Elinkeino-, liikenne- ja ympäristökeskus
Centre for Economic Development, Transport and the Environment

Dog-assisted flying squirrel inventories
Summary

Dog-assisted flying squirrel inventories in Rekijoki area 2019–2020

The dog-assisted flying squirrel inventory action in the Flying Squirrel LIFE Project has several goals. One of the goals is to inventory flying squirrel occurrence in Rekijoki Natura 2000 areas both on Salo and Somero sites and test the method. The sites are also inventoried by human-made method and the results and methods are compared in the end. In the inventories it is also studied how well dogs can find the droppings in breeding and nesting sites, such as cavity and twig-nest trees. It is also considered if it is possible to train dogs to identify sex of the flying squirrels. This process is done in collaboration with the City of Espoo.

The planned time for the inventories were 2019 and 2020. There have been previous flying squirrel inventories in the area during the years 2012–2013, and those were conducted with pellet method. These surveys were used as part of the pre-materials for the inventories and choosing the inventory sites. The inventory areas include both uncharted and previously charted patterns.

The goal was not only to compare the findings between human and dog findings but also the age and the amount of the droppings and the site of the findings of dog surveys.

Photo 1 Nature conservation detection dog is ready to work in Rekijoki area in spring 2020. Photo: © Tanja Karpela

Animal trainer Tanja Karpela from K9 Institute (previously Kaer Oy) was responsible of the training of the nature conservation detection dogs, charting with the dogs and writing the survey report. Janne Erjola from K9 Institute was responsible of handling the collected data and visualisation. MSc Jyrki Lehtinen from Tmi Jyrki Lehtinen made all the human based pellet method surveys and inventories. Charting dogs are trained by K9 Institute with a specific method. The surveys made by the dogs and surveys made by human are compared.

Method

All the charted areas were new environments to the dogs and the trainer, and the occurrence of the flying squirrel was unknown for the trainer. All the surveys were meant to be held during the April, May and August 2019, and April and May 2020. Areas were chosen by the suitability to flying squirrel. Areas also included some changed habitats by forest management actions. Surveys included areas without any previous flying squirrel inventories and some areas were charted by humans in 2012–2013. These areas were also chosen for the suitability to flying squirrel and also included some changed habitats that forest management actions had caused. That was also an opportunity to study if the management actions have had some consequences for the occurrence of the flying squirrel. The main focus was the age and the amount of the droppings and the accessibility of the dropping site; does it require moving some detritus or if the droppings were located right under the tree. The nature chart dog surveys were held during the spring and the autumn, so the dogs could perform both under easier observation conditions and under harder observation conditions. Spring is easier for humans, when the pellets are lighter coloured (easier to spot) and there is less vegetation to hide pellets. Autumn is harder for human eye as at that time pellets are darker and there are fallen leaves and other detritus, and more vegetation in general. The plan was to make the inventories in the chosen areas first with two dogs and then the sites would be surveyed by human.

Implementation

Dogs used their smell to scent droppings, urine, cavity tree nests, and twig-nests of flying squirrel. Dogs indicated the findings as they were taught behaviour. Trainer checked the site and marked it with GPS equipment if there were any visible traits such as droppings. Dogs also indicated site when there were invisible traits like droppings under the detritus or droppings that had been silted. Dog trainer and nature surveyor were not aware of each other's inventory results during the inventory period.

During the first inventory year 2019 the surveys concentrated in testing and development of the dog assisted charting method. All the 2019 inventories were conducted with two dogs. The first dogs searched the area and then the other one searched the same area as a confirmation round. The findings were compared and then results were compared to human-made findings. During year 2020 the inventories were made with one dog at the time. The route of the dogs was also documented. The area was searched systematically with the dogs, so the challenges of the terrain were taken into consideration. Dogs had breaks regularly during which they were fed and watered, and they got the time to rest as well. The dogs also got breaks when the trainer was checking the findings and the quality of the findings. All the findings were saved as GPS markers and the category of the findings was also documented such as droppings, nest etc. (Table 1). The dog-made findings were categorised as follows: dropping, urine, cavity tree, twig-nest tree and indicating without any visible dropping or urine. The tree species were also documented. All these markers have their own symbol or letter. With uncertain findings, which were usually small parts of droppings, silted droppings or otherwise unusual droppings, a sample was taken and tested later with scent distinguish method if it was dropping or not. All the trainer-made findings on cavity and twig-nest trees which dogs did not indicate were also documented. Other nature characteristic such nature values, tree structure composes, and age was not documented in the dog-assisted surveys.

