



LIFE Project Number
LIFE13 NAT/SE/000065

FINAL Report
Covering the project activities from 01/01/2015 to 30/04/2021

30/07/2021

Life-Taiga

Project Data

Project location	Sweden
Project start date:	01/01/2015
Project end date:	31/12/2019 Extension date: 30/11/2020 (30/4/2021)
Total Project duration (in months)	60 months (including Extension of 11 + 5 months)
Total budget	11,219,812 €
Total eligible budget	11,219,812 €
EU contribution:	5,609,906 €
(%) of total costs	50,00
(%) of eligible costs	50,00

Beneficiary Data

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2. Executive Summary

Swedish forests have until the 1800s, been burned on a regular basis. The fires have occurred every 20 to 50 years, usually started by lightning. During the 1800s and 1900s, the number of fires has reduced drastically, to the point where they are virtually non-existent today. Up until some 150 years ago, 1 % of the wooded area in the country burned annually. Today less than 0.016 % burns annually.

The reduction in the frequency of fires is one of the major ecological changes that have taken place in woodlands since the 1800s. Fire, has over time, exerted a strong selection pressure, which has led to the development of pyrophilic organisms. We know today that some 40 insects and some 50 fungi species are dependent on burned wood and burned ground for their survival. Hundreds of other species among other insect taxa such as flies, bees, and crabronids are also favoured by fire.

Controlled burning for nature conservation in most sites is a requirement for western taiga (9010), and to some extent also coniferous forests on, or connected to, glaciofluvial eskers (9060) to develop favourable conservation status.

The knowledge and understanding regarding the significance of fire for the habitats and species within western taiga has increased significantly over recent decades. Life-Taiga provides a unique opportunity to catch up with the management of many sites where controlled burning events are recommended to partly restore the species and habitat values associated with a natural continuity of fire. The results within Life-Taiga has set a new standard concerning controlled burning both in Sweden and Finland. And this result has also been noticed by several other countries in Europe: Latvia, Estonia, Poland, Norway and Denmark for example. More about this is presented later in this report.

The objectives of Life-Taiga are:

1. To transform a significant proportion of the area of the annex 1 habitat type western taiga (9010) in Sweden, from unfavourable to favourable conservation status.
2. To develop the methods for controlled burning and to train and encourage authorities, companies, organizations and contractors associated with controlled burning.
3. To promote a dialogue and deliver good quality, easy to understand information to landowners, local residents, visitors and the general public.
4. To develop mutual collaboration with Finland in relation to the management of the annex I habitat type western taiga.

The objectives of Life-Taiga will be met using the following methods:

The project will undertake some 120 controlled burning events on a total area of 2046 ha in 89 different N2000 sites. In addition, fencing, the creation of bare soil and specific species targeted actions will be carried out on 18 of these N2000 sites.

The project will develop a database which will be used to refine methods of controlled burning. The project will also arrange seminars and work actively, through the reference group, to exchange ideas with other organizations and contractors.

The project will reach new target groups via innovative information such a mobile app, QR-coded information signs and an interactive website. Specific N2000 sites will have information trails developed to highlight the ecology of controlled burning.

By cooperation with Finland and possibly other EU countries, Life-Taiga will make an impact for many decades to come, even outside of Sweden by the fact that it is innovative and works at a large scale.

The general progress of the project has been good, even though unfavourable weather conditions has resulted in that the project was a bit behind the schedule concerning action C1 during early 2019. We would thus not be able to reach the goals in the application concerning this action. To be able to solve this problem a request for amendment was sent in in February 2019. After our request was accepted, we could add a new whole season for burning during 2020. Since the new end date of the project was set to November 2020. In November 2020 a new request for amendment was accepted by the Commission, this only includes the postponing of the Final seminar until April 20-21, 2021 related to the situation with Covid-19.

After reviewing the application and comparing this with the underlying data we have realized that the actual area for action C1 in the application should be **1943** ha and nothing else (before we had 2046 ha). The main action in the project is controlled burning (C1) and in total 2544 ha have been burnt during the time of the project. This is 131 % of the total planned project area of 1943 ha. The burning season of 2020 was a tremendous success and a total of 849 ha was burnt. Those numbers include the biggest ever controlled burning conducted in Sweden – a massive effort of 451 ha burned for one day, this was performed by the partner Gävleborg. This spectacular action was made possible using ignition by helicopter, a technique used for the first time ever in Sweden within Taiga during 2018. So, this was the second time ever that this technique was used in Sweden.

Life-Taiga contained many partners and the partners have been spread over almost whole Sweden; the project also included some counties with relatively small experience of Life-projects. All the factors above were a bit risky situation before the project started. But due to an intensive and proactive work the project management team could straighten out this question marks. The work included some large gatherings, telephone conferences and at last one visit to each partner by the project manager and assistant project manager during the first year of the project. This work has continued in the same way up to the end of the project. We have had intense communication within the whole group including all 14 beneficiaries and have been able to create a very friendly and inspirational atmosphere within the project. And we have got a very good spirit in the whole Taiga-group and the word is spreading also outside the project. Both from a nature conservation view, but also as a pattern of good teamwork Life-Taiga has set an example that inspire other coming projects in Sweden.

A full overview of the progress can be found in table 1.

Table 1. Deliverable products and project milestones.

Product/milestone	Action	Deadline	Completed	Comments
Project coordinating team started	F1	Jan/2015	Jan/2015	Reported in inception report
Steering group formed	F1	May/200	Nov/2014	Reported in inception report
Information strategy	A3	May/2015	May/2015	Attached in inception report
Regional management plan	F2	June/2015	May/2015	Attached in inception report
Website	E3	July/2015	July/2015	www.lifetaiga.se
Digital information	E4	Nov/2015	Nov/2015	See more information under section 5.2
Project sign text, layout and print	E1	Nov/2015	Nov/2015	Attached in Progress report 1
Rollup on project introduction	E2	Nov/2015	Nov/2015	See more information under section 5.2
206 hectares have been burned	C1	Dec/2015	Aug/2015	See more information under section 5.1
Concept for QR codes	E4	Jan/2016	Jan/2016	See more information under section 5.2
One major seminar	E5	Jan/2016	Oct/2015	Attached in Progress report 1
Detailed description monitoring	D3	Jan/2016	Nov/2017	See more information under section 5.1
National leaflet	E2	Jan/2016	Jan/2016	Attached in Progress report 1
Regional leaflet	E2	Feb/2016	Jun/2016	Attached in Midterm report
Interactive database	D1	Feb/2016	May/2020	More information under D1.
Leaflet and rollup ready for print	E2	Mar/2016	Mar/2016	Attached in Progress report 1
Interactive app	E4	Sept/2016	-	See more information under section 5.2
820 hectares have been burned	C1	Dec/2016	Not fulfilled.	See discussion under problems encountered.
Interactive part of the website	E4	Jan/2017	Jan/2017	
Educational visit to Russia	F3	Dec/2017	Oct/2017	The trip took part during October 2017. After discussions with the Commission we changed the destination to USA instead. See more information under action F3.
More than 1000 unique visitors web	E3	Dec/2017	Dec/2017	More than 2000 unique visitors.
1440 hectares have been burned	C1	Dec/2017	Not fulfilled	See discussion under Assessment as to whether the project objectives and work plan are still viable.
89 controlled burning plans	A1	May/2018	Nov/2017	91 plans completed in Nov 2017. Attached in Midterm r
14 excursions or info meetings	E6	Oct/2018	Oct/2018	
30 % of fences put up	C2	Oct/2018	Not fulfilled	See discussion under Assessment as to whether the project objectives and work plan are still viable.
Controlled burns in 45 project sites	D1	Oct/2018	Oct/2018	

1850 hectares have been burned	C1	Dec/2018	Not fulfilled	See discussion under Assessment as to whether the project objectives and work plan are still viable.
Species survey of at least on bird	D2	Dec/2108	Dec/2018	Reports attached in PR2
Exhibition on controlled burnings	E10	Dec/2018	April/2019	
1,3 ha of coniferous woodland	C4	Jan/2019	Dec/2017	Completed in December 2017
89 project signs	E1	Jan/2019	April/2020	101 signs
2 major seminars and 5 minor	E5	Dec 2019	Dec/2019	Final seminar April 2021
2046 (1943 is the correct) hectares have been burned	C1	Dec/2019	Aug/2020	2544 ha
28 excursions or information meet	E6	Dec 2019	Sep/2020	In total 89 meetings
A report describing population state	D2	Dec/2019	Dec/2019	See PR2
A total of 12000m of fencing	C2	Dec/2109	June/2020	12169 m completed
After-Life plan	F4	Dec/2109	Dec/2020	Completed in Dec 2020 see appendix 7.2:F4
Delivery of results in final report	D3	Dec/2019	April/2021	Completed in July 2021
Layman's report	E11	Dec/2019	April/2021	Completed in April 2021
Trails have been restored	E9	Dec/2019	Dec/2019	Completed in Dec 2019

During the first nine months of the project a large part of the time was put on planning and communication (both internally and externally). During the first four months of the project much time was put on explaining the content of the application and the Common Provisions. Many questions about accounting routines also arose during the start of the project. We have had a tight project management group that has been working very well together. All members of the group have been aware of the contents of the application and the great importance of the Common Provisions. The great importance of always checking that the objectives of different actions are met is well understood by all members of the project. The areas of responsibility have also been well understood. Intense communication within the project management group combined with meetings and field visits have led to a constructive climate that has prevented many problems.

Due to quite extreme weather during the spring and summer of 2017 our plans were halted. In northern part of Sweden, it was impossible to find any day suitable for burning during the whole summer of 2017. And thus, the project lost the chance to burn at least like 400 ha that were planned and ready for burning. But during the burning season of 2018 the project was able to burn almost 530 ha.

And to make this extra more impressive one must keep in mind that during the summer of 2018 we had a lot of wildfires during some part of the summer that made it impossible for us to conduct any controlled burnings. During the time of the project the partners have learnt to use the first day that is good for burning, and not wait for that very perfect day. That very perfect day might not occur even once during a whole burning season some years. This might sound like a simple thing to realize, but it takes some year of practical work with burning in the field to fully understand this. And thus, this is a major achievement in the small scale within the project.

Except from the delay mentioned above Life-Taiga has for sure been a well running project.

During 2017 we realized that we had to be able to find some way to get the project extra time. And thus, we started to discuss with the Commission about sending in an amendment request. In February 2019 the amendment was sent, and it was accepted in June 2019. A summary of this is presented below:

The amendment application includes three proposed modifications, which will be elaborated below. It concerns the

- addition of a new associated beneficiary (SEPA)
- extension of the project duration (within present budget) and
- changes in geographical scope/ site modification.

These modifications will not result in changes to overall project objectives, goals, and budget.

When the amendment was accepted, it meant the following:

Year 2019 was the last year of the project, according to plan. To counteract for the risk of less favourable weather conditions during the coming summer increased the chances of achieving the project results foreseen finalising the entire project fulfilment with two solutions:

1. Prolong the project duration with another summer season, that is another project year, within the same budget frame. The Life Taiga project would then end by 30th November 2020, instead of 31st December 2019.
2. Establish a flexibility between the participating CABs as a buffer regarding location of the remaining areas are burnt. We would like to allow those counties in southern Sweden that have already accomplished their goal and have money left for actions, to conduct more C1-actions, to cover up for the northern counties which may have fewer good possibilities to accomplish their goal depending on the coming weather conditions.

The proposed approach ensured that the overall goals was reached on a national level.

The present co-financer SEPA Swedish Environmental Protection Agency offered to enter the project as an associated beneficiary, with the responsibility to take the costs for the final seminar (action E5). This ensured a more efficient country wide and international dissemination and transfer of results.

The inclusion of SEPA as a partner allowed the project to solve the problem with reaching the 2% rule, because the project have had a higher proportion of costs for permanent personnel than originally foreseen.

The final seminar was not stated as a separate action post within E5 in the proposal, but as a part of the total E5 seminars, which is why we have not been able to specify the SEPA contribution to this activity in the budget overview, without changing the total sum. SEPA finances the entire project with 2.886.393 Euro, whereof 40.000 Euro covered the costs for the final seminar.

In November 2020 a second amendment was accepted, this only includes the postponing of the Final seminar until April 2021 related to the situation with Covid-19. The Final seminar was held on April 20-21, 2021.

Under chapter 3 we discuss the objectives and the problem of the project and we also present important insects and birds favoured by the project.

Under chapter 4 we discuss the phases of the project and evaluates the management system.

Under chapter 5 we put a lot of effort to present the result from the concrete restoration actions. Especially action C1 is presented in a rich way with many tables and figures.

2.1 Answers to questions on the Progress report 3 (Nov 2020)

Technical issues

C1. The project results of controlled burning have been conducted on 2544 ha. This corresponds with 0,2 % of the total habitat area of Western taiga (9010) in Sweden. More detailed statistics are found in section 5.1. on action C1 Table 4.

C2. Maps for all sites where fences have been constructed are attached as appendix 7.2:C2. More information can also be found under action C2 in this report.

C4. See section 5.1 on action C4.

D1. Explanations can be found under action D1 in this report.

D2. The two species of the EU habitats' directive are: Slät tallkapuschongbagge (*Stephanopachys linearis*)* and grov tallkapuschongbagge (*Stephanopachys substriatus*). Both are most dependent on burnt forest for their long-term survival.

The tree species in the Annex 1 in the Birds Directive are European nightjar (*Caprimulgus europaeus*), black woodpecker (*Dryocopus martius*) and three-toed woodpecker (*Picoides tridactylus*).

The European nightjar is favoured by dead trees and more open forests with more broadleaved trees. See more under action D2.

E3. The correct information about the end date of the project and the role of SEPA in the project is now published in the website.

E5. A list of all seminar can be found at the text concerning action E5.

The Final seminar of the project was held 20-21 April 2021. The program of the seminar is attached as appendix 7.3:E5a and the participant list are attached as appendix 7.3:E5b.

E8. See the text concerning action E8.

