

Boreal Peatland LIFE Project

Working for the Finnish Peatlands



Layman's Report



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In addition to humans, several birds and mammals eat cranberries and other berries growing in the peatlands. PHOTO: MAARIT SIMILÄ

Parks & Wildlife Finland 2014

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Print: 500 copies

Lönnberg Print & Promo, Helsinki 2014.



“Let’s all join our forces to ensure the diversity and rich flora and fauna of Finnish peatlands can be maintained.”

PHOTO: MIKKO TIIRA

Peatlands – an Essential Part of Finnish Nature

Peatlands are a diverse natural environment with a distinctive and varied flora and fauna. Finland has major international responsibility for the maintenance of natural peatland habitats: it is one of the countries with most peatlands in the world.

Draining peatlands for forestry purposes is the factor that has changed our natural peatland habitats the most. Digging of drainage ditches began in the 1930s, first manually and later using machinery.

On the other hand, the nature conservation value of peatlands was discovered quite early, and protection started in the 1960s. Since then, the area of protected peatlands has been increased gradually to the present level.

In addition to pristine peatlands, protected areas may also have a drained section, where the hydrological conditions and local flora and fauna have deteriorated. The most significant means of enhancing the condition of Finnish peatlands is the restoration of drained peatlands, in other words, blocking of the

ditches and channelling of the waters to their original routes.

When the diversity and rich flora and fauna of Finnish peatlands are maintained, future generations will have a chance to enjoy everything peatlands have to offer: the concerts of spring birds, autumnal peace and quiet, the peatland scents and colourful landscapes, and the berries for anyone to pick.

Suoverkosto-LIFE



Boreal Peatland LIFE

- Boreal Peatland LIFE is a LIFE+ Nature project.
- It was coordinated by Metsähallitus Parks & Wildlife Finland.
- Other parties involved in the project were the Central Finland Centre for Economic Development, Transport and the Environment, and University of Jyväskylä.
- The budget was EUR 6.7 million, 50% of which came from the European Commission. The other half was national self-financing.
- The project concerned 54 Natura 2000 sites in different parts of Finland.
- This publication describes the results of the project.



The frigga fritillary is reappearing in many restored peatlands. PHOTO: JUSSI MURTOSAARI



LIFE+ is the EU's funding instrument for the environment. Its objective is to contribute to the implementation of the EU's environmental policy and legislation by funding nature conservation and environmental projects. The first Life funding programme began in 1992. Finland joined the EU in 1995 and started to receive funding for the management of its Natura 2000 network areas. The Boreal Peatland Life Project which is now ending has focused on restoring Finnish peatlands within the Natura 2000 network and providing information about peatlands to the public.



The ruffs (*Philomachus pugnax*), nesting in Finland, winter in West Africa. The ruff population has fallen significantly in recent years. PHOTO: ANTTI BELOW



The *Tipula melanoceros* is one of the most common crane fly species in the Finnish peatland habitats. PHOTO: JOUNI PENTTINEN



Raised bog in Kauhaneva.

PHOTO: METSÄHALLITUS / JARI ILMONEN



Even after ditches have been filled in, water flows continue to stay in the lines of ditches. Dams stopping and diverting water flows are important for ensuring successful restoration. PHOTO: METSÄHALLITUS / JARI ILMONEN.

Blocking Ditches to Retain the Water in Peatlands

Under the Boreal Peatland LIFE Project, peatland restoration was carried out in 51 protected areas from Hankoniemi to Central Lapland, over a total area of 4,700 hectares.

The ditching of peatlands lowers the water level in the area. In drained peatlands flood and rainwater rapidly drain into downstream water bodies along ditches. Peatland vegetation declines and forest takes over.

The changes are also reflected in other peatland species, such as birds, butterflies and dragonflies. In addition, as dried out peat begins to decompose, the carbon stored in the peat is released into the atmosphere as carbon dioxide thus contributing to climate change.

