

## 6 Uses and Users of the Parks

Protected areas provide society with many ecosystem services, including vital products, such as clean air, water, soil, food and biodiversity, as well as natural cycles and processes that maintain habitats important to humans. Protected areas and their ecosystems also encompass many kinds of cultural values and provide intangible services, such as aesthetic, spiritual or recreational experiences, and environments for learning and research.

Protected areas have many kinds of uses, which can also be viewed as services offered by natural systems. National parks, wilderness reserves and national hiking areas in Finland receive almost two million visits annually. Recreational use has a significant impact on well-being for both individuals and society as a whole. Protected areas provide a livelihood for nature tourism companies and, in the north, for those practising traditional natural livelihoods. Protected areas also have the important task of preserving representative examples of Finnish natural environments for research and environmental education.

Examples of ecosystem services provided by different kinds of habitats are shown in Figure 35, and connections between these ecosystem services and human well-being are illustrated in Figure 36.

### 6.1 Nature Recreation and Tourism Increasing

Almost a quarter of tourism in Finland is nature tourism. Although tourism in Finland has grown more slowly than anticipated in recent years, nature tourism has grown more quickly than tourism in general. The strongest growth, especially with regards to winter tourism, has been in Lapland. This growth has been led by large tourism centres and clusters. The general trend in tourism is also reflected in the numbers of visitors to national parks. Visitor numbers and increases in visits are highest in national parks near large tourism centres in Lapland and NE Finland, such as Pallas-Yllästunturi and Oulanka.

#### 6.1.1 Nature Recreation in Finland is Based on Free Access

The concept of ‘everyman’s right’ gives everybody in Finland free access to natural environments, irrespective of who owns or occupies the land. These rights may be exercised without the landowner’s permission, and free of charge. Everyman’s right cannot, however, be used in any way that causes harm or disturbance.

The tradition of everyman’s right has been preserved in the Nordic countries, and is based on different legal statutes. The related rights also apply to foreigners. Everyman’s right allows everyone to move under their own steam and stay temporarily on land, for instance camping out in a tent. Everyone may also pick wild berries and mushrooms, fish with a simple rod and line, fish through a hole in the ice, go boating or swimming in waters, and travel across ice. On the other hand, everyman’s right does not include the right to light fires, leave litter, use off-road vehicles, or hunt or fish with other equipment without the necessary permission.

Everyman’s right may be restricted in statutory protected areas on State-owned land. The legislation passed to establish protected areas can allow activities covered by everyman’s right, such as access, fishing with a rod and line, or picking mushrooms and berries. The Nature Conservation Act states that regulations which apply to protected areas can include rules that must be observed by visitors. Access to all or parts of an area can be temporarily restricted or completely prohibited, for instance. Such prohibitions can only be enforced, where they are necessary for the conservation of the area’s flora or fauna.

This relative freedom to use all of Finland’s natural areas afforded by everyman’s right is rare from an international perspective, and this is the reason why in many countries national parks and other natural areas intended for recreational use have a considerably higher significance and usage pressure than they do in Finland. Finland is a sparsely populated country and there is still an abundance of natural diversity. Finns do not necessarily need to visit protected areas to find mushrooms, places to swim or peaceful natural areas.

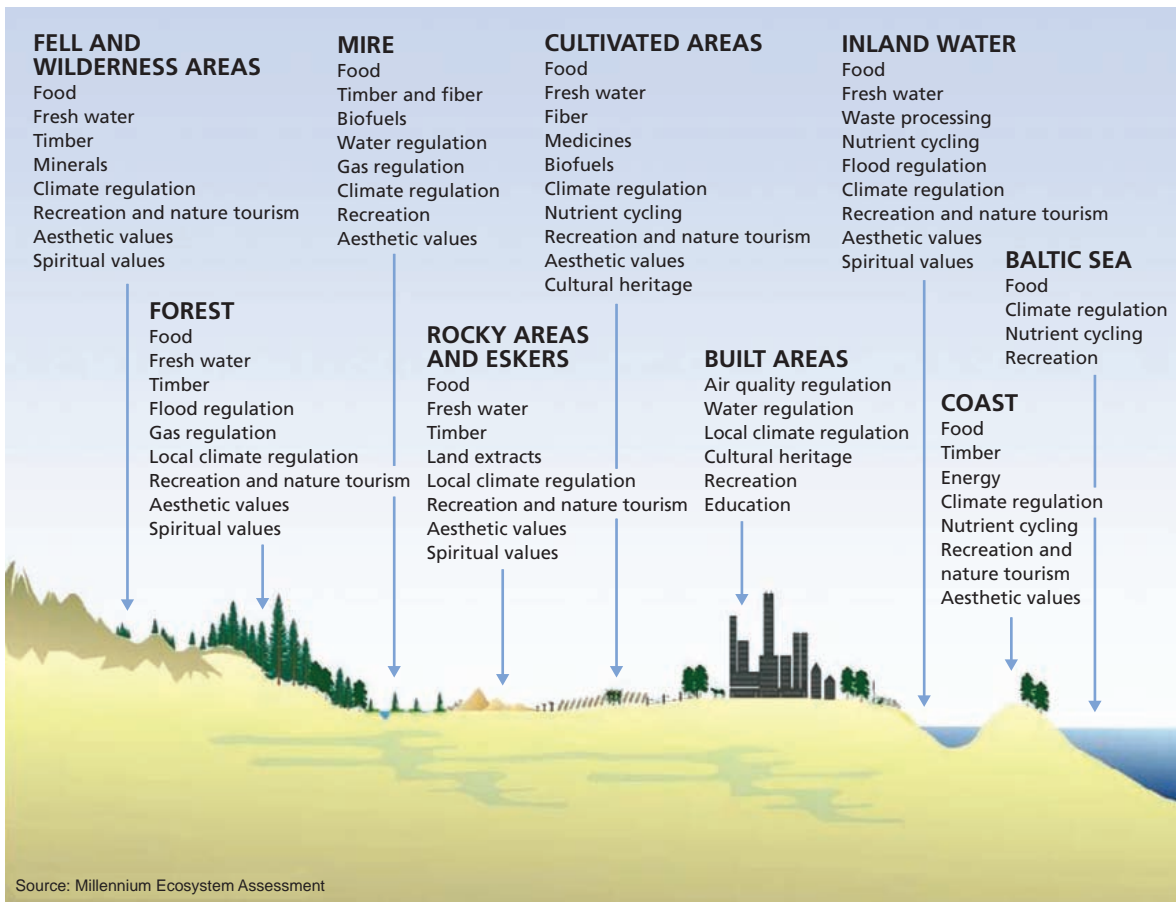
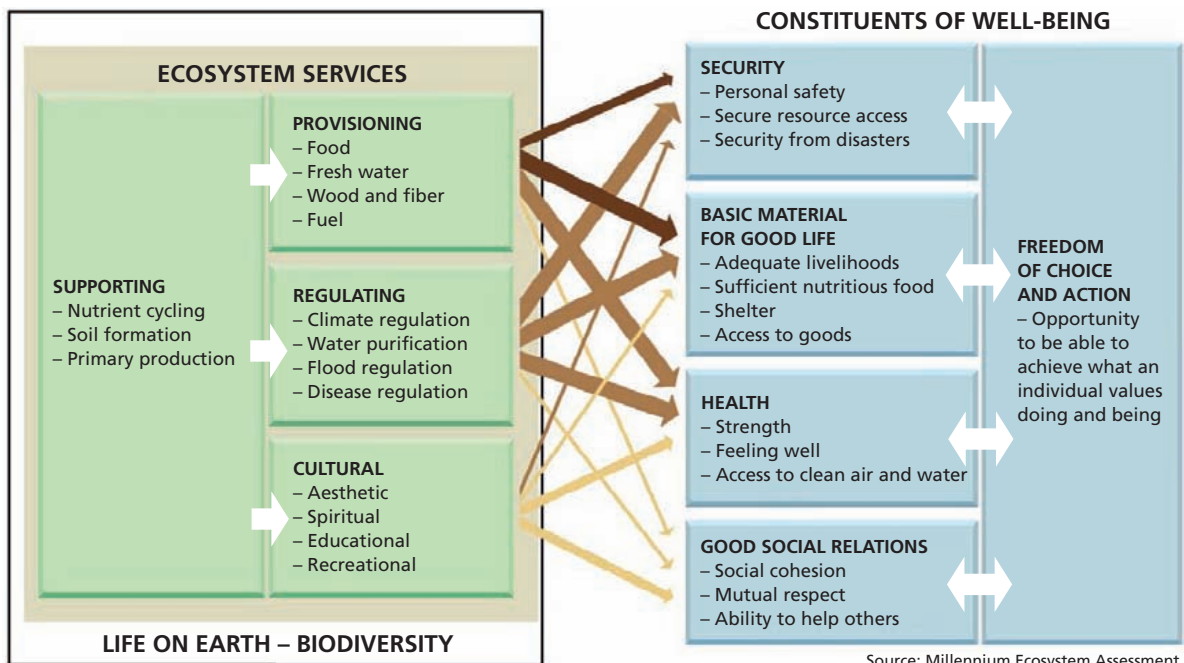


Figure 35. Ecosystem services offered by different types of habitats. Source: Millennium Ecosystem Assessment 2005.



**ARROWS COLOR**  
Potential for mediation by socioeconomic factors

- Low
- Medium
- High

**ARROWS WIDTH**  
Intensity of linkages between ecosystem services and human well-being

- Weak
- Medium
- Strong

Figure 36. Relations between ecosystem services and the constituents of human well-being. Source: Millennium Ecosystem Assessment 2005.



**Ice fishing in Linnansaari National Park.** Fishing with a simple rod and line is permitted under everyman's right throughout Finland, even in protected areas. Traditional free access to the land and the right to camp out can be restricted where necessary to conserve plants and animals. Photo: Marie Louise Fant.

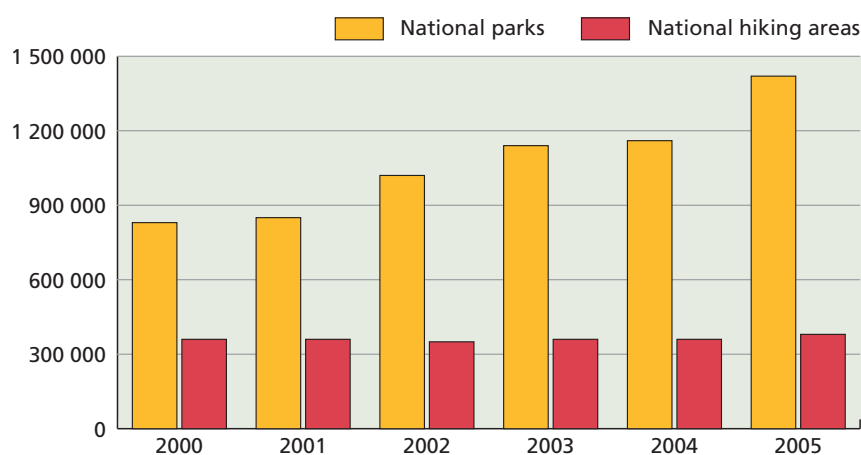
### 6.1.2 More Visitors As New Parks Established

The use of protected areas offering facilities for the public, i.e. demand and changes in demand, are monitored with the help of visitor counters, visitor surveys and other research (assessing the nature of demand and related trends). The numbers of visitors to national parks have been monitored by simple methods since the early 1990s. Such data has been compiled by the Natural Heritage Services (NHS) using more comprehensive methods since 1998, also for hiking areas. National visitor figures from 2000-2005 can be seen in Figure 37 and Tables 11 and 12. Visitor numbers for individual national parks and hiking areas are listed in Appendix 16.

The annual total numbers of visits to national parks under Metsähallitus administration have grown steadily since the beginning of the decade. The total number of visits in 2005 was 1,410,000, a rise of almost 20% on the previ-

ous year. A significant part of this increase is a result of parks being transferred to Metsähallitus administration (Pallas-Ounastunturi and Pyhätunturi, 2002) and their extension (Pallas-Yllästunturi and Pyhä-Luosto, 2005), as well as the establishment of new parks (Repovesi and Leivonmäki, 2003). The increases in visitor numbers to most individual national parks have, however, remained small. The total number of visits to national hiking areas in 2005 was 360,100, a rise of only 3% on the previous year. The total number of visits to hiking areas has remained virtually unchanged since the beginning of the decade. Over a longer time-span from 1992 to 2005 the total numbers of visits to national parks have tripled.

Visitor numbers vary between different parks according to the attractions they have to offer. The annual numbers of visits to Metsähallitus's most popular national parks, Pallas-Yllästunturi, Urho Kekkonen, Oulanka and Nuuksio, are in excess of 100,000. Almost a third of visitors to



**Figure 37.** Total numbers of visits to Finnish national parks and hiking areas under Metsähallitus administration 2000-2005. Source: Metsähallitus.

**Table 11.** Numbers of visits to national parks and annual increases 2000-2005. Source: Metsähallitus.

| National parks                               | 2000    | 2001    | 2002      | 2003      | 2004      | 2005      |
|--|---------|---------|-----------|-----------|-----------|-----------|
| Number of national parks                     | 30      | 30      | 32        | 34        | 34        | 34        |
| Visits, total                                | 833 000 | 851 000 | 1 012 000 | 1 123 200 | 1 153 900 | 1 410 000 |
| Visits, average per area                     | 27 767  | 28 393  | 31 625    | 33 035    | 33 938    | 41 471    |
| Change from the previous year (total visits) |         | 18 800  | 160 200   | 111 200   | 30 700    | 256 100   |
| Change from the previous year (%)            |         | 2.2     | 15.8      | 9.9       | 2.7       | 18.2      |

**Table 12.** Numbers of visits to national hiking areas and annual changes 2000-2005. Source: Metsähallitus.

| National hiking areas                        | 2000    | 2001    | 2002    | 2003    | 2004    | 2005    |
|--|---------|---------|---------|---------|---------|---------|
| Number of national hiking areas              | 7       | 7       | 7       | 7       | 7       | 7       |
| Visits, total                                | 350 000 | 355 000 | 346 500 | 353 000 | 350 500 | 360 100 |
| Visits, average per area                     | 50 000  | 50 714  | 49 500  | 50 429  | 50 071  | 51 443  |
| Change from the previous year (total visits) |         | 5 000   | -8 500  | 6 500   | -2 500  | 9 600   |
| Change from the previous year (%)            |         | 1.4     | -2.5    | 1.8     | -0.7    | 2.7     |

the most popular national parks are foreigners, but in most parks visitors are mainly Finnish. According to research, high numbers of visitors are linked to beautiful landscapes and abundant facilities both inside and in the vicinity of the parks (see Information Box 12).

### 6.1.3 Customer Profile Emerging

Visitor surveys have become increasingly important in the context of protected area management planning, as visitor numbers have increased and the importance of the recreational use of nature has become more important in many ways. Visitor surveys consist of questionnaires or interviews

directed at visitors to a certain area, which are used to collate up-to-date information about visits. Visitor surveys can be used to identify the types of visitors, their recreational motives, their opinions about areas and their facilities, levels of visitor satisfaction, visitors' activities and their related expenditure. Knowing about visitors is a vital precondition for managing areas according to visitors' needs.

