Danish Ministry of the Environment
Nature Agency

5th Danish Country Report

To the Convention on Biological Diversity

March 2014

Contents

Preamble

This Danish country report is intended to provide an overview of the current status of biodiversity in Denmark and to present how nature initiatives are managed and prioritised at political and practical levels.

The report is structured in line with the UN Convention on Biological Diversity guidelines, which determine that the report must include a status report on:

- biodiversity conditions (Chapter 1)
- political strategies and priorities, practical initiatives and funding (Chapter 2)
- progress made towards meeting United Nations biodiversity targets by 2020 (Chapter 3).

The report has been prepared by The Danish Nature Agency with input from The Danish Environmental Protection Agency, the Ministry of Food, Agriculture and Fisheries in Denmark, and the Ministry of Foreign Affairs of Denmark.

Chapter 1 is based on ongoing work conducted by COWI A/S in preparation for the nextDanish State of the Environment Report.

Project manager in charge of preparing the report:

Søren Mark Jensen (soemj@nst.dk)
Section for Biodiversity and Species
The Danish Nature Agency
Danish Ministry of Environment

EXECUTIVE SUMMARY

Denmark's nature and biodiversity are the result of landscape development since the Ice Age as well as of centuries of human impact from agriculture, fisheries, forestry, and urban and infrastructural development.

Two-thirds of the land area is now agricultural land and the landscape has only a few large nature areas with long-term continuity and favourable conditions for ecological dispersal.

From an European perspective Denmark's coastline is of unique natural value and to a certain extent, there is still space here fornatural dynamism.

About one quarter of theDanish flora and fauna which have been subject to studies and assesments are listed on the national Red List of endangered species as threatened, nearly threatened or extinct. There is, however, also constant migration of new species from neighbouring countries.

The forest is the natural habitat which is home to most of this country's endangered species. Many of the forests are cultivated intensively and their conservation status is unfavourable bad. However, there are some signs of positive development in the shape of new forests with less intensive forestry and there is a transition to more natural stewardship, e.g. an increase in areas of untouched forest.

Open natural habitats, including meadows, heaths and commons, are threatened by the impacts from nutrientswhich lead to overgrowth and few dominant nutrient-requiring species of vegetation. Other threats are insufficient ruminant grazing, drainage and fragmentation. These impacts cause the demise of species which historically have adapted to live in a rural landscape with open habitats. For instance are many Danish birds species declining - although fortunately not as fast as they did in the past.

Nutrient discharge into watercourses, lakes and seas has been significantly reduced since 1990, and there are signs of positive development in the biodiversity of aquatic environments. Oxygen depletion, however, continues to dog many fjords, which fail to meet goals for better biological conditions.

In the main, fish stocks are exploited sustainably, with the exception of a small number of stocks, e.g. of herring and cod in certain locations. Many marine habitats are negatively impacted by nutrient substances and, in some cases, by bottom trawling and rock fishing. A project to restore rocky reefs off the island of Læsø and the construction of offshore wind farms have locally created suitable habitats for many marine species.

Current and future climate changes are expected to bring more pressure to bear on biodiversity and it is also expected that many species will migrate, e.g. if coastal land areas and habitats disappear due to rising sea levels. Other climate-related issues are increased rainfall and therefore more intensive outflow of nutrient substances from fields into watercourses, lakes and coastal waters. In addition coastal protection measures may eliminate some of the dynamism of coastal nature and issues related to invasive alien species may also be exacerbated by climate change.

To sum up biodiversity in Denmark continues to decline in many spheres but there are also some areas in which the speed of decline has slowed and, for some natural habitats and species, there are improvements on the horizon. Compared with the previous Danish national report to the

Biodiversity Convention four years ago, there are improvements but there are also many challenges yet to be resolved.

A large number of international, European and national policies, strategies and legislative measures are important for and underpin nature conservation in Denmark. In recent years, the provisions of the EU Habitats and Birds Directives have played a significant role in nature conservation initiatives in Denmark. The Water Framework and Marine Strategy Directives also helps frame Danish nature conservation efforts. In the future, new EU directives concerning profit-sharing in connection with the exploitation of genetic resources and concerning invasive alien species will also be important not only for Denmark's biodiversity but also for biodiversity in other parts of the world.

The lions' share of nature initiatives in Denmark until 2015 has beenfinanced througha Green Growth agreement (2009/2010). This agreement was complemented in 2013by the present Government in the shape of the Green Transition agreement.

The goals set include amongst others the following: Further reduction in nitrogen and phosphorus discharges from agriculture, a reduction in the use of pesticides and the establishment of 50.000 hectares of new nature areas in the shape of buffer zones along watercourses and lakes as well as establishment of more forests and restoration af wetlands.

Several initiatives have also been designed to encourage more organic farming and to actively manage vulnerable natural habitats, such as meadows, heaths and bogs.

Presently, a first generation of Nature Plans for Nature 2000 areas is being implemented and supports the achievements of several of the nature-related goals anda first generation of Aquatic Plans is on way and will further contribute to the achievement of these.

In 2013, a National Commission for Nature and Agriculture presented recommendations to secure both more sustainable and profitable agricultural production and the creation of more robust, richer and less fragmented nature in Denmark. The government is currently considering how best to realise these.

Recently, the government set up an independent nature foundation, thus realising one of the commission's key recommendations. The nature foundation will be funded by state grants and donations from two private benevolent funds. The main purpose of the foundation will be to protect and create areas of natural value and to ensure that nature is more cohesive.

In 2014, the Danish government has also planned to launch a new National Forestry Programme which will guide the future management of forests and address the challenges of ensuring better conditions for the forest biodiversity.

The majority of the EU’s and UN’s targets for biodiversity are to be obtained by 2020. As documented in this report a wide range of activities have been launched to achieve the overall goal of halting the decline in biodiversity, and more particularly to achieve the biodiversity related Millennium Development and the Aichi targets.

In order to further strengthen these efforts the government will launch an overarching Nature Plan for Denmark in 2014 which will determine and focus the direction of Denmark's future nature initiatives, including the preparation of a new national biodiversity strategy.

1. Chapter

Current Status of National Biodiversity Management, Policies, Strategies, Actions and Financing

1.1 General land use

- Denmark is an agricultural country. In 2013, 66% of the land area was cultivated.
- The area of open natural habitat has declined over the last fifty years and continues to decline.
- The forest area is growing and has done so since a first forest census in 1881.

A small country with many stakeholder groups

The landscape of Denmark is primarily cultural, in the sense that most of the open landscape is cultivated. More than half (66%) of the total land area of Denmark is used for agricultural purposes. The remainder is covered by urban areas, roads and infrastructure (10%), forests (14%), heaths (2%) and meadows, lakes and bogs (7%) [1].

The relatively small area of Denmark has to accommodate many different needs. Space must be allowed for farming, urban and business development, energy production,defences against flooding, conservation of cultural environments, larger areas of forest, more preserved nature areas etc. Many factors have to be considered but in some cases it is possible to accommodate several different needs on the same area of land. For example, establishing wetlands can help to remove nitrogen while providing habitat for plant and animal life. The many issues require an holistic approach to land administration and planning.

Forests, nature areas in the form of wetlands, towns, roads and other infrastructural areas are growing gradually, primarily at the expense of agricultural land area while the area of open natural habitets such as grasslands, heaths and bogs have been rather stable during the last decade.

Notwithstanding this development, Figure 1-1indicates that the share of cultivated agricultural land in Denmark remains one of the highest and the share of forest among the lowest, compared to other European Member States.

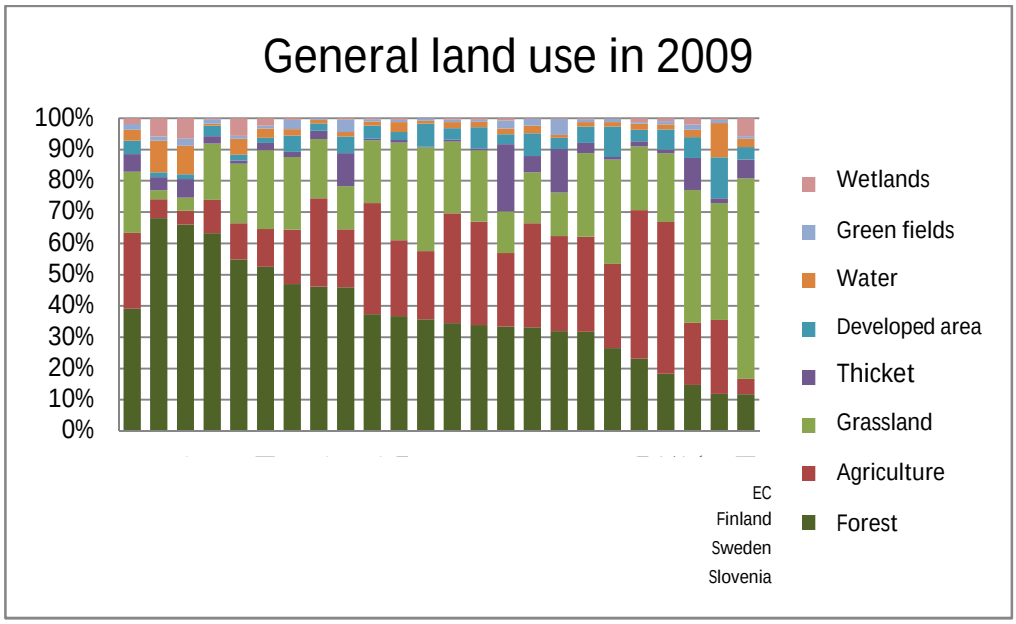

Figure 1-1Land cover, land use and landscape in 2009 in the European Union and its member states (except Bulgaria, Cyprus, Malta and Romania). source: Eurostat (online data code: lan_lcv)

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1.2 Arable land

1.2.1 Agriculture and the environment

- Nutrient discharge into the surroundings has been reduced during the last 20 years whereas the frequency of pesticide treatment has increased since 2009.
- The atmospheric nitrogen load and the uneven distribution of grazing cattle lead to a loss of biodiversity due to overgrowth in open natural habitats.
- Climate change may bring about more nutrient discharge and increased pesticide use.

Although a number of initiatives have been introduced in order to reduce agriculture's impact on the environment, intensive agriculture, including the use of pesticides and nutrients, continues to impact Danish biodiversity, the aquatic environment and drinking water.

