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Chapter I – Status of biological diversity in Norway

1.1 Facts about Norway

Norway stretches from 57° 57' 31" to 80° 49' 44" north, separated only by the Barents Sea between 71° 08' 02" to 76° 30' N. The landmasses are connected by a shallow, productive and continuous continental shelf. The Norwegian surface area covers 385,230 km², and the total sea area within the economic zone and the fisheries protection zones around Svalbard and Jan Mayen total 1,878,961 km². Norway's population numbers 4,787,000 with a population density of 12.4/km². Administratively, the Norwegian mainland is divided into 19 counties and 434 municipalities. The Svalbard archipelago is administered under Norwegian law in accordance with a treaty signed in 1920 by 42 signatory countries.

The Norwegian mainland area consists of:

- Mountain and mountain plateau – 44,4 %
- Forest – 38,2 %
- Freshwater and glaciers – 7 %
- Bog and marshland – 5,8 %
- Farmland – 3,2 %
- Urban land – 1,4 %

In addition, 60 % of the high arctic areas of Svalbard are covered by glaciers.

The Norwegian government owns one third of the mainland. The remainder of land is predominantly owned by private landowners utilising the land for agriculture and forestry. For example, 88% of the afforested area is owned by 120,000 private landowners. Free un-motorised traffic in outfield areas is a legal public right in Norway.

14.3 % (46,276 km²) of the Norwegian mainland is protected as national parks, nature reserves, or other conservation areas. The figure for Svalbard is 65 % (39,800 km²). Most of the protected area occurs in the alpine zone (see fig. 1)

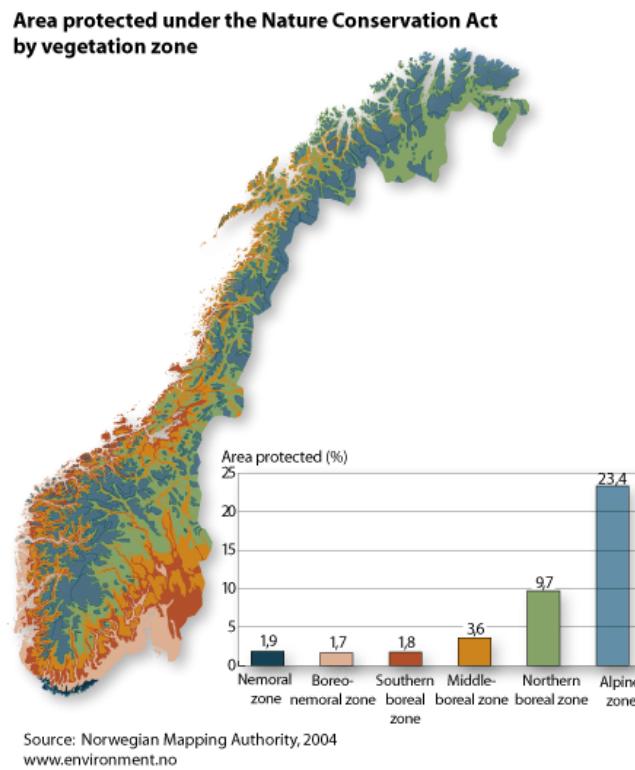
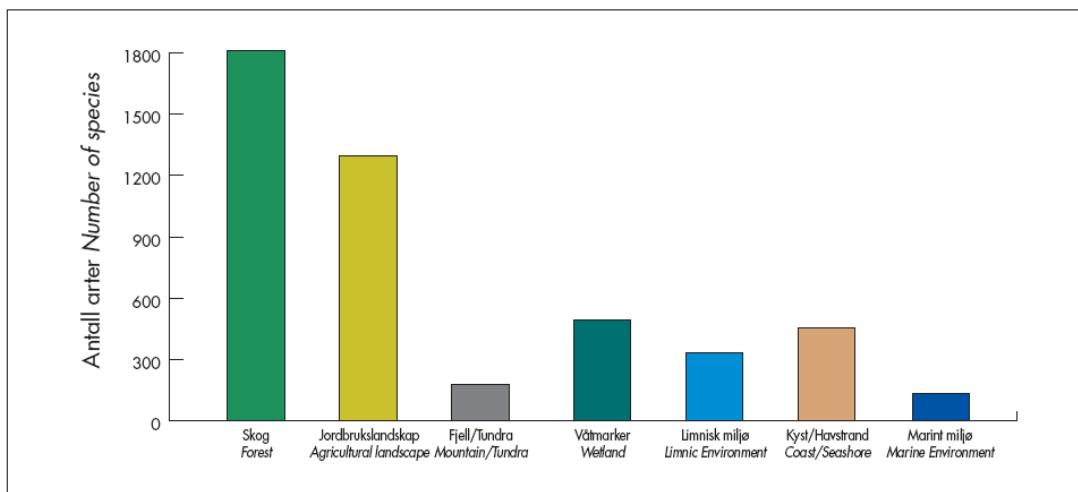


Figure 1: Vegetation zones in Norway and the portion of these within protected areas

1.1.1 Threats to biological diversity in Norway

The most recent Norwegian Red List was published in 2006 and was devised in accordance with the international red-list guidelines of the World Conservation Union (IUCN). Species are classified in categories according to their assessed risk of extinction. Most biological groups on the Norwegian mainland have been assessed, while vascular plants, birds, and mammals have been assessed on Svalbard. Marine invertebrates, algae, fish and sea mammals have been assessed in the Norwegian economic zone and the protected fisheries zone around Svalbard.

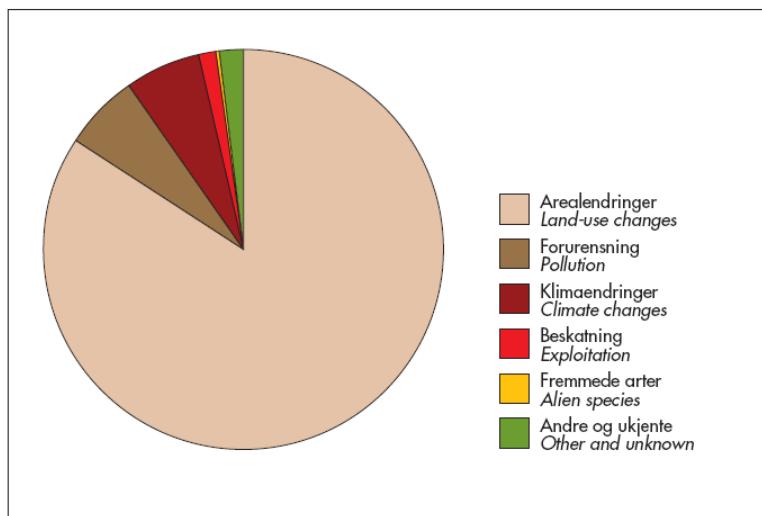
Red-list assessments have been undertaken for indigenous multicellular species. At present, we know of approximately 40,000 such species. The Red List is comprised of assessments made for about 18,500 of these species. Data deficiencies pertaining to distribution records and taxonomy are the main reason why more species have not been assessed. In total 3,799 are classified as red-list species. Of these, 1,941 species are ranked as threatened (i.e. they are in one of the top three red-list categories; critically endangered, endangered or highly vulnerable). The next red-list will be published in 2010 and will assess the status of about 20,000 of our known multicellular organisms.



Figur 8. Fordelingen av rødlistede arter på hovednaturtyper. Skog omfatter alle typer skog inkludert hogstflater, nyplantinger, fjellbjørkeskog, parker og tresatt impeditment; Jordbrukslandskap omfatter i tillegg til det rene jordbrukslandskapet også infrastruktur knyttet til dette slik som veier, bygninger; Fjell/Tundra omfatter arealer over skoggrensa og tundralignende arealer; Våtmarker omfatter myr og ferskvannstrender; Limnisk miljø omfatter alt fra store innsjøer til små tjern samt alle typer rennende vann; Kyst/Havstrand inkluderer den delen som ligger over havnivå ved overgangen mellom land og sjø, også sanddyner som ligger nær havet og klipper som f.eks. fuglefjell; Marint miljø omfatter hav inkludert brakkvann. *Distribution of Red List species within main landscape types. Forest comprises all types of forest, including felled areas, newly planted areas, alpine birch forest, parks, and non-productive areas planted with trees; Agricultural landscape comprises, in addition to the real agricultural landscape, also associated infrastructure such as e.g. roads and buildings; Mountain/tundra comprises areas above the tree limit and tundra-like areas; Wetland comprises bogs and freshwater shores; Limnic environment comprises everything from large lakes to small ponds, and all types of running water; Coast/seashore comprises the part above sea level in the transition zone between land and sea, also sand dunes in the proximity of the sea and cliffs such as e.g. bird cliffs; Marine environment comprises sea including brackish water.*

Figure 2: Number of species on the Norwegian red list in major ecosystems (biomes)

Altered land use is the most significant factor impacting on Norwegian biological diversity. This is the predominant threatening process for 85 % of the red-listed¹ species. The second most threatening factor is pollution (6 %). Climate change is thought to pose a similar risk as pollution. Exploitation is the main hazard to 1 %, but affects mainly key species within ecosystems.



Figur 11. Arealendringer, forurensning, klimaendringer, beskattning og fremmede arter representerer de fem store globale truslene mot biologisk mangfold. I Norge er arealendringer den klartiktigste påvirkningsfaktoren. Andre og ukjente faktorer omfatter bl.a. støy og ferdsel, samt påvirkninger utenfor Norge. *Land-use changes, pollution, climate change, exploitation and alien species are the five major global threats to biological diversity. In Norway, land-use changes are clearly the most significant impact factor. Other or unknown factors include noise, traffic and influences from outside Norway.*

Figure 3: Factors affecting biological diversity in Norway (red-listed species)

¹ The Red List also includes data deficient (DD) species, but these are believed to most certainly be threatened.

1.1.2 Natural habitats

Mapping of especially valuable natural habitat types began in 1999 (DN-handbook 13).

Approximately 20 % of all the localities described in the handbook are mapped to date. Table 1 shows the number of localities mapped within each biome (2008).

Table 1: Number of localities mapped within each biome.

Biome	Number mapped
Bog	2,556
Avalanche flats, rock and scrubland	876
Mountain	645
Cultural landscape	8,147
Freshwater/marsh	5,269
Forest	11,301
Seashore/coast	2,233
Other major types	1,044
Sum (all biomes)	32,071

1.1.3 Indicators for monitoring of biological diversity

Political agreements on halting or significantly reducing the current rate of biodiversity loss by 2010 are accompanied by a growing consensus on the need for structured European coordination of biodiversity monitoring, indicators, assessment and reporting efforts, with a long-term perspective and sound funding basis. As a result, a Pan European initiative, SEBI2010 (Streamlining European 2010 Biodiversity Indicators), was launched in 2004. Its aim is to develop a European set of biodiversity indicators that would be used to assess the progress made towards the European 2010 targets.

Norway at present reports on the following three indicators to the SEBI2010: the abundance and distribution of selected species (bird index/1a), national protected areas (7), and critical load exceedance for nitrogen (9).

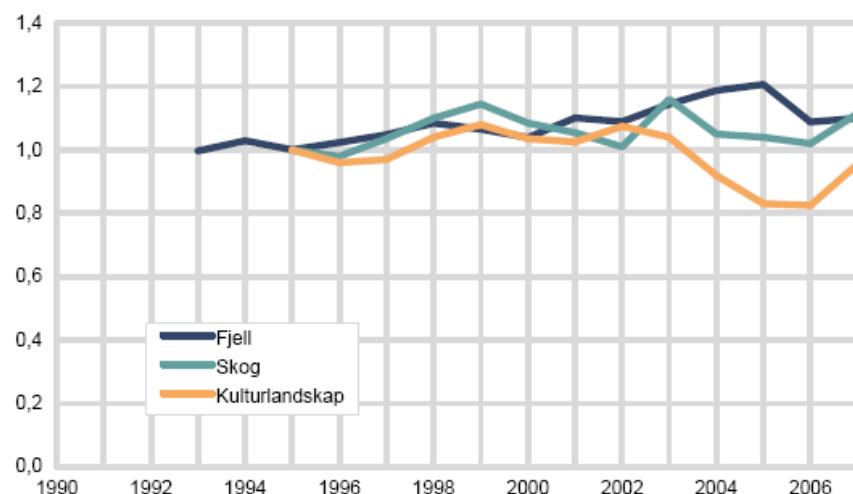


Figure 4: *The Bird Index (1a): Population index for breeding birds on land, given as an index in relation to the average for 1994-96 set as value 1. This indicator is also included in the indicator set for sustainable development. Dark blue = mountain; light blue = forest; yellow = cultural landscape*

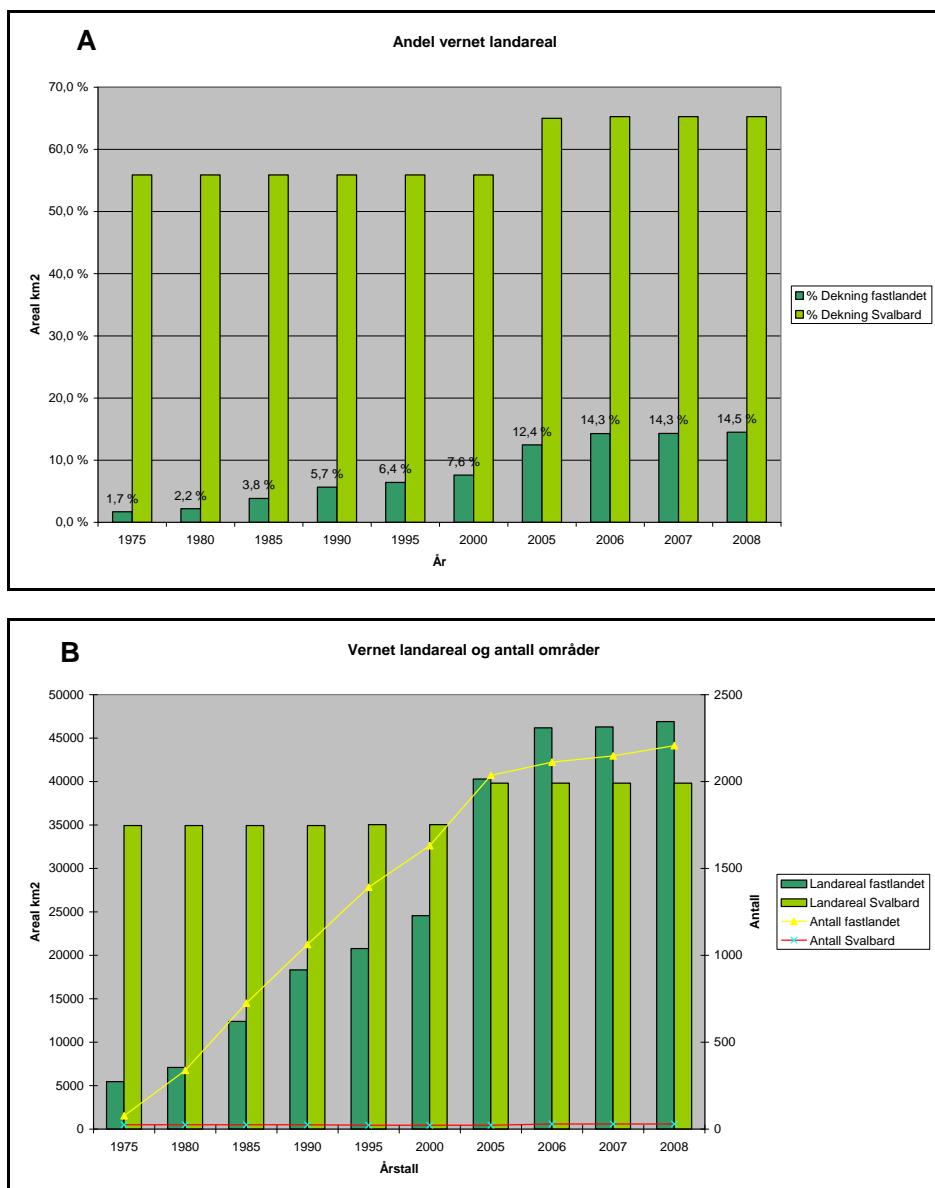


Figure 5: *Nationally designated protected areas (7): Cumulative summary of the proportion of the Norwegian land area within protected areas in relation to total land area (A). Fastlandet = mainland Norway; landareal = land area; antall = number.*

Norway has relevant databases to report on 14 of the 26 indicators (see table 2), but still need to establish data flow for most of these. For two of the indicators, which are based on several sub-indicators, Norway only has the ability to report on one of the sub-indicators (1a and 20b). There are still 10 indicators that cannot be reported on because the methodology within SEBI is not fully developed (2, 11, 24, 25, 26). An additional three cannot be assessed as they are based on data connected to the EUs Bird- and Habitat Directive (3, 5, 8), which Norway has opted out of.

Table 2: Norwegian database for reporting on SEBI2010 indicators

Indicator (SEBI2010)	Deliverable	
	Yes	No
1 Abundance and distribution of selected species	x	
2 Red List Index for European species		x

3 Species of European interest		x
4 Ecosystem coverage		x
5 Habitats of European interest		x
6 Livestock genetic diversity	x	
7 Nationally designated protected areas	x	
8 Sites designated under the EU Habitats and Birds Directives		x
9 Critical load exceedance for nitrogen	x	
10 Invasive alien species in Europe	x	
11 Occurrence of temperature-sensitive species		x
12 Marine Trophic Index of European seas	x	
13 Fragmentation of natural and semi-natural areas		x
14 Fragmentation of river systems	x	
15 Nutrients in transitional, coastal and marine waters	x	
16 Freshwater quality	x	
17 Forest: growing stock, increment and fellings	x	
18 Forest: deadwood	x	
19 Agriculture: nitrogen balance		x
20 Agriculture: area under management practices potentially supporting biodiversity		x
21 Fisheries: European commercial fish stocks	x	
22 Aquaculture: effluent water quality from finfish farms	x	
23 Ecological Footprint of European countries	x	
24 Patent applications based on genetic resources		x
25 Financing biodiversity management		x
26 Public awareness		x

1.1.4 Nature index for Norway

The Norwegian government has initiated the development of a Nature index (NI) for Norway. New methodology calculating the condition of different types of nature are being developed and tested in Mid-Norway (Nybø and Skarpaas 2008). The work to develop this index for the entire country has been initiated. The Nature index will be an essential tool to monitor the overall trend in nature over time. Furthermore, it will also be a basis for the comparison of the condition of different natural habitats and districts, and can be used for setting management goals. It should also be a tool for international comparison and indicates the need for mapping and monitoring of biodiversity.

The Nature Index methodology is built on the Natural Capital Index, where populations of species or surrogates are entered to estimate the condition of the areas. Species/surrogates included in the project are chosen in relation to a set of criteria intended to ensure that the index represents all facets of biodiversity. This makes it possible to present thematic indices, i.e. on changes in populations of threatened species, changes in populations as a consequence of various pressures, and changes in various species groups. The nature index can be presented as maps or graphs. Further work is in progress to assign values to various areas included in the index, thereby indicating their relative importance for biological diversity. This evaluation will probably be defined using areas that contain especially important habitats.

The first version of the nature index for the entire Norway will be presented in spring 2010. All large research institutions that have long-term monitoring data on biological diversity are involved in the work. The ultimate goal is for the nature index to be included in official statistics, and Statistics of Norway is already involved in the work. The index will be regularly updated.

1.2 The farmland ecosystem

Norway has limited farmland of high cultivation quality. The large outfields² have been important as additional resources for farming. Large parts of the outfields have, to varying degrees, been influenced by extensive use, be it through leaf harvest, rough grazing, mowing of road slopes, swamps and so-called mowing outfield meadows, burning and grazing of coastal heathland, etc. Modernization of agriculture in recent years has led to major changes in the use of the cultural landscape, both arable lands and culture-influenced outfields. This development has occurred through a so-called “polarisation” of agriculture where areas of intensive production are further intensified, while the use of areas of previously extensive production has changed or ceased. Many of the latter become overgrown in the absence of management. Species adapted to a multifaceted cultural landscape with old farming methods have been strongly reduced. Almost 20 % of the species on the red-list are currently threatened by intensive farming, while more than a quarter are threatened by dismantled farming.

1.2.1 Biological diversity of the farmland ecosystem

Area under management practices potentially supporting biodiversity

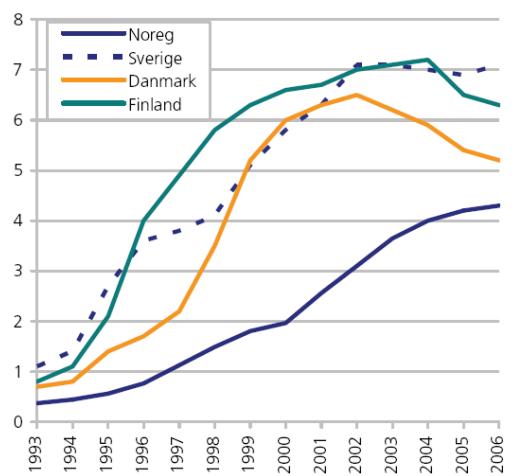
SEBI2010 indicator 20 "Agriculture" is divided into three part indicators:

- a) High nature farmland area
- b) Area under organic farming
- c) Area under biodiversity supportive agri-environmental schemes

Norway can at present report only on sub-indicator 20b. In general, ecological land use supports higher levels of biodiversity (Hole et al. 2005). However, the proportion and total area used for ecological farming is not indicative of sound management and care of important biodiversity areas. Cultivation that does not make use of artificial fertilisers and pesticides is nevertheless positive, as it minimises the potential negative effects on biological diversity, for both the agricultural land and other aspects related to drainage and pollution. The proportion and area farmed ecologically therefore serves as some indication of how farming contributes to sustainable utilisation and to some degree how it contributes to biological diversity. Today, over 4 % of Norway's farmland is managed ecologically (Statistics of Norway 2008), but the government's goal is to obtain 15 % by 2015.

² Outside arable land

Figur 9.3. Del sertifisert økologisk areal og karensareal av totalt jordbruksareal i drift i dei nordiske landa. 1993-2006.
Prosent



Kjelder: Debio (Norge), KRAV (Sverige), Danmarks statistik (Danmark), KTTK, Plant Production Inspection Centre (Finland).

Figure 6: Proportion of ecological farming in Norway (dark blue) in comparison with Sweden (dark blue stippled line), Denmark (yellow), and Finland (green).

Corncrake (*Landrail*)

The corncrake (*Crex crex*) is a red-listed species threatened by intensive farming methods. The primary risk comes from regular machine mowing, as the birds nest's on the ground are destroyed. It was previously a common bird species in southern Norway. At the end of the 1800s and the beginning of the 1900s, the population declined severely, and by the 1950s the species was almost eliminated as a breeding species in southeast Norway. In the mid 1990s only 50-75 singing male corncrakes were recorded in Norway. Their numbers increased from this very low level until 2003, after which there has been great variation from year to year (fig. 7). A national management plan for the conservation of corncrakes has been developed.

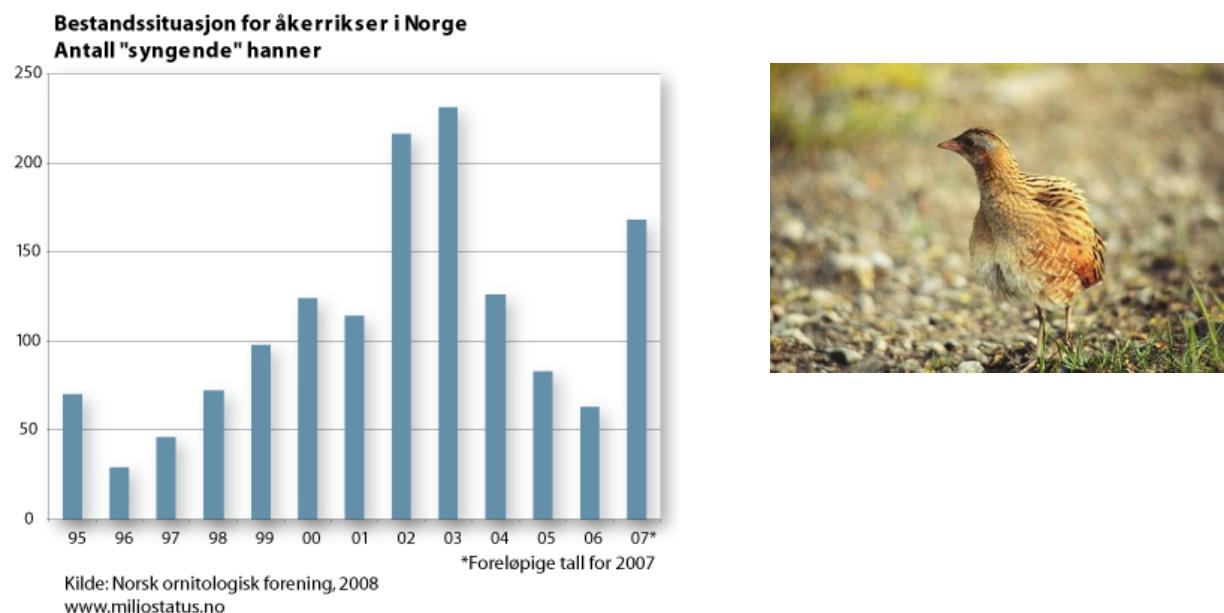


Figure 7: Corncrake population in Norway (number of singing males)

1.3 The forest ecosystem

Woodland is the second largest land ecosystem in Norway. A part of this area is commercially unviable mountain forest, wooded bog, or other woodland in low-productivity terrain, but the majority (60 %) is commercial forest. It is assumed that two-thirds of Norwegian terrestrial species are woodland species. Forestry results in habitat changes that may lead to acute habitat loss and reduced habitat quality for many species, as well as fragmentation of their habitats. The effects can be considerable. Almost 40 % of the forest-living species on the red-list are affected by these changes.

1.3.1 Forest biological diversity

Biologically mature forest

A large part of the biological diversity in woodland is related to biologically mature forest. Conservation of characteristic features of biologically mature forest, such as mature trees and dead wood, is a precondition to protect forest community species.

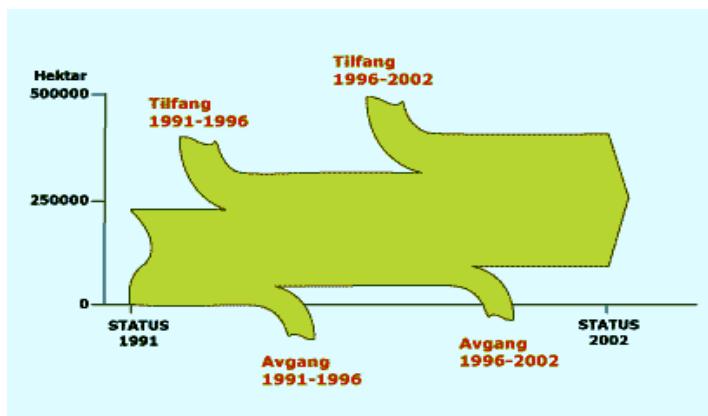


Figure 8: Changes in the commercially productive area of biologically mature forest from 1991 to 2002

Biologically mature forest is naturally developed forest that is older than commercially mature forest. There has been a 45 % net increase in biologically mature forest from 1991-2002 due to less logging of commercially matured forest, but 18 % of the forested area considered “biologically mature” in 1991 has disappeared. In addition there are reductions from windthrow, etc. These natural losses are about equal to those from logging. The total area of biologically mature forest is now about 450,000 hectares. This forms 6 % of the commercial forest area of Norway (7.5 mill. hectares).

Most biologically mature forest in Norway is located in areas of middle or low productivity. In the most productive areas today, only 1 % is comprised of biologically mature forest. The proportion of biologically mature forest in high productivity zones is very low, and one of the reasons for the large number woodland species appearing on the red-list .

