



BIODIVERSITY IN FINNISH FORESTS

WWW.MMM.FI
WWW.ENVIRONMENT.FI

**PUBLISHERS:
MINISTRY OF AGRICULTURE AND FORESTRY
AND MINISTRY OF THE ENVIRONMENT**



MINISTRY OF AGRICULTURE AND FORESTRY



Also available on the internet at:

www.mmm.fi/metso/

www.environment.fi/

Ministry of the Environment / Publications / Brochures

FRONT AND BACK COVER:

Biodiversity of a commercially managed forest in eastern Finland.

INNER FRONT COVER:

A naturally regenerated 60-year-old birch stand
in an area formerly cleared and burnt for farming.
(Erkki Oksanen)

FRONT FOLD:

Autumn colours create seasonal diversity.

INNER BACK COVER:

A peaceful snow-clad forest.
(Hannu Viitanen)

BACK FOLD:

Snow falling from a tree.
(Jouni Klinga)



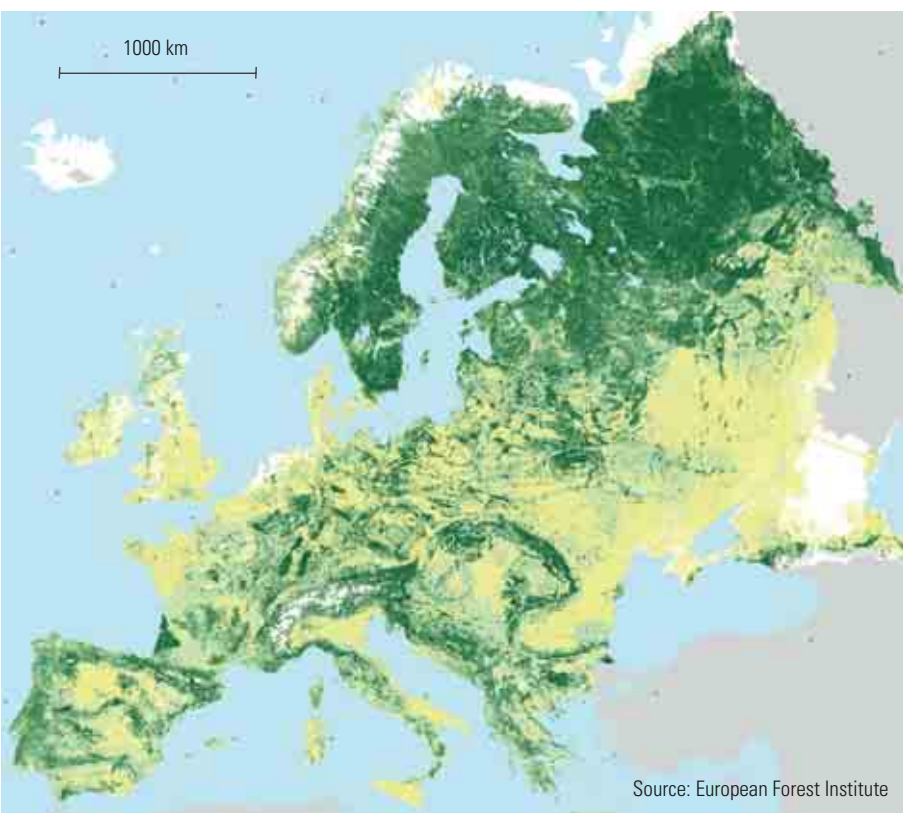
BIODIVERSITY IN FINNISH FORESTS

Since the 1990s, maintaining and protecting the biodiversity of forests has been an integral part of sustainable forest management. Today, biodiversity is taken into account in a number of ways in the management of our forests. The proportion of Finland's forests under strict protection is almost four

times the European average. Most protected areas are located in the sparsely populated regions of Eastern and Northern Finland. In 2008 the Finnish Government launched a new programme to safeguard forest biodiversity in Southern Finland.

The Forests of Europe

Proportion of forest out of the total land area (% at 1x1 km resolution)



Source: European Forest Institute

EUROPE'S MOST FORESTED COUNTRY

Finland is Europe's most forested country, with forests covering three-quarters of the land area. The total forest area is 22,000 square kilometres, making it the largest in Europe after Sweden (27,000 sq km). Other countries with extensive forests are France (15,000 sq km), Spain (14,000 sq km) and Germany (11,000 sq km).