Dog assisted surveys year 2019 in numbers:
- Total number of areas: 11 (4 during the spring and 7 during the autumn)
- Total area: 72 hectares (43 during the spring and 29 during the autumn)
- Total individual field visits: 35
- Total number of field days: 25 (13 during the spring and 12 during the autumn)

Dog assisted surveys year 2020 in numbers:
- Total number of areas: 30 (all during the spring)
- Total area: 155 hectares
- Total individual field visits: nk
- Total number of field days: 29 days

Scent teaching for identifying the flying squirrel sex was started in autumn 2020. For this purpose, flying squirrel scent samples were received from City of Espoo during the collaring process.

Results and conclusions

In the year 2019 the surveys were done with two dogs per visit. The purpose was to test and developed the method. First year gave some reliable results, therefore in the year 2020 the surveys were done with one dog per visit. This shortened the time used per survey visit.

The results of the dog assisted surveys were positive and they gave a lot of information about the surveyed areas (Maps 1, 2 and 3). The surveys were accurate and efficient: there was abundance of findings

and observations as well as information on the age of the droppings. Typically, the flying squirrel surveys are done during the spring, but with dog-assisted surveys the seasons have less impact on the findings as the dog could detect findings also in the autumn.

The dogs could indicate both the piles of droppings as well as the single droppings on the ground, and under the detritus and thin snow layer. Those urine marks that were practically invisible for human, dogs could detect those as well. Dogs could also detect both distinctly older droppings and fresh droppings. During the inventories dogs made one visual observation (autumn 2019). There were also many dog-made findings that the trainer could not verify, but the dogs indicated those with certain scent category related behaviour. These findings were documented because the findings can give some information about the moving of the flying squirrel and thus the boundaries and the continuity of the territory.

Table 1 The GPS marker symbols were categorised with different colours and figures.

Symbol	Legend
	Detection without visible cavity tree, twig-nest tree, droppings and/or urine
	Detection, droppings
	Sight detection of flying squirrel
	Cavity tree detected, no droppings
	Cavity tree detected and droppings
	Cavity tree, not detected, no droppings
	Twig-nest tree detected, no droppings
	Twig-nest tree detected and droppings
	Twig-nest tree, not detected, no droppings

For the trainer spring was easier to verify the findings because the droppings are more visible, and the terrain is more open from vegetation. Autumn was harder to verify the findings. Weather, humidity, wind direction and force, shape and structure of terrain, temperature, as well as the age and the amount of the droppings influenced the working conditions for dogs. Hunting season is something to take into consideration, as during the autumn inventory there were some gun shots heard nearby and the survey had to be stopped in the area. The cavity tree nests, and twig-nest trees found by the dogs were marked individually on a separate map, so the nesting and breeding areas are easily seen in the map. Cavity and twig-nest trees are marked with different symbols depending on if there were also found droppings next to it.

Photo 2 Nature conservation detection dog in action. Dogs are trained to not to interfere the findings and the trainer is always close to the working dog. Photo: © Tanja Karpela

Dogs detected the droppings well also in autumn, and they could scent frozen droppings, too. During the 2020 surveys the temporal depth of the age of the droppings were studied. Winter 2019–2020 was rainy and nearly snowless. Usually, during spring surveys there are more piles of droppings to be found. In spring 2020 the findings were mainly single or few droppings at the pointed site. This was shown both the human-made and dog-assisted surveys. Dogs detected droppings under the detritus and over one year old droppings. Rainy season probably made it harder for human eyes to verify dog-made findings as the droppings were silted in the ground and not in solid form. Dogs made findings in the areas where human-made surveys could not during spring 2019 and spring 2020.

