



Koitajoki Natura 2000 area

The Koitajoki Natura 2000 area is situated in the easternmost corner of Finland, in the surroundings of Hattuvaara village in Ilomantsi. The total area of the Natura 2000 area is 7,561 hectares. Around 7,400 hectares of the area is managed by Metsähallitus, and 65% of this is covered by bogs and mires, 30% by mineral soils and 5% by water areas.

Mosaic of forests and mires

The Koivusuo Strict Nature Reserve, established in 1982, is with its forests and mires the most valuable part of the Koitajoki Natura 2000 area. The mire conservation areas of Ristisuo and Ruosmesuo-Hanhisuo were established in 1985 and 1988 respectively. In addition, there are areas that were included in the Old-Growth Forest Conservation Programme in the 1990s.

Raised bogs, aapa mires and bog woodland, together with western taiga forests, constitute the most extensive Natura 2000 natural habitats. Natural taiga forests, covering about 1,500 hectares of the area, are an interesting and valuable feature of the area.


Species of old-growth forests and mire wilderness

There are around 43,000 organism species in Finland, 20,000 of which live in forests. Forest species known to be threatened amount to around 600, though the actual number is probably higher because the viability of the populations of all forest species is not known.

The forests and mire wilderness of the Koitajoki Natura 2000 area, traversed by the meandering River Koitajoki, provides a diversity of habitats for various species. Brown bears, wolves and wolverines occasionally roam the extensive wilderness-like area. The rich avifauna includes species of both mires and old-growth forests. In addition, various threatened or near-threatened species of polypores and beetles are known to live in the forests of the Koitajoki area.

Extensive nutrient-poor mires

Extensive, varied raised bogs and aapa mires are a significant part of the Koitajoki Natura 2000 area. Koivusuo is one of the largest raised bogs in Finland. The mires in the area are predominantly low-nutrient or nutrient-poor pine fens, fens or flark fens. On aapa mires as well as on the edges of raised bogs with nutrient-poor central parts there are also nutrient-rich habitats supporting demanding species such as the Early Marsh-orchid (*Dactylorhiza incarnate*), the Narrow-leaved Marsh-orchid (*Dactylorhiza traunsteineri*) and the Bog Orchid (*Hammarbya paludosa*). (A, B)



Perisoreus infaustus

River shared by two states

The Koitajoki Natura 2000 area was named after the River Koitajoki that traverses the area. Locally the river is also known as the River Ylä-Koitajoki. The river has its headwaters in Russian Karelia. It flows on Finnish territory for 20 kilometres, after which it turns back to Russia, returning to the Finnish side of the border further south in Möhkö village in Ilomantsi. The gradient of the river is low and therefore its rapids are also small. The biggest rapids are called Polvikoski. The river has sand banks and it flows in tight meanders on the delta formed during the final stages of the last Ice Age. The water of the river is dark because of the humus-rich runoff from the mires. (C)

Slash-and-burn cultivation and selective felling

Although it is hard to find pristine natural forests in the southern half of Finland, there are areas in the Koivusuo Strict Nature Reserve that have probably never been (clear-)felled or slashed and burnt. Forest inspection reports of the forest administration authority from the 1910s state that traces of slashing and burning could be found in about 50% of the area covered by forests in the Koivusuo Strict Nature Reserve and the Hoikka area, while the corresponding figure for the southern parts of Ilomantsi was about 80%.

Until the early 20th century, only logs that fulfilled certain measurement and quality requirements were harvested from the forests. As a result of selective felling, poor-quality large trees and small-diameter trees were left in the forests. Reminders of past forest activities in the Koitajoki area include trees that have been ring-barked in preparation for slashing and burning, unfelled reject trees, tall tree stumps and remains of forest workers' temporary log huts. The forest ranger's farm at Pirhu was built in the 1950s and the lumberjack cabin at Polvikoski in 1943.

Scene of defensive battles of Ilomantsi

Around 13,000 Finnish soldiers took part in the battles fought from July to August 1944 in the area between the central village of Ilomantsi and Hattuvaara village. Traces of the battles can be found in the Koitajoki Natura 2000 area, and in the vicinity there are various war memorials. Taistelijan Talo (the Warrior's House) in Hattuvaara displays exhibitions related to the local war history, and the 'Taistelijan taival' trail, also located in the area, provides a further insight into the battles.

