



Summary of the action A6: Preparation of plans to maintain habitat network within managed forests in Estonia

Editor: Tõnu Laasi (Estonian Environmental Board)

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As part of the Flying Squirrel LIFE project, Metsakorralduse Büroo, in cooperation with the Estonian Environmental Board and the Estonian Private Forest Union, prepared forest management plans for privately owned land within the project areas. In total, plans were developed for **31 land parcels**, covering **872.5 hectares**. The completed management plans were coordinated with the Environmental Board's forestry and nature-conservation divisions, the landowners, and the project partners. Of the 31 management plans, forestry operations were carried out on 15 land parcels during the project (**action C2**), covering a total of 153 ha. All work followed the approved management plans, and every site lay within the areas agreed in the project proposal. Monitoring of the nearest flying-squirrel sites was carried out for every logging area, both before and after the felling operations (**action D1**).

Table 1. List of the project areas in Estonia

Project area	Area (ha)
Uljaste	616,43
Kõrma	1439,16
Sirtsu (Miila)	1068,93
Jalastu - Kaanissoo (Nüri)	1576,38
Udriku-Palasi	774,06
Koolma	2079,92
Oonurme	2294,62
Pasuna-Peressaare (Peressaare)	2424,85
Murru-Ojadevahe-Pärnamäe (Ojadevahe)	2140,56
Kellassaare	289,55
Muru Paadenurme (Muru)	1385,32
Adraku - Kõveriku (Adraku)	862,16
Jõemetsa -Tolmu (Jõemetsa)	387,63
Kivistiku	224,61
Roogendiku	518,77
Mäetaguse (Metsküla)	3290,44
Muraka (Leterma)	2393,34
Tärivere	388,49
Kärasi	669,23

General felling principles based on flying squirrel conservation needs:

Selective Felling

Selective felling aims to produce quality timber while meeting key conservation objectives:

- Maintain continuous high forest (minimum height 15 m) to reduce edge effects and thereby lower predation risk at nesting and feeding sites.
- Preserve or enhance deciduous tree diversity to support feeding opportunities.
- Retain individual old deciduous trees for additional cover and structure.
- Ensure the presence of aspen in the stand composition.
- Retain spruce as a shade-providing species (including second-storey and regeneration), while avoiding monoculture spruce stands.
- Preserve functional movement corridors and reduce predation risk within them.
- Safeguard the wind resistance of nesting stands.

Thinning

Thinning in immature stands (pole-stage, middle-aged, or maturing forest) serves both silvicultural and conservation purposes:

- Maintain continuous high forest (minimum height 15 m) to reduce edge effects and predation risk.
- Encourage or retain deciduous tree diversity to maintain feeding resources.
- Leave individual old deciduous trees standing for structural and cover benefits.
- Maintain aspen in the species mix.
- Retain spruce, especially in the second storey or regeneration layer, while avoiding spruce-dominated stands.
- Preserve existing aspen–spruce tree pairs.
- Protect movement corridors and mitigate predation risk.
- Maintain wind firmness of nesting stands.

Cleaning

From the perspective of flying squirrel conservation, early-stage cleaning should:

- Avoid the complete removal of aspen.
- Guide the development of a structurally and species-diverse future stand.

Sanitary Felling

In the limited management zones of flying squirrel protection sites:

- Avoid removing all aspens infected with aspen heart-rot fungus (*Phellinus tremulae*), as these serve as cavity trees.
- In stands where spruces are heavily browsed by elk, consider retaining damaged spruces located near aspens.
- Selective, single-tree felling with chainsaws in naturally regenerated, heterogeneous, middle-aged stands does not preclude future nesting suitability.
- Excessive cleaning should be avoided, as it may lead to dense hazel thickets, increased root rot and bark beetle issues, and the loss of hollow tree potential - especially if “sick” aspens are removed, reducing opportunities for woodpeckers to create cavities.

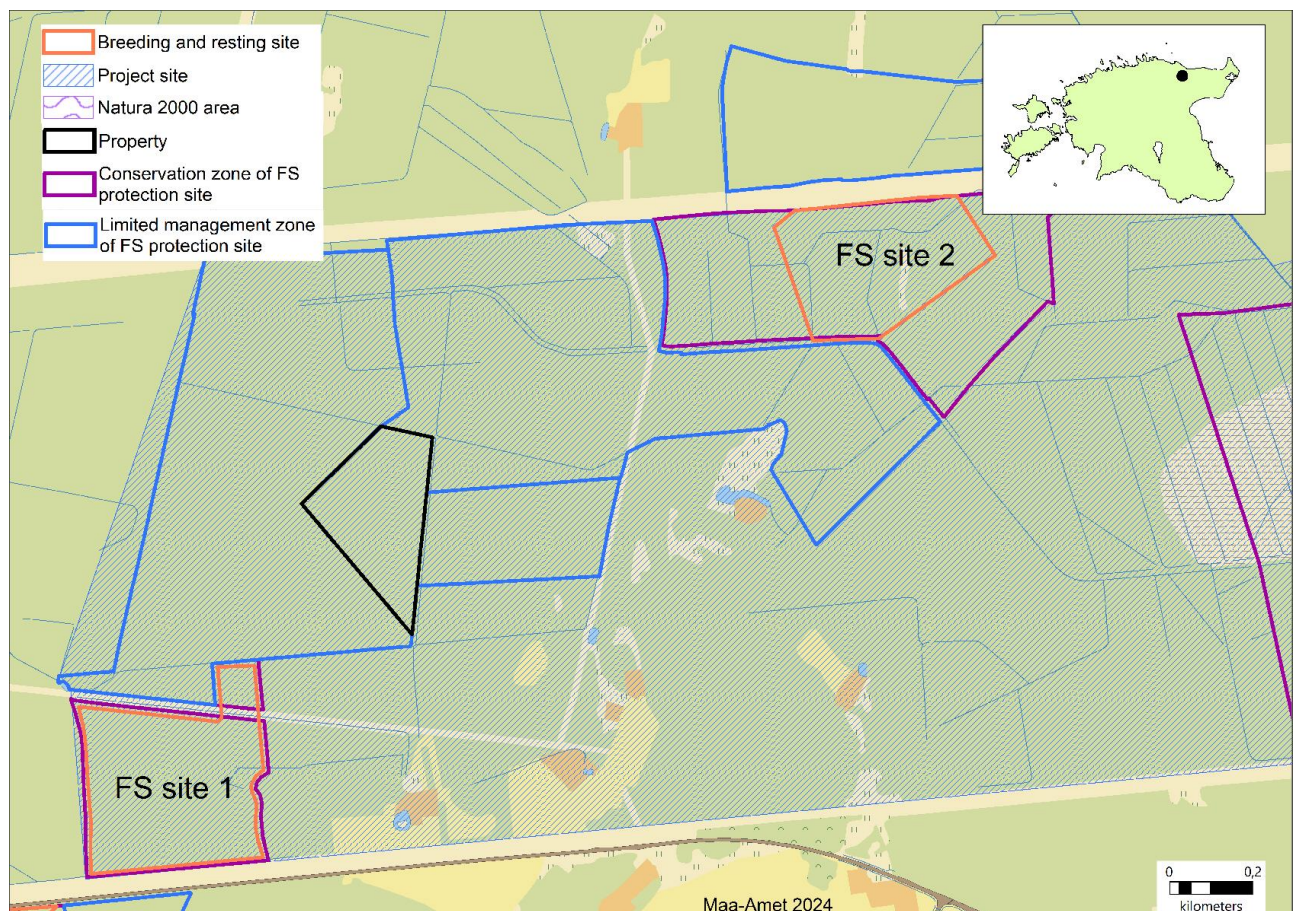
Uljaste project area

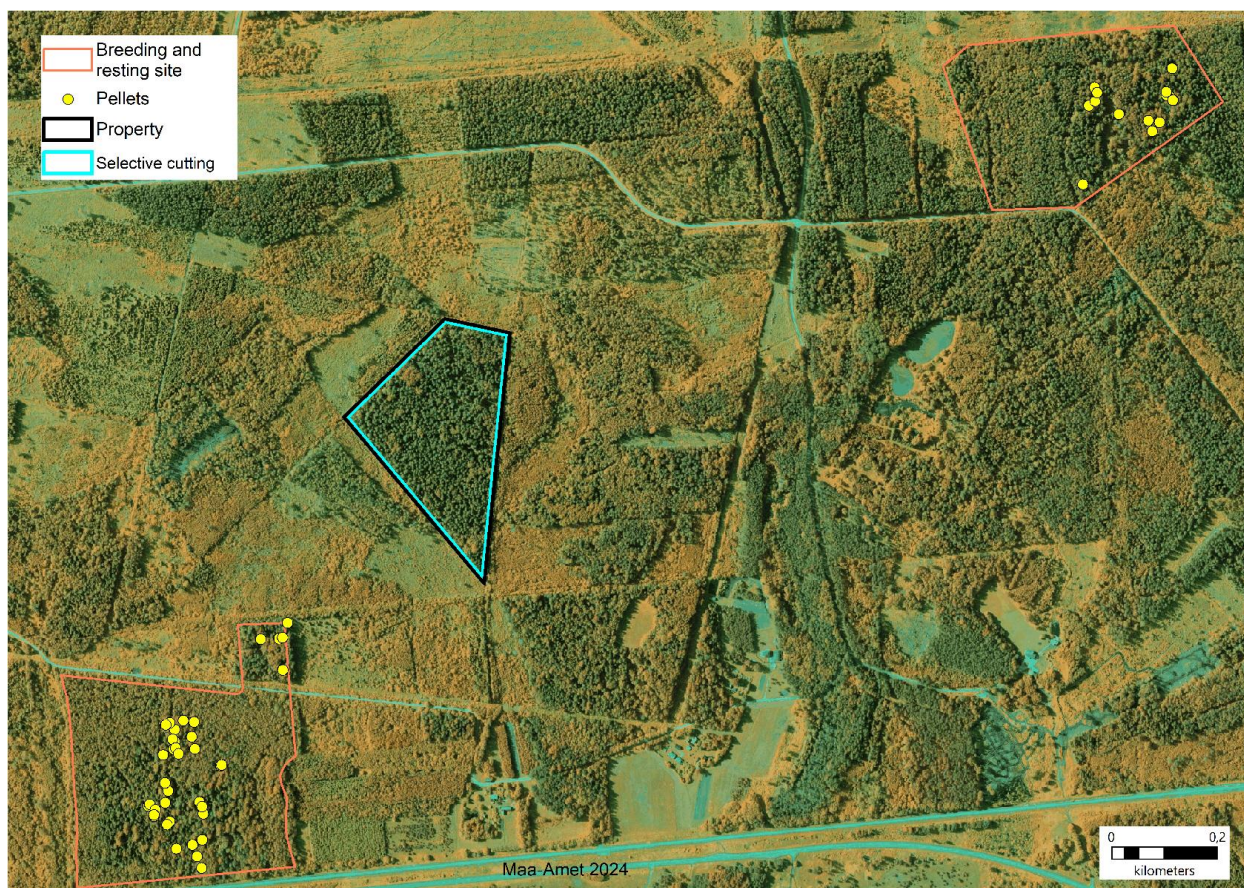
The Uljaste project area is located in Vinni Municipality, Lääne-Viru County. The site lies between two flying-squirrel localities - one continuously occupied since 2013, the other intermittently since 2014. To protect these localities, species protection sites have been created: the nest-tree surroundings form the conservation zones, each encircled by a limited management zone whose purpose includes maintaining continuous-forest links to neighbouring areas. Forests in the region have been managed very intensively over the past 30 years.

The entire 8,3 ha property is within a limited management zone and supports a 90-year-old mixed spruce stand, which is important as a movement corridor between the two nest forests.

A selective cutting was carried out in 2021 to remove trees damaged by game or spruce bark beetle, while all older aspens and the trees around them were retained. The operation prevented a wider beetle outbreak, kept the stand wind-firm and provided the owner with a useful timber volume (523 m³).

The forest's main function remains to provide movement habitat for flying squirrels, though it can also serve as a temporary stop-over or even a nest forest.





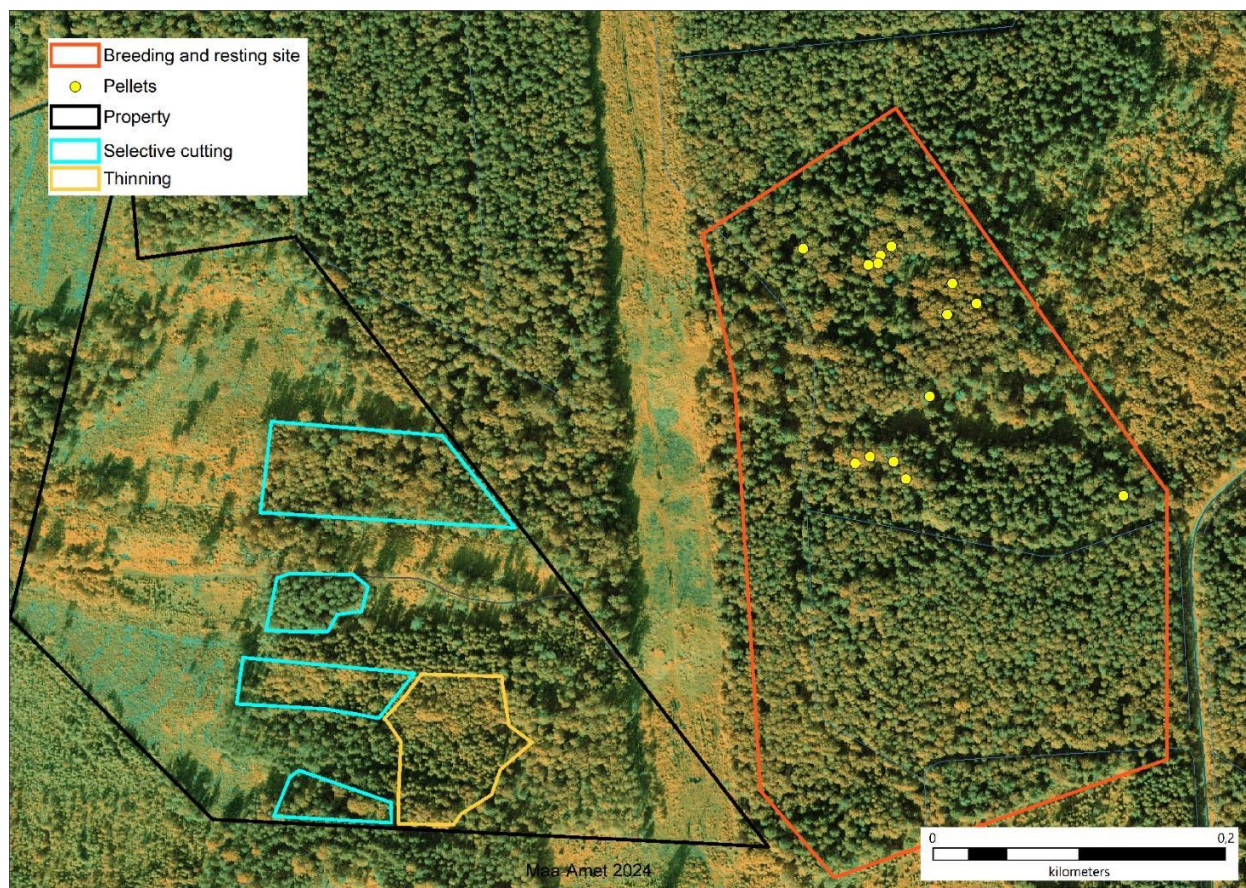
Annual flying squirrel inventories are carried out during the project in 2018-2024. + inhabited by FS, - uninhabited by FS.

	2018	2019	2020	2021	2022	2023	2024
FS site 1	+	+	+	+	+	+	+
FS site 2	-	+	-	-	+	+	-

The second property in the Uljaste project area also lies between two flying-squirrel localities - one continuously occupied since 2013, the other intermittently since 2014. To protect these localities, species protection sites have been established: nest-tree surroundings form conservation zones, each encircled by a limited management zone whose aim is to maintain continuous forest links with neighbouring areas. Forests in the region have been managed very intensively over the past 30 years. Of the 12,35 ha property, 7,17 ha fall within a limited management zone and carry mixed forest of varied ages and composition. For the flying squirrel, this stand is mainly important as a moving corridor between the two nesting forests.

Selective cutting was planned in the older stands, while the younger parts were scheduled for thinning to improve light conditions. Thinning has indeed increased illumination and made the stand structure more diverse. The forest's primary function will remain to provide safe moving habitat for flying squirrels.





Annual flying squirrel inventories are carried out during the project in 2018-2024. + inhabited by FS, - uninhabited by FS.

	2018	2019	2020	2021	2022	2023	2024
FS site	-	+	-	-	+	+	-

Kivistiku project area

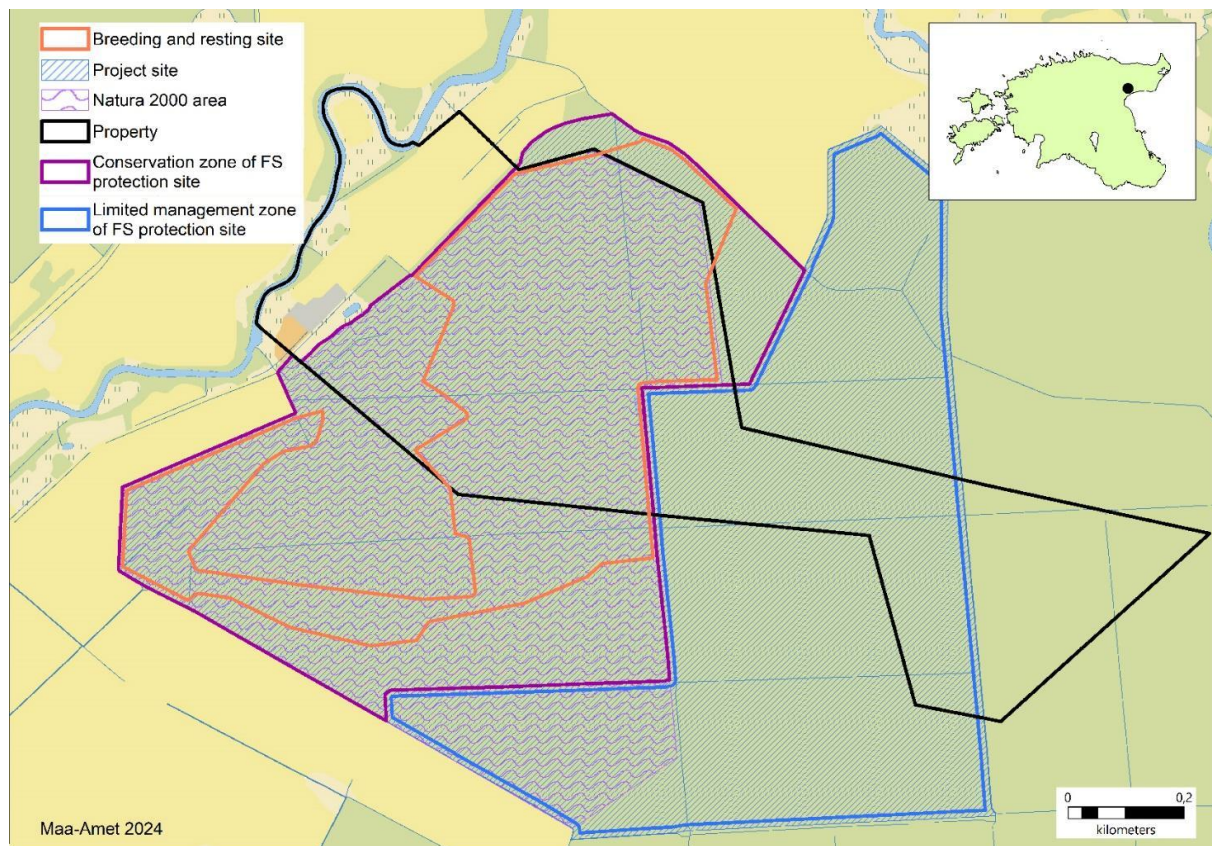
The Kivistiku project area is located in Alutaguse Municipality, north-eastern Estonia.

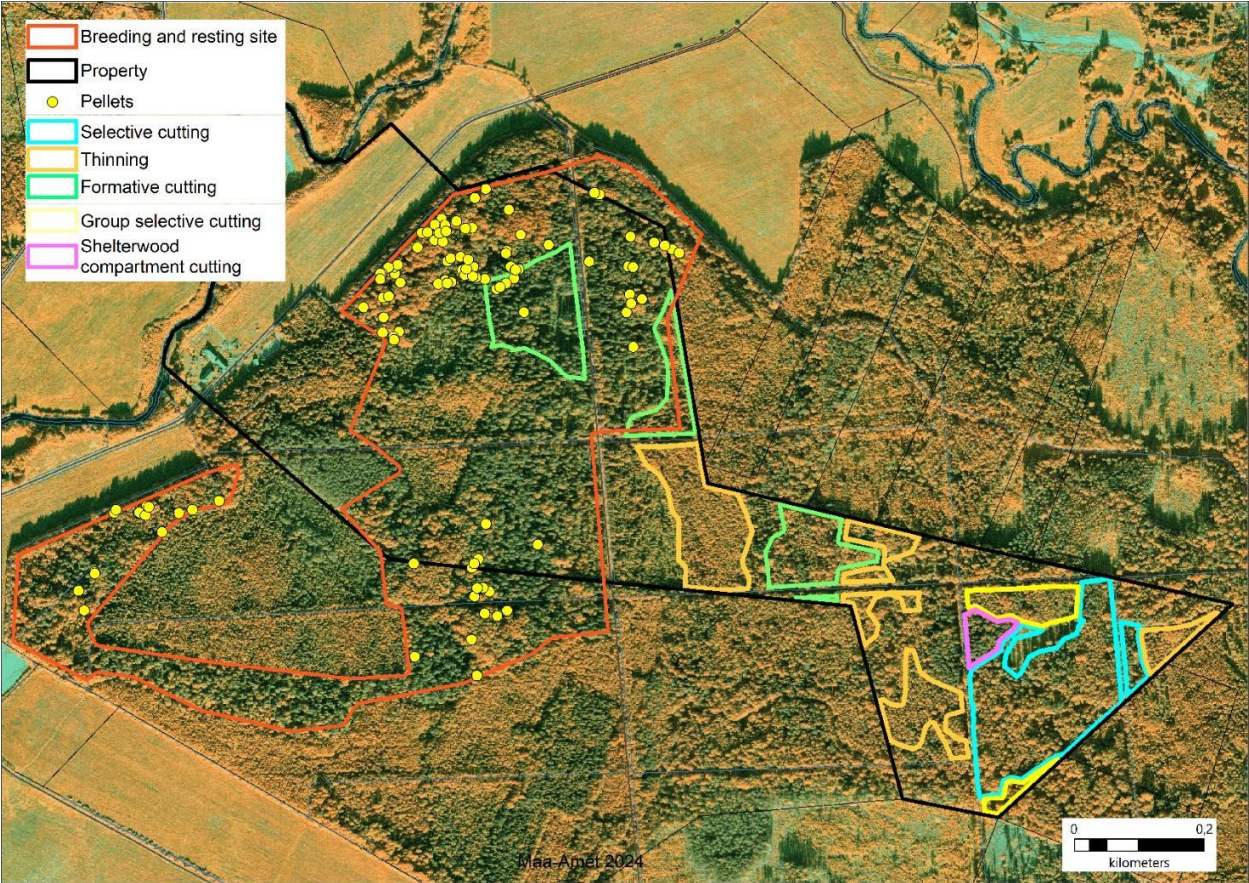
One part of the property contains a flying-squirrel habitat that has been continuously occupied since 1986. To protect the locality, a species protection site has been established: nest-tree surroundings form the conservation zone, encircled by a limited management zone whose purpose is to prevent negative edge effects and maintain a continuous forest link with neighbouring areas.

The property has 49,63 ha of forest land, of which 28,50 ha lie in the conservation zone and 12,23 ha in the limited management zone. Conservation-zone stands are structurally variable and mostly over 65 years old; one older patch supports a 120-year-old spruce-dominated forest. Alongside spruce, pine and birch, black and grey alder and aspen are also present. The limited management zone consists mainly of 30- to 70-year-old mixed forest that is important for squirrel movements between different nest forests. In the oldest stand, selective cutting created a few gaps to promote aspen regeneration.

In younger stands, thinning was prescribed to improve light conditions and increase the share of aspen; existing aspens were retained. Thinning has improved light conditions and made stand composition more diverse. The forest will continue to serve primarily as a movement corridor for flying squirrels and, on a smaller scale, as a site where new nest forest can develop.

Logging operations were carried out in 2024 on 7,86 ha, producing a timber volume of 275 m³.





Annual flying squirrel inventories are carried out during the project in 2018-2024. + inhabited by FS, - uninhabited by FS.

	2018	2019	2020	2021	2022	2023	2024
FS site	+	+	+	+	+	+	+

A second property lies in the same area. One part of the site contains a flying-squirrel habitat that has been continuously occupied since 1986. A species protection site safeguards the locality: nest-tree surroundings form the conservation zone, encircled by a limited management zone whose aims are to prevent negative edge effects and maintain continuous forest links with neighbouring areas. The property holds 54,47 ha of forest land, of which 32,95 ha fall within the conservation zone and 21,27 ha within the limited management zone. The stands are of mixed age and variable structure. Forest in the limited management zone is crucial for squirrel movements between different nest forests.

