



Description of the current conservation legislation and management procedures of the Siberian flying squirrel (*Pteromys volans*) in Finland and Estonia

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2022

Flying Squirrel LIFE
LIFE17 NAT/FI/000469



Cover photos: Rainer Carpelan/Vastavalo.fi

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



1. Introduction

The aim of this document is to give an overview and compare the conservation and management procedures of the Siberian flying squirrel (*Pteromys volans* L.) in Finland and Estonia. The document does not provide new recommendations or guidelines but summarizes the information of the current situation.

The Siberian flying squirrel is the only species of flying squirrel found in Europe. Within the European Union, the flying squirrel is only found in Finland and Estonia. The species is classified as vulnerable within the European Union due to the rapid decline in its population. The biggest threats to the flying squirrel are the reduction and fragmentation of suitable habitats.

The conservation and management of the flying squirrel has both similarities and differences between Finland and Estonia. In both countries, the flying squirrel is strictly protected under the Habitats Directive (Annexes II and IV) and classified as Vulnerable (Finland) or Critically Endangered (Estonia), and therefore it must be taken into account carefully in forest and land use processes. On the other hand, Finland and Estonia have differences in national legislation and conservation procedures considering the flying squirrel.

This document has been created in the Flying Squirrel LIFE project (<https://www.metsa.fi/projekti/liito-orava-life/>) as one of the efforts to improve the exchange of knowledge about the conservation of the flying squirrel between the project partners and stakeholders. The project aims to improve the conservation of flying squirrels in Europe through co-operation. The Flying Squirrel LIFE project is coordinated by Metsähallitus Parks & Wildlife Finland, with 17 partners from Finland and Estonia.



2. The status of the flying squirrel

Finland	Estonia
<ul style="list-style-type: none"> • The flying squirrel is classified as vulnerable. • Accurate population size of the flying squirrel in Finland is not known. The national estimate for the population size of the flying squirrel from 2006 is ca. 143 000 females (Ministry of Environment), but this estimate has been criticized (e.g. Sulkava et al. 2008; 49 000-73 000 females). • A national follow-up based on flying squirrel occupancy at study sites carried out regularly shows that its population trend is continuously declining. The decline is estimated to be over 30% during the past ten years (during about three generations). This leads the flying squirrel to the category vulnerable. • The distribution of the flying squirrel is most prominent to Southern and Central Finland, and it does not exist in Lapland. • The flying squirrel inhabits suitable sites located in commercial forests and conservation areas as well as in urban areas. The flying squirrel is listed on 456 Natura 2000 sites. 	<ul style="list-style-type: none"> • The flying squirrel is classified as critically endangered. • The number of inhabited sites is 94 (year 2021). • The flying squirrel is found only in the North-East corner of the country. • Presently there are 47 Species Protection Sites (SPS) for the Flying squirrel in Estonia. In addition to the SPS, the species is a conservation objective also in 10 other protected areas and in 12 Natura 2000 sites.



3. The Habitats Directive

- The Habitats Directive ensures the conservation of a wide range of rare, threatened, or endemic animal and plant species.
 - European Union's laws and directives are implemented into the national legislation of participating countries.
- The flying squirrel is listed in annexes II and IV of the Habitats Directive.
 - **Annex II** species (about 900): core areas of their habitat are designated as sites of Community importance (SCIs) and included in the Natura 2000 network. These sites must be managed in accordance with the ecological needs of the species.
 - **Annex IV** species (over 400, including many annex II species): a strict protection regime must be applied across their entire natural range within the EU, both within and outside Natura 2000 sites.
- Breeding sites and resting places of a species listed in the **IV(a) annex of the Habitats Directive** must not be destroyed or deteriorated



4. Identification of “breeding sites and resting places”

- **Guidance document on the strict protection of animal species of Community interest under the Habitats Directive 92/43/EEC, II.3.4.b) Identification of “breeding sites and resting places” (concerns all species listed in Annex IV):**
 - (52) Although Article 12(1)(d) explicitly refers to the protection of “breeding sites” and “resting places” of species listed in Annex IV(a), neither Article 12(1)(d) nor Article 1 of the Directive provide any specific definitions. (53) In the light of the objectives of the Directive, however, breeding sites and resting places may be considered to require strict protection because they are crucial to the life cycle of animals and are very important parts of a species’ entire habitat, needed to ensure its survival. Their protection is directly connected with the conservation status of a species. The provision in Article 12(1)(d) should therefore be understood as aiming to **safeguard the ecological functionality** of breeding sites and resting places. Thus, Article 12(1)(d) ensures that such sites and places are not damaged or destroyed by human activities so that they **can continue to provide all that is required for a specific animal to rest or to breed successfully**.
 - (54) It thus follows from Article 12(1)(d) that such **breeding sites and resting places also need to be protected when they are not being used, but where there is a reasonably high probability that the species concerned will return to these sites and places**. If for example a certain cave is used every year by a number of bats for hibernation (because the species has the habit of returning to the same winter roost every year), the functionality of this cave as a hibernating site should be protected in summer as well so that the bats can re-use it in winter. On the other hand, if a certain cave is used only occasionally for breeding or resting purposes, it is very likely that the site does not qualify as a breeding site or resting place.
- **“A Hamster Act”:** European Court of Justice’s decision regarding European hamster *Cricetus cricetus* (C-477/19; July 2nd, 2020): empty but still suitable breeding site and resting place of a strictly protected species via IV(a) should be saved to maintain a possibility for a species return (*Cricetus cricetus* is critically endangered in the IUCN Red List, 2020).



