20.2.2024

Flying Squirrel LIFE (LIFE17 NAT/FI/000469)

Action A8. Preparation of plans to support continuity of aspen in the long term
Deliverable: Site plans to improve aspen continuity

Supporting the aspen continuity

Project site documentation

Action A8 includes 16 project sites: 10 in Natura 2000 areas and 6 in state-owned managed forests in Finland. Responsibles are Metsähallitus Parks & Wildlife Finland (MHPWF) and Metsähallitus Forestry ltd (MHFORESTRY). This document includes summaries of Supporting the continuity of aspen in the long term:
Action A8 Preparation of plans to support continuity of aspen in the long term
Action C3 Supporting the continuity of aspen in the long term
Action D1 Monitoring the conservation actions

This action directly relates to project's objectives "Prevent habitat loss and fragmentation" and "Increase cooperation and develop tools".

In these actions, we will support the continuity of trembling aspen (*Populus tremula* L.) in Natura 2000 sites and their surroundings in Finland, also in managed forests belonging to this network. A8 plans will be implemented in C3 and monitored in D1.

Aspen is an essential character within the suitable habitats for the Flying squirrel for preferred nesting cavities and buds, catkins, and summer leaves for food. A typical character of many breeding and resting sites of the Flying squirrel is a small group of large aspens with some large spruces offering simultaneously food and shelter. Large aspens also host many other specialist and threatened species in Fennoscandian boreal forests. Aspen is thus designated as a key species for biodiversity in boreal forests.

At some regions, variability in the continuity of aspen may be followed by bottle necks in certain age classes. Gaps of even 100 years in availability of large aspens may be expected in some areas where the only existing aspens now are well matured and scattered within old boreal forests in conservation areas. This is because aspen has had problems during past decades related to socio-economic aspects but also on biological factors. Now, in many areas, high density of herbivores and rodents prevent natural regeneration of aspens by eating their seedlings.

At project sites, baseline inventory for aspens was done before continuing with more detailed management plans. Within Natura 2000 sites, no nature management was planned to any existing Natura 2000 habitat type, and flying squirrel inventory was done only at a site Konnevesi-Kalaja-Niinivuori, where the data of the species needed updating. In managed forest sites, flying squirrel inventories were carefully done within the planning process of Action A6.

At three sites of managed forests, Jänisselkä, Hanhivaara and Kivilampi, activities were planned on enlargements of project sites (MHFORESTRY, application in the Midterm Report 2021, afterwards preliminarily approved by the CINEA). Support for the aspen continuity seemed most relevant to be done just outside the original project sites, which were mainly older boreal forests.

Measures to support continuity of aspen in Action C3 was designed to suit best to the conditions at each site (see below). At some sites, two different measures were applied. All nature management activities were done outside important areas for the flying squirrel (such as breeding sites and resting places, feeding areas, or moving connections), and their timing of was outside the flying squirrel's breeding season.

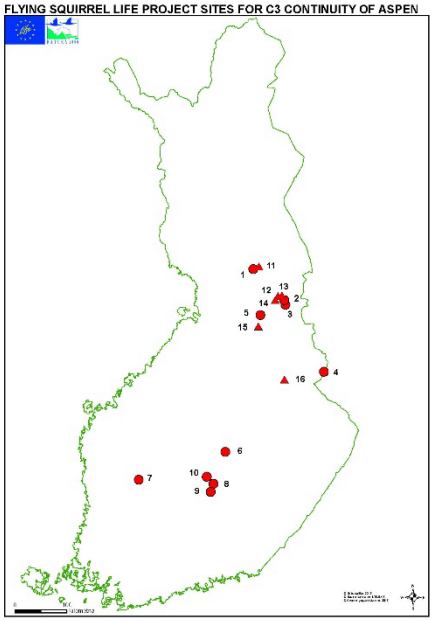
Project sites for Supporting the continuity of aspen in the long term

Natura 2000 sites

1. Syöte, Taivalkoski
2. Riuskanselkonen, Suomussalmi
3. Huuhkajanlehto, Suomussalmi
4. Ulvinsalo, Kuhmo
5. Ison Jänisjärven letto, Puolanka
6. Konnevesi-Kalaja-Niinivuori, Rautalampi & Konnevesi
7. Aurejärvi, Parkano
8. Katajaneva-Vuorilammenalue-Huhtalampi, Toivakka
9. Haapasuo-Syysniemi_Rutajärvi-Kivijärvi, Joutsa
10. Palstonvuori-Jääskelä, Jyväskylä

State-owned managed forests

11. Kivilampi, Taivalkoski
12. Hanhivaara, Suomussalmi
13. Jänisselkä, Suomussalmi
14. Pata-aho, Suomussalmi
15. Kurikkavaara, Puolanka
16. Palovaara, Sotkamo



Measures for Supporting the continuity of aspen in the long term

1. **Opening growing space by removing spruces** was done in 8 Natura 2000 areas (Syöte, Huuhkajanlehto, Ison Jänisjärven lehto ja letto, Konnevesi-Kalaja-Niinivuori, Aurejärvi, Katajaneva-Vuorilammen alue-Huhtalampi, Haapasuo-Syysniemi-Rutajärvi-Kivijärvi, Palstonvuori-Jääskelä). Spruces or other trees around aspens or aspen groups were removed by using harvesters, chainsaws, or brush cutters to give more growing space for aspens.
   Lessons learned: 1) With new approaches and methods, learning new things takes time. Management methods to support nature values may be almost opposite to more traditional methods. 2) Sometimes ongoing learning process even led to too careful execution of the management plan.

2. **Opening growing space by exposing mineral soil** was done in two Natura 2000 sites (Riuskanselkonen, Huuhkajanlehto). Mineral soil was treated with excavator, also an experiment with a terracut cultivator was done, to promote growing of aspen seedlings and increasing growing space.
   Lessons learned: 1) Terracut cultivator is not efficient enough in exposing mineral soil. 2) Treatment areas were immediately fenced to prevent herbivory of seedlings.

3. **Opening growing space by carrying out restoration burning** was done in Ulvinsalo Natura 2000 area. Preparatory work included opening the fire corridors.
   Lessons learned: Restoration burning will be done in 2024 and the lessons learned will be updated.

4. **Protecting young aspens from herbivory** was done in 5 managed forests (Kivilampi, Hanhivaara, Jänisselkä, Pata-aho, Palovaara) and 2 Natura 2000 areas (Huuhkajanlehto, Riuskanselkonen). Aspen seedlings were protected from herbivory by fencing groups of young aspens. Hight of the fence elements was 2.25 meters. The size of 46 enclosures varied from 18 m^2 to 1.2 hectares. Fences will remain in place at least 10-15 years until aspens have grown high enough to avoid herbivores, after which they will be used for similar conservation purposes. (Number of enclosures was lower than planned 70. This was due to higher material costs, but also a more optimal fencing was reached with a bit smaller enclosure number. Some of the fence elements were broken during transportation, and few were even stolen before installing.)
   Lessons learned: 1) The future shows if enclosures are an efficient method to protect aspens from herbivory. Already now seedlings seem to grow better inside than outside of them. 2) Further development of durable fence elements is likely needed. Comparison with other methods including monitoring their effects is needed (e.g., larger areas with different fences, moose ribbon, and changes in herbivory species populations). 3) Enclosures are relatively small: effectiveness at larger areas might be important to be developed.

Figure: Enclosures protect the aspen seedlings from herbivory. Excample from Kivilampi project site one year after implementation. (Photo: Saara Airaksinen / Metsähallitus)

5. **Supporting the aspen continuity with forestry measures** was done in 6 state-owned managed forest sites (Kivilampi, Hanhivaara, Jänisselkä, Pata-aho, Kurikkavaara, Palovaara). Aspens were left standing in all cuttings but especially when thinning the young stands. Growing space for aspens was opened in selective cuttings and small gap fellings. Aspens were selected as retention trees. Some of the densest aspen groups were thinned to enlarge the remaining aspens.
   Lessons learned: 1) It takes time to learn to promote the growing of aspens since there is long tradition of removing the aspens from the forests. 2) Skillful forestry workers are the key persons.

Monitoring of the impact of the project actions

All A8 project sites locate on state owned land, and MHPWF will be responsible for monitoring on all the sites in this action during the project (incl. defining the Flying squirrel's occurrence at sites also in the Action chain A6-C2). After the project MHPHF is responsible for monitoring Natura 2000 areas and MHFORESTRY for managed forests. The success of aspen regeneration (vegetative shoots) and the condition of the fences will be checked once a year during the project. The final effects from this action for the Flying squirrel will be seen within a long-time scale of tens on years, but a promising growth of natural seedlings will indicate the success in the future. Possible damages for the fences will be prepared to ensure a new start for regeneration. The fences will be reused for similar conservation purposes after ca 15 years when the aspens have grown tall enough to avoid herbivory of moose during thick snow cover in winter.

Outcomes of the actions

	Project site area (ha)	Total future habitat (ha)	Opening growing space by removing spruces (ha)	Opening growing space by exposing mineral soil (ha)	Opening growing space by carrying out restoration burning (ha)	Protecting young aspens from herbivory, enclosures (ha)	Protecting young aspens from herbivory, enclosures (number)	Supporting the aspen continuity with forestry measures (ha)
Syöte (1)	19625	**8,85**	8,85					
Riuskanselkonen (2)	4226	**4,05**		2,8		1,25	12	
Huuhkajanlehto (3)	392	**5,35**	5,35	5,35		0,07	10	
Ulvinsalo (4)	3946	**19,84**			19,84			
Ison Jänisjärven lehto ja letto (5)	22	**1,5**	1,5					
Konnevesi-Kalaja-Niinivuori (6)	15259,3	**27,87**	27,87					
Aurejärvi (7)	717	**30**	30					
Katajaneva-Vuorilammin alue-Huhtalampi (8)	288	**29,75**	29,75					
Haapasuo-Syysniemi-Rutajärvi-Kivijärvi (9)	5060	**65,4**	65,4					
Palstonvuori-Jääskelä (10)	178	**23,18**	23,18					
Kivilampi (11)	67	**13,9**				0,025	5	13,9
Hanhivaara (12)	25,1	**0,018**				0,018	4	
Jänisselkä (13)	30,8	**0,025**				0,025	5	
Pata-aho (14)	31,5	**0,025**				0,025	5	
Kurikkavaara (15)	97,9	**16,2**						16,2
Palovaara (16)	24,6	**0,5**				0,025	5	0,5
Total	**49892,3**	**237,6**	**191,9**	**8,15**	**19,84**	**1,44**	**46**	**14,4**

The project has received funding from the LIFE Programme of the European Union. The material reflects the views by the authors, and the European Commission or the CINEA is not responsible for any use that may be made of the information it contains.

Flying Squirrel LIFE (LIFE17 NAT/FI/000469)

Project site: Aurejärvi

Summary of the following actions:

A8 Preparation of plans to support continuity of aspen in the long term
C3 Supporting the continuity of aspen in the long term
D1 Monitoring the conservation actions

Project site: **Aurejärvi (FI FI0321008)**
Municipality: **Ylöjärvi, Parkano; Pirkanmaa region**
Country: **Finland**
Size of the project area (ha): **717**
Responsible organisation(s): **Metsähallitus Parks & Wildlife Finland**

Was action implemented as planned in the proposal? **Yes**
Instead of 27 ha in the proposal, area implemented was 30 ha
Was action implemented in the same location than described in the proposal? **Yes**
Was C-action implemented according to the A-action's plan? **Yes**

General description of the area

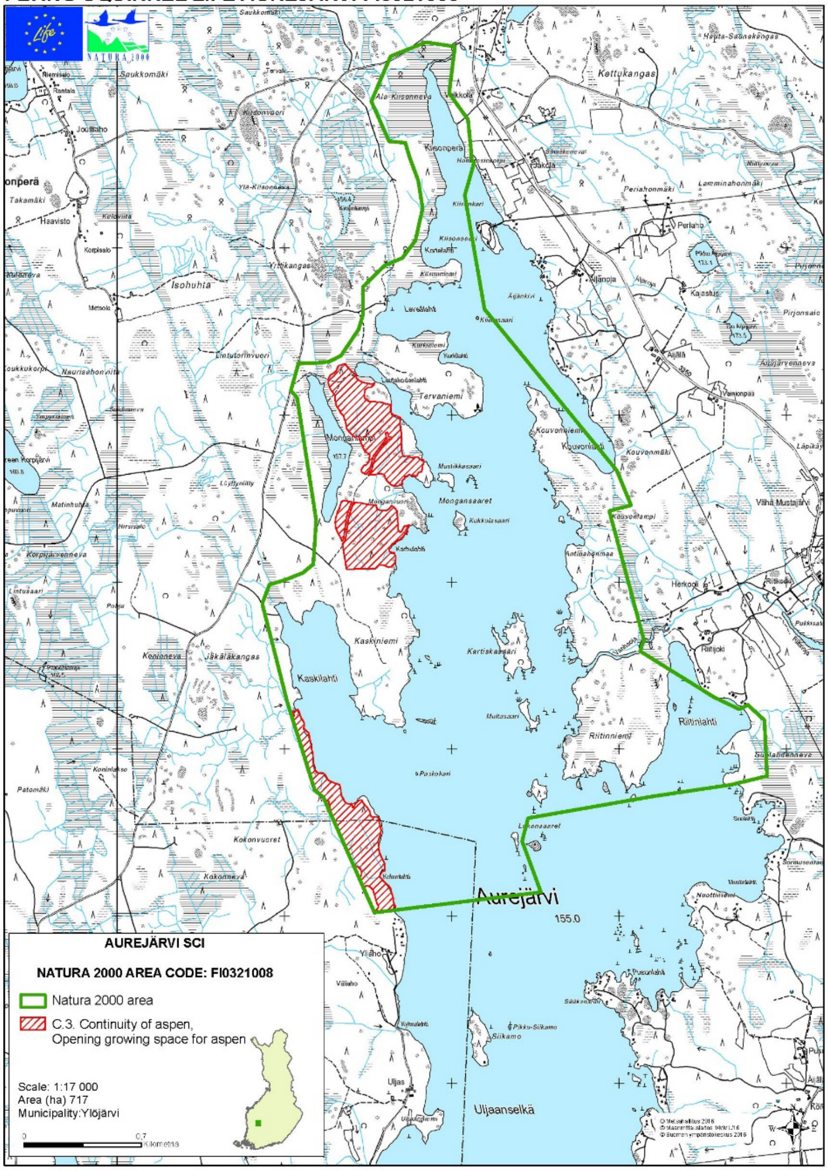
Lake Aurejärvi is located on the western Finnish watershed area Suomenselkä. The aquatic nature is exceptionally well preserved, and it is one of the few lakes on the region which can still be considered to be in natural state. It is part of the national Shore Conservation Programme. The Natura site includes the northern part of the lake and its shorelines. Relevant Natura 2000 habitats on the area are Western Taiga and Bog woodland.