There is strong focus on achieving a better balance between maintaining profitable agriculture in Denmark and better biodiversity protection, pure drinking water and favourable ecological conditions in watercourses, lakes and coastal waters.

Inevitably, vast agricultural areas dedicated to farming make a strong impact on nearby natural and marine environments. The use of pesticides reduces biological diversity in and around agricultural land, and nutrient discharges (nitrogen and phosphorus) affect natural habitats and the aquatic environment due to nitrogen leaching position and discharge via drainage and surface water, which may ultimately lead tobloom of algeas and oxygen depletion in lakes, fjords and seas.

In Denmark, many of the most endangered and valuable habitats, such as commons, salt marshes and freshwater meadows, depend on extensive agricultural activities such as grazing and cutting. Without these activities, natural areas becomedominated by nutrient-requiring plant species and biodiversity diminishes. The challenge is to ensure that there is sufficient grazing livestock to graze on open habitats and that grazing is profitable. Cattle farming is most common in western Denmark whereas there are less animals grazing the habitatsin other parts of the country.

Habitats are isolated and adversely affected by nutrient substances
For several centuries, agriculture has dominated Danish nature with its annual crop rotation and areas grazed by cattle. The list of species which depend on extensive grass and areas planted with arable crops is long and included the hare, partridge, lark, stork, wild bee and many plants.

Following the industrialisation of agriculture, many of these species have dramatically declined due to the eradication of small uncultivated areas and the increased use of pesticides and fertilizers.

Parallel developments in the form of urbanisation and extension of the infrastructure (i.e. road and railway systems) have created barriers in the landscape which prevent the free movement of wild animals and plants.

The numbers of species of birds which like to inhabit arable land, such aspartridge, skylark, corn bunting and northern lapwing, continue to decline. Also a rare breeding bird, the little owl, continues to decline rapidly andit is believed that there remains a breeding population of only 40 pairs. Recent research indicates that the decline is due to a lack of food in the breeding season because there are fewer healthy meadows, commons and permanent pastures [1].

In the mid-1990s, many hectaresof cultivated fields were laid fallow in connection with EU agricultural policy. Some of these fallow fields quickly became suitable habitats for farmland animals and plants. When agricultural policy was changed in 2007/2008, about 80% of the fallow

fields (approx 115.000 hectars) were returned to ordinary farming and the re-established natural habitats disappeared [8].

Climate changes are expected to produce increased crop yields due to increased CO_2 in the air, higher temperatures and a longer growing season. These changes will presumably require more fertilizers and heavier and possibly more frequent rainfallcan cause more nutrient substances to dissipate into the aquatic environment. A warmer, more humid climate can also be expected to change plant protection needs, and resulting in more pesticide consumption due to the occurrence of different plant diseases and other pests [2].

Table 1-1
Pesticide Load Indicator (Load units per ha), based on the total sales of pesticides in Denmark for application on the "conventionally" grown area [3].

	2007	2008	2009	2010	2011	2012
Pesticide Load Indicator (PLI) [Load units per ha]						
Human health	0,89	1,08	0,74	0,94	1,06	1,29
Environmental fate	0,86	1,03	0,64	0,88	0,96	1,39
Environmental toxicity	0,67	1,44	1,46	1,57	1,00	2,32
Total	2,41	3,55	2,85	3,39	3,02	5,00

Nitrogen load is falling, but use of pesticides is increasing

The quantity of surplus nutrient substances in agriculture is falling year on year. This applies to both nitrogen (N) and phosphorus (P). The N-field surplus has been reduced by about 25% since 2002, from 101 kgN/ha to 75 kgN/ha, and by about 46% since 1990, where the surplus was 138 kgN/ha. The P balance has also fallen since 1992 [5]. Research has shown that there is a clear connection between the field balance for nitrogen and the land-based deposition of nitrogen into the seas around Denmark [6]. We must conclude therefore that there has been a significant fall in the input of nitrogen into our coastal waters.

As shown in, Figure 1-2 the goal to reduce the Treatment Frequency Index (TFI) to 1.70 by 2009 was not achieved. From 2000 to 2012, the TFI is seen to have increased from about 2.58 to 3.96 [7]. The increase in sale in 2012 is due to the increased tax introduced from 1. July 2013. The load based on the first year with pesticides data from the farmers statistic is 2,2 (2011/12). One of the methods used to reduce the pesticide load is to convert to organic farming, in which only certain pesticides with negligible or no environmental load may be used and then only to a very limited extent. The area farmed organically is increasing but continues to account for only a small share of the total agricultural area.

Atmospheric nitrogen deposition, of which 58% originates from farming, has fallen generally in recent decades. For a large number of areas which have low-nutrient habitats, the critical load is still exceeded.

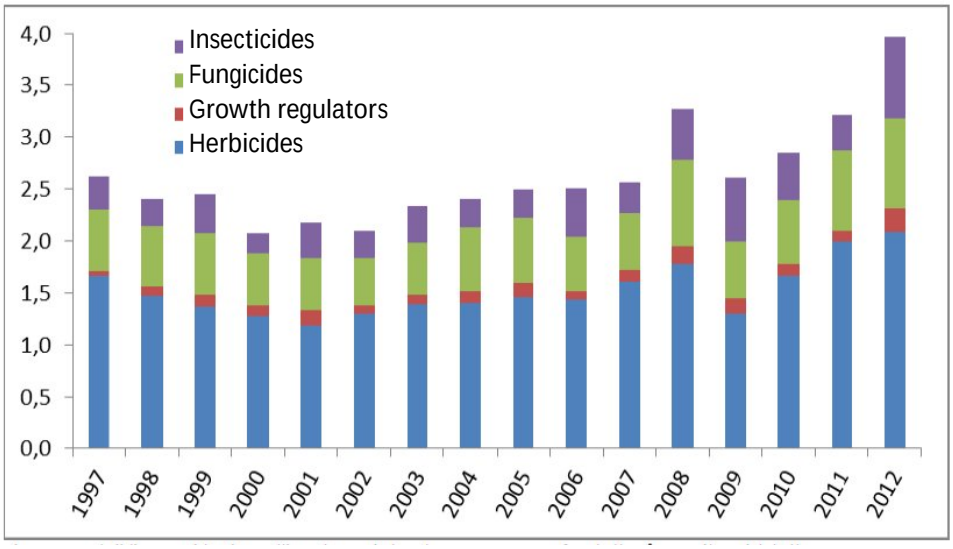

Figure 1-2Treatment frequency from 2000 to 2012, calculated on the basis of sales figures. [4]

Pesticide statistics in Denmark has been based on reported sales for decades. The resulting statistics is presented as the Treatment Frequency Index (TFI), and – since 2007 - the Pesticide Load Indicator (PLI), expressing the load on human health and the environment [2]. Both indicators show an overall increasing trend during the period 2007-2012 (Figure 1-25). Some of the pesticides used may end up in our watercourses and may have adverse effects on the organisms in them. Possible consequences for the watercourse ecoloy include deterioration of biodiversity and reduced capacity to metabolise organic material.

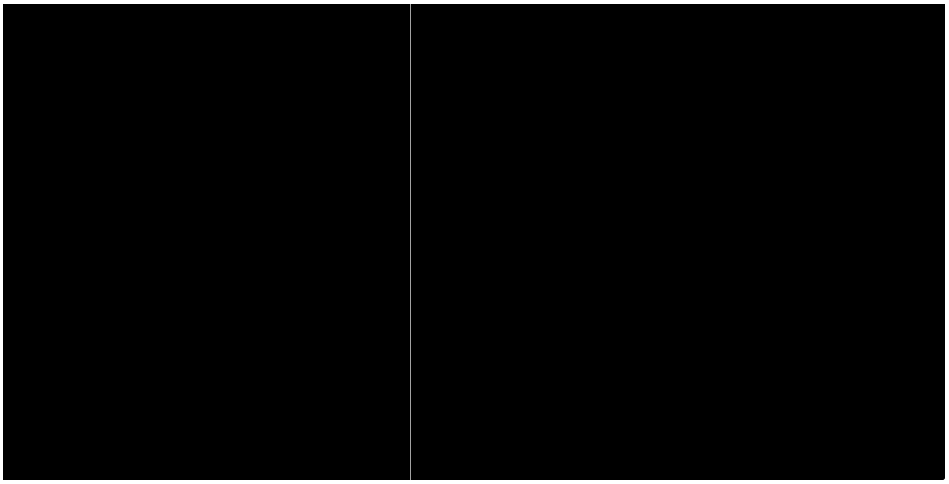

Figure 1-3Relative development of Treatment Frequency Index /TFI) and Pesticide Load Indicator (PLI) 2007-2012 (2011 = index 100). modified from [7].

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1.2.2 Atmospheric deposition of nitrogen

- The atmospheric deposition of nitrogen poses a threat to open natural habitats, such as heaths, commons, bogs and dunes, as well as to the perimeters of woods and forests.
- Nitrogen is deposited in the atmosphere from agriculture, traffic and industrial combustion.
- Increased levels of nitrogen in low-nutrient habitats impede ecological conditions for life and lead to suppression of dwarf species of plants, typically vascular plants (tracheophytes), lavers and mosses.

Critical thresholds for low-nutrient nature are exceeded
Atmospheric deposition, in particular of nitrogen (N), is a threat to vulnerable, low-nutrient habitats, such as woods, heaths, fens and commons. When nitrogen in the air comes into contact with water, it can be absorbed via plant roots.

The airborne nutrients come in particular from agriculture but also from industrial and traffic sources. They spread by the wind but are most often deposited close to the source, e.g a cowshed or pigsty, chimney or road.

The critical load of N for a habitat is a measure of its sensitivity, expressed as the maximum level of nitrogen deposition the ecosystem assimilate without significant damage or harm. If the maximum critical load is permanently exceeded, endangered hardy species disappear and are replaced by more common nutrient-requiring species, such as tall grasses, nettles, creeping thistle, cow parsley and birch. Maximum critical load levels have been set for atmospheric deposition in different habitats (see below).

To a certain extent, the negative changes in vegetation can be counteracted by means of nature management or extensive cultivation but in the long run biodiversity is compromised if the quantity of nitrogen is not simultaneously reduced.

As 35% of the total nitrogen deposition in Denmark stems from Danish sources and the remaining is the result of long distance transport from abroad, it is important that EU Member States make a concerted effort to reduce nitrogen deposition so that European low-nutrient habitats can be preserved.