5. National legislation considering the flying squirrel

Finland	Estonia
<ul style="list-style-type: none"> • Nature Conservation Act: https://www.finlex.fi/fi/laki/kaannokset/1996/en19961096.pdf § 49. Special provisions on species protected in the European Community The destruction and deterioration of breeding sites and resting places used by specimens of animal species referred to in Annex IV(a) of the Habitats Directive is prohibited. • Land Use and Building Act: https://www.finlex.fi/fi/laki/kaannokset/1999/en19990132.pdf • Forest Act: https://www.finlex.fi/fi/laki/kaannokset/1996/en19961093_20140567.pdf 	<ul style="list-style-type: none"> • Nature Conservation Act: https://www.riigiteataja.ee/en/eli/ee/527012021002/consolide/current § 46. Protected categories of species (1) The following will be included in the protected category I: 1) species that are rare in Estonia, are located within restricted geographical areas, in few habitats, in isolation or whose population is thinly scattered over a more extensive range; 2) species which are in danger of disappearance, whose population been reduced as a result of human activity, whose habitats have been damaged to a critical point and whose extinction in the Estonian wild is likely if the adverse impact of the danger factors continue. § 48. Ensuring favourable conservation status of species (1) The protection of all known habitats of species in the protected category I will be ensured by formation of protected areas or determination of species protection sites. <ul style="list-style-type: none"> • Regulation act of the flying squirrel species' protection sites: https://www.riigiteataja.ee/akt/118042019010?leiaKehtiv • Regulation acts of other protected areas

