of duck boards were completed in 2020. The renovations of Saarioisjärvi and Kukkia bird watching towers and building of duck boards to Kukkia tower were finished in 2021.	VVK

The results

Expected results	Achieved results	Status	Beneficiary responsible
At Puruvesi area 1,5 km long nature trail to Hytermä. Re-directed and improved app. 5 km nature trail at Punkaharju.	Completed 2018	Completed in Phase 2	MH_LP
At Latokartanonkoski in Kiskonjoki area clearing of path network and surrounding habitats covering (includes also removal of Himalayan Balsam) on 16 ha, four new wooden stairs to the riveside and place for canoist to go shore.	Completed	Completed in Phase 1	VARELY
At Vanajavesi area the improvement of bird watching facilties at 5 sites: trail at Hattelmalanjärvi, bird watching tower at Ormajärvi, renovation of bird watching tower at Kukkianjärvi and Tykölänjärvi. Path to the bird watching tower at Tykölänjärvi, Kukkia and Saarioisjärvi.	Ormajärvi bird watching tower completed 2017-2018. Path (300m) with duckboards at Hattelmalanjärvi completed. Tykölänjärvi birdtower renovation completed in June 2020. Kukkianjärvi and Saarioisjärvi bird towers renovated in Autumn 2021.	Completed in Phase 3	VVK

Output

Milestones

Milestone	Foreseen date in GA	Actual date	Beneficiary responsible
Planning for recreational facilities at Latokartanonkoski (Kiskonjoki) completed	30.9.2016	31.1.2017	VARELY
Hytermä and Punkaharju trails completed	30.9.2016	31.12.2018	MH_LP
Bird watching tower Ormajärvi at Vanajavesi area completed	10.1.2018	10.1.2018	VVK
Path with duckboards at Hattelmalanjärvi completed	30.10.2020	31.5.2021	VVK
Wooden stairs, clearing and go ashore site for canoe completed at Latokartanonkoski (Kiskonjoki)	30.10.2017	31.12.2017	VARELY
Bird watching tower renovation and path leading to the tower at Kukkianjärvi at Vanajavesi area completed	30.10.2020	30.10.2021	VVK
Bird watching tower renovation and path at Saarioisjärvi and bird watching tower renovation and path at Tykölänjärvi at Vanajavesi area completed	30.10.2020	30.10.2021	VVK

Continuation of the action after the project

In Vanajavesi area, the local ornithological societies will take care of the built and renovated bird watching towers. In Latokartanonkoski and Puruvesi, MH is responsible for maintaining the built structures.

Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification

ACTION C.12: Organising voluntary restoration camps

Beneficiary responsible for the implementation:	WWF
Other beneficiaries involved:	MH_LP
Foreseen start date: Jan 1st 2016	Actual start date: Jan 1st 2017
Foreseen end date: Dec 31st 2019	Actual (or anticipated) end date: Sep 5th 2022

WWF Finland arranged five camps for volunteers during the project. The camp tasks of camps were traditional habitat restoration, restoring habitats by hand where machines could not be used.

New spawning and youngling habitats were created for extremely endangered land-locked salmon in Koitajoki voluntary restoration camp in July 2019.

The activities

As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
Altogether 5 camps totaling ca. 40 days will be arranged during the project. Each camp is expected to have ca. 20 volunteers and 4-7 persons from the organizing beneficiaries.	Five restoration camps were organised successfully gathering 100 voluntary workers for 40 days of hard work. The camps were organised in five different Freshabit target areas and the tasks were mainly river and stream restoration. Voluntary restoration camps are irreplaceable because several delicate habitats cannot be restored by machine work. In addition, the camps are extremely successful in raising awareness. The voluntary workers act as ambassadors who spread the good news how valuable freshwater habitats can be salvaged by restoration. Also, all the camps have received a lot of media attention. COVID-19 pandemic postponed the Naamijoki camp by a year. Otherwise, there were no major problems in this action. Restoration camps were following: Target area: River Karjaanjoki, Pitkälankoski rapids in Karkkila Time: 26.8.-2.9.2017 Beneficiaries involved: WWF and LUVY Attendees: 19 volunteers, personnel from WWF and LUVY Results: over 50 new spawning gravels were created, using ca. 100 cubic meters of gravel, and restoration was completed about 500 meters or river reach. Target area: Kiskonjoki river and tributary streams Time: 11.-18.8.2018 Beneficiaries involved: WWF and VARELY Attendees: 23 volunteers and personnel from WWF and LUVY Results: Spawning and youngling habitats were created for	WWF

	endangered brown trout, totalling ca 350 m length of the main river in Latokartanonkoski area, and 125 m of tributary streams. Invasive plant species (*Impatiens glandulifera)* were removed as part of the camp activities. Target area: River Koitajoki Time: 13-20.7.2019 Beneficiaries involved: WWF, POKELY and MHLP Attendees: 19 volunteers and personnel from WWF, POKELY and MH_LP. Results: New spawning and youngling habitats were created for extremely endangered land-locked salmon. Previously created habitats were restored and improved as well. Moss-covered boulders were collected by diving and transported to previously restored areas to enhance natural process. Hiking tracks in Patvinsuo national park were improved. Target area: River Naamijoki Time: 17.-24.7.2021 Beneficiaries involved: WWF and MHLP Attendees: 20 volunteers and personnel from WWF and MHLP Results: 17 spawning habitats (41 m2) were created in Kelhunjoki. 5 small migration barriers were removed from Kenttäoja. Trouts were spotted on sight! Reeds were mowed in Vaattojärvi. Also, stream inventories were conducted. Target area: Vanajavesi, Evo hiking area Time 27.8.-3.9.2022 Beneficiaries involved: WWF, VVK and MHLP Attendees: 17 volunteers and personnel from WWF, VVK and MHLP Results: Stream restorations including 20 new spawning habitats created in three rapids Ylimyllynkoski, Katiskoski and Ämmänmäenkoski. Altogether 39 tons/60 cubic meters of gravel were used. Trouts were spotted spawning in restored areas in the following October!	

The results

Expected results	Achieved results	Status	Beneficiary responsible
5 camps organised, ca 20 participants per camp. In total 100 participants.	Five voluntary restoration camps organised: 2017 Karjaanjoki (19 volunteers) 2018 Kiskonjoki (23 volunteers) 2019 river Koitajoki (19 volunteers) 2021 Naamijoki (20 volunteers) 2022 Vanajavesi (17 volunteers)	Completed	WWF

Output

Milestones

Milestone	Foreseen date in GA	Actual date	Beneficiary responsible
One WWF camp organised	30.9.2017	26.8.2017	WWF
Three WWF camps organised	30.9.2019	20.8.2019	WWF
Five WWF camps organised	30.9.2021	3.9.2022	WWF

Continuation of the action after the project

Voluntary work camps are frequently used in management and restoration of conservation areas by WWF and FANC. This work will continue after the project.

Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification

ACTION D.1: Monitoring impacts on biodiversity

Beneficiary responsible for the implementation:	SYKE, LUKE, MH_LP
Other beneficiaries involved:	EPOELY, KESELY, LAPELY, LUVY, POKELY, VARELY, VVK. UO
Foreseen start date: Jan 1st, 2016	Actual start date: Jan 1st, 2016
Foreseen end date: Sept 30th, 2022	Actual end date: Sept 30th, 2022

Monitoring was divided into monitoring for biodiversity (D1), ecosystem functioning (D2), and technical monitoring (D5). Technical monitoring for e.g. amounts of materials used and the durability or built structures was considered as a minimum demand, and monitoring for biodiversity and/or ecosystem functioning were applied as necessary. For example, in bird wetland restoration the focus was on the impact on target species, and monitoring for water quality was implemented with lower intensity.

Action D1 summarizes what kind of baseline monitoring was implemented on all relevant indicators of biodiversity in relation to concrete actions C3-4 and C6-9. The WFD indicates that assessment of ecological status is based on Biological Quality Elements (BQEs) depending of water body type. Practically all indicators are intercalibrated against eutrophication pressure and common European indicators sensitive for other pressures such as water level regulation and morphological changes are missing. In HD the structure and function of a habitat is assessed but no indices of metrics have been given. For FRESHABIT, the list of most relevant indicators based on best available knowledge have been collected to monitor the effectiveness of each action in phase 1 of the project.

The list of indicators have two levels: a) base-level monitoring, and b) high intensity monitoring. The base-level forms a basis for all actions to be monitored; they are widely accepted and applied to all target areas. The b-level of monitoring is focused more into demonstrating and piloting partly novel indicators, which are not yet widely used in freshwater management. The object of this two-level monitoring is to define the most suitable indicators in practice to monitor the effectiveness of concrete actions, and ultimately find the most compliant ones with WFD, i.e. reference-based indicators and specific to water types. In most cases, project actions are being compared to the initial situation of habitats and/or species, but also comparison to the reference sites is used.

The impact of our measures on lakes and rivers in the target N2000 sites has been combined in Deliverable D7.1, combining monitoring results by our beneficiaries with national background monitoring data. Additional results are also presented in outputs of actions D1, D2 and D5, and relevant C actions. Report on the success of captive breeding and restocking of freshwater pearl mussel was reported as part of Action C9.

NOTE: The division between D1/D2/D5 was not applied as initially planned in all cases, e.g. all monitoring for fish passes was rather reported under ecosystem functioning D2 than biodiversity D1. The results are given under the action where the deliverables are appointed to.

The activities

As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
In action D1, baseline monitoring is implemented on all relevant indicators of biodiversity in relation to concrete actions C1-9.	Impacts of concrete conservation actions on biodiversity have been monitored in all regions and for all relevant C actions implemented, but with variable intensity. As biological responses are often slow and require a lot of resources to detect, biological monitoring has been focused on those species and actions, where responses can be expected to be detected within the time frame of the project. These are birds in bird lakes and wetlands (C7), and fish in the dam bypass (C3) and stream restoration (C4) sites. An exception is action C6, where substantial monitoring effort was used to assess the impacts of different restoration methods to stream biodiversity end ecosystem functioning, using the high intensity monitoring indicators. In addition to target species, we have also monitored the impacts of lake shore and bird wetland restoration (C7) on HD Annex IV species, which are often considered as possibly suffering from collateral damage by restoration measures. Having a large consortium implementing a nature restoration project with mutual goals has been a success factor. We have been able to provide similar guidance to all parties, and they have been able to get support from each other in implementing the restoration. For example, rearing and monitoring of the FPM has been coordinated by a peer network led by JYU and MH_LP, resulting to increased capability for such	Regional managers, CORE organizations, OU, JYU

	measures among all beneficiaries involved. On the other hand, the time line of any project, even a relatively long one such as Freshabit, is usually too short to fully detect the impacts of restoration measures on biodiversity. It usually takes a few years from planning to implementation of measures, leaving little for monitoring within a project. This has been experienced in all Freshabit actions, and some measures, such as the fish bypasses built in Kiskonjoki were implemented so late that monitoring within a project was not possible. Therefore, in addition to project-funded monitoring, resources should be available for after-project monitoring as well. In addition, more resources should be reserved for within-project monitoring, and common databases for storing the data for all kinds of beneficiaries should be available. These issues are dealt with in more detail in deliverables A10.5, D7.1, and the After LIFE Plan of Freshabit.	

The results

Expected results	Achieved results	Status	Beneficiary responsible
D1 monitoring actions are expected to be implemented in:	**D1 monitoring actions have been implemented in:**		
7 sites for enhancing fish migration in action C3	Reported in Action D2	Completed	LUVY, EPOELY, VARELY, Vatten
Ca. 50 stream sections where habitats are restored in action C4	Monitoring for biodiversity in stream restoration sites was focused on salmonid fish (Deliverable D1.1). These included a single catchment-scale restoration in Naamijoki, a tributary of Tornionjoki located in South-Western Lapland. Multiple on-site stream restorations with the aim of enhancing the natural reproduction of brown trout (Salmo trutta) and land locked salmon (Salmo salar) were conducted on four rivers: Ostrobothnian Isojoki and Karvianjoki, Ala-Koitajoki in North Carelia and Karjaanjoki in Southern Finland. Information about the restoration measures and results of monitoring electrofishing surveys were collected. These were then analysed together with open water quality and weather or river discharge data to assess the effects of the restorations to the target populations. Results showed that in Isojoki restorations together with migration barrier removal had increased the YOY brown trout (young of the year) production on several sites. However, the effect was not seen in older trout densities. For catchment scale restoration in Naamijoki, using water- and sediment retention increasing protective structures, no effect on trout densities was observed during the relatively short monitoring period. In Ala-Koitajoki the results of a treatment-control design with water moss (Fontinentalis sp.) suggested that there might be benefits in water moss transplantations for YOY salmon survival. However, this could not be verified statistically. In Karjaanjoki increasing trends could be seen in YOY densities after restorations, but the lack of adequate monitoring before the restorations hindered conclusions. In Karvianjoki YOY densities showed some decrease after restorations while densities of older trout increased. This could be a result of increased area of deeper pools and hiding places which have altered the sites better suitable for older trout and decreased the catchability of YOY trout. This study underlined the importance of adequate monitoring planning, with long enough before- and after-restoration electrofishing survey periods. Especially in small streams, where hydrological conditions cause strong variation in the species densities a long time series is needed in order to detect possible trends. Monitoring age-class-specific habitat chances and catchability is also a good practice as restorations may impact different age-classes in dissimilar manner. The example of Isojoki shows that strong beneficial effects can, however, be detected even during shorter monitoring periods. In addition to fish, benthic macroinvertebrates have been monitored in Karjaanjoki. The results show that the ecological status of the river has improved during the last	Completed	LUVY, EPOELY, VARELY, POKELY, LUKE

	two decades, but project-related impacts on benthic macroinvertebrates cannot yet be detected.		
12-18 stream sections for demonstrative habitat restoration in action C6	Intensive monitoring for ecosystem functioning as well as biodiversity was implemented and the results are reported in Action C6.	Completed	OU, LUKE, EPOELY, SYKE
19 bird lakes in action C7	Biodiversity monitoring was implemented in 11 lakes that can be considered as bird lakes (N2000 SPA/SCI sites with waterfowl as conservation priorities). In addition 7 lakes or parts of lakes were either influenced by catchment area actions or restoration measures in the lake (e.g. two separate bays in Lake Puruvesi). In addition to waterfowl, monitoring was targeted to HD Annex IV species, when demanded by the environmental permits. The effects of restoration measures in lakes are dealt with in detail in Deliverable D7.1. In short, positive trends were observed for waterfowl on many sites, but on the other hand also neutral or even decreasing trends were detected. The trends are also dependent on many other things than on-site measures, e.g. long-term population trends, and often take longer than just 2-3 years after restoration to settle. The additional Deliverable D1.6 reports long-term trend for birds as a background. However, positive signs indicate that bird wetland restoration is beneficial, and as more measures are implemented in the Helmi habitats programme, wider effects on waterfowl can be expected. Positive trends were also observed for HD Annex IV species, the Moor Frog and Darters (*Leucorrhinia* spp.). This is encouraging and useful to show, as these species are often considered to potentially suffer collateral damage from restoration measures, which also affects the extent that restoration measures can be implemented. We expect to see that showing the benefits of restoration to these species makes permit application easier in future restoration projects.	Completed	KESELY, MH, EPOELY, ESAELY, VVK
1 lake for biomanipulation in C8	Results are reported under Action C8. Biomanipulation by removing cyprinid fish is an additional complementary measure for other restoration measures, such as catchment area management implemented in the catchment areas of Lakes Vaattojärvi and Puruvesi, where C8 was implemented. The methodology applied (e.g. fyke nets) allow for releasing the predatory fish back into the lake and removing the cyprinid fish.	Completed	MH, ESAELY
2 mussel populations in action C9	Results are reported in Action C9. The most intensive monitoring was focused in Rivers Ähtävänjoki and Mustionjoki, where we managed to restock juvenile FPM mussels during phase 3 of the project. FPM have also been surveyed and taken into ex-situ facilitation in Rivers Isojoki and Karvianjoki, but the work is continued in LIFE Revives project.	Completed	EPOELY, LUVY, VARELY

Output

Deliverables

Code	Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable	Delivered
D1.1	Report on stream restoration effects on biodiversity and functioning (Action D2 included)	30.9.2022	11.5.2022	LUKE	Stream restorations and their impacts for brown trout and salmon in FRESHABIT LIFE IP-projects.	FR
D1.2	Article on peer-reviewed journal on stream restoration effects on biodiversity and functioning (Action D2 included)	30.9.2022	29.6.2021	LUKE	Species–environment relationships of fish and map-based variables in small	FR

					boreal streams: Linkages with climate change and bioassessment.	
D1.3	Report of restoration effects on e.g. diatoms, macroinvertebrate and aquatic mosses	30.9.2022	30.9.2022	OU	Lisää puuta puroon: miten puukunnostus vaikuttaa purojen toimintaan ja lajistoon	FR
D1.4	Report of the restoration effects on spawning area of critically endangered river spawning densely-rakered whitefish (Coregonus lavaretus f. nilssoni)	30.9.2022	30.9.2022	POKELY	Report of the restoration effects on spawning area of critically endangered river spawning densely-rakered whitefish	FR
D1.5	Report of the impacts of transferred mosses on the juvenile and adult habitats of Salmo salar. m. sebago (critically endangered species)	30.9.2022	30.9.2022	POKELY	Report of the impacts of transferred mosses on the juvenile and adult habitats of Salmo salar. m. sebago	FR

Additional output

Code	Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable	Delivered
D1.6	Report of Inland waterfowl population trends 1986–2018	NEW	30.7.2019	SYKE, LUKE, MH_LP	Laaksonen, T., Lehikoinen, A., Pöysä, H., Sirkiä, P. & Ikonen, K. 2019: Inland waterfowl population trends 1986–2018. – Linnut-vuosikirja 2018: 46– 55 (in Finnish with English summary)	IR2

Milestones

Milestone	Foreseen date in GA	Actual date	Beneficiary responsible
List of all relevant indicators in relation to biodiversity parameters updated	31.8.2016	31.8.2016	SYKE
Monitoring of biodiversity effects completed	30.9.2022	30.9.2022	SYKE

Continuation of the action after the project

During the project duration we expect to have gained mostly the first signals for impacts for most biodiversity indicators, because the time span for responses in naturally usually at least ten years. This applies especially to benthic macroinvertebrate and aquatic bryophyte communities. On the other hand, some responses such as increase in spawning salmonids or nesting birds can be detected faster. Nevertheless, monitoring for the biodiversity impacts of the project needs to be continued after the project to detect the longer-term changes.

Challenges and development needs for monitoring have been dealt with in the After LIFE Plan of Freshabit. As the time scale of most individual projects is too short for detecting the impacts of restoration, funding sources for monitoring beyond projects are needed. Also long term monitoring networks would be useful for detecting the impacts of restoration in a pre-destined set of sites over time. Such a network exists for peatlands already, but we need networks for other habitats as well. For further details, see the After LIFE Plan.

Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification

ACTION D.2: Monitoring ecosystem functioning

Beneficiary responsible for the implementation:	SYKE, LUKE, MH_LP
Other beneficiaries involved:	UO, EPOELY, ESAELY, LUVY, POSELY, Raase
Foreseen start date: Jan 1st, 2016	Actual start date: Jan 1st, 2016
Foreseen end date: Sept 30th, 2022	Actual end date: Sept 30th, 2022

In Action D2, indicators of ecosystem functions have been monitored in relation to concrete actions C1-C9 as preliminary indicated in Table D.1. “Ecosystem function” generally includes stocks of materials (e.g., carbon, water, mineral nutrients) and rates of processes involving fluxes of energy and matter between trophic levels and the environment, and monitoring is generally restricted to those properties or processes. Thus in FRESHABIT, the ecosystem functioning is interpreted in wide contexts, and in addition to fluxes of energy and matter monitored more closely in Action D3, this Action D2 includes the movements of biota between habitats and restoration effects on stream ecosystem functioning.

The list of indicators have two levels: a) base-level monitoring, and b) high intensity monitoring. The base-level forms a basis for all actions to be monitored; they are widely accepted and applied to all target areas. The b-level of monitoring is focused more into demonstrating and piloting partly novel indicators, which are not yet widely used in freshwater management. The object of this two-level monitoring is to define the most suitable indicators in practice to monitor the effectiveness of concrete actions, and ultimately find the most compliant ones with WFD, i.e. reference-based indicators and specific to water types. In most cases, project actions are being compared to the initial situation of habitats and/or species, but also comparison to the reference sites is used.

The impact of our measures on lakes and rivers in the target N2000 sites has been combined in Deliverable D7.1, combining monitoring results by our beneficiaries with national background monitoring data. Additional results are also presented in outputs of actions D1, D2 and D5, and relevant C actions. Report on the success of captive breeding and restocking of freshwater pearl mussel was reported as part of Action C9.

NOTE: The division between D1/D2/D5 was not applied as initially planned in all cases, e.g. all monitoring for fish passes was rather reported under ecosystem functioning D2 than biodiversity D1. The results are given under the action where the deliverables are appointed to.

Releasing artificial leaves for monitoring the retention capacity of the stream.

The activities

As stated in the GA	The key achievements, main factors of success and lessons	Beneficiary

	learned	responsible
In action D2, baseline monitoring is implemented on all relevant indicators of ecosystem functioning in relation to concrete actions C1-9. Ecosystem functioning is measured by indicators for habitat quality, e.g. water chemistry, sediment cover, retention capacity etc.	Impacts of concrete conservation actions on ecosystem functioning have been monitored for all relevant actions. Least activity in action D2 has been in Karjaanjoki, where monitoring is focused more on biodiversity and technical monitoring, and Naamijoki, where most concrete actions have not yet been implemented. On the other hand, monitoring for ecosystem functioning has been very active in Pohjanmaa, where OU, LUKE and SYKE are implementing a large experimental set-up in action C6, and in Puruvesi, where an extensive monitoring scheme for water quality is being implemented. Also all monitoring for fish migration has been reported in this Action instead of D1, where it was originally assigned. Fish migration was considered more as an indicator of ecosystem functioning than biodiversity. The positive things regarding a large consortium and challenges related to time reported in D1 apply here as well. For example, observing responses in water chemistry variables after restoration measures is dependent on both temporal and spatial scale. It takes years for e.g. catchment area measures to settle in a way that nutrient and solids leaching is significantly reduced. An in larger water bodies, such as Lake Puruvesi, the measures in catchment area need to be wide-spread to have an impact. The results of monitoring in D2 have been mostly compiled in Deliverable D7.1.	Regional managers, CORE, OU

The results

Expected results	Achieved results	Status	Beneficiary responsible
D2 monitoring actions are expected to be implemented in:	**D2 monitoring actions have been implemented in:**		
4 catchment areas (number of sampling sites to be detailed in further plans for the actions) in action C1. 10 N2000 sites (number of sampling sites to be detailed in further plans for the actions) in action C2	Monitoring for C1 and C2 are reported together. Water quality has been monitored in 4 peatland restoration sites in Keski-Suomi, 31 locations in Koitajoki, 3 locations in Pohjanmaa and 1 location in Naamijoki. Monitoring for the impact of other catchment area restoration actions 1 N2000 location in Puruvesi, 2 in Naamijoki, and 4 in Vanajavesi. The results are reported in Deliverable D7.1. To summarize, the impacts of catchment area actions implemented in phases 2 and 3 of Freshabit in the receiving water bodies by the end of the project are still little, and more time and measures are most likely needed for real responses. For example, in larger lakes such as Kukkia and Ormajärvi in the Vanajavesi region, and Puruvesi, the Freshabit measures have not had a significant impact on water quality during the project. All these lakes are relatively large, and their ecological status is good, but signs of deterioration (e.g. algal blooms) have been detected. Measures are needed to maintain their ecological and conservation status at the preferred level. The overall impact of Freshabit measures was considered positive, but further measures are also needed. Regarding rivers, Naamijoki is a tributary of the large Tornionjoki-Muonionjoki N2000 site. A slight positive trend can be detected in the water quality monitoring results in Naamijoki regarding a decrease in solid matter loading from the catchment area. This has very little impact on the whole N2000 site, but on the other hand the effects on Naamijoki may be significant over time.	Completed	KESELY, POKELY, MH, EPOELY, ESAELY
7 sites for enhancing fish migration in action C3 (moved from D1)	Upstream and downstream migration and reproduction of the target salmonid fish, and migration of other fish have been monitored in all fish bypass sites (Isojoki (1 bypass), Kiskonjoki (2), Karjaanjoki (2), Saarijärven reitti (2)) before and after the construction of the passes, if applicable. The fish passes of Kiskonjoki were opened only in 2022, so the after-monitoring is done after the project. Also all the other bypasses have been finalized late in the project (2020-21), so we do not have much data on the functioning of the fish passes. During 2020-21 more than 3 300 fish have been observed to use the Åminnefors fishway in Mustionjoki, including 12	Completed	LUVY, EPOELY, VARELY, Vatten, LUKE

	identified species and 57 individuals of salmon of trout. 896 fish have been observed in the Hietama fishway in Saarijärven reitti, including 30 trout specimens. The Kiskonjoki fish pass will be monitored after Freshabit. Thus promising initial results are available regarding upstream migration, but there are still details to be developed to improve the attractivity of the entrance to upstream migration, and especially to improve the guidance of downstream migrating juveniles into the fish pass instead of the turbine channel, where they may be chopped to pieces. Downstream migration experiments proved, that in most cases the migrating smolts are driven into the turbines, where their survival is very low. This is improved by structures guiding the fish into the dish passes instead of turbine channels. Structures are being developed. In Isojoki, where the Villamo dam was removed completely, brown trout have been observed to migrate quite far upstream of the former dam, into their original spawning sites (Deliverable D2.6). This increases the reproduction potential of the Isojoki brown trout considerably. In the current channel the downstream migration is not an issue.		
Ca. 50 stream sections where habitats are restored in action C4	Water quality indicators have been monitored with respect to Action C4 in Isojoki, Karvianjoki and Karjaanjoki rivers. The overall effects of stream restoration on water quality in these rivers is very small or indetectable, as can be expected (see Deliverable D7.1). The measures have been targeted on biota, where results for especially salmonid fish have been rather good (see Action D1).	Completed	POKELY, EPOELY, VARELY, VVK
2 sites for improving riparian connectivity in action C5	All monitoring activities related to C5 in Pohjanmaa were being implemented under D5 as technical monitoring, because the restoration activities affect only the structure of the stream channel and the riparian zone, and not water quality.	-	EPOELY
12-18 stream sections for demonstrative habitat restoration in action C6	Intensive monitoring for ecosystem functioning as well as biodiversity was implemented and the results are reported in Action C6.	Completed	OU, LUKE, EPOELY
19 bird lakes in action C7	Water quality parameters have been monitored wit variable intensity in bird lake sites, where the impacts of habitat restoration on waterfowl was the main goal. The overall effects of habitat restoration on water quality in these lakes is very small or indetectable, as can be expected (see Deliverable D7.1).	Completed	KESELY, MH, EPOELY, VVK
1 site for improving trophic web functioning in action C8	Intensive water quality monitoring has been implemented in Lake Puruvesi, but the impacts of biomass removal cannot be separated from other measures. A total of 117 tons of fish biomass has been removed from the lake, which equals to ca. 1 ton of phosphorus. In the long run, commercial fishing is more significant in removing phosphorus from the lake, but additional biomass removal may be useful in smaller targeted areas, as implemented in Freshabit.	Completed	ESAELY
2 mussel populations in action C9	Monitoring was focused on biodiversity, not water quality. Results are reported in Action C9.	Completed	EPOELY

Output

Deliverables

Code	Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable	delivered
D2.1	Report of survival of descending Atlantic salmon smolts (River Karjaanjoki)	31.12.2018	18.12.2017	LUVY	Lohen vaelluspoikasten käyttäytyminen ja kuolleisuus Mustionjoen voimalaitoksilla	IR2
D2.2	Report on the use of concrete actions to restore longitudinal connectivity of riverine habitats in target areas	30.6.2021	7.3.2022	Luke	Kalateiden merkitys alasvaelluksen kannalta Mustionjoen voimalaitoksilla - testivaiheen tuloksia Billnäsin ohjausrakenteesta. Länsi-Uudenmaan vesi ja ympäristö ry. https://www.luvy.fi/julkaisut/julkaisu-1-2022/	FR

D2.3	Monitoring report of the success of natural reproduction (densities of juvenile salmonids) in the nursery areas above the fishways in River Kiskonjoki	30.6.2021	23.5.2022	VARELY	Kiskonjoen-Perniönjoen vesistön taimenkannat vuonna 2021	FR
D2.4	Brown trout migration (first monitoring period 06/2020-11/2020) report in Saarijärven reitti	30.6.2021	1.12.2020	Luke, Vatten	Kalamäärien arviointi Hietaman voimalaitoksen alakanavassa ja kalatiessä vuonna 2020	FR

Milestones

Milestone	Foreseen date in GA	Actual date	Beneficiary responsible
List of all relevant parameters in relation to ecosystem functioning (Table D1.1) updated	31.8.2016	31.8.2016	MH_LP
Monitoring of first fishway running in Saarijärven reitti	30.6.2020	1.12.2020 Report Kalamäärien arviointi Hietaman voimalaitoksen alakanavassa ja kalatiessä vuonna 2020. Monitoring needs to be continued beyond the project.	LUKE
Monitoring of both fishways running in River Kiskonjoki	30.9.2020	The fish passes were finalized in 2022. Monitoring is started and needs to be continued beyond the project.	VARELY
Monitoring of ecosystem functioning and integrity completed	30.9.2022	30.9.2022	MH_LP
Report of salmonid fish migration routes in the bay of Pohjanpitäjänlahti in River Karjaanjoki	30.6.2021	To be replaced with a report about the of effects of fishways on the survival of descending Atlantic salmon smolts in C3	LUVY

Additional output

Code	Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable	Delivered
D2.5	The downstream migration of brown trout smolts in Leuhunkoski and Hietamankoski	NEW	8.11.2021	LUKE	The downstream migration of brown trout smolts in Leuhunkoski and Hietamankoski	FR
D2.6	Brown trout migration monitoring in Isojoki	NEW	23.6.2022	LUKE	Isojoen taimenten radiotelemetriaseuranta 2019–2021 : Taimenten vaelluskäyttäytyminen, levittäytyminen ja kutualueiden sijainti	FR

Continuation of the action after the project

During the project duration we expect to have detected only the first signals for impacts for some ecosystem functioning indicators. For migration and reproduction of salmonid fish the results have already been positive. Nevertheless, monitoring for the ecosystem functioning impacts of the project needs to be continued after the project. The monitoring applied during the project will serve as background data in all areas, even if the impacts cannot be detected at the project time scale. Also the continuous monitoring device in Puruvesi region will serve as a very good data source for further assessments of the loading of matters into Lake Puruvesi.