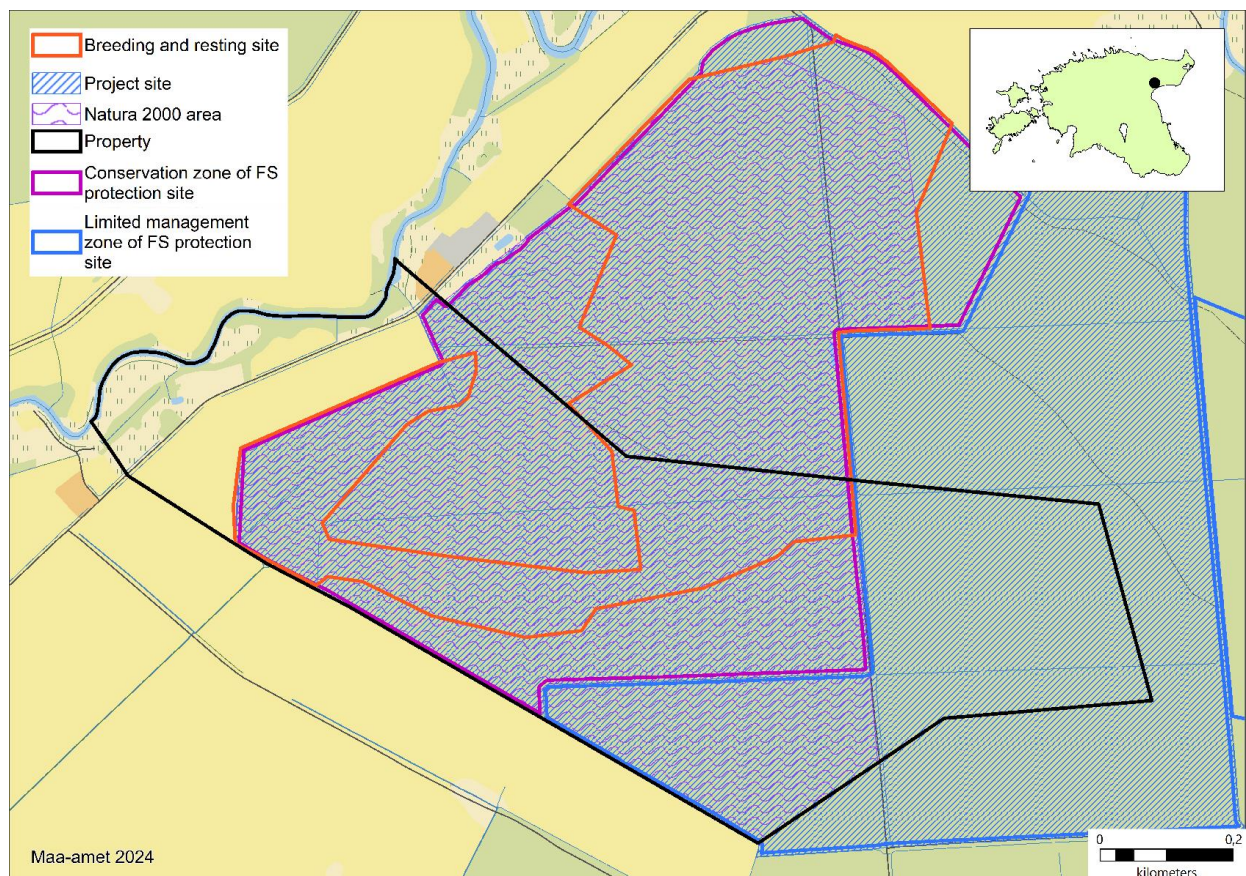
Logging was planned as follows:

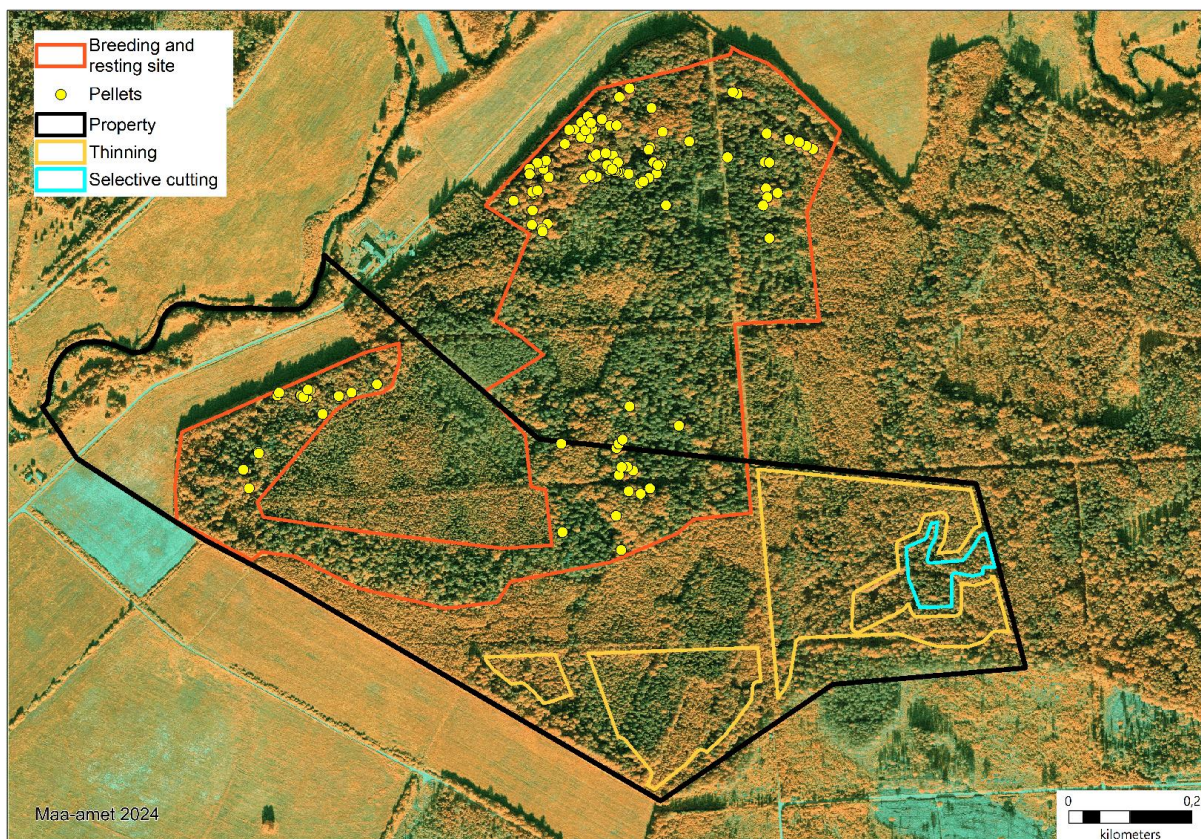
Selective cutting on 1,17 ha of older birch-dominated forest in the limited management zone, increasing the share of aspen.

Thinning on 15,24 ha of younger stands to improve light conditions and further raise aspen proportion; all aspens present were retained.

Thinning has improved illumination and made stand composition more diverse. The forest will continue to function primarily as a movement corridor for flying squirrels and, to a lesser extent, as a site where new nest forest can develop.

Felling operations were carried out in 2022–2023, producing approximately 800 m³ of timber.





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	2018	2019	2020	2021	2022	2023	2024
FS site	+	+	+	+	+	+	+

Kõrma project area

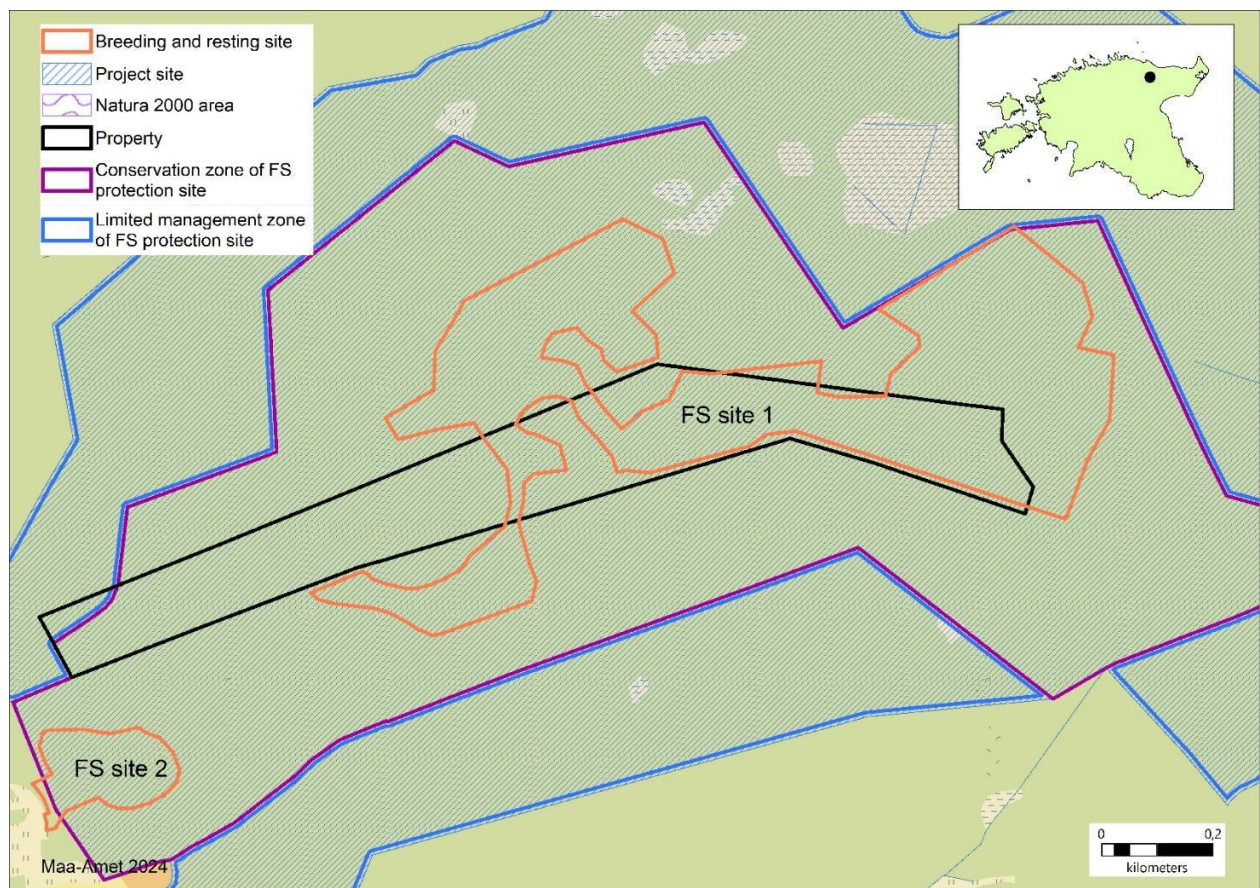
The Kõrma project area lies in Vinni Municipality, Lääne-Viru County.

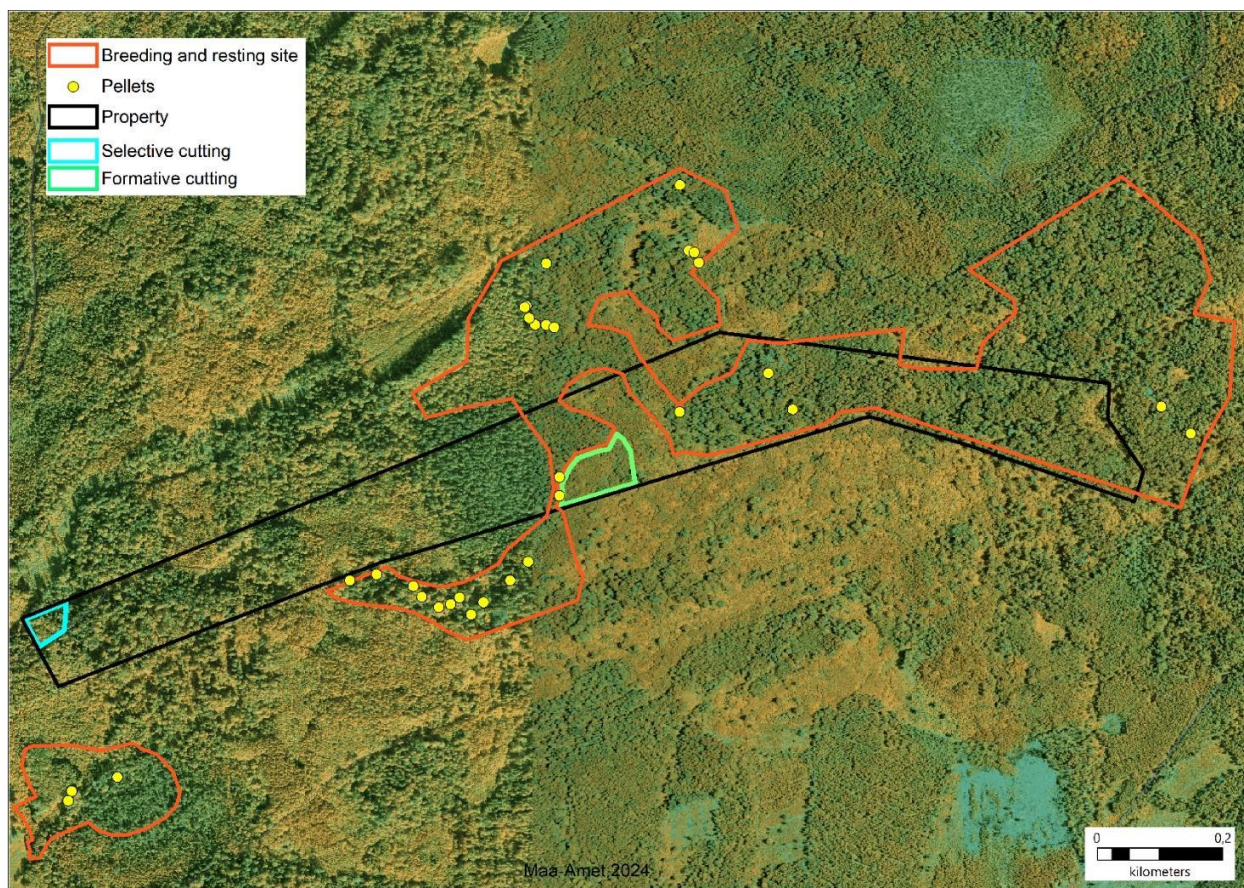
Part of the site overlaps a flying-squirrel locality that has been continuously occupied since 2010. To protect this locality, a species protection site has been established: the nest forest itself forms the conservation zone, surrounded by a limited management zone. Forests in the region have been managed very intensively over the past 30 years. Of the 25,7 ha property, only 0,53 ha lie within the limited management zone; the remainder lie inside the conservation zone.

Logging was planned on just two compartments:

a formative thinning on 0,8 ha of young forest that regenerated after clear-cutting 30 years ago and a 0,3 ha selective cutting in grey-alder compartment.

Because of difficult machine access and the small volume involved, the planned work has not been carried out.



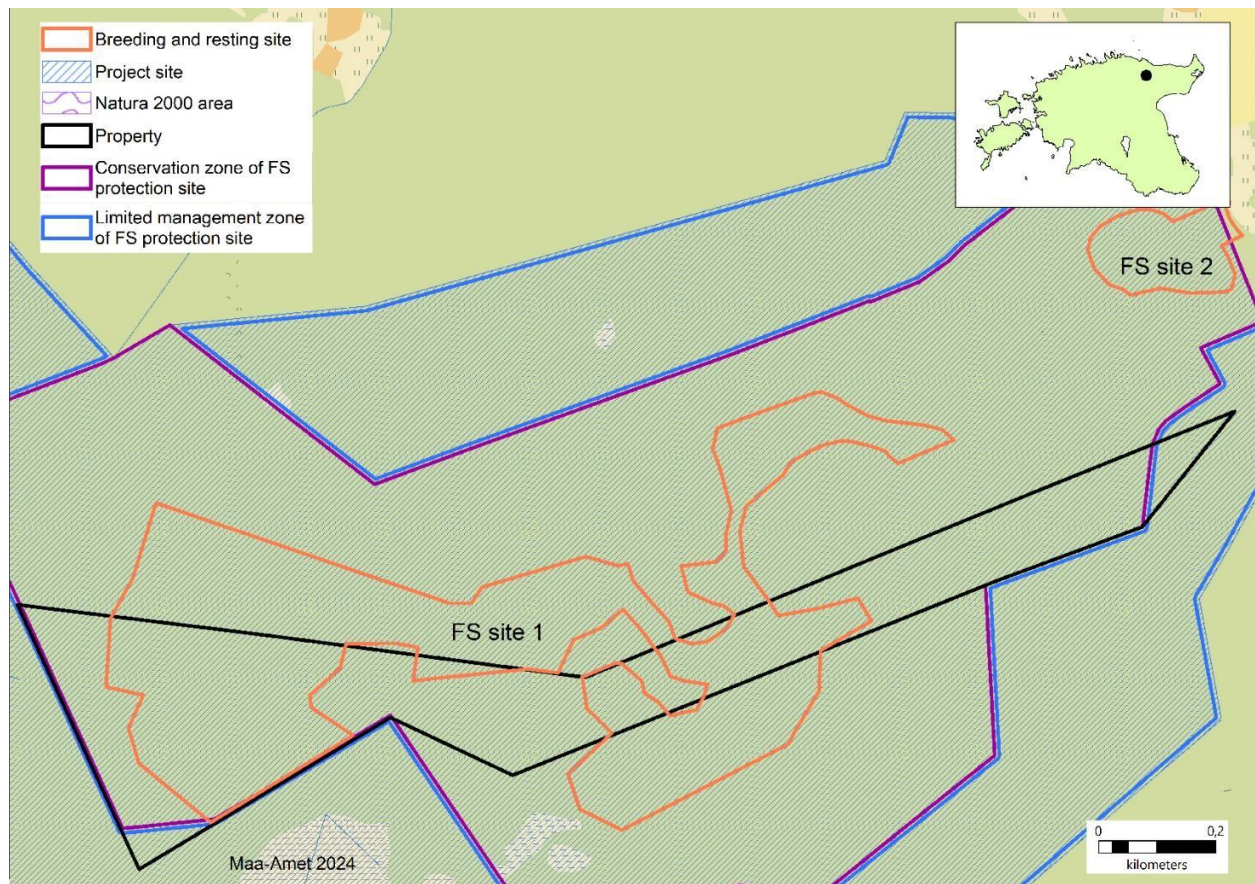


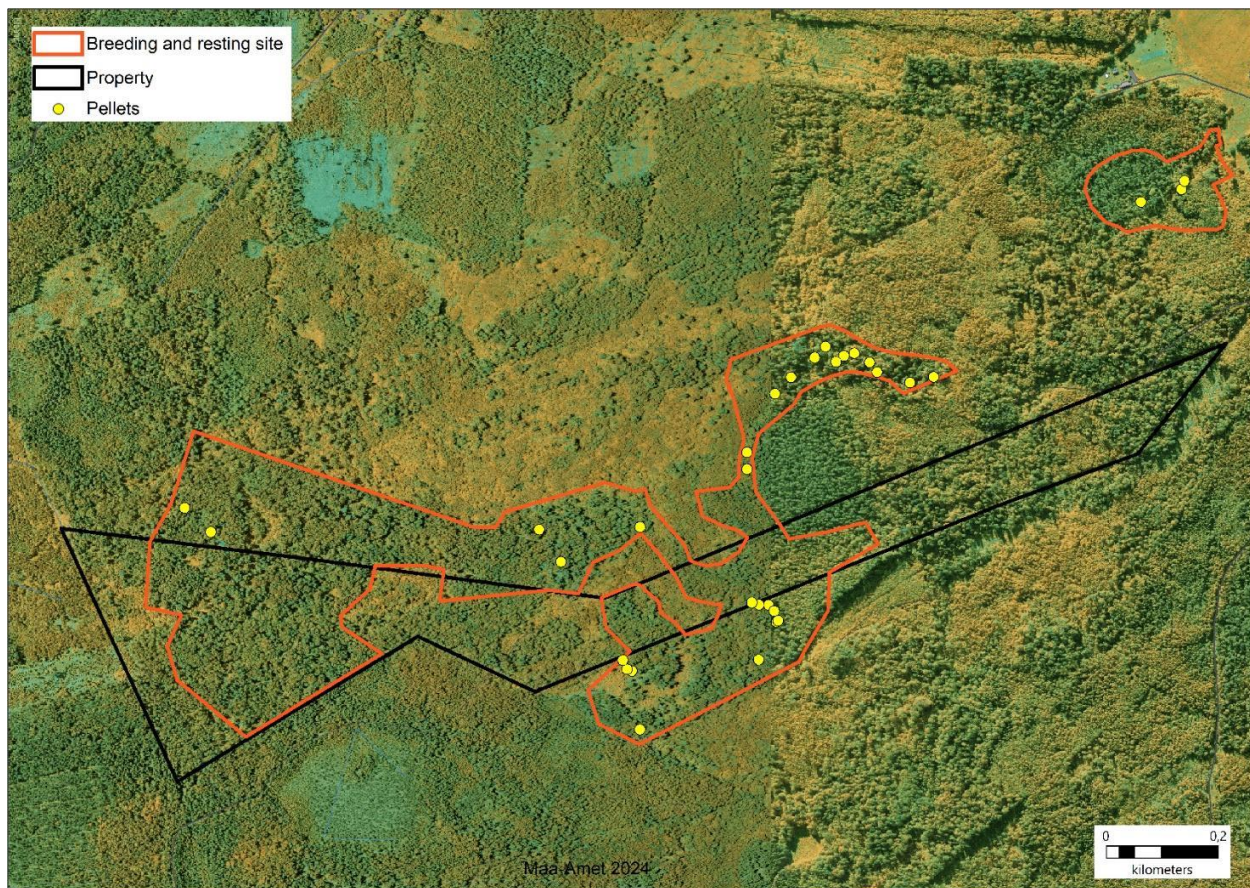
Annual flying squirrel inventories are carried out during the project in 2018-2024. + inhabited by FS, - uninhabited by FS.

	2018	2019	2020	2021	2022	2023	2024
FS site 1	+	+	+	+	+	+	-
FS site 2	-	-	-	+	+	-	-

A second property adjoins the previous one. Part of it overlaps a flying squirrel locality that has been continuously occupied since 2010. To protect the site, a species protection site has been established: the nest forest itself is a conservation zone, surrounded by a limited management zone. Forests in the area have been managed very intensively over the past 30 years. Of the entire 33,29 ha property, 31,72 ha lie in the conservation zone and just 1,57 ha in the limited management zone.

Because the project decided to plan management works mainly inside limited management zones - and this parcel contains only two small patches of such forest, totalling 1,57 ha - no felling was planned here. The stand's primary function remains to preserve nesting habitat for the flying squirrel.





Annual flying squirrel inventories are carried out during the project in 2018-2024. + inhabited by FS, - uninhabited by FS.

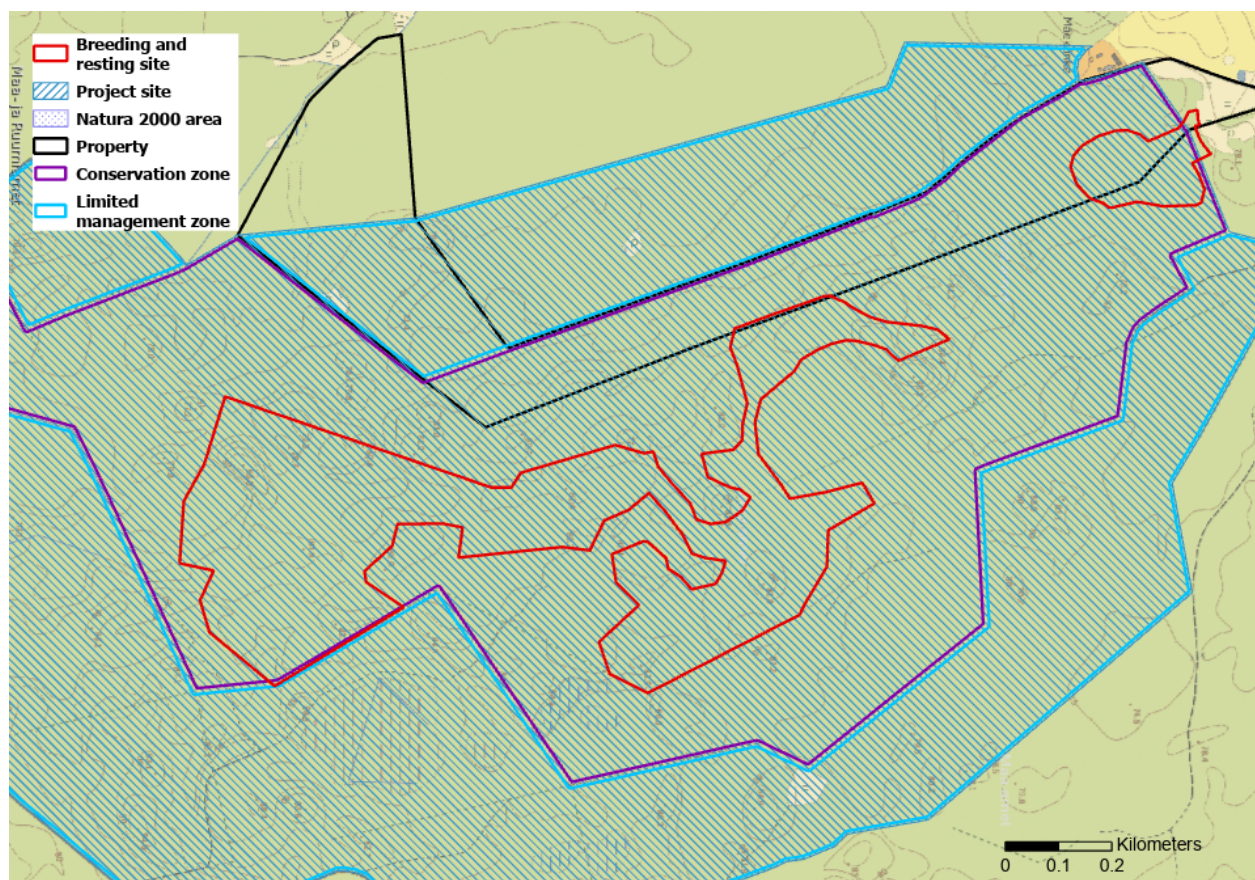
	2018	2019	2020	2021	2022	2023	2024
FS site 1	+	+	+	+	+	+	-
FS site 2	-	-	-	+	+	-	-

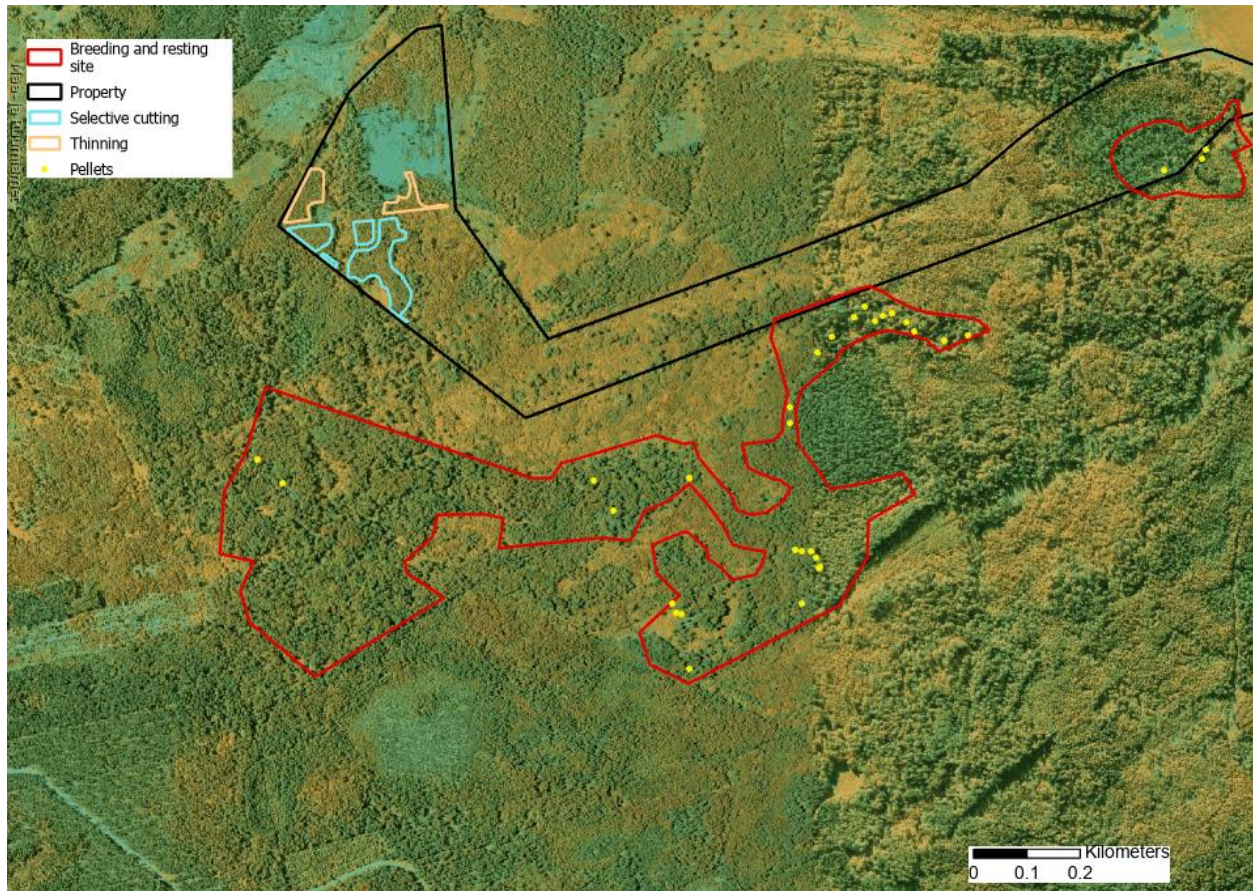
Part of the third site of Kõrma project area contains a flying squirrel habitat that has been occupied intermittently since 2012. To protect it, a species protection site has been established: the nest-tree surroundings form the conservation zone, encircled by a limited management zone whose purpose is to prevent negative edge effects and maintain continuous forest links with neighbouring areas.

