

1.1 Norwegian ecosystems will achieve good status and deliver ecosystem services.

Indicator:

Ecological status and trends for the following major ecosystems: marine and coastal waters, rivers and lakes, wetlands, forest, mountains and cultural landscapes (see the Norwegian Nature Index and the Water Management Regulations)

Are we moving in the right direction?

- + About 60 % of Norway's rivers and lakes likely to meet targets for ecological status ¹
- . Ecological status of coastal waters generally good ²
- Nature Index values stable in freshwater ³
- Nature Index values stable in marine waters ⁴
- Slight improvement in Nature Index values in coastal waters ⁵
- Steady decline for Nature Index values in wetlands ⁶
- Positive trend in forests but Nature Index values are still low ⁷
- Small decline in Nature Index values for mountain ecosystems ⁸
- Steady decline for Nature Index values in cultural landscapes ⁹

Indicator:

Population status of breeding bird species in the major ecosystems forest, mountains and cultural landscapes

Are we moving in the right direction?

- = Farmland bird populations declining ¹⁰
- + Decline in mountain birds in recent years ¹¹
- . Stable populations of common forest birds ¹²

Indicator:

Population status of species on which harvesting has significant impacts

Are we moving in the right direction?

- + Status of wild salmon stocks ¹³
- + Wild reindeer numbers are healthy, but their habitat is under pressure ¹⁴

Indicator:

Number of invasive alien organisms in the following major ecosystems: marine and coastal waters, rivers and lakes, wetlands, forest, mountains and cultural landscapes

Are we moving in the right direction?

- + Twenty-seven invasive alien species in rivers and lakes ¹⁵
- + Alien organisms in wetlands ¹⁶
- + More than 100 invasive alien species in forests ¹⁷
- . Few invasive alien species in the mountains ¹⁸
- = Alien organisms in the cultural landscape ¹⁹

Indicator:

Change in total area of land without major infrastructure development

Are we moving in the right direction?

- = Areas without major infrastructure development ²⁰

Indicator:

Number of areas of semi-natural habitat types that are actively managed

Are we moving in the right direction?

Indicator:

Number of cases where unauthorised genetically modified organisms or levels of GMOs exceeding the permitted thresholds have been detected

Are we moving in the right direction?

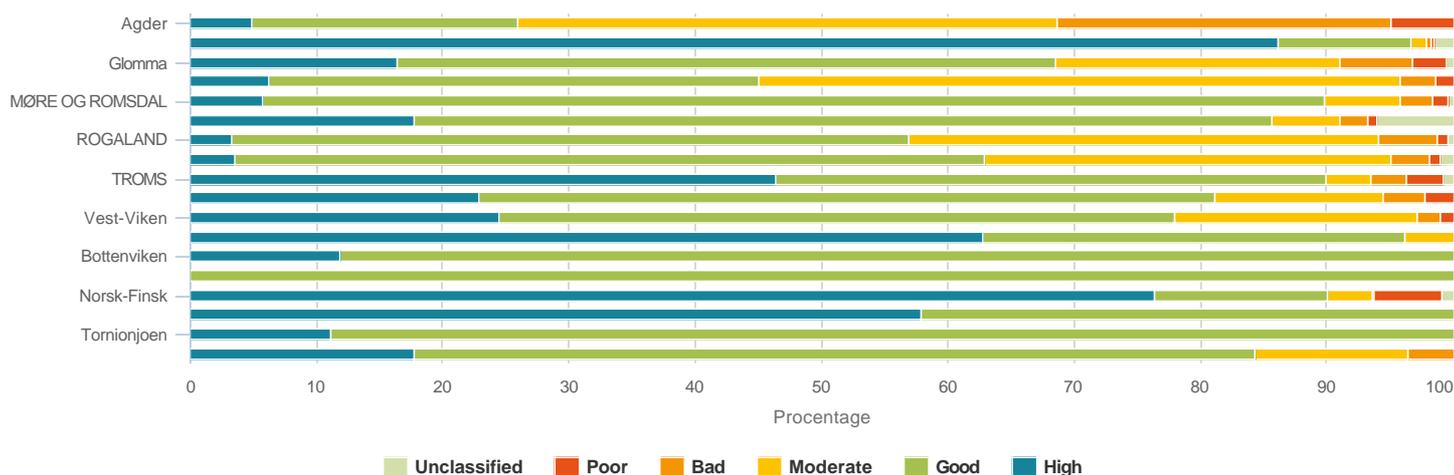
Miljømål 1.1 Norwegian ecosystems will achieve good status and deliver ecosystem services.

Indikator: Ecological status and trends for the following major ecosystems: marine and coastal waters, rivers and lakes, wetlands, forest, mountains and cultural landscapes (see the Norwegian Nature Index and the Water Management Regulations)

About 60 % of Norway's rivers and lakes likely to meet targets for ecological status

Ecological status of Norway's rivers

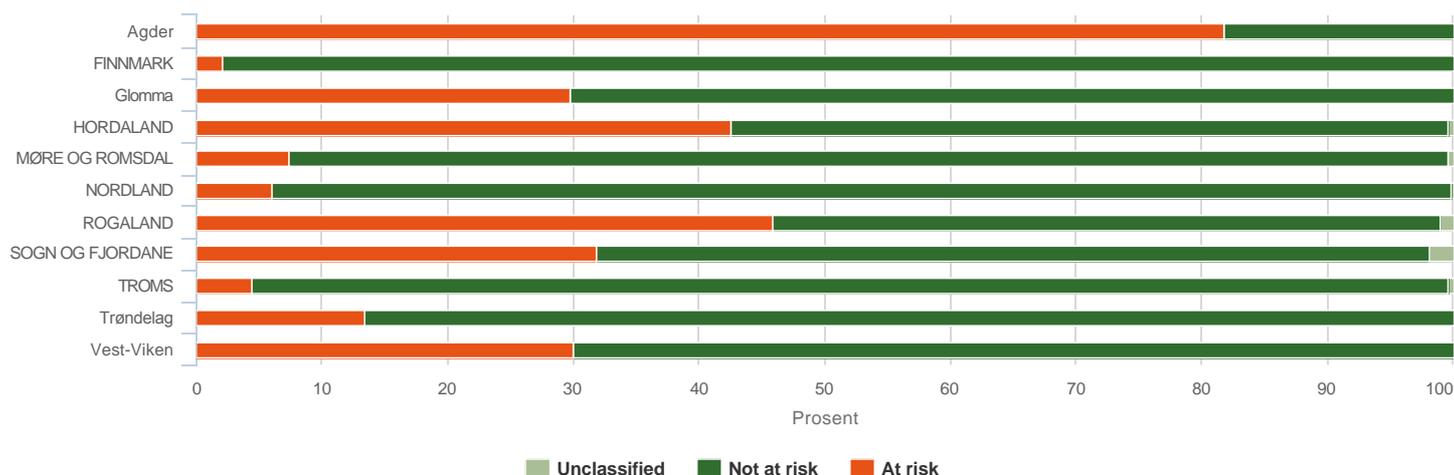
Figures from 25. may 2016



Source: Vann-Nett Licence: Norsk Lisens for Offentlige Data (NLOD)

Proportion of rivers at risk of not achieving target

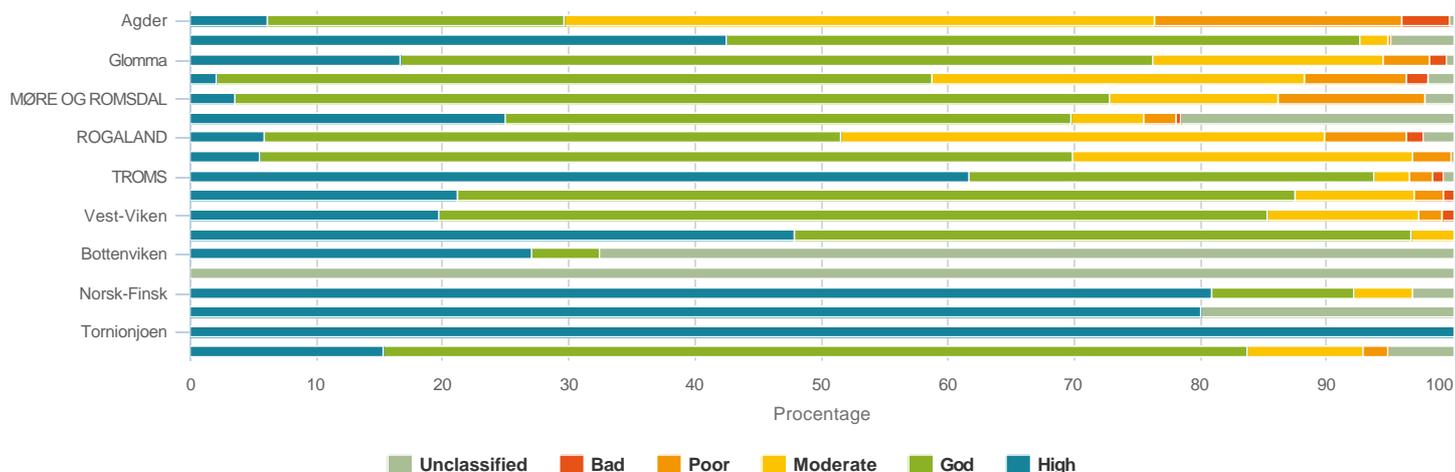
Figures from 25. may 2016



Source: Vann-Nett Licence: Norsk Lisens for Offentlige Data (NLOD)

Ecological status of Norway's lakes

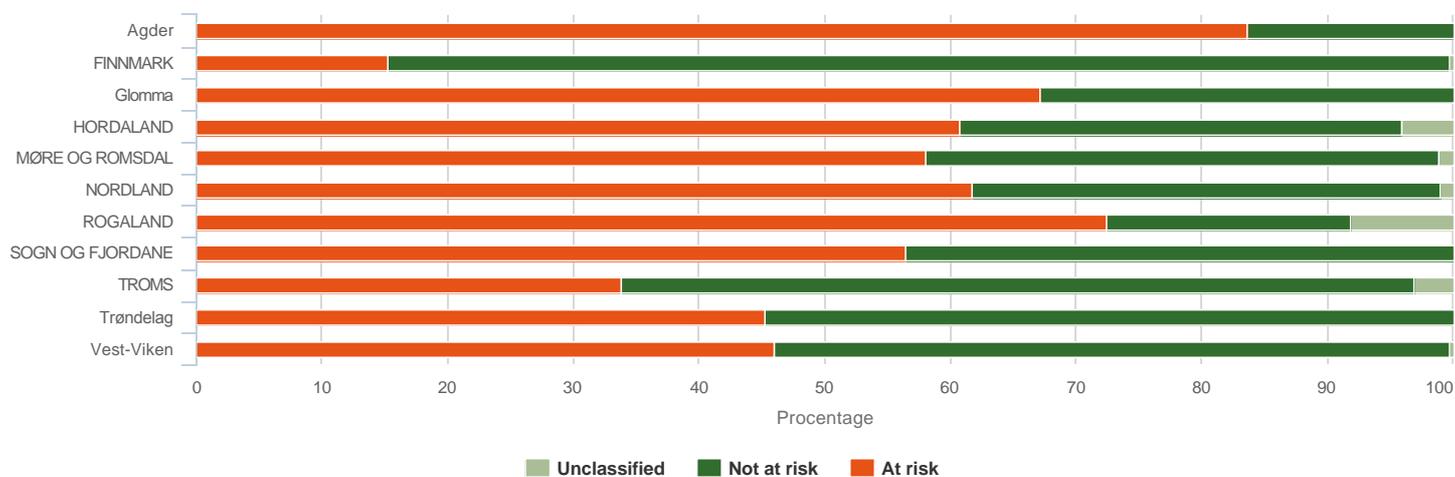
Figures from 25. may 2016



Source: Vann-Nett Licence: Norsk Lisens for Offentlige Data (NLOD)

Proportion of lakes at risk of not achieving target

Figures from 25. may 2016



Source: Vann-Nett Licence: Norsk Lisens for Offentlige Data (NLOD)

+ Are we moving in the right direction?