Over 40 visitor studies have been carried out over the last 5 years in protected areas, mainly national parks and hiking areas. Studies are conducted according to a standard practice, and the aim is to repeat these studies in the most important areas approximately every five years.



Visitor studies have helped to create an overall picture of areas' seasonal variations in visitors, typical visitors, visitors' activities and their length of stay, as well as impacts on the area and the local municipalities. Data from the National Outdoor Recreation Demand and Supply Assessment (LVVI) study has also been used to improve knowledge about visitors and the recreational use of State-owned areas in relation to other areas.

### *Local recreation and hiking*

The studies have shown that users of State areas reserved for recreational purposes are equally distributed across different areas of Finland. Although the north has more State-owned (recreation) areas in terms of their total extent, the population is denser in the south and the distances to smaller recreation areas are shorter. People more likely to use State-owned recreational areas include people living near such areas, people from Eastern Finland, and residents of towns with over 100,000 inhabitants. Having a small family and abundant free time increases the amount of use. Users are typically well-educated men working in white-collar jobs. Users are generally active outdoor types. State areas are used especially for sports that require large areas and certain natural features, such as cross-country skiing, wilderness trekking, and fishing.

### *Flow of nature tourists from south to north*

State areas are the destination for a quarter of nature tourism trips and a fifth of the total number of days spent on such trips. The studies have also revealed that State-owned protected areas are visited from further afield and for longer periods than other areas. Their users also tend to spend more money as well as time. Most short trips are made by private individuals to holiday homes.

A third of all nature tourism trips are made to Northern Finland. A fifth of these are skiing trips. The next most important reasons are hiking, fishing and downhill skiing. Half of the trips last more than three days. The majority of visitors to Eastern and Northern Finland are from other areas of Finland, especially the south; only around a third come from the same region as their destination.

### *Boating in State waters*

Metsähallitus has considerable importance as a provider of citizens' nature recreation opportunities in marine waters and archipelagos. Such areas are increasingly popular destinations for nature recreation and tourism. Undeveloped shores are rare outside protected areas, especially around large population centres. Even areas in the shore conservation programme include hundreds of holiday homes built before the Government designated areas for the programme. Different forms of nature- and culture-based tourism in the archipelago are developing rapidly. Boating is increasing, as is the average size of vessels.

An estimated 17,500 boats and nearly 190,000 people visited Metsähallitus harbours in 2003. Users of boating facilities were not differentiated from other users in the Metsähallitus visitor surveys. A study of water-area users has only been conducted in the Archipelago Sea, where the typical user is a man from Southern Finland travelling in his own boat with his family. People are visiting the SW Archipelago increasingly often.

## **6.2 Hunting and Fishing a Part of Life in the North**

### **6.2.1 Hunting and Fishing Highly Popular Throughout Finland**

The Finns' close relationship with nature can be seen in the popularity of hunting and fishing, which is among the highest in Europe. Over 300,000 Finns are registered hunters and it is estimated that up to 1.5 million Finns (of 5.2 million inhabitants) go fishing every year. Everyone who goes hunting or fishing in Finland pays the State an annual tax in the form of hunting and fishing licence fees, the proceeds of which are used to fund related management activities.

Hunting and fishing are practised in Finland in quite a different way to other EU countries. Although the search for prey is an essential part of hunting, Finnish hunters typically emphasise the connection with nature, the experience of hunting, and ecological concerns. Both hunting and fishing remain widely practised by all social groups in Finland, irrespective of income levels or social position. There is a desire for hunting

and fishing to be regarded as a permanent and straightforward part of the Finnish lifestyle.

State lands are of great importance to Finnish hunters without lands of their own. Metsähallitus is the official authority managing hunting and fishing matters on State land. Metsähallitus has a statutory duty to provide citizens with hunting and fishing opportunities on State-owned land. The location of these lands in sparsely populated districts, their large size, and their special natural values, such as their wilderness-like appearance, are an important attractive factor.

### *Game and fish available through local rights, permits or leases*

The basis for the administration and practical organisation of hunting and fishing on State lands is rooted in legislation. The Hunting and Fishing Acts state that hunting and fishing rights belong to land-owners. When the land-owner is the State, legislation gives Metsähallitus the power to administer hunting and fishing rights. In this task Metsähallitus is regarded as an official authority.

A reworking of the legislation concerning Metsähallitus means that decisions made regarding hunting and fishing permits, as well as the leasing of hunting and fishing rights, are administrative decisions subject to the right of appeal. This is because so many special legal rights are seen as being included in the use of these rights.

One kind of special right connected with State land is the free hunting right granted locally to residents of Lapland and part of the Oulu Province (see Fig. 38). Over 50,000 citizens living in the north have such a right. With regards to fishing, there are also similar public fishing rights. All Finnish citizens have the right to fish using a simple rod and line, ice-fish and under certain conditions also fish with a lure irrespective of who owns the waters. All 16-64-year-olds fishing with lures must buy a provincial lure-fishing permit.

Hunting or fishing on State land which is not covered by the special rights or public rights mentioned above always requires a permit. Metsähallitus has organised small-game areas on its land (mostly in commercial forests), for which hunting permits are sold. Around 35,000-40,000



**Autumn elk hunting.** State lands are important to landless hunters. Mostly hunting permits are issued for and hunting grounds leased in commercial forests. In protected areas hunting is restricted through park statutes, particularly in national parks of Southern Finland. Local hunting rights are elaborated in management plans. Photo: Tapio Kostet.

such permits are sold annually. Additionally, around 10,000 customers buy elk-hunting permits for hunting on State land. Furthermore, there are specific permit procedures for hunting fur animals, large carnivores and other animals including roe deer. Waters on State lands are divided into recreational and other fishing waters. Around 60,000 lure-fishing and net-fishing permits are sold annually.

Metsähallitus can lease fishing waters and hunting grounds to individuals. In Southern Finland almost all the State lands used for forestry are leased to hunting associations. In certain protected areas, where hunting and fishing are permitted by regulations, grounds and waters are also leased in this way.

### 6.2.2 Hunting Restricted in Southern Parks

Hunting in nature reserves is governed by the Hunting Act and the Nature Conservation Act. These acts are complemented by the legislation passed to establish protected areas and the regulations based on them, as well as guidelines on hunting issued by Metsähallitus. Hunting in some form or another is permitted in many nature reserves.

The trapping, killing or harassment of wild vertebrates, the destruction of their nests or dens, and the trapping or collection of invertebrates are prohibited in national parks and strict nature reserves under the Nature Conservation Act. Protective legislation may have area-specific exceptions, for instance concerning the right to hunt.

According to the Hunting Act, inhabitants of municipalities in the 'free hunting zone' of Northern Finland also have the right to hunt in national parks. Hunting in Southern Finland's national parks is usually expressly forbidden. Exceptions are marine parks, where local residents may be granted hunting permits.

Hunting is permitted in mire reserve areas in the free hunting rights zone; whereas elsewhere the issue of whether hunting is permitted, is resolved through the specific regulations for each reserve. The legislation passed to establish herb-rich forest reserves forbids hunting in all areas outside the free hunting rights zone. In old-growth forest reserves in Southern Finland the



**Figure 38.** Local residents in Lapland and in certain municipalities of Oulu Province have the right to hunt on State-owned land in their own municipality. Source: Ministry of Agriculture and Forestry.

only permissible form of hunting is the driving of elk, subject to land-owners' permission.

The Nature Conservation Act and most of the statutes passed to establish protected areas allow with the land-owners' permission to reduce the populations of certain plant or animal species where they have become too prolific or otherwise become harmful. Such statutes have allowed the hunting of the alien mink in the Archipelago National Park, for instance (see Information Box 20), and of white-tailed deer in the Ekenäs Archipelago National Park.

According to the Hunting Act, hunting may only be restricted in nature reserves established under the Nature Conservation Act for reasons of general safety, or if it endangers the preservation of the population of a certain game animal in a game management district's area. Hunting prohi-



bition areas have been established in the interests of general safety in various places, including areas around the tourism centres in Lapland.

Fishing is usually allowed in national parks. Local inhabitants in particular have fishing rights apart from a few special sites. Fishing is not possible in strict nature reserves where access is limited. General fishing rights may be subject to certain restrictions connected with conservation objectives, which can be included in the legislation passed to establish areas or subsequent regulations.

### 6.2.3 Off-road Traffic Increasing

Off-road traffic has increased dramatically over the last twenty years. There are already over 100,000 snowmobiles in Finland and snowmobile safaris are the most popular winter tourism programme service in the north. The Off-road Traffic Act of 1995 includes regulations covering off-road driving and the establishment of snowmobile routes. Motorised off-road vehicles may usually only be used in the countryside with the land-owners' permission. Exceptions include the use of vehicles by authorities, such as border patrols and rescue services, and by reindeer herders. There are no restrictions on driving on frozen water courses.

The increase in cross-country traffic has made it necessary to limit snowmobiles to their own routes. Finland has around 17,000 km of unofficial snowmobile tracks, of which over 5,000 km are located in areas administered by Metsähallitus, mainly in Northern Finland. There are tens of kilometres of such tracks in nature reserves and national hiking areas, and several hundred in wilderness reserves and areas within conservation programmes. Permits for the use of tracks administered by Metsähallitus are free for local residents in the North, but other users are charged fees.

More official snowmobile routes are defined in the Road Traffic Act as roads intended for snowmobile traffic. These routes may be used free of charge. Around 1,500 km of such routes have been established so far. The aim is for a skeletal network to cover the whole country and that snowmobile drivers would not have

to think which kind of permit is needed for a certain route. No such routes have so far been established in nature reserves, and the aim is for them to remain outside protected areas also in the future.

## 6.3 Local Livelihoods from the Parks

### 6.3.1 Opportunities for Enterprises in Nature Tourism

Tourism and recreational activities in protected areas offer many opportunities for local enterprises. Tourists buy different kinds of services and products during their visits, providing the area with both income and jobs. Programme service enterprises are able to take advantage of protected areas' natural environment and facilities, when they offer guided nature excursions and adventures. The use of Metsähallitus facilities for arranging programme services that customers pay for, requires a contract with Metsähallitus (see Section 8.5.4). Such contracts define the kinds of activities possible in the area, according to the principles of sustainable nature tourism and the need to avoid endangering conservation goals. The majority of tourism enterprises, e.g. those offering accommodation and food, benefit from their proximity to popular nature tourism sites even, if they do not actually organise activities in the protected areas themselves.

Apart from direct economic benefits through tourist expenditure, nature tourism generates indirect income for areas, when enterprises that serve tourists source goods from other lines of business. Similarly, the maintenance and development of protected areas' facilities brings economic benefits to different business areas, e.g. construction, waste management and transport companies. Visitor centres have been built in the vicinity of many national parks, and their running involves the purchase of goods and services from different businesses. Metsähallitus has a principle that, wherever possible, it buys the services it requires from local enterprises, so that as large a share as possible of the indirect income from tourism and recreation benefits the local economy.





**Dog-sledding on the frozen Ivalo River, Hammastunturi Wilderness Reserve.** Tourist service providers often use protected areas on State land and Metsähallitus's facilities. Long-term partnerships have been formed with hundreds of small businesses around the country. Such firms may maintain cabin accommodation within protected areas and also organise various activities for park visitors. Photo: Veikko Vasama.

### 6.3.2 Traditional Local Livelihoods Protected

Traditional local livelihoods, i.e. reindeer husbandry, hunting, fishing, and picking berries and mushrooms, are important sources of income in sparsely populated municipalities in Northern Finland and the archipelago, and they help to keep communities in these areas viable. Such livelihoods also have an important cultural significance, especially reindeer husbandry, which is closely connected to Sámi culture in the north. Legislation in Finland supports the preservation of such livelihoods by allowing them to be practised also in nature reserves.

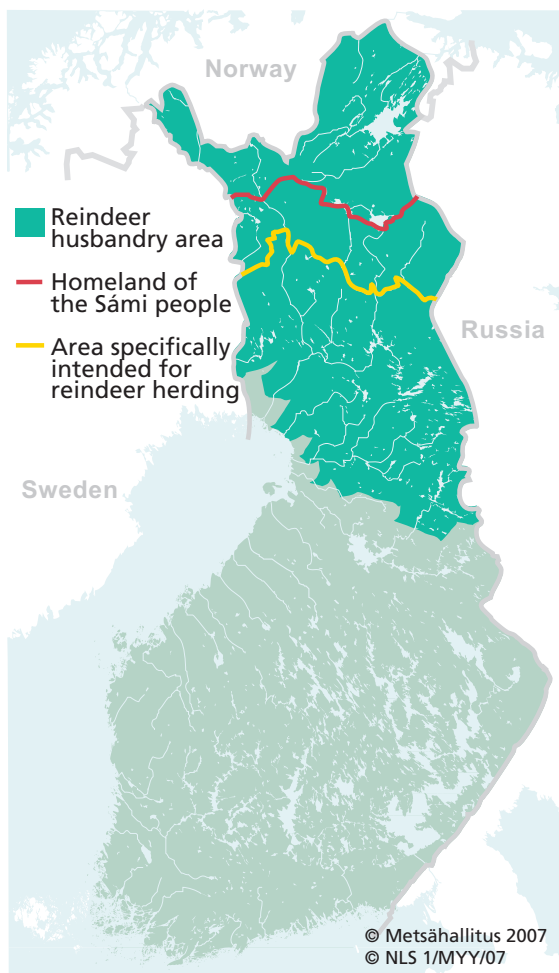
#### *Reindeer husbandry practised across a third of Finland*

The reindeer husbandry area covers 114,000 km<sup>2</sup> (36%) of the entire land area of Finland (see Fig. 39). Four-fifths of the reindeer husbandry area is in the province of Lapland. Only the industrialised and more densely populated southwest of Lapland lies outside the reindeer husbandry area.

The northern and eastern parts of Oulu Province also belong to the reindeer husbandry area.

Finland's reindeer husbandry area is divided into 56 districts with their own reindeer herders' associations. This system is based on cooperative caring for the reindeer in each area. Local reindeer herders are shareholders in their local associations. The umbrella organisation, the Reindeer Herdings' Association, lobbies for reindeer herders' interests on a national level. It also supervises reindeer herding, promotes reindeer husbandry and the related research, and deals with the relationships between reindeer husbandry and other sectors of society. The association is also responsible for the building and maintenance of reindeer fences along national borders, the approval of new reindeer markings, and the maintenance of a register of reindeer markings.

Reindeer husbandry is still based to a large extent on natural grazing areas in which the reindeer roam free, which is why their numbers must be regulated. The Ministry of Agriculture and Forestry decides on the maximum permitted number of reindeer in a ten-year period, based mainly on the condition of winter pastures avail-



**Figure 39.** Reindeer husbandry area in Finland. In the Sámi Homeland area reindeer husbandry is given priority in land use, and in the area specially intended for reindeer husbandry other land uses are not allowed to hinder it. Source: Ministry of Agriculture and Forestry.

able for grazing. The ministry issued its latest decision in 2000 based on proposals made by a broad-based working group. Provincial Administrative Boards supervise reindeer herders' associations, and can impose conditional fines and compulsory slaughtering where reindeer numbers exceed quotas. The current maximum permitted number of reindeer is 203,700. This figure refers to the number of reindeer left alive

after the annual reindeer separation and slaughter. Between the birth of new reindeer calves in the spring and the reindeer separation in early winter there are around 100,000 reindeer more than this figure. The numbers of reindeer and reindeer herders are shown in Table 13. Future trends in reindeer numbers will depend greatly on trends in the market for reindeer meat, Finnish and EU politics, and the possible development of new kinds of activity connected to reindeer herding.