The forests of Central Europe are denser and grow faster than the coniferous forests of the north. In terms of growing stock and increment, the most important countries for forestry in Europe are France, Germany, Sweden and Finland. The impact of forests on the national economy and the whole of society has been greatest in Finland. The country's development from a relatively undeveloped, agrarian society into a prosperous, post-industrial country has largely been based on forestry and the forest industries. In the 1950s, the forest industries accounted for as much as 80 per cent of Finland's export income. Today, about a fifth of Finland's export income still comes from the forest sector, especially from high-tech paper products.

Finland's forest industries are highly competitive. They have grown rapidly to become an increasingly globalised sector. The largest Finnish forest industry companies are now among the leading companies



UP/KK/MME

in global markets. More than half of their production is located outside Finland, especially in Central Europe. International environmental norms are strictly observed in all their operations.

4

FAMILY FORESTRY HAS CREATED WIDESPREAD PROSPERITY

In Finland, as elsewhere in Europe, about two thirds of forests are owned by families. As a result of their land ownership history, these forest holdings tend to be small, averaging about 24 ha, so forestry also tends to operate on a small scale, with fellings and silvicultural measures typically applied in small forest stands of just 1–2 ha on average.

The forests have provided employment, income and vital wood for many generations of Finns. Income from wood sales and the related employment opportunities are still vital for about 400,000 families, and for rural Finland as a whole. Forestry and the forest industries provide work for thousands of businesses with tens of thousands of employees.

Unlike in many other countries, Finnish forestry is a profitable industry. As a result, private forest owners have traditionally shown great interest in the sustainable management and use of their forests. The Finnish Government has actively supported and guided private forestry. Since the 1950s, the forested area has increased, and the total annual harvest has risen from 55 million to 100 million cubic metres. There is more wood in the forests now than previously, and this allows for the increased utilisation of wood for industrial purposes.

The valuable natural features of forests have become increasingly important in recent decades, and they are now taken into account in all forms of forest use. A deep-rooted respect for the cultural, recreational and environmental values of the forests is an integral part of Finnish family forestry. Everybody has free access to all of Finland's forests, even privately owned forests, to enjoy outdoor recreational activities or, for example, to pick wild berries and mushrooms.



OF SISU/AUTO AB

Forests dominate the Finnish landscape, and tens of thousands of people depend on forestry for their livelihood.

BIODIVERSITY AN INTEGRAL PART OF FINLAND'S NATIONAL FOREST PROGRAMME

Finnish forest policy is guided by the current National Forest Programme, which extends until 2015. All the relevant stakeholders, including environmental organisations, have been involved in the preparation and implementation of the programme, which aims to ensure that forestry in Finland remains sustainable in economic, social and ecological terms.

The programme's most important economic objectives are to increase the annual cut by 10–15 million cubic metres to 65–70 million cubic metres, to use wood raw material in more diverse ways, to raise the production of the forest industries by a fifth, and to increase the use of wood for energy to 8–12 million cubic metres a year.

The main objectives in terms of social sustainability are related to the positive impacts of the programme on employment and living conditions in rural areas, and the maintenance of traditional uses of forests such as hunting, reindeer husbandry, outdoor recreation and landscape management.

In terms of ecological sustainability, the programme aims to ensure that forest species and habitats have favourable conservation statuses, thanks to a combination of protected areas and the appropriate management of commercially used forests. This objective is fully in line with the Convention on Biological Diversity, which Finland has ratified.

Means to help ensure ecological sustainability include the establishment of new protected areas, the conservation and careful management of forests within the Natura 2000 network, and the implementation of the new Forest Biodiversity Programme for Southern Finland (2008–2016), which was approved in tandem with the new National Forest Programme. New means have also been developed for the management of natural habitats in commercially exploited forests.

JOUNI KLINGA



A well-earned rest after a successful day's hunting.

ERIKI OJASALMI



All Finnish forests are freely accessible for outdoor activities, including the picking of wild berries and mushrooms.