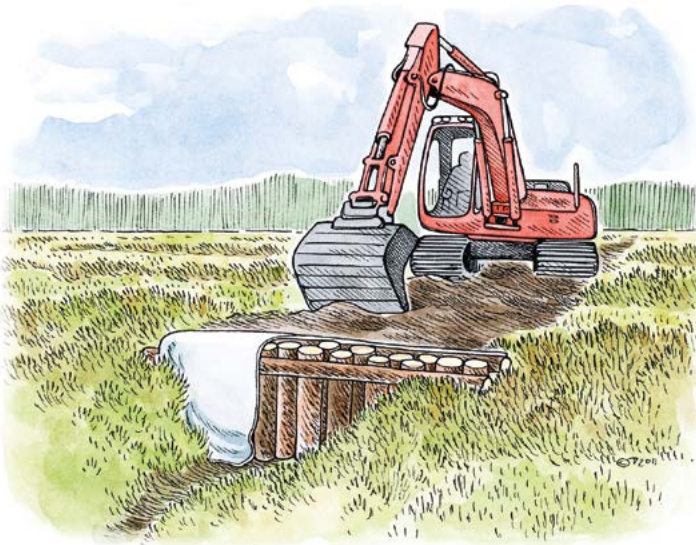
When peatlands are restored, they retain water from melting snow and rainwater for longer and the water level rises. Thus the peatland vegetation and other species communities begin to

recover. Peat formation is also restored and the peatland stores carbon again.

Ditches are usually blocked using an excavator. If large amounts of water flow in the ditches, or the peatland is steeply sloping, it may be necessary to build dams reinforced with geotextile and wooden supports to prevent drainage. Trees that have grown in the area after ditching are usually felled and removed.

Special dams

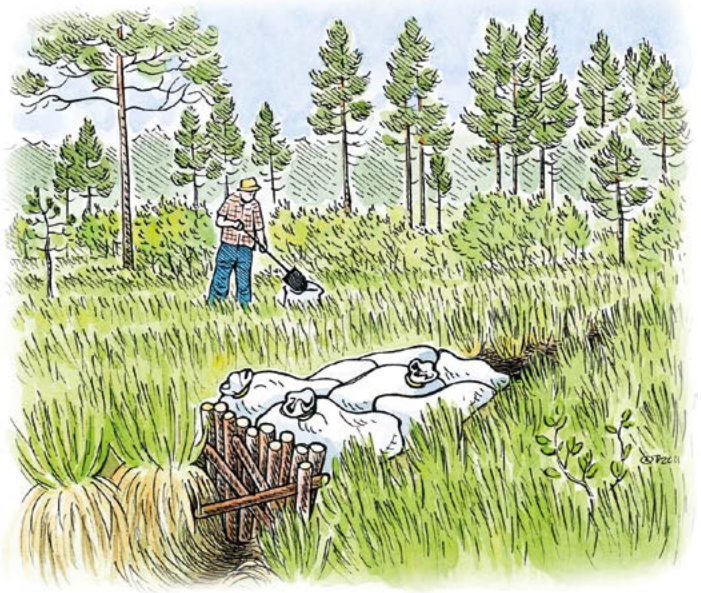
If large amounts of water need to be dammed or re-channelled or when restoring steeply sloping peatland sites, it may be necessary to construct dams reinforced with wooden supports and geotextile.



↑↓ Log dams may be constructed where suitable logs can be cut from trees felled on the site. The logs can be placed horizontally or vertically depending on the depth of peat. The dam is then covered with geotextile and peat. Log dams can be further stabilised with the help of supporting logs aligned at right angles to the other logs. The geotextile used to cover the wooden structures is only partly shown in the illustrations to enable their underlying structures to be seen.



↑ Obliquely aligned log dams can be made by combining manual and mechanical work, though an excavator driver can often create a dam on its own if suitable logs are available. In the illustrated example the direction of water flow is from the direction of the excavator. This kind of dam is suitable for almost all restoration sites in wooded peatlands.



↑ Jute sacks filled with compressed peat can be used to dam ditches with sensitive springs or seepage areas, for instance. Such sack dams are also suitable for repairing dams in restored sites where excavators can no longer work. Sacks can be fixed in place using wooden stakes hammered into the peat.

ILLUSTRATIONS: TUPU VUORINEN.



Ditches are infilled with ditch spoil and peat from between the ditches. PHOTO: JOUNI PENTTINEN



Sturdy dams prevent the flow of water in infilled ditches and divert the water flows from mineral soil to peatlands. PHOTO: JOUNI PENTTINEN

Handbook for peatland restoration

In Finland peatland restoration know-how has been accumulated over more than 25 years, and top-level competence in restoration measures has been thus established. During the Boreal Peatland LIFE Project, a new comprehensive handbook for the restoration of drained peatlands was published in Finnish in 2013. The handbook was produced by dozens of Finnish peatland experts. The handbook can be downloaded free of charge from <http://julkaisut.metsa.fi/julkaisut/show/1601>.