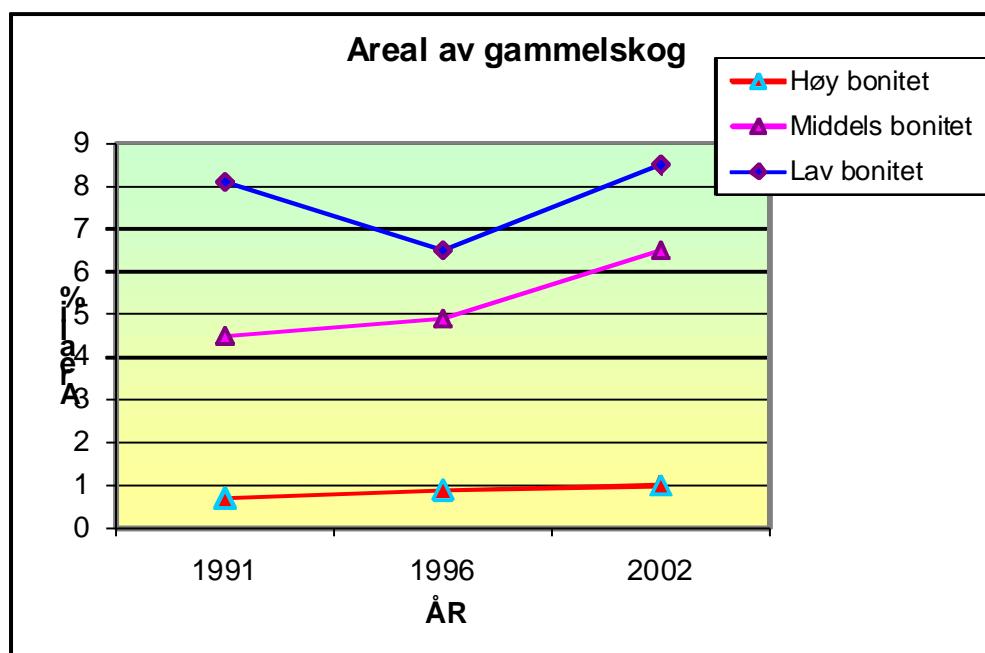
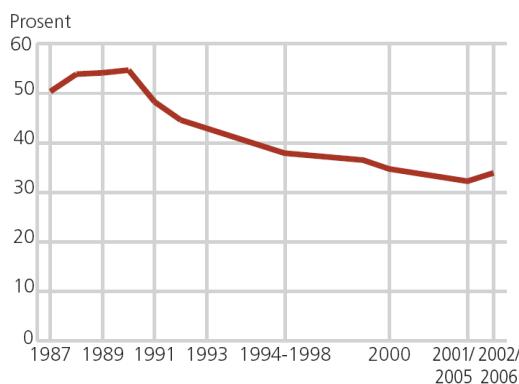


Figure 9: Area of “biologically mature forest” in relation to the total area in the three productivity classes, high (red line), middle (violet) and low (blue) productivity shown in % in the years 1991, 1996 and 2002.

Forest growing stock

SEBI2010 indicator 17 "growing stock, increment and fellings" indicates how much wood is removed in relation to growing stock. This indicator would be more accurate by adding estimates of firewood logging etc, which is not recorded by the official timber registration. An alternative indicator is to use "Degree of forest exploitation" (Figure 10). This indicates a decline in growing stock since 1990.

Figur 5.6. Utnyttingsgrad av skogen¹. 1987-2002/2006



¹ Utnyttingsgrad er her definert som avvirket volum i forhold til brutto tilvekst.
Kilde: Skogstatistikk, Statistisk sentralbyrå og Landskogstakseringen.

Figure 10: Degree in % of forest exploitation from 1987 to2006 (Statistics of Norway 2007)

Brown bear

About 150 years ago there were 4,000-5,000 brown bears (*Ursus arctos*) in Scandinavia, two thirds of them living in Norway. The density of bears was te highest in the western parts of southern Norway. Intensive hunting drove the bear population in Norway and Sweden to the brink of extinction.

There are two populations of bears in Norway today. In Norway's northernmost county Finnmark, the bear is part of the Norwegian/Finnish/Russian population. In other parts of Norway bears are found mainly along the border to Sweden. This population is increasing. It is difficult to estimate the Norwegian bear population. During 2006-2007 a total of 126 bears were counted in Norway. In Sweden there are about 2,500 bears.

Lynx

The lynx (*Lynx lynx*) was almost exterminated in the 1930s, but since then has increased in numbers and distribution. Today lynx are widely distributed. In 2008 a minimum of 72-76 females reproduced, which is equivalent to a total population of 429-452 animals. The national goal is to gain 65 annual breeding females.

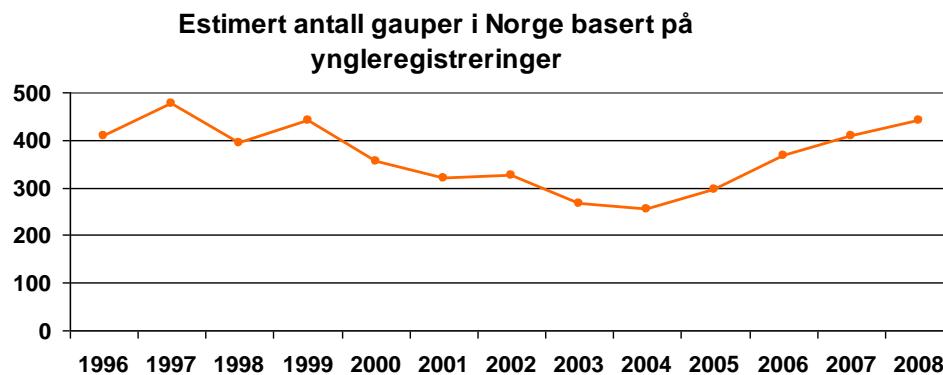


Figure 11: Estimated lynx population in Norway based on breeding records

Wolf

The national goal within the Norwegian management zone for reproducing wolves (*Canis lupus*) is three reproducing females annually. Reproduction in Scandinavia in 2007 was limited to 19 pairs, but no breeding was documented in Norway. In the winter of 2007-2008, 166-210 wolves were recorded in Scandinavia (20-21 family groups and 17-18 territorial pairs).

In Norway, 12-18 wolves were recorded during the winter of 2007-2008, comprising a single family group of 3-4 wolves, 2-4 territorial pairs, and 4-5 other individuals. In addition, one family group and 3 territorial pairs were observed in common Norwegian/Swedish territories. Breeding was recorded in three entirely Norwegian territories during the winter of 2008-2009.,.

Registrerte ulv i Norge

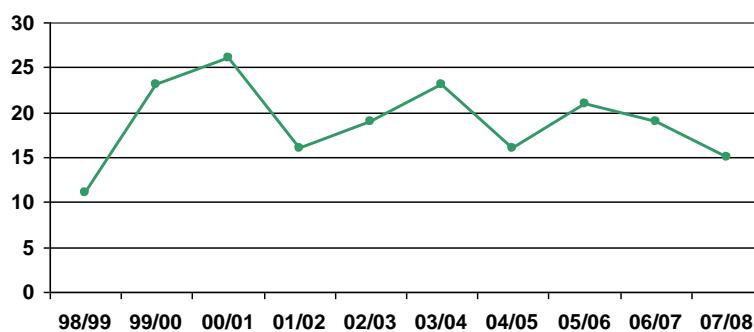


Figure 12: Number of wolves recorded in Norway

1.3.2 Climate and pollution

Monitoring in birch and spruce forests, nationwide investigations of epiphytic lichen on trees, and pollution loads in biota, show that the biomass of mosses has increased considerably, especially in the south, due to longer growing seasons (warmer and wetter autumns). Many species of lichen on trees have increased considerably over many areas, especially the more thermophilic species such as Monk's hood lichen (*Hypogymnia physodes*) and Green starburst lichen (*Parmeliopsis ambigua*). This

may be related to a trend towards a milder climate and a longer growing season. The proportion of damaged lichen has also declined considerably, and the coverage of pollution sensitive Witch's hair lichen has increased, probably due to reduced acid precipitation (Framstad et al 2008).

The more alkaline demanding plant species Wood sorrel (*Oxalis acetosella*) and Oak fern (*Gymnocarpium dryopteris*) have shown clear declines in southern parts until 1998, which is consistent with a time-delayed response to long-term soil acidification. Pollution sensitive lichens have in recent years increased in numbers, something that may have been caused by both reduced sulphur deposition and a milder climate with better growth conditions. Effects from sulphur deposition are shown i.e. by the increase in algal coverage of trees in the south-western part of Norway. This is probably caused by a combination of the fertilising effect of nitrogen from precipitation in this part of the country, and a milder and wetter climate. A certain increase in nitrogen-loving vascular plants, for example Wavy hair grass (*Deschampsia flexuosa*), and a reduction in nitrogen sensitive lichen in the ground vegetation in the southern areas may also be explained by the fertilising effects of nitrogen from precipitation.

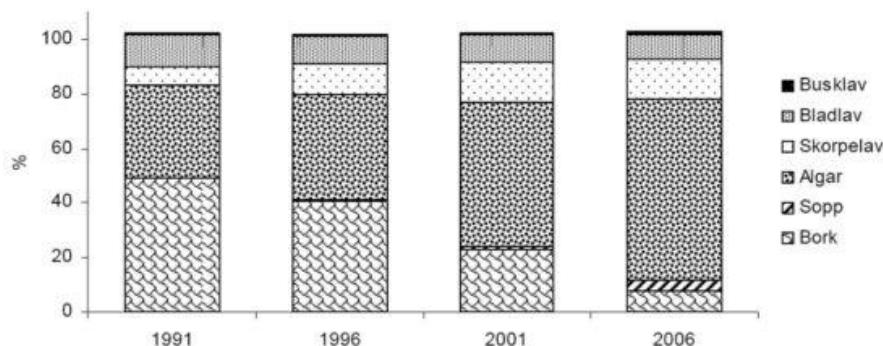


Figure 13: Development of algae and lichens on birch trunks in a monitoring area at Lund, southwest Norway (Framstad et al 2007)

The health status of woodland is monitored in Norway by recording crown density, crown colour, damage and mortality of 35,000 trees in two thousand quadrates nationwide. This monitoring programme started in 1986 and is the Norwegian part of the European woodland monitoring programme ICP Forests, which is a part of the UNs convention on long-distance trans-boundary air pollutants. Additionally reports of woodland damage are registered in the web database "Skogskader" (forest damages) on internet.

The average crown densities for Norway spruce (*Picea abies*) and Scots pine (*Pinus sylvestris*) in Norway have declined over the past four years, and for birch (*Betula*) over the last three years (fig. 14). Compared with other European countries, the crown density in Norway remains high, except in central and eastern Norway where the crown density is lower than the European average. This has probably been caused by climatic change. The health condition of trees, ascertained by crown density, discolouration and mortality, is affected largely by direct climatic conditions such as drought, frost and wind; or indirectly by the climate affecting the incidence of fungal diseases and insect attacks. Long-range air pollutants can add to this, or be cumulative with climatic change effects.

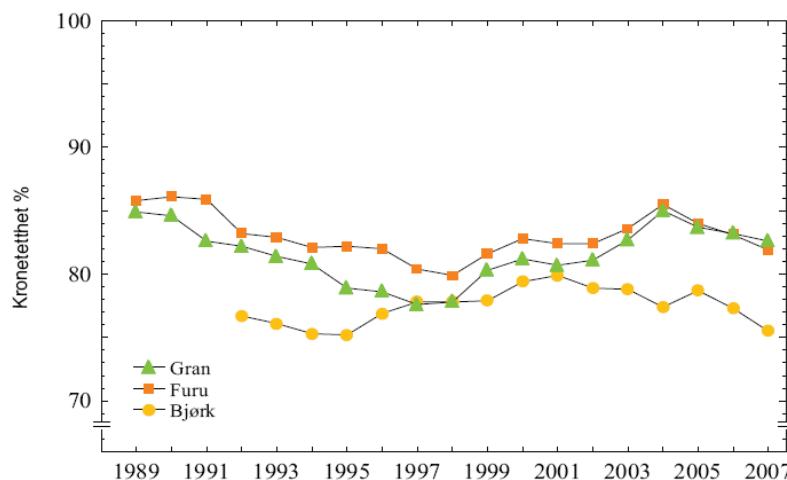


Figure 14: Trends in average crown density in % for Norway spruce (green triangles), Scots pine (orange squares), and birch (yellow circles) from 1989 to 2007 (Andreassen et al 2008).

1.4 Fresh water ecosystems

About 5 % of the Norwegian onshore territory is fresh water environment, formed by streams, rivers, ponds, and lakes. There are more than 5,000 species living in fresh water habitats, of which 238 are red-listed. This comprises 7 % of all red-listed species in Norway. Mayflies (54 species), beetles (50 species), vascular plants (38 species), algae (30 species) and crustaceans (24 species) are the largest groups of red listed species in this biome.

Physical encroachment threatens 78 % of the red-listed species in fresh water. This is the most important threat to freshwater biodiversity. Farmland rationalisation during the last 60 years has resulted in pond fill-in and channeling of streams. Another example of physical encroachment with serious consequences is watershed regulation for hydropower development, causing water level fluctuations, altered current conditions, drying out, and sedimentation. Dredging, dumping, substrate depositions in the shore zone, and canalisation have also impacted on the freshwater habitats. Pollution is a threat to 52 % of red-listed species in fresh water, and is the second most serious threat to this ecosystem. Long-range pollution from sulphur and nitrogen (acidification) remains an important threat to fresh water diversity, especially in southern Norway. The third most important factor affecting red-listed species in fresh water is climate change, which is considered to be a threat to 12 % of red-listed species in this ecosystem.

1.4.1 The EU Water Framework Directive

Norway started developing watershed planning, coastal zone planning, and multi-use water plans many years ago. Coordinated plans for hydropower construction and watershed protection are such examples. Management of the water environment is somewhat fragmented and conflicted, despite a traditionally good cooperation and dissemination of information in Norway. The EU Water Framework Directive is expected to improve this situation.

According to Norwegian water regulations, Norway is obliged to follow the EU Water Framework Directive as from 1.4.2009. The purpose of this is to protect the environmental status of all rivers, lakes, ground water, and coastal areas. In locations where the environmental cleanliness is threatened, pollution shall be removed and other necessary measures taken. This implies that all

activities that affect water condition shall be better coordinated. In addition to monitoring of physical and chemical qualities, mapping of biological and ecological conditions shall be focussed on.

Norway is divided into nine water regions (fig. 27) managed by water region authorities that are responsible for leading the work and ensuring good cooperation. This is organised by a cooperation committee in which the regional environmental authorities, sectors, municipalities, and interest groups, etc. participate and all affected parties shall contribute to a unified process.

The status of the freshwater environment in Norway is good compared to other countries in Europe. The status of water environments are categorized into one of three classes: "no risk", "possible risk" and "at risk". These categories are based on meeting environmental goals. The first step has been an overarching review of the environmental status of water environment in Norway. This indicated that more than 50 % would probably satisfy the EU's environmental demands. There are large regional differences, and not surprisingly the condition of the water environment is the poorest in eastern and southern parts of the country where most people live. With few exceptions, conditions are best in central and northern Norway.

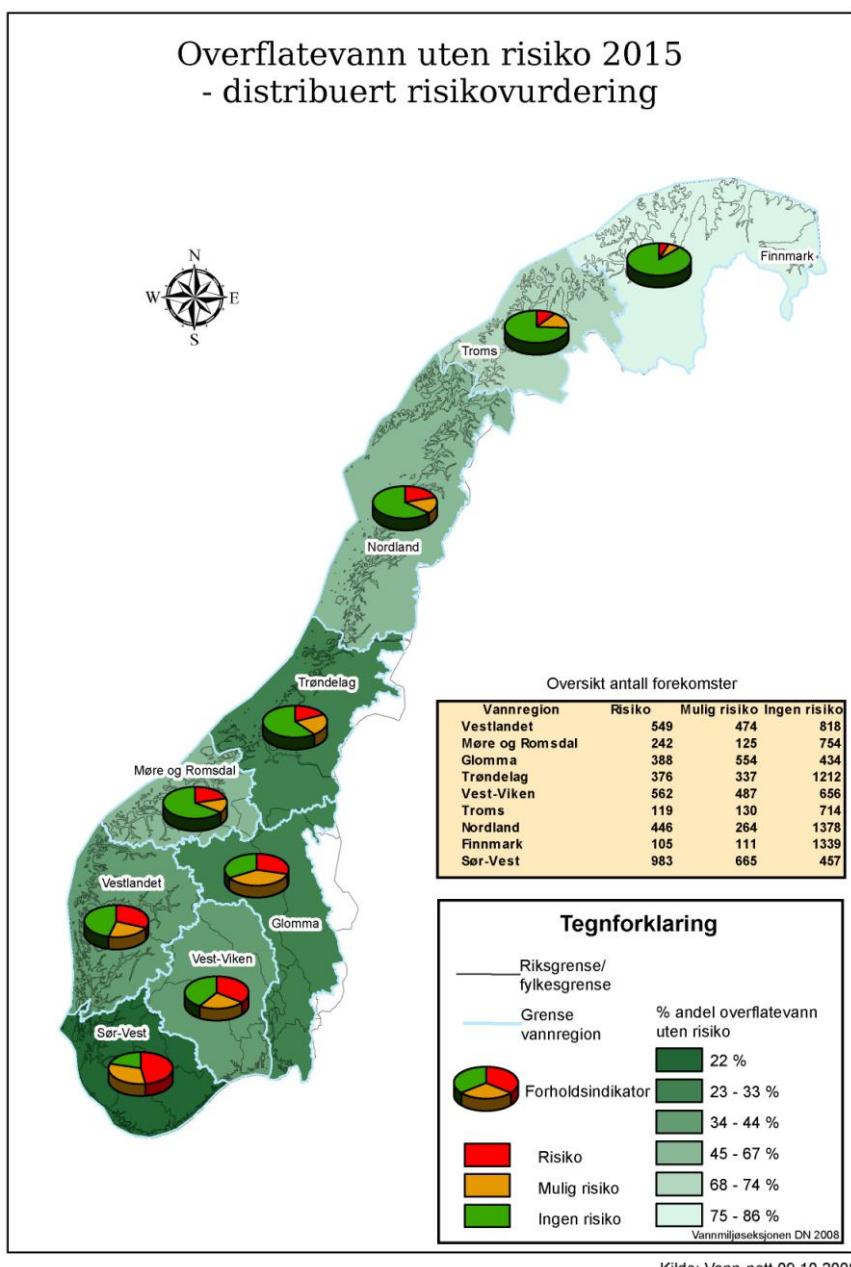


Figure 15: Status of water quality in Norway. The circles show the proportion in each water district of the categories at risk (red), possible risk (yellow) and not at risk (green). The green colorization indicates the proportion in each district of surface water not at risk

Various impact factors influence the ecological condition and species diversity in rivers and lakes differently. For example, physical modifications and pollution may change the fish abundance and species diversity. Introduction of alien species may have considerable consequences to aquatic ecosystems. The spread of Canadian pondweed (*Eloëda canadensis*), which leads to a complete change in the plant composition in lakes and rivers, is an example of this. Since the Canadian pondweed prefers very nutrient rich rivers and lakes, it is important to assess the potential cumulative effects of different impact factors.

1.4.2 River deltas

River deltas are an important biotope, i.e. for many bird and plant species. Agriculture, road building, river regulation, and industrial development are the most common impacts to estuaries. Over half of the 290 river deltas that are larger than 25 hectares are moderately or strongly influenced.

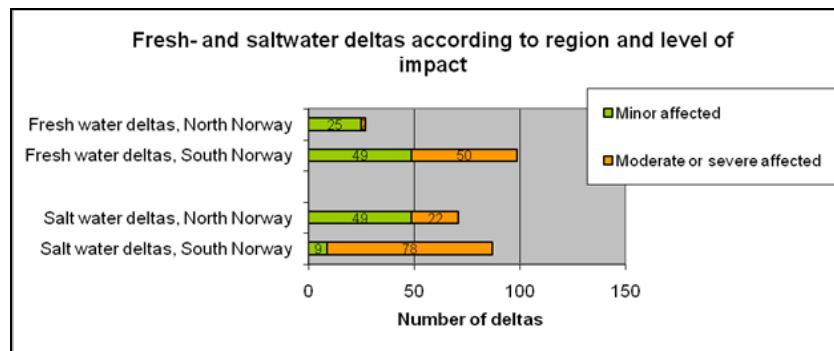


Figure 16: Impacted river deltas in Norway

1.4.3 Biological diversity in freshwater ecosystems

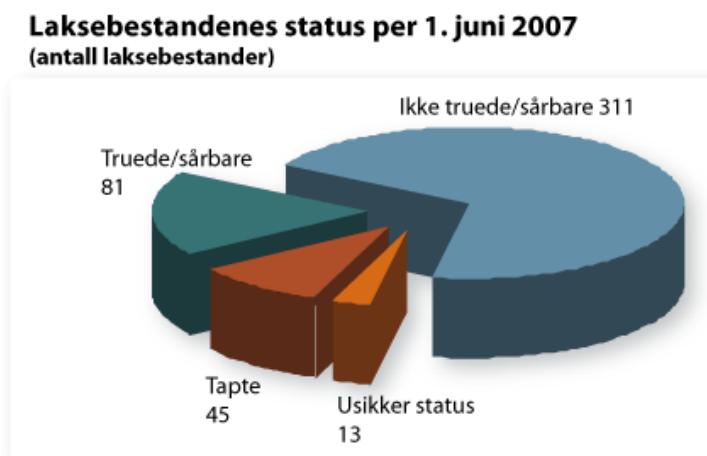
Atlantic salmon

Status and trends

According to a 2007 review, 45 self-reproducing salmon populations (*Salmo salar*, L.) categorised as extinct in Norway. Historically, 72 populations have become extinct, but 27 of these have been re-established through measures to reduce water acidification and exterminate the salmon parasite *Gyrodactylus salaris*. Such measures have improved the situation, but impacts from commercial salmon farming still affect wild salmon populations. The Norwegian salmon populations are today still relatively low compared with the 1960s-70s when the total number was 1-2 million. It is not expected to re-attain the same numbers before the most important threats are reduced.



Figure 17: Drifts of wild salmon (numbers) before the annual fishing seasons from 1983-2007



Kilde: Direktoratet for naturforvaltning, 2007
www.miljostatus.no

Figure 18: Status of Norwegian wild salmon populations in 2007 (311 populations not threatened, 81 vulnerable, 45 lost, and 13 of status not defined)

Threats to wild salmon populations

Acidification, watershed regulation, the salmon parasite *G. salaris*, escaped farmed salmon, and salmon lice are anthropogenic impacts posing significant threats to wild salmon populations. Water flows of one third of Norwegian salmon rivers are regulated. Many of these are among our most important salmon rivers. Regulation has affected low-number populations strongest, and many of these are now extinct or threatened.

It is well documented that escaped farmed salmon have an impact on wild salmon populations. The most common impacts are genetic, ecological and infections. In 2007 escaped farmed salmon comprised 34 % of the salmon catch at the coast, 26 % in the fjords, 9 % in rivers, and 13 % of the spawning population.

The salmon lice (*Lepeophtheirus salmonis*, Crustacea) can be a considerable problem for salmon, especially for smolts (young salmon) migrating into sea. When smolts en route to the sea are infected, their immune system and health are compromised. The salmon lice eat salmon skin, affecting the salt balance regulation of the smolts. Large infections of salmon lice may cause mortality. Over 80 % mortality of smolts has been recorded in some fjords.

Remedial actions

International agreements to reduce emissions and national liming mitigation have been important measures to protect salmon populations. Salmon are perhaps the most acidification-sensitive fish species. In Norway salmon have been exterminated from 18 watersheds due to acidification. A further 12 populations are threatened with extinction. Twenty-one watersheds in Norway have been limed.



Figure 19: Map of limed salmon watersheds in southern Norway

Norway maintains gene-samples from wild salmon populations in a gene-bank to safeguard threatened salmon stocks. This is done by collecting and storing frozen sperm and by farming fish in specially designed farm installations. Farming fish is a measure used for the most threatened salmon stocks. After improvements of the native watershed, fish are reintroduced. Nine of the 29 stocks protected by live-stocks in gene-banks have been returned to their native rivers. One more stock is now in process of reintroduction, while seven will be returned after *G. salaris* has been exterminated from their native rivers.

The salmon parasite *G. salaris* has been recorded in 46 Norwegian watersheds, but remedial measures have now cleaned 24 of them. In infected watersheds, salmon become extinct or endangered. Chemical treatment of infected watersheds is the only effective treatment to combat *G. salaris*. Building of fish barriers is also considered to reduce the area that has to be treated chemically. Chemical treatment has been carried out in 35 watersheds. In 15 of the watersheds the parasite has been eliminated and the watershed declared parasite-free.

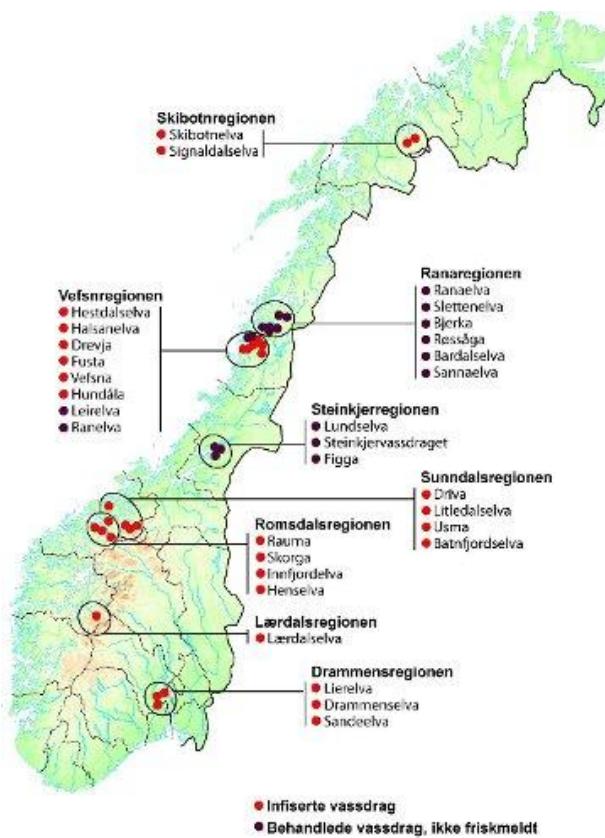


Figure 20: *Gyrodactylus salaris*; the map indicates known infected regions and rivers (February 2009)

Fifty-two areas have been designated as National Salmon Watersheds and 29 as National Salmon Fjords. The purpose of these designations are to give special protection to the most important salmon populations by preventing the negative effects associated with escaped farmed salmon, infections, salmon lice, watershed regulations, agricultural impacts, etc. Populations protected in designated areas will also be prioritised by other measures to strengthen wild salmon populations like extermination of *G. salaris*, restoration habitats, revision and improvement of hydropower licenses, compensation measures in regulated watersheds, watershed liming, and regional programmes for population monitoring and combating salmon lice.

Freshwater pearl mussel

Norway has almost a third of the remaining freshwater pearl mussel (*Margaritafera margaritafera*) localities and more than half of the mussel population of Europe. The species is known from 400 to 500 localities (Figure 21) and is classified as vulnerable by the Norwegian red-list.

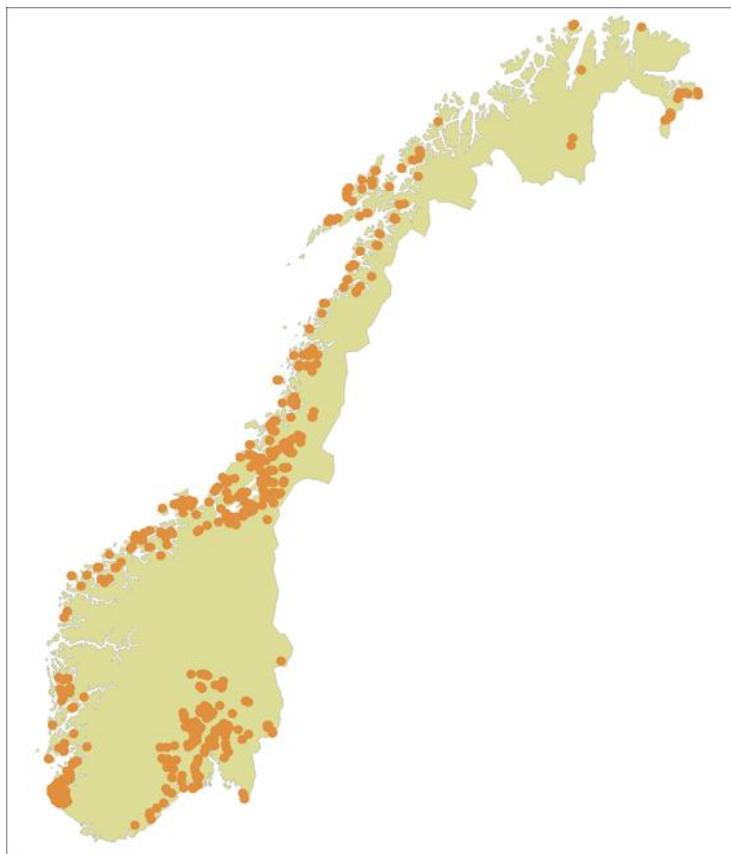


Figure 21: Distribution of freshwater pearl mussel in Norway

The freshwater mussel is threatened by acidification. Liming of lakes and watersheds is a temporary measure that counteracts the damaging effects of acidification and is currently the best-known method to limit acidification. It has been shown that liming of acidified watercourses may increase the freshwater mussel's annual growth by several hundred percent, and that frequency of growth disturbances declined. Liming has therefore a positive effect both on growth and reestablishment of populations.