Indicated by dogs in 2020 inventories:
- Total 1132
- Red flag - scented by dog but not observed by human 626
- Green flag - both dogs and humans found droppings 292
- Red pin - cavity trees without visible droppings 160
- Green pin - trees with visible droppings 53
- Green ball - twig-nest tree with visible droppings 1
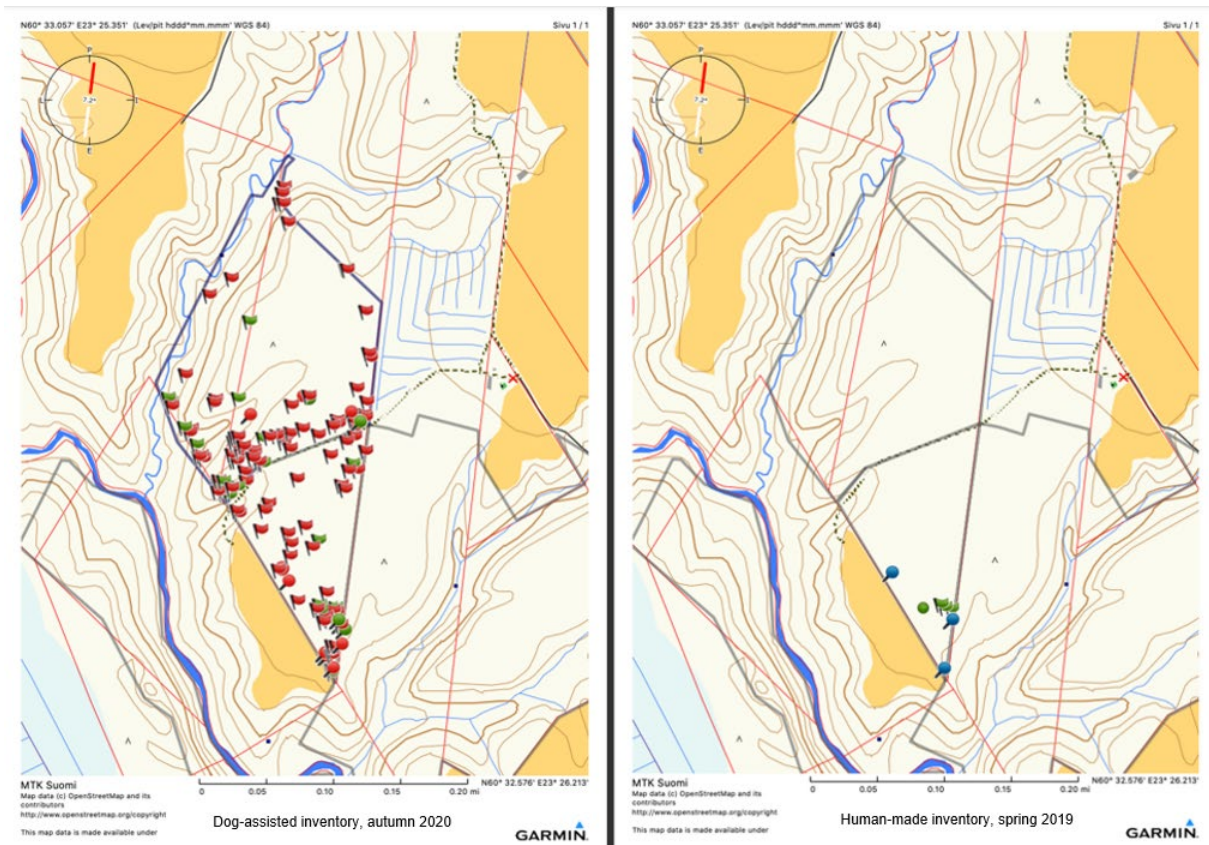
Map 1 On the left is dog-assisted inventory results in one area in autumn 2019. On the right is the same area inventoried by human in spring 2019. Map: © K9Insititute