Challenges and development needs for monitoring have been dealt with in the After LIFE Plan of Freshabit. As the time scale of most individual projects is too short for detecting the impacts of restoration, funding sources for monitoring beyond projects are needed. Also long term monitoring networks would be useful for detecting the impacts of restoration in a pre-

destined set of sites over time. Such a network exists for peatlands already, but we need networks for other habitats as well. For further details, see the After LIFE Plan.

Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification
5/2020: Transfer of the task and budget from POSELY to Luke: Monitoring the functioning of fishways in Saarijärvi watercourse. External assistance will be bought to 1) monitor the fish aggregating near the entrance of Hietama fishway (echo sounding study) and 2) to conduct a tagging experiment of downstream migrating trout smolts (to examine the usability of the fishways as a downstream migration route and the mortality of brown trout as they move downstream past the hydropower plants).	Beneficiary responsible POSELY POSELY budget - 36 750 euros	Beneficiary responsible Luke Luke budget + 36 750 euros	None	Technical monitor confirmed in 18th of May 2020 that no amendment request is required and gave instructions how to report the modification
Re-allocation of a sum of 35 000€ to purchase equipment for fishway monitoring from the LUVY budget	Monitoring was done only on one of the two built fishways.	Re-allocation of a sum of 35 000€ to D2	Monitoring of the two fishways secured	Approval from EASME by e-mail from Sarunas Zableckis 2.12.2020.

ACTION D.3: Monitoring and modelling of hydrochemical impacts

Beneficiary responsible for the implementation:	SYKE
Other beneficiaries involved:	LUKE, GTK, OU, JAMK, POKELY, ESAELY, LUVY, LAPELY, UHEL-LBS, MH_MT VVK
Foreseen start date: Jan 1st, 2016	Actual start date: Jan 1st, 2016
Foreseen end date: Sept 30th, 2022	Actual end date: Sept 30th, 2022

In this Action D3 the site applications following the preparatory work on assessment model and indicator systems of Actions A1 (Development of integrated national model for river basins) and A2 (Development of integrated model and indicators systems for assessing ecosystem services and sustainability) were documented.

The activities

Task	As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
Task 1	*Applications of river basin models* The site application of the river basin model system (constructed in A1) will be conducted for Koitajoki and Puruvesi catchments using different climate change, management and water protection scenarios.	The national integrated model chain was developed and the necessary databases compiled in Action A1 (see A1 Task 1). Work for modelling and comparing different future climate scenarios and effectiveness of the water protection measures was finalized 27.5.2021. Work was done together with the complementary EU Horizon 2020 project Operandum (*Open air laboratories with nature based solutions to manage environmental risks*). The two projects were mutually supportive as they both intended to produce different climate scenarios and to assess the impact of different forestry measures and water protection methods.	SYKE
Task 2	*Applications of integrated model system for ecosystem service and sustainability assessment* In this task the site application of the developed integrated model system for ecosystem service (ES) and sustainability assessment (deliverable/report of Action A2) is documented. The application is done to site Karjaanjoki, using the collected database	The development of the integrated model system has been done in Action A2 according to plans (see A2 Task 1). The final documentation of the application in this Action was done in 11.11.2021.	SYKE
Task 3	*Assessment reports on vulnerability and ecosystem impacts at selected N2000 sites using long-term ecosystem data* the compiled monitoring data base of Action 2 (deliverable) will be used to produce two separate assessment reports for the intensively monitored sites Hietajärvi (located in the catchment area of the FRESHABIT catchment Koitajoki) and Valkea-Kotinen (Vanajavesi catchment).	The data for the assessment report has been compiled in Action A2 according to plans (see A2 Task 3). The final documentation of the application in this Action was done by the end of 2020. A compilation of spatial data sets on greenhouse gas emissions and sinks at Vanajavesi target area has been completed. A scientific publication has been completed in 2021 (Holmberg et al. 2021, https://doi.org/10.1016/j.scitotenv.2021.146668). Based on this work the collection of spatial datasets has been extended to the national scale, and these datasets will be distributed to regional authorities (ELY-Centres and regional councils) to facilitate the implementation of regional climate change mitigation roadmaps.	SYKE

The results

Expected results	Achieved results	Status	Beneficiary responsible
Reports on the use of integrated model systems for assessing ecosystem services, environmental impacts and sustainability of measures and agricultural products at the site-scale, 1-2 sites.	Model applications have been developed and tested in the Karjaanjoki region. D3.3.Report on the application of the integrated model framework for ecosystem service and sustainability assessment at the Karjaanjoki catchment.	Completed	SYKE
Demonstration of model and tool performance at	Model applications have been developed and tested in	Completed	SYKE

selected test sites, 3-4 sites.	the Koitajoki, Puruvesi and Karjaanjoki regions. D3.3.Report on the application of the integrated model framework for ecosystem service and sustainability assessment at the Karjaanjoki catchment. D3.5 Report on the effect of climate change and actions in forestry and agriculture in water quality in Koitajoki and Puruvesi.		
Reports demonstrating the assessment of long-term ecosystem impacts of climate change and air pollutants at intensively monitored N2000 sites, 2 sites.	Analyses on the time series data are being done, preparing of the assessment reports completed. • D3.2 Report on the long-term impacts of climate change and air pollutants at the Valkea-Kotinen site (Vanajavesi) • D3.4 Report on the long-term impacts of climate change and air pollutants at the Hietajärvi site (Koitajoki)	Completed	SYKE
Seminars presenting the assessment results to stakeholders and the general public, 2-3 seminars.	SMK has organised two webinars 4.11.2020 and 13.4.2021 Results of D3.3 have been presented as presentation "An integrated catchment modelling for assessment of water quality and its effect on aquatic ecology" in EGU General Assembly 23.-27.5.2022, Vienna, and Maataloustieteen päivät 14.-15.6.2022, Helsinki. Public event (Jokijuhla 2) was held 28.8.2021 in Karkkila where results of D3 where shared with public.	Completed	SYKE, Luke SMK. LUVY
Publications on model applications and ecosystem service assessment , 2-3 publications.	Two publications completed (Poikolainen et al. 2019) and Holmberg et al. 2021. Kotamäki et al. 2022. Mallien yhteiskäytöllä lisäarvoa vesiensuojelun tietotarpeeseen. Vesitalous 6/2022. A story map presenting project results to stakeholders, organisations and laymen is published 11/2022 (LUVY).	Completed	SYKE, LUKE, LUVY

Output

Deliverables

Code	Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable	Delivered
D3.1	Report on the influence of groundwater in Lake Puruvesi	31.3.2019	31.3.2019	ESAELY	Uusitalo, J. 2019: Järveen purkautuvan pohjaveden laadun ja määrän vaikutus Puruveden lahtien vedenlaatuun ja vesitaseeseen	IR2
D3.2	Report on the long-term impacts of climate change and air pollutants at the Valkea-Kotinen site (Vanajavesi)	30.6.2020	30.6.2020	SYKE	Assessment report on vulnerability and the long-term ecosystem impacts of climate change and air pollution at the remote pristine Natura 2000 site in South Finland using long-term ecosystem data	FR
D3.3	Report on the application of the integrated model framework for ecosystem service and sustainability assessment at the Karjaanjoki catchment	31.12.2020	11.11.2021	SYKE	Raakun mahdollisuudet Karjaanjoella - Mustionjoen jokihelmisimpukan (Margaritifera margaritifera) kuormitustekijöiden moninäkökulmainen kestävyysarviointi	FR
D3.4	Report on the long-term impacts of climate change and air pollutants at the Hietajärvi site (Koitajoki)	31.12.2020	31.12.2020	SYKE	Assessment report on vulnerability and the long-term ecosystem impacts of climate change and air pollution at the remote pristine Natura 2000 site in Eastern Finland using long-term ecosystem data	FR
D3.5	Report on the effect of climate change and actions in forestry and agriculture in water quality in Koitajoki and Puruvesi	31.12.2020	27.5.2021	SYKE	D3.5 Report on the effect of climate change and actions in forestry and agriculture on the water quality in Koitajoki and Puruvesi	FR

Milestones

Milestone	Foreseen date in GA	Actual date	Beneficiary responsible
Report on the long-term impacts of climate change and air pollutants at the Valkea-Kotinen site (Vanajavesi) ready	30.6.2020	30.6.2020	SYKE
Seminar for local stakeholders, organisations and laymen at Karjaanjoki	31.10.2020	30.11.2022	SYKE
Report on the application of the integrated model framework for ecosystem service and sustainability assessment at the Karjaanjoki catchment ready	31.12.2020	11.11.2021	SYKE
Report on the long-term impacts of climate change and air pollutants at the Hietajärvi site (Koitajoki) ready	31.12.2020	31.12.2020	SYKE
Scenarios available of the effect of climate change and actions in forestry and agriculture in water quality in Koitajoki and Puruvesi	31.12.2020	27.5.2021	SYKE

Continuation of the action after the project

Developed model systems will be used for assessing future impacts of land use, air pollution and forestry/agricultural change. Monitoring and reporting of long-term impacts of air pollution and climate change will continue under EU National Emission Ceilings Directive (NECD).

Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification
Lake sediment analysis from Valkea-Kotinen demonstration site will be an additional output by SYKE and GTK	Lake sediment analysis done only in Hietajärvi	Lake sediment analysis is done also in Valkea-Kotinen	Analysis from Valkea-Kotinen demonstration site will provide important information i) for assessment of level of heavy metals loading and its long-term changes in South Finland and ii) for comparing the heavy metal exposure and trends between high-deposition area and low-deposition area.	E-mail approval from Sarunas Zableckis 16.2.2021.
A continuous measurement station for a number of water quality parameters was set up in autumn 2019 in Kuonanjoki, which is the worst single source of nutrients to Lake Puruvesi. The station was partially funded by Freshabit in cooperation with Operandum (SYKE, Luke, ESAELY). ESAELY will continue running the station.	Models based on single samples only.	Continuous measurement of PO4 in Kuonanjoki flowing into Puruvesi was funded by FH. Five months funded by FH in 2020, total cost 13 020 € (SYKE). In addition continuous measurements of chlorophyll-A, cyanobacteria, electrical conductivity, water temperature, total and dissolved organic carbon, turbidity, suspended solids, total phosphorus and discharge were measured and funded by FH in 2019 by 5 200 € (Luke).	Continuous measurement of provides a far more better picture of the variation in PO4 fluxes and reasons behind peak values, end helps developing the after Freshabit. The results are available online (https://virpo.fmi.fi/operandum/) and local people have followed the results with great intrest, in addition first results of chlorophyll etc. will be published in Vesitalouslehti 2022 (December 2022), PO4 results for six month period have been published in Vesitalouslehti 05/21.	Internal decision. Direct benefits of using the continuous long-term measurements for monitoring the loading from Kuonanjoki catchment into Puruvesi with a reasonable cost.

ACTION D.4: Monitoring socio-economic impacts

Beneficiary responsible for the implementation:	LUKE, SYKE, MH, JAMK, VARELY
Other beneficiaries involved:	
Foreseen start date: Jan 1st, 2016	Actual start date: August 1st, 2016
Foreseen end date: Sept 30th, 2022	Actual end date: Dec 31th, 2022

The socio-economic impact evaluation of Freshabit LIFE IP focuses on ecosystem services; impacts on employment and the economy; attitudes, values and engagement; recreation, hiking and well-being; and environmental education, awareness and communication.

Picture: Good water quality increases the popularity of recreation.

The activities

Task	As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
Task 1	MH conducted first of the visitor studies at Punkaharju conservation area by Lake Puruvesi in 2016, and the report will be finalized by the end of year 2017. The survey will be repeated in Phase 3 allowing the validation of the measures and the development of the approach.	Surveys addressed to visitors to Punkaharju and Lake Puruvesi area were conducted during the project both in 2016 and again five years later in 2021. MHLP conducts uniform visitor surveys in popular destinations with the aim of helping to improve the services and plan the use of these areas. A total of 734 persons responded to the 2021 survey. Punkaharju is a popular tourist destination, and Lake Puruvesi is known for its clear and clean waters. The area offers many services that support recreational use, including hiking trails, campfire sites, a tour skating trail and plenty of services provided by entrepreneurs. Visitor numbers to the area have increased every year between 2016 and 2021. Over 75% of the respondents found enjoying fresh water either a highly important or fairly important recreational motive. Visitors were also asked in the survey about their experiences of water quality in Lake Puruvesi and its impact on visits to the area. Based on the responses, for one out of two visitors water quality is a pull factor that has increased visits to the area.	MH_LP
Task 2	In Phase 1, LUKE conducted an internet based survey to gather information from people visiting Lake Puruvesi. The purpose of study was to examine the association between water quality changes and recreation use, and to estimate the recreation benefits before the management actions.	Recreational use of Lake Puruvesi was investigated by means of an online survey sent to 868 visitors to the area. A total of 327 of them responded, giving a response rate of 29%. On average, respondents had paid 58 visits to Lake Puruvesi in the previous 12 months. For recreational users, the most important features of the lake were the water's fitness for swimming, water clarity and infrequent occurrence of blue-green algal blooms. These characteristics were very important for more than 90% of the respondents. Drinkable water was important for 68% of the respondents. Overall, recreational users regarded factors related to water quality highly important. Water quality had an obvious impact on the expected number of recreational visits. Respondents estimated that an improvement of one grade in water quality would increase the number of annual	LUKE

		visits by an average of 20%.	
Task 3	The values and motivations of rural residents, public, and residential land owners in relation to the water quality provided by Saarijärvi watercourse will be assessed. In Kiskonjoki region, the values of landscape and evaluation of the private landowners' appreciation towards nature conservation, both using GIS-based methods, will be surveyed in Phase 1. The results will be published as two master theses for University of Turku.	In Saarijärvi water route area local residents were asked in a survey about their views of the status and importance of surface waters, the objectives of water management, attitudes towards Natura 2000 sites, willingness to pay for water management work and funding for water management. An estimate of the economic value of water management in the area was also produced. The survey was conducted as thesis for JAMK with co-operation of SYKE and MH. The survey revealed that 80% of respondents considered the water quality in water bodies satisfactory, passable or poor. More than 90% of the respondents agreed or somewhat agreed with the statement that streams are as important as rivers and lakes in terms of water system diversity. 10.5% of the respondents would be prepared to pay a water management fee to improve the ecological status of the water bodies along Saarijärvi waterway. On average, residents were willing to pay slightly over EUR 19 a year for water management work, which means that the overall willingness to pay would be around EUR 345,760 a year. However, residents would assign the greatest responsibility for water management funding to the central government and municipalities. In Kiskonjoki region, the values of landscape and evaluation of the private landowners' appreciation towards nature conservation, both using GIS-based methods, was surveyed. In the first thesis it was studied how landowners' social values are spatially distributed in the Kiskonjoki catchment area in Salo and how they overlap with spatial conservation prioritization data to see if socio-ecological clusters can be found. Especially cultural, historical and spiritual values and provisioning values clustered in ecologically important areas. This study showed that mapping of socio-ecological clusters can be an asset in nature conservation planning and it can be useful especially in situations where resources are highly limited and decisions between potential nature conservation areas has to be done. The aim of the second thesis was to study the differences and similarities of scientific and local knowledge regarding provisional and cultural services. The methods include expert judgements of land cover and land use classes' capacities to provide services, public participation GIS survey and field work to demonstrate the variety in landscapes by photography. This research provided new information about landscape services and their valuation by locals and the relationship to scientific knowledge in Finnish context.	JAMK, VARELY
Task 4	A feasible model will be developed to investigate the economic values provided by LIFE-projects (or other EU-funded projects).	MH has used the external assistance to develop a feasible model to investigate the economic values provided by LIFE-projects (or other EU-funded projects). In general, the aim was to provide user friendly economical model for project persons to fill in the figures, and with the help of properly assessed multipliers, they are able to assess the economic values provided by projects e.g. for employment, the value of properties etc. by regions. The tool in general is available to use in all future EU-funded projects. However, Freshabit tested the tool in the end of the project and in our experience gathering of all the necessary data is too laborious compared to the achieved outcome. Therefore efforts were steered to the overall assessment report (task 5) instead .	MH_LP
Task 5	The Task 5 concentrates on combining all information provided by Tasks 1-4 together in usable format and with already existing knowledge (e.g. TEEB for Finland, 2015). For this overall assessment, LUKE will perform a GIS-based survey of most important factors affecting social (recreation activity) aspects of FRESHABIT actions. The overall socio-economic impact assessment report for FRESHABIT will then be composed by the project management core-team as part of the final report.	The overall socioeconomic impact assessment report was completed in the end of the project. The report gives a broad picture of the project impacts on ecosystem services, employment and economy, attitudes, values and engagement, recreation and well-being, environmental education, awareness and communication. The project's impacts on ecosystem services were examined by means of a survey conducted by the Finnish Environment Institute. It found that, in particular, project measures had impacts on cultural services, including e.g. environmental education, as well as regulating services, such as diversity of habitats and species as well as genetic diversity. The value of paid work carried out during the project amounted to EUR 9.5 million. The value of various services outsourced to around 350 different providers in total amounted to approx. EUR 4.2 million. Several case studies conducted in tasks 1-4 give different perspectives from local point of view, for example, determining the economic value of Lake Puruvesi. We decided to invest extra resources to the assessment report because Freshabit produced a lot of valuable data but it was somewhat fragmented. The additional outputs, the ecosystem	MH_LP, LUKE, SYKE, SMK

		services study and indicators, give much needed overall picture of the project impact. The high quality report has received a lot of interest from the management of MH and other LIFE projects. Based on the report, MH is developing a set of socioeconomic indicators to be used in other LIFE projects as well. Luke has completed the GIS-based survey and the results have been published in a scientific article (D4.10).	

The results

Expected results	Achieved results	Status	Beneficiary responsible
The economic value of the recreational use and wellbeing effects in Puruvesi (clearwater, oligohumic lake) in its current and future state in monetary terms.	According to the Report of the recreation benefits in Puruvesi under various development alternative, respondents put the average negative impact of blue-green algae on property value at 19.6%. According to respondents' assessments, blue-green algae affect property values more than eutrophication. This study put the value of properties on the shores of Lake Puruvesi at EUR 365–390 million and, consequently, a 20% reduction in value would mean EUR 73–78 million.	Completed	LUKE
Information of citizens' willingness to take part and pay for improved water status by way of management and their appreciation towards N2000-areas in Saarijärvi watercourse.	Asukkaiden halukkuus osallistua vesienhoitoon Saarijärven reitillä –thesis 2018, deliverable D4.4. The survey gives the impression, that local people value the water management of the area the second most important topic, right after the development of health care.	Completed	JAMK
Information on recreational use of national parks and other key recreation areas in Punkaharju to be used in assessments of local economic impacts, and also in visitors experiences their wellbeing effects (psychological, social and physical).	First visitor survey done 2018, deliverable D4.2. Second part was completed in 2021.	Completed	MH_LP
User-friendly economical model for project persons to use in assessment of economic values provided by projects e.g. for employment, the value of properties etc. by regions.	Model tool completed 2018, deliverable D4.5.	Completed	MH_LP
Reports for the modeling approach (4 reports)	• Report of the recreation benefits in Puruvesi under various development alternative; deliverable D4.3. • Report of an approach for valuing recreation wellbeing effects; deliverable D4.1. • Report of visitor survey results in Punkaharju; deliverable D4.2 • Report of valuing wellbeing effects of improved water status in Saarijärvi water course; deliverable D4.4	Completed	LUKE
At least one complementary project started during the project (1-3 complementary projects)	Two complementary projects focusing especially in this issue, Operandum and Biowater, have started.	Completed	Several

Output

Deliverables

Code	Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable	Delivered
D4.1	Report of the recreation benefits in Puruvesi under various development alternative	31.5.2017	31.5.2017	LUKE	D4.1. Report of an approach for valuing recreation wellbeing effects of Lake Puruvesi	IR1
D4.2	Report of visitor survey results; Task 1	31.12.2017	20.12.2017	MH_LP	Punkaharjun ja Puruveden alueen kävijätutkimus D4.2b Punkaharjun ja Puruveden alueen kävijätutkimus 2021	IR2 FR
D4.3	Report of an approach for valuing recreation wellbeing effects; Task 2	31.12.2017	5.1.2018	LUKE	Recreation benefits of Lake Puruvesi under various development alternatives	IR2
D4.4	Report of valuing wellbeing effects of improved water status in Saarijärvi watercourse; Task 3	31.5.2018	14.2.2018	JAMK	Halukkuus osallistua vesienhoitoon Saarijärven vesireitin alueella Kyselytutkimus Saarijärven vesireitin asukkaille	IR2
D4.5	Tool to assess the economic impacts of EU-funded projects in Finland; Task 4	31.12.2018	31.12.2018	MH_LP	(LIFE)-hankkeiden talous- ja työllisyyslaskentataulukot	IR2
D4.6	Report of the socio-economic	31.12.2022	31.12.2022	MH_LP	Freshabit LIFE IP Evaluation of	FR

	assessment of the project as part of the final report				socio-economic impacts (available in Finnish and English)	

Milestones

Milestone	Foreseen date in GA	Actual date	Beneficiary responsible
Survey carried out in Puruvesi; Task 1	31.12.2016	5.1.2018	LUKE
Economical tool ready and in use	31.12.2018	31.12.2018	MH_LP
GIS-based survey of most important factors affecting recreation activity aspect of FRESHABIT actions ready, Task 5	31.12.2021	31.12.2021	LUKE
Socio-economic assessment of the project finished	31.12.2022	31.12.2022	MH_LP
First visitor survey carried out in Punkaharju; Task 2	31.5.2017	20.12.2017	MH_LP
Survey carried out in Saarijärvi water course; Task 3	31.12.2017	14.2.2018	JAMK
Second visitor survey carried out in Punkaharju; Task 2	31.9.2021	13.12.2021	MH_LP

Additional output

Code	Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable	Delivered
D4.7		NEW	11/2017	VARELY	Maisemapalveluiden kartoitus ja arvottaminen: Tieteellisen ja paikallisen tiedon vertailu	FR
D4.8		NEW	4/2017	VARELY	Maanomistajien sosiaalisten arvojen kartoitus osallistavin paikkatietomenetelmin luonnonsuojelusuunnittelun tueksi - tapaustutkimus Kiskonjoelta	FR
D4.9		NEW	30.09.2022	SYKE	Asiantuntija-arviot kunnostushankkeiden vaikutuksista ekosysteemipalveluihin FRESHABIT-hankkeessa	FR
D4.10		NEW	12/2021	Luke	Heterogeneous preferences towards quality changes in water recreation: Latent class model for contingent behavior data See MS GIS-based survey of most important factors affecting recreation activity aspect of FRESHABIT actions ready, Task 5	FR

Continuation of the action after the project

Based on the Evaluation of socioeconomic impact report, MH is developing a set of socioeconomic indicators to be used in other LIFE projects as well. The experiences gained in FH will be utilised e.g. in a new strategic LIFE Nature project Priodiversity LIFE which is at the moment in the application phase, as well as currently ongoing LIFE projects.

Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification

ACTION D.5: Monitoring technical implementation

Beneficiary responsible for the implementation:	All beneficiaries with concrete conservation measures
Other beneficiaries involved:	
Foreseen start date: Jan 1st 2016	Actual start date: Jan 1st 2016
Foreseen end date: Sept 30th 2022	Actual end date: Sept 30th 2022

In Action D5, the technical implementation of concrete actions C1-C9 with special emphasis on their technical success, functionality and efficiency has been monitored. Restoration sites have been visited at least once in 1-2 following years the measures were put into practice (when applicable, some measures were finalized in 2022), and before the actions are implemented when necessary (e.g. extent of suitable habitat for monitoring action C4) for collecting background data. The object of this monitoring is to determine whether the goals that have initially been set are achieved and that measures have succeeded technically. It is also cost-effective to identify potential problems at their early stage and to further develop methods according the outcomes. Action D5 is mainly intended to be short-term technical monitoring of the concrete conservation actions.

Technical monitoring for stream restoration in Pohjanmaa region.

The activities

As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
In Action D5, the technical implementation of concrete actions C1-C9 with special emphasis on their technical success, functionality and efficiency is monitored. All sites will be visited at least once in 1-2 following years the measures were put into practice, and before the actions are implemented when necessary. The emphasis is on monitoring success of the conservation actions by easily assessed technical indicators, such as materials used, functioning of structures, individuals moved, etc.	Technical monitoring is the base level of monitoring for concrete conservation actions and it has been implemented for all relevant actions. Technical monitoring is intended to be a relatively easy and quick method, compared to monitoring for biodiversity and ecosystem functioning, where responses may take a decade or longer. The challenge with technical monitoring is, that there are currently very little widely approved guidance for indicators and methods, and there is no common platform for managing the data. Also in Freshabit these data have not been collected consistently in any one platform. Results are presented in reports and online storymaps, or stored by the AB's for further use.	Several

The results

Expected results	Achieved results	Status	Beneficiary responsible
D5 monitoring actions are expected to be implemented in:	**D5 monitoring actions have been implemented in:**		
4 catchment areas (multiple sites to be detailed in further plans for the actions) and 6 peatland restoration sites in action C1 10 N2000 sites (multiple sampling sites to be detailed in further plans for the actions) in action C2	Monitoring for C1 and C2 are reported together. Technical monitoring for peatland restoration is typically a check-up on restored sites 1, 3, and 5-10 years after the restoration to see if the restoration process is going	Completed	KESELY, POKELY, ESAELY, EPOELY, MH, SMK, VVK,

	as expected. MH_LP has developed guidance for this during the 2000's. Improved guidelines for technical, biological and hydrological monitoring by drones will be developed in Hydrology LIFE complementary project. In the peatland restoration sites implemented in Freshabit techncal monitoring has been implemented, and no significant problems have been encountered. Technical monitoring for water protection structures is typically a check-up on restored sites, just as in peatlands. Guidance for this has been scarce, but SMK developed their own guidance for Freshabit sites. They have also applied this to all their sites, and results for structure by SMK can be viewed in the online story map. In general, the water protection structures constructed in Freshabit have worked well so far and no significant needs for repairing have emerged.		LSPKe
7 sites for enhancing fish migration in action C3	Monitoring for the fish passes has focused on the ecosystem responses, i.e. fish migration. Technical monitoring has been applied as monitoring for progress of the construction works. The fish passes have been technically successful, although in the Billnäs power plant some unexpected fractures were detected, which delayed the building and increased expenses. Planning for the most viable solutions and getting the permits have been the most challenging part of the process, considering the limited time line of the project.	Completed	LUVY, Luke, VARELY, EPOELY
Ca. 50 stream sections where habitats are restored in action C4	Results for technical monitoring of stream habitat restoration are summarized in Deliverable D7.1 for Karjaanjoki (Table 17), Karvianjoki (Table 20), and Isojoki (Table 22). In Karjaanjoki the restoration has been mostly implemented using rock material (boulders, stones, spawning gravel), whereas in Karvianjoki and Isojoki restoration also wood material has been added considerably. More than 200 new spawning areas for salmonid fish were created in the habitat restoration measures.	Completed	LUVY, EPOELY, POKELY, VVK, MH
2 sites for improving riparian connectivity in action C5	Technical monitoring for the Villamo area in the Isojoki River N2000 site has been reported in Deliverable D7.1 Table 22. In Vanajavesi region the measures were completed in spring 2022 and no reports are yet available.	Completed	EPOELY, VVK
12-18 stream sections for demonstrative habitat restoration in action C6	Monitoring for C6 has been extensive, and the results are reported in Action C6.	Completed	EPOELY
19 bird lakes in action C7	Very little technical monitoring has been applied to lake restoration projects, other than monitoring of the implementation of the work. However, in Keski-Suomi region drone photography has been used for monitoring the area of open water areas and habitat structure in Peuralamminneva, Kilpisuo, and Ylin N2000 sites (see Deliverable D7.1).	Completed	MH, ESAELY, VVK, KESELY
2 mussel populations in action C9	Monitoring was focused on biodiversity. Results are reported in Action C9.	Completed	EPOELY, LUVY

Output

Milestones

Milestone	Foreseen date in GA	Actual date	Beneficiary responsible
List of all relevant parameters in relation to technical monitoring for actions C1-C9 updated and agreed between all beneficiaries	31.5.2016	31.5.2016	MH_LP
Technical monitoring of implemented concrete actions done	30.9.2022	30.9.2022	MH_LP

Continuation of the action after the project

Technical monitoring is mainly intended for short-term success of concrete conservation actions to be done during the project. However, some concrete conservation actions were implemented in the final years of the project and technical monitoring needs to be implemented, among other monitoring measures, after the project.

Challenges and development needs for monitoring have been dealt with in the After LIFE Plan of Freshabit. Regarding technical monitoring, commonly approved guidance and methodology does not yet exist, nor do we have platforms for data management. These issues should be solved soon, as in e.g. the Helmi habitats programme aims for restoration are high and technical monitoring would be useful. For further details, see the After LIFE Plan.

Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification

ACTION D.6: Monitoring of the project's contribution to the implementation of the PAF

Beneficiary responsible for the implementation:	MH_LP, MoE
Other beneficiaries involved:	SYKE, LUKE, SMK
Foreseen start date: Jan 1st, 2016	Actual start date: April 1st, 2016
Foreseen end date: Sept 30th, 2022	Actual end date: Sept 30th, 2022

The Ministry of Environment (MoE) established a PAF monitoring group related to the contribution of FRESHABIT towards the full implementation of the PAF. The PAF monitoring group convened 1-2 times a year to discuss the experience gained in the FRESHABIT project, how the lessons learnt in FRESHABIT can be used in the other types of Natura 2000 sites and particular Annex II habitats, how to ensure that the lessons learnt and key results are disseminated throughout public administration, how other EU or national financing instruments could be used for the implementation of the PAF with emphasis on improving of the complementary use of funds for Natura 2000, and how to take Natura 2000 related issues into account in the next financing period and finally, update the Finnish PAF-document.