The property has 35,48 ha of forest, of which 20,07 ha lie in the conservation zone and 7,52 ha in the limited management zone. Forests in the conservation zone are mixed and mostly more than 70 years old, with spruce and birch as the main species, plus black alder, grey alder and aspen. The limited-zone area is mainly 30- to 70-year-old mixed forest that is important for flying squirrels moving between different nesting forests.

A selective cutting covering 2,05 ha was planned, targeting mainly grey alder, black alder and birch, while increasing the share of aspen in the stand. The primary function of the forest will remain to provide movement habitat for flying squirrels and to shelter the nest forest from westerly winds.

No felling operations were carried out during the project period; however, the landowner retains the option to implement the management plan in the future, if they choose to do so.



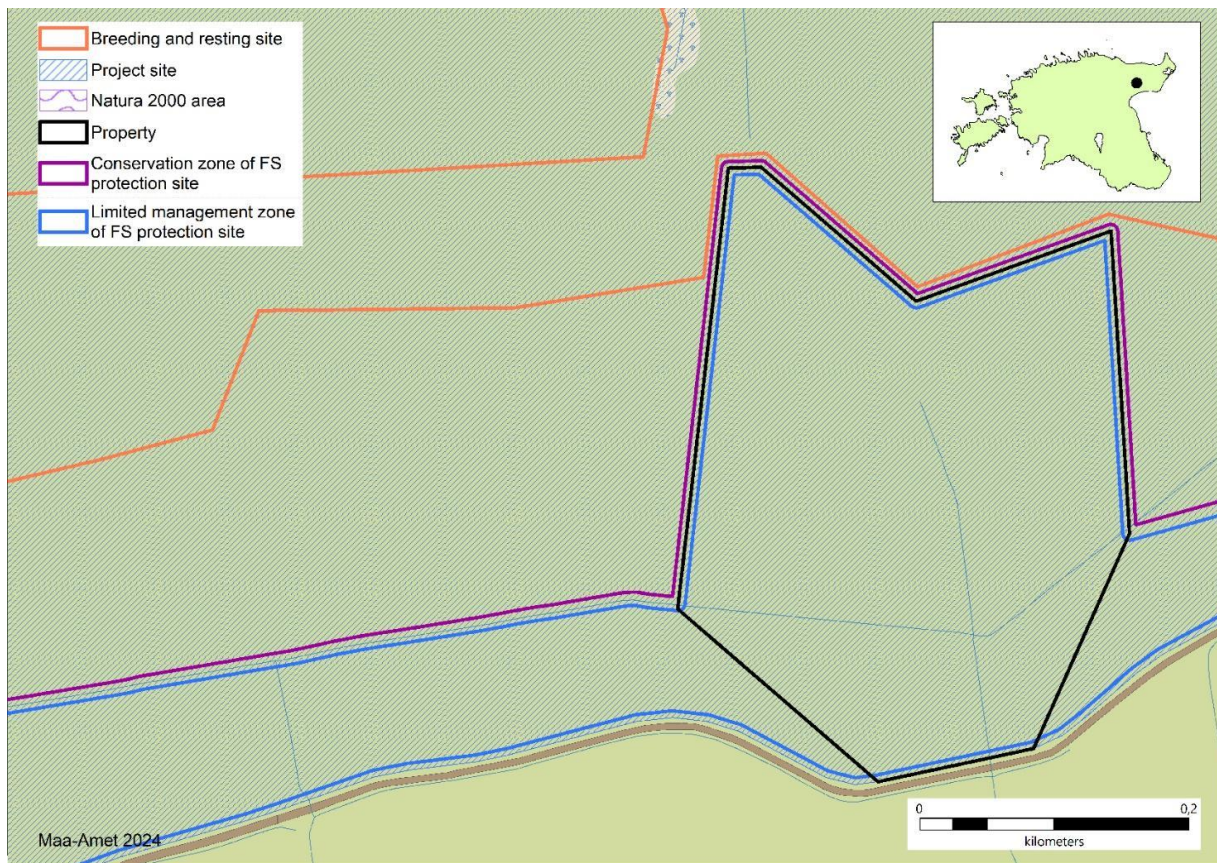


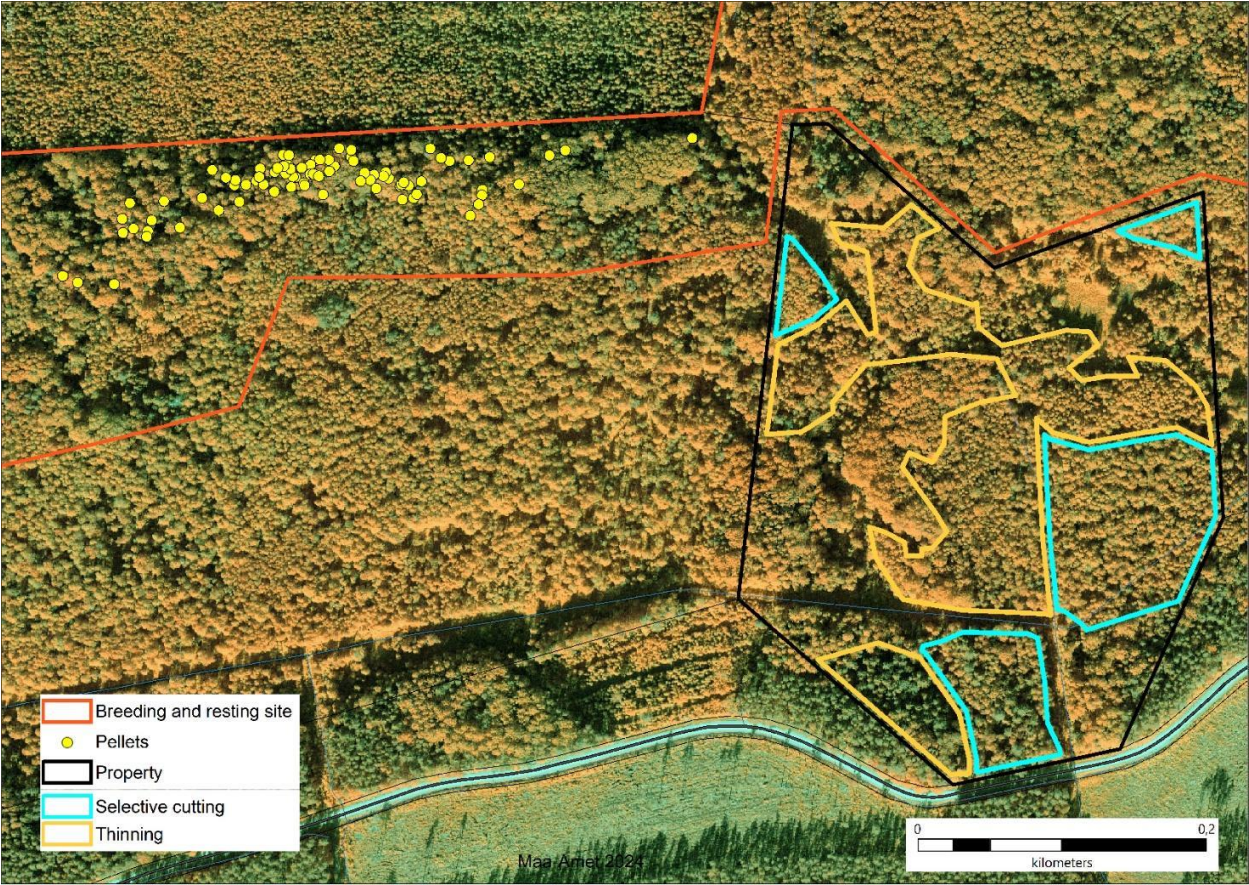
Mäetaguse project area

The Mäetaguse project area is located in Alutaguse municipality, Ida-Viru County. The site borders a flying squirrel nesting forest that has been continuously inhabited since 2014. To protect the site, a species protection site has been established. This includes a conservation zone around the nest trees and a surrounding limited management zone, aimed at reducing negative edge effects and ensuring connectivity with adjacent forest areas. The land unit lies entirely within the limited management zone of the species protection site and covers 9.62 hectares. The property contains structurally diverse, mixed-age forest stands.

Within the first project site, selective felling was carried out on 2.69 hectares in birch- and black alder-dominated stands, resulting in an increased proportion of aspen and spruce. In addition, thinning was conducted on 3.41 hectares in birch, black alder, and pine stands to improve light conditions and promote the growth of aspen. During thinning, the few existing aspens were preserved. The primary function of this forest remains to buffer the nesting area against edge effects and maintain movement opportunities for flying squirrels, while also offering limited potential for the development of new nesting habitat.

Felling operations were carried out between 2022 and 2024, with approximately 370 cubic metres of timber harvested.





Annual flying squirrel inventories are carried out during the project in 2018-2024. + inhabited by FS, - uninhabited by FS.

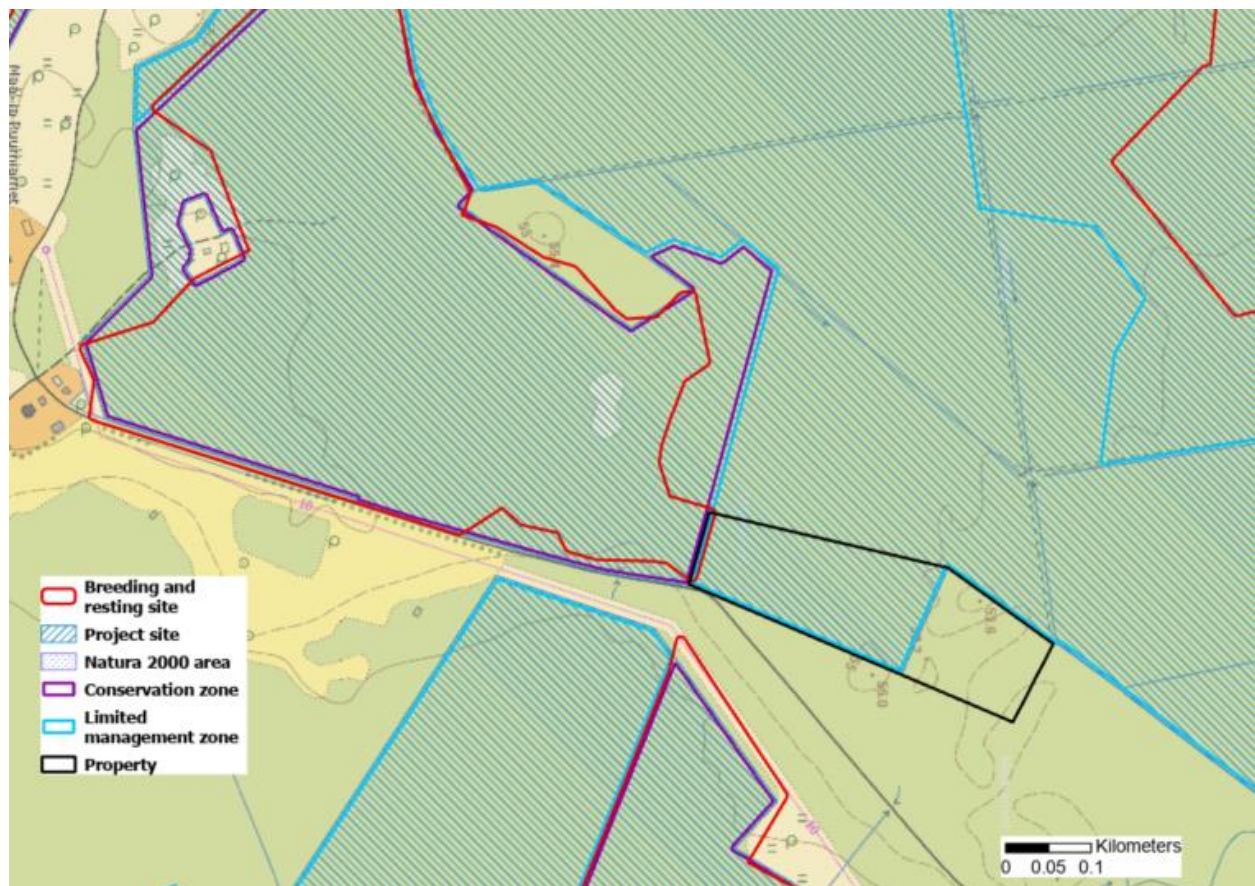
	2018	2019	2020	2021	2022	2023	2024
FS site	+	+	+	+	-	+	+

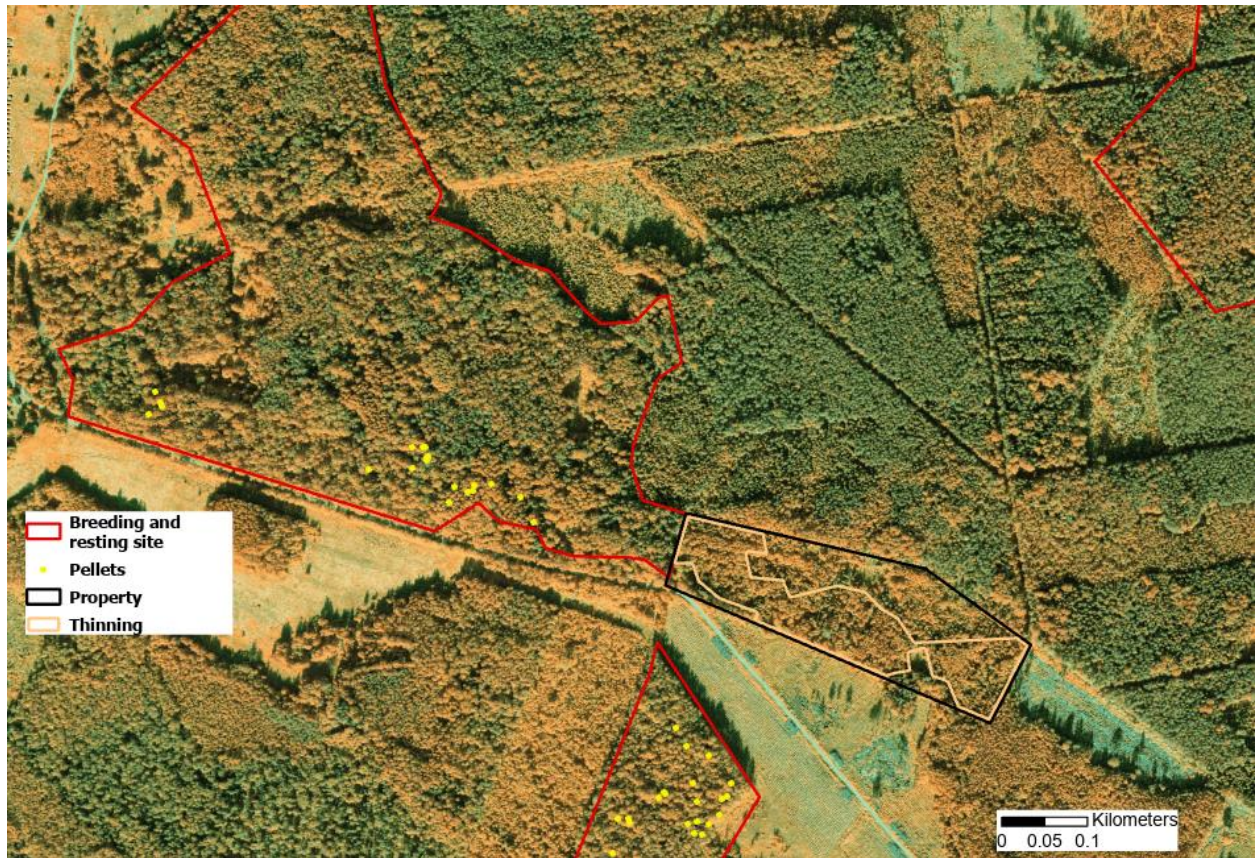
The second project site of Mäetaguse project area lies between two known flying squirrel locations, both of which have been continuously inhabited since 2014. To protect these sites, species protection areas have been designated, each consisting of a conservation zone around nest trees and a surrounding limited management zone. The purpose of these zones is to ensure forest connectivity between key areas. Forests in the region have been intensively managed over the past 25 years. Of the land unit's total area of 4,82 hectares, 3,09 hectares fall within the limited management zone of the species protection site.

The limited management zone is mostly covered by young birch-dominated stands aged 10–20 years. In addition, a 0,14-hectare patch of 70-year-old mixed birch forest is present, with scattered aspen and spruce. This area is important for flying squirrels as a movement corridor between nesting sites, while the older stand with mature aspens also has potential to serve as nesting habitat.

Thinning was planned out on two forest compartments within the project site, covering a total of 3 hectares. In one of the compartments, the share of aspen in the stand composition was increased. As the stands are only around 20 years old, the primary objective of thinning was to improve light conditions and create more space for spruce growth.

As a result, the forest structure became more diverse. The primary function of this forest will continue to be facilitating movement between flying squirrel nesting areas, while also offering limited potential for the development of new nesting habitat.





Muraka project area

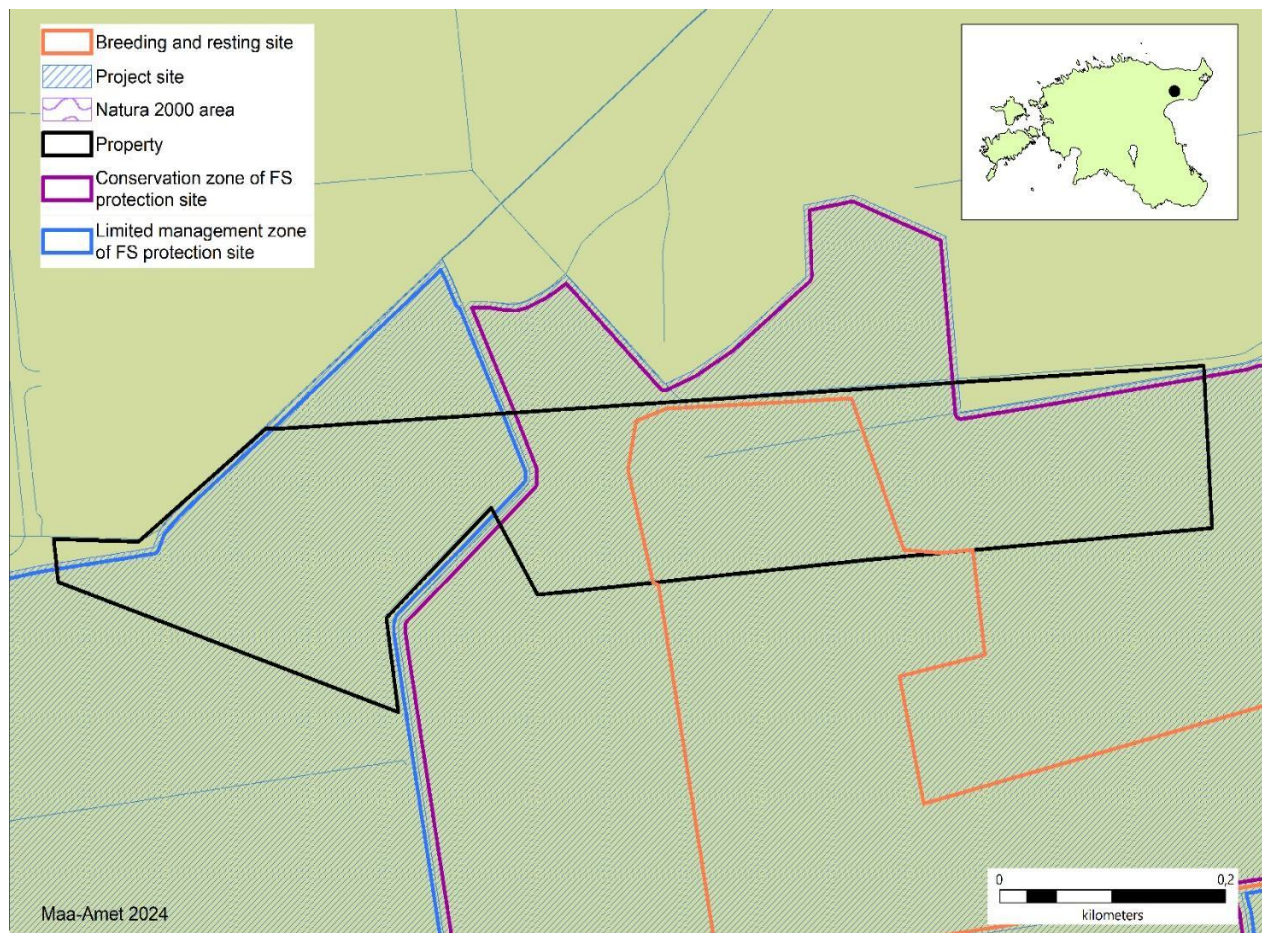
The Muraka project area is located in northeastern Estonia, in Alutaguse municipality.

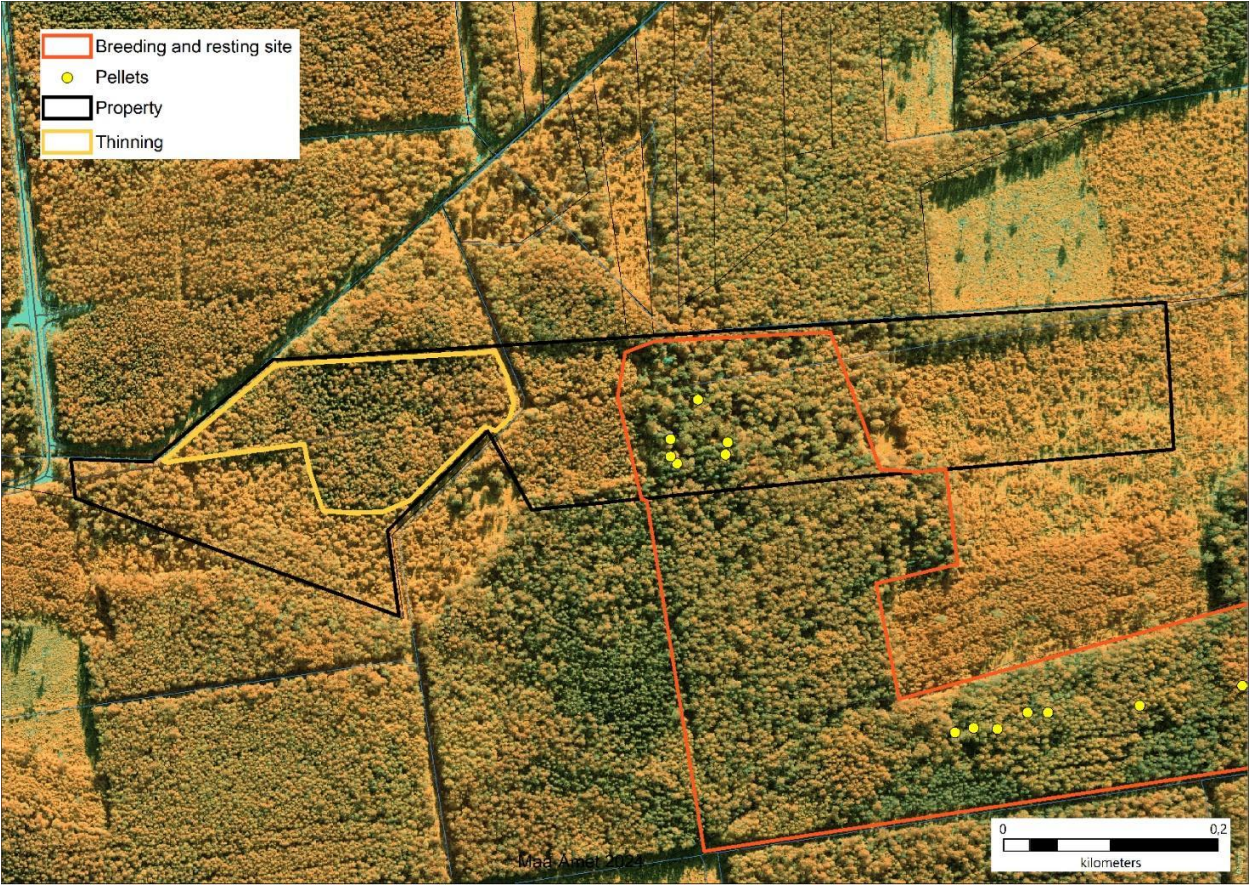
One part of the site includes a flying squirrel habitat that has been continuously inhabited since 2014. To protect this site, a species protection site has been designated, consisting of a conservation zone around nest trees and a surrounding limited management zone. The aim of these zones is to reduce negative edge effects and ensure forest connectivity with neighboring areas. Within the land unit, 8,8 hectares fall within the conservation zone and 5,35 hectares within the limited management zone.

The forests in the conservation zone are structurally diverse and mostly over 80 years old. The oldest section includes a 120-year-old spruce–aspen mixed stand. In addition to spruce, aspen, and birch, black alder is also present. The limited management zone contains mostly young stands aged 15–25 years, as well as a 1,2-hectare patch of 55-year-old deciduous forest dominated by birch and black alder. The forest in the limited management zone plays an important role in buffering the nesting forest from negative edge effects.

In the project site, thinning was carried out in a 25-year-old birch–spruce stand by removing up to 20% of the trees to shape the young forest. During the thinning, individual aspens present in the stand were retained. As a result, light conditions improved, and the growth rate of the young stand increased. The primary function of this forest remains to reduce edge effects on the adjacent nesting habitat, while it may also serve as a foraging area for flying squirrels.

Felling operations were carried out in 2022, with approximately 100 cubic metres of timber harvested.





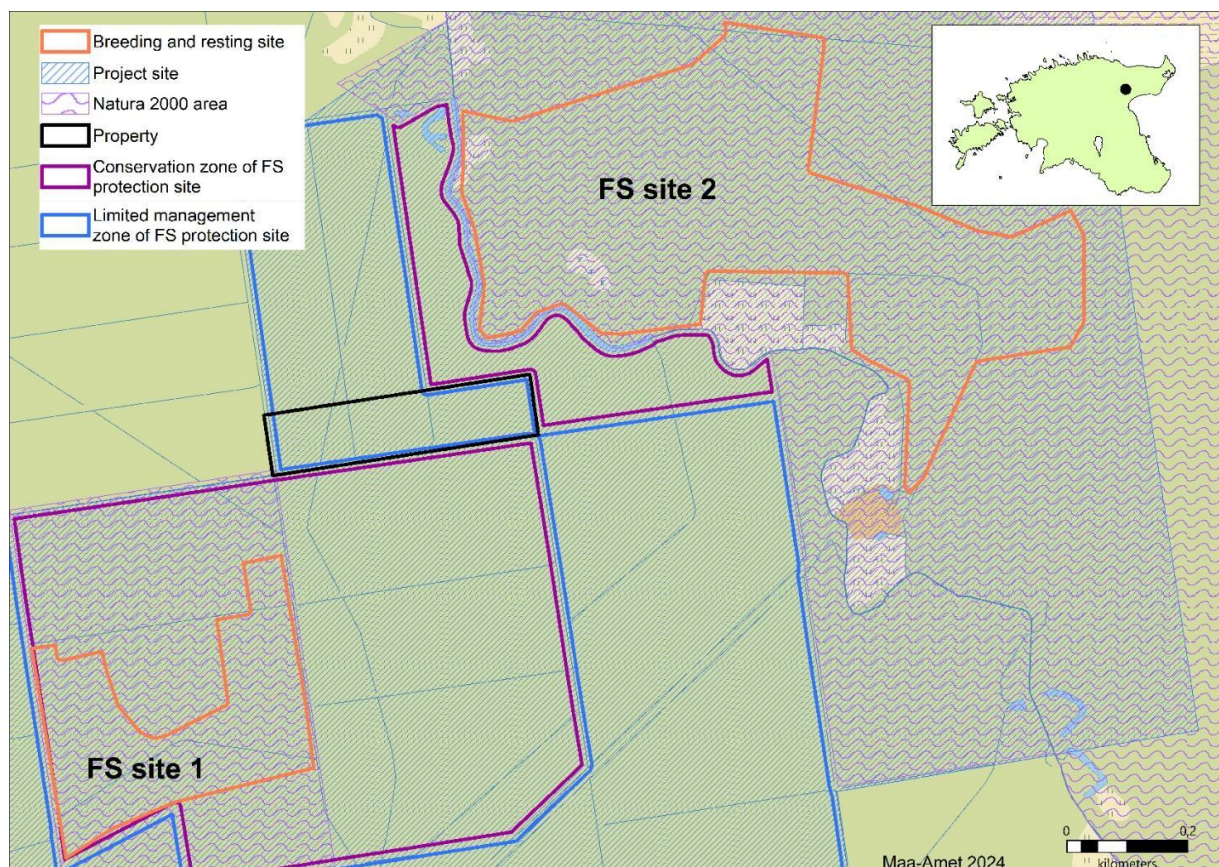
Annual flying squirrel inventories are carried out during the project in 2018-2024. + inhabited by FS, - uninhabited by FS.