Published 02.01.2015 by the Norwegian Environment Agency

This indicator for rivers and lakes is based on the requirements of the Water Management Regulations, which incorporate the EU Water Framework Directive into Norwegian law. An indicator based on the Norwegian Nature Index is described here.

For Norway as a whole, about 40 per cent of all rivers and lakes are at risk of not achieving the target of good ecological status by 2021. We expect the target to be achieved for most of the remaining 60 per cent.

Where rivers and lakes are at risk of not achieving the target of good ecological status, this is explained by pressure from human activity that in turn results in changes in the fish fauna, phytoplankton, other aquatic flora and benthic invertebrate fauna.

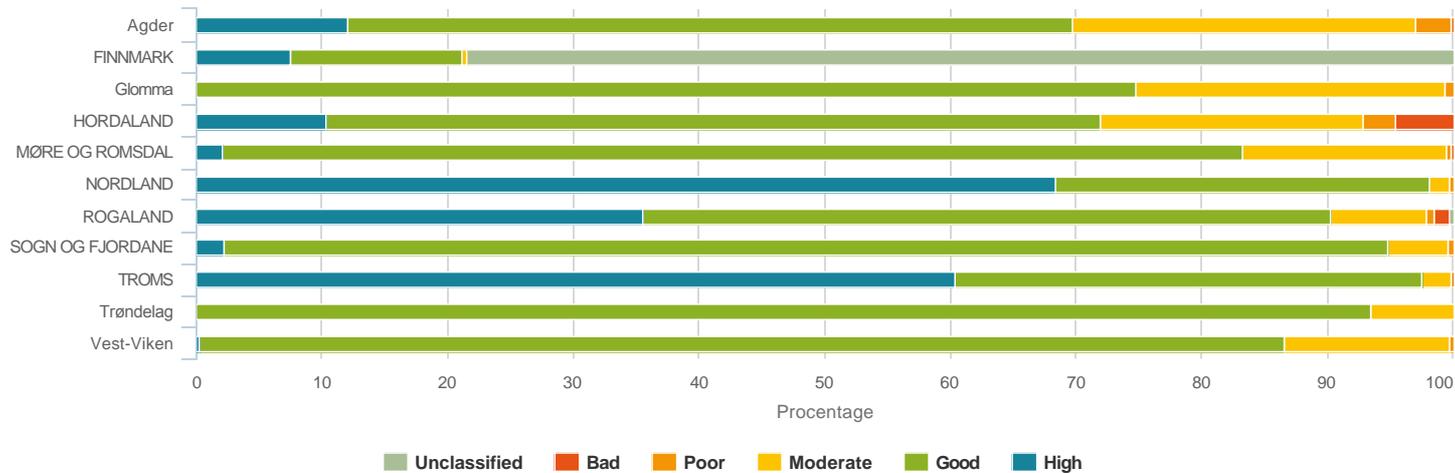
There are considerable regional variations in Norway. The proportion of water bodies at risk of not achieving the target is highest in the southernmost areas (Agder river basin district), largely because of the impacts of acid rain. Glomma, Vest-Viken and Rogaland in Central and South-West Norway, have challenges with excessive supplies of nutrients from sewage and agriculture. In Western Norway, many water courses are affected by the development of power plants. From Trøndelag and further north, between 85% and 95% of the water bodies have good or very good ecological status.

The data used in the figures above have been obtained during the process of implementing the EU Water Framework Directive in Norway. In 2015, regional water management plans and associated action programmes were adopted. The ongoing work of the sectoral authorities will determine how quickly we achieve the target of good ecological status.

Ecological status of coastal waters generally good

Ecological status of Norway's coastal waters

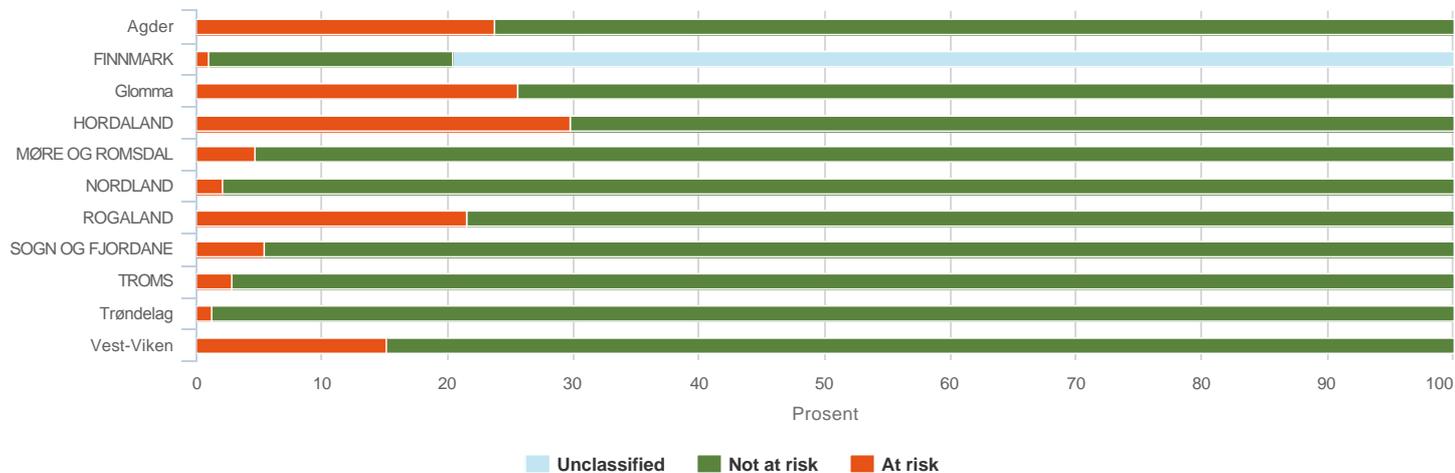
Figures from 25. may 2016



Source: Vann-Nett Licence: Norsk Lisens for Offentlige Data (NLOD)

Proportion of coastal waters at risk of not achieving target

Figures from 25. may 2016



Source: Vann-Nett Licence: NLOD

Are we moving in the right direction?

Published 02.01.2015 by the Norwegian Environment Agency

This indicator for coastal waters is based on the requirements of the Water Management Regulations, which incorporate the EU Water Framework Directive into Norwegian law. An indicator based on the Norwegian Nature Index is described here.

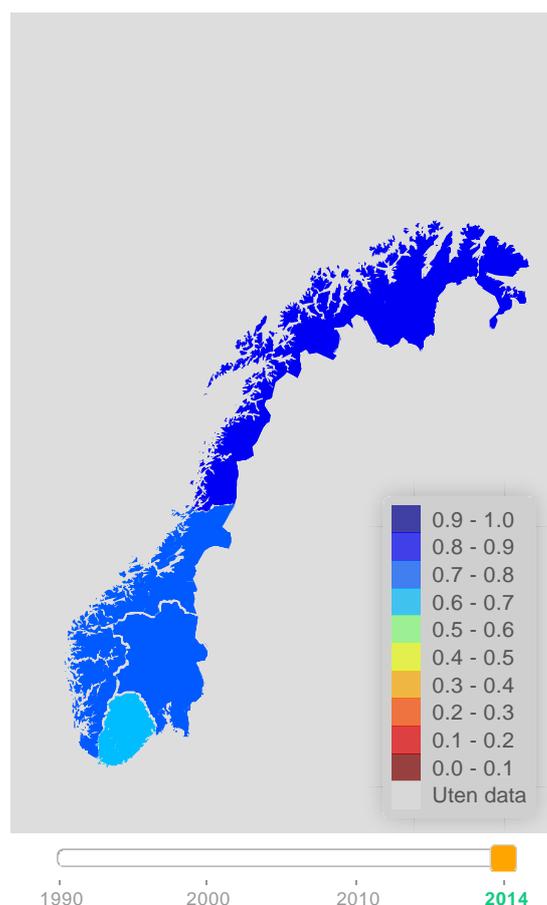
The ecological status of Norway's coastal waters is generally good, with little deviation from natural conditions. We therefore expect the target of good ecological and chemical status to be achieved by 2021 for most coastal water bodies. However, for some water bodies, especially those close to densely populated areas, it is unlikely that the target will be achieved unless further action is taken to improve the situation.

Water bodies are placed in one of the categories 'at risk', 'not at risk' or 'insufficient data' by assessing whether the phytoplankton and macroalga flora and the benthic fauna correspond to what would be expected in undisturbed conditions, or how far they have been altered by pressure from human activity. Water bodies categorised as 'not at risk' are expected to achieve the target of good ecological status by the 2021 deadline.

The data used in the figures above have been obtained during the process of implementing the EU Water Framework Directive in Norway. Assessments of ecological status and the extent to which good ecological status is being achieved may change over time as more information becomes available.

Nature Index values stable in freshwater

Nature Index values for freshwater



Source: www.naturindeks.no

➔ Are we moving in the right direction?

Published 02.01.2015 by the Norwegian Environment Agency

This indicator for rivers and lakes describes the state of biodiversity in freshwater ecosystems as measured by the Norwegian Nature Index in 2014. An indicator based on the requirements of the Water Management Regulations is described here.

For Norway as a whole, the state of biodiversity in freshwater ecosystems has been stable since 1990. This is confirmed by results from 2014, which show an overall Nature Index value of 0.75 for freshwater ecosystems (in this system, the reference state is given the value 1, and is defined to correspond to minimal disturbance from human activities.) Nature Index figures are somewhat lower for Southern Norway and parts of Western Norway. This is explained by the widespread and persistent acidification of river systems caused by long-range transport of pollutants.

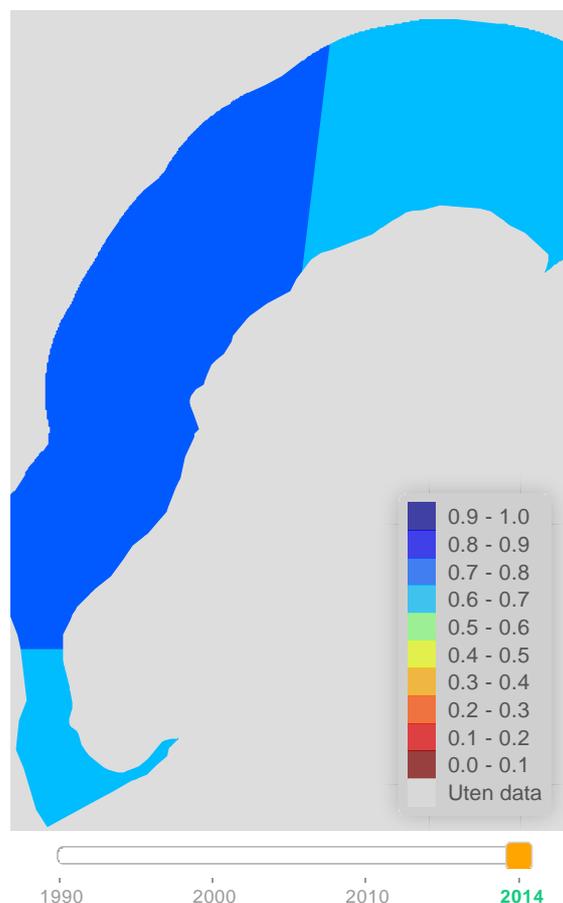
More locally, there are parts of Eastern and Central Norway where the state of biodiversity is somewhat poorer, mainly as a result of agricultural pollution and subsequent eutrophication problems and large-scale regulation of rivers for hydropower production. Even in North and Western Norway, where Nature Index figures are highest, large-scale hydropower regulation has had a negative impact on biodiversity in some areas.