The guidebook was also published as a concise English version. With the help of this handbook, the Finnish experiences can be utilized in other countries. The handbook can be downloaded free of charge from <http://julkaisut.metsa.fi/julkaisut/show/1733>.



Peatland flarks, puddles and ponds are the natural habitat of dragonfly nymphs. Adult dragonflies may sometimes fly quite far away from waterbodies. KUVA: JOUNI PENTTINEN.

Life on Restored Peatlands

Metsähallitus Parks & Wildlife Finland monitors the impacts of peatland restoration, such as the occurrence of peatland vegetation, water table fluctuations and water quality.

Monitoring provides information on changes occurring in peatlands after restoration measures. Monitoring is performed and analyses made in collaboration with researchers. Monitoring has revealed that the recovery of peatland habitats begins immediately after restoration.

The growth of *Sphagnum* mosses usually increases within a few years as the water level rises. Pioneer species - particularly hare's-tail cottongrass and *Carex canescens* – rapidly exploit the peat surfaces of blocked ditches.

Drainage reduces the dragonfly populations in peatlands, as the peatland ponds, growth sites for dragonfly nymphs, dry out, and trees begin to grow on the peatland. The assemblage of dragonfly species and number of individuals begin to recover within three years from restoration measures.



Hare's-tail cottongrass blooms very early in spring. PHOTO: MAARIT SIMILÄ

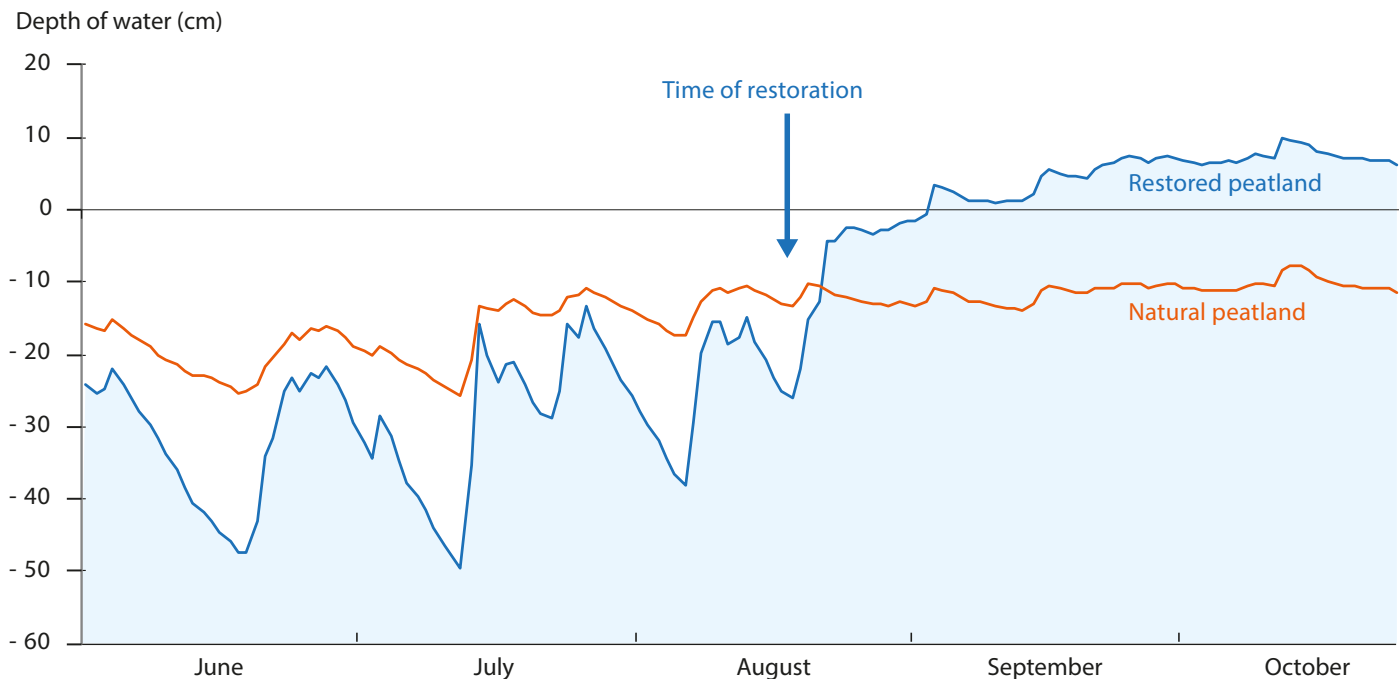
Some 30 species of butterflies found in Finland live mainly in peatland habitats. The draining of peatlands rapidly wipes out certain species from the habitat, such as frigga fritillary and freija fritillary. Following restoration, the assemblage of peatland butterfly species begins to recover gradually.