Changes in nitrogen deposition
Nitrogen deposition has generally fallen in recent decades but the critical limit in many areas with low-nutrient habitats is still exceeded. In 2011 the average atmospheric background load was 14kgN/ha, and total deposition was 60,098 tons of N in land zones. In 2011, the sources of deposition in land zones were distributed as 58% from farming and 42% from combustion processes [1].

Recent research indicates that more than 10% of Danish plant species have declined solely due to atmospheric nitrogen deposition and more than half of these species are the endangered, Red-Listed or characteristic species for their habitats[2].

Table 1-2 Empirical critical loads for habitats and forests. For a number of habitats, the critical load should be reduced in line with new recommendations [2].

Habitat	Critical load	Deviations
Common	10-25 kg	acidic common 10-20, chalky common 15-25
Heath	10-25 kg	dry heath 10-20, humid heath 15-25
Freshwater meadow	15-25 kg	
Bog and fen	5-25 kg	raised bogs 5-10, sphagnum basins, peat valleys 10-15, low-nutrient fens and heath bogs 10-20, chalky bogs and springs, high-nutrient fens 15-25
Deciduous forest	10-20 kg	
Coniferous forest	10-20 kg	

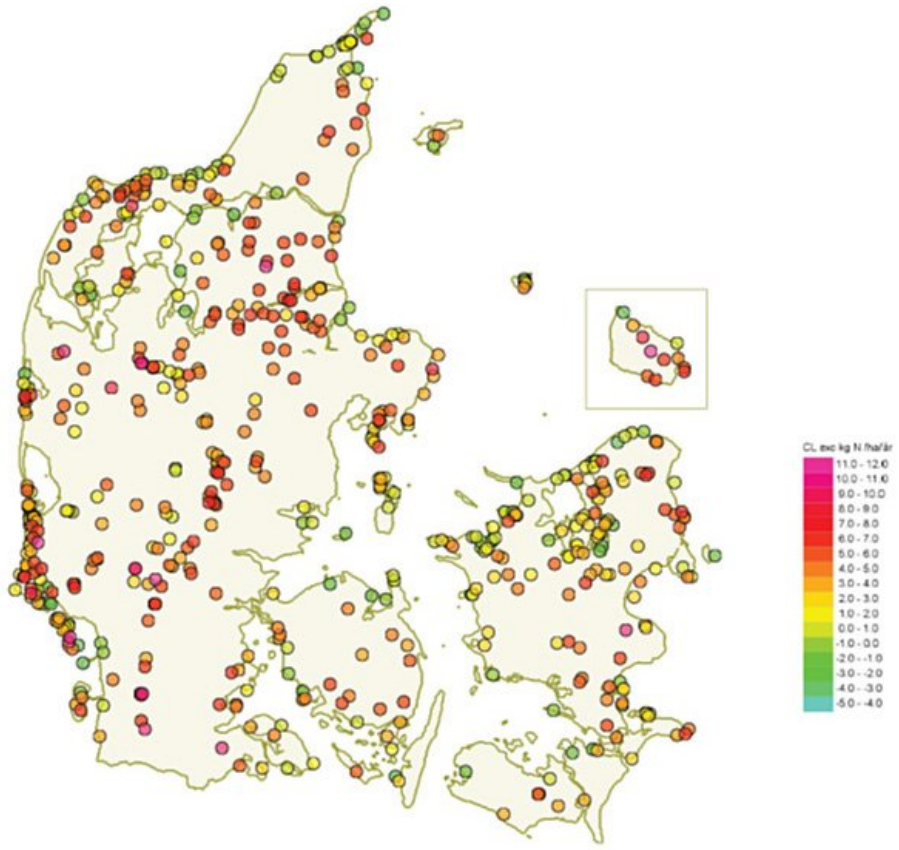

Figure 1-4Calculated exceedance of critical load in 2010 based on a criteria stipulating no decline in biodiversity compared to the reference year 1992. The dots symbolise the intensive novana stations within the natura 2000 areas [2]

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1.2.3 Organic farming

- The area farmed organically has increased about 4.5 times in the last 18 years.
- Organic farming benefits biodiversity.
- Organic farming reduces the nutrient load.

Transformation is progressing slowly

Organic farming is required to desist from using artificial fertilizers, pesticides and genetically modified organisms (GMOs). Organic farmers fight weeds by crop rotation planning, mechanical means and use natural fertilizers. The transformation from conventional to organic farming is shown to have several positive effects on the environment and on species of flora and fauna in and around the agricultural areas. Among other factors, this is due to a lower pesticide load on nearby small biotopes [1,4].

Nutrient discharge from organic fields is most often less than from conventional fields. In the period 2008-2011, Aarhus University calculated that there is 17kgN/ha less leached from organic fields [2,3,5].

Steps in the right direction

Organic farming in Denmark accounted for 6.9% of the agricultural land in 2012 [6]. However, the share of organic farming is growing. Following strong growth in organic farming in the 1990s and a minor decline in the period 2002-2006, in 2012 the area dedicated to organic farming exceeded the previous record level (which was achieved in 2002). The area dedicated to organic farming has increased from 150,207 hectares in 2007 to 182,930 hectares in 2012.

Despite financial crisis in recent years, turnover of organic food products remains relatively high. In 2012, 7.5% of total food sales in Denmark was organic. The figures are unchanged relative to 2011 [7]. The figures cover home-grown and imported food but not farm-gate sales, sales via subscription and specialist stores. In 2007, the share of organic foods was just over 5%.

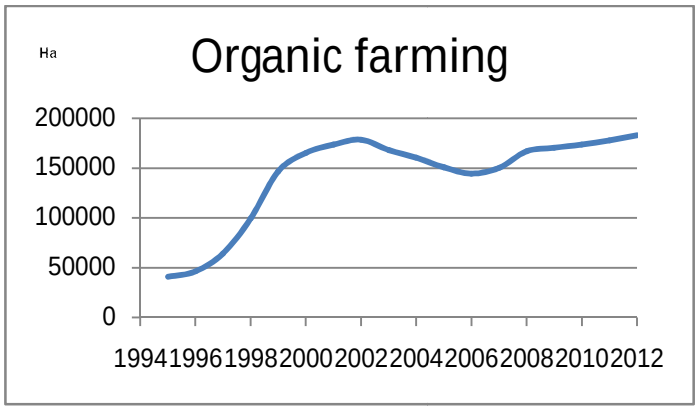

Figure 1-5Development in total organic production area 1995-2012. Source: statbank denmark search for "oeko1".

Figure 1-6Organic rapeseed field. Organic fields provide suitable habitats for a wider variety of species in and around them, due to a circumspect use of pesticides. On the other hand, yields are lower than from a conventionally farmed field. Image: Aske Thorn

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1.3 The open natural habitats

1.3.1 Grasslands, heaths, bogs, meadows and saltmarches

- The area covered by open natural habitats has declined considerably since the 19th century but is now stable and covers approx 10% of Denmark's total area.
- Many species associated with open natural habitats continue to decline in number.

The open natural habitat types – grasslands, heaths, bogs, freshwater meadows, sand dunes and salt marshes – are natural habitats of types, whose biodiversity, to a great extent, depends on grazing, clearing or cutting. There are certain species, including orchids, butterflies and ground-nesting birds, which are specially adapted to the ecosystems of open natural habitats.

During the past decade, the area covered by open natural habitats has remained stable but their quality and biodiversity are declining [4].

The quality of the open types of natural habitats is under pressure from a combination of factors, including lack of grazing animals/cutting, unnatural hydrology and airborne nitrogen pollutants, the effects of which are to reduce biodiversity and exacerbate overgrowth. Overgrowth of tall, nutrient-requiring species of plants in open natural habitats reduces biodiversity, not only among plants with low nutrient reguierments plants (often low-growing plants), such as shrubs, orchids and broad-leafed herbs, but also among the insects associated with dwarf flora.

Fragmentation of natural landscape areas and invasive species also represent a threat to the biodiversity of the open natural habitats.

Based on what we currently know about climate change and its potential effects, open natural habitats are expected to face specific challenges if they are located in the coastal zone or are dependent on a flow of water containing little nutrient pollution.

In the case of salt marshes, which lie between the sea and inland areas, experts are talkingabout “coastal squeeze". Coastal squeeze is understood as a situation in which the salt marshes are expected to become permanently flooded or increasingly eroded due to rising sea level but are unable to shift further inland due to dykes and other fixed landward boundaries built to protect agricultural land, towns and roads against the rising sea level.

In the case of meadows and moors, increased rainwater drainage as a result of more and more torrential rains is expected to result in more nutrient discharges from adjacent agricultural land. This would lead to less biodiversity in the open natural landscape and to increased risk of overgrowth.

Open natural habitats in Denmark, which cover just under 10% of the total land area, are protected under the auspices of the Nature Conservation Act (Paragraph 3) . They are protected regardless of whether they are registered as protected or have been inadvertently omitted from the register. Article 3 of the act protects habitats from most changes in their condition, e.g. ploughing, drainage, more fertilizers and spraying, etc.

In the case of freshwater meadows protected by paragraph 3 which have been subject to conversion, e.g. every 7-10 years, this practise should preferably continue.

It seems that the total area of land protected by Article 3 is not shrinking. Yet the quality of the Article 3 areas continues to deteriorate due to the effects described above.

There are significantly more Article 3-protected natural habitats in municipalities in Central and Northern Jutland than in the rest of the country. The largest areas of protected natural habitat are found in a few municipalities, including Thisted, Ringkøbing-Skjern and Varde. This fact is explained by their agricultural structure and geological conditions, i.e. extensive areas with sand dunes and salt marshes.

In addition to natural habitats protected under Article 3, there are other types of open natural habitats and other natural environments, such as permanent pasture. Despite relatively intensive farming, these pastures often encompass small, more natural spots which become the habitats of birds, mammals and insects. This means that, in combination with agricultural land, permanent pastures often make a positive contribution to the landscape's ecology. An area corresponding to 4% of Denmark's land area is permanent pasture. These pastures are partly financed by EU agricultural grant schemes, which include care requirements.

Less than 2% of the land area is dunes, cared for by the Danish Nature Agency's administration (particularly clearing and burning). From the European perspective, the dune areas of Denmark are unique. There are extensive, unbroken chains of dunes, with successive stretches of white, grey and green dunes, dune heaths, scrub and dune slacks. Almost 80% of the total EU area of dunes heaths of the type registered as Special Areas of Conservation (SAC) is found in Denmark[5].