Forests and mires of the area have been affected by forestry until the beginning of 1990's. Due to this, some parts of the heath forests are almost pure Scots pine (*Pinus sylvestris*) or Norway spruce (*Picea abies*) forest stands. Some young forest stands have aspen (*Populus tremula*) as a mixture. These aspens are shaded by conifers and their condition is starting to get weaker.

The forests and bog woodlands on the shores of Aurejärvi are inhabited by flying squirrel (*Pteromys volans*). The baseline inventory for aspen on the project site was carried out in 2018.

Site map

FLYING SQUIRREL LIFE AUREJÄRVI FI0321008



Action A8

The aim of the nature management plan was to improve the quality of habitats suitable for flying squirrel by promoting the growth of deciduous trees in heath forests. In young, 35–50-year-old, pine and spruce forest stands pine, spruce and other trees were removed or ringed around the aspens and birch (*Betula spp*.) to give them space to grow. This was to increase food sources and nesting sites for flying squirrel in the future. Nature management was not planned in known flying squirrel breeding sites and resting places. Total area under nature management to promote aspen continuity was 30 ha.

Action C3

Nature management was carried out in 2018-2022 according to the plan created in action A8.

Action D1

Monitoring is carried out by Metsähallitus Parks & Wildlife Finland on relevant intervals when the general monitoring for nature management is done on the area.

Monitoring after the project

Monitoring is carried out by Metsähallitus Parks & Wildlife Finland on relevant intervals when the general monitoring for nature management is done on the area.

Outcomes of the actions

Nature management aims to increase ecologically functional areas for the flying squirrels as long-term conservation effects. Aspen continuity was promoted by chosen management measures that help aspens to regenerate.

	Project site area (ha)	Future habitat *** (ha)
Total	717	30
Opening growing space by removing spruces		30
Opening growing space by exposing mineral soil		-
Opening growing space by carrying out restoration burning		-
Protecting young aspens from herbivory (Enclosures)		-
Supporting aspen continuity with forestry measures		-

*** **Future habitat** = management allows spruce and deciduous trees to grow better so that suitable habitat characteristics will be reached in the long run.

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Flying Squirrel LIFE (LIFE17 NAT/FI/000469)

Project site: Haapasuo-Syysniemi-Rutajärvi-Kivijärvi

Summary of the following actions:

A8 Preparation of plans to support continuity of aspen in the long term
C3 Supporting the continuity of aspen in the long term
D1 Monitoring the conservation actions

Project site: **Haapasuo-Syysniemi-Rutajärvi-Kivijärvi**
Municipality, region: **Joutsa, Central Finland region**
Country: **Finland**
Size of the project area (ha): **5064**
Responsible organisation(s): **Metsähallitus Parks & Wildlife Finland**

Was action implemented as planned in the proposal? **Yes**
Was action implemented in the same location than described in the proposal? **Yes**
Was C-action implemented according to the A-action's plan? **Yes**

General description of the area

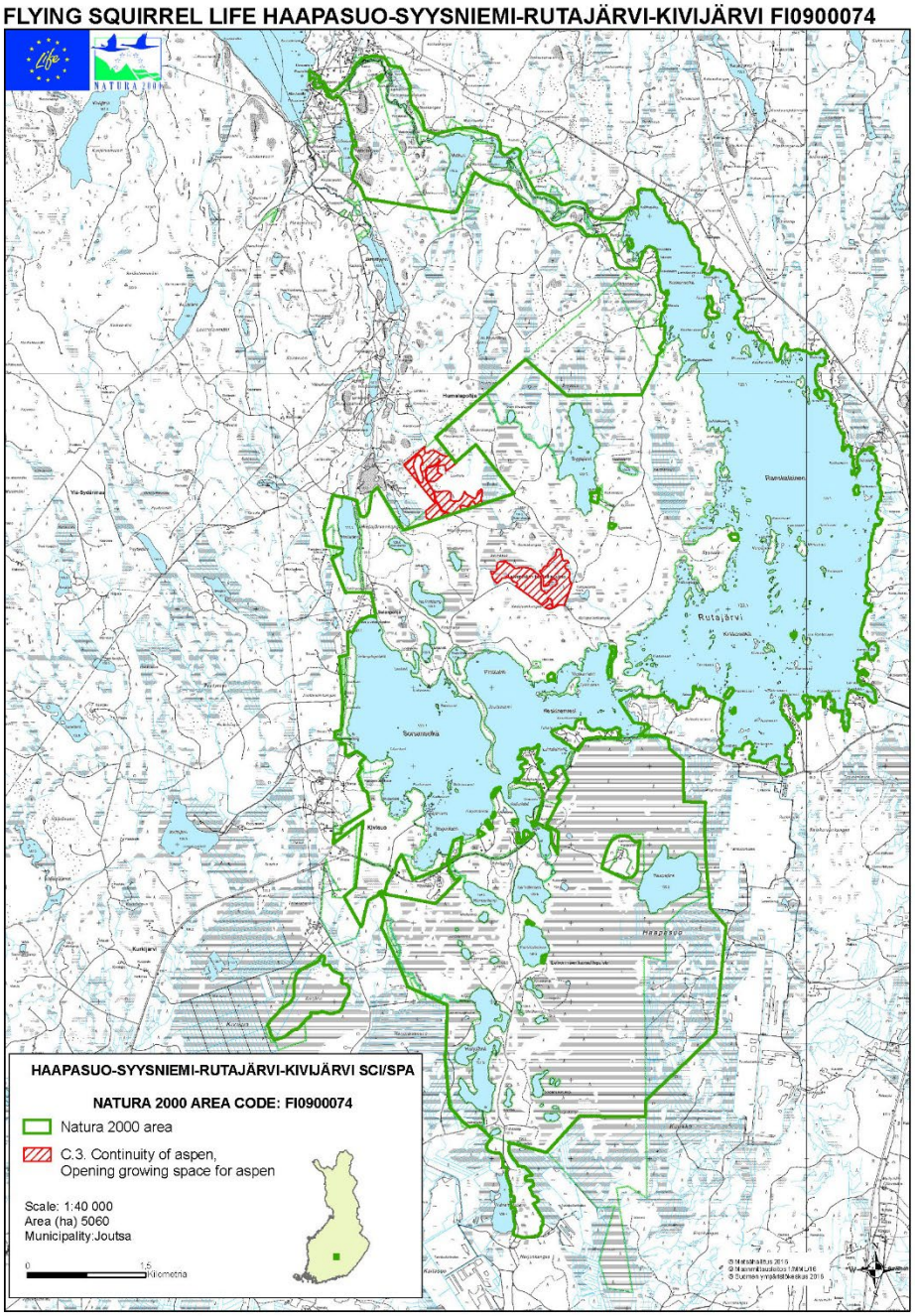
This large area is an ensamble of various representative Natura 2000 habitats which makes Haapasuo-Syysniemi-Rutajärvi-Kivijärvi area ecologically valuable part of the Natura network. The site is also part of the Central Finnish conservation network for flying squirrel (*Pteromys volans*). Majority of this area is a part of Leivonmäki National Park. There are also several national red-list as well as regionally threatened plant species. The mires, lakes and ponds have a strong population of breeding migratory birds.

Haapasuo is an eccentric raised bog with small areas of aapa mires and Kivijärvi is nutrition rich open fen where several regionally threatened plant species can be found. Rutajärvi has a vital population of endangered Salmo trutta lacustris and the adjacent river Rutajoki is a breeding area for the species. Relevant Natura 2000 habitat types are Bog woodland, Western Taiga and Coniferous forests on, or connected to, glaciofluvial eskers.

Nature management areas consist of mixed forests in different ages. Many of them are sown or planted Norway spruce (*Picea abies*) or Scots pine (*Pinus sylvestris*) stands mixed with deciduous trees such as birch (*Petula* spp.), aspen (*Populus tremula*), alder (*Alnus* spp.) and pussy willow (*Salix caprea*).

The baseline inventory for aspen on the project site was carried out in 2019.

Site map



Action A8

The aim of the nature management plan was to support the continuity of aspen and other deciduous trees to improve the flying squirrel's habitat. Resting places and feeding areas were promoted by increasing the proportion of deciduous trees in the forest sites. Pine and spruce trees were removed around deciduous trees to give them growing space. At some areas also deciduous tree groups were thinned to largen the rest of the trees so that they will function as nesting trees for flying squirrel in the future.

Nature management was not planned in known flying squirrel breeding sites and resting places. Total area under nature management to promote aspen continuity was 65,4 ha.

Action C3

Nature management was carried out in 2021 according to the plan created in action A8.

Action D1

Monitoring is carried out by Metsähallitus Parks & Wildlife Finland on relevant intervals when the general monitoring for nature management is done on the area.

Monitoring after the project

Monitoring is carried out by Metsähallitus Parks & Wildlife Finland on relevant intervals when the general monitoring for nature management is done on the area.

Outcomes of the actions

	Project site area (ha)	Future habitat *** (ha)
Total	5063,8	65,4
Opening growing space by removing spruces		65,4
Opening growing space by exposing mineral soil		-
Opening growing space by carrying out restoration burning		-
Protecting young aspens from herbivory (Enclosures)		-
Supporting aspen continuity with forestry measures		-

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Flying Squirrel LIFE (LIFE17 NAT/FI/000469)

Project site: Hanhivaara

Summary of the following actions:

A8 Preparation of plans to support continuity of aspen in the long term
C3 Supporting the continuity of aspen in the long term
D1 Monitoring the conservation actions

Project site: **Hanhivaara**
Municipality, region: **Suomussalmi, Kainuu**
Country: **Finland**
Size of the project area (ha): **25,1**
Responsible organisation(s): **Metsähallitus Forestry Ltd, Metsähallitus Parks & Wildlife Finland**

Was action implemented as planned in the proposal? **No**

Loggings were not done due to nature values

Was action implemented in the same location than described in the proposal? **No**

Metsähallitus Forestry Ltd has applied an enlargement for project site Hanhivaara in the Midterm Report 2021 (Annex 24) that was preliminarily approved in the feedback letter from the CINEA (May 2021). Activities to support aspen continuity seemed most relevant to be done just outside the original project site.

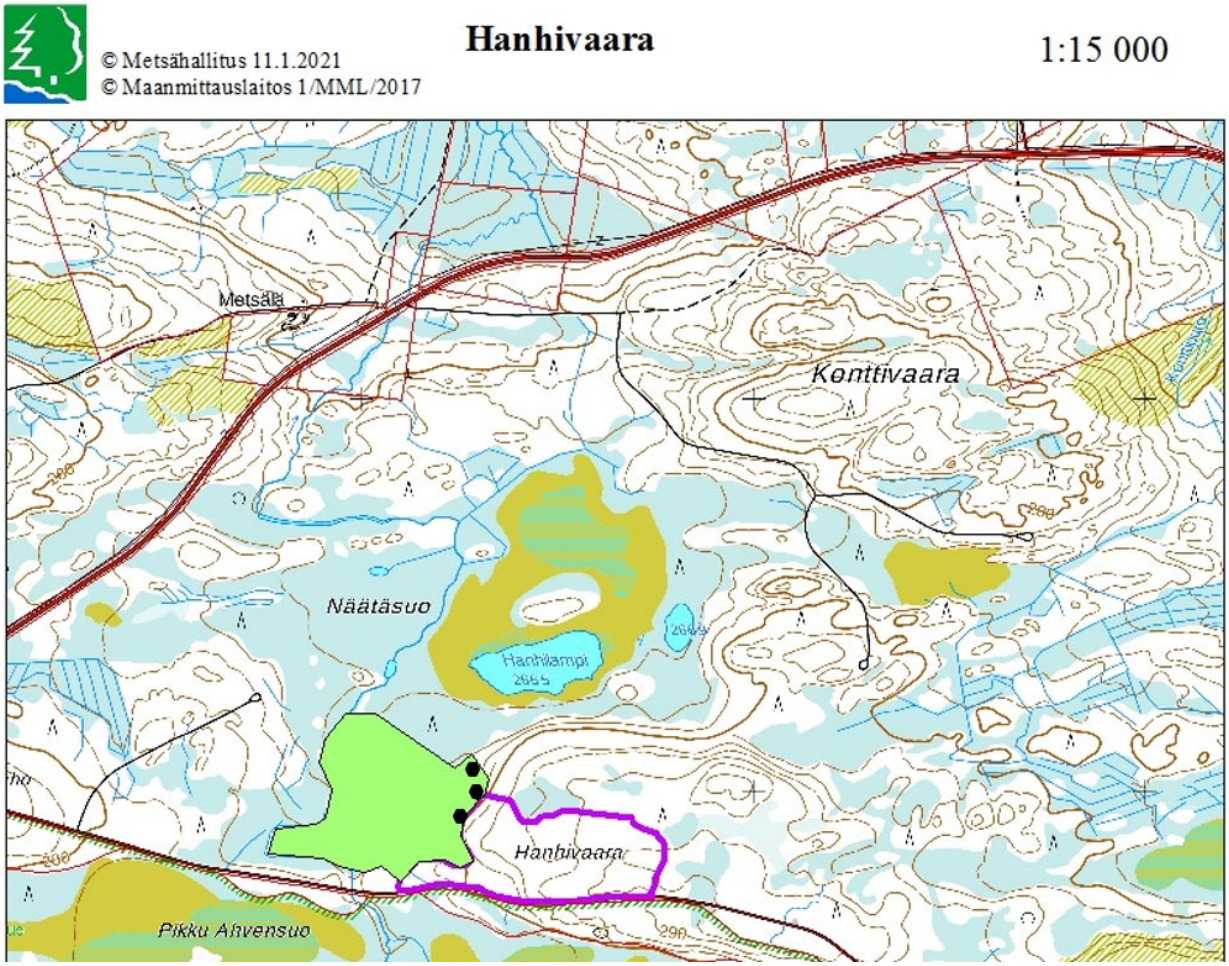
Was C-action implemented according to the A-action's plan? **Yes**

General description of the area

Hanhivaara is located between Nature 2000 area Riuskanselkonen and protected forest Näätäsuo. Original project site is mature Norway spruce (*Picea abies*) dominated mixed forest, mainly mesic heath forest including Aspen (*Populus tremula*) approximately 20-50 trunks per hectare. Flying squirrel observations have been made in the project site in 2015, but in 2019 only potential nesting trees were found. The site has so big nature and protectional values that A6 plan and loggings were not made. For the same reason, also plans for opening growing space for seedlings were given up. The original project site was protected in 2022 and moved to responsibility for Metsähallitus Parks & Wildlife Finland.

To be able to conduct the actions for promoting aspen continuity, the original project site was expanded to neighboring young forest stand, size 13,7 ha. The expansion area is Scots pine (Pinus sylvestris) and spruce dominated, mainly under 60-year-old forest.

Site map



Original project site with violet lining, expansion area on green color. Aspen enclosures marked with black dots.