The assemblage of bird species and their territories are also smaller in drained peatlands than in natural peatlands. Restoration triggers the recovery process that re-establishes a habitat favourable for peatland bird species.

Moving peat during restoration measures causes the leaching of nutrients (such as nitrogen and phosphorous), but in some cases, their leaching reduces rapidly. In the long run, the leaching of nutrients lowers to natural levels.



General monitoring is carried out on all restored peatland sites to ensure that the water table level is rising, the dams work well and water is diverted along its natural routes. PHOTO: MAARIT SIMILÄ



In drained peatlands, the water level fluctuates more than in natural peatlands. The 0 level in the diagram shows the peatland surface level. Immediately after restoration, slight flooding often occurs in peatlands, but the water level soon stabilises to near natural levels. The graph has been drawn on the basis of data collected by automatic water level loggers.

The English sundew is a small and colourful peatland plant. The tentacles on its leaves trap and digest small insects. PHOTO: JOUNI PENTTINEN





“The best part was when I had a chance to see a carnivorous plant!”

— A SCHOOLCHILD ON A PEATLAND TRIP

PHOTO: SANNNA VAPANIEMI

↑↓ The Boreal Peatland LIFE Project organised peatland trips for schoolchildren and special groups.



PHOTO: HANNA AHO

Making Peatlands Familiar to Everyone

Not all people are yet aware of the diversity and values of peatlands. Therefore, during the Boreal Peatland LIFE Project, information about peatlands, their flora and fauna, protection and restoration was disseminated to people in various ways.

Trips to bogs located in Leivonmäki, Seitsemäniemi and Torronsuo National Parks were organised for more than 3,500 school children

and 500 people with visual or physical disabilities. The peatland scents and atmosphere stirred the memories of many older people, taking them back to the berry-picking trips of their youth and many of them began to plan new trips to peatlands with their friends.

In the children’s opinion, the best parts of the trips were the “peatland itself”, “the chance to see a carnivorous plant” and “the packed lunch, of course”. Teachers commended the guidance

given and the diverse exercises provided by the project.

Duckboards were renovated at Kilpisuo Bog in Karstula and Kauhaneva–Pohjankangas National Park to allow easy and safe access for visitors. Information boards about the special characteristics of peatlands and peatland restoration were also developed as part of the project.

A portable mire exhibition 'Peatland Adventure' was implemented under the Boreal Peatland LIFE project. It presents the special characteristics of mires using comic strips, sounds and computer applications. The exhibition is shown around Finland in Metsähallitus Nature Centres and, in the future, it will spread peatland information from other visitor attractions related to Finnish nature, such as natural history museums.

↓ *The Peatland Adventure exhibition gives the visitors a chance to help Susanna Suokukka (a ruff) to choose a fiancé.* PHOTO: JOHANNA ROTKO

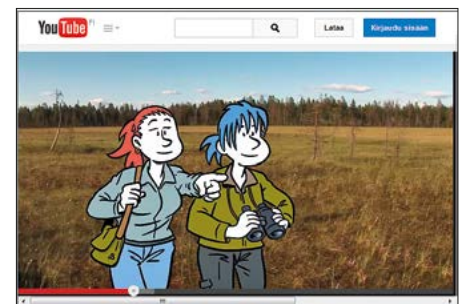


New duckboards attract visitors to the bogs. PHOTO: VEERA TÄHTÖ.