The proportion of protected areas within the reindeer husbandry area increases towards the north. Both reindeer and protected areas are most widespread in the Sámi Homeland region, where the financial and cultural significance of reindeer husbandry is also strongest. Most professional reindeer herders live in this region, although even here most herders practice reindeer husbandry as a sideline to other activities. In the southern parts of the reindeer husbandry area reindeer do not depend on natural pastures so much, as they are intensively fed and also kept fenced-in for part of the year. In Forest Lapland and the Sámi Homeland the situation is different. Most reindeer pastures are protected to some extent, and the reindeer depend all year round on their condition, although almost all reindeer herders' associations nowadays also put out fodder for their reindeer, at least during hard winters.

Even though there are many protected areas within the Sámi Homeland, they are not evenly distributed between the reindeer herders' associations and the significance of commercially managed forests as grazing areas varies. For example, of the reindeer herding districts located in forested areas, 47% of the Ivalo district consists of State-owned commercially managed forest, compared to just 2% of the Sallivaara district. In northern areas reindeer herders' cooperatives are further divided into smaller herding groups, who collaborate on the herding of reindeer in their

**Table 13.** Reindeer owners in 2005 and maximum reindeer numbers permitted for the period 2000-2010 by the Ministry of Agriculture and Forestry. Source: Ministry of Agriculture and Forestry. See also Figure 39.

| Area                                 | Reindeer owners<br>2005 | Live reindeer<br>2005 | Slaughtered<br>reindeer 2005 | Maximum permitted no. of<br>reindeer 2000-2010 |
|--------------------------------------|-------------------------|-----------------------|------------------------------|--|
| Sámi Homeland                        | 1 310                   | 77 428                | 38 340                       | 77 100   |
| Special reindeer husbandry area      | 2 324                   | 120 187               | 63 819                       | 120 700  |
| Other reindeer husbandry area        | 2 919                   | 80 871                | 42 499                       | 83 000   |
| <b>Total reindeer husbandry area</b> | <b>5 243</b>            | <b>201 058</b>        | <b>106 318</b>               | <b>203 700</b>                                 |

own areas. Even within one district the grazing areas traditionally used by different herding groups can vary according to the use of the land. Conflicts can therefore also arise between forestry and reindeer herding even in districts with many protected areas.

### *Local residents have special hunting and fishing rights in the North*

Fishing and hunting are traditional natural sources of livelihood which still have a strong cultural significance in the north and the archipelago. Local residents in Northern Finland may hunt in State-owned lands in their own municipality, including most protected areas. It has been decided that there is little need to restrict hunting in sparsely settled areas on the grounds of nature conservation, and hunting is regulated in protected areas in the same way that it is in other State-owned areas. The Finnish Game and Fisheries Research Institute collates estimates of game species' populations, and regional game management districts and game management associations make decisions on hunting seasons, quotas and other arrangements on the basis of the principle of sustainable use. One disadvantage of the free hunting rights is that they make it more difficult to evaluate hunting pressure and compile statistics on catches than in areas where hunting is regulated by permits.

Finland's elk population has been strong for a long time, and elk hunting also has some economic significance. Other game animals which are financially significant include the brown bear, even though its numbers are scarce, and the willow grouse. Only a few people in Lapland make a living hunting willow grouse with traps, but in a good year dozens of people earn considerable income this way. Restaurants like to use trapped willow grouse as it contains no shots. The hunting of other forest game birds has little economic significance, but is still of great cultural importance.

Protected areas contain many important fishing waters used by local households, as well as important fishing tourism centres. The most popular fishing waters in the north are salmon and trout rivers, and lakes containing arctic charr (*Salvelinus alpinus*). Many protected areas also include traditional fishing sites that have been

used for generations, and old fishing grounds and their buildings have been preserved to keep such traditions alive. Local residents often have special fishing rights in protected areas. Permits for net fishing in lakes of the Urho Kekkonen National Park are only sold to local inhabitants, for instance.

## **6.4 Parks for Research and Education**

According to the Nature Conservation Act, the aims of the protected area system include enabling research and the monitoring of the state of the environment, as well as promoting environmental education, instruction, nature awareness and hobbies, on condition that such activities do not endanger the areas' conservation functions.

### **6.4.1 Multidisciplinary Study and Research**

The NHS does not conduct research itself, but it offers research institutions and individual researchers a wide range of research subjects, field environments and support. Protected areas can be used as valuable comparative or control areas in many studies. The NHS also actively collaborates with universities by offering trainee posts.

In 2003 the NHS examined all the reports and studies made in the areas it administers. This analysis was based on a reference database compiled by Metsähallitus which at that point included almost 5,000 references. By the end of 2005 about 800 new references had been added. The figures in Table 14 provide a rough overall picture.

The numbers of studies and reports on or connected to protected areas have steadily increased from the 1980s onwards. Research particularly focuses on national parks and strict nature reserves, although studies have been conducted in all the different types of protected areas. Most research is carried out in Finland's southernmost and northernmost regions (the areas covered by the former NHS, Southern Finland and Northern Lapland). Most research takes place in areas which are in close proximity to a university research centre, such as the Archipelago and Oulanka National Parks, and the Kevo and Värriö Strict Nature Reserves. A lot of research has also been conducted in the Urho Kekkonen and Seitsemien National Parks.



**Table 14.** Research in protected areas by area type and regional unit. PAs = protected areas in conservation programmes. Source: Metsähallitus.

| Protected area type             | Number of studies | Regional unit    | Number of studies |
|---------------------------------|-------------------|------------------|-------------------|
| National parks                  | 2 125             | Southern Finland | 1 328             |
| Strict nature reserves          | 1 271             | Western Finland  | 582               |
| Mire reserves                   | 387               | Eastern Finland  | 453               |
| Herb-rich forest reserves /PAs  | 109               | Ostrobothnia     | 674               |
| Old-growth forest reserves /PAs | 265               | Kainuu           | 261               |
| Bird wetlands /PAs              | 203               | Northern Finland | 580               |
| Shores /PAs                     | 52                | Northern Lapland | 1 117             |
| Eskers                          | 14                |                  |                   |
| Natura 2000 areas               | 122               |                  |                   |
| Wilderness reserves             | 176               |                  |                   |
| National hiking areas           | 61                |                  |                   |
| Landscape conservation areas    | 5                 |                  |                   |
| <b>Total</b>                    | <b>4 790</b>      |                  | <b>4 995</b>      |

Research on protected areas has very often been focused on Northern Lapland, where as much as 75% of the area is protected. A seminar report on environmental research in Northern Lapland was published in 2000. Central topics of research have been those related to the tree line, and to environmental capacity of reindeer pastures. Reports on wilderness reserves have been conducted from different perspectives. The nature survey of the protected areas of Northern Lapland and the Urho Kekkonen National Park in the late 1990s was an important step towards a wider biotope inventory conducted later in protected areas of Southern Finland. Research into threatened species has also been carried out in protected areas in Lapland, as has the long-term monitoring of nesting birds and fish stocks.

Multidisciplinary research and scientific monitoring have also been carried out in the protected areas that used to belong to the Finnish Forest Research Institute (Metla). In Lapland the Pallas-Yllästunturi National Park currently has over 100 ongoing research projects, some of which are a part of an international programme to measure and monitor air quality. Other notable research topics include the environmental impacts of tourism, and the ecology and variations of vole populations. The Pallasjärvi research area is located right next to the park. Some of Metla's other research areas also include protected areas (Kilpisjärvi, Vesijako, Punkaharju, Koli).

These areas will be transferred to Metsähallitus in 2008.

The Game and Fisheries Research Institute also plays an active role in protected areas in the north. About 100 of Finland's 1,600 game survey triangles are situated in protected areas, most often in northern national parks and strict nature reserves (e.g. Lemmenjoki, Pallas-Ylläs and Urho Kekkonen National Park), but also in some mire reserves and sites within conservation programmes.

Most of the research on protected areas in other parts of Finland concentrates on vegetation and biota, with particular focus on birds and invertebrates, especially insects. Some research has been conducted on hiking and recreational use, and a few studies have focused on subjects related to geology and culture. Standardised research has been carried out since 2000 on visitors to national parks and hiking areas.

Research permits granted by Metsähallitus are needed whenever samples are taken from nature reserves. The researchers must then duly report their related findings to the NHS. This often provides valuable information on the species in an area. The NHS formulated a research strategy in 2003 aiming to steer research towards areas relevant to practical management work. The NHS also participates in research projects that support nature conservation work (see Section 8.4.2. for more details).



#### 6.4.2 Learning Environments and Nature Schools

Nature reserves are used for environmental education on the condition that nature is not disturbed. Visitor centres and some nature information points offer schools ready-made programmes and a range of study material. Programmes covering Finnish nature, nature conservation, environmentally friendly hiking and lifestyles, and cultural heritage, are all suitable for study trips, school camps and class excursions.

Different customer service sites have chosen different themes for the education and interpretation they provide, aiming to complement each another in such a way that every important aspect

of Finnish nature (forests, mires, lakes, the Baltic Sea, arctic fells etc.) is represented in protected areas specialising in such themes. Exhibitions are also designed to encourage visitors to get out into the local national park.

National parks and other nature reserves that have active guidance for visitors take special account of pedagogical requirements, and the needs of children and young people. Some areas develop facilities for nature camps, nature schools and school camps, in addition to serving as destinations for nature study trips. Nature reserves support schools by providing learning environments and basic materials to facilitate field observations and valuable experiences in natural settings.



**A classroom out in the woods, Seitsemien National Park.** National parks and other reserves are fine places to learn about nature. Visitor centres offer exhibitions, ready-made programmes and special educational materials for visiting school groups. Photo: Timo Nieminen.

# 7 Management Challenges

## 7.1 Pressures on Natural, Cultural and Recreational Values

Pressures on the conservation values of protected areas can be examined with regard to temporal trends and spatial differences, local infrastructures, former land uses and current pressures due to land uses inside and outside protected areas. The risks such threats represent to conservation values in the longer term can also be assessed.

On a general level, it is practical to examine the long-term impacts of pressures on biodiversity through different types of habitats. Figure 40 classifies pressures into five categories, assesses the current seriousness of each pressure for each major type of habitat or ecosystem in Northern Europe, and indicates whether such threats are thought to be increasing or decreasing. Similar assessments have been made for the global Millennium Ecosystem Assessment and the evaluation of the state of biodiversity in the EU.

Major factors affecting the state of biodiversity include changes in the structures and functions of habitats induced by decades of increasingly intensive farming and forestry, and the widespread fragmentation of habitats due to the construction of buildings and infrastructure. Continued pressures for the use of natural resources and environments considerably reduce their quality and quantity. Natural ecosystems and the preconditions for the maintenance of

biodiversity are also increasingly threatened by trends related to climate change and the impacts of invasive alien species, especially where aquatic and farmland habitats are concerned.

It is important to survey the conservation values of each protected area, and to understand the pressures and threats that the areas are confronted with, to be able to take concrete action to mitigate and control them. Such surveys were carried out on a preliminary basis for national parks, strict nature reserves and wilderness reserves in connection with the international Management Effectiveness Evaluation (MEE) conducted in 2004. In the future the continuous monitoring of pressures and threats will be an important part of routine protected area management and monitoring.

The preliminary MEE surveys of the threats facing protected areas applied the WWF's Rapid Assessment and Prioritisation of Protected Area Management (RAPPAM) method. For each area, current pressures on conservation values were examined and future threats evaluated to enable assessments of the relative impacts of each of the key factors in terms of their spatial and temporal extent and their intensity. On this basis a data form was later drawn up for the purposes of Metsähallitus's property and land use information system, enabling the necessary data to be compiled and stored for each area.

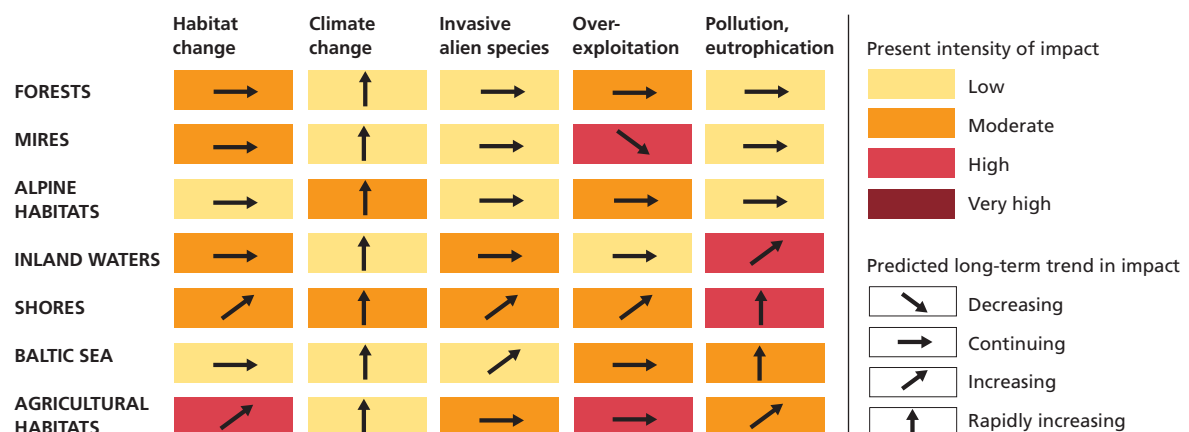


Figure 40. Present relative intensity of pressures affecting main habitat types and predicted future trends of impacts in Northern Europe. Adapted from: Commission of the European Communities 2006.