In the wake of decades of serious demise, there are currently no significant changes in permanent pastures and dunes. As for the natural quality of the dunes, there are signs of modest progress in dune heaths, while the natural quality of low-nutrient dune slacks is deteriorating. Progress for dune heaths is probably due to more focused and efficient care including comprehensive tree clearing in the period 2004-2009[2].

In the latest report to the EU on the conservation status of Denmark's natural environment, only three out of 34 terrestrial open natural habitats are assessed to have favourable conservation status. These four are habitats, of whose total area Denmark has only a very modest share [5, 6].

More open natural habitats were created by new legislation in 2012, the Buffer Zones Act which determines that a 10-metre buffer zone must be established around every watercourse and lake (area > 100 m^2) located in land zone. The Act ensures that an area of 50,000 hectares becomes buffer zone, in which it is not permitted to grow crops, spray pesticides or fertilize the soil. The Act permits public access to the buffer zones in accordance with the Nature Conservation Act regulations.

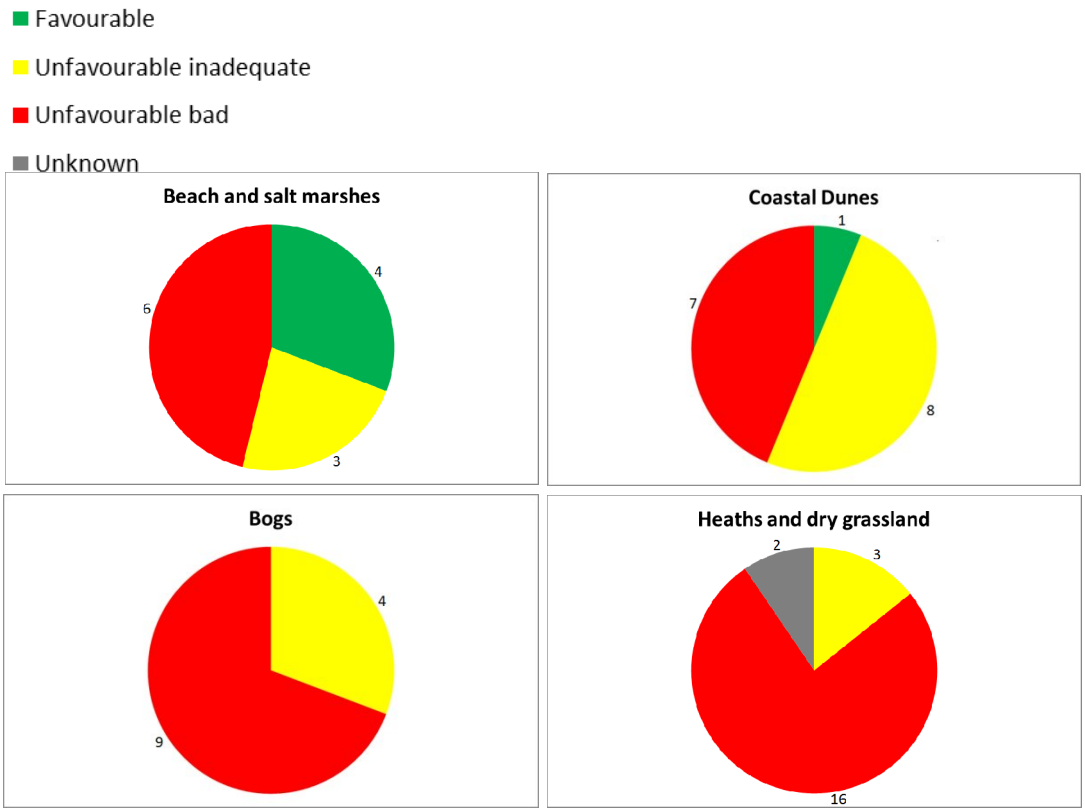


Figure 1-7Conservation status of 34 open types of natural habitat (occurring in Annex 1 of the EU Habitats Directive) assessed in the period 2007-2013. Denmark is divided into an atlantic and a continental zone. Conservation status for the habitat type is assessed for each of these biogeographical zones. A habitat type counts for two observations if it is found in both zones. The sum of the figures of the four diagrams is therefore greater than 34 [6].

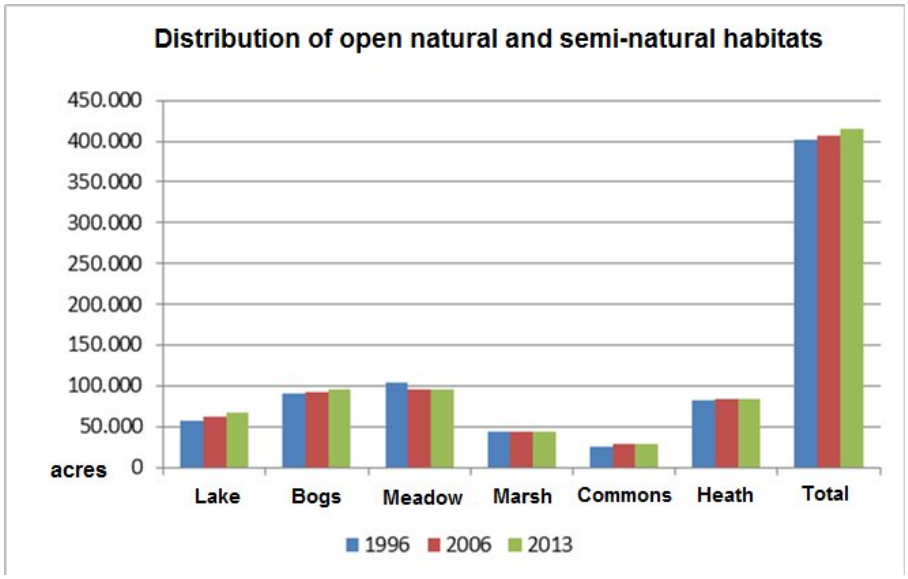


Figure 1-8Distribution of total area of open natural habitats in Denmark 1996, 2006 and 2013. [3]

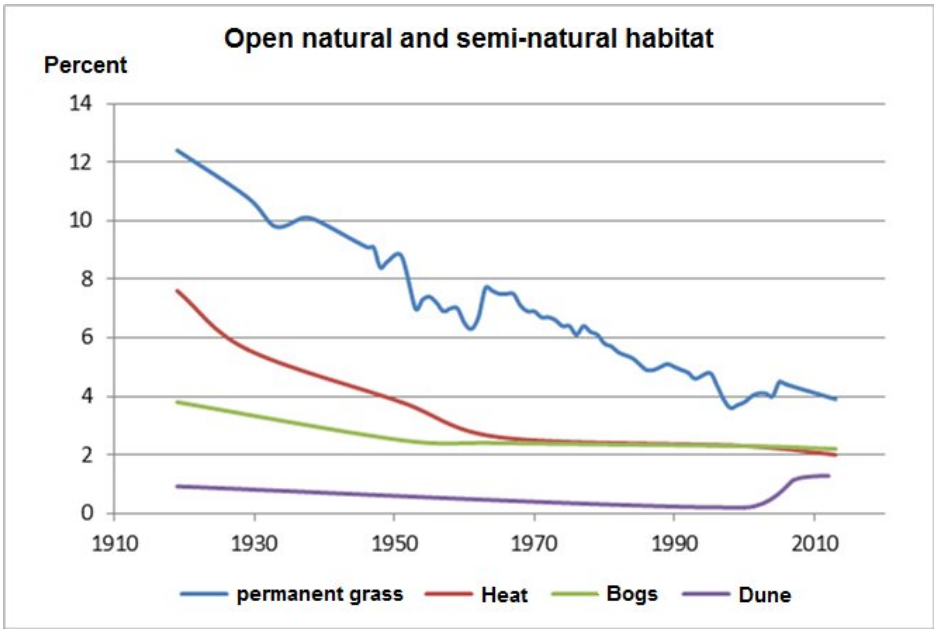


Figure 1-9 A century's development in Danish open natural habitats 1910-2010 [4].

References

[1] Ejrnæs, R. & R. M. Buttenschøn, 2012. Hvordan sikrer vi græslandets og hedens biodiversitet I (How do we conserve the biodiversity of grasslands and heaths? I): Det Grønne Kontaktudvalg (a forum for green, voluntary organisations): Nature in Denmark towards 2020. Stemming the loss of biological diversity.

[2]Ejrnæs, R. & B. Nygaard. Forests 2011 In Ejrnæs, R., Wiberg-Larsen, P., Holm., T.E., Josefson, A., Strandberg, B., Nygaard, B., Andersen, L.W., Winding, A., Termansen, M., Hansen, M.D.D., Søndergaard, M., Hansen, A. S., Lundsteen, S. , Baatrup-Pedersen, A., Kristensen, E., Krogh, P.H., Simonsen, V., Hasler, B. & Levin, G. Danmarks biodiversitet – status, udvikling og trusler (Denmark's biodiversity – status, development and threats). Danmarks Miljøundersøgelser (a former Danish research institute), Aarhus University. 152 pages – DMU Scientific Report no. 815.

[3] HTTP://WWW.NATURSTYRELSEN.DK/NATURBESKYTTELSE/NATIONAL_NATURBESKYTTELSE/PARAGRAF3/AREALOPGOERELSE/

[4] http://naturogmiljoe.dmu.dk/naturbiodiversitet/62/

[5] http://bd.eionet.europa.eu/article17/habitatsreport/

[6] Extract from national Article 17-reporting.

1.3.2 Small biotopes

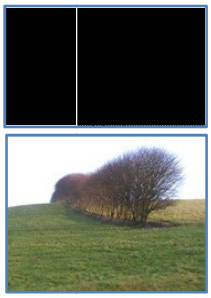
- Small biotopes are importasnt habitats for many species
- Althoug the number of small biotopes occur to be stable e.g. hare and partridge populations remain small s

Small biotopes are important habitats

In botanical terms, small biotopes rarely constitute anything more than nutrient-requiring plants, such as grasses, nettles and creeping thistles. However, small biotopes are excellent habitats and hiding places for the animals that live on arable land, e.g. bees, hares, amphibians, reptiles and mammals. Small biotopes are also stepping stones which help species to spread from one natural habitat to the next.

Box: What is a small biotope?