RISTO TUOMEN

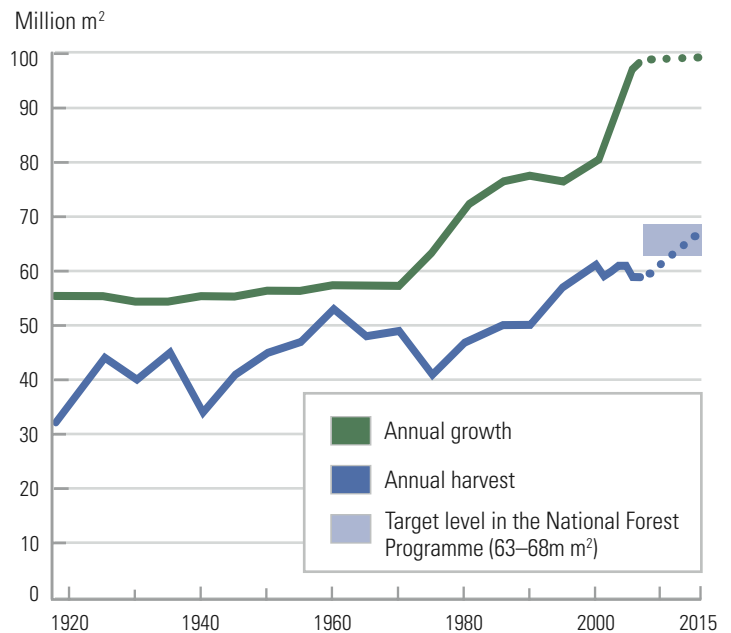
A NEW WIDE-RANGING BIODIVERSITY ACTION PLAN

The new National Strategy and Action Plan for the Conservation and Sustainable Use of Biodiversity in Finland 2006–2016 emphasise the crucial role of forests. The Government-approved strategy and action plan are to be implemented under the supervision of an Environment Ministry working group that also includes the representatives of a wide range of stakeholders.

The overall aim is to increase the areas of forest under protection, particularly in Southern Finland, and to also ensure that biodiversity is duly considered in commercially managed forests. Related measures in addition to the new Forest Biodiversity Programme for Southern Finland

Forest growth and harvesting levels in Finland since the 1920s

Source: Finnish Forest Research Institute



The Finnish Forest Act prohibits felling alongside streams in all kinds of forest.

include surveys of ecologically valuable forest habitats, research and training related to forest biodiversity, and intensified co-operation between the forestry and environmental authorities.

The ultimate goal is to ensure that natural forest habitats, the vital structural features of forests and their characteristic species can all be preserved.

PROTECTED AREAS COVER ABOUT A TENTH OF FINLAND

Protected areas in Finland's State-owned lands have a total area of 14,000 square kilometres. Wilderness areas with a total extent of a further 14,000 sq km have additionally been established in northernmost Lapland, in areas characterised by open fells and timberline forests. These areas together amount to some 28,000 sq km, about 10 per cent of Finland's total land area, or roughly the area of Belgium. Protected areas are kept in as natural a state as possible, and most are freely accessible to everyone wishing to enjoy their beautiful natural features or outdoor activities.

According to a recent international evaluation, Finland's network of protected areas is well managed, but suffers from regional imbalance. In Northern Finland 15.9 per cent of forests are under protection, but in the more populated south this figure is just 2.2 per cent.

Overall a total area of forest of 19,000 square kilometres is under strict protection in Finland – accounting for half of the strictly protected forests within the EU. The proportion of all forests covered by strict protection is almost three times higher in Finland than in the EU on average. Finland's Natura 2000 network covers about 12 per cent of the whole country, encompassing about 10,000 square kilometers of ecologically valuable forest habitat. Almost all of Finland's strictly protected forests are also in the Natura network.

ERIKKI OJASANEN



Mechanised harvesting is an integral part of modern cost-effective forestry.

ERIKKI OJASANEN



A naturally regenerated pine stand.



JOUNI KLINGA

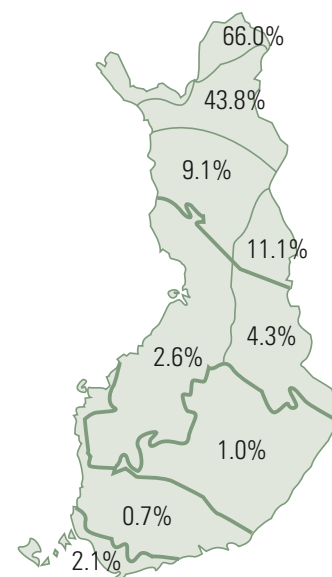
VALUABLE OLD-GROWTH FORESTS UNDER PROTECTION

During the 1980s and 1990s Finland drew up a large number of national nature conservation programmes to be implemented by 2009. State-owned lands can be protected through administrative decisions, and a total sum of 580 million euros will be used to purchase private lands and compensate landowners.