Status of eels in Norway

Resource monitoring of eels (*Anguilla anguilla*) in Norway is limited. Figures from 1975 to 2006 from the Imsa River (Rogaland, southwestern Norway) indicate that the number of migrating elvers (immature eels) that have passed the fish trap on the way up river, and the number of silver eels (adult eels) that have migrated out, show a significant decline (fig. 22).

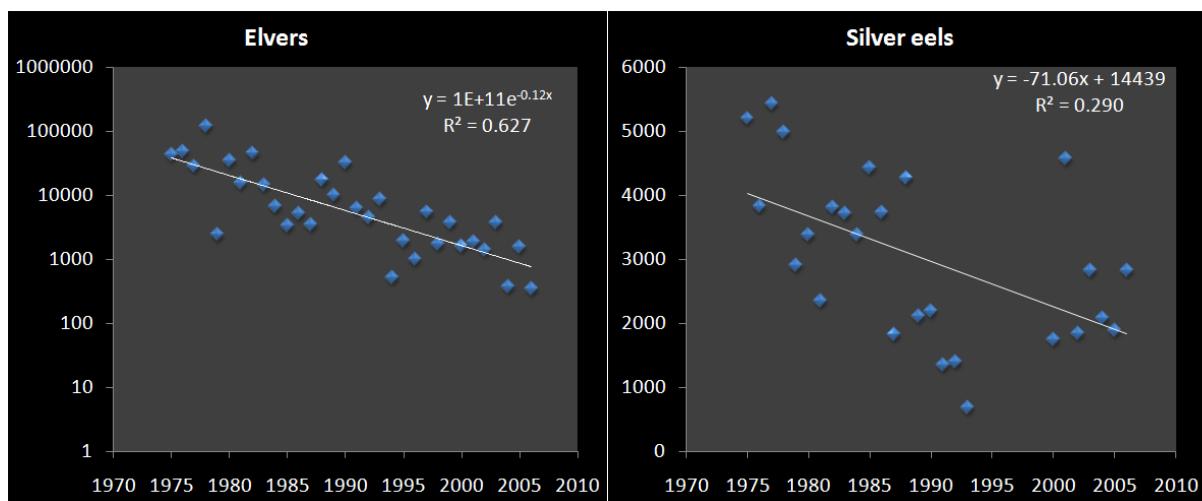


Figure 22: In- and out-migration of eels in Imsa in Rogaland 1975-2006

The Norwegian data of migrating elvers and silver eels show a significant negative correlation by a 7 to 11 year's delay to the observations of surface temperature in the Sargasso Sea. This indicates that increasing surface temperatures in the Sargasso Sea, the eels' spawning grounds, affects the recruitment of eels, probably through a reduction in primary productivity (Norwegian Institute of Marine Research 2008). The European eel is critically endangered (CR).

1.4.4 Alien invasive species

Introduction of fish into historically fish-free ponds and tarns constitutes the greatest threat to amphibians like the pool frog (*Rana lessonae*) and great crested newt (*Triturus cristatus*). The pool frog is classified as critically endangered, while the crested newt is listed as vulnerable in Norway.

Importing fish into aquariums and ornamental ponds involves a risk of introducing alien aquatic species. The pumpkinseed sunfish (*Lepomis gibbosus*), a North American species of perch, was found in some small lakes in Asker municipality in 2005. Studies have shown that the pumpkinseed sunfish is infected by two parasites in the class *Monogenea* (the same class as *G. salaris*). These parasites have not previously been described in Norway. The effect of these parasites to naturally occurring fish species, i.e. our native perch, is unknown. There is currently no restriction on the import of fish to closed aquariums.

Use of live bait and illegal releases are other important causes of alien species. This may also be a challenge from increased human immigration to Norway that may introduce other cultures and traditions conflicting Norwegian regulations.

Pink salmon (*Oncorhynchus gorbuscha*) has now spread into many rivers in north Norway as a result of large-scale release in the Kola Peninsula. The potential effects on Atlantic salmon are under investigation.

Table 3: Survey of alien fish species introduced to Norway

Name	Scientific name	Family	No. localities
Tench	<i>Tinca tinca</i>	Cyprinidae	160 – 250
Common carp	<i>Cyprinus carpio</i>	Cyprinidae	20 – 30
Sunbleak	<i>Leucaspis delineatus</i>	Cyprinidae	4
Gudgeon	<i>Gobio gobio</i>	Cyprinidae	2

Goldfish	<i>Carassius auratus</i>	Cyprinidae	1
Minnow	<i>Phoxinus phoxinus</i>	Cyprinidae	See fig. 23
Brook trout	<i>Salvelinus fontinalis</i>	Salmonidae	50 – 100
Lake trout	<i>Salvelinus namaycush</i>	Salmonidae	12
Pink salmon	<i>Oncorhynchus gorbuscha</i>	Salmonidae	11
Rainbow trout	<i>Oncorhynchus mykiss</i>	Salmonidae	3
Brown bullhead	<i>Ameiurus nebulosus</i>	Ictaluridae	13 – 15
Pumpkinseed sunfish	<i>Lepomis gibbosus</i>	Centrarchidae	6

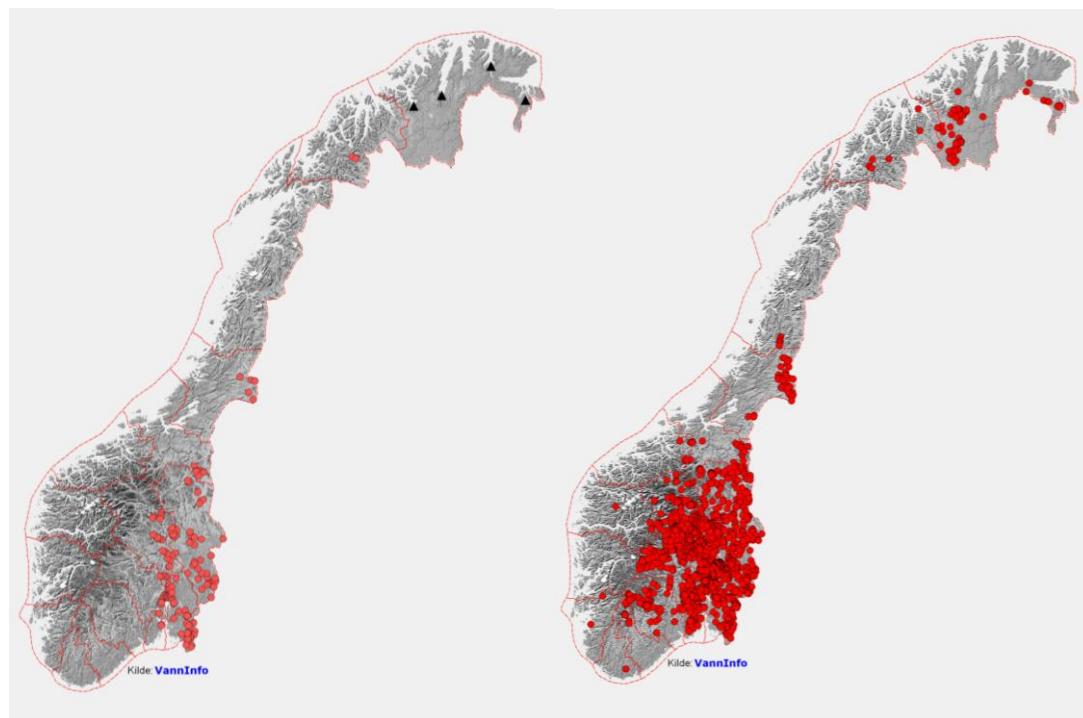


Figure 23: Distribution of minnows; 1920 to the left and 2002 to the right

1.4.5 Acidification

Acidification of water and watersheds as a result of long-range sulphur pollution from Europe has become a problem in southern Norway since the end of the 1800s. The problem increased particularly in the post-war period and reached a peak at the end of the 1980s. It is assumed that more than 20 % of all species disappeared from the most polluted watersheds in the southernmost part of Norway. Some important biological groups, such as snails and mayflies, are virtually extinct in some areas. Over 15,000 fish populations have died out or been strongly affected by acidification. The salmon population in 25 rivers in southern and south-western Norway have disappeared and at least 20 others have been negatively affected.

Emission reductions in Europe from the 1990s, and especially as a result of the Gothenburg protocol of 1999, have led to considerable reductions in the chemical components in precipitation and therefore an improved situation for the watersheds in south Norway. The concentrations of sulphur and sulphate are 70-80 % lower when compared to the highest levels recorded in the 1980s.

Nitrogen compounds are somewhat lower, but also considerably reduced for the same period. This has resulted in higher pH-values and lower concentrations of poisonous aluminium in watersheds, and re-colonisation by pollution sensitive species. The populations of pollution sensitive species

remain unstable or low in the most exposed watersheds. The total area of damage to fisheries, estimated at 20,500 km² in 1990, has been reduced to 13,300 km² in 2006, a reduction of 38 %. Damage to Atlantic salmon is not included in this assessment (see section on Atlantic salmon). In the two southernmost provinces of Norway there are still large areas of damaged fisheries, and the reduction in the damaged area is also considerably less here than in the rest of southern Norway (3-7 % reduction in the period 1990 to 2006).

1.5 Bog ecosystem

Bog and marshland are relatively extensive biotopes in Norway. In an arctic landscape with a modest and relatively young soil development (since the last ice age c. 10,000 years ago), bogs have been a considerable stabiliser, both of vegetation formation and for water storage in terrestrial ecosystems.

Marshland and bogs have a rich and unique diversity of birds, plants, and insect species. Bog comprises the great majority of the marshland area. Destruction of these areas constitutes the greatest threat, and in the period 1950-1990 a comprehensive draining of such areas for forestry, agriculture, or building purposes took place. It is estimated that 25 % of the original bog area below the tree line has been drained (Moen 1995). Conservation work for bog and marsh has therefore been prioritised from the mid 1970s. Norway is a signatory of the Ramsar convention and has protected 14 areas of international importance. In the red-list, 190 species are associated with bog habitats and almost 400 species to marsh and water's edge habitats.

1.5.1 Bog biodiversity

Palsa peatlands

Palsa formations in bogs occur mainly in two regions, the Dovrefjell area in the south and the eastern parts of Troms and Finnmark in the north. The area of palsa peatlands has been reduced since the end of the 1900s, but some new development of palsa formations has occurred (Hofgaard 2006). It is believed that further climate impacts such as an increase in temperature and/or increases in precipitation will result in the degeneration of the most marginal palsa peatland areas in the course of a few decades. A national monitoring programme for palsa peatlands was established in Norway in 2004.

Lesser white-fronted goose

At the beginning of the 20th century, the breeding population of lesser white-fronted geese (*Anser erythropus*) in Norway numbered several thousand pairs. It has now declined to an estimated 20-30 breeding pairs and the population is critically endangered (IUCN category CR). Remaining pairs that still breed in Fennoscandia are found on Finnmarksvidda and in adjacent fjord areas. Breeding birds are no longer documented from Sweden or Finland, which previously were a part of the population's natural breeding area. In total 13-14 pairs were estimated to be breeding on Finnmarksvidda in 2008. After a moderate breeding season 40 lesser white-fronted geese arrived at the Norwegian resting and migration area at Stabbursneset (Finnmark) at the end of August. Only three pairs were accompanied by young (in total 13 young).

The species' dramatic decline is related especially to heavy harvesting pressure along its migration route, in the form of illegal and unintentional hunting. New data from satellite tagged birds indicates that Hungary, Kazakhstan, Azerbaijan, and Iraq may be key areas for lesser white-fronted geese in winter, while it was already known that the border region of Greece and Turkey (particularly the

Evros delta) is an overwintering locality for a smaller portion of the population. Other important threats to the remaining Fennoscandian population are predation at resting and breeding sites, disturbance in the breeding season, and encroachments on resting and breeding areas.

A number of important processes are underway to protect the species. Norway is preparing a national management plan for lesser white-fronted geese that is a direct follow up to the international conservation plan for the species which was adopted in August 2008 (AEWA 2008). Through an EU-LIFE project, Norway has contributed actively in building knowledge and developing measures that will contribute to safeguarding the European migration route. Other measures include:

- 1 population monitoring in Norway;
- 2 removal of predators in the breeding area;
- 3 bilateral cooperation with Russia to strengthen knowledge about the species' habitat use in important resting sites during migration, and to reduce the risk of illegal hunting.

1.6 The mountain ecosystem.

Mountain and mountain plateau regions comprise almost half of the Norwegian land area. Anthropogenic effects on biological diversity within this biome are relatively small given the sparseness of physical encroachments. The proportion of red-listed species in mountains is therefore lower than in the other biomes (5 %). The most important threats are related mainly to climate change, long-distance transported pollutants and grazing. Physical encroachments related to development (infrastructure, sports facilities, cabin building, etc.) and disturbances from traffic are also an increasing negative factor. In recent years the ecologically important small rodent cycle in the mountains has been absent or greatly reduced. This may be due to grazing pressure or climate changes.

1.6.1 Biological diversity

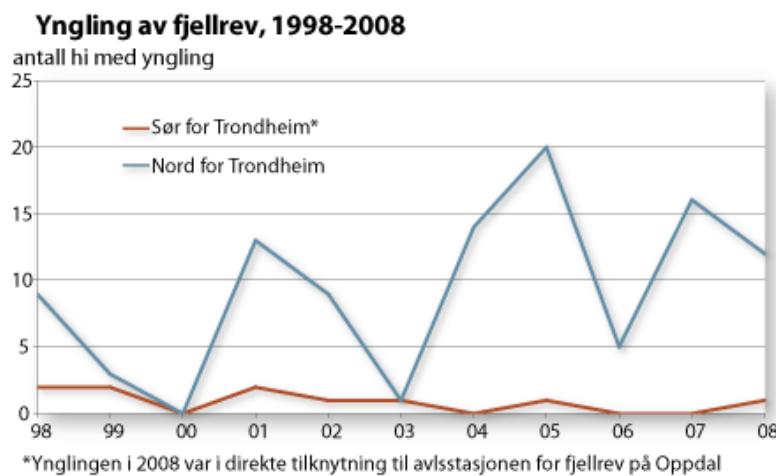
Milder climates and a longer breeding/growing season in the mountains are expected to lead to increased bird populations in these areas. A population index based on 1000 fixed counting points in mountain monitoring areas shows increases in populations of bird species associated with woodland habitats, while species which prefer open habitats appear to have a more stable population trend. As the increase in woodland species has not displaced species which breed in the open, these long-term effects are interpreted more as direct effects of climatic variables (e.g. earlier spring, longer growth season) than effects of habitat change. Monitoring data shows, for example, that breeding in the pied flycatcher (*Ficedula hypoleuca*) begins earlier (Framstad et al 2008).

High concentrations of lead in the liver of grouse species, and high concentrations of organic environmental poisons in the eggshells of many birds of prey are still being recorded. However, this has not been shown to affect reproduction or population trends. Population trends of grouse species in the fixed monitoring areas indicate that hunting has not had any significant effect.

Arctic fox

The Fennoscandian arctic fox (*Alopex lagopus*) population is estimated to number approximately 120 adult individuals. During the period 1998–2008, 111 breeding attempts were recorded for the

species. Nearly all breeding was located north of Trondheim/central Norway (Figure 24). The species has become extinct in most mountain areas in southern Norway.



Kilde: Norsk institutt for naturforskning, 2008
www.miljostatus.no

Figure 24: Number of recorded dens with breeding during the period 1998-2008

Hunting and trapping led to a collapse in the arctic fox population at the beginning of the 20th century. Despite the fact that the arctic fox has been protected in Norway since 1930, it has not managed to recover in numbers (Figure 25). The arctic fox is classified as threatened in Norway, Sweden, and Finland, but not in higher arctic areas like Svalbard and other Arctic archipelagos. In Norway the species is listed as critically endangered (CR), but has apparently maintained most of its habitat range since protection despite continued low population densities.

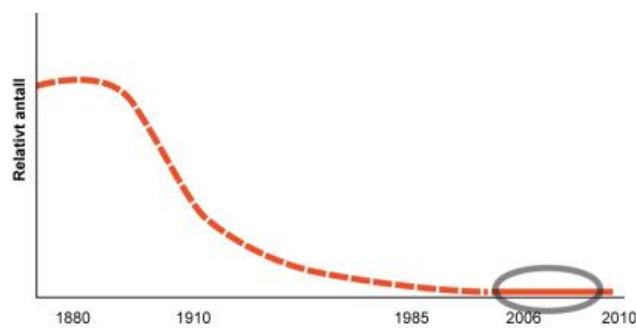


Figure 25: Estimated arctic fox population in Fennoscandia since the late 19th century

Hunting and trapping before protection in 1930 resulted in the original population decline in Norway. Competition from red fox may be a key factor behind the fragmentation of the arctic fox population after protection. Fragmentation and isolation have, over time, led to negative demographic and genetic effects. It is not thought that climate changes have had a direct negative effect on arctic foxes. Indirect effects are however possible through reduced and/or absent small rodent cycles and the geographic expansion of the red fox to higher altitudes and latitudes.

A management plan to sustain arctic fox populations in Norway has been developed. Measures are mainly directed towards control of red foxes in mountain areas through shooting, with breeding,

supplementary releases, monitoring, and genetic mapping of the arctic fox population. The species is now re-established in many areas of central and north Norway.

Wolverine

The wolverine (*Gulo gulo*) is distributed in two population areas in Norway; one along the Swedish border from Finnmark to Femunden, and the other in southern Norway in Dovre, Rondane, Reinheimen, and Snøhetta. Through monitoring in recent years, it has been demonstrated that there is exchange of individuals between the two populations.

Data from the national predator-monitoring programme estimates a winter population of wolverine in Norway at 339 individuals nationally during 2006–2008. In 2008 reproduction was confirmed in 51 cases in total in Norway. The national target is for reproduction to occur 39 times annually.

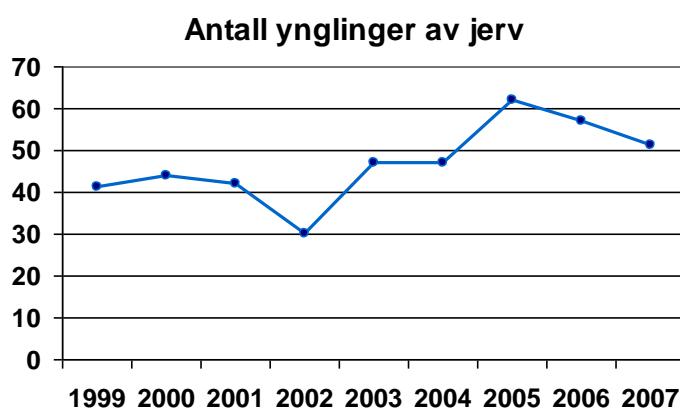


Figure 26: Reproduction of wolverine in Norway

Wild reindeer

The population of wild reindeer has recovered from overhunting prior to 1940. Numbers have since fluctuated due to overpopulation and measures taken to reduce the population to allow re-growth of grazing land. The wild reindeer has been replaced by domestic reindeer throughout the mountains of Norway's four most northerly provinces and in parts of the southern Norwegian mountains. The earlier problems are no longer relevant to today's wild reindeer management, but habitat fragmentation and displacement as a result of power generation developments, communications links, and holiday cabins pose a steadily increasing challenge. These processes are responsible for the previously large, continuous distribution being fragmented into many more or less isolated areas today.

1.7. Marine and coastal ecosystem

The marine area managed within the economic zone and the fisheries protection zones around Svalbard and Jan Mayen is altogether more than five times larger than the Norwegian land area. This comprises the marine areas of Skagerrak (western part), North Sea (eastern part), Norwegian Sea, Barents Sea (western part), Greenland Sea (eastern part), and part of the North Pole basin. These

marine areas contain probably more than 10 000 species. Knowledge concerning these populations is currently very limited, but recently changes related to the effects of fishing, pollution, exotic species, petroleum operations, and climate changes have been reported. The registered proportion of red-listed species in the sea that are affected by these is nevertheless low compared to terrestrial ecosystems, but there is great uncertainty.

Climate change and acidification of the sea are the main threats to marine ecosystems and are expected to cause severe impacts on plankton, coral reefs, fish eggs, and fish populations in the future. Introduced species are also an increasing threat.

1.7.1 Management plans

Marine areas have considerable environmental value and contain natural resources that are highly important to Norway. It is important to safeguard this environment and rich natural resources for the future. The increasing level of activities makes good coordination essential to ensure that the ecosystem can continue to provide a basis for long-term co-existence of different industries. However, we at present know too little about the relation between the impacts of different activities and the overall pressure on the ecosystem. During the parliamentary debate on the white paper on the marine environment, the Parliament endorsed the need for integrated management of Norwegian maritime areas based on an ecosystem approach. The first management plan was developed for the Barents Sea/Lofoten area and is considered as a groundbreaking effort by incorporating integrated, ecosystem-based management plans for Norwegian marine areas.

What are the main measures to achieve a holistic and ecosystem-based management?

- Area-based management, where activities and measures are adjusted to the environmental quality of the ecosystems.
- Protection of the most valuable and vulnerable areas against negative pressures, including oil pollution.
- Reduction of long-range pollution.
- Strengthening of fisheries management.
- Securing control with the development of the state of the environment in the Barents Sea/Lofoten area based on information from a more coordinated and systematic environmental monitoring.
- Strengthening the knowledge base through better surveys and increased research.

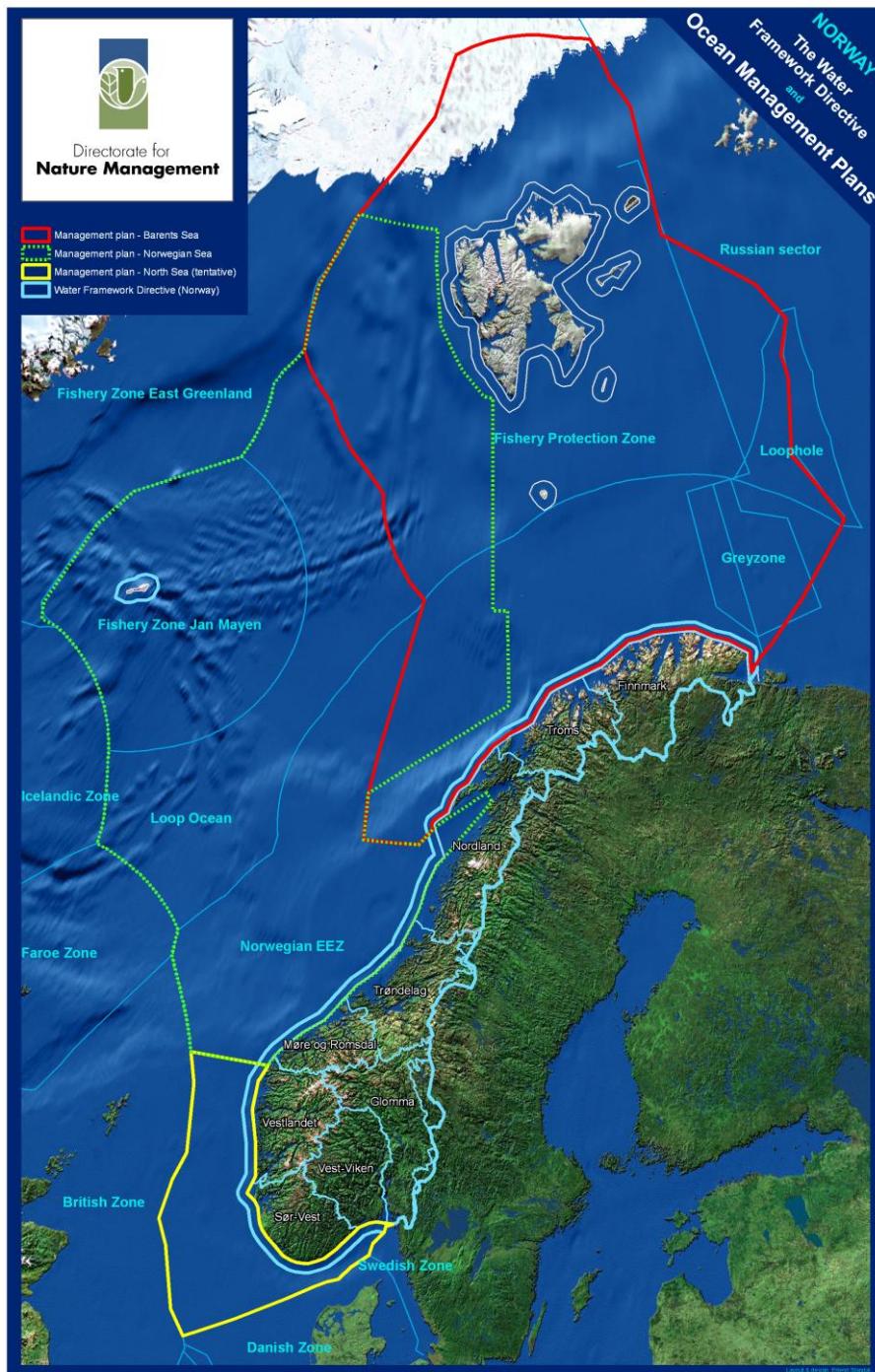


Figure 27: Geographical delimitation of the Barents Sea (marked by the red line) and Norwegian Sea (green stippled line) management plan areas and the water framework management regions (light blue lines)

The Barents Sea

The management plan for the marine environment of the Barents Sea and sea areas off Lofoten (almost 1.4 million km²) is the first comprehensive regional management plan and was approved in 2006 (fig. 27). The overall framework for existing and future activities in the sea area is delineated in the management plan, and arrangements for coexistence between industries such as fisheries, sea transport, and petroleum prospecting and extraction put in place.

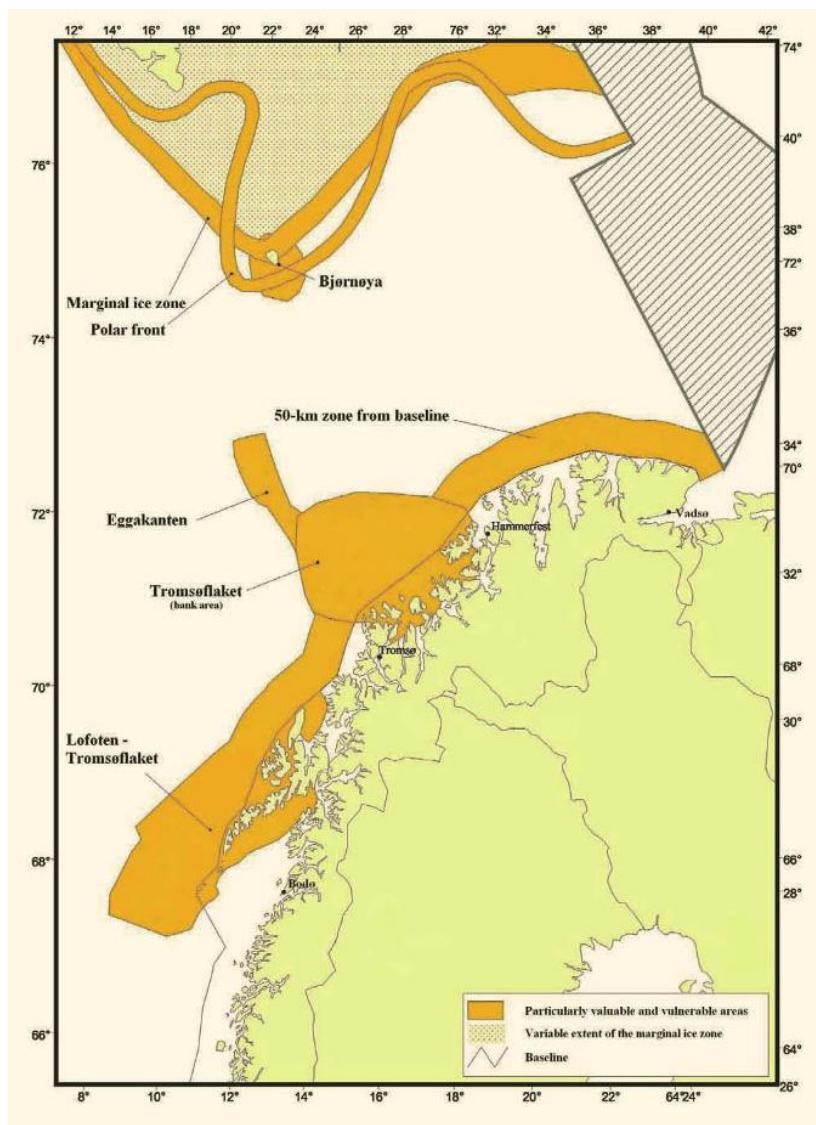


Fig 28: Particularly valuable and vulnerable areas

A cautious approach will be adopted when evaluating demands and restrictions for activities in particularly valuable and vulnerable areas. This includes, for example, that petroleum exploration and extraction has so far not taken place in particularly valuable and vulnerable areas (fig. 28). A range of preventative measures has been taken in marine safety and oil pollution protection preparedness in the area. These will be further strengthened, and work to establish new, mandatory shipping lanes for hazardous cargoes is in progress. In 2007 a marine traffic control centre for north Norway was established.