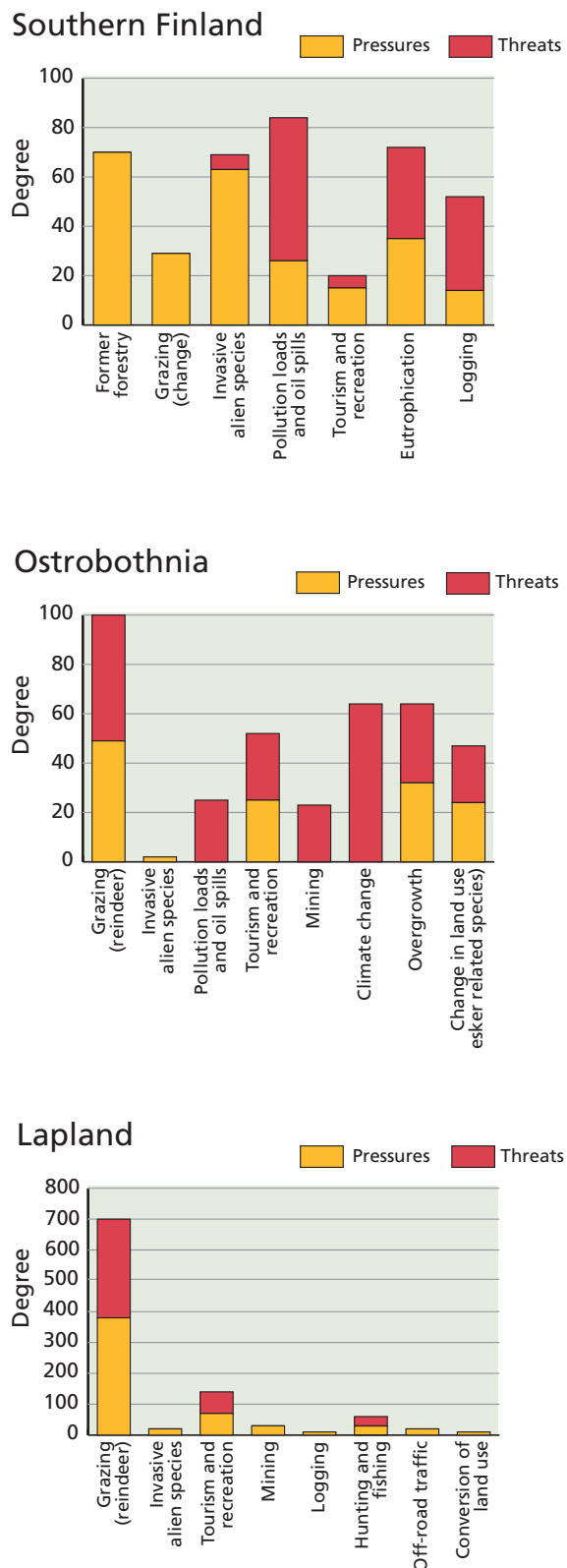
Figure 41 summarises how pressures and threats to protected areas were perceived by the Natural Heritage Services park superintendents in various parts of Finland during the RAPPAM surveys.

The most serious problem affecting hiking areas in Southern Finland was considered to be the effects of earlier commercial forestry. Tourism and recreational use were seen as less serious threats. Problems perceived in national parks and strict nature reserves included earlier forestry and invasive alien species, as well as tourism and recreational use. Eutrophication was seen as a problem in aquatic environments, and oil spills were recognised as a serious threat to marine areas, especially in the Eastern Gulf of Finland National Park. In northern Ostrobothnia and particularly in Lapland the impacts of reindeer grazing were seen as major pressures and continuing threats to natural values in protected areas. The impacts of tourism are also perceived as significant in the north. In Ostrobothnia climate change was also mentioned as a possible threat. These survey results were included in the international MEE evaluation report of the NHS's activities, which was published in spring 2005.

This report will now look more closely at activities that affect protected areas and their habitats, and examine their impacts on different ecosystems. The characteristics of protected areas and the protected area network, that affect their capability to respond to internal and external pressures and threats, will also be reviewed.

### 7.1.1 Parks Are Part of their Surroundings

The operating environment of the NHS was examined in Section 4.1. The whole context for the management of protected areas varies considerably between the north and the south of Finland in both ecological and socio-economic terms. The quality and quantity of pressures on individual protected areas also varies greatly depending on how the area and its activities are linked with the surroundings. Opportunities for Metsähallitus, as the administrator of protected areas, to influence such pressures largely depend on whether the surrounding areas belong to the State or private landowners, for instance.



**Figure 41.** Pressures and threats affecting protected areas in Southern Finland, Ostrobothnia and Lapland. Park managers' views on impact intensity and the extents of different factors have been compiled using WWF's RAPPAM assessment methodology. The assessment covers national parks, strict nature reserves, national hiking areas and wilderness reserves. Note that the scale for Lapland deviates from the other areas due to the high impact of reindeer herding. Source: Metsähallitus.



### *Size, shape and connections count*

According to classical ecological observations, the numbers of species occurring in an area tend to increase with the size of the area. Larger areas have room for more individuals, which increases the probability that more species and habitats will also occur. Extensive areas can encompass entire ecosystems and natural processes. With increasing size it is also more likely that new species will establish themselves, and less likely that any species could disappear altogether. This relationship between species and the extent of areas can also be used to predict the impact of the disappearance of suitable habitat. It has been roughly estimated that, if an area of habitat shrinks to half of its original size, the number of species present will fall by about ten percent. Correspondingly, surveys carried out in Kainuu and Kuuusamo have shown that the numbers of forest and mire bird species occurring in a protected area double, when the area becomes twenty times larger (see Information Box 7, p. 60).

The shapes of protected areas and their interconnectedness also affect their biodiversity and the functioning of their ecosystems. The shape determines the ratio of their external boundaries to their total surface areas. Elongated areas are more affected by “edge effects”, meaning that external pressures affect a larger proportion of their total area. Ecological connections between areas significantly improve the prospects for their species and ecological communities, by facilitating the movements of individuals from one area to another.

The sizes, shapes and connectivity of protected areas are also meaningful in socio-economic terms. The accessibility of areas and their proximity to other tourist attractions are significant factors in relation to their recreational use. Interconnectedness can also be significant with respect to local cooperation networks and the regional economic context. Such factors are considered in planning and other activities.

#### **7.1.2 Previous Land Uses Have Long-term Impacts**

Commercial forestry practices are generally prohibited in protected areas, with the exception of national hiking areas, where limited logging may

be permissible. Most of the areas now protected in Southern Finland have at some time in the past been affected by commercial forestry, since a considerable part of the areas have only been established in the last couple of decades. Many protected areas also contain mires that have been totally or partly ditched to speed drainage. Some localities are still affected by other earlier land uses, such as sand or gravel extraction, former settlements or grazing, even if the areas may have been protected for a long time. Such former land uses no longer represent continuing pressure, but the quality of habitats may remain reduced for a long time.

#### ***Structural degradation caused by commercial forestry***

Most of the factors that shape forest biodiversity in Finland are related to commercial forestry. According to the most recent national forest inventory (NFI9), over 90% of Finland’s forest land is currently used for commercial forestry.

The areas of forest in a natural state and the amounts of decaying wood in forests have declined considerably, especially in Southern Finland. The quantities of decaying wood remained relatively high into the early 1950s, especially in State forests, as logging was uneconomical over extensive areas due to the lack of forest roads. But by the years 1986-1994, when Finland’s eighth national forest inventory (NFI8) was conducted, less than one percent of forest land in the hemiboreal, southern boreal and middle boreal zones consisted of natural or near natural old-growth forest, and the situation did not change significantly over the years before the ninth and most recent inventory was conducted in 1996-2003 (see Section 5.2.1).

Over the last 50 years the fragmentation of natural forests and older managed forests has also clearly changed Finland’s forest landscapes. The most noticeable factors leading to such fragmentation include regeneration felling and the construction of forest roads. Such fragmentation reduces the sizes of continuous patches of forest habitat; the remaining patches become more isolated from each other; and the proportions of edge habitats unfavourable to many true forest species have increased. For natural forest species fragmentation thus compounds the negative



impacts of the overall shrinking in the total area of habitat, since it restricts the movements of individuals from one forest area to another, and reduces the overall suitability of the forest habitat. The fragmentation of older commercially managed forests also worsens the prospects for species that require extensive areas of older forest, even though these forest habitats do not need to be in a completely natural state. Examples of such species include capercaillie (*Tetrao urogallus*) and flying squirrel (*Pteromys volans*).

There have been considerable changes in the age-structure of Finland's forests over the last 80 years. One of the greatest changes has been a reduction in the proportion of old-growth forests in Northern Finland to less than a half of the figure in the 1920s, when the first national forest inventory (NFI1) was conducted. In the 1920s as many as 45% of the forests in Northern Finland were more than 140 years old, but their share has fallen to less than 20% according to NFI9. Almost 60% of the forests in Southern Finland are now less than 60 years old, and in the north this figure is more than 40%. One contemporary forestry objective in Finland has been to create an even age-structure in commercially managed forests.

Various natural disturbances serve to maintain a diverse mixture of tree ages and species in natural forests. The regeneration of deciduous tree species is directly affected by grazing pressures, and particularly by the local densities of elk and deer populations. Reductions in the diversity of deciduous trees in protected areas can weaken the populations of many of the demanding species that depend on their presence. Formerly,

on esker slopes affected by forest fires, nutrient leaching and the exposure of sandy subsoil due to erosion created mosaic-like habitat favourable to many plant and insect species, that thrive in such sunlit habitats. Once widespread occurrences of wild thyme (*Thymus serpyllum*) on esker slopes have declined considerably. Although wild thyme itself is not red-listed, some 20 insect species that depend on wild thyme are threatened, including the baton blue butterfly (*Pseudophilotes baton*).

On a larger biogeographical scale, fellings in the natural forests of the boreal coniferous forest zone have in effect broken the connections between the more isolated forested areas of NW Europe and the vast continuous natural forests of Russia. Much of the zone known as the Fenoscandian Green Belt, which runs along the Finnish-Russian border, has already been affected by commercial timber production.

#### *Mire hydrology changed by drainage and peat extraction*

Finland can be said to hold the world record for mire drainage. Out of an original area of some 10.4 million hectares (104,000 km<sup>2</sup>) of natural mires, only 40% today remain in their natural state unaffected by artificial drainage. The commercial exploitation of mires has destroyed many of their natural features, ecosystems and species. Many mire types and species are now threatened. The exploitation of peatlands has also changed landscapes and increased nutrient loads in watercourses.

About 55% of Finland's original natural peatlands have been exploited for forestry and



**Wild thyme (*Thymus serpyllum*) and baton blue (*Pseudophilotes baton*).** Wild thyme thrives in open sunny places like the slopes of eskers. Thyme is vital for many threatened butterflies such as the critically endangered blue baton. Photos: Terhi Ryttylä and Antti Below.

farming, and a further 5% for peat extraction or hydropower production. Almost a million hectares (10,000 km<sup>2</sup>) of forested mire habitat have been so radically affected by drainage schemes that the latest national forest inventory no longer classifies these areas as mires. There are considerable regional differences in the extent of artificial drainage, with ditches much more widely dug in the south. In Southern Finland, about 80% of mires are drained, and for the provinces of Oulu and Lapland the figure is just over 40%. No new mire drainage schemes have been initiated since 2001.

Approximately four million hectares (40,000 km<sup>2</sup>) of unditched mires remain in Finland. Recent studies have surveyed the remaining patches of undrained mire habitat, their distribution, their interconnectedness, and developments around their natural margins. There are hardly any larger patches of mire habitat (over 1,000 ha) left in Southern Finland. The average distances between the remaining medium-sized patches of mire habitat, which are mainly less than 200 ha in extent, have grown considerably. This makes it much harder for individuals of specialist mire species to move between patches of suitable habitat. There have also been significant changes around the margins of the remaining undrained mires affecting their hydrology and ecological zones. The extensive exploitation of peatlands has significantly reduced their biodiversity.

Even in commercially exploited peatlands it is important to strive to preserve biodiversity wherever possible. The aim should be to ensure that the area of natural mires no longer decreases, to restore habitats in ecologically valuable mires to their natural state, and to make sure that peat resources in different mire zones are not overexploited.

### 7.1.3 Human Influence Deteriorates Natural Ecosystems

Forestry and peat extraction no longer affect established protected areas as internal pressures. But such activities carried out in the vicinity of smaller areas can have harmful external impacts. The pressures that result from the activities described below are generally internal pressures that effect protected areas continuously.

The activities that most influence biodiversity in the arctic fell and wilderness habitats of Lapland are reindeer herding, tourism, off-road traffic and the construction of infrastructure. Northern fell species may also be significantly affected in the future by climate change.

The state of aquatic habitats in Finland's inland waters and the statuses of their characteristic species have particularly been affected by changes in water quality, by hydrological engineering, and by the regulation of water levels. Harmful invasive species also have significant impacts in some waters. Introductions of supplementary fish stocks, especially when originating from foreign waters, can have negative impacts on the diversity of indigenous fish populations, and also lead to wider problems for the diversity and ecology of fish communities.

Aquatic ecosystems are also affected by changes in their immediate surroundings and their entire catchment areas. Impacts from surrounding land are especially pronounced for smaller water bodies, where shore zones and shallow waters predominate. Forestry can particularly influence smaller water bodies and watercourses, which have widely been drained, redirected or cleared out. Their shore zones are also affected directly by silviculture.

The most serious problem in the Baltic Sea is eutrophication, although marine ecosystems are also affected by hazardous substances and construction work done in connection with shipping, boating and holiday home developments. One serious threat particularly facing the Gulf of Finland is increasing oil tanker traffic.

Shore habitats have been extensively influenced by land use changes. Most built-up areas in Finland are located by waters. The development of shores for leisure has also considerably affected natural habitats in many places. Coastal "flada" lagoons face pressure for construction and dredging, and this often inhibits their natural progression from shallow bays to lakes and wetlands. The overgrowth of open shore habitats has accelerated due to the eutrophication of waters, and because such areas are no longer grazed or mown. The impacts of harmful invasive species can also be significant locally.

### *Reindeer husbandry has wide-ranging impacts in Lapland*

Reindeer husbandry has many ecological impacts in protected areas. The most visible impacts concern the lichens that reindeer graze on during the winter. In the early 1990s lichen pastures all over Finnish Lapland were in a poor state, as reindeer numbers were excessively high for many years. Lichen pastures have more recently begun to recover in some reindeer husbandry districts, but the situation is still far from optimal. The exposure of the soil due to grazing and trampling by reindeer during the summer speeds erosion on fell-sides, making it hard for lichen pastures to recover even if grazing pressure decreases.

The impacts of grazing on the plants reindeer feed on in the summer have not attracted as much attention as the depletion of lichen pastures. But in places the structures of forests have changed where reindeer browse on willow and birch. From the perspective of nature conservation, it would be important to maintain or even increase the proportion of deciduous

trees in protected areas, but due to high grazing pressure this is not always possible. From time to time mountain birch stands in Lapland are widely destroyed by natural mass outbreaks of autumnal moths (*Epirrita autumnata*). Grazing pressure evidently inhibits the regeneration of mountain birch stands after such events. This may be one reason why mountain birch stands in the Kevo Strict Nature Reserve have failed to regenerate after heavy moth damage.

The effects of reindeer feeding on willow and birch on the arctic fells may reduce the populations of insects dependent on leafy biomass, indirectly affecting population trends in insect-eating birds. Willow buds provide important winter nutrition for willow grouse (*Lagopus lagopus*), so intense grazing by reindeer could make it harder for the grouse to survive the winter. Reindeer can also trample birds' nests, although some bird species benefit from the fact that reindeer grazing keeps vegetation low and prevents the growth of scrub.

Reindeer are important prey animals for eagles and large carnivorous mammals, while



**Reindeer grazing summer pastures beside Lake Inari in Northern Lapland.** Natural reindeer pastures are still the basis of reindeer husbandry. The condition of winter pastures limits the numbers of animals that can feed on natural pastures all year round. The sizes of reindeer herds need to be balanced with the availability and productivity of pastures to ensure they remain in good condition. Photo: Jouni Klinga.



smaller meat-eating animals and birds also benefit from their carcasses. It is thought that the increasing numbers of red foxes, which feed on reindeer carcasses, may have been a contributory factor behind the decline of arctic foxes in Fell Lapland.