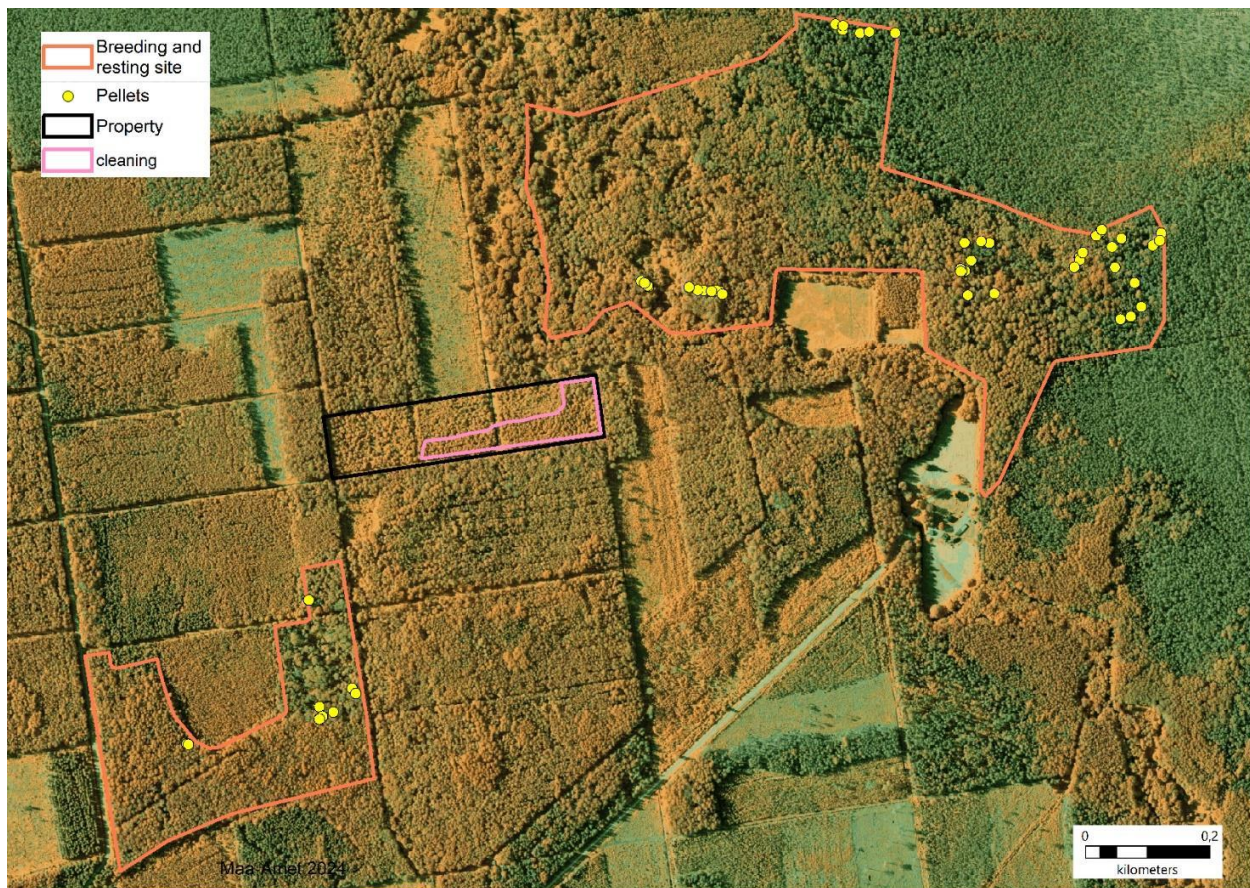
	2018	2019	2020	2021	2022	2023	2024
FS site	+	+	+	+	+	+	+

The second site of Muraka project area lies between two flying squirrel locations that have been continuously inhabited since 2012. To protect these locations, a species protection site has been established, consisting of a conservation zone around the nest trees and a surrounding limited management zone. The goal is to ensure forest connectivity with neighboring areas. Forests in the region have been subject to very intensive management over the past 25 years. The entire 4,04-hectare forest property lies within the limited management zone of the species protection site. The entire forested area - covering 4,01 hectares - is occupied by a 15-year-old birch-black alder stand up to 13 meters tall. As a result, the forest is currently only marginally suitable for flying squirrel movement.

Clear-cutting was carried out on the site just 15 years ago. Therefore, a thinning operation involving 5–20% removal was planned to shape the young stand. During thinning, the few aspens and spruces present in the stand were retained. The thinning aimed to improve light conditions and accelerate the growth of the young forest. The forest's primary function remains to support flying squirrel movement, but it may also serve as a foraging area.

However, due to difficult machine access and the small scale of the planned work, the operations could not be carried out during the project period. The landowner may still implement the planned activities outlined in the management plan after the project.





Annual flying squirrel inventories are carried out during the project in 2018-2024. + inhabited by FS, - uninhabited by FS.

	2018	2019	2020	2021	2022	2023	2024
FS site 1	+	+	+	+	+	-	+
FS site 2	+	+	+	+	+	+	+

The third site of Muraka project area is located within a flying squirrel habitat that has been continuously inhabited since 2009. To protect the site, a species protection site has been designated, consisting of a conservation zone around the nest trees and a surrounding limited management zone. The purpose of these zones is to ensure connectivity with neighboring areas through continuous forest cover. Forests in this region have been intensively managed over the past 25 years. The entire 10,02-hectare forest property lies within the conservation zone of the species protection site.

The property includes areas that were clear-cut 15 and 5 years ago, where young birch, black alder, and aspen stands now grow, reaching heights of 10–15 meters. These young stands currently offer only limited suitability for flying squirrel movement.

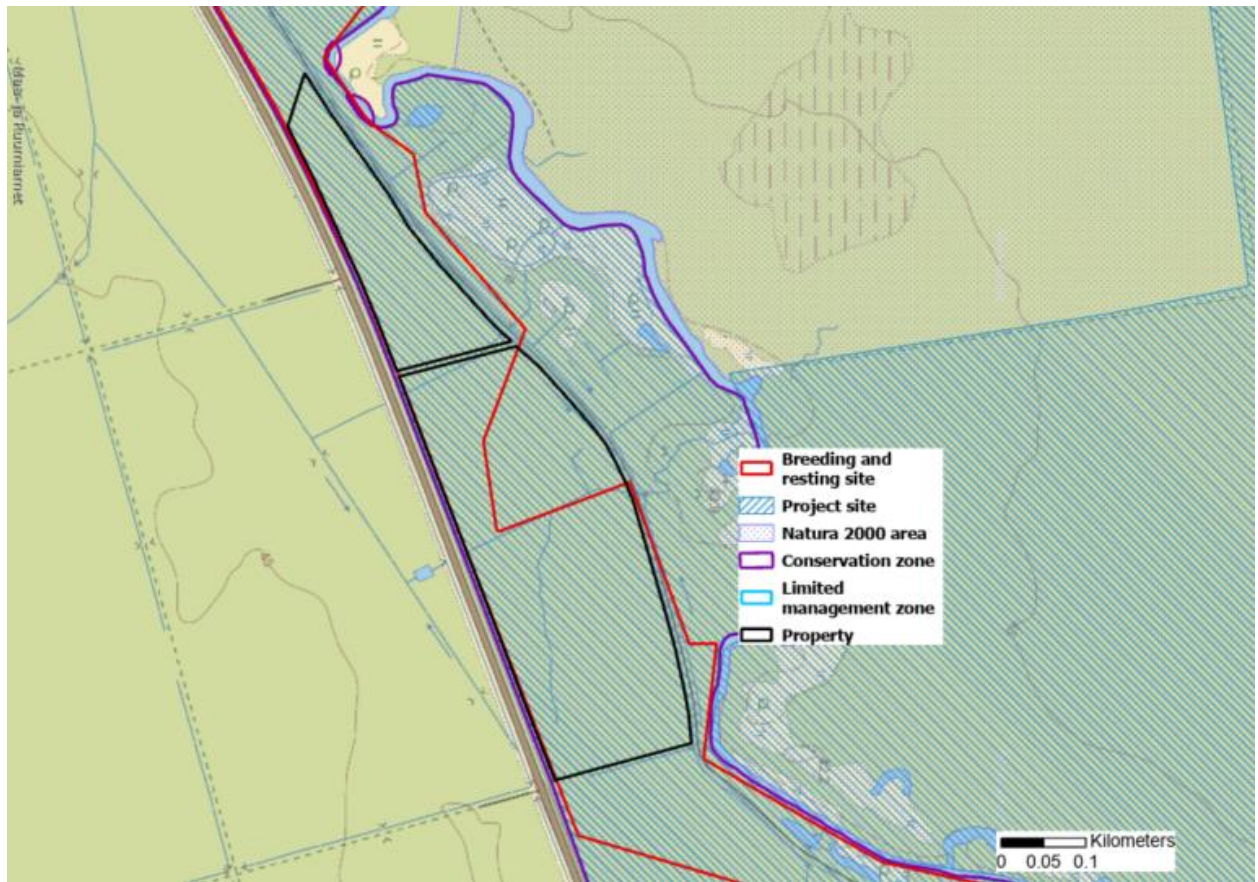
In the site, cleaning and early thinning operations were planned to improve light conditions, accelerate the growth of young forest, and shape stand composition to better suit the needs of flying squirrels. In the short term, the forest primarily serves as a movement corridor and foraging area. In the longer term, it has the potential to develop into suitable nesting habitat. Felling operations were carried out during the project period in 2024–2025.

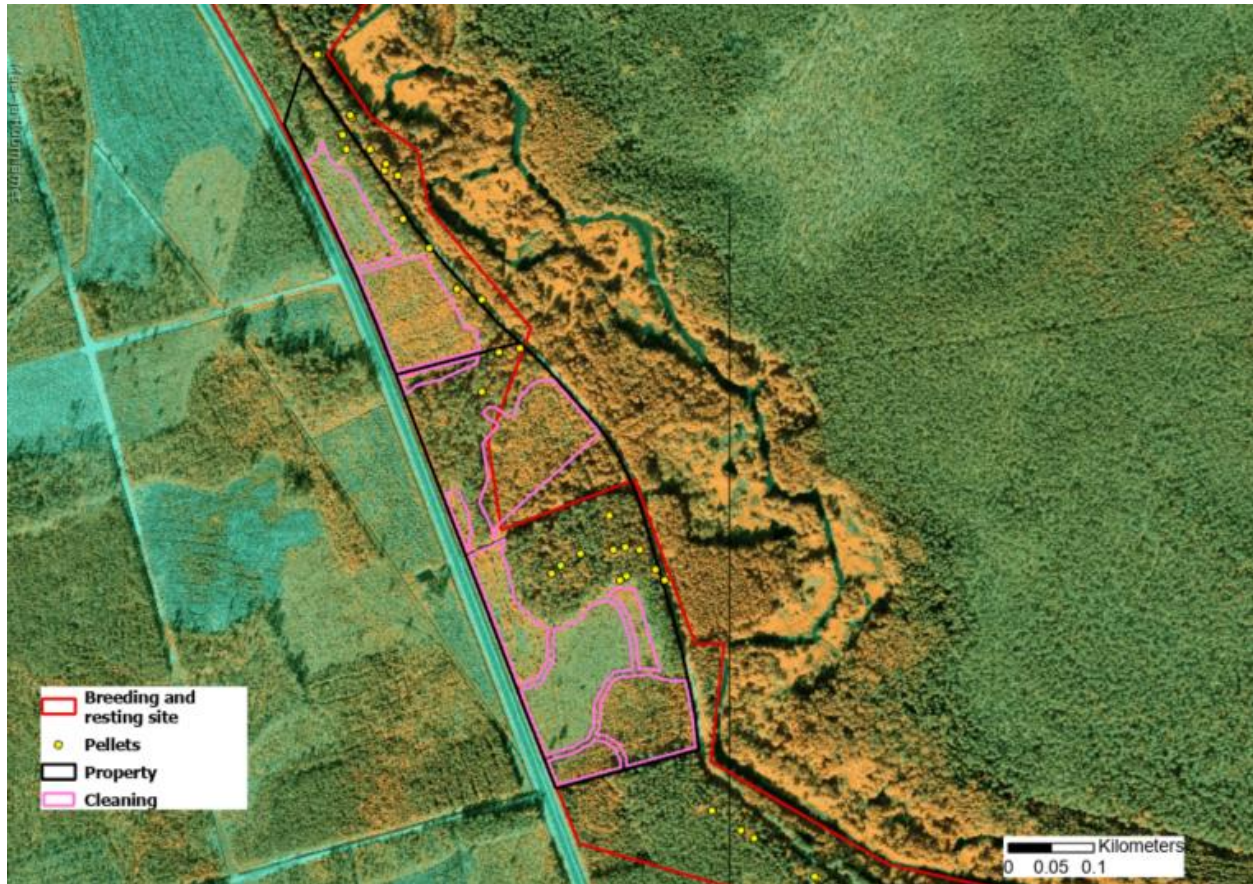
The fourth site is located next to previous, within a flying squirrel habitat that has been continuously inhabited since 2009. To protect the area, a species protection site has been established, consisting of a conservation zone around the nest trees and a surrounding limited management zone. The purpose of these zones is to maintain connectivity with neighboring areas through continuous forest cover. Forests in the region have been intensively managed over the past 25 years. The entire 3,19-hectare forest property lies within the conservation zone of the species protection site.

On 2 hectares of the property, clear-cuts were carried out 12 and 5 years ago. These areas are now covered by young stands dominated by birch and pine, reaching approximately 10 meters in height. As such, these young stands currently offer only limited suitability for flying squirrels as movement corridors or habitat.

In the site, cleaning and early thinning were planned with the aim of improving light conditions, accelerating the growth of young forest, and shaping stand composition to better suit the ecological needs of flying squirrels. In the short term, the forest primarily functions as a movement corridor and foraging area. Over time, however, it also holds potential to develop into nesting habitat.

Felling operations were carried out during the project period in 2024–2025.





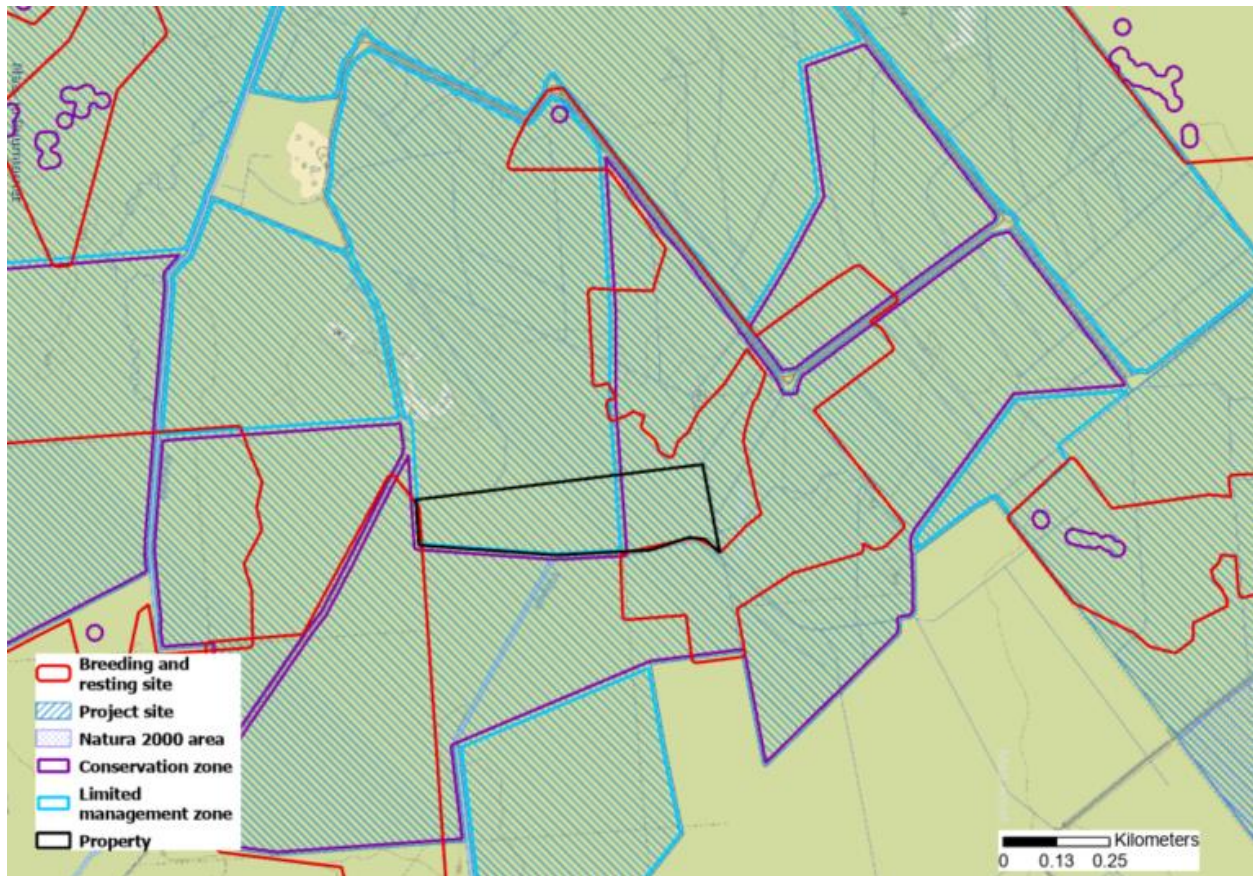
Murru-Ojadevahe-Pärnamäe project area

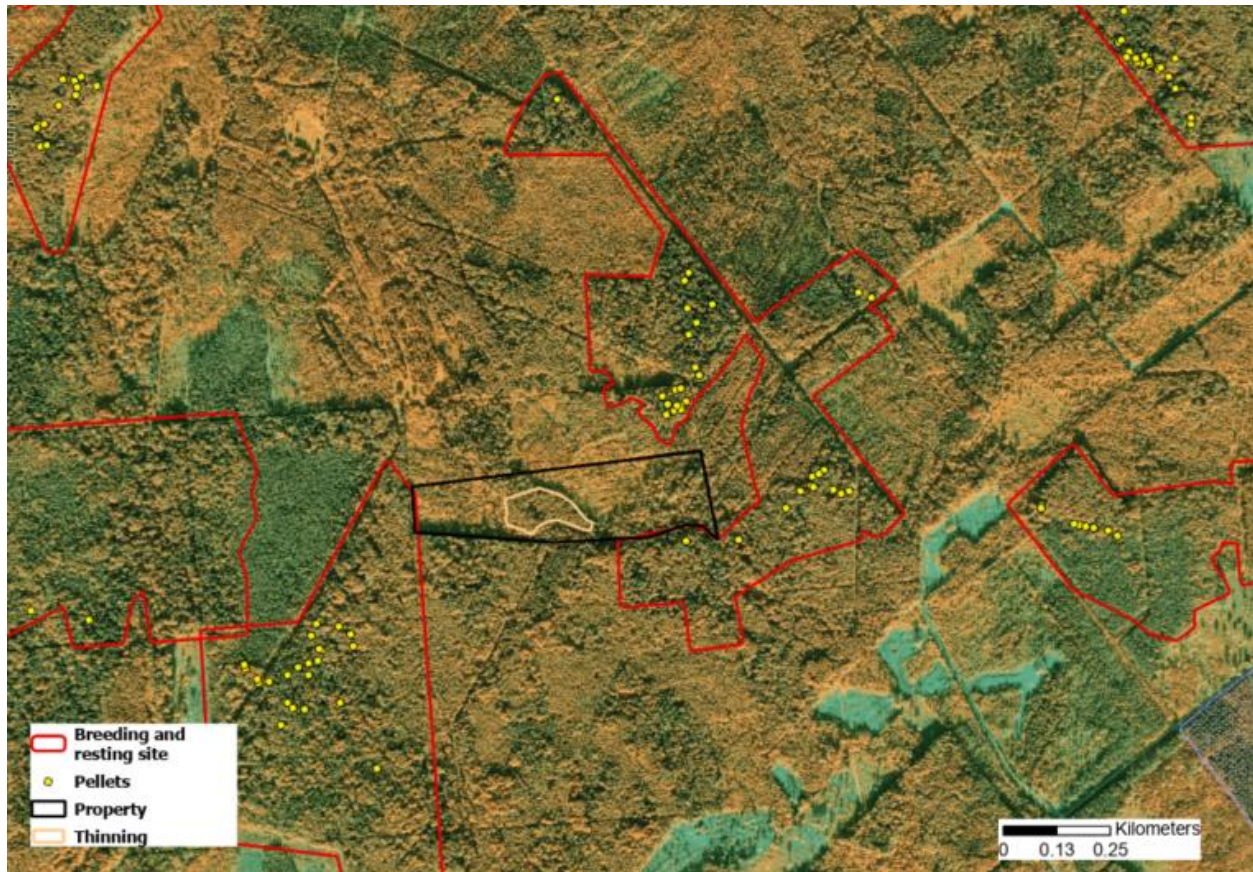
The Murru–Ojadevahe–Pärnamäe project area is located in northeastern Estonia, in Alutaguse municipality.

The site lies between two flying squirrel locations that have been intermittently inhabited since 2008. To protect these locations, species protection sites have been established, consisting of conservation zones around nest trees and surrounding limited management zones. The aim of these zones is to ensure connectivity with neighboring areas through continuous forest cover. Forests in the region have been intensively managed over the past 25 years.

Of the land unit's total area of 11,6 hectares, 7,59 hectares fall within the limited management zone and 4,01 hectares lie within the conservation zone. Approximately half of the property is covered by middle-aged stands up to 100 years old, while the other half consists of young stands up to 20 years old. The forest in the limited management zone is important for enabling movement between nesting areas, and the older aspen-rich stands may also develop into suitable nesting habitat in the future.

In the project site, thinning was planned in a middle-aged mixed forest of birch, spruce, and black alder, with the aim of reducing birch dominance. As a result, light conditions improved and the stand structure became more diverse. The primary function of this forest remains to provide movement opportunities for flying squirrels, while also offering limited potential for the development of new nesting habitat.





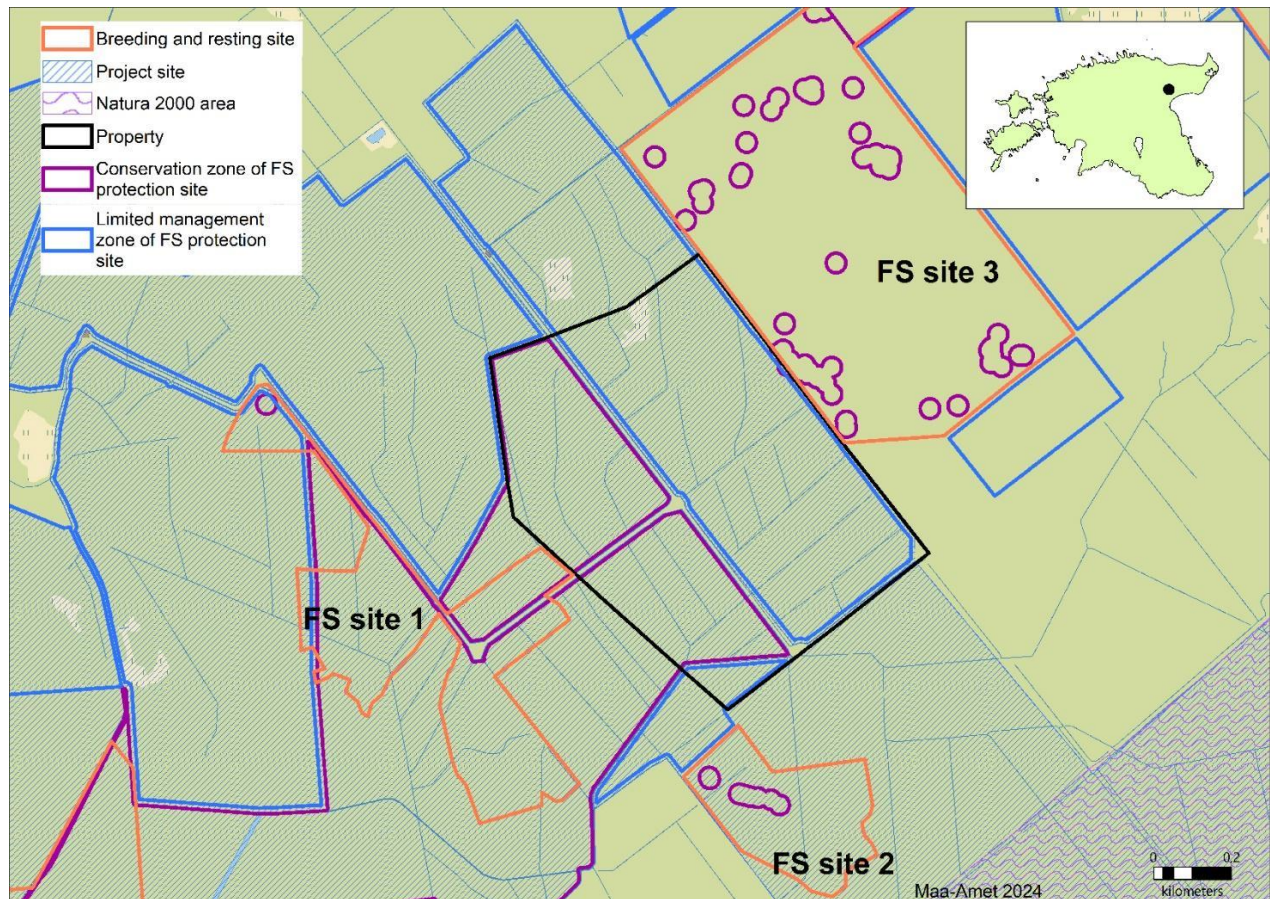
The second site is located between three flying squirrel habitats that have been intermittently inhabited since 2008, 2017, and 2019. To protect these areas, species protection sites have been established, consisting of conservation zones around nest trees and surrounding limited management zones. The aim of these zones is to reduce negative edge effects and ensure connectivity with neighboring areas through continuous forest cover.

