



31.3.2025

Flying Squirrel LIFE (LIFE17 NAT/FI/000469)

Action A6. Preparation of plans to maintain habitat network within managed forests

Deliverable: Forest plans for Finnish private and state-owned forests (A6)

Maintaining habitat network in state-owned managed forests

Project site documentation

Action A6 includes 37 project sites: 28 private sites and nine state-owned sites in Finland in the Flying Squirrel LIFE project. This document includes summaries of Maintaining habitat network in managed forests actions in 11 state-owned multiple-use forests (Metsähallitus Forestry Ltd), as two sites (40 and 45) are also included. These sites were removed from the joint planning process due to a high amount of nature values, but afterwards, permanent protection was agreed to them during the project.

Action A6 Preparation of plans to maintain habitat network within managed forests

Action C2 Maintaining habitat network in managed forests

Action D1 Monitoring the conservation actions

These actions directly relate to objectives "Prevention of habitat loss and fragmentation" and "Increase in co-operation and tool development".

Project sites used in these actions are real examples showing how to maintain forest structure favorable for the flying squirrel: essential habitats for the species are maintained and secured in the area for a long time ahead. These summaries serve as examples of good practices of forest cuttings near flying squirrel habitats. Project sites are not parts of any Natura 2000 area and do not include any Natura 2000 habitat types. Five of these sites - Hanhivaara, Jänisselkä, Kivilampi, Kurikkavaara and Palovaara - are also used in an Action Chain A8-C3, supporting aspen continuity.

Before starting the planning of sites, baseline information was gathered using flying squirrel inventories at the project sites and their neighborhood (by flying squirrel experts) and listing landowner's objectives. Many professionals representing of several project partners and nature conservation authorities participated a joint planning process developed for the project during the years 2019-2021.

Forest management activities were planned outside strictly protected breeding sites and resting places (Habitats Directive IV(a)) and to maintain feeding areas and moving connections ensuring functional connectivity of breeding sites and resting places. Typically, forestry measures can be carefully planned within flying squirrels' home ranges (averages for females eight and for males 60



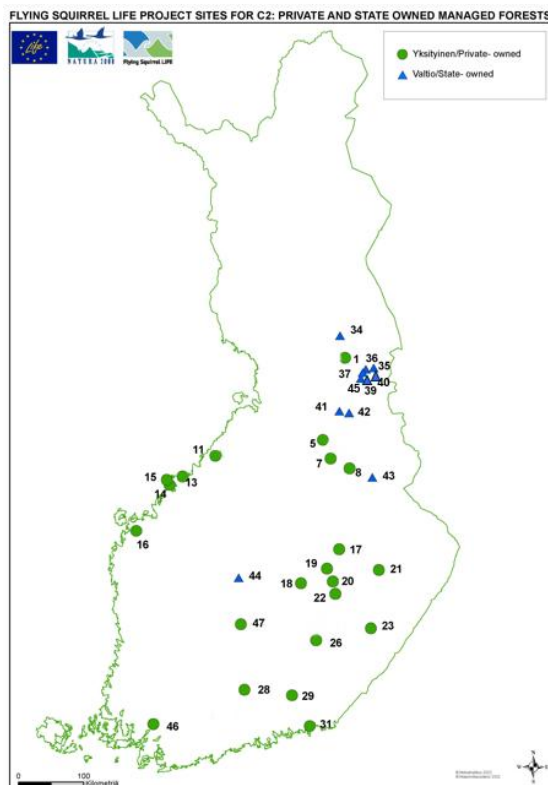
hectares), which are larger areas including breeding sites and resting places, but also moving connections and foraging areas. In addition, in state-owned lands moving connections to other suitable habitats can often be promoted to enable species' spreading regionally.

Forestry measures were chosen to maintain ecologically important functions of forests for the flying squirrel, namely forests suitable for breeding and moving (including strictly protected parts of forests). Sometimes forest structure was promoted to gain suitable habitats in the future. In general, applied forestry management methods aim to maintain and promote continuous tree coverage and natural uneven structural distribution of trees in stands. In some sites, protection was found to be a correct management method.

Methods can include thinnings or mature thinning and methods of continuous-cover management like selective felling and uneven-aged felling. Small-gap felling with maximum clearing size of 0,3 hectares can be used; the amount of the gaps in chosen management area is not restricted but the basal diameter of the whole managed area with the spaces between gaps being thinned must meet the criterium of the Forest Act (minimum of basal area varies throughout the country between 6-10 m²/ha). Retention tree felling was applied in some cases. Deciduous trees (aspen) were favored in all forestry measures.

Management actions (C2) on sites were carried out during 2021-2022 outside flying squirrel's breeding season (from March/April to June/August, varying regionally).

Project sites for Maintaining habitat network in managed forests





Outcomes of the actions

Results of nine example project sites at state-owned multiple-use forests from an ecological perspective are shown in a table below. More detailed descriptions of selected forestry measures at each project site are found in summaries of each 11 site (pages 4-32). On maps of sites, there are some variabilities in how different themes are described. Sites 40 and 45 were left out from the joint planning process 2021 due to a high amount of nature values. They are documented here as baseline inventories with preliminary planning were made and afterwards, decisions for permanent protection were agreed during the project.

		Total project site area (ha)	Flying squirrel habitat (ha) *	Moving habitat (ha) **	Future habitat (ha) ***
34	Kivilampi	63,3	21,9	-	13,9
35	Hanhivaara	11,6	11,6	-	-
36	Hikilehto	2	-	-	0,9
37	Jänisselkä	23,1	23,1	-	-
39	Parviaissuo	8,2	0,4	3,9	2,1
40	Peranganvaara (protection)	105,6	85,0	20,6	-
41	Kurikkavaara	97	27,5	6,3	9,9
42	Pöppölä	125	23,9	32,2	29,2
43	Palovaara	24,6	6,5	-	0,5
44	Sipilänperä	17,5	2,3	3,6	3,9
45	Syrjävaara (protection)	96,0	43,0	53,0	-
	Sum	573,9	245,2	119,6	60,4

* **Flying squirrel habitat** = management saves breeding sites and resting places (based on conservation legislation) and/or feeding areas. Feeding areas contain deciduous trees, and some selective cuttings can be made in these areas without changing the ecological function. Saving these areas for long term are based on present conservation legislation or on organization's own decision.

** **Moving habitat** = management maintains forest cover so that flying squirrel can use area for moving.

*** **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:

A6 Preparation of plans to maintain habitat network within managed forests

C2 Maintaining habitat network in managed forests

D1 Monitoring

Project site: **Kivilampi**

Municipality, region: **Taivalkoski, Northern Ostrobothnia**

Country: **Finland**

Size of the project area (ha): **63,3**

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**

Same site is also part of action chain A8 - C3. 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).

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 in the west and more barren habitats in the east. Norway spruce (*Picea abies*) and Scots pine (*Pinus sylvestris*) mixed forests cover 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 sites ("neighbor sites") are situated in state owned land in couple of kilometers distance. The moving connections are saved in the spatial information system of Metsähallitus as ecological connections.



Site map

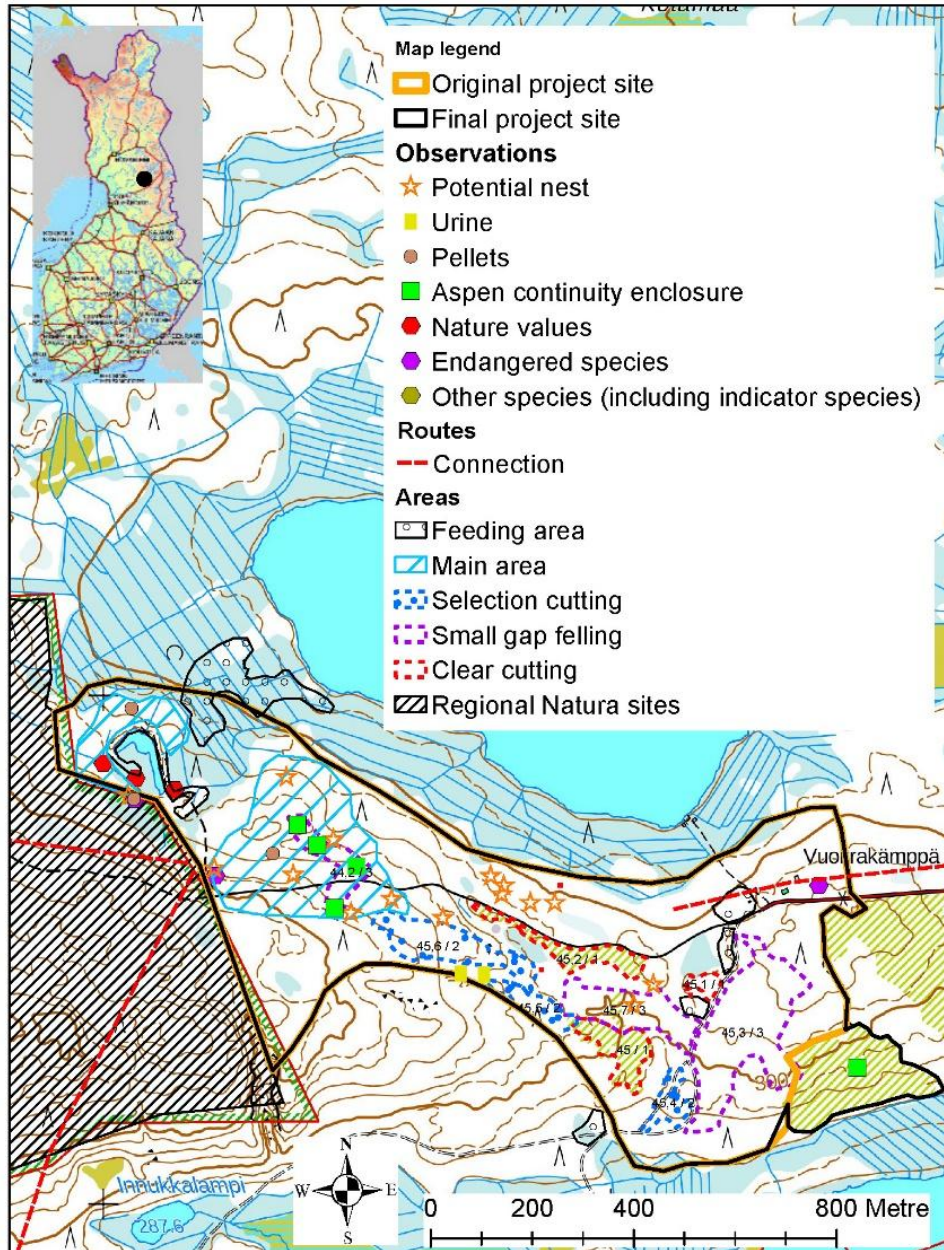


Kivilampi

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A6 project site and actions (original project site) with orange lining, expansion area for A8 actions on black lining. Aspen enclosures marked with green squares.