Finland's national programme for the conservation of old-growth forests was finalised in 1996, with old-growth forests defined according to ecological criteria such as the ages of trees, the amounts of decaying wood, the time elapsed since the last felling, the extent of old growth, and biogeographical location. Field surveys were carried out in almost one million hectares of potential old-growth forest, which were then ranked according to ecological criteria. The Government then resolved on the basis of proposals made by a working group including the representatives of various stakeholders to protect 345,000 hectares of the most valuable forests.

Percentages of forest under strict protection by vegetation zone

Sources: Finnish Forest Research Institute, Finnish Environment Institute



The Kitkajoki river valley in Oulanka National Park.

During the period 1997–2001, an additional 129,000 hectares of valuable forest habitat and ecological corridors were identified in the landscape ecological plans drawn up by Metsähallitus, the government agency responsible for managing forests owned by the Finnish State.

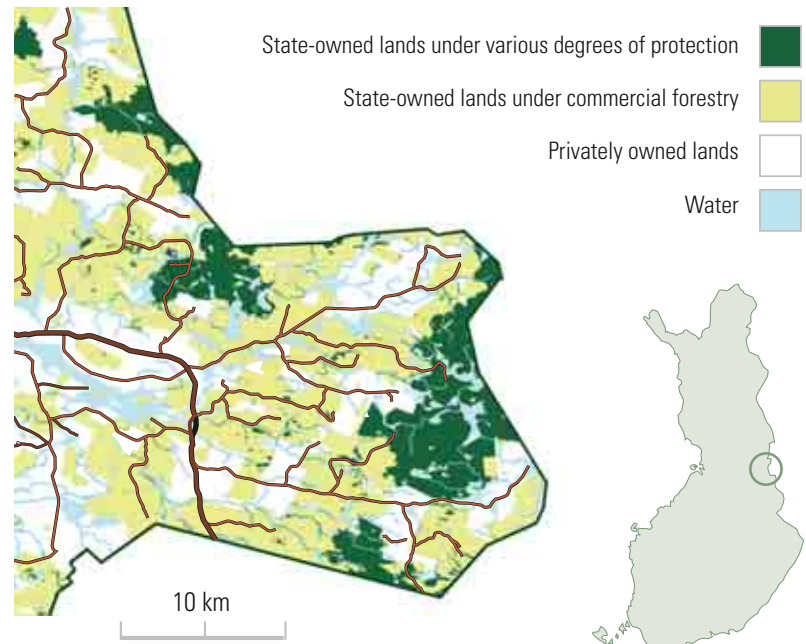
International evaluations have described Metsähallitus as a forerunner in the development and implementation of such new ecological planning methods. In the winter of 2003 the Finnish Association for Nature Conservation and WWF Finland began collaboration with Metsähallitus to enhance the conservation of forests in Northern Finland through such planning, on the basis that no separate new conservation programme would be needed for the region. Consequently, areas of old-growth forest amounting to 55,000 hectares were designated to be spared from felling. Metsähallitus now excludes more than 200,000 ha of State-owned forest from logging plans so as to benefit nature, create ecological corridors or enhance reindeer pastures.

EMPHASIS ON ENDANGERED FOREST SPECIES IN SOUTHERN FINLAND

Since the 1980s three comprehensive Red List surveys of threatened species have been carried out in Finland. The most recent Red List, completed in 2000, was based on the criteria of the World Conservation Union (IUCN), and assessed the statuses of more than 15,000 of Finland's 43,000 known species. The only other country that has carried out such an extensive survey is Sweden. Altogether 1,505 species were classified as threatened, with 43 per cent of these species primarily found in forest habitats. This proportion is naturally high since so much of the country consists of forests that have long been used by people. Wild forest species including bears and wolves still survive, however, although wolves are endangered in Finland and bears are classed as near threatened. The populations of both species have recently been increasing, partly as a result of influxes of animals from nearby Russia.

Forest species are particularly under threat in Southern Finland for

Mosaic of commercial forests and conservation areas in Kainuu



Source: National Land Survey of Finland, Metsähallitus, Finnish Environment Institute



Hikers take a break to grill salmon over an open fire.



various reasons. Herb-rich forests have shrunk due to their widespread clearance over the centuries to create farmland. For many broadleaved tree species Finland represents the northernmost limit of their natural range. Woodland pastures have almost completely disappeared because very few farmers now graze their animals in forests. Modern forestry practices have reduced both the amounts of decaying wood and the numbers of broadleaved trees, especially aspens. The forests are also now generally younger than before. Forest fires, which are a part of the natural cycle of boreal forests, have become less common at least partly due to improved fire prevention.