Financial issues from MR

9. We attach the personnel documentation for the seven mentioned persons. See financial report for more information.

14. We attach copies of the two deliverables. See financial report for more information.

The missing documents concerning the reindeer moss bas and the movie production (E3) are attached in this report, appendix 8a

3. Introduction

Swedish forests have until the 1800s, been burned on a regular basis. The fires have occurred every 20 to 50 years, usually started by lightning. During the 1800s and 1900s, the number of fires has reduced drastically, to the point where they are virtually non-existent today. Up until some 150 years ago, 1 % of the wooded area burned annually in Sweden by natural fires. Today less than 0.016 % burns annually.

The reduction in the frequency of fires is one of the major ecological changes that have taken place in woodlands since the 1800s. Fire, has over time, exerted a strong selection pressure, which has led to the development of pyrophilic organisms. We know today that some 40 insects and some 50 fungi species are dependent on burned wood and burned ground for their survival. Hundreds of other species among other insect taxa such as flies, bees, and crabronids are also favoured by fire.

Controlled burning for nature conservation in most sites is a requirement for western taiga (9010), and to some extent also coniferous forests on, or connected to, glaciofluvial eskers (9060) to develop favourable conservation status. If burning is not applicable, other disturbing such as grazing or mechanical disturbance can be used. Specific nature values in some types of 9010 may benefit from being completely undisturbed. Controlled burning creates a lot of dead wood, reduce the humus layers and kills a lot of invading spruce trees and is thus a multifactor action and the effect will stay for at least up to 20-25 years (and in many cases up to 50-100 years) and is therefore to seen as a very cost-effective way to conduct nature conservation. Burning will have a positive effect on many species of insects, mushroom, plants and birds.

Objectives of Life-Taiga are:

1. To transform a significant proportion of the area of the annex 1 habitat type western taiga (9010) in Sweden, from unfavourable to favourable conservation status.
2. To develop the methods for controlled burning and to train and encourage authorities, companies, organizations and contractors associated with controlled burning.
3. To promote a dialogue and deliver good quality, easy to understand information to landowners, local residents, visitors and the general public.
4. To develop mutual collaboration with Finland in relation to the management of the annex I habitat type western taiga.

Problems:

1. Controlled burning is a risky and very weather dependent activity. A lot of work is needed in planning a burning. And unfavourable weather might spoil a season totally.
2. The public opinion might sometimes be very negative to controlled burning. A lot of communicative work is needed to avoid this problem.
3. There are few companies that work with controlled burning and thus the project has offered more work than those companies can handle. This had slowed down implementation of the burning action.

4. Some of the partners had no or very little experience of controlled burning before the project started, this meant that they had a lot to learn before they could start the work in field.

Expected longer term results:

In general, it can be said that all burnings have had good results and have reached the goals set in the burning plans. The effect on the habitat have been very promising in all the burned areas. Since many effects on species will be seen over many years it is a bit hard to draw a lot of conclusions only a year after some of the burning events. Concerning insects, we have already after some years a lot of good results can be seen at all the burned sites. Good examples can be found here:

[Sotsvart praktbagge flyttar omedelbart in på Västersjön - LifeTaiga](#)

[”Kvitto på att det funkar” - LifeTaiga](#)

[Rödlistade arter funna i inventering inom Taiga under 2018 - LifeTaiga](#)

The insects are very favoured by the large number of fire-damaged trees that are produced during the burn. Also, the long-term production of dead wood is most favourable for the insects. The woodpeckers (*Dryocopus martius* and *Picoides tridactylus*) are very much favoured by the large number of insects that are produced in the fire-damaged wood and the dead wood. Good examples can be found here:

[Hacke trivs efter naturvårdsbränningar - LifeTaiga](#)

Lack of dead wood is one main issue and constrains for many red listed species that have been discussed by researchers for a long time, Life-Taiga promotes an elegant solution to this problem. Also, many uncommon mushrooms and insects find great use of all the dead wood created after a burning. Most of the other effects are seen during a longer-term period and is a bit difficult to make conclusions about at this early stage. The structural change within the actual forest we must wait for some more years before it can be fully seen. The European nightjar (*Caprimulgus europaeus*) is very much favored by this more long-time effect.

The good results with controlled burning within Taiga have led to a large discussion initiated by the Swedish Environmental Protection agency (SEPA) about the great possibilities to create very cost effective and most important nature conservation by increasing the numbers of controlled burnings in Sweden. SEPA is very interested in promoting controlled burning to those counties not involved in the Taiga-project. Also, those counties involved in Taiga have plans for increased work with burning after the project has ended. Thus Life-Taiga has created a good impact and will create a lot of good conservation work after the project has ended. After the project all sites included will undergo proper monitoring for a long time and all the areas and facilities will also get proper management financed by money from regular sources.

4. Administrative part

4.1 Description of the management system

The County Administrative Board of Västmanland has been the coordinating beneficiary. The other beneficiaries have been the following 13 County Administrative Boards:

Norrbottnen, Västerbotten, Jämtland, Västernorrland, Dalarna, Gävleborg, Värmland, Örebro, Södermanland, Östergötland, Jönköping, Kronoberg, Kalmar and SEPA since the amendment no 1 in 2019.

The steering group was formed in November 2014 and the first meeting was held in November 2014. This group usually holds meetings 3-4 times a year. The project manager attends all these meetings and acts as secretary at the meetings. The project group in Västmanland started the project on January 2, 2015. No costs have been taken on the project before this date.

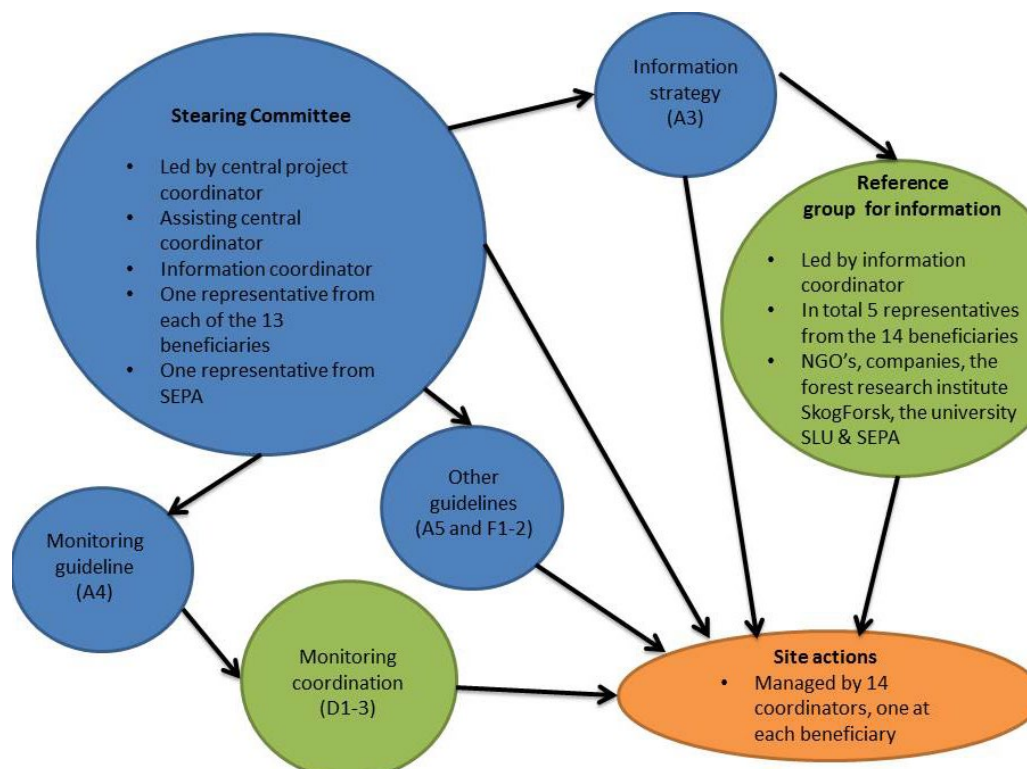


Figure 1. Organigramme of the project team and the project management structure

The project management team has held meetings regularly (usually twice a month). The first meeting was held in the beginning of February 2015. Outside the meetings there has been tight information exchange between all partners. The project management team has also paid visits to all the associated beneficiaries in the project to discuss about regulations and routines. The importance of the Common Provisions has been explained. The content of the application and the great importance of always checking that the objectives of different actions are met have been explained. The areas of responsibility have been explained. Dates for payment have been established. Contacts have been established with experts within fields such as forestry, insects and plants.

During the first phase the focus was put on planning the controlled burning. Since controlled burning is both a risky and very weather dependent activity requiring a lot of planning and communication. The first phase of the project lasted for like one year. During the second phase the large-scale controlled burning were started, this phase lasted until the autumn of 2020. After this the reporting phase started, this will last until the final report is completed.

In February 2016 Ulrika Mogren replaced Jenny Eldh as project communicator. The assistant project manager (Erik Andersson) left the project temporarily from July 2016 to May 2017 due to parental leave. In August 2017 Julia Carlsson replaced Erik Andersson as assistant project manager. In March 2020 Martina Pettersson replaced Helena Blomquist as financial manager.

Reports delivered since the start of the project

- A1 Burning plans (118 completed, 107 of them attached in Midterm report and PR2 + 11 more plans attached in PR3)
- -2 Management plans (the nine completed plans were attached in Midterm report + one more plan in PR2)
- A3 Communication strategy (an updated version attached in Midterm report)
- A3 Graphical guidelines (attached in Inception report)
- A4 Monitoring strategy (attached in Inception report), and final version attached in this report
- A6 Risk Assessment (attached in Inception report)
- D3 Material (questionnaire and interview questions) attached in Midterm report.
- E1 Five improved nature reserve signs (attached in PR3)
- E2 National and regional leaflet (attached in PR 1). Three examples of regional leaflets attached in Midterm report)
- E2, Rollup (attached in PR 1)
- E5. Information from National launch seminar (attached in PR 1)
- F3 Lessons-learned report (attached in Midterm report)
- F4 After life plan, attached in this report
- E11 Layman's report, attached in this report
- E5 Information final seminar attached in this report

4.2 Evaluation of the management system

The project management group has been working very well together. All members of the group are aware of the contents of the application and the great importance of the Common Provisions. The great importance of always checking that the objectives of different actions are met is well understood by all members of the project. The areas of responsibility have also been well understood.

An initial problem was that some of the partners had very limited or almost no experience of participating in Life-projects. Intense communication within the project management group combined with meetings and field visits have led to a constructive climate that that have prevented many problems.

The communication with the Commission and the Monitoring team has been running well and both parts are easy to communicate with and are very understanding to the project's possible problems.

5. Technical part

5.1. Technical progress, per task

5.1.1. Preparatory actions (Category A)

A1. The planning of the work with plans for controlled burning started in February 2015. The first draft of the work plans were written in the spring and several were completed in late spring and early summer of 2015. In total 129 plans have been completed. 89 plans were foreseen in the application. A few more plans were completed during 2019, this is linked to the amendment that was sent in during the beginning of 2019.

All 11 plans that have been completed during the latter part of the project were attached in the PR3.

A2. The work with the minor revisions of nature reserve management plans started during the spring of 2015 and was finalized during the beginning of 2019. The plans finalized during the latter part of the project is linked to the request for amendment that was sent in during 2019. Nine minor revisions have been completed, and plans are approved by each County Board. Eleven plans were foreseen in the application, but after some more discussion we realized that two plans did not have to be changed. All plans have been attached in earlier reports. All plans were attached in MR-report and the names can be found below:

Trolltjärn
Sjulsmyran
Björnnäset
Stensryd
Ställbergsmossen
Västeråsmossen
Orrkojgölarna
Jättungsmyran
Helvetesbrännan

A3. The work with the information strategy started in January and was completed in late May 2015. The final version of the information strategy was attached in the Inception report. The graphic guidelines that will be used in the project were finished in the beginning of September 2015 (this material was attached in the Inception report). A more completed plan was attached in Midterm report.

A4. The work with the monitoring methods, nature conservation and socioeconomic indicators started during spring of 2015 and an almost completed document was attached in the Inception report. A final document is attached with this report. See appendix 7.2:A4

A5. The work with call for tenders started in January 2015. During late winter of 2015 the first tender was completed. In total there have been 273 tenders (114 direct procurements, 223 public procurements and 36 with simplified procedure) during the project time. The tenders have mostly been focused on buying material for burning (pumps and hoses) or tenders for contractors conducting the controlled burnings. In the application no quantitatively goal was set for this action.

A6. The work with risk analysis started in January 2015 and the action was completed during August 2015. The risk analysis was attached in the inception report.

5.1.2 Concrete conservation actions (Category C)

C1. After reviewing the application and comparing this with the underlying data we have realized that the actual area for action C1 in the application should be **1943** ha and nothing else (before we had 2046 ha).

The work with planning of controlled burnings started during the early spring of 2015.

In total controlled burnings have been conducted in 101 areas to the end of August 2020 and a total area of 2544 ha have been burnt (Table 2-5). In the application the goal was set to 1943 ha, and in the amendment 2292 ha. Several of the project's partners had plans for many areas to counteract the risk of not conducting any burnings at all.

The good results within this action has led to a large discussion initiated by the SEPA about the great possibilities to create very cost effective and most important nature conservation by increasing the numbers of controlled burnings in Sweden. SEPA is very interested in promoting controlled burning to those counties not involved in the Taiga-project. Also, those counties involved in Taiga have plans for increased work with burning after the project has ended. Thus, Life-Taiga has created a good impact and will create a lot of good conservation work after the project has ended. After the project all sites included will undergo proper monitoring for a long time and all the areas and facilities will also get proper management financed by money from regular sources. Life-Taiga has proved that controlled burning can be made at a large and effective scale and this will increase the efforts to conduct burning also outside the Life-project. Taiga has made burnings in protected areas normal and kind of routine. Talking of this have been going on in Sweden for ten years or more, but with the arrival of Taiga it was finally made possible. A major achievement.