Action A6

The aim of the forest management plan was to diversify the age structure and density of trees, give space for aspen and other deciduous trees and help spruce and deciduous trees to sprout. Small gap felling, thinning, selective cutting and clear cutting were the selected forestry measures on the project site. Total area under cuttings was 13,9 ha of which 9,7 will remain suitable for flying squirrel. All the potential nesting trees surrounded at least 10-meter buffer zones were left intact.



These buffer zones as well as management areas that require precise cutting, were marked in the field. Deciduous trees were left standing. Forest cuttings were operated outside the nesting time.

Small gap felling was carried out on 8,7 hectares with clearing areas of maximum 0,3 hectares. Clearing areas covered maximum of 25 percent of the management area, together 2,2 ha. The cuttings were situated in most pine-dominated forests of the site to help the spruce and deciduous trees to sprout and give space for undergrowth. The cutting areas were left to regenerate naturally. Thinning was done in the areas between small gap fellings.

Clearings of 0,04 hectares were made around or beside groups of aspens to give growing space for aspen root sprouts. Aspens that were wanted to sprout were cut from high as high stumps and left to form dead wood. The same was done also to some individual shading birches. Selective cutting was done on three hectares. Mostly pine and small spruce were cut but old pines and pines in open areas were left standing. All the possible deciduous trees were left intact. Only spruces that grew on strip roads were cut. Clear cutting was done in almost pure pine stands that have been useful for flying squirrel only as moving connections. The spruces and spruce undergrowth were left standing. Cutting areas were mounded and mix-planted to spruce and pine.

Altogether 10 hectares were marked as biodiversity development areas in the GIS system of Metsähallitus ("Main area" in the map above). Future management of these areas aims at making the forest structure more suitable for flying squirrel.

Action C2

The forest cuttings were carried out in 2021 according to the plan created in action A6. Management activities were not done during a breeding season.

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

Management aims to maintain ecologically functional areas for the flying squirrels as long-term conservation effects. Ecological functions may be categorized to flying squirrel habitats, moving habitats and future habitats. Of moving and future habitat, most likely function is selected.



Project site information	Area (ha)	Flying squirrel habitat (ha) *	Moving habitat (ha) **	Future habitat (ha) ***	Combination of flying squirrel conservation & recreation (ha) ****
Total project site area	63.3	20 ^a	-	-	-
Breeding sites and resting places	Not defined	Not defined	-	-	-
Feeding areas	1,9	1,9	-	-	-
Selection cutting	3.1	-	-	3,1	-
Small gap felling	8.7	-	-	8,7	-
Clear cutting	2.1	-	-	2.1	-
TOTAL	-	21,9	-	13,9	-

* - **** see legend in the front page

^a hectares are based on expert evaluation including main area on the map

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Flying Squirrel LIFE (LIFE17 NAT/FI/000469)

Project site: Hanhivaara

Summary of the following actions:

A6 Preparation of plans to maintain habitat network within managed forests

C2 Maintaining habitat network in managed forests

D1 Monitoring

Project site: **Hanhivaara**

Municipality, region: **Suomussalmi, Kainuu**

Country: **Finland**

Size of the project area (ha): **11,6**

Responsible organisation(s): **Metsähallitus Forestry Ltd, Metsähallitus Parks & Wildlife Finland**

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

Natural values at the site were high, so after baseline inventories site protection was selected as a management measure for the area. No loggings were done.

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

Same site is also part of action chain A8 - C3. 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**

Protection decision of the site was confirmed by transferring the responsibility of the area from Metsähallitus Forestry to Metsähallitus Parks & Wildlife, Finland in 2022.

General description of the area

Hanhivaara is located between Nature 2000 area Riuskanselkonen and protected forest Näätäsoo. 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 (11.6 ha) was protected in 2022 and moved to responsibility for Metsähallitus Parks & Wildlife Finland.

To be able to conduct the actions for promoting aspen continuity (A8), 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.



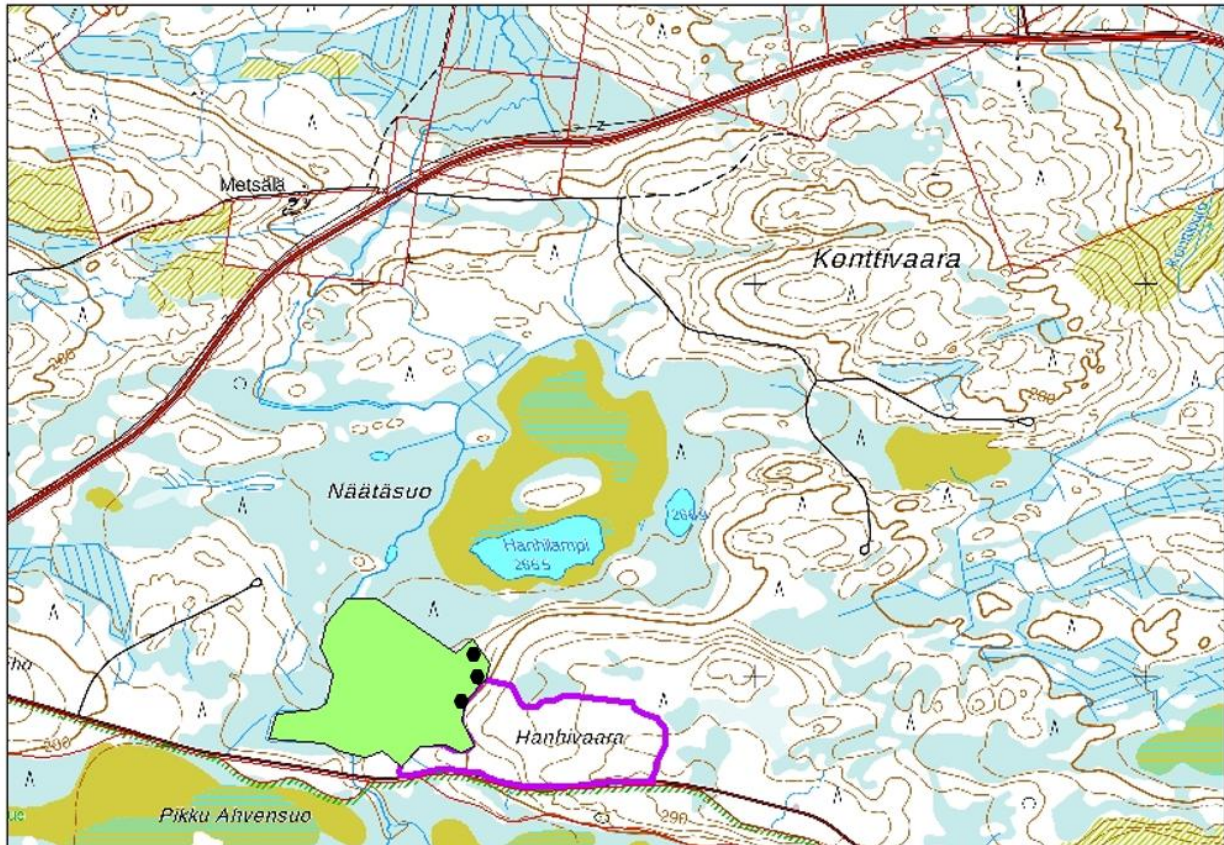
Site map



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Hanhivaara

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A6 project site and actions (original project site) with violet lining, expansion area for A8 actions on green color. Aspen enclosures marked with black dots.

Action A6

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 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.

Action C2

The original project site has so big nature and protectional values that A6 plan and loggings were not made. The original project site, size 11,6 ha, was protected in 2022 and moved under management of Metsähallitus Parks & Wildlife Finland.

Action D1

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



Monitoring after the project

New responsible of the area Metsähallitus Parks & Wildlife Finland will continue monitoring of the flying squirrel at relevant intervals after the project.

Outcomes of the actions

Management aims to maintain ecologically functional areas for the flying squirrels as long-term conservation effects. Ecological functions may be categorized to flying squirrel habitats, moving habitats and future habitats. Of moving and future habitat, most likely function is selected.