Reindeer herding practices have changed and are still changing. Extra winter fodder is put out for reindeer throughout the reindeer husbandry region, partly due to the poor state of winter pastures, and partly to ease the herders' work. In this way reindeer can be encouraged to stay within a particular area of forest. Fodder distributed within protected areas may contain non-native species, and uneaten fodder can exacerbate local eutrophication or otherwise spoil environments, such as nutrient-poor heaths or water bodies.

Reindeer herders today also practise pasture rotation, aiming to optimise grazing and spare winter pastures from summer pressure. This rotation has involved the construction of more reindeer fences, also in protected areas. Mesh-like fences lead to some deaths among game birds. They also inhibit the movements of larger game animals and human visitors to protected areas.

Fences and corrals used for reindeer separation can be found in many parks and wilderness reserves, and some of the traditional ones are still in active use. In larger protected areas other structures are needed for reindeer herding in addition to fences. The increased use of all terrain vehicles in the summer necessitates the construction of special plankways in some parks to limit erosion. Cabins and saunas are still needed by herders today, even though they no longer need to stay out in the wilds as often as they used to.

### *Hunting and fishing affect native stocks*

In Finland hunting does not threaten the occurrences of any species inside or outside protected areas, as long as official hunting quotas, hunting seasons and the principles of sustainable use are duly observed. Problems related to bird identification may sometimes cause individuals of protected species to be shot accidentally. Illegal poaching primarily affects elk and large carnivores, and may have population impacts, at least where wolves are concerned. Such poaching occurs also in protected areas to some extent.

In some protected areas illegal and irresponsible fishing practices have been problematic. Catches of undersized trout have affected trout stocks, since fewer trout consequently survive to reproductive age. Fish poachers have also sometimes used nets or torches and spears, with trout spawning areas being emptied of fish in the worst cases. Grayling stocks can be endangered by ice-fishing during their spring spawning season. Ice-fishing is freely permitted under common fishing rights, and thus hard to control or prohibit even in protected areas. Publicity measures, supervision and changes in fishing arrangements can help to solve such problems.

Supplementary fish stocks have earlier been introduced into waters in protected areas and elsewhere to improve catches, at times without regard to the origin of the introduced fish. This practice has destroyed the genetic distinctness of many local fish populations, reducing their conservation value. Some introductions have involved species that are not native to Finland at all, including rainbow trout and peled whitefish. The North American brook trout introduced into the River Kemi are steadily increasing their range and threatening local brook trout populations.

The use of fishing nets increases mortality rates among young Saimaa ringed seal pups. The use of fishing nets is now limited in many seal breeding areas in spring and early summer under an agreement between the Metsähallitus NHS and local fishing associations, who receive compensation in return for the agreed protective restrictions.

### *Erosion is the most visible impact of tourism and off-road traffic*

The environmental impacts of recreational use include the erosion of vegetation and soils, the construction of facilities, disturbance of species and litter. The most evident long-term problem caused by hiking and nature tourism in protected areas is erosion. In some places the terrain around the most popular routes and sights has been denuded of all ground vegetation. Sensitive vegetation communities can be slow to recover in northern conditions. Studies of erosion in national parks, including Oulanka and Pallas-Yllästunturi, have aimed to identify the key factors determining sensitivity to erosion and to find





**All terrain vehicles cause extensive erosion.** To avoid damage, essential maintenance and other off-road traffic is mostly restricted to the wintertime in protected areas. Summertime off-road traffic connected to local nature-based livelihoods is directed to certain routes. Reindeer herders may use all terrain vehicles even in the summer where necessary. Photo: Sulo Norberg.

ways to minimise the impacts of the provision of facilities (see Information Box 14).

Tourism is more important to Lapland than any other Finnish province. Environmental impacts depend on both the type and extent of tourist activities. The indirect impacts of some forms of tourism can be seen as positive in terms of the biodiversity of arctic fell habitats, but tourism can also lead to problems. The recent increase in the use of off-road vehicles for experience tourism has caused considerable pressures on ecosystems in some areas.

Today there is a lot of off-road traffic, particularly in Fell Lapland. The numbers of trips using snowmobiles, all terrain vehicles and helicopters in fell areas have grown significantly since the mid 1990s. Attempts have been made to channel off-road traffic in Fell Lapland onto certain marked routes, but so far controls over the intensity of traffic have not been very effective.

Marked public snowmobile tracks with a total length of almost 480 km run through Finland's nine wilderness reserves. The use of off-road vehicles for reindeer herding is not limited in wilderness reserves, and local residents can obtain

winter off-road permits. The use of off-road vehicles by people from elsewhere is more restricted, but visitors may join guided snowmobile excursions into wilderness reserves, for example. In some areas such as the Pöyrisjärvi Wilderness Reserve, off-road traffic has led to considerable erosion, especially in summer.

Reindeer herders today invariably use motor vehicles. The most disturbing environmental impact of snowmobile use is noise, but the summertime use of all terrain vehicles and motor cycles can cause permanent damage to the natural terrain. There has been increasing debate about this problem in recent years, and the reindeer herders' cooperatives have also addressed the issue. Helicopters are increasingly used for reindeer round-ups and separation, reducing erosion and the need for manpower, and also speeding the round-up.

Future trends in off-road traffic in the years until 2010 will largely depend on developments in tourism and reindeer herding. It has been estimated that about half of Finland's snowmobiles will then be used in the vicinity of Lapland's main tourist centres.

## Erosion Studies Help to Keep Hiking Sustainable

Researchers from the University of Oulu have studied the ecological effects of tourism in the national parks of Oulanka and Pallas-Yllästunturi. Practical experiments involving the trampling of trails have been carried out to assess the tolerance limits of vegetation in different forest types, and to define the impacts of the season and gradient of the trails. The combined effects of trampling and reindeer grazing have also been studied. All these studies reveal that the durability of northern vegetation is low, even if the visitor numbers remain quite low. In many national parks there are already more visitors than the vegetation can tolerate. This emphasises the need to direct visitors away from vulnerable sites.



Measuring trail erosion in Pallas-Yllästunturi National Park. Photo: Pekka Sulkava.

When the risks are known, it is possible to direct the use of the sites so that the erosion of trails and vegetation are limited to acceptable levels. The studies indicate that the environmental impacts of individual visitors depend greatly on how they move around. Horse-trekking, for example, has proved to be particularly troublesome in this context. Horses cause more trail erosion than people, and germination tests have shown that horse manure contains many seeds of crop plants with sprouting ability. This phenomenon can help invasive grasses spread into protected areas, where they can rapidly proliferate and out-compete natural vegetation dominated by dwarf shrubs.

According to the studies carried out in Oulanka and Pallas, summer and winter use have different environmental effects. Hiking in summer directly erodes the terrain and vegetation, whereas the effects of cross-country skiing trails on vegetation are limited to the impacts of the clearing of trails. Clearing the trees and the shrub level vegetation alters the light and moisture conditions along trails, where the natural vegetation is often replaced by new plants. The results of these studies can be utilised in planning sustainable trail networks, especially in new nature reserves.

Source: Siikamäki, P., Tolvanen A., Törn, A. & Kangas, K. 2006: Metsät virkistys- ja matkailukäytön kohteina. [Use of forests for recreation and tourism.] – In: Horne, P. et al. (eds), METSO:n jäljillä. Pp. 336-337.

### *Local problems due to mining and land extraction*

Mining activities are relatively limited in Finland. The quantities of metal ores mined have been declining since the early 1990s. Ores are mined deep underground, and thus do not greatly disturb nature. Contrastingly, many minerals for industrial use are extracted from open quarries, which result in very dramatic impacts on a local scale. Overall, mining activities do not have very significant impacts on the biodiversity of habitats, with the exception of the quarrying of limestone and ultra-basic rock. Mining and land extraction are most significant in certain rocky areas, marine areas, and eskers where sands and gravels are extracted.

At the end of 2005 a total of 37 mining concessions were established in areas administered by the NHS, with a total area of almost 500 hectares, and an additional 364 mining claims existed with a total area of almost 9,000 ha. Fourteen concessions and 72 claims are located in protected areas or areas within conservation programmes, including the national parks of Lemmenjoki, Urho Kekkonen and Pyhä-Luosto, and several wilderness reserves, national hiking areas and mire reserves.

Gold-mining is significant locally within the Lemmenjoki National Park, where gold has been mined for more than 130 years. The area's "gold rush" was in the 1940s, and the need for controls over gold-mining was considered when the park was established 50 years ago, and also when it was later expanded. Legislation allowed for the continuation of gold-panning according to principles set out in the Mining Act, and park regulations were defined to control the related accommodation and movements of people and equipment. It was clear at an early stage that the park regulations could not limit mechanical mining methods where the legislation establishing the park does not form a basis for such restrictions. In 1991 the situation became clearer when all mechanical mining outside already established claims was prohibited. This limits such mining to a fairly small area within the park, and it is considered that mining will not significantly endanger the park's conservation objectives, as long as the conditions for environmental permits are

duly observed. These conditions have not always been met in the past, however.

Gravel extraction was very intense in Finland in the 1970s and 80s, when more than 80 million tonnes of gravel was extracted annually. Annual extraction rates fell rapidly in the early 1990s to about 50 million tonnes, and have since remained stable. Gravel is often extracted from the most representative esker formations. Today such activities are mainly concentrated around major population centres. Extraction indirectly affects protected areas, especially marine habitats.

The use of crushed rock has increased by more than 60% since the early 1990s. Crushed rock is now widely quarried instead of gravel, especially near larger cities and in areas with limited sources of gravel. The quarrying of crushed rock results in slightly less disturbance to biodiversity than gravel extraction. The rocky areas exploited for this purpose are seldom of great significance for species associated with rocky habitats.

### *Pollution loads impair water quality*

Water quality of inland waters in Finland has generally improved in recent decades. But high and diffuse nutrient loads are still a challenge in terms of water protection, as many waters are still suffering from eutrophication. The problem is compounded by airborne nitrogen emissions and the nutrient loads that enter watercourses in runoff during mild winters, which are expected to increase as a consequence of climate change. Humus concentrations in water bodies may also rise in future as the climate changes.

Many nutrient-poor waters suffered from acidification between the 1960s and 1980s, when acidification was seen as a major problem. Subsequent reductions in long-range pollution involving sulphur compounds have halted this process, and acidified lakes have begun to recover throughout Finland, initially in terms of water quality and then also ecologically.

The large-scale regulation of water levels in lakes and rivers began in Finland after the Second World War. The numbers of regulated waters went on increasing into the 1970s, but few new schemes have been initiated more recently. Water levels are today regulated in more than 300 lakes around Finland. These account for about a third of the total surface area of Finland's lakes. The



impacts of regulation depend on the extent and timing of the changes in water level. There is an increasing need for habitats to be restored around regulated lakes, where natural features such as flood meadows and collapsed banks have been disappearing, sandy shores have become overgrown, reed-beds have spread, and sedge-beds have shrunk, for example.

The factors that threaten Baltic marine and coastal ecosystems are shown schematically in Figure 42, according to the spatial extent and seriousness of their impacts. The most serious problems affecting the whole of the Baltic Sea are eutrophication, hazardous substances, invasive alien species and the overfishing of commercially important fish species. In coastal areas, water traffic and construction can have significant negative impacts on a local scale.

Most coastal waters are more eutrophic than open marine waters, due to nutrient inputs from the land and the more intense functioning of the nutrient cycle between seafloor sediments and the seawater in these typically shallow waters. In Finland's coastal waters most of the nutrient inputs that originate from the land are transported by rivers.

The Baltic Sea is extremely sensitive to the impacts of many hazardous substances, due to its limited exchange of water with the open oceans and local conditions, that inhibit chemical decomposition, namely cold temperatures and

winter ice cover. Monitoring data is only available for a few of the chemical pollutants that end up in the Baltic Sea. Monitoring has mainly focused on the most notorious organic pollutants, such as PCB, DDT and HCH, and concentrations of certain heavy metals like mercury, lead, copper and zinc. These chemicals are known to have contributed significantly to population declines of top predators in marine food chains, including seals and birds of prey.

### *Increasing water traffic and oil spill risks*

Water traffic has direct and indirect impacts on biodiversity in the Baltic Sea and inland waters. The most important direct impacts are disturbance, erosion, and deliberate or accidental oil spills. Indirect impacts relate to the construction and maintenance of shipping and boating routes and harbours. The Finnish Maritime Administration maintains some 7,600 km of shipping lanes in coastal waters and some 7,900 km of inland waterway routes. The construction of waterways and harbours destroys sub-aquatic habitats, changes flow conditions and leads to the releases of nutrients and hazardous substances from disturbed sediments.

The quantities of oil being shipped on the Gulf of Finland have grown rapidly in recent decades, as more new oil terminals have been built in Russia. This increase is expected to continue. Safety standards for oil tankers have improved in recent years thanks to many changes in the regulations controlling navigation in the Northern Baltic. But in spite of this relative reduction in risks, the threat of a major oil spill in the Gulf of Finland must still be taken very seriously, as such an accident could have extremely serious impacts on a sensitive sea like the Baltic.

### *Shores in demand for holiday homes*

According to statistics compiled in 2002, some 460,000 holiday homes are located along shores around Finland, with a quarter of them on the seashores of the Baltic and three quarters beside inland waters. The most developed shores are beside the Eastern Gulf of Finland and the Bothnian Sea, where in some places more than half of the shoreline is built-up. Thousands of new holiday homes are built every year.

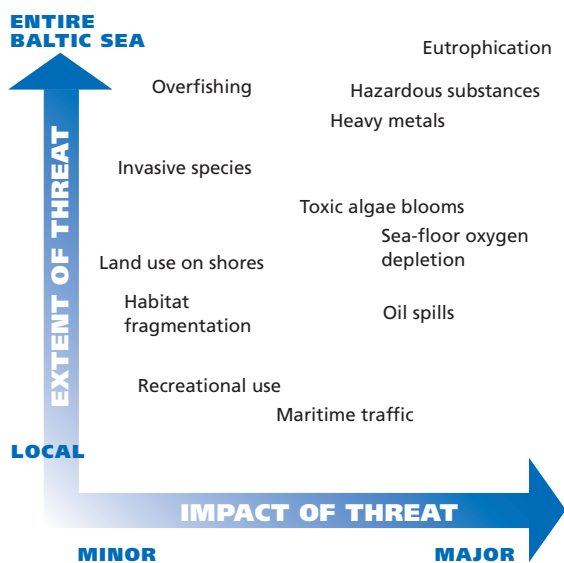


Figure 42. Threats to the Baltic Sea. Source: Pitkänen 2004.

The increasing spread of lakeside holiday homes along shores is thought to significantly affect the prospects for many species, including the endangered Saimaa ringed seal (*Phoca hispida saimensis*), which lives in certain waters within the Saimaa Lake System.

Building developments also threaten rocky habitats and eskers. Eskers have traditionally been used in Finland as routes for paths and roads, and it has often been easy to build along them.

### *Shorelines and heritage landscapes threatened by overgrowth*

Eutrophication has improved growth conditions for the common reed (*Phragmites australis*) and other large plants around the shores of the Baltic Sea, and especially along lakeshores in areas with a lot of farmland. The end of widespread mowing and grazing along shorelines has also promoted such overgrowth. The common reed has taken over many former shore meadows. At the same time, willows and grey alders (*Alnus incana*), whose growth used to be impeded by mowing, have widely proliferated.