Action A8

Aim of the action plan was to promote the network of flying squirrel habitats in the long run and to promote the regeneration of aspen close to Nature 2000 areas. The original plan was to open growing space for aspen and protect aspen seedlings from herbivory with enclosures. Five enclosures with the size of 50 m2 were planned to build on the site to prevent the herbivores grazing the aspen seedlings and young aspens. Plans for opening growing space for seedlings were given up because of the big nature and protection values on the original project site. Metsähallitus Forestry Ltd has applied an enlargement for project site Hanhilampi in the Midterm Report 2021 (Annex 24) that was preliminarily approved in the feedback letter from the CINEA (May 2021). Activities to support aspen continuity seemed most relevant to be done just outside the original project site, where already seedlings exist.

Action C3

Aspen continuity was promoted by placing four 50 m^2 enclosures instead of five, since some of the fence elements were stolen. The enclosures were built in 2022 on the expanded project site area according to the plan created in action A8. All the coniferous trees were felled inside the enclosures and around the enclosures a meter wide walkable area was opened.

Action D1

Annual flying squirrel inventories are carried out during the project in 2021-2024. Enclosures will be monitored every year.

Monitoring after the project

Metsähallitus Forestry ltd will continue monitoring the flying squirrel occupancy at relevant intervals. Enclosures will be monitored every year.

Outcomes of the actions

	Project site area (ha)	Future habitat *** (ha)
Total	25,1	0.02
Opening growing space by removing spruces		-
Opening growing space by exposing mineral soil		-
Opening growing space by carrying out restoration burning		-
Protecting young aspens from herbivory (Enclosures)		0,02
Supporting aspen continuity with forestry measures		-

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Flying Squirrel LIFE (LIFE17 NAT/FI/000469)

Project site: Huuhkajanlehto

Summary of the following actions:

A8 Preparation of plans to support continuity of aspen in the long term
C3 Supporting the continuity of aspen in the long term
D1 Monitoring the conservation actions

Project site: **Huuhkajanlehto**
Municipality, region: **Suomussalmi, Kainuu region**
Country: **Finland**
Size of the project area (ha): **392**
Responsible organisation(s): **Metsähallitus Parks & Wildlife Finland**

Was action implemented as planned in the proposal? **Yes**
Was action implemented in the same location than described in the proposal? **Yes**
Was C-action implemented according to the A-action's plan? **Yes**

General description of the area

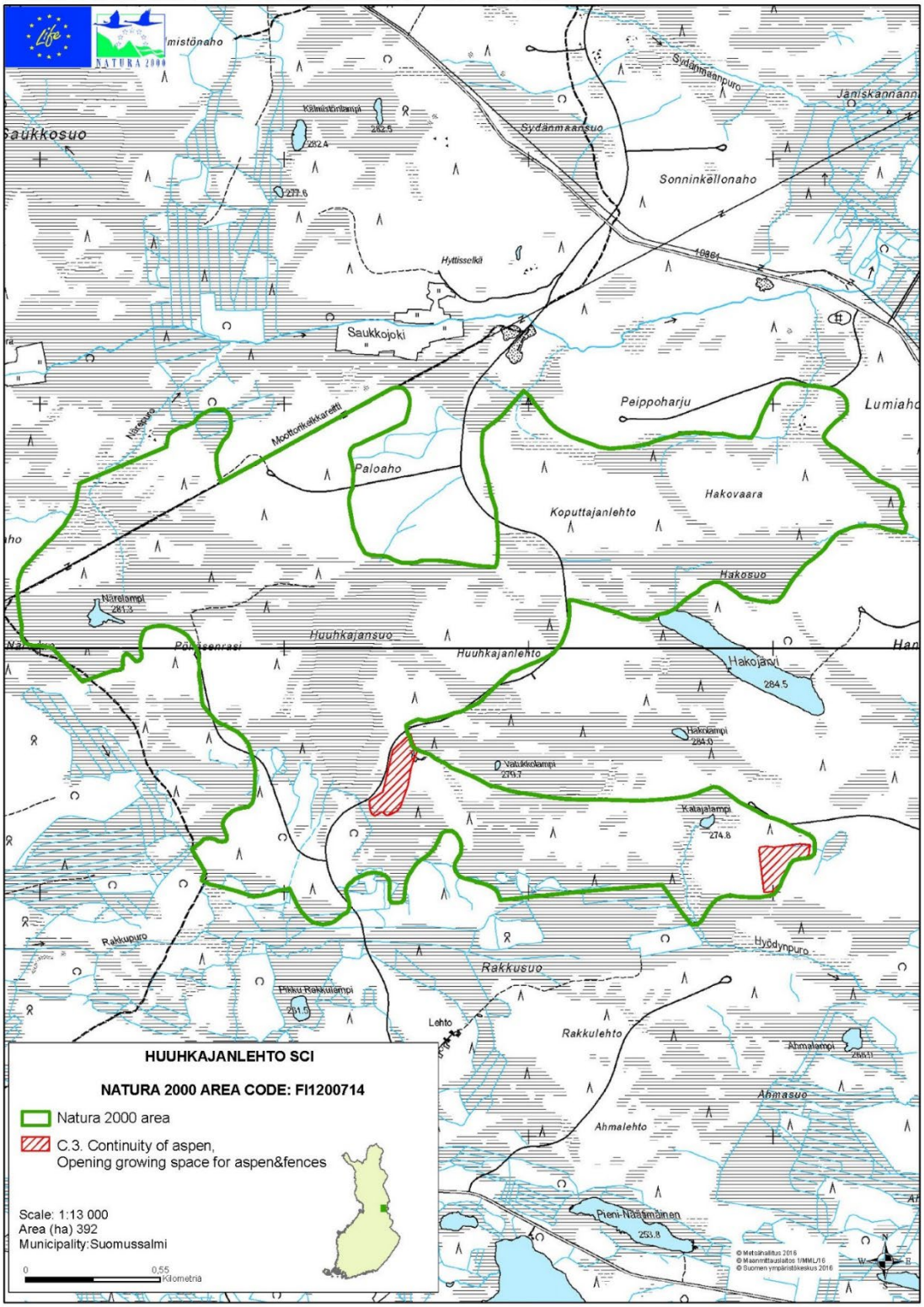
Huuhkajanlehto is regionally important old-growth forest site and a valuable part of the regional conservation network for flying squirrel. The core areas are continuous primary forests but there are also some young forest stands which have originated from clear-cuttings in the late 20th century. The project area consists of mainly old mesic heath forests, dominated by Norway spruce (*Picea abies*). The amount of deciduous trees is significant including large birches (*Betula* spp.) and aspens (*Populus tremula*). Relevant Natura 2000 habitats on the area are Western Taïga and Bog woodland.

The conservation issue in this region is on one hand the ageing and poor regeneration of aspen inside closed old-growth forest stands and on the other hand the heavy grazing of young aspens by moose and reindeer. To mitigate this problem, one of the two management areas at this project site is a seedling stand of Scots pine (*Pinus sylvestris*) with a lot of aspen seedlings grazed by herbivores. The other stand is an older mixed forest.

The baseline inventory for aspen on the project site was carried out in 2019.

Site map

FLYING SQUIRREL LIFE HUUHKAJANLEHTO FI1200714



Action A8

The aim of the nature management plan was to improve the quality of flying squirrel's habitat by promoting the aspen continuity and the abundance of deciduous trees on the area. Small amounts of pine, spruce and other trees were cut around aspen and other deciduous trees to increase the growth and sprouting of aspen. All the felled trees were left on the site to form decaying wood.

The regeneration of aspen and other deciduous trees was promoted by exposing mineral soil to help sprouting. Ten enclosures (size varies between 50-100 m2, altogether 690 m2) were placed on the project site to prevent the herbivores grazing the aspen seedlings and young aspens. The trees were cut only if erecting the fences required.

Nature management was not planned in known flying squirrel breeding sites and resting places. Total area under nature management to promote aspen continuity was 5,35 ha.

Action C3

Nature management was carried out in 2022-2023 according to the plan created in action A8. Some fence elements had been broken during the transportation, and this has an effect on the size of the fenced area. Also some of the fences planned to built in Ulvinsalo project site were placed in Huuhkajanlehto site. Hence some of the enclosures are bigger.

Action D1

Monitoring is carried out by Metsähallitus Parks & Wildlife Finland on relevant intervals when the general monitoring for nature management is done on the area. Condition of fences will be checked on a yearly basis and the success of aspen regeneration will be evaluated in the end of the project.

Monitoring after the project

Metsähallitus Parks & Wildlife Finland will continue monitoring the flying squirrel occupancy at relevant intervals. Condition of fences will be checked every year.

Outcomes of the actions

	Project site area (ha)	Future habitat *** (ha)
Total	392	5,35
Opening growing space by removing spruces		5,35
Opening growing space by exposing mineral soil		5,35
Opening growing space by carrying out restoration burning		-
Protecting young aspens from herbivory (Enclosures)		0,07
Supporting aspen continuity with forestry measures		-

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Flying Squirrel LIFE (LIFE17 NAT/FI/000469)

Project site: Ison Jänisjärven lehto ja letto

Summary of the following actions:

A8 Preparation of plans to support continuity of aspen in the long term
C3 Supporting the continuity of aspen in the long term
D1 Monitoring the conservation actions

Project site: **Ison Jänisjärven lehto ja letto**
Municipality, region: **Puolanka, Kainuu**
Country: **Finland**
Size of the project area (ha): **22**
Responsible organisation(s): **Metsähallitus Parks & Wildlife Finland**

Was action implemented as planned in the proposal? **Yes**
Was action implemented in the same location than described in the proposal? **Yes**
Was C-action implemented according to the A-action's plan? **Yes**

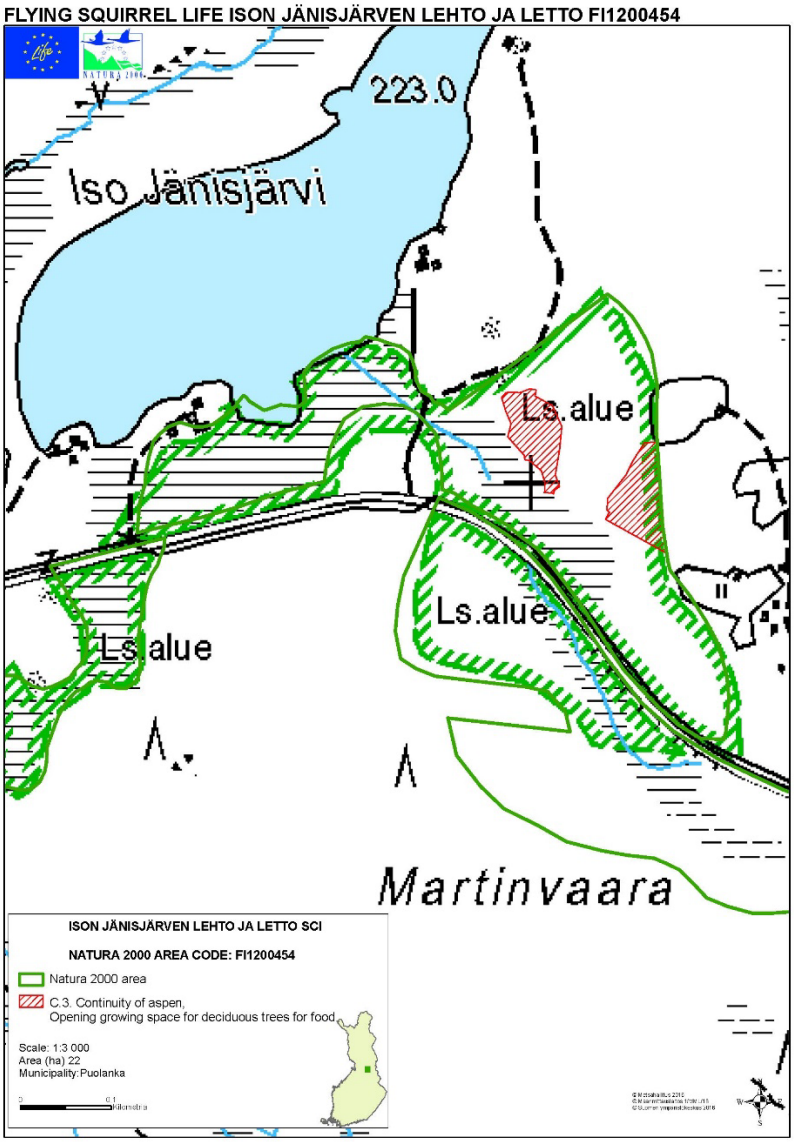
General description of the area

Ison Jänisjärven lehto ja letto N2000 site is situated at the hill-side belt of Kainuu region, which is considered nationally important area for the conservation of herb-rich forests, eutrophic fens, springs and spring fens. The site is especially valuable part of the regional conservation network for flying squirrel (*Pteromys volans*), as well as for rare and endangered plant species of herb-rich forests. Due to history of slash and burn culture and cattle grazing this site contains herb rich forests with alder (*Anlus* spp.), aspen (*Populus tremula*) and other deciduous trees as predominant species rather than spruce. These deciduous herb rich forests are particulary important feeding sites for flying squirrel in Kainuu hillside region. The deciduous herb rich forests are gradually being taken over by spruce, which leads to replacement of deciduous trees, vital for flying squirrel, as well as for several plant species of herb-rich forests. Relevant Natura 2000 habitats on the area are Fennoscandian herb-rich forests with Picea abies and Western Taiga.

The management sites are herb rich forests and mesic heath forests. Domination of Norway spruce (*Picea abies*) acidifies the ground and increases shading that are harmful for the vegetation of herb rich forests. Former management of the herb rich forests of the project area haven't been effective enough to avoid the domination of spruce.

The baseline inventory for aspen on the project site was carried out in 2019.

Site map



Action A8

The aim of the nature management plan was to improve the quality of flying squirrel's habitat and to manage the herb rich forest. The management actions were to ensure the continuum of deciduous herb-rich forests as important feeding areas for flying squirrel. In mesic heath forest stand some spruces were removed around deciduous trees and under the forest canopy to enlarge the single trees and to give space to deciduous trees. The biggest spruces were left standing. Also in herb rich forest some spruces were cut to avoid its acidifying and shading effect. Undergrowth was harvested by lumberjack work. Nature management was not planned in known flying squirrel breeding sites and resting places. Total area under nature management to promote aspen continuity was 1,5 ha.

Action C3

Nature management was carried out in 2022-2023 according to the plan created in action A8. In mesic heath forest stand more undergrowing spruces were removed that planned by accident.

Action D1

Monitoring is carried out by Metsähallitus Parks & Wildlife Finland on relevant intervals when the general monitoring for nature management is done on the area.

Monitoring after the project

Monitoring is carried out by Metsähallitus Parks & Wildlife Finland on relevant intervals when the general monitoring for nature management is done on the area.

Outcomes of the actions

	Project site area (ha)	Future habitat *** (ha)
Total	22	1,5
Opening growing space by removing spruces		1,5
Opening growing space by exposing mineral soil		-
Opening growing space by carrying out restoration burning		-
Protecting young aspens from herbivory (Enclosures)		-
Supporting aspen continuity with forestry measures		-

*** **Future habitat** = management allows spruce and deciduous trees to grow better so that suitable habitat characteristics will be reached in the long run.