Project site information	Area (ha)	Flying squirrel habitat (ha) *	Moving habitat (ha) **	Future habitat (ha) ***	Combination of flying squirrel conservation & recreation (ha) ****
Total project site area	11,6	11,6	-	-	-
Breeding sites and resting places	-	-	-	-	-
Feeding areas	-	-	-	-	-
First thinning	-	-	-	-	-
Selective cutting	-	-	-	-	-
TOTAL	-	11,6	-	-	-

* - **** see legend in the front page

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Flying Squirrel LIFE (LIFE17 NAT/FI/000469)

Project site: Hikilehto

Summary of the following actions:

A6 Preparation of plans to maintain habitat network within managed forests

C2 Maintaining habitat network in managed forests

D1 Monitoring

Project site: **Hikilehto**

Municipality, region: **Suomussalmi, Kainuu**

Country: **Finland**

Size of the project area (ha): **2**

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**

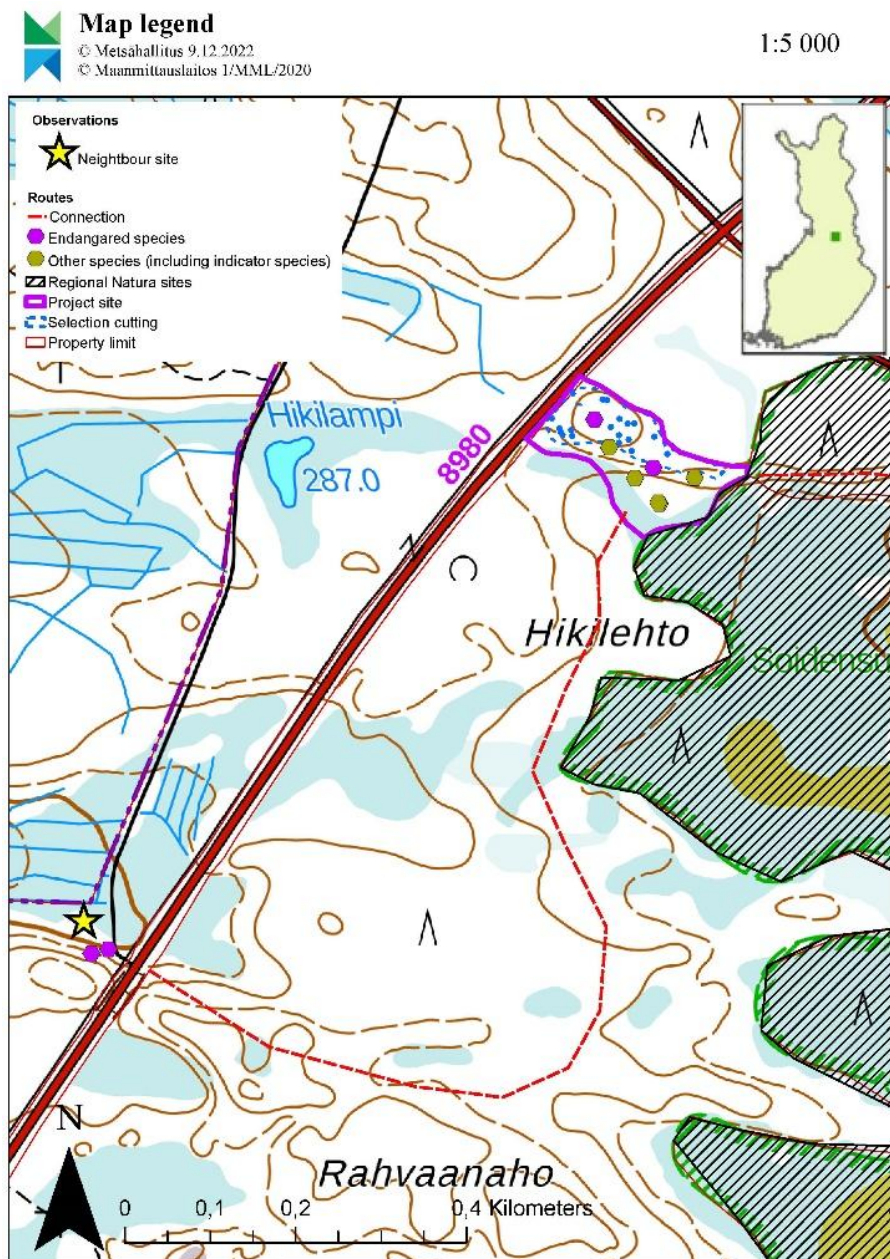
Was C-action implemented according to the A-action's plan? **Yes**

General description of the area

The project site consists of approximately 150-year-old Norway spruce (*Picea abies*) dominant forest, where the marks of earlier selective cutting can be found. Some birch (*Betula spp.*) and individual aspens (*Populus tremula*) are found at the site. North from the site is a seedling stand of spruce, where the tallest trees reach up to 10 meters. South from the site is a young forest with a lot of deciduous trees. West side of the site borders with a road. The baseline inventory for the project site was carried out in 2019 but there were no marks of Flying squirrel found. The earlier observations of the species are from the years 2014 and 2018. The project site is neighboring peatland protection area and connected with two protected forest areas via ecological connections that are saved in the spatial information system of Metsähallitus. This ensures the preservation of the moving connections to the potential and existing Flying squirrel habitats.



Site map



Action A6

The aim of the forest management plan was to increase the amount of young deciduous trees, especially aspen and pussy willow (*Salix caprea*), and spruce to improve the flying squirrel's habitat. The selected forest management measure on the project site was selective cutting that enlarges the tree trunks to create potential nesting and gliding trees for flying squirrel in the future. This also creates better conditions for deciduous trees and spruce to sprout and grow seedlings. South-west from the management area was left an area where the observations of Flying squirrel had been made. A zone near to a natural state spruce mire was left intact. A group of retention trees was left standing where the Flying squirrel observation from the year 2014 had been made. Groups of trees were also left by the edges of the management area where other vulnerable forest species were found. Approximately 35 % of the trees were cut in the way that structural variation was left in



the site as much as possible. The largest spruces and aspens were left standing. One aspen was felled to increase reproduction of aspen. One to four artificial snags per hectare were made during the loggings by cutting a living tree from the height of 3-4 meters. Total area under cuttings was 0,9 ha.

Action C2

The forest cuttings were carried out in 2021-2022 according to the plan created in action A6. Management activities were not done during a breeding season.

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

Management aims to maintain ecologically functional areas for the flying squirrels as long-term conservation effects. Ecological functions may be categorized to flying squirrel habitats, moving habitats and future habitats. Of moving and future habitat, most likely function is selected.

Project site information	Area (ha)	Flying squirrel habitat (ha) *	Moving habitat (ha) **	Future habitat (ha) ***	Combination of flying squirrel conservation & recreation (ha)****
Total project site area	2	-	-	-	-
Breeding sites and resting places	-	-	-	-	-
Feeding areas	-	-	-	-	-
Selective cutting	0.9	-	-	0.9	-
TOTAL	-	-	-	0.9	-

* - **** see legend in the front page

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Flying Squirrel LIFE (LIFE17 NAT/FI/000469)

Project site: Jänisselkä

Summary of the following actions:

A6 Preparation of plans to maintain habitat network within managed forests

C2 Maintaining habitat network in managed forests

D1 Monitoring

Project site: **Jänisselkä**

Municipality, region: **Suomussalmi, Kainuu**

Country: **Finland**

Size of the project area (ha): **23,1**

Responsible organisation(s): **Metsähallitus Forestry Ltd, Metsähallitus Parks & Wildlife Finland**

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

Natural values at the site were high, so after baseline inventories site protection was selected as a management measure for the area. No loggings were done.

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

Same site is also part of action chain A8 - C3. 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**

Protection decision of the site was confirmed by transferring the responsibility of the area from Metsähallitus Forestry to Metsähallitus Parks & Wildlife, Finland in 2022.

General description of the area

Jänisselkä project site is located on the northern border of Natura 2000 area Riuskanselkonen. The project site consists mainly of 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.

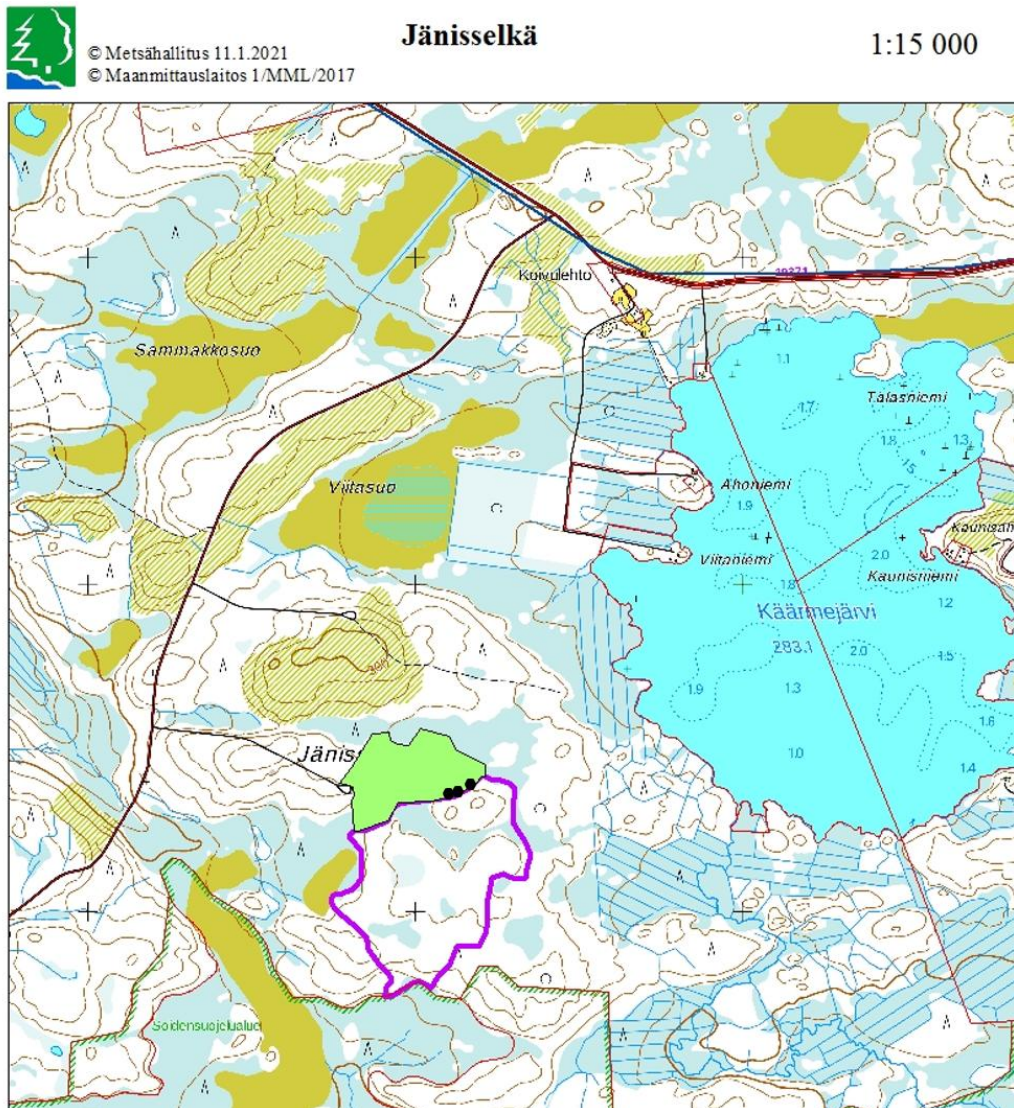
There are a lot of earlier observations of flying squirrels from the project site, latest on year 2018. In the baseline inventories flying squirrel droppings were found under two trees and also many potential nests were found.