The PAF for 2014-2020 was valid for most of the project duration, but the project was also actively involved in updating the documents and ensuring that project is still valid for implementation of the PAF for 2021-2027. Project aims were restructured in phase 3 to meet the main objectives of the PAF for 2021-2027, or pillars as set out by the Commission.

The activities

As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
The Ministry of Environment (MoE) will establish in spring 2016 a PAF monitoring group in particular related to the contribution of FRESHABIT towards the full implementation of the PAF. The experts from the FRESHABIT project will be members in the group and other will attend as expert when needed. The project results and experiences from the project areas of FRESHABIT are presented regularly in the meetings by the beneficiaries from the areas. The PAF monitoring group will convene 1-2 times a year.	In total 8 meetings were organized 2016-2022. The reputation of Freshabit kept growing during the project, and the project has been constantly seen as a good example of how complementary funding can be raised for Natura2000. Beneficiaries of Freshabit have been actively involved in the updating process of the PAF, and the document has been promoted in all relevant occasions. The monitoring group consists of people from the following organizations: • Business Finland • SYKE • LUKE • SMK • Ministry of Agriculture and Forestry • Ministry of the Environment • Parks & Wildlife Finland • Centre for the Economic development, Transport, and the Environment for North Ostrobothnia • Centre for the Economic development, Transport, and the Environment for Southwest Finland • Centre for the Economic development, Transport, and the Environment for South Savo • Regional Council of Kainuu • Regional Council of Lapland • Council of Tampere Region • Regional Council of North Karelia • Council of Pohjois-Savo Region • Helsinki-Uusimaa Regional Council • Council of Oulu Region	MoE, MH_LP
MoE will organise at least three national/regional PAF implementation seminars. The seminars will deal with the lessons learnt from FRESHABIT and particular efforts will be put for planning new actions and projects for implementing the prioritized actions in the Finnish PAF.	Update of the national PAF came up in 2018, and the topic of the second seminar was changed to one that served the updating process better ("Workshop on *Strengthening investments in Natura 2000 through accessing EU funds and updating of the Prioritised Action Frameworks (PAFs)*"). The project has had significant input on the update of the national PAF, both regarding the freshwater issues but also the general implementation of the PAF, especially how complementary funding can be raised for Natura2000. The third seminar was in November 2021 with the theme Businesses and biodiversity. The seminar was shifted to a webinar just the last minute because of the COVID 19 -restrictions. 73 people participated. Many views for improving common	MoE, MH_LP

	understanding and networking were presented. **The seminars:** • Seminar I: *The possibilities for complementary funding for FRESHABIT and other PAF-targeted projects. How are the current possibilities used and how could they be used in a more efficient way?* (27.10.2026) • Seminar II: *Strengthening investments in Natura 2000 through accessing EU funds and updating of the Prioritised Action Frameworks (PAFs).* (30.11.2018) • Seminar III: *Biodiversity, bioeconomy, and business. Finding new public-private partnership associations for nature conservation.* (30.11.2021) MoE has updated the PAF for 2021-2027 in 23.3.2021, and is preparing an update for 2023.	

The results

Expected results	Achieved results	Status	Beneficiary responsible
Dissemination of project results and lessons learnt within the public sector	Dissemination has been very efficient and successful since the start of the project; FRESHABIT is a well-known brand for complementary funding for Natura 2000 both nationally and internationally. PAF has been actively promoted in all relevant occasions by project beneficiaries.	Completed	MoE, MH_LP
At least 8 project group meetings	9 project meetings arranged 2016-2022.	Completed	MoE, MH_LP
Three project seminars	3 project seminars arranged.	Completed	MoE, MH_LP

Output

Deliverables

	Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable	Delivered
D6.1	Analysis of the implementation of the PAF within the Final report	31.12.2022	12.1.2023	MH_LP	Analysis of the implementation of the PAF FI	FR
D6.2	Updated PAF	31.12.2022	23.3.2021	MoE	Prioritised Action Framework (PAF) for Natura 2000 in Finland	FR

Milestones

Milestone	Foreseen date in GA	Actual date	Beneficiary responsible
PAF monitoring group established	30.4.2016	30.4.2016	MH_LP, MoE
First meeting of PAF monitoring group	31.5.2016	18.5.2016	MH_LP, MoE
First PAF seminar organized	30.11.2016	27.10.2016	MH_LP, MoE
Second PAF seminar organized	30.11.2018	30.11.2018	MH_LP, MoE
Third PAF seminar organized	30.11.2021	30.11.2021	MH_LP, MoE
At least 9 PAF meetings held	30.9.2022	16.3.2022	MH_LP, MoE

Continuation of the action after the project

The PAF monitoring group was a diverse assembly of authorities and organizations with national and regional coverage. The concept of the group has been mutually considered as useful and it needs to be continued after the project in some form. Seminars have also been considered very useful. In general, we can conclude that the mainstreaming of Natura2000 into business and other administrational sectors besides the environmental sector is progressing quite well, and this will be continued during the next PAF period 2021-2027.

FRESHABIT has opened the door for accepting that Natura 2000 does not only restrict business and livelihoods, but is also a very strong argument for raising funds for projects that enhance livelihoods in addition to improving conservation status of habitats and species. Good examples include e.g. the large amounts of complementary funding gathered for fish passes, catchment area restoration and some other actions implemented in project areas. In addition, in 2019 the Ministry of Agriculture and Forestry and the Ministry of Environment launched two restoration and management programmes for bird wetlands, one from the game perspective and the other from nature conservation perspective. Funding from Helmi

habitats programme (MoE) is available for conservation areas and funding from SOTKA programme (MoAF) is available outside the conservations areas, aimed to improve the populations of game fowl species. This reflects a change of view in the management and conservation of natural resources in Finland, which will carry on after the project.

These views were reflected in the updated Finnish PAF for 2021-27, where the targets for habitats and species conservation were more clearly defined than in the previous PAF. MH_LP was the main responsible body for producing material for the needs an priorities within the conservation area network, and other beneficiaries (e.g. SYKE, LUKE, SMK) and stakeholders were addressed during 2020 for the green infrastructure approach in the PAF.

It was agreed in the last PAF monitoring group meeting in March 2022, that the best way to continue is to integrate the PAF view in other similar working groups. Mainly the action will be integrated in the work of the Finnish Biodiversity Monitoring Group led by MoE, but PAF is also constantly promoted in all other relevant working groups.

Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification
Seminar themes have been changed between II and III due to the upcoming update of the PAF in 2018-2019. All seminars were organised but in different order.	• Seminar I: The possibilities for complementary funding for FRESHABIT and other PAF-targeted projects. How are the current possibilities used and how could they be used in a more efficient way? • Seminar II: Biodiversity, bioeconomy, and business. Finding new public-private partnership associations for nature conservation. • Seminar III: Implementation of PAF in Finland. What has FRESHABIT achieved, what has been done elsewhere, what are the next steps towards full implementation of the PAF.	• Seminar I: The possibilities for complementary funding for FRESHABIT and other PAF-targeted projects. How are the current possibilities used and how could they be used in a more efficient way? • Workshop on *Strengthening investments in Natura 2000 through accessing EU funds and updating of the Prioritised Action Frameworks (PAFs)* • Seminar III: Biodiversity, bioeconomy, and business. Finding new public-private partnership associations for nature conservation.	No impact on project implementation. The change was made to respond to the updating process, and the intended theme of seminar II can be well handled in seminar III.	The issue was discussed in the joint monitoring visit VII in Vaasa, June 12-13 2019. An amendment was not seen necessary for such a small change.

ACTION D.7: Overall impact assessment on ecological and conservation status

Beneficiary responsible for the implementation:	SYKE, LUKE, MH, UO, ESAELY, POKELY
Other beneficiaries involved:	All other beneficiaries contribute to the implementation of monitoring and background data
Foreseen start date: Jan 1st 2018	Actual start date: Jan 1st 2016
Foreseen end date: Sept 30th 2022	Actual end date: Dec 19th 2022

In action D7 overall impact assessment based on official WFD compatible ecological quality elements and conservation status criteria were applied to N2000 sites, utilizing all available monitoring results. Assessment was done at water body and N2000 site level. Ecological quality elements are periphytic algae, macrophytes, macroinvertebrates and fishes in rivers. Data for assessment has been collected in monitoring actions D1, D2, and D5, and additional data from national monitoring network. Impacts of the Freshabit measures on conservation status of target N2000 sites was evaluated based on official methodology developed in A9.

The activities

As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
Assessment of ecological status of water bodies before and after restoration Assessment of parameters (structure and function) affecting the conservation status of species and habitats of Community interest before and after restoration	All available data was collected and analyzed in water body and N2000 site level the final year of the project. Despite of the common indicators and guidance for monitoring created in the early stages of the project, we realized at the end of the project that we had some issues in data collecting as well as management. Comparable data has not been consistently collected among all beneficiaries and sites, nor has it been stored in a way that grants easy access to the data. Monitoring data was collected from the beneficiaries during the last year of the project by bilateral communication, whereas a common platform for management would have been a more ideal solution. Consequently, analysis of the data was pushed until the end of the project. We did manage to analyze all available data into a report and several publications, but the peer-reviewed article promised as Deliverable D7.1 is still being prepared. The issues encountered in Freshabit monitoring are widely acknowledged in other projects and programmes as well, e.g. the Helmi habitats programme. Lack of common, easily accessed data storage and management platform is one of the big issues. The other is, that typically in projects the efforts are focused in implementation of the conservation measures instead of monitoring. In addition, the responses to conservation measures typically take longer than any given project. Hence, monitoring should be applied also beyond project funding, as a long-term monitoring in e.g. set networks of sites for each relevant habitat type. This would need considerably more funding for monitoring than is currently available. Monitoring was considered as one of the most important fields for further development beyond the project, and these issues are dealt with in the After LIFE Plan.	SYKE, MH_LP

The results

Expected results	Achieved results	Status	Beneficiary responsible
WFD status assessment reports with improved data	Reported in deliverable D7.1. In a before-after comparison, most water bodies have been assessed to be in a similar ecological status as they were before the project. In 1/30 water body the status has been assessed deteriorated, and in 3/30 improved.	Completed	SYKE
HD status assessment with improved data	Reported in deliverable D7.1.	Completed	SYKE

	In a before-after comparison, most N2000 sites have been assessed to have improved with regards to their conservation status, at the least by improved trend if not by a class change.		
The overall impact assessment report of FRESHABIT	Reported in deliverable D7.1. The overall impact of the project can be assessed as positive, even though the time frame for assessing the impacts using measured parameters is too short.	Completed	SYKE

Output

Deliverables

Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable
D7.1 Report on ecological status and conservation status of water bodies under restoration	30.9.2022	15.12.2022	SYKE	Vuorio ym. 2022. Kunnostusten vaikutukset vesistöjen ekologiseen tilaan ja Natura-alueiden suojelutasoon Freshabit LIFE IP -hankkeen kohteilla. Impacts of restoration actions on the ecological status of water bodies and on the conservation status of Natura 2000-sites in Freshabit LIFE IP -project.
D7.2 Article on peer-reviewed journal comparing status assessment according to WFD and Natura 2000 reporting	30.9.2022	Manuscript in process	SYKE	Härkönen et al. 2023. Matter of sight? Assessing the status of eutrophied waterfowl lakes with indicators of different directives behind biodiversity protection and nature conservation

Milestones

Milestone	Foreseen date in GA	Actual date	Beneficiary responsible
List of all relevant ecological quality elements updated	31.5.2016	31.5.2016	SYKE

Additional Output

Code	Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable	Delivered
D7.3	Assessment of the conservation status for Puruvesi N2000 site	NEW	22.12.2021	MHLP	NATA-arviointi Puruvesi 2021	FR

Continuation of the action after the project

The tools and methods (Action A9) developed in the project will be utilized in the further reporting rounds for WFD and HD, and the assessment protocol used in D7.1 is a useful example for future projects in situations, where official assessments cannot be utilized. The general need for development of monitoring has been dealt with in other parts of the project Final Report.

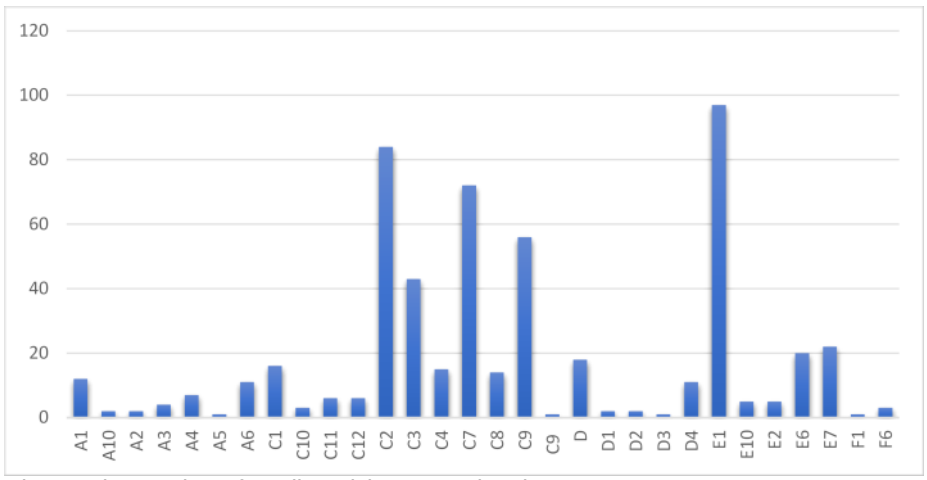
Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification

ACTION E.1: Communication OK

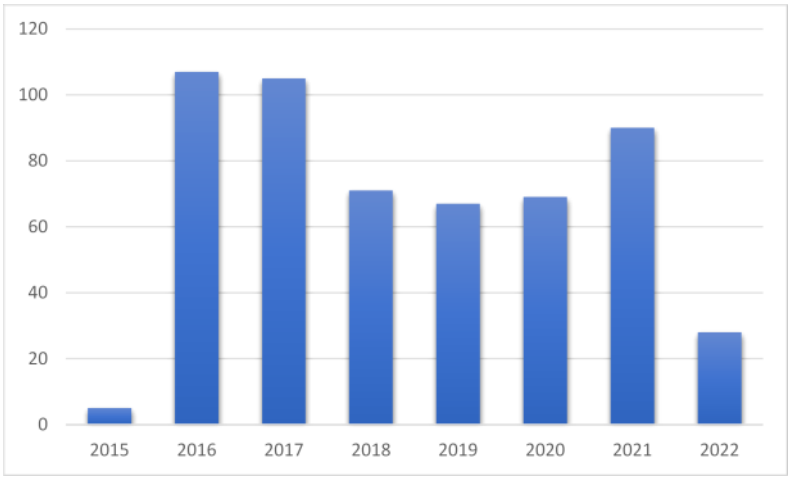
Beneficiary responsible for the implementation:	MH_LP
Other beneficiaries involved:	SMK, LUKE, GTK, WWF, EPOELY, ESAELY, LAPELY, LSPHä, LUVY, POKELY, ProPuru, SMK, VARELY, VVK
Foreseen start date: Jan 1st, 2016	Actual start date: Jan 1st, 2016
Foreseen end date: Sept 30th, 2022	Actual end date: Sept 30th, 2022

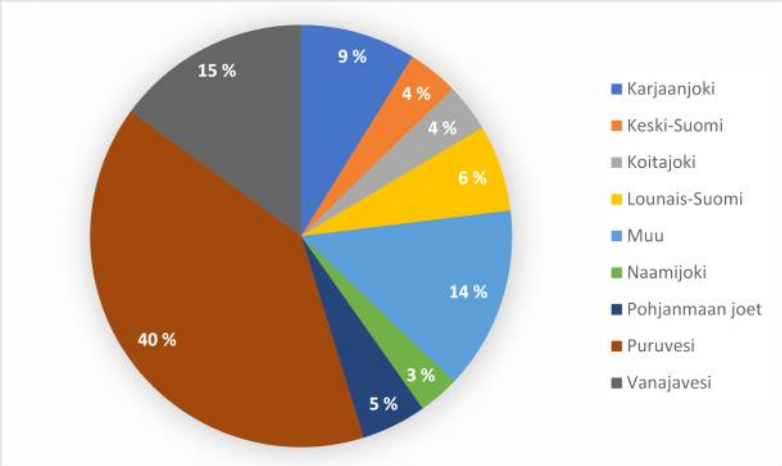
The activities

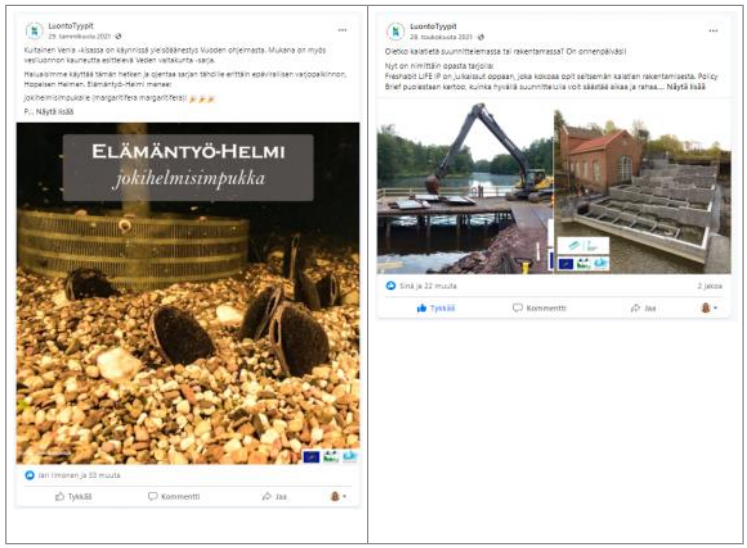
As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
MH_LP will organize at least 2-3 yearly media events (e.g. media trips etc.) during project, and also do social media promotion (Facebook, Twitter and/or Instagram) for FRESHABIT.	All project beneficiaries participated in organising media events. This approach turned into amazing amount of 542 published media articles during the project. Most popular themes were bird wetland habitat restoration (C7), conservation acts of freshwater pearl mussel (C9), building of fishways (C3) and environmental loading (C2). Action E1 is project communication and includes all the topics that could not be categorised in one action and therefore peaks in the comparison. This result clearly shows that the media is mostly interested in stories that include fauna such as wetland birds, freshwater pearl mussel or migratory fish. In contrast, it was really challenging to get articles published about e.g. catchment area restoration.  *Figure: The number of media articles per action theme.* In addition to media events and press releases, Freshabit has organised several events and launched social media campaigns. Biggest events have been the annual seminar of Water Restoration network, the final seminar of Freshabit LIFE IP and outdoor learning conference Ulos-Ut-Out. In social media campaigns we have utilised the social media channels of all 31 project beneficiaries. The themes of the campaigns have included e.g. Natura 2000 day, freshwater pearl mussels, nature education and Worlds of Water documentary series.	MH_LP
WWF Finland will communicate and disseminate materials on sustainable seafood choices from local freshwater sources in seminars, exhibitions, stakeholder meetings and other relevant events as well as via social media and other on-line forums.	Communication material (Fact sheets) have been produced of less-valuable fish species or of otherwise sustainable choices (4 wild-caught and 1 aquaculture species). See deliverables E5.6.1-E5.6.4 The communication materials (Fact sheets) were primary aimed as hand out materials in different events and seminars. However, due to Covid-19 restrictions most of such events were cancelled or organized online during the project period. Therefore the dissemination and outreach of Fact sheets didn't work as planned. However the materials are disseminated via WWF website and linked to the corresponding recommendations in the WWF Finland Seafood Guide as well as promoted in webinars (e.g. WWF Seafood guide launch webinar for retail and seafood market actors), relevant stakeholder events such as Finnish Parliaments "fish day" for members and personnel of the Parliament (8.10.2019, approx.100 participants) as well and via personal communication with journalists, teachers and seafood markets actors. The total reach of factsheets (i.e. how many people have been informed about	WWF

	the Fact sheets) is approx. 590 people, but total number of downloads is only 50. This is a clear indication that the activity didn't success as anticipated. However the information and content of the Fact sheets has been widely use as part of WWF communications activities on sustainable seafood and sustainable diets and therefore it can be assumed that the information and messages provided in the Fact sheets has had much wider reach than what can be measured from the website download figures.	
Nature trail to Hattelmalanjärvi	Hattelmalajärvi nature trail was completed in the end of 2022 and opening ceremony was held in June 2022.   *Pictures: Nature trail to Hattelmalanjärvi. Pictures: Ina Rosberg*	LSPHä

The results

Expected results	Achieved results	Status	Beneficiary responsible
At least 15 national media events	Exceptionally large amount of beneficiaries have ensured that media coverage has been outstanding during the whole project. The CB has maintained a media monitoring by gathering the information from the AB's. Altogether 542 media articles were published during the project. Most of the local actions were completed in 2021 and therefore the amount of articles decreased in 2022.  *Figure: The number of media articles per year.* Pro Puruvesi a local NGO is responsible for the communication of the Puruvesi target area. Their work is exceptional and sets an example to other target areas and ongoing and future projects. The main target group of the communication is local people and stakeholders. Communication is open, reliable, foreseen and active. The main focus is to build a foundation and acceptability for protection and restoration actions now and also after the LIFE project in the future. The project and EU LIFE as a financer is always highlighted. Pro Puruvesi has actively participated in local events, organised their own events (for example annual Puruvesi day for pupils) and their media coverage in local newspapers is grand:	Completed	All

	216 articles! This has resulted in high awareness of the Freshabit LIFE IP project and acceptability to the project actions in Puruvesi area.		
3-5 short printed policy briefs in English on e.g. catchment area management actions for forest owners, cross-policy co-operation approaches, how to prepare a catchment area plan, information on fish ways and their functionality	Policy briefs are a key tool to present research and recommendations to a non-specialized audience. They provide evidence-based policy advice to help readers make informed decisions. Policy briefs describe research findings in plain language and draws clear links to policy initiatives. Freshabit published three policy briefs about subjects risen from the sore spots experienced during project actions. First policy brief about better planning in building of fishways (Deliverable E1.1.1) was published in 2021. Second policy brief about harmonization of nature protection and use and directive species in lakes and lakeshores (Deliverable E1.1.2) was published in 2022 and was presented in two seminars to raise discussion. Third policy brief about integrated multi-stakeholder planning for catchment area management of N2000 areas (Deliverable E1.1.3) was published in the end of the project and was presented in the Freshabit final seminar. The policy briefs were of good quality but the response has been relatively passive. All policy briefs were posted in social media channels of involved beneficiaries but they did not raise discussion possibly due to their specific topic. Therefore more effort was made to present the policy briefs in seminars were you can reach the target group straight. In addition to publishing the policy briefs in social media a lot of effort is needed to raise discussion on the matter. Since the policy briefs were published in the end of the project we cannot yet tell whether they have made substantial impact.	Completed	All
Local media events	FH has been present in several local events and exhibitions, e.g. Koitajoki-Koitere forum, Puruvesi day and several press conferences. The visibility of the project has been outstanding in local newspapers.  In the third phase Freshabit launched "The Epic Media Tour". Media events were organised in every target area highlighting the co-operation and the large scale of actions done in Freshabit. Some of the events were targeted for media and others also for local people. Naamijoki media day 18.8.2020 (3 newspaper articles Lapin Kansa, Sampo, Luoteislappi, tv news YLE) Puruvesi media day 26.8.2020 (2 newspaper articles Karjalainen and Itä-Savo, radio YLE) Keski-Suomi media week 3.-5.5. 2021 (4 webinars) Freshwater pearl mussel media event 18.6.2021 (6 newspaper articles Västra Nyland, Lieksan lehti, Pietarsaaren Sanomat, Keskisuomalainen, Åbo Underrättelser, Maaseudun tulevaisuus) Karjaanjoki public event 28.8.2021 (approx. 150 people) Kiskonjoki public event 28.8.2021(50 people, 1 newspaper article Perniönseudun lehti and Salonseudun Sanomat) Vanajavesi media day 28.10.2021 (4 newspaper articles Maaseudun tulevaisuus, Sydän-Hämeen lehti, Keski-Häme, Aamuposti) Pohjanmaat joet 21.6.2022 (2 newspaper articles Ilkka-Pohjalainen, Suupohjan Sanomat) Koitajoki, Koitajoki-Koitere foorumi 7.10.2022 (15 people)	Ongoing	All

	 *Picture: All the media invited, including national tv, came to the media event organised in Naamijoki. Photo: Ilkka Numminen.*		
Social media promotion	In the third phase there were several social media campaigns in addition to constant social media activity. • Natura 2000 day 21.5.2021 • Restocking of freshwater pearl mussel juveniles in their home rivers June-July 2021. Also, a heart-melting short film was produced to tell the incredible journey of the mussels. You can choose English subtitles in YouTube. • Ulos-Ut-Out virtual environmental education event in May-June 2021 • Ulos on In -virtual environmental education event in November 2021 • Worlds of Water documentary series campaign in January-February 2020 	Ongoing	All
Increased awareness on sustainable seafood choices from local freshwater sources	The overall aim of the action was to increase awareness on sustainable local seafood choices by communicating about sustainability aspects of (selected) freshwater fisheries and aquaculture production. The goal was to increase the recognition and value of local freshwater resources as a source of sustainable seafood. According to the available information, such as annual consumer surveys conducted by Pro Kala, annual seafood consumption statistics and annual 'Kalamarkkinakatsaus' reports conducted by Natural Resources Institute Finland (LUKE) as well as personal communication with retail and seafood sector, the interest and demand for sustainable local seafood products has increased by seafood processors, retail sector and consumers. Also the increased availability for local sustainable seafood products indicates the growing demand for such products.	Completed	WWF
Increased availability of local sustainable seafood choices	In recent years there have been several new products in the market made of less-valuable freshwater fisheries and more local sustainably caught fish are available for consumers. According to LUKE, the demand for especially roach and bream has exceeded the amount of available raw material, indicating that there is traction and need from the seafood market to further increase the availability of sustainable local freshwater fish. The increased availability local sustainable seafood choices results mainly from long-lasting product development by private seafood companies as well as support from the Finnish government and fisheries related EU funding such as	Completed	WWF

	European Fisheries and Maritime Fund. The Freshabit activities was mainly focusing on filling-in data gaps and provide reliable and up-to-date information on certain sustainability aspects of selected freshwater fisheries/aquaculture production as well as promoting local freshwater fish as an alternative for imported seafood. The activities conducted under Freshabit project have been complementing other parallel projects and activities related to the promotion of sustainable freshwater fisheries but it is extremely difficult to evaluate the exact role of FRESHABIT activities with regards to the overall development. However, the new products are often marketed by highlighting the environmental and sustainability aspect, indicating the importance of reliable sustainability information and awareness rising activities.		
Awareness rising activities conducted in multiple platforms	Awareness rising activities on sustainable fishing and sustainable local seafood choices have been conducted in social media, seminars as well as newspaper and TV-interviews. - Facebook Live event on sustainable seafood choices 29.5.2020 (60-80 followers) - TV-interview on Arctic Waters tv-show 5.12.2020 - Presentations on webinars and seminars (7 webinar/seminar presentations on sustainable fisheries and seafood choices) - Interview/commenting on "Pullervo –sciencebook for kids" - Finnish Parliaments "fish day" for members and personnel of the Parliament (8.10.2019, approx. 100 visitors) - Interview on YLE podcast "Pieleen mennyt historia" on sustainable fisheries https://areena.yle.fi/podcastit/1-50677839 21.7.2021	Completed	WWF
Important stakeholders contacted	Important stakeholders have been contacted by personal communication and meetings with retailers and seafood actors (e.g. Marine Stewardship Council, Kalaneuvos, Nordic Trout, Fifax, The We are Group, Finnforel, Kesko, S-ryhmä and Lidl) and by participating official ministerial multi-stakeholder working groups and stakeholder events such as Vesiviljelyn kehittämistyöryhmä, Kalastuslain toimeenpanon seurantaryhmä, Kalatalouden sidosryhmätilaisuus and Kalatalouden innovaatiopäivät.	Completed	WWF
Several newspaper and on-line articles published by WWF	During the action period WWF has contributed to 5 newspaper, magazine and online-articles on sustainable fisheries and local sustainable seafood sources. The articles have been published in major national newspapers and magazines (Helsingin Sanomat 29.10.2019 and Hufvudstadsbladet 14.5.2019 newspapers, Kuluttaja and Apu magazines, Liedellä online-magazine and MTV news).	Completed	WWF
Nature trail to Hattelmalanjärvi	Hattelmalanjärvi Nature trail was completed in May 2022.  *Picture: Infoboard on the Nature trail*	Completed	LSPHä

Output

Deliverables

Code	Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable
E1.1	3-5 printed policy briefs	31.12.2022	30.9.2022	MH_LP, SYKE, LUKE, SMK	1. Parempaa suunnittelua kalateiden rakentamiseen 2. Vesienhoidon ja luonnonsuojelun yhteensovittaminen – uhkaako vesistökunnostus viitasammakkoa? (Deliverable C7.1.) 3. Miten Natura 2000 -alueet huomioidaan vesistö- ja valuma-aluekunnostuksissa? Toimintamalli tukee suunnittelussa

Milestones

Milestone	Foreseen date in GA	Actual date	Beneficiary responsible
First round of media events organised	31.3.2016	31.3.2016	MH_LP
Social media promotion completed	30.6.2016	30.6.2016	MH_LP

Second round of media events organised	30.9.2016	30.9.2016	MH_LP
Third round of media events organised	30.9.2017	1.11.2017	MH_LP
Communication activities of WWF conducted	30.9.2019	31.12.2020	WWF
10 media events organised	31.12.2019	31.12.2019	MH_LP
At least 15 national media events organized	30.9.2022	30.9.2022	MH_LP

Continuation of the action after the project

The results of the project will be communicated to the stakeholders and public by all project beneficiaries also after the project.

Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification

ACTION E.2: Networking

Beneficiary responsible for the implementation:	All beneficiaries
Other beneficiaries involved:	
Foreseen start date: Jan 1st 2016	Actual start date: Jan 1st 2016
Foreseen end date: Sept 30th 2022	Actual end date: Sept 30th 2022

The activities

As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
The main goal of activity is to exchange experiences with other (LIFE) projects in Finland and other parts of EU working in the same field i.e. managing freshwaters with emphasis on catchment area approach.	Networking nationally and internationally has been active by FRESHABIT beneficiaries. COVID 19 restrictions have hindered networking in the third phase because travelling abroad was not an option in 2020-2021. So far, we have connected with the following international projects or organisations: • Pearls in Peril - securing the future of the freshwater pearl mussel in Great Britain: participation and presentation in their final seminar held in Scotland in May 2016 (MH_LP) • UK Water Platform Meeting: participation and presentation in the LIFE Platform meeting held in May 2016 in Manchester, UK (MH_LP, SYKE) • Second Natura 2000 Boreal Seminar: participation and presentation in special freshwater restoration -workshop in Vilna in September 2016 (MH_LP) • The Northern European Network connecting Forests, Forestry and Water issues (SNS EFInord network project 2016-03, in collaboration with EU Interreg project WAMBAF): Participation and presentations held in Uppsala in September 2016 (LUKE, SMK) • Visit to captive breeding station of freshwater pearl mussels in Austevoll, Bergen in order to learn techniques for maintenance and rehabilitation of adult FPM and cultivation of juvenile FPM in November 2016 (JYU) • Preparing WETLANDSPACE - A European training Network for high level and multidisciplinary experts responding to wetland management needs from local to broad scales: participation in workshop held in University of Angers, France in November 2016 (VVK) • SostPro: participation and presentation in their first seminar for beneficiaries and stakeholders in Stockholm in April 2017 (MH_LP, SMK, UO) • Habitat contact forum 2017, Barents region: presentation in the workshop held in Oulu in June 2017 (SYKE) • Linking biodiversity to national economic and social priorities in the EU Member States -workshop: participation in workshop held in September 2017 in Brussels (MH_LP) • 13th International Coregonid Symposium: participation and presentation in symposium held in Bayfield, Wisconsin USA, in September 2017 (JYU) • International Cisco Workshop: invited expert and presentation in workshop held in Ashland, Wisconsin, USA in September 2017 (JYU) • European Commission DG RTD's Joint Workshop with IEA "Hydropower and Fish, Research and Innovation in the context of the European Policy Framework": participation to the workshop in May 2017 in Brussels (LUKE, 60) • CEEweb for Biodiversity: Towards a shared ecological rationale for more integrated implementation of the Nature and Water Directives. Participation and presentation for platform held in November 2017 in Sarród, Hungary (MH, 30 participants) • Water Management in Baltic forests, Interreg project conference in Malmö, Sweden, 31.12.2018: Oral presentation about developing tools and methods for river basing management planning (SMK) • Source Stream Protection Symposium, UBC, Vancouver, Canada, 14.5.2019. Poster presentation about numerical buffer zone optimization method developed in Freshabit LIFE IP-project (SMK) • Participating in workshop on using machine learning to calculate wet area maps. 6-8.11.2019 Umeå, Sweden, with Water Management in Baltic forests, Interreg project • Joint workshop on using LIDAR-scanning to assess condition of buffer zones along source streams in Karlstad Uni. with SLU, Oulu Uni. and Natural Resouces Canada. Karlstad, Sweden, 20-22.11.2019 (SMK) • Forestry and Water conference (WAMBAF), 29 January 2019 (MH_LP,	All

	SMK) • Joint field trip with Lithuanian Naturalit LIFE IP project in FRESHABIT target sites in South-West Finland, 7-8 May 2019 • Grip on LIFE project meeting, sharing experiences from FRESHABIT, 13-14 November, Härnösand, Sweden (MH_LP, SMK) • EU Water managers meeting, 26 November, Helsinki, Finland. (MH_LP) • The 10th Pan-European Green Belt Conference, October 15.-19. 2018, Wartburg, Eisenach, German. (LUKE) • EU Interreg conference “Forestry and Water in the Baltic Sea Region”, Stockholm, January 29-30. 2019 (LUKE) • International conference "Advances in the Ecology of Stream Salmonids V", May 20.-24. 2019, Granada, Spain (LUKE) • International conference, "Land Use and Water Quality, Agriculture and the Environment", June 3.-6. 2019, Aarhus, Denmark. (LUKE) • European Association of Environmental and Resource Economists, 24th Annual Conference, June 24.-29. 2019 Manchester, UK. (LUKE) • XXVIII European Society for Rural Sociology Congress, "Rural futures in a complex world", June 25.– 28. 2019, Trondheim, Norway (LUKE) • EU Water Innovation Conference 2019, December 11.-13. 2019 Zaragoza, Spain (LUKE) • Freshwater pearl mussel co-operation seminar with Freshabit LIFE IP and CoastNet LIFE projects 25.11.2020, Online (MHLP, JUY, VARELY, POKELY, LUVY) • Participation in the Biogeomon conference June 26-July 3th 2022 in Tartu Estonia (LUKE) • The General Assembly 2022 of the European Geosciences Union (EGU) in Vienna, Austria 23.-27.5.2022  *Picture: reshabit LIFE IP was well presented in the meeting of EU Water and Marine Directors in Helsinki in 26.11.2019*	
We will openly disseminate and distribute our experiences on the preparing of the LIFE IP proposal and also managing of the project to any other ongoing LIFE (IP) project beneficiaries potential, LIFE IP project applicant or national contact point.	We have shared our experiences with e.g. Danish, Swedish and Lithuanian LIFE national contact points and project applicants on the concept note phase.	All
The project will also participate to the national and international LIFE meetings such as FIN-SWE-DK LIFE platform meeting and seminars organized during the project period.	FH project members participated in • Official kick-off of LIFE Integrated Projects 2014 held in Brussels, Belgium in January 2016 • European Ecosystems Conference 2016: participation and presentation in special LIFE-workshop in Antwerpen in August 2016 • LIFE IP Platform: organizing and several presentations in Lohja in February 2017 • LIFE Water Platform meeting: COSTING THE EARTH? – translating the ecosystem services concept into practical decision: participation in workshop held in May 2017 in Tallinn, Estonia • LIFE Water Platform meeting: One River, Many Interests: participation and	All

	presentation in the seminar held in Koblenz, Germany in June 2017 • LIFE international networking conference, Environment needs LIFE for the next 25 years. Participation in the conference celebrating 25th Anniversary of the LIFE programme and the Habitats Directive held in May 2017 in Ljubljana, Slovenia (LUKE) • Water related LIFE IP network meeting 10-11 April in Brussels • Nordic Platform meeting 11–13 June 2018, in Punkaharju, Finland • LIFE IPE Platform Meeting14h-16th of October 2019 in Brussels • Nordic Platform Meeting 14.4.2021, Online (MHLP) • Water IP Network Meeting 18.-20.2021, Online (MHLP) • Workshop on Life IPs, Finland 12.-14.9.2022	

The actions

Expected results	Achieved results	Status	Beneficiary responsible
Active networking with other LIFE (IP) projects especially in the field of freshwater habitat and species protection and catchment area level approach throughout the project period and also beyond. The project results presented in various relevant national and international seminars and events. Lessons learnt passed to the Commission.	Project members participated in LIFE platform meetings and other seminars and conferences. Following LIFE projects have visited Freshabit LIFE: • LIFE IP Naturalit • LIFE Tritó Montseny • GRIP for LIFE • Latvian Nature Conservation Agency preparing an LIFE IP project	Ongoing	All

Continuation of the action after the project

The project results and experiences will be actively shared after the project in different national and international forums.

Modifications (action and/or budget)

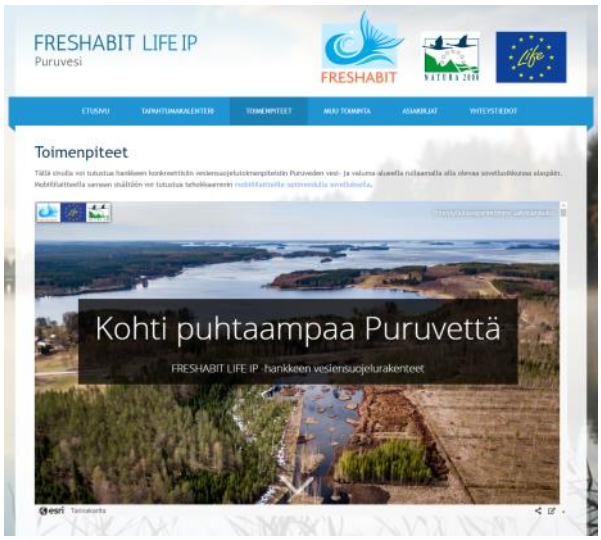
Description/justification	Before modification	After modification	Impact of the modification	Communication about modification

ACTION E.4: Producing the project website

Beneficiary responsible for the implementation:	MH_LP
Other beneficiaries involved:	ProPuru
Foreseen start date: Jan 1st, 2016	Actual start date: Jan 1st, 2016
Foreseen end date: Sept30th, 2022	Actual end date: Sept 30th, 2022

The activities

As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
We create a website for the FRESHABIT and hence disseminate the public with information about the project, such as its objectives, actions, progress and results. MH will use professional communications officer to develop this website at the beginning of the project, and regular updates will be carried out together with project manager. The content is updated regularly when milestones and deliverables are achieved.	The project website was established by June 2016, and it has been updated ever since. The main language is Finnish, but some of the pages have also been translated in Swedish and English for international readers. All deliverables of the project can be downloaded from the website. The main site with links to all existing regional sites may be found in: http://www.metsa.fi/freshabit To visualize the actions implemented in target regions, MH has utilised ArcGIS Online, which is the cloud-based mapping platform. Esri Story Maps enables to combine authoritative maps with narrative text, images, and multimedia content, and thereby make it easy to harness the power of maps and geography to tell the story of whole project. A1 Development of national integrated model for river basin management A5 Development of assessment methods for headwater habitats and Action A6 Development of survey and assessment methods for lake habitats Vanajavesi target region Karjaanjoki target region Naamijoki target region In 2020 a brand new story map (FI/ENG) introducing the whole project was published. The story map functions as the Layman's report of the project though also a PDF version is made available. In 2019 new legislation came into force ensuring accessibility of information for all the different people. In 2021 a consultant was hired to evaluate the accessibility of the Freshabit story maps. Because of these compulsory changes and updates in the ArcGIS online we had to re-do the story maps in 2022. These costs were not foreseen in the budget but where necessary to keep the story maps operational.	MH_LP
Puruvesi target area will produce their own website for their own region.	At the beginning of the project, ProPuruvesi produced their own website for the project. Special attention was given to interactive GIS-based service on all sub-regions in Puruvesi area. The website for Puruvesi target region may be found in: http://www.propuruvesi.fi/FRESHABIT/	ProPuru



The results

Expected results	Achieved results	Status	Beneficiary responsible
A website, which presents the project in full detail, regularly updated with the project results	Website operational 30.6.2016 and updated 10/2020 and 12/2022 (FIN/SWE/ENG). In addition, a new story map presenting the whole Freshabit LIFE IP project was published in 9/2020 in Finnish and English. It was updated in the end of the project and it will serve as the Layman's report. It will be in active use in our communications about the project results after the project.	Completed/ ongoing	MH_LP
Increased awareness of public towards conservation and management of N2000 sites	Management of N2000 sites as part of the Freshabit LIFE IP project have been well presented in the media. The website alone has reached more than 42 000 individual visits during 2016-22.	Ongoing	

Output

Deliverables

Code	Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable	Delivered
E4.1	A website, which presents the project in full detail	30.6.2016	30.6.2016	MH_LP	http://www.metsa.fi/freshabit	IR1

Milestones

Milestone	Foreseen date in GA	Actual date	Beneficiary responsible
The project website and Puruvesi website operational	30.6.2016	30.6.2016	MH_LP

Continuation of the action after the project

The project website and the story maps will be operational at least five years after the project. All deliverables can be found on the website.

Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification

ACTION E.5: Producing project materials

Beneficiary responsible for the implementation:	MH
Other beneficiaries involved:	LUVY, SMK, SYKE, WWF, VVK
Foreseen start date: Jan 1st 2016	Actual start date: Jan 1st 2016
Foreseen end date: Sept30th 2022	Actual end date: Sept 30th 2022

In this action, all specific project material such as leaflets, notice boards, newsletters, exhibition stands etc. were produced. The main purpose of these was to draw public attention into FRESHABIT and conservation of N2000 sites.

The activities

As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
Leaflets (project and Karjaanjoki) will be handed to public in all relevant exhibitions, meetings, or conferences, and public noticed boards standing at all proposed target sites.	Original printed project leaflet was out in 2016 and the leaflet was updated in November 2019 emphasizing the results and achieved actions of the project. Because COVID-19 restrictions forbid all events for two years some of the printed leaflets were left unused. Nowadays social media has taken over many traditional means of communication such as leaflets but then again the visualisations produced for the leaflet has been actively used also in presentations and social media. We have received a lot of praise how informative the visualisations are. In our busy lives, information needs to be compact, easy to digest and distinctive. In addition to the brochure, we produced Freshabit stickers which had a short description of the project and link to the website on the back-side. The stickers were easier to carry around and distribute, and they functioned as a note to read more about the project online.  	MH_LP, LUVY
An exhibition stand is established and used in meetings and conferences.	The layout of roll up and ppt-slideshow was done by MHLP. MHLP also spread roll ups to each target region and some of the partners purchased their own roll ups.	MH_LP
At Vanajavesi keskus a leaflet/newsletter for restored bird lakes will made.	The regional leaflets have been produced in Keski-Suomi (SYKE), Karjaanjoki (LUVY), Lounais-Suomi (VARELY), and Vanajavesi (VVK). Also, the actions of Vanajavesi FRESHABIT have been reported on several Vanajavesi newsletters.	VVK
We produce ca. 10 minutes video on YouTube	The project YouTube-video in Finnish with English subtitles is found here: https://www.youtube.com/watch?v=gt9Icpfm33c In the third phase a short film was made for social media about the incredible journey of the Freshwater pearl mussel from the certain extinction to doubling the populations in the target rivers. You can choose English subtitles from the YouTube. The short film was distributed through several social media posts and it was shown in several seminars and meetings.	MH_LP

Producing communication materials on sustainable local seafood choices (WWF) WWF will produce communication materials on sustainable seafood choices from local freshwater sources.	Communication material (Fact sheets) have been produced of less-valuable fish species or of otherwise sustainable choices (4 wild-caught and 1 aquaculture species). These communication materials are based on 3-5 sustainability evaluation reports on selected fisheries/aquaculture practices completed in Action A7. The dissemination was done in Action E1.	WWF

The results

Expected results	Achieved results	Status	Beneficiary responsible
Leaflets and other project material to hand out to public (project leaflet/newsletter and local leaflet for Karjaa, Vanajavesi)	Project leaflet and Karjaanjoki leaflet completed	Completed	MH_LP, LUVY, VVK
Notice boards at each location of the target sites where actions will be implemented	Notice boards have been placed in all restoration sites. See examples bellow:  *Picture: Pölsfors river restoration notice board in Ostrobothnian rivers target area*  *Picture: Leuhunkoski Fishways noticeboard in Central-Finland*  *Picture: Billnäs fishway info board in Karjaanjoki target area*	Completed	Several

	 *Picture: Villamo work site info board in Ostrobothnian rivers target area*		
Exhibition stands (roll-ups) to be used in meetings/seminars and at the offices of the beneficiaries	Roll-ups in Finnish and English.	Completed	MH_LP
Project video on for MH YouTube -channel	The project YouTube-video in Finnish with English subtitles is found in here: https://www.youtube.com/watch?v=gt9Icpfm33c	Completed	MH_LP
Increase in public awareness of conservation of N2000 sites	During the project altogether 542 media articles were published and hundreds of presentations have been given in seminars, events and meetings. The outreach has been great but we cannot calculate how many people we have reached and told about conservation measures of N2000 sites. We arranged a social media campaign in Natura 2000 day 21.5.2021 highlighting the N2000 network. In total 13 beneficiaries made 21 posts on social media.	Completed	All
Communication materials on sustainability of selected freshwater fisheries and aquaculture production.	Communication material (Fact sheets, deliverable E5.6) have been produced of less-valuable fish species or of otherwise sustainable choices (4 wild-caught and 1 aquaculture species). They are based on sustainability evaluation reports completed in A7. Dissemination in E1.	Completed	WWF

Output

Deliverables

Code	Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable	Delivered
E5.1	Notice boards	Ongoing action	30.9.2022	Several	Notice boards examples	IR1
E5.2	Project leaflet	31.5.2016	31.12.2016	MH_LP	FRESHABIT - Annetaan yhteistyön virrata!	IR1
E5.3	Project roll-ups ready	31.8.2016	31.12.2016	MH_LP	Freshabit - yhteistyötä vesiperintömme säilyttämiseksi	IR1
E5.4	Project video on YouTube	31.12.2016	1.7.2017	MH_LP	Freshabit LIFE - yhteistyötä vesiperintömme säilyttämiseksi	IR1
E5.5	Leaflet for Karjaanjoki completed	31.12.2018	31.8.2016	LUVY	Freshabit Mustionjoella 2016-2022	IR1
E5.6	Communication materials on sustainable local seafood choices	31.12.2018	30.4.2020	WWF	Fakta 2020: E5.6.1 Särkikalat, E5.6.2 Sisävesien kuha E5.6.3 Kiertovesiljelty kirjolohi E5.6.4 Kuore	IR2
E5.7	Leaftet/newsletter for Vanajavesi	31.12.2019	28.5.2018	VVK	Vanajaveden Freshabit -esite	IR2

Milestones

Milestone	Foreseen date	Actual date	Beneficiary

	in GA		responsible
Notice boards ready and distributed	31.5.2016	30.9.2022	Several
Project roll-ups made and distributed	31.10.2016	31.12.2016	MH_LP

Additional output

Code	Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable	Delivered
E5.8.	Project leaflet for Lounais-Suomi	NEW	1.12.2017	VARELY	Freshabit LIFE IP Lounais-Suomen joet – Kiskonjoki vapaaksi ja Karvianjoki kuntoon	IR1

Continuation of the action after the project

Project materials will be utilized well after the end of the project for the dissemination on the results by the project beneficiaries. A permanent restoration board will be placed in the main restoration sites.

Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification

ACTION E.6: Producing high-class transmedia

Beneficiary responsible for the implementation:	DocArt
Other beneficiaries involved:	
Foreseen start date: 1st of January 2017	Actual start date: 1st of January 2016
Foreseen end date: 30th of June 2020	Actual end date: 30th of March 2020

World of Water is a high-grade documentary series (6 x 30 min.) about freshwater habitats, the vital importance of water, the underwater life and myths and legends related to water, broadcasted by Finland's national public service broadcasting company YLE. It is not only a traditional television series but also an interactive transmedia project, using multiple platforms and formats, such as social media, interactive websites and events, in order to reach wider audience.

The activities

As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
The detailed planning of the documentary begins in 1/2017 and the shooting script will be finalised by 5/2017. Ahti's Kingdom is going to be filmed at different locations in Finland between spring 2017 and autumn 2018. A remarkable part of the filming is going to be done at FRESHABIT project sites and other NATURA areas across Finland. Some of the actions and results of FRESHABIT project will also be presented in the final documentaries and transmedia platforms.	 *Picture: The six documentaries present director Petteri Saario's deep dive into the wonders of water with his 24-year-old son Antti. The series is a fascinating journey to Finland's water nature both above the surface and underwater.* Highly praised TV series Worlds of Water (working title Ahti's Kingdom) was released in 2020 and raised millions of viewers. The TV series contains six episodes (6 x 30 min) with one main theme on each. The final titles of the documentaries are: 1. The Wonderful Nature of Water (Veden ihmeellinen luonto) 2. Water Treats (Veden viljaa) 3. A Dive to Finland (Sukellus Suomeen) 4. Mythical Water (Myyttinen vesi) 5. Finnish Waterways (Reittivesien Suomi) 6. Water – the Oldest Cure (Vesi vanhin voitehista) More about the episodes and trailers: https://www.vedenvaltakunta.fi/index.php/worlds-of-water/ The shooting of the series was done in 2016 - 2019 including 60 filming trips, in total 150,5 shooting days. Major part of the filming took place at FRESHABIT project sites and other N2000 areas across Finland as stated in the GA. Shootings were done among others at Puruvesi, Kiskonjoki, Etelä-Konnevesi, Karvianjoki and Vanajavesi FH areas. Other locations have been e.g. Kitinen River, Lake Valkiajärvi, Kiikunlähde Spring and Natura 2000 areas of Hossa, Oulanka, Luosto, Teijo, Linnasaari, Tornio River and Pihlajavesi. The themes and objectives of FRESHABIT project have an essential role in the TV series, it aims to make people appreciate and take care of our water resources and increase the interest in Finland's water heritage in general. In addition, some of the actions and results of FRESHABIT project are presented in the series, e.g. the freshwater pearl mussels in Karvianjoki and at Konnevesi research center.	DocArt

	 *Picture: Freshwater pearl mussels in Konnevesi research center and Karvianjoki are presented in the episode "A Dive to Finland". A screenshot from the series.* The main goal of the TV series was to raise awareness on the unique and delicate nature of our freshwater ecosystem with the motto "through the heart to the brain". That is why a character driven narrative with emotional and personal angle in the focus was chosen as the genre of documentaries. According to the positive feedback from viewers and press this seemed to be an excellent choice. In January 2020, a few weeks before the TV broadcast, a pre-screening for the media and cooperation partners was arranged at Finnish Film Foundation's movie theater in Helsinki. The event was a success: over 100 people participated, including many representatives of press, e.g. the biggest national paper Helsingin Sanomat which made a large article about the TV series (https://www.hs.fi/kulttuuri/art-2000006408657.html). Also Yle Radio Finland made a 30-minutes radio interview of the production (https://areena.yle.fi/audio/1-50402625). Altogether there has been 38 articles and mentions about the series in the media. **Changes** 1. One of the six themes was changed because we noticed that fishing was an issue which required more attention. Therefore the planned episode "Water and Society" was changed into "Water treats" focusing on fishing. (Even though there are nearly 188 000 lakes in Finland, three fourths of all fish Finns eat is imported, which is both ecologically and ethically not sustainable). Other five main themes remained as stated in the proposal. 2.The main title of the series has changed from Ahti's Kingdom (Ahdin valtakunta) into Worlds of Water (Veden valtakunta). The change was made in order to make the essence of the series immediately understandable for the audience and conclusion was made that the word "water" should be mentioned in the name.  *Picture: Fishing required an episode of its own. Paavo Pekkinen and his team winter fishing at FRESHABIT area Lake Puruvesi. A screenshot from the episode "Water Treats".*	
Ahti's Kingdom documentary series will be broadcasted on Yle TV1 channel 12/2019. TV1 is the most watched TV channel in Finland (share of daily television viewing 41,9% in 2013). Each episode will also be streamed on-demand via Finland's most popular internet TV service Yle Areena.	TV series was broadcasted on YLE TV1 in 2020 and again 2022. All of the episodes can be viewed on-demand via YLE Areena.	DocArt
The TV-series will be supported by transmedia actions using multiple platforms (e.g. interactive websites and social media). The transmedia actions including e.g. dedicated website and social media sites (Twitter, Facebook, Instagram)	**Transmedia actions** 1. **A social media campaign** was organized with project beneficiaries in January- March 2020. The core of the campaign was Worlds of Water's broadcasting dates. 2. **An official website** for the TV series was opened in January 2020 Before that the series was introduced as part of DocArt's webpage. The webpage has been shared in Facebook by DocArt and project beneficiaries have shared it in their social media platforms. The website has also been delivered to the media in press releases. 3. **Yle web** has published articles about Worlds of Water. An article about the significance of water in Finnish myths was published in collaboration with DocArt, Yle Nature and Yle Education (9694 page views). DocArt also created an interactive quiz in collaboration with Yle Nature which aimed to increase the knowledge of water life in Finland in an	DocArt

	interactive way (24823 page views). The articles were shared on social media platforms by DocArt, Yle and project beneficiaries. They raised a lot of interest, showing among the most viewed and shared articles of the week in Yle Factual websites. 4. **Trailers** of the series have been shared by DocArt in Youtube, Facebook, Instagram and Vimeo. 5. **A raffle in social media** was launched by DocArt on 14th January 2020. We shared a 4 minutes long teaser of the series in Facebook and Instagram and asked from the viewers which was their favorite animal. Prizes were invitations to the preview screening of the series and books written by the documentarist Petteri Saario. The raffle was shared also by project beneficiaries. The raffle reached 44 459 and engaged 2 824 people. 6. **Worlds of Water was a part of a popular television show**: An insert from the first episode was asked to participate in the Yle TV2 series "Sohvaperunat". Programme is a popular reality show based on a British format "the Gogglebox" about television viewers' comments and reactions to last week's programs. Sohvaperunat is one of the most watched entertainment programs in Finland and participating the show gave plenty of promotion for the series. **Changes:** We planned to open Facebook, Twitter and Instagram accounts for Worlds of Water on 1.1.2018. However, we noticed that more efficient way to communicate in Facebook and Instagram was to use accounts which already exist and use hashtags to connect the post to the television series rather than create new accounts. Therefore we decided to make posts with #vedenvaltakunta and #freshabit and use following already excisting accounts in order to promote the series: **Facebook** **DocArt - Filming nature and human nature** The first post made on page of Veden valtakunta 25.2.2017 After this date regular posts from filming trips. **Freshabit life IP** The first post made of Veden valtakunta 25.2.2017 After this regular posts from filming trips. **Petteri Saario** The first post made of Veden valtakunta 27.2.2017 After this regular posts from filming trips. In 2020 posts were made also from project beneficiaries and Yle Nature accounts. **Instagram** First post made from Filmingnature - DocArt account with #vedenvaltakunta 15.11.2018 **Twitter:** Because the golden rule in connecting in social media is presence – there's no point creating an account unless you are active - we decided that we concentrate our energy to engage people in Facebook and Instagram. However we were pleased to see that there were quite a many tweets with #vedenvaltakunta on Twitter by people and organizations with a lot of followers, e.g. YLE, other Freshabit co-partners and social media influencers. Their summed up amount of followers was over 118 000, which for its part raised the awareness of the subject. **Website:** A page for Worlds of Water was created as a part of DocArt's webpages in Finnish on 17.6.2016 and in English on 30.11.2017. Because the essence of the series was informed at DocArt's page, we decided to postpone the opening of the official website to January 2020.	
After the first broadcast in Finland an English translated version of the series is going to be made and Yle Sales will be in charge for the international distribution of the production. The documentaries are also going to be distributed to national and international film festivals.	An English subtitled version of the TV series was completed in January 2020 and Yle Sales is in charge of the international distribution. The festival distribution starts after the broadcasting.	DocArt

The results

Expected results	Achieved results	Status	Beneficiary responsible
Ahti's Kingdom documentary series (6 x 30 min.) is completed and handed over to Yle in October 2019.	Worlds of Water documentary series (6 x 30 min.) was completed and handed over to Yle in November 2019.	Completed	DocArt
Yle shows the documentary series in 11-12/ 2019 on prime time (TV Premiere + one replay broadcast). The expected audience ratings are at least 3-5 million viewers.	TV Premiere on YLE Channel 1 on 9th of February 2020. The series was broadcasted on prime time on Sundays at 18.15 during 9.2 – 15.3.2020. Each episode had two replay broadcasts on following Wednesday at 5.55 and Saturday at 14.40. In addition, there has been three TV replays so far, in June-July and September 2022. The audience ratings were excellent: the total amount of viewers of the 6 part series have been 6,998 millions by 7.11.2022 (TV 6 598 000 + online views 399	Completed	DocArt

	578), the best average viewer rate being 796 000 of a single episode (including TV Premier + 2 replay broadcasts + on-line). All the episodes raised into the Finnpanel ranking list of the Top20 Week's Most Watched TV Programs of Yle in 2020 (5 of them were among the Top10). Although the main age group of the audience was adults +30 years the theme interested also younger audiences. The series has been watched as a part of education in several primary schools and it is included in MAPPA.fi, the Central Material Bank and Search Service for Environmental and Sustainability Education and Outdoor Learning in Finland. The online material bank is designed to support teaching, educational and youth work. YLE was very pleased with the viewing success and it nominated the series as a candidate for Golden Venla Annual TV Industry Awards in 2020. In addition to YLE TV1 and YLE Areena in Finland the series was shown in 2020 two times on TV Finland free-to-air television channel in Sweden, but there are no audience rates available. The total amount of the Finnish viewers is going to be over 7 million because the series is available at YLE Areena Internet TV Service and there are still most likely going to be several replay broadcasts on YLE TV1 channel in the future.		
Each episode can be viewed on-demand via Yle's internet TV service Yle Areena	All episodes of the series can be viewed on-demand via YLE Areena.	Completed	DocArt
An international version of the documentary series is made and Yle Sales starts the international distribution in 2020.	An English subtitled version of the series was completed in January 2020. Yle Sales is in charge of the international distribution. The series has been shown at several international TV sales markets, for instance at MipCancun, MipCOM, MIPTV and EFM&AVANT PREMIERE and several channels from different countries (Brazil, Germany, China, Italy, Mexico, France, Norway and Japan) have expressed their interest. The international sales negotiations take normally a long time and so far broadcasting contracts have been made with RAI Channel in Italy and Naturkanal1 in Norway. Because of the COVID pandemic the international festival distribution has not been as successful as anticipated and many of the festivals have been postponed or cancelled. The series has been submitted to festivals in USA (International Wildlife Film Festival), Canada (Water Docs Film Festival), Russia (Baikal International Film Festival) and Estonia (Matsalu Nature Film Festival). The international festival premiere was in Estonia in September 2021 when four episodes of Worlds of Water series were screened in the Finalist category at MAFF.	Completed	DocArt

Output

Deliverables

Code	Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable	delivered
E6.1	Ahti´s Kingdom production completed, broadcasted and reported	30.6.2020	23.3.2020	DocArt	Worlds of Water (Veden valtakunta) documentary series (Episodes 1-6, English subtitles. For preview use the Vimeo versions): https://drive.google.com/open?id=1hdMOaiZBiTqSfjXalb4jKLfFrgEaoXQ6 Trailer of the series: Vimeo  Password: WaterWorldTrailer	IR2

Milestones

Milestone	Foreseen date in GA	Actual date	Beneficiary responsible
Planning of Ahti´s Kingdom completed	30.4.2017	1.5.2017	DocArt
Principal photography completed	30.9.2018	30.9.2018	DocArt
Post-production completed, TV-series is handed to Yle	30.9.2019	12.11.2019	DocArt
Ahti's Kingdom TV-series is broadcasted on Yle TV1	31.12.2019	9.2.2020	DocArt
Final reporting of the project completed	30.6.2020	23.3.2020	DocArt

Continuation of the action after the project

Worlds of Water documentary series will be available for on-demand viewing in Yle's internet TV service YLE Areena for approximately five years after the project.