The Norwegian Sea

The overall management plan for the Norwegian Sea is to cover, geographically, the areas included in the Norwegian economic zone sea boundary from 62° to 80°N, including deep water areas in the Norwegian economic zone in the west of the Barents Sea, the fisheries protection zone around Svalbard, the fisheries zone around Jan Mayen and the 'Smutthavet', altogether 1.26 million km² (Figure 27).

The greatest threats from regular activities in this marine region are from the effects of the fisheries on bottom-living animals, coral reefs, blue whiting (*Micromesistius poutassou*), cod (*Gadus morhua*), Greenland halibut (*Reinhardtius hippoglossoides*), redfish (*Sebastes marinus*), Norway haddock / lesser redfish (*Sebastes viviparus*), tusk (*Brosme brosme*), common seal (*Phoca vitulina*) and common porpoise (*Phocoena phocoena*).

The consequences of acute emissions from ship traffic and petroleum activities are relatively large for seabirds but small for fish populations and most sea mammals. The coastal fishery banks are especially vulnerable areas in this respect.

1.7.2 Marine biological diversity

Plankton

The biomass of macro-plankton in the ocean is uncertain and varies greatly through the year and between years. There is a suggestion of a weakly declining trend in biomass in both Atlantic and coastal waters. The estimated biomass in the Norwegian Sea is 150 million tons of zooplankton and an annual production of ca. 650 million tons of phytoplankton (Ottersen og Auran 2007).

Bottom fauna- coral reefs, sponge communities, kelp forests

Norway has what is probably one of the world's largest populations of the reef building cold water coral *Lophelia pertusa*. This and many other species of cold water corals are found in Norwegian oceanic waters, along the coast, and in fjords. The distribution of the sponge community in Norwegian waters is scarcely documented, but some mapping has been done in the form of by-catches in bottom-trawling investigations. The mapping programme MAREANO (mapping of depth, bottom conditions, biological diversity, biotopes, and pollution in sediments in Norwegian coastal and oceanic areas), and the Norwegian Institute for Marine Research' earlier investigations, have revealed many coral reefs and sponge communities in the Barents Sea. Sponges and corals are important for biological productivity in ocean areas (Ottersen og Auran 2007). Not only in the form of their own existence, but also because they create a spatial structure where many other species find food and protection.

The most important factor affecting these biotopes is fishing methods that actively damage the bottom, such as bottom trawling. Climate change and acidification of the sea are considered to be an increasing threat in the future. Construction on the seabed for petroleum industry purposes is also a serious threat. In addition, there are many other human impacts which to a greater or lesser degree represent a danger for corals and sponges.

There is a great need to map the occurrence of both corals and sponges, together with increasing research and development on these, as a basis for a knowledge-based management of our populations. At the same time it is important to protect corals and sponges against the threats in both the short and longer terms. This should be done through coordinated, trans-sectoral plans for protection of the coral and sponge communities.

Forests of tangle kelp (*Laminaria hyperborea*) are distributed along the coast and are in good condition up to central Norway, where the species is exploited commercially. Further north, kelp has been grazed down by sea urchins since the 1970s, but there are no signs of reestablishment north to Vega in Nordland (Norderhaug & Christie 2007).

Fish populations

Many fish populations in the North Sea are at low levels. This applies to spawning stocks of, for example, cod (*Gadus morhua*). Generally, the spawning stocks in the North Sea are relatively strongly affected by fisheries.

In 2006, mackerel (*Scomber scombrus*) and blue whiting (*Micromesistius poutassou*) were exposed to levels of fishing exceeding limits considered feasible and sustainable (Ottersen & Auran 2007). This implies that more fish of these species were harvested than the production surplus within these populations. In total, the statuses of 26 spawning stocks of fish in the North Sea were investigated (fig. 29).

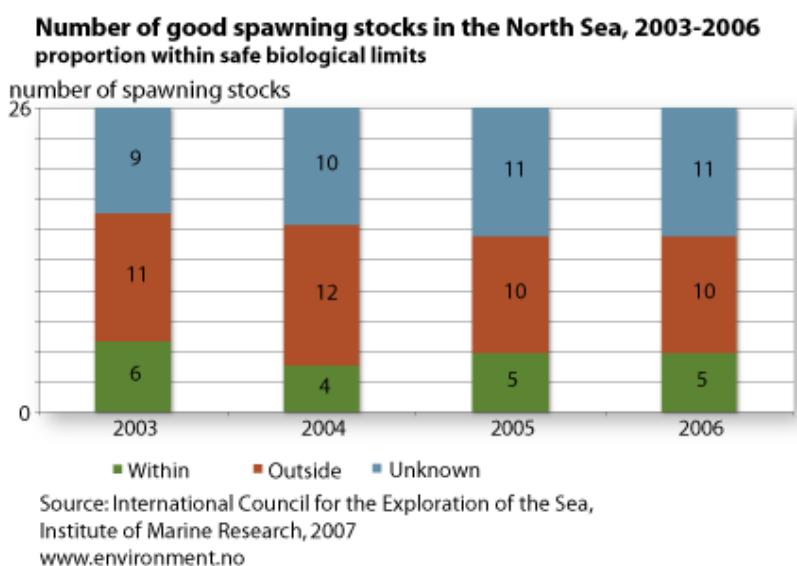


Figure 29: Proportion of fish stocks in the North Sea with spawning populations which are within (green) or outside (red) safe biological limits, or which have uncertain status (blue)

Populations of capelin (*Mallotus villosus*), haddock (*Melanogrammus aeglefinus*) and arctic cod in the Barents Sea are managed through the Norwegian/Russian fishery commission according to a joint harvesting rule for sustainable exploitation. Capelin shows enormous fluctuations because it consists of very few year classes. Presently the population is at its peak; after a moratorium in the capelin fishery from 2003, in 2009 the stock was again opened to commercial fishing.

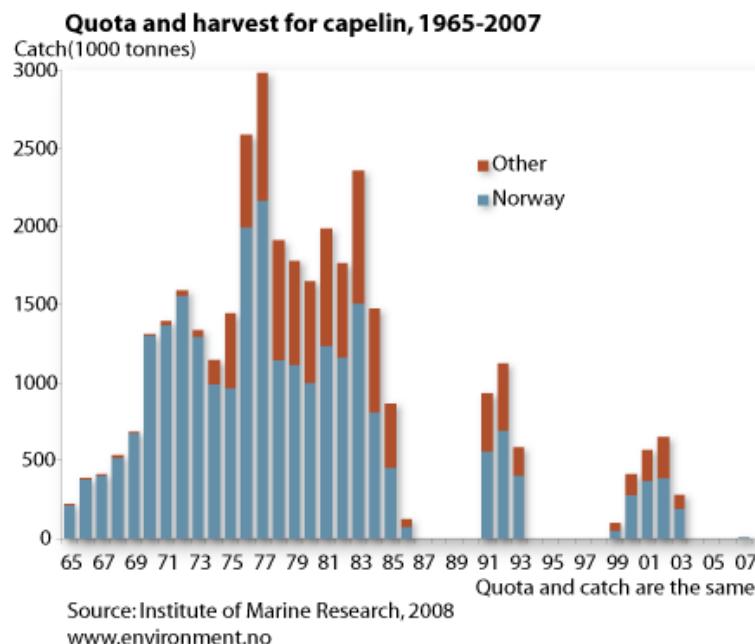


Figure 30: Capelin (*Mallotus villosus*) population in the Barents Sea based on quotas and harvest

The spawning stock of arctic cod in the Barents Sea is at an acceptable level as regards the harvesting regulations, but nevertheless lies well below its biological potential, and the level which would give the greatest yield. In recent years there have been enforcement problems with the arctic cod fishery. Problems include unregistered catches and a rate of exploitation that exceeds the fisheries commission's quotas. Forecasts for population development have therefore also become less certain.

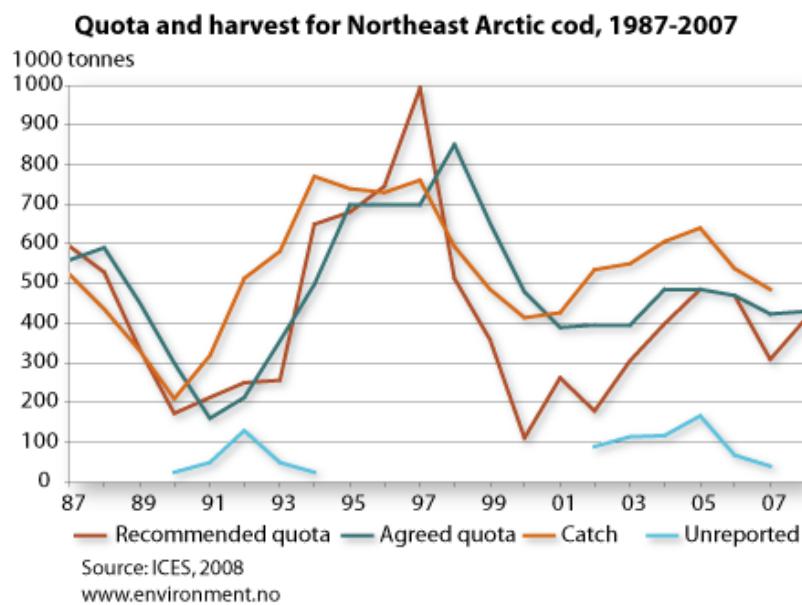


Figure 31: Arctic cod population in the Barents Sea, based on quotas and catches

There are several populations of coastal cod (*Gadus morhua*) from Stad (62 ° N) northwards to the border with Russia. Coastal cod persist off the belt of tangle kelp to deeper water, as deep as 500 m. In 1994 the populations exceeded 300,000 tonnes, but have since declined dramatically and is now at a record-low level. The International Council for the Exploration of the Sea (ICES) have recommended

total ban in the fishing later years, and the population is considered highly endangered (EN) on the Red List.

Norwegian spring-spawning herring (*Clupea harengus*) have a maximum age of about 25 years. The herring population consists of many year classes. This reduces the chances of rapid changes in the population as a result of one or a few unsuccessful year classes. The five coastal states EU, Norway, Russia; Iceland and the Faeroes, which manage the population cooperatively, agreed a long-term management strategy in 1999. The parties agreed in 2001 that quotas would be reduced whenever the spawning stock fell below 5 million tons. ICES have considered setting goals in the management plan in accordance with the precautionary principle. The spawning stock was estimated at ca. 11.9 million tonnes in 2008. This means that the stocks are at a level that is comparable with the 1950s (Ottersen & Auran 2007), and within secure biological boundaries. Growth in the population of Norwegian spring spawning herring continues, as a result of a combination of good conditions in the sea, a large spawning stock, and a well-functioning management plan.

ICES classifies the population of Norwegian autumn spawning herring in the North Sea and Skagerrak as being at risk of a reduced reproductive ability and at risk of being harvested unsustainably. The spawning stock in 2006 was considered below the precautionary principle. Since 2001, all age classes have been among the lowest since the end of the 1970s.

Seabirds

Norwegian coastal and ocean areas are among the most productive in the world, and the northern areas are especially important habitats for marine bird populations. An estimated 2.7 million pairs of birds breed along the Norwegian coastline. During 2004-2008, severe problems for breeding seabirds in the Northeast Atlantic were noted. First and foremost among these is poor breeding success, especially among fish-eating species. This is especially prominent in colonies in Mid-Norway and further northwards. Many links in the food chain in Nordic waters appear to have been broken. This has resulted in food shortage, which has led in turn to many birds failing to breed or abandoning breeding early in the breeding season. The number of breeding birds has decreased dramatically, and rearing of young has collapsed in many areas.

Table 4: Status of colony breeding seabirds (Norwegian Red List 2006)

Species	Category
Guillemot (<i>Uria aalge</i>)	CR
Northern lesser black-backed gull (<i>Larus fuscus fuscus</i>)	CR
Puffin (<i>Fratercula arctica</i>)	VU
Kittiwake (<i>Rissa tridactyla</i>)	VU
Steller's eider (<i>Polysticta stelleri</i>)	VU
Common tern (<i>Sterna hirundo</i>)	VU
Black-headed gull (<i>Larus ridibundus</i>)	NT
Tystie (black guillemot) (<i>Cephus grylle</i>)	NT

Climate driven changes in the sea are considered to be the basic explanation for this negative development. There is a need for systematic monitoring and knowledge building in this situation, and more than ever it is important to understand the other factors that affect seabirds negatively.

Overharvesting of seabird prey species is the most important anthropogenic factor. Other threats are acute oil pollution, environmental contaminants, by-catch of seabirds in fishing gear, introduced species, areal use, transport related disturbance, and the cumulative effect of these in combination with a change in the sea food-chain dynamics and increased climatically induced effects.

The Nordic countries have agreed to develop joint Nordic and national action plans for seabirds to obtain coordinated and trans-sectoral measures that can contribute to improving the situation for colony breeding seabirds. The Norwegian SEAPOP programme is a cooperation between management, research, and industry which will obtain and maintain basic knowledge on seabirds, in order to contribute to better management of the marine environment.

Mammals

Seal

The Harp seal (*Pagophilus groenlandicus*) is only found in the North Atlantic and three different populations or breeding areas are recognised. The largest population (ca. five million animals) lives in the north-western Atlantic and has its young on the drift ice off Newfoundland in Canada. In the Norwegian Sea the population of one year old and older animals is estimated at 618,000 individuals. The population of Harp seals in the Norwegian Sea has been harvested since the 1800s, and at times has been severely overexploited. ICES have recommended quotas in an attempt to stabilise populations at current levels. In recent years harvest has been below than the recommended quota.

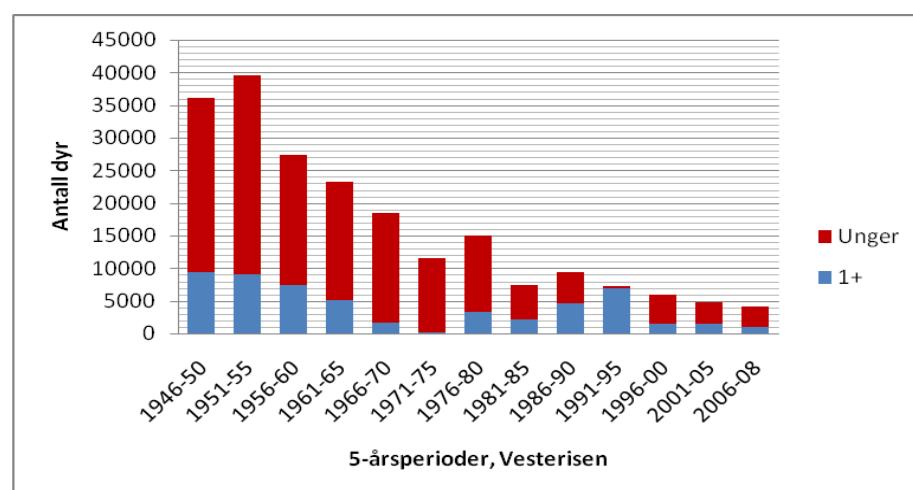


Figure 32: Development of average harvest of Harp seal on the western ice (red = young; blue = age 1+)

The Hooded seal (*Cystophora cristata*) is found only in the North Atlantic, and one of three populations is found in the drift ice in the Norwegian Sea north of Jan Mayen. Populations are lower than those of Harp seal and were estimated at 71,400 individuals in 2005, a decline from 1997. Since 2007 ICES has therefore recommended that trapping of Hooded seals should not be permitted on the western ice (Haug 2008).

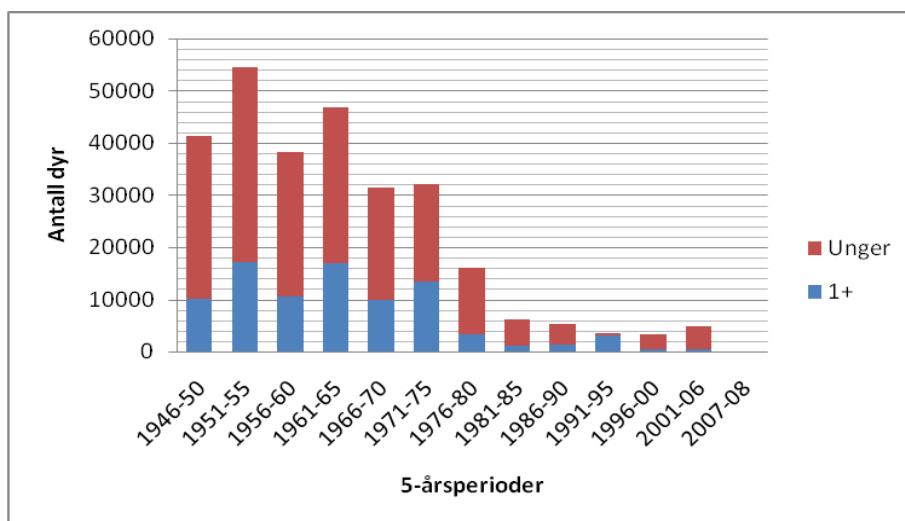


Figure 33: Average harvest (in 5 year periods) of Hooded seals on the western ice, taken by Norwegian and Russian seal trappers in the period 1946–2008 (red = young, blue = age 1+)

The Grey seal (*Halichoerus grypus*) is mainly distributed along the Norwegian coast. The Common seal (*Phoca vitulina*), which is also a coastal species, is also found in very limited numbers on the west coast of Spitzbergen. A study of Grey seals in 2001-2003 indicated a Grey seal population of 4,600-5,500 individuals aged 1 year or older. Counts of moulting Common seals during 1997-1999 provided the basis for a population estimate of between 10,000 and 12,000 animals. Both species may be hunted in Norway. From 2003 the quota has been set considerably higher than the researcher's recommendations, but the quotas have not been attained. From 2006 a bounty has been introduced. There are signs of a reduction in the population of Common seals and this species is classified as vulnerable (VU) on the Norwegian red-list.

Whales

The Minke whale (*Balaenoptera acutorostrata*) is the only species of whale harvested in Norway (Ottersen og Auran 2007). The north-eastern Atlantic population, inhabiting the areas east and north of Cape Farewell, has an estimated population of 184,000 animals, based on counts made in 1995. The Minke whale is a species with a relatively long life cycle and is therefore not expected to be vulnerable to large variations in population and recruitment over time frames shorter than 5-10 years (Øien 2008).

The Bowhead whale (*Balaena mysticetus*) has been harvested since the 1600s; the original pre-hunting population is estimated at over 50,000 individuals in the area between eastern Greenland and Franz Josef's Land (Dutch whaling at Spitzbergen from 1650-1750 harvested over 57,000 animals (Torkildsen et al 1991)). There is now only a small relict population (assumed to be less than 50 reproducing individuals) remaining in this area. As the species is associated with ice filled waters, a temperature increase which forces the ice edge further northwards may lead to extinction in this area. The population is classified as critically endangered.

The Blue whale (SCIENTIFIC NAME) was previously heavily harvested; today there are probably between 1,000 and 2,000 individuals in Norwegian waters. The species is listed as near threatened (NT).

1.7.3 Alien invasive species

King crab

The Alaskan king crab (*Paralithodes camtschaticus*) was caught in the Norwegian zone for the first time in 1976 (Varangerfjorden). Russian researchers intentionally released the crab a number of times in the Russian part of the Barents Sea in the 1960s. To date it has spread west along the Finnmark coast to a point west of the North Cape (fig. 34). The natural range of the species is the Bering Sea and northern Pacific. In the Russian zone the crab has a considerable pelagic distribution, while on the Norwegian side it appears to stay closer to the coast. Studies of larval crab temperature tolerances indicate that the king crab can establish itself in areas further south and further north than had been assumed.

The king crab affects the bottom-dwelling fauna in areas where it is numerous, but to date the scope of these effects have not been surveyed to any extent (Sunnanå et al., 2009). It is for the moment too early to say whether the crab will inflict irreversible changes in the species composition of the bottom fauna.

A management regime for king crabs in the Norwegian zone was introduced in June 2008. The goal is to maintain a harvestable population of the crab in a limited area of eastern Finnmark. Outside this area the harvesting is unregulated, with the main aim of maintaining the population at as low a level as possible.

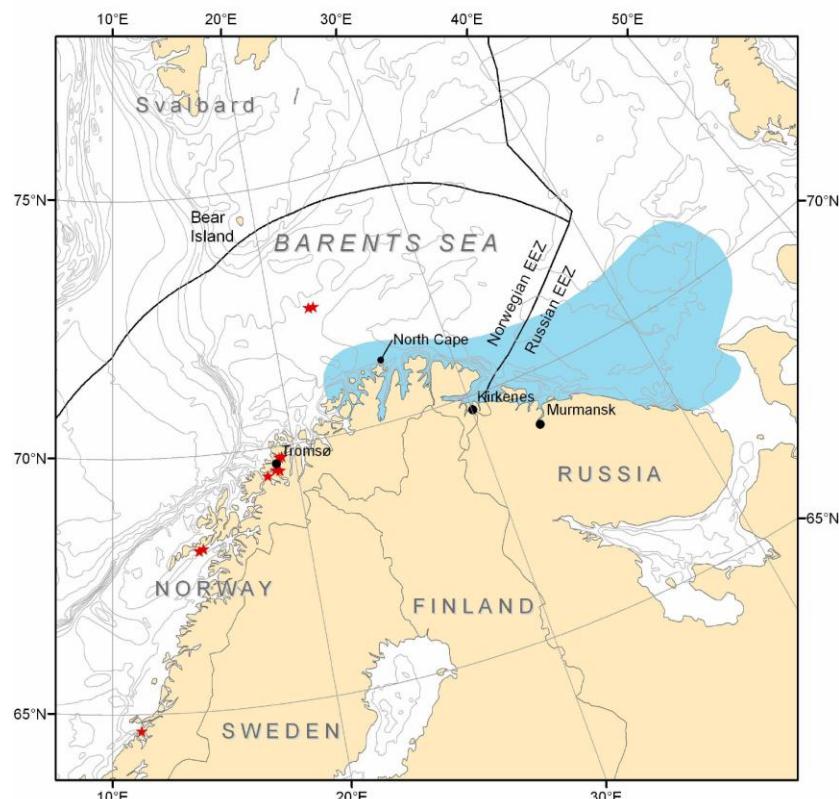


Figure 34: Distribution of Alaskan king crab in the Barents Sea as of January 2008 (blue area), and isolated records (red stars)

Snow crab

The Snow crab (*Chionoecetes opilio*) is an introduced species found in the Barents Sea, first observed by Russian researchers in 1996 near the Goose Bank in the Russian zone. It is uncertain how it was introduced to the Russian zone and whether it was introduced via ballast water or whether it migrated in from the Bering Sea north of Siberia. The first reports of Snow crab in Norway were made off Finnmark in 2003. It has since spread westwards (Sunnanå et al., 2009) and is greatly expanding its range in large parts of the Barents Sea. The species appears to have a more northerly distribution than the king crab and it is considered probable that the species will be able to establish populations as far north as Svalbard (Sunnanå et al., 2009).

The Snow crab's diet consists mainly of bottom-dwelling animals such as crayfish, mussels, and brittle stars. It is itself food for fish such as cod and wolf fish. Any effects caused by the species are expected to primarily affect the bottom fauna.

1.8 Arctic ecosystem

Norway has a high arctic ecosystem that differs in many respects from other main ecosystem definitions. Even though the northern part of the Norwegian mainland may in many ways be defined as arctic, it is nevertheless the Svalbard archipelago in the northern Barents Sea and the surroundings that clearly fits the definition and should be managed separately.

The terrestrial ecosystem on Svalbard is closely connected to the Barents Sea ecosystem and is therefore in many ways a part of it. The land area in itself is of very low productivity and the life there depends mainly on the more productive marine area, and on the secondary effects of the flow of nutrients carried on-shore by animals, mainly by seabirds.

Svalbard has rather limited impacts of industry, tourism, and settlements of permanent residents compared to the Norwegian mainland. Wilderness areas therefore still characterize Svalbard. The Norwegian goal is to protect this pristine quality. This also applies in principle to the resources in the surrounding seas; however, the sea areas are not under a management regime that can safeguard this environment to the same degree. Of 212 species evaluated on Svalbard, 70 are on the Norwegian red-list.

1.8.1 Distribution of sea ice

The sea ice and the ice edge in the Barents Sea are very important for the ecosystem in the northern arctic. Observations over the last two decades, and projections and modelling of the distribution of sea ice in the coming decades, show a clear and unambiguous reduction. The models show an ice-free Arctic Ocean basin in summer within a relatively few decades. In September 2007 a preliminary minimum figure for the extent of circumpolar sea ice of 4.3 million km² was recorded. September 2008 showed a small increase compared with the year before, but the observation nonetheless strengthened an observed trend towards a strong decline in summer ice in the last 30 years. The minimum in 2007 was 39 % lower than the average extent during the period 1979-2000 (National Snow and Ice Data Centre).



Figure 35: Distribution of sea ice in September 2008 where the ice covers an area of 4.7 million km² (NASA)

The same negative trend is observed in the Barents Sea (fig. 35). During April, usually the month with the greatest extent of ice in the Barents Sea, time series from 1976-2006 show a negative trend. In August, which with early September often has the seasonal minimum, time series also show a negative trend for this period. The decline from 1979 to 2007 is about 23 % per decade for area with over 30 % coverage of ice. Towards the end of this period, the whole area has been without pack ice or dense drift ice.

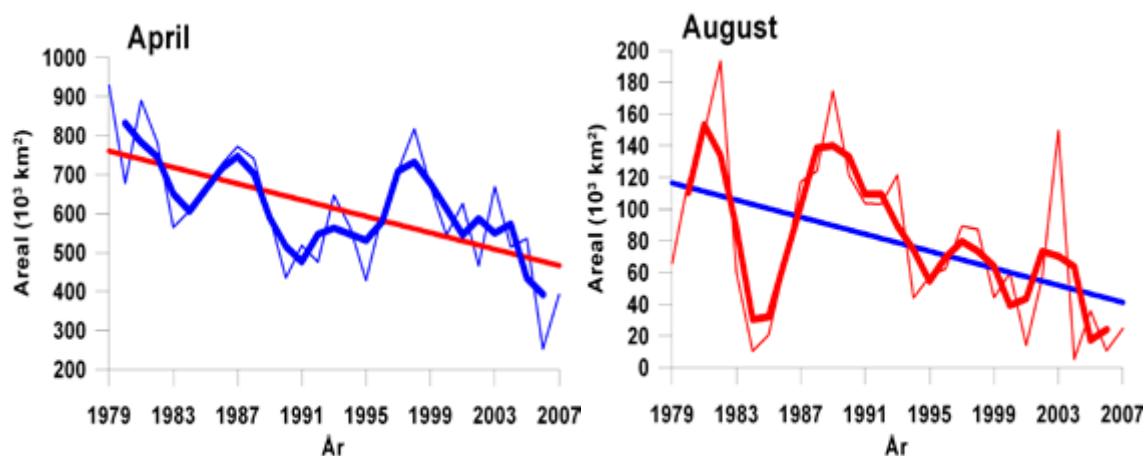


Figure 36: Trends in extent of ice in the Barents Sea in the period 1979-2007. The extent of ice is measured as areas with coverage of over 30%. The thin blue line shows annual median values, the thick blue line indicate a running 3-year median; and the thick red line the trend (Barents Sea monitoring group 2008)

Changes in the geographic distribution and timing of sea-ice melting in spring coincide with minimal ice coverage observed in the Barents Sea in recent years. This has great importance for primary production since melting creates a stable surface layer that is a precondition for the spring bloom of phytoplankton at the ice edge. Relatively large movements of the ice edge northwards before the spring bloom, as observed in 2006, may alter primary production in the area.