Locally, inputs of nutrients, primarily from agriculture, can be a problem in all regions of the country, particularly in lowland areas.

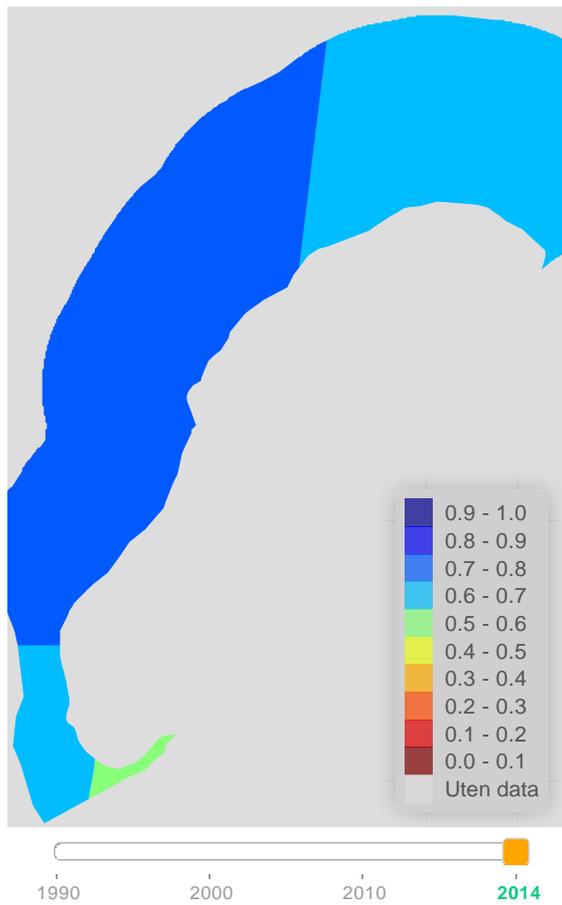
The overall stability of Nature Index figures in freshwater is partly explained by a range of management measures that Norway has introduced. They include protection for some threatened species, steps to reduce inputs of acidifying substances and liming of river systems. However, at the same time other trends have had negative impacts on biodiversity. These include increasing eutrophication and habitat degradation caused by physical alterations, for example in connection with infrastructure development.

Nature Index values stable in marine waters

Nature Index values for marine waters – seabed



Nature Index values for marine waters – pelagic



Source: www.naturindeks.no

➔ Are we moving in the right direction?

Published 02.01.2015 by the Norwegian Environment Agency

The state of biodiversity in marine ecosystems as measured by the Norwegian Nature Index has been stable since 2000. Pelagic marine ecosystems showed an improvement from 1990 to 2000, while the situation on the seabed has been generally stable.

In 2014, the Nature Index values for Norway as a whole were 0.70 for seabed ecosystems and 0.72 for pelagic ecosystems (in this system, the reference state is given the value 1, and is defined to correspond to minimal disturbance from human activities.)

In the **Barents Sea**, the cod stock is at a record level, and the cod and capelin stocks have both been stable and healthy since 2009.

In the **Norwegian Sea**, the state of biodiversity has been stable and Nature Index values high since around 2000, and the herring stock, and later the mackerel stock, have been growing.

Herring is a key species in the ecosystem because its numbers can fluctuate greatly, affecting many other species. Fishing pressure on herring was too high until the 1970s, and this resulted in a prolonged collapse of the stock. Since the 1990s, stocks of both herring and other pelagic schooling species such as mackerel have shown a positive trend. Blue whiting, which lives in rather deeper water, was fished heavily right up to the beginning of this century, and growth of the stock is still weak.

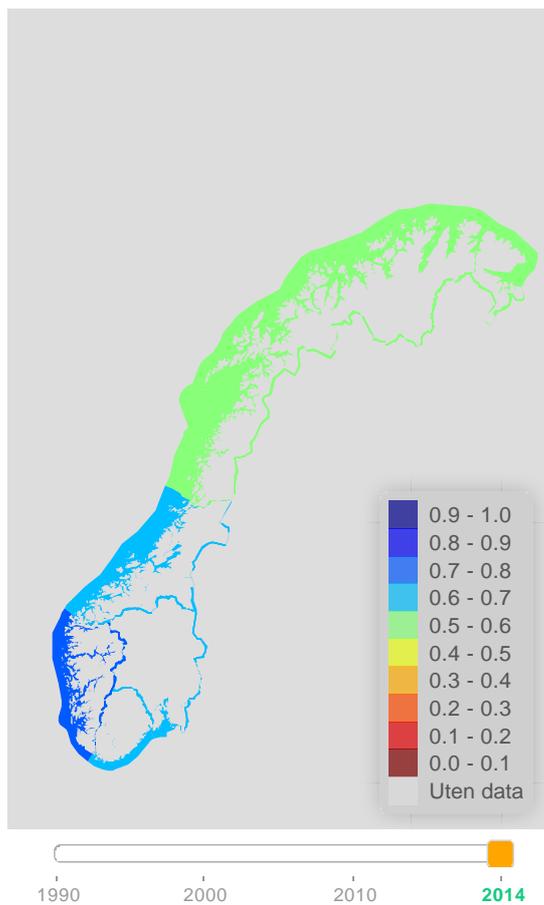
The breeding populations of seabirds in the Norwegian Sea, including fulmar, puffin and razorbill, have been declining since 1990. The reasons are not fully understood, but it is known that poor food supplies near breeding colonies, for example puffin colonies, have resulted in poor recruitment.

In the **North Sea and Skagerrak**, there has been a positive for some species since 2010, but stocks of key species such as sandeels and cod are still weak. The result is that the overall state of biodiversity has been relatively stable in recent years.

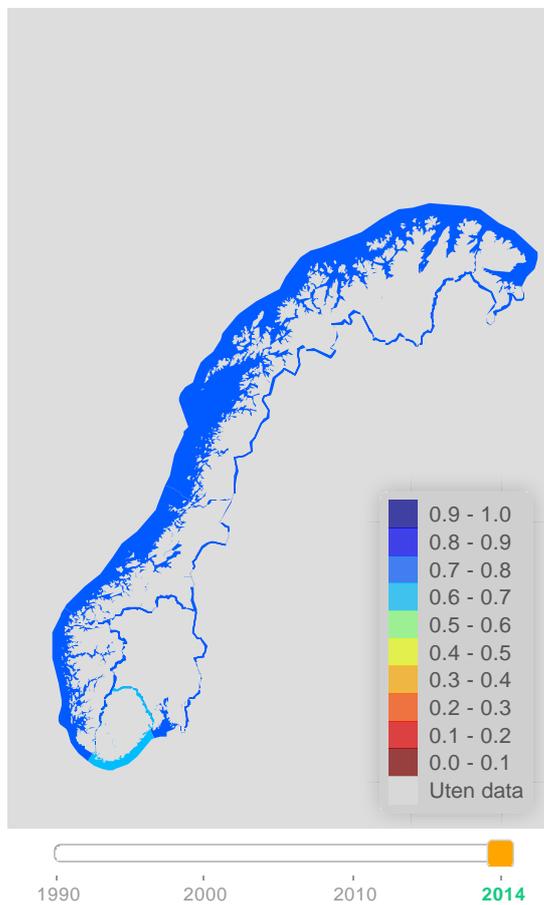
The satisfactory overall results for biodiversity in marine ecosystems can probably be linked to improvements in **fisheries management** since 1990. There are now measures in place to protect vulnerable stocks and prevent harvesting of fish under specific sizes, to allow growth and ensure recruitment to the mature stock. In addition, quotas are now based more on the precautionary principle to ensure sustainable management of fish stocks, and fishing vessels are not permitted to discard catches. Technological developments have helped to reduce bycatches by improving the selectivity of fishing gear so that the right species and sizes can be targeted more effectively.

Slight improvement in Nature Index values in coastal waters

Nature Index values for coastal waters – seabed



Nature Index values for coastal waters – pelagic



Source: www.naturindeks.no

➔ Are we moving in the right direction?

Published 02.01.2015 by the Norwegian Environment Agency

This indicator for coastal waters describes the state of biodiversity as measured by the Norwegian Nature Index in 2014. An indicator based on the requirements of the Water Management Regulations is described here.

Overall, the state of biodiversity in coastal ecosystems has shown a slight improvement since 1990, but there has been a small decline in Nature Index values from 2010 to 2014. In 2014, the Nature Index values for Norway as a whole were 0.62 for seabed ecosystems and 0.72 for pelagic ecosystems (in this system, the reference state is given the value 1, and is defined to correspond to minimal disturbance from human activities.)

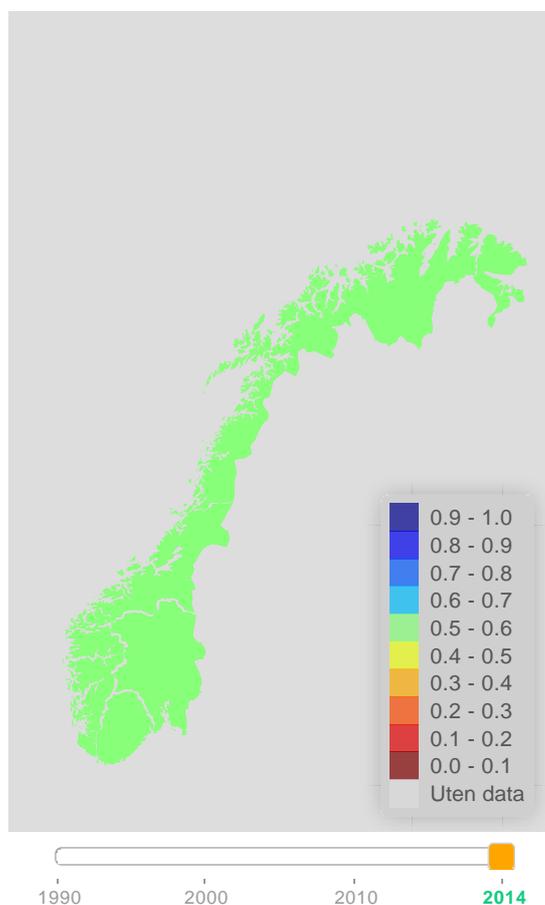
The positive overall trend is mainly explained by an improvement in Nature Index values for species in pelagic ecosystems, including phytoplankton and the common seal. The state of seabed biodiversity has been fairly stable during this period.

After 2010, Nature Index values for pelagic ecosystems have shown some decline, but not in Eastern Norway. The decline is explained by weaker coastal populations of herring, sandeels and a number of seabird species. Along the coast of Eastern Norway, inputs of nutrients carried by ocean currents from the southern part of the North Sea have been reduced since the mid-1990s. As a result, populations of phytoplankton have been healthy in recent years, providing a good basis for population growth in most marine animal species.

In general, Nature Index values are somewhat lower for seabed ecosystems than for pelagic ecosystems. Populations of some species are low, for example sugar kelp, lobster and certain fish, although they have shown some recovery since the late 1990s. Kelp forests have shown major changes since then, with a positive trend in some areas and a negative trend in others. In Nordland county, particularly the southern half, kelp forests are becoming re-established, but there are still large areas further north that are severely overgrazed by sea urchins.