Online information on peatlands

In the project, information was also collected for schoolchildren on the Internet. The video series 'The Handbook

of Modern Peatlands' with ten episodes, combines video images and animation. You can also put your peatland knowledge to the test with 'The Peatland Quiz', where you get acquainted with Finnish peatlands, guided by the Moss Fairy. The quiz is intended for Year 6 and 7 students and it can be found at the address <http://yhteiso.luontoon.fi/visat> (in Finnish).



With the help of the Handbook of Modern Peatlands, schoolchildren can get acquainted with the flora and fauna, protection and use of peatlands, restoration of drained peatlands, and the cultural heritage.

Achievements of the Project

- 35 restoration plans were made.
- A management plan was drawn up for three Natura 2000 sites.
- Several restoration courses were organised, with the participation of 380 restoration workers.
- Almost 600 hectares of valuable peatlands were acquired for protection areas in Central and Eastern Finland.
- Approximately 4,700 hectares of drained peatlands in 51 Natura areas were restored. More than a million metres of ditches were blocked and dammed, and almost 900 truckloads of trees grown after drainage were felled and removed from peatlands.



Taking a water sample to monitor water quality. PHOTO: JOUNI PENTTINEN.

- 100 contractors were employed in restoration work supported by EU financing, amounting to a total of 90 person-years.

- More than 100 hectares of peatland forest patches were restored in six Natura 2000 areas to increase the amount of dead wood.

- More than 2.5 kilometres of duckboard trails were built on two peatland sites.

- Information boards were developed for various sites.

- A birdwatching tower was built at Kilpisuo.

- Bog trips were organised for more than 3,500 schoolchildren and an exercise booklet was made.

- A portable mire exhibition was made for children.

- ‘The Handbook of Modern Peatlands’ with ten episodes was made for viewing free of charge through Youtube, providing information about the history and current state of Finnish peatland nature and the Boreal Peatland LIFE Project.

- A quiz on peatland issues was made for schoolchildren in the Internet.

- Mire trips were organised for more than 500 people with physical disabilities.

- The impacts of peatland restoration on the peatland water table level and quality, vegetation, birds, butterflies and dragonflies was monitored.



The project was mentioned more than 250 times in different media. Kauhaneva was presented on television. PHOTO: MIKKO TIIRA

Boreal Peatland LIFE Project Sites



PHOTO: METSÄHALLITUS / JARI ILMONEN

1. Stormossen
2. Rajasuo
3. Petkelsuo
4. Kytjä–Usmi
5. Nukinrahka–Hirvilamminsuo
6. Koskeljärvi
7. Iso-Hölo
8. Himmaistenrahka
9. Pitkäsuo
10. Kukilankeidas
11. Haapakeidas
12. Helvetinjärvi
13. Lauhanvuori
14. Kauhaneva–Pohjankangas
15. Kolovesi
16. Pirjatanneva
17. Kermajärvi
18. Pässilänvuori
19. Aittosuo
20. Laihistenneva–Härkäneva
21. Pyhä–Häkki
22. Saarisuo–Valleussuo
23. Kilpisuo
24. Pohjoisneva
25. Eitikansalonsuot
26. Salamajärvi
27. Suojärviensuo
28. Seläntauksensuot

29. Hukkasuo
30. Pilvineva
31. Kotkanneva ja Pikku-Koppelonmetsät
32. Särkkälammit
33. Päävaara
34. Kansikkopuro
35. Kuoppasuo
36. Eteläneva–Viitasalonneva–Seljänneva
37. Saarisuo–Kurkisuo
38. Losonvaara
39. Kansanneva–Kurkineva–Muurainsuo
40. Haapaveden lintuvedet ja suot, Köyrynrimpi ja Porerimpi
41. Antinmäki–Kylmänpuro–Hevossuo
42. Rumala–Kuvaja–Oudonrimmet
43. Pitkäsneva
44. Haarasuo
45. TormuanPohjavaara/Särkilamminsuot ja Kortepaikanpuro
46. Tervajärvi–Ouvonsuo
47. Liejusuo–Kaakkurisuo
48. Salmitunturi–Rääpysjärvi
49. Syöte
50. Asmuntinsuo–Lamminsuo
51. Tynnyriaapa
52. Termusaapa
53. Ellitsa
54. Pomokaira



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Beautiful peatlands!

A solid moss layer is a bouncy surface to walk on. Many visitors to bogs also favour duckboard trails, where you can step lightly and admire the life in the peatland environment.



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