During the burning season of 2018 the project was able to burn almost 518 ha, and during the season of 2020 the numbers were 847 ha. This is a very good result that would have sounded odd and unrealistic only ten years ago. At a meeting in Finland during 2009 a discussion between Finnish and Swedish conservationists arose about how large areas that would be able to burn every in each country in protected areas. The answer then was that like 50 ha every year in each country was the level that was realistic. So, 518 ha and 847 ha are a very impressive result that has affected the thinking about the possibilities and set a new standard concerning controlled burning both in Sweden and Finland. And this result has also been noticed by several other countries in Europe, Latvia, Estonia, Poland, Norway and Denmark for example. All mentioned above is examples of things that will enhance replication and transferability.

Table 2. List sorted year by year of the burnings that have been done 2015-2020.

Partner*	Site name	Area in application	Area in amendment 2018	Burned area	As plan (P) Revised (R) New (N)	Burning year
AC	Sjulsmyran - Tungspenebrännan	65		31,55	R	2015
D	Fjällmossen östra	9		6,78	P	2015
F	Stolpaberg	41		17,41	P	2015
G	Våraskröv	3		3,66	P	2015
H	Allgunnen Påsetegen			6,74	R	2015
H	Smedjevik	12		10,85	R	2015
S	Brattforsheden	16		9,24	R	2015
S	Västersjön (norra)			38,99	N	2015
S	Västersjön (södra)	56		30,29	R	2015
T	Ställbergsmossen	26		16,19	P	2015
T	Ställbergsmossen			1,98	P	2015
T	Ställbergsmossen			2,21	P	2015
T	Ställbergsmossen			7,08	P	2015
T	Västeråsmossen	33		27,54	P	2015
T	Västeråsmossen			7,59	P	2015
W	Haftahederna Vimyran			1,93	P	2015
W	Skattlösberg Hälsingkullen			4,63	P	2015
X	Djupsjön-Römmaberget	4		4,8	P	2015
X	Lomtjärn	11		4,09	R	2015
X	Stora Korpimäki	5		4,97	P	2015
Y	Helvetesbrännan Åkroken			14,26	P	2015
Y	Helvetesbrännan, Östra Flisternäset	45		31,47	P	2015
Y	Oringsjö/Mo-Långsjön, N	10		6,46	P	2015
Z	Brötarna	8		5,69	R	2015
AC	Tjäderberget - Spoludden	58		35,58	P	2016
D	Fräkenkärret	13		13,42	P	2016
D	Ormsjöbergen	5		5,18	P	2016
E	Kärnskogsmossen Stora dämmet	12		12,64	P	2016
F	Solgens södra övärld (Kraftö)	6		6,16	P	2016
F	Stora och lilla Fly	14		17,59	R	2016
G	Singeltorps fly	22		27,14	R	2016
G	Storasjö (Tonaberg)	21	19,44	19,46	R	2016
G	Årshultsmyren N	9		9,36	N	2016
H	Allgunnen Krogölen			16,53	N	2016
H	Allgunnen Lövö			19,02	N	2016
H	Bödakustens östra naturreservat	15		27,27	R	2016
H	Kvarntorpet	15		15,95	P	2016
T	Römyren	14		5,12	P	2016
T	Römyren			1,84	P	2016
T	Römyren			1,06	N	2016
T	Römyren			26,09	N	2016

T	Römyren			2,16	R	2016
U	Lappland			20,27	N	2016
W	Hästingsflotten Rutån			3,25	P	2016
X	Färnebofjärden - Hemrevallen			14,26	N	2016
X	Ålkarlstjärnarna	14		13,34	P	2016
Y	Jämtgaveln, Bodmyran			40,42	P	2016
Y	Nipsippan vid Krången	1		1,37	P	2016
Z	Helvetesbrännan	8		8,64	P	2016
AC	Liksgelisen	47	27,24	25,74	P	2017
AC	Västermark - Hundmyrbrännan	19	7,52	9,69	R	2017
BD	Tolikheden	13		13,88	P	2017
E	Orrkojgölarna Nordöstra			8,48	N	2017
E	Åsvikelandet-Kvädö Baggholmen			23,96	R	2017
G	Bockaskruv	18		19,44	R	2017
G	Stocksmyr Norrsjön			22,94	N	2017
S	Brännan	24		12,24	R	2017
U	Lappland			5,49	N	2017
U	Lappland			4,31	N	2017
U	Lappland			4,3	N	2017
U	Stora Flyten			9,87	P	2017
W	Fux-Andersknallarna	31		30,94	R	2017
W	Tenningbrännan	19		9,89	R	2017
X	Färnebofjärden Ökestavallen			39,84	N	2017
Y	Jämtgaveln, Entréområdet			2,3	N	2017
Y	Oringsjö/Mo-Långsjön, S			8,52	R	2017
AC	Isklinten	30		11,58	P	2018
AC	Sjulsmyran - Larsbäcksholmarna	7		13,65	R	2018
AC	Sjulsmyran - Sprintarlunden	5,53		7,33	R	2018
AC	Sjulsmyran - Trettitalsbrännan	22,52		21,94	R	2018
AC	Stavaliden	37		39,78	P	2018
BD	Jylkkyvaara			9,31	R	2018
BD	Tervavuoma	73		31,91	R	2018
E	Bibergskärren Norrholmen			6,71	N	2018
E	Bibergskärren Storholmen	10		10,11	P	2018
E	Orrkojgölarna Holmarna	4		6,69	R	2018
G	Storasjö Klocknaberg N			19,29	N	2018
G	Storasjö Klocknaberg S			16,34	N	2018
H	Allgunnen Sjömunnen			0,69	N	2018
T	Römyren			11,56	N	2018
U	Stora Flyten			12,96	P	2018
W	Haftahederna Vimyran Oståsen	32		13,91	N	2018
W	Skattlösberg Silmamossen			28,7	N	2018
X	Börningsberget			23,56	N	2018
X	Ensjölokaler			11,85	N	2018
X	Färnebofjärden Öberget N			28,81	N	2018

X	Färnebofjärden Öberget S	39		40,46	P	2018
X	Hagåsen			19,00	N	2018
X	Stensjön			8,81	N	2018
X	Stora Sundsjöberget	49		50,28	P	2018
Y	Jämtgaveln, Bastunäset N			8,7	P	2018
Y	Jämtgaveln, Bastunäset S			22,83	N	2018
Y	Stormyran Lommyran, Östra bränningen			27,65	N	2018
Z	Lungsjöskogen			13,3	N	2018
BD	Tervavuoma			28,56	N	2019
D	Fjällmossen västra			3,7	P	2019
F	Stolpaberg			20,26	P	2019
H	Björnnäset 1	10		9,44	P	2019
H	Björnnäset 2			5,47	N	2019
S	Fräkensjömyrarna		19,54	21,16	N	2019
S	Fräkensjömyrarna		22,68	23,41	N	2019
S	Fräkensjömyrarna		23,28	24,07	R	2019
T	Ställbergsmossen			43,71	N	2019
U	Skommarmossen		2,43	4	N	2019
U	Stora Flyten	51		30,66	P	2019
W	Gåsberget Stockåstjärn	52	52,03	7,5	R	2019
W	Haftahederna Svenmyran			20,52	R	2019
W	Långön		13,61	13,17	N	2019
AC	Buberget - Vägmyråsen	38	39,12	18,00	P	2020
AC	Jättungsmyran - Kammen	46,0	31,91	16,89	R	2020
AC	Jättungsmyran - Småholmarna			6,24	N	2020
AC	Kammen		6,75	7,00	N	2020
BD	Tervavuoma		19,49	19,49	N	2020
BD	Tervavuoma		18,74	18,74	N	2020
BD	Tolikheden			16,62	N	2020
F	Nennesmo		22,05	10,1	N	2020
G	Stocksmyr Nässjön			16,75	N	2020
G	Storasjö Bostorp		26,68	26,68	N	2020
S	Brattforsheden - Kittelfältet			4,33	N	2020
S	Västersjön - nordväst			17	N	2020
T	Römyren			9,88	N	2020
W	Gåstjärnskölen		12,26	14,29	N	2020
W	Gåstjärnskölen Ormnäset		12,26	5,46	N	2020
W	Rensjön		32,46	36,60	N	2020
W	Skattlösberg Stormossholmen	36	17,89	25,64	R	2020
W	Skissen		15,33	8,98	N	2020
X	Färnebofjärden - Öbyhalvön			451,32	N	2020
Y	Jämtgaveln, Vårsjöbrännan	143		74,7	R	2020
Y	Jättjärn			5,94	N	2020
Y	Stormyran Lommyran, Hättena		36,57	36,57	N	2020

* D – Södermanlands län, E – Östergötlands län, F – Jönköpings län, G – Kronobergs län, H – Kalmar län, S – Värmlands län, T – Örebro län, U – Västmanlands län, W – Dalarnas län, X – Gävleborgs län, Y – Västernorrlands län, Z – Jämtlands län, AC – Västerbottens län, BD – Norrbottens län.

Table 3. List sorted partner by partner of the burnings that have been done 2015-2020.

Partner*	Site name	Area in application	Area in amendment 2018	Burned area	As plan (P) Revised (R) New (N)	Burning year
AC	Sjulsmyran - Tungspenebrännan	65		31,55	R	2015
AC	Tjäderberget - Spoludden	58		35,58	P	2016
AC	Liksgelisen	47	27,24	25,74	P	2017
AC	Västermark - Hundmyrbrännan	19	7,52	9,69	R	2017
AC	Isklinten	30		11,58	P	2018
AC	Sjulsmyran - Larsbäcksholmarna	7		13,65	R	2018
AC	Sjulsmyran - Sprintarlunden	5,53		7,33	R	2018
AC	Sjulsmyran - Trettitalsbrännan	22,52		21,94	R	2018
AC	Stavaliden	37		39,78	P	2018
AC	Västermark - Gåsnabben			11,72	R	2019
AC	Buberget - Vägmyråsen	38	39,12	18,00	P	2020
AC	Jättungsmyran - Kammen	46,0	31,91	16,89	R	2020
AC	Jättungsmyran - Småholmarna			6,24	N	2020
AC	Kammen		6,75	7,00	N	2020
BD	Tolikheden	13		13,88	P	2017
BD	Jylkkyvaara			9,31	R	2018
BD	Tervavuoma	73		31,91	R	2018
BD	Tervavuoma			28,56	N	2019
BD	Tervavuoma		19,49	19,49	N	2020
BD	Tervavuoma		18,74	18,74	N	2020
BD	Tolikheden			16,62	N	2020
D	Fjällmossen östra	9		6,78	P	2015
D	Ormsjöbergen	5		5,18	P	2016
D	Fräkenkärret	13		13,42	P	2016
D	Fjällmossen västra			3,7	P	2019
E	Kärnskogsmossen Stora dämmet	12		12,64	P	2016
E	Orrkojgölarna Nordöstra			8,48	N	2017
E	Åsvikelandet-Kvädö Baggholmen			23,96	R	2017
E	Bibergskärren Norrholmen			6,71	N	2018
E	Bibergskärren Storholmen	10		10,11	P	2018
E	Orrkojgölarna Holmarna	4		6,69	R	2018
F	Stolpaberg	41		17,41	P	2015
F	Solgens södra övärld (Kraftö)	6		6,16	P	2016
F	Stora och lilla Fly	14		17,59	R	2016
F	Stolpaberg			20,26	P	2019
F	Nennesmo		22,05	10,1	N	2020
G	Våraskruv	3		3,66	P	2015

G	Singeltorps fly	22		27,14	R	2016
G	Storasjö (Tonaberg)	21	19,44	19,46	R	2016
G	Årshultsmyren N	9		9,36	N	2016
G	Bockaskruv	18		19,44	R	2017
G	Stocksmyr Norrsjön			22,94	N	2017
G	Storasjö Klocknaberg N			19,29	N	2018
G	Storasjö Klocknaberg S			16,34	N	2018
G	Stocksmyr Nässjön			16,75	N	2020
G	Storasjö Bostorp		26,68	26,68	N	2020
H	Allgunnen Påsetegen			6,74	R	2015
H	Smedjevik	12		10,85	R	2015
H	Allgunnen Krogölen			16,53	N	2016
H	Allgunnen Lövö			19,02	N	2016
H	Bödakustens östra naturreservat	15		27,27	R	2016
H	Kvarntorpet	15		15,95	P	2016
H	Allgunnen Sjömunnen			0,69	N	2018
H	Björnnäset 1	10		9,44	P	2019
H	Björnnäset 2			5,47	N	2019
S	Brattforsheden	16		9,24	R	2015
S	Västersjön (norra)			38,99	N	2015
S	Västersjön (södra)	56		30,29	R	2015
S	Brännan	24		12,24	R	2017
S	Fräkensjömyrarna		19,54	21,16	N	2019
S	Fräkensjömyrarna		22,68	23,41	N	2019
S	Fräkensjömyrarna		23,28	24,07	R	2019
S	Brattforsheden - Kittelfältet			4,33	N	2020
S	Västersjön - nordväst			17	N	2020
T	Ställbergsmossen	26		16,19	P	2015
T	Ställbergsmossen			1,98	P	2015
T	Ställbergsmossen			2,21	P	2015
T	Ställbergsmossen			7,08	P	2015
T	Västeråsmossen	33		27,54	P	2015
T	Västeråsmossen			7,59	P	2015
T	Römyren	14		5,12	P	2016
T	Römyren			1,84	P	2016
T	Römyren			1,06	N	2016
T	Römyren			26,09	N	2016
T	Römyren			2,16	R	2016
T	Römyren			11,56	N	2018
T	Ställbergsmossen			43,71	N	2019
T	Römyren			9,88	N	2020
U	Lappland			20,27	N	2016
U	Lappland			5,49	N	2017
U	Lappland			4,31	N	2017
U	Lappland			4,3	N	2017