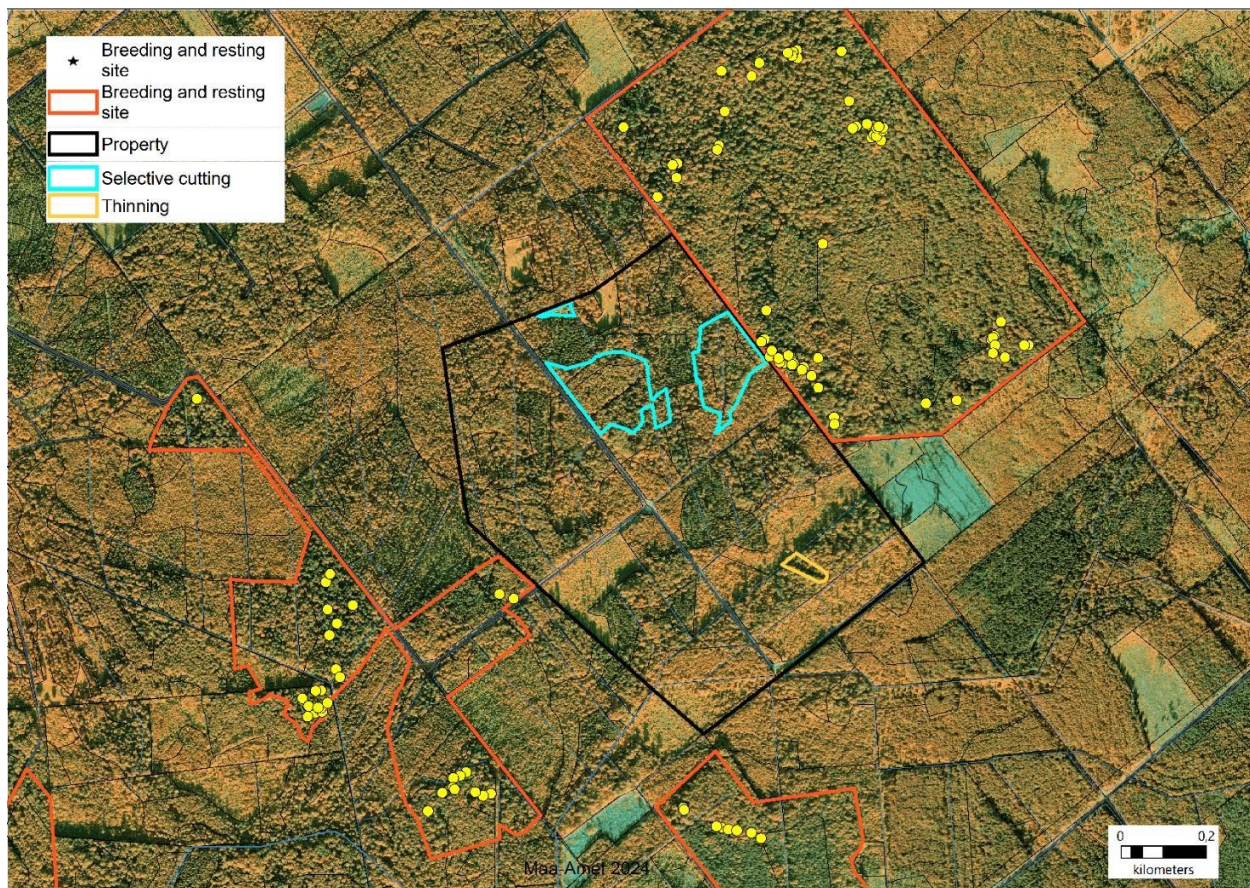
The land unit lies entirely within a species protection site, of which 27,14 hectares are in the conservation zone and 42,1 hectares in the limited management zone. The property contains structurally diverse, mixed-age forest stands. The forest in the limited management zone plays an important role in enabling movement between flying squirrel nesting areas.

In the site, selection cutting was planned on 5,97 hectares of older birch-, black alder-, and grey alder-dominated stands in the limited management zone, with the aim of increasing the share of aspen and spruce. Additionally, a 0,28-hectare thinning was planned in a 50-year-old spruce-dominated stand to improve light conditions and increase the proportion of deciduous trees. During thinning, individual aspens present in the stand were retained.

The primary function of this forest will remain the facilitation of flying squirrel movement between habitat areas, while also offering limited potential for the development of new nesting habitat.

No felling operations were carried out during the project, but the owner remains free to implement the management plan in the future if desired.





Annual flying squirrel inventories are carried out during the project in 2018-2024. + inhabited by FS, - uninhabited by FS.

	2018	2019	2020	2021	2022	2023	2024
FS site 1	-	+	+	+	+	+	+
FS site 2	-	-	-	-	-	+	-
FS site 3		+	+	+	+	+	+

A third site lies between three flying-squirrel habitats that have been occupied intermittently since 2008, 2017 and 2019. Each habitat is protected by a species protection site: nest-tree surroundings form the conservation zone, encircled by a limited management zone whose purpose is to prevent negative edge effects and maintain continuous forest links with neighbouring areas. The property falls almost entirely inside a species protection site: 20,88 ha lie in the conservation zone and 45,9 ha in the limited management zone. The stands are of mixed age and variable structure. Forest in the limited management zone is crucial for squirrel movements between different nest forests.

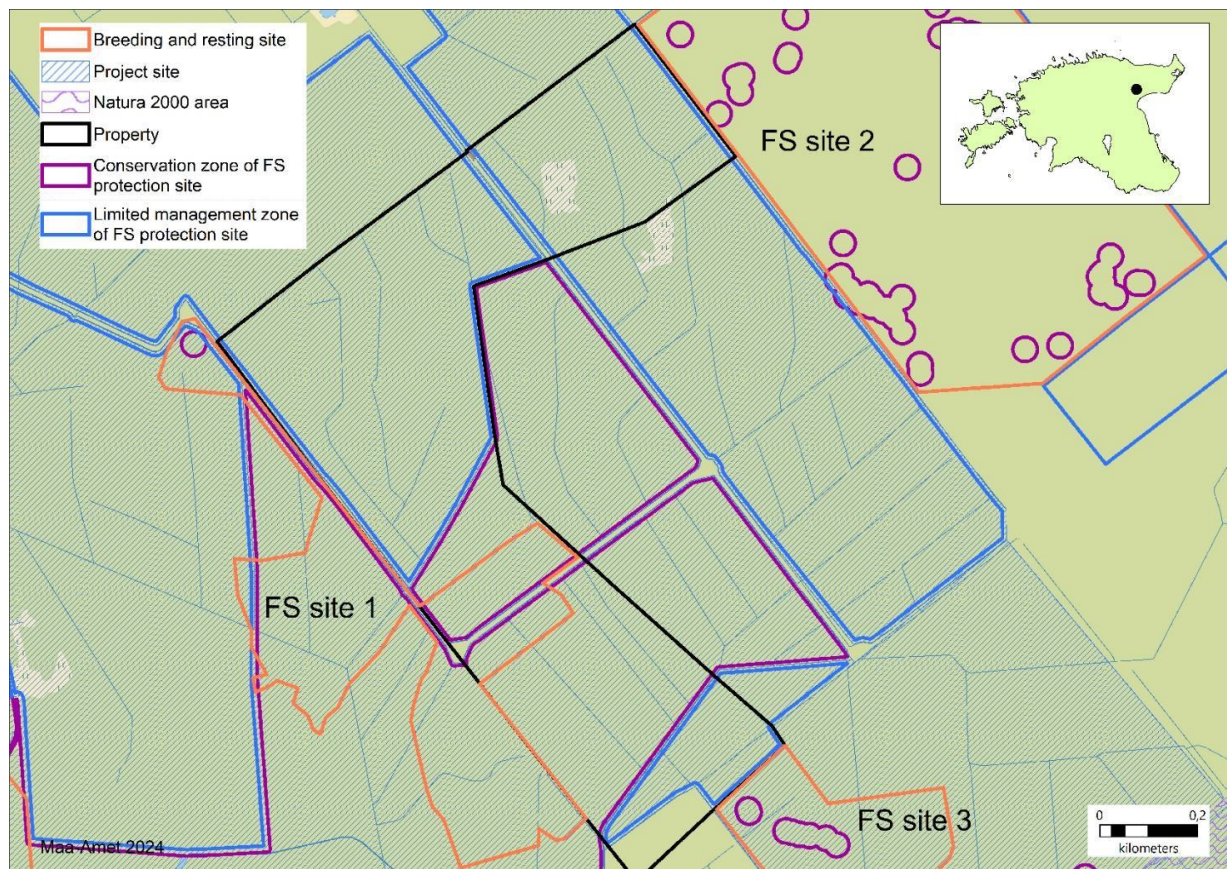
On the site, the following fellings were planned:

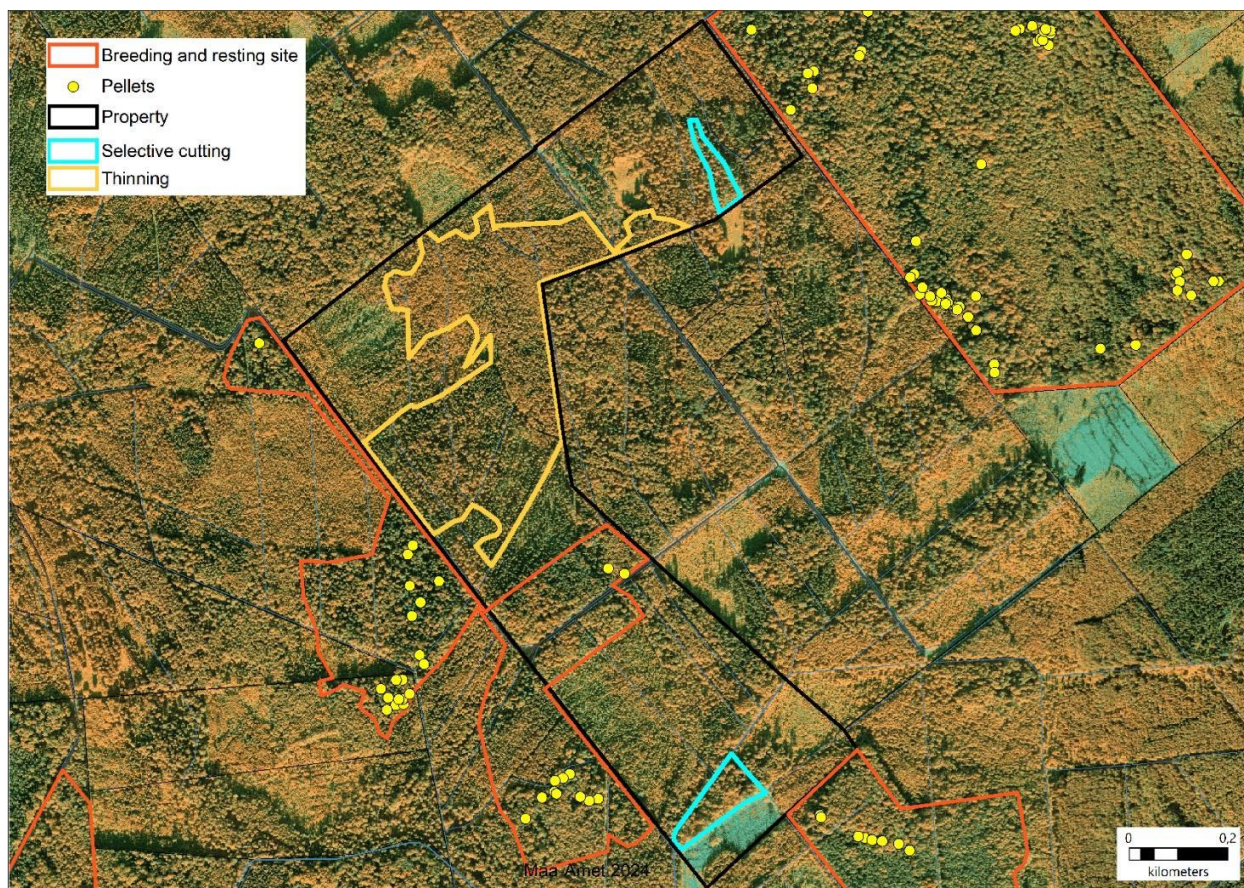
selective cutting on 2,11 ha of older birch-dominated forest in the limited management zone, increasing the share of aspen and spruce; thinning on 18,98 ha of mainly 50- to 60-year-old mixed spruce, birch and black-alder stands to improve light conditions and raise the proportion of aspen.

All existing aspens were retained during thinning.

The primary function of this forest will remain to provide movement corridors for flying squirrels and, to a lesser extent, to allow new nesting forest to develop.

Felling operations were carried out in 2023–2024, producing approximately 290 m³ of timber.





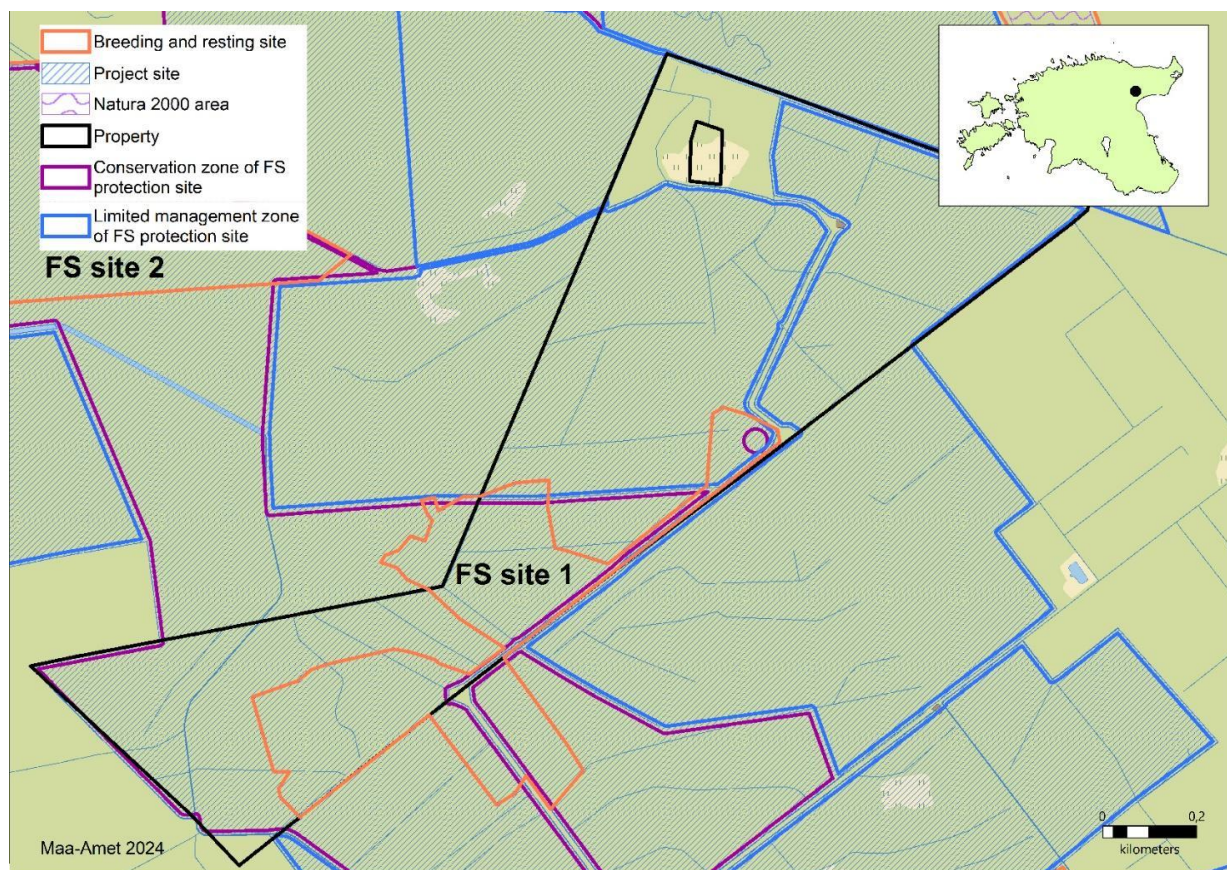
Annual flying squirrel inventories are carried out during the project in 2018-2024. + inhabited by FS, - uninhabited by FS.

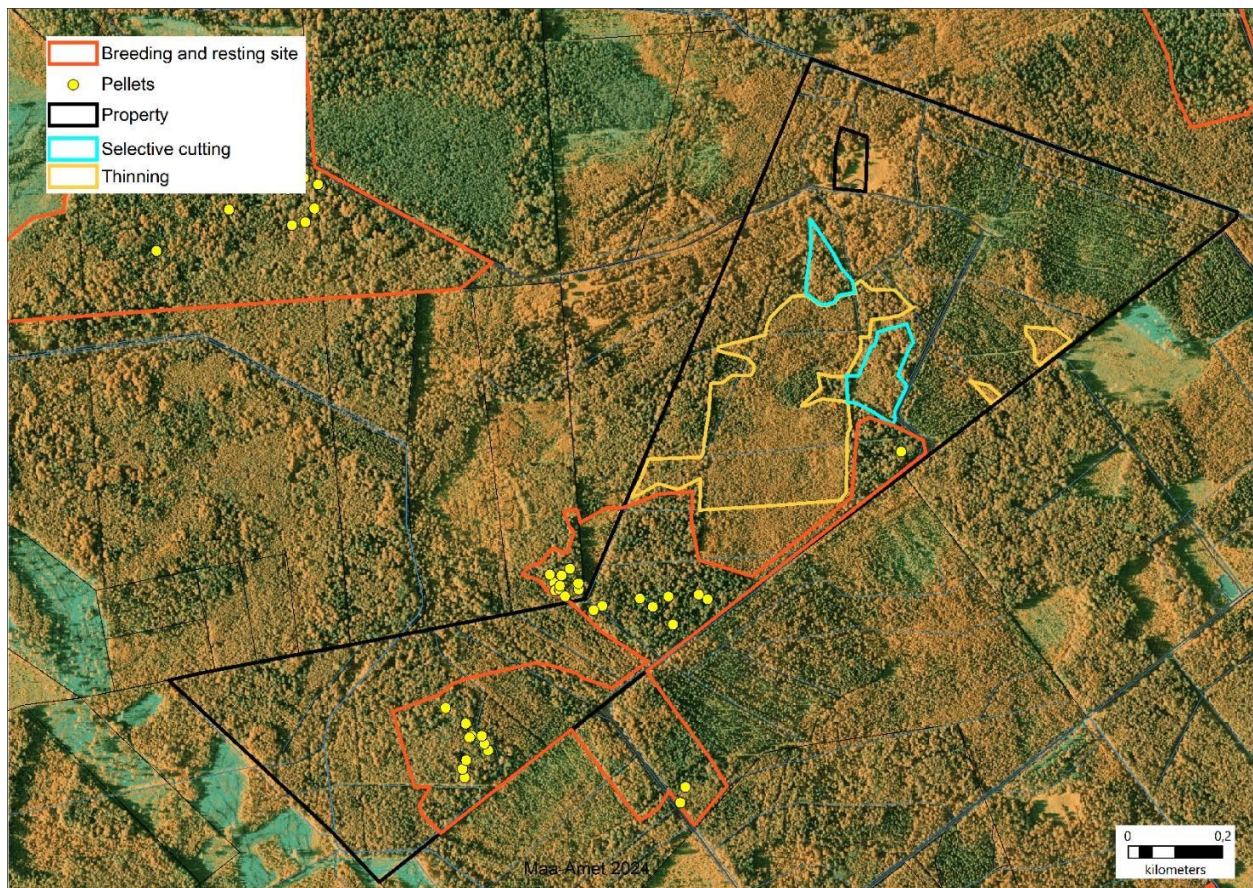
	2018	2019	2020	2021	2022	2023	2024
FS site 1	-	+	+	+	+	+	+
FS site 2		+	+	+	+	+	+
FS site 3	-	-	-	-	-	+	-

A fourth site partly overlaps a flying squirrel habitat that has been intermittently inhabited since 2008. To protect the area, a species protection site has been designated: the immediate surroundings of nest trees form the conservation zone, which is encircled by a limited management zone intended to reduce edge effects and maintain continuous forest connectivity with neighboring areas. The property lies almost entirely within this protection site, comprising 38,02 hectares of conservation zone and 55,66 hectares of limited management zone. The forest stands are uneven-aged and structurally diverse. The forest within the limited management zone is essential for enabling squirrel movement between different nesting areas. Planned fellings: selective cutting on 3,07 hectares of alder- and birch-dominated stands in the limited management zone, aimed at increasing the proportion of aspen and spruce. Thinning on 13,07 hectares of mainly 50- to 60-year-old birch–spruce stands to improve light conditions and further enhance the share of aspen. All existing aspens were retained.

These operations improved the structural diversity of the forest while maintaining its primary role: providing safe movement corridors for flying squirrels and, to a lesser extent, creating conditions for the development of new nesting habitat.

Felling was carried out during 2023–2024, yielding approximately 730 m³ of timber.





Annual flying squirrel inventories are carried out during the project in 2018-2024. + inhabited by FS, - uninhabited by FS.

	2018	2019	2020	2021	2022	2023	2024
FS site 1	-	+	+	+	+	+	+
FS site 2		+	+	+	+	+	+

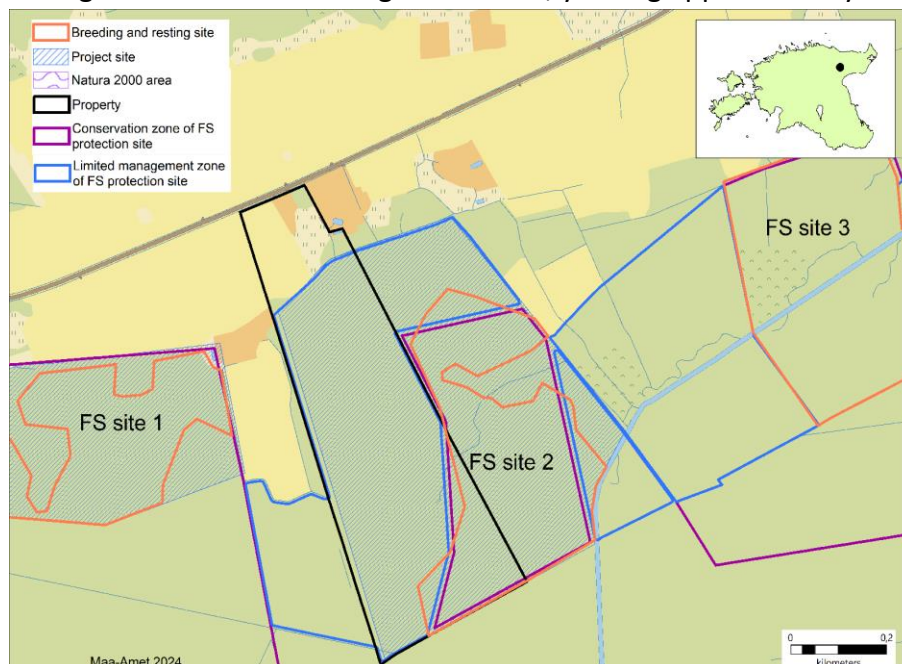
Oonurme project area

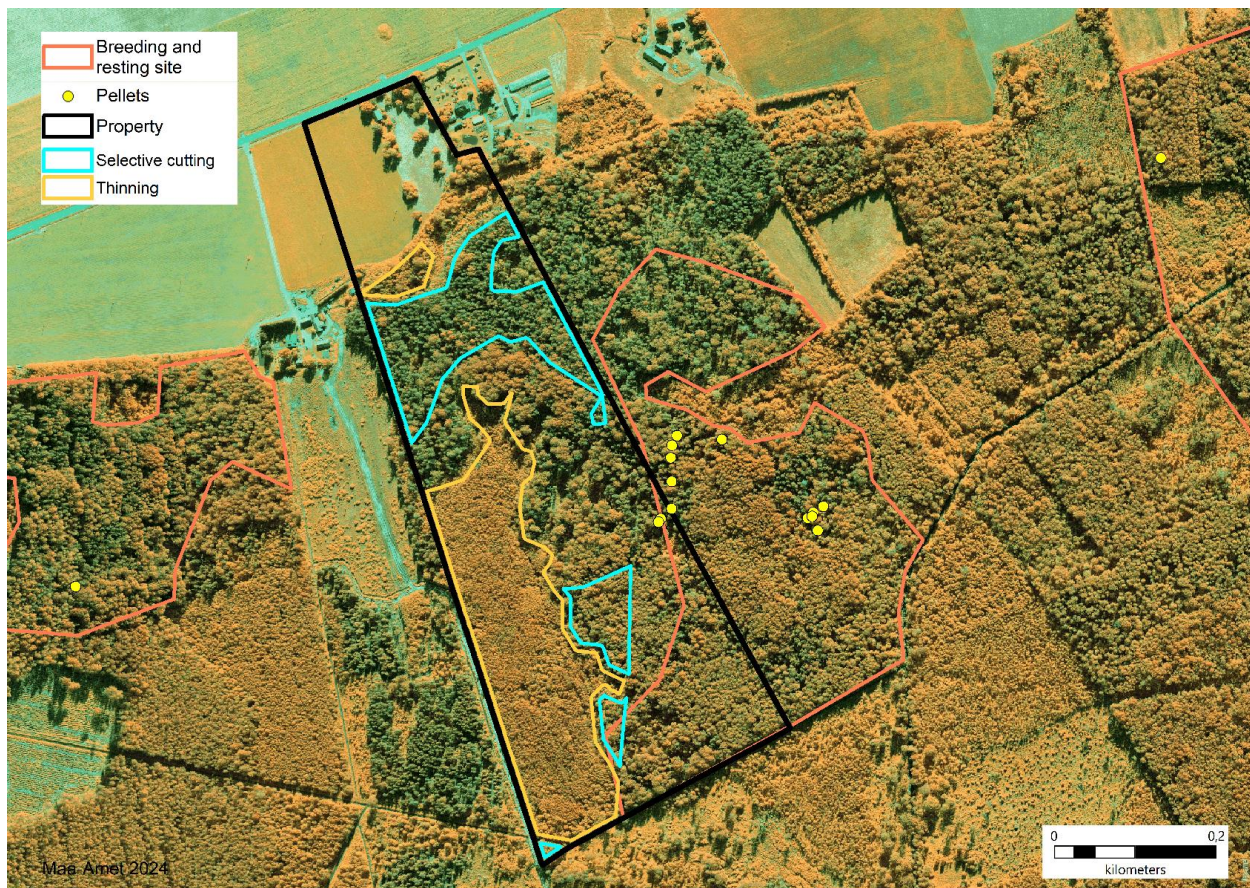
The Oonurme project area is located in northeastern Estonia, in Alutaguse municipality. One part of the site overlaps a flying squirrel habitat that has been intermittently inhabited since 1986. To protect this location, a species protection site has been designated: a conservation zone surrounds the nest trees, enclosed by a limited management zone aimed at reducing negative edge effects and maintaining forest connectivity with neighboring areas. The property includes 20,6 hectares of forest land, of which 4,72 hectares lie within the conservation zone and 15,88 hectares within the limited management zone. The forests in the conservation zone are structurally diverse and mostly over 80 years old, composed of mixed spruce, birch, aspen, and black alder. The limited management zone contains forest stands of varying age. These forests play an important role in enabling movement between nesting areas and also serve as foraging habitat for the flying squirrel.

In the site, thinning was carried out in a 20-year-old young stand to improve light conditions and increase the share of aspen. As a result, light conditions improved, and stand composition became more diverse. Selection felling was also carried out in 80-year-old black alder-dominated and 90-year-old pine-dominated stands, which altered the stand structure and increased the share of aspen.

The forest's primary function remains to support the movement of flying squirrels, while also contributing to the development of new nesting habitat.

Felling was carried out during 2022–2024, yielding approximately 670 m³ of timber.





Annual flying squirrel inventories are carried out during the project in 2018-2024. + inhabited by FS, - uninhabited by FS.