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Flying Squirrel LIFE (LIFE17 NAT/FI/000469)

Project site: Jänisselkä

Summary of the following actions:

A8 Preparation of plans to support continuity of aspen in the long term
C3 Supporting the continuity of aspen in the long term
D1 Monitoring the conservation actions

Project site: **Jänisselkä**
Municipality, region: **Suomussalmi, Kainuu**
Country: **Finland**
Size of the project area (ha): **30,8**
Responsible organisation(s): **Metsähallitus Forestry Ltd, Metsähallitus Parks & Wildlife Finland**

Was action implemented as planned in the proposal? **No**

Loggings were not done due to nature values

Was action implemented in the same location than described in the proposal? **No**

Metsähallitus Forestry Ltd has applied an enlargement for project site Jänisselkä in the Midterm Report 2021 (Annex 24) that was preliminarily approved in the feedback letter from the CINEA (May 2021). Activities to support aspen continuity seemed most relevant to be done just outside the original project site.

Was C-action implemented according to the A-action's plan? **Yes**

General description of the area

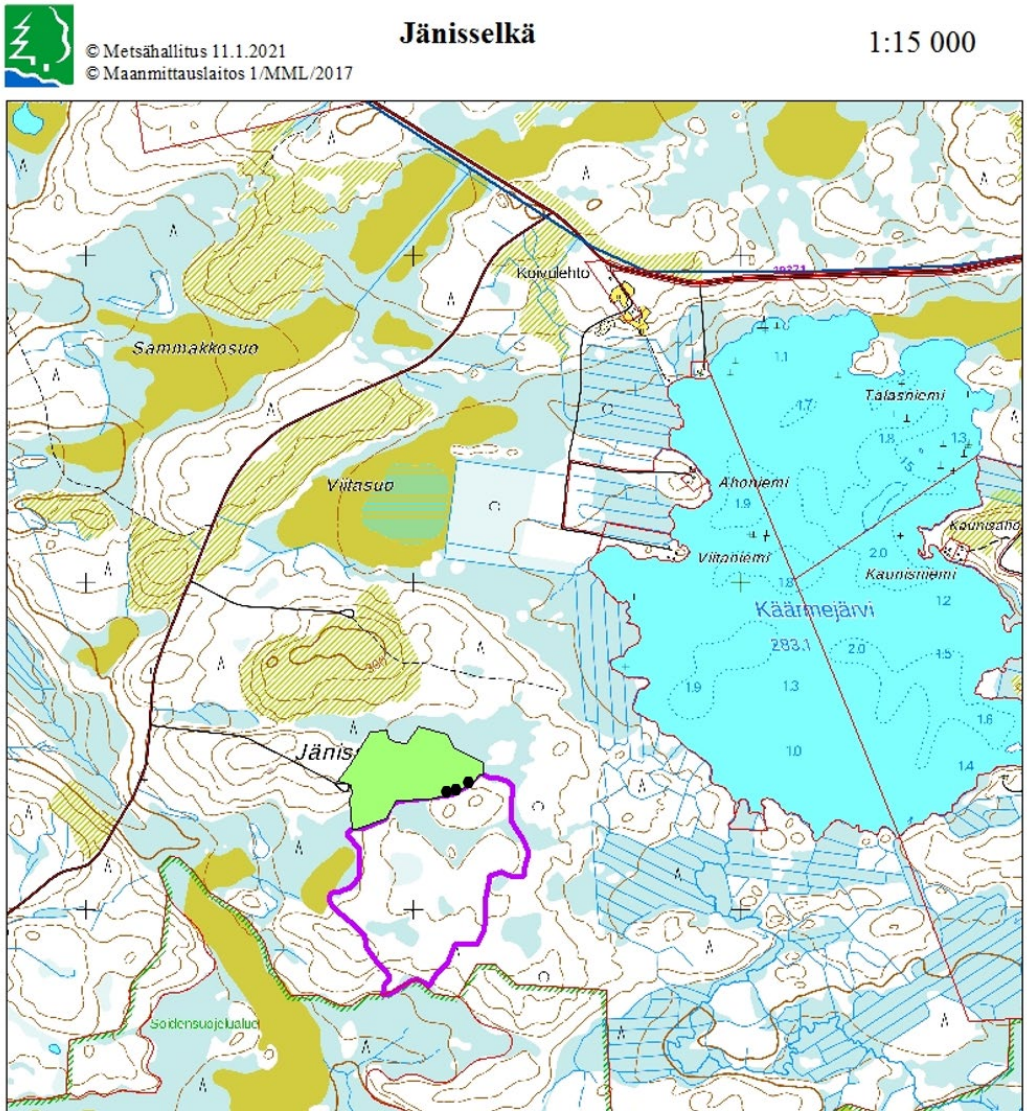
Jänisselkä project site is located on the northern border of Natura 2000 area Riuskanselkonen. The project site consists of mainly mature mesic heath forest with approximately 3 ha spruce mires and pine mires. Norway spruce (*Picea abies*) dominated, approximately 150 old mixed forests cover almost all of the site. Scots pine (*Pinus sylvestris*) dominated mixed forest covers only 0,5 ha of the site. There are about 20-50 aspen (*Populus tremula*) trunks per hectare.

There are a lot of earlier observations of flying squirrels from the project site, latest on year 2018. In the baseline inventories flying squirrel droppins were found under two trees and also many potential nests were found.

Because of the nature and protectional values, A6 plan and loggings were not made. For the same reason, also plans for opening growing space for seedlings were given up. The original project site was protected in 2022 and moved to responsibility for Metsähallitus Parks & Wildlife Finland.

To be able to conduct the actions for promoting aspen continuity, the original project site was expanded to neighboring young forest stand, size 8 ha, west border of the original site. The expansion area is spruce dominated, 20-40 year-old forest.

Site map



Original project site with violet lining, expansion area on green color. Aspen enclosures marked with black dots.

Action A8

Aim of the action plan was to promote the network of flying squirrel habitats in the long run and to promote the regeneration of aspen close to Nature 2000 areas. The original plan was to open growing space for aspen and protect aspen seedlings from herbivory with enclosures. Five

enclosures with the size of 50 m2 were planned to build on the site to prevent the herbivores grazing the aspen seedlings and young aspens. Plans for opening growing space for seedlings were given up because of the big nature and protection values on the original project site. Metsähallitus Forestry Ltd has applied an enlargement for project site Hanhilampi in the Midterm Report 2021 (Annex 24) that was preliminarily approved in the feedback letter from the CINEA (May 2021). Activities to support aspen continuity seemed most relevant to be done just outside the original project site, where already seedlings exist.

Action C3

Aspen continuity was promoted by placing five 50 m^2 enclosures. The enclosures were built in 2022 on the expanded project site area according to the plan created in action A8. All the coniferous trees were felled inside the enclosures and around the enclosures a meter wide walkable area was opened.

Action D1

Annual flying squirrel inventories are carried out during the project in 2021-2024. Enclosures will be monitored every year.

Monitoring after the project

Metsähallitus Forestry ltd will continue monitoring the flying squirrel occupancy at relevant intervals. Enclosures will be monitored every year.

Outcomes of the actions

	Project site area (ha)	Future habitat *** (ha)
Total	30,8	0,025
Opening growing space by removing spruces		-
Opening growing space by exposing mineral soil		-
Opening growing space by carrying out restoration burning		-
Protecting young aspens from herbivory (Enclosures)		0,025
Supporting aspen continuity with forestry measures		-

*** **Future habitat** = management allows spruce and deciduous trees to grow better so that suitable habitat characteristics will be reached in the long run.

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Flying Squirrel LIFE (LIFE17 NAT/FI/000469)

Project site: Katajaneva-Vuorilammen alue-Huhtalampi

Summary of the following actions:

A8 Preparation of plans to support continuity of aspen in the long term
C3 Supporting the continuity of aspen in the long term
D1 Monitoring the conservation actions

Project site: **Katajaneva-Vuorilammen alue-Huhtalampi**
Municipality: **Toivakka**
Country: **Finland**
Size of the project area (ha): **288**
Responsible organisation(s): **Metsähallitus Parks & Wildlife Finland**

Was action implemented as planned in the proposal? **Yes**
Was action implemented in the same location than described in the proposal? **Yes**
Was C-action implemented according to the A-action's plan? **Yes**

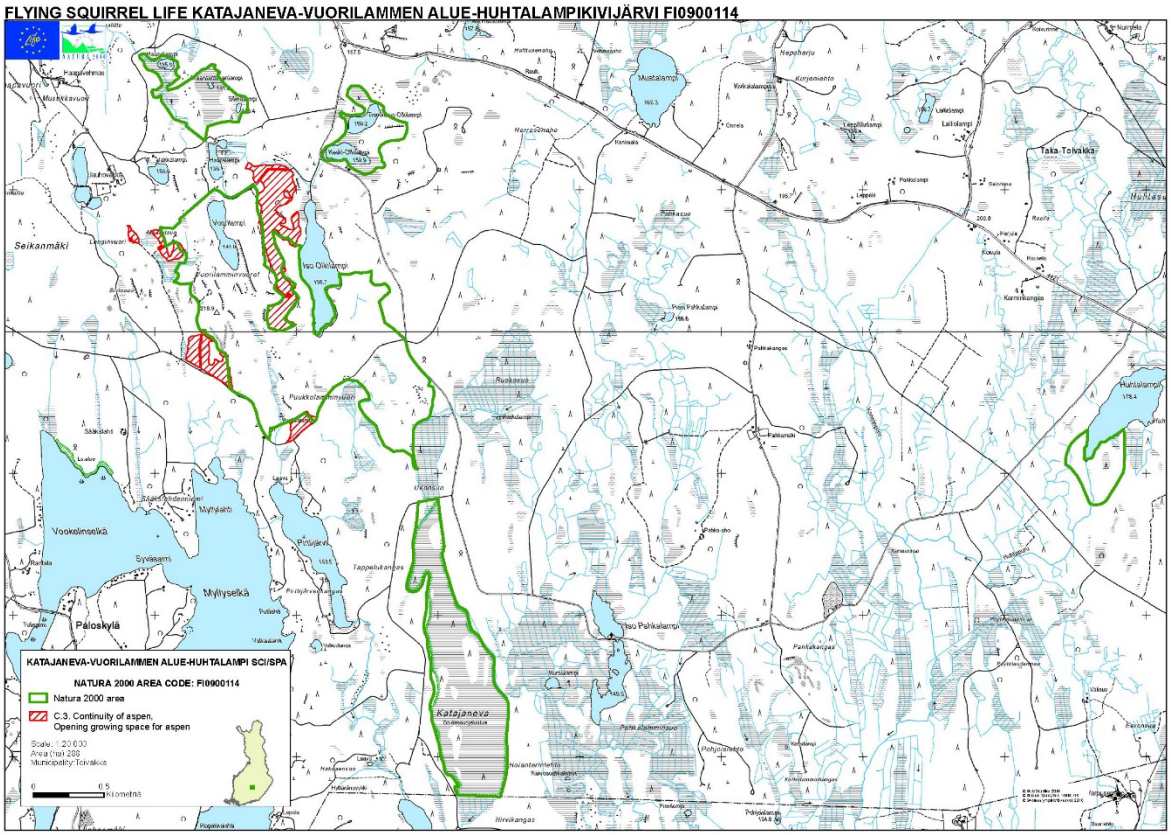
General description of the area

This site consists of three different sub-sites. Katajaneva is rather large uniform raised bog and aapa mire combination. Vuorilammen alue site is hilly mesic heath forest, in the depressions of the landscape spruce mires have formed. The forests are spruce dominated but mixed with large aspen trees. Some small freshwaters, mostly creeks can also be found on this site. Relevant Natura 2000 habitats on the area are Western Taiga, Bog woodland, Fennoscandian herb-rich forests with Picea abies. The forests in Vuorilammen alue sub-site are structurally well suited for flying squirrel (*Pteromys volans*). There is more or less continuous forest cover and large aspens (*Populus tremula*) provide nesting holes and food source for the species.

Management sites consists of mixed forests in different ages. Many stands have been planted or sown for Norway spruce (*Picea abies*) but have a mixture of birch (*Betula* spp.), aspen, alder (*Alnus incana*), rowan (*Sorbus aucuparia*) or pussy willow (*Salix caprea*).

Near the management sites exists several old spruce dominated forests that have lots of large aspens with cavities. Also flying squirrel pellets have been found there. Most likely the management sites are already used by flying squirrels as feeding areas. The baseline inventory for aspen on the project site was carried out in 2019.

Site map



Action A8

The aim of the nature management plan was to improve the quality of flying squirrel's habitat by promoting the aspen continuity and the abundance of deciduous trees on the area. The plan was to free growing space for aspen and other deciduous trees and hinder the dominance and shading effect of spruce. Spruces were removed around deciduous trees and at some places also deciduous trees were harvested to enlarge remaining trees. Some spruces were left standing to function as cover trees and in the future as nesting trees. Also spruce groups were left untouched if there were no deciduous trees. The number of large aspens will increase in the future, and this will benefit the flying squirrel in the long term by increasing its breeding and feeding opportunities.

Nature management was not planned in known flying squirrel breeding sites and resting places. Total area under nature management to promote aspen continuity was 29,76.

Action C3

Nature management was carried out in 2020 according to the plan created in action A8.

Action D1

Monitoring is carried out by Metsähallitus Parks & Wildlife Finland on relevant intervals when the general monitoring for nature management is done on the area.

Monitoring after the project

Monitoring is carried out by Metsähallitus Parks & Wildlife Finland on relevant intervals when the general monitoring for nature management is done on the area.

Outcomes of the actions

	Project site area (ha)	Future habitat *** (ha)
Total	236	29,76
Opening growing space by removing spruces		29,76
Opening growing space by exposing mineral soil		-
Opening growing space by carrying out restoration burning		-
Protecting young aspens from herbivory (Enclosures)		-
Supporting aspen continuity with forestry measures		-

*** **Future habitat** = management allows spruce and deciduous trees to grow better so that suitable habitat characteristics will be reached in the long run.

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Flying Squirrel LIFE (LIFE17 NAT/FI/000469)

Project site: Kivilampi

Summary of the following actions:

A8 Preparation of plans to support continuity of aspen in the long term
C3 Supporting the continuity of aspen in the long term
D1 Monitoring the conservation actions

Project site: **Kivilampi**
Municipality, region: **Taivalkoski, Northern Ostrobothnia**
Country: **Finland**
Size of the project area (ha): **67,0**
Responsible organisation(s): **Metsähallitus Forestry Ltd, Metsähallitus Parks & Wildlife Finland**

Was action implemented as planned in the proposal? **Yes**
Was action implemented in the same location than described in the proposal? **Yes and No**

> **Metsähallitus Forestry Ltd has applied an enlargement for project site Kivilampi in the Midterm Report 2021 (Annex 24) that was preliminarily approved in the feedback letter from the CINEA (May 2021). Some activities to support aspen continuity seemed most relevant to be done just outside the original project site.**

Was C-action implemented according to the A-action's plan? **Yes**

General description of the area

The project site Kivilampi consists of mesic heath forests on the west and more barren habitats in the east. Norway spruce (*Picea abies*) and Scots pine (*Pinus sylvestris*) mixed forests covers the site. Spruce is dominating in the north and west sides, where also the groups of aspens (*Populus tremula*) as well as big aspens are located. Potential feeding areas are the stands of deciduous trees on the east and west ends, that are dominated by birch (*Betula* sp.), added with aspen and pussy willow (*Salix caprea*). The project site borders the Syöte National Park on the west side. In the baseline inventory no recent marks of Flying squirrel were found from the site, only approximately some years old pellets and three urine marks in five spots. Flying squirrel was found from the project site last time in 2004. Four known flying squirrel habitats ("neighbor sites") are situated in sate owned land in couple of kilometers distance. The moving connections are saved in the spatial information system of Metsähallitus as ecological connections.