Insufficient information is available about many threatened species, although several major research programmes examining forest biodiversity have helped to redress this situation, and also revealed the presence 1,500 forest species never previously recorded in Finland.

KEY HABITATS

Favourable forestry practices can also be adopted to benefit threatened species. To this end Finland's Forest Act defines "key habitats" where certain forestry activities are limited. Such habitats include nutrient-rich spruce mires, patches of herb-rich woodland, and the surroundings of springs, streams and pools. Forest biodiversity is also supported by encouraging controlled burnings, the growth of mixed forest and aspens, the sparing of retention trees during fellings, and measures to increase the amounts of decaying wood in the forests.

INNOVATIVE TOOLS IN THE FOREST BIODIVERSITY PROGRAMME FOR SOUTHERN FINLAND

The Finnish Government approved a new Forest Biodiversity Programme for Southern Finland in March 2008. The programme includes many measures to promote biodiversity. So far funding amounting to 182 million euros has been ear-marked for the period until 2012, but the programme will eventually run until 2016.

Because most of the forests in Southern Finland are privately owned, the forest biodiversity programme primarily aims to encourage forest owners to conserve ecologically valuable features in their own forests, and it provides new incentives for such voluntary conservation. These measures will be offered to landowners as an integral part of official forestry advisory services. Forests may be purchased by the State, or conserved or suitably managed under temporary or permanent agreements, depending on the nature of their valuable ecological features.

Forests with a lot of decaying wood and old-growth, for instance, may be preserved for periods of 10–20 years to benefit hole-nesting birds and other species that depend on such habitats. The habitats of flying squirrels and other threatened species must still be legally protected, however. The programme also strives to enhance the management of habitats in commercially exploited forests and promote further research into forest biodiversity. The programme will be implemented jointly by the relevant ministries, forest owners and other stakeholder groups. Its results and impacts will be regularly evaluated.

NEW FOREST REGENERATION METHODS

Finnish forestry is based on the country's three main native tree species, Scots pine, Norway spruce and birch. All three species take 60–120 years to reach maturity in Finnish conditions. During the regeneration cycle stands are subjected to 1–3 thinnings, and at maturity they are typically regenerated by clear cutting or seed tree felling. Natural regeneration with seeding is used whenever possible (in practice in about a third of all stands).

Clear cutting is used in about two-thirds of regeneration fellings, with stands then regenerated through planting or seeding. Clear cuts are common in Finland because two of the most common tree species, pine and birch, are pioneer species, meaning that they regenerate best in well-lit open areas. Clear-cut areas are usually very small, between one and two hectares, and several retention trees are typically left standing

MATKAALUN EREBTÄMÄSKESKUS

JARI KOSTET



Forests have always been closely associated with the Finnish identity.



Finland's bear population has increased in recent decades.



HARRIPOLLI



JOUINKINGA



JOUINKINGA

The golden eagle, southern dunlin and lady's-slipper are all threatened species in Finland.

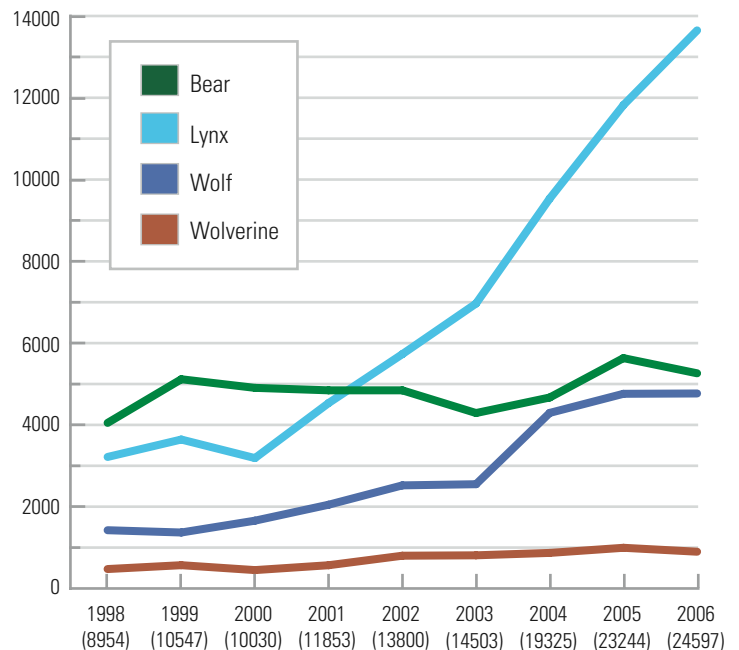
to help preserve the landscape and its biodiversity. Seedlings used in replanting are almost always of domestic origin.