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 (A8), the original project site was expanded to neighboring young forest stand, size 7,7 ha, west border of the original site. The expansion area is spruce dominated, 20-40 year-old forest.

Site map



A6 project site and actions (original project site) with violet lining, expansion area for A8 actions on green color. Aspen enclosures marked with black dots.

Action A6

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 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.



Action C2

The original project site has so big nature and protectional values that A6 plan and loggings were not made. The original project site, size 23,1 ha, was protected in 2022 and moved under management of Metsähallitus Parks & Wildlife Finland.

Action D1

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

Monitoring after the project

New responsible of the area Metsähallitus Parks & Wildlife Finland will continue monitoring of the flying squirrel at relevant intervals after the project.

Outcomes of the actions

Management aims to maintain ecologically functional areas for the flying squirrels as long-term conservation effects. Ecological functions may be categorized to flying squirrel habitats, moving habitats and future habitats. Of moving and future habitat, most likely function is selected.

Project site information	Area (ha)	Flying squirrel habitat (ha) *	Moving habitat (ha) **	Future habitat (ha) ***	Combination of flying squirrel conservation & recreation (ha)****
Total project site area	23,1	23,1	-	-	-
Breeding sites and resting places	-	-	-	-	-
Feeding areas	-	-	-	-	-
First thinning	-	-	-	-	-
Selective cutting	-	-	-	-	-
TOTAL	-	23,1	-	-	-

* - **** see legend in the front page

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Flying Squirrel LIFE (LIFE17 NAT/FI/000469)

Project site: Parviaissuo

Summary of the following actions:

A6 Preparation of plans to maintain habitat network within managed forests

C2 Maintaining habitat network in managed forests

D1 Monitoring

Project site: **Parviaissuo**

Municipality, region: **Suomussalmi, Kainuu**

Country: **Finland**

Size of the project area (ha): **8,2**

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 consists of Scots pine (*Pinus sylvestris*) dominated peatland forest mixed with some Norway spruce (*Picea abies*) along the ditches. The age of trees is 40-80 years. The baseline inventory for the project site was carried out in 2019, but no marks of flying squirrel were found. In previous inventories in 2006 to 2017 pellets and urine marks were found within the site in a location that has more spruce. This area of 0,4 hectares is excluded from the cuttings to develop its biodiversity values and suitability for flying squirrel. Surrounding peatland forests can be used by flying squirrel as moving connections and feeding areas. Two known flying squirrel sites ("neighbor sites") are located approximately in 3 and 6 kilometers distances from the project site. There are no nature protection areas or vast state-owned land near by the project site to ensure the continuity of flying squirrel habitats. Moving connections to neighbor sites will be maintained at least in state owned land.

Action A6

The aim of the forest management plan was to create more functional habitat for flying squirrel in the future by diversifying the age structure and density of trees and increasing the number of deciduous trees. Thinning and selective cutting were the selected forestry measures on the project site. Thinning was done in pine dominated stand and selective cutting in stand with more spruces. Deciduous trees and undergrowing spruces were left intact and growing space was given to them. Mainly pine was felled, and birch (*Betula* spp.) and spruce were left to enlarge. Artificial standing dead wood was made 1-4 per hectare by cutting the trees from the height of 3-4 meters. Total area of the cuttings was 6 hectares.



Site map

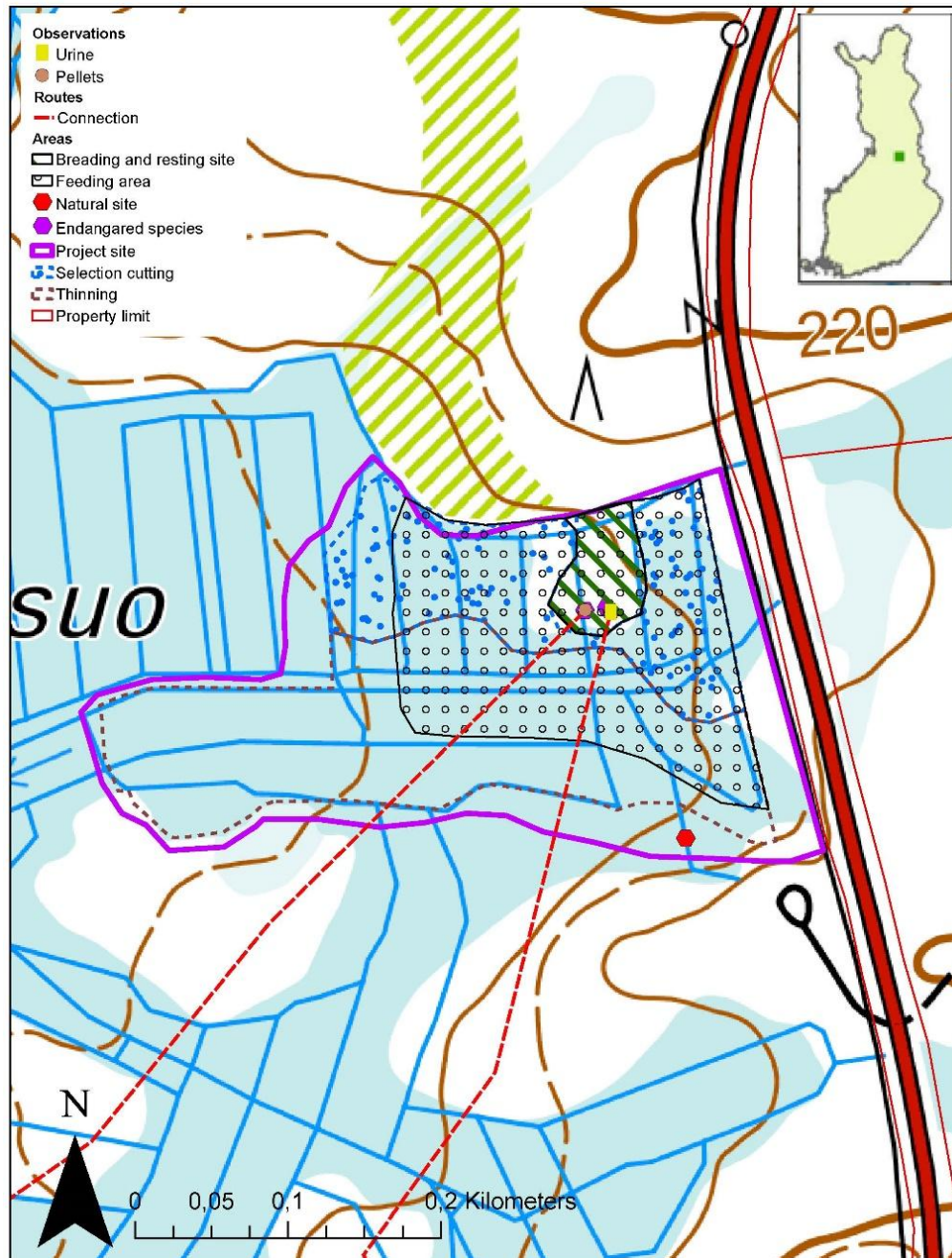


Map legend

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Action C2

The forest cuttings were carried out in 2021 according to the plan created in action A6. Management activities were not done during a breeding season.



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

Management aims to maintain ecologically functional areas for the flying squirrels as long-term conservation effects. Ecological functions may be categorized to flying squirrel habitats, moving habitats and future habitats. Of moving and future habitat, most likely function is selected.