Site map

Kivilampi

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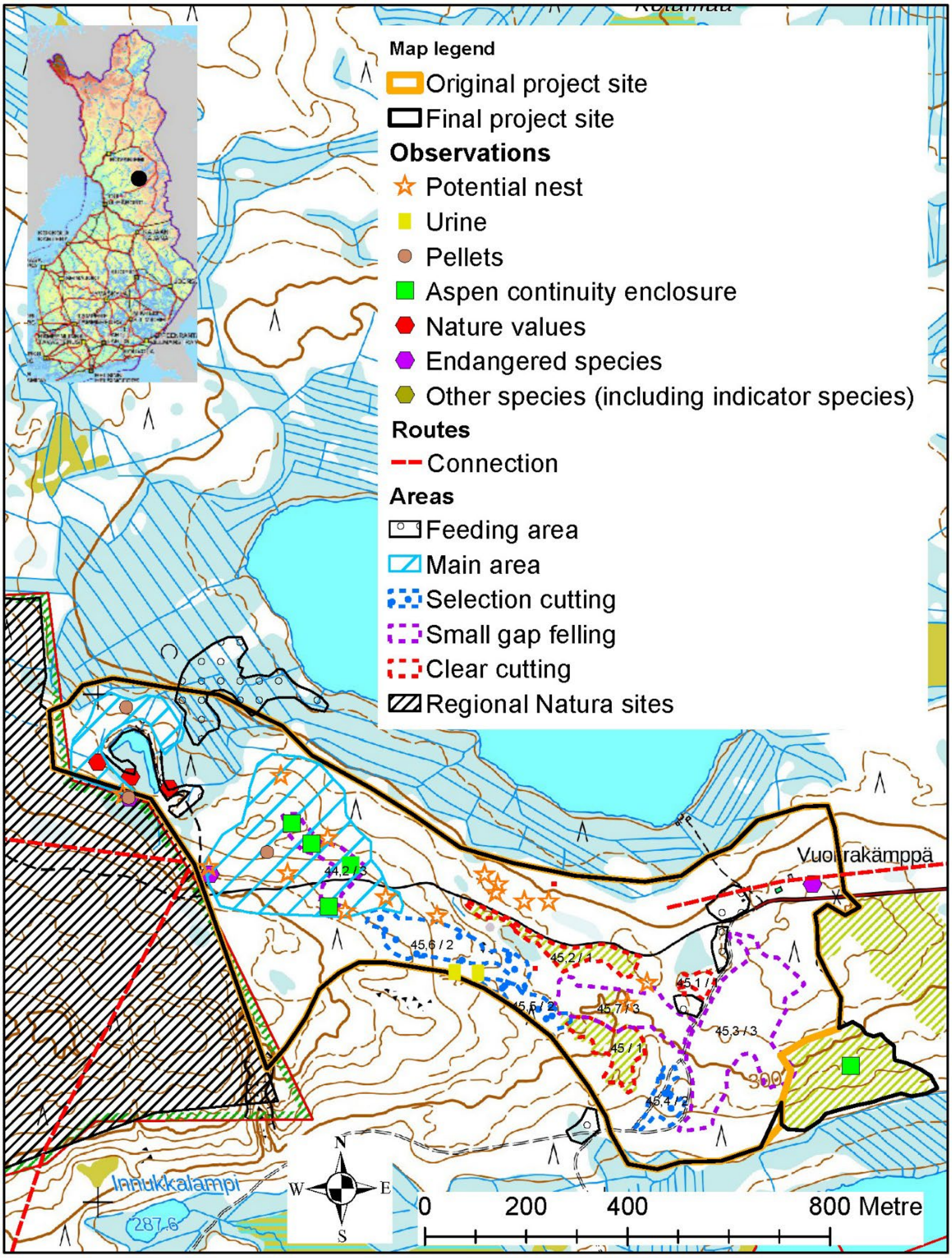
1:9 000



Action A8

Kivilampi project area contains also project activities A6 (preparation of plans to maintain habitat network within managed forests) and C2 (maintaining habitat network in managed forests). Small gap felling areas were located often near big aspens that promotes the continuity of aspen.

Five 50 m^2 enclosures were placed in the felling areas to prevent the herbivores grazing the aspen seedlings and young aspens.

Action C3

Nature management was carried out in 2022 according to the plan created in action A8.

Action D1

Annual flying squirrel inventories are carried out during the project in 2021-2024. Enclosures will be monitored every year.

Monitoring after the project

Metsähallitus Forestry ltd will continue monitoring the flying squirrel occupancy at relevant intervals. Enclosures will be monitored every year.

Outcomes of the actions

	Project site area (ha)	Future habitat *** (ha)
Total	67,0	13,9
Opening growing space by removing spruces		-
Opening growing space by exposing mineral soil		-
Opening growing space by carrying out restoration burning		-
Protecting young aspens from herbivory (Enclosures)		0,025
Supporting aspen continuity with forestry measures		13,9

*** **Future habitat** = management allows spruce and deciduous trees to grow better so that suitable habitat characteristics will be reached in the long run.

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Flying Squirrel LIFE (LIFE17 NAT/FI/000469)

Project site: Konnevesi-Kalaja-Niinivuori

Summary of the following actions:

A8 Preparation of plans to support continuity of aspen in the long term
C3 Supporting the continuity of aspen in the long term
D1 Monitoring the conservation actions

Project site: **Konnevesi-Kalaja-Niinivuori**
Municipality, region: **Rautalampi, North Savo region**
Country: **Finland**
Size of the project area (ha): **15259,3**
Responsible organisation(s): **Metsähallitus Parks & Wildlife Finland**

Was action implemented as planned in the proposal? **Yes.**

Fencing was not done due to good circumstances for aspen sprouting even without the enclosures.

Was action implemented in the same location than described in the proposal? **Yes**
Was C-action implemented according to the A-action's plan? **Yes**

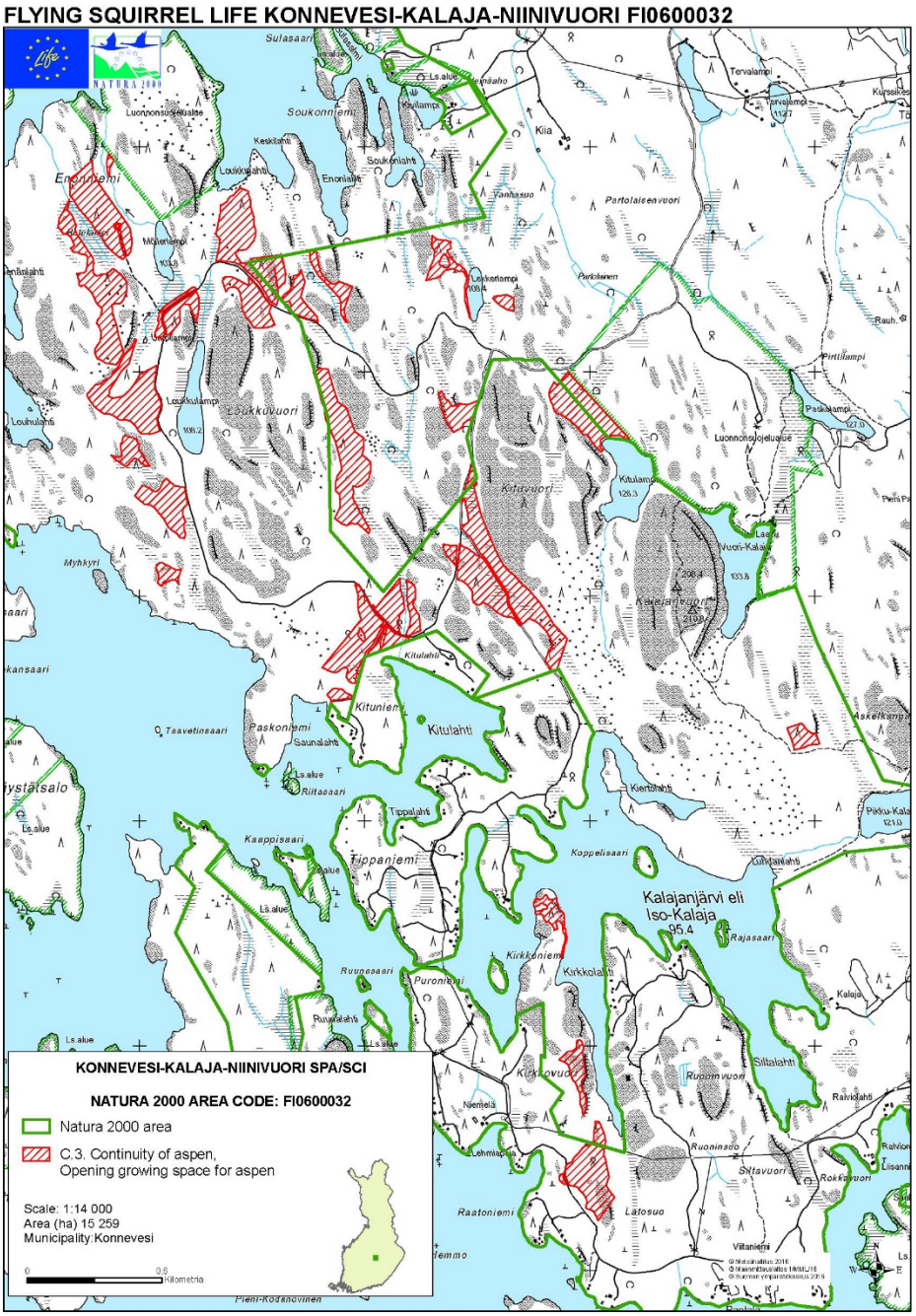
General description of the area

Konnevesi-Kalaja-Niinivuori Natura site is partly part of the Southern Konnevesi National Park. The biodiversity values are in natural water system, pristine old heath forests and herb-rich forests. There are many threatened plant species and plant community of rocky habitats, including relict species, is special. The forests are mostly quite low-nutritious pine and spruce dominated xeric and mesic heath forests. However, there are small areas of alkaline bedrock which creates eutrophic habitats in the glens of the landscape. For example, the regionally most valuable linden (*Tilia cordata*) forests are found from this site. In many places giant aspens (*Populus tremula*) are prominent and also plenty of pussy willow (*Salix caprea*) grows on the site. There is good dead wood continuum in the old forests that consists of Norway spruce (*Picea abies*) mixed with old aspens, though there has not been regeneration of aspens. The hills are dominated by Scots pine (*Pinus sylvestris*) as the glens have more deciduous trees such as aspen, birch (*Birch* spp.) and pussy willow. Relevant Natura 2000 habitats are Western Taiga, Fennoscandian herb-rich forests with Picea abies and Bog woodland.

Most of the forests of the area have been used as a commercial forest in the past and the forest stands are quite young. These forests typically have a good mixture of deciduous trees. Nature management sites are situated in these 20- to 50-year-old pine, spruce or birch dominated mixed forest stands that are not Natura 2000 habitats.

Flying squirrel (*Pteromys volans*) lives on the project site. The baseline inventory for the project site was carried out in 2019. The closest flying squirrel breeding sites and resting places are located in 1 and 3,3 km distance from the management areas.

Site map



Action A8

The aim of the nature management plan was to improve the quality of flying squirrel's habitat by promoting the aspen continuity and the abundance of deciduous trees on the area. The plan was

to free growing space for aspen and hinder the dominance and shading effect of spruce. Aspen groups and individual aspens were given space to grow by removing surrounding trees. At one management site also undergrowth was removed to give better light conditions to aspen saplings. Nature management was not planned in known flying squirrel breeding sites and resting places. Total area under nature management to promote aspen continuity was 27,87 ha.

Action C3

Nature management was carried out in 2021 and 2023 according to the plan created in action A8.

Action D1

Flying squirrel inventories are carried out during the project in 2021-2024.

Monitoring after the project

Metsähallitus Parks & Wildlife Finland will continue monitoring the flying squirrel occupancy at relevant intervals.

Outcomes of the actions

	Project site area (ha)	Future habitat *** (ha)
Total	15259,3	27,87
Opening growing space by removing spruces		27,87
Opening growing space by exposing mineral soil		-
Opening growing space by carrying out restoration burning		-
Protecting young aspens from herbivory (Enclosures)		-
Supporting aspen continuity with forestry measures		-

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Flying Squirrel LIFE (LIFE17 NAT/FI/000469)

Project site: Kurikkavaara

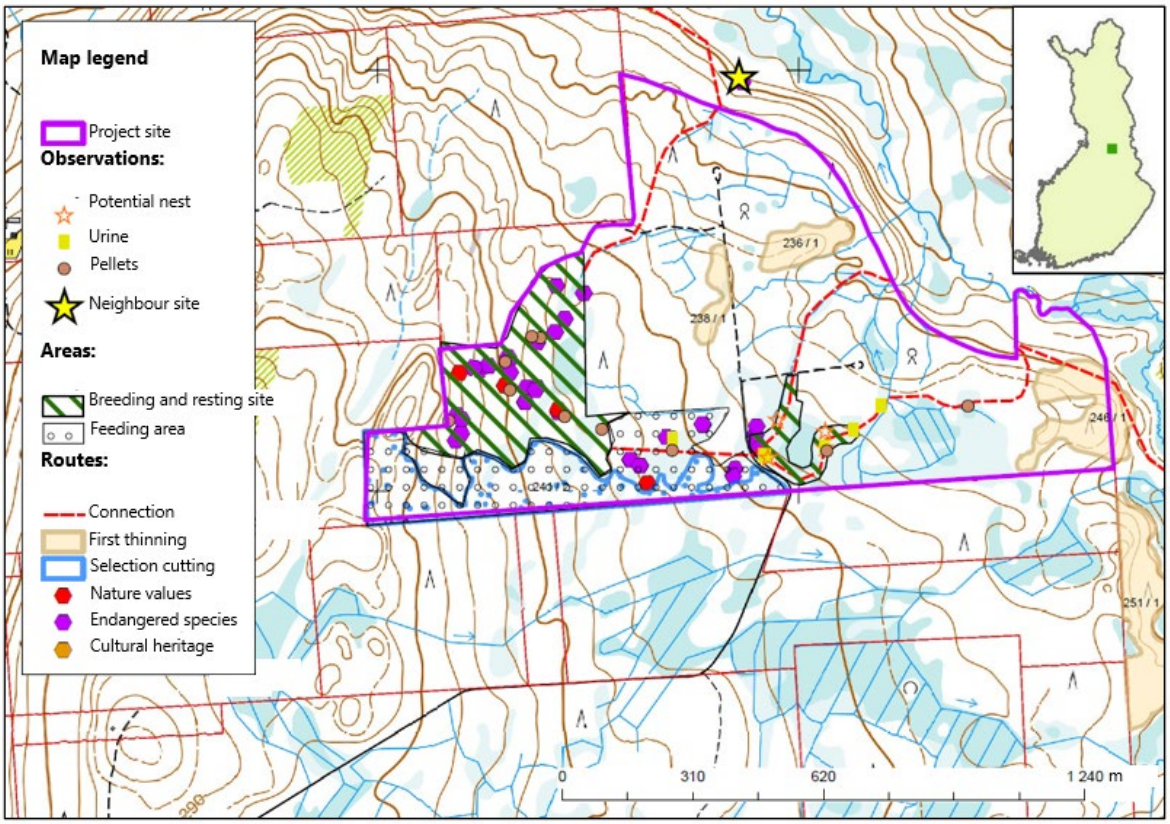
Summary of the following actions:

A8 Preparation of plans to support continuity of aspen in the long term
C3 Supporting the continuity of aspen in the long term
D1 Monitoring the conservation actions

Project site: **Kurikkavaara**
Municipality: **Puolanka**
Country: **Finland**
Size of the project area (ha): **97**
Responsible organisation(s): **Metsähallitus Forestry Ltd, Metsähallitus Parks & Wildlife Finland**

Was action implemented as planned in the proposal? **Yes**
Was action implemented in the same location than described in the proposal? **Yes**
Was C-action implemented according to the A-action's plan? **Yes - No fencing**

Site map



General description of the area

The project site is located in the region of Kainuu in eastern Finland. The area consists of both young and mature mesic heath forests, dominated by Norway spruce (*Picea abies*) and birch (*Betula* spp.) trees. Aspen (*Populus tremula*) is also common, and there is one pure aspen stand within the project site. The baseline inventory for the project site was carried out in 2019, and flying squirrel pellets, urine marks and potential nests were found within the project site. Two breeding sites and resting places of the flying squirrel were identified from the area. Four known flying squirrel sites ("neighbor sites") are located north and south from the project site, and the moving connections are saved in the spatial information system of Metsähallitus as ecological connections. These connections are not included in the achieved hectares of the project but will help to take into account the habitat network of the flying squirrel in the future.

Action A8

Kurikkavaara project area contains also project activities A6 (preparation of plans to maintain habitat network within managed forests) and C2 (maintaining habitat network in managed forests). First thinning and selective cutting were the selected forestry measures on the project site to give growing space for aspen.

Aspen continuity in Kurikkavaara is so good that fencing the aspen seedlings was not planned or done. Continuity of aspen will be secured in the future when tending the seedling stands especially by opening growing space for aspen groups.

Action C3

The forest cuttings were carried out in 2021 according to the plan created in action A8.

Action D1

Annual flying squirrel inventories are carried out during the project in 2021-2024.

Monitoring after the project

Metsähallitus Forestry ltd will continue monitoring the flying squirrel occupancy at relevant intervals.

Outcomes of the actions

	Project site area (ha)	Future habitat *** (ha)
Total	97	16,2
Opening growing space by removing spruces		-
Opening growing space by exposing mineral soil		-
Opening growing space by carrying out restoration burning		-
Protecting young aspens from herbivory (Enclosures)		-
Supporting aspen continuity with forestry measures		16,2

*** **Future habitat** = management allows spruce and deciduous trees to grow better so that suitable habitat characteristics will be reached in the long run.

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Flying Squirrel LIFE (LIFE17 NAT/FI/000469)

Project site: Palovaara

Summary of the following actions:

A8 Preparation of plans to support continuity of aspen in the long term
C3 Supporting the continuity of aspen in the long term
D1 Monitoring the conservation actions

Project site: **Palovaara**
Municipality, region: **Sotkamo, Kainuu**
Country: **Finland**
Size of the project area (ha): **24,6**
Responsible organisation(s): **Metsähallitus Forestry Ltd, Metsähallitus Parks & Wildlife Finland**

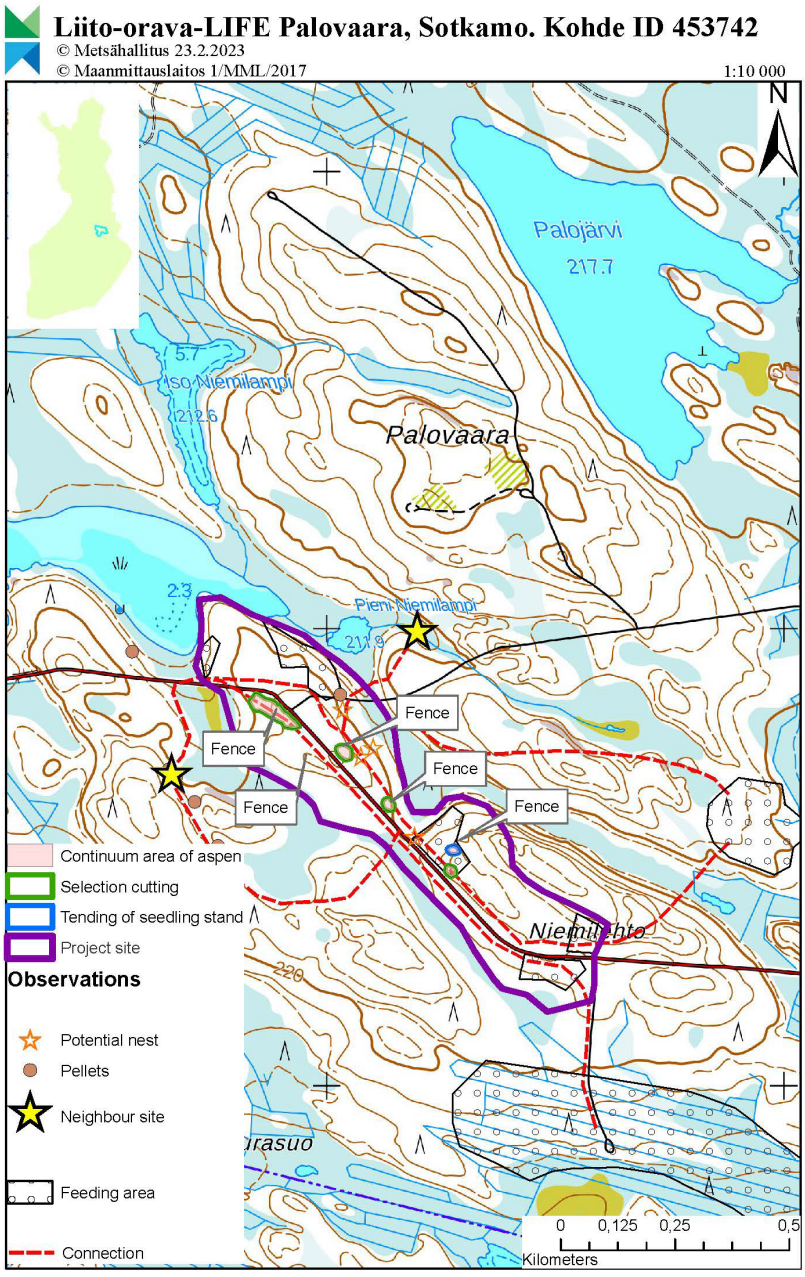
Was action implemented as planned in the proposal? **Yes**
Was action implemented in the same location than described in the proposal? **Yes**
Was C-action implemented according to the A-action's plan? **Yes**

General description of the area

The core of the project site is mature mesic heath forest with lots of dead wood. Average age of trees is 160 years. The area of mature forest covers approximately 5 ha of the whole site, and it is dominated by large Norway spruce (*Picea abies*) mixed with large Scots pine (*Pinus sylvestris*), birch (*Betula* spp.) and aspen (*Populus tremula*). Project site has also young pine forests with mixture of spruce and deciduous trees. The average age of trees in these young forest stands is 25 years. Also spruce dominated seedling stands are abundant. These will be usable for Flying squirrel in the future as feeding and moving areas. Young forest stands surround the project site on many sides that restricts the moving of Flying squirrel to the neighbor habitats. As the stands grow, the connections will start functioning again. Project site is bordering south-west side with protected forest. In the project site and outside it is located many old-growth forest sites and species under varying vulnerability status.

In the baseline inventories for the project in 2019, flying squirrel pellets and potential nests were found. From earlier inventories more marks of flying squirrel have been found that gives a reason to assume there might be a few breeding sites and resting places inside and outside the project site. Potential feeding areas and moving connections were identified with the help of satellite maps and forest data available.

Site map



Action A8

Palovaara project area contains also project activities A6 (preparation of plans to maintain habitat network within managed forests) and C2 (maintaining habitat network in managed forests). Small gap felling areas were located often near big aspens that promotes the continuity of aspen.

Five 50 m^2 enclosures were placed in the felling areas to prevent the herbivores grazing the aspen seedlings and young aspens.

Action C3

Nature management was carried out in 2022 according to the plan created in action A8.

Action D1

Annual flying squirrel inventories are carried out during the project in 2021-2024.

Monitoring after the project

Metsähallitus Forestry ltd will continue monitoring the flying squirrel occupancy at relevant intervals. Enclosures will be monitored every year.

Outcomes of the actions

	Project site area (ha)	Future habitat *** (ha)
Total	24,6	0,5
Opening growing space by removing spruces		-
Opening growing space by exposing mineral soil		-
Opening growing space by carrying out restoration burning		-
Protecting young aspens from herbivory (Enclosures)		0,025
Supporting aspen continuity with forestry measures		0,5

*** **Future habitat** = management allows spruce and deciduous trees to grow better so that suitable habitat characteristics will be reached in the long run.

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Flying Squirrel LIFE (LIFE17 NAT/FI/000469)

Project site: Palstonvuori-Jääskelä

Summary of the following actions:

A8 Preparation of plans to support continuity of aspen in the long term
C3 Supporting the continuity of aspen in the long term
D1 Monitoring the conservation actions

Project site: **Palstonvuori-Jääskelä**
Municipality, region: **Jyväskylä, Central Finland region**
Country: **Finland**
Size of the project area (ha): **178**
Responsible organisation(s): **Metsähallitus Parks & Wildlife Finland**

Was action implemented as planned in the proposal? **Yes**
Was action implemented in the same location than described in the proposal? **Yes**
Was C-action implemented according to the A-action's plan? **Yes**

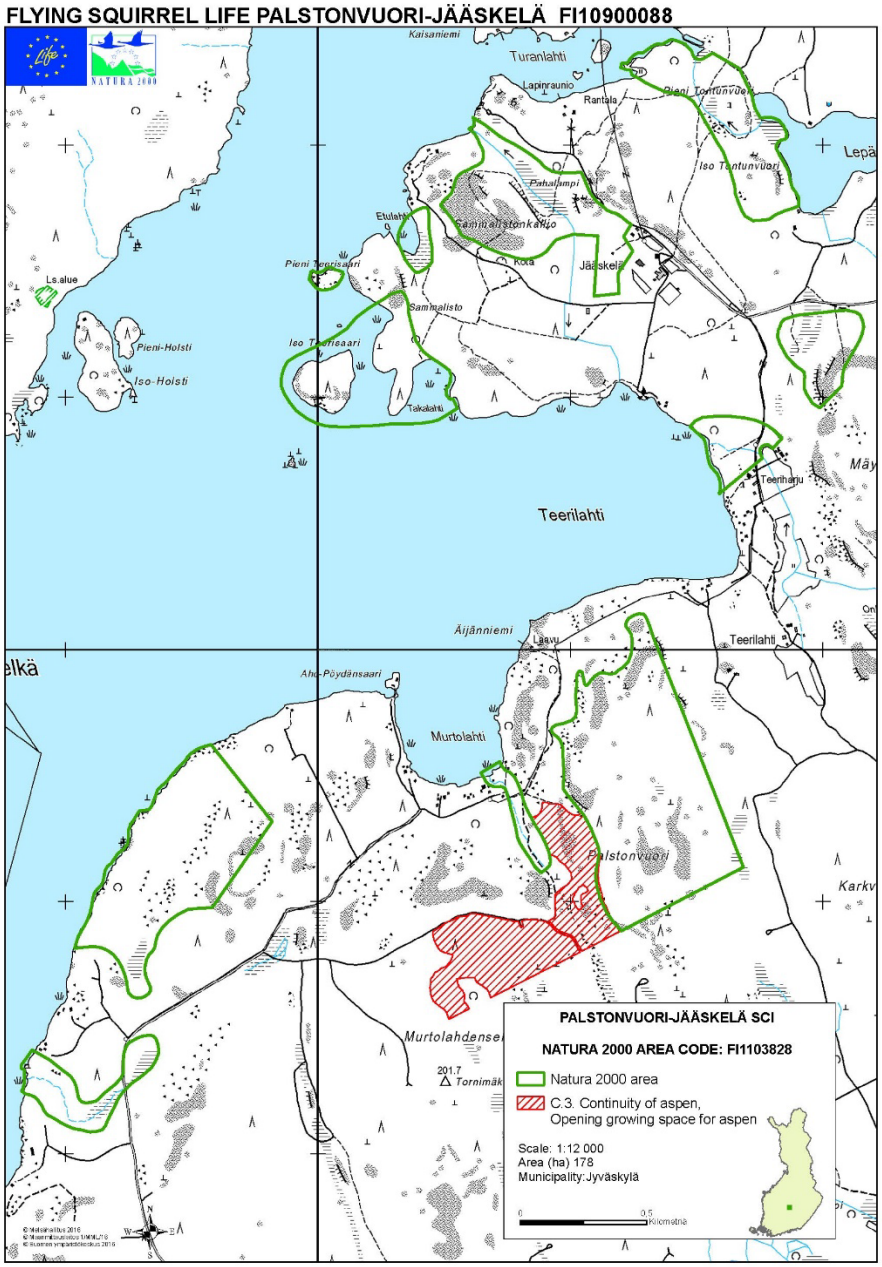
General description of the area

The project site is located on the northern shores of lake Päijänne. The landscape is rocky with steep hills, most forests are xeric or mesic heath forests on the tops and slopes of the hills. There is a small creek flowing through the area along which there are herb-rich forests, small swamp forests and eutrophic spruce mires forming a patchwork of habitats. The biodiversity value of Palstonvuori-Jääskelä area is in the versatility of habitats which have preserved relatively well despite of small scale human activity. The project site is part of old-growth forest protection area that is connected with other nature protection areas.