Steady decline for Nature Index values in wetlands

Nature Index values for wetlands



Source: www.naturindeks.no

➤ Are we moving in the right direction?

Published 02.01.2015 by the Norwegian Environment Agency

There has been a negative trend in the state of biodiversity in wetland ecosystems as measured by the Norwegian Nature Index since 1990. In 2014, the Nature Index value for wetlands for Norway as a whole was 0.54 (in this system, the reference state is given the value 1, and is defined to correspond to minimal disturbance from human activities).

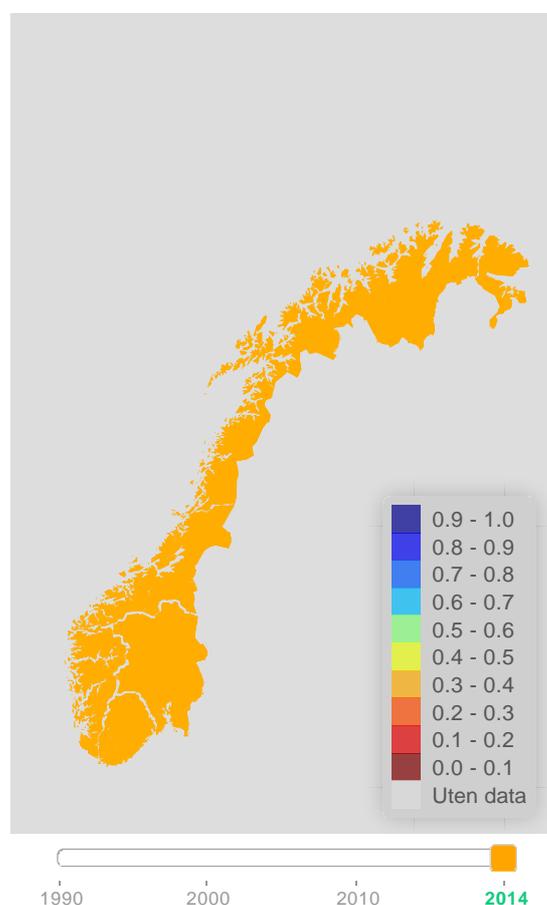
The weak but steady decline in Nature Index values for wetlands since 1990 is apparent in all regions of the country, but the underlying causes vary to some extent between regions. The main pressure on many wetland species, including a number of vascular plants, amphibians and birds, is land-use change. This is also the main threat to Atlantic raised bogs.

For many years, large areas of mires and bogs in Norway were converted to farmland or forest by ditching and draining. The rate of loss of these habitats was particularly high in the post-war period and up to 1990. In some intensively farmed areas, only fragments of the original mires still exist today. In other parts of the country, the abandonment of traditional farming techniques such as grazing and mowing has made conditions less suitable for species that prefer open areas with plenty of light.

Climate change is another pressure on biodiversity in some wetland areas. For example, palsa mires are peat bogs dotted with hummocks, each with a core of ice, and rising temperatures are causing them to thaw. In contrast, both the smooth newt and the great crested newt have shown a positive response to climate change since 2010. Rising temperatures and more precipitation are probably important reasons for better survival rates and stronger recruitment to newt populations.

Positive trend in forests but Nature Index values are still low

Nature Index values for forest



Source: www.naturindeks.no

➔ Are we moving in the right direction?

Published 02.01.2015 by the Norwegian Environment Agency

The state of biodiversity in forest ecosystems as measured by the Norwegian Nature Index has shown a weak positive trend since 1990. In 2014, the Nature Index value for forests for Norway as a whole was 0.37 (in this system, the reference state is given the value 1, and is defined to correspond to minimal disturbance from human activities).

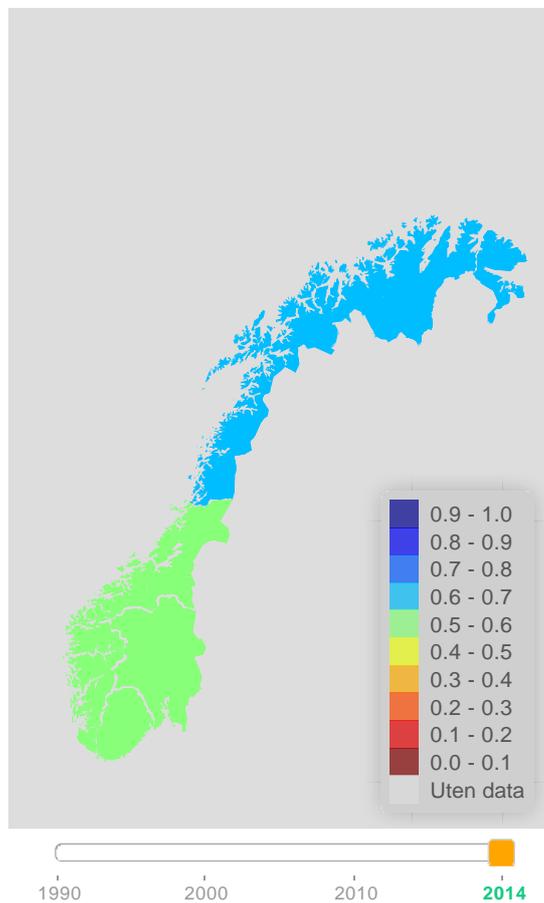
The small numbers of old trees, low volume of standing and lying dead wood and low carnivore numbers in Norway's forests today go a long way towards explaining the low Nature Index values for forest. Dead wood and old trees are important habitats for many insects and fungi, and biodiversity is lower where these habitats are in short supply. On the other hand, index values for two other key indicators, bilberry ground cover and small rodent populations, are somewhat higher.

The improvement in the state of biodiversity in forest ecosystems since 1990 is explained by an increase in the quantity of dead wood and bilberry ground cover and also growing cervid populations in recent years. The trend over time clearly illustrates the slow ecological processes and pace of change in forest ecosystems.

In a forest in the reference state used for comparison in the Nature Index, human activities would have very little effect, but disturbance by natural incidents such as forest fire, windthrow and insect outbreaks and the subsequent succession processes would be found throughout forested areas. This has not been the case in most areas of Norwegian forest for many hundred years, because they have been used and altered by people over a very long period. Forestry is considered to be the most important pressure on Norwegian forests today. Other important pressures are infrastructure development (roads, power lines and buildings), nitrogen inputs and climate change.

Small decline in Nature Index values for mountain ecosystems

Nature Index values for mountain ecosystems



Source: www.naturindeks.no

➡ Are we moving in the right direction?

Published 02.01.2015 by the Norwegian Environment Agency

The state of biodiversity in mountain ecosystems as measured by the Norwegian Nature Index has fluctuated over the past 25 years, but the value for the whole country is now slightly lower than in 1990. In 2014, the Nature Index value for mountain ecosystems for Norway as a whole was 0.62 (in this system, the reference state is given the value 1, and is defined to correspond to minimal disturbance from human activities.)

Nature Index values for mountain ecosystems improved from 2000 to 2010, but are now 3.6 % lower than in 1990, indicating a decline in mountain biodiversity. This is true of Norway as a whole and of each separate region except North Norway. The largest decline has been in Southern Norway.

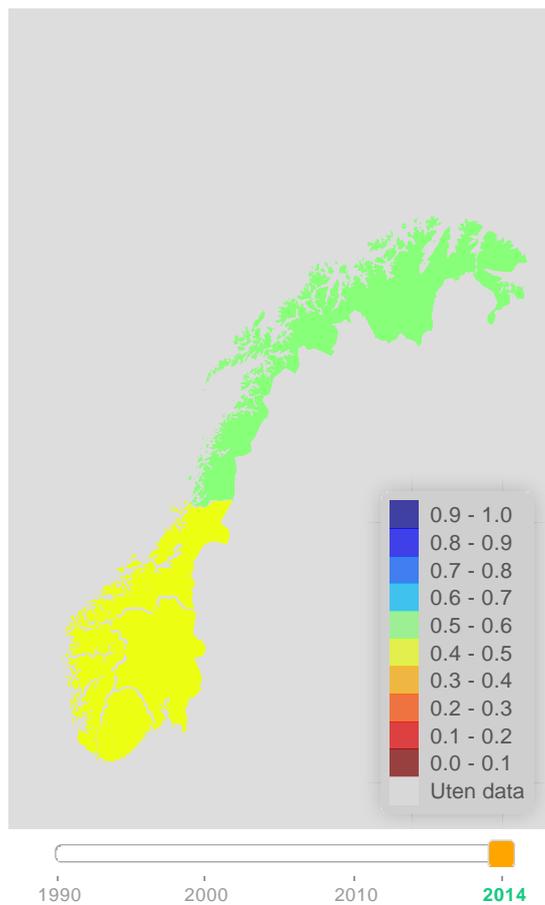
The indicator species included in the Nature Index for mountain ecosystems that have shown the strongest negative trend from 1990 to 2014 are ptarmigan, willow grouse, rough-legged buzzard, golden plover and Lapland bunting. Other indicators, including the Alpine *Salix* belt, golden eagle and bluethroat, have shown a positive trend.

Some of the most important pressures on mountain species are land-use change and the physical disturbance caused by infrastructure development (road and railway construction, hydropower developments, holiday cabins and other tourism-related developments). The abandonment of traditional farming techniques such as grazing and mowing may also affect many typical mountain species that use open areas near montane forests.

Climate change is another important pressure on mountain ecosystems. For example, milder winters can result in the formation of a layer of ice on the ground or snow surface, making conditions more difficult for small rodents living under the snow. This may cause peaks in their population density to become less regular or disappear. The Nature Index results indicate that these effects can have major impacts on other species at various levels in the food chain, including ptarmigan and willow grouse (herbivores) and Arctic fox and raptors (predators).

Steady decline for Nature Index values in cultural landscapes

Nature Index values for cultural landscapes



Source: www.naturindeks.no

➔ Are we moving in the right direction?

Published 02.01.2015 by the Norwegian Environment Agency

The state of biodiversity in cultural landscapes (or open lowland) as measured by the Norwegian Nature Index has been following a negative trend since 1990.

In 2014, the Nature Index value for cultural landscape for Norway as a whole was 0.47 (in this system, the reference state is given the value 1. In semi-natural ecosystems such as cultural landscape, the reference state is defined to correspond to optimum biodiversity under a traditional management regime.) The Nature Index value for cultural landscapes is somewhat higher in North Norway than in the rest of the country.

Cultural landscapes (or open lowland) in this context consist of open areas below the treeline where the vegetation is semi-natural. The state of biodiversity here is assessed using indicator species that are mainly associated with habitat types such as coastal heathland and semi-natural meadows, which have been formed through long periods of traditional management, including grazing, mowing and burning of the vegetation. There are many light-demanding species in these habitats that are dependent to a varying extent on an active management regime.

There has been a negative trend in the state of biodiversity in cultural landscapes for many years throughout the country. These areas have been changing over a long period with alterations in agricultural techniques and land use. There has been a dramatic shift from traditional farming techniques to intensive agriculture, including tilling for crop production and the application of nutrients in the form of mineral fertilisers. At the same time, many areas of traditional pasture and meadow have been abandoned, and open landscapes such as coastal heathlands and herb-rich hay meadows are becoming overgrown with trees and shrubs.