Project site information	Area (ha)	Flying squirrel habitat (ha) *	Moving habitat (ha) **	Future habitat (ha) ***	Combination of flying squirrel conservation & recreation (ha)****
Total project site area	8,2	-	-	-	-
Breeding sites and resting places	0,4	0,4	-	-	-
Feeding areas	-	-	-	-	-
Thinning	3,9	-	3,9	-	-
Selection cutting	2,1	-	-	2,1	-
TOTAL	-	0,4	3,9	2,1	-

* - **** see legend in the front page

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Flying Squirrel LIFE (LIFE17 NAT/FI/000469)

Project site: Peranganvaara

Summary of the following actions:

A6 Preparation of plans to maintain habitat network within managed forests

C2 Maintaining habitat network in managed forests

D1 Monitoring the conservation actions

Project site: **Peranganvaara**

Municipality: **Suomussalmi**

Country: **Finland**

Size of the project area (ha): **105.6**

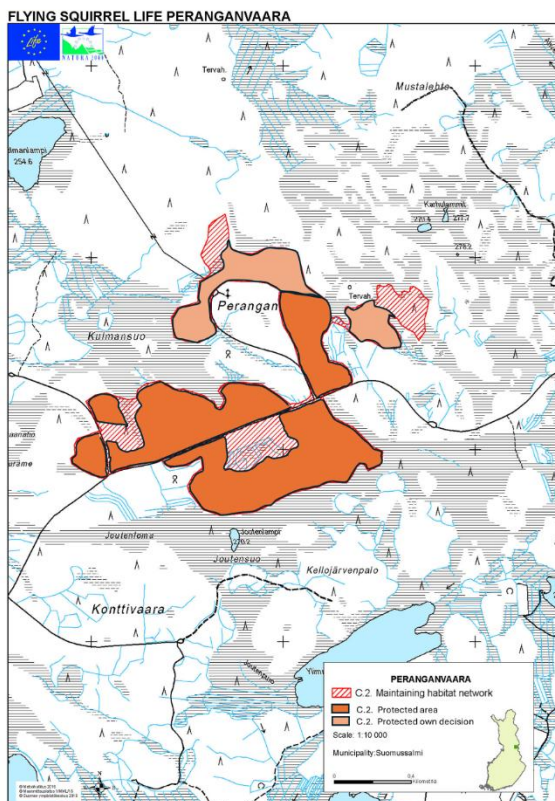
Responsible organisation(s): **Metsähallitus Forestry Ltd, Metsähallitus Parks & Wildlife Finland**

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

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

Was C-action implemented according to the A-action's plan? **No**

Site map



Picture 1. Map of the project site and a delineation of the new protected area with a legal status (dark orange, covering 67 ha), and with MHFORESTRY's own decision (orange, 18 ha). Management of the remaining young forests (20.6 ha) will follow environmental guidelines for state-owned forests.

General description of the area

The project site is in the region of Kainuu in eastern Finland. The forests are mainly spruce (*Picea abies*) dominated mature heath forests, with some deciduous trees (birch *Betula* spp. and aspen *Populus tremula*). Some clear-cutting areas and young stands originated from earlier clear cuttings exist. The forest has been inhabited by flying squirrels, and there also were other threatened species in the area.



Action A6

The aim of the forest management plan was to improve the flying squirrel's habitat network and promote the aspen continuity on the area in the long term. Field work for preliminary cutting plans were done in 2019 and 2020. Baseline flying squirrel inventory was done by FANC in 2019 with no observations on the flying squirrel. In addition, a dog-assisted FS inventory was done by KAER Ltd in 2020, and it resulted many observations of the flying squirrel in Peranganvaara area. As there were many different nature values in Peranganvaara, it became obvious that finding possibilities for careful cuttings was very complicated. Finally, no forest management was seen impossible without decreasing nature values and the joint planning process for this area was stopped in 2021.

(Simultaneously, a minimum of nine state-owned project areas for A6 action was reached so that Peranganvaara was not necessarily needed in the process.)

Action C2

MHFORESTRY still looked for ways to support project objectives to safeguard the flying squirrel. Possibilities to decrease habitat loss were found via protection by MHPWF and by MHFORESTRY's own decision. In 2023, the most valuable old-growth parts of Peranganvaara covering 67 hectares were **strictly protected with a legal status** (picture 1), and the right of possession of the area was moved to Metsähallitus Parks & Wildlife Finland. In addition, 18 hectares of old-growth forest were protected by MHFORESTRY's **own decision as valuable habitats** (representing heath forest with much decayed wood, "runsaalahopuustoinen kangasmetsä") in landscape ecological planning. This decision is valid for at least 20 years. Thus, 85 hectares are permanently protected (legal status and own decision) for flying squirrel habitat.

The remaining 20.6 hectares of the original project area consist of young forests or sapling stands here and there: their management will follow environmental guidelines for state-owned forests (Ympäristöopas) as moving connections for the flying squirrel. In addition, potential moving connections around the area were defined in a GIS system used in everyday forest planning in MHFORESTRY so that the surrounding habitat network will be maintained locally. Thus, the whole project area is safeguarded for the flying squirrel's future.

Action D1

Monitoring action D1 (2021-2024) was not carried out in Peranganvaara as it was dropped out from the joint planning process 2021 (also due to lack of resources).

Monitoring after the project

Monitoring the flying squirrel occupancy will continue in Peranganvaara's protected part by Metsähallitus Parks & Wildlife Finland and in other areas by Metsähallitus Forestry Ltd at relevant intervals.



Outcomes of the actions

Management aims to maintain ecologically functional areas for the flying squirrels as long-term conservation effects. Ecological functions may be categorized to flying squirrel habitats, moving habitats and future habitats. Of moving and future habitat, most likely function is selected.

Project site information	Area (ha)	Flying squirrel habitat (ha) *	Moving habitat (ha) **	Future habitat (ha) ***	Combination of flying squirrel conservation & recreation (ha) ****
Total project site area	105.6	-	-	-	-
Breeding sites and resting places: STRICT PROTECTION LEGAL STATUS		67	-	-	-
Breeding sites and resting places: VALUABLE HABITAT OWN DECISION		18			
Young forests with careful management			20.6	-	-
TOTAL		85	20.6	-	-

* **Flying squirrel habitat** = management saves breeding sites and resting places (based on conservation legislation) and/or feeding areas. Feeding areas contain deciduous trees, and some selective cuttings can be done in these areas without changing the ecological function. Saving these areas for long term are based on present conservation legislation or on organization's own decision.

** **Moving habitat** = management maintains forest cover so that flying squirrel can use area for moving.

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

**** **Combination of flying squirrel conservation & recreation** = management increases recreation values and safety in urban forest while maintaining or improving important habitat characteristics for the flying squirrel

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Flying Squirrel LIFE (LIFE17 NAT/FI/000469)

Project site: Kurikkavaara

Summary of the following actions:

A6 Preparation of plans to maintain habitat network within managed forests

C2 Maintaining habitat network in managed forests

D1 Monitoring

Project site: **Kurikkavaara**

Municipality: **Puolanka**

Country: **Finland**

Size of the project area (ha): **97**

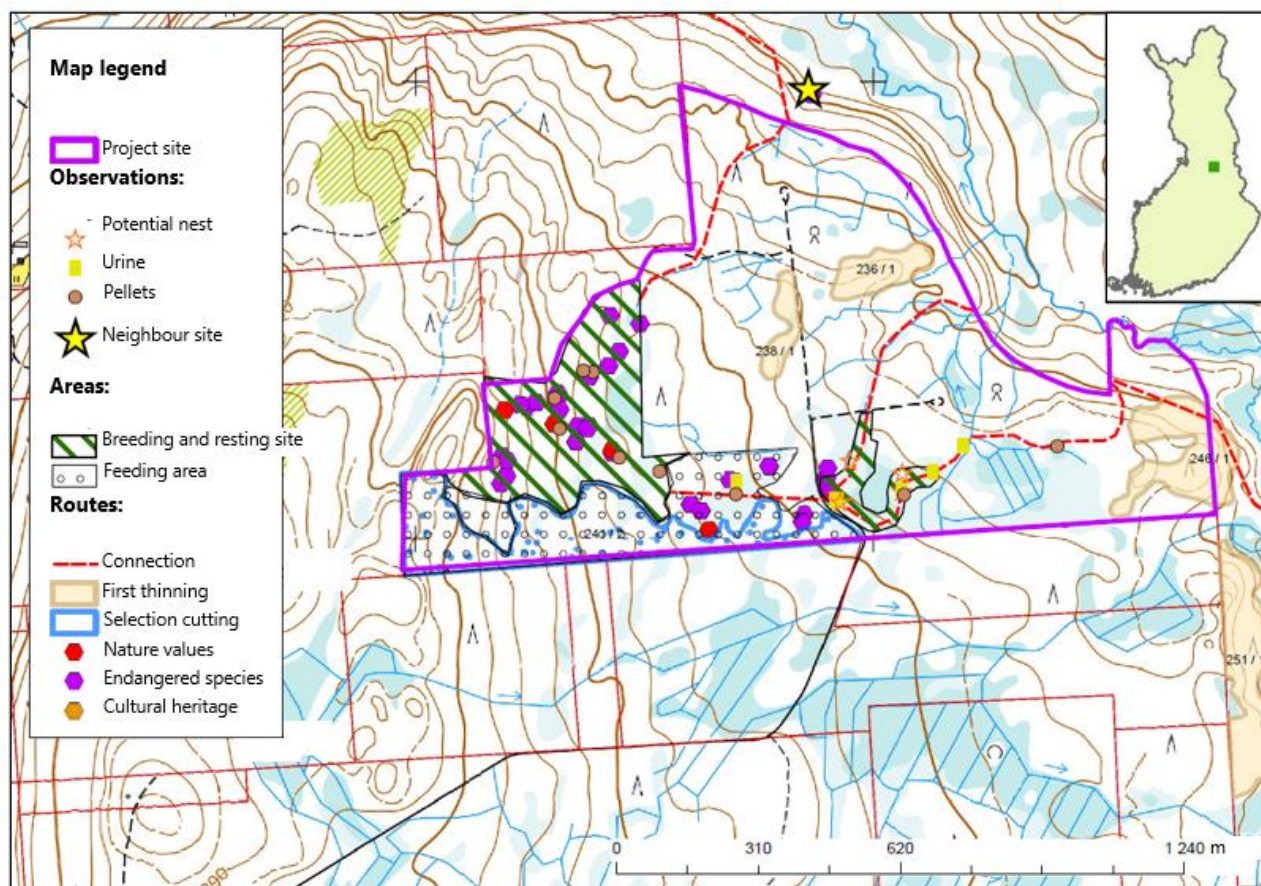
Responsible organisation(s): **Metsähallitus Forestry Ltd, Metsähallitus Parks & Wildlife Finland**