FS Habitat	2018	2019	2020	2021	2022	2023	2024
FS site 1	-	-	-	-	-	+	-
FS site 2	-	-	+	+	+	+	-
FS site 3	-	+	-	-	-	-	-

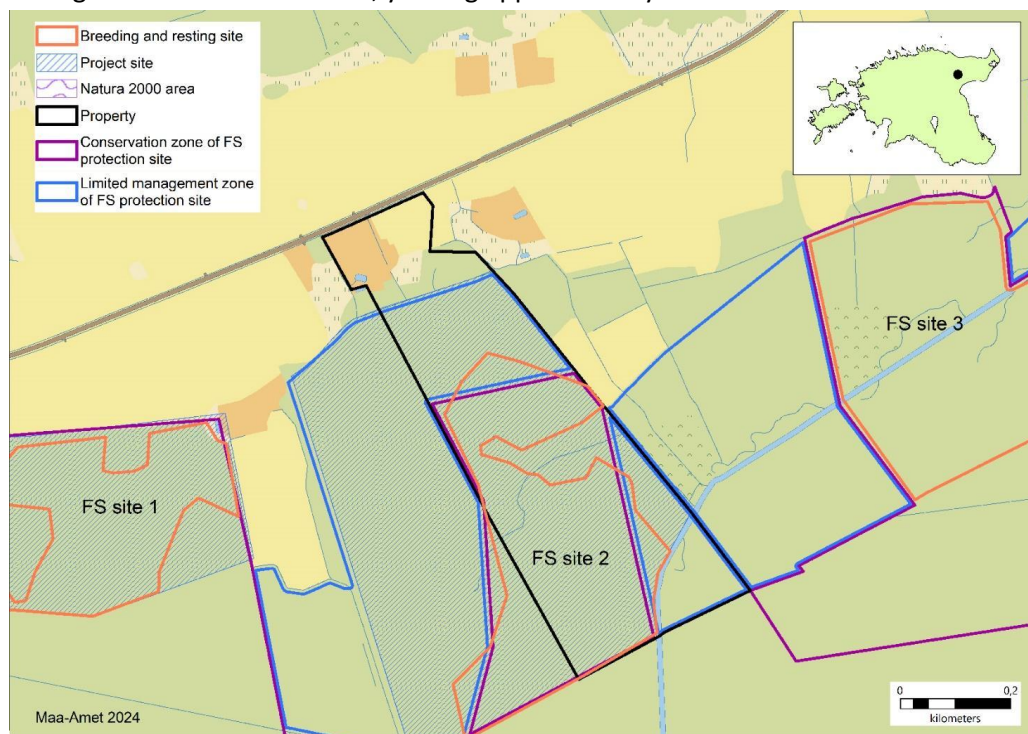
The second site of Oonurme project area is located adjacent to the previous one. The flying squirrel site here has been monitored since 1994, with all pellet trees mapped annually. The site remained uninhabited between 2013 and 2019. Two neighboring flying squirrel sites are located approximately 500 meters to the north and south. To protect the site, a species protection site has been established: a strict protection zone surrounds the nesting trees, and it is encircled by a limited management zone, designed to ensure continuous forest connectivity with adjacent areas.

The area hosts a forest of varying ages, comprising aspen, Norway spruce, Scots pine, birch, and black and grey alder. In one section, young stands of aspen, spruce, and birch have regenerated following storm damage in 2000 and 2001. In 2012, a limited-scale selective felling was also conducted in the area. Of the property, 12,25 hectares lie within the conservation zone and 8,69 hectares within the limited management zone of the species protection site. The forests in the conservation zone are structurally diverse and mostly over 80 years old, composed of mixed aspen, spruce, birch, and black alder. The limited management zone includes stands of varying ages and plays an important role in enabling flying squirrel movement between nesting areas, while also serving as foraging habitat and having the potential to develop into nesting forest.

In the site, thinning was carried out on a total of 2,21 hectares in 20- and 40-year-old stands, with the goal of improving light conditions and increasing the share of aspen. As a result, stand diversity improved and light conditions were enhanced. Selective felling was also carried out in black alder- and pine-dominated stands, covering a total of 2,77 hectares. These operations altered the stand structure and increased the proportion of aspen.

The main function of these forests remains to ensure movement corridors for flying squirrels, while also supporting the future development of nesting habitat.

Felling was carried out in 2024, yielding approximately 213 m³ of timber.





Annual flying squirrel inventories are carried out during the project in 2018-2024. + inhabited by FS, - uninhabited by FS.

	2018	2019	2020	2021	2022	2023	2024
FS site 1	-	-	-	-	-	+	-
FS site 2	-	-	+	+	+	+	-
FS site 3	-	+	-	-	-	-	-

Udriku-Palasi project area

The project area is located in Vinni municipality, Lääne-Viru County, in northeastern Estonia. Over the past 20 years, the forests in this region have been subject to very intensive management, leading to a high degree of fragmentation of potential flying squirrel habitats outside protected nature conservation areas. For this reason, it is especially important to preserve not only known breeding sites but also potential habitats and movement corridors for the species.

The property features both young and mature moderately moist mixed forests, containing spruce, birch, pine, aspen, black alder, and grey alder. A baseline forest inventory was conducted for the site in 2018.

Two known flying squirrel habitats - breeding and nesting sites - partly overlap with the property. The designated logging area lies between these two sites, which are about 300 meters apart. One site has been continuously inhabited for the past 10 years, while the other has shown intermittent occupancy since 2005. Additionally, three neighboring sites are located to the south of the property.

To safeguard breeding and nesting sites, feeding grounds, and movement corridors, a species protection site has been established. A conservation zone surrounds the breeding and nesting trees, while a limited management zone has been designated to support feeding and movement activities.

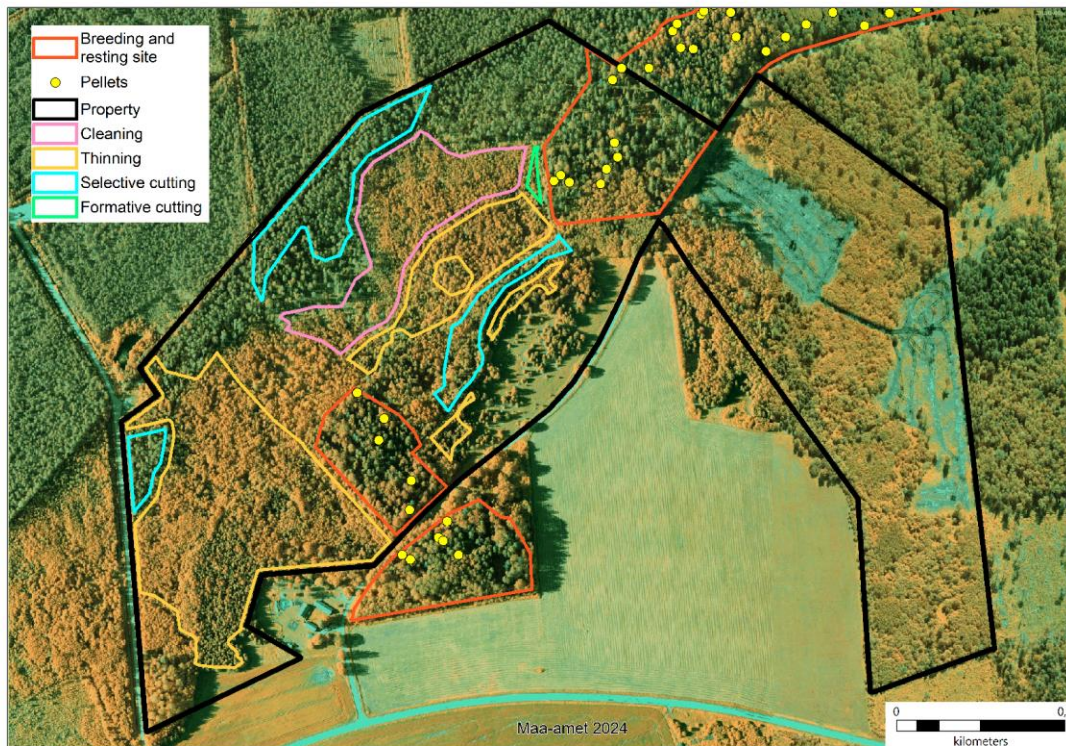
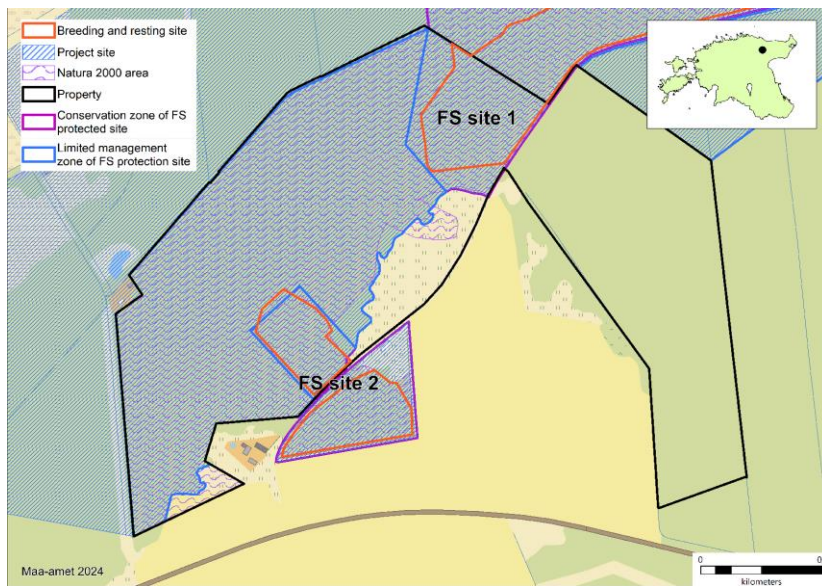
The aim of the forest management plan was to improve the flying squirrel's habitat network and promote long-term aspen continuity in the area. In addition to ensuring the presence of aspens of various ages, the plan also aims to maintain a connection to a neighboring nesting forest. As a result, the site will also serve as suitable foraging habitat.

Cleaning, first thinning, selective cutting, and formative cutting were the forestry measures applied on the project site.

The goal of thinning (9,41 ha) and selective cutting (2,58 ha) was to maintain a habitat corridor between the flying squirrel's breeding and nesting areas. During felling, existing aspens were preserved, and the share of deciduous trees - especially aspens - was increased in the remaining stands.

As a result of the thinning, light conditions in the stand improved, which supports faster growth in young forest. On this property, most stand compartments initially lacked aspen and therefore functioned primarily as movement habitat for the flying squirrel.

Felling was carried out during 2022–2023, with a total harvested timber volume of approximately 425 m³.



Annual flying squirrel inventories are carried out during the project in 2018-2024. + inhabited by FS, - uninhabited by FS.

FS Habitat	2018	2019	2020	2021	2022	2023	2024
FS site 1	+	+	+	+	+	+	+
FS site 2	-	-	+	+	+	-	+

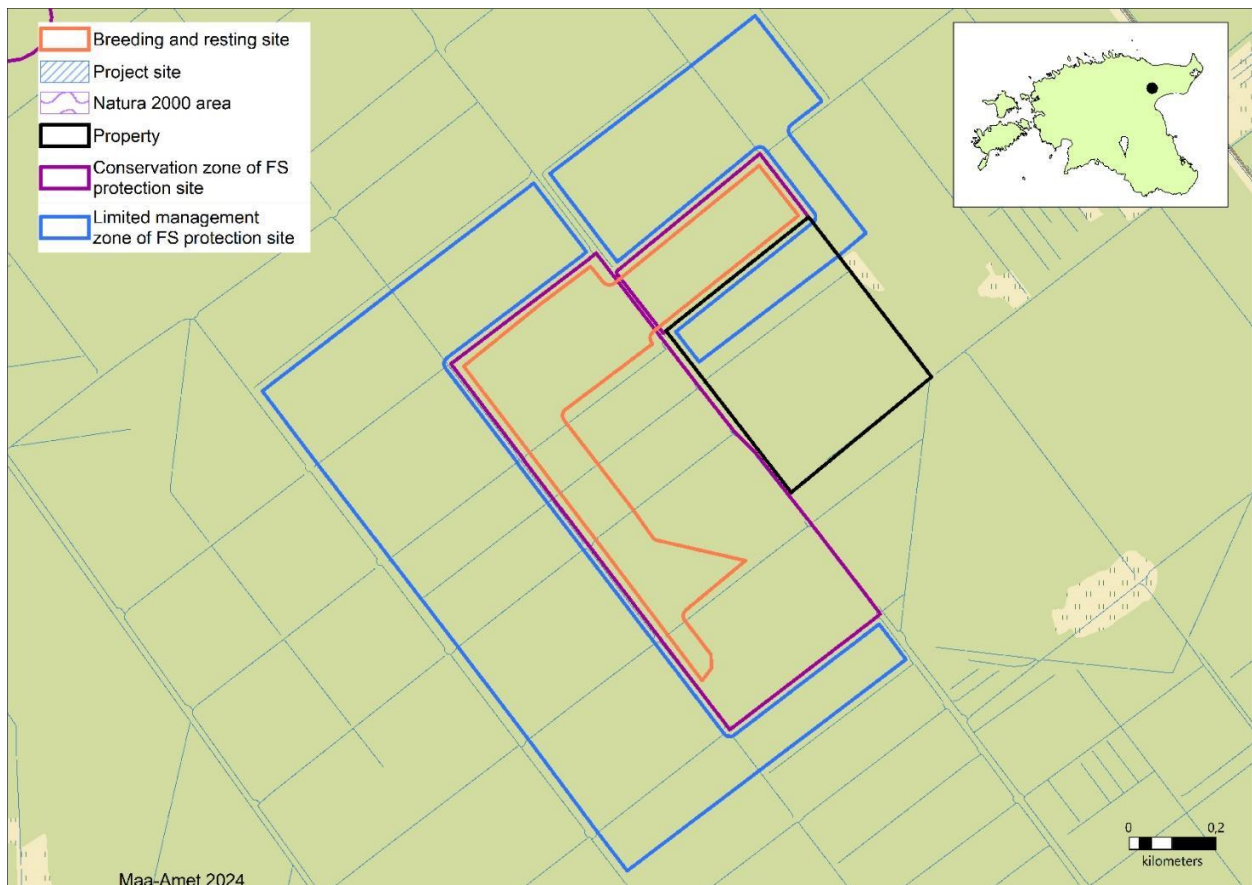
Peressaare-Pasuna project area

The Peressaare-Pasuna project area is in Alutaguse municipality, Ida-Viru County.

On the property, a thinning operation was planned on 1,57 ha of a 30-year-old spruce plantation, where an 18-year-old naturally regenerated understory of birch, aspen, and alder has developed. The area is important as a buffer zone for a nesting forest and serves as a movement corridor.

The main goal of the planned thinning was to improve light conditions in the young stand. During thinning, it is also possible to remove trees damaged by wildlife. However, care must be taken to retain a sufficient number of aspens and other deciduous trees in the stand to ensure connectivity between neighboring flying squirrel habitats. As the forest matures, the stand could become a suitable feeding area and, in the longer term, even develop into a nesting habitat.

Although no felling operations were carried out during the project, the landowner retains the option to implement the planned management activities in the future.





Annual flying squirrel inventories are carried out during the project in 2018-2024. + inhabited by FS, - uninhabited by FS.

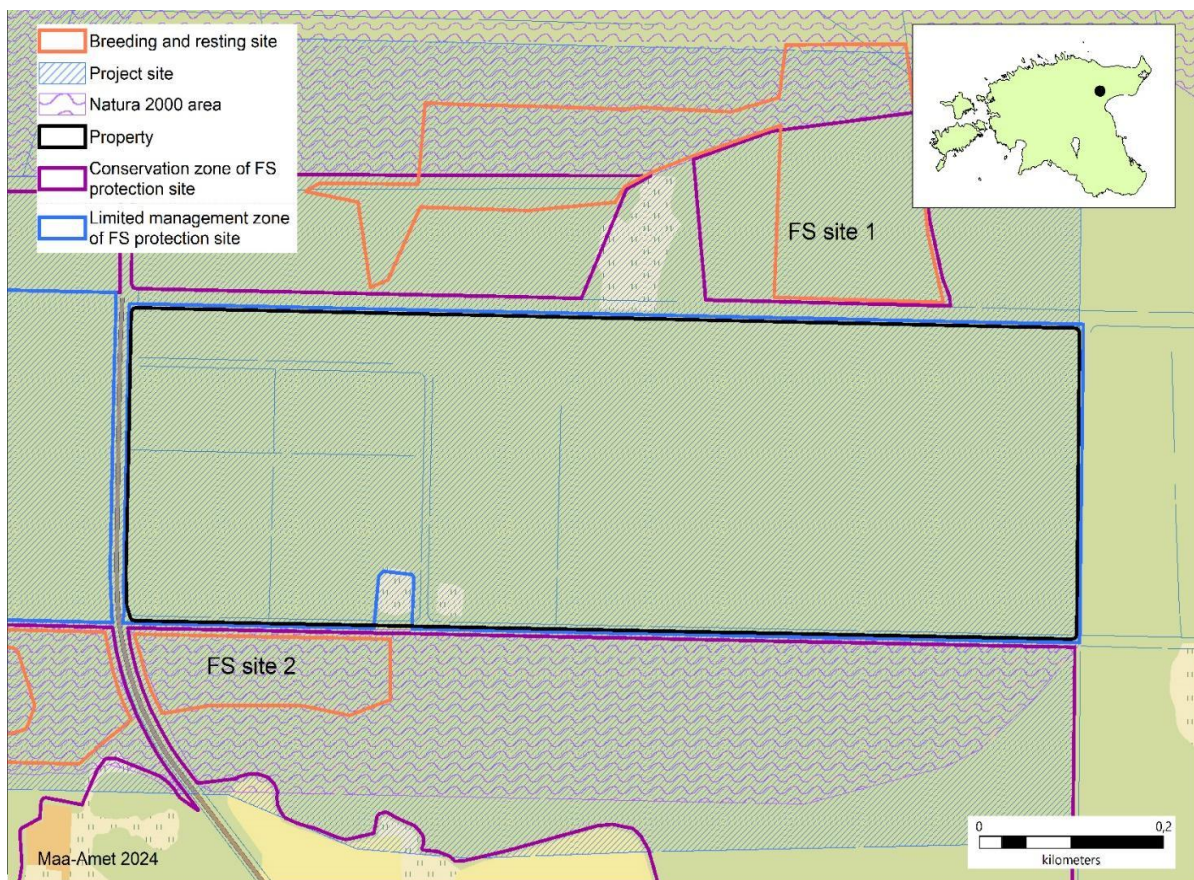
	2018	2019	2020	2021	2022	2023	2024
FS site 1	+	+	+	+	-	+	-

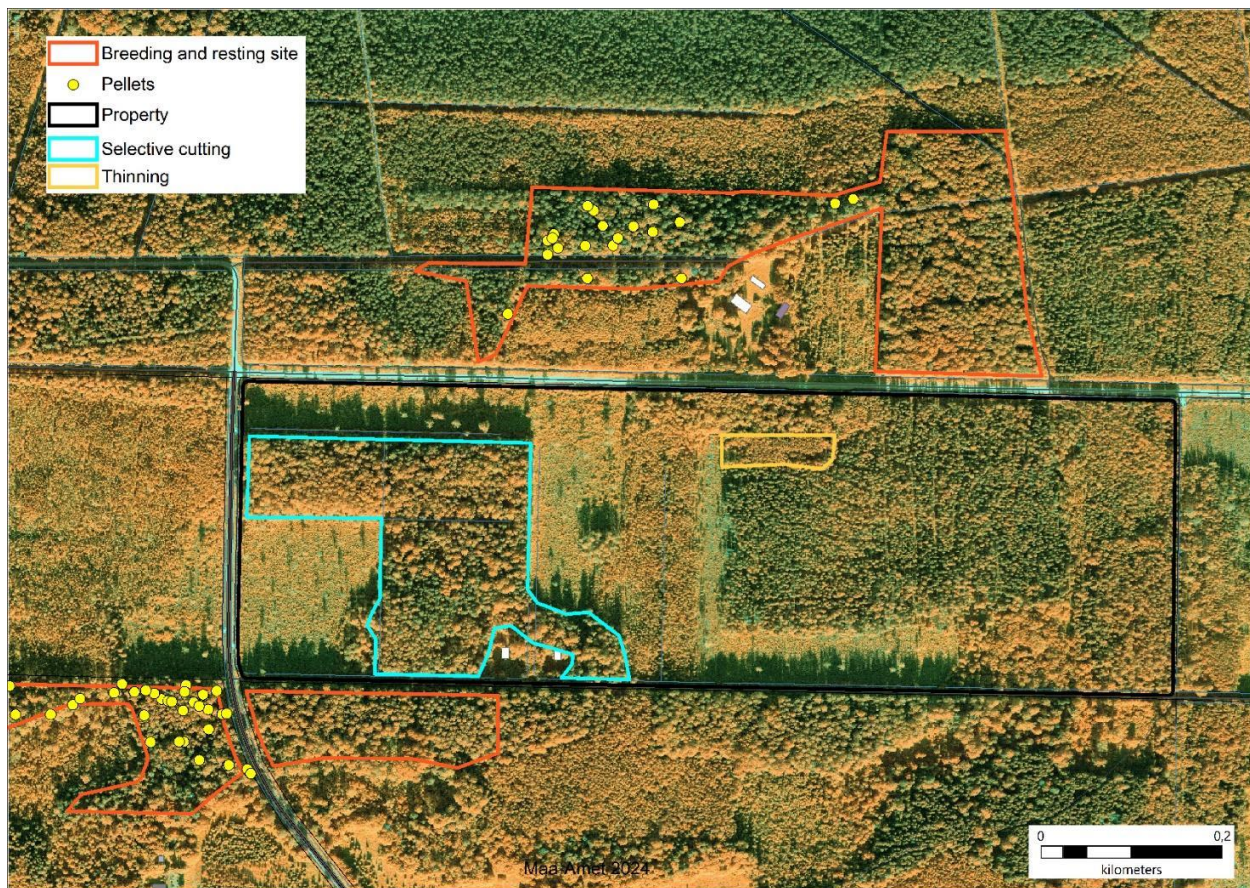
The second project site of Peressaare-Pasuna is in Alutaguse municipality, Ida-Viru County, between two flying squirrel habitats that have been intermittently inhabited since 2008. To protect these sites, a species protection site has been established: a conservation zone around the nest trees is surrounded by a limited management zone, the purpose of which is to ensure continuous forest connectivity with neighboring areas. In recent decades, the surrounding forests have been intensively managed, and the property is situated between two closely located flying squirrel sites. The entire property falls within the limited management zone, aiming to maintain a connection between the two habitats.

At the site, thinning was planned on 0,42 hectares of 25-year-old birch, aspen, and black alder young stands, and selective cutting on 6,02 hectares of 70-year-old mixed forest dominated by birch, aspen, and spruce. The area serves an important function as a movement corridor and as a buffer zone for the nesting habitat.

The thinning aimed to improve light conditions in the young stand, while the selective cutting was intended to shape the species composition. Primarily, spruces damaged by wildlife were removed; however, spruce trees around older aspens were left untouched.

Felling operations were carried out during the project in 2022–2023, yielding a total of 355 m³ of timber.





Annual flying squirrel inventories are carried out during the project in 2018-2024. + inhabited by FS, - uninhabited by FS.

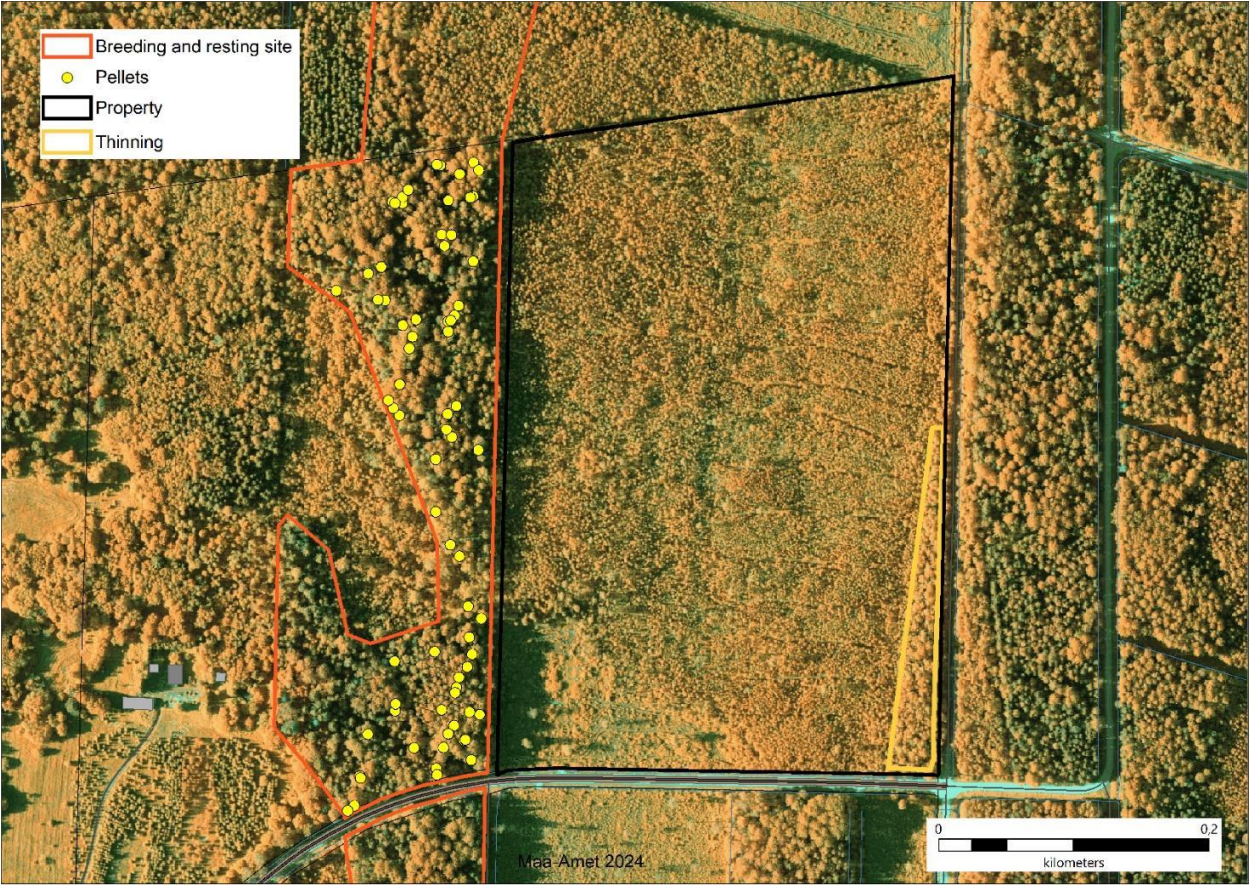
FS Habitat	2018	2019	2020	2021	2022	2023	2024
FS site 1	-	+	-	+	+	+	+
FS site 2	-	-	-	+	+	+	+

The third project site of Peressaare-Pasuna is located between two flying squirrel habitats that have been intermittently inhabited since 2008. To protect these sites, a species protection site has been established: a conservation zone around the nest trees is surrounded by a limited management zone, the purpose of which is to ensure continuous forest connectivity with neighboring areas. The forests in the region have been intensively managed over the past 30 years. The entire 16,25-hectare forest property lies within the limited management zone. Most of the property was clear-cut 15 years ago, and only 0,58 hectares are currently covered by a 50-year-old birch stand. As a result, the area currently provides only minimal suitability for flying squirrel movement.

On the project site, thinning was planned on the 0,58-hectare birch stand, which also includes small amounts of aspen and black alder. The aim of the felling was to slightly increase the proportion of aspen in the stand. The primary function of this forest is to provide movement corridors for flying squirrels, while also serving as a potential feeding habitat.

No felling operations were carried out during the project, but the landowner may implement the planned management activities in the future based on the management plan.





Annual flying squirrel inventories are carried out during the project in 2018-2024. + inhabited by FS, - uninhabited by FS.