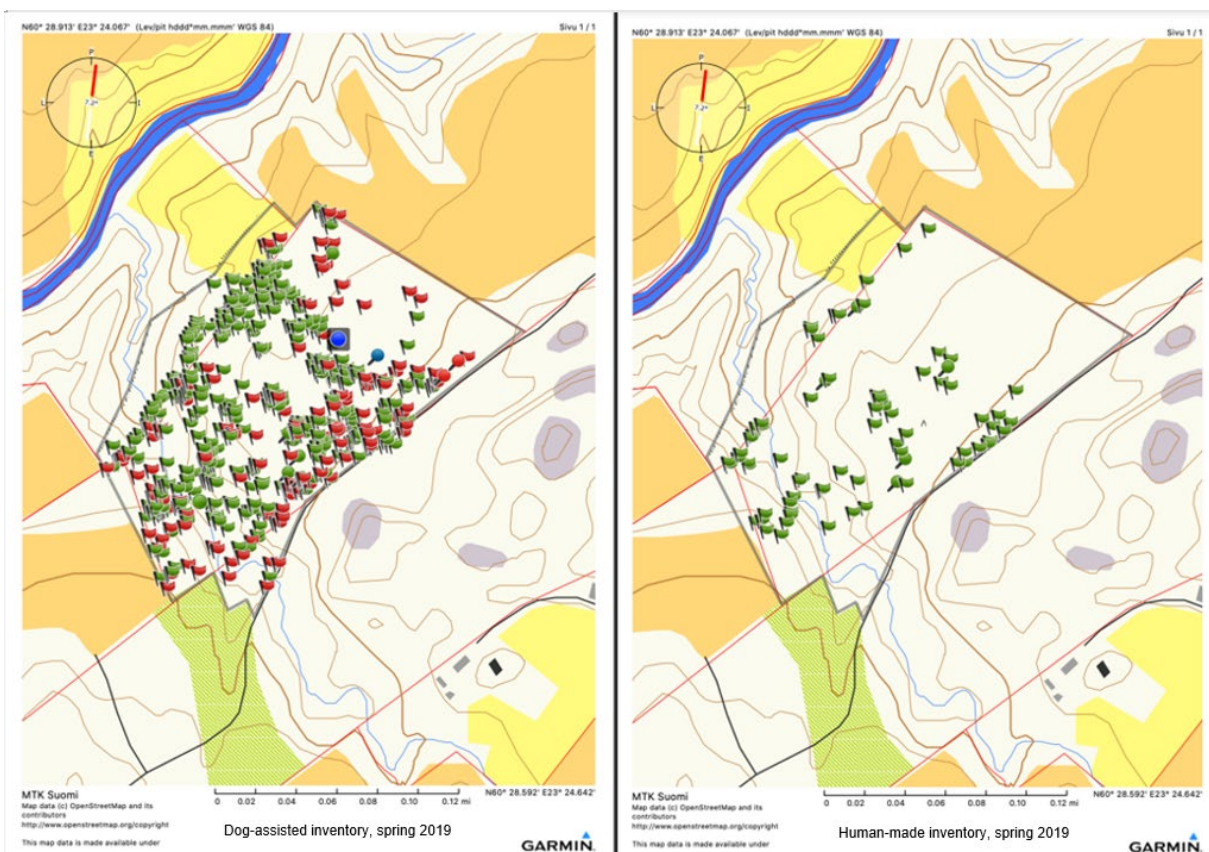
Map 2 On the left is dog-assisted inventory results in one area in spring 2019. On the right is the same area inventoried by human in spring 2019. Map: © K9Insititute
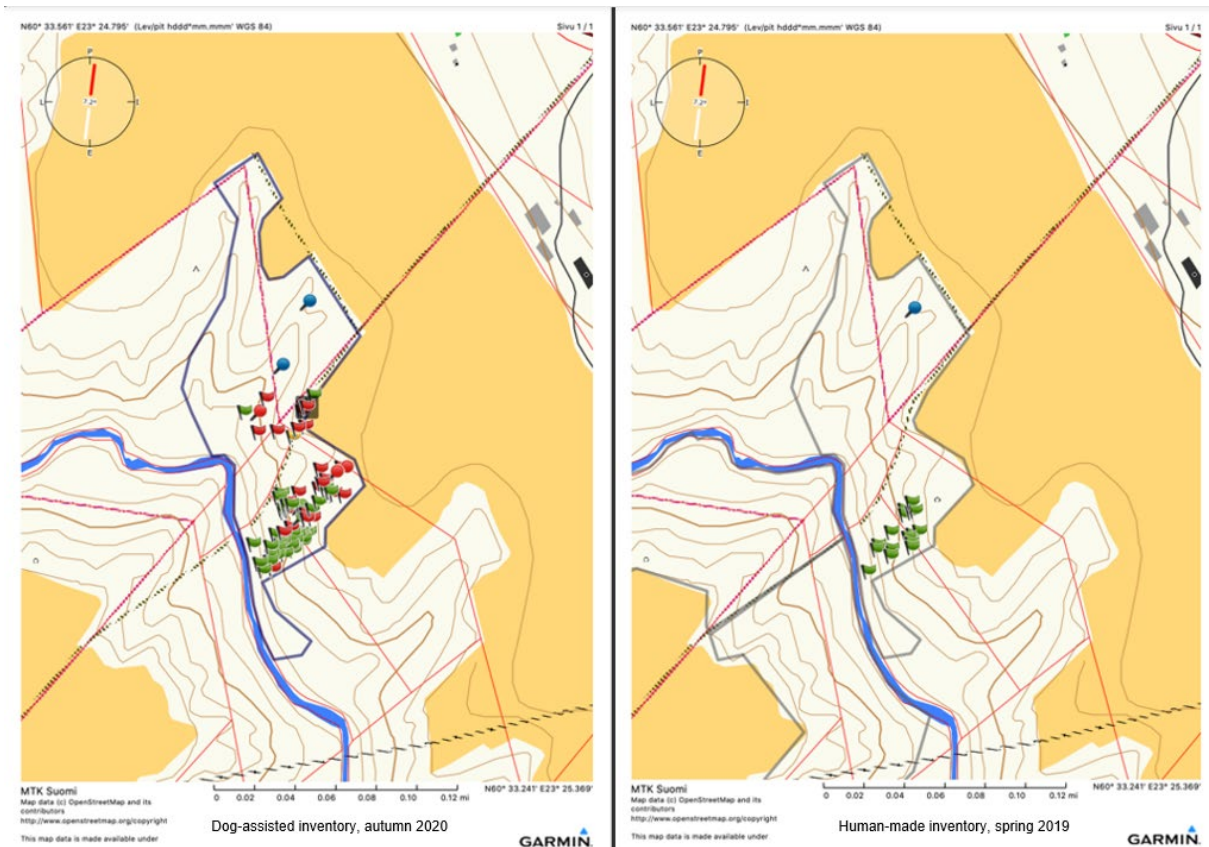
Map 3 On the left is dog-assisted inventory results in one area in autumn 2019. On the right is the same area inventoried by human in spring 2019. Map: © K9Insititute