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**

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 A6

The aim of the forest management plan is to improve the flying squirrel's habitat network and promote the aspen continuity on the area in the long term. First thinning and selective cutting were the selected forestry measures on the project site. First thinning will be carried out on 6.3 ha on larch (*Larix* sp.) and Scots pine (*Pinus sylvestris*) dominated forests. Selective cutting will be carried out on 9.9 ha, on a mixed forest south from the breeding site and resting place of the flying squirrel. This area is a possible feeding area of the flying squirrel. The cuttings do not weaken the feeding area or endanger the moving connections between the breeding sites and resting places of the flying squirrel. The breeding sites and resting places of the flying squirrel are left intact, as required by law. All potential nesting trees found during the cuttings are left standing with a surrounding group of trees. Total area under cuttings is 16.2 ha.

In the selective cutting, the aim is to diversify the age structure and density of trees by removing trees of different ages and sizes. Large spruces and aspens are left standing. Some of the thick aspen stands are thinned to enlarge the single aspens. In the first thinning, larch and pine stands are thinned, and spruces and aspens are left standing. Both forestry measures will create a forest pattern with trunks of all sizes at different stages of growth. The number of large spruces and aspens will increase in the future, and this will benefit the flying squirrel in the long term by increasing its breeding and feeding opportunities.

Action C2

The forest cuttings were carried out in 2021 according to the plan created in action A6. Management activities were not done during a breeding season.

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

Management aims to maintain ecologically functional areas for the flying squirrels as long-term conservation effects. Ecological functions may be categorized to flying squirrel habitats, moving habitats and future habitats. Of moving and future habitat, most likely function is selected.

Project site information	Area (ha)	Flying squirrel habitat (ha) *	Moving habitat (ha) **	Future habitat (ha) ***	Combination of flying squirrel conservation & recreation (ha) ****
Total project site area	97	-	-	-	-
Breeding sites and resting places	12,5	12,5	-	-	-
Feeding areas	15	15	-	-	-
First thinning	6.3	-	6.3	-	-
Selective cutting	9.9	-	-	9.9	-
TOTAL	-	27,5	6.3	9.9	-

* - **** see legend in the front page

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Flying Squirrel LIFE (LIFE17 NAT/FI/000469)

Project site: Pöppölä

Summary of the following actions:

A6 Preparation of plans to maintain habitat network within managed forests

C2 Maintaining habitat network in managed forests

D1 Monitoring

Project site: **Pöppölä**

Municipality, region: **Hyrynsalmi, Kainuu**

Country: **Finland**

Size of the project area (ha): **125**

Responsible organisation(s): **Metsähallitus Forestry Ltd, Metsähallitus Parks & Wildlife Finland**

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

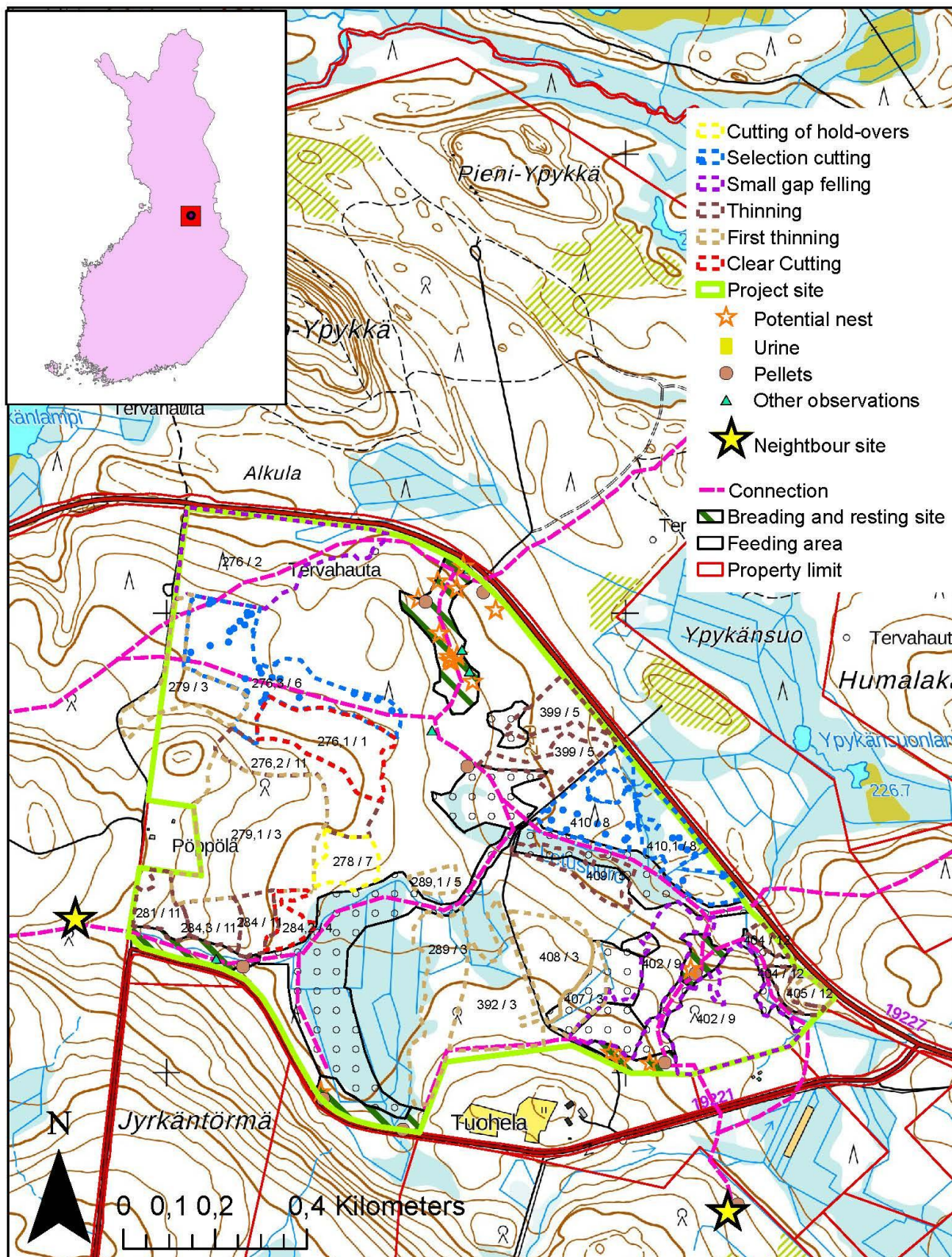
Was action implemented in the same location than described in the proposal? **Yes**

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

General description of the area

The project site is located near Paljakka nature reserve. Mature Norway spruce (*Picea abies*) and birch (*Betula* spp.) dominated heath forests have a good mixture of aspen (*Populus tremula*) in different ages, including tens of large aspens. There are plenty of living habitats and feeding areas for flying squirrel around the project site. The site has also mature Scots pine (*Pinus sylvestris*) dominated, and pine and spruce mixture heath forests as well as young pine forest stands and seedling stands. Young stands have only few deciduous trees and are suitable only for moving connections at present or in 5-10 years. The project site has some brooks with eutrophic groves on brook sides that are possible breeding sites and resting places for flying squirrel, and function also as moving connections and feeding areas. Those are left outside forest management as they are also biodiversity hot spots. Alder (*Alnus* spp.) grows along the brooks and eutrophic glens.

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. Five breeding sites and resting places, and nine feeding areas of flying squirrel were identified from the area. Five known flying squirrel sites ("neighbor sites") are located north-east, south-east and west from the project site. 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. Two of the neighbor sites are situated in private land.





Action A6

The aim of the forest management plan is to maintain and improve the diversity of the age structure of trees. First thinning, thinning, small gap felling, selective cutting and clear cutting were the selected forestry measures on the project site. Small gap fellings of size 0,1-0,25 ha were done and the area between them was managed with thinning. Small gap fellings were located mostly on places where the pine was dominant to help spruce and deciduous trees to sprout and seedlings to grow. This will benefit the flying squirrel in the long term by increasing its breeding and feeding opportunities. Clear cutting was carried out on 3,9 ha on two different stands to change the dominating tree species into spruce with mixture of deciduous trees. This creates more living habitats for flying squirrel in the far future. In all forestry measures deciduous trees, especially aspen, were left standing. Breeding sites and resting places, as well as most of the feeding areas were left intact. Breeding sites and resting places, as well as other places with special ecological values were marked on the field, if they were bordering the management areas and the borders were unclear. Total area under cuttings was 61,4 ha.

Action C2

The forest cuttings were carried out according to the plan created in action A6 in 2021-2022. Management activities were not done during the breeding season.

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

Management aims to maintain ecologically functional areas for the flying squirrels as long-term conservation effects. Ecological functions may be categorized to flying squirrel habitats, moving habitats and future habitats. Of moving and future habitat, most likely function is selected.