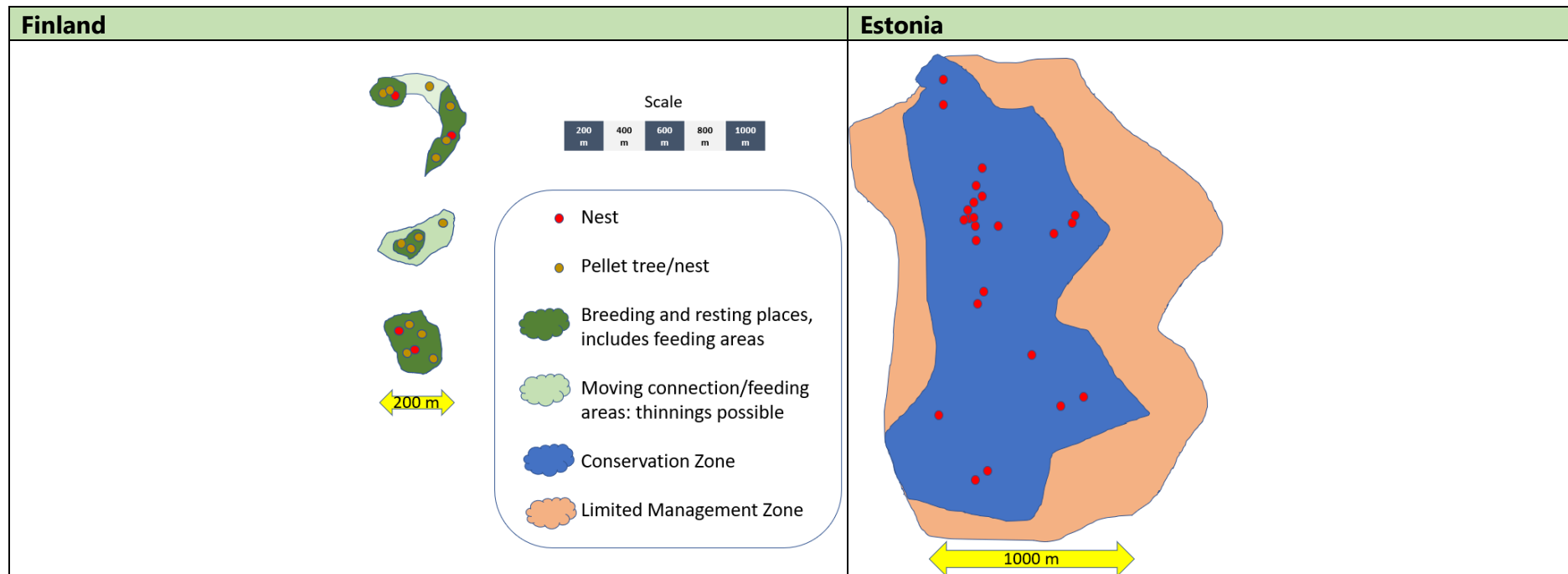


6. Breeding site and resting place of the flying squirrel

Finland	Estonia
<ul style="list-style-type: none"> Breeding site and resting place cover nesting tree(s) with adjacent sheltering trees, related feeding trees and connections between them. <ul style="list-style-type: none"> Definition of a nest tree: the core area of the flying squirrel is assessed case by case in the field. Important indicators are a reasonable number of droppings, and/or a nest (cavity or twig den). As breeding sites and resting places cannot be deteriorated, their functionality needs to be confirmed by saving enough habitat to provide all that is required for the flying squirrel to rest or to breed successfully. No specified sizes for protected areas have been decided. Each case must be planned individually. One forest patch can include many breeding sites and resting places, and all of them are strictly protected. Earlier local ELY Centres delineated protected breeding sites and resting places when asked. After the change in the Nature Conservation Act in 2016, a landowner or his/her representative has the responsibility of taking legislation into account and protect breeding sites and resting places. Local ELY Centre may give an advice when asked, but it does not make official delineations anymore. If the nesting site is observed as empty for several years (e.g. 5-10 years), ELY Centre may delineate that it is not determined as a flying squirrel's breeding site and resting place anymore. These delineations are very rare and exceptional. ELY Centre can give a permit to deviate from the protection ("poikkeuslupamenettely") in rare, individual cases. The conditions for the permit are very strict. 	<ul style="list-style-type: none"> Nesting tree of a flying squirrel, and the surrounding area within the radius of 25 meters (0,19 hectares) is automatically protected when the information of a new nesting tree is submitted to Environmental Register. This is a minimum requirement that preserves only nesting trees, not the entire habitat. <ul style="list-style-type: none"> Definition of a nest tree: all trees with flying squirrel droppings are determined as a nest tree. Until the species is classified in protection category I, all habitats must be protected as SPS (Species Protection Sites) or within other protected areas. A conservation zone is a land or water area of a protected area prescribed for the preservation of natural and semi-natural biotic communities established or to be developed therein. Economic activities usually prohibited. A limited management zone is a land or water area of a protected area where some economic activities are permitted if they do not harm the conservation objectives. Official evaluation and proposals for protected sites are made by the Environmental Board, and the final decisions are made by the Ministry of Environment.



7. Safeguarding in practice: a schematic view



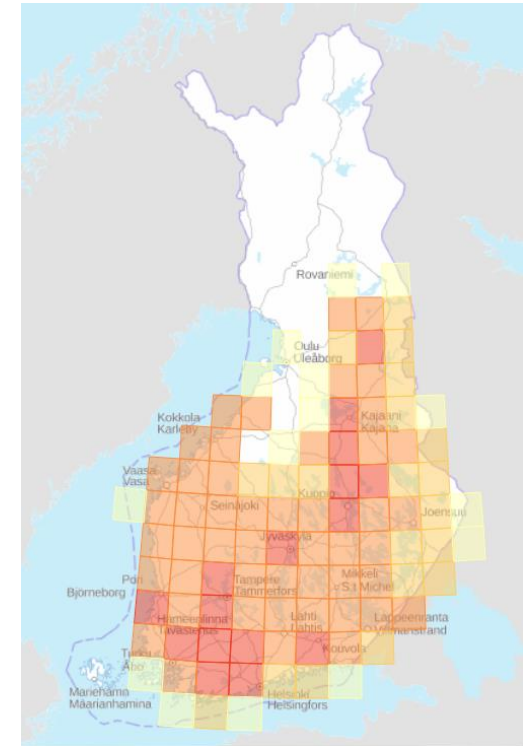
The selected practical approach in safeguarding the flying squirrel may have scale differences. In Finland, flying squirrel is often considered at a relatively small area at a time, at a scale of a forest cutting plan by a private landowner. Thus, the functionality of breeding sites and resting places is safeguarded by protecting key features at a focal private land area, case by case. In Estonia, each nesting tree is protected within a 25-meter radius at its minimum. However, as the aim is to protect all flying squirrel habitats as Species Protection Sites (SPS) or within other protection areas, safeguarding often leads to large Conservation Zones surrounded by Limited Management Zone, irrespective of the landowner.



8. Flying squirrel monitoring

Finland

- Monitoring of the flying squirrel is funded by the Ministry of Environment and coordinated by the Finnish Museum of Natural History (Luomus).
- Regular monitoring has been carried out since 2006 using a sample of study plots (each plot is 9 hectares in size). Original number of study plots is 1682 (in 2006) locating in 13 municipalities from southern Finland up to Kokkola's level. Monitoring effort has varied during years: for example, some plots are not accessible due to road conditions during spring. Also, some plots have degraded due to land use, at least temporarily. Overall, occupancy % in study plots vary between years, and there is also variation between municipalities.
- Read more about the flying squirrel monitoring (in Finnish):
<https://www.luomus.fi/fi/uutinen/liito-oravan-valtakunnallinen-seuranta-jatkuu-tarkeaa-tietoa-lajinsuojeluun-tutkimukseen>