BOREAL CONIFEROUS FOREST

Decaying wood is essential for forest wildlife

An estimated 4,000-5,000 forest species rely on decaying wood at some stage of their lifecycle. Declining or recently dead trees support bark beetles, which mainly eat phloem, as well as polypore fungi that act as agents of wood decay. Polypore and other fungi as well as insects that make use of the actual wood appear next. A single large tree trunk may thus provide different kinds of habitats for various species that depend on decaying wood for as long as 100 years.

Forest fires enhance natural regeneration of forests

Boreal coniferous forests are extremely well-adapted to natural disasters such as wildfires and storms. Wildfires bring about drastic changes in natural forests and make room for a new generation of trees. It is estimated that wildfires caused by lightning used to occur in Finnish forests at 100-150 year intervals. On average every second fire destroyed a significant proportion of the tree stock. Dead timber after a forest fire may have amounted up to 300 cubic metres per hectare in the Koitajoki area.

Due to human activities – especially due to slash-and-burn cultivation that became common in Ilomantsi in the 16th century – the frequency of forest fires doubled. In contrast, fires involved smaller areas.



Species relying on burnt wood have become threatened

Dozens of species of flora and fauna that depend on wildfires live in coniferous forests. Because of the efficient fire-fighting methods, forest fires rarely occur nowadays and consequently species relying on burnt wood have become threatened. In conservation areas such as the Koitajoki Natura 2000 area it is possible to take these species into account by setting controlled fires in small forest areas at intervals of a few years.

Areas left untouched by wildfires

Wildfires usually circumvent spruce mires, springy depressions and wooded patches in the middle of mires. Such forests provide habitats with a distinctive microclimate and specialised species that have adapted to these conditions.



NATURAL FOREST SUCCESSION

Regeneration of natural forests takes place either simultaneously over a large area in a process called a large cycle, or gradually in smaller areas in a process called a small cycle.

Large cycle

In the large cycle, the development of a forest starts from the beginning, for example after a fierce forest fire or storm, when the entire tree stock of a large area has died within a short period of time. A new generation of trees gradually becomes established in the area left by the dead trees. Deciduous trees begin to grow from root suckers or, like conifers, from seeds that survived the wildfire or storm. The soil seed bank contains seeds of grasses and herbs.

Young deciduous seedlings and shoots quickly colonise the burnt area. As they mature, shade-tolerant Norway Spruce (*Picea abies*) undergrowth develops in the mixed deciduous forest. On nutrient-poor soils, an area swept by a wildfire is not solely colonised by deciduous trees but may develop into a mixed Scots Pine-deciduous forest or a pure Scots Pine (*Pinus sylvestris*) stand.

Small cycle

The small cycle refers to the continuous small-scale changes in forests resulting from winds, fungal diseases, insects or some other factors killing individual trees or small clumps of trees. Dead trees allow more light to the field layer and give way to a new generation of trees.

Winds may fell entire small clumps of trees especially in old forests, providing good growing conditions for both deciduous and coniferous seedlings and shoots.

The Norway Spruce gradually becomes the dominant species without wildfires

On fertile soils, the first pioneer trees give way to the Norway Spruce, which becomes dominant. The Norway Spruce tolerates shade better than other tree species and, unless there is a wildfire, other species will sooner or later be displaced by it on fertile and semi-fertile soils.

Over decades, shading by the Norway Spruce makes the growing conditions for other trees unfavourable. The maximum temperatures in the field layer decrease, the evaporation of moisture and the decomposition of litter slow down, the soil becomes acidic and mires may even develop. In these conditions seedlings of deciduous trees and the Scots Pine cannot germinate as well as those of the Norway Spruce. However, the Norway Spruce does not survive wildfires to the same extent as the Scots Pine, which reduces its competitiveness.

Polypores thrive in the old-growth forest

70 polypore species have been found in Kolvananuuro, of which six are threatened. Thanks to the diversity of habitats and to forests in their natural state, the area supports a wide variety of polypores, including both southern and northern species. The steep slopes of the gorge, where the tree stands are dense and the soil fertile, and where the water running down the slopes together with the brook channels create small coves with a damp microclimate, provide excellent habitats for polypores.