Scent teaching for identifying the flying squirrel sex was started in spring 2020 and tested in autumn 2020. The dogs could point different flying squirrels, but it was uncertain if the dogs identified the individual or its sex. This needs more practicing and studying as trainer could not verify that the dogs identified sex and not the individuals. In order to this method requires a lot of samples for the training period and a way to distinguish if the dogs have learnt to identify the samples itself or the desired qualification of the sample.

Photo 3 Light yellow pellets of flying squirrel next to tree trunk in Rekijoki area. Photo © VAR ELY, JG

The dog-assisted inventories gave promising results and there are certain benefits in it. The method gives reliable information on the occurrence of the flying squirrel in the area and its habitat. There are some challenges that has to be taken into consideration such as safety of the working dogs during the hunting season or the workload and intensity to the dog when there is abundance of flying squirrel traits (Table 2.).

Table 2. Benefits and challenges with dog-assisted flying squirrel inventory.

Benefits	Challenges
Finding old, silted and poorly visible or totally invisible (hidden under the detritus/snow) droppings.	Autumn is harder for trainer to verify the findings (conditions in nature).
Finding urine marks that can be invisible for humans.	Wind direction and force, humidity, terrains shape and structure, temperature, droppings age and amount can affect the dogs work during the inventory.
Longer period for charting: from spring to autumn, and the possibility to perform inventories during the unfavourable season for humans. Advances when handling the notification of forest use.	Hunting season in autumn can restrict moving in the area and put dogs and the trainer in a risk.
Reliable findings (the abundance of findings, and accuracy and efficiency with findings).	Abandoned old barbwires can hurt the dogs.
The diversity of the dropping age is wider.	Charting with dogs may require more time (food, rest etc.).
Efficient inventory method to find cavity nest trees and twig-nest trees.	Abundance of the flying squirrel traits or too vast areas per visit can exhaust the working dog sooner. In these cases, the active operating time in the field can be shorter.
Data can give better understanding of the whole habitat	
Possibilities to distinguish sex.	

Kuva: © VAR ELY | II

This report summary is a part of the Flying Squirrel LIFE Project 2018–2025.

The dog-assisted flying squirrel inventory method was tested, developed, and conducted in Rekijoki area in 2019 and 2020. The results were compared and analysed with human-made inventories.

Flying squirrel LIFE Project

The Flying Squirrel LIFE project improves the conservation of flying squirrels in Europe through co-operation. The project brings together key actors in land use, such as land-use planning and forestry, as well as information on the habitat networks of flying squirrels.

In the area of EU, 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 project has approximately 120 areas of activity in total. The budget is EUR 8.9 million, most of which is EU LIFE Nature Programme funding. The project has started August 2018 and it will end March 2025.