A small area within an agricultural area, which is neither part of crop rotation nor fallow, is called a small biotope. Some of them are linear (e.g. stone walls, soil dykes, natural hedges, green hedgerows, ditches, small streams, field boundaries, cart tracks and verges) while others are surfaces, (e.g. natural or artificial ponds, marl pits, barrows and small cops and thickets, including deer retreats covering less than 2 hectares). The Nature Conservation Act and the Museums Act protect only stonewalls, dykes and ponds measuring more than 100 m2, and even then only to a limited extent.



Decline is halted but key species on arable land are still not thriving

There is very little available data regarding the biodiversity of the small biotopes, although there are some signs that the decline in the total area of small biotopes is halted. The total area fell right up until the end of the 1980s. Some types of small biotopes are now advancing due to the planting of green hedges and a growing interest in hunting, which may help to preserve and establish small biotopes. When establishing new green hedges and deer retreats, the authorities recommend the use of indigenous species of plant, which are known to attract multiple species of insects.

These initiatives have, however, not proven effective in reversing the decline in populations of e.g. hare and partridge, which are specifically associated with open habitat and which need extensive cultivated areas in which to live and forage (See Fig 1-10).

Populations of common farmland birds have also experienced a fall during the last decades (Fig 1-11).

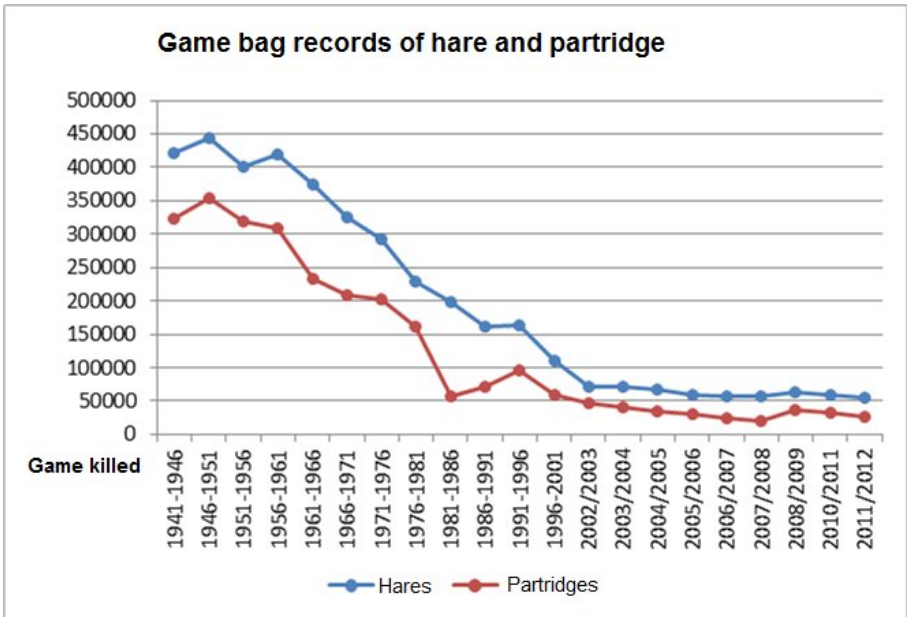


Figure 1-10Hunting quarry of hare and partridge in the period 1941-2012. The total number of days in the hunting season has been reduced in the period. The figures for 1941-2001 are based on a five-year average, whereas those for the hunting season 2002/2003 are annual figures. [1]

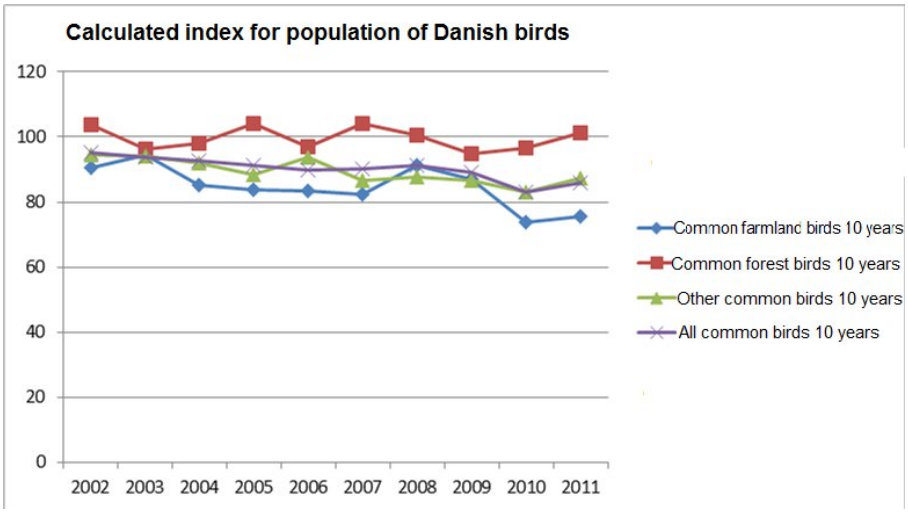


Figure 1-11 Calculated index for the population of Danish birds on farmland, in forests and for all common species for the past ten years (2002-2011). The figures are based on bird counts conducted since 1975 by a number of voluntary observers reporting to the Danish Ornithological Society [2].

References

[1] DCE, Natural resources/7.6 Hunting quarry and quarry statistics 2011/2012.

[2] Heldbjerg, H, Lerche-Jørgensen, M. & Jørgensen, m.f. (2013): Monitoring common species of birds in Denmark 1975-2012. Annual report of the bird count project, Danish Ornithological Society.

1.4 Forest

1.4.1 Forest are growing and serving multiple purposes

- About 14.1% of Denmark's total area is forested. About three-quarters of forests are privately-owned.
- The area of protected forest has increased but the conservation status is unfavourable bad.
- The proportion of deciduous forest is greatest on clay soils to the east of the country, while conifers are dominant on sandy soils.

If it was not for human activity Denmark would be covered by forests. The demand for timber and for cultivating the soil has over time resulted in the felling of much of our forests. About the year 1800, the Danish forests covered 2-3% of the total land area. They have since grown, which became apparent when the first forestry statistics were published in 1881.

Forests have many particularly positive characteristics which means that there is often widespread public support for afforestation projects. The forest helps provide timber, protects ground water, supports cultural, scenic and cultural historical values, provides habitats for many species of plants and animals, offers venues for recreational activities (e.g. exercise and nature experiences) and stores CO_2.

While there is a national desire to expand the forested area by means of afforestation, it is a challengeto find space for new forests and woods in an intensively cultivated agricultural landscape.

Areas in which new forests are desired or not desired are designated by the municipal authorities, whose decisions are based on an overall assessment of societal factors.

Many endangered species live in woods and forests. Many of the Red-Listed Danish species of flora and fauna are associated with dead wood. Intensive forestry presents a threat to the conservation status of our forests and their biodiversity while extensive forestry and of course forest with non intervention management often have multiple positive effects on biodiversity.

Status of forested areas
The total forested area in Denmark covers about 608,078 hectares (2012), corresponding to about 14.1% of the total area. The forested areas have increased from 493,000 hectares since 1990. New forests cover 67,000 hectares. However, part of this discrepancy is explained by changes in the method used to calculate forest area [1].

About 75% of the Danish forests has trees of the same age which are planted or has been established by natural regeneration. When private forests are planted with state subsidies, the owners are obliged to comply with forest reserve regulations. All public forests are under such regulations which implies that the areas must remain forest areas [2]. Owners may fell trees if they subsequently plant new trees and open natural habitats must bepreserved.

About three-quarters of Danish forests are privately-run or owned by individuals or foundations. In recent years the local authorities have become involved in projects, in which the state, municipality and e.g. waterworks join forces to establish forests close to urban areas or to protect groundwater. Such forests also fall under the forest reserves regulations.

OWNERSHIP OF DANISH FOREST AREAS IS ILLUSTRATED IN

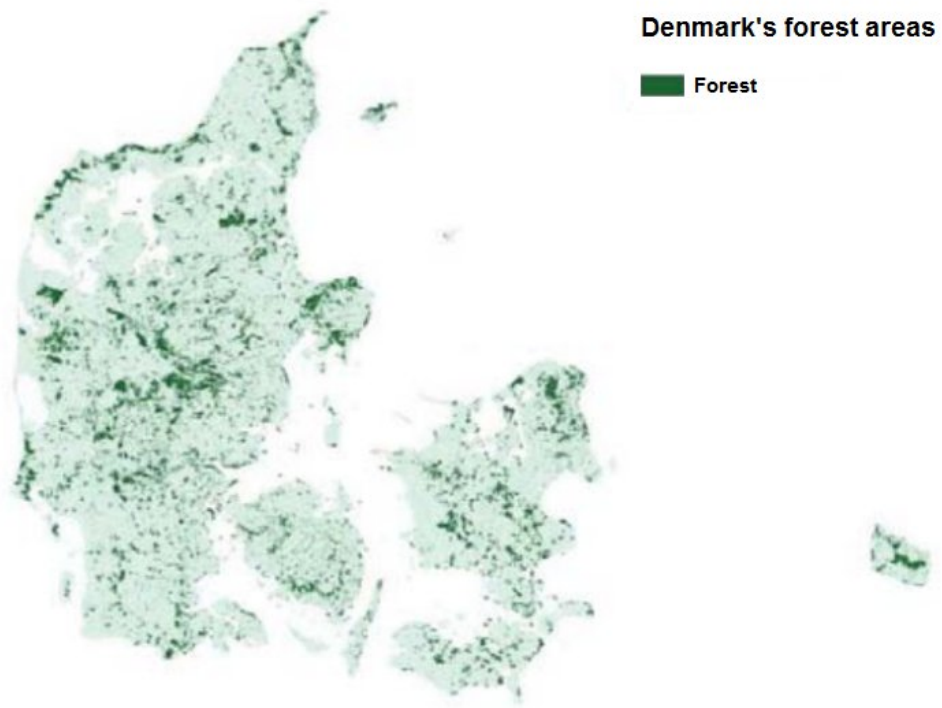


Figure 1-12Danish forested areas – a survey based on satellite image mapping 2011 [2].

Most Danish forests grow in sandy soils where site quality is poor. In those areas of the country where there is most sandy soil, there is a predominance of coniferous trees. The distribution of forest areas per region and type of tree is illustrated in Fig 1-15.