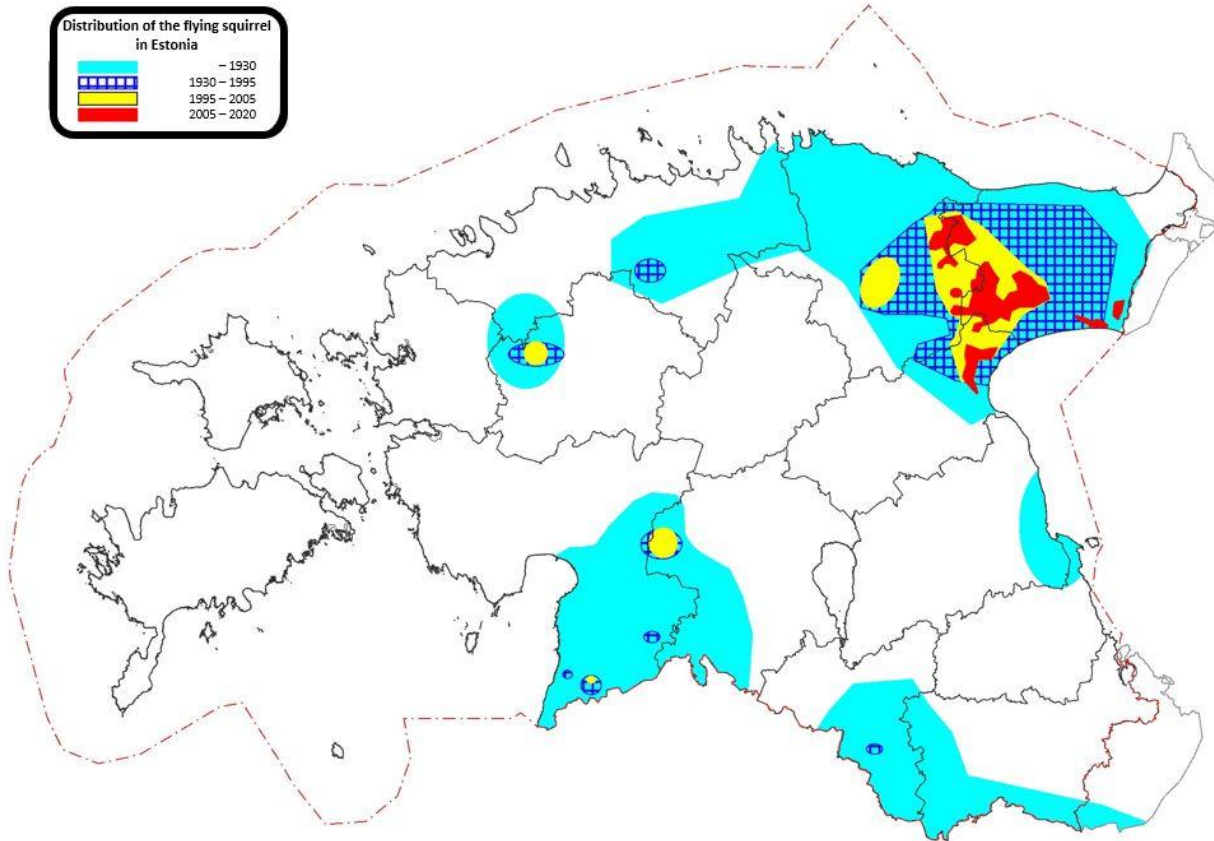


Map above: Flying squirrel observations in Finland from the Laji.fi database in 1995–2021 (situation on 19 January 2022).
 The redder the area, the more flying squirrel observations have been reported from the area.
 Map source: Finnish Biodiversity Info Facility (2022)



Estonia

- Monitoring of the flying squirrel is the responsibility of Environmental Agency, which outsources the work to the Environmental Board.
- Regular monitoring has been carried out since 1994.
- Since 2015, all flying squirrel sites in Estonia are monitored each year.



9. Flying squirrel observation data

Finland	Estonia
<ul style="list-style-type: none"> • Flying squirrel data has been interpreted as public data in Finland (Act on the Openness of Government Activities, https://www.finlex.fi/en/laki/kaannokset/1999/en19990621_20150907.pdf). The idea is that it is possible to protect flying squirrel better when its locations are known. • Official data gathered in LajiGIS database (previously Hertta), coordinated by SYKE. • Official data reachable by other organisations such as Finnish Forest Centre (Suomen metsäkeskus, official responsible of forest law implementation on private forests) and Metsähallitus Forestry Ltd (Metsähallitus Metsätalous Oy, responsible of state-owned multiple-use forests). • Other organisations may have their own archives. • In the Flying Squirrel LIFE project, Finnish Museum of Natural History (LUOMUS) has built an Observation Management System, which combines data from different sources and where also new observations can be saved. The system has been operable since 2019. 	<ul style="list-style-type: none"> • Information which would endanger the protected areas or the preservation of protected species and their habitats (I and II protection category) is for internal use only (Public Information Act § 35). • Environmental Register (coordinated by the Environmental Agency) compiles official environmental information. It gives the data a legal meaning and reliability. • Some part of it is accessible for all and some for internal use only. • Restricted data is accessible only to persons who are performing their duties provided by law.



10. Forest management notification

Finland	Estonia
<ul style="list-style-type: none"> Private landowners can see species data (recorded in to an official LajiGIS system) of their own land from the web service held by Finnish Forest Centre. Also, the system notifies if there's a flying squirrel observation within 100 meters from the landowner's property. Other information from the neighbor land is not available for landowners. A landowner must make an official notification of planned forest cuttings to Finnish Forest Centre. If there is a flying squirrel observation on landowner's land within 100 meters from planned cuttings, Finnish Forest Centre notifies a local ELY Centre about the plan. ELY Centre will evaluate the impacts of planned forest cuttings on the flying squirrel and, if necessary, set conditions. 	<ul style="list-style-type: none"> The landowner receives a protection obligation notice if flying squirrel is found in his/her forest. The forest notification is an official document that must be submitted to the Environmental Board if the forest owner wishes to carry out felling work on the forest property. Environmental Board checks the compliance of the forest work plan with the protection rules and, if necessary, sets conditions.