CHERISHING VALUABLE NATURAL FEATURES IN COMMERCIALLY MANAGED FORESTS

Forestry must be economically sustainable. This viability also guarantees that biodiversity and other aspects of sustainability be duly safeguarded. Finland's commercially managed forests include 8,000 square kilometers of forest (4 per cent) where forestry practices are limited to safeguard their ecological or recreational value. Although most of these restrictions are prescribed by law, forest owners also widely preserve these features on a voluntary basis. In certain cases forest owners may be entitled to compensation for economic losses they suffer due to conservation.

Annual numbers of observations of large carnivores in Finland

Source: Finnish Game and Fisheries Research Institute





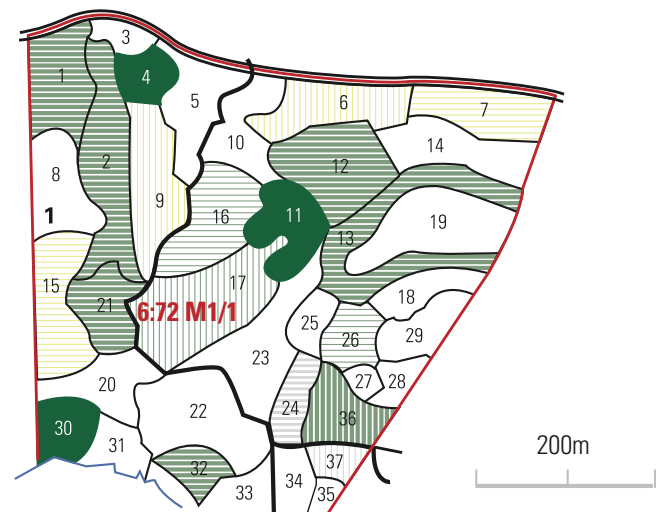
ERIK OIKARINEN

Advisory services, forest planning and forest certification also help to promote biodiversity in Finland's forests. Two-fifths of all forest owners' holdings are covered by forest management plans, which are based on field surveys that also note any ecologically important sites. Forest owners are actively encouraged to preserve such features.

Some 95 per cent of Finland's forests have been certified under the Finnish Forest Certification System (FFCS). This certification commits forest owners to preserve ecologically valuable features, monitor how forest habitats are managed, support the training of professional foresters and forest workers, and spare decaying trees and other trees of importance for biodiversity during fellings. Certification criteria are revised every five years and independent inspectors annually ensure that the criteria for certification are met. The FFCS system is part of the Programme for the Endorsement of Forest Certification Schemes (PEFC), and Finnish firms may use PEFC labeling on their products as applicable.

Example stand map from a forest management plan

Source: Forestry Development Centre Tapio



Decaying trees are important for maintaining forest biodiversity. Forests are managed so as to increase the amounts of decaying wood.

CLIMATE CHANGE AND FINLAND'S FORESTS

Finland's forests help to mitigate climate change, since the concentrations of greenhouse gases in the atmosphere are reduced when carbon is bound up in trees, forest soils and timber products. Wood-based products and bioenergy can be used instead of more energy-intensive products and non-renewable forms of energy to improve the overall carbon balance.