1.8.2 Biological diversity in the Arctic

Colony breeding seabirds

The most numerous colony-breeding seabirds in the Norwegian arctic are the Common guillemot (*Uria aalge*), Brünnich's guillemot (*Uria lomvia*), Kittiwake (*Rissa tridactyla*) and Little auk (*Alle alle*). There is no good monitoring method for Little auks, but all indications are that the population in Svalbard is stable.

Common guillemot

The Common guillemot (*Uria aalge*) is distributed north to Bear Island 74.5°N. The colony on Bear Island is by far the largest in Norway and the Barents Sea. Before 1986 the breeding population was estimated at ca. 245,000 pairs. In the 1986-1987 season the breeding population collapsed by 80-90 %. The main cause of the decline was lack of food. The guillemot is a dietary specialist that, on Bear Island, lives almost entirely on Capelin (*Mallotus villosus*) in the breeding season. Capelin declined greatly in the 1980s due to overfishing. The guillemot population has increased significantly afterwards and is expected to be at pre-1986 level soon.

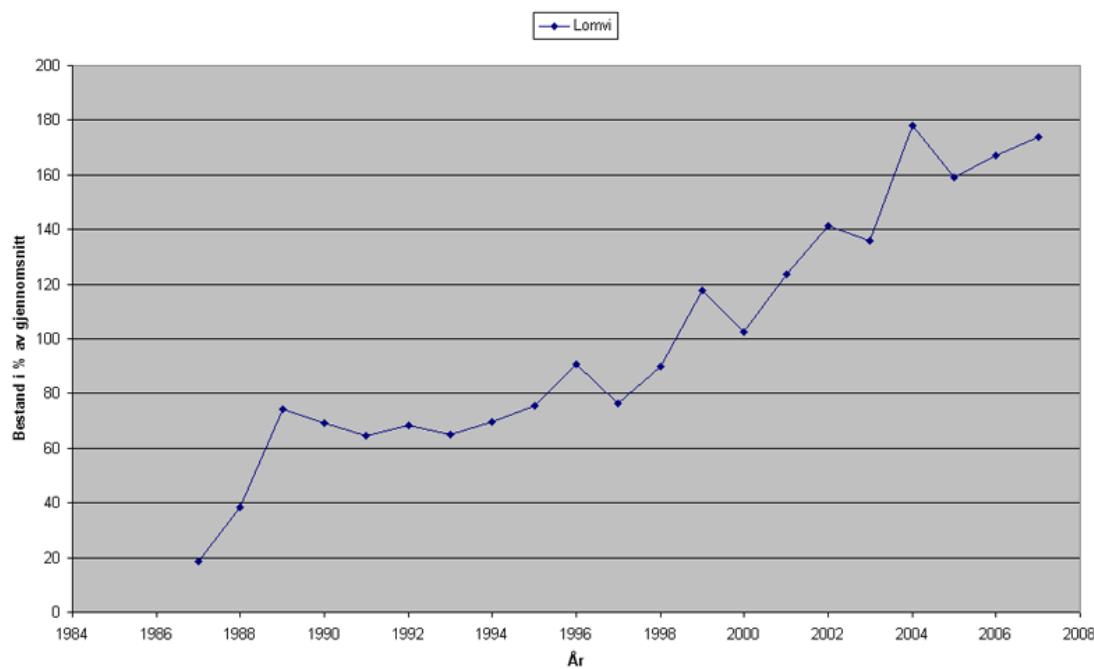


Figure 37: Population of Common guillemots on Bear Island

Brünnich's guillemot

Brünnichs guillemot (*Uria lomvia*) is the second most common auk in Svalbard, after Little auk. Brünnichs guillemot breeds over large parts of the archipelago, but has its major concentrations on Bear Island, Hopen, and in the Storfjorden area (together over 70 % of the population). The population in Svalbard is estimated at over 850,000 breeding pairs. Brünnichs guillemot comprises the largest proportion of the seabird biomass in the Barents Sea (over 60%). It is a generalist, and the

species is an important predator of Capelin, Arctic cod (*Boreogadus saida*), pelagic amphipods, and krill.

Population monitoring on Spitsbergen indicates relatively large annual variations in the breeding population. The population on Bear Island has shown a significant negative trend over the period. This, however, applies in the study areas where the guillemot shows a complementary positive trend. Overall, monitoring in Svalbard indicates a stable, or for certain colonies, weak negative population trend.

Kittiwake

The Kittiwake (*Rissa tridactyla*) breeds all over Svalbard, but has its main concentrations on Bear Island, Hopen, and in the Storfjorden area (together over 60 % of the population). The total population in Svalbard is estimated at c. 270,000 breeding pairs, and the species comprises ca. 13 % of the seabird biomass in the Barents Sea. The Kittiwake population on Spitsbergen and Bear Island is stable, after having declined in many areas at the end of the 1990s; the species is in decline on the mainland. The Kittiwake accounts for ca. 11 % of the total consumption of food by seabirds in the same area. The Kittiwake feeds at the sea surface and the most important prey are younger year classes of Capelin, Arctic cod and crustaceans.

Polar bear

The Polar bear (*Ursus maritimus*) in Svalbard is a part of a larger Barents Sea population that Norway shares with Russia (fig. 38). Population estimates are available from 2004, based on a comprehensive population count carried out by collaborating Norwegian and Russian researchers. This estimated the population at 2,644 individuals (95 % CI: 1899-3592). Prior to this period, only estimates based on observations from boats or from den counts are available. These estimates vary widely and during 1980-1983 estimated population in Svalbard alone at 1,700-2,000 and 3,000-5,000 for the area from eastern Greenland to the western Russian arctic. These estimates are not scientifically based and cannot therefore be compared with the 2004 estimate. There is therefore no quantitative trend data available. A new count and population estimate is planned for 2010.

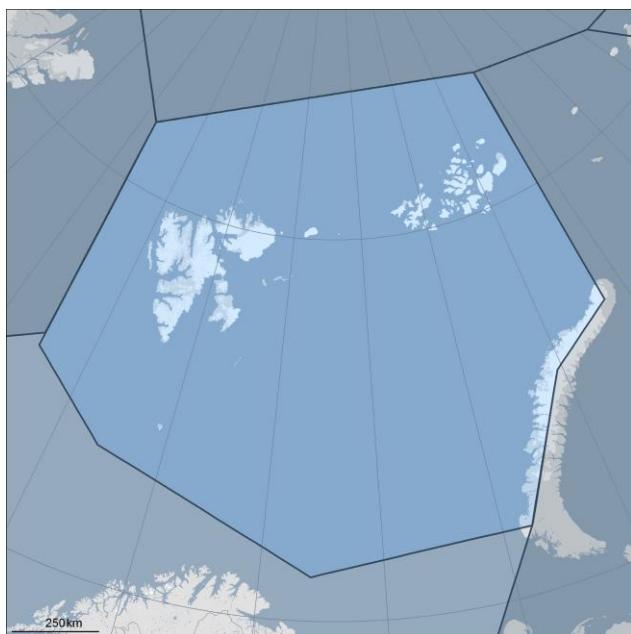


Figure 38: Limits of the Barents Sea population of Polar bear (IUCN/Polar Bear Specialist Group)

Svalbard reindeer

The Svalbard reindeer (*Rangifer tarandus platyrhynchus*) is one of seven surviving subspecies of wild reindeer in the circumpolar area (originally nine subspecies). It is only found on the Svalbard archipelago. The population was greatly reduced and partly extinct on the archipelago due to hunting until the Svalbard population became legally protected in 1925. There is no estimate of the total population in Svalbard today, as there have not been adequate systematic attempts to count the species. Conservative estimates based on very uncertain data from the 1980s-1990s vary from 8,500-11,000 animals (Hindrum et al 1995, and Environmental Information Svalbard 2000).

The number of reindeer in Svalbard is affected today largely by natural factors, except for six defined areas on Nordenskiöld Land (central Spitsbergen) where limited hunting is permitted at levels that are not presumed to affect the species' natural productivity, diversity, and distribution. Regular counts are conducted in the six hunting areas and in the subpopulations on the Brøgger peninsula, in Reindalen and in Adventdalen. Evidence indicates that the total population continues to increase but that it has not yet reached the original numbers seen before humans discovered Svalbard.

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Chapter II – Norway’s action plan for the Convention on Biodiversity with focus on sectoral integration – actions and status

Norway’s action plan for the conservation of biodiversity was presented to the Norwegian parliament in the form of a white paper. The white paper is a political tool for use in Norway’s efforts to follow up the Convention on Biological Diversity. Parliamentary report 42 (2000 – 2001) *Biological Diversity – Sectoral Responsibilities and Integration* is the national strategy and action plan (NBSAP) for Norway. Its subtitle is a direct reference to Article 6 of the convention, which states that all sectors must take responsibility for integrating biological diversity considerations into their administrative tasks. Hence, 16 Ministries and the Sámediggi (Saami parliament) were actively involved in the preparation of the plan.

The Norwegian NBSAP Parliamentary Report 42 (2000 – 2001) has been further amended in other relevant reports to the Parliament; *The Government’s Environmental Policy and the Environmental State of the Nation* (Parliamentary Report 21 (2004-2005) and Parliamentary Report 26 (2006-2007)). These three reports set the framework for Norwegian biodiversity policy and define national goals for sustainable use and conservation of biological diversity, and for genetic resources.

In accordance with commitments made under the Convention on Biological Diversity, it is the government’s vision that Norway, through national action and international cooperation, will contribute to:

1. safeguarding the world’s biological diversity,
2. making use of the values associated with biological diversity to the benefit of human society as a whole,
3. ensuring that benefits and burdens of the measures are equitably distributed within and between different generations and communities

Norway is only directly responsible for managing a small fraction of the world’s overall biological diversity, but the species and ecosystem diversity found in the country are important and in some cases unique both in the Nordic region and globally. Norway also manages some of the most productive marine areas in the northern hemisphere. The national policy ensures that Norway assumes its share of the global burdens, as the principle of conservation and sustainable use of biological diversity set out in the Convention requires. Action at national level to follow up on the Convention is of crucial importance for development opportunities and economic growth in Norway, for the quality of people’s lives and for their welfare.

Strategic objective:

The environment shall be managed in a way that maintains the diversity of habitats and landscape types and ensures that there are viable populations of naturally-occurring species: this will ensure that biological diversity can continue to evolve. Norway aims to halt the loss of biodiversity by 2010.

National targets:

1. A representative selection of Norwegian habitats will be protected for future generations;
2. Major disturbance such as infrastructure development will be avoided in endangered habitats, and in vulnerable habitats important ecological functions will be maintained;
3. The cultural landscape will be managed in such a way that biological diversity, the historical and aesthetic value of the landscape, opportunities for experiencing it and its accessibility are maintained;

4. Harvesting and other utilisation of biological resources will not cause species or populations to become extinct or endangered;
5. The human induced spread of organisms that do not occur naturally in ecosystem will not damage or limit ecosystem functions;
6. Populations of endangered species and species for which Norway has a special responsibility will be maintained or restored to viable levels;
7. The needs of future generations will be taken into account when managing soil resources that are suitable for cereal production.

The government recognises that the objective of a strategy that requires a cross-sectoral approach must be to reduce losses of biological diversity effectively. This means that the various tasks must be put in order of priority and that actions required to achieve specific goals must be practical and cost-effective.

Major challenges

The Government's vision, targets and analysis of the strategy for the conservation and sustainable use of biological diversity provide a basis for identifying the following seven challenges.

1. Identifying cross-sectoral and sectoral responsibilities and coordinating the use of policy instruments
2. Coordinating and improving knowledge of biological diversity
3. Ensuring sustainable use of biological resources
4. Avoiding the undesirable introduction of alien species
5. Ensuring sustainable land use
6. Avoiding pollution
7. Enhancing international cooperation
8. Ensuring nature diversity as a foundation for Saami Culture

2.1 Identifying cross-sectoral and sectoral responsibilities and coordinating the use of policy instruments

2.1.1 Cross-sectoral and sectoral responsibilities

All authorities, industrial sectors and other relevant players must play their part in efforts to ensure the conservation and sustainable use of biological diversity. The ministries are responsible for integrating biological diversity concerns into their administrative responsibilities and for encouraging subordinate agencies, industrial sectors and NGOs in areas related to their spheres of responsibility to follow up on the national targets for biological diversity. Examples of The Ministries' integration of the environment/biological diversity in strategies and practical measures are presented in chapter III.

The following principles and responsibilities are intended to apply to the central government administration in its efforts to ensure the conservation and sustainable use of biological diversity (Parliamentary Report 42 (2000 - 2001)):

1. Each ministry shall maintain an overview of the environmental impact of activities within its field of responsibility, and shall survey and monitor biological diversity in accordance with the national programme.
2. In principle, each ministry is administratively and financially responsible for action within its own sphere of responsibility. This must be explicitly laid down wherever the ministry's authority is exercised and includes action to ensure the conservation and sustainable use of

biological diversity, preventive measures, restoration, and the mitigation of adverse effects on biological diversity associated with activities within the ministry's sphere of responsibility. Every ministry is expected to follow up these requirements.

3. The ministries shall actively seek cross-sectoral cooperation in order to make the conservation of biological diversity more effective and to make joint efforts possible. Any agreements on cooperation frameworks or the division of responsibility shall be financially binding.
4. Wherever possible, the responsibility for action shall be delegated to the local level. This will make it possible to take local decisions and priorities into account within the framework of national targets and priorities.
5. Each ministry is expected to provide reports and other information on environmental trends and impacts and on the costs of planned or implemented actions included in the annual budgets within their respective sphere of responsibility.

These principles are primarily intended to apply to current and future instruments and activities. However, vulnerable elements of biological diversity may also be associated with areas where land use practises have changed. The national programme to survey and monitor biological diversity should help to improve our knowledge of such areas and identify cases where they should be evaluated separately so that their value for vulnerable elements of biological diversity is maintained or restored.

Norwegian Saami policy: The basis for the Government's Saami policy is that, as a state, Norway was established on the territories of two peoples, Norwegians and Saami, and that both these peoples have the same right to develop their cultures and languages. Consideration of Saami interests shall be included in the development of policies in relevant areas. Ensuring nature diversity as a foundation for Saami Culture is hence an important aspect of Environmental governance. The Ministry of Labour and Social Inclusion (the Department of Saami and Minority Affairs) is the central administrative and coordinating organ concerning Saami issues. The Ministry shall work to make conditions favourable for the Saami people for the further development and strengthening of their culture, their language, their industrial and community life. In this perspective, the Ministry of Labour and Social Inclusion has the main responsibility for developing and maintaining an overall governmental policy towards the Saami people in Norway. In this regard it cooperates with other ministries such as the Ministry of Environment.

2.1.2 Integration of resources

2.1.2.1 Legal resources

The Convention on Biological Diversity provides a new international framework for comprehensive management of biodiversity. It is the first major international environmental protection agreement that clearly focuses on the links between the use and conservation of biodiversity and on the equitable sharing of its benefits.

In order to ensure that the Norwegian legislation reflects this, in 2001 the government established a committee to consider new Norwegian legislation for biodiversity and commissioned a report in this regard. The committee provided their conclusions and recommendations in an Official Norwegian

Report (NOU) in December 2004. Following this the Ministry of Environment has led and coordinated the work and completed a new Act on nature management.

The CBD has also had bearings for the development and updating of sectoral legislation.

Nature Management Act

The Nature Management Act was presented to the Parliament in spring 2009. The Act will apply to all biological diversity, i.e. for ecosystems, natural habitats, species, and genetic diversity within species' populations as well for landscape and geological diversity. The Act has regulations on knowledge-based management; about which species and habitats are most important for conservation.

The Act has important supplements to existing legislation; General rules for invertebrates and plants, common management objectives and principles for sustainable use, common rules for harvesting of biological resources, common rules for invasive alien species and a new set of regulations on access and benefit-sharing related to genetic resources

The Act will imply that all sectors that affect or exploit natural resources must put emphasis on common objectives and principles (i.a. precautionary principle, cumulative impacts, principle of payment for affecting the environment (based on polluter pays principle)), as well as minimize negative impacts on biodiversity. The Act puts emphasis on nature's dynamics and the need for differentiated measures (including legislation and economic incentives) in order to reach the national target to halt the loss of biological diversity.

Through the process of developing the Act there has been extensive cooperation with all relevant economic sectors and stakeholders. A consultation process with the Saami Parliament was included as part of this process.

"A consultation process with the Saami Parliament was included as part of this process":

The consultations were concluded by the end of 2008. After several meetings, the Government and the Sami Parliament achieved agreement, and in a plenary session in November 2008 the Sami Parliament endorsed the Act.

Central topics in the consultation process have been as follows:

- Ensuring Sami culture is one of the objectives of the Act.
- The authorities shall gather traditional knowledge, innovations and practices before making administrative decisions under the provisions of the Act.
- Substantial weight shall be given to Sami interests when a measure under the provisions of the Act is being considered.
- The principle of consultations will not be reflected in the Act.
- Provisions concerning commercial and other utilization of genetic resources ensure indigenous peoples and local communities rights to access and benefit-sharing.

Planning and building Act

According to the Planning and Building Act it is the local authority (municipality) in the first instance that, through the planning process, shapes the physical environment and ensures that standards of construction and the application of conservation measures conform to local conditions and requirements. Each individual municipality is responsible for specific planning projects (municipal, regulatory, building and development) in accordance with the legislation. In the planning process, the local authorities must follow guidelines and targets set by government agencies and county councils. It is up to these bodies to ensure that important national and regional considerations at any given time are taken into account in the planning process.

Management of Wild Marine Resources Act

The Act came into force in 2009, and includes all wild living marine resources and their genetic material. The purpose of the Act is to secure a sustainable and socio-economically profitable management of wild marine resources and associated genetic material and to contribute to securing employment and settlement in coastal communities. A central element in the Act is that management is now required to regularly assess the management measures necessary to secure sustainable management.

The Aquaculture Act

Processes on the environmental side are collected in their own chapter and the Act has clearer guidelines for the adaptation of aquaculture to the environment. It is now required that the activities of enterprises must, through their entire lifetime, be environmentally justifiable. This implies that the company must not at any time have appreciable negative consequences for the surrounding environment and wild organisms

2.1.2.2 Economic incentives

Until now, there has been little emphasis on economic instruments as a means for safeguarding biological diversity in Norway. However, use of such incentives in other contexts is a familiar and important tool for example in pollution control policy and in agricultural sector, where environmental taxes, grants and subsidies are used to provide economic incentives for environmentally sound operations. The market rarely reflects the real value of biological diversity, and there has been little integration of biodiversity concerns into the economy (See also 3.2 Ministry of Finance).

The Norwegian Government has strengthened research, mapping and monitoring of biodiversity during the past years and greatly increased this component in the Governmental budget of 2009. Since 2005 funds related to biodiversity has increased by 40 % and totals more than 1 billion Norwegian kroner (NOK). In 2008 a Nature index for Norway was developed and will be implemented from 2010. This index will show the overall status of Norwegian nature and will be a tool to measure the success of international targets. Norway is also a partner in the European Environmental Agency (EEA) cooperation to report on biodiversity indicators (SEBI2010) that is a Pan-European follow-up of the CBD indicators. Several national programmes are initiated to increase the further contribution to research, mapping and monitoring of biological diversity (National Program, MAREANO, SEAPOL, the Species Map Program, the Species Observation Program, the Nature Database, Environment 2015, and the Saami research programmes "Àrbediehtu" and "EALÁT", etc.), and also international cooperation and several species-specific projects.

2.1.2.3 Information

Information is an important tool, and each sector is supposed to take responsibility for making their knowledge available, followed up with guidance for use by their own sectors and for related target groups. The Ministry of the Environment has close collaboration with other Ministries, especially in cases where the responsibility for species and natural habitats is divided between Ministries. Examples of processes where more binding commitments to interministerial cooperation on communication processes are the work related to *Intersectoral National Strategy for Invasive Alien Species*, produced in 2007 (see Chapter 2.4) and through the *National Programme for Mapping and Monitoring of Biological Diversity* (see Chapter 2.2), which has been under way since 2002. The Ministry of the Environment coordinates the interministerial committee that leads this work. The committee has decided that a common communication strategy is to be developed for the task, which will present results from projects in the programme on a common platform.

Children and young people will be tomorrow's users and managers of biodiversity, and are therefore a particularly important target group. It is important that an effort is made to develop knowledge and information for educational purposes at each stage through primary, middle, and high school. The Ministry of the Environment works closely with the Ministry for Education and Research on the internet-based educational resource *Network for Environmental Studies*. The *Network for Environmental Studies* is a part of the Norwegian follow-up to the UN decade of education for sustainable development. The website *Sustain* (Environment studies; see box below) is an example of interministerial environmental protection cooperation aimed at children and young people, as the future managers of biological diversity. The project *The Natural Schoolbag* (TNS), which was set up in 2008, is intended to contribute to developing curiosity about and knowledge of nature and of sustainable development, and to increase environmental engagement among all students and teachers in primary schools. *The Natural Schoolbag* forms part of a cooperation between the Ministry of the Environment and the Ministry of Education and Research. In 2009 a pilot project was begun, initially in three counties and ten municipalities.

Sustain.no

Sustain.no is a tool for teaching in sustainable development. The website contains activities which children can carry out in their own neighbourhoods. The network was established in preparation for cooperation between schools, research institutions, and voluntary organisations. The schools can access information, and contribute information that may be of mutual benefit.

Through uploading results to the website, schools can contribute data which is both useful for the school itself, and for other schools, environmental management authorities, and researchers. Sustain.no is a teaching aid that supports teaching in sustainable development for all classes from primary school to the end of high school. It can also be used within higher education. The activities describe among other things how schools can cooperate with local management and research institutions in order to investigate, protect, or improve their local environment.

Link: <http://sustain.no/> Norwegian version: <http://www.miljolare.no/>

The Ministry of the Environment shall, through its communication strategy, seek to increase interest in environmental questions, and motivate the various sectors of society to pay regard to environmental issues. The Ministry will communicate environmental knowledge to the public in a professional manner, and assist those who would like information on the Ministry's work. There shall be at all times good access to environmental information. The media and internet are two important information channels. A great deal of environmental information is made available through nature management websites.

The most important target group for Ministerial communication is the general public. The goal is that the whole population will know about the most important decisions the Ministry takes. More specific target groups are those directly affected, such as local counties, companies, organisations, and directorates and other Ministries, both nationally and internationally.

Information is also central in 2.2.3 Research and evaluation.

Postcard initiative

In 2008 the Ministry of the Environment sent, on behalf of the Environment Minister Erik Solheim, a postcard to each of the 430 municipal mayors in Norway. The postcard shows a picture of a threatened or near-threatened species that has been recorded in the county. The text explained the goal of halting the loss of biodiversity by 2010, and the mayor was challenged to take care of the county's biological diversity in general and in particular the species on the card. Good media coverage was arranged. A considerable part of the information campaign consisted of web pages that showed all the species classified by municipalities. As of February media coverage of the story continues and there have been about 150 articles in internet newspapers, in addition to coverage in printed newspapers and on radio and TV. The campaign will be followed up in 2009 with a conference for, among others, local municipalities and NGOs, where engagement and positive ring-fencing around the municipalities' biological diversity will be the main focus.

Link: <http://www.dirnat.no/content.ap?thisId=500035081>

The climate information campaign *Klimaøftet* coordinates the governments' collected climate information aimed at the general public. A range of joint projects will be set up, and comprehensive national information measures developed, in accordance with the Climate Agreement.

2.1.2.4 Cooperation with NGOs

NGOs are important participants in the work involved in meeting the challenges related to implementing the Convention on Biological Diversity. Through their activities and participation in societal debate, these organisations contribute positively to the work of protecting biological diversity. The organisations are central players in teaching and guidance work. The expertise that the organisations have is useful for local authorities' tasks of recording and mapping biological diversity. The voluntary organisations also have a role as a platform for the general societal interest in local planning processes, and other political decision-making processes.

Conservation and sustainable use of biological diversity is an important issue for a number of the voluntary organizations, including the Norwegian Society for the Conservation of Nature/Friends of the Earth, the Norwegian Association of Hunters and Anglers and the Norwegian Council for the

Conservation of Biodiversity (SABIMA). The kind of work these organisations do can be exemplified by SABIMA, which mainly focuses on biological diversity. This is an umbrella organisation for 13 societies in the field of biology, with about 15 000 members and includes most of Norway's biological expertise. SABIMA has for example run 10 regional courses that provided theoretical and practical training in surveying and evaluating biodiversity for the Directorate for Nature Management. They were intended as a supplement to the directorate's manuals for the municipal programme to survey biological diversity and identify and classify its value. SABIMA's other activities include registering biodiversity and taking part in Local Agenda 21 processes, and it plays an important role as an environmental NGO and as a source of expertise for various sectoral authorities organizations and business and industry.

The environmental management authorities give basic financial support to the voluntary organisations to enable spreading of knowledge and engagement about biological diversity.

2.2 Coordinating and improving knowledge of biological diversity

Establishment of a knowledge-based management system for biological diversity is central to the work of halting the loss of biological diversity. Responsible management of biological diversity requires a good knowledge base. Data on what exists, how biological diversity values are distributed geographically, and what affects diversity are necessary for the management system to function. The knowledge base is strengthened if an integrated effort in mapping, monitoring, and research is in place. It is as important to improve decision makers' and the authorities' access to knowledge.

The Norwegian Biodiversity Information Centre

The Norwegian Biodiversity Information Centre (NBIC) was set up in 2005 as a result of Parliamentary Report 42 (2000-2001) *Biological diversity, Sectoral responsibility and integration*. The Government's main initiative in this report was the foundation of a new management system to hinder the unnecessary loss of biological diversity. The NBIC is a national knowledge source for biological diversity in Norway, where the most important role is to supply the society with updated and easily accessible knowledge on species and natural habitats. There is information and data of great use to society in journals and databases held by museums, research institutions, management organs, and voluntary organisations. The NBIC has the role of making this knowledge visible and accessible. The NBIC is working closely with professional and voluntary biological institutions to obtain knowledge for our users and target groups.

Link (English): <http://www.biodiversity.no/frontpage.aspx?m=23>

2.2.1 Mapping and monitoring

Strengthened mapping and monitoring both on land and sea are a prerequisite for reaching the goal of halting the loss of biological diversity by 2010. Knowledge-based management makes it easier for decision makers to weigh up various relevant factors. The time frame for demonstrating negative or positive changes in the state of the environment is 5-30 years. It is therefore necessary to secure continuous and long-term monitoring even after 2010.

National programme for mapping and monitoring of biological diversity

As a direct result of Parliamentary Report 42 (2000-2001) *Biological diversity. Sectoral responsibility and integration*, a *National programme for mapping and monitoring of biological diversity* has been established. Under the leadership of the Ministry of the Environment, all seven Ministries (MD, LMD, FKD, FD, SD, OED, KD) have cooperated to obtain better integration of mapping and monitoring which is relevant to biological diversity, and to establish new activities where the data basis is insufficient. The programme will contribute to a coordinated effort to collect knowledge on biological diversity, so that Norway can to a greater degree manage nature in accordance with the goal of sustainable use and protection of biological diversity. The goal is to provide information on the location and value of important areas for biodiversity, changes in biological diversity over time, causes of changes, recommendations for appropriate measures, and to assess the effectiveness of measures. It is a requirement that results will be included in national reporting from the sectors via systems for results validation, and in Norway's international reporting.

The first part of the programme took place in 2003 – 2006 and the second will take place in the period 2007 - 2010. The first programme period was used mainly for mapping and methodological development, while more emphasis is placed on monitoring in the current programme phase. The work has been addressed towards the coastal and marine areas, cultural landscape, forest, and freshwater natural habitats, together with threatened species, threatened natural habitats, and exotic species. In addition, data integration and biological information with regard to impact assessments, has been assessed. Mountain, bog, and marsh natural habitats will be covered later. The national programme has generated large amounts of geolocated data. 50 000 data sets on natural habitats from 400 local counties are available to all at www.naturbase.no. Mapping will continue and will be supplemented with monitoring systems for biological diversity.