11. Examples of forest management plans

The following pages present examples of forest management plans created in the Flying Squirrel LIFE project. At first, flying squirrels have been inventoried on the site, and according to the flying squirrel observations and based on the goals set by the landowner, forest management plan has been created as a joint effort of project partners.

Case 1: Private-owned forest, Finland

Case 2: State-owned forest, Finland

Case 3: Private-owned forest, Estonia

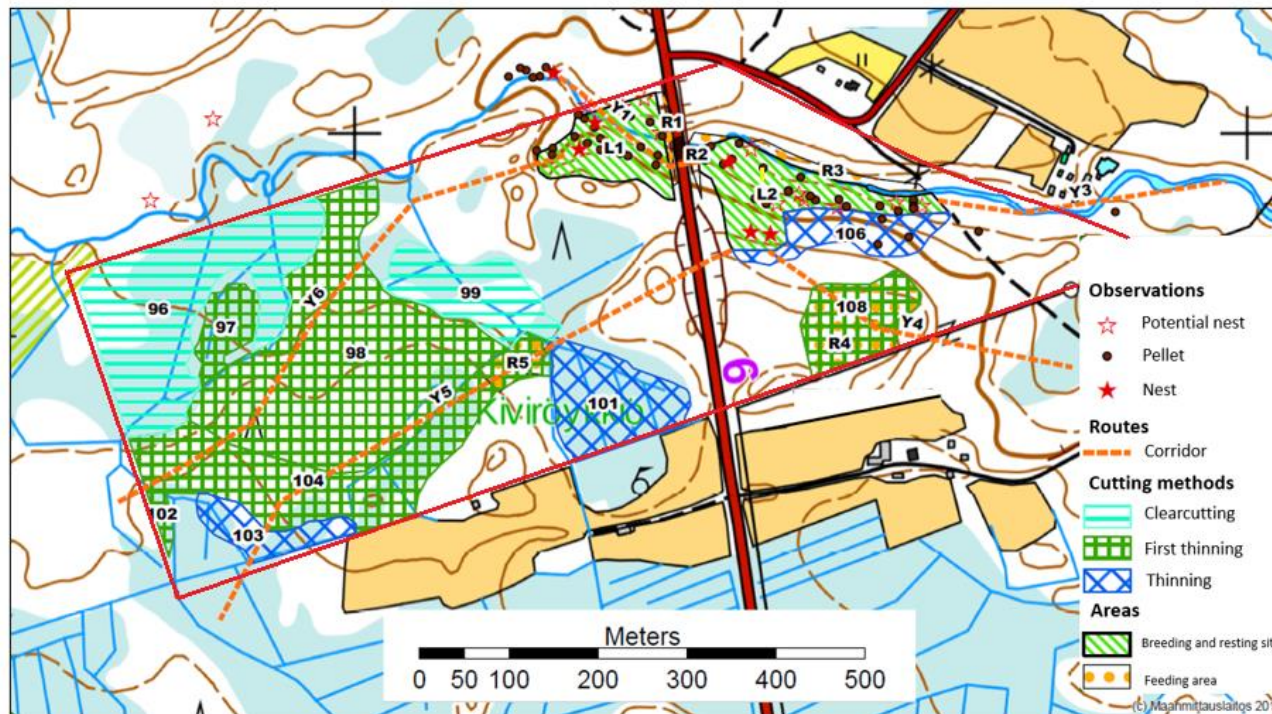
Case 4: Private-owned forest, Estonia



Case 1: Private-owned forest (Kainuu, Finland)

Size of the project area: 34 ha

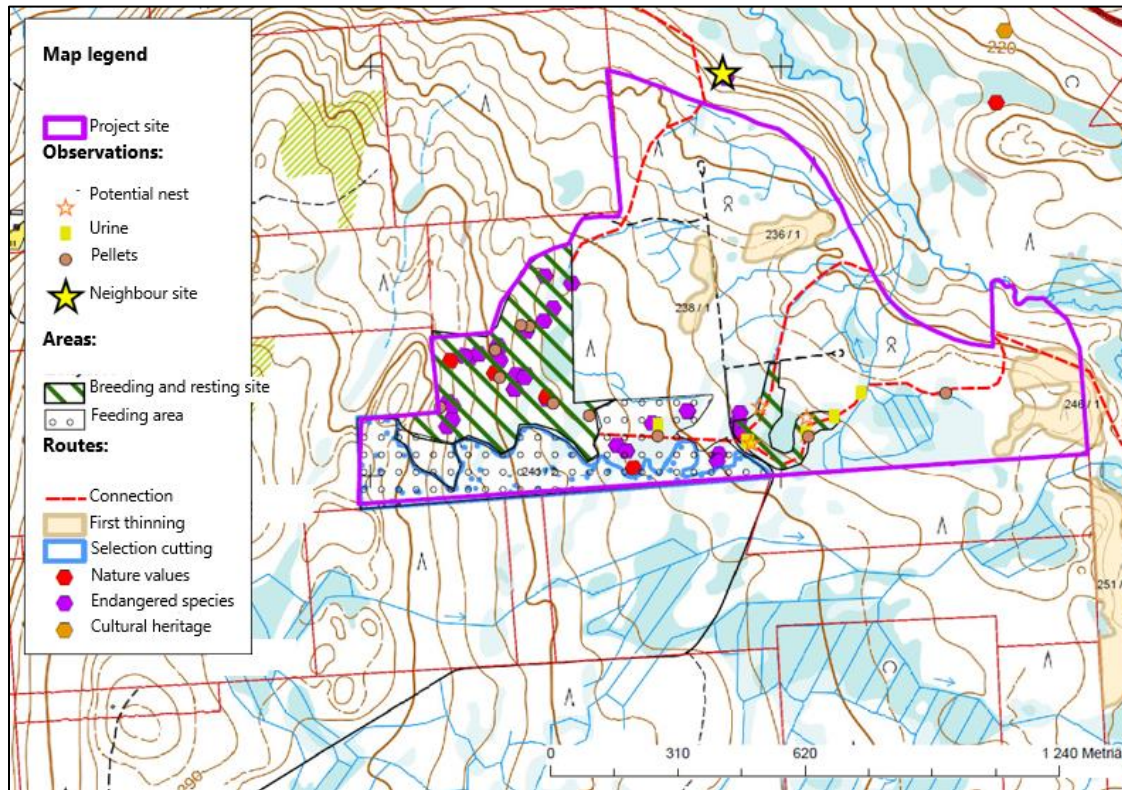
Landowner's goal: The landowner was planning clearcuttings for mature forests of the estate to maximize the economic gain. Due to the flying squirrel, felling according to the original plan was not possible, and clearcuttings were located further away from the flying squirrel's breeding and resting site. The plan is a compromise in which the flying squirrel is taken into account as required by law, but the landowner also receives some logging income. The breeding and resting site will be protected under the METSO program.