The Aspen – a valuable pioneer tree of natural forests

Boreal coniferous forests support around 150 organism species that depend on the Aspen (*Populus tremula*). The Aspen is also an important tree species for a number of threatened species. The leaf litter of the Aspen is nutritious and alkaline. The Aspen is capable of controlling the dispersion of the Norway Spruce because its leaf litter can to some extent prevent the germination of spruce seedlings. A few parent trees with root suckers can alone prevent the Norway Spruce from spreading to their immediate vicinity. The Aspen has been disfavoured in forestry because it is suspected of contributing to the spreading of the Pine Twisting Rust (*Melampsora pinitorqua*). Therefore big, mature aspens are almost solely found in forests within conservation areas.

Restoration contributes to the re-creation of habitats

Forestry and other human activities have considerably transformed the natural forest and mire environments. As a result of forestry activities, the structure of forests becomes unvaried, decaying wood is scarce, and disturbances that are essential factors in natural forest succession – such as forest fires – are effectively prevented. Mires have been drained by ditches. The impact of forestry can also be seen in places in the mires and forests of conservation areas. The quality of conservation areas is now being improved by restoration. Structural features of natural forests are being restored in former commercial forests within conservation areas and a more natural hydrology is being restored in drained mires. (D)

Structural features of natural forests are being restored in the forests

The transformation of former commercial forests into near-natural forests can be speeded up by restoration. In the Koitajoki Natura 2000 area, forest felling has been carried out in the surroundings of Polvikoski since the 1950s. These areas have been replanted mainly with the Scots Pine, resulting in single-species forests with one canopy layer.

In recent years, restoration measures have been taken in the forests of the Koitajoki Natura 2000 area. Standing dead trees have been created for species that rely on decaying wood by ring-barking Scots pines. Trees have been felled both manually and by diggers. Small clearings have been cut in young and mature cultivated forests in order to improve the growing conditions for deciduous and coniferous seedlings. Thus the structure of the tree stock will become more diverse. Forests in the area have also been restored by prescribed fires in order to create habitats for species depending on fires.

Restoration of mires aims at restoring their natural hydrology

Mires in the Koitajoki Natura 2000 area were being drained by ditches since the 1960s. To date, restoration measures have been taken in almost all of the drained mires in the area by filling or damming the ditches. The objective is to restore a natural-like hydrology in the mires. Trees grown after ditching have been removed from the mires that used to be treeless before ditching. Where restoration is successful, mire vegetation will gradually re-colonise areas and mires will begin to form peat again. The restoration of mires is a slow process that takes decades.

INFORMATION FOR HIKERS

The Koitajoki area is the easternmost Natura 2000 area in Finland. The area offers excellent opportunities for hiking and nature watching. The area has marked trails with free-of-charge huts or lean-to shelters at about 5-kilometre intervals. Polvikoski, located in the middle of the area, lies about 50 km away from the centre of Ilomantsi. The 18-kilometre 'Pirhun kierto' circular nature trail starts from Polvikoski. The trail is easily accessible with boardwalks across the mires. The area can be explored more fully along the 20-kilometre 'Tapion taival' hiking trail that runs between Lakonkangas and Hoikantie. In the Natura 2000 area there are two free-of-charge huts as well as a rental cabin run by Wild North at Polvikoski. In addition there are several designated campfire sites in the area.

Access to the Koivusuo Strict Nature Reserve is only permitted along the marked trails. Part of the Natura 2000 area lies within the border zone between Finland and Russia and therefore a special permit issued by the Finnish Border Guard is required for accessing this area. Lighting a fire is permitted only at the designated campfire sites; lighting a fire is however not permitted anywhere if a wildfire warning has been issued.

Hunting outside the Koivusuo Strict Nature Reserve is permitted with appropriate permits. Hunting in the Koivusuo Strict Nature Reserve is prohibited.

The River Koitajoki is suitable for canoeing. A recommended route runs from Koidanvaara to Polvikoski or Lakonkangas. The best season for canoeing is in early June.

Visitors to the area should bear in mind that signal strength for mobile phones may be poor.

Further information on hiking:
Metsähallitus Ruunaa Visitor Centre
tel. +358 (0) 205 64 5757
www.luontoon.fi/koitajoki