U	Stora Flyten			9,87	P	2017
U	Stora Flyten			12,96	P	2018
U	Skommarmossen		2,43	4	N	2019
U	Stora Flyten	51		30,66	P	2019
W	Haftahederna Vimyran			1,93	P	2015
W	Skattlösberg Hälsingkullen			4,63	P	2015
W	Hästingsflotten Rutån			3,25	P	2016
W	Fux-Andersknallarna	31		30,94	R	2017
W	Tenningbrännan	19		9,89	R	2017
W	Haftahederna Vimyran Oståsen	32		13,91	N	2018
W	Skattlösberg Silmamossen			28,7	N	2018
W	Gåsberget Stockåstjärn	52	52,03	7,5	R	2019
W	Haftahederna Svenmyran			20,52	R	2019
W	Långön		13,61	13,17	N	2019
W	Gästjärnskölen		12,26	14,29	N	2020
W	Gästjärnskölen Ormnäset		12,26	5,46	N	2020
W	Rensjön		32,46	36,60	N	2020
W	Skattlösberg Stormossholmen	36	17,89	25,64	R	2020
W	Skissen		15,33	8,98	N	2020
X	Djupsjön-Römmaberget	4		4,8	P	2015
X	Lomtjärn	11		4,09	R	2015
X	Stora Korpimäki	5		4,97	P	2015
X	Färnebofjärden - Hemrevallen			14,26	N	2016
X	Ålkarlstjärnarna	14		13,34	P	2016
X	Färnebofjärden Ökestavallen			39,84	N	2017
X	Börningsberget			23,56	N	2018
X	Ensjölokaler			11,85	N	2018
X	Färnebofjärden Öberget N			28,81	N	2018
X	Färnebofjärden Öberget S	39		40,46	P	2018
X	Hagåsen			19,00	N	2018
X	Stensjön			8,81	N	2018
X	Stora Sundsjöberget	49		50,28	P	2018
X	Färnebofjärden - Öbyhalvön			451,32	N	2020
Y	Helvetesbrännan Åkroken			14,26	P	2015
Y	Helvetesbrännan, Östra Flisternäset	45		31,47	P	2015
Y	Oringsjö/Mo-Långsjön, N	10		6,46	P	2015
Y	Jämtgaveln, Bodmyran			40,42	P	2016
Y	Nipsippan vid Krången	1		1,37	P	2016
Y	Jämtgaveln, Entréområdet			2,3	N	2017
Y	Oringsjö/Mo-Långsjön, S			8,52	R	2017
Y	Jämtgaveln, Bastunäset N			8,7	P	2018
Y	Jämtgaveln, Bastunäset S			22,83	N	2018
Y	Stormyran Lommyran, Östra bränningen			27,65	N	2018
Y	Jämtgaveln, Vårsjöbrännan	143		74,7	R	2020

Y	Jättjärn			5,94	N	2020
Y	Stormyran Lommyran, Hättena		36,57	36,57	N	2020
Z	Brötarna	8		5,69	R	2015
Z	Helvetesbrännan	8		8,64	P	2016
Z	Lungsjöskogen			13,3	N	2018

* D – Södermanlands län, E – Östergötlands län, F – Jönköpings län, G – Kronobergs län, H – Kalmar län, S – Värmlands län, T – Örebro län, U – Västmanlands län, W – Dalarnas län, X – Gävleborgs län, Y – Västernorrlands län, Z – Jämtlands län, AC – Västerbottens län, BD – Norrbottens län.

Table 4. Overview of burnt areas as a share of the Western taiga habitat (9010*) in Sweden and per counties.

Partner	County	Area (1000 ha)		Share of forest land
		Sum of forest land per county	Total land area per county	
D	Södermanlands län	372	605	61%
E	Östergötlands län	682	1 073	64%
F	Jönköpings län	749	1 031	73%
G	Kronobergs län	691	838	82%
H	Kalmar län	783	1 111	70%
S	Värmlands län	1 467	1 768	83%
T	Örebro län	641	853	75%
U	Västmanlands län	340	509	67%
W	Dalarnas län	2 238	2 817	79%
X	Gävleborgs län	1 593	1 862	86%
Y	Västernorrlands län	1 854	2 110	88%
Z	Jämtlands län	3 431	4 907	70%
AC	Västerbottens län	4 020	5 471	73%
BD	Norrbottens län	5 632	9 687	58%
	Sum of forest land of Life Taiga partners	24 493		
	Total area of 9010 Western Taiga¹	25 768		92% of total forest land is Western Taiga in Sweden
	Total area of forest land in Sweden	27 900		8,7% of the total forest land in Sweden is protected
	Total area of protected forest land in Sweden (coniferous forests)²	1 266		4,9% of the protected coniferous forests is Western taiga
	Total land area in Sweden	40 700		
	Controlled burning in Life Taiga	2,5		Corresponds with 0,2% of the protected coniferous forest land in Sweden, which is mainly 9010*.

¹ Statistics Sweden (SCB) 2013. Markanvändningen i Sverige 2010 (Land use in Sweden 2010)

² Statistics Sweden (SCB) 2018-2020

https://www.statistikdatabasen.scb.se/pxweb/sv/ssd/START__MI__MI0603__MI0603D/FormelltSkydd/

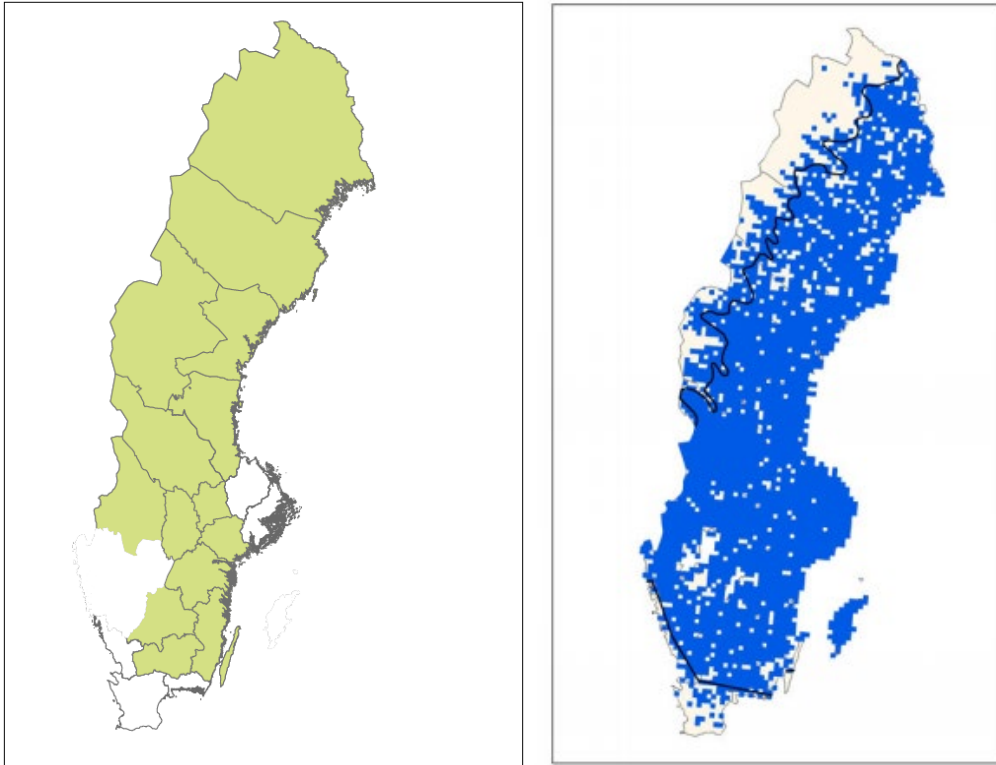


Figure 2. Maps over participating counties (left) and habitat distribution area of Western Taiga (9010*) in Sweden.

Table 5. Overview of burnings in hectares per year.

Partner	2015	2016	2017	2018	2019	2020	Total 2015-2020	Application	Amendment
AC län	31,5	35,9	35,4	94,3	11,7	48,1	256,6	386	381,8
BD län			13,88	41,2	28,6	54,9	138,6	91	121,9
D län	6,8	18,6			3,7		29,1	48	42,6
E län		12,6	32,4	23,5			68,5	51	87,6
F län	17,4	23,8			20,3	10,1	71,6	94	87,2
G län	3,6	56	42,4	35,6		43,4	181	91	181
H län	17,6	78,8		0,7	14,9		112	120	143,5
S län	78,5		12,2		68,6	21,3	180,6	130	156,3
T län	62,6	36,3		11,6	43,7	9,9	160,4	73	110
U län		20,3	24	13	34,7		92	136	120,5
W län	6,6	3,2	40,8	42,6	41,2	91	225,4	182	201,5
X län	13,9	27,6	39,8	182,8		451,3	715,4	156	280,2
Y län	52,2	41,8	10,8	59,2		117,2	281,2	311	291,9
Z län	5,7	8,6		13,3			27,6	74	85,2
SUM (ha):	296,4	363,2	251,7	517,8	267,8	847,2	2544	1943	2291,6

The project has arranged three courses on how to work with controlled burnings, these were planned in the proposal. The first course took place 20-21th of April 2016. 23 people attended the course where most of them work at the different CAB-partners in the project. Eight of the participant's work as contractors. These courses were financed with money from outside the project and is just to be seen as an added value.

See link below for further information within this action:

<https://www.svt.se/nyheter/lokalt/orebro/passar-pa-att-elda-i-torra-vadret-for-mangfald>

The second course took place on 16-17th of April 2018, also a 2-day basic level course. 26 participants work at different CAB-partners in the project. Six participants were contractors, also working in the Taiga project.

The third course on advanced level was held 7-9th of May 2018, preparing the participants to become controlled burning leaders. 17 participants many of whom many were CAB staff and three participants were contractors.

C2. The work with planning of fencing started 2016. A total of 12 799 m of fence have been built. 2710 m of fence have been built at Jättungsmyran (three different areas at this site), 1541 m have been built at the site Tjäderberget (increased length linked to the amendment), 500 m have been built at the site Bibergskärren, 430 m have been built at the site Orrkojgölarna (change linked to the amendment), 401 m have been built at the site Storasjö, 1217 m have been built at the site Singelstorps fly (change linked to the amendment), 2300 m have been built at the site Fux-Andersknallarna (increased length linked to the amendment), 800 m have been built at the site Gåsberget, 1150 m have been built at the site Tenningbrändan and also 200 m at the site Skattlösberg stormosse. Linked to the amendment one extra site have been fenced, this is the site Björnlandet where a total of 1550 m of fence have been built. In the application the total length planned within this action was 12 169 m and thus the goals in the application has been reached.

Table 6. All partners in this action have built fences in sites directly linked to burned areas (see attached maps, appendix 7.2:C2), except Västerbotten. In Västerbotten fences have been built at seven sub-areas in one Natura2000-site (Björnlandet). One fence has been built in direct connection to a burned area within the project. Three of the fences have been built on areas burned some years before the project started, and three fences have been built on areas where the invasive species *Pinus contorta* has been taken away through cutting outside the project. We would very much like to point out that the same ecological and conservation effect will be reached through this selection of sub-areas for fencing. Both an old burned area and a clear cut will be a perfect area for regeneration for broadleaved trees.

County	Length (m)	Location
Västerbotten (LST AC)	2710	Jättungsmyran
Dalarna (LST W)	2300	Fux-Andersknallarna
Västerbotten (LST AC)	1541	Tjäderberget
Kronoberg (LST G)	1217	Singelstorps fly

Dalarna (LST W)	1150	Tenningbrändan
Dalarna (LST W)	800	Gåsberget
Östergötland (LST E)	500	Bibergskärren
Östergötland (LST E)	430	Orrkojgölarna
Kronoberg (LST G)	401	Storasjö
Dalarna (LST W)	200	Skattlösberg stormosse
Västerbotten (LST AC)	1550	Björnlandet (after amendment)
Total	12 799	

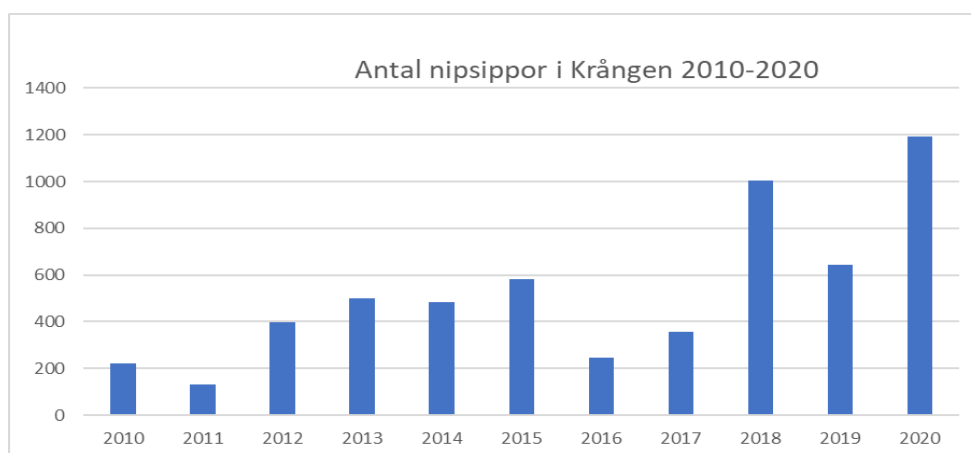
C3. The work with planning of exposing of soil in sandy biotopes started during the winter of 2015. Concrete actions have been undertaken in t areas: Haftahedarna: 2,47 ha and Skattlösbergs stormosse: 1,63 ha. In total 4,1 ha of soil have been exposed. In the application a total area of 7 ha was presented within this action for one partner (Länsstyrelsen Dalarna). We have not reached the goals within this action. The reasons are as follows:

For one area (Hästingflotten) it was not possible to create any exposed soil at all due to a very loud local opinion against the digging. The local people were very afraid that the creation of large-scale exposed soil would destroy the wild atmosphere of this area. After several information meetings with the local people without any change in opinion we had to cancel this action in the Hästingflotten area. This type of action has never been conducted in this type of habitat in Sweden, and thus it was hard to foresee the final cost. And due to this we have seen an increase in cost in this action compared what was set in the budget.

See more about this action in appendix 7.2:C3.

C4. The work with increasing the population of *Pulsatilla patens* was started during 2016. The action has involved cutting of trees and preparation for small scale burning at one area (Krången). During 2016 one burning of 1,5 ha have been conducted within this action. Four small areas have got exposed sand through work with an excavator during 2017, total area is 600-700 square meters. This is in line with the goals set in the application. Information signs has been installed during 2017. This action is thus completed at the end of 2017. And the outcome of the actions seems promising this far and the number om flowering plants have increased dramatically after the burning and exposing the soil. 2010 the number of flowering plants were counted to 222, 2020 the same area had 1192 flowering plants. Thus, the number of flowering plants has increased five times! See more about this action in appendix 7.2:C4.