The series has been shown at several international TV sales markets, for instance at MipCancun, MipCOM, MIPTV and EFM&AVANT PREMIERE and several channels from different countries (Brazil, Germany, China, Italy, Mexico, France, Norway and Japan) have expressed their interest.
The international sales negotiations take normally a long time and so far broadcasting contracts have been made with RAI Channel in Italy and Naturkanal1 in Norway.

Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification

ACTION E.7: Environmental education

Beneficiary responsible for the implementation:	MH_LP
Other beneficiaries involved:	WWF, FANC, NoM, ESAELY, LSPHä, LSPKe, LSPPo, LUKE, ProPuru, VVK
Foreseen start date: Jan 1st 2016	Actual start date: Jan 1st 2016
Foreseen end date: Sept 30th 2022	Actual end date: Sept 30th 2022

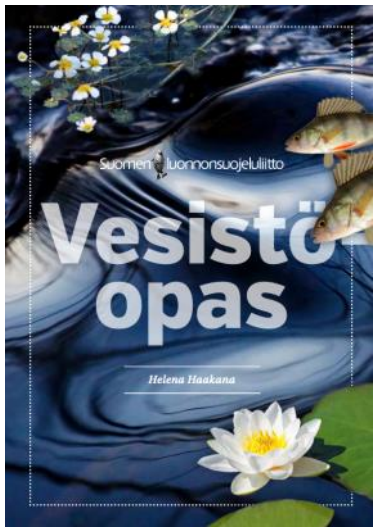
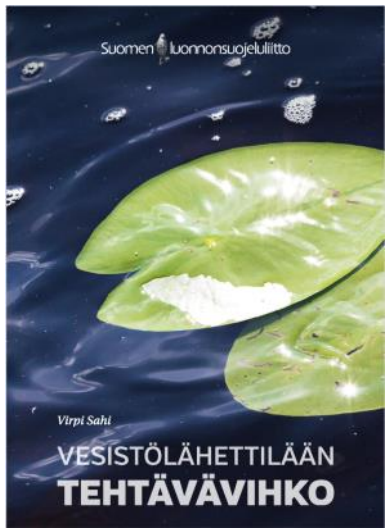
Attitudes and awareness of the future generations play a decisive role in assuring the good condition of the freshwater environments in Finland. Therefore environmental education for children and young people is needed. The education in this project has been implemented in multiple ways suitable for different age groups.

The activities

As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
Task 1 Organising nature school and training in Swedish and Finnish.		
A FRESHABIT outdoor education programme (OEP) suitable for nature schools will be developed. The preliminary scope of the OEP includes streams and rivers, lakes and the shores. The OEP will include two different versions, adopted for different age-groups: version a) for the grades 5-6 and version b) for the grades 7-9. Thorough training to all interested nature school teachers and other environmental education professionals will be offered. The nature schools of NoM will offer nature school days based on the FRESHABIT OEP	Outdoors education programme (OEP) suitable for nature schools was developed. OEP manual is published as printed and online in Swedish and Finnish “En djupdykning i sötvatten - material och inspiration till uteundervisning” (SWE), “Syväsukellus makeaan veteen – materialeeja ja innostusta ulkona oppimiseen (FI). The supplementary activity sheets are offered online. It combines strong tradition and methodology of Finnish and Swedish outdoor education with relevant information about the freshwater environment. The OEP offers hands-on guidance on how to plan, organize, implement and evaluate safe nature school days by the water. The OEP includes a large range of activities including nature observations, field investigations and a variety of games and other play-based learning activities. The OEP includes activities both for winter and the snow-free season. 39 schools in the project target areas ‘Karjaanjoki’, ‘Kiskonjoki’ and ‘Pohjanmaan joet’ were involved in the development phase. Schools were contacted and invited to take part in pilot nature school days. Bus transportation was offered to the participating schools. After participating in nature school days, schools were encouraged to give feedback on the activities. The experiences, ideas and wishes from other nature school teachers across Finland (LYKE-network) were gathered by a web questionnaire. Due to significant changes in staff of NoM, the finalizing of the OEP for grades 5-6 and grades 7-9, the manual for OEP and marketing brochure were completed a little behind the schedule in May-June/2019. During the project 138 nature school days were organized, resulting in a total of 2480 people taking part in nature school days. Due to covid-19 restrictions in 2020, 12 nature school days could not be organized and were instead substituted with educational videos. The videos have been a success with high number of 2050 online views (29.11.2021). We have been able to reach a significantly higher amount of people with the videos compared to 12 nature school days they are substituting. Four training workshops based on the OEP had been organized, with a total of 64 educators attending. Workshops were organized in Vaasa (LYKE-network), Ähtävänjoki river (Ostrobothnian regional network of outdoor educators), Espoo (Mitt i Naturen outdoor conference) and Turku (Koulujemme lähivedet- educators network). Further, a demo nature school day was organized at Freshabit Life IP national annual meeting in Summasaari 2019. OEP activities have also been presented at five network meetings/other occasions with a total of 150 attendees at physical meetings and 277 in distance meetings. The largest of these were the brand new network meeting and workshop for freshwater pedagogics in 2019 hosted by the Swedish Centre for Nature Interpretation, SCNI, in Lidköping, Sweden. Three Annexes to OEP were completed in 2022. See deliverables E7.6.	NoM

	 *Picture. Five educational videos where produced in the middle of COVID epidemic which presented how to manufacture your own water research equipment.*	
Task 2 Producing and/or translating material for education in Finnish and Swedish Developing education on freshwater environments in schools and producing an application in cooperation with schools		
A mobile application focused on the observation of freshwater environments that will support the learning experience will be produced. There will be two levels of the application: one to the grades from 3 to 6, and another to the grades from 7 to 9 in comprehensive school. 6 teacher training sessions for interested teachers will be provided.	The mobile applications "Great Onshore Adventure" and "Mystery of the Waters" were published and translated into Swedish and English. The Swedish version of the mobile learning app was evaluated by NoM nature school teachers. So far, 1612 teachers and educators have uploaded the game, of which we can estimate that at least 55 000 pupils have explored freshwater environments by playing the mobile games. There has been several on-line marketing campaigns for the mobile apps and a marketing video has been produced. They were also presented in the EDUCA fair (2019). 39 educator training sessions (2018-2020) have been organized and altogether 654 educators or teacher trainees have been introduced to the mobile materials. As only 6 training sessions were originally planned, the number of educators reached is significantly larger and, therefore, the impact of the education activities greater than anticipated. The games are built on a Seppo platforms which has turned out to be fairly expensive to maintain. 500 downloads a year costs 4 800 euros which means that one game costs 10 euros. We learned that when developing mobile materials, the maintenance costs should be calculated for longer time period.  *Picture: Mobile applications were developed in collaboration with the target group itself, the pupils. Picture: Essi Aarnio-Linnanvuori/WWF*	WWF
Freshwater themed environmental education material will be created for the use of recreational children and youth camps.	The freshwater themed camp material 'Adventure in the kingdom of water' (Seikkailu veden valtakunnassa) was published in Finnish and Swedish in 2019. Approx. 2900 copies of the learning material for children and youth camps have been distributed. The material was prepared together with its target group: two workshops with youth workers and scout leaders were organised, and activities were tested in three different childrens' camps: two scout camps and one childrens day camp arranged by a church parish. The final material was developed based on these experiences	WWF, (NoM)

	and feedback. The camp material was presented first in the EDUCA fair in January 2019. It was delivered directly to some scout districts and the youth work units of the Evangelical Lutheran Church of Finland. In addition, it was marketed in several social media channels and WWF newsletters. A fair stand at Nuori2020 event in January 2020 was reserved to deliver the material for youth workers. PDF-version of the guide is available also in the popular outdoor education online material bank MAPPA (mappa.fi).	
VVK will prepare education material on four N2000 sites in Vanajavesi. In addition, guided tours with voluntary guides from VVK and NGOs in the region to the sites will be organized, with emphasis on bird observation.	Bird watching event "100lintua" was organized simultaneously in three project sites in 2017. The attendees (about 100 pupils) were local elementary school classes. 12 guided tours to project sites have been organized for different audiences.	VVK
MH will produce an outdoor education package linked to the Punkaharju nature trail with a theme: Eskers and their role in water cycle; A journey of a water drop. The school visitors are offered a free of charge guiding in Punkaharju using the education package .	"Ikivanha kiertolainen ja Jääjättiläisen hiekkakakku" - Nature education program for Puruvesi and Punkaharju areas was published in 2017. It was tested by schools in 2018. The program is in active use of MHLP when local schools visit Puruvesi and Punkaharju area.	MH_LP
Task 3 Freshwater ambassadors		
Freshwater ambassadors will bring together local people to improve their knowledge of freshwater habitats. Ambassadors organize workshops and help local people to find out what the human impacts on local freshwater ecosystem are, how you can study them and what can be done to reduce them. During the workshops field surveys will also be organized.	In this task the concept of Freshwater ambassadors was launched. The heart of the concept is local people improving their knowledge of freshwater habitats and taking action to protect and restore them. The developing of the concept started in phase 1 and 2. In local pilots in Kyyjärvi and Saarijärvi, project coordinator acted as a ”Freshwater ambassador” and called local people together. During 2018-2019 the project coordinator organised workshops and meetings with two local action groups in Kyyjärvi and Saarijärvi region. In addition, workshops were organized for the students at the JAMK Bioeconomy campus where the teachers together with the pupils continue to measure the conditions in the nearby lakes (Lake Pieni-Lumperoinen and Lake Summanen). In phase 3 we wanted to replicate the pilot all over Finland. Open call was launched for volunteers to act as Freshwater ambassadors and to establish local study groups. Articles on Freshwater Ambassadors and freshwaters were published in FANC’s membership magazine Luonnonsuojelija (print circulation 30 000 and electric distribution). Comprehensive instructions were published to aid Freshwater Ambassadors. (See additional outputs E7.13 Freshwater themed study group and E7.14 Freshwater activity book.) They present how to learn more about your local freshwaters and what one can do to improve its state. 30 ambassadors were registered by 1/2021 and in spring 2021 a webinar on how to run local study groups was held for them. This webinar included nine online specialist lectures about • Getting acquainted with freshwaters nearby • ABC of rivers and streams and hydropower • How to get rivers and streams to a municipality’s agenda? Water issues in municipal elections and making initiatives in municipalities • Let us give an opinion on River Basin Management Plans. How to influence on the water management planning. Dams in Finland. Hydropower installations and other barriers of flow. • Water Act helping to protect our streams. Setting, changing and putting into force a fishery obligation/compensation for a hydropower installation River rapids ”Palokinkosket” • Let us give an opinion on River Basin Management Plans – a workshop • Mapping thousands of culverts. An inventory method and data collection. The webinar lectures can be found on the FANC homepage and has been downloaded already 3191 times. Unfortunately, the COVID19 restrictions caused postponing of the activities and these 30 ambassadors could not arrange local meetings. However, we succeeded to prepare excellent material for volunteers which will be utilized and funding will be actively applied for further development post COVID19.	FANC

	 	
The guidebook of Freshwater Biology will be produced. Also two leaflets: “Landowner’s Guide to the Conservation of Freshwater Habitats” and “Landowner’s Guide to Wetland Restoration” will be produced to be delivered in workshops.	• The guidebook of Freshwater Biology was published in 9/2017. This guidebook is the first handbook about freshwaters to layman's. The guidebook includes e.g. information about water systems and ecology, flora and fauna, human impacts and mitigation measures, how to monitor freshwater habitats. The aim is to activate the layman to take care for their local freshwater habitats. • Landowner’s Guide to the Conservation of Freshwater Habitats was published in 12/2017. • Landowner’s Guide to Wetland Restoration was published 9/2018. • Instructions for Freshwater Ambassadors (Vesistölähettilään tehtävävihko) was published 11/2020. Press release • The materials were distributed in Freshwater ambassador events and meetings, All material is permanently available in FANC website and is being used in FANC’s further activities. The material can also be found in the portal for environmental education in Finland mappa.fi. The paper versions are distributed in events.	FANC
The Freshwater ambassadors of FANC’s Keski-Suomen piiri ry. (LSPKe) will organize workshops for local people on Saarijärvi project area. The Freshwater ambassadors of LSPKe will also organize peatland restoration events. 20 information boards of freshwater biology and conservation will be installed in nature sights. Information of 40 important water or peatland habitats are gathered and published in internet.	This task was completed in phase 1. Four voluntary work events to restore peatlands (ca. 50 ha) was organised with total of nearly 200 people, and one water day with ~100 attendees in Keski-Suomi. Also, five permanent information boards have been established which gather information on ~40 important habitat sites within same area. Approximately 100 people participated the workshops. Information of 40 important water or peatland habitats gathered.	LSPKe
LSPPo will organize river restoration events and training courses for volunteers (2-3 events/year during phase 2) on Pohjanmaa project area. LSPPo will also organize a ” Taimenpäivä”, a seminar in freshwater river ecology, for professionals and locals yearly	Three “Taimenpäivä” seminars have been organised in Pohjanmaa-region (2018, 2019 and 2022) (~160 participants), and 4 voluntary work days to restore streams. In 2018 Lohiluoma/River Isojoki (ca. 100 m in length; ~6 participants) and Iivarinkylä/River Isojoki (ca 50 m in length; 40 participants) were restored. In 2019 Paholuoma in Karvianjoki river (ca 150 m length; 30 participants) was restored.	LSPPo
ProPuruvesi organises yearly starting from 2016 a special outdoor Puruvesi Day for 5th and 6th grades of 3 schools. In addition a separate GIS-based mobile application presenting at least 20 sites were various water protecting measures have been made will be produced in 2018-2019.	16 outdoor days for 5-6 graders have been organised in Puruvesi area (~430 participants). In outdoor days, the volunteers have shared the knowledge on water quality, flora and fauna, and cultural heritage of Lake Puruvesi area. Also, pupils have done some measurements by themselves! The concept is pure gold: All local children participate in an outdoor day during their grammar school. Through learning and experiencing their local freshwater habitats first hand children are more likely to cherish it in the future.	ProPuru

	 *Picture: Outdoor days organised in lake Puruvesi educate the pupils of the values of local freshwater habitats.* GIS-based mobile application is ready for open use in Finnish and in English. Latest update have been done in September 2022. It introduces the water protection measures in the Lake Puruvesi target area of the Freshabit LIFE IP project. The application is designed for mobile devices. All the maps in the application are interactive. Sometimes it is difficult to explain what water protection structures are and why they are built. Because of the visual design of the application and comprehensive descriptions the app is extremely useful in demonstrating best practices for different stakeholders. Puruvesi Day was organised in collaboration with MH_LP in 2018, 2019 and 2022. These seminars have been an important forum between the specialists and local people. In their study (E7.11) commissioned by Pro Puruvesi, Kivistö & Heinänen (2021) calculated the economic value of Lake Puruvesi. In addition, a survey addressed to residents was conducted to determine the effects of eutrophication and blue-green algae on property value. According to survey responses, the recreational values of Lake Puruvesi accounted for 21% of property value. During the review period 2010–2020, the sales prices of properties on bays affected by eutrophication were more than 50% lower than the prices of properties on open water areas. Respondents put the average negative impact of blue-green algae on property value at 19.6%. According to respondents' assessments, blue-green algae affect property values more than eutrophication. This study put the value of properties on the shores of Lake Puruvesi at EUR 365–390 million and, consequently, a 20% reduction in value would mean EUR 73–78 million.	
Distribution of the results and products of the project at the Educa Education Fair and at the National Environmental Education Days	The Project had a stand at the Educa Education Fair in 25.-26.1.2019. WWF presented their mobile applications and educational material for youth camps, NoM presented the OEP and Luke presented "Wellbeing from blue spaces: streams in research and good practices". 18 400 people visited the fair in two days and traffic in FH stand was good.	WWF, NoM, LUKE, MH_LP
In 2020 educators will be trained during the National Environmental Education Days.	Freshabit participated in organising a virtual outdoor learning conference 'Ulos on In' where ~400 participants participated in freshwater themed workshops and lectures presenting the work and materials produced in the project. The same recordings were utilised in Ulos on IN virtual event with also 400 participants in November 2021. These events were important venues to distribute materials and methods produced in FH to teachers and environmental educators. The event was planned as an grand F2F meeting in 2020 but unfortunately COVID 19 restrictions caused the cancellation of the event two years in a row. Therefore, the event was eventually held online. Delays and changes caused a lot of extra work and in the end the turnout in the virtual event was not as high as were the expectation for the live event.	MHLP
	13 lake school days for children (~255 attendees) and two nature evenings (~205 attendees) were organised 2016-2019. A podcast series called "Vesimerkillistä" was used to replace some of the live education events during the COVID19 pandemic. The podcast series included 8 1-hour-long episodes and three additional 20-minute extras. The series has been listened to ~900 times (3.11.2022).	LSPHä
A peatland restoration for one of the restoration hotspots in the Saarijärvi route with the help of the volunteers. (See modifications below)	A voluntary peatland restoration camp was organised in Pylkönmäki, Mäkelä, Lepikkokangas in 23.-24.8.2021. Despite COVID19 restrictions, the restoration camp was a success. Four dams were built in order to restore a peatland area with the help of 19 volunteers. The event was well covered in the local media. The structures have been monitored and they are fully functional.	JAMK

The results

Expected results	Achieved results	Status	Beneficiary responsible
A comprehensive manual explaining the Freshabit OEP. The manual will consist of 20-30 pages per version and there will be two versions (grades 5-6 and grades 7-9). The manual includes text and photos/ illustrations. The manual will be released in to different languages, one version in Swedish and one version in Finnish. The Swedish version will be printed in 20 copies and the Finnish version in 100 copies.	The manual “En djupdykning I sötvatten/ Syväsukellus makeaan veteen” was published in 6/2019 in Swedish and in Finnish. The manual includes activities for both grades 5-6 and 7-9. The manual is available as a printed version and online at NoM website. It includes a considerable web-based appendix with ready-to-use activity sheets and other educational materials. Four workshops organised on OEP material. Presentations of the project activities at five meetings/events.	Completed	NoM
A marketing brochure (1-2 sheets size A4) for the nature school days based on the Freshabit OEP. The brochure will be produced in two versions, one in Swedish (500 ex) and one in Finnish (2000 ex).	The brochure "Oletko valmis laittamaan itsesi likoon?/Redo att blöta ner dig? was published in 5/2019 in Swedish and in Finnish. It is available as a printed version and online at NoM website.	Completed	NoM
Nature school days for all the Swedish schools in high quality freshwater nature “classrooms” in the drainage areas of Kiskonjoki, Karjaanjoki and the Pohjanmaan joet. Including all pilot/ test groups we will arrange a total of 150 nature school days during the whole project period, reaching directly some 3100 youngsters and their teachers.	138 nature school days organised. 2480 people attended. 12 nature school days could not be organized du to covid-19 and were instead substituted with educational videos. Karjaanjoki river, Kiskonjoki river and Pohjanmaan joet rivers have been thoroughly mapped in order to find suitable freshwater nature “classrooms”.	Completed	NoM
One big marketing event at the EDUCA fair in Helsinki in early 2018.The environmental education actions of the Freshabit project will have a common exhibition stand.	Participated EDUCA FAIR in 25th and 26th of January 2019. Approx. 2000 educators visited the project fair department.	Completed	NoM, WWF, MH_LP, LUKE
Hundreds of summer camps organized by different organizations will be arranged every year in Finland and this project aims to reach as many of them as possible. Each camp has approximately 20-50 participants. These camp participants form the potential group of children and young people that will be reached by this project. Not all camps will use our material but in reality we expect several hundreds if not thousands camp participants to be reached each year. This will continue not only for a limited period but hopefully for many years to come because the materials produced can be used year after year. The material targeted for camps can be used in schools as well which will broaden the group of people that will be reached.	"Seikkailu veden valtakunnassa" camp material was published in 1/2019. Approx. 2900 copies of the learning material for children and youth camps have been distributed.	Completed	WWF
The mobile application will be designed to support the new national curriculum and therefore can be expected to be used frequently in schools. The application can be used by anyone outside schools as well and this way people of all ages can be reached regardless of location or other such factors. One expected result of this project is an increase in information in Järviwiki service. The mobile application will allow citizens to contribute to this database and this way help collect useful data on freshwater environments in Finland.	"Suuri rantaseikkailu" and "Vesistömysteeri" mobile application ready 8/2017. 39 teacher training sessions organised. Possibilities to use Järviwiki has been presented in 39 educator training sessions but it has not been possible to follow how much the use of the Järviwiki have increased because of this.	Completed	WWF
Vanajavesi: 4 sets of educational material on bird lakes, visitors to the Natura2000 sites are well-informed and inspired, guided tours with voluntary guides to the bird lakes	Bird watching event "100 lintua" was organised simultaneously in three project sites 5.5.2017. The attendees (about 100 pupils) were local elementary school classes. The attendees were also given educational material on each bird lake. 12 guided tours to project sites were organized for different audiences. Vanajavesi story map completed 2019. A video about restoration of lake Saarioisjärvi was completed in 2022.	Completed	VVK
Puruvesi: outdoor education package in role of eskers in water cycle, a free of charge guiding in Punkaharju for school visitors	"Ikivanha kiertolainen ja Jääjättiläisen hiekkakakku" - Nature education program for Puruvesi and Punkaharju areas	Completed	MH_LP
3000 leaflets will be distributed in workshops and through FANC local member associations	Maanomistajan vesiensuojeluvinkit leaflet 2017, printed 1500 copied, downloaded at least 80 times Maanomistajan suon ennallistamisvinkit leaflet 2018,	Completed	FANC

	printed 1500, downloaded at least 387 times		
200 guidebooks will be distributed in workshops and through FANC local member associations	Vesistöopas published 2017, printed 300, downloaded at least 2493 times	Completed	FANC
Approximately 20 people will participate every workshop organized by the ambassadors (FANC)	4 workshops 2017 and 2 workshops 2018 in Kyyjärvi 2 workshops 2018 in Saarijärvi	Completed	FANC
Approximately 200 persons will participate workshops organized by LSPKe ambassadors	Approximately 100 people participated	Completed	LSPKe
Approximately 70 volunteers will participate in peatland restoration events (LSPKe)	4 work camps organised in Central Finland, total of 160 working days and 110 persons participated.	Completed	LSPKe
Approximately 2 km2 of slightly ditched peatlands are restored by building dams in ditches (LSPKe)	2 km2 slightly ditched peatlands restored.	Completed	LSPKe
5 permanent and 15 temporary (1 month) information boards will be installed in nature sights (LSPKe)	5 permanent information boards and 8 temporary information boards installed.	Completed	LSPKe
Information of 40 important water or peatland habitats are gathered and published in internet (LSPKe)	Information of 40 important water or peatland habitats gathered.	Completed	LSPKe
Totally 60-90 volunteers will participate in river restoration events (LSPPo)	96 people participated in 7 restoration days: 2016 13 people 2017 6 people 2019 27 people 2020 12 people 2021 approx. 20 people + in fall 18 people for 2 days	Completed	LSPPo
Appr. 50-100 persons/year will participate Taimenpäivä –seminar (LSPPo)	2016, 2017, 2018 approx. 80 persons/year 2019 50 persons, not organised 2020-2021 due to COVID-19, but then again 2022 30 persons.	Completed	LSPPo
Puruvesi: Yearly Puruvesi days on the lake and shores for 3 local schools, mobile app on water protection measures, assessment of the values on Puruvesi	14 nature days (Puruvesipäivä) organised for 5th and 6th graders in Puruvesi. Due to COVID-19 Puruvesi days were cancelled in 2020 and 2021, but it was organised again in 2022. Mobile app on water protection measures is ready for open use. Assessment of the values on Puruvesi completed.	Completed	ProPuru
Lifecycle of a trout exhibition (Taimenen elinkierto)	Lifecycle of a trout exhibition (Taimenen elinkierto) completed in 2020 in Kellokas nature centre in Äkäslompolo	Completed	MH_LP
A peatland restoration for one of the restoration hotspots in the Saarijärvi route with the help of the volunteers.	A voluntary peatland restoration camp was organised in Pylkönmäki, Mäkelä, Lepikkokangas in 23.-24.8.2021	Completed	JAMK
Organising and hosting lake schools and nature evenings in Vanajavesi	Several lake schools and nature school evenings organised 2016-2019. Due to COVID-19 restrictions in 2020-2021 lake schools and nature evenings were replaced with a three episodes long podcast "Vesimerkillistä", which is about the mystery of water, water protection and freshwater nature in South-Häme.	Completed	LSPHä

Output

Deliverables

Code	Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable	Delivered
E7.1	A mobile application for teaching (WWF)	31.8.2017	15.8.2017	WWF	Suuri rantaseikkailu and Vesistömysteeri	IR2
E7.2	A marketing flyer of the mobile application (WWF)	31.8.2017	31.8.2017	WWF	Mobiilioppimateriaalilla rantaluonto tutuksi!	IR2
E7.3	Leaflet: Landowner's guide to the conservation of freshwater habitats (FANC)	30.9.2017	20.12.2017	FANC	Maanomistajan vesiensuojeluvinkit	IR2
E7.4	10 information boards (LSPKe)	31.12.2017	12.12.2017	LSPKe	Loppuraportti SLL Keski-Suomen hanketöistä	IR2
E7.5	Leaflet: Landowner's guide to wetland restoration (FANC)	30.9.2018	20.9.2018	FANC	Maanomistajan suon ennallistamisvinkit	IR2
E7.6	Manual of Freshabit OEP (NoM)	31.12.2018	31.5.2019	NoM	E7.6.1 En djupdykning i sötvatten E6.7.2 Syväsukellus makeaan veteen Annexes	IR2 FR

E7.7	Marketing broschure Freshabit OEP (NoM)	31.12.2018	31.12.2018	NoM	E7.7.1 Oletko valmis laittamaan itsesi likoon? E7.7.2 Redo att blöta ner dig?	IR2
E7.8	Camp material (WWF)	31.1.2019	20.1.2019	WWF	Seikkailu veden valtakunnassa	IR2
E7.9	Guidebook to Freshwater Biology (FANC)	30.9.2019	31.8.2017	FANC	Vesistöopas	IR1
E7.10	Education material for four bird lakes in Vanajavesi	30.9.2020	13.5.2019	VVK, MH_LP	Presentations of lakes Tykölänjärvi, Saarioisjärvi, Ahtialanjärvi and Hattelmalanjärvi, Vanajavesi story map	IR2
E7.11	Valuation assessment of Puruvesi completed	31.1.2021	12.10.2021	ProPuru	Puruveden taloudellinen arvo - Kiinteistöomaisuus ja vuotuiset vaikutukset	FR

Additional outputs

Code	Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable	Delivered
E7.12	Outdoor education package	NEW	21.12.2017	MH_LP	Ikivanha kiertolainen ja Jääjättiläisen hiekkakakku - Ympäristökasvatusohjelma Puruveden ja Punkaharjun maisemissa	IR2
E7.13	Freshwater themed study group	NEW	31.12.2020	FANC	Vesistöaiheinen opintopiiri	FR
E7.14	Freshwater activity book	NEW	31.12.2020	FANC	Vesistölähettilään tehtävävihko	FR

Milestones

Milestone	Foreseen date in GA	Actual date	Beneficiary responsible
WWF Pilot schools searched and chosen	31.5.2016	30.6.2016	WWF
OEP, first draft version (in Swedish) (NoM)	31.8.2016	31.8.2016	NoM
WWF Mobile application pilot started	31.8.2016	31.10.2016	WWF
Draft of Guidebook to Freshwater Biology (FANC)	30.9.2017	31.8.2017	FANC
Information of 40 water or peatland habitats published in internet (LSPKe)	30.9.2017	30.9.2017	LSPKe
WWF Mobile application ready	30.9.2017	15.8.2017	WWF
OEP, second draft (in Swedish) (NoM)	30.11.2017	28.11.2017	NoM
WWF Children and youth camp material first draft	31.5.2018	15.5.2018	WWF
WWF Children and youth camp material printed	31.1.2019	20.1.2019	WWF
EDUCA fairs attended	31.1.2019	27.9.2019	MH_LP

Continuation of the action after the project

Freshwater ambassadors material and the working model will be utilized and updated in upcoming projects. They will be useful in facilitating citizen participation in the water management planning round. The Guidebook to Freshwater Biology (E7.9), and other material will be available in FANC website at least five years after the end of the project.

The mobile learning materials (E7.1) and camp leader guide (E7.8) will be available in WWF learning material bank and MAPPA material bank after the project.

OEP will be actively and continuously utilized in all nature schools of NoM. The freshwater theme days will be part of the standard product palette offered to schools within the activity areas of NoM nature schools. Continuation of already established cooperation with schools in the project river drainage areas will be of high priority, but it will also be important to reach new schools in the vicinity. OEP will also be marketed widely to new possible users in whole Finland. Training workshops will be offered as a product also in the future. All project material will be republished and held freely available for at least 5 years after the project. Freshwater themed nature school days will be a permanent part of the NoM nature school programme after the project.

Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification

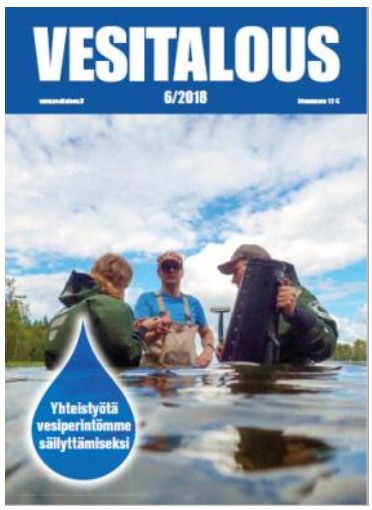
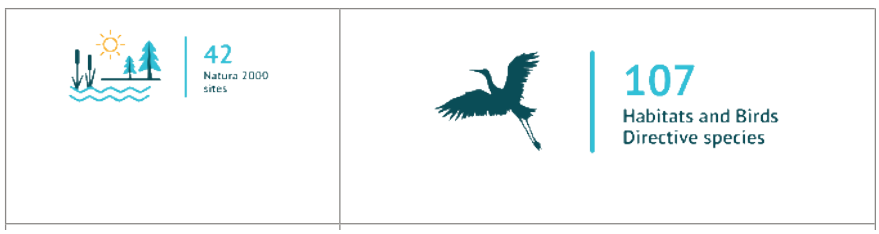
Because of the restrictions caused by the corona virus, in spring 2020 the school buildings in Finland were closed and gatherings with more than 10 people are forbidden. NoM was not able to organize nature school days for school classes.	40 nature school days will be organised in 2020.	Instead of 12 nature school days five 1-5 min education videos (for teachers and pupils doing distance learning from home. In the videos chosen parts of the the Outdoor education programme (OEP) will be utilised. Some nature school days transferred to autumn 2020 and year 2021?		23.4.2020 email from monitor Sonja Jaari confirming the approval of EASME (Sarunas Zableckis)
A peatland restoration for one of the restoration hotspots in the Saarijärvi route with the help of the volunteers.	-	A peatland restoration for one of the restoration hotspots in the Saarijärvi route with the help of the volunteers.	Extra peatland restoration in the Saarijärvi route	Agreement from Sarunas Zableckis from EASME by email 5.1.2021.

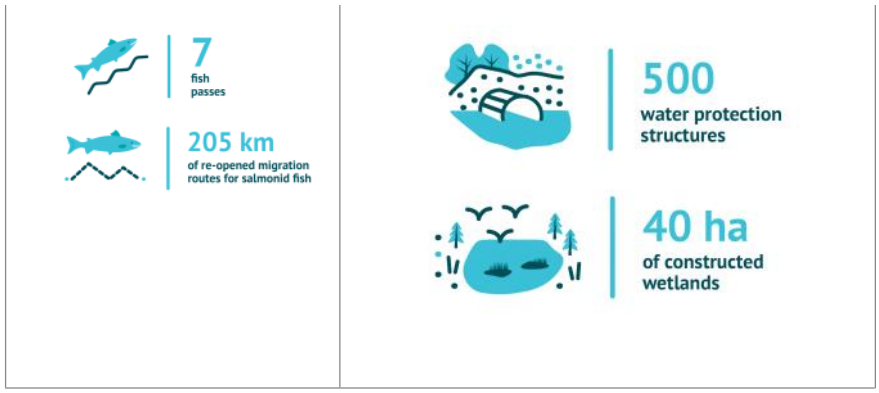
ACTION E.8: Technical publications on project

Beneficiary responsible for the implementation:	MH_LP
Other beneficiaries involved:	ESAELY, LUKE, OU, SMK, VARELY
Foreseen start date: Jan 1st 2016	Actual start date: Jan 1st 2020
Foreseen end date: Sept 30th 2022	Actual end date: Sept 30th 2022

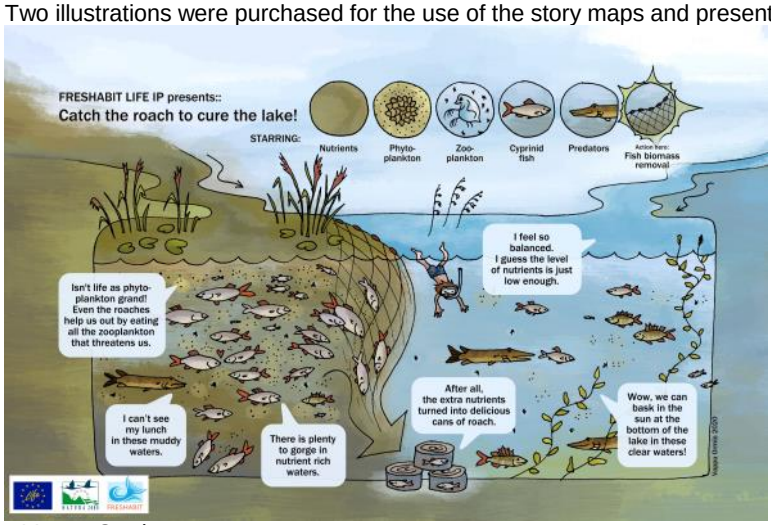
This action focused on final conclusions to be drawn and publishing them as articles, reports or national guidance. Please note, that some of the publications have been made under other Actions, and are listed here only as reference. The logic in the application phase was that data is collected in the respective Actions and the technical publications are produced under E8, but that logic was not followed consistently. Thus some reports listed here have been produced under other Actions, which can be seen in the deliverable numbering. Our intention was not at any stage to publish same results twice.

The activities

As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
This action is for beneficiaries to prepare their technical publications for stakeholders, articles for newspapers, and other writings for e.g. social and printed media. Several beneficiaries working in the areas will produce various kind of articles, newsletters on the results of the project.	In addition to 22 scientific articles published based on data gathered in Freshabit, there has been two Freshabit theme issues in Vesitalous magazine, in 2018 and 2022. Vesitalous is a leading magazine for professionals in water sector.  See information on newspaper articles in Action E1.	All
This actions also includes the layout, pictures, drawings, translations and printing cost of the key publications.	Several visualizations have been drawn to illustrate the key figures and results of the projects in different communication channels. Here are some examples:  	Several



Two illustrations were purchased for the use of the story maps and presentations.



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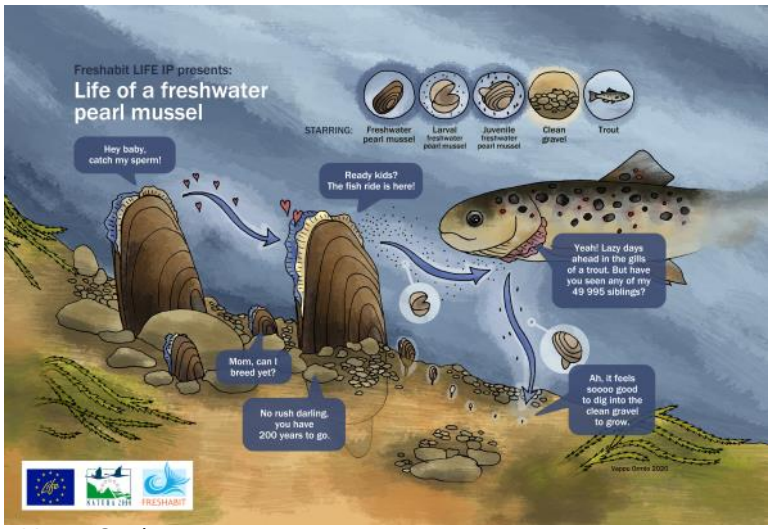

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National guidance with practical recommendations for monitoring and mapping of stream and lake restoration measures.	A10.5 National guidance with practical recommendations for monitoring stream and lake restoration measures - lessons learned in Freshabit-project - An article prepared by 09/2022 and to be published in 12/2022.	SYKE
The practical guide for multi-stakeholder planning, implementation and monitoring of catchment area management with special focus on Natura 2000 values.	A10.2 Integrated multi-stakeholder planning for catchment area management of N2000 areas – lessons learned in Freshabit-project - Report of Finnish Environment Institute published in 9/2022. E1.1.3 Policy brief Miten Natura 2000 -alueet huomioidaan vesistö- ja valuma-aluekunnostuksissa? Toimintamalli tukee suunnittelussa.	SYKE

The results

Expected results	Achieved results	Status	Beneficiary responsible
Articles and reports of project results at project	Two theme issues in the national Vesitalous magazine for freshwater resource management, including altogether 16 articles about Freshabit, 6/2018 (9	Completed	Several, Luke, SMK,

areas	articles), and 6/2022 (7 articles). In addition 22 scientific articles published by the end of the project: • Poikolainen, L., Pinto, G., Vihervaara, P., Burkhard, B., Wolff, F., Hyytiäinen, R. & Kumpula, T. (2019) GIS and land cover-based assessment of ecosystem services in the North Karelia Biosphere Reserve, Finland. Fennia 197(2) 1–19. Nr. 2, S. 249–267. DOI: https://dx.doi.org/10.11143/fennia.80331 • Heino, J., Alahuhta, J., Bini, L.M., Cai, Y., Heiskanen, A.-S., Hellsten, S., Kortelainen, P., Kotamäki, N., Tolonen, K.T., Vihervaara, P., Vilmi, A. and Angeler, D.G. (2021), Lakes in the era of global change: moving beyond single-lake thinking in maintaining biodiversity and ecosystem services. Biol Rev, 96: 89-106. https://doi.org/10.1111/brv.12647Online, • Karppinen P, Hynninen M, Vehanen T, Vähä J-P. Variations in migration behaviour and mortality of Atlantic salmon smolts in four different hydroelectric facilities. 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The Science of the Total Environment, 762, 144098, ISSN 0048-9697, https://doi.org/10.1016/j.scitotenv.2020.144098. • Rajakallio, M, Jyväsjärvi, J, Muotka, T, Aroviita, J. Blue consequences of the green bioeconomy: Clear-cutting intensifies the harmful impacts of land drainage on stream invertebrate biodiversity. J Appl Ecol. 2021; 58: 1523– 1532 https://doi.org/10.1111/1365-2664.13889 • Menberu, M. W., Marttila, H., Ronkanen, A.-K., Haghighi, A. T., & Kløve, B. (2021). Hydraulic and physical properties of managed and intact peatlands: Application of the van Genuchten-Mualem models to peat soils. Water Resources Research, 57, e2020WR028624. https://doi.org/10.1029/2020WR028624 • Lauren, A.; Guan, M.; Salmivaara, A.; Leinonen, A.; Palviainen, M.; Launiainen, S. NutSpaFHy—A Distributed Nutrient Balance Model to Predict Nutrient Export from Managed Boreal Headwater Catchments. Forests 2021, 12, 808. https://doi.org/10.3390/f12060808 • Lehtoranta,V. & Louhi, P. 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	K. Heikkinen, M. Saari, J. Heino, A.-K. Ronkanen, P. Kortelainen, S. Joensuu, A. Vilmi, S.-M. Karjalainen, S. Hellsten, M. Visuri, H. Marttila, Iron in boreal river catchments: Biogeochemical, ecological and management implications, Science of The Total Environment, Volume 805, 2022, 150256, ISSN 0048-9697, https://doi.org/10.1016/j.scitotenv.2021.150256. Tienhaara, A., Lankia, T., Lehtonen, O. & Pouta, E. Heterogeneous preferences towards quality changes in water recreation: Latent class model for contingent behavior data, Journal of Outdoor Recreation and Tourism,Volume 35, 2021, 100386, ISSN 2213-0780, https://doi.org/10.1016/j.jort.2021.100386. • Jani Heino, Jorge García Girón, Heikki Hämäläinen, Seppo Hellsten, Jari Ilmonen, Juha Karjalainen, Teemu Mäkinen, Kristiina Nyholm, Janne Ropponen, Antti Takolander, Kimmo T. Tolonen. Assessing the conservation priority of freshwater lake sites based on taxonomic, functional and environmental uniqueness. Diversity and Distributions, 28, 1966– 1978. https://doi.org/10.1111/ddi.13598 • Turunen, J, Elbrecht, V, Steinke, D, Aroviita, J. Riparian forests can mitigate warming and ecological degradation of agricultural headwater streams. Freshw Biol. 2021; 66: 785– 798. https://doi.org/10.1111/fwb.13678 • Benito X, Vilmi A, Luethje M, Carrevodo ML, Lindholm M and Fritz SC (2020) Spatial and Temporal Ecological Uniqueness of Andean Diatom Communities Are Correlated With Climate, Geodiversity and Long-Term Limnological Change. Front. Ecol. Evol. 8:260. https://doi.org/10.3389/fevo.2020.00260 • Heino, J., & Koljonen, S. (2022). A roadmap for sustaining biodiversity and ecosystem services through joint conservation and restoration of northern drainage basins. Ecological Solutions and Evidence, 3, e12142. https://doi.org/10.1002/2688-8319.12142 • Morris, P. J., Davies, M. L., Baird, A. J., Balliston, N., Bourgault, M.-A., Clymo, R. S., et al. (2022). Saturated hydraulic conductivity in northern peats inferred from other measurements. Water Resources Research, 58, https://doi.org/10.1029/2022WR033181 • Menberu, M. W., Marttila, H., Ronkanen, A.-K., Haghighi, A. T., & Kløve, B. (2021). Hydraulic and physical properties of managed and intact peatlands: Application of the van Genuchten-Mualem models to peat soils. Water Resources Research, 57. https://doi.org/10.1029/2020WR028624		
Key reports: National guidance with practical recommendations for monitoring and mapping of stream and lake restoration measures and the practical guide for multi-stakeholder planning, implementation and monitoring of catchment area management with special focus on Natura 2000 values	A6.4 Ilmonen, J., Hellsten, S., Kuoppala, M., Suonio, M. & Vertio, L. 2022. Laaksonen, M., A line survey method for submerged vegetation in lakes. Background, results, and quidance for field work. Report, 19 pp. A10.5 National guidance with practical recommendations for monitoring stream and lake restoration measures - lessons learned in Freshabit-project - An article prepared by 09/2022 and to be published in 12/2022. A10.2 Integrated multi-stakeholder planning for catchment area management of N2000 areas – lessons learned in Freshabit-project - Report of Finnish Environment Institute published in 9/2022. E1.1 Policy brief Miten Natura 2000 -alueet huomioidaan vesistö- ja valuma-aluekunnostuksissa? Toimintamalli tukee suunnittelussa	Completed	SYKE
Increase in stakeholders and public awareness towards conservation of N2000 sites	On the Natura 2000 day 21.5.2021 we had a social media campaign. Altogether 13 beneficiaries made 21 posts on social media.	Completed	All

Output

Deliverables

Code	Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable	Delivered
E8.1	The practical guide for multi-stakeholder planning, implementation and monitoring of catchment area management with special focus on Natura 2000 values	31.5.2020	30.9.2022	SYKE	A10.2 Integrated multi-stakeholder planning for catchment area management of N2000 areas – lessons learned in Freshabit-project - Report of Finnish Environment Institute published in 9/2022. E1.1 Policy brief Miten Natura 2000 - alueet huomioidaan vesistö- ja valuma-aluekunnostuksissa? Toimintamalli tukee suunnittelussa	FR A10.2 FR E1.1
E8.2	National guidance with practical	31.8.2022	30.9.2022	SYKE	A10.5 National guidance with	FR

	recommendations for monitoring and mapping of stream and lake restoration measures				practical recommendations for monitoring stream and lake restoration measures - lessons learned in Freshabit-project - An article prepared by 09/2022 and to be published in 12/2022.	
E8.3	Report of mussel surveys conducted in Rivers Kiskonjoki and Karvianjoki	30.9.2022	20.1.2018	VARELY	Jokihelmisimpukan ja vuollejokisimpukan nykytilan selvitykseen sekä raakkujen siirtoon liittyvät työt Kiskonjoella ja Karvianjoella vuosina 2016 ja 2017	FR
E8.4	At least 25 articles prepared for the results of the actions in the project areas	30.9.2022	30.9.2022	MH_LP, SYKE, Luke, SMK	See the list above in Expected results	FR
E8.5	At least 15 articles prepared for media by core beneficiaries	30.9.2022	30.9.2022	MH_LP, SYKE, Luke, SMK	Two theme issues of Vesitalous magazine 6/2018 and 6/2022.	IR2,FR

Continuation of the action after the project

Several articles based on the data gathered in Freshabit will be published after the end of the project.

Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification
The practical guide for multi-stakeholder planning, implementation and monitoring of catchment area management with special focus on Natura 2000 values	DL 31.5.2020	DL 30.9.2022	No significant impact because of the delay.	-

ACTION E.9: Layman´s report

Beneficiary responsible for the implementation:	MH_LP
Other beneficiaries involved:	
Foreseen start date: Jan 1st 2022	Actual start date: Jan 1st 2022
Foreseen end date: Dec 31st 2022	Actual end date: Jan 27th 2023

The activities

As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
The Layman's report will present the project, objectives, actions and the key results. The report (10–15 pages) will be produced both in paper and electronic form at the end of the project in 9/2021. It will be printed in Finnish and English. Edition of 500 printed copies (250 copies each language) of the report will be distributed and the electronic version of the report will be made available at the project website. We will use the material produced in the other actions of the project as the main source for Layman´s report.	A new story map presenting the whole Freshabit LIFE IP project was published in 9/2020 In Finnish and English. It was updated in the end of the project and it will serve as the Layman's report. The story map was in active use in our communications already during the final years of the project. The Layman's report will not be printed as agreed with EASME/CINEA, but a PDF version is a deliverable of this project and delivered as annex 2.	MH_LP

The results

Expected results	Achieved results	Status	Beneficiary responsible
500 printed copies of Layman's report will be distributed and an electronic version of the report will be made available on the project's website.	The electronic and PDF versions are available online both in Finnish and English.	Completed	MH_LP

Output

Deliverables

Code	Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable	Delivered
E9.1	Layman's report	30.9.2022	30.9.2022	MH_LP	Freshabit LIFE IP -Healing the Kingdom of Water https://storymaps.arcgis.com/stories/e095a44309a347f1bb504c22a763a99d Freshabit LIFE IP - Veden valtakunnassa tapahtuu https://storymaps.arcgis.com/stories/0493dc50dfc34862bf18fe2c9ce1b03a	FR

Continuation of the action in the third phase and after the project

The Layman's report will be used in communications of Freshabit project results after the project.

Modifications (action and/or budget)

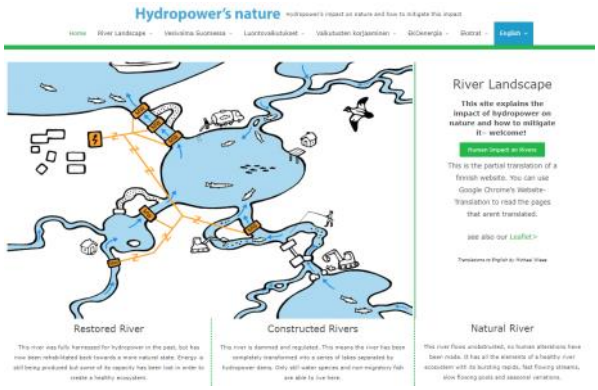
Description/justification	Before modification	After modification	Impact of the modification	Communication about modification
Layman's report will be distributed as an electronic version and not printed	500 printed copies of Layman's report will be distributed and an	An electronic version of the Layman's report will be made available on the	Less paper waste	E-mail agreement from Sarunas Zableckis 1.12.2020

	electronic version of the report will be made available on the project's website.	project's website.		

ACTION E.10: Information related to the fish passages

Beneficiary responsible for the implementation:	FANC
Other beneficiaries involved:	
Foreseen start date: 1.1. 2016	Actual start date: 1.1.2016
Foreseen end date: 31.12.2021	Actual end date: 31.12.2021

The activities

As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
We concentrate on pre-marketing, communication and producing the material for the fish pass seminar organized in Action A8. After the seminar, we will use its outcomes to develop our communication even further.	The marketing of Fish Passage Seminar (2018) was successful resulting 80 participants in situ and more on-line. The outcomes were shared via FANC and EKOenergy media channel, leaflets and information material.	FANC
We will create the layout and visual design for the website, which will be produced in Action A8. After launching the website, we will market it via the Internet and EKOenergy contact groups.	We have produced the website on hydropower's impacts on nature and consumers´ possibilities to reduce them. The summary pages have been translated into English. The website has been promoted on the websites of FANC and EKOenergy. (E.g. banner on the front page of www.ekoenergy.org, between 25,000 and 50,000 visitors per month), the social media of EKOenergy and FANC, in various leaflets (e.g. "Hyvä tietää vesivoimasta" - "Good to know about hydropower") and in publications of other organisations, e.g. Vesitalous-magazine 4/2018. A leaflet about the impact of hydropower and consumers´ possibilities to reduce them was designed. A map was published to present the projects financed through the River Restoration Fund. 75 meetings with large consumers, energy companies and sustainability consultants were organised to discuss the involvement of energy consumers in river restoration.  *The website has been produced on hydropower's impacts on nature and consumers´ possibilities to reduce them.*	FANC
We will write articles on the river restoration projects that are funded by EKOenergy to Suomen Luonto and Luonnonsuojelija magazines. We will also actively use social media to communicate.	• Several articles published about the projects funded by ECOenergy. • 5 leaflets about the projects funded from the River Restoration Fund published • Several articles published in the social media channels • Please see expected results for details	FANC
We will create the layout and design for visible and popularized campaign	• The public communication campaign in phase 2 reached less audience than expected. To reach wider audiences, a new public communication	FANC

material (content created in Action A8) and advertisement material for it to engage the public. This will be done through the active use of social media and free media coverage. The active communication will continue throughout the whole project, but the main public communication campaign will be done during summer 2018.	campaign called Vapauta virrat" ("Set the streams free") was launched in 2021. It utilized FANC's social media channels and widely read membership magazine "Luonnonsuojelija". The campaign page has had 21 056 visitors. The campaign was supported with 10 webinars on freshwaters, rivers and hydropower. The new campaign quickly achieved the visibility targets in terms of total viewers and individual publications. According to coverage data, the postings in March 2021 reached some 300 000 users in Facebook, over 100 000 in Twitter and 280 000 in Instagram. In addition, press releases on rivers and hydropower were published actively. See highlights listed below in Expected results.  • A brochure called "Hyvä tietää vesivoimasta" (Good to know about hydropower) was published in 7.11.2018. The brochure or corresponding contents and postings were disseminated in seminars, meetings and via web. • Several articles published. (See Expecter results) • Active communication on EKOenergy's social media: Facebook, Twitter, Linkedin and Instagram	
To get reliable information on consumers´ raising interest, we will track the monthly appearance of key words, such as "fish passages", "fish migration" and "EKOenergy", before and after the campaign for two months. We will use the media tracking service used by the Finnish Association for Nature Conservation to track the media hits on the key words of the campaign.	This indicator did not function as expected. No remarkable result in search results. These words hardly appear in google search analytics. We did learn that setting such an indicator to monitor in general media space is too general and unfocused. It is impossible to specify what was the impact of the Freshabit project or EKOenergy to the search result.	FANC

The results

Expected results	Achieved results	Status	Beneficiary responsible
Clear increase in people's awareness towards EKOenergy	Indicators: • Between 10 000 and 15 000 unique visitors on our website per month • 12 new authorised sellers in 2021 and (so far) 16 new authorised sellers in 2022.	Completed	FANC
At least 4 publications per year in Finnish consumers'	2016 • Suomen luonto 7/2016, Taimen ei hävinnytkään 2017	Completed	FANC

websites and/or magazines of electricity suppliers.	• Elämä ja Energia 2017 • Suomen luonto 3/2017, Kosken kupeella 2018 • Luonnonsuojelija 2/2018, Tietopaketti vesivoimasta • Luonnonsuojelija 4/2018, Vangitut virrat + Mitä on EKOenergia-merkitty vesivoima • Vesitalous 6/2018, Tunnetaanko vesivoiman luontovaikutukset • Suomen luonto 6/2018, Ojasta allikkoon • Suomen luonto 7/2018, Vastavirtaan • Suomen luonto 8/2018, Toivoa sukupuuton partaalle • Ekoenergian Ympäristörahasto uudistuu Virtavesirahastoksi, spring 2019 • FEE Suomi verkkolehti 2/2018: Vesivoiman luontovaikutukset paketoitiin verkkosivuksi 2019: • Nordic Green Energy, spring 2019: Ekoenergian Ympäristörahasto uudistuu Virtavesirahastoksi • Loiste Energia verkkolehti 4.4.19: Vihreämpi sähkösopimus on ympäristöteko 2020 • Luonnonsuojelija 2/2020: Muotokuvat pinnan alta • Luonnonsuojelija 2/2020: Ryhdy vesistölähettiläälksi • Luonnonsuojelija 2/2020: Iijoki murtaa padot 2021 • Luonnonsuojelija 1/2021: Sydämessä virtaa • Luonnonsuojelija 1/2021: Matarinkoski kuohuu huolet pois • Luonnonsuojelija 1/2021: Vapauta virrat! • Luonnonsuojelija 1/2021: Hätähuudot vaelluskalojen tilasta ohitettu • Luonnonsuojelija 1/2021: Kahlittu Kemijoki • Luonnonsuojelija 1/2021: Kalatalousvelvoitteet kuntoon! • Luonnonsuojelija 1/2021: Virran vaellus -peli • Luonnonsuojelija 1/2021: Virtaavan veden todellinen helmi • Luonnonsuojelija 1/2021: Virrat veivät mennessään • Luonnonsuojelija 1/2021: Matti rintala löysi Turkimusojan raakut • Luonnonsuojelija 1/2021: Pula-ajan luvat • Luonnonsuojelija 2/2021 Vesilaki vuotaa • Luonnonsuojelija 2/2021 Virtavedet kunnan agendalle • Luonnonsuojelija 2/2021 Vesien vaeltajat • Luonnonsuojelija 3/2021 Kuohuva paratiisi – Luonto palasi Markus Penttisen punaiselle myllylle • Luonnonsuojelija 3/2021 Maijalanojalla rakennetaan lisääntymisalueita taimenelle		
At least 100,000 viewers in total for our web publications by the end of the campaign in June 2018. At least 15,000 viewers per individual publication, but we try to achieve more than 40,000 viewers per publication.	Since the campaign period was slightly postponed, a coverage check was done in 10.6.2019: • In social media (Facebook) the coverage of postings was almost 120 000, of which some 72 000 in FANC fb and 48 000 in EKOenergy site. Only 2 postings of 18 reached over 15 000 viewers. • In print media, the total distribution of articles was 106 300 • In web articles or similar, the total number of articles read/videos watched was 11 500. EKOenergy's own social media in 2020 and 2021: more than 70 posts with in total at least 30,000 impressions. See list at https://docs.google.com/spreadsheets/d/1ihUoC3e7MkUkUV4s7gHCy5FTSUHBYtnvIWJScwzTn4M/edit?usp=sharing Visitors on EKOenergy's Frehabit related website: • https://www.vesivoimanluonto.fi/ 7678 page views in 2018 and 6781 page views in 2019 • https://www.ekoenergy.org/our-results/environmental-fund/ Page views in 2017: 347 / Page views in 2018 1100 (424 for FI; 360 for EN) / Page views in 2019 = 2500 (423 for FI; 933 for EN; 323 for ES) • Regular mentioning in our own Newsletter (1980 subscribers – mainly representatives of energy companies) To boost the supply of EKOenergy-labelled hydropower with demand, we focused on direct contacts with large energy consumers (such as big companies), energy sellers and with energy consultants instead of	Completed	FANC

small households. We believe this paves a way for also small households who want to by EKOenergy-labelled hydropower.

A new campaign was launched in March 2021 under the title “Vapauta virrat” (“Set the streams free”), with following highlights:

- 1.3.2021 Luonnonsuojelija Magazine was published, a special issue dedicated to rivers and hydropower https://issuu.com/luonnonsuojeluliitto/docs/ls_1_2021
- 2.3.2021 Campaign #vapautavirrat in social media was launched (FANC’s Facebook, Twitter and Instagram) and also the website was published https://www.sll.fi/vapauta-virrat/
- 23.3.2021 Campaign day (and week) dedicated to river Kemijoki in social media and in web https://www.sll.fi/vapauta-virrat/vapauta-kemijoki/
- 8.4.2021 Campaign day dedicated to state-owned hydropower I: responsibility policy
- 28.4.2021 Campaign day dedicated to state-owned hydropower II: fish migration needed to power plants https://www.sll.fi/2021/04/28/fortumin-vesivoimalat-ilman-kalateita/
- 5.5.2021 Campaign day dedicated to Iijoki river https://www.sll.fi/vapauta-virrat/vapauta-iijoki/
- 22.5.2021 Campaign day dedicated to Eurajoki river, with participation to paddling event and expert panel https://www.sll.fi/2021/05/20/vapauta-eurajoki/
- During the summer an easy-to-understand package to laymen in social media about rivers, fish and hydropower, 6 postings
    - Padottu joki estää vaelluskalan matkan
    - Virtavesiä ovat joet, purot ja norot
    - Aiemmin täysin perattu ja padottu joki oli miltei kuollut
    - Tippavoimalat ovat vesivoimaloista pienimpiä
    - Padot eivät aiheuta ongelmia vain kalojen nousulle
    - Kuivalla maalla ei voi kutea
- 6.-7.8.2021 Sieriniemi rowing event in river Kemijoki
- 20.9.2021 Campaign day dedicated to river Vantaa
- September: Five myths about hydropower https://www.sll.fi/2021/09/21/5-myyttia-vesivoimasta/
- 13.10.2021 Campaign day dedicated to Oulujoki river https://www.sll.fi/vapauta-virrat/vapauta-oulujoki/

The new campaign quickly achieved the visibility targets in terms of total viewers and individual publications. According to coverage data, the postings in March 2021 reached some 300 000 users in Facebook, over 100 000 in Twitter and 280 000 in Instagram. In addition, press releases on rivers and hydropower were published actively.

The campaigning for rivers also included webinars targeted to active FANC members. Ten webinars in the spring of 2021 covered a wide range of issues about freshwaters, rivers and hydropower from the very basics (incl. Freshwater Ambassadors and Hydropower’s Nature) to relatively complicated issues such as how to promote environmental flows and fish migration in river basin management plans. In each webinar there were approximately 30-50 participants. The webinars were recorded.