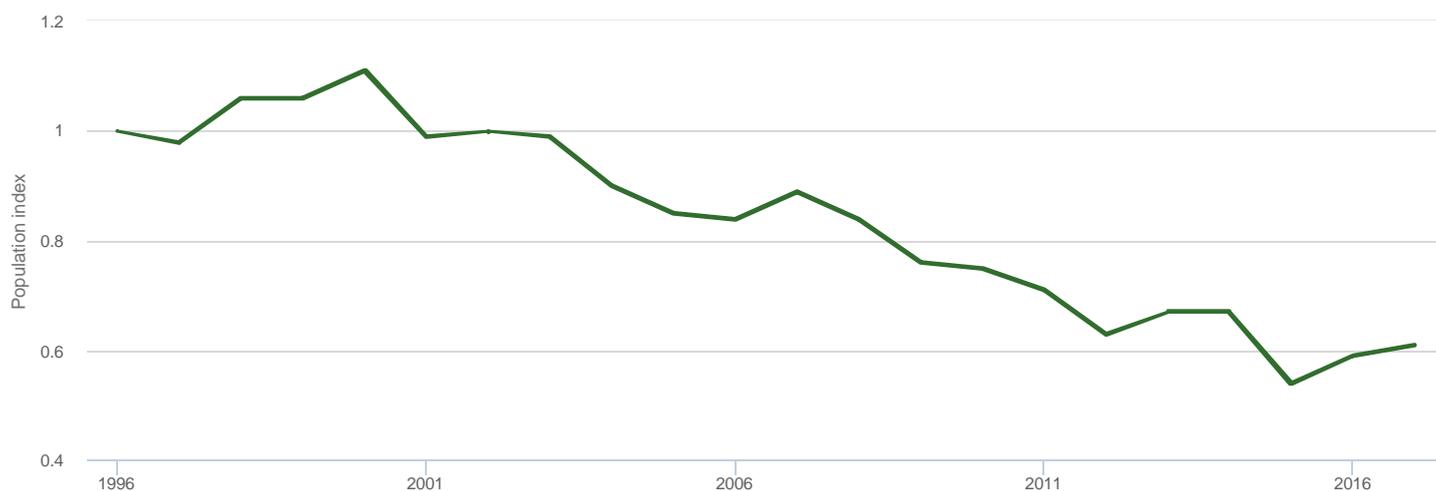
Changing agricultural techniques have had negative impacts on species and ecosystems that are adapted to a traditional management regime, and the 20th century saw a steep decline in the area of semi-natural meadow, coastal heathland, boreal heath and tidal meadow in Norway.

Indikator: Population status of breeding bird species in the major ecosystems forest, mountains and cultural landscapes

Farmland bird populations declining

Breeding birds: farmland

Population index (1996 = 1)



Source: Norwegian institute for nature research (NINA) Licence: NLOD

= Are we moving in the right direction?

Published 02.01.2015 by the Norwegian Environment Agency

Farmland is an important habitat for about 5 per cent of Norway's breeding bird species. In the past 50 years there have been major changes as agriculture has become more intensive and heavily mechanised. In addition, many areas of marginal farmland have been developed for other purposes or have been abandoned and are becoming overgrown by forest and less suitable for farmland birds.

The figure above shows a steady decline in the breeding population of eight of the commonest farmland species after 2000. The decline has been particularly steep for lapwing, curlew, skylark and yellowhammer, but less marked for starling, white wagtail, swallow and whinchat.

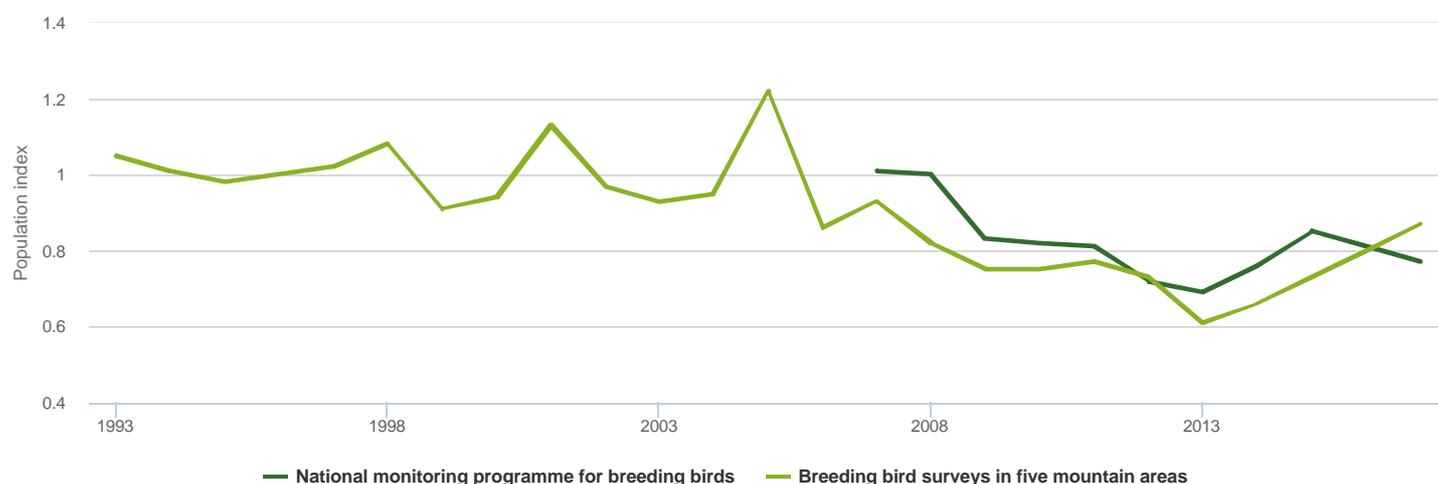
Similar trends for farmland birds have been registered across large parts of Europe. They are considered to be linked to major changes in farming practices, which have been even greater in many other Western European countries than in Norway. If developments in the agricultural sector in Norway continue to follow the same trends as in other countries, we can expect a further decline in farmland breeding birds.

It is possible to reduce such declines locally by increasing the funding available for grants to improve conditions for birds during the breeding season and by providing better information about the grant schemes.

Decline in mountain birds in recent years

Breeding birds: mountains

Population index (1996 = 1)



Source: Norwegian institute for nature research (NINA) Licence: NLOD

+ Are we moving in the right direction?

Published 02.01.2015 by the Norwegian Environment Agency

Areas above the treeline and open areas in montane forests are important habitats for about 10 per cent of Norway's breeding bird species. Marked changes are taking place in these areas at present, as montane forests become denser and the treeline shifts upwards. As a result, the open areas in lower lying parts of the mountains are shrinking.

Climate change and the accompanying changes in temperature and precipitation are also believed to be influencing Norway's mountain areas. In addition, human activity is increasing in the mountains, and changes in land use and growing traffic and disturbance are putting pressure on mountain habitats.

The graph for the whole period 1993–2017 in the figure above is based on breeding bird surveys in five of Norway's mountain areas, the southernmost being the Hardangervidda and the northernmost Dividalen. This shows that bird populations were relatively stable from 1993 to 2005. After 2005 there was a decline until 2013, followed by a slight increase the last four years.

The graph for the period 2007–2017 shows a similar development, and is based on the results of a national monitoring programme for breeding birds. The surveys include eight of the more common mountain species in Norway: Lapland bunting, bluethroat, meadow pipit, ring ouzel, wheatear, golden plover, willow grouse and ptarmigan. All the eight species are associated with more open areas in the mountains.

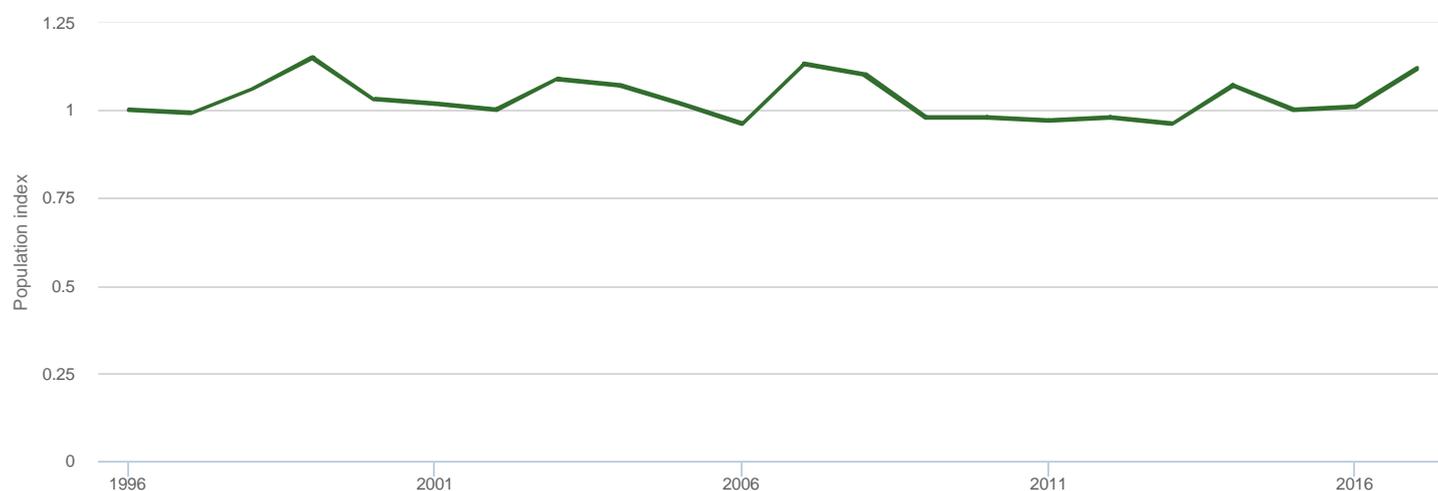
A decline in mountain bird populations has also been observed for mountain areas throughout Norway, Sweden and Finland in the period 2005–2013.

The reasons for the decline are uncertain and probably complex, but one of them may be climate change, which is resulting in less favourable weather conditions during the breeding season. During periods with a decline in bird populations in the mountains, it is important to reduce pressures on these species as far as possible.

Stable populations of common forest birds

Breeding birds: forest

Population index (1996 = 1)



Source: Norwegian institute for nature research (NINA) Licence: NLOD

Are we moving in the right direction?

Published 02.01.2015 by the Norwegian Environment Agency

Forests are the most important habitats for a large number of Norway's bird species, and just over one third of all breeding bird species are mainly associated with forests. At present, the total area of forest in Norway is increasing and the average age of the trees is rising. However, the area of undisturbed natural forest is shrinking.

The population index in the figure above is based on combined figures for 24 forest bird species, and shows that breeding populations of Norway's most common forest species have been relatively stable over the past 20 years. Populations of most of the 24 species, for example blackbird, chaffinch and hedge accentor, have been stable in the period 1996–2017, while some species, such as the song thrush and chiffchaff, have shown a small rise, and others, including the robin and tree pipit, have shown a small decline.

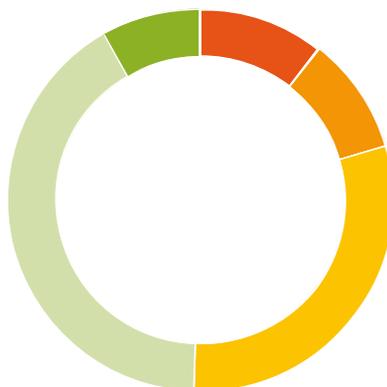
Many of the species that are most strongly associated with natural forests are less common, and population trends for these species have not been registered.