FS Habitat	2018	2019	2020	2021	2022	2023	2024
FS site	-	-	-	+	+	+	+

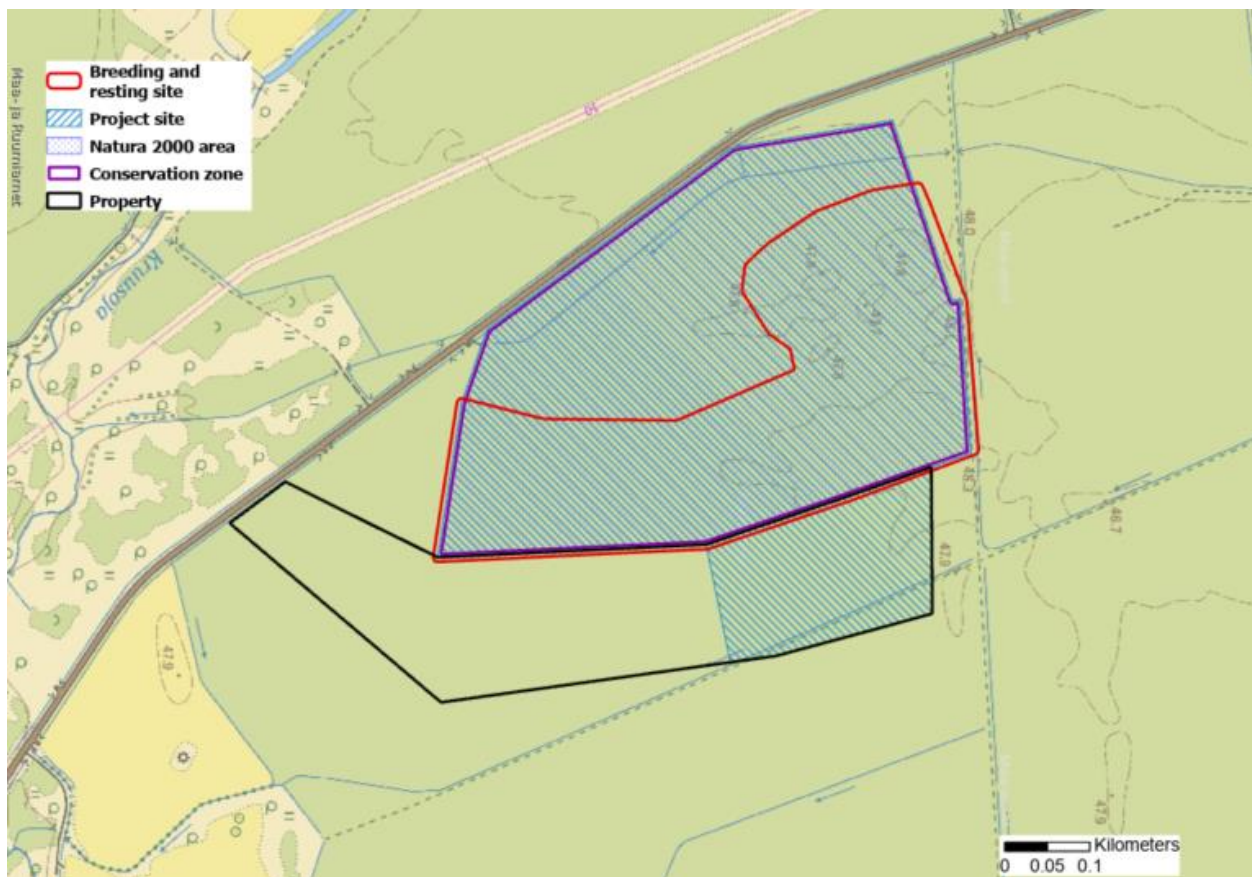
Kellassaare project area

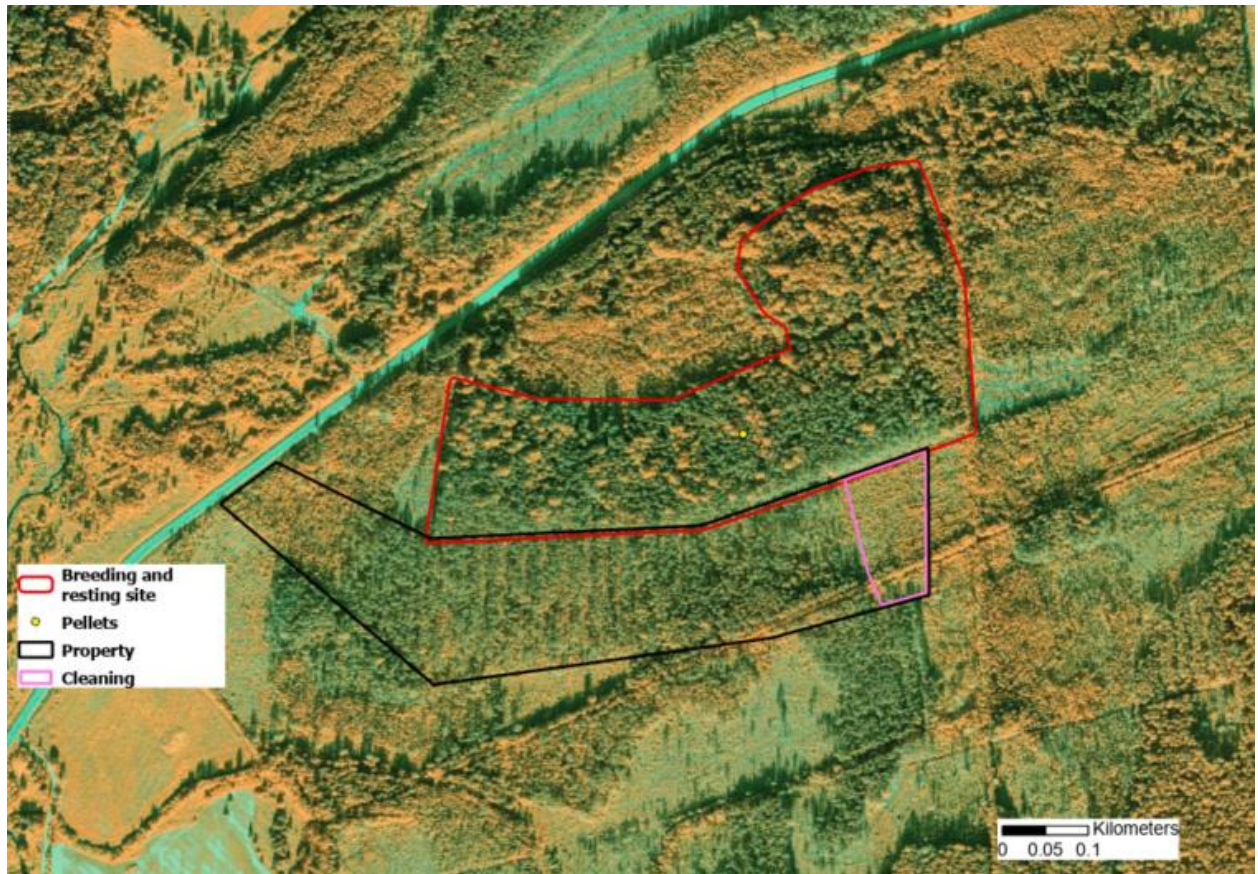
The project site is in northeastern Estonia, in Alutaguse municipality.

The site is situated near a flying squirrel habitat, in a region where forests have been intensively managed in recent years. To protect the site, a species protection site has been established: the nest trees are surrounded by a conservation zone, which is encircled by a limited management zone aimed at maintaining continuous forest connectivity with neighboring areas. The 12-hectare forest property lies entirely within the limited management zone. Approximately half of the property is covered by 70- to 110-year-old forest stands, while the other half consists of young stands up to 20 years old.

At the property, a clear-cutting operation was partly carried out 10 years ago. As a result, a cleaning operation was planned to shape the young stand by removing up to 20% of birch. During the cleaning, existing aspens, pines, and spruces were to be preserved. The goal was to improve light conditions and accelerate the growth of the young forest. The primary function of this forest is to provide movement corridors for flying squirrels, while also serving as suitable foraging habitat.

The cleaning was not carried out during the project, but the landowner may implement it in the future in accordance with the management plan.





Roogendiku project area

The project area is located in northeastern Estonia, in Alutaguse municipality.

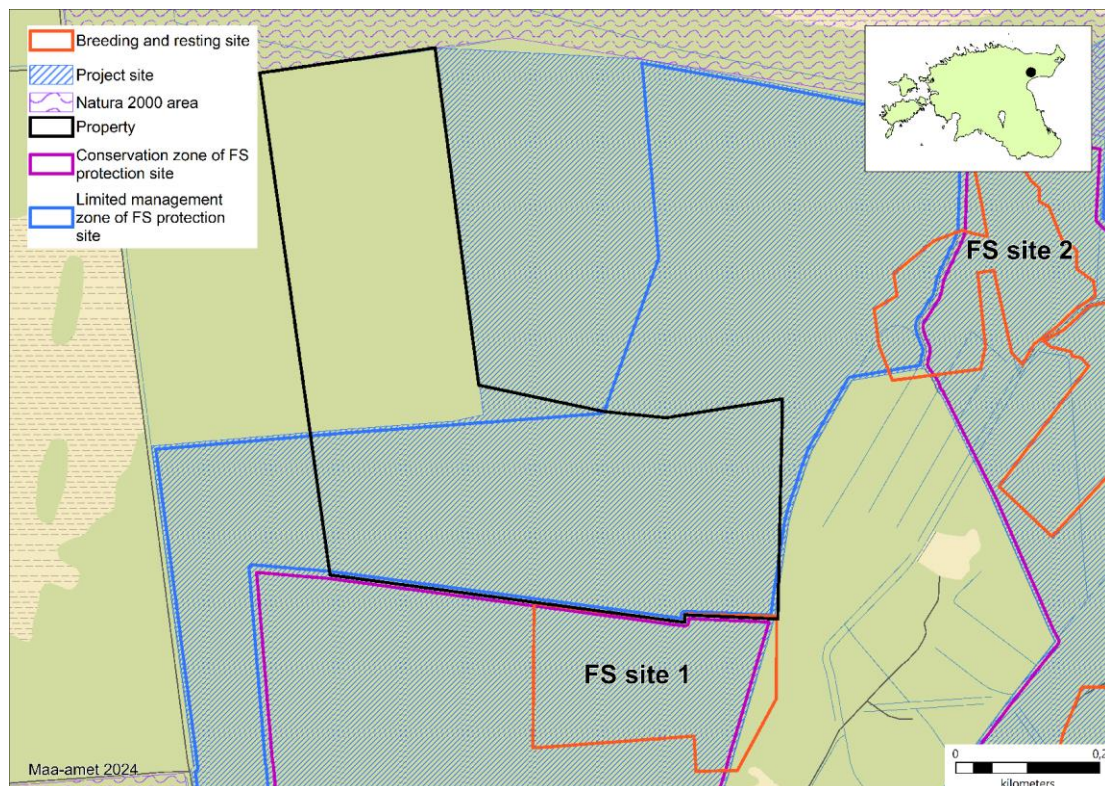
The property lies between two flying squirrel habitats - one inhabited since 2008 and the other since 2013. To protect these sites, a species protection site has been established: a conservation zone surrounds the nesting trees and is enclosed by a limited management zone, the purpose of which is to ensure continuous forest connectivity with neighboring areas. The region's forests have been intensively managed over the past 30 years.

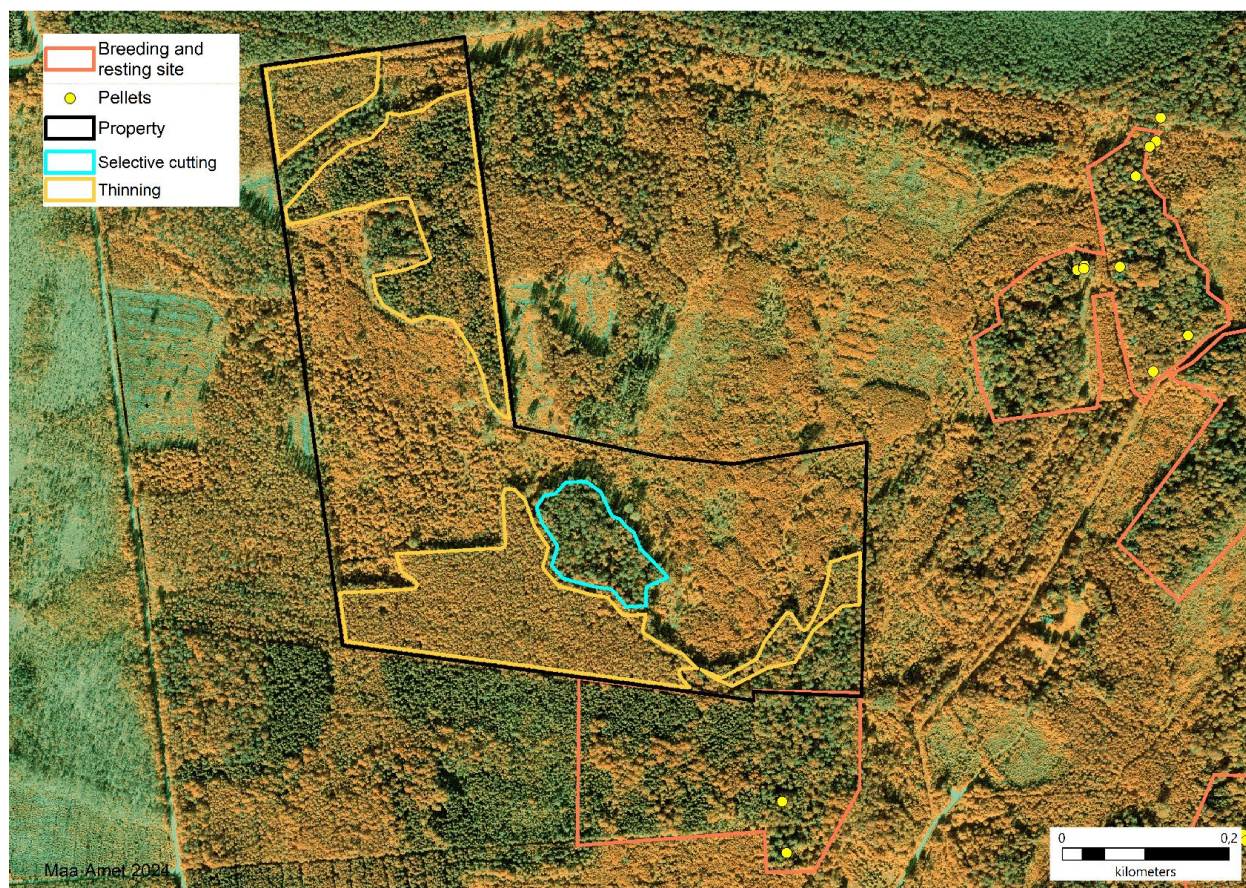
Of the total 28,7-hectare property, 16,23 hectares fall within the limited management zone of the species protection site. This zone is mainly covered by 8- to 15-year-old young stands, with smaller areas of 40–50-year-old birch-dominated forest. In addition to birch, Scots pine and Norway spruce are also present. The forest within the limited management zone plays an important role in enabling movement between flying squirrel nesting areas.

At the project site, selective cutting was planned in older stands to reduce the share of pine and increase the proportion of deciduous trees. In the younger stands, thinning was carried out to improve light conditions and promote the growth of aspen. During the thinning, existing aspens were preserved, and the dominance of coniferous species in the compartments was reduced.

As a result, light availability improved, and stand structure became more diverse. The primary function of this forest remains to ensure movement opportunities for flying squirrels.

Felling operations were carried out during the project in 2022–2023, with a total of 447 m³ of timber harvested.





Annual flying squirrel inventories are carried out during the project in 2018-2024. + inhabited by FS, - uninhabited by FS.

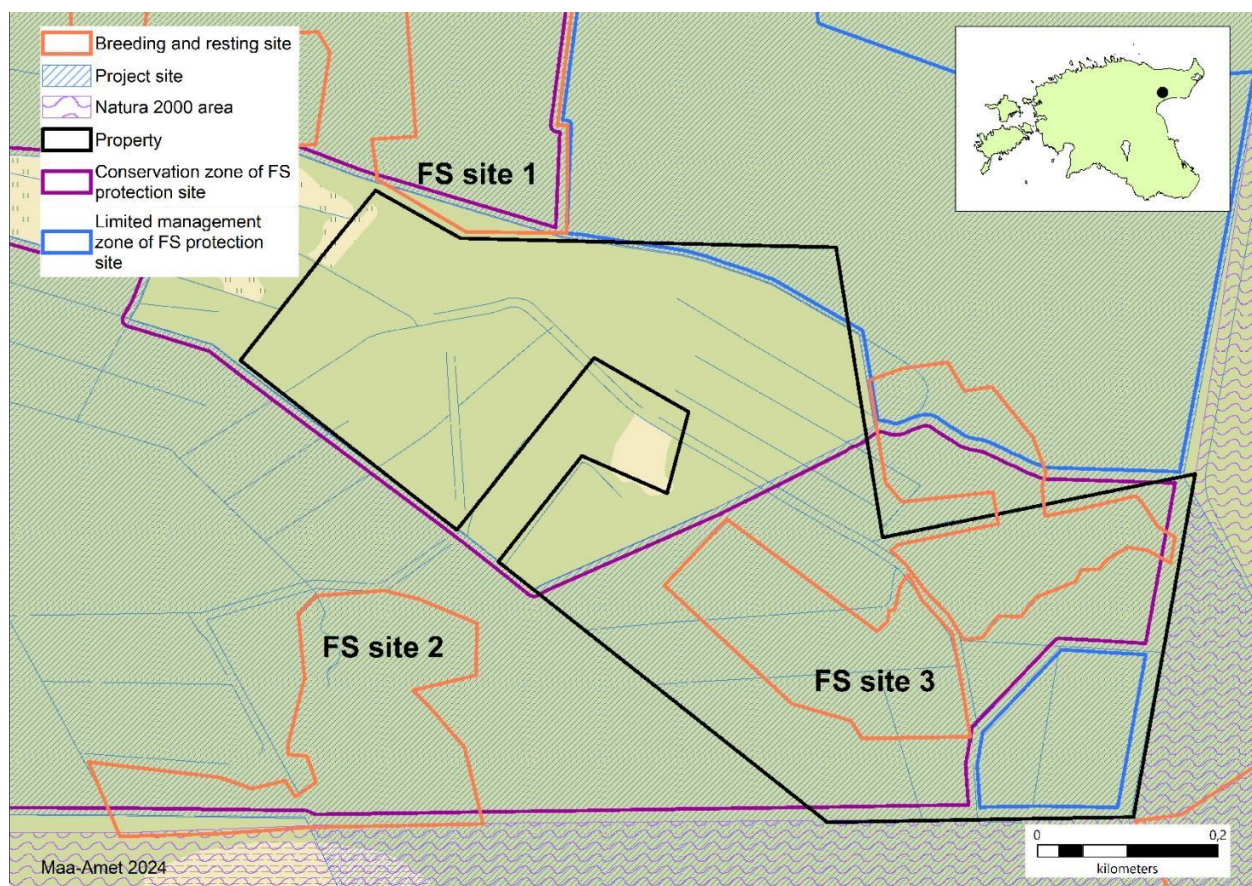
	2018	2019	2020	2021	2022	2023	2024
FS site 1	-	-	-	-	-	-	-
FS site 2	+	+	+	+	+	+	+

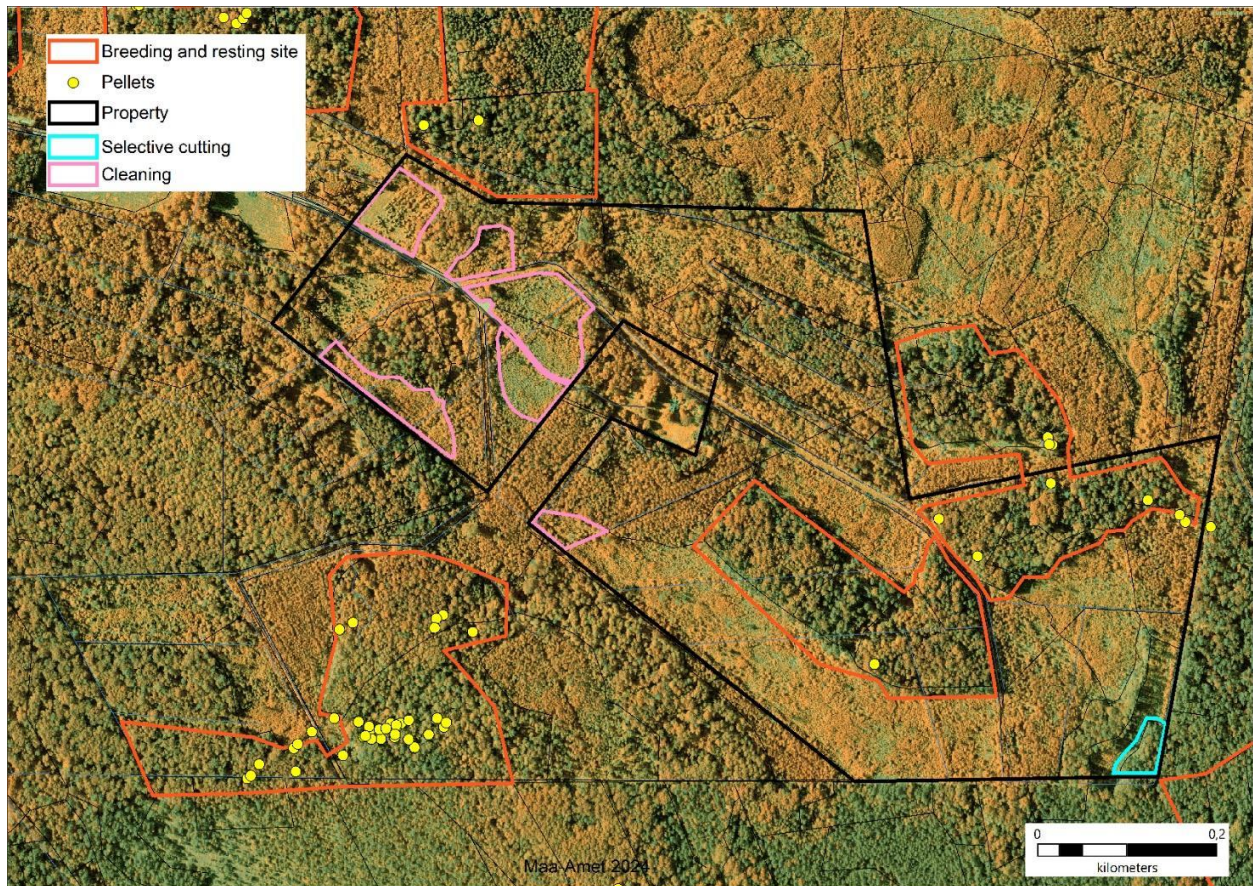
The second project site lies partly within a flying squirrel habitat that has been continuously inhabited since 2015. To protect the site, a species protection site has been established: a conservation zone around the nest trees is surrounded by a limited management zone, the purpose of which is to prevent the negative impacts of edge effects and to ensure continuous forest connectivity with neighboring areas.

Nearly half of the property falls within the species protection site - 16,17 hectares in the conservation zone and 3,13 hectares in the limited management zone. Forests in the region have been intensively managed over the past couple of decades. The site itself consists of structurally diverse stands of varying ages. The forest within the limited management zone is important for enabling movement between flying squirrel nest areas.

At the project site, selective cutting was planned on 0,2 hectares of 85-year-old pine-dominated forest located within the limited management zone. The goal was to increase the proportion of aspen and spruce in the stand. The primary function of this forest remains to provide movement corridors for flying squirrels, and to a lesser extent, allow for the development of a new nest forest.

No felling operations were carried out during the project.

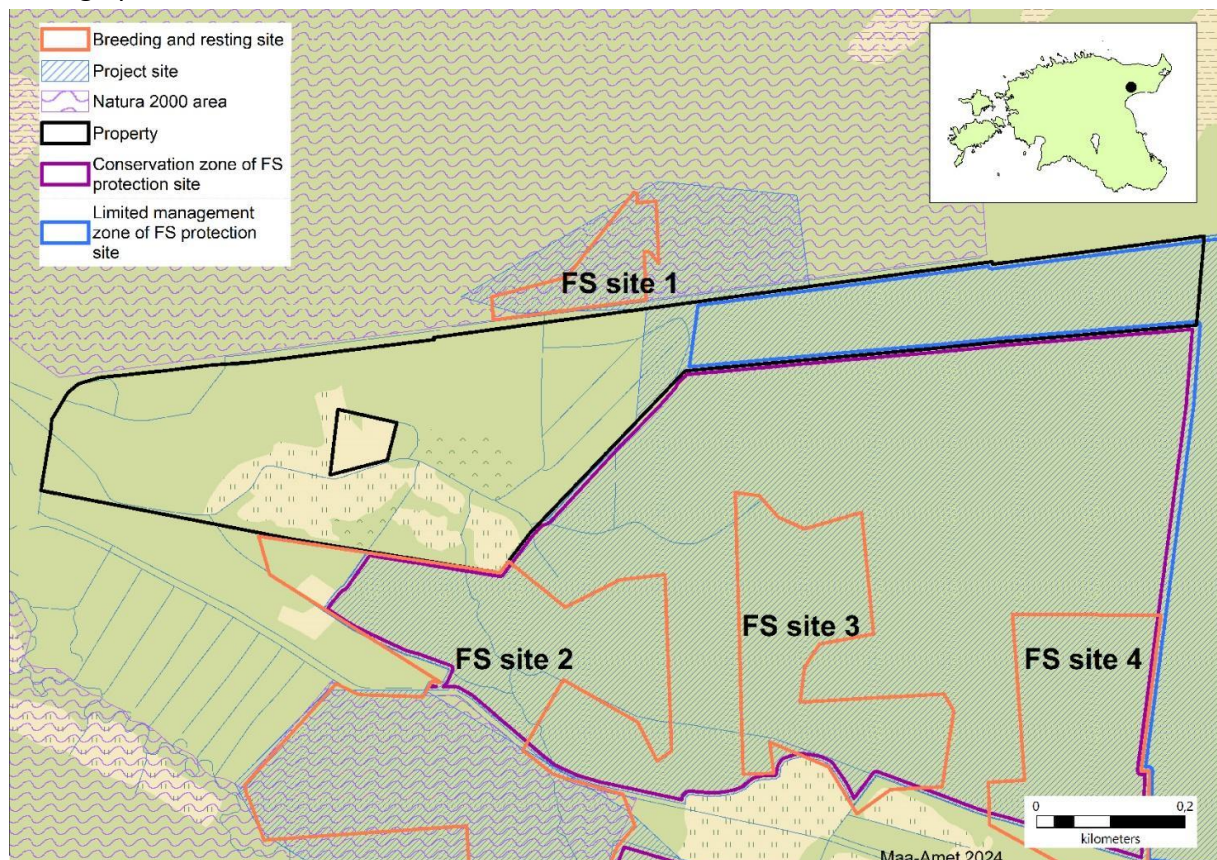


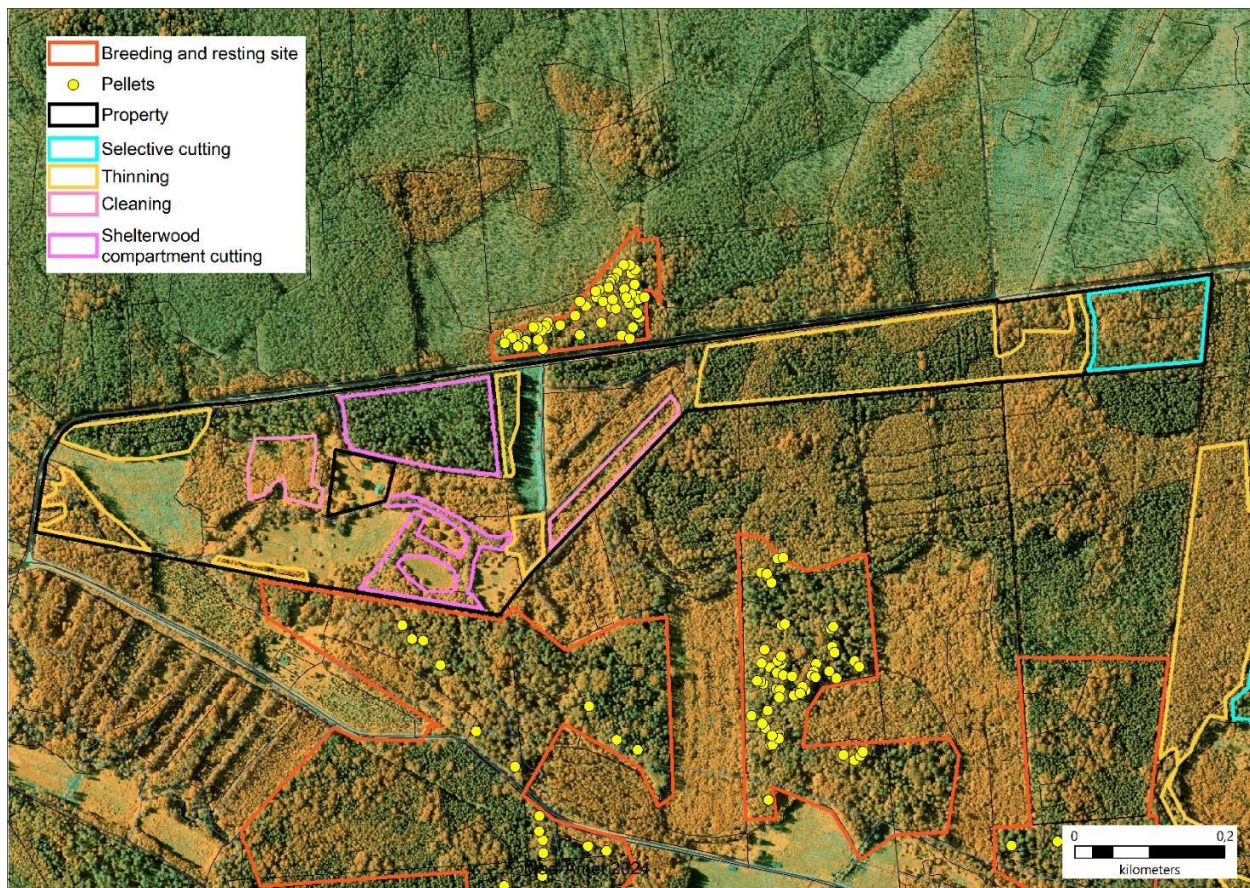


Annual flying squirrel inventories are carried out during the project in 2018-2024. + inhabited by FS, - uninhabited by FS.