Figure 3. Number of *Pulsatilla patens* at site Krången.



Monitoring of the impact of the project actions (Category D)

D1. The work with planning of monitoring part one started in January 2015 and monitoring has been carried out in a total of 101 areas to this date; 88 was foreseen in the application. 101 burning reports have been made. These includes the monitoring before, during and in many cases also after the burning event. A number of variables were monitored through photos or measurements, documentation of specific conservation values and depth of humus layer in transects. During the actual burning we recorded the ignition process and weather data.

The planning process of the database on controlled burning started in 2015, but actual creation of the inventory part of the database started during the autumn 2017, after delays and an extended procurement and requisition process when producing the product design specification and cost calculation. This was finally defined and completed by a group of specialists from the IT Service Department of the County Administrative Boards and the Department "Förvaltningsobjekt Natur", and the database has been developed by Sweco (consultancy company). A steering group has been established, which has discussed the progress continuously during the development phase and after the launch. The first version of the database was launched in June 2018, whereafter several test periods with some regional project managers in Taiga have been ongoing during 2019 and 2020. Adjustments and improvements with bugs and map imports have been conducted continuously.

The database includes an inventory part, where burning data can be reported in field and offline, and an export of data part where the information is displayed and accessible in a database. Please see appendix 7.2.D1 for screen prints and information on the content of these tools. The database will include simple functions allowing for comparison of monitoring indicators between areas, years and controlled burning events and other inventories, aiming to improve safety, planning and effectiveness in future burning events, as well as communication.

The original plan was that the database also would work as a platform that includes companies and organizations outside of Life Taiga in Sweden that conducts controlled burning. As a first step, the burning events of Life Taiga, that has already been monitored to a large extent, was planned to be registered in the web platform, allowing each county to enter their own variables in the database. As a second step, the database was planned to be complemented with burning

information from other companies and organizations, as well as developing a visualization tool of the data.

Regarding funding, the project cost for D1 turned out to be more expensive than expected in the development phase of the specification and inventory part (partly due to misunderstandings in size of the database), and the budget has been exceeded. The development and building of the inventory tool have taken almost all project time, and the counties have been collecting monitoring data in other ways meanwhile. Due to both the development delays and lack of full financial cover, the original plan to collect an extended database with information on controlled burning from external companies and organisations has not been fulfilled. After the end of the Life Taiga project, the inventory and export parts of the database will be managed by the division of Förvaltningsobjekt Natur at the IT service department of the CABs nationally.

D2. The monitoring part for birds and insects is finalised. In total 31 local inventories of insects have been conducted to this date, two on birds, and one on mushrooms. In one object, a water chemistry monitoring has been conducted too (not financed by Life Taiga). Some of these inventories have been made before the burning event and will be followed up in coming years, to examine the fire regime effects on insect and bird populations. Insect traps and bird routes have been used as monitoring indicators. It takes somewhere between 1-5 years after a burning occurrence before most of the fire dependent species find their way to the site. During 2017, the planning for a grand inventory collaboration between seven counties started. This inventory of insects was completed during 2018 and two larger reports has been attached in the previous report. Both those inventories have been conducted by external experts and have led to a lot of findings of red listed insects. Both reports also conclude that controlled burning is a most important management for pine dominated forests.

The two species of the EU habitats' directive are: Slät tallkapuschongbagge (*Stephanopachys linearis*) and grov tallkapuschongbagge (*Stephanopachys substriatus*).

Both are most dependent on burnt forest for their long-term survival. These two species have been found on a regular basis linked to many of the burnings. Both species have a quick response to the burning activities.

The tree species in the Annex 1 in the Birds Directive are European nightjar (*Caprimulgus europaeus*) black woodpecker (*Dryocopus martius*) and three-toed woodpecker (*Picoides tridactylus*).

The European nightjar is favoured by dead trees and more open forests with larger amounts broadleaved trees. The three-toed woodpecker has a very quick response to the burning events and have been seen in many areas just weeks after the actual burning feasting on insect larvae's in the dead trees.

The European nightjar and the black woodpecker have similar needs and are both favoured by forests with large dead trees for nesting. They are both also favoured by more open forests with larger number of broadleaved trees. These are exactly what we create during a burning. The response from these two species are not very rapid since they thrive from the more long-term transformation of the habitat. The long-term effect of the burnings is a more open and warm forest where lot of the spruce is killed away in favour of pine and broadleaved trees. The full positive effect for the pine trees and broadleaved trees might be seen first after 25-30 years. During a burning a lot of dead wood is created almost instantly, this is very positive for many

insects, birds and mushrooms. A well implemented controlled burning also creates a lot of slowly dying trees, this significantly increases the length of the production of new dead wood. The dying of new trees might go on for at least ten years after the burning event and creates very good condition for a long time. Burnt wood is also often very resistant to aging and stays for many tens of years after it has been created. So, a lot of good effects can be seen on the coming 25-30 years after a burning. The structural change within the actual forest we must wait for like 40-50 years before it can be fully seen.

The last two monitoring reports (one on birds and one on insects, two different reports) were attached in the PR3.

D3. A full report of this action can be found as appendix 7.2:D3. Below, a summary is presented.

Investigating project impact on enterprises and emergency services

21 interviews were held with contractors in all project counties and other forest companies that also conduct controlled burning. The interviews were held over phone, varying from 15 to 75 minutes, during 2018-2020. 14 interviews were held with head officers at selected local emergency services from all project counties 2019-2020. These interviews were also held over phone and lasted 10-35 minutes.

Clearly, the project has been an important incentive and starting point for a large share of the interviewed contractors to start or develop their business within the controlled burning sector. All interviewees confirm that the project has been crucial for developing the knowledge and expert base in conducting controlled burning and raising awareness for the nature conservation benefits from the method. Indeed, the project has established controlled burning as a standardised nature conservation method, with high impact and contribution to the national PAF goals. The network that has been established during the project years has united professionals working with controlled burning on a national scale that was not established before. The network has provided a platform to enable knowledge sharing on methods, equipment and positive nature conservation attitudes. This includes the exchange both the project partners, contractors and policy makers. Several contractors mention how the project and new tasks in conducting controlled burning has widened their understanding of the nature conservation objectives and motivated them to take on more similar contracts in that field. In addition, other forest companies also look at the project partners' experiences and knowledge in controlled burning and forest fire behaviour as a valuable role model and inspiration to develop the methods even more in their own companies.

The cooperation with the emergency services has been developed over the years. The understanding of the purpose and the trust that controlled burning for nature conservation can be undertaken safely have both increased when comparing the project start and end. On several occasions, the project has been able to share experiences with the emergency services regarding how fire behaves in woodlands and methods for lighting fires to control wildfires. This expertise has served very well at several occasions of wildfires in 2018, 2019 and 2020, when regional project managers have been contacted to assist the emergency services.

The communication and information routines with emergency services are an important part of the controlled burning. In preparation for each burning event, the regional project managers have sent a written registration to the concerned fire station, not only where the site is situated but also in neighbouring municipalities where smoke may be detected due to wind. Contact is also held with the emergency services during the controlled burning, and sometimes they have visited the ignition start. It has been clear that we need to collaborate with the emergency services to spread information on the purpose and execution of the burnings, to avoid anxiety among the public and neighbours. At some occasions, the fire stations and SOS alarm agency were overloaded with phone calls from people who were impacted by or worried about the smoke but had not received information about the ongoing controlled burning.

Visitor attitudes from several public guided events in burned areas

One objective with the monitoring of socio-economic effects was to investigate how Life Taiga has contributed to increased knowledge and understanding for controlled burning among the public.

The County Administrative Boards have been careful to engage in dialogue with the public to alleviate their concerns and justify the benefits of controlled burning.

Guided walks have been undertaken during the project for the public to describe the aim with controlled burning and to show the rare species that have returned to the woodlands following a fire. At some of the seminars, guided tours and other public events organised in the counties, we have asked the visitors to participate in a questionnaire investigating their attitudes to controlled burning before and after the meeting, their knowledge of Life projects, and how the fact that an area is burnt influences their interest to visit the area. The results from the questionnaires were presented at the final seminar and in the Layman report.

107 persons answered our questionnaires on 10 different occasions.

County	Number of respondents	Location and year
Dalarna (LST W)	18	Siljansnäs 2018
Dalarna (LST W)	18	Hästingsflotten 2018
Örebro (LST T)	12	Römyren 2018
Gävleborg (LST X)	7	Ökestavallen 2018
Värmland (LST S)	3	Fräkensjömyrarna 2019
Värmland (LST S)	3	Brännan 2019
Värmland (LST S)	15	Brännan 2019
Västerbotten (LST AC)	19	Tjäderberget 2019
Östergötland (LST E)	9	Orrkojgölarna 2019
Östergötland (LST E)	3	Åsvikelandet-Kvädö 2019

5.2 Dissemination actions

5.2.1 Objectives

The objectives of the dissemination plan are that assorted groups shall have a good knowledge about controlled burning at the end of the project.

Special attention and directed information have been foreseen for some extra vital groups, see list below:

- Fire departments
- NGO: s interested in nature conservation
- School children and students
- Land owners
- Sami villages and reindeer herders
- Large forest companies
- And media of course

5.2.2 Dissemination: overview per activity

The main goal for the dissemination plan was to increase the general knowledge about controlled burning for selected groups. This goal has been reached for example through the production of a very pedagogic long film (Levande Taiga) that can be found on YouTube and Vimeo. This film has been watched several thousand times. There has also been a lot of media attention about the activities in the project.

We have got very good reaction from the public and the assorted groups linked to the fact that we decided to offer a lot of help from the Taiga-project linked to the work with fighting the large wildfires that occurred in northern Sweden during the summer of 2018. The project helped the Fire departments with both a lot of material, knowledge and personnel from the project. This effort gave a lot credibility to the idea of controlled burning to the public, since both material and great knowledge gained within the project could be used to help the society. Linked to this the project has also spread the concept from USA about bad fires and good fires. The concept of fire prevention, if you carry out a prescribed burning to reduce the fire load in the forests has not been discussed in northern Europe before. A good fire, the one where you reduce the burnable material in the forest in a controlled way, greatly reduce the risks for an uncontrolled wildfire in that area. Thus, controlled burning at a large scale can work to reduce the risk for large wildfires, a concept that has met a lot of attention and appreciation among fire departments and part of the public.

There has also been a lot of media attention about the activities in the project. This has given a lot of knowledge about controlled burning to the public and we have got a lot of positive response on this from many groups. We have also used social media (Facebook and Twitter) to inform the public about controlled burning.

In total there have been 128 articles in newspapers (both local and national), 46 reports in radio and 32 segments in TV. Some selected examples can be found below.

Life and Natura 2000 stickers have been put on all equipment bought within the project. On all reports, signs, and other printed material the Natura 2000- and Life logo have been exposed.

On May 29, 2019 the crown princess of Sweden visited the Life-Taiga projects regional project manager in Västernorrland. During this visit the crown princess Victoria were able to visit a site (Jämtgaveln) that have been burned within the project and also got practical information about how we conduct a burning. She was also presented to a visitor facility built within the Taiga-project. This was for sure a major storefront for Life-Taiga and a lot of attention from media was obtained. Some photos and text from this visit can be found below:

<http://www.lifetaiga.se/2019/12/09/kronprinsessans-vandring-genom-taiga-landskap/>

Below some other links to good examples can be found:

<https://www.vlt.se/artikel/naturvardsbranning-i-stora-flyten-20-hektar-kommer-brannas>

<https://www.vlt.se/artikel/tio-hektar-mark-i-naturresevat-utanfor-sura-ska-brinna-ingar-i-stort-naturvardsprojekt>

<https://www.svt.se/nyheter/lokalt/ost/naturvardbranning-i-kolmarden>

<https://sverigesradio.se/sida/artikel.aspx?programid=159&artikel=7254172>

<https://www.svt.se/nyheter/lokalt/smaland/har-brinner-30-hektar-skogsmark-for-naturens-skull>

<https://sverigesradio.se/artikel/7486157>

E1. The work with information signs started during the winter of 2015, to this date 1 information sign has been completed which all of the beneficiaries has used when a controlled fire has been conducted. In total this sign has been put up at 101 project areas, the goal in the application was signs in 89 areas. Two examples of the sign were attached in the PR1.

The following number of signs have been put up at each partner:

Västerbotten:	14 signs.
Norrbotten:	3 signs.
Södermanland:	6 signs.
Östergötland:	4 signs.
Jönköping:	6 signs.
Kronoberg:	6 signs.
Kalmar:	8 signs.
Värmland	7 signs.
Örebro	6 signs.
Västmanland	4 signs.
Dalarna	10 signs.

Gävleborg	10 signs.
Västernorrland	14 signs.
Jämtland:	3 signs.

In addition to this Kalmar have produced five improved nature reserve signs. Examples of those were attached in the PR2.

E2. The work with information leaflets and rollups started during the spring of 2015. The national leaflet is completed and printed in 5000 copies, this folder and the rollup were attached in PR1. The regional folders were attached in the Midterm report. The regional folder is a frame that is filled with different maps, so they all look the same. In total, they are produced in 10 000 copies. The goals in the application were 5000 respectively 10 000 copies. This action is thus finalized.

E3. The work with website started during the winter of 2015 and the launch was in the beginning of July 2016 (www.lifetaiga.se). During the fire season the number of visitors were close to 50 per day, in the off season the number is between 1-6 unique visitors per day. The goal in the application was a website up running within four months after the start of the project, and this has been achieved. The website of the project will be up and running at least until April 30, 2026.

Except for the website the project also has a very good information channel through twitter: <https://twitter.com/lifetaiga>

The projects twitter-account has attracted even higher visitor numbers then the project website.

E4. The work with digital information started during spring of 2015. In May the QR code was produced. The OR code has been used on all info signs. Due to lack of space it was sadly enough not possible to use the QR code on the leaflets. A good dialogue with the general public has been reached this was the goal set in the application.