The project site consists of mixed forests in many ages, age structures and densities, created naturally or by cultivation. Many forest stands have sown or planted Scots pine (*Pinus sylvestris*) or Norway spruce (*Picea abies*) forest mixed with birch (*Betula* spp.), aspen (*Populus tremula*), alder (*Alnus* sp.) or pussy willow (*Salix caprea*). Relevant Natura 2000 habitats on the area are Western Taiga, Bog woodland, Fennoscandian herb-rich forests with Picea abies and Fennoscandian deciduous swamp woods. Habitat types in management areas are mainly young sub-xeric or mesic heath forests and they don't include Natura 2000 habitats. Flying squirrel (Pteromys Volans) inhabits the site and Palstonvuori-Jääskelä area is a valuable part of the conservation network for the species.

The baseline inventory for aspen on the project site was carried out in 2019. Promotion of continuity of deciduous trees in Palstonvuori project site will support Flying squirrel in neighbor habitats.

Site map



Action A8

The aim of the nature management plan was to improve the quality of flying squirrel habitats by increasing the amount of aspen and other deciduous trees and to ensure aspen continuum on the area. Mainly pine and spruce were removed to give growing space to aspen and deciduous trees so that in the future they will function as feeding areas and nesting trees, when the trees become large enough. Also some deciduous trees were cut to enlarge the rest of the trees. Felled trees were left on the site to form dead wood. Some spruces were left standing next to deciduous trees to function as a cover for Flying squirrel against predators. Spruce and pine groups were left where

there were no deciduous trees. Nature management was not planned in known flying squirrel breeding sites and resting places. Total area under nature management to promote aspen continuity was 23,2 ha.

Action C3

Nature management was carried out in 2021 according to the plan created in action A8.

Action D1

Monitoring is carried out by Metsähallitus Parks & Wildlife Finland on relevant intervals when the general monitoring for nature management is done on the area.

Monitoring after the project

Monitoring is carried out by Metsähallitus Parks & Wildlife Finland on relevant intervals when the general monitoring for nature management is done on the area.

Outcomes of the actions

	Project site area (ha)	Future habitat *** (ha)
Total	178	23,2
Opening growing space by removing spruces		23,2
Opening growing space by exposing mineral soil		-
Opening growing space by carrying out restoration burning		-
Protecting young aspens from herbivory (Enclosures)		-
Supporting aspen continuity with forestry measures		-

*** **Future habitat** = management allows spruce and deciduous trees to grow better so that suitable habitat characteristics will be reached in the long run.

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Flying Squirrel LIFE (LIFE17 NAT/FI/000469)

Project site: Pata-aho

Summary of the following actions:

A8 Preparation of plans to support continuity of aspen in the long term
C3 Supporting the continuity of aspen in the long term
D1 Monitoring the conservation actions

Project site: **Pata-aho**
Municipality, region: **Suomussalmi, Kainuu**
Country: **Finland**
Size of the project area (ha): **31,5**
Responsible organisation(s): **Metsähallitus Forestry Ltd, Metsähallitus Parks & Wildlife Finland**

Was action implemented as planned in the proposal? **Yes**
Was action implemented in the same location than described in the proposal? **Yes**
Was C-action implemented according to the A-action's plan? **Yes**

General description of the area

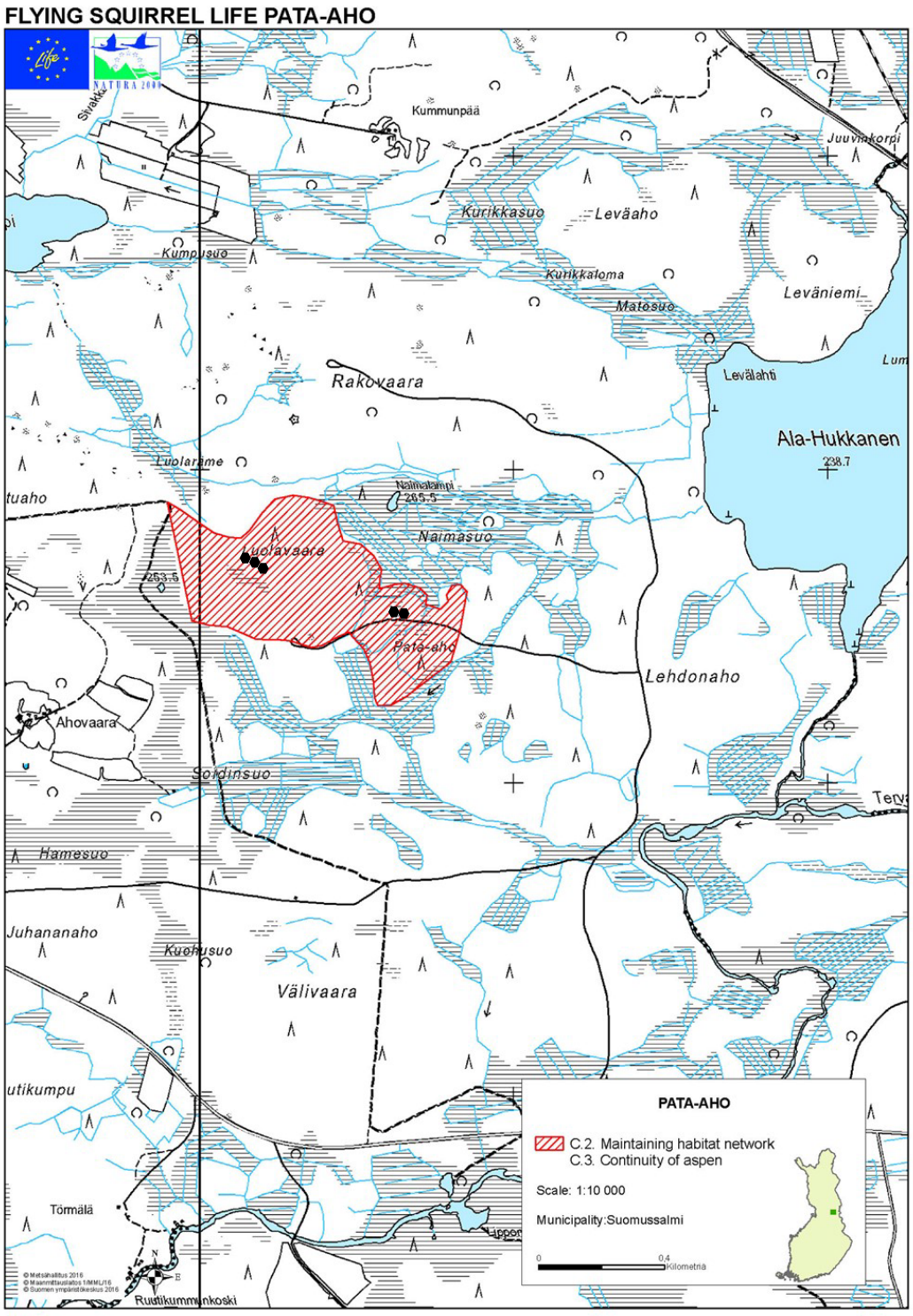
The project site Pata-aho consists mainly of mesic spruce heath forest dominated by spruce. The nearest Natura 2000 areas are Riuskanselkonen in 6 kilometres distance and Mäkilamminvaara in 4 kilometers distance. There are many flying squirrel observations from the years 2002 to 2012. On the time of project proposal there was about 24 hectares of mature forest but due to lack of shared information, 6.2 hectares of it was logged in 2018. Flying squirrel was known and cuttings were planned accordingly outside the most important parts of the forest. Commission was reported about the incidence and a change was applied: site was removed from the action A6 but kept in action A8. Original plan was to plan A6 and A8 activities to Pata-aho simultaneously.

Action A8

Aim of the action plan was to maintain the flying squirrel habitat network in the long timescale and promote aspen regeneration close to Natura areas.

Aspen continuity was promoted by placing five 50 m^2 enclosures in the project site to prevent the herbivores grazing the aspen seedlings and young aspens. The enclosures were built on the sides of logged stands close by remained aspens. All the coniferous tree seedlings were removed from inside the enclosures.

Site map



Aspen enclosures marked with black dots.

Action C3

Nature management was carried out in 2022 according to the plan created in action A8.

Action D1

Annual flying squirrel inventories are carried out during the project in 2021-2024. Enclosures will be monitored every year.

Monitoring after the project

Metsähallitus Forestry ltd will continue monitoring the flying squirrel occupancy at relevant intervals. Enclosures will be monitored every year.

Outcomes of the actions

	Project site area (ha)	Future habitat *** (ha)
Total	31,5	0,025
Opening growing space by removing spruces		-
Opening growing space by exposing mineral soil		-
Opening growing space by carrying out restoration burning		-
Protecting young aspens from herbivory (Enclosures)		0,025
Supporting aspen continuity with forestry measures		-

*** **Future habitat** = management allows spruce and deciduous trees to grow better so that suitable habitat characteristics will be reached in the long run.

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Flying Squirrel LIFE (LIFE17 NAT/FI/000469)

Project site: Riuskanselkonen

Summary of the following actions:

A8 Preparation of plans to support continuity of aspen in the long term
C3 Supporting the continuity of aspen in the long term
D1 Monitoring the conservation actions

Project site: **Riuskanselkonen**
Municipality, region: **Suomussalmi, Kainuu region**
Country: **Finland**
Size of the project area (ha): **4226**
Responsible organisation(s): **Metsähallitus Parks & Wildlife Finland**

Was action implemented as planned in the proposal? **Yes**
Was action implemented in the same location than described in the proposal? **Yes**
Was C-action implemented according to the A-action's plan? **Yes**

General description of the area

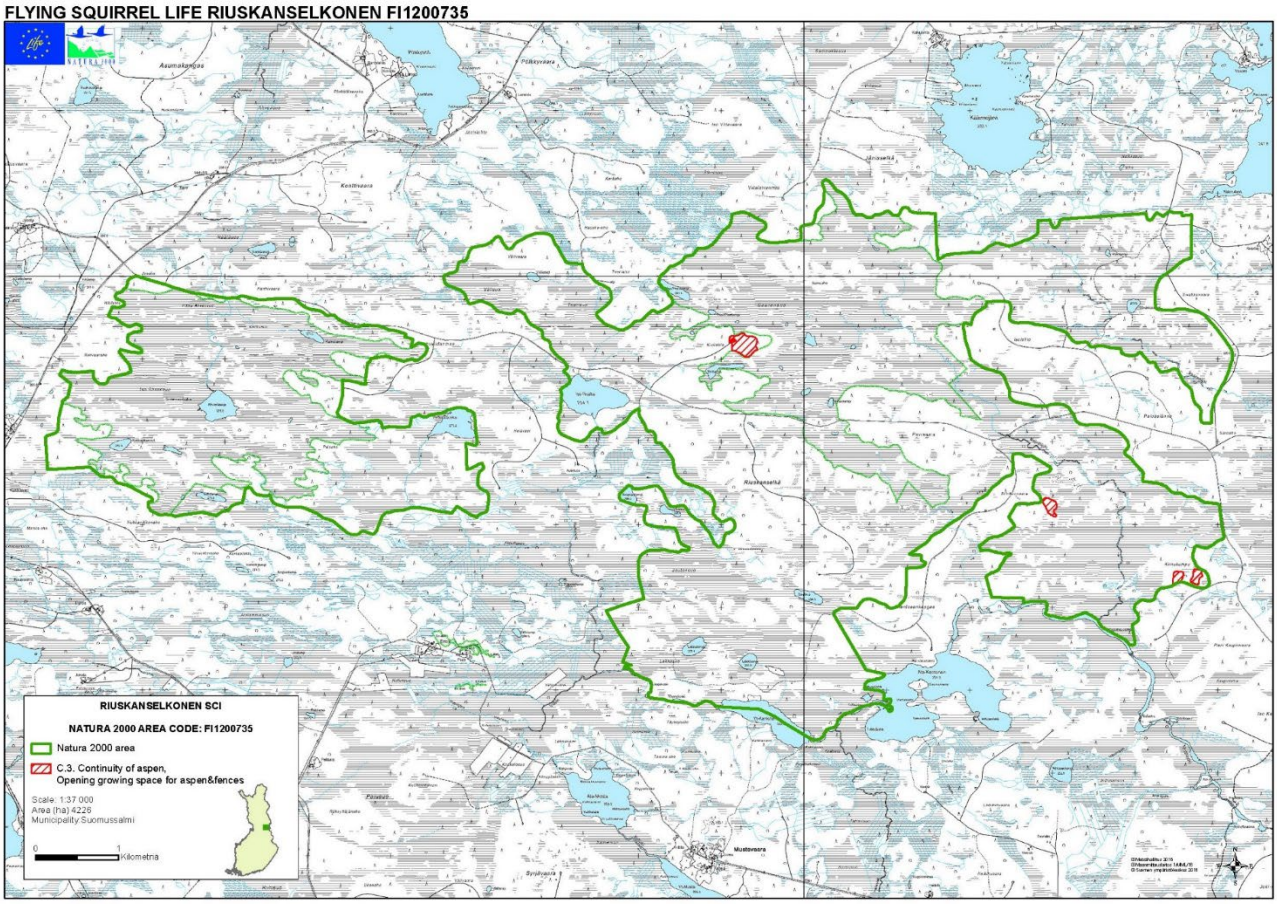
The project site with continuous old-growth forests and large mires represents one of the most pristine wilderness areas in the Kainuu region. Because of its location and large size Riuskanselkonen is especially valuable part of the regional conservation network for flying squirrel (*Pteromys volans*). The forests are at large continuous old-growth forests – the core areas include very old forests in climax stage – but there are also some young stands which have originated from clear-cuttings in the late 20th century. A special feature on this site is patches of mixed forests which have developed through natural succession after forest fires. In these areas the amount of deciduous trees is significant including large birch (*Betula* spp.) and aspens (*Populus tremula*).

The forests of this site are mainly Norway spruce (*Picea abies*) dominated heath forests mixed with large aapa mires, streams, small lakes and ponds. The abundance of deciduous varies. In the north-eastern part of the site aspens have been ringed in the past. They are seedling stands that have aspen, Scots pine (*Pinus sylvestris*) and birch trees as retention trees. Relevant Natura 2000 habitats on the area are Western Taiga and Bog woodland. Management areas are do not include Natura 2000 habitats.

The continuous conservation issue of Aspen dependent species in this region is on the one hand the ageing and poor regeneration of aspen inside old-growth forest stands and on the other hand the heavy grazing of young aspens by moose and reindeer.

The baseline inventory for aspen on the project site was carried out in 2019.

Site map



Action A8

The aim of the nature management plan was to improve the flying squirrel's habitat by promoting the amount of aspen and other deciduous trees and continuum of aspen. The restoration actions will ensure vital aspen continuum in the future as well. Enhancing aspen regeneration was done by exposing mineral soil. Ground layer vegetation was removed and soil surface broken to help aspen and other deciduous trees to sprout. After soil preparation the managed areas were fenced to prevent the grazing of young aspens by moose and reindeer. Eleven small 50 m^2 enclosures and one large 12000 m^2 enclosure were placed on the project site to prevent the herbivores grazing the aspen seedlings and young aspens. The trees were cut only if erecting the fences required.

