



## NORDIC NATURE – TRENDS TOWARDS 2010

### Threats to biodiversity in the Nordic Countries

**Biodiversity – which is vital for life on Earth – has declined alarmingly over the last century. The deterioration of species' habitats is the largest single threat to biodiversity both globally, and in the Nordic Countries, where the rate of biodiversity decline is just as rapid as it is worldwide.**

Land use changes lead to the loss, shrinking or deterioration of natural habitats. There is less room for biodiversity wherever natural areas are built over or converted to farmland, and wherever open areas become overgrown. The quality of the remaining natural ecosystems may also decline, due to habitat fragmentation, climate change and pollution. Impacts on habitats are directly reflected in species' populations and genetic diversity, often putting the survival of entire species at risk.

Invasive alien species and climate change are the next most serious threats to biodiversity. Many species' populations are also affected by hunting, trapping, gathering and fishing, with its significant by-catches. Pollution additionally alters habitats through eutrophication, acidification and contamination, often seriously affecting species' prospects.

#### Harmful land use changes

Our use of the land and exploitation of natural resources have always shaped natural habitats, consequently altering their species assemblages and the interrelationships between species. Land use changes tend to be unfavourable to an area's former flora and fauna – with the exception of the protection of habitats in new nature reserves.

Land use changes result from society's demands for the increasingly intensive commercial exploitation of land and other natural resources. Some of the most harmful processes for biodiversity include the conversion of "unproductive" natural areas such as mires and wetlands into farmland, commercial forests or peat extraction sites, with the help of artificial drainage schemes.

The intensification of agriculture and the abandonment of production in less productive areas have led to the loss of ecologically valuable traditional agricultural biotopes shaped by earlier farming practices. These species-rich habitats have widely become overgrown where traditional grazing and mowing have ended. Many of their characteristic species are now seriously threatened. Such areas have been replaced by large, uniform open fields, fertilised, managed using machines, and drained by concealed ditches. Such landscapes lack the grassy verges, ditches and wooded patches that were rich in species.

Intensive forestry has meanwhile created forest habitats that are more uniform in terms of the ages and species of trees. Natural old-growth forests with their many dead and decaying trees have been disappearing, together with their many typical species. Arctic fell habitats have been altered by overgrazing and the consequent erosion in many places, while elsewhere they have become overgrown where summer pastures are no longer grazed.

Built-up areas and transportation routes are spreading through natural areas and becoming even denser in more populated regions. Forest roads nowadays penetrate deep into remote wild areas in Norway, Sweden and Finland, further fragmenting the last extensive natural environments. Even the most remote locations in Iceland and the Faroe Islands can now be reached by road or sea, and disturbance from visitors and traffic has increased greatly. Species' populations are increasingly cut off from each other, threatening their genetic diversity. Shore habitats change due to new building developments including holiday homes. Increasing nature tourism can worsen noise and other kinds of disturbance, especially from motor vehicles.

Dams and reservoirs have harnessed natural rivers and drowned large areas of land. Oil and gas rigs and wind turbines blemish natural seascapes, just as telecommunications masts spoil wild areas. Mining, quarrying, landfill and

Some threats only have destructive impacts on a local scale, and do not endanger the survival of entire biotopes or species. If a pond that is home to a frog population becomes overgrown due to eutrophication, for instance, frogs may be able to move to another more favourable habitat, as long as suitable pathways are not blocked by fragmentation. It may also be possible to restore habitats to help bring back a lost population – as long as it was not the species' last population. But other changes have much wider impacts on whole biotopes and their characteristic species, as is the case with the effects of climatic warming on tundra habitats and the ecosystems of continental ice sheets and sea ice.

Certain threats may be acute, with their impacts apparent immediately, while others may not become evident for some time. This may depend on the extent of a species' typical territory. Habitat deterioration may have immediate impacts on species that live within a limited range, whereas changes may only be reflected slowly in species that range over extensive territories, e.g. as reduced availability of food.

The impacts of individual threat factors may be limited in themselves, but the combined impacts of several factors could be disastrous. The mechanisms involved are often complex, and it can be hard to differentiate causes from effects.



*Changes caused by the intensification of agriculture are visible in the landscape. The number of farms is decreasing, and modern farms have larger, more uniform fields, reducing their biodiversity. The landscape pictured is in southwestern Finland. Photo: Riku Lumiaro.*

dumping all destroy habitats. The only remaining truly untouched wild areas in the Nordic Countries are in Svalbard and a few fragmented protected areas.

At least three-quarters of the Nordic Countries' threatened species are at risk due to land use changes. Most of these are species of old-growth forests, traditional agricultural biotopes or natural mires. The impacts of intensification on biodiversity are clearly evident in agriculture and forestry, and measures to address such problems have been initiated. EU subsidies support the mowing and grazing of traditional farmland habitats, for instance. Forestry practices are being softened to consider conservation priorities – for example by leaving decaying wood in the forests. In ditch cleaning and supplementary ditching of peatlands, the impacts on surrounding habitats are now carefully considered. Mires, wetlands, traditional agricultural biotopes, springs and other habitats are being restored in many places.