Indikator: Population status of species on which harvesting has significant impacts

Status of wild salmon stocks

Status of wild salmon stocks

Proportion of stocks in different categories

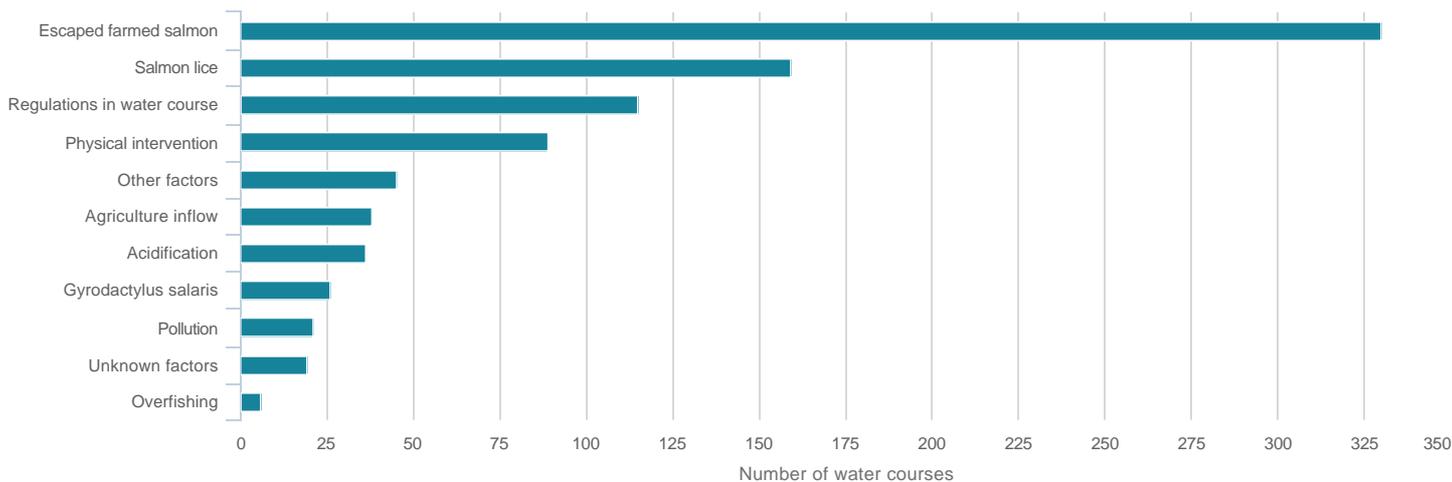


■ Critically threatened or lost
 ■ Very poor
 ■ Poor
 ■ Moderate
 ■ Good
 ■ Very good

Source: Vitenskapelig råd for lakseforvaltning Licence: NLOD

Most important impacts on salmon water courses

In 45 water courses



Source: Vitenskapelig råd for lakseforvaltning Lisens: [Norsk Lisens for Offentlige Data \(NLOD\)](#)

+ Are we moving in the right direction?

Published 02.01.2015 by the Norwegian Environment Agency

There are three species of anadromous salmonids in Norway – Atlantic salmon, brown trout and Arctic char. Migratory populations of trout and char are usually called sea trout and sea char. Sea-run char are found only in North Norway and Svalbard.

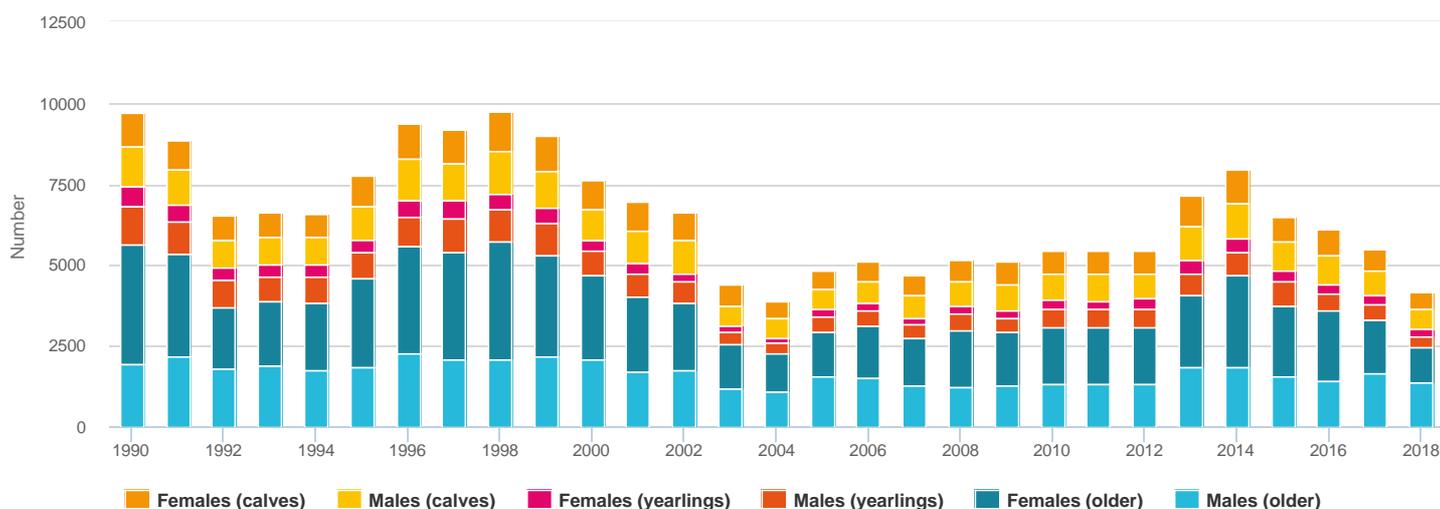
Data on stock status and numbers are most complete for salmon. Many salmon stocks are threatened or have been lost. There was a serious decline during the 1980s and 1990s, and at the end of this period, salmon stocks were reduced to only one third of their size in the mid-1980s. In 1997, the total catch of salmon was the lowest recorded in the 20th century. After a recovery period around the end of the century, numbers have declined again.

At present, 49 naturally reproducing salmon stocks are considered to be critically threatened or lost. In all, 73 salmon stocks have been lost, but it has been possible to re-establish 27 of these after the most serious threats (acidification and the salmon parasite *Gyrodactylus salaris*) have been brought under control.

According to the Norwegian Scientific Advisory Committee for Atlantic Salmon Management, escaped farmed salmon and sea lice are the most serious threats at population level that are not currently under control, while other threats (*Gyrodactylus*, acid rain, regulation for hydropower purposes and physical alteration of river systems) have been brought under control. They can still pose a threat to wild salmon stocks, but there is a lower risk that they will further reduce salmon production or cause the loss of more stocks in the future.

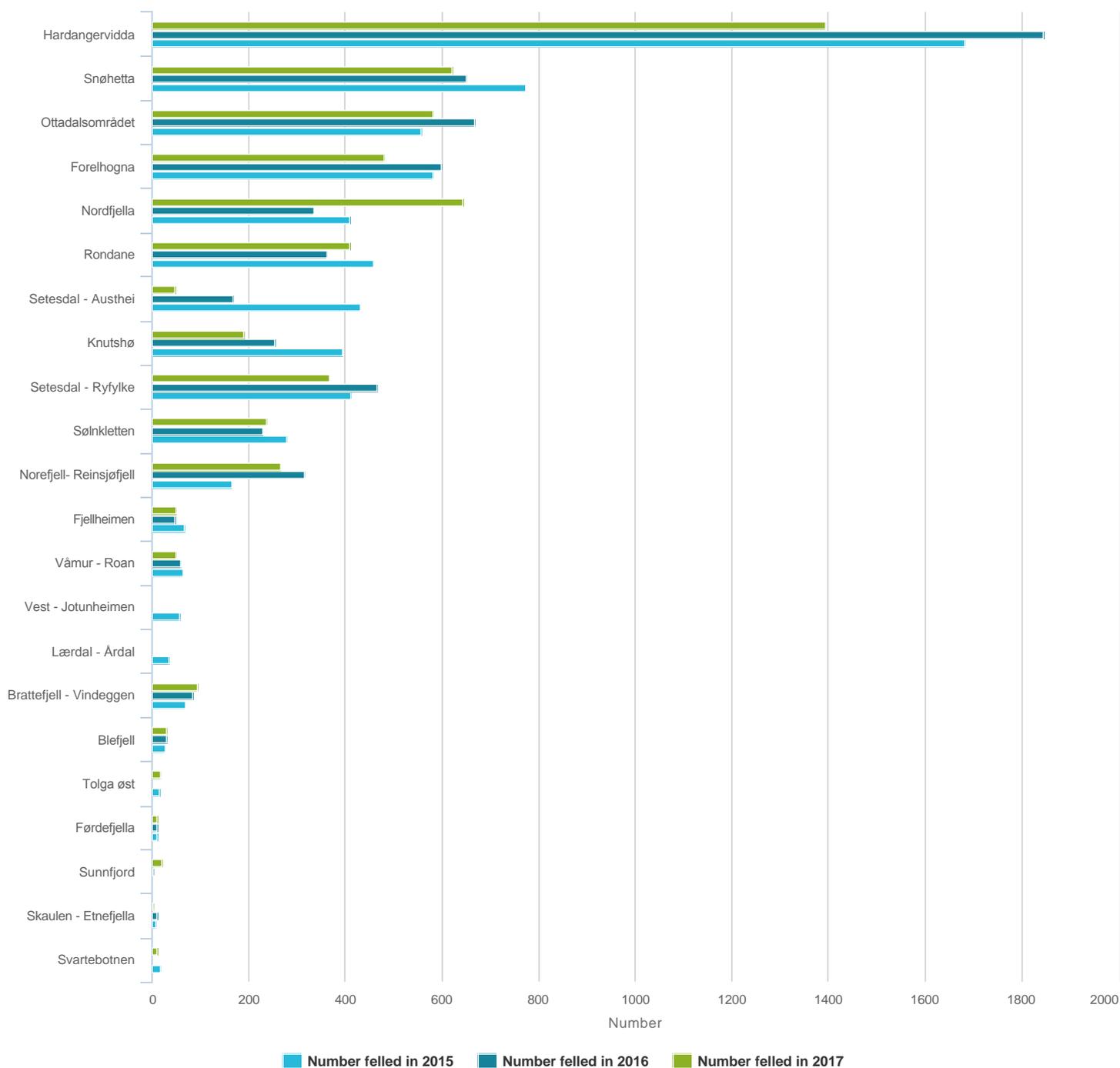
Wild reindeer numbers are healthy, but their habitat is under pressure

Hunting statistics for wild reindeer by age and sex



Source: Statistisk sentralbyrå (SSB) Lisens: Norsk Lisens for Offentlige Data (NLOD)

Hunting statistics for wild reindeer by management area, 2015-2017



Source: Statistisk sentralbyrå (SSB) Lisens: [Norsk Lisens for Offentlige Data \(NLOD\)](#)

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Norway is home to the last remaining viable populations of wild reindeer in Europe, and we therefore have a special responsibility for ensuring their survival.

Wild reindeer are not considered to be threatened in Norway today. The total population numbers about 35 000 animals, split between 23 different management areas. Population counts are obtained through a combination of aerial censuses and ground observations. This gives a good overview of the number of reindeer in each of the management areas.