Case 2: State-owned forest (Kainuu, Finland)

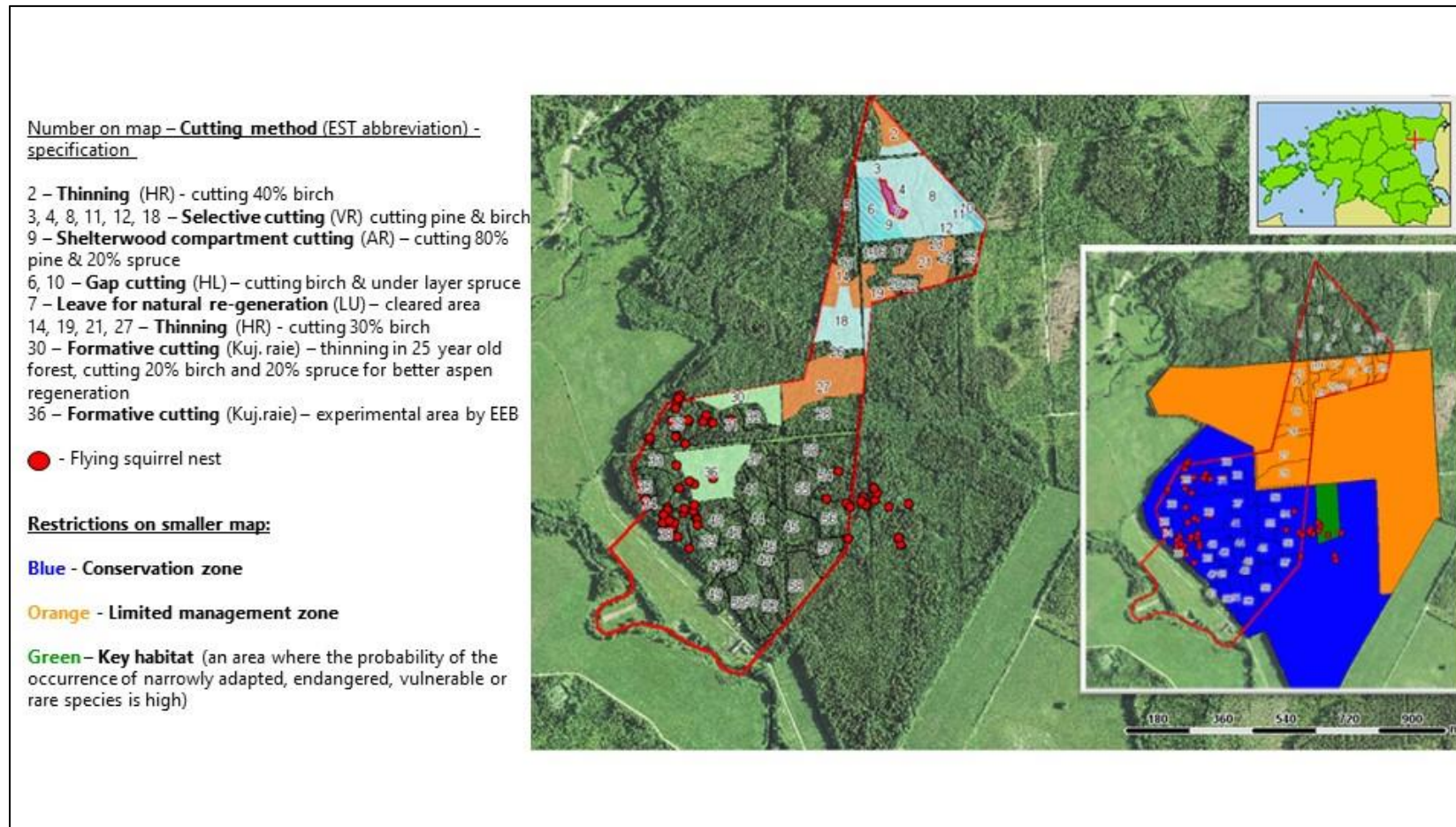
Size of the project area: 97 ha

Landowner's goal: Forest management that takes into account the flying squirrel and may even improve the habitat of the flying squirrel. After selection cutting the forest will be more diverse in age and species structure. Also, cutting dense groups of aspens might enlarge single aspens, which may later offer feeding and nesting opportunities for the flying squirrel.