Reed-beds provide important habitats for many birds, and the widespread decline in reed-beds in Central and Southern Europe is a factor threatening many bird species. In Finland, contrastingly, the spread of reed-beds and the overgrowth of more open shore habitats have had negative impacts on many bird species that thrive in open habitats, and also reduced the diversity of their flora.

Traditional rural livelihoods in Finland have considerably added to the diversity of natural habitats, and created habitats for species associated with cultural environments. But on the other hand, the clearance of farmland has fragmented forest habitats and especially reduced the total areas of herb-rich forest and shallow peatland. Farming practices have changed greatly in recent decades, and are still intensifying today. Such trends tend to leave less room for many farmland species. The decline of traditional small-scale mixed dairy and crop farming has particularly led to the rapid loss of traditional meadowlands and pastures.

### *Invasive alien species gaining ground*

Alien species are species not originally native to local ecosystems, which have spread beyond the natural barriers that earlier limited their ranges, such as seas, land masses or mountain ranges, aided by man either deliberately or inadvertently. Alien species should not be confused with newcomer species that have spread into Finland from surrounding regions unaided, for instance during years or periods with favourable climatic conditions. Invasive alien species may be able to breed and spread prolifically, and they can have negative impacts on native species through competition or interbreeding. Some ecologically harmful invasive species may also be associated with health risks or significant socio-economic impacts.

Alien species purposefully brought to Finland by man include non-native game animals and fur animals, as well as many fish species and decorative plants. Aquatic ecosystems are especially open to invaders, as they contain hardly any barriers to limit their spread, as long as habitats meet the invaders' requirements in terms of conditions such as temperatures and salinity. The intense shipping in the Baltic has enabled many invasive marine species to arrive by ship. Some of these invaders have been able to establish themselves.

The ecological impacts of some invasive alien species are not yet understood. The most harmful invaders in socio-economic terms have included the bay barnacle (*Balanus improvisus*), which arrived as long ago as the 1840s; the notorious zebra mussel (*Dreissena polymorpha*); and the fish-hook water flea (*Cercopagis pengoi*). Unwelcome invaders in inland waters include the crayfish plague (*Aphanomyces astaci*), a parasitic mould that has wiped out Finland's native freshwater crayfish species from many waters. There is as yet little detailed information on other invasive invertebrate species established in Finland.

Around twelve mammals considered to be alien species can be found in Finland. Many introduced game animals can only survive the winter if they are artificially fed. The only species whose population has been rising is the white-tailed deer (*Odocoileus virginianus*). This species is not thought to have resulted in significant ecological problems, as its numbers can be effectively controlled through hunting. Canadian beavers

(*Castor canadensis*) were introduced erroneously into Finland to replace the almost extinct wild populations of European beaver (*Castor fiber*), due to a lack of information about the two species. The Canadian beaver today competes with its European cousin, and the Canadians have more serious impacts on forestry and native forest ecosystems, as they are busier builders. Other harmful alien and invasive mammals include American mink (*Mustela vison*) and raccoon-dog (*Nyctereutes procyonoides*), both of which kill birds on islands and in wetlands.

Only two deliberately introduced bird species have established viable populations in Finland: Canada goose (*Branta canadensis*) and pheasant (*Phasianus colchicus*). Canada goose populations are rising steeply, but they are not as yet known to have any harmful impacts on other breeding birds in Finland. Invasive fish species include rainbow trout (*Oncorhynchus mykiss*), carp (*Cyprinus carpio*) and American brook trout (*Salvelinus fontinalis*). Of these species only the brook trout has proliferated rapidly. Not enough is yet known about its effects on native trout stocks.

Many alien vascular plant species can be found in Finland. Rough estimates of their total number vary between 1,000 and 3,000. About 50 established invasive plants may have ecologically harmful impacts. Observations indicate that some 30 species are able to establish viable populations in the wild. Many harmful invasive plants have spread into shore ecosystems, such as sandy shores, waterside and herb-rich forests, riverbanks and other wetlands. About ten of the harmful plant invaders are mainly limited to roadside verges and their surroundings.

The most clearly harmful plant invaders include Japanese rose (*Rosa rugosa*), which is found on sandy shores and islands; Himalayan balsam (*Impatiens glandulifera*), found in herb-rich woodland and riversides; reed sweet-grass (*Glyceria maxima*), which is spreading along the shores of inland waters; the lupin (*Lupinus polyphyllus*), which has taken over many verges and meadows; and various Asian hogweed species (*Heracleum* sp.). All of these invasive plant species are currently at a stage where their distributions are expanding rapidly.



**Japanese rose (*Rosa rugosa*) in the Eastern Gulf of Finland National Park.** This species, which originates from SE Asia, has rapidly found suitable habitat in sandy areas along the Finnish coast and in the archipelago. Thickets can spread over beaches and entirely displace native vegetation. Such growths also hinder the recreational use of shores. Photo: Tiina Kanerva.



There is not yet much detailed information available on alien or invasive species in protected areas, as this phenomenon has only recently begun to be systematically examined. Populations of beavers and game animals have been monitored through national surveys and there is fairly comprehensive information on population trends for alien bird species, but there is very little data on invasive plants, for instance. Problems with mink and raccoon-dog in archipelago parks are well known, but there have been no systematic surveys of coastal Natura sites, for instance.

### *Effects of global warming visible already*

Climate change will significantly affect biodiversity in the future. According to extensive international research, recent changes in regional temperatures have resulted in observable changes in many physical and biological phenomena around the world. There is evidence that glaciers are receding, permafrost is melting, winter ice covers rivers and seas for shorter periods, and growing seasons are becoming longer. There are predictions that winter precipitation will increase and that extreme weather events will become more frequent, especially in northern regions. Climate change thus represents a significant extra pressure on natural environments in addition to other anthropogenic impacts.

Researchers have noted statistically significant changes in the populations of hundreds of species around the world that are presumed to be linked to rising temperatures. Such changes have already affected the timing of plant or animal species' reproduction, the lengths of growing seasons, the timing of animals' migrations and other movements, species' distributions and population sizes, and the occurrence of pests and diseases.

Climate change can significantly alter habitats and biotopes, especially aquatic habitats and arctic biotopes. Species' distributions change, and some species may well become extinct. The impacts of invasive species in ecosystems may become greater. There is also a risk that climate change will have negative impacts on the many ecological, economic and social benefits biodiversity provides for people through ecosystem services.

Present knowledge suggests that climate change is progressing most rapidly in northern

regions. Climate change could threaten the survival of the species and biotopes of open arctic fells, as the tree line rises, and frost and snow conditions change. The melting of the permanent icy cores of palsa mires is one example of such impacts. Threatened species and arctic species are particularly at risk, since their populations are typically small and isolated.

This serious threat to arctic fell ecosystems represents a challenge in terms of the need to adapt for nature conservation, for traditional livelihoods and even for tourism. It is as yet uncertain how reindeer husbandry can adapt to climate change, though it is clear that risks will increase. On the other hand, the overall productivity of northern ecosystems can be expected to increase as the climate warms. This could have both positive and negative impacts on biodiversity.

The kind of impacts described have already been observed, for instance in Northern Canada, where research has been conducted into the predicted impacts of climate change on protected areas. A study done in 2002 forecasted the changes that can be expected in vegetation zones or biomes in 39 Canadian national parks by 2100. More than half of these parks are expected to have different biomes than today. Arctic ecosystems would be replaced by sub-arctic ecosystems, while boreal coniferous forests would be taken over by more southerly forest types or grasslands. Certain mountain ecosystems could disappear altogether. Increasingly frequent storms and rising water levels are expected to threaten shore ecosystems, and particularly wetlands. These changes and increased natural destruction will greatly affect the biota of protected areas. Opportunities for the recreational use of parks will also change considerably.

### **7.1.4 Cultural Heritage Threatened by Time and Neglect**

Time represents the greatest threat to cultural heritage. The features of cultural environments can fall into neglect or become forgotten, along with the related events, customs and skills. The lack of understanding or appreciation of such features can lead to their deliberate or accidental destruction. Land use and management plans and measures do not always give due consideration to

the values and sites of cultural heritage. Cultural landscapes can thus be lost due to neglect, while archaeological relics may be destroyed, if they are not recognised or their value is not realised.

New times always provide and require new features and new constructions that will compete with older existing ones. It is often difficult and expensive to maintain old buildings and plan for their continued purposeful use. There is readily a desire to destroy old buildings or replace them with new buildings considered to be better. Even if old buildings are maintained, they are often repaired using unsuitable methods and materials. The same is true for the furnishings and objects they contain. Repair work and restoration is often done as a one-off process with little regard to the need for continuous maintenance.

The most common threats to cultural heritage do not all affect nature reserves or hiking areas in practice, as these areas are not subject to intense commercial pressure. But cultural heritage features in areas managed by the NHS can particularly be at risk, if they remain unknown to experts and have not been professionally evaluated. Sites may also be located in remote areas with difficult terrain, which can hinder their maintenance. In projects designed to promote employment and nature tourism, features suitable for nature tourism may be favoured at the expense of the management planning of features of greater cultural and historical value.

### 7.1.5 Infrastructure Loses Value without Maintenance

The recreational values of protected areas can be reduced where the attractiveness of natural values and landscapes decreases, and also if facilities provided for the public, such as routes, buildings and structures, are not continuously maintained.

An information system set up in 2004 helps the NHS to monitor the condition of such facilities. Figure 43 classifies the state of various types of buildings, structures and routes managed by the NHS. According to statistics for early 2006 the proportion of facilities classified as being in a poor state was 9%. Information was not available for a further 14% of facilities.

This classification system facilitates evaluations of property values and safety risks. Most of the buildings in poor condition are open wilderness huts, saunas, old barns and storehouses. These buildings do not have high values individually, but if not renovated or maintained, they will have no use value in the future. The whole building stock administered by the NHS has not yet been evaluated. However, with a few exceptions, the buildings categorised as being in poor condition do not include buildings that were classified as having significant cultural and historical value in a 1994 survey.

Most of the structures in poor condition are campfire sites, although some are also shelters, sheds, duckboards and information boards. Some footbridges are also in poor condition, but hardly any routes are classed as poor. Structures associated with safety risks, such as steps and hanging

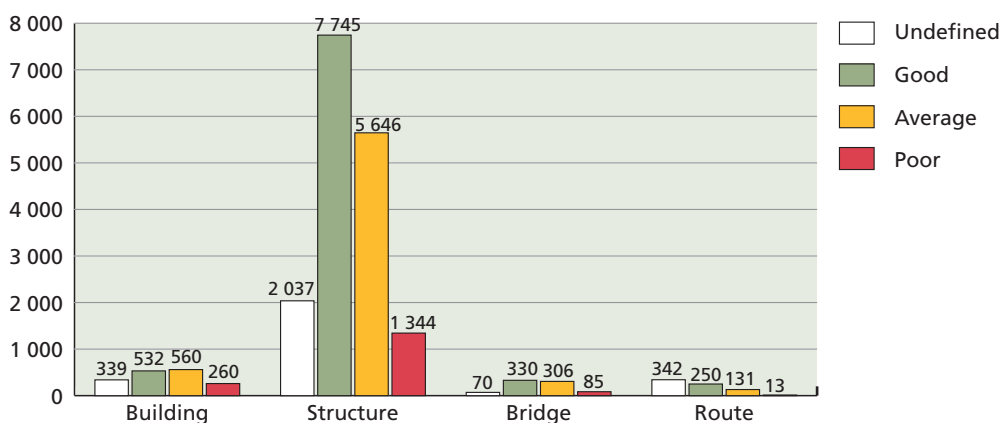


Figure 43. Condition of recreational facilities. Source: Metsähallitus.



**Vandalised information board, Pihlajavesi Natura site.** Routes and facilities require continuous monitoring as well as occasional repair and maintenance. The information on such boards also needs to be updated regularly. Photo: Pasi Ikonen.

footbridges, are repaired as urgently as possible, when found in disrepair.

One problematic aspect of the provision of services for hikers is that in 2003 only around 40% of information boards in the field were considered to be up-to-date in terms of their information content. Information is renewed on average every six years, meaning that about 17% should be renewed every year. Additionally about a quarter of the exhibitions in customer service points designed to help advise visitors about nature are more than ten years old. Some of the limited number of audio-visual programmes available for such purposes are also outdated.

## 7.2 Management Issues and Principles

Protected area management encompasses all the activities carried out by the authority or institute responsible for managing and administering an area towards the objectives defined for the protected area. In addition to measures designed to improve an area's natural habitats, it also includes the construction of facilities, and materials for instruction and nature interpretation, as well as the steering and supervision of the use of an area. Gathering information to provide a basis for the

planning of the management and use of an area is also part of this work.

Careful planning, targeted measures and the steering of the use of areas all help to actively preserve conservation values, even while aiming to promote nature tourism in protected areas. Metsähallitus is not able to address through its own measures all of the indirect pressures that affect protected areas due to human activities, except through participation in the development of legislation and knowledge-based steering policies. Metsähallitus can, however, strive to reduce pressures that directly affect protected areas due to local economic and recreational activities through purposeful measures. Table 15 lists both the pressures that indirectly affect natural habitats in Finland due to human activities, and the direct pressures caused by local economic and recreational activities, together with measures that can be taken to help prevent or reduce the impacts of such pressures in various types of ecosystem.

The challenges faced in the management of individual protected areas relate directly to the pressures and threats that the areas are confronted with. Table 16 assesses the seriousness of such pressures and threats for each type of protected area on the basis of the factors broadly discussed



**Table 15.** Factors and actions affecting habitats in protected areas. Source: Metsähallitus.

A. Indirect pressures and threats, with general measures to mitigate and control them.

| Habitat type                                   | Indirect pressures caused by man  | Counteraction (general)                              |
|--|---|--|
| Forests  | air pollution (habitat quality)   | legislation, technology, research                    |
| Mires  | global warming (habitat change)   | information steering, research                       |
| Rocky and esker habitats                       | air pollution (habitat quality)   | information steering, research                       |
| Fells and wilderness areas                     | global warming (habitat change)   | information steering, research                       |
| Inland waters and bird wetlands                | acidification and eutrophication (habitat quality)                                  | information steering, research                       |
| Baltic Sea                                     | eutrophication (habitat quality)<br>invasive alien species (ecological disturbance) | information steering, research                       |
| Shores   | changes in land use (habitat change)  | legislation, information steering                    |
| Agricultural habitats                          | nutrient loads, changes in vegetation (habitat quality and structural change)       | legislation, information steering, financial support |
| Built environments (urban and transport areas) | competing land use (habitat fragmentation)  | information steering                                 |

B. Direct pressures and threats, with measures taken by the NHS to mitigate and control them.

| Habitat type                    | Land use pressures   | Counteraction (Metsähallitus)            | Recreational pressures   | Counteraction (Metsähallitus)                          |
|---------------------------------|--|--|--|--|
| Forests                         | commercial forestry; roads (habitat structure and processes) | habitat restoration, cooperation, advice | hunting (disturbance, population size, alien species)                | permits, spatial and seasonal restrictions, monitoring |
| Mires                           | ditching, peat extraction (hydrology)                        | habitat restoration                      | species disturbance  | spatial and seasonal access restrictions               |
| Rocky and esker habitats        | mineral and soil extraction                                  | permits                                  | erosion  | trail and facility placement                           |
| Fells and wilderness areas      | reindeer herding (vegetation change)                         | cooperation, research                    | off-road traffic (erosion and disturbance)                           | permits, routes  |
| Inland waters and bird wetlands | hydrological engineering and regulation                      | habitat restoration and management       | fishing and hunting (disturbance, population size, invasive species) | permits, spatial and seasonal restrictions, monitoring |
| Baltic Sea                      | aquaculture and commercial fishing                           | permits                                  | boating (habitat disturbance and change)                             | route and facility placement                           |
| Shores                          | changes in traditional land use (coastal meadows)            | habitat management                       | leisure building   | land use planning                                      |
| Agricultural habitats           | changes in traditional land use (traditional biotopes)       | habitat management                       | changes in traditional use   | upholding traditional use, voluntary work camps        |
| Built environments              | changes in (traditional) land use                            | planning, site management                | lack of use and maintenance  | reuse, restoration                                     |

in the previous section (7.1). Such an assessment sets priorities for the measures that are needed.