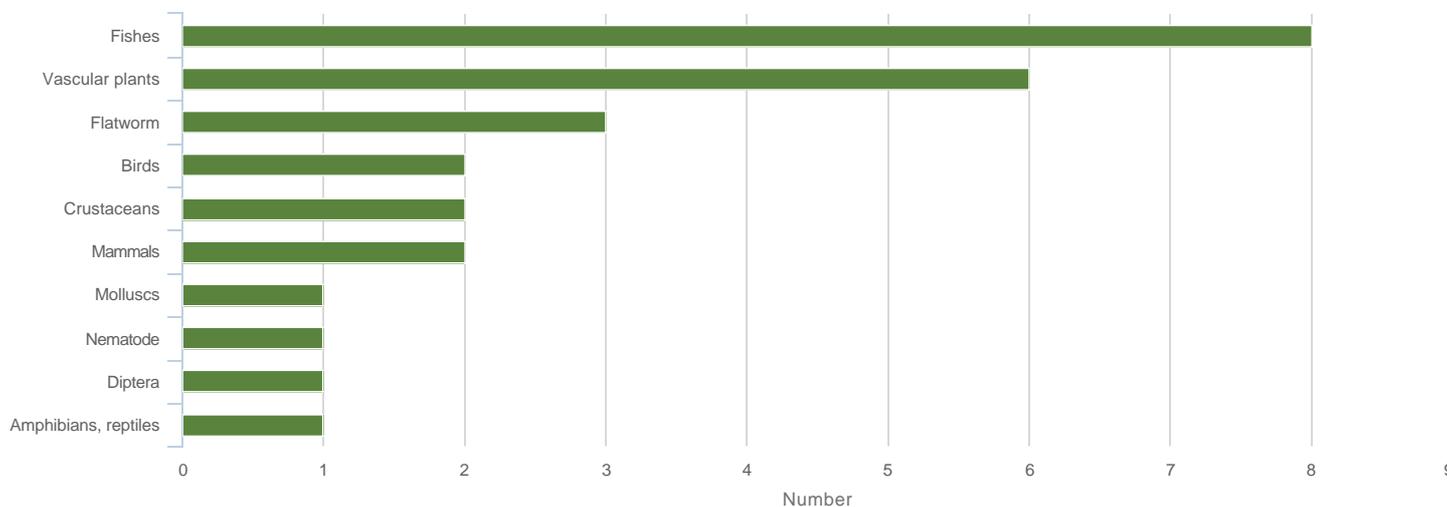
The wild reindeer populations are regulated by hunting. To ensure a balance between grazing resources and the number of reindeer, some animals need to be culled in each management area. The number of reindeer hunted has been fairly stable for the last years, although there has been fewer reindeers hunted in some areas compared to the target for 2017.

Wild reindeer require large continuous areas of suitable habitat with little disturbance if their numbers are to remain healthy in the long term. Nowadays, there is constant pressure to develop areas of wild reindeer habitat, for example for hydropower purposes or holiday cabins. Protected areas in the mountains include only parts of the areas used by wild reindeer, and local and regional planning processes are therefore vital for improving reindeer management.

Indikator: Number of invasive alien organisms in the following major ecosystems: marine and coastal waters, rivers and lakes, wetlands, forest, mountains and cultural landscapes

Twenty-seven invasive alien species in rivers and lakes

Number of invasive alien species in fresh water



Source: Norwegian Biodiversity Information Centre Licence: NLOD

Numbers of different groups of invasive alien species in Norway that are associated with rivers and lakes and that the Norwegian Biodiversity Information Centre has placed in the categories 'severe impact' or 'high impact'. In all, 27 freshwater species have been registered in these categories.

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Some invasive alien species have more impact than others on the chances of achieving good ecosystem status in rivers and lakes.

A great deal of work is being done to reduce the range of the salmon parasite *Gyrodactylus salaris* and to prevent its further spread. In total 50 river systems have been infested by the parasite. Now the parasite is either eradicated or in process of being eradicated from 43 of the 50 infested river systems. Thus, good progress is being made towards a situation where this species will no longer affect the chances of achieving good status in rivers and lakes.

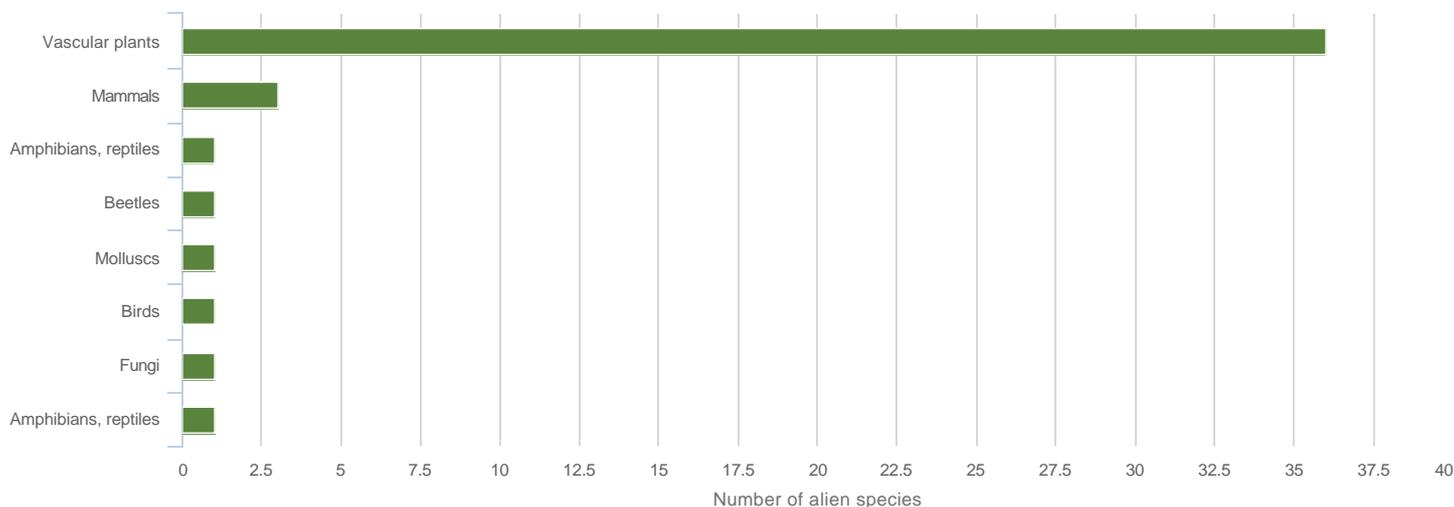
For other invasive alien species in rivers and lakes, we only have sufficient resources at present to take action in the highest-priority areas. Unfortunately, alien fish species are frequently introduced to new rivers and lakes, and there are insufficient resources to follow this up properly.

Once alien fish species are firmly established in a river system, it is difficult and costly to eradicate them, and it is a complicated process to restore an ecosystem to its natural state. Some people release fish illegally in lakes and rivers where they do not occur naturally in order to stock waters with new and exotic species for recreational fishing. It may be possible to discourage this by providing more and better information on the potential impacts of such introductions on biodiversity.

Alien water plants such as Canadian pondweed and Nuttall's pondweed are also a threat to freshwater ecosystems. The two pondweed species have now been found in more than 100 localities. They can form dense stands in lakes, crowding out other species and impoverishing the natural aquatic vegetation. They can also cause eutrophication, since they take up nutrients from the sediments during growth and release them to the water column during decomposition. The spread of pondweed to new localities is often discovered too late, when control and eradication measures are no longer practical. The most cost-effective measure for dealing with the two pondweed species is to provide information to the general public in order to avoid further spread to new areas.

Alien organisms in wetlands

Number of invasive alien species in wetlands



Source: Norwegian biodiversity information centre Lisens: Norsk Lisens for Offentlige Data (NLOD)

+ Are we moving in the right direction?

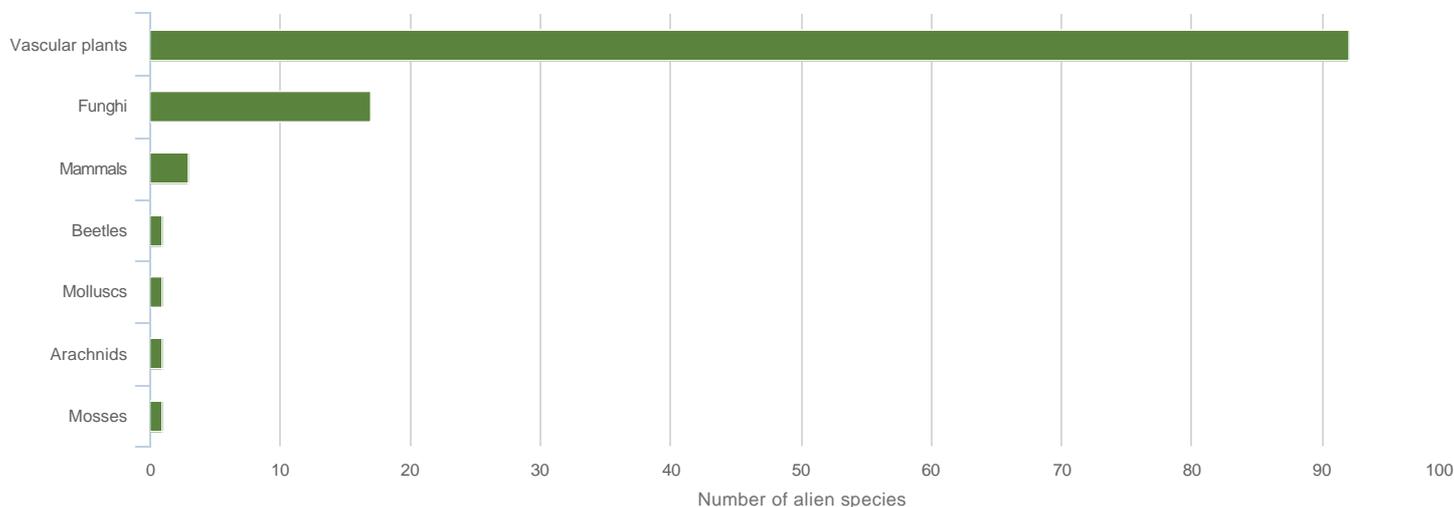
Published 02.01.2015 by the Norwegian Environment Agency

45 of the 217 species on the 2012 edition of Norway's Black List of invasive alien species are associated with wetlands. Two of these are the raccoon dog, which has been observed a number of times in Norway, and the American mink, which has established wild populations in almost all parts of the country. Action plans have been drawn up for both species and are being implemented.

The raccoon dog is an omnivorous predator that can cause particularly serious damage to ground-nesting birds and amphibians in wetlands. The species is common in Finland and Russia, and the main objective of the action plan is to prevent its establishment in Norway. The steps being taken include information campaigns, the development of an early warning system for observations of raccoon dog, and culling of any individuals that are observed. So far the action plan appears to be giving satisfactory results, and there is no evidence that there is an established population of raccoon dog in Norway.

More than 100 invasive alien species in forests

Number of invasive alien species in forests



Source: Norwegian Biodiversity Information Center Licence: NLOD

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Plants are the invasive alien species that are the greatest threat to biodiversity in Norwegian forests. The vast majority of the alien invasive species that are associated with forests are typical garden plants. Many of these have spread spontaneously from parks and gardens to forested areas. In other cases, they have been introduced by people who have dumped their garden waste in nearby forest, even though this is illegal.

A number of tree species that are not native to Norway have also spread from plantations to natural forest habitats. In 2012, Norway adopted regulations on planting and sowing foreign tree species for forestry purposes, which will make it easier to control the types of tree species that are planted and where they are planted. It should therefore be possible to prevent the use of foreign tree species from having negative impacts on biodiversity in future.