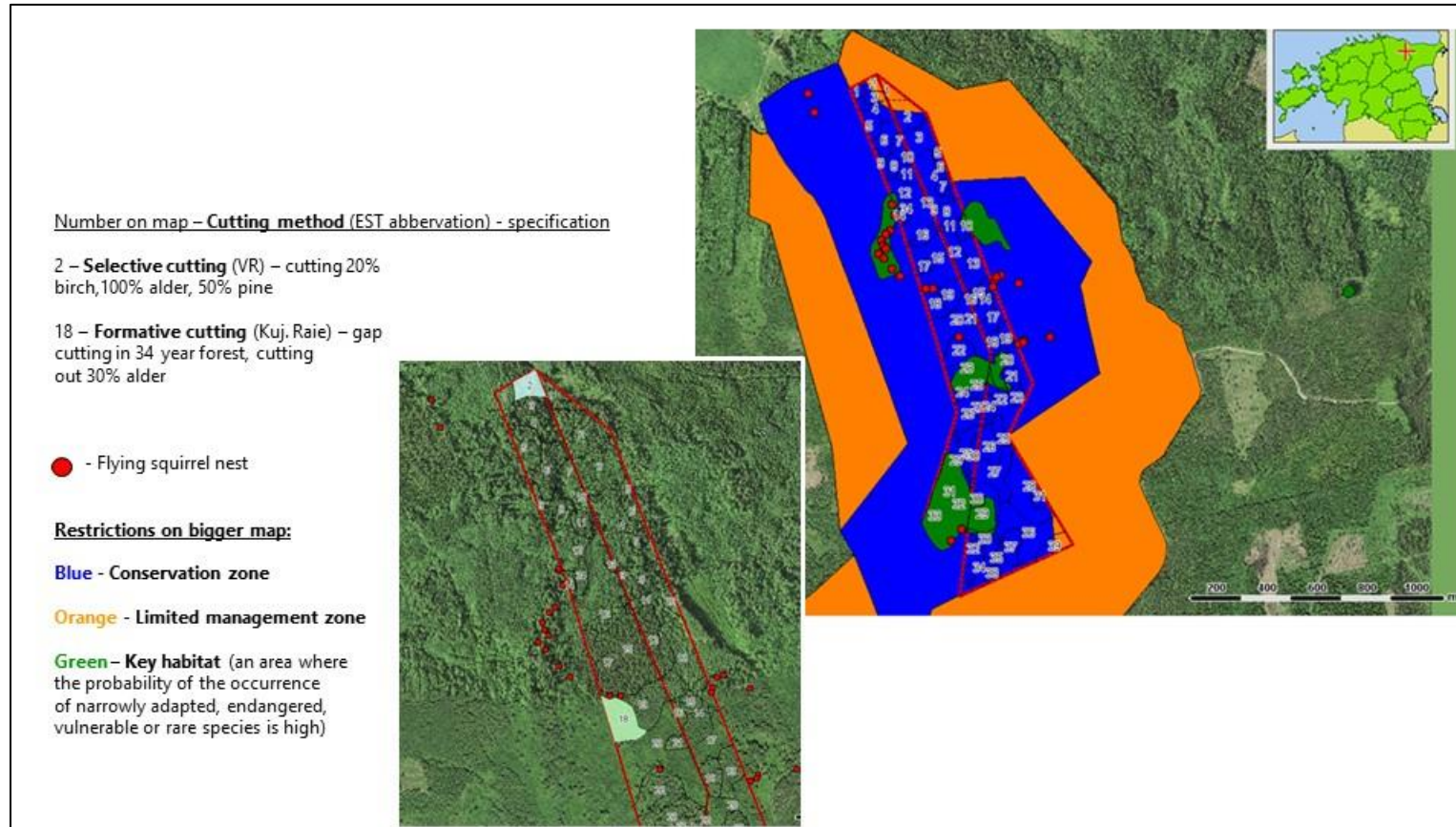
Case 3: Private-owned forest (Estonia)

Size of the project area: 49,6 ha



Case 4: Private-owned forest (Estonia)

Size of the project area: 58,9 ha



12. Compensation systems

Finland	Estonia
<ul style="list-style-type: none"> • According to the Nature Conservation Act (Section 53), the landowner is entitled to full compensation from the State if the prohibition on the destruction of the flying squirrel's breeding sites and resting places causes significant inconvenience. • Whether inconvenience is to be considered significant is always assessed on a case-by-case basis. • ELY Centres are responsible for the compensation decisions agreed with landowners. Compensation is disbursed by the Ministry of Environment. 	<ul style="list-style-type: none"> • Compensation in conservation zones is 110 eur per hectare per year (both inside and outside Natura 2000 areas). Funded through CAP program, landowners must submit application every year to get the compensation. • Compensation on limited management zones is 60 eur per hectare per year – only on Natura 2000 areas. Funded through CAP program, landowners must submit application every year to get the compensation. • The procedure for calculating the purchase price of land is controversial, because within limited management zones no compensation based on the flying squirrel is considered if the forest is outside Natura 2000 areas. • If the intended use of the land is limited, the landowner has the right to sell it to the state (only if new restrictions are applied to the land, and only in case of strict restrictions on most of the land). • Estonian Private Forest Centre (SA Erametsakeskus) and Agricultural Registers and Information Board (ARIB) are responsible for the compensation decisions. Compensation is disbursed by the ARIB.