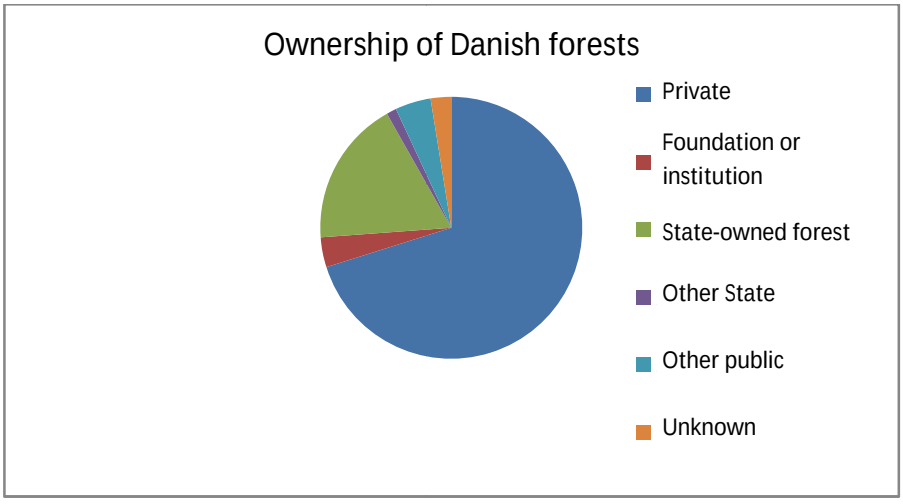


Figure 1-13Ownership Of Danish Forests [3]

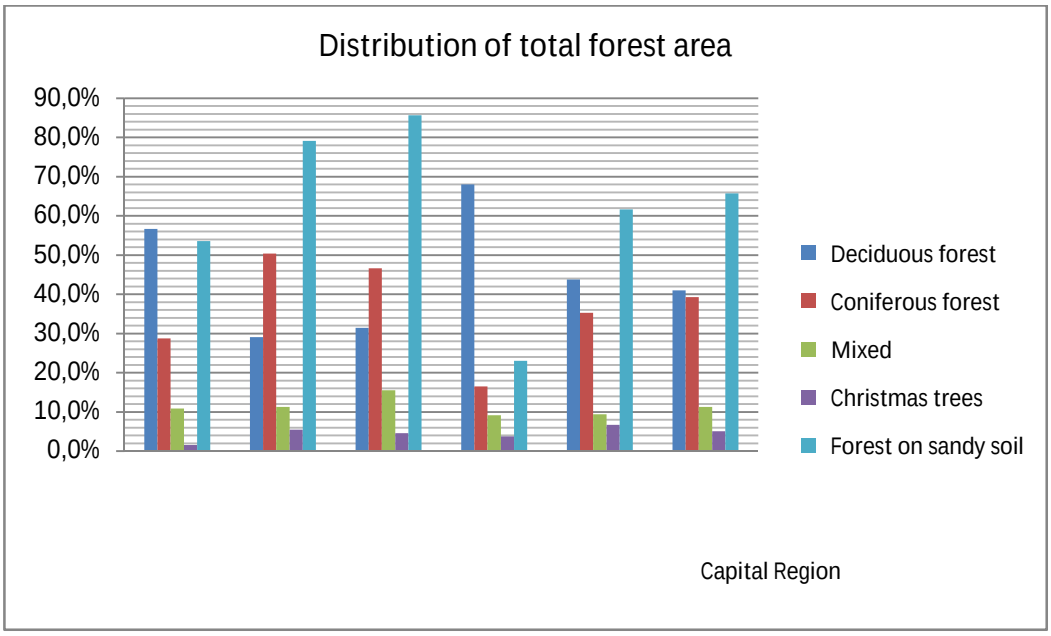


Figure 1-14Distribution Of Forest Areas Per Region And Type Of Tree [3]

References

[1] STATISTICS DENMARK (SKOV11)

[2] Http://Sl.Life.Ku.Dk/Erhverv_Og_Myndigheder/Myndighedsbetjening/~/Media/Sl/Erhverv_Myndigheder_Collaboration/Myndighedsbetjening/Evaluering%20biodiv1992%202012net.Ashx

[3] http://ign.ku.dk/nyheder/skove-plantager-2012/sp-2012.pdf/

1.4.2 Biodiversity in the forest

- Forests hold the largest number of Danish species and also the largest number of endangered species.
- Biodiversity, particularly in old-growth deciduous forests with no or extensive commercial activities, is good for biodiversity due to occurrence of many tree species, natural hydrology, old trees and deadwood which is beneficial especially for insects and fungi.
- The most serious threat to the biodiversity of the forests is the loss of habitats due to drainage, planting and felling, lack of dead wood and the lack of variation in habitats within the forests, such as forest meadows, forest bogs, etc.

Forests are habitat for most Red-Listed species

Compared to our neighbours, a relatively small share of Denmark's total land area is forested. The EU average is 3-4 times more forest area per capita than in Denmark.

The size of forests and the extent to which they are commercially exploited is significant for biodiversity.Some of the Danish forests are rich in biodiversity while many forest are intensively managed and hold much less biodiversity.In general doeslarge continuations of forested land with extensive and varied exploitation offer a far greater number of different habitats than intensive forestry.

In particular old-growth deciduous forest with undulating terrain, varied hydrology and high volumes of deadwood have higher biodiversity than coniferous forests and intensively managed deciduous forests. This is due to several factors, including that coniferous forests consist of treespecies introduced from abroad which do not have the same natural biodiversity associated as Danish deciduous forests.

The forests in Denmark provide many different habitats that are beneficial to specialised species of plants and animals and they are home to a greater proportion of Red-Listed species than any other type of natural habitat (54.1%).

More than 100 species on the Danish Red List are associated directly with deadwood in the forests, especially insects and fungi.

The forest is also the ecosystem that contains most species, in particular a wide diversity of invertebrate animals and fungi that is much greater than in other Danish ecosystems [1].

According to the Habitats Directive, Denmark has ten forest habitats, for which Special Areas of Conservation (SACs) must be designated.

Still low biodiversity in Danish forests but increasing volumes of deadwood in some forests

Two hundred years ago the Danish forest area had shrunk to its smallest and covered less than 3% of the country's total area. The 1805 a Forest Reserve Scheme (“Fredskovsforordningen”) set off an increase in forest area. Much of the forests are, however, relatively homogeneous in terms of the trees, herbs, fungi, mosses and birds they support because they are exploited intensively, i.e. the undergrowth is cleared, untouched areas with fallen logs, deadwood and high groundwater level are not prioritised, and the trees grown are mostly conifers.

However, the proportion of deciduous forest is increasing. Deciduous forests account for about 25% of today's total forest area, while coniferous and mixed forests each account for about 36%.

Species of trees that are not indigenous to Denmark are predominant in coniferous forests, e.g. in state-owned cornifer plantations in Jutland, while deciduous forest areas contain indigenous

treespecies , such as beech, oak and ash. The increase in the area of deciduous forests has been achieved thanks to targeted afforestation initiatives. In the long term, these are expected to have positive outcomes for Red-Listed species.

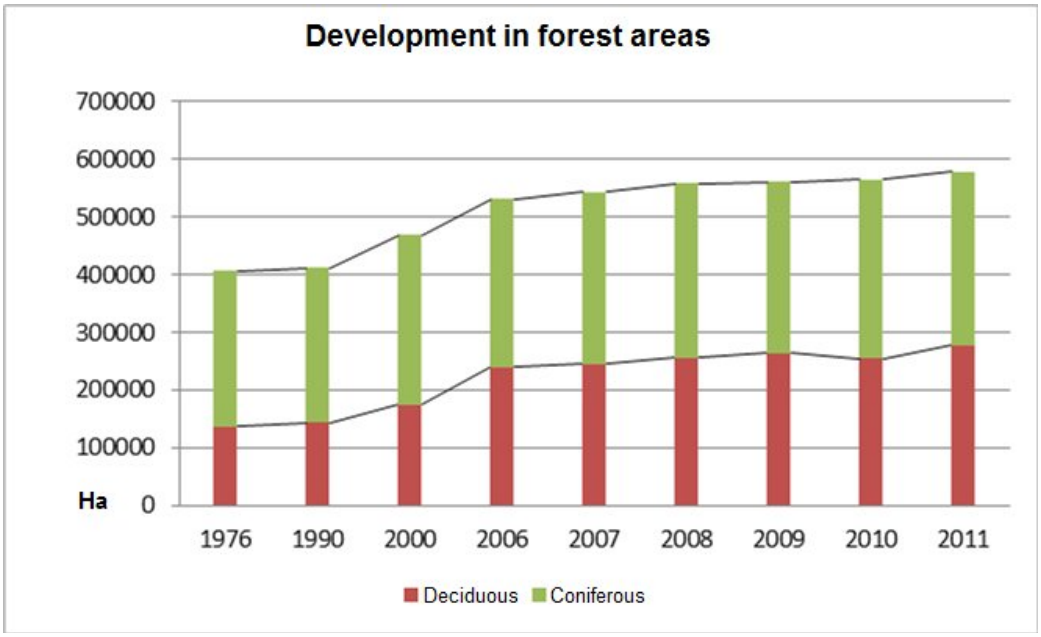


Figure 1-15The total area of forest has increased during the last 40 years, mainly due to a growth in the area with deciduous forest [3] and [4].

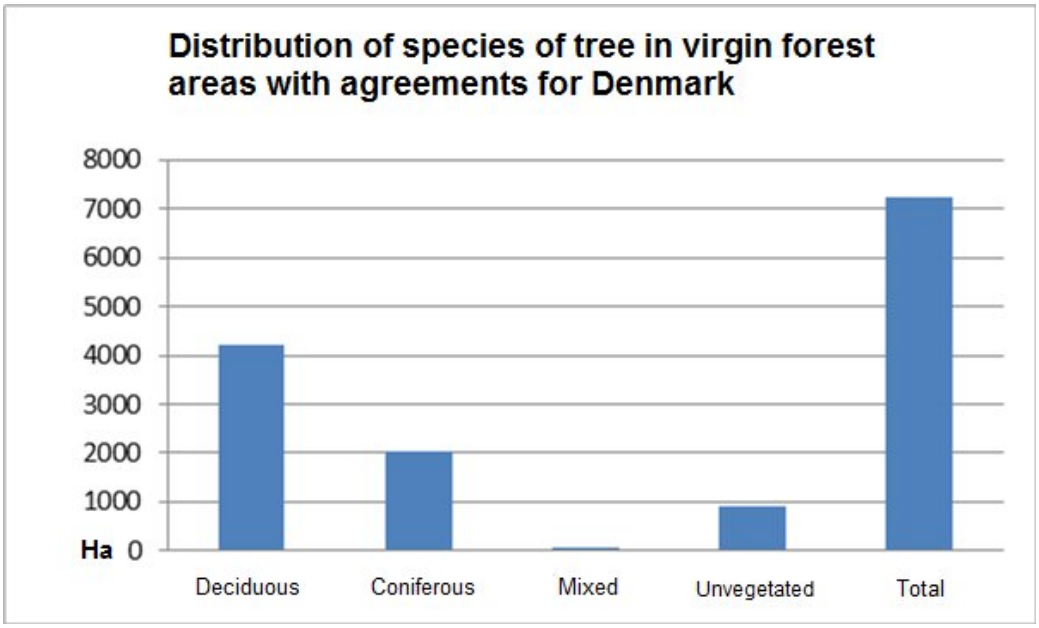


Figure 1-16Species of trees in natural forests in Denmark [4].