Management objectives are set for each individual protected area also on the basis of society's wider objectives and the grounds on which the protected area was established, including the natural, cultural and recreational values that the area was particularly designated to preserve (see Fig. 2, p. 23).

### 7.2.1 Legislation as the Basis for Management

Most of Finland's nature reserves have been established through specific statutes issued under the Nature Conservation Act. These statutes specify the main natural and cultural values within the areas to be protected, together with the aims and means of their protection. The Wilderness Act likewise defines objectives for the establishment and use of wilderness reserves, and the Outdoor Recreation Act defines the grounds for establishing national hiking areas. Natura sites are designated to protect species listed in the Birds Directive and the Habitats Directive. Many other legislative statutes, that control land use more widely, must also be considered in the context of protected area management.

The planning and implementation of the management and use of protected areas is thus controlled by a wide range of legislation. To assess the success of management work, its impacts must be examined in relation to wider objectives defined in legislation.

#### *Specific objectives for different types of protected areas*

Table 6 in Section 4.3.3 (p. 55) lists objectives for the use and management of protected areas of different types as defined by the World Conservation Union (IUCN). Table 16 lists the main pressures and threats facing these different types of areas in the Finnish context. These interpretations are based on the RAPPAM analysis for management effectiveness evaluation and comparable analyses of certain other protected areas.

The focus on specific protected areas within this first State of the Parks in Finland report has been limited to national parks, strict nature re-

serves, wilderness reserves and national hiking areas. These types of areas have clear bases and objectives, as defined in conservation programmes and the legislation passed to establish them. These objectives are defined to help realise the aims of international agreements and other goals considered important by society.

**National parks** are large (over 1,000 ha), State-owned nature reserves whose natural diversity or other conservation values make them significant at least at national level. They must also be significant as natural attractions or otherwise, in terms of increasing public awareness of and interest in nature. They are preserved permanently outside the scope of economic activities that alter the natural environment. Measures may be taken as necessary to preserve or restore their natural state.

National parks' main task is 1) conservation, with respect to their original natural geological and ecological features, their species and their ecological communities. Conservation work may focus on whole environments, ecological communities, landscapes or structures created as a consequence of traditional human activities. Digressions may be made from general conservation principles in national parks to allow reindeer herding or other local livelihoods, as long as this does not significantly or permanently endanger conservation objectives.

Within limits defined by their conservation goals, national parks also serve to promote 2) environmental education, instruction and public awareness of nature, by providing locations and opportunities for independent and supervised nature studies. They also facilitate 3) research and monitoring related to natural sciences and the state of the environment. National parks should additionally promote 4) outdoor recreation, by providing public attractions accessible to everyone, and opportunities for visitors to enjoy activities and experiences in natural settings.

National parks must be managed to ensure they carry out all these tasks as well as possible. They should therefore be developed to be functional and versatile. But since their conservation objectives are of prime importance, all other activities must be adapted to ensure these primary objectives are not endangered. Because national parks differ greatly in their sizes, locations and

**Table 16.** Pressures and threats causing need for management measures by protected area type. Impact is assessed by relative extent and severity. 1 = primary, 2 = secondary, 3 = possible. MR = mire reserves, OFR = old-growth forest reserves, PA = protected areas, BW= bird wetlands. Source: Metsähallitus.

| Pressures and threats                   | Protected area class   |                            |                    |                              |                                   |                              |                     |
|---|------------------------|----------------------------|--------------------|------------------------------|-----------------------------------|------------------------------|---------------------|
|   | Strict nature reserves | MR, OFR (Southern Finland) | National parks     | Small PAs                    | Managed sites (Natura sites / BW) | Landscape conservation areas | Wilderness reserves |
| Forestry (former)                       | 3                      | 2                          | 1                  | 2                            | 3                                 |                              | 3                   |
| Changes in hydrology                    | 3                      | 2                          | 2                  | 3                            | 2                                 |                              | 3                   |
| Changes in traditional land use         | 3                      |                            | 2                  | 1                            | 1                                 | 1                            | 3                   |
| Overgrazing (reindeer)                  |                        |                            |                    |                              |                                   |                              | 1                   |
| Hunting, fishing                        |                        |                            |                    |                              | 2                                 |                              | 2                   |
| Tourism, off-road traffic               |                        |                            | 2                  |                              |                                   |                              | 2                   |
| Mining, land extraction                 |                        |                            |                    | 3                            | 3                                 |                              | 3                   |
| Changes in land use (construction etc.) |                        |                            | 3                  | 3 (shore areas 2)            | 3                                 | 2                            |                     |
| Invasive and alien species              |                        |                            | 3                  | 3 (marine and shore areas 2) | 2                                 |                              |                     |
| Environmental degradation               |                        |                            | 2 (marine areas 1) | 2 (marine areas 1)           | 2                                 |                              |                     |
| Climate change                          | 3                      |                            | 3                  | 3                            | 3                                 |                              | 2                   |

characteristics, they are developed to different degrees in terms of their activities, accessibility and visitor numbers.

**Strict nature reserves** are State-owned national nature reserves that are permanently preserved in as natural a state as possible with minimal disturbance, due to their high value for scientific research. Restrictions, such as limited public access, are applied. According to the new Nature Conservation Act, strict nature reserves should play a significant role in safeguarding natural processes, in scientific research or in education. Visitors' access is typically limited to certain roads, paths or specific areas, and access to other areas is subject to permission from the reserve administration. Many exceptions to this complete protection have been granted through specific statutes, however.

Many strict nature reserves contain valuable small-scale biotopes and cultural sites whose protection necessitates continuous management.

Strict nature reserves resemble national parks in their national significance, and also usually in their extent and their natural diversity, but their functions have a different emphasis. The roles of conservation and research are predominant. Functions related to environmental education and instruction are limited to a few strict nature reserves.

**Mire reserves** are primarily established to protect mire ecosystems, their species, and examples of their ecological communities, landforms and landscapes. The protection of mire complexes forms the basis of mire conservation in Finland. It is essential that the formation of peat and other natural processes are allowed to continue undisturbed. It is also important to protect mires' natural variations, their small-scale features and edge habitats, all of which create ecological variations and zoning between mires, their forest margins, and isolated areas with mineral soils within mires. All mire types



within mire reserves are preserved in as natural a state as possible. This makes them very useful for comparative purposes during assessments of the impacts of forest drainage and peat extraction on water courses.

The legislation passed to establish individual mire reserves allows forestry to be practised in many areas within certain limits. Metsähallitus resolved in 1994, however, that mire reserves would no longer be used for forestry. Everyman's right of free access to the land and its associated rights to fish, hunt, pick berries or mushrooms and enjoy recreational activities are only limited where such activities would endanger conservation objectives. So far facilities and guidance for visitors have only been provided at a few mire reserves.

**Other nature reserves** vary greatly in their size, characteristics, conservation targets and management objectives. They may be covered by strict regulations similar to those applied in strict nature reserves. Some contain habitats that require continuous management (especially herb-rich forest reserves in the south) or cultural landscapes (e.g. Telkkämäki). In some reserves the main aim of management is to maintain beautiful landscapes. Seven protected areas have been set up in State-owned waters in the Baltic Sea with the specific objective of protecting grey seals and their habitats. Hunting is prohibited throughout these seal reserves, and fishing and other access is forbidden in waters around the seals' island colonies.

Forestry is prohibited in the regulations passed to protect old-growth forest reserves in Southern Finland. These regulations closely resemble those for mire reserves, although camping out and lighting fires are forbidden, and the only permissible form of hunting is the driving of elk towards hunters positioned outside such reserves.

Conservation objectives are resolved on an individual basis for each of these "other" types of nature reserve, with regulations duly defined in connection with the legislation establishing them. All of the reserves so far designated within this category are special protected areas as stipulated in the old Nature Conservation Act. In areas to be established in the future under the new act, regulations will apply similar controls to those used in national parks and strict nature reserves.

Most of the new nature reserves within this category will be relatively small sites designated for the Natura 2000 programme and other national conservation programmes. The number of such reserves will be very large, however. Another trend will see the establishment of an increasing number of larger areas of which only parts will be strictly protected.

**Wilderness reserves** have been established to preserve their wilderness-like characteristics, to safeguard Sámi culture and traditional local livelihoods, and to promote the diverse sustainable use of natural resources. The Wilderness Act prohibits the establishment of mining concessions, the construction of permanent roads, and the transfer or leasing of land or rights to use the land for purposes other than traditional livelihoods and the operations of the authorities. The act also prohibits forestry in most wilderness reserves, and Metsähallitus has recently ended all logging in these areas. Reindeer husbandry is practised in all wilderness reserves. Other land uses are controlled through management plans drawn up in cooperation with local stakeholders.

**National hiking areas** are diverse areas primarily intended for hiking and other recreational uses of nature. They all belong to the Natura 2000 network, and can be categorised as protected areas even though they are not nature reserves as such. Forestry is practised to a limited extent, with consideration given to natural values and recreational needs. Fishing and hunting are generally permitted in national hiking areas.

**Natura sites** may be protected through legislation (under the Nature Conservation, Wilderness, Forest, Water, Outdoor Recreation, Land Use and Building, and Land Extraction Acts), through administrative orders or under voluntary agreements. Various economic activities may be permitted in Natura sites, as long as they do not threaten the natural values they have been established to conserve. Where necessary, management plans have to be drawn up for such areas. Ramsar wetland sites and Baltic Sea Protected Areas (BSPA) are also Natura sites, and the conservation objectives defined in the respective agreements are duly considered in the planning and implementation of the use and management of these areas.

### *Cherishing cultural heritage*

Metsähallitus is legally obliged to cherish Finland's cultural heritage as well as natural values, and these obligations are met primarily through the management of protected areas. Metsähallitus must also safeguard conditions for Sámi culture in protected areas within the Sámi Homeland region. Regulations defined in connection with the establishment of individual protected areas also stipulate that cultural features should be preserved, for instance in the Archipelago National Park. Metsähallitus is also obliged to protect features including cultural landscapes in the Telkkämäki Nature Reserve that have developed due to the traditional practice of slash-and-burn farming in this part of Eastern Finland; the attractive English-style garden within the Aulanko Nature Reserve; and the naturally beautiful scenery and cultural environments around the Langinkoski rapids at the mouth of the River Kymi, including an imperial fishing lodge used by the Russian Tsars. All ancient archaeological and underwater relics in Finland are protected by the Antiquities Act.

The location of cultural features in State-owned nature reserves ensures their preservation in their natural surroundings, and thus increases their value as cultural heritage. The primary objective is to survey and evaluate all surviving features, which can then be managed with the limited resources available for the work. These features are accessible to everyone, and some of them are significant tourist attractions. Particularly in areas popular with tourists they can represent opportunities for interpretation and also for preservation of traditional working methods. Such sites can also be used by researchers.

### *National land use objectives duly considered*

Finnish legislation on land use and building was renewed at the turn of the millennium. A set of national land use objectives was enacted by the Government. State officials are all obliged to ensure that nationally significant cultural and natural heritage values are preserved. Other obligations under international agreements and

Government decisions concerning cultural and natural heritage must be taken into account in all official activities. Officially drafted national inventories are also considered in land use planning. Regions with especially significant natural and cultural values at a national level include the SW Archipelago, the land uplift coasts of Western Finland, Lapland's arctic fells, and the Saimaa Lake area.

The NHS must also consider in all of its activities the objectives defined in regional land use planning, and work towards the national land use objectives. Areas designated by planners for conservation and outdoor recreation are duly considered and marked on plans. Regional land use plans and local master plans are fully considered when management plans are made for protected areas and reviewed to account for the perspectives of stakeholders. The impacts of land use outside protected areas on the natural values of Natura 2000 sites are evaluated as part of planning procedures. If it is suspected that planning solutions will result in such impacts, planners must evaluate them with respect to individual protected areas.

### **7.2.2 Work Guided by Management Principles**

The uses of protected areas are controlled by legislation and also by a set of Principles of Protected Area Management, first approved by Metsähallitus in 1992. These guidelines define the types of State-owned nature reserves administered by Metsähallitus together with their respective conservation objectives and the general principles that must be applied in their management and use. These principles were updated in 2004 and completely revised in 2007.

These outlines help the Metsähallitus Natural Heritage Services to ensure that protected areas are managed and used as effectively as possible with regard to the objectives defined when they were established. These principles are particularly referred to following the conclusion of practical measures. They are also applied in areas administered by Metsähallitus which have been acquired for the purposes of nature conservation, but have not yet been legally established.

### *Preserving nature in its natural state*

The main principle to be applied in managing nature reserves is that natural processes should not be interfered with except for the purposes of nature conservation. In some parts of protected areas that were previously exploited economically, habitat restoration work is done to speed up the process of reversion to the natural state. Some threatened species can only be protected if their habitats are actively managed. Archaeological relics and built heritage are protected and managed alongside natural values in many nature reserves. In the management of hiking areas and wilderness reserves special attention is paid to recreational objectives and the need to preserve Sámi culture. The goal is that the uses of protected areas should not reduce the cultural or conservation values they were established to preserve.

In practice, the various uses of protected areas are controlled through planning, the provision of facilities and guidance, and supervision. Efforts are made to ensure that areas are used for recreational activities and local livelihoods on a suitable scale with respect to their sizes and conservation objectives. Some related basic principles are defined in the Nature Conservation Act. More detailed controls are set out in the regulations defined when areas are established and in management plans. Certain activities are absolutely prohibited in protected areas, and some are subject to permits. In the Sámi Homeland and the Archipelago local residents have certain special rights.

In the planning of its own activities and the use of areas by the public, Metsähallitus strives to ensure through the zoning of larger areas, such as national parks, that the most valuable sites in conservation terms are preserved as well as possible. Facilities are provided according to demand, and maintenance work is done in ways that minimise environmental impacts. In collaboration with other actors Metsähallitus also seeks effective ways to control and reduce pressures. Table 15 shows measures that Metsähallitus can apply to address pressures affecting different habitat types. These are elaborated in the following.