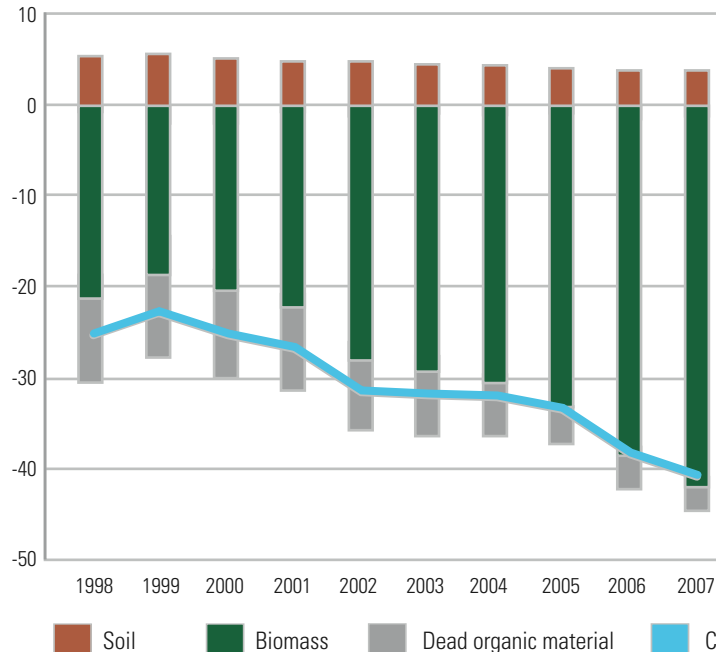
Finland's forests absorb a significant share of the country's carbon dioxide emissions. In 1990 the growing forests soaked up about half of Finland's carbon dioxide emissions, while in 1999 this form of carbon sequestration accounted for about a quarter of Finland's emissions. This proportion varies considerably due to fluctuating trends in both emissions and logging.

HANNUVALLAS



Finland's forests absorb a significant share of the country's carbon dioxide emissions.

The carbon balance of Finland's forests



Changes in total volumes of timber are the most important factor in the forests' carbon balance. When the amount of wood removed during harvesting is less than total forest growth, forests serve as net carbon sinks absorbing carbon from the atmosphere (indicated by negative values on the graph). Drained peatlands contrastingly release greenhouse gases overall, and thus act as net carbon sources (positive values). In future as fellings increase in line with the National Forest Programme, net carbon absorption will decline temporarily until young forests start to grow and bind up carbon again. The increased use of residual wood for energy will not greatly affect the overall balance, as litter on the forest floor would otherwise rapidly decompose and emit carbon. Finland's total carbon dioxide emissions averaged 78.4 million tonnes of CO₂ equivalent over the years 2002–2006, while the forests absorbed an average of 35.4 million tonnes annually.

Source: Statistics Finland



ARTO MOUTKANEN

Whenever forests are logged, carbon will eventually be released into the atmosphere when logging residues or wood-based products decompose or are burnt. But this has no negative impact in terms of climate change as long as new forests are regenerated in place of the logged forests as soon as possible, since the released carbon is in effect reabsorbed by the growing trees.

If the amounts of timber logged in the forests each year are lower than the total annual growth of all their trees, as is the case in Finland, forests act as a net carbon sink, binding more carbon than they release into the atmosphere. Over the last 30 years the total amount of wood in Finland's forests has increased by about a quarter.

Finland's forests are currently growing at a rate of about a hundred million cubic metres a year. Even if total annual logging increases considerably from the present rate of some 60 million cubic metres, the reserves of carbon in the forests can be expected to go on expanding. Finland's National Forest Programme for 2015 aims to increase total annual fellings to some 65–70 million cubic metres. This means the amounts

Using wood or wood-based products can help to combat climate change.

PEKKA VÄISÄNEN



PEKKA VÄISÄNEN



of carbon being absorbed by the forests will rise slightly at first, with the increase becoming more rapid in the 2010s as young forests grow in logged areas.

Choosing to use wood or related products to replace fossil fuels or products derived from them can help to combat climate change. The share of wood energy in total energy consumption is higher in Finland than in any other EU country, at about a fifth. Using such renewable forms of energy greatly contributes to Finland's efforts to mitigate climate change.

It has been predicted that climate change will lead to higher temperatures and precipitation in Finland, and also increase the frequency of extreme weather events like heavy rainstorms and prolonged hot, dry spells. The winter periods of snow cover and groundfrost are likely to become shorter. More ecologically diverse forests are better able to adapt to changing climatic conditions. According to the new National Forest Programme, Finland's official forestry recommendations will be duly revised to help forests thrive in changing circumstances.



It is expected that climate change will increase the frequency of extreme weather events such as floods in Finland.