Populations of butterflies associated with woody glades, coppices, peripheries and woody meadows continue to decline. Species such as clouded apollo, duke of Burgundy, large tortoiseshell, black hairstreak and ilex hairstreak are extinct and seven of the remaining endangered species of forest butterflies continue to decline. There is a similar decline in populations of other forest insects [1].

Populations of forest birds are generally stable or with slight positive developments (see Fig 1-11, Chapter 1.3). The populations of the common goldeneye and the sea eagle are growing and benefit from targeted management, whereas other species, such as the golden oriole and the Eurasian wryneck are in decline, a European trend which cannot definitively be attributed to human impact [5].

The most recent report on Danish nature to the European Union concluded that the conservation status of all of Denmark's ten internationally protected forest habitats is unfavourable bad. These ten forest habitats, which are mainly deciduous forest types and includes managed forest, cover about 15% the of total forest area. 21 % of the total area of the Habitat Directive forest types in Denmark are designated as Natura 2000 sites. The reason for the unfavourable bad conservation status is primarily a lack of large, old trees and deadwood on the forest floor.

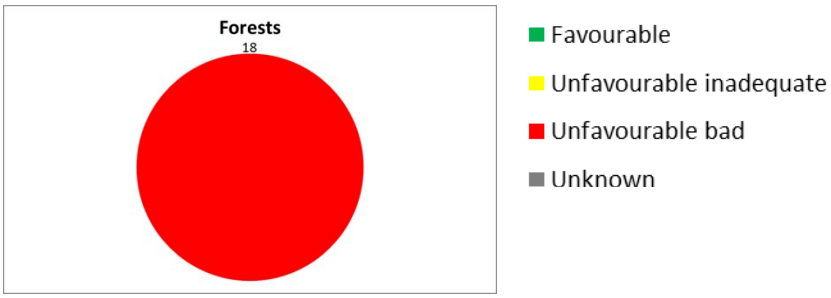


Figure 1-17Conservation status of 10 types of forest habitats (occurring in Annex 1 of the EU Habitats Directive) assessed in the period 2007-2013. All forest habitats are assessed to have unfavourable bad conservation status. Data from national Article 17 reporting. Denmark is divided into an atlantic and a continental zone. Conservation status for the habitat type is assessed for each of these biogeographical zones. A habitat type counts for two observations if it is found in both zones. The sum of the figures of the diagram is therefore greater than 10.

All state forests are FSC or PEFC-certified and about 15% of the private forest areas are PEFC-certified and much less are FSC-certified. These certificates mean that the timber produced comes from sustainably managed forests. Forest management requirements include encouraging natural forest management, protecting areas of particular natural value, preserving old trees and deadwood in the forest, protecting historical artefacts and reducing environmental impacts, e.g. caused by using fertilizers and pesticides.

References

[1] Ejrnæs, R. & B. Nygaard. Forests. In Ejrnæs, R., Wiberg-Larsen, P., Holm., T.E., Josefson, A., Strandberg, B., Nygaard, B., Andersen, L.W., Winding, A., Termansen, M., Hansen, M.D.D., Søndergaard, M., Hansen, A. S., Lundsteen, S. , Baatrup-Pedersen, A., Kristensen, E., Krogh, P.H., Simonsen, V., Hasler, B. & Levin, G. 2011 Danmarks biodiversitet – status, udvikling og trusler (Denmark's biodiversity – status, development and threats). Danmarks Miljøundersøgelser (a former Danish research institute), Aarhus University. 152 pages – DMU Scientific Report no. 815.

[2]HTTP://IGN.KU.DK/NYHEDER/SKOVE-PLANTAGER-2012/SP-2012.PDF/ SIDE 93

[3] Statistics Denmark (SKOV11)

[4]
HTTP://WWW2.SNS.DK/UDGIVELSER/2003/SKOVOGNATURITAL/SKOVOGNATURITAL2003.PDF

[5] Buchwald, E., 2013. Klar fremgang for de rødlistede skovfugle (Increase in the populations of Redlisted forest birds) – Skoven 11: 498-503.

1.5 Watercourses and lakes

1.5.1 Lakes

- Many Danish lakes are affected by the deposition of nutrient substances.
- The Conservation status is unfavourable for five of the Habitats Directives' lake habitats and for 13 of the 17 natural habitats associated with Danish lakes.
- National surveillance in 2011 indicated that there was a general improvement in our lakes in the shape of a 50% reduction in phytoplankton, 9% better water clarity and 17% more aquatic plants compared to the period 1980-1995, when the same parameters were last measured.

One of Denmark's national goals is to have pure, clear lakes. However, most Danish lakes remain polluted, due, among other things, to deposition of nutrient substances. Surplus nutrients cause cloudy water and algae growth, which prevents underwater vegetation and causes low oxygen content on the lake bed.

There is special focus on phosphorus as a limittrd quantity of phosphorus generally reduces algae growth in the lakes, i.e. algae growth is determined by the available quantity of phosphorus while there is an excess of nitrogen. Thus, when large quantities of phosphor are deposited, phytoplankton growth is increased, thus shifting the environmental condition of the lake in an unfavourable direction.

Phosphorus in the aquatic environment comes primarily from agricultural and natural areas, from waste water (in urban and rural settlements alike) and, to a lesser extent, from industry and fish farms [1].

Algae, water clarity and aquatic plants

The condition of Danish lakes has improved during the last 20 years. Developments in 15 lakes across the country were monitored intensively from 1989-2011. The volume of algae (measured as chlorophyll concentration) had fallen by 50% from 59.4 microgrammes/litre in the period 1989-1995 to 29.9 microgrammes/litre in 2011. Among other reasons, the fall is due to successful reduction in nutrient deposition in the most nutrient-rich of these lakes.

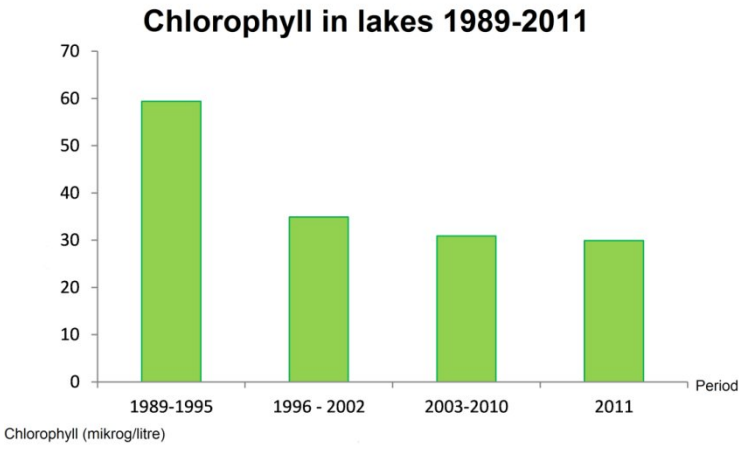


Figure 1-18 Chlorophyll concentration in lakes in the period 1989-2011. The figures are expressed in microgrammes/litre and based on the average of 15 lakes monitored intensively. [1]

As the chlorophyll concentration fell, the water in the lakes became clearer and water clarity increased from 1.95 metres on average in the period 1989-1995 to 2.15 metres in 2011. Water clarity in Danish lakes varies generally from 10-15 cm in polluted lakes to more than 8 m in pure, clean lakes.

Improved water clarity means that sunlight can penetrate further into the water, creating better growing conditions for the aquatic plants on the lake bed. Biodiversity, measured as the number of species of aquatic plants in 13 tested lakes, has increased in the period 2004-2011 from 9.7 species to 11.4. Aquatic plants also cover a greater area of the water surface and fill more of the lakes' total volume. The average maximum depth at which aquatic plants grow increased from 3.3 m to 3.7 m.

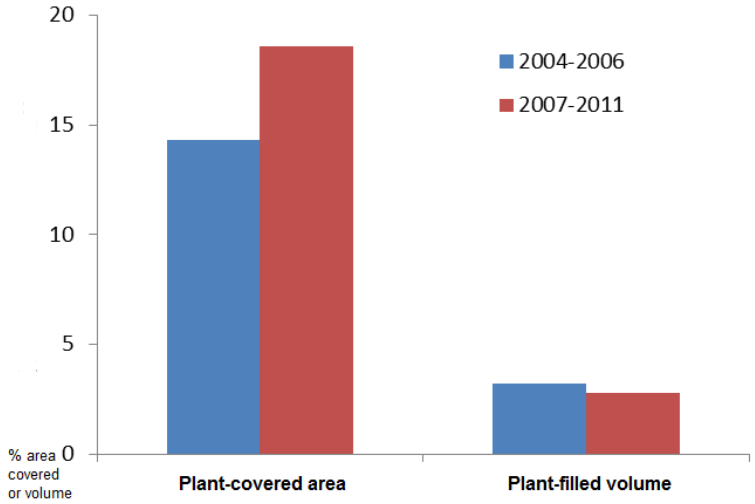


Figure 1-19 Underwater vegetation in plant-covered area and volume based on tests in 13 lakes monitored in the periods 2004-2006 and 2007-2011. Source: DCE.

According to the most recent report to the EU, despite improvements, all five internationally protected types of lake are categorised as having unfavourable conservation status.