### 7.2.3 Mitigation of Pressures on Conservation Values

#### *Reindeer grazing pressure reduced through pasture agreements*

Reindeer husbandry is practised both inside and outside protected areas as defined in the Reindeer Husbandry Act. The Ministry of Agriculture and Forestry defines the maximum permissible numbers of reindeer on the basis of the capacity of their pastures, and provincial authorities oversee the observation of reindeer quotas in their respective areas.

In the planning of the management of protected areas, attempts are always made to investigate former land uses and current pressures. In the north, this means assessing the significance of an area for reindeer husbandry and the impact of the local reindeer herding association's pasture rotation system on the park ecosystems. Reindeer herders typically participate actively in such management planning procedures, since the use of larger protected areas in particular is vital for their activities.

The impacts of reindeer grazing in the Malla Strict Nature Reserve have been assessed in detail to provide a basis for future policy decisions. This reserve is the only protected area where reindeer herding is expressly prohibited. In this part of NW Lapland grazing pastures are in increasingly short supply, partly due to the use of more areas for tourism, and it has been proposed that reindeer should also be allowed to range through Malla. The reserve's vegetation is characteristic of the calcium-rich soils of the nearby Scandinavian Mountains in Norway and Sweden and includes many species not found anywhere else in Finland. According to a related report, many scarce species would actually benefit from grazing pressure that would keep other vegetation in check, so some level of grazing could favour these rare plants.

Experts believe that variations in grazing pressure, to which fell vegetation seems to be able to adapt, are more important than reindeer numbers as such. The wild ancestors of today's domesticated reindeer were originally an integral part of local ecosystems, and they have shaped



arctic environments since the end of the Ice Age. The prevention of reindeer grazing in protected areas means that they no longer truly correspond to their natural state. Natural populations of wild reindeer fluctuated greatly. During harsh winters many animals could die of starvation or disease. The consequent reductions in grazing pressure enabled natural pastures to recover. Nowadays most domesticated reindeer survive even the toughest winters, thanks to the provision of extra fodder and medication against parasites.

The international management effectiveness evaluation (MEE) in 2005 recommended that the NHS should make agreements with reindeer herders' associations to establish more grazing-free areas within protected areas, ensure pastures are rotated sustainably, and control grazing pressure on the basis of research findings. In protected areas Metsähallitus can only influence reindeer numbers and their environmental impacts through negotiations on pasture rotation systems, and through controls over the structures used by reindeer herders and the distribution of extra fodder.

### *Regulating harmful species*

Unregulated hunting and fishing can threaten species, but systematically controlled hunting and fishing can also be useful management tools for conservation purposes. The present system of regulation ensures that viable populations of game species survive in the wild. The use of selective hunting and fishing in the management of natural areas is increasing rapidly in Finland, also in protected areas. One such example is killing off harmful non-native American mink and raccoon-dog in the Archipelago (see Information Box 20). Similar action may be taken in future in certain protected areas where numbers of Canadian beavers have become excessive.

Increasing numbers of elk and deer are becoming an issue in the management of certain national parks in Southern Finland, where the hunting of elk and deer is generally prohibited. In practice, hunting is the only way to limit their populations in the south, where there are few large carnivores to keep numbers down. There have been calls for the hunting of elk and deer to be permitted in national parks in the south, as it already is in northern national parks.

### *Channeling off-road traffic onto designated routes*

Metsähallitus strives to direct all snowmobile leisure traffic onto designated routes and tracks. Exceptional permits are granted on a case by case basis for necessary access. In the Sámi Homeland all local residents have permits allowing off-road access to most protected areas, but not national parks or strict nature reserves. The permit system accounts for the region's winter conditions and the existence of extensive areas with no roads. Off-road traffic can easily result in problems in the reindeer husbandry region, so Metsähallitus negotiates with herders' district associations on permit procedures.

The main principle throughout Finland is that visitors to protected areas should move under their own steam, and that tourist activities involving motor vehicles should only be organised outside protected areas. Tourism firms may, however, apply for permits for off-road access to enable them to maintain facilities, also in some national parks. Management plans for individual protected areas address off-road traffic issues more specifically. The NHS staff may themselves use off-road vehicles for maintenance work, supervision, surveys and ecological management work.

Permits for off-road traffic are only rarely granted during the summer. Where access is vital, traffic is directed onto designated routes. Permits can be granted, for instance, for the movement of fishing equipment needed at locations in protected areas by people practising traditional livelihoods, and for various types of research. The summer use of off-road vehicles seems to be increasing with the growing popularity of all terrain vehicles for leisure use. All-terrain vehicles disturb natural environments so much, that it is even more important to limit their use than to control snowmobile traffic.

### *Addressing land use outside parks*

Activities that use and consume natural resources and the construction of facilities, for both economic and recreational activities, are all subject to permits within protected areas. The new Nature Conservation Act defines circumstances for the granting of permits for activities that would normally contravene protective legislation. Permits

may be granted for activities including research work, fishing and hunting, structures used by reindeer herders, and geological research or prospecting. The use of protected areas for such activities as tourism is also controlled through leases and user rights agreements. In every case efforts are made to ensure that protected areas' conservation values are preserved, and their natural state remains undisturbed.

Metsähallitus strives to reduce the impacts on protected areas of nearby developments by influencing various forms of planning, including land use planning and the planning of roads and forestry development schemes. But, except in areas owned by the State, Metsähallitus has few ways to limit the impacts of land use practices outside protected areas on natural processes. In many small protected areas in Southern Finland the necessary ecological buffer zone has formed inside the protected area itself, reducing the size of the area effectively under protection. The legislation concerning Natura 2000 sites has significantly improved this situation, since all developments outside protected areas are obliged to consider their environmental impacts on Natura 2000 sites.

In the future more extensive forms of ecosystem-based land use planning conducted in cooperation with the owners of the lands around protected areas may result in new ways to reduce the pressures threatening the natural values of protected areas.

#### 7.2.4 Restoring and Safeguarding Natural Processes

One important function of nature reserves is to safeguard natural processes that are not allowed to act unchecked outside protected areas, such as peat formation, flooding, decay, storm damage and, to some extent, also wildfires. Metsähallitus strives to preserve sufficient examples of natural areas shaped by such processes in all types of habitat in each vegetation zone.

Especially in Southern Finland, nature reserves have usually been at least partially exploited commercially before their designation, and many forests and mires in such areas no longer have all their original features and species. These habitats

are restored to safeguard the threatened species that remain in the small remnants of old-growth forest or natural mire habitat. Some of the valuable biotopes and species found in protected areas can only be conserved through active and continuous management work.

#### *Habitat restoration simulates natural processes*

Habitat restoration is a globally used conservation tool that involves various measures designed to trigger the reversion of ecosystems towards their natural state. Such work usually consists of one-off measures designed to speed processes that will help ecosystems shaped by human activities to return to a state as close to their desired natural state as possible. Such measures are carried out where the consequent benefits to biodiversity will be greatest, and the risks lowest.

Habitat restoration work is rational from an economic perspective, as it enables the full conservation benefit to be obtained more rapidly from areas reserved for nature conservation. In Finland, the habitat restoration work on affected mires and forests began about ten years ago, on a trial basis. The first restoration schemes were in nutrient-poor wooded pine mires, but more recently work has also been done in lush spruce mires and in forests growing on mineral soils. Streams and springs are also restored. Disused forest roads can be reforested, and fields can be converted back into herb-rich forest.

The METSO Forest Biodiversity Programme for Southern Finland has enabled extensive habitat restoration work in protected areas. Restoration methods and their desired impacts on forest and mire habitats are described in more detail in Information Box 15.

There is a clear need for restoration work in mires in protected areas, but some mires outside protected areas could also be restored. Finland's eighth national forest inventory estimated that more than 9% of Finland's artificially drained forests are no longer worth draining or using for forestry. The drainage schemes previously carried out in this total area of some 450,000 hectares are now considered to serve no useful purpose from a forestry perspective.

## Restoring Natural Processes in Protected Areas

Humans have greatly reshaped Finland's natural features over recent centuries. There have especially been considerable changes in forests and mires. Commercial forestry has made forests more uniform, and about a half of all the country's mires have been artificially drained. This has led to steep declines in the populations of species associated with mires and burnt or decaying wood.

Habitat restoration helps to return habitats that have been changed by human activities to their natural state. Restoration work is done mostly in formerly commercially managed forests and drained mires which now lie in protected areas. In the long term, restoration measures will be done in about a tenth of the total area of nature reserves in Southern Finland.

Restoration diversifies the structure of tree stands and increases the amount of decaying wood. This creates more living space for many declined or threatened species, including woodpeckers and other hole-nesting birds. Mire restoration raises the humidity levels in dried mires, benefiting for example the cloudberry (*Rubus chamaemorus*), as well as many game bird species.

Forest restoration methods include controlled burning, promoting the structural diversity of forests through the creation of small openings, and increasing the amount of dead and decaying wood by damaging trees. Controlled burnings aim to imitate natural forest fires, which are nowadays rare, because of effective fire preven-



Habitat restoration can involve the controlled burning of forest stands. Photo: Jari Kostet.

tion. To prevent the uncontrolled spread of fire, trees are cleared in wide firebreaks around the patch of forest to be restored through burning. Fire-fighting equipment and staff are also kept at hand.

According to studies, burning is a very good restoration method for biodiversity, because it makes the structure of forests diversify rapidly, and creates a lot of dead wood. Because it is an expensive method, however, most forest restoration work is carried out using other methods. Loggers use chain saws to create dead trees, which may be left standing or fallen, to increase the amount of decaying wood. The structure of uniform coniferous forests can also be diversified by making small clearings, which enable the saplings of deciduous trees to get more light and thrive. Deciduous trees will later offer nesting places for birds and other species that have become threatened due to a shortage of the large deciduous trees, which they depend on.

Mires are restored by blocking drainage ditches and by building dams using excavators. To restore an open mire, any trees which have grown there following its drainage need to be removed before the ditches are blocked. Restoration measures should be carried out outside birds' nesting season.

Trees are removed from mires during the winter, by machines or by hand. Measures to create more decaying wood and small clearings are also usually conducted outside the summer time. Habitat restoration work thus provides welcome employment for local forestry workers during the winter.



Mire habitats are restored by filling in ditches. Photo: Metsähallitus.



## *Ecological management maintains biodiversity*

Ecological management methods are often used to help preserve environments created by traditional land use, such as burning of small wood clearances for farming or mowing and pasturing of natural meadows. These ecologically diverse traditional agricultural habitats are managed to preserve or recreate natural, cultural or landscape values that would decline without repeated or annual measures.

Ecological management measures are also conducted to help conserve certain species and their habitats. Examples include the local extermination of non-native small predators (American mink and raccoon-dog) to protect wetland bird species. Overgrown inland waters are also cleared of vegetation to create more open waters for birds. Sunlit esker slopes can be cleared to create more habitat for specialist plants and the many rare insect species that depend on them. It is also necessary to restrict the growth of spruce trees in herb-rich forests to protect their characteristic species. Many species, like the white-backed woodpecker, benefit from light. Herb-rich forests are most widely managed in Southern Finland.

### **7.2.5 Maintaining Service Structures and Actively Using Buildings**

Buildings and other structures only have any value, if they are kept in good condition, and only buildings that are actively used and maintained, will last in the longer term. Metsähallitus aims to keep as many buildings and structures as possible in good shape and active use. Repairs and renovation work are scheduled to ensure that no arrears accumulate. Attempts are made to find new uses for buildings that no longer serve their original function.

Section 7.1.5 reviewed the condition of buildings and structures administered by the NHS. Another important factor is the usage rates of buildings. In 2005 it was calculated that some 88% of all of the NHS's almost 1,700 buildings were in use, including all buildings designated for guidance purposes. About 95% of cabins and open wilderness huts were in use. The remaining disused huts had fallen into disrepair. There has

not yet been a more comprehensive survey of the state of all buildings in all protected areas.

It has been possible to renovate some of the buildings in lands acquired by the NHS. Such buildings can often be used as nature information points. Old pilot and coastguard stations in the Kvarken Archipelago are now visited by tourists, and many other valuable old buildings have likewise been restored for visitor guidance. A beautifully restored old house in Savonlinna now serves as the Nestori-Saimaa Visitor Centre, where an exhibition features the life of the Saimaa ringed seal in national parks of the Saimaa Lake District. The Muurahainen Nature Information Point in Lauhanvuori National Park used to be a school building.

The controlled burning of forests and the management of traditional agricultural biotopes increase biodiversity and preserve traditional landscapes. The management of cultural landscapes as a whole often necessitates the restoration, renovation and maintenance of local buildings as well.

### **7.2.6 Welcoming More Visitors within Sustainable Limits**

Efforts will be made to channel most of the expected increase in visitor numbers due to the growth of nature tourism in State-owned lands into areas that are already quite intensively used, for reasons related to sustainability. The Action Plan to Develop Nature Tourism and the Recreational Use of Natural Areas (VILMAT) estimated that nature tourism will increase by around 8% annually in Finland overall. Metsähallitus's own forecasts suggest that the numbers of visits to protected areas near expanding tourist centres will rise annually by almost 5%. This will ultimately represent an overall increase of almost 40% over the period 2003-2010. Protected areas in districts where tourism is expanding account for approximately 90% of all visits to State-owned areas, and 97% of the ongoing increase in visitor numbers.

Growth in nature tourism, especially in national parks, is an integral goal of the VILMAT action plan. To ensure the ecological, cultural and socio-economic sustainability of its operations, the Metsähallitus NHS adopted in 2004 a set of principles for sustainable nature tourism. These



This former coast guard station today serves as a nature information point in the Kvarken Archipelago. Five such stations have been renovated for nature tourists visiting the area. Photo: Jari Kostet.

principles are followed in NHS's own work and in all forms of cooperation with firms providing nature tourism services.

Sustainable nature tourism is practised in protected areas, wilderness reserves and areas in conservation programmes administered by Metsähallitus according to the following principles:

- Natural values are preserved and all activities promote nature conservation.
- The environment is subjected to as little pressure as possible.
- Local traditions and cultures are respected.
- Visitors increase their understanding and appreciation of nature and cultures.
- Improved recreational facilities are provided for visitors.
- Visitors are encouraged to enjoy both mental and physical recreation.
- Local economies and employment are promoted.
- Publicity materials are produced responsibly and carefully.
- Activities are planned and organised cooperatively.

Appendix 17 lists the ways the NHS applies these principles in practice. Ecological sustainability is ensured through the placement of service structures, guidance and practical controls. The increasing numbers of visitors in the most popular protected areas mean that it is important to evaluate and monitor these areas' capacity to deal with visitors in more detail. It is intended that by 2010 the ecological sustainability of the most visited areas will be routinely measured through a wider range of more accurate indicators and measures, and that management work will be adapted according to results.

The reasons for monitoring the sustainability of the management and use of protected areas lie in legislation and policies related to the conservation of natural and cultural values, as well as in the objectives defined for areas' recreational and other use, which are also included in their respective management plans. The implementation of these plans is evaluated approximately every five years. The effectiveness of the management of protected areas is also continuously monitored according to the operational objectives for Metsähallitus's work as directed by the ministries and defined each year by the Finnish Parliament.