Due to a clever design of the website we have been able to get the app function directly on the website. The technique of designing websites has been improved since the application of the project was written and due to this fact, we were able to solve this issue in another and more elegant way. The website has been created so that it is very adapted to use in a smart phone (a responsive design). Actually, many visitors think that the website looks more attractive in a smart phone than on a computer screen. The interactive part of the website may include the map of planned burnings.

E5. The work with seminars started during the spring of 2015. One large start-up seminar has been held and the Final seminar was held in April 2021 and had 109 participants from 12 countries. The goal in the application with two major seminars have been achieved. The other goal in the application with 1-2 regional seminars have also been met.

On October 13, 2015 the national launch seminar was held in Karlstad. The agenda and list of participants of this event was attached in the MT-report.

On April 20, 2016 the project management participated in Flora & Fauna conference in Uppsala and spread information about the project and the LIFE-programme (More information about this was attached in the PR 1).

The world premiere of the Taiga-movie (Living-Taiga) was carried out on January 25, 2019 and arranged by Länsstyrelsen Dalarna, in total 50 participated. Together with this a presentation about the project was made. This movie can be seen on the project's website and on Youtube (more than 5500 views). Further information below:

www.mynewsdesk.com/se/lansstyrelsen_i_dalarnas_lan/pressreleases/idag-har-unik-film-om-eldens-betydelse-foer-naturen-vaerldspremier-paa-naturum-dalarna-2388812

Länsstyrelsen Värmland held a regional seminar on April 3, 2019. This was arranged together with many of the counties Fire departments and give information about the Life-Taiga project and controlled burning more generally. Contractors working with controlled burning were also invited. In total 60 people participated. More information can be found here:

<http://www.lifetaiga.se/2019/04/05/manga-kom-pa-seminarium-om-skogsbrand/>

The Final seminar of the project was held 20-21 April 2021. The program of the seminar is attached as appendix 7.3:E5a and the participant list are attached as appendix 7.3:E5b.

All partners in the project has held information meeting with local fire department's every spring during the last years to inform and discuss about the coming burning-season. Information about the other regional seminars can be found in the table below.

A list of at least one seminar per partner can be found below:

Partner	Date	Place	Subject	Target group	Number of participants
Norrbottn	2018-08-23	Kåbdalis	General information	University students	9
Norrbottn	2019-05-21	Kåbdalis	General information	University students	16
Västerbotten	2020-05-27	Umeå (in field)	General information	NGO: s and forest owners.	27 (several groups)
Jämtland	2019-02-21	Vålådalen	General information	General public	20
Västernorrland	2015-04-22	Sundsvall	General information	Fire departments and forest owners.	140
Dalarna	2018-01-25	Siljansnäs	General information	General public	67
Gävleborg	2017-10-01	Gysinge	General information	General public	12
Värmland	2019-04-03	Karlstad	General information	Fire departments, forest owners and contractors.	59
Västmanland	2016-04-17	Virso	General information	General public	21

Örebro	2016-09-08	Römyren	General information	School children (gymnasium)	53
	2019-10-05	Römyren	General information	School children (gymnasium)	
Södermanland	2020-04-01	Nyköping	General information	Fire departments and forest owners	24
Östergötland	2015-12-03	Linköping	General information	Fire departments and forest owners	13
	2019-09-13	Linköping	General information	Fire departments and forest owners	
Jönköping	2016-04-25	Jönköping	General information	NGO: s and people from the municipality	26
	2019-04-10	Jönköping	General information	Forest owners and farmers	
Kronoberg	2016-03-09	Växjö	General information	General public	8
Kalmar	2020-06-24	Algunnen (in field)	General information	General public	12 (two groups)

E6. The work with field excursions and information meetings started during the spring of 2015. In total 85 excursions and information meetings have been held to this date. In the application the goal was set to at least 34 excursions/meetings. A complete list of these events is attached as appendix 7.2:E6.

See link below for more information about work within this action:

<http://www.lifetaiga.se/2019/12/09/kronprinsessans-vandring-genom-taiga-landskap/>

E7. The work with network with Sami villages started during the spring of 2015. In total 13 meetings (four in Västerbotten, five in Norrbotten and four meetings in Jämtland) have been held. In the application the goal was set to 10 meetings. The most prominent of these meetings was held on March 21, 2018. It was a meeting with Sametinget (the parliament of the Sami people) with 16 participants. A presentation from this meeting was attached in the PR2.

The main goal with these meetings has been to discuss about the problems with controlled burnings linked to the keeping of reindeers. These meetings have been fruitful and attended by 3-7 people and some of them have held out in the forest. The main concern from the Sami stakeholders is that the fire consumes the lichens, this is the primary food source for the reindeers during the wintertime. And thus, this is a question of great concern for the Sami stakeholders.

On February 5, 2020 a major seminar with within this action was held in Umeå. In total almost 40 people from different Sami villages participated. A lot of interesting issues was discussed, and this was the first meeting of this magnitude ever arranged in Sweden within this subject. See attached link for more information:

E8. The work with information and dissemination for external use was a function that we added to the application since we have experience from other Life-projects that this often is a task that gets confusing and takes a lot of time away from the regional project managers.

Work within this action started directly during the winter of 2015. The main goal with this action has been to simply and make the information within the project uniform through a central communication officer. This has made the work much more professional and effective. Due to this the project has been able to save a lot of extra work if 14 counties have had to work on their one on this subject, and we have also been able to send out a uniform message. This has very much facilitated the information exchange within the project.

During the appointment of this function we were able to find a person with great experience and background from media. This has been most productive and the person in charge have supported the partners in a very good way. The production of templates for signs and texts and folders have been most vital, the person has also provided data for different other publications and of course had a lot of contacts with media. The production of the movie within the project was also one concrete result of this function. Also, during the Final seminar this person was most vital for the arrangement. In total this function has ensured that the project have had an effective and innovative approach to information and dissemination.

E9. The planning of management for visitors (trails, benches and other facilities) started during 2016. The following has been constructed within this action:

Västmanland (Stora Flyten):

5,8 km of trails, two benches, one parking lot and 600 m of board walks have been built.

In the application the goal was: 6 km of trail, two benches, one parking lot, 600 m of board.

Södermanland (Fjällmossen):

750 m trail, 150 m of board walks, one shelter and one car parking have been built.

In the application the goal was: 750 m trail, 150 m of board walk, one shelter and one car parking.

Östergötland (Orrkojgölarna)

One shelter, 70 m of boardwalk and 1,5 km of trail have been built.

In the application the goal was: One shelter, 70 m of board and 1,5 km of trail

Jönköping (all sites)

Benches and shelter replaced/repared at Kraftö (Solgen).

2000 m of trail have been improved at Stolpaberg.

In the application the goal was: All trails will be improved and benched and shelters will be repaired.

Kronoberg (Bockaskruv, Singelstorps fly and Stocksmyr):
One parking lot and 3 km of trail at Stocksmyr.
1217 m of trail at Singelstorps fly and 660 m of boardwalk at Bockaskruv.
In the application the goal was: 660 m of board walk, 3 km of trail and one car park.

Värmland (Brattforsheden and Fräkensjöarna):
1055 m of board walk built at Fräkensjöarna.
780 m of board walk built at Brattforsheden.
In the application the goal was: 1820 m of board walk.

Örebro (Västeråsmossen, Ställbergsmossen and Römyren):
5,8 km of trails have been built: 2 km m at Västeråsmossen, 3,8 km at Ställbergsmossen and 4,3 km m of board walk at Römyren. Two parking lots have also been built (Västeråsmossen and Ställbergsmossen).
In the application the goal was: Two car parks, 5,9 km of trail and 2,7 km of board walk.

Västernorrland (Jämtgaveln):
A 200 m long ramp for disabled people together with a 2 km long information trail have been built.
In the application the goal was: Construction of a ramp.

Jämtland
Four benches built and one shelter repaired (Siljeåsberget and Bollberget).
In the application the goal was: Putting up four benched and repairing one shelter.

E10. The planning of management for visitors (outdoor exhibitions and information trails). The work with outdoor exhibitions and information trails started in the spring of 2017.

Östergötland
1,5 km of trail with information have been built.
In the application the goal was: 1-2 km of trail.

Kronoberg (Algunnen)
An outdoor museum has been built during 2018. Note that this museum was built directly in connection to an area that have been burnt (this can be seen on the photos) and is thus very pedagogic. A lot of information signs have also been produced and will soon be put up in this museum. The information will focus on fire behavior and fire ecology and explain pedagogically about the need for controlled burnings. A shorter trail has also been built linked to the museum. Photos from this museum was attached in PR2.

In the application the goal was: Construction of one outdoor museum together with information signs and a shorter trail.

Jämtland
An information trail at Bolsberget has been built and equipped with information signs.
In the application the goal was: Building of one trail.

Västernorrland (Jämtgaveln):

A 200 m long ramp for disabled people together with a 2 km long information trail have been built. In the application the goal was: Construction of a 1-2 km long information trail

Dalarna (naturum)

A most interesting and informative exhibition at naturum Dalarna (Siljansnäs) was opened in 2019. This will also work is a concept that can be copied by other partners.

In direct connection to the naturum a small controlled burning has been carried out during 2018. In this way the exhibition can be linked to the real nature. Further information below:

<http://www.lifetaiga.se/2019/05/28/lar-dig-mer-om-skog-och-life-taiga-under-langhelgerna/>

In the application the goal was: Development of one exhibition for Naturum.

E11. The work with Layman's report has started during the first part of 2020 and was finalized during April 2021. In total it was printed in 13 000 copies. 10 000 in Swedish and 3 000 in English. See appendix 7.3.1E11a and 7.3.1E11b

5.3 Evaluation of Project Implementation

Large-scale controlled burnings in protected areas on a national level is something totally new from the European perspective. During the work with the application for Life-Taiga many people inflicted that we set the goals too high and that we should not be able fulfil the obligations that was set within the C1-action. This reaction of course must be seen in the perspective that back in 2014 no one had seen a large-scale project on controlled burnings in Europe. So clearly the actual implementation and to achieve (and even surpass) the set goals is a major success seen in the rear-view mirror. The total budget for C1-actions also still have some substantial amount of money left in the budget even though the goals have been surpassed, so for sure this has been a cost-effective effort.

Another major step to make controlled burning even more cost-effective was tested by the partner Gävleborg when they used ignition by helicopter, a technique used for the first time ever in Sweden within Taiga during 2018. During 2020 a second attempt with this technique was used within Taiga and made it possible to burn a total area of almost 500 during a single day. This is a breakthrough that can be spread to other parts of Sweden and other countries as well. The good results with controlled burning within Taiga have led to a large discussion initiated by SEPA about the great possibilities to create very cost effective and most important nature conservation by increasing the numbers of controlled burnings in Sweden. SEPA is very interested in promoting controlled burning to those counties not involved in the Taiga-project.

One weakness that we have spotted is the relatively low number of contractors available for conducting controlled burning in Sweden. This sometimes makes it hard to be able to implement multiple burning events on several places in Sweden at the same time.

The effect of the burning actions has shown very good results and the effect on the forest structure will stay for up to 100 years without any additional actions. Some species of insects that formerly was almost extinct in Sweden has shown up during monitoring done at some of the burned areas within Taiga, one example is, *Boros schneideri*;

[Smal skuggbagge - Artbestämning från SLU Artdatabanken \(artfakta.se\)](#)

The work within the project has inspired several European countries to start controlled burning on their own, for example: Norway, Denmark and all Baltic states.

- Compare the results achieved against the objectives:

The objectives were met very well in all burnings, burning of this scale at single spots in protected areas have never been conducted in Sweden before. The Swedish EPA have seen the need for measures of this magnitude for at least the last ten years. But they have never been able to start a project of this magnitude on their own.

When the Life-Taiga project were approved the Swedish EPA was really elevated and found this a most needed project. During the whole life span of the project the SEPA have been supportive and presented the Taiga-project as a very good example both within Sweden and for neighbouring countries: More information can be found here:

[Life mötte departementet - LifeTaiga](#)

Researchers from the Swedish University of Agricultural Sciences (SLU) have worked close together with us (founded by money from outside the project) during the whole span of the project and they are very satisfied with the effect of the burnings within the project.

- Table 7. The impact from all burnings indicated.