	2018	2019	2020	2021	2022	2023	2024
FS site 1	-	-	-	-	-	-	-
FS site 2	+	-	+	+	+	+	+
FS site 3	+	+	+	+	+	+	+

The third project site lies between two flying squirrel localities that have been inhabited intermittently since 2008. To protect these sites, a species protection site has been established: a conservation zone surrounds the nesting trees and is encircled by a limited management zone, the aim of which is to maintain continuous forest connectivity with neighboring areas. The forests in this region have been intensively managed over the past 25 years. Of the total 26,1-hectare property, 7,03 hectares fall within the limited management zone of the species protection site. The forest in this zone is predominantly 55–60-year-old spruce-dominated stands, with occasional birch, aspen, and pine. Additionally, just under 2 hectares is covered by mixed pine–birch stands older than 70 years, with a small presence of aspen. This forest plays an important role in facilitating movement between different nest forests, and the older aspen-rich patches could potentially develop into suitable nesting habitat. At the project site, selective cutting was planned in older stands to increase the proportion of deciduous trees, particularly aspen. Thinning was planned in younger stands to improve light conditions and raise the share of aspen and other deciduous species. During thinning, aspens present in the area were preserved and the dominance of conifers in the compartments was reduced. As a result, light conditions improved, and the stand structure became more diverse. The forest's primary function remains to support flying squirrel movement, while also offering the potential for new nesting habitat in the future. Felling operations were carried out in 2024, with a total volume of 280 m³ of timber harvested.





Annual flying squirrel inventories are carried out during the project in 2018-2024. + inhabited by FS, - uninhabited by FS.

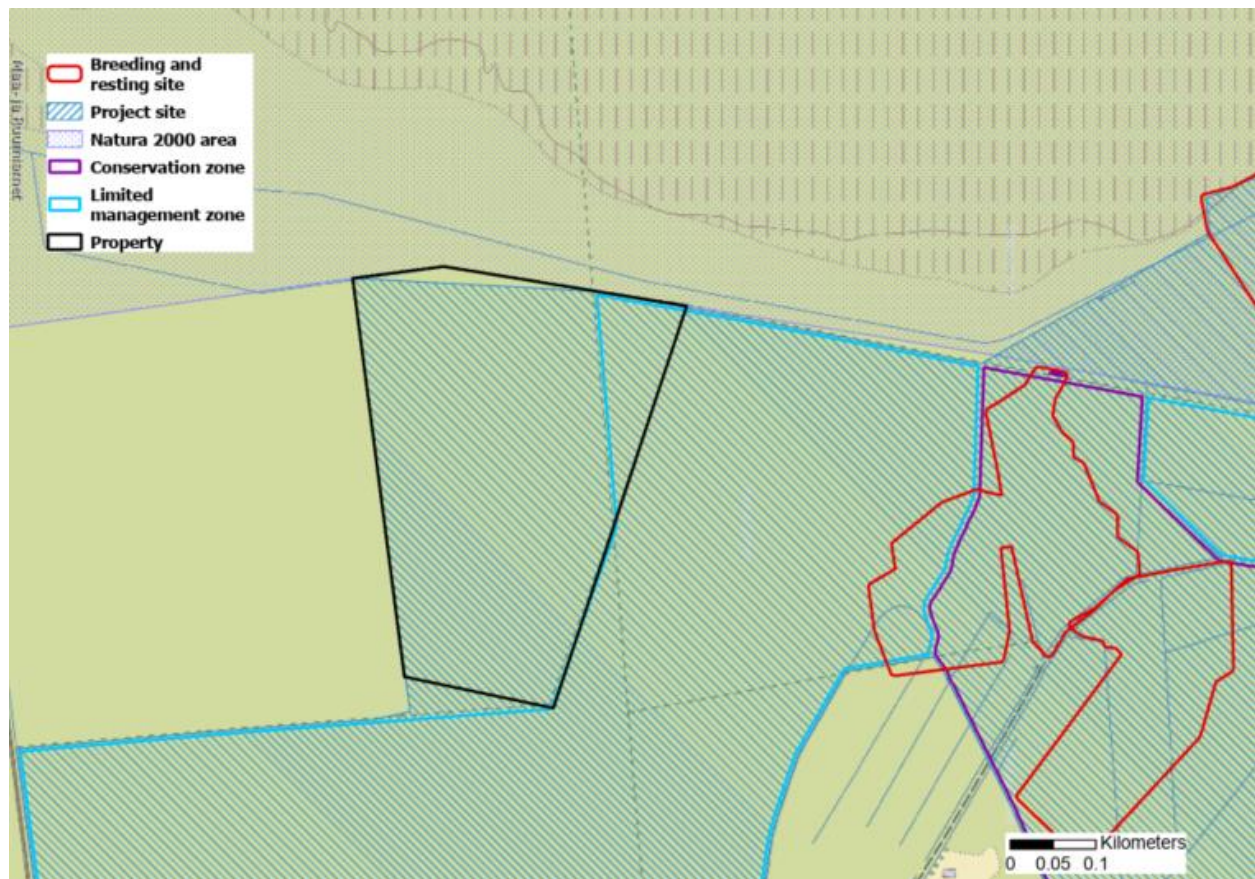
	2018	2019	2020	2021	2022	2023	2024
FS site 1	+	-	-	-	-	+	+
FS site 2	+	+	+	+	+	+	+
FS site 3	+	+	+	+	+	+	+
FS site 4	-	-	-	-	-	-	-

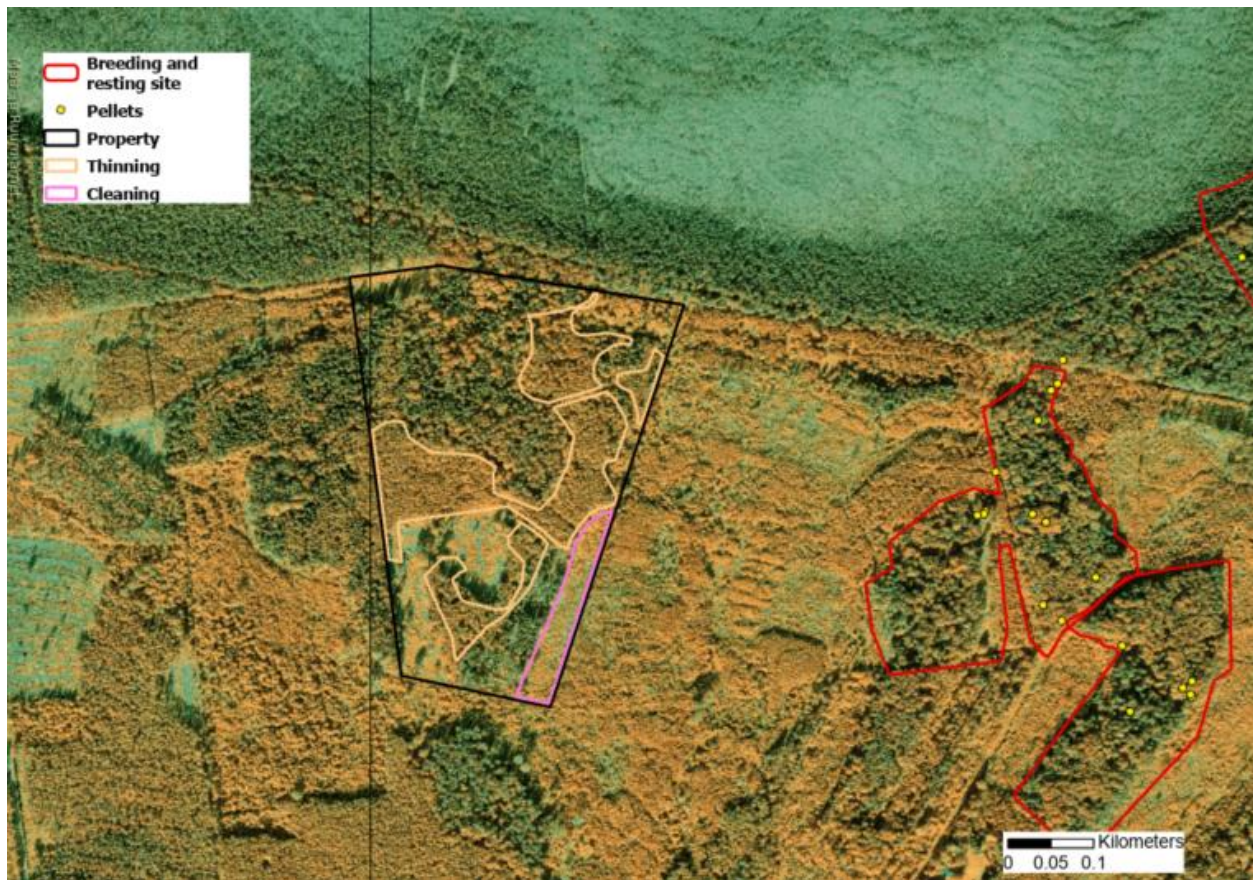
The fourth site of Roogendiku project area is located between two flying squirrel localities, one of which has been inhabited since 2008 and the other since 2013. To protect these locations, a species protection site has been established, comprising a conservation zone around the nesting trees and a surrounding limited management zone aimed at maintaining continuous forest connectivity with neighboring areas. Forests in this region have been intensively managed over the past 30 years.

A total of 1,45 hectares of the property lies within the limited management zone of the species protection site.

The forest in the limited management zone consists primarily of 15-year-old young stands. Additionally, there are smaller patches of 40-year-old birch-dominated forest, with some aspen, pine, and spruce also present. This forest is important for enabling movement between different flying squirrel nest areas.

A 0,29-hectare thinning operation was planned within the limited management zone to improve light conditions, increase the proportion of aspen, and diversify the stand composition. The primary function of this forest remains to provide movement corridors for flying squirrels. No felling was carried out during the project, but the landowner may implement the planned actions in the future based on the management plan.





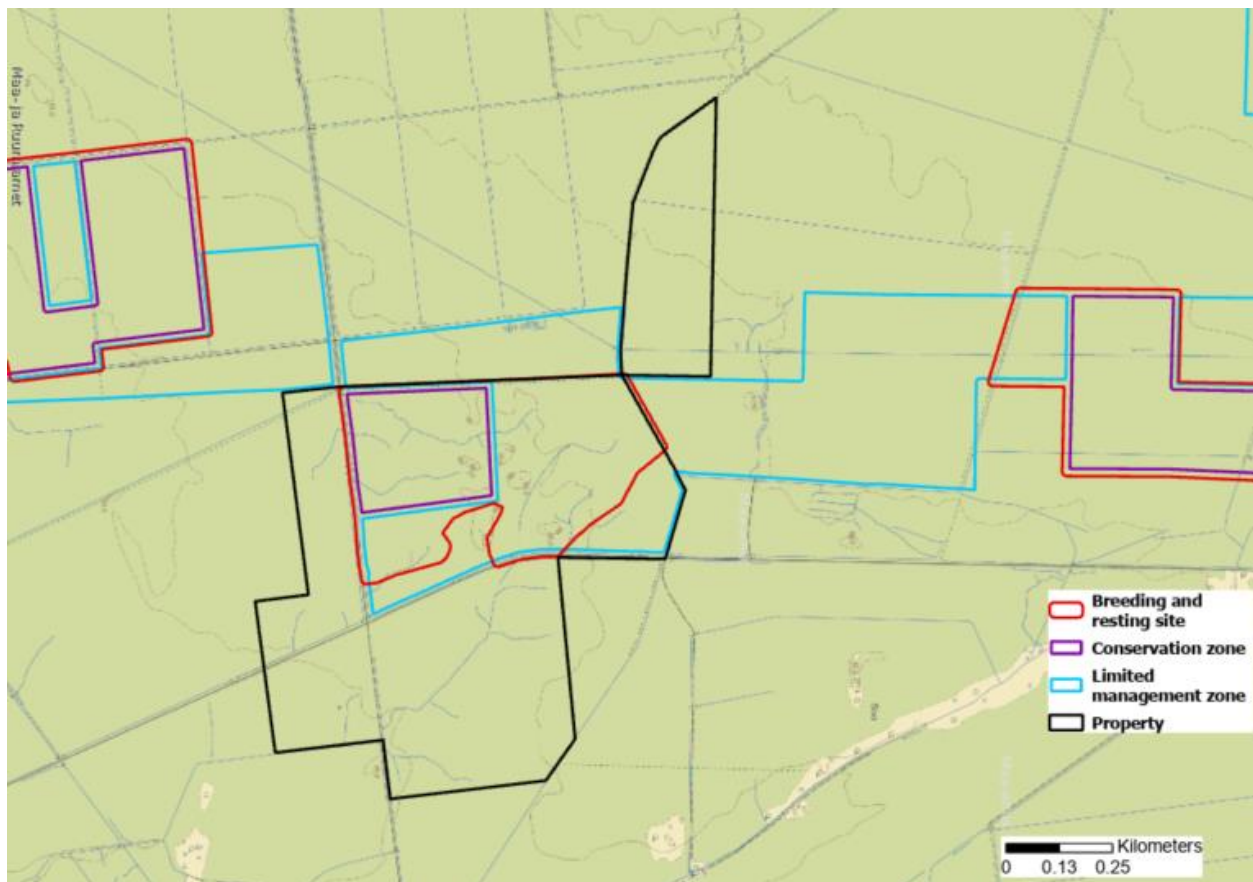
Muru-Paadenurme project area

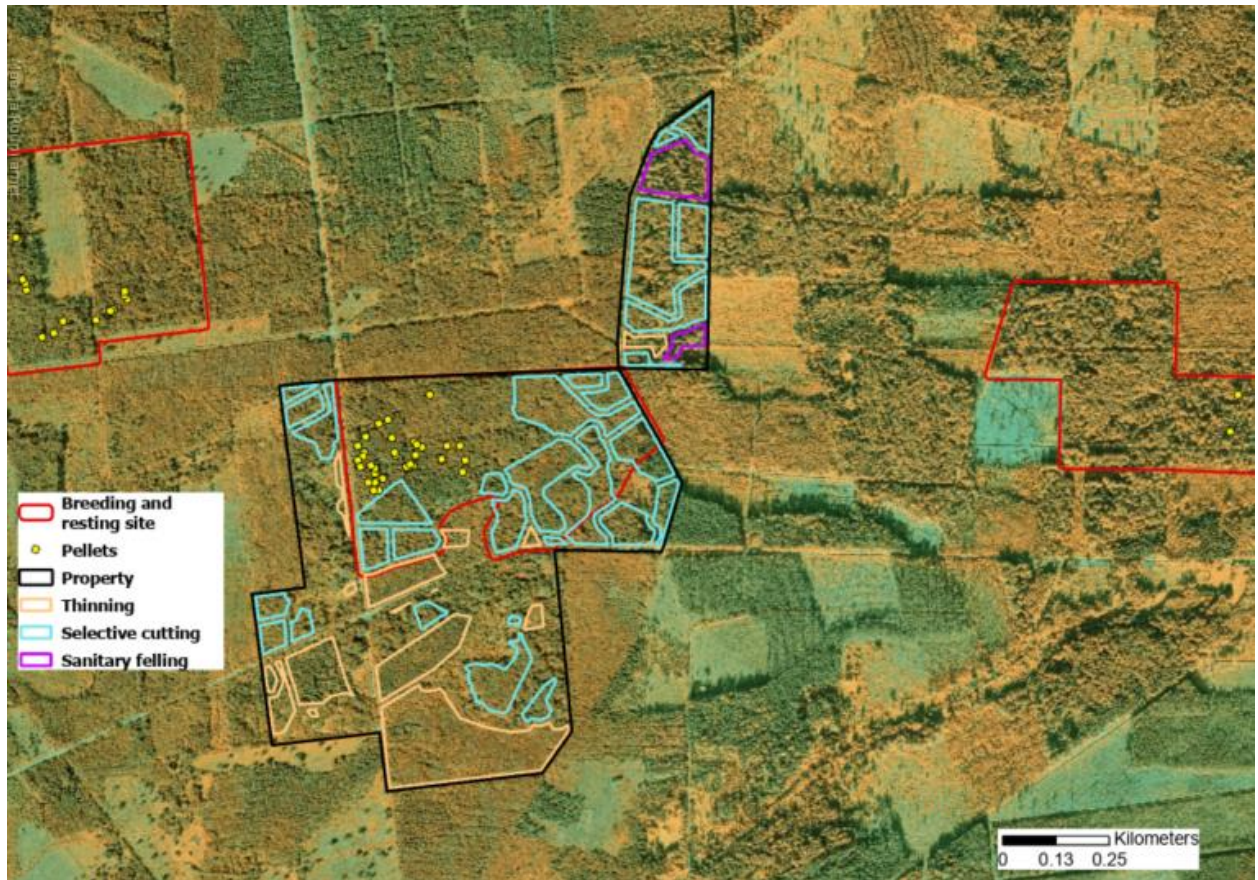
The area is located in Vinni municipality, Lääne-Viru County.

On the property, 9,22 hectares fall within the conservation zone and 22,25 hectares within the limited management zone of a species protection site established to safeguard a flying squirrel habitat registered in 2022. Both the conservation and limited management zones consist of uneven-aged, structurally diverse stands that have been managed as continuous cover forest. The mixed stands include aspen, Norway spruce, birch, and black alder. Forest within the limited management zone plays an important role in enabling flying squirrel movement between nest sites and also serves as feeding habitat and potential future nesting habitat. The owner intends to continue managing the forest as continuous cover, conducting both thinning and selective felling. Thinning is planned across 15,63 hectares and selective cutting on 24,37 hectares. The main objectives are to improve light conditions for forest growth, increase the proportion of aspen, and provide firewood. The forest within the limited management zone will continue to serve primarily as a movement corridor for flying squirrels and, in the longer term, support the development of new nesting habitat.

The neighboring property lies partly within the planned limited management zone of a proposed species protection site for the flying squirrel. It borders a flying squirrel habitat registered in 2022, for which the establishment of a species protection site has been initiated. The forests on the property are uneven-aged and structurally diverse, and have mostly been managed as continuous cover forests. The forest area planned within the limited management zone is important for flying squirrel movement between nest sites but also serves as feeding habitat and potential future nesting habitat.

The landowner intends to continue managing the forest as continuous cover, carrying out both thinning and selective cutting. Thinning is planned for over 0,52 hectares and selective felling across 7,39 hectares. The objectives are to improve light conditions for forest growth, increase the proportion of aspen, and produce necessary firewood. The main function of the forest in the limited management zone will remain to provide safe movement corridors for flying squirrels, while also enabling the future development of nesting habitat.



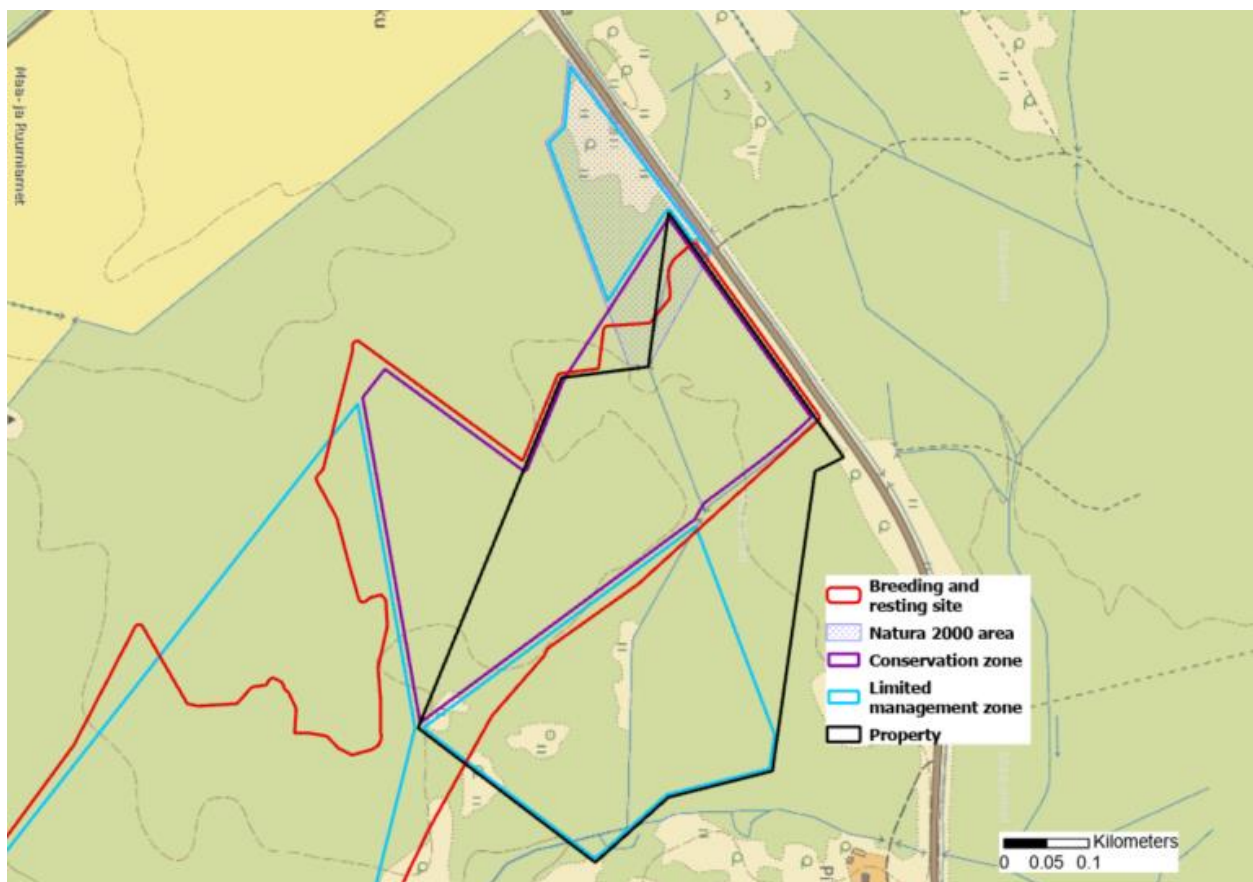


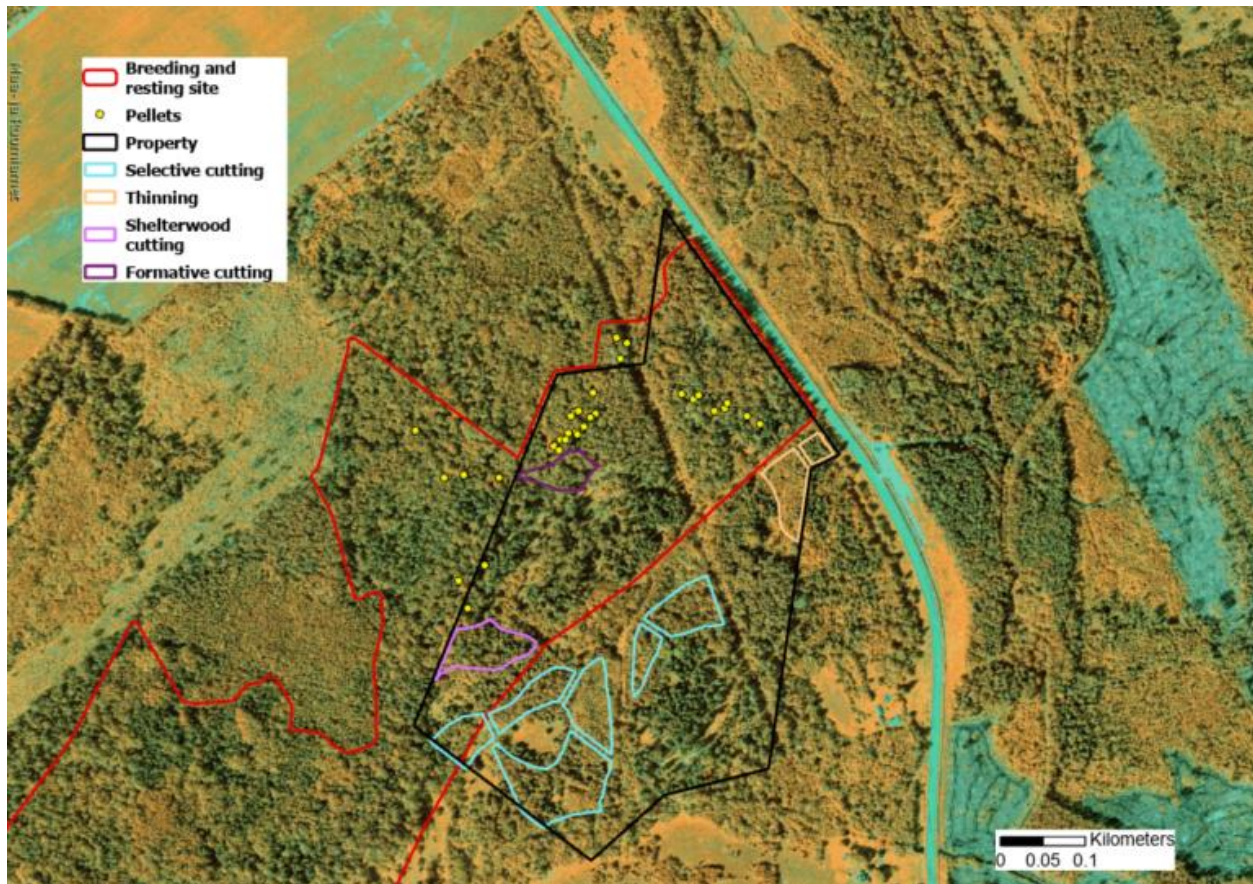
The third site is located in Mustvee municipality, Jõgeva County.

On this property, 8,98 hectares fall within the conservation zone and 7,76 hectares within the limited management zone of a species protection site established to safeguard a flying squirrel habitat registered in 2022. The forests within both zones are uneven-aged and structurally diverse, managed as continuous cover forest, and composed of mixed stands of aspen, spruce, birch, and black alder. The forest in the limited management zone is important for enabling flying squirrel movement between different nesting sites and also serves as feeding habitat and potential future nesting habitat.

The owner intends to continue managing the forest as continuous cover, conducting both thinning and selective cutting. Thinning is planned for over 0,6 hectares and selective cutting over 3,72 hectares.

The main objectives are to improve light conditions for forest growth, increase the share of aspen, and obtain necessary firewood. The forest in the limited management zone will continue to serve primarily as a movement corridor for flying squirrels and support the development of new nesting habitat.





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