GRAPHIC DESIGN:
Luze Oy

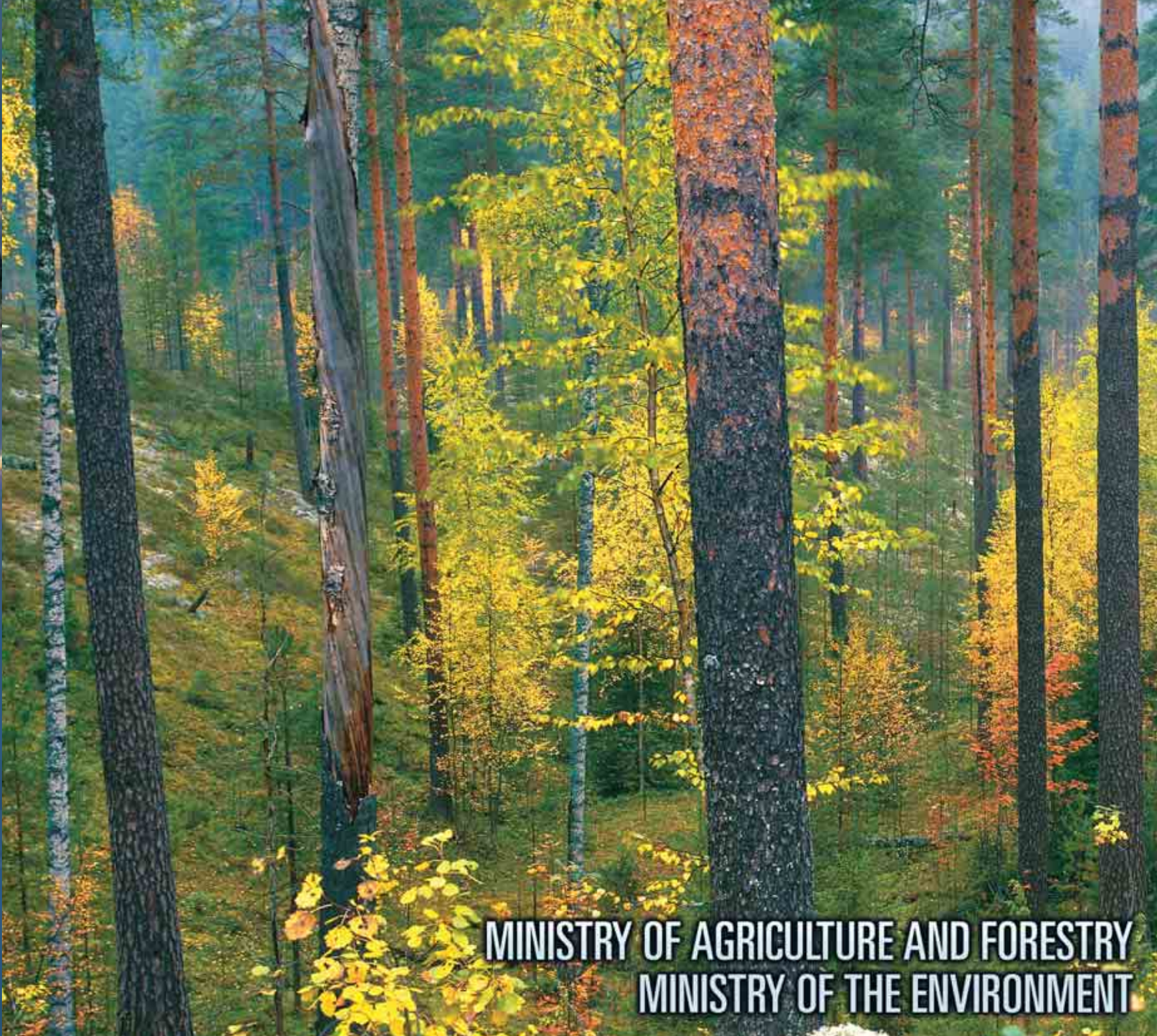
EDITOR:
Ahti Kotisaari

PHOTOGRAPHS:
Arto Mutikainen, Pekka Väisänen, Hannu Vallas, Erkki Oksanen,
Jouni Klinga, Jari Kostet, Jarmo Manninen, Harri Pulli, Risto Timonen,
Jari Tuiskunen, Hannu Viitanen, Finnish Forest Industries Federation,
UPM-Kymmene, Finnish Tourist Board, Oy Sisu Auto Ab

PAPER:
Printed on paper fulfilling the Eco-Management Audit Scheme
(EMAS) requirements of the European Commission.

PRINTING:
Painoprisma 2008





**MINISTRY OF AGRICULTURE AND FORESTRY
MINISTRY OF THE ENVIRONMENT**