Output

Deliverables

Code	Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable	Delivered
E10.1	4 articles in Suomen Luonto and Luonnonsuojelija about the river restorations that EKOenergy Finances: one article in Suomen Luonto (in 2017) and three articles in Luonnonsuojelija (in 2016, 2016, and 2018 respectively)	31.12.2018	31.12.2018	FANC	Suomen Luonto (distribution 26 000): E10.1.1 Taimen ei hävinnytkään 7/2016 E10.1.2 Kosken kupeella 3/2017 E10.1.3 Ojasta allikkoon 6/2018 E10.1.4 Vastavirtaan 7/2018 E10.1.5 Toivoa sukupuuton partaalle 8/2018 Luonnonsuojelija (distribution 30 000): E10.1.6 Erään joen tarina 2/2016 E10.1.7 Virtavesien vaalija 3/2016	IR2

	(31.12.2018)				E10.1.8 Tietopaketti vesivoimasta 2/2018 E10.1.9 Vangitut virrat + Mitä on EKOenergia-merkitty vesivoima 4/2018 E10.1.10 Vesivoimalle uudet ympäristövaatimukset 1/2019 E10.1.11 Suojelutyö luo toivoa 4/2019	

Milestones

Milestone	Foreseen date in GA	Actual date	Beneficiary responsible
Material to be used in fish pass seminar (organized in Action A8) ready	10.6.2017	6.10.2017	FANC
Launching the public communication campaign	30.6.2018	3.4.2018	FANC
5-10 presentations of EKOenergy at specialized seminars (in the fish sector, in the hydropower sector and in the renewable electricity sector)	30.9.2021	31.12.2018	FANC
The design and layout for the A8-website finished: with content from Action A8 task 3 (31.11.2017) and task 2	1.6.2018	3.4.2018	FANC
At least 100,000 viewers (or at least 15,000 viewers per main publication) for our web publications by the end of the campaign	15.7.2018	1.6.2019	FANC
20-30 yearly meetings with private and state owned companies whose electricity consumption is over 5-10 GWh per year	30.9.2021	31.12.2021	FANC

Continuation of the action after the project

EKOenergy label has stable income and is not reliable on external funding. EKOenergy is an environmental label for renewable energy, including wind, solar, hydropower and other renewable sources. The new hydropower criteria and information packages will be further used and disseminated by EKOenergy.

The national and international recognizability and visibility of our ecolabel continues to grow. To attract more energy consumers, we continue to explain the difference between non-ecolabelled and ecolabelled energy and communicate about our concrete results.

We will continue to use the materials developed during this project. They have been written in such a way that they are not very time-sensitive. They will be of use for many more years.

“Vapauta virrat” campaign received small funding from a national outdoor shop (Ympäristöbonus, Partioaitta), which will allow us to continue the work, and build on the experiences of the past years.

Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification

ACTION F.1: Project management

Beneficiary responsible for the implementation:	MH_LP (SYKE, LUKE, SMK)
Other beneficiaries involved:	All
Foreseen start date: Jan 1st 2016	Actual start date: Jan 1st 2016
Foreseen end date: Sept 30th 2022	Actual end date: Sept 30th 2022

The activities

As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
Project management in the coordinating beneficiary The coordinating beneficiary (MH) will be in charge of the management of the project (administrative, technical and financial aspects) and of fulfilling the LIFE-IP reporting obligations. The project will be coordinated by a full-time project manager to be recruited by MH.	The learning curve in project management has been steep. In the beginning of the project, IP's were a new concept and the guidance a bit vague causing few bumps in the start. But during the project we developed new and more effective ways to manage a big project e.g. online reporting templates, tours to meet beneficiaries face to face and comprehensive guidelines. In the end, MHLP received a lot of praise for excellent project management from the beneficiaries. There has been three competent project managers in Freshabit. Pauliina Louhi from the beginning of the project until April 2018. Viliina Evokari until the end of 2021 and finally Jari Ilmonen who has worked as a freshwater specialist in FH until the end of the project. Evokari have assisted in project management and reporting also in 2022. In addition, in the beginning of 2019 a planner was hired to assist in project management and reporting.	MH_LP
Project Management Core Team Each stakeholder has either full-time or part-time project manager carrying out the proper implementation of FRESHABIT objectives, monitoring the progress of the project, reporting activities and financial matters to the Project Steering Committee and to the Commission. The Core Team will have monthly meetings to ensure the efficient communication and progress among major stakeholders in project.	The Project Management Core Team was set up of representatives of MH, SYKE, LUKE and SMK. The core team has had monthly meetings altogether 65 times. Each member organisation of core team had either full-time (MH) or part-time (SYKE, LUKE, SMK) project manager carrying out the proper implementation of FRESHABIT objectives, monitoring the progress of the project, reporting activities and financial matters to the Project Steering Committee and to the Commission.	MH_LP, SYKE, LUKE, SMK
Project Steering Committee The project steering committee will convene once each year.	The project steering committee consisted of representatives of most relevant ministries, from each of the organizations in core group and target areas, and national stakeholders. Stakeholders have shown great interest towards Freshabit project and we had no difficulties in setting up the steering committee. This committee has been established in Action F2, and has met once or twice in each year (total 10 times). Also, a field visit was organised for steering group members to Vanajavesi target area in May 2019.	MH_LP
Regional Steering Committees and Management Teams The Regional Steering Committees (8 pcs) will be established in each project region to ensure the fulfilling of project objects at the regional level. The regional steering committees will convene once each year.	Each region (8 pcs) established their own Regional Steering Committee in Action F2 to ensure the fulfilling of project objects at the regional level. The meetings have been held annually 1-3 times in each region according to ones needs, and they have discussed otherwise similar topics than the Project Steering Committee, but within their own region. Regional steering committees consist of regional associated beneficiaries, and other relevant regional authorities, universities, major regional co-financers for LIFE-IP itself and complementary projects. The 1-2 representatives of core team have also regularly taken part to the meetings of Regional Steering Committees.	MH_LP, EPOELY, VARELY, LUVY, VVK, SYKE, ESAELY, POKELY
Regional Management Teams	Most of the regions also had their own Regional Management	MH_LP,

The Regional Management Teams (8 pcs) will be established in each project region to ensure the correct implementation of project objects at the regional level.	Team, to ensure the correct implementation of project objects at the regional level. These groups were led by designated AB in each region, and it consisted of regional AB´s. Each region nominated a part-time or full-time regional coordinator to have the main responsibility of running regional management teams and to assure the smooth communication among local stakeholders and to the CB.	EPOELY, VARELY, LUVY, VVK, SYKE, ESAELY, POKELY
Management of Complementary Projects The Management of Complementary projects will be carried out by Regional Management Teams.	The management of regional complementary projects was done jointly with all beneficiaries. Each beneficiary has the responsibility on continuity of complementary projects, and that they will also contribute importantly towards the full implementation of the PAF. The information of complementary projects was maintained by the coordinating beneficiary. In 2020 a new national funding habitat programme HELMI was established. Freshabit has been actively involved in preparing the stream section. (see Action F6).	MH_LP
Thematic Working Groups Thematic Working Groups will be established around widely distributed topics governing most concrete actions. These topics have been recognised to be: i) communication and education, ii) environmental models and monitoring, iii) mapping, iv) stream restoration (including actions involved with freshwater pearl mussel), v) water basin restoration, and vi) bird wetland habitat restoration.	Thematic working groups are highly important in bonding together all 8 regions as one large LIFE IP-project. Thematic Working Groups was established around i) communication and education, ii) environmental modelling and river basin (catchment) restoration, iii) environmental and socioeconomic monitoring, iii) inventory of lakes and streams, iv) stream habitat restoration (including actions involved with freshwater pearl mussel), and vi) bird wetland habitat restoration. Each of these group has met at least twice a year, and some of them even more often depending on actions needed. Depending on the time scale of the actions some of the theme groups did not need to convene in phase 3.	MH_LP

Annual project meeting gathered 51 people to Summassaari in April 2019.

The results

Expected results	Achieved results	Status	Beneficiary responsible
The project will progress according to the planned timetable and achieve its assigned accomplishments. All reports will be delivered in time. The project administration is of a high quality, cost-effective and sound. The project will advance the other national and Union funding, and this will give birth to numbers of complementary projects supporting the main aims of FRESHABIT.	There were major challenges with the financial reporting in the beginning but we have overcome the obstacles. Overall, the reporting of Freshabit have went well though it has been laborious. Success story in complementary funding which is 230 million euros at the moment. See action F6.	Completed	MH_LP

Output

Milestones

Milestone	Foreseen date in GA	Actual date	Beneficiary responsible
Project manager nominated	15.1.2016	1.3.2016	MH_LP
Project Management Core Team established	31.3.2016	31.3.2016	MH_LP
Regional Management Teams established	31.3.2016	31.3.2016	MH_LP
First meeting of Project Management Core Team held	30.4.2016	19.2.2016	MH_LP
First meeting of Regional Management Teams held	30.4.2016	31.5.2016	MH_LP
First get-together meeting of Regional Management Teams and Project Management Core Team held	30.6.2016	13.4.2016	MH_LP
At least 10-12 meetings of Regional Management Teams held	30.9.2022	30.9.2022	MH_LP
At least 10-12 meetings of Project Management Core Team held	30.9.2022	30.9.2022	MH_LP
4 get-together-meetings of Regional Management Teams and Project Management Core Team held	30.9.2022	30.9.2022	MH_LP
At least 5-6 get-together-meetings of Regional Management Teams and Project Management Core Team held	30.9.2022	30.9.2022	MH_LP

Continuation of the action after the project

This action was completed during the project.

Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification

ACTION F.2: Project steering groups at project and regional level

Beneficiary responsible for the implementation:	MH_LP (SYKE, LUKE, SMK)
Other beneficiaries involved:	All
Foreseen start date: Jan 1st 2016	Actual start date: Jan 1st 2016
Foreseen end date: Sept 30th 2022	Actual end date: Sept 30th 2022

The activities

As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
MH will establish in spring 2016 a project steering committee for FRESHABIT to ensure the correct implementation of the project according to its objectives.	The project steering committee has been an important channel to communicate about the project results to the key stakeholders. The committee consisted of representatives of most relevant ministries, from each of the organizations in core group and target areas, and national stakeholders. Stakeholders have shown great interest towards Freshabit project and we had no difficulties in setting up the steering committee. This committee has met once or twice in each year (total 10 times). Also, a field visit was organised for steering group members to Vanajavesi target area in May 2019.	MH_LP
The regional steering committees (8 pcs) will be established to ensure the correct implementation of project objects at the regional level.	Each region (8 pcs) established their own Regional Steering Committee in Action F2 to ensure the fulfilling of project objects at the regional level. The meetings have been held annually 1-3 times in each region according to ones needs, and they have discussed otherwise similar topics than the Project Steering Committee, but within their own region. Regional steering committees consist of regional associated beneficiaries, and other relevant regional authorities, universities, major regional co-financers for LIFE-IP itself and complementary projects. The 1-2 representatives of core team have also regularly taken part to the meetings of Regional Steering Committees.	MH_LP, EPOELY, VARELY, LUVY, VVK, SYKE, ESAELY, POKELY

Picture: Too rarely, the members of the steering group are seen out of the meeting rooms. A regional steering group field trip was organised in Naamijoki area in September 2019.

The results

Expected results	Achieved results	Status	Beneficiary responsible
Project steering committee and regional steering committees will meet at least 6 times during the project period.	Project steering group: 10 times + a field trip Pohjanmaan joet: 10 meetings Puruvesi: 10 meetings Karjaanjoki: 13 meetings Koitajoki: 6 meetings Keski-Suomi: 6 meetings Naamijoki: 6 meetings and a 2-day field visit Varsinais-Suomi: 6 meetings Vanajavesi: 14 meetings	Completed	MH_LP, EPOELY, VARELY, LUVY, VVK, SYKE, ESAELY, POKELY

Output

Milestones

Milestone	Foreseen date in GA	Actual date	Beneficiary responsible
Project steering committee established	31.3.2016	6.9.2016	MH_LP
Regional steering committees (8 pcs) established	31.3.2016	31.5.2016	MH_LP
First meeting of project steering committee held	30.4.2016	20.6.2016	MH_LP
First meetings of regional steering committees held	30.4.2016	31.5.2016	MH_LP
At least 6 project steering committees held	30.9.2022	30.9.2022	MH_LP
At least 6 regional steering committees in each region held	30.9.2022	30.9.2022	MH_LP

Continuation of the action after the project

This action was completed during the project.

Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification

ACTION F.3: Thematic working groups

Beneficiary responsible for the implementation:	MH_LP (SYKE; LUKE; SMK)
Other beneficiaries involved:	All
Foreseen start date: Jan 1st, 2016	Actual start date: Jan 1st, 2016
Foreseen end date: Sept 30th, 2022	Actual end date: Sept 30th, 2022

The activities

As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
Thematic Working Groups will be established around widely distributed topics governing most concrete actions. These topics have been recognised to be: • communication and education, • environmental models and monitoring • mapping of headwater and lakes • stream restoration (including actions involved with freshwater pearl mussel) • river basin (catchment area) restoration • bird wetland habitat restoration.	Six Thematic Working Groups (TWG) was established around main topics of FRESHABIT governing most concrete actions. These TWG's are: 1) communication and education, 2) environmental modelling and river basin (catchment area) restoration 3) monitoring of environmental and socioeconomic effects 4) mapping of headwaters and lakes 5) restoration of running water habitats (including actions involved with FPM and fishway-related issues) 6) restoration of lake and bird wetland habitats. Most of these groups had at least one yearly face-to-face meeting and several online meetings. They have been an important forum in exchange of knowledge and experiences and planning of FH actions. These working groups were one of the corner stones of capacity building beyond the project. The contents of the groups were modified during the project, and some of the groups have proven less necessary than others. The monitoring group was most active in the first stage of the project, and the activity faded after the monitoring guidelines (Deliverable A10.4) was published in 2020 and there was a consensus of how monitoring was to be implemented in Freshabit. The thematic group for mapping proved to be irrelevant, as each action A5 and A6 were implemented independently and had little in common. The group did not convene in Phase 3.	MH_LP

The results

Expected results	Achieved results	Status	Beneficiary responsible
Increased exchange of knowledge among scientists, management and other stakeholders	This has realized very well through most of the thematic working groups. For the modelling and monitoring groups the process has been more of a top-down process, where national experts have produced models and indicators to be field-tested in the project, and fine-tuned as necessary. The habitat restoration groups for lakes and streams were also active, but working more on a peer knowledge-exchange basis, sharing experiences and best practices. The communication group was also very active in planning communication across the network of beneficiaries. The thematic group for mapping and surveying was the least active, and it was found out that the approaches for mapping lakes and streams differ too much, and cooperation was not found necessary.	Completed	All
Prevention of billowing difficulties or challenges	The groups have discussed and shared their experiences on their respective themes, which has aided in solving some issues that have risen during the process, such as permit applications or construction work and costs for lakes and fish passes.	Completed	All
Focusing of methods used on the best available methods	The peer networks within the thematic groups have improved the exchange of knowledge and experiences related to methodology, especially regarding the stream and lake habitat restoration methodology.	Completed	All
At least 10 meetings/workshops per working group	Lake restoration: 6 times Communication and environmental education: 9 times Mapping and surveying: 5 times	Completed	Several

	Modelling: 5 Monitoring: 8 Instream habitat restoration, freshwater pearl mussels and fish ways: 7		

Pictures: We took a moment to celebrate the great results of the conservation acts for freshwater pearl mussel.

Output

Milestones

Milestone	Foreseen date in GA	Actual date	Beneficiary responsible
Thematic Working Groups established	31.3.2016	31.3.2016	MH_LP
First meeting of Thematic Working Groups held	30.4.2016	13.4.2016	MH_LP
10-12 meetings/workshops of Thematic Working Groups held	30.9.2022	30.9.2022	MH_LP

Continuation of the action after the project

This action was completed during the project. However, similar thematic groups will be utilized in other projects, as most of them proved useful.

Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification

ACTION F.4: Technical/financial monitoring and reporting

Beneficiary responsible for the implementation:	MH (SYKE, LUKE, SMK)
Other beneficiaries involved:	EPOELY, ESAELY, VARELY ,VVK, POKELY, LUVY
Foreseen start date: Jan 1st 2016	Actual start date: Jan 1st 2016
Foreseen end date: Sept 30th 2022	Actual end date: Jan 27th 2023

This action is to ensure that all beneficiaries are prepared to fulfil all reporting obligations of LIFE IP projects given by Commission.

The activities

As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
An interim report together with a request for interim payment and a new detailed planning for next phase must be submitted to committee three months before the end of each phase. In addition, all project materials charged to LIFE must also be annexed to the interim reports or the final report. Also, indicator tables completed in action F5 will be included in these reports.	There were major challenges with the financial report of the first interim report. Report was complemented, and the First Interim Report was finally approved in July 2018. CB took several steps to improve reporting in phase 2 and 3. Second Interim Report went really well. The preparations for the Final report were started over a year in advance by arranging a tour in each target region for collecting and discussing the results achieved. Even so, it still surprised how much work final reporting was. There were several changes regarding monitoring of the FH. Monitoring of FH have been taken over from Milka Parviainen to Sonja Jaari in NEEMO in January 2019. Moreover, IP projects were handed over from DG Envi to EASME in February 2018. In April 2021 EASME became CINEA. Our monitor has been helpful and prompt, but in many matters we need the approval of CINEA and it seems ineffective and time consuming that all communication travels from AB's via project manager and monitor to CINEA. In Autumn 2022 we were surprised to find out that the final report template had been updated even though in the monitoring mission in June 2022 we asked whether the final report template would be the same as in Interim reports. This caused us a lot of unforeseen work.	MH_LP
At the start of the project the coordinating beneficiary MH will held a separate LIFE administration meeting with all beneficiaries and their administrative personnel.	Information on administration and financial issues was first offered to all beneficiaries in the kick-off meeting before the start of the project, 30.11.-1.12.2015. After that support for administrational and financial issues has been given in yearly project meetings, Teams meetings and in smaller groups or individually as necessary.	MH_LP

Joint & Monitoring visits and other letters

Main issues	Progress
22.-23.6.2016 Savonlinna	Representatives of DG ENVI, EASME, NEEMO and Ernst & Young: Laszlo Becsy, Päivi Rauma, Marita Arvela, Sonja Jaari, Katja Lähdesmäki
C10: During the mission you reported that the costs for land purchase and compensation will not be included in the project budget, but that national METSO funding will be used. However, in the budget you have allocated € 543,530 to the cost category 'Land purchase or long-term lease of land/use rights'. With your next report, please provide a detailed explanation of how you foresee to use these costs.	Included in the first interim report.
C11: The timetable for action C11 is not provided in the GANT chart	Included in the first interim report.

included in the Grant Agreement. Provide an updated GANT chart with your next report, including the missing information.	
C12: The timetable for action Cl2 is not provided in the GANT chart included in the Grant Agreement. Please provide an updated GANT chart with the next report, including the missing information.	Included in the first interim report.
14.-15.12.2016 Jyväskylä	Representatives of DG ENVI, EASME, NEEMO and Ernst & Young: Sonja Jaari, Katja Lähdesmäki
C3: Prepare detailed plans for the construction of each of the foreseen fishways and be ready to discuss them in detail.	Fishways have been discussed in many occasions during mission visits.
C9: Be prepared to discuss how you think the in vitro rearing will affect the project timetable and the chances of reaching the project objectives successfully.	FPM rearing and timetable have been discussed in many occasions during monitoring visits.
C7: Raising the water level of lake Teurajärvi, may require raising a nearby road in the Naamijoki area. The final disposal of the removed biomass has not been elucidated and the costs for this were not foreseen in the budget. Be prepared to discuss how you foresee these issues to be resolved.	Subject has been presented during monitoring visits and GA has been amended accordingly.
C8: Accepted that the target of tonnes of fish removed can be increased to 100 tonnes.	Ok
E4: Upload all the project deliverables produced to the website.	Ok
F4: The following changes accepted to the Grant Agreement in the reporting schedule: • First amendment and preliminary budget for phase II: 30/09/2017 • First interim report (phase I): 31/03/2018 • Second amendment and preliminary budget for phase III: 30/09/2019 • Second interim report (phase II): 31/03/2020 • Final report (phase I - III): 31/12/2022	Ok. Reporting schedule updated in the amended GA.
6.2.2017 Tikkurila	Representatives of DG ENVI, EASME, NEEMO and Ernst & Young: Laszlo Becsy, Päivi Rauma, Bent Jepsen, Sonja Jaari, Katja Lähdesmäki
The original signed Form A8 is not required for including complementary projects, as long as a clear written indication of the commitment between the complementary project and the IP project has been established.	Ok
A4: Provide a detailed explanation on how the four regional water protection plans will be implemented in the project regions with the next report.	Explanation has been provided in the first interim report.
C1: You informed the representatives of the Commission that due to peatland restoration completed in the Freshabit project, damage has been done to infrastructure constructed within an EU funded Leader project. You requested that €5,000 from the Freshabit budget be used to correct the damage done. I can accept that Freshabit funds are used, as long as you can verify the funding is used for covering the actual damage and not for the own-contribution of the Leader project. Please include this proof with the first Interim report.	Proof has been included in the first interim report.
C3: Accepted that the fish ways are constructed in accordance with the revised plans in all instances, under the condition that the amount of funding placed on the LIFE project for each fish way is not increased and that additional funding is mobilised for the increased costs. The additional funding should be included as co-financing to the FRESHABIT project. Include a detailed explanation for the technical modification and all budget implications in the amendment request due on 2017. Include a case- by-case explanation in your Interim report about why such high costs cannot be avoided and make a comparison of natural vs. technical fish paths.	Explanation has been provided in the first interim report. Major part of the costs will be reported in the second interim report.
C7: Over 30 tons of fish will be removed from lake Teurajärvi and will most likely be used as animal feed in fur farms in the area. If the fish is sold, be reminded that all income generated in the project has to be included as income at the reporting stage.	No income is generated from the removal of fish.
C9: In vitro rearing of Freshwater pearl mussels accepted as a measure of rescuing the endangered populations as a non-substantial technical modification to the GA. Include a detailed explanation and justification, including all budget implications, of the technical measures taken in the amendment request 2017.	Explanation has been provided in the amendment request 2017 and first interim report.
22.-23.8.2017 Tikkurila	Representatives of DG ENVI, EASME, NEEMO and Ernst & Young: Sonja Jaari, Katja Lähdesmäki, Adam Preucil

C11: The building of a hiding hut instead of bird watching tower in the Vanajavesi area accepted as a non-substantial modification to the Grant Agreement.	Ok
E4: Ensure that the project websites are updated in all language versions with the results achieved so far and deliverables. Other relevant materials produced should also be made available on the site.	Website is updated periodically.
E5: Make sure that all of the project materials foreseen for phase 1 are available on the project website and also submit them with your Interim report. Include photos of the notice boards that have been installed at the project sites, as these were not available during the visit.	Included in the first interim report.
7.-8.2.2018 Tikkurila	Representatives of DG ENVI, EASME, NEEMO and Ernst & Young: Laszlo Becsy, Päivi Rauma, Sarunas Zableckis, Milka Parviainen, Katja Lähdesmäki
The new method ELY Centres use when granting funding accepted.	Ok
Reminder of the stipulation in Article II.19.2 (iii) of the General Conditions: the sum of the public beneficiaries' contributions as beneficiaries to the project budget must exceed by at least 2% the sum of the salary costs charged to the project described in Annex II for public entity employees who are not considered 'additional'.	Ok
28.-29.8.2018 Hämeenlinna	Representatives of DG ENVI, EASME, NEEMO and Ernst & Young: Milka Parviainen, Katja Lähdesmäki, Emil Zalepa
C2: creating 27 hectares of wetlands is not a realistic target for the Koitajoki area. New proposal will be given in fall 2019 for the new target.	Amended in the phase 3 amendment.
C10: In your future reports, please provide maps that show clearly where the purchased land parcels are, compared to the project area and Natura2000 areas. C10: Upload land purchase data from your project into the Land Purchase database (LPD)	Map provided. See Action C10. We have requested access to LPD from the technical monitor but there seems to be technical problems and therefore due to circumstances beyond our control data from EPOELY and KESELY is still missing from the database.
D6: Shifting the topics of the second and third PAF seminars accepted.	Ok
Be prepared to provide information during the next external monitoring team visit about complementary projects.	Presented in Vaasa in June 2019.
12.-13.6.2019 Vaasa	Representatives of NEEMO and CINEA: Sonja Jaari, Camilla Strandberg-Panelius, Sarunas Zableckis
Listed deliverables submitted to the technical monitor were not fully in accordance with the LIFE rules or else were not available for evaluation during the visit to the project. E-mail deliverables to the technical monitoring expert three weeks prior to the next visit to the project and submit all deliverables to EASME with the Interim Report that is due on 30 March 2020.	Delivered to technical monitoring expert 7.2.2020. Undelivered deliverables included in the IR2.
A2: Provide clear information on the indicators developed by the project, including links to the website biodiversity.fi. Include this information in your Interim Report.	See Action A2. Two new biodiversity indicators have been developed (Development of lake regulation, Removal of migration barriers), also some existing indicators have been developed further. The indicators have been updated to the Luonnontila.fi.
A8: Ensure that the website www.vesivoimanluonto.fi includes a disclaimer excluding the Agency's or the Commission's responsibility.	Disclaimer added.
C1: During the project visit, information on the progress of the restoration actions in the Koitajoki area was not available. During the next project visit, be prepared to discuss the restoration progress in the area.	Ok
C2: Provide clear information stating the number of water protection structures that have been completed using LIFE funding and the number of structures that have been completed as complementary activities. Clearly separate the LIFE-funded project measures from the complementary actions when you report on the activities in phase 2.	See Action C2.
D5: During the following monitoring visit to the project, be prepared to discuss the progress of the monitoring actions. Provide this information to the technical monitoring expert by e-mail three weeks prior to the next visit to the project.	Delivered to technical monitoring expert 14.2.2020
E4: Ensure that the website is continuously updated and all deliverables are promptly uploaded onto the website. Improve the information content of the Swedish website. Recommendation that on the project website you include a clear section describing the PAF.	Deliverables have been updated. Key issues have been provided in Swedish. Major update of the website planned for 2020.
E5: Ensure that the LIFE programme and information on the project are clearly displayed at all sites where restorations are ongoing.	Ok
25.7.2019 Phase 1 Interim Report	

Please ensure that future reports are correctly named (this Interim Report was incorrectly named a “draft report”).	Ok
Please let me remind you to include the updated legal address of the Coordinating Beneficiary in the upcoming phase 3 amendment request.	Updated in the phase 3 amendment request.
A3: The removal approved from the deliverables list of the deliverable "2 restoration plans for peatland restoration in Isojoki" because the restoration plans for the Pohjanmaan joet target region (Haapakeidas and Kauhaneva-Pohjankangas) had already been made prior to the project and that no further planning is needed.	Ok
A6: Include the deliverable for Action A6: The report on spatial diversity in the target lakes with your next Interim Report.	Reported as an ArcGis Online storymap https://metsahallitus.maps.arcgis.com/apps/MapJournal/index.html?appid=15cb7da6372447dd938031e253cf1c12
C2: The following modification to the expected result of the action in the Puruvesi area is acceptable because it does not threaten the project objectives. The modifications are: an increase in the total area of constructed wetlands (floodplains) from 12 hectares to 20 hectares and a reduction in the construction of other structures from 55 to 40 units.	Ok
C11: I accept that the initially planned hiding hut on the shore of Lake Hattelmalanjärvi will not be built because the local birdwatchers and landowners did not find it reasonable. Instead, the path network around the Lake Hattelmalanjärvi bird-watching tower will be made longer than the 500 meters originally planned.	Ok
E1: Provide samples of media articles with the next Interim Report or upload them onto the project website for easy access.	Samples of media articles included in the IR2.
E4: Improve the English and Swedish versions of the website by adding the relevant deliverables and including information gained about the project results so far. Include a disclaimer in accordance with the article II.7.2 of the General Conditions on your website.	Disclaimer and deliverables added. Bigger website update planned for 2020.
Freshabit LIFE-IP – Project visit 25 – 26 March 2020 and Interim report 2	Representatives of NEEMO: Sonja Jaari, Camilla Strandberg-Panelius
C1. You reported that the implementation of the task C1.2. Restoration of former peat harvesting area may be delayed, as the landowner has not agreed to implement the management plans that had been drawn up and is making special demands as a prerequisite for agreeing to the management actions. I understand that negotiations are still ongoing with the landowner to resolve the situation. Please keep the external monitoring team updated on the situation and be prepared to discuss the progress of the task on the next monitoring visit.	In the program of the next monitoring visit
C4. With the report you have informed me that the stream restoration may not be implemented to the extent planned in the main channel in Kiskonjoki, as the restoration measures have been more costly than expected. No details on the extent of the reduction of the in-stream restoration were included in the report. Please be prepared to provide this information to the monitoring team on the next monitoring visit.	In the program of the next monitoring visit
C7. You report that the implementation of the management plans in Puruvesi has been downscaled due to the presence of Annex IV species living in the area that have to be taken into consideration when implementing the plans. On the next visit to the project, please explain in detail how the species have affected the implementation of the management plans what the project has done to mitigate the conflict between the nature conservation actions planned for the site and to protect the Annex IV species.	In the program of the next monitoring visit
Despite the remark raised in the letter from 25 July 2019, the financial part of the Interim Report was very succinct and did not contain the information required. You are strongly encouraged to improve the respective part at the Final Report stage; otherwise, the report might not be accepted. Please note that your comments and justifications must be provided particularly with respect to the following aspects, when they assume significant values: substantial deviations from the budget, unforeseen costs or project roles, higher than foreseen costs or daily rates, any other explanations needed to properly interpret the information presented in the financial statements. In addition, you are kindly asked to enclose the table of the costs incurred per action as compared to the budget.	Presenting an annex Excel for reporting substantial deviations from the budget, unforeseen costs or project roles, higher than foreseen costs or daily rates Discussion in the next monitoring visit about the table of the costs incurred per action compared to the budget
In several cases it was difficult to link the reported project roles with the budget or the role was stated in inappropriate Column B2 (Job title). You are kindly requested to use the names of the roles (in Column B3) according to the budget in the Final Report. In case of unforeseen role, the respective description should be provided in Column B3 with the indication ´new role´ in brackets.	Final report is in line with this guidance.
You indicated several employees as “additional” although the starting date of their contracts (stated in Column C1) preceded the project	Corrected in the Final Report

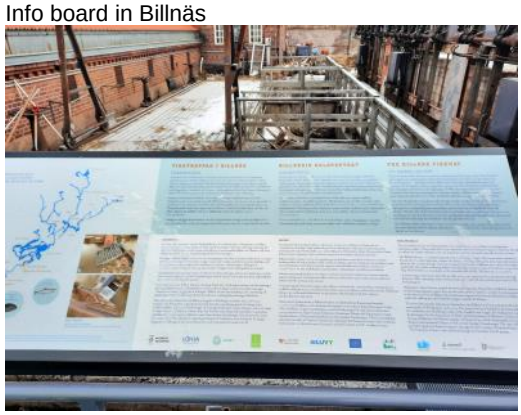
period. You are kindly reminded that according to Article II.19.2 of the General Conditions, only employees whose contracts or contract renewals start on or after the start date of the project or on or after the date of signature of the grant agreement and specifically assigned to the project could be considered “additional”. Please double-check the status of your employees taking into account the conditions mentioned above and make appropriate adjustments in your Final Report.	
For verification purposes please provide invoices no. 416417, 416814 and 417610, along with the respective proofs of payments, during the next project visit.	Delivered to our monitor Sonja Jaari on a monitoring visit
"You are kindly asked to provide the respective supporting documents linked the selection procedure of Teuvo Repo during the next project visit for verification purposes. The documentation should contain at least the following, if relevant according to the respective binding regulation: a) Description of the tender procedure employed, b) Proof of publication of the procurement (website of the beneficiary etc.) or proof that potential subcontractors/suppliers were contacted (letter, e-mail, proof of delivery etc.) c) Offers received (only the summary section with the price quotation, not the entire technical part), d) Comparison of all the offers received, according to the selection criteria, e) Record from the final decision on awarding the contract, with appropriate justification, f) Contract with the winning bidder (excluding technical annexes), g) Invoice(s) related to execution of the contract and the corresponding payment proof(s)."	Delivered to our monitor Sonja Jaari on a monitoring visit
Freshabit LIFE-IP – Project visit 18 – 19 May 2021	Representatives of NEEMO: Sonja Jaari, Camilla Strandberg-Panelius
On the updated website I cannot locate a mention of the PAF or a link to the Ministry of Environment that is responsible for the PAF. As already mentioned in the EASME letter of 09/07/2019, I recommend that you include a section describing the PAF, why it is important and how it is implemented in Finland.	Information and link added to the website
Issue 8. I understand that you and the external monitoring team visited several sites at which Freshabit actions were being implemented. At none of the sites had information signs, temporary or permanent, been erected. Please let me remind you of the requirement to place temporary information signs at all locations at which project actions are being implemented, in order to ensure the visibility of the project and securing the reimbursement for the project activities done.	Info board in Billnäs 
Issue 9. During the visit, you informed the external monitoring team that the deliverable “Education material for four bird lakes in Vanajavesi” is part of the story map in Vanajavesi. The story map is in several respects very attractive and informative. As all deliverables that are produced in a language other than English are to include an English summary of the material, I ask you to please update the online material with an English summary.	All the story maps were updated and reissued during 2022. After Metsähallitus moved the ArcGIS Online (AGOL) servers to EU region in November 2021, we had technical issues due to outdated versions of the AGOL applications. The problems have been fixed and all story maps are currently available.
You have informed me that you will present the project results as an online story map and that this will replace the planned printed Layman’s Report. I accept that. Please make sure the story map is available in PDF format, so it can be posted on LIFE database. I would also like to remind you that the story map should be available both in Finnish and English, as these were the language versions planned for the Layman’s Report	You can find the Layman's report as an attached deliverable.