Nature management was not planned in known flying squirrel breeding sites and resting places. Total area under nature management to promote aspen continuity was 12 ha.

Action C3

Nature management was carried out in 2022-2023 according to the plan created in action A8. Some fence elements had been broken during the transportation, and this has an effect on the size of the fenced area. Due to ground shape and extra fence elements from Ulvinsalo project site, one big fence was decided to do instead of several small ones.

Action D1

Monitoring is carried out by Metsähallitus Parks & Wildlife Finland on relevant intervals when the general monitoring for nature management is done on the area. Condition of fences will be checked on a yearly basis and the success of aspen regeneration will be evaluated in the end of the project.

Monitoring after the project

Metsähallitus Parks & Wildlife Finland will continue monitoring the flying squirrel occupancy at relevant intervals. Condition of fences will be checked every year.

Outcomes of the actions

	Project site area (ha)	Future habitat *** (ha)
Total	4226	12
Opening growing space by removing spruces		-
Opening growing space by exposing mineral soil		12
Opening growing space by carrying out restoration burning		-
Protecting young aspens from herbivory (Enclosures)		1,25
Supporting aspen continuity with forestry measures		-

*** **Future habitat** = management allows spruce and deciduous trees to grow better so that suitable habitat characteristics will be reached in the long run.

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Flying Squirrel LIFE (LIFE17 NAT/FI/000469)

Project site: Syöte

Summary of the following actions:

A8 Preparation of plans to support continuity of aspen in the long term
C3 Supporting the continuity of aspen in the long term
D1 Monitoring the conservation actions

Project site: **Syöte**
Municipality, region: **Pudasjärvi, Northern Ostrobothnia region**
Country: **Finland**
Size of the project area (ha): **19641**
Responsible organisation(s): **Metsähallitus Parks & Wildlife Finland**

Was action implemented as planned in the proposal? **Yes**

Enclosures were not erected in Syöte due to difficult accessibility. Instead, the fence elements were used in Huuhkajanlehto and Riuskanselkonen project areas.

Was action implemented in the same location than described in the proposal? **Yes**

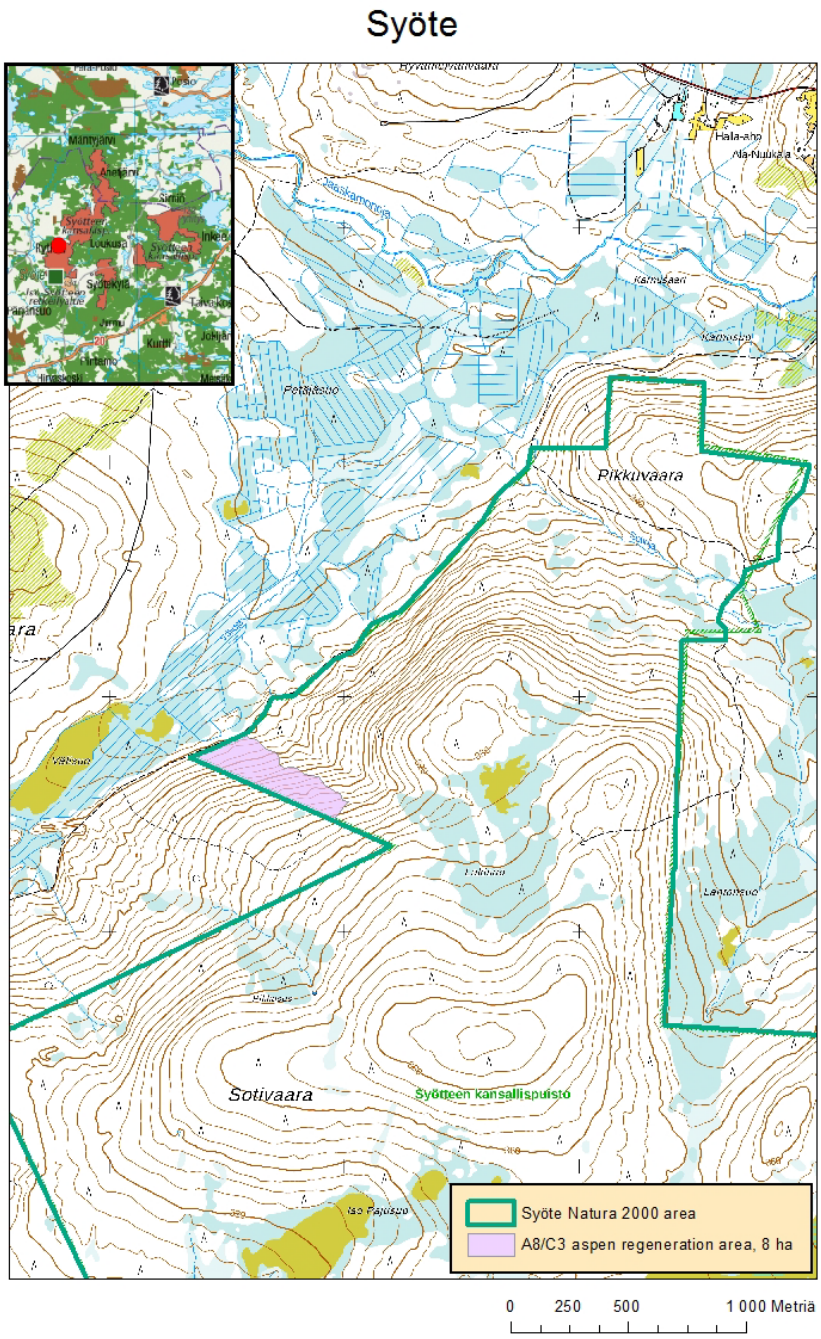
Project site is the same, but the management area was changed to more suitable location.

Was C-action implemented according to the A-action's plan? **Yes**

General description of the area

The project site is a part of Syöte Natura 2000 area and Syöte National Park. This chain of pristine forest habitat continues undisrupted for 25 km in north-south axis. The site consists mainly of old-growth forests, partly high-altitude forests, but has also sloping fens and springs with eutrophic spots. The forests are mainly Norway spruce (*Picea abies*) dominated mesic heath forests. In places conifers are mixed with significant amount of old deciduous trees. The continuum of dead wood (spruce) is significant and there are also fire-refuge areas where no forest fires have occurred in centuries and the trees are especially old. Syöte National Park has the northernmost known populations of flying squirrel (*Pteromys volans*) in Finland. Relevant Natura 2000 habitats on the project area are Western Taiga and Bog woodland. Nature management areas are situated in mature, mesic heath forests, that do not include Natura 2000 habitats. The baseline inventory for aspen on the project site was carried out in 2019.

Site map



Action A8

The aim of the nature management plan was to improve the flying squirrel's habitat by promoting the growth of aspen (*Populus tremula*) and other deciduous trees. Safeguarding aspen continuum has a direct positive impact on flying squirrel populations in Syöte area. Spruce was removed especially around aspens. Felled trees were left on the site to form dead wood. Nature management was not planned in known flying squirrel breeding sites and resting places. Total area under nature management to promote aspen continuity was 8,85 ha.

Action C3

Nature management was carried out in 2022 according to the plan created in action A8.

Action D1

Monitoring is carried out by Metsähallitus Parks & Wildlife Finland on relevant intervals when the general monitoring for nature management is done on the area.

Monitoring after the project

Metsähallitus Parks & Wildlife Finland will continue monitoring the flying squirrel occupancy at relevant intervals.

Outcomes of the actions

	Project site area (ha)	Future habitat *** (ha)
Total	19641	8,85
Opening growing space by removing spruces		8,85
Opening growing space by exposing mineral soil		-
Opening growing space by carrying out restoration burning		-
Protecting young aspens from herbivory (Enclosures)		-
Supporting aspen continuity with forestry measures		-

*** **Future habitat** = management allows spruce and deciduous trees to grow better so that suitable habitat characteristics will be reached in the long run.

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Flying Squirrel LIFE (LIFE17 NAT/FI/000469)

Project site: Ulvinsalo

Summary of the following actions:

A8 Preparation of plans to support continuity of aspen in the long term
C3 Supporting the continuity of aspen in the long term
D1 Monitoring the conservation actions

Project site: **Ulvinsalo**
Municipality, region: **Kuhmo, Kainuu region**
Country: **Finland**
Size of the project area (ha): **3949**
Responsible organisation(s): **Metsähallitus Parks & Wildlife Finland**

Was action implemented as planned in the proposal? **Yes – No fencing**
Was action implemented in the same location than described in the proposal? **Yes**
Was C-action implemented according to the A-action's plan? **Yes – No fencing**

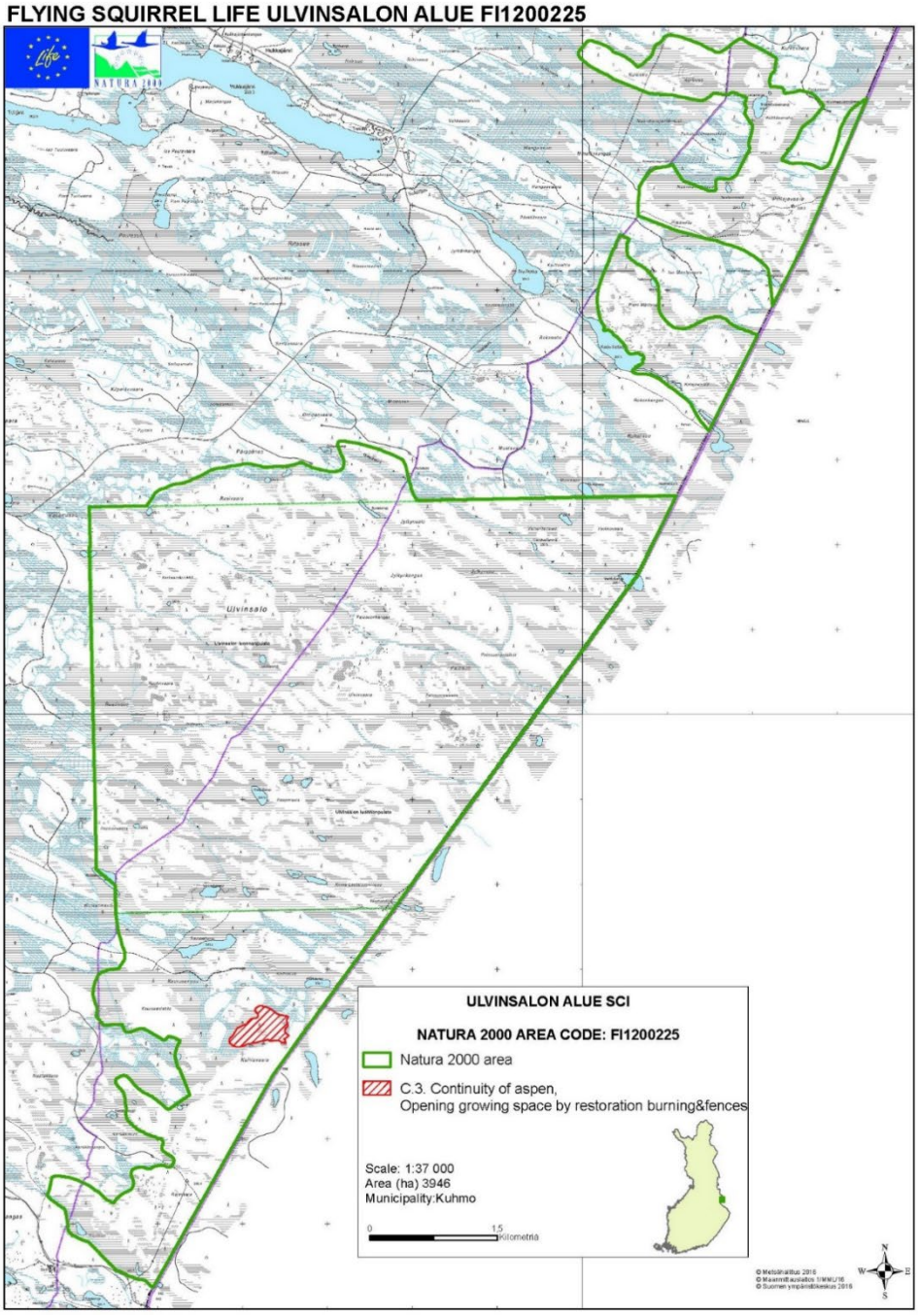
General description of the area

Ulvinsalo is one of the most pristine old-growth forest areas in Kainuu region and an important area at the north eastern part of Finnish conservation network for flying squirrel (*Pterymus volans*). The project site is characterized with typical landscape of eastern Kainuu region where old-growth taiga forests, aapa mires, streams and ponds form a maze of habitats. Forests and mires inside strict nature reserve are largely in pristine state but the Northern and southern parts of site, which have been added later to the site as enlargement, have a history of forestry such as clear cuttings and mire drainage. Relevant Natura 2000 Habitat types are Western Taiga and Bog woodland. Nature management area is located in previously commercially managed forests stand, cut in the seventies and growing now conifers. It does not include any Natura 2000 habitat type.

The continuous conservation issue of Aspen dependent species is on the one hand the ageing and poor regeneration of aspen inside old-growth forest stands and on the other hand aspen saplings are under heavy grazing pressure by elk and reindeer, which prevents regeneration of aspen.

The baseline inventory for aspen on the project site was carried out in 2019.

Site map



Action A8

The aim of the nature management plan was to improve the flying squirrel's habitat by increasing the amount of deciduous trees after the restoration burning. The planned restoration actions included prescribed burning of young pine plantation which will re-start the natural forest succession and also induce the regeneration of aspen.

To prepare the burning, young trees were cut and a fire corridor was formed around the restoration area by removing the ground layer. The planned restoration actions will ensure vital

aspen continuum in the future as well. The plan was to build 20 enclosures on the site to prevent herbivory and promote aspen and other deciduous trees to regenerate. However, due to the delay in prescribed burning, it was decided to use the fence elements in Huuhkajanlehto and Riuskanselkonen project sites.

Nature management was not planned in known flying squirrel breeding sites and resting places. Total area under nature management to promote aspen continuity was 19,84 ha.

Action C3

Nature management was carried out in 2022-2024 according to the plan created in action A8. Preparatory work for the prescribed burning was carried out in 2022, and the burning in 2024. Due to insufficient weather conditions, burning had to be delayed till the last project summer and the enclosures were built in the project sites Riuskanselkonen and Huuhkajanlehto. This change also gives valuable experiences of bigger enclosures and also makes monitoring more efficient.

Action D1

Monitoring is carried out by Metsähallitus Parks & Wildlife Finland on relevant intervals when the general monitoring for nature management is done on the area.

Monitoring after the project

Metsähallitus Parks & Wildlife Finland will continue monitoring the flying squirrel occupancy at relevant intervals.

Outcomes of the actions

	Project site area (ha)	Future habitat *** (ha)
Total	3949	19,84
Opening growing space by removing spruces		-
Opening growing space by exposing mineral soil		-
Opening growing space by carrying out restoration burning		19,84
Protecting young aspens from herbivory (Enclosures)		-
Supporting aspen continuity with forestry measures		-

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