Project site information	Area (ha)	Flying squirrel habitat (ha) *	Moving habitat (ha) **	Future habitat (ha) ***	Combination of flying squirrel conservation & recreation (ha) ****
Total project site area	125	-	-	-	-
Breeding sites and resting places	5.9	5.9	-	-	-
Feeding areas	18	18	-	-	-
First thinning	21.4	-	21.4	-	-
Thinning	10.8	-	10.8		
Selective cutting	10	-	-	10	
Small gap felling	14	-	-	14	-
Cutting of hold-overs	1.3	-	-	1.3	
Clear cutting	3.9	-	-	3.9	
TOTAL	-	23.9	32.2	29.2	-

* - **** see legend in the front page

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Flying Squirrel LIFE (LIFE17 NAT/FI/000469)

Project site: Palovaara

Summary of the following actions:

A6 Preparation of plans to maintain habitat network within managed forests

C2 Maintaining habitat network in managed forests

D1 Monitoring

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**

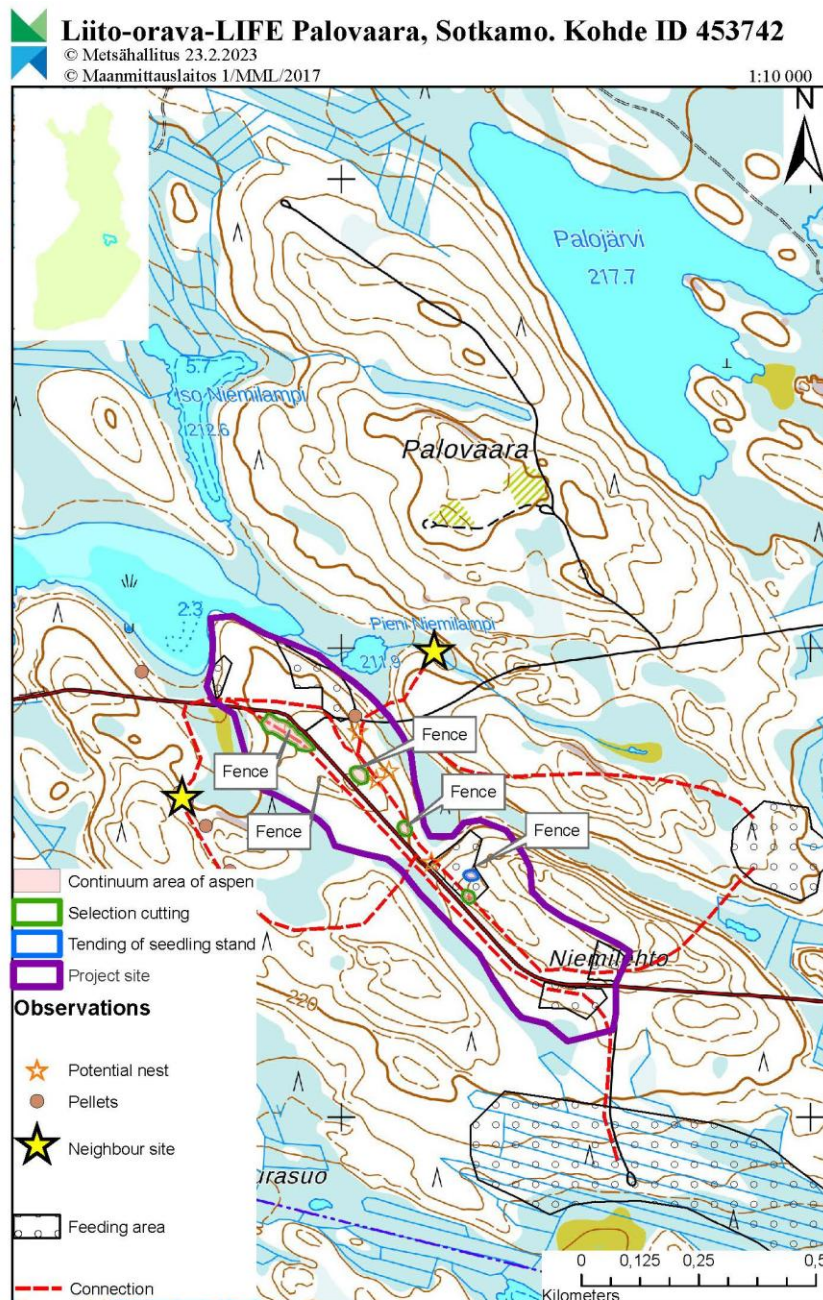
General description of the area

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 of it are located many old-growth forest sites and species under varying vulnerability status.

In the baseline inventories for the project in 2019, flying squirrel pellets (on one spot) and several 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 A6

The aim of the forest management plan was to create new breeding sites and resting places for flying squirrel in the future. The aim was to increase the number of deciduous trees, help aspen to reproduce and diversify the age structure and density of trees. Small gap felling and selective cutting were the selected forestry measures on the project site. Outside the small gap felling areas selective cuttings were made focusing on pine and spruce, except in the core of the mature forest where harvesting was not done. Felling areas were located near to single or groups of aspens to help sprouting. For the same reason and to form dead wood some aspens were cut from high. Otherwise, aspens were left intact. One of the small gap felling sites was situated in seedling stand and it was managed by a logger. All the potential nesting trees, majority of deciduous trees and the area where pellets were found was left untouched. All the spots with special ecological importance



were marked in the field before harvesting. Cuttings were done outside the breeding season. Total area under cutting was 0,5 hectares.

Most of the Palovaara site and some of the surrounding managed forests were saved in the GIS system of Metsähallitus as biodiversity development area and the moving connections as ecological corridors to ensure the favorable development for flying squirrel in the future. In Palovaara site, the biodiversity development area covers 18,5 hectares.

Action C2

The forest cuttings were carried out in 2020 according to the plan created in action A6. Management activities were not done during a breeding season.

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

Management aims to maintain ecologically functional areas for the flying squirrels as long-term conservation effects. Ecological functions may be categorized to flying squirrel habitats, moving habitats and future habitats. Of moving and future habitat, most likely function is selected.

Project site information	Area (ha)	Flying squirrel habitat (ha) *	Moving habitat (ha) **	Future habitat (ha) ***	Combination of flying squirrel conservation & recreation (ha)****
Total project site area	24,6	3 ^a	-	-	-
Breeding sites and resting places	Not defined	Not defined	-	-	-
Feeding areas	3,5	3,5	-	-	-
Small gap felling and Selection cutting	0,5	-	-	0,5	-
TOTAL	-	6,5	-	0,5	-

* - **** see legend in the front page

^a hectares are based on expert evaluation not shown on the map

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Flying Squirrel LIFE (LIFE17 NAT/FI/000469)

Project site: Sipilänperä

Summary of the following actions:

A6 Preparation of plans to maintain habitat network within managed forests

C2 Maintaining habitat network in managed forests

D1 Monitoring

Project site: **Sipilänperä**

Municipality, region: **Multia, Central Finland**

Country: **Finland**

Size of the project area (ha): **17,5**

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 is located near Kulhanvuori and Saunalehto nature protection areas. The site consists of forest stands with various ages and tree species, mainly young Norway spruce (*Picea abies*) and Scots pine (*Pinus sylvestris*) dominated forests and mature mixed forest with varying amount of birch (*Betula* spp.) and aspen (*Populus tremula*). There has been a house and fields in the area in the past and the influence on human impact can be seen clearly. There is also a natural spring in the area. The baseline inventory for the project site was carried out in 2019. Flying squirrel pellets and a potential nest were found within the project site from the area of ecological connection saved in the spatial information system of Metsähallitus. One breeding site and resting place, and three feeding areas of the flying squirrel were identified from the project site. One potential feeding area was identified outside the project site. Nine known flying squirrel sites ("neighbor sites") are located outside 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.