13. Protection tools for private landowners

Finland	Estonia
<ul style="list-style-type: none"> • Voluntary forest protection is promoted by the State through the Forest Biodiversity Programme for Southern Finland 2014–2025, called METSO. • The METSO Programme offers various tools for the forest owners: they can offer their forests either for permanent protection or make temporary protection agreements (10 or 20 years). • Both ELY Centre and Finnish Forest Centre (Finnish Forest Centre) make contracts with landowners. The ELY Centre implements permanent protection on sites usually larger than 4 hectares, while the Finnish Forest Centre implements temporary agreements for smaller forest sites. • Compensation payments are paid at one time. Usually ownership stays under the forest-owner in METSO contracts. In some cases, the land can be purchased by the state. • After 10 or 20 years of temporary protection, landowners can renew the contract, if the terms and conditions are still valid. • Note also: Particularly important habitats under the Forest Act (metsälakikohteet). 	<ul style="list-style-type: none"> • Compensations are paid for conservation zones and limited management zones defined to a specific species. • Key habitats have a defined criteria to meet. Contracts of key habitats are usually not relevant for FS protection. • The compensation for strictly protected conservation zones (for the flying squirrel) is lower than for key habitat contracts. The payment is not related to the timber value.



14. Establishment of conservation areas (the process)

Finland	Estonia
<p>State-owned land:</p> <ul style="list-style-type: none"> • Most protected areas in Finland are situated on state-owned land. State-owned protected areas are managed by Metsähallitus, Parks & Wildlife Finland. • Nature conservation areas are usually established by decree: areas of more than 100 hectares are established by government decree and smaller areas by decree of the Ministry of the Environment. • Preparatory work related to the preparation of the founding regulations is coordinated by the Ministry of Environment, in cooperation with key local stakeholders. Discussions are held with, among others, the province, municipalities and hunting and nature conservation organizations. <p>Private-owned land:</p> <ul style="list-style-type: none"> • A private landowner can sell a site to the State at current price or designate it as a nature conservation area and receive compensation for this. • A private nature conservation area can be established at the initiative of either the landowner or the authority. The founding decision is made by the ELY Center. • Application is given to the ELY Centre, which also gives guidance about establishing a conservation area. 	<ul style="list-style-type: none"> • No distinction is made between state-owned and private land when creating a protected area. • Everyone has the right to submit a proposal to place a natural object (area, species etc.) under protection. • Estonian Environmental Board will arrange for expert assessment of the justification and purposefulness of placing the natural object under protection. • Preparatory work related to the preparation of the founding regulations is coordinated by the Environmental Board. Discussions are held with, among others, landowners, key local stakeholders, municipalities, Forest Management Center, nature conservation organizations and other NGOs. • Coordination with other ministries • Nature conservation areas are usually established by government decree, Species Protection Sites are established by decree of the Ministry of the Environment.



15. Literature and links

In English:

- **Habitats Directive** in a nutshell:
 - Website: https://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm
- **Guidance document on the strict protection of animal species of Community interest under the habitats Directive 92/43/EEC:**
 - Website: https://ec.europa.eu/environment/nature/conservation/species/guidance/pdf/guidance_en.pdf
- **Developing more effective conservation and research: the case of the Siberian flying squirrel** (Jokinen, M. 2019):
 - Website: <https://helda.helsinki.fi/handle/10138/305374>
- **METSO Programme** (Ministry of Agriculture and Forestry):
 - Website: <https://mmm.fi/en/forests/biodiversity-and-protection/metso-programme>
- **Metsonpolku.fi:**
 - Website: <https://www.metsonpolku.fi/en-US>
- **Metso factsheet:**
 - Website: <https://www.metsonpolku.fi/en-US/Materials>
- **METSO interests forest owners** (LUKE):
 - Website: <https://www.luke.fi/en/blog/metso-interests-forest-owners/>
- **Most METSO sites are valuable** (LUKE):
 - Website: <https://www.luke.fi/en/most-metso-sites-are-valuable-%e2%88%92-the-ecological-criteria-are-effective/>



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<https://jyx.jyu.fi/bitstream/handle/123456789/63663/azf08.pdf?sequence=1>
- Neuvontamateriaali (2016). **A guiding document on taking flying squirrel into account in forestry made by Tapio Oy.**
 - Website: <https://tapio.fi/oppaat-ja-tyovalineet/liito-oravan-huomioon-ottaminen-metsankayton-yhteydessa-neuvontamateriaali/>
 - Guide, PDF: <https://tapio.fi/wp-content/uploads/2019/10/Liito-orava-neuvontamateriaali.pdf>
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- Monimuotoisuudelle arvokkaiden metsäympäristöjen tunnistaminen (2016). **Selection criteria for METSO Programme.**
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