Partner	Site name	Impact on species/habitat
AC	Sjulsmyran - Tungspenebrännan	Good
AC	Tjäderberget - Spoludden	Good
AC	Liksgelisen	Good
AC	Västermark - Hundmyrbrännan	Good
AC	Isklinten	Good
AC	Sjulsmyran - Larsbäcksholmarna	Good
AC	Sjulsmyran - Sprintarlunden	Good
AC	Sjulsmyran - Trettitalsbrännan	Good
AC	Stavaliden	Good

AC	Västermark - Gåsnabben	Good
AC	Buberget - Vägmyråsen	Good
AC	Jättungsmyran - Kammen	Good
AC	Jättungsmyran - Småholmarna	Good
AC	Kammen	Good
BD	Tolikheden	Good
BD	Jylkkyvaara	Good
BD	Tervavuoma	Good
BD	Tervavuoma	Good
BD	Tervavuoma	Good
BD	Tervavuoma	Good
BD	Tolikheden	Good
D	Fjällmossen östra	Good
D	Fräkenkärret	Good
D	Ormsjöbergen	Good
D	Fjällmossen västra	Good
E	Kärnskogsmossen Stora dämnet	Good
E	Orrkojgölarna Nordöstra	Good
E	Åsvikelandet-Kvädö Baggholmen	Good
E	Bibergskärren Norrholmen	Good
E	Bibergskärren Storholmen	Good
E	Orrkojgölarna Holmarna	Good
F	Stolpaberg	Good
F	Solgens södra övärld (Kraftö)	Good
F	Stora och lilla Fly	Good
F	Stolpaberg	Good
F	Nennesmo	Good
G	Våraskröv	Good
G	Singeltorps fly	Good
G	Storasjö (Tonaberg)	Good
G	Årshultsmyren N	Good
G	Bockaskröv	Good
G	Stocksmyr Norrsjön	Good
G	Storasjö Klocknaberg N	Good
G	Storasjö Klocknaberg S	Good
G	Stocksmyr Nässjön	Good
G	Storasjö Bostorp	Good
H	Allgunnen Påsetegen	Good
H	Smedjevik	Good
H	Allgunnen Krogölen	Good
H	Allgunnen Lövä	Good

H	Bödakustens östra naturreservat	Good
H	Kvarntorpet	Good
H	Allgunnen Sjömunnen	Good
H	Björnnäset 1	Good
H	Björnnäset 2	Good
S	Brattforsheden	Good
S	Västersjön (norra)	Good
S	Västersjön (södra)	Good
S	Brännan	Good
S	Fräkensjömyrarna	Good
S	Fräkensjömyrarna	Good
S	Fräkensjömyrarna	Good
S	Brattforsheden - Kittelfältet	Good
S	Västersjön - nordväst	Good
T	Ställbergsmossen	Good
T	Ställbergsmossen	Good
T	Ställbergsmossen	Good
T	Ställbergsmossen	Good
T	Västeråsmossen	Good
T	Västeråsmossen	Good
T	Römyren	Good
T	Römyren	Good
T	Römyren	Good
T	Römyren	Good
T	Römyren	Good
T	Römyren	Good
T	Ställbergsmossen	Good
T	Römyren	Good
U	Lappland	Good
U	Lappland	Good
U	Lappland	Good
U	Lappland	Good
U	Stora Flyten	Good
U	Stora Flyten	Good
U	Skommarmossen	Good
U	Stora Flyten	Good
W	Haftahederna Vimyran	Good
W	Skattlösberg Hälsingkullen	Good
W	Hästingsflotten Rutån	Good
W	Fux-Andersknallarna	Good
W	Tenningbrännan	Good

W	Haftahederna Vimyran Oståsen	Good
W	Skattlösberg Silmamossen	Good
W	Gåsberget Stockåstjärn	Good
W	Haftahederna Svenmyran	Good
W	Långön	Good
W	Gåstjärnskölen	Good
W	Gåstjärnskölen Ormnäset	Good
W	Rensjön	Good
W	Skattlösberg Stormossholmen	Good
W	Skissen	Good
X	Djupsjön-Römmaberget	Good
X	Lomtjärn	Good
X	Stora Korpimäki	Good
X	Färnebofjärden - Hemrevallen	Good
X	Ålkarlstjärnarna	Good
X	Färnebofjärden Ökestavallen	Good
X	Börningsberget	Good
X	Ensjölokaler	Good
X	Färnebofjärden Öberget N	Good
X	Färnebofjärden Öberget S	Good
X	Hagåsen	Good
X	Stensjön	Good
X	Stora Sundsjöberget	Good
X	Färnebofjärden - Öbyhalvön	Good
Y	Helvetesbrännan Åkroken	Good
Y	Helvetesbrännan, Östra Flisternäset	Good
Y	Oringsjö/Mo-Långsjön, Norra området	Good
Y	Jämtgaveln, Bodmyran	Good
Y	Nipsippan vid Krången	Good
Y	Jämtgaveln, Entréområdet	Good
Y	Oringsjö/Mo-Långsjön, Södra området	Good
Y	Jämtgaveln, Bastunäset N	Good
Y	Jämtgaveln, Bastunäset S	Good
Y	Stormyran Lommyran, Östra bränningen	Good
Y	Jämtgaveln, Varsjöbrännan	Good
Y	Jättjärn	Good
Y	Stormyran Lommyran, Hättena	Good
Z	Brötarna	Good
Z	Helvetesbrännan	Good
Z	Lungsjöskogen	Good

As said before the response concerning insects is often very rapid and can in some cases be seen during the actual day of burning. The woodpeckers (*Dryocopus martius* and *Picoides tridactylus*) are very much favoured by the large number of insects that are produced in the fire-damaged wood and the dead wood and the response from them can be seen within weeks or months. The same span can be seen for fire dependent plants. The European nightjar (*Caprimulgus europaeus*) is also very much favored by dead wood for nesting and more open forests. Response concerning mushrooms can be seen after some years. Another major effect that we hope for is the transformation of the actual forest from a spruce dominated to a more pine and broadleaved dominated forest. This might take 10-20 years before this effect fully can be seen. Concerning insects, birds, plants, and some mushrooms we have seen very good response, which can be seen in the inventory reports that have been attached in previous reports. The structural change within the actual forest we must wait for some more years before it can be fully seen.

The amendment within the project has been of great value and gave the project a whole extra season for burning, this resulted in more than 800 ha extra of burned area.

The effectiveness of the dissemination has been good, and this can be measured by the increased knowledge about controlled burning among the common public in Sweden. The movie produced within the project have been very appreciated and have reached large groups through social media. The invitation of the Swedish crown princess to the project was a major success and gave very good echo in a lot of media.

5.4 Analysis of long-term benefits

5.4.1 Environmental benefits

Direct / quantitative environmental benefits:

In general, it can be said that all burnings have had good results and have reached the goals set in the burning plans. In total 2544 ha have been burnt for the 9010-habitat (action C1) and 1,5 ha have been burnt for the *Pulsatilla patens* (action C4). The effect on the habitat have been very promising in all the burned areas. Since many effects on species will be seen over many years it is a bit hard to draw a lot of conclusions only months after some of the burning events. Concerning insects, we have already seen a lot of good results for all the burned sites. Good examples can be found here:

[Sotsvart praktbagge flyttar omedelbart in på Västersjön - LifeTaiga](#)

[”Kvitto på att det funkar” - LifeTaiga](#)

[Rödlistade arter funna i inventering inom Taiga under 2018 - LifeTaiga](#)

5.4.2 Long-term benefits and sustainability

Long-term / qualitative environmental benefits

To be able to reach favourable conservation status for the 9010-habitat is most vital that the forests can gain lot of dead wood of different sizes and quality. The insects are very favoured by the large number of fire-damaged trees that are produced during the burn. Also, the long-term production of dead wood is most favourable for the insects. The woodpeckers (*Dryocopus martius* and *Picoides tridactylus*) are very much favoured by the large number of insects that are produced in the fire-damaged wood and the dead wood. The European nightjar (*Caprimulgus europaeus*) is also very much favored by dead wood for nesting and more open forests. Good examples can be found here:

[Hacke trivs efter naturvårdsbränningar - LifeTaiga](#)

Lack of dead wood is one main issue and constrains for many red listed species that have been discussed by researchers for a long time, Life-Taiga promotes an elegant solution to this problem. Also, many uncommon mushrooms and insects find great use of all the dead wood created after a burning. Most of the other effects are seen during a longer-term period and is a bit difficult to make conclusions about at this early stage. The long-term effect of the burnings is a more open and warm forest where lot of the spruce is killed away in favour of pine and broadleaved trees. The full positive effect for the pine trees and broadleaved trees might be seen first after 25-30 years. During a burning a lot of dead wood is created almost instantly, this is very positive for many insects, birds and mushrooms. A well implemented controlled burning also creates a lot of slowly dying trees, this significantly increases the length of the production of new dead wood. The dying of new trees might go on for at least ten years after the burning event and creates very good condition for a long time. Burnt wood is also often very resistant to aging and stays for many tens of years after it has been created. So, a lot of good effects can be seen on the coming 25-30 years after a burning. The structural change within the actual forest we must wait for like 40-50 years before it can be fully seen.

The good results with controlled burning within Taiga have led to a large discussion initiated by the Swedish Environmental Protection agency (SEPA) about the great possibilities to create very cost effective and most important nature conservation by increasing the numbers of controlled burnings in Sweden. SEPA is very interested in promoting controlled burning to those counties not involved in the Taiga-project. Also, those counties involved in Taiga have plans for increased work with burning after the project has ended. Thus Life-Taiga has created a good impact and will create a lot of good conservation work after the project has ended. After the project all sites included will undergo proper monitoring for a long time and all the areas and facilities will also get proper management financed by money from regular sources. The structural change within the actual forest we must wait for some more years before it can be fully seen.

Long-term / qualitative economic benefits

The project has indeed shown that controlled burnings can be carried out at a large scale in a cost-effective way. And a lot of new knowledge and experience have been gained by so many partners working together, both within the country and together with the Finnish sister project.

In the application we had set to the goal to burn 1943 ha in total (action C1), the result in the end was 2544 ha, this is 131 % of the total planned project area of 1943 ha. On top of this the project still have some substantial amount of money left in the budget for action C1. So, this have been a very cost-effective action. The cost per burning varies a lot due to different conditions and different sizes (a small burning is always more expensive per ha). A cost between 1500-2500 euro per ha is quite normal. But the project has shown that using the technique with ignition by helicopter can reduce the cost to like 200 euro per ha. This result will dramatically change the possibilities for conducting extremely cost-effective burnings. At the moment a controlled burning might seem expensive, but the effect will stay for like 50-100 years without any additional work and this has to be seen as a very cost-effective activity in the long run. And a single burning activity will ensure a favourable conservation status for the 9010-habitat for a very long time.

The Taiga-project has made it possible for many counties to start to carry out controlled burning at a large scale by gaining knowledge and material. Due to these many counties get a boost and are right now planning to conduct several burnings outside the project.

The counties not included in the project have also got the information about the good results of the project. Also, those counties are now gaining experience from Taiga and have plans to buy some material on their own to be able to start small scale burnings during the coming years. Also, burnings outside Natura2000-areas are planned as valuable compliment to the Taiga-project.

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

The European nightjar and the black woodpecker have similar needs and are both favoured by forests with large dead trees for nesting. They are both also favoured by more open forests with larger number of broadleaved trees. These are exactly what we create during a burning. The response from these two species are not very rapid since they thrive from the more long-term transformation of the habitat. The long-term effect of the burnings is a more open and warm forest where lot of the spruce is killed away in favour of pine and broadleaved trees. This is for sure also a habitat that is very attractive to visitors to the protected areas. The full positive effect for the pine trees and broadleaved trees might be seen first after 25-30 years. During a burning a lot of dead wood is created almost instantly, this is very positive for many insects, birds and mushrooms. A well implemented controlled burning also creates a lot of slowly dying trees, this significantly increases the length of the production of new dead wood. The dying of new trees might go on for at least ten years after the burning event and creates very good condition for a long time. Burnt wood is also often very resistant to aging and stays for many tens of years after it has been created. So, a lot of good effects can be seen on the coming 25-30 years after a burning. The structural change within the actual forest we must wait for like 40-50 years before it can be fully seen.

Due to the facts above we are sure that controlled burning will become much more common in the future and thus create a lot of new jobs for contractors. It is clear that the project has been an important incentive and starting point for a large share of the interviewed contractors to start or develop their business within the controlled burning sector. All interviewees confirm that the project has been crucial for developing the knowledge and expert base in conducting controlled burning and raising awareness for the nature conservation benefits from the method.

The Taiga-project has received a lot of attention from Fire departments all over the country. This is since one of the main conclusions from the massive wildfire that raged in Sweden during August 2014, was that the Fire departments did lack the skill and knowledge to manage the situation in the right way.

Due to this fact a lot of the burning within Taiga have been visited by local Fire departments that would like to get knowledge about the behaviour of a controlled fire. The county of Jönköping was invited to assist the regional Fire department with both material and personnel during a wildfire that went on for almost a week (May 28 – June 3, 2017). Of course, the time used for this was payed for by the Fire department, no cost at all was put on the Taiga-project. The same scenario was repeated during the summer of 2018 when Sweden had a lot of large wildfires. Both material, knowledge and personnel from the Taiga-project served as an important backup in the work with fighting all those wildfires.

A brand-new guidance from the Swedish Civil Contingencies Agency was attached in the PR2 and this Agency is most interested in the work within the project. Because of the Life-Taiga project a lot of writing about controlled burning has been included here. This should not have happened if the Taiga-project did not have such a good penetration into the society.

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

The good results within this action has led to a large discussion initiated by the SEPA about the great possibilities to create very cost effective and most important nature conservation by increasing the numbers of controlled burnings in Sweden. SEPA is very interested in promoting controlled burning to those counties not involved in the Taiga-project. Also, those counties involved in Taiga have plans for increased work with burning after the project has ended. In the long-term planning SEPA has stated that like 4000 ha of habitat 9010 must be burnt every year if we shall be able to create favourable conservation for this habitat on a national level. Thus, Life-Taiga has created a good impact and will create a lot of good conservation work after the project has ended. After the project all sites included will undergo proper monitoring for a long time and all the areas and facilities will also get proper management financed by money from regular sources. Life-Taiga has proved that controlled burning can be made at a large and effective scale and this will increase the efforts to conduct burning also outside the Life-project. Taiga has made burnings in protected areas normal and kind of routine. Talking of this have been going on in Sweden for ten years or more, but with the arrival of Taiga it was finally made possible. A major achievement.

Since the Taiga-project has been able to transfer a strange and risky management to something normal and well known all counties in Sweden (both those inside and outside Taiga) have put extra focus on controlled burnings and will increase the efforts during the coming years to carry out burnings in protected areas. SEPA has also been very active in promoting this work after Taiga have presented the results from the last years of burning.

The good results within the work with controlled burning within Taiga has led to a large discussion initiated by SEPA about the great possibilities to create very cost effective and most important nature conservation by increasing the numbers of controlled burnings in Sweden. SEPA is very interested in promoting controlled burning to those counties not involved in the Taiga-project. Also, those counties involved in Taiga have plans for increased work with burning after the project has ended. Thus Life-Taiga has created a good impact and will create a lot of good conservation work after the project has ended. After the project all sites included will undergo proper monitoring for a long time and all the areas and facilities will also get proper management financed by money from regular sources.

The effect of the Taiga-project is to boost the work with controlled burnings for many years to come. And this is also spreading to other countries in Europe.

5.4.4 Replicability, demonstration, transferability, cooperation:

Due to the seminar that we arranged in Finland the knowledge of controlled burnings have been spread to several other countries in Europe.