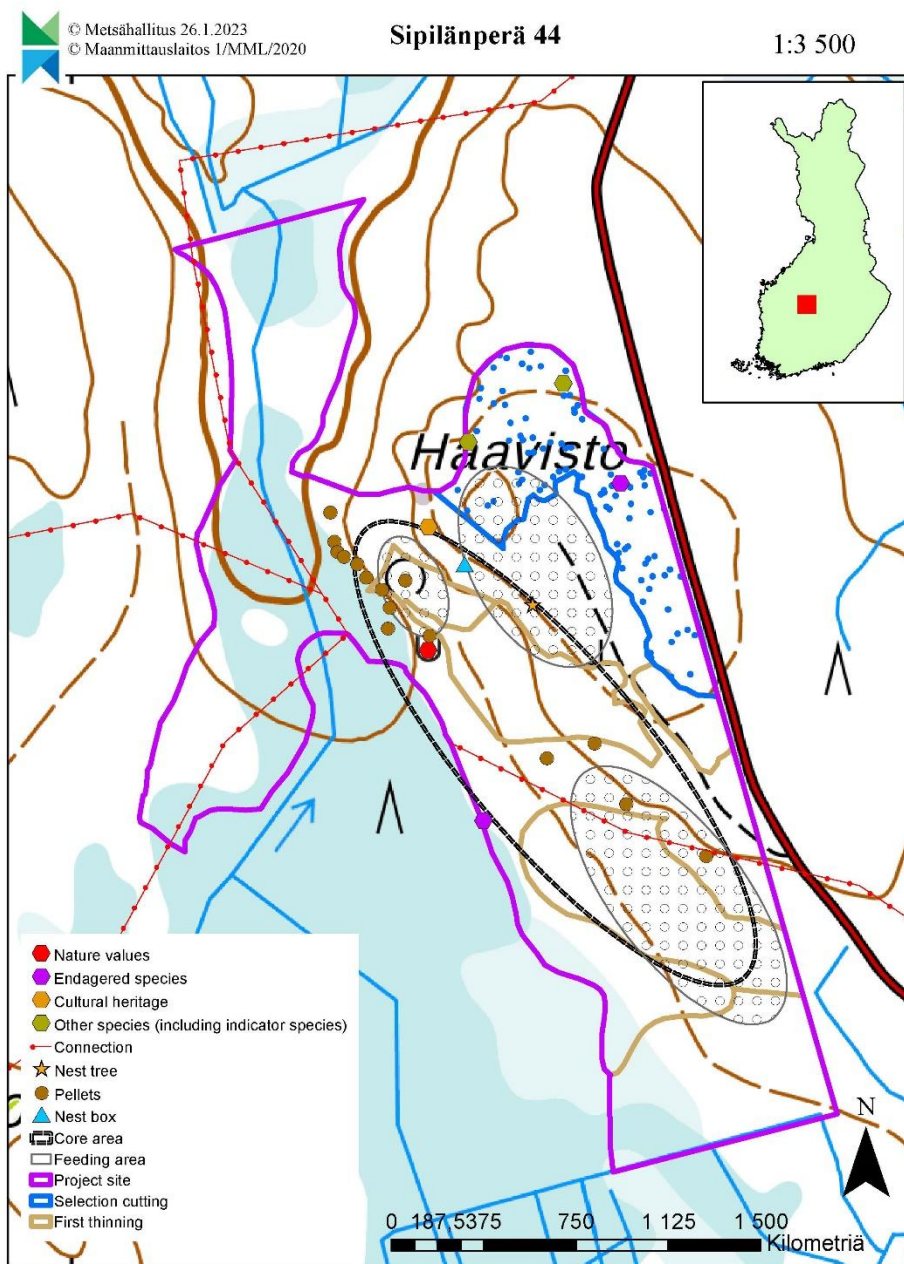
Action A6

The aim of the forest management plan was to improve the flying squirrel's habitat in the long term by diversifying the age structure and density of trees and increasing the proportion of deciduous trees. First thinning and selective cutting were the selected forestry measures on the project site. Both forestry measures were to create a forest pattern with trunks of all sizes at different stages of growth and to maintain the connectedness of the forest.



Selective cutting was carried out on 2.2 ha on a 70-year-old mixed forest. Mainly pine trees were removed and all the birch and aspen trees were left standing. Also the biggest spruce trees were left standing as gliding trees for flying squirrel. First thinning was carried out on young forest stands. Birch trees were given growing space by harvesting pine, spruce, and also birch or aspen when necessary and if there were plenty. All the large birch and aspen trees were left standing. A birch dominated forest stand in the middle of the project site, the ecological connection and an eutrophic peatland were left outside the cuttings. Nest box and a potential nesting tree with zones of 15-20 meters was left untouched and marked in the field. Total area under cuttings was 7,5 ha.

Site map





Action C2

The forest cuttings were carried out in 2021 according to the plan created in action A6. Management activities were not done during a breeding season.

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

Management aims to maintain ecologically functional areas for the flying squirrels as long-term conservation effects. Ecological functions may be categorized to flying squirrel habitats, moving habitats and future habitats. Of moving and future habitat, most likely function is selected.

Project site information	Area (ha)	Flying squirrel habitat (ha) *	Moving habitat (ha) **	Future habitat (ha) ***	Combination of flying squirrel conservation & recreation (ha) ****
Total project site area	17.5	-	-	-	-
Breeding sites and resting places	0,8	0.8	-	-	-
Feeding areas	1,5	1,5	-	-	-
First thinning	5.3	-	3.6	1.7	-
Selective cutting	2.2	-	-	2.2	-
TOTAL	-	2.3	3.6	3.9	-

* - **** see legend in the front page

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Flying Squirrel LIFE (LIFE17 NAT/FI/000469)

Project site: Syrjävaara

Summary of the following actions:

A6 Preparation of plans to maintain habitat network within managed forests

(A8 Preparation of plans to support continuity of aspen in the long term)

C2 Maintaining habitat network in managed forests

(C3 Supporting the continuity of aspen in the long term)

D1 Monitoring the conservation actions

Project site: **Syrjävaara**

Municipality: **Puolanka**

Country: **Finland**

Size of the project area (ha): **96**

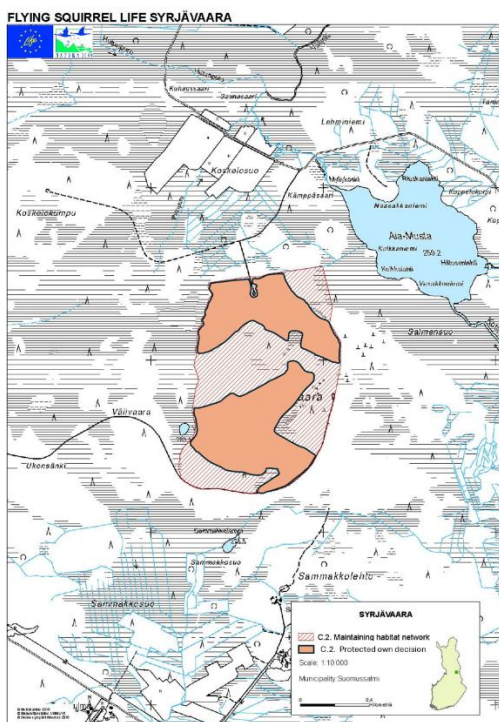
Responsible organisation(s): **Metsähallitus Forestry Ltd, Metsähallitus Parks & Wildlife Finland**

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

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

Was C-action implemented according to the A-action's plan? **No**

Site map



Picture 1. Map of the project site and a delineation of the area protected with MHFORESTRY's own decision (orange, covering 43 ha). The remaining area (53 ha) is designated as an area for increasing biodiversity values and its management will follow environmental guidelines for state-owned forests.

General description of the area

Syrjävaara was proposed as an additional site to A6-C2 (and as a reserve to A8-C3) via an amendment request (2021) to partly replace the site Pata-aho. Syrjävaara locates close to the site Pata-aho, and 2 km from Riuskanselkonen Natura 2000 site (FI1200735), both inhabited by flying squirrels.



Syrjävaara is a state-owned commercial forest, managed by Metsähallitus Metsätalous Oy, and locates in the region of Kainuu in eastern Finland. About half of the forests are spruce dominated mature heath forests (Norway spruce *Picea abies*), with some deciduous trees (birch *Betula* spp. and aspen *Populus tremula*). The rest of the forests are mixed (pine *Pinus sylverstris*, spruce and deciduous trees) young stands.

Action A6

The aim of the forest management plan was to improve the flying squirrel's habitat network (A6-C2): the habitat would be safeguarded by maintaining the continuum of suitable habitat characteristics and habitat network for the flying squirrel within goals of commercial forestry.

Field work for preliminary cutting plans were done in 2019 and 2020. Baseline flying squirrel inventory was done by FANC in 2019, and a dog-assisted FS inventory was done by KAER Ltd in 2020. Both inventories showed some observations on already known parts of the Syrjävaara area.

As there were many different nature values in Syrjävaara, it became obvious that finding possibilities for careful cutting was very complicated. Thus, no forest management was planned to Syrjävaara as it was seen impossible without decreasing nature values, so the joint planning process for it was stopped 2021. Simultaneously, a minimum of nine state-owned project areas for A6 action was reached: after all, Syrjävaara was not needed in the process it was applied for.

Action C2

MHFORESTRY still looked for ways to support project objectives to safeguard the flying squirrel. Possibilities to decrease habitat loss were found via protection by its own decision. In Syrjävaara, old-growth forests covering 43 hectares were protected by MHFORESTRY's **own decision as valuable habitats** in 2023 (aarniometsikkö, runsaslahopuustoinen kangasmetsä) valid for at least 20 years. This land use pattern is shown as protected area in Picture 1.

The remaining 53 hectares of the project site consist of young forests which are labelled as areas for increasing biodiversity values by MHFORESTRY's own decision. their management will follow environmental guidelines for state-owned forests (Ympäristöopas) as moving connections for the flying squirrel. In addition, potential moving connections around the area were defined in a GIS system used in everyday forest planning in MHFORESTRY so that the surrounding habitat network will be maintained locally. Thus, the whole project area is safeguarded for the flying squirrel's future.

Action D1

Monitoring action D1 (2021-2024) was not carried out in Syrjävaara due to lack of resources (and as it was dropped out from the joint planning process 2021).



Monitoring after the project

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

Outcomes of the actions

Management aims to maintain ecologically functional areas for the flying squirrels as long-term conservation effects. Ecological functions may be categorized to flying squirrel habitats, moving habitats and future habitats. Of moving and future habitat, most likely function is selected.

Project site information	Area (ha)	Flying squirrel habitat (ha) *	Moving habitat (ha) **	Future habitat (ha) ***	Combination of flying squirrel conservation & recreation (ha) ****
Total project site area	96	-	-	-	-
Breeding sites and resting places: OWN DECISION VALUABLE HABITAT		43	-	-	-
Young forests			53	-	-
TOTAL	-	43	53	-	-

* **Flying squirrel habitat** = management saves breeding sites and resting places (based on conservation legislation) and/or feeding areas. Feeding areas contain deciduous trees, and some selective cuttings can be done in these areas without changing the ecological function. Saving these areas for long term are based on present conservation legislation or on organization's own decision.

** **Moving habitat** = management maintains forest cover so that flying squirrel can use area for moving.

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

**** **Combination of flying squirrel conservation & recreation** = management increases recreation values and safety in urban forest while maintaining or improving important habitat characteristics for the flying squirrel

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