Link: <http://www.dirnat.no/content.ap?thisId=500030825>

Guidance material for mapping has been developed, which initially covers 56 especially important natural habitats. Twenty percent of these natural habitats have already been surveyed (see Chapter I). Mapping of natural habitats shall, with other records, provide the basis for identifying the locations of all the most important areas for biological diversity.

Another area of activity required to attain a satisfactory survey at the natural habitat level, is mapping of marine habitats. This is a necessary measure to obtain oversight over all major Norwegian ecosystems and take into account national goals. Furthermore, it will be necessary to make a considerable effort to survey locations where threatened and vulnerable species are found.

Data located in, among other places, universities, other R&D institutions, voluntary organisations and management will be made available through common information channels to all relevant users. Easy access to biodiversity information is a prerequisite for knowledge-based management of biodiversity.

2.2.1.1 Sectoral measures

The national monitoring programme for predators (lynx, wolverine, bear, wolf, and golden eagle) was established in 2000. The programme is regularly updated with regards to both content and methodology. In recent years DNA analysis of biological material has been implemented as a monitoring method, as a permanent supplement to more conventional monitoring. DNA-analyses are largely used in monitoring of wolverine, bear, and wolf but currently to a lesser degree for lynx and golden eagle.

In order to contribute to the implementation of the precautionary principle and the ecosystem approach in management of marine ecosystems, contributions are made continuously to increase mapping of marine natural habitats. Through the *National Programme for Mapping and Monitoring of Biological Diversity*, a systematic mapping of the coastal zone in Norwegian local counties has been set under way. Similarly, a systematic mapping of the ocean bed in Norwegian sea areas through the mapping programme MAREANO is underway.

As a subsidiary project of the national project for mapping and monitoring, *Sub-project exotic species*, surveys of exotic species in Norwegian nature will be undertaken in order to provide recommendations for monitoring of these species.

In order to secure a sustainable management of living marine resources, annual monitoring of the most economically important fish populations in Norwegian coastal waters are undertaken. Based on the background of the management principles in the Sea Resources Act, systems of monitoring of all species that are harvested are now being established, among other ways through the systematic collection of data from commercial fishing.

A number of programmes monitoring pollutants in the marine environment are underway, including monitoring of wild shellfish along the coast. Background levels of pollutants in selected fish have been recorded since 2007. The results of monitoring are reported internationally, among other means through an annual status report on coastal and sea areas. Work is being developed on estimates of continuous emissions from the oil industry and of soluble components in industrially emitted water and their effects on marine organisms, especially fish.

The improved mapping of valuable cultural landscapes in active agricultural use provided by participation in the *National programme for mapping and monitoring of biological diversity* will be continued.

Furthermore, work is underway to expand on the monitoring programme for the cultural landscape, 3Q, which began in 1998. The 3Q programme (status monitoring and result control in the agricultural cultural landscape) monitors changes in the cultural landscape. The programme focuses on indicators that are informative of area condition, biological diversity, cultural heritage and cultural environments, and access.

Investments to obtain good knowledge of forest and environmental values, both on a national and local level, are being taken further. At a landownership level, data concerning forest and environmental values is obtained through the system of forestry planning with environmental registration. To date environmental registration has been carried out for 2.5 million ha, or about 40-50% of the commercial forest area.

2.2.2 Division of responsibility in mapping and monitoring

All the ministries share the responsibility for gathering more data on biological diversity.

This follows from the principle that sectoral authorities are responsible for monitoring and reporting on environmental impacts within their own sectors. Furthermore, each ministry is responsible for making its own data available by ensuring that data sets are compatible, and for making sure that wherever possible data are accompanied by geographical coordinates. The government considers it important to improve cooperation between the ministries by means of an interministerial programme in order to ensure that programmes to survey and monitor biological diversity use a uniform methodology and are cost-effective. A system must also be developed for accessing data on the conservation and sustainable use of biological diversity and for the exchange of such data between databases under different ministries.

Further, all Ministries have a responsibility to make their own data accessible through integration of data systems, and to ensure that this information is so far as possible geographically specific. The Government emphasises the need to strengthen cooperation between Ministries in order to secure a unified and cost effective effort in mapping and monitoring of biological diversity in the *National programme for mapping and monitoring of biodiversity*. Systems have been developed for obtaining and exchanging data on biological diversity within the various Ministries' areas of responsibility (see boxes on *Species map*, *Species observations* and *Naturebase*, below).

The Norwegian Biodiversity Information Centre has the responsibility for making knowledge on biological diversity available through connecting various primary databases on a common platform (see Species maps box below).

The Nature Index in Norway will generate important statistics that will be useful for many sectors. The Nature Index is a method of measuring the status of Norwegian nature. It measures condition through changes in populations of species. The method was tested in central Norway, and experience gained will be used to produce a Nature Index for the whole of Norway. The Nature Index value for central Norway is approximately 0.7. This means that the various species have on average ca. 70% of the populations they would have had in an undisturbed environment. In the pilot work for central Norway, 126 indicators (species or indirect measures), from marine species like cod, to forest encroachment on cultural landscapes, to the prevalence of mature trees in forest, are measured. Many research institutions have contributed data. The method will be further developed in 2009, and the plan is that the Nature Index for all Norway will be presented in 2010 and included in national statistics.

Species Map

The Norwegian Biodiversity Information Centre has produced *Species Map (Artskart)* – a website which shows geographically specific information on species. The service allows one to search for information on species distribution records from more than 35 databases at 10 different institutions simultaneously; the service is accessible to the general public. Data is presented in the form of maps that can be zoomed to local scales. This represents a breakthrough in mediating spatial data on species in Norway. 12 600 species are included, divided into 17 species groups.

Through Species Map, research institutions obtain a larger database with which to research the relationship between species and their living areas. Farmers, forestry owners, and their organisations can use the service to adapt their activities so that unnecessary loss of biological diversity can be avoided. Local counties and regional authorities can use the new database in the same way to hinder encroachments on nature that destroy species diversity. Central environmental protection authorities will have much more information to build their nature management policies on, and the service will thereby become an important tool in the work to halt the loss of biological diversity in Norway.

Species Map is organised so that the research institutions themselves quality-control and organise data for mediation from their primary databases through so-called node databases. This ensures that new finds, updates, and other changes are automatically shown in the searched map. Data are simultaneously published directly in the open, international [GBIF-network](#), so that they are available for researchers and other users in all countries.

Link: <http://artskart.artsdatabanken.no/>

Species Observations

The Norwegian Biodiversity Information Centre launched *Species Observations (Artsobservasjoner)* in 2008. It is a digital reporting system for selected species groups. The purpose is to make registration solutions available for the general public and thereby increase the reporting of species records in Norway, together with presenting findings in a wider perspective. Over one million observations were registered in the first six months. Data registration is open to all. Experts arrange for quality control, especially the red listed species. Approximately 80% of observations are of birds.

Link: <http://www.artsobservasjoner.no/>

Naturebase

Through *Naturebase (Naturbase)*, data on priority natural habitats, protected areas, valuable cultural landscapes with importance for biological diversity, and species occurrence in the form of the species' functional areas (resting places, etc.) is collected. Naturebase has its own informational map solution on the internet (www.naturbase.no) and WMS-services for connections to mapping solutions in the local counties, sectors, etc., together with environmental status in Norway. Species observations are managed by natural history museums, research institutions, etc. and made available through the Norwegian Biodiversity Information Centre's service *Species Map (Artskart)* (see above). The open service *Species observations (Artsobservasjoner)* (see above) was established in 2008 and makes available large quantities of observation data collected outwith the scientific institution's purview.

2.2.3 Research and evaluation

There is a pressing need to improve our knowledge on biological diversity. This includes both a basic knowledge of ecological interactions and knowledge of challenges that may arise from the interplay between the natural environment and our use of it. Such knowledge is needed to give a better understanding of causal relationships and to make appropriate choices as regards management of biodiversity and which measures to implement. This means that research must be given priority, especially research involving cooperation between the natural and social sciences. Research on biological diversity must also be better coordinated. Moreover, it is important to obtain data that will provide a better basis for decision-making on the basis of political targets and targets for the management of biological diversity for all administrative levels, from local to regional to national, and for all relevant sectors.

Basic research on biodiversity is mainly carried out at the universities and colleges. Most applied research takes place within Norwegian biodiversity policy and action plan – cross-sectoral responsibilities and coordination programmes organized or financed by the Research Council of Norway, at applied research institutions such as the Institute of Marine Research, and as in-house research organized by business enterprises. It is important to forge closer ties between all these institutions and provide better opportunities for research cooperation both at national level and internationally, especially within the EU and the OECD.

Research Programme Environment 2015

Environment 2015 – or Norwegian environmental research towards 2015- is a broad, interdisciplinary research programme intended to provide knowledge on central environmental questions and to lay the basis for future policy formation. *Environment 2015* is organised in five specific thematic areas: society, land, water, pollution, and an interdisciplinary research area. *Environment 2015* is to develop new research-based knowledge for a more precise understanding of the limits of exploitation of environmental resources, how other concerns can be balanced with this, and how policies and processes can be configured and carried out to provide durable solutions to environmental questions.

Link (English):

<http://www.researchsradet.no/servlet/Satellite?c=Page&cid=1224697848161&p=1224697848161&pagename=miljo2015%2Fhovedsidemal>

2.2.4 Traditional knowledge and biological diversity related to Saami use

In 2008 the Ministry of Labour and Social Inclusion, the authority responsible for coordination of the Norwegian Saami policy, in close collaboration with the Saami parliament initiated work focused on traditional knowledge in order to implement article 8j (see box below).

The funding has, in consultation with the Saami Parliament, been granted to the Saami College in Kautokeino for the pilot project "Árbediehtu" – delineation, protection and use of Saami traditional knowledge.

The Saami parliament is further exploring possible tools and mechanisms to improve the management of such information.

The "Árbediehtu" Project

The "Árbediehtu" project commenced in autumn 2008 and is planned to last three years. Saami traditional knowledge is a living and dynamic collective knowledge, which has the form of practical skills as well as knowledge. The project is anchored in the local society, on the basis of article 8 j. The work is organised on a partnership model with local Saami institutions and actors. Local partners are seen as co-producers of knowledge, and are active in the development of research questions and defining research needs. A main initiative is the delineation of "birgejupmi", a term meaning finding a way of making a living within a given ecological system. The project is working to develop suitable methods to record traditional knowledge and to develop competences and methods for collection, together with defining strategies for new documentation measures.

Research project EALÁT

The research project EALÁT is a holistic, interdisciplinary and multicultural investigation which focuses on vulnerability and climate change, both in the Saami region and the reindeer herding region Yamalo Nenetski A.O. in Russia. Reindeer herding is seen as a model for sustainable development of northern areas, based on the accumulated knowledge of several generations. The goal is to document the reindeer herder's expertise of climate changes, climate variation, snow and snow variation, etc., and to reduce the vulnerability of reindeer herding to global warming, so that reindeer herding will remain an economically and ecologically robust industry in the future.

Link (English): <http://arcticportal.org/en/icr/ealat>

2.3 Ensuring sustainable use and protection of biological resources

In Norway, agriculture, forestry, fishing, whaling and sealing, aquaculture, and various outdoor activities such as hunting, angling, and collecting berries and mushrooms involve the direct use of biological resources. These areas are important in the management of biodiversity. Both directly and indirectly, the primary industries and harvesting of biological resources on uncultivated land account for a large proportion of wealth creation in Norway and are important for employment, especially in outlying districts. The government's targets for the conservation and sustainable use of biological diversity will also help to make it possible to continue activities based on the use of renewable biological resources. Thus, wealth creation in the primary industries and harvesting as a part of outdoor recreation can be further developed: these activities also have positive effects on the quality of people's lives, their well-being and sense of identity, and provide opportunities for experiencing the natural environment.

2.3.1 Threatened and vulnerable species and natural habitats, species of special responsibility

To attain the goal that biological diversity loss will halt by 2010, both species protection and protection of species' habitats will be required.

Most threatened and vulnerable species are under pressure due to changes in habitats and land uses such that the living area becomes too small, too fragmented, or reduced in quality. Woodland, the cultural landscape, and marshland are the natural habitats that have the most red-listed species (see box below). Forest regrowth in earlier open landscapes is an increasing threat to many species. In mountain and coastal areas and in fresh water there are particular species that, for various reasons, have great problems with survival. The arctic fox has been protected since 1930, but remains in danger of extinction in Norway. The Ministry of the Environment has increased funding for development and implementation of management plans for threatened species and natural habitats; these include concrete measures that can be taken for single species and natural habitats in specific places.

Work on protecting habitat for species through protection in accordance with the Nature Protection Act, and to secure sustainable land use through sectoral regulations and the local county planning in accordance with the Planning and Building Act, will be the most central measure leading up to 2010.

For a proportion of the threatened species it will nevertheless be necessary to develop special management plans in order to secure the continued survival of Norwegian nature.

Norwegian Red List

The Norwegian Biodiversity Information Centre's first red list was published in 2006. Norwegian Red List 2006 is a survey of species that are considered to have a limited survival probability in Norway over time¹. Estimates are based on the International Union for the Conservation of Nature (IUCN) criteria. Work on the red list was carried out by 23 expert committees and together have estimated the status of ca. 18 500 species. This comprises almost half of the about 40 000 species we know are found in Norway. The total for Norway, including sea areas and Svalbard, is 3886 species red listed; 1988 of these are considered threatened species. Fact sheets for a selection of red listed species have also been produced. These include a description of threats to the species, but not measures that can be taken.

A red list produced according to IUCN criteria forms an important knowledge base which can be used in political and societal discussions and decisions, and will be an important contribution to the goal of halting the loss of biodiversity by 2010. The red list gives an estimate of the risk of extinction in Norway. This is a basis of knowledge necessary if management authorities are to develop priorities.

Work on red listing of species is of greater value for society if the list is regularly updated. This will over time build improved knowledge of the occurrence of, and population changes in, the various species. The next update of the red list is planned for 2010. Updates are thereafter planned at 5-year intervals.

Link: (English): <http://www.biodiversity.no/Article.aspx?m=207&amid=3573>

¹ The Red List also contains the category data deficient (DD). It is considered however, that these species with a high probability are threatened.

Management plans for threatened species and natural habitats

The CBD requires the parties to, among other things, "strengthen threatened species' survival possibilities". A range of measures of more general character shall be carried out, including strengthening of mapping and monitoring of biological diversity and to review and further develop regulations and processes significant for protecting biodiversity. For particular species currently threatened with extinction in Norway, such general measures alone will not be sufficient. For such species it will be necessary to carry out specific management and protection measures to secure their long-term survival. The development and implementation of species action plans (conservation plans) is one such extraordinary measure. The government has decided for these reasons to produce such action plans for a selection of threatened species in Norway.

The action plans will identify the threats to the species, current and planned remedial measures, and completed and future monitoring. As of 2008, actions plans for six threatened species, including arctic fox, have been produced. Remedial measures have commenced for all six species. A further 11 action plans are in production. It has been decided to produce 22 new action plans for threatened species and natural habitats, including uncultivated grassy areas formerly harvested for hay (slåttemark), in 2009.

2.3.2 Agricultural resources

Agriculture contributes to holistic and living cultural landscapes through mediating cultural historic values, protecting cultural monuments, biological diversity, variation in landscape, and recreational possibilities. New technology and greater demands for efficient harvesting and production have lead to cultural landscape types such as meadows and hay producing areas being used for other purposes, or becoming overgrown. A considerable proportion of Norway's threatened and vulnerable species, ca. 30%, are connected to these kinds of natural habitat in the cultural landscape.

About half of Norway's species diversity and half of all threatened and endangered species in the country are associated with forests, and forestry operations are listed as an important threat to many red-listed species. Therefore another priority for Norway's efforts to conserve biodiversity is to strike a balance between ecological and economic considerations in the forestry industry by adapting it better to the environment.

The Ministry of Agriculture and Food and the ministry of the Environment have jointly initiated a project selecting certain farming landscapes with considerable value in terms of both cultural monuments and biodiversity. Additionally, a project directly aimed at World Heritage Sites is underway, aiming to secure the safeguarding of agricultural cultural landscapes.

See also Chapter III.

2.3.3 Marine resources

The fisheries and aquaculture industry has become one of Norway's largest export industries, with a potential for very significant economic growth. Economic growth based on the management of living marine resources is dependent on a comprehensive regulatory system that includes both measures to ensure sustainable harvesting of stocks and appropriate technical regulatory measures. Even though the aquaculture industry has already solved many of its problems and taken steps to reduce

its environmental impact over the years, there are still challenges to be met in order to limit the impact of aquaculture on biological diversity. The most important tasks are to prevent the escape of farmed fish and to resolve conflicts related to land use in the coastal zone. Administrative bodies for fisheries and aquaculture must also continue the development of the legislation, survey marine biological diversity and find ways of taking environmental concerns more fully into account.

To contribute to the attainment of the national goal against escape of farmed fish, a range of measures have been carried out. In 2006, an action plan against farmed fish escapes was produced, the *No Escape Vision (Visjon nullflukt)*. The action plan contains 30 tasks for working against fish escapes. These include the double securing of drains from fish hatcheries, and regulations on mesh sizes of catching nets in relation to fish size. In addition, possible effect indicators/vulnerability indicators have been prepared for estimating the effect of escaped farmed fish on wild populations.

In order to contribute to reducing bycatches of birds, seals, and small cetaceans in Norwegian fisheries, a reporting regulation for bycatch of sea mammals and seabirds has been introduced. Potential measures to limit bycatch will be considered as knowledge on the extent of bycatch is accumulated. Work continues in an attempt to get line fishermen to use a device that effectively scares seabirds away from baited lines.

Furthermore, a goal has been set to establish a long-term management plan for seaweed and seaweed resources that takes the environment and biological diversity into account. Variations in condition of the kelp community and effects of kelp harvesting on coastal areas are investigated annually through a monitoring programme. In every county harvesting areas are checked at all stages of the regrowth phase (5 years) and compared with reference areas where harvesting is permanently banned. Advice is given to management authorities on opening/closing of harvesting areas based on the condition of the kelp vegetation.

2.3.4 Genetic resources and gene technology

Genetic resources are the basis for the perpetuation of life. Conserving genetic resources and ensuring their sustainable management are thus necessary for maintaining biological diversity and food security. Genetic resources in domestic animals, agricultural plants, and forestry trees are the living basis for today's agriculture and forestry. Access to genetic diversity is the material precondition for further development and adaptation to future needs in food and agriculture.

Norway is responsible for securing its genetic resources and managing these in a sustainable manner. This commitment is affirmed in the CBD, the International Treaty on Plant Genetic Resources (ITPGRFA) and other international agreements. The issue is also pursued in the context of Nordic cooperation.

The Norwegian Genetic Resources Centre (established 2006) is responsible for conservation and sustainable use of genetic resources within agriculture and food production via three sectoral national programmes for forest trees, agricultural plants and domestic animals, and their respective current action plans 2007-2010.

There is a need to enhance the knowledge base for the sustainable use of agricultural genetic resources for both commercial and conservation purposes and about issues concerning rights and access to genetic resources. Climate change will increase the need for utilising a broader range of genetic diversity and emphasises the relevance of these issues.

Much of the activities are organized within the framework of Nordic cooperation. The Nordic Ministerial Council's declaration from 2003 concerning access and rights to genetic resources, and the Nordic strategies for agriculture and environment, provide a basis for Nordic Genetic Resource

Center (NordGen) established in 2008. This is a Nordic institution for conservation and sustainable use of plants, farm animals and forest trees, incorporating established sectoral activities including the collections held by the Nordic Genebank. While continuing sectoral activities on conservation and use, NordGen and will promote interdisciplinary research-based knowledge on genetic resources and facilitate Nordic cooperation between NordGen and the national programmes on genetic resources.

Development of a national legal framework for genetic resources is briefly referred to under Legal Resources.

Svalbard Global Seed Vault

Svalbard Global Seed Vault was opened in 2008 and functions as a security store for the preservation of duplicates of seed collections on behalf of the world's gene banks. Seed from the most important agricultural plants are maintained frozen in the seed vault.

The seed vault has the capacity to store all the unique varieties of seed that are stored in the ca. 1400 gene banks found in more than 100 countries around the world. In addition, the seed vault will have the capacity to store new types of seed that will be collected in the future. Svalbard Global Seed Vault will, when in full use, represent the largest global collection of seed.

Link (English): <http://www.the Government.no/en/dep/lmd/campain/svalbard-global-seed-vault.html?id=462220>

The third objective of the CBS is “the fair and equitable sharing of the benefits arising out of the utilization of genetic resources”.

The country of origin must be guaranteed a fair and equitable share of the results of research and development and the benefits arising from the utilization of genetic resources. Developing countries are the stewards of the largest proportion of the world's genetic resources today, but it is the industrial countries that have the technology needed to exploit these resources. A common perception among developing countries is that there has been a biased distribution of the benefits that are created by the use of genetic resources since CBD entered into force. To rectify this situation the developing countries have been advocates urging for development of an international regime for access to and benefit sharing related to genetic resources, the so called *ABS negotiations*. The objective is to finalise these negotiations for approval of a new regime at the 2010 Meeting of the Parties. Norway has advocated a legally binding protocol under the CBD Norway will also use as a basis the government's proposal for a new Nature ManagementAct and its elements on regulation of access to genetic resources and benefit sharing.

Necessary rules cannot only be developed within the CBD, since many important elements related to the management of genetic resources fall within the realm of other organizations. Within the World Food Organisation FAO has already developed an international regime on management of plant genetic resources for food and agriculture through the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA). Organisations like the World Trade Organisation WTO and the World Intellectual Property Organisation (WIPO) handle important framework conditions for ABS, since these organizations manage important rules for i.a. patents and plant breeding, rules that are central for rights for commercial products based on genetic resources.

This issue has been addressed at the WTO and WIPO; Within WIPO Norway have advocated for the development of a set of rules that give better protection of traditional knowledge associated with genetic resources. Norway was the first OECD country to support the introduction of rules in the WTO concerning the compulsory disclosure of the origin of genetic resources in patent applications for inventions. Norway also works for acceptance of this type of regulations in trade negotiations bilaterally and through the European Free Trade Agreement (EFTA).

Genetically modified organisms (GMO)

The gene technology might give several possibilities within i.a. production of food and medicines. At the same time, GMOs might have negative effects on the environment and human health. The Government will therefore continue to pursue a restrictive policy in this regard and make sure that consumers can still choose GMO free products.

GenØk - Centre for Biosafety was founded in 1998 and is a non-commercial foundation, engaged in research and teaching in the professional field of Gene Ecology. The Foundation focuses in particular on the environmental and health related consequences of the application of gene technology and gene modification. GenØk is also engaged in the broad dissemination of information and offers advisory and consulting services in its field of expertise. GenØk is part of a national and international cooperative network. The network encompasses Norwegian research institutions as well as internationally recognised research environments and independent NGO's.

2.4 Avoidance of the spread of alien invasive species

Norway has, through ratification of the Convention on Biological Diversity's article 8h, committed itself as far as possible and appropriate to hinder the introduction of, to control, and to exterminate alien invasive species that can threaten biodiversity and ecosystem functions. Many different bodies in a range of administrative sectors are responsible for action to address the problem of alien species and for administration and enforcement of legislation relating to the introduction, spread, and management and control of alien species. Effective action to reduce the threat from alien species therefore requires targeted and coordinated cross-sectoral efforts. A cross-sectoral strategy on invasive alien species was finalized in 2007 (see box below).

Increasing trade, tourism, and travel and reductions in border controls with Europe render introductions an increasing environmental problem for Norway. A number of laws and regulations control the introduction and import of plants, animals, and microorganisms to Norway. These regulate regard for disease, business interests, and natural ecosystems. The Nature Management Act (2009) addresses invasive alien species.

National strategy against exotic species

The *Intersectoral national strategy and on invasive alien species* was completed in 2007. The strategy contains a number of concrete measures which will lead to better care of biological diversity through reducing the spread of, and increasing the fight against, exotic pest species.

The strategy is based on the precautionary principle, with a focus on prevention of introductions, removal of established problem species, and limitation of spread and damage. The strategy is a cooperation between 10 Ministries (MD, FIN, FKD, FD, JD, KD, LMD, NHD, OED, SD) with contributions from agencies affected by exotic species. Measures will be implemented by all affected Ministries.

Link (English): <http://www.regjeringen.no/en/dep/md/documents-and-publications/Reports-and-plans/Plans/2007/Norwegian-Strategy-on-Invasive-Alien-Spe.html?id=469655>

Norwegian Black List

The Norwegian Black List was completed in 2007, and provides a review of evaluations of the ecological risk associated with 217 of the exotic species that are known in Norway. Ecological risk in this context means the risk that the species can have negative effects on ecosystems, native species, or genotypes, or can be a vector for other species (parasites or diseases) which can be damaging to native biological diversity. The Black List is primarily intended to contribute to a knowledge-based management of biological diversity, but also to disseminate knowledge on exotic species to the general public and to relevant target groups in society. It has been developed by the Norwegian Biodiversity Information Centre in cooperation with experts from six research institutions. The Norwegian Black List 2007 also contains the most comprehensive review to date of exotic species recorded in this country; in total 2483 species.

Link (English): <http://www.artsdatabanken.no/Article.aspx?m=208&amid=3572>

2.5 Sustainable land use

Various forms of development and activities that have an impact on biological diversity are affecting larger and larger areas of Norway. A central precondition for maintaining diversity and securing sustainable use lies in all players and sectoral authorities adhering to nationally determined goals. It is also important that implementation is differentiated so that especially valuable natural habitats and ecosystems are prioritised.

Constructions and other developments that require large areas of land may be in conflict with the target of ensuring the conservation and sustainable use of biological diversity. The aim is for all authorities with responsibility for land use to consider biological diversity in their processes of policy formation, regulation framing, planning, and initiatives. Good systems should be developed for reporting the scale and type of disturbance in areas that have been identified as comprising threatened or vulnerable ecosystems. Other activities may include building up expertise and developing advisory material for subordinate agencies and relevant sectors.

A central judicial process in land use administration with regard to care for biological diversity is the Planning and Constructions Act. The purpose of the Act is to provide a framework for integrated planning as a basis for use and protection of land and other natural resources. Many management sectors have regulations that both regulate activities, but also include land use decisions. Important examples are the Soil Act, Forestry Act, Nature Protection Act, Cultural Monument Act, Management of Wild Marine Resources Act, Aquaculture Act, Roads Act, Water Resource Act, Watershed Regulation Act, Energy Act, and Pollution Act.

The local counties exercise responsibility and authority for a range of sectoral laws. It is important that both the local counties and sectoral management authorities take an active responsibility for sustainable use and protection of biological diversity in the course of their processes, including clarifying conflicts in open planning processes. This also applies to national sectoral authorities.

The Ministry of the Environment has, in cooperation with KS (the Local County Central Association), a project named "Vigorous local counties". An example of the themes for the local county network is land use management. Many of the networks work to secure more sustainable land use management practices for the beach zone, coast, water management, etc. Ministry of the Environment will work towards these projects focusing on biological diversity to a greater extent in future.

2.5.1 Protection of areas

Protection of areas in accordance with the Nature Protection Act is a central tool for protecting species living areas. Implementation of protection plans will contribute to Norwegian goal attainment with regard to CBD's work programme on area protection. Following up on the Berne Convention through the Emerald Network will also contribute to this. There is a need to see area protection in a larger context in the form of holistic ecosystems and ecosystem networks. This demands cooperation and effort from many sectors.

In order to collect and communicate necessary knowledge on biological diversity for a better management of protected areas, existing knowledge on biodiversity in the protected areas is being systematised with the intention of evaluating the level of protection and enrolment of protected areas in the Emerald Network. In addition, a system for following up and monitoring of protected areas on the basis of concrete conservation goals for protected areas is being established (2007-2011).

Marine protected areas

Norway, under the Convention on Biological Diversity, has endorsed the establishment of a representative network of Marine Protected Areas (MPAs) by 2012. MPA normally includes all types of protected areas. The work of a national marine protection plan as laid down in Parliamentary Report 43 (1998 - 1999) is delayed in relation to original objectives. A first version of the marine protection plan containing a representative network of marine protected areas protected after the Nature Protection Act and for marine areas protected by other regulations/laws/acts is planned to be established in 2010. The protection plan shall then in the second phase supplement / be adjusted as necessary to ensure a representative, coherent ecological network for the Norwegian coastal and sea areas by 2012. The first phase will focus on 36 areas with a total area of approximately 16 000 km². The formal planning process has not started. Marine protected areas will help to complement the national network of MPAs.