Photo: Joint mission visited the removed Villamo dam in June 2019.

The results

Expected results	Achieved results	Status	Beneficiary responsible
The project will progress according to the planned timetable and achieve its assigned accomplishments. All reports will be delivered in time.	After the difficulties in the beginning all reports and amendments have gone well.	Completed	MH_LP

Continuation after the project

Final report was submitted in the end of January 2023.

Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification

ACTION F.5: Completing the indicator tables

Beneficiary responsible for the implementation:	MH_LP (SYKE, LUKE, SMK)
Other beneficiaries involved:	
Foreseen start date: Jan 1st 2016	Actual start date: Jan 1st 2016
Foreseen end date: Sept 30th 2022	Actual end date: Jan 27th 2023

The FRESHABIT is a Nature IP aiming for better conservation status of N2000 sites. Thus, our monitoring indicators (quantitative and qualitative) are aiming to monitor the ecological effectiveness of concrete actions at the moment. The table of preliminary indicators is seen in technical description of Action D1, and this table will be completed at early stages of FRESHABIT. These indicators will be monitored in Actions D1-D3 (biodiversity, ecological functioning, and hydrochemical indicators), and D5 (technical indicators). In addition to those indicators designed to measure the direct impacts of concrete conservation actions, Key Project Indicators are used to measure the more general impacts of the project.

The activities

As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
The indicators for concrete conservation Actions C1-C9 will be monitored in Actions D1-D3 (biodiversity, ecological functioning, and hydrochemical indicators), and D5 (technical indicators).	The indicators for monitoring have been updated in the early stages of the project and their use has been communicated to all beneficiaries. The indicator list has remained quite similar, but we had some difficulties in monitoring the monitoring actions. An Excel-based too was created in the first phase and updated in the end of the second phase, and it now serves the purpose of monitoring when, where and which C-actions are monitored in each region. Monitoring activity is reported under actions D1, D2, and D5, and the results are utilized in action D7.	MH_LP, SYKE
Key Project Indicators are used to measure the more general impacts of the project.	The Key Project-level Indicators for FRESHABIT were first built in phase 1 and have been subject to changes many times since then. Prior to the current update the content of the KPI has not been fully understood and the original indicators set at the project beginning were not viable in many cases. The updates have been made according to the current instructions available, separating between LIFE and Complementary funding whenever possible, and aiming at measurable indicators. The last update was in January 2021, and the data was considered valid at that point. However, in January 2023 we got completely new instructions, which lead to the complete revision of the KPI's.	MH_LP

The results

Expected results	Achieved results	Status	Beneficiary responsible
We expect to achieve positive changes in ecological status and further in conservation status as a results of concrete actions and monitoring their effectiveness. Indicators will give support to assess the conservation status of habitats and species defined in Action D7.	An Excel-based tool has been used to monitor when, where and which C-actions are monitored in each region. Through phases 1 and 2 the emphasis of the project was in concrete conservation actions. We started gathering data for the ecological impacts of our actions in the last year of the project, which was a bit too late and we had to analyze the results after the project had ended.	Completed	MH_LP, SYKE

Output

Deliverables

Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable
Table of all relevant indicators used in FRESHABIT (KPI)	30.9.2022	27.1.2023	MH_LP	The KPI webtool with updated indicators

Milestones

Milestone	Foreseen date in GA	Actual date	Beneficiary responsible
Table of all relevant indicators updated	31.8.2016	31.8.2016	MH_LP

Major problems encountered

In our view, the process of creating and monitoring project KPI's has failed because:

- The KPI database was launched after the project start for IP projects, and has undergone many revisions since,
- Guidance on the initial KPI database was vague and information about the changes in the system have not reached the project management team of Freshabit at all,
- The revisions have made earlier inputs partially invalid technically. For example, it appears that the system has undergone quite significant changes between Jan 2021 - Jan 2022, since many of our values from Jan 2021 failed the checks in the webtool, when trying to update,
- We had the first moment of understanding of the KPI's together with the project technical monitor in January 2023, including how to set up the context of the indicators and the areal indicators in 1.5,
- We created the indicators initially in a very complicated way and included some very vague values without thinking how to find data for them,
- We perhaps did not pay enough attention on finding the right way of doing the KPI's through the project.

Continuation of the action in the third phase and after the project

Monitoring is essential in order to find out what is the impact of a given action. We have developed indicators and guidance for monitoring the impact of freshwater habitat and catchment area restoration, and this guidance is available for all other projects and actors as well as a publication. As learned with our experiences with project-related indicators as well as the KPI database, attention should be paid to clear and concise guidance.

Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification

ACTION F.6: Combining complementary projects

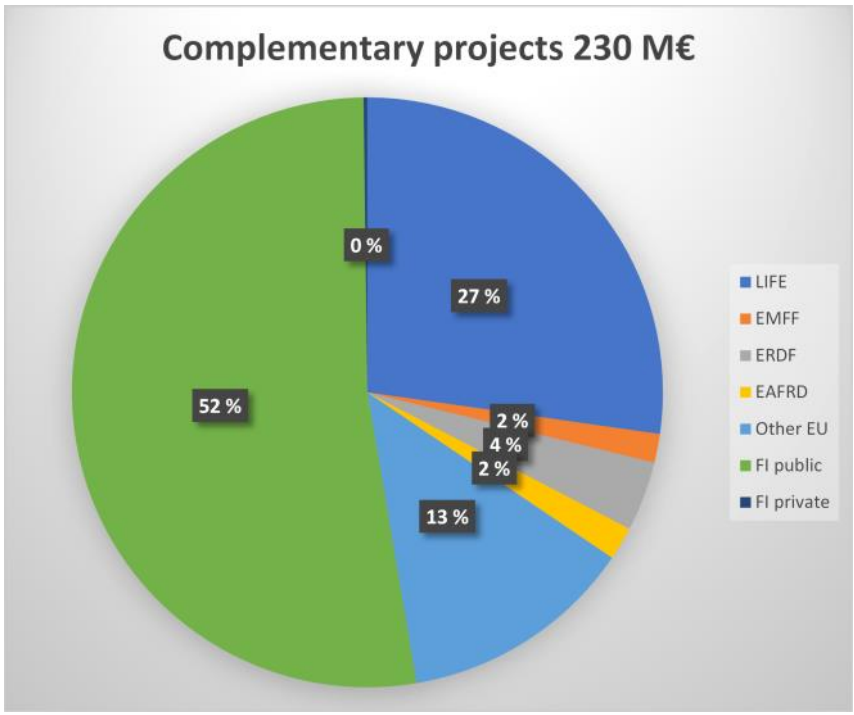
Beneficiary responsible for the implementation:	MH (SYKE, LUKE, SMK)
Other beneficiaries involved:	EPOELY, VARELY, LUVY, VVK, ESAELY
Foreseen start date: Jan 1st, 2016	Actual start date: Jan 1st, 2016
Foreseen end date: Sept 30th, 2022	Actual end date: Sept 30th, 2022

We have paid special attention to securing that the FRESHABIT LIFE IP has close and operational link to the complementary projects. Most of the complementary projects are managed by regional or CORE beneficiaries, or at least have one or more Freshabit beneficiaries involved. We have made sure that the results and lessons learnt from complementary projects are used actively in the implementation of Freshabit and vice versa.

We have followed and approached potential funding sources to include further complementary projects. This follow-up started in the beginning of the project (see action D6) and was carried out throughout the project.

The activities

As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
FRESHABIT is foreseen to mobilize in total ca. 4.47 M€ (18% of the total complementary project budget) of complementary funds, 2.01 M€ of this being complementary Union funds and 2.46 M€ national funds. Beyond those listed in form FP, many opportunities for complementary funding are foreseen from both Union and national sources during the duration of FRESHABIT, and these opportunities will be fully utilized.	Complementary funding has been actively searched for to complement some of our concrete actions, such as the construction of fish passes, or to complement some themes in the project, e.g. measuring the socioeconomical impacts of the project. Complementary projects have also emerged without our active input through contacts made by people working for new applications. By the end of Freshabit the total sum of complementary funding for FRESHABIT is 231 M€.  *Picture: A complementary project WoodProWater piloted novel woor-based constructions for freshwater management in forestry.*	Several



Distribution of the compelentary funding by funding sources in June 2022. National public funding includes the whole Helmi habitats programme, which implements the PAF as well as restoration of freshwater and wetland habitats.

The results

Expected results	Achieved results	Status	Beneficiary responsible
High number of promoted mobilization of relevant funding sources	Success story in complementary funding which is 230,4 M€ at the end of the project.	Completed	All
Increased exchange of knowledge among all stakeholders	The concept of complementary funding for N2000 and LIFE has been actively promoted in various seminars and meetings. The concept and the responsibilities it brings to each stakeholder was very vague at the application phase, resulting in a modest pool of complementary projects. Throughout the project the idea has been clarified among all beneficiaries and many stakeholders, and the pros of complementarity are now commonly identified.	Completed	All
Prevention of billowing difficulties or challenges	Complementary projects have helped significantly in achieving the project goals, e.g. in constructing the fishways in Karjaanjoki region.	Completed	All

Output

Milestones

Milestone	Foreseen date in GA	Actual date	Beneficiary responsible
Monitoring complementary projects through regional management teams acknowledged	30.4.2016	31.5.2016	MH_LP
First meeting of regional management teams in relation to complementary projects held	30.4.2016	31.5.2016	MH_LP
10-12 meetings of regional management teams in relation to complementary projects held	30.9.2022	30.9.2022	MH_LP, EPOELY, VARELY, LUVY, VVK, SYKE, ESAELY, POKELY

Continuation of the action after the project

The concept of complementary funding has been made well-known during the implementation of FRESHABIT and it is most likely that similar forms of complementarity will be more common in the future. An example of this development is that MoE has launched the Helmi habitats programme for enhancing biodiversity and MoAF the SOTKA project for improving the status waterfowl in the end of 2019, and these projects are mutually seen by the ministries to complement each other. Practical applications of complementary funding include numerous cases in the regions, where projects have been complementing each other in concrete conservation and restoration actions, larger projects such as constructing fish passes and catchment area restoration around Natura 2000 freshwater bodies, and research and development projects for decreasing the impact of land use around valuable freshwater habitats. Experiences gained in Freshabit will help in the preparation for the new Strategic Nature Project.

Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification

ACTION F.7: Audit of the project

Beneficiary responsible for the implementation:	MH_LP
Other beneficiaries involved:	All
Foreseen start date: Oct 1st, 2022	Actual start date: Jan 1st, 2018
Foreseen end date: Dec 31st, 2022	Actual end date: Jan 20th 2023

The activities

As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
The financial report provided for the Commission with the final report will be verified by an independent auditor.	The key persons preparing the FH were not aware of the need of audit after each phase until the beginning of the project so organizing it required some extra effort and more funds than budgeted. The first interim report was complemented in November 2018. In February 2019 EASME requested FH to submit an updated certificate on the financial statements. Additional audit was arranged and updated certificate delivered to EASME in June 2019. The second interim report was audited in March 2020. There were 7 beneficiaries (MH_LP, SYKE, LUKE, SMK, VARELY, EPOELY, VVK) that filled the criteria for the obligation to provide the certificate on the financial statements (audit). The final report was audited in November and December 2022 and it included 7 beneficiaries (MH_LP, SYKE, LUKE, SMK, VARELY, EPOELY, VVK) that filled the criteria for the obligation to provide the certificate on the financial statements (audit).	MH_LP
The overall project auditing will be carried out by MH and all other beneficiaries (28 pcs) are responsible of their own auditing (no cost for LIFE project) and providing all supporting documents of their own audits to the MH project auditor.	The auditing was carried out as stated in the Grant Agreement and Annex X.	

The results

Expected results	Achieved results	Status	Beneficiary responsible
Audit of the FRESHABIT project	Audit of the first phase completed in 3/2018. Additional audition completed in 5/2019. Audit of the second phase in March 2020. Final audit completed January 2023.	Completed	MH_LP

Output

Deliverables

Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable
Audit report with the final report	30.9.2022	20.1.2023	MH_LP	Freshabit 2020-2022 Independent Report on Factual Findings

Milestones

Milestone	Foreseen date in GA	Actual date	Beneficiary responsible

Documents for audit gathered for the auditor	30.9.2022	23.11.2022	MH_LP
Audit completed and audit report produced	30.12.2022	20.1.2023	MH_LP

Continuation of the action after the project

Final audit was completed within three months after the project, the final approval was delayed three weeks from that.

Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification

ACTION F.8: After LIFE plan

Beneficiary responsible for the implementation:	MH_LP (SYKE, LUKE, SMK)
Other beneficiaries involved:	
Foreseen start date: Jan 1st 2022	Actual start date: Jan 1st 2022
Foreseen end date: Dec 31st 2022	Actual (or anticipated) end date: 31.12.2022

The activities

As stated in the GA	The key achievements, main factors of success and lessons learned	Beneficiary responsible
The coordinating beneficiary will produce the after-LIFE conservation plan as a separate chapter of the final report. The plan will be set out how the future conservation management of the target sites will be developed and how the long-term management of sites, habitats and species will be assured.	Preparations for the after LIFE conservation plan were started in December 2021 by arranging a tour in each target region for discussing the continuity of each action, while also collecting and discussing the results achieved in the project. In March 2022 a workshop was arranged by the CB to discuss and formulate the key challenges that remain after the project. The first draft was completed already in April 2022. The document has been updated after the project ended.	MH_LP

The results

Expected results	Achieved results	Status	Beneficiary responsible
The deliverable will be the after-LIFE plan presented as a separate chapter of the final report.	The after LIFE plan was completed in the end of the project.	Completed	MH_LP

Output

Deliverables

Deliverable	Foreseen date in GA	Actual date	Beneficiary responsible	Name of the deliverable
The after-LIFE plan presented as a separate chapter of the final report	31.12.2022	23.12.2022	MH_LP	Freshabit LIFE IP - After LIFE suunnitelma

Continuation of the action in the third phase and after the project

This action was completed in the end of 2022.

Modifications (action and/or budget)

Description/justification	Before modification	After modification	Impact of the modification	Communication about modification

7. Key Project-level Indicators

tiistai 7. tammikuuta 2020 15.27

Firstly, we have to state that comparison to the Freshabit KPI's reported at any earlier stage of the project are impossible. The KPI's were completely revised in January 2023. The reasons for this are presented below, and the finals indicator values are dealt with at the end of the chapter.

The Key Project-level Indicators for FRESHABIT were first built in phase 1 and have been subject to changes many times since then. Prior to the current update the content of the KPI has not been fully understood and the original indicators set at the project beginning were not viable in many cases. The updates have been made according to the current instructions available, separating between LIFE and Complementary funding whenever possible, and aiming at measurable indicators. The last update was in January 2021, and the data was considered valid at that point. However, in January 2023 we got completely new instructions, which lead to the complete revision of the KPI's.

In our view, the process of creating and monitoring project KPI's has failed because:

- The KPI database was launched after the project start for IP projects, and has undergone many revisions since,
- Guidance on the initial KPI database was vague and information about the changes in the system have not reached the project management team of Freshabit at all,
- The revisions have made earlier inputs partially invalid technically. For example, it appears that the system has undergone quite significant changes between Jan 2021 - Jan 2022, since many of our values from Jan 2021 failed the checks in the webtool, when trying to update,
- We had the first moment of understanding of the KPI's together with the project technical monitor in January 2023, including how to set up the context of the indicators and the areal indicators in 1.5,
- We created the indicators initially in a very complicated way and included some very vague values without thinking how to find data for them,
- We perhaps did not pay enough attention on finding the right way of doing the KPI's through the project.

Indicator context

The indicator context created in the earlier stage of the project was very complex and built largely upon the target N2000 sites. The overarching contexts could not be reduced at the later stages and, consequently, the remaining overarching contexts include a lot of redundant contexts. The specific contexts were reduced to two, reflecting the main purpose of the project, freshwater habitat restoration, and split into LIFE and LIFE+Complementary funding.

1.5 Project area length/area

Indicators were reduced to two, based on the specific contexts, and the measurable quantitative results reflecting the needs for streams and bird lakes/wetlands as indicated in the PAF FI 2021-27. For these the realized results and a forecast for the next 5 years are given. Fulfillment of the PAF targets is given in chapter 4. Most of the indicator values set up in the earlier stage of the project were concrete and refer to site-specific targets.

1.6 humans to be influenced

The number of people reached are in most cases difficult to measure. Initially we had set indicators and values that would have been very difficult to measure. Currently, indicators with best available data and understanding are given. The outreach of Freshabit is evidently very good and the project has been well respected, but difficult to quantify.

Values for humans influenced were revised and reduced from 3 to 2 indicators. The numbers influenced are really difficult to estimate and some of the original estimates were unrealistic.

2.Water

The terrestrial extent refers to the catchment area restoration, and the aquatic extent to the stream restoration targets. These were well realized in the project and provide good examples for future implementation of similar measures.

Apparently the logic has changed in section 2.3.2 similarly to 1.5, and all the dam bypass action in different sites were forced to combine under one indicator instead of site-wise separation, which was available in the earlier versions of the webtool.

7.Nature and Biodiversity

Ecosystem assessment refers to the catchment area restoration around N2000 water bodies achieved in Freshabit, and expected to realize in the next 5 years based on current trends in the society. Ecosystem services assessment refers to the status of ecosystem services provided by freshwater habitats based on their conservation and ecological status. These trends are difficult to turn in a short time and require significant changes in land use. The EU restoration legislation and the CBD COP15 decisions are prone to have a positive impact, if implemented sufficiently.

Section 7.4 had also been changed and the previous indicator ruined. The FPM *Margaritifera margaritifera* was not found in the HD species lists. Despite of trials to address the species by reporting it under EU red-listed species the system failed due to unknown technical reasons, and the indicator was removed.

10. Governance

Indicators for governance refer to the bodies involved in LIFE projects to implement the PAF FI. There is a positive trend for inclusion of more bodies into nature projects after Freshabit, as seen in e.g. Biodiversea LIFE IP and the strategic nature project in application phase, Priodiversity LIFE.

11.Information and awareness raising to the general public

These indicators were earlier based on vague estimates of people reached, but are now replaced by the number of products in selected categories that are easy to quantify. For the website we have monitored data on visits, and the results were very good, more than 41 000 as compared to 25 000 estimated at the beginning of the project. 11.2 was revised completely, referring to media outputs instead of people reached, using data collected in the project (printed media articles, reports, etc.).

12.Capacity building

Capacity building indicators are based on the project staff and estimated reach of people by other means of networking.

13.Jobs

Jobs are based on the FTE calculations on Freshabit staff. We have hired a lot of additional personnel to the project. No comprehensive data on their employment has been collected, but based on what we know we expect the staff to be well employed for the forthcoming years. For example, all the additional personnel in MH_LP project management team have been hired in other project at the end of the project. The FTE's in 13 were reduced to one figure derived from the project personnel data, as data for age, education and gender distribution are not commonly collected in Finland for such purposes.

14.Contribution to economic growth

Indicators on economy are based on project outcome and reflections of what has been calculated as the resource need for implementing the Helmi habitats programme and the PAF FI 2021-27. The budgets to be realized are difficult to forecast, as these are dependent

of the decisions given by each government, which we can expect are at least two that are different from the current one, until the current PAF FI 2021-27 period ends.

8. Next phase: changes/adjustments N/A

torstai 22. syyskuuta 2022 10.14

N/A

9. Comments on the financial report

tiistai 7. tammikuuta 2020 15.27

9.1 An Overview of Costs Incurred

For projects with the budget in phases

Cost category	Approved budget. Eligible costs (€)*	Approved budget. Phase 3 (€)	Consolidated cost statement. Eligible costs (€)	Percentage of costs incurred per whole budget (%)	Percentage of costs incurred per Phase N (%)**
Personnel	10 494 412	3 468 853	3 837 395	37	111
Travel	1 013 617	328 446	165 557	16	50
External Assistance	5 370 641	1 974 072	2 597 515	48	132
Infrastructure	583 450	0	136 291	23	
Equipment	145 768	43 829	67 620	46	154
Prototype					
Land Purchase	530 880	1 000	219 548	41	21955
Consumables	332 285	89 386	76 613	23	86
Other Costs	218 330	95 213	120 822	55	127
Overheads	1 271 095	419 986	490 108	39	117
TOTAL ELIGIBLE COSTS	**19 960 477**	**6 420 784**	**7 711 469**	**39**	**120**

*) If the Agency has officially approved a budget modification through an amendment, indicate the breakdown of the revised budget. Otherwise this should be the budget in the original Grant Agreement.

**) Calculate the percentages by budget lines of the budget for the reporting period by the costs incurred in the reporting period: e.g. the % of the budgeted personnel costs that were actually incurred

The costs for the third and final phase were higher than budgeted because some of the actions were transferred from phase 2 to phase 3. The costs are well in line with the technical progress of the project. The costs given in Table 9.1. consider the Phase 3 in total (1.1.2021 - 30.9.2022). The CB have included the reporting costs until 31.10.2022 and the costs of the audit in December 2022.

Our FMO Peter Mezco confirmed us by e-mail 10.6.2021 that tracking costs per action in the IP is not obligatory and therefore allocation of costs per action is not provided.

All the major deviations between the budget and reporting have been explained in the annex 6.

Main budgetary changes were already accepted in Amendment no. 2 in the end of 2019, so no major percental shift between cost categories occur except for the land purchase. VARELY has been able to do more land purchase and long-term lease than anticipated in the GA. Additional land purchase and long-term lease have been covered as additional beneficiary's own contribution and does not affect the budget of other cost categories or EU-contribution. The action C10 aimed to test and implement targeting the METSO forest conservation program in riparian forests with high biodiversity values. Permanent protection of the riparian forest of valuable water bodies can have strong positive effects both in the freshwater ecosystems and in the riparian freshwater dependent ecosystems with high biodiversity values. The promoting worked very well; it has gained wide support and in total 194 ha in 38 real estates have been protected either by purchase or compensation for permanent conservation area. This is planned to continue in forthcoming nature projects as well as by the national METSO funding.

Following AB's finished their project actions in phase 1 or 2 and therefore do not report costs in the final phase: LSPKe, Raase, SAARI, DocArt.

Requested Union contribution in the Funding sheet has been reported in the following way:

- The received EU commission of the beneficiary in the third phase. Some of these costs are actually used to cover the costs of the previous phases.
- Expected Union Contribution is based on the already received Union Contribution. If the beneficiary exceeds the budget the Expected Union Contribution is Max. EU contribution - the received EU contribution. If the total costs are below Union Contribution the Expected Union Contribution is Total costs x funding % - the received EU Contribution. The deficit has been transferred to budgets of MHLP and VARELY based on the 20% rule.
- Extra line is added if received and expected EU contribution exceeds the expenditures in the final phase.

9.2 Accounting system

Please find as annex 7 Description of accounting systems. It includes following information from all the beneficiaries:

- System for recording project expenditures
- Cost account for the management of the project
- Documentation between the CB (coordinating beneficiary) Metsähallitus Luontopalvelut and the AB (associated beneficiary)
- Providing copies of invoices and corresponding payment proof on the mission
- Providing a copy of a timesheet per beneficiary
- Calculation of annual personnel costs, i.e. annual gross salary, obligatory charges and pension contribution
- Calculation of annual productive hours in your organization?
- Explanation of your organization's method of calculation and reimbursement of travel costs: tickets, fuel, allowances etc.
- Tendering and procurement process

9.3 Partnership arrangements (if relevant)

The beneficiaries set the rules and arrangements to reporting between Coordinating beneficiary and associated beneficiaries in Partnership Agreements. Partnership agreements with all AB´s were signed in years 2016-2017. Agreements have been updated when necessary as part of the Amendment request process and have been delivered to EASME as part of the Amendment requests.

All beneficiaries follow the guidelines of the Commission i.e. the contracts specify the roles and responsibilities of the project parties, funding, rules for technical and financial reporting.

The CB has received four payments from the Commission which have been distributed to beneficiaries as stated in the Consolidated statement Funds distribution sheet within 30 days of the receipt of the funds paid by the Agency/Commission. The dates of payment are 19.2.2016, 23.12.2018, 10.10.2019 and 3.7.2020. The costs are distributed based on the costs incurred.

The beneficiaries have updated the financial reporting and the consolidated cost statement regularly. The CB has made a quality control to the beneficiaries statements annually.

Please read more in attachment 7 Description of accounting systems.

36 750 euros of the budget was transferred from POSELY to Luke in Action D2. Luke has used the budget to the same purpose as it was originally planned in the POSELY budget: "The Monitoring the functioning of fishways in Saarijärvi watercourse. External assistance will be bought to 1) monitor the fish aggregating near the entrance of Hietama fishway (echosounding study) and 2) to conduct a tagging experiment of downstream migrating trout smolts (to examine the usability of the fishways as a downstream migration route and the mortality of brown trout as they move downstream past the hydropower plants)."

40 000 euros of the budget was transferred from MHMT to LUVY (20 000 euros) and VVK (20 000 euros). VVK used the extra funds to complete the work in action C2. And LUVY used the extra funds i actions C9, D1 and D2.

3975 euros of the budget were transferred from MHLP to MoE to cover the costs of the Final Seminar (F2) held in September 2022.

9.4 Certificate on the financial statement

The external auditor for Parks & Wildlife, Metsähallitus is:
KPMG Oy
Töölönlahdenkatu 3 A (PL 1037)
00100 Helsinki

In FR, seven beneficiaries MHLP, SYKE, LUKE, SMK, VARELY, EPOELY and VVK fill the requirements for certificate on the financial statement and the report of the external auditor with possible findings is included to the FR as annex 10 Audit Report Freshabit. KPMG audited all seven beneficiaries.

All project beneficiaries (CB and ABs) are using the financial forms from the LIFE homepage. The Financial Statements of the Phase 3 for each Beneficiary are included in Annex folder “Financial statements”.

Annexes

tiistai 27. syyskuuta 2022 11.01

1. Table of complementary projects
2. Layman's report
3. After LIFE report
4. Report on socio-economic benefits
5. List of deliverables and milestones
6. Table of major deviations between budget and reporting
7. Description of accounting systems
8. Financial statements
9. Consolidated statements
10. Audit report and ToR
11. Land purchase documents
12. Impact of actions for each target N2000 site