### Alien species a real threat

The spread of invasive alien species is rated as the second greatest threat to biodiversity globally. Non-native species are spreading into new areas increasingly rapidly through human activities as international trade, transportation and travel intensify.

Some aliens eventually become well established, often to the detriment of local native species. In the Nordic region invaders have become harmful where they out-compete native species for food or territory, increase their populations and disrupt natural ecosystems. They may also bring in parasites and diseases that have unforeseen impacts on local species. New species are likely to spread northwards due to habitat changes induced by climate change. Not all alien species become harmful to native species, however.

Once they become established, it is often extremely difficult to eradicate alien species. In seas and inland waters this may be almost impossible. The best way to prevent their arrival and spread is to anticipate problems, and enact effective legislation. Once a species has arrived, steps can still be taken to try to exterminate them, slow their spread, or reduce the harm they cause to local species. The earlier such actions are initiated, the more likely they are to succeed. Publicity and awareness raising measures play a vital role in such work.

### Climate change a growing threat

Climatic warming, increased precipitation and sea level rise can all be expected to affect biodiversity in the Nordic Countries. Climate change mainly results from increases in the amounts of greenhouse gases released into the atmosphere by human activities, and its impacts will depend on future trends in emissions. These impacts may be particularly disastrous for coastal biotopes and biotopes associated with ice and permafrost, and their typical species.

The distributions of biotopes and species will change considerably, with some species even vanishing altogether. Dramatic changes are particularly predicted for arctic regions. Some species will not be able to adapt to habitat changes or shift their distributions accordingly. As the climate warms, arctic tundra and fell habitats will change, and species will run out of habitat as the tree line shifts ever further northwards and upwards in mountainous regions. The waters of the Arctic Ocean ultimately block the northward spread of species. Biotopes associated with permafrost conditions may disappear completely. If the permanently frozen icy cores of palsa mires thaw, for instance, we will lose these unique habitats for ever.

The arctic tundra biotopes that dominate much of Greenland will vanish as the climate warms. Continental ice sheets will shrink, as will the sea ice that is vital to the polar bears. Shorter, milder winters are already causing problems for seals that raise their pups in dens built on the ice. This problem is particularly a concern for the endangered Saimaa ringed seals in Finland. New species may arrive in the Nordic Countries from the south as conditions become favourable to them. Climatic warming can also accelerate the overgrowth of traditional agricultural biotopes, and help non-native species to survive and spread.

All references are listed on the home page of the fact sheet:  
[www.environment.fi/nordicnature](http://www.environment.fi/nordicnature) > Fact sheets > Threats to biodiversity in the Nordic Countries

### Exploitation of fish, whale and game stocks

Like the land itself, the populations of many plant and animal species have also been exploited intensively, with many species consequently becoming endangered. Stocks of many fish, crustaceans, seals and whales have been exploited beyond their capacity to recover. International quotas and protective measures have been defined in an attempt to ensure their survival, but such quotas are often so high that stocks are still overexploited in practice.

People have hunted since time immemorial, and many populations of game species and large carnivores have been seriously endangered. Modern hunting controls and quotas aim to ensure that their populations are managed sustainably, also striving to minimise damage to domestic livestock. But the persecution of large carnivores has not totally ended in the Nordic Countries, and large carnivores are still hunted illegally.

### Harmful chemicals

Pollution and the consequent contamination, eutrophication and acidification represent considerable indirect threats to biodiversity. Although problems caused directly by toxic substances have declined recently in the Nordic environment, other threats remain such as the increasing risks of oil and chemical spills.

The eutrophication of inland waters and the Baltic Sea will continue as long as nutrients are released into water bodies in sewage effluent and runoff from farmland. Many marine and inland waters are suffering from eutrophication, and sandy shores are widely becoming overgrown. Nutrient pollution also affects terrestrial habitats. Airborne nitrogen deposition increases eutrophication of traditional agricultural biotopes, speeding their overgrowth.

### Distinct threats faced by Greenland

Unlike elsewhere in the Nordic Countries, the greatest threat to species and habitats in Greenland is not land use changes, but the excessive exploitation of natural resources. Hunting, fishing and other disruptive activities have together led to significant declines in the populations of many mammals, birds, fish and crustaceans. Today biologically defined quotas and close seasons are set to stop the decline.

Habitat fragmentation is not problematic in Greenland, since this vast island's lengthy ice-free coastal areas are still huge in relation to its small and scattered human population. Only about 700 hectares of land in Southern Greenland is farmed. Natural habitats are not broken up by roads or other infrastructure, since traffic between settlements goes by air or sea. Oil and gas production and traffic are rising, however. Additionally, the impacts of climatic warming are already a significant threat to the biodiversity of this unique land.