During the burning season of 2018 the project was able to burn almost 518 ha and during 2020 849 ha. This is a very good result that would have sounded odd and unrealistic only ten years ago. At a meeting in Finland during 2009 a discussion between Finnish and Swedish conservationists arose about how large areas that would be able to burn every in each country in protected areas. The answer then was that like 50 ha every year in each country was the level that was realistic. So, 518 ha and 849 ha are a very impressive result that has affected the thinking about the possibilities and set a new standard concerning controlled burning both in Sweden and Finland. And this result has also been noticed by several other countries in Europe, Latvia, Estonia, Poland and Denmark for example. All mentioned above is examples things that will enhance replication and transferability.

During the time of the project the partners have learnt to use the first day that is good for burning, and not wait for that very perfect day. That very perfect day might not occur even once during a whole burning season some years. This might sound like a simple thing to realize, but it takes some year of practical work with burning in the field to fully understand this. And thus, this is a major achievement in the small scale within the project.

During 2018 Länsstyrelsen Kalmar have a lot of contacts with people in Denmark working with nature conservation (GEUS) and shared experience about how to conduct controlled burning. One person from Denmark also made a study visit to Kalmar to be able to discuss about the use of controlled fire on spot in some burned areas. During the beginning of 2019 this have been followed up by discussions of more study trips to Sweden by more several participants from Denmark. There is a large need for some kind of restoration of planted spruce and pine forests in Denmark and controlled burning seems to be one attractive option.

During 2018 there have been a lot of communication with Latvia (Sigulda National Park) of the need for controlled burning in Latvia. Exchange with Life-Taiga is most wanted, and the Swedish EPA have also been involved here. A visit to Latvia by people from Life-Taiga was performed during May 2019. All mentioned above is very good examples of replication and

transferability. Both Latvia and Denmark are most interested in copying the Swedish concept of burning. Connected to this we have also explained very properly that controlled burning is a very cost-effective way of working since the effect stays for at least 20-25 years without any maintenance or operational cost at all.

During 2020 we have had a lot of contact with Norway (Miljödirektoratet and Fylkesmannen i Oslo) concerning controlled burning. On November 5th this year we arranged a digital seminar with five participants from Norway to discuss how to start the work with prescribe burning in Norway. A two-day field trip in Värmland is also planned but has been halted due to covid-19.

5.4.5 Best Practice lessons:

The project has shown how to conduct large scale burnings with good quality in a cost-effective way. Life-Taiga has proved that burning is a very important and cost-effective way to restore habitats within 9010. See further above.

5.4.6 Innovation and demonstration value:

The main thing here is the transformation of knowledge to several other countries in Europe.

During the burning season of 2018 the project was able to burn almost 518 ha and during 2020 even higher number with 849 ha. These are very good results that would have sounded odd and unrealistic only ten years ago. At a meeting in Finland during 2009 a discussion between Finnish and Swedish conservationists arose about how large areas that would be able to burn every in each country in protected areas. The answer then was that like 50 ha every year in each country was the level that was realistic. So, 518 ha and 849 ha are a very impressive result that has affected the thinking about the possibilities and set a new standard concerning controlled burning both in Sweden and Finland. And this result has also been noticed by several other countries in Europe, Latvia, Estonia, Poland, Norway and Denmark for example.

5.4.7 Long term indicators of the project success:

After the end of the project, the monitoring will go on to be able to see all the effects. This will be carried out by all partners in a national system that demands that we carry out inventories in the burned areas at least every sixth year. The monitoring will mainly contain monitoring of insects, birds and mushrooms. The major efforts will be directed to monitoring the species composition of the trees, the amount of dead wood and structural changes to the forest. And actual monitoring of species (mainly insects and mushrooms) will also be conducted in assorted areas.

As a bonus several researchers working with fire ecology will use the areas burnt within Life-Taiga for studies after the project has ended. This is mainly work done by the Swedish University of Agricultural Sciences. Those studies will bring a lot of new knowledge to be able to draw conclusions about the long-term success of the project.

6. Comments on the financial report

6.1. Summary of Costs Incurred

PROJECT COSTS INCURRED			
Cost category	Budget according to the grant agreement*	Costs incurred within the project duration	%**
1. Personnel	€ 4 136 589	€ 3 911 836	94,57%
2. Travel	€ 585 832	€ 373 157	63,70%
3. External assistance	€ 4 562 285	€ 3 705 283	81,22%
4. Durables: total <u>non-depreciated</u> cost			
- Infrastructure sub-tot.			
- Equipment sub-tot.	€ 496 574	€ 526 160	105,96%
- Prototypes sub-tot.			
5. Consumables	€ 701 152	€ 757 925	108,10%
6. Other costs	€ 3 500	€ 538	15,37%
7. Overheads	€ 733 880	€ 649 218	88,46%
TOTAL	€ 11 219 812	€ 9 924 117	88,45%

*) If the Commission has officially approved a budget modification indicate the breakdown of the revised budget. Otherwise this should be the budget in the original grant agreement.

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

6.2. Accounting system

Brief presentation of the accounting system(s) employed and the code(s) identifying the project costs in the analytical accounting system.

See separate documents in the financial annex.

Brief presentation of the procedure of approving costs.

All invoices are received electronically by the County Administrative Boards and certified by the client and the authorized manager.

The payments are then sent on file to the bank for payment. This file is countersigned by two people. Once the payment has been made, we will receive confirmation from the bank of this, which is loaded into our financial system. payment receipts can then be withdrawn from our system

Regarding travel expenses, these are also processed electronically in a system and signed by the authorized manager. These are paid at the monthly salary payments.

The type of time recording system used, i.e. electronic or manually completed timesheets.

All county administrative boards have electronic time reporting. Some are also electronically certified by the authorized manager, while others are printed and signed manually by the manager and employee.

Brief presentation of the registration, submission and approval procedure/routines of the time registration system,

All county administrative boards have electronic time reporting. Some are also electronically certified by the authorized manager, while others are printed and signed manually by the manager and employee. The reported time is automatically posted once a month.

Brief explanation how it is ensured that invoices contain a clear reference to the LIFE+ project showing how invoices are marked in order to show the link to the LIFE+ project

At the start of the project, all project partners have been informed of the importance of this being stated on supplier invoices. All partners have also obtained a stamp with this text specified to simplify administration.

6.3. Auditor's report/declaration

Name and address of the external auditor: Peter Ohlson, Länsstyrelsen, Box 22067, 104 22 Stockholm

The auditor's report is attached in the financial annex (Appendix 8c).

6.4 Summary of costs per action

Action number/name	1. Personnel	2. Travel	3. External	4.b Equipment	6. Consumables	7. Others	Total sum	Budget	over/under budget	in %
A1 Plans for controlled burning	€ 190 203	€ 21 641	€ 476		€ 7 039		€ 219 359	€ 222 921	€ 3 562	1,60%
A2 Minor revision of nature reserve management plans	€ 46 438	€ 27			€ 24		€ 46 489	€ 60 544	€ 14 055	23,22%
A3 Information strategy including graphic design	€ 8 505	€ 342	€ 6 864				€ 15 711	€ 25 536	€ 9 825	38,47%
A4 Strategy for monitoring methods, nature conservation goals and socio-economic indicators	€ 15 199						€ 15 199	€ 17 200	€ 2 001	11,64%
A5 call for tenders	€ 263 673	€ 358					€ 264 031	€ 337 120	€ 73 089	21,68%
A6 Risk analysis	€ 5 799						€ 5 799	€ 5 160	-€ 639	-12,39%
C1 Controlled burning for nature conservation	€ 997 997	€ 150 189	€ 2 756 139	€ 526 160	€ 600 677	€ 30	€ 5 031 192	€ 6 045 341	€ 1 014 149	16,78%
C2 Fencing	€ 6 241	€ 575	€ 220 970		€ 54 798		€ 282 584	€ 337 408	€ 54 824	16,25%
C3 Exposing soil in sandy biotopes	€ 7 747	€ 823	€ 33 375		€ 282		€ 42 228	€ 30 362	-€ 11 866	-39,08%
C4 Increase the population of Pulsatilla patens	€ 3 574	€ 2 374	€ 6 963		€ 582		€ 13 492	€ 17 231	€ 3 739	21,70%
D1 Monitoring part one	€ 80 514	€ 10 729	€ 119 246		€ 25 790		€ 236 280	€ 182 426	-€ 53 854	-29,52%
D2 Monitoring part two	€ 43 049	€ 3 268	€ 32 556		€ 612		€ 79 485	€ 86 044	€ 6 559	7,62%
D3 Monitoring of socio-economic character	€ 12 510						€ 12 510	€ 17 200	€ 4 690	27,27%
E1 Information signs	€ 71 035	€ 53	€ 68 414		€ 7 577		€ 147 080	€ 173 877	€ 26 797	15,41%
E10 Management for visitors: outdoor exhibitions and information trails	€ 57 982	€ 783	€ 125 768		€ 5 707		€ 190 239	€ 176 760	-€ 13 479	-7,63%
E11 Layman's report	€ 48 404		€ 2 865				€ 51 268	€ 34 400	-€ 16 868	-49,04%
E2 Information leaflets and rollups	€ 34 702	€ 59	€ 29 200				€ 63 962	€ 140 164	€ 76 202	54,37%
E3 Website	€ 46 666		€ 16 490				€ 63 156	€ 111 320	€ 48 164	43,27%
E4 Digital information	€ 10 145		€ 12 064				€ 22 209	€ 46 832	€ 24 623	52,58%
E5 Seminars including final project seminar	€ 33 034	€ 6 879	€ 49 680		€ 250		€ 89 843	€ 117 976	€ 28 133	23,85%
E6 Field excursions and information meetings	€ 83 302	€ 15 844	€ 12 312		€ 182	€ 0	€ 111 640	€ 185 225	€ 73 585	39,73%

E7 Network project with Sami villages focusing on controlled burning for nature conservation	€ 19 167	€ 389	€ 5 450				€ 25 006	€ 35 940	€ 10 934	30,42%
E8 Information and dissemination for external use and for beneficiaries	€ 149 594	€ 836			€ 4 316		€ 154 746	€ 136 720	-€ 18 026	-13,18%
E9 Management for visitors. Trails, benches and other facilities	€ 14 918	€ 945	€ 146 969		€ 30 752		€ 193 584	€ 236 807	€ 43 223	18,25%
F1 Project management	€ 694 570	€ 45 176	€ 51 616		€ 19 165	€ 468	€ 810 995	€ 705 254	-€ 105 741	-14,99%
F2 Regional project management and administration	€ 866 156	€ 39 459	€ 0		€ 107	€ 40	€ 905 763	€ 826 459	-€ 79 304	-9,60%
F3 International networking	€ 100 709	€ 72 408			€ 65		€ 173 181	€ 160 705	-€ 12 476	-7,76%
F5 Financial audit			€ 7 867				€ 7 867	€ 13 000	€ 5 133	39,49%
Overheads							€ 649 219	€ 733 880	€ 84 661	11,54%
TOTAL	€ 3 911 836	€ 373 157	€ 3 705 283	€ 526 160	€ 757 925	€ 538 117	€ 9 924 117	€ 11 219 812	€ 1 295 695	88,45%

Standard payment request and financial statement for Västmanland (coordinating beneficiary) is attached as appendix 8b.

Action C3- It was hard to foresee the final cost since this type of action never have been conducted in this type of habitat in Sweden. Here it has been a clear underestimation of the cost in the application since work on this scale has never been conducted before in Sweden in this habitat. Therefore, this action has increased in cost compared to the budget.

Action D1 – the costs related to the development of the database has caused this action to exceed budget. This is due to a complex task that was hard to describe in a concise way in the ordering to the IT service department. This was a kind innovative work that was hard to be able to put a correct pricing on in the application.

Action E5 – The invoices related to Laymanreport: Layout, printing and shipping (inv.nr 910921) and Rent of venue, tech, technicians, lunch and snack (inv.nr 20910) total cost of 33 247 euro was paid directly by Naturvårdsverket (Swedish Environmental Protection Agency).

Action F1 – the extension of the project has caused this action to exceed budget

Action F2 – the extension of the project has caused this action to exceed budget

Action F3 – this action exceeds budget mainly because the study trip to the USA got a bit more expensive then foreseen in the budget. In the application a study trip to Russia was foreseen and this change of country did rise the costs. However, this action has been a very important tool to increase knowledge both in the project group and to other people outside the project about controlled burnings and has also helped with teambuilding and creating several new contacts and networking.

Even though some of the actions has required more time and money the final cost in the project is lower than the total budget.

Answer to question 4 (action D1) concerning the MR-report (November 2017)

The IT service department is a cooperation among all 21 County Administrative Boards in Sweden. Instead of each individual County Administrative Boards having one small IT-department all 21 have joined to form one single powerful unit to be able to use the money in the best way and to create a competent unit. The single one IT-department means that each individual County Administrative Board don't have people in each house that can perform this kind of work, and this should instead be sent to the central department. The central department is kind of "owned" together by all 21 County Administrative Boards and are governed by the same rules concerning tender as a County Administrative Board. If the central department are interested in using an external company the must conduct tendering in exactly the same way as a County Administrative Board do it.

7. Annexes

7.1 Administrative annexes

7.2 Technical annexes

See Appendix

- 7.2 A4 Monitoring strategy
- 7.2.C2 Fencing
- 7.2 C3 Exposure of sandy soils
- 7.2.C4 Report
- 7.2. D1 Inventory database
- 7.2. D3 Report on socioeconomic monitoring
- 7.2. E6 Meetings and field excursions

7.3 Dissemination annexes

7.3.1 Layman's report

The Layman's report is attached in Appendix 7.3.1 in one English and one Swedish version.

7.3.2 After-LIFE Communication plan – for LIFE+ Biodiversity and LIFE Environment Policy and Governance projects

See Appendix

- 7.2.F4 Taiga After-LIFE

7.3.3 Other dissemination annexes

See Appendix

- 7.3.3 a Photos from final seminar
- 7.3.3 b Example of articles in newspapers
- 7.3. E5 a Final seminar invitation
- 7.3. E5 b Final seminar participant list

7.4 Final table of indicators

See Appendix 7.4.

8. Financial report and annexes

8a. Answers to questions Progress Report no 2.

8b. Standard payment request and financial statement for Västmanland (coordinating beneficiary).

8c. Independent Audit report.