Area based management measures have so far been introduced to Norwegian fisheries management for the following reasons: protection of spawning grounds, protection of juvenile fish, permanent and real time closures, rebuilding of depleted stocks (i.e. coastal cod, redfish, sandeel), management measure for stationary stocks (i.e. lobster and seaweed) and protection of vulnerable bottom habitats (i.e. coral reefs). MPAs may vary from smaller areas in the fjords, up to rather huge areas off shore. There are more than 150 smaller areas along the Norwegian coast where local area based management measures have been introduced. Furthermore, part of the year, control and surveillance systems are established in some areas, and during that time, more specific regulations and area based management measures may also apply. One example of the work done in this area is the establishment of a network of 52 National Salmon Rivers (NSR) and 29 National Salmon Fjords (NSF). The purpose of NSF and NSR is to give the most important salmon stocks in Norway special protection against possible negative impacts from certain activities in the rivers, and from salmon farming in the surrounding fjords and coastal areas.

Provincial Protection Plans

Work aiming to protect a representative selection of Norwegian nature has been furthered through two parallel approaches: 1) protection of natural habitats and habitats through thematic protection plans; and 2) protection of large undisturbed/partially undisturbed areas such as national parks and landscape protection areas through the national parks plan. Most thematic protection plans have been driven as provincial protection plans, with work beginning on these in 1976. Thematic protection plans have been produced for, among other natural habitats, marshlands, rich deciduous forest, bog and seabird areas. The plans typically comprise many different sites, for example 20-30 sites.

The aim is to protect a selection of the most valuable areas of the applicable natural habitat in the province, and to ensure that these areas are representative of the variation in the natural habitat in the province (both typical and special areas must be included). The provincial protection plans are a strand in the work of protecting a representative selection of Norwegian nature. Work on the great majority of provincial protection plans is now completed. In addition, work is underway to supplement earlier provincial plans for some provinces. The great majority of protected areas were designated through these provincial protection plans.

Link to a selected protection plan: *Protection plan for rich deciduous forest in Finnmark:*
<http://www.theGovernment.no/nb/dep/md/presesenter/pressemeldinger/2007/Verneplan-for-rik-lovskog-i-Finnmark-opp.html?id=475623>

2.5.2 Management of protected areas

CBD's goal of effective management of biological diversity in protected areas by the end of 2012 requires considerable resource allocation to the management and care of protected areas. Management plans are to give concrete guidelines on use, information, care, possible adaptations, etc. Work on management plans will take place in an open and democratic manner with participation from affected parties.

The government will strengthen work on establishing protection plans for national parks and larger protected areas and strengthen work on care in the areas where it is necessary. In 2008 a survey of the need for measures and plans in protected areas was carried out. The survey shows that

management plans are available for 385 protected areas, but there is a need for 990 new management plans. It is expected that ca. 100 management plans will be completed in the course of 2009, and there are ambitions to step up the work in the coming years. Management plans are an important tool in the work of caring for protection values in protected areas, both as regards protecting them from undesired encroachments and to promote desirable activities.

Management and care of protected areas

Environmental management has a goal for management and care of protected areas to be strengthened in order to secure protected values and to increase the local community interest in nature protection. Local management regulations have been piloted, and on the basis of these, work aimed at finding good management models is now in progress which both protect scientifically defensible management and local participation. An increase in funding for management measures now makes it possible to intensify care and to carry out other necessary measures in the protected areas. Increased resources have also led to the development of many new management plans, some of which are already finalised.

2.5.3 Sustainable management of coastal and sea areas

Management plans Barents Sea and Norwegian Sea

The comprehensive management plan for the marine environment in the Barents Sea and the sea areas off the Lofoten islands was completed in 2006 as the first regional management plan for a Norwegian sea area, and a milestone in the work to establish an ecosystem based management of all Norwegian sea areas.

A management plan for the Norwegian Sea, on the pattern of the Management Plan for the Barents Sea, is under development. It is intended that the management plan for the Norwegian Sea should be laid before Parliament in spring 2009. See Chapter I for supplementary information.

The management plans provide the overall framework for existing and new activity in the sea area, and provide for coexistence between industries such as fisheries, sea transport, and petroleum-related activities. The aim of the plan is to establish a management plan that is comprehensive and ecosystem based. All activities in the sea area shall be managed in a coordinated manner within a framework that ensures that the overall environmental effects do not become greater than the level allowing the ecosystems' structure, function, and productivity to be preserved.

Link to Management Plan Barents Sea (English version): http://www.theGovernment.no/Upload/MD/Vedlegg/Svalbard%20og%20polarområdene/Managementsplan%20Barentshavet/PDF0080506_engelsk-TS.pdf

See also Chapter I.

2.6 Avoiding pollution

Pollution is an important cause of the loss of biological diversity. National targets relating to pollution are therefore important in relation to the conservation of biological diversity. One important task in this field is to document the impacts of pollution. Changes in the pollution load can be used as an indicator for changes in biological diversity. All pollutants have some biological effect, and for several years efforts to combat pollution have been given high priority.

Municipal discharges and emissions from industry and agriculture are well known; much has already been done to reduce pollution from these sources, and they are monitored continuously. Other priority areas of great importance for biodiversity are more complex to deal with and their impacts more intricate.

The most important are acidification, emissions of hazardous chemicals and emissions of greenhouse gases.

2.6.1 Acidification and chemical emissions dangerous to health and the environment

Even though international agreements have resulted in substantial reduction in emissions of sulphur and nitrogen from Norway and the rest of Europe in the last 10-15 years, acidification is still one of the most serious threats to the environment in Norway. A nationwide network of measuring stations monitors sulphur and nitrogen in air and precipitation in order to observe trends in the deposition of acidifying substances. While emissions of sulphur are traditionally related to emissions from industrial processes and metal production, the major proportion of nitrogen emissions comes from coastal and road traffic. With regard to biological diversity, acidification is a clear example that demonstrates the advantages of cross-sectoral and international efforts.

The emission and use of hazardous chemicals is one of the most serious threats to biological diversity worldwide. Hazardous chemicals enter the Norwegian environment both as a result of direct releases to air, water and soil from Norwegian sources and as a result of long-range transport via the atmosphere and ocean currents. The large volume of international trade in products that contain hazardous chemicals is also an important cause of their dispersal across national borders.

Many of these substances are harmful to human health and the environment, and majority end up in the environment at some stage and may thus have an impact on the state of the environment. A number of chemicals are degraded very slowly in the environment and can therefore accumulate in food chains, thus representing a serious threat to biological diversity. The most dangerous chemicals, including persistent organic pollutants such as PCBs and dioxins, can cause damage even at very low concentrations. Hazardous chemicals can reduce fertility or damage the immune system, the nervous system and other internal organs and thus threaten individuals, populations and species.

See Chapter I about i.a. polar bears.

A number of measures have been adopted, such as limitations on use, and strong concession conditions, etc., for particular substances placed on the priority list of environmental poisons. New substances that satisfy the criteria are added to the priority list; see Parliamentary proposition No. 1 (2008–2009). Measures are carried out in accordance with agreed plans, but the necessary measures with regard to these substances are continual.

2.6.2 Climate

Climate change will have serious negative impacts on biological diversity. It is therefore of crucial importance that the Convention on Climate Change is followed up effectively and that work under this convention and the Convention on Biological Diversity is well-coordinated at both national and international level. In Norwegian climate policy it is stated that climate change measures that has positive effects both to mitigate climate change and protect biological diversity will be prioritised.

Climate gas emissions from deforestation and degradation of forest comprise about 20% of total global emissions and are possible to reduce relatively quickly and at relatively low cost. Large and durable reductions in climate gas emissions from deforestation and degradation of forest have as a precondition that limitations of emissions from these sources are included in a new climate agreement, see box below. If this work succeeds it will also affect biodiversity in a positive manner.

Climate and Forest Project

The Government's Climate and Forest Project was launched at the climate meeting in Bali in 2007. The project will contribute to a rapid, cost effective reduction in emissions of climate gasses from deforestation and forest deterioration in developing countries. The Government has budgeted up to 3 billion kroner annually for this purpose, and will cooperate with international organisations such as the UN and World Bank and the forest nations themselves. It is important to find good projects that genuinely contribute to reduce emissions. Investment of billions on forest measures is, to date, one of the largest and most important initiatives ever made in this area, and can create new dynamism in climate negotiations ahead of the important climate meeting in Copenhagen in 2009. The goal for climate and forestry projects is to develop mechanisms so that emissions from deforestation can be regulated in a new international climate agreement. Measures will include pilot projects, demonstrations, and support for the development of national strategies for monitoring, measuring, and reducing emissions from deforestation.

Link (English): <http://www.theGovernment.no/en/dep/md/Selected-topics/climate/why-a-climate-and-forest-initiative.html?id=526489>

2.7 Saami policy

The basis for the Government's Saami policy is that, as a state, Norway was established on the territories of two peoples, Norwegians and Saami, and that both these peoples have the same right to develop their cultures and languages. Consideration of Saami interests shall be included in the development of policies in relevant areas. Norwegian implementation of ILO Convention no. 169 concerning Indigenous and Tribal Peoples in Independent Countries is relevant for the Norwegian implementation of the CBD and the work programme on article 8j and related provisions.

In 2005, the Finnmark Act was adopted, after time-consuming consultations between the Norwegian Parliament, the Saami Parliament and the Finnmark County Council. The Act is based on the report of the Saami Rights Committee, submitted in January 1997. The Finnmark Act establishes that all formerly so-called "state-owned" land in Finnmark is transferred to a new entity called the Finnmark

Estate (Finnmarkseiendommen/Finnmárkkuopmodat), governed jointly by the Saami Parliament and the Finnmark County Council.

In 2005, the Government and the Saami Parliament reached agreement on the “Procedures for Consultations between the State Authorities and the Saami Parliament of 11th May 2005”. (<http://www.regjeringen.no/en/dep/aid/Topics/Saami-policy/midtspalte/PROCEDURES-FOR-CONSULTATIONS-BETWEEN-STA.html?id=450743>) The scope of the agreement is extensive. The consultation procedures apply to the Government and its ministries, directorates and other subordinate State agencies or activities. Furthermore, they apply in matters that may affect Saami interests directly.

For relevant activities related to mapping and research see 2.2.4.

2.8 International cooperation

The ambition is to make Norway a leading nation in environmental policy. Steps will be taken to address the major environmental challenges, and devise measures and policy instruments that give results in practice. We must ensure economic development and improvements in welfare, but not at the expense of the environment.

The Government’s aim is for Norway to play a leading role in making environmental concerns an integral part of all development cooperation. In these efforts, the Government will give priority to sustainable management of biodiversity and natural resources, water resources management, water and sanitation, climate change and access to clean energy, and hazardous substances. Norway’s efforts are intended to help developing countries to improve their own capacity and expertise in the environmental field.

2.8.1 The Science / policy interface

Considerable emphasis will be placed on securing a scientifically valid basis for implementing the convention. This is a precondition for sustainable use. As a forum for technical discussions between representatives from developed and developing countries on central themes to be covered by the convention, Norway has arranged five “Trondheim conferences”. These conferences focus on the scientific base, capacity building, and recommendations for improving cooperation under the aegis of the convention. It is intended that further conferences will be held, as a cooperative task of Ministry of the Environment, Foreign Office, Ministry of Agriculture, Ministry of Fisheries and Coastal Affairs, and relevant UN organs.

Trondheim Conference

The fifth Trondheim Conference on biological diversity was held in 2007. The conference provided advice to CBD on the importance of biodiversity and ecosystem services for welfare, development, and the fight against poverty. Recommendations were also made regarding the climate convention, related to climate and biological diversity.

The sixth Trondheim Conference will be held in February 2010, and will focus on the status of the 2010-goal on reduced loss of biological diversity and on priorities after 2010. The conference will strengthen the scientific background for the meeting of parties in Nagoya in October 2010, and will contribute to the development of the third *Global Biodiversity Outlook* (MD).

More information on the Trondheim conferences can be found on the homepage
www.trondheimconference.org

Millennium Ecosystem Assessment

Norway participated in the work of the Millennium Ecosystem Assessment and carried out among other tasks a pilot study of the Glomma watershed. Norway is active in negotiations on strengthening the science/policy interface for biodiversity and ecosystem services.

2.8.2 Northern and Polar Areas

The goal is that Norway shall be the foremost manager of environment and nature resources in northern areas. Strict environmental demands will be set for all activities, and frameworks will be set in place to ensure that unique nature and cultural environments are protected against negative effects and protected for future generations. Norway shall also be an international leader as regards the development of knowledge on, for, and in northern areas. Knowledge is the hub of the northern area strategy, with direct ramifications for environmental management, resource exploitation and value creation. Knowledge is a prerequisite should the challenges in the north be met. The government will also strengthen international cooperation to reduce environmental burdens in the north.

Norway is chairman of the Arctic Council during the period 2007 - 2009. The Arctic Council is an intergovernmental organ for cooperation on questions related to the challenges faced by arctic countries. The aim is to further sustainable development while paying regard to the environment, social conditions, and the economy. Cooperation on updating of the predicted consequences and challenges of expected climate change in the arctic (see the ACIA Report), and a joint approach to a holistic ecosystem-based resource management are central to the Norwegian chairmanship. Norway has initiated a project on climate change and the cryosphere (snow, water, ice and permafrost) and a project on ecosystem-based resource management. The Management Plan for the Barents Sea is used as an example in this connection. Norway plays an important role in the Arctic Council's environmental monitoring programme (AMAP), participates in cooperative projects with regard to the Arctic and Russia, and in the marine programme for the arctic (PAME).

Norway also contributes through annual economic contributions to the environmental partnership Northern Dimension Environment Programme (NDEP) in the EU's work on The Northern Dimension.

Norway leads the Barents Council's environmental working group until autumn 2009. Work on reduction of emissions of environmental poisons and climate gases from the large pollution sources in northwest Russia (hot-spots), climate change, and conservation of biological diversity in the region are priorities.

Cooperation on sea areas is especially highly prioritised in the bilateral work under the Norwegian-Russian environmental protection commission. A special marine environment group will contribute to increased cooperation on ecosystem based management of the Barents Sea. Among other initiatives, a joint Norwegian-Russian environmental status report for the whole Barents Sea will be produced in 2009, as a basis for further cooperation.

Protection and management of biological diversity in the Barents region, reduction of pollution, cleaner production, border area cooperation, cultural monuments, and management of protected areas on arctic island groups are the other main areas for bilateral environmental protection cooperation with Russia.

2.8.3 Europe

The EU is our most important partner in the area of the environment. Iceland, Liechtenstein and Norway have made the protection of the environment and promotion of sustainable development core areas of support from the EEA and Norway Grants (<http://www.eeagrants.org/id/1>). The Ministry of the Environment emphasises political dialogue with new EU countries, and will contribute to increased bilateral contact between national and local authorities in Norway and the new EU countries.

Norway has been actively involved in the Pan-European Biological and Landscape Diversity Strategy (PEBLDS) process to contribute to dialogue and cooperation between the Eastern areas in the region, Caucasus, Balkan, and Central Asia.

Norway, in collaboration with Belgium, is host for the next *Biodiversity in Europe* conference in 2009. This conference gathers participants from the whole Pan-European region and will focus on follow up of the CBD COP9 and input to the convention's new strategic plan.

For Norway, Nordic cooperation and the work under the Nordic Council of Ministers, are important. The purpose of environmental co-operation is to conserve and improve the quality of the environment and of life in the Nordic countries as well as to influence regional and international co-operation. At the same time, environmental co-operation must also contribute towards implementing the Nordic Strategy for Sustainable Development.

2.8.4 Development cooperation

The Convention's national commitments place a considerable burden on developing countries, as they manage a considerable part of the earth's biological diversity. To ensure a just distribution of benefits and burdens, developed countries have pledged to contribute funding, technology transfer, and active assistance to developing countries. Norway contributes financially through the global mechanism for environmental financing, the Global Environmental Facility (GEF), through financial contributions to multilateral organisations, through bilateral financial support, and financial support to NGOs (civil society).

Strengthening of developing countries' competence and capacity to implement international environmental agreements has been an important premise for Norwegian environmental aid during

this period. Environmental management competence has especially been used through the medium of bilateral institutional cooperation.

Norway has special agreements on environmental cooperation with South Africa, China, Indonesia and India. Cooperation with South Korea was agreed in the summer of 2008. These countries are all important for improvements in the global state of the environment. Political and strategic dialogues and implementation of concrete environmental measures are key elements in the agreements.

The objective of Norway's development policy is to fight poverty and bring about social justice. In its budget for 2009, the Government achieved its target of allocating one percent of gross national income (GNI) to international development. This budget post has been increased by NOK 3.9 billion and totals NOK 26.2 billion for this year.

The Government will continue to focus its efforts on priority areas where Norway can make the greatest contribution: the environment and sustainable development; peace building, human rights and humanitarian assistance; oil and clean energy; women and gender equality; good governance and the fight against corruption; and efforts to reach the health-related Millennium Development Goals. Norway places particular emphasis on efforts to fight climate change and deforestation.

In 2006 the Norwegian action plan for environment in development cooperation was launched, see box below.

Norwegian action plan for environment in development cooperation

The Government's aim is for Norway to play a leading role in making environmental concerns an integral part of all development cooperation. Norway realises that environmental problems must be dealt with if we are to reduce poverty and solve the development problems the world is facing. What is more, examples of how environmental cooperation contributes to peace, reconciliation, security and regional development are frequently seen. Norway's environmental development cooperation must be based on developing countries' own priorities. Norway will support measures targeted specifically at environmental and natural resource management, and ensure that environmental concerns are an integral part of Norway's general development cooperation. In line with the Paris Declaration on Aid Effectiveness, Norway will promote more effective forms of cooperation between donors and recipients. This action plan sets the direction for Norway's efforts for the next ten years.

In the action plan, four thematic priority areas are presented.

- Climate change
- Conservation and sustainable use of biological diversity and natural resources
- Water resources management, water and sanitation
- Hazardous substances

The prioritized topics directly relevant for biodiversity are:

- Support conservation and sustainable use of areas and ecosystems of global importance
- Promote the ecosystem approach to natural resource management
- Help to secure access and rights to resources for local communities, including indigenous peoples. This includes land, forests and wildlife, and the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources
- Support the implementation of multilateral environmental agreements, including agreements on the marine environment and marine resources
- Promote the integration of biological diversity concerns in all sectors
- Support the implementation of the Convention to Combat Desertification
- Facilitate cooperation and seek to identify synergies between the Convention on Biological Diversity, the Convention to Combat Desertification and the Framework Convention on Climate Change, both in policy development and in implementation
- help to prevent the loss of biological diversity in connection with efforts to reduce the impact of pollution, climate change and natural disasters

Link (English): <http://www.regjeringen.no/upload/kilde/ud/rap/2006/0089/ddd/pdfv/287538-actplanenv.pdf>

Chapter III – Intersectoral Environment Protection Policies

The Government has established that all authorities, industries, and other relevant players shall contribute to the work of attaining sustainable use and protection of biological diversity. The Ministries have the responsibility to integrate biodiversity considerations in their management. They also have the responsibility to promote implementation of the national targets for biodiversity in subordinate agencies, sectoral industries, and interest organisations in their areas of responsibility. Below a selection of the sectors strategies and actions for the integration of environment/biodiversity are presented. The information is collected from Proposition to the Parliament 1 (2008 – 2009) under the respective Ministries, and from contributions received directly from the Ministries.

3.1 Ministry of Children and Equality (BLD)

Both volume of consumption and patterns of consumption by society have effects on the environment, including the climate. Environment, resource and climate loads from consumption in Norway are higher than what would constitute a sustainable level on a global scale. The Government's strategy for sustainable development underlines the need to alter production and consumption patterns. The Strategy attempts to reduce environmental loads by altering the pattern of consumption towards the normal consumption pattern representing sustainable practice. An altered consumption pattern and a reduced total resource use will demand changes in attitudes, behaviour, and lifestyle, as well as in technology and economic policies.

In 2007 the Ministry, together with the Ministry of the Environment and the Agriculture and Food Ministry, gave economic support to information work carried out by the Environment Mark Foundation (Stiftelsen miljømerking), Debio and Fairtrade/Max Havelaar. The goal is to make the environment mark scheme better known to the public.

The Ministry also gave support in 2007 to further development and marketing of the website *etiskforbruk.no*, (ethical consumption Norway), which will be a tool to assist interested people to choose products according to ethical and environmental criteria. The website is operated by Grønn Hverdag (Green Everyday) and Etisk forbrukernettverk (the Ethical Consumption Network).

3.2 Ministry of Finance (FIN)

Sustainable development

The Ministry of Finance coordinates the Government's work on sustainable development. Individual Ministries have responsibility for implementation in their areas.

Work on sustainable development was an important theme in the 2008 National Budget, in which the Government presented a national strategy for sustainable development. The strategy is a result of a broad process to which Norwegian organisations have contributed actively at various stages.

The 2008 National Budget also put forward an updated and more policy-relevant set of indicators for sustainable development. Statistics Norway has an important role in furthering work such indicators and presenting annual development through indicators with associated analyses. The work of implementing the national strategy for sustainable development will be reported annually in the national budget.

Intersectoral environmental tools

The Ministry of Finance has the overall responsibility for the introduction of levies into environmental policy. Charges comprise, together with tradable emissions quotas and direct regulation, the most practical tool which the can make use of to reduce environmental problems. Correctly structured levies provide an incentive to reduce emissions in the most economic fashion, and ensure that the polluter pays. Considerable emphasis will therefore be made on environmental and energy charges.

On contract from FIN, the consultancy SWECO carried out a survey of national grant schemes with environmentally damaging consequences. The report was delivered to the Finance Minister on 22nd April 2008. Evaluation included whether such schemes contributed to reductions in biological diversity and natural areas. The report finds that certain grant schemes under the Ministry of the Environment, Agriculture and Food Ministry, Fisheries and Coast Ministry, Industry and Trade Ministry, Transport Ministry, Oil and Energy Ministry, and Local Government and Regional Ministry can be considered to have negative environmental consequences. Grants for supporting transport; primary industry; and county and industrial development are particularly significant in this respect.

3.3 Ministry of Fisheries and Coastal Affairs (FKD)

With the aim of improving fisheries legislation as a tool for caring for the marine natural environment and marine biological diversity, the Management of Wild Marine Resources Act (Sea Resource Act) was enacted on 6th June 2008, and came into force on 1st January 2009. The act covers all wild living marine resources and related genetic material. The purpose of the act is to secure sustainable and socio-economically profitable management of wild marine resources and related genetic material and to contribute to securing employment and settlement in coastal communities. A central element in the Act is that management now has a duty to regularly assess the management measures necessary to ensure sustainable management.

Biological diversity is one of several environmental values that are affected by the allocation of licences and localities for aquaculture. The Aquaculture Act requires that activities throughout the lifetime of an operation shall be environmentally defensible. By environmentally defensible it is meant that the operation is to be defensible both with regard to pollution and to ecological effects, including effects on biological diversity. This implies that activities must not at any time have significant negative consequences on the surrounding environment and wild organisms. In addition, the Act forbids the release of non-native organisms.

Processes where regard for biological diversity has been integrated include among others the Ministry of Fisheries and Coastal Affairs' (i.e. the Government's) plan for sustainable future-oriented cod farming. An important area of effort is to hinder spawning in fish cages, so that genetic mixing between farmed cod and wild cod can be avoided. A requirement to ensure this will come into force from 2015.

Establishing marine protected areas (MPAs) is one important instrument in the Ministry's effort for securing biodiversity. Other important elements of the Norwegian fisheries management regime are the discard ban, the obligation for fishers to leave fishing areas when the intermixture of juveniles exceed certain limits, and the Barents Sea monitoring program for real time closures of such areas. More than 60 closures, amendments and re-openings are undertaken annually in a successful effort to protect juvenile fish.

Another example of the fishery authorities' work is that against the escape of farmed aquacultural organisms. Such escapes are the greatest environmental challenge the aquaculture industry faces. These challenges are related to genetics, ecology, and spread of disease. Work includes a focus on controls to secure that existing measures are complied with, the improvement of these and the development of new measures. The work of the Fishery Directorate's action plan against escaped farmed fish – the "No Escape Vision (Visjon nullflukt)" has a very high priority. The plan consists of 30 study and action points that will be carried out in the course of the current year. The action plan comprises work on better regulation and better management tools, a more goal-oriented and risk based inspection effort, and revision of technical standards.

Fisheries management authorities participate actively in the UNs general meetings and have contributed actively to setting a focus on the challenges of overfishing, black fishing (IUU), discards of fish, and the connection between IUU fishing and other organised international crime.

3.4 Ministry of Defence (FD)

Environmental and social responsibility shall carry considerable weight in all activities in the defence sectors, and adjustments will be made to provide for a more careful use of the environment. Further development and improvement of the environment leadership system in 2009, including third party certification of some activities, will be central elements for integrating regard for the environment into all planning and decision making processes.

The defence sector will make environmental information accessible both for its own activities and to the public. Systematic registration and use of environmental data will form the basis for inspection of activities and for initiating appropriate improvement measures. Defence has a long and good experience of deploying environmental protection officers, who participate in planning and carrying out exercises in Norway; this experience is to be extended to operations abroad.

As a consequence of altered requirements, many firing ranges and exercise areas have been closed. Considerable manpower effort in removing explosives, and costs related to the environmental clean-up of these areas must be expected for a considerable period ahead. The return of Hjerkinn firing range to civil use is being carried forward; the work of removing infrastructure is being scaled up in 2009 according to plan.

Participation in the interministerial national programme for mapping and monitoring of biological diversity (2007–2010) will be carried forward in 2009.

3.5 Ministry of Health and Care Services (HOD)

The health and care services sector's goal is to achieve a safer and more health-orientated environment. Important measures are to clarify the environmental factors in public occupational health, support local county environmentally orientated health protection, including good enforcement of regulations, contribute to preventing injuries and accidents, prevent poisoning, prevent asthma, allergies and indoor climate illnesses, and improve children's environment and health.

The Ministry of Health and Care Services, in its business meetings of January 2008, asked regional health enterprises to implement the Government's Action Plan 2007–2010 through environmental and societal responsibility in procurement decisions. The Ministry has established that enterprises should bring in competence and contribute to developing new competence through procurement, in

order to identify and choose solutions that have a low negative effect on the environment. The Ministry has asked regional health enterprises to cooperate in order to carry out national-level work, lead by Health West RHF, to survey established, transferable environmental measures in the sector, and prepare possible new climate measures within the specialist health service.

3.6 Ministry of Justice and the Police (JPD)

Work on environmental protection within the Ministry of Justice and Police's area of responsibility mainly concerns legislation, combating crime, preventative work on societal safety and emergency preparedness, and coordination of Governments policy in polar areas. The Ministry aims to ensure that individual subordinate agencies and sectors will use environmentally friendly products and technology.

The largest environmental challenge for the police services is related to fighting illegal, unreported, and unregulated commercial fishing (UUU-fishing) in the Barents Sea, escaped farmed fish, the working environment, art and cultural monuments, and pollution.

The Police Service has a central role in the work of reducing environmental crime. This is performed through preventive measures, integration of surveillance activities carried out under police authority, and through rapid investigation and indictment of breaches of environmental legislation.

Økokrim (Norwegian National Authority for Investigation and Prosecution of Economic and Environmental Crime) is the police and prosecution authority's foremost competence centre in the environmental area and has a special responsibility for environmental crime. Økokrim has an important function both through investigation and indictments in especially serious and principal cases and as a guide and assistance organ for the police counties. Environmental crimes are investigated by a special environment team in Økokrim and through special environment coordinators in the police counties. Økokrim participates in international police cooperation related to combating environmental crime, through Interpol, Europol and the Baltic Sea Task Force.

Interdisciplinary cooperation, competence and good technical environments in the police counties are important for the success of the police in the fighting of environmental crime. The Provincial Environment Forum has an important function in this connection. At a central level, cooperation is strengthened by the Central Environment Forum, under the leadership of the Police Directorate, now comprising 14 different inspection and supervision agencies.

3.7 Ministry of Local Government and Regional Development (KRD)

The Ministry of Local Government and Regional Development carried out various environment-related measures in 2009, mainly in the areas of housing, living environments and construction. The Ministry's related activities in the Housing Bank and National office of Building Technology and Administration are important role players in the implementation of the Government's housing and building policies. Prioritised areas of effort include reduced energy requirements, energy adjustment, more environmentally friendly material use in the building industry, and waste management.