Three alien mammal species that are on Norway's Black List are associated with forest habitats: raccoon dog, wild boar and fallow deer. There is no established population of raccoon dog in Norway, and the other two species are only found in south-eastern Norway near the border with Sweden at present. Fungi such as Dutch elm disease (*Ophiostoma novo-ulmi*) and oak mildew (*Erysiphe alphitoides*) and the fungus-like pathogen *Phytophthora ramorum*, which causes 'sudden oak death', can all cause serious damage or kill trees and thus pose a threat to forest biodiversity.

Few invasive alien species in the mountains

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Few alien species have spread to mountain areas, and ecosystem status with respect to invasive alien species is therefore considered to be good in Norway's mountains.

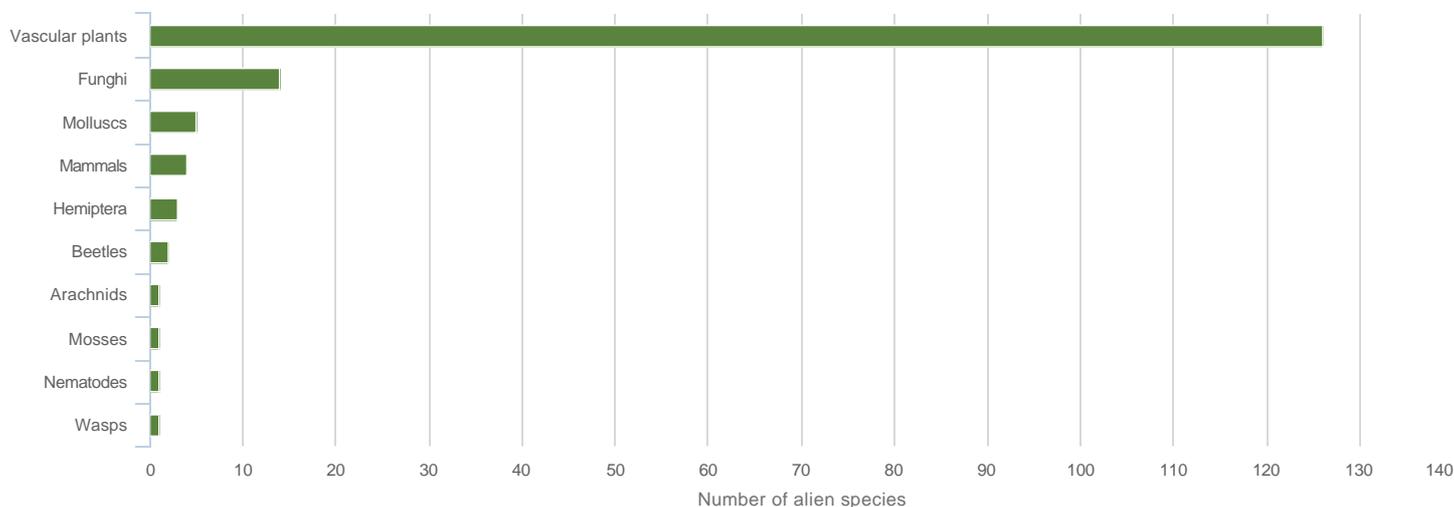
Of the more than 1000 alien species that reproduce or are considered to be capable of reproducing in the wild in Norway, only three are associated with mountain ecosystems. These are dwarf mountain pine (*Pinus mugo mugo*), emperor goose (*Anser canagicus*) and ice poppy (*Papaver croceum*). Of these, only the dwarf mountain pine is classified in the 'severe impact' category in the Black List.

The emperor goose (which has only been recorded a few times in Norway) and the ice poppy have been categorised as 'potentially high impact' species. They do not pose a great threat at present, but could become a problem if environmental conditions change.

The harsh climate in the mountains often limits which species can survive there. As the climate changes and becomes wetter and warmer, alien species that are found in the lowlands are expected to be able to spread upwards towards the mountains. It is therefore uncertain whether good ecosystem status with respect to invasive alien species will be maintained in the future.

Alien organisms in the cultural landscape

Number of invasive alien species in cultural landscapes



Source: Norwegian Biodiversity Information Center Lisens: Norsk Lisens for Offentlige Data (NLOD)

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Cultural landscapes include areas around gardens and parks, and also road verges. It is estimated that 40 per cent of the vascular plants that spread to the Norwegian environment are escaped garden plants. They can have negative impacts in the semi-natural vegetation types found in cultural landscapes, where many native species cannot compete with them.

Protected areas have priority

Most action to deal with alien organisms focuses on areas of cultural landscape that are protected under the Nature Diversity Act. The Norwegian Nature Inspectorate organises annual campaigns to deal with alien species, including Himalayan balsam (*Impatiens glandulifera*), Japanese rose (*Rosa rugosa*) and other escaped garden plants. An action plan for combating the spread of Japanese rose was published in 2013.

In addition, the Norwegian Environment Agency funds a range of activities every year to deal with alien organisms outside protected areas. These are often organised by the county governors, and include containment and control measures and training, information and surveys. Several of the county governors' offices have now published brochures on the risks associated with the spread of garden escapes. The county governors of Oslo and Akershus, Østfold, Rogaland, Aust-Agder and Sogn og Fjordane have drawn up alien species action plans, and several other counties are in the process of preparing plans.

The Norwegian Biodiversity Information Centre was asked to develop a system for early detection and warning of the spread of alien organisms. It is now possible for anyone to register an email address and receive regular information about new records of the species they are interested in from the Biodiversity Information Centre's portals *Artsobservasjoner* (where scientists and others can report species observations) and *Artskart* (the Species Map Service), either for the whole country or for selected areas.

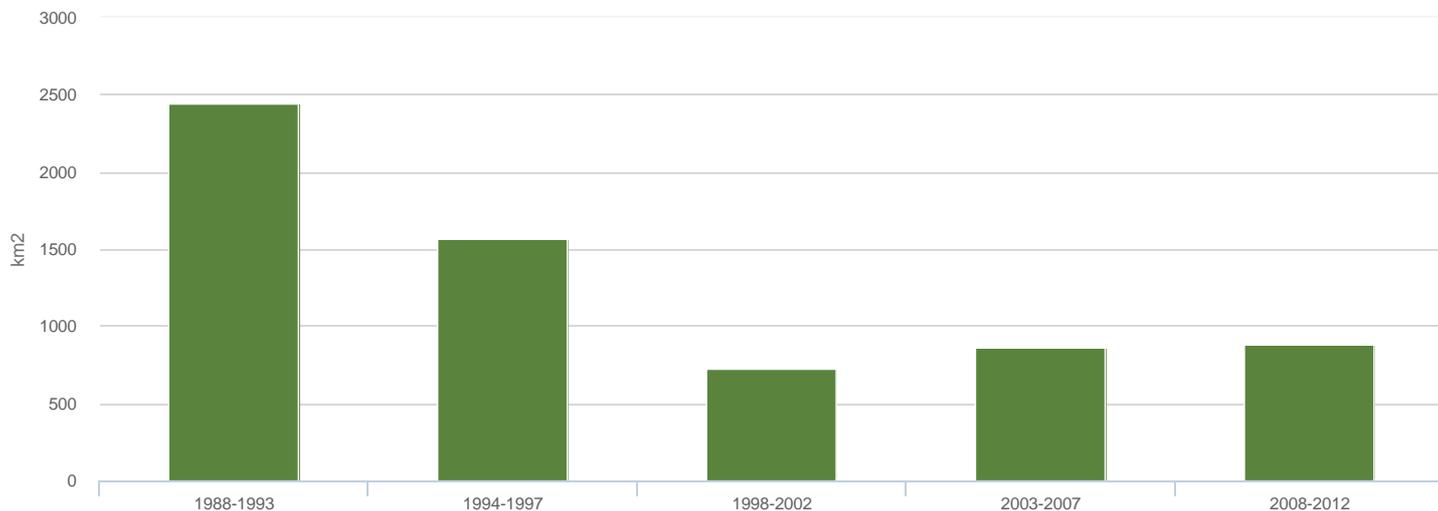
The Biodiversity Information Centre is also encouraging members of voluntary organisations and others who are interested to register observations of alien organisms, so that more information is made available.

However, more still needs to be done to limit the spread of alien vascular plants to the cultural landscape, and the provisions of the current legislation are not sufficient to restrict their spread.

Indikator: Change in total area of land without major infrastructure development

Areas without major infrastructure development

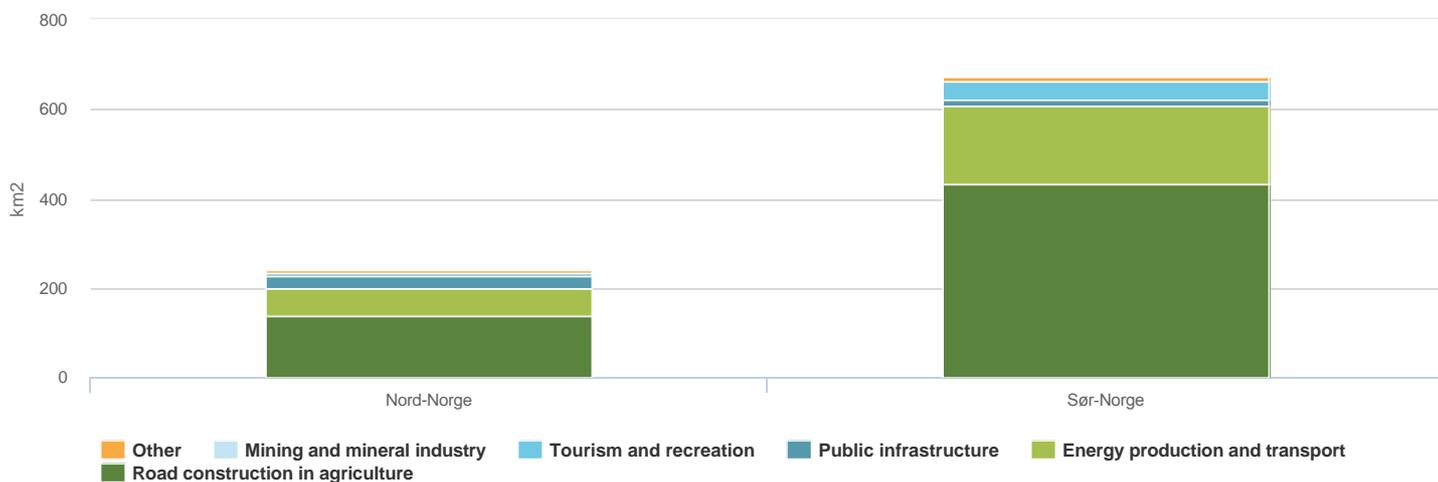
Loss of areas without major infrastructure development



Source: Miljødirektoratet Licence: NLOD

Loss of areas without major infrastructure development

In the period from 2008-2012



Source: Miljødirektoratet Licence: NLOD

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Areas without major infrastructure development are defined as lying at least one kilometer in a straight line from the nearest infrastructure development. Roads, railway lines, hydropower developments, wind turbines and power lines are examples of infrastructure development.

The extent of areas without major infrastructure development is shrinking steadily. Nearly 900 square kilometers were lost during the period 2008-2012. This is a slight increase of about three per cent compared to the previous period from 2003-2007. Road construction and hydropower developments accounted for about 90 per cent of the loss.

For the country as a whole, the proportion of wilderness-like areas (areas at least five kilometer away from infrastructure development) dropped from approximately 50 per cent to just under 12 per cent in the past 100 years. In Southern Norway, only five per cent of the area was categorized as wilderness-like by January 2013.

Indikator: Number of areas of semi-natural habitat types that are actively managed

Indikator: Number of cases where unauthorised genetically modified organisms or levels of GMOs exceeding the permitted thresholds have been detected