Green Energy Municipalities (Grønne energikommuner) is a cooperation project between the Ministry of Local Government and Regional Development, Ministry of the Environment, Oil and Energy Ministry and KS. Twenty-two local municipalities were selected for the project, and are connected in five networks. The goal of Green Energy Municipalities is for Norwegian local municipalities to invest in energy efficiency measures, bioenergy, and to reduce climate gas emissions. The local municipalities chosen for the project shall, through technical, administrative and

economic support in their own networks lift energy planning to a strategic level in the local municipalities. Experience from the networks will be an inspiration and learning resource for local municipalities throughout the country through learning networks in Vigorous Counties (Livskraftige kommuner). To stimulate local anchoring and support locally initiated projects, a one-off grant of 1.25 million NOK Has been made available to the networks. Use of the money is at the discretion of the local network, so long as it is in accordance with the programmes purpose.

All participating local counties are now working towards or have completed climate and energy plans. The programme will continue through 2010.

3.8 Ministry of Culture and Church Affairs (KKD)

The Ministry of Culture and Church Affairs' environmental work takes place through the Norwegian church, museums, grants to sports halls and construction for culture and sport, and the aesthetic quality of the surroundings.

The museums' object based conservation and interpretation work contributes to spreading knowledge about and experience of connections and changes in the natural and culture based environments around us. Many museums manage cultural monuments in the form of buildings and factories, and many cultural monuments themselves are used as museums. In the Ministry of Culture and Church Affairs budget, an operating grant is now given directly to about 100 museums in the national museum network. The Norwegian Culture Council's technical committee for protection of culture gives grants to museums and culture conservation measures.

Conservation and interpretation of cultural monuments has been a central part of the museums' activities in 2007. In addition many museums have produced projects and exhibitions related to other aspects of environmental protection, for example the Norwegian Folkemuseum's exhibits "Nothing disappears – use, consumption, and recycling" and "Hot Spot" and the Norwegian Technical Museum's exhibition "Climate X", on how technological development has in it the seeds of modern climate change. The museum's engagement in natural science topics has contributed to strengthening interest in environmental questions and ecology.

3.9 Ministry of Education and Research (KD)

The Ministry of Education and Research works for a good environmental profile within the various sectoral Ministries and subordinate activities that it contributes in shaping.

In kindergartens and schools transmission of knowledge and good attitudes towards the environment are an integrated part of the pedagogic task. Welfare and teaching in kindergarten shall promote human equality, equality of opportunity, tolerance, health and understanding of sustainable development. Included in this is love of nature, and understanding of interactions in nature and between people and nature. Nature, environment and technical science are a part of the teaching curriculum in kindergartens; see *Framework plan for kindergartens*.

In school education, environmental studies are integrated into the current teaching plan. Teaching shall give the greatest possible overall knowledge and understanding, and develop the ability and desire to work for a society in harmony with the natural resource base. The period 2005–14 is the UN decade for teaching for sustainable development, and the Directorate of Education has developed a national strategy for the period 2006–10 as a central part of the environmental policy effort within primary education in the coming years.

Universities and colleges are also important institutions for knowledge transmission, but also for research on the environment. Environmentally oriented research is important for obtaining a good understanding of the environment and how the environment is developing; this is an important precondition for good and reasonable development of environmental policy. In Parliamentary Report no. 20 (2004–2005) *The desire to research*, energy and the environment are selected as one of five thematic areas of effort for Norwegian research in the coming years. The Ministry of Education and Research also supports climate research, e.g. through grants from the fund for research and innovation to the programme NORCLIMATE managed by the Norwegian Research Council. In addition the Ministry finances research inside the EU's framework programme; a large proportion is environment related. The Ministry has a focus on following up the climate report and climate agreement as regards research.

Another important measure is the Ministry's financing of Norwegian membership in the Global Biodiversity Information Facility (GBIF), which is an international initiative to secure electronic access to biodata for researchers and other interested parties throughout the world. The Norwegian Research Council represents Norway in GBIF.

3.10 Ministry of Agriculture and Food (LMD)

In order to systematise and strengthen environmental work, the Ministry of Agriculture and Food (LMD) has developed a strategy and action plan for environmental challenges that the agricultural and food sector will be faced with. *The Ministry of Agriculture and Food's Environment Strategy 2008 – 2015* will contribute to attaining the national environment goals and is organised in accordance with the result areas in Parliamentary Report no. 26 (2006–2007), *The Government's Environmental policy and Environmental State of the Nation*. The Ministry's ability to uphold and better integrate regard for biological diversity in its activities is central to the strategy. Furthermore, the strategy invites cooperation and dialogue centrally and regionally between industry, local counties, interest organisations, and the state to secure integration of regard for the environment in a goal-oriented and cost effective way. This is developed in a number of strategy documents on selected themes, which also give an impression of how regard for biological diversity can be integrated into the agricultural sector. A strategy for research and research-based innovation 2007 – 2012 elaborates on the knowledge requirements of themes in the environment strategy and has environment and resource management as one of six prioritised research areas. Development of environmentally friendly production and environmentally friendly products are stressed in three of six strategies for food policy that are presented in the strategy Taste of Norway 2008–2010.

LMD wishes to increase the agriculture sectors effort in climate work both to reduce Norwegian emissions of climate gases and to develop strategies for adaptation to a changed climate. The Government will therefore produce a Parliamentary Report in 2009 on agricultural and food policy and climate challenges. Increased investment in bioenergy with a basis in forestry raw materials will be one of the themes. The Ministry has established a policy maintaining that increased extraction of raw materials for bioenergy from forests will follow the same principles for sustainability as other activities. The Ministry has also asked the Norwegian Research Council to increase effort aimed at increasing new knowledge in this field.

Research related to biological diversity has been strengthened, especially because of the increased extraction of biomass from forests for bioenergy purposes. Research in the field of sustainable use and protection of the nations protected areas is also highly prioritised. The same applies to agricultures effects on watersheds and other environments. The framework for investment in agriculture and biological diversity is found in the Ministry of Agriculture and Foods environment strategy and strategy for research and research-based innovation.

The *intersectoral national strategy and measures against damaging exotic species* contains a range of measures within the agricultural sectors area of responsibility, e.g. work to hinder introduction and spread of plant pests. From 2009 Norway has a new regulation requiring importers of wood packaging to take measures to prevent the introduction of serious forestry pests.

The Ministry of Agriculture and Foods is a participant in a range of international processes where regard for biological diversity is central. The Ministry is actively following up international work under, among others, the FAO commission for genetic resources, the UN convention on biological diversity and the international treaty for plant genetic resources for food and agriculture (ITPGRFA). In the UN's forestry policy forum (UNFF) the Ministry works for a more binding cooperation between countries to care for and better manage the world's forests.

3.11 Ministry of Trade and Industry (NHD)

The Government will motivate industry to be at the forefront of implementing environmental measures to secure a sustainable future for the industry. The Ministry's goal is to lead an active innovations policy to advance development and commercialisation of environmentally friendly technologies and services. This will contribute to an improved environment and lay the foundation for competitive superiority for Norwegian industry. A range of industries in Norway have their basis in a clean environment, e.g. tourism, angling and commercial fisheries, and forestry. The tourism industry is to a great degree based on attractive natural and environmental qualities.

Three central goals for environmental work are to: 1) implement policy for resource use nationally and internationally that can unite regard for the environment, regard for trade policy, and regard for industry; 2) contribute to developing and bringing into use environmentally friendly technology and environmentally friendly goods and services, and 3) work actively within the UN's shipping organisation IMO to prevent and reduce environmental pollution from ships.

Development and use of environmentally friendly technology, goods, and services

Through dialogue with Innovation Norway, emphasis is placed on the environment and energy. Innovation Norway has in recent years committed considerable funds to environmental projects. Most environmentally oriented measures Innovation Norway has been involved with in recent years have been projects where the development or implementation of an environmental product or service has been central. Innovation Norway has considerable network activities that are environmentally relevant, and the company cooperates with many existing company networks in the field of environmental technology.

3.12 Ministry of Petroleum and Energy (OED)

The Government's vision is that Norway shall be an environment and climate friendly energy nation, and take the lead in the development of environmentally friendly energy. Norway shall be at the forefront in the use of new technology that ensures a high degree of resource exploitation with the least possible climate gas and environmental emissions.

A challenge is to unite Norway's role as a petroleum producer and exporter with the country's ambition to be a leader in environment and climate policy. Energy and climate are now integrated to a greater degree on the international agenda. A major mission is to develop new clean energy and to produce fossil fuels without it leading to large CO₂ emissions and thereby contributing to climate change. Norway is working for the cleanest possible production of energy, both in the production of

renewable and fossil energy sources, together with technological development to contribute to reductions in global climate gas emissions.

Regard for the environment has been a feature of Norwegian energy and petroleum production for many years. The strict demands which have been set for activity have led to the fact that Norway has today an environmental friendly energy and petroleum activity which is in a good position to meet steadily stricter demands for environmentally friendly activity.

The Government continues to prioritise reducing CO₂ emissions from the Norwegian sea basin. From 1st January 2008 the Norwegian quota system for climate gases was extended to cover almost 40 % of Norway's emissions, and all of the Norwegian petroleum installations are now included in the quota system. At the same time, the Norwegian quota system has joined the EU quota system.

It is important to ensure that the expansion of wind and water power happens without negative effects on natural diversity, outdoor recreation, or significant landscapes. Sea-based production of renewable energy is interesting in the long-term, but it will require a considerable effort in, among other things, research, development and demonstration of new technologies.

3.13 Ministry of Transport and Communications (SD)

Transport infrastructure and traffic affect the natural and cultural environment both through direct consumption of land, through barrier effects, and through reduced use and quality of experience for areas near transport infrastructure.

Regard for the natural and cultural environment will be better integrated in planning, construction, and running of transport infrastructure. Transport authorities will seek to avoid encroachment on protected natural areas, larger connected natural areas without heavier encroachments, vulnerable natural habitats, and valuable cultural areas.

The Ministry of Transport and Communications and transport agencies participate in an intradepartmental cooperation to survey and monitor biological diversity. Transport agencies will further this work by building up and maintaining a broad environmental science competence. Furthermore, knowledge on the effects of encroachments and of amelioration measures will be improved through further investment in research and development, including stepping up of pre- and post-intervention investigations.

In 2008-2009 the National Roads Authority is carrying out a programme of post-implementation investigations of wildlife measures along the road network. These will focus specifically on the evaluation of measures that might reduce the number of wildlife-related accidents and measures that reduce the barrier effects which roads have, and on measures aimed at red deer.

Chapter IV - Conclusions: Progress towards the 2010 Target and Implementation of the Strategic Plan

4.1 Progress towards the 2010 Target and the strategic plan

4.1.1 Regional and national targets established, and global targets adopted

The European Environmental Ministers (including the Norwegian) approved the goal “to halt the loss of biodiversity by 2010” at its ministerial conference in Kiev in 2003. The Norwegian parliament (Storting) adopted this goal in 2003.

The Norwegian report to the Storting No. 21 (2004-2005) amended the strategic objective to include Norway’s international commitment of halting the loss of biodiversity by 2010. Following this, the Norwegian strategic objective is that “the environment shall be managed in a way that maintains the diversity of habitats and landscape types and ensures that there are viable populations of naturally-occurring species: this will ensure that biological diversity can continue to evolve. In addition, Norway aims to halt the loss of biodiversity by 2010.”

4.1.2 Incorporation of target into relevant sectoral and cross-sectoral strategies, plans and programmes

The Norwegian report to the Storting No. 42 (2000-2001) on the Norwegian Biodiversity Strategy and Action Plan (NBSAP) constitutes the basis for a new management system of biodiversity and a common platform for sectoral measures. Key aspects were the development of a Nature Diversity Law, establishing a National Program for Survey and Monitoring, sector integration through coordination of government measures (including legislation and economic incentives), and the establishment of a Norwegian Biodiversity Information Centre.

The Government agreed on seven overall challenges for the implementation of the Strategic Plan (see chapter II), and has accordingly given priority to implementation of measures by 14 of its ministries related to these challenges.

To achieve the 2010-target it is important that all sector authorities, industry, research institutes and other experts, and NGO’s contribute. An important part of this is the coordination and strengthening of measures (including legislation and economic incentives). Research, mapping and monitoring of the state of nature is a prerequisite to initiate and implement efficient measures.

Implementation of the 2010-target is considered an integrated part of Norwegian Biodiversity policy, and the policies, measures and concrete activities must be seen as this. The 2010-target has represented an additional positive “pressure” for improved implementation of biodiversity concerns in Norway.

4.1.3 Progress made towards the 2010-target and the strategic plan

- 1) A proposal for a new Nature Management Act was presented by the government to the parliament (Storting) April 3, 2009. The Act will contain important environmental principles such as the precautionary principle, the ecosystem approach and the polluter pays principle, extending beyond the scope of pollution. Moreover, the act will codify the principle that decisions affecting the environment are to be built on scientific knowledge, as well as traditional knowledge. Important chapters in the new act are: designation of selected habitat types, priority species and their natural habitats, protected areas, Invasive alien species, access to genetic resources and benefitsharing. The provisions of the Nature Management Act concerning objectives, scientific standards, environmental principles, and access to genetic material, will apply on land and at sea, both beyond and within the 12 nautical mile limit.

- 2) The Norwegian Government has strengthened research, mapping and monitoring of biodiversity during the past years, including a significant increase in the National budget for 2009. Since 2005 budget lines related to biodiversity has increased by 40 % and now amount to more than 1 billion Norwegian kroner (NOK). Several national programmes have been initiated to increase the further contribution to research, survey and monitoring of biological diversity (including the National Program, MAREANO, SEAPOP, the Species Mapping Program, the Species Observation Program, the Nature Database, Environment 2015, and the Sami research programmes "Årbediehtu" and "EALÁT"), and also international cooperation and several species-specific projects.
- 3) In 2008 a Nature index for Norway was developed that will be implemented from 2010. The index will show the overall status of Norwegian nature and will be a tool for measuring the state of Norwegian nature.
- 4) The Norwegian National Red List of threatened species was revised in 2006 in accordance with the IUCN criteria. A new and more comprehensive revision will be published in 2010. The Norwegian Biodiversity Information Centre (Artsdatabanken) was established in 2005, which inter alia will undertake this Red List revision.
- 5) Norway has developed action plans for selected threatened species, that include initiated and planned measures and monitoring. Until 2008 six action-plans have been produced for threatened species including actions already initiated, and a further 11 action plans are underway. It has been decided to produce 22 new action plans for threatened species and biomes in 2009.
- 6) A survey of the need for measures and management plans in protected areas was conducted in 2008. There are approved management plans in 385 protected areas, but there is still a need for 990 new ones. 100 new plans are expected to be finalised in 2009.
- 7) A draft National Plan for Marine Protected Areas has been produced, but there are still outstanding issues to be clarified before approval and implementation.
- 8) Norway has developed and approved an integrated management plan for the Barents Sea, and a similar plan for the Norwegian Sea will be presented for the Government this spring. The management plans sets the overall framework for both existing and new activities in these waters, and facilitates the co-existence of different industries, particularly the fisheries industry, maritime transport and petroleum industry
- 9) An action plan to halt escape of farm-fish from the aquaculture industry along the coast and in the fjords has also been initiated by the Ministry of Fisheries and Coastal Affairs
- 10) The Norwegian Ministry of Agriculture and Food has developed an Action-plan for genetic resources. This contributes to the Nordic Gene Bank and to follow up i.e. of the International Treaty on Plant Genetic Resources for Food and Agriculture.
- 11) The Norwegian Ministry of Agriculture and Food has prepared an Environmental Strategy for the period 2008-2015 to contribute to the achievement of the National Strategic Plan. A central goal for this strategy is improved integration of biodiversity concerns into agricultural activities. The Strategy for Research and Research-based Innovation 2007-2012 specifies knowledge needs attached to the topics of the Environmental Strategy.

- 12) A cross-sectoral national strategy and action-plan against alien invasive species was completed and approved by ten relevant ministries in 2007. The strategy is based on the precautionary principle, focusing on preventing introduction, removing established harmful species and limiting distribution and damage. The Norwegian Black-list was published in 2007 by the Norwegian Biodiversity Information Centre, and is a review of expected ecological risks from 217 of the 2,483 alien invasive species found in Norway. This is the so far most comprehensive review of alien invasive species in Norway.
- 13) Recent developments in the Norwegian Sami policy are highly relevant for the implementation of the CBD. The Finnmark Act of 2005 established the Finnmark estate to be jointly governed by the Sami Parliament and the Finnmark County Council. Procedures for consultation between the State Authorities and the Sami Parliament were established in 2005. The Consultation procedure was used in the preparation of the new Nature Management Act (2009).

International work and integration of biodiversity in relevant international processes:

- 14) The Norwegian Government expects that the consideration of biological diversity as a resource for sustainable development shall form the basis for and be integrated into all relevant international processes where Norway participates, and contributes to measures and decisions under different conventions are mutually supportive.
- 15) Norway has arranged five “Trondheim conferences on biological diversity” to provide scientific input to the CBD and to facilitate a dialogue between representatives of developed and developing countries, focusing on the scientific basis, capacity building and on making recommendations to serve the work of the convention. The next Trondheim conference will be arranged in February 2010, focusing on the 2010 target and beyond.
- 16) Norway participated in the Millennium Ecosystem Assessment work, and inter alia conducted one of the pilot studies.
- 17) An action plan for environment in development cooperation was launched in 2006. Sustainable management of biodiversity and natural resources is one of the prioritised topics.
- 18) Norway’s International Climate and Forest Initiative was launched during the climate change negotiations at Bali in December 2007. Under this initiative Norway is prepared to allocate up to NOK three billion a year to efforts to reduce greenhouse gas emissions from deforestation in developing countries. The initiative applies to all types of tropical forests.

4.1.4 Overall state of progress made towards the goals and objectives

The Norwegian Ministry of Environment coordinates the sector follow-up on the Norwegian Biodiversity Strategy and Action Plan (NBSAP). It is at present difficult to quantify to what extent this work has contributed to reduce human impact on biodiversity. However, the awareness of protecting nature diversity has been considerably improved and would be expected to contribute to significant results on longer term.

1. Sector responsibility and coordination of use of instruments based on the NBSAP have been well incorporated in goals and measures of most sectors, especially within sectors responsible for use of biological resources (i.e. agriculture, forestry and fisheries). This work is annually reported by the sector ministries in the Norwegian Royal Proposition of the Governmental Budget. This is to a large extent related to legislation and regulation and to information and awareness raising.

2. Coordination and strengthening of knowledge have also been considerably strengthened, especially through large cross-sectoral research, mapping and monitoring programs. Established sector initiated research and monitoring programs have also been further developed to integrate biodiversity to a larger extent. Sami (indigenous people group) traditional knowledge from new research projects also provides a significant contribution. Databases collecting accessible information about biodiversity from research institutes, museums, management, NGO's, etc., are developed and made accessible to sector authorities and the public.
3. Sustainable use of biological resources has for a long time been pronounced as an overarching policy of Norwegian primary industry. Based on the NBSAP this has been developed in more specific terms and is also being implemented through measures in most sectors, and this principle has also gradually been anchored into sector laws, regulations and framework plans. An important part of this is conservation measures.
4. Sustainable habitat management (land use planning) is first and foremost secured through the Norwegian Planning and Building Act.
5. Avoid pollution and establish climate change measures: Norway is a member of international and regional conventions, agreements and directives relevant to pollution and climate measures. All sectors are instructed to follow up their relevant parts of these through measures to reduce or halt harmful discharge. Based on a report to the parliament in 2007 Norway has also approved ambitious goals related to climate change mitigation.
6. International cooperation: Norway is a party to several international and regional organizations to secure sustainable use and conservation of biodiversity. Implementation of international conventions and agreements forms the premises of Norwegian cooperation with developing countries as well as regional cooperation in Europe and the Arctic.

4.1.4 Indicators used for measuring progress

Norway participates in the European Environmental Agency (EEA) cooperation to report on biodiversity indicators (SEBI2010), which is a Pan-European follow-up of the CBD indicators.

Norway reports data to the SEBI2010 (Streamlining European 2010 Biodiversity Indicators), but at present we are reporting only on three of these indicators (see chapter I), but has relevant data basis to report on 14 of the 26 indicators (see chapter I, table 2).

The Norwegian government has started the development of a Nature index for Norway. The Nature index will show the overall change of nature, and serve as a useful tool for information and communication. The index will also indicate where the knowledge (mapping and monitoring) has to be improved in order to present reliable information. In spring 2010 the first version of the Nature index for the whole of Norway will be presented.

As an important tool for following up the Norwegian Strategy for Sustainable Development a set of indicators are developed, also covering biodiversity, it is a yearly reporting on progress in the national budget.

4.1.5 Obstacles encountered

The main obstacles to be reported from the Norwegian implementation of the 2010-target and the CBD in general are:

Conflicting interest: The different sectors legitimately have different objectives. There are some ways to address trade-offs between (short-term) economic interests and the conservation of biological diversity. In general impact assessments and specific processes like the one that was leading up to the management plan for the Barents Sea, are procedures to minimize conflicts between different sectors. Such processes are dependent upon:

Knowledge on the biodiversity and the values it represents. Improved knowledge, including site-based and easy accessible knowledge is important for the management of biodiversity at all levels.

Time: Processes, including governmental processes, often take more time than expected.

External factors, globalization – incidents and developments that Norway alone cannot control or avoid.

4.3 Conclusions

4.3.1 Implementation of the Convention – impact on improved conservation and sustainable use of biodiversity, and fair and equitable sharing of benefits of utilization of genetic resources

The Norwegian Biodiversity Strategy and Action Plan (NBSAP) with further amendments and the moves towards the implementation of the plan have had positive influence and impact to the Norwegian implementation of the Convention, including the following:

- Convention obligations have been integrated into practical Norwegian policy and management;
- Sector responsibility, coordination and involvement of economic sectors;
- New legislation, in particular the new Nature ManagementAct;
- Management based on knowledge and on targeted measures, and increased sector demand for biodiversity knowledge;
- Major activities and outcome are given under 4.1.3 in this chapter.

4.3.2 Lessons learned regarding implementation

The work to establish measures, instruments and an infrastructure with capacity of implementing the Convention has been more time-consuming than expected. This work needs good infrastructures that take time to build.

4.3.3 Summary of future priorities and capacity-building needs for further national-level implementation of the Convention

This information is based on existing policies and priorities given in relevant official documents approved by the Parliament.

Survey and monitoring of biodiversity:

- Finalise ongoing projects and programs. An important part of this work is to develop a joint system to obtain and exchange data supporting protection and use of biodiversity between different databases. Analyse information from the Nature index with regard to data need and habitat status.
- Continue the developments of an overall monitoring programme for biodiversity.
- Establish and develop the Species Project (“Artsprosjektet”).

Research, knowledge and capacity building:

- The Norwegian Environmental Research towards 2015 (Environment 2015) – is a broad and multidisciplinary research programme supposing to attend knowledge of central environmental issues and to make basis for future policy-making. Environment 2015 is supposed to develop new research-based knowledge to support sustainable use and management of the natural and cultural environment.
- As a precautionary measure it is necessary to develop capable systems to report the scale and character of encroachments in habitats identified as threatened or in need of special protection. This would support capacity building of subordinated authorities and relevant industry, and development of sector guidelines.

Environmental strategies:

- The Norwegian Ministry of Agriculture and Food will follow up the ambitions in its environmental strategy for the period 2008 - 2015 to achieve the national goals.

Sustainable use:

- Sustainable use of biological resources is a priority principle for the primary industries, including of fisheries, forestry and agriculture, and will be implemented through management plans of activities that may cause a threat to biodiversity.

Action-plans and regulations:

- Development of action-plans for threatened species and biomes is still a prioritized action.
- It is a priority to strengthen regulations and control systems, including review of laws, regulations and international agreements, to achieve an improved coordination, management and a more holistic set of rules to combat the impact of alien invasive species.

Protection measures:

- Systematize existing knowledge to evaluate protected areas in Norway for the inclusion into Emerald Network (European network of protected areas under the Bern Convention, aligned to EU's Natura 2000 network), and to establish a system to follow up on and monitor concrete protection goals.
- To establish a representative, ecological network of protected areas for Norwegian coastal and sea areas within 2012.
- Strengthen the work of establishing management plans for national parks and other protected areas, included special management measures in areas where necessary.

Pollution and climate change mitigations:

- Acidification from long-range trans-boundary pollution is still one of the largest threats to the Norwegian environment and will still have to be followed up with mitigation measures.
- The Norwegian implementations and policy for further development of international conventions related to significant reduction of pollution and hazardous chemicals.
- Implementation and further development of the framework convention on climate change (UNFCCC). Maximize synergies between the three Rio conventions.

4.3.4 Suggestions for actions that need to be taken at the regional and global levels to further enhance implementation of the Convention at the national level

- Continue working for mainstreaming of biodiversity at all levels.
- New international target/vision with a few selected measurable indicators might stimulate implementation
- Improved information on the values from biodiversity and ecosystem services and the establishment of an intergovernmental platform for biodiversity and ecosystem services.
- Further clarified links between climate change (both adaptation and mitigation) and biodiversity and ecosystem services.
- Maximize the use of systems and tools to ensure a comprehensive implementation of all related international obligations.
- Facilitate arenas for review-procedures where countries can share experiences and learn from each other.
- Targeted financial and technical assistance to eligible countries. More detailed obligations might release more funding.
- Coordination and improvement of international system of agreements. Industry related agreements must have goals that are mutually supportive to the environmental agreements. CBD should play a central role in this coordination attempt.

Appendix I - Information concerning reporting Party and preparation of national report

A. Reporting Party

Contracting Party	Norway
NATIONAL FOCAL POINT	
Full name of the institution	<i>The Royal Ministry of Environment</i>
Name and title of contact	<i>Tone Solhaug, Senior Adviser</i>

officer	
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CONTACT OFFICER FOR NATIONAL REPORT (IF DIFFERENT FROM ABOVE)	
Full name of the institution	<i>Directorate for Nature Management</i>
Name and title of contact officer	<i>Reidar Hindrum, Senior Adviser</i>
Mailing address	<i>7485 Trondheim, Norway</i>
Telephone	+47 73580833
Fax	+47 73580501
E-mail	reidar.hindrum@dirnat.no
SUBMISSION	
Signature of officer responsible for submitting national report	
Date of submission	<i>April 2009</i>

B. Process of preparation of national report

The Royal Norwegian Ministry of Environment (MoE) instructed in its Governmental Assignment of 2009 the Directorate for Nature Management (DN) to coordinate the process to compile inputs to and to draft the 4th Norwegian National Report to the CBD. In a letter of January 22, 2009 MoE also urged for sectoral input to the report from the following ministries and the Sami Parliament:

- Ministry of Agriculture and Food,
- Ministry of Fishery and Coastal Affairs,
- Ministry of Foreign Affairs,
- Ministry of Labour and Social Inclusion,
- Ministry of Finance,
- Ministry of Defence,
- Ministry of Children and Equality,
- Ministry of Justice and the Police,
- Ministry of Culture and Church Affairs,
- Ministry of Local Government and Regional Development,

- Ministry of Education and Research,
- Ministry of Petroleum and Energy,
- Ministry of Transport and Communications,
- Ministry of Health and Care Services

Additionally DN in a letter to the same ministries and the Sami Parliament February 2, 2009 forwarded detailed instructions for the requested input.

This report is prepared by inputs from different processes and assignments within the Norwegian Governmental management. The overview of Biodiversity Status, Trends and Threats are mainly produced from relevant reports from monitoring, mapping, and management activities coordinated or implemented by DN, the Norwegian Polar Institute and the Norwegian Institute for Marine Research, while the chapters describing current status of national biodiversity strategies and action plans, and sectoral and cross-sectoral integration or mainstreaming of biodiversity consideration, are compiled from inputs made by Norwegian sector ministries.

The Norwegian Biodiversity Policy and Action Plan - Cross-Sectoral Responsibilities and Coordination was made as a report to the Norwegian Parliament (Storting) Report No. 42 (2000-2001) in 2001. Simultaneously with the submission of the 3rd Norwegian National Report to CBD, the status of the sector responsibility to the Action Plan was reported in the Government's Environmental Policy and the State of the Environment in Norway (Report No. 21 (2004-2005) to the Storting). The sector ministries were asked to similarly update their issues of the Action Plan to the 4th National Report.