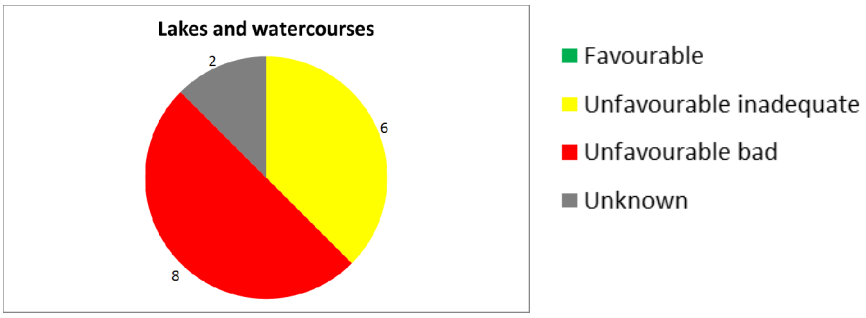


Figure 1-20Conservation status of 8 protected types of lake and watercourse habitats(occurring in Annex 1 of the EU Habitats Directive) assessed in the period 2007-2013. All of these freshwater habitats are found in both the atlantic and continental biogeographical zones. A habitat type counts for two observations if it is found in both zones. The sum of the figures of the four diagrams is therefore greater than 8. With the exception of the rare mud banks along rivers and streams, the conservation status of which is unknown, all the prevalent lake and watercourse habitats have unfavourable conservation status. Source: data from article 17 reporting.

References

[1] DCE, 2012. Lakes 2011. NOVANA. Aarhus University, DCE –National Centre for Environment and Energy, 100 pages. - Scientific report no. 33 by DCE - National Centre for Environment and Energy
http://www.dmu.dk/Pub/SR33.pdf

1.5.2 Watercourses

- Concentrations of phosphorus and nitrogen in watercourses fell 50-60% in the period 1989-2011
- Species of pondweed, some freshwater insects and some species of fish are endangered or extinct.
- Some species of invertebrate animals, birds, trout and otter are thriving.
- The share of watercourses with a good to excellent animal conservation status has increased by 37% in the period 1994-2011.

Denmark's many watercourses are affected by straightening and, in many cases, also by heavy-handed maintenance and deposition of nutrients and sediment. Many stretches of the watercourses have an unnatural, unvaried course. In other watercourses, fish migration is prevented by obstructions. A few watercourses run in pipes for parts of their course.

Nitrogen and phosphorous in watercourses

The conservation status of the watercourses indicates that positive progress was made in the period 1989-2012 as concentrations of nutrient substances (nitrogen and phosphorus) have fallen.

Nitrogen concentration has fallen generally in the watercourses most affected by nitrogen from arable land or from specific sources, such as purified waste water from towns and industry [1], whereas the volume of nitrogen in natural watercourses is more or less unchanged in the period 1989-2003 (data available only until 2003). There was generally only a minor reduction in the nitrogen content in watercourses affected by fish farming.

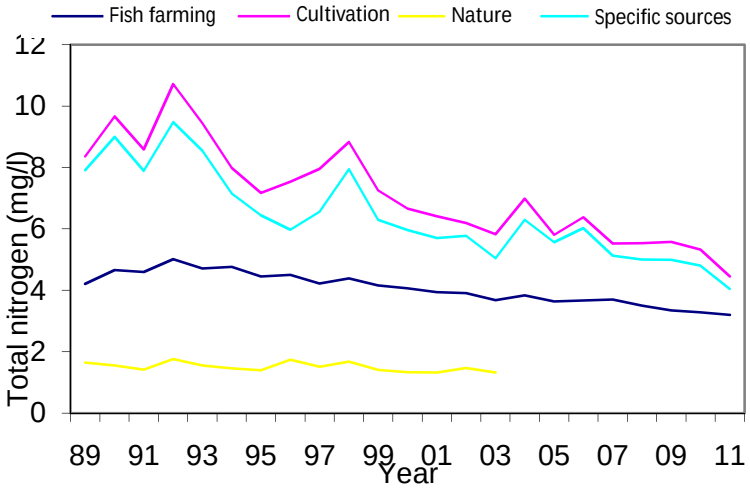


Figure 1-21 Development in nitrogen concentrations in watercourses since 1989. The figure shows the average of water flow-weighted annual mean values for watercourses with different impacts classified in accordance with conditions prevailing in 1991. Source: DCE.

Phosphorus makes very little difference to the environmental quality of watercourses. However, watercourses transport phosphorus to lakes and fjords. Measuring phosphorus concentrations in watercourses is therefore important in assessing the quantity and character of such depositions. Since 1989 phosphorus depositions from isolated sources have fallen significantly due to improved waste water purification. Emissions from fish farms are lower – primarily due to the closure of many fish farms, but also due to more stringent fish feed requirements. There is no significant change registered for natural watercourses.

There has been a modest fall in phosphorus concentrations in watercourses that run through cultivated areas.

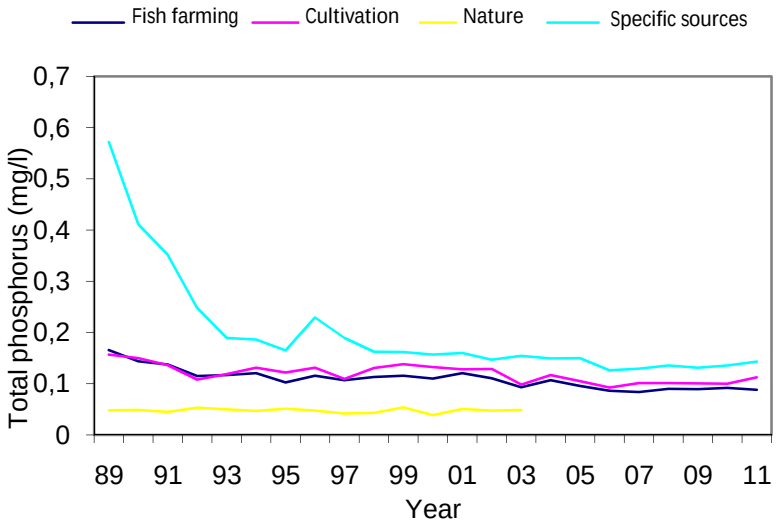


Figure 1-22Development in phosphorus concentrations in watercourses since 1989. The figure shows the average of water flow-weighted annual mean values for watercourses with different impacts classified in accordance with conditions in 1991. Source: DCE.

Pesticides and pollutants in water courses

Pesticides used in agricultural production represent 90% of Denmark's total consumption of pesticides [2]. Consumption of herbicides in particular is increasing. In 2011, herbicides represented 83% of total pesticide consumption in agriculture. Some of the pesticides used end up in our watercourses and may have adverse effects on the organisms in them. Possible consequences for the watercourse ecologies include deterioration of biodiversity and reduced capacity to metabolise organic material.

A number of pesticides and pollutants are included in watercourse monitoring, although not in the period 2007-2009. Pollutants were screened in a large number of watercourses in 2008-2009 [2].

Screening research conducted in 2008 investigated the presence of a number of pesticides, two of which, Chloropyrifos and Chlorfenvinphos, are on the Water Framework Directive's list of priority hazardous substances. The use of these substances is, however, no longer permitted in Denmark and none of these two pesticides exceeded the water quality requirements. (There are no quality requirements for the remaining substances.) In general, little is known about pesticide levels in Danish watercourses.

Faunaclasses - water courses

The biological status of a watercourse is described in terms of the small animals living in it. The DSFI (Danish Stream Fauna Index) measurements show that conditions in about 250 streams have improved significantly since 1994. The table (below) shows that the share of watercourses in poor or very poor condition (fauna classes 1-3) is reduced from 22-26% in the period 1994-1998 to 7-11% in the period 2008-2011. Similarly, the share of watercourses in a moderate condition (fauna class 4) has fallen from 45-58% to 33-38%. The percentage of watercourses in good to excellent condition (fauna class 5-7) has also increased in the period from 19% in 1994 to 56% in 2011.

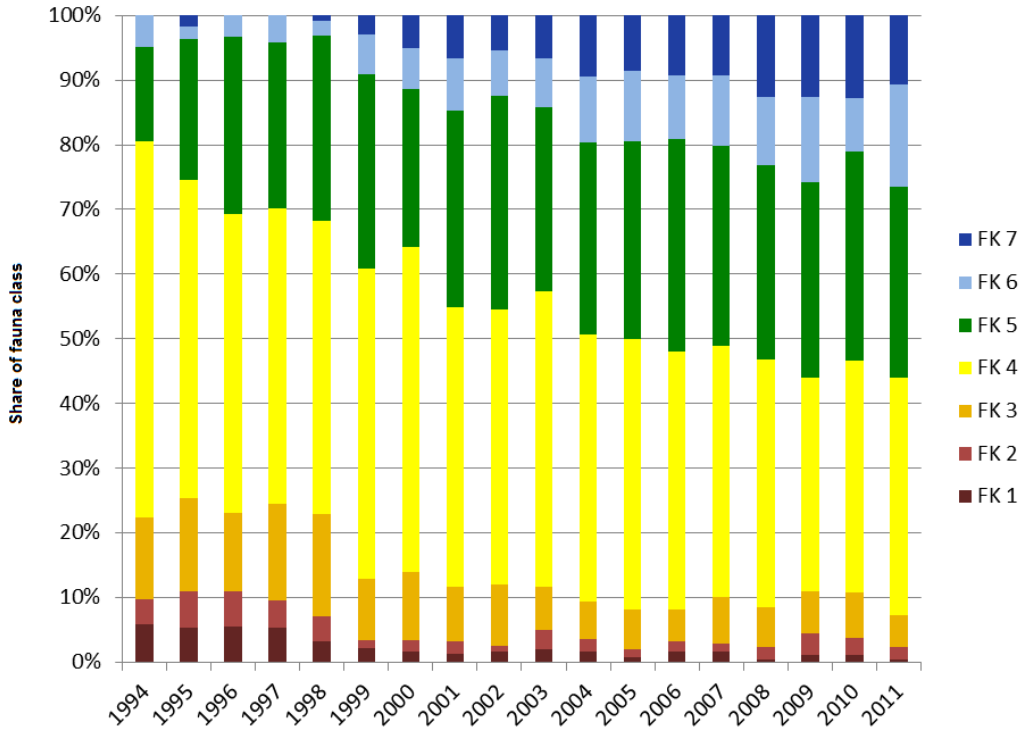


Figure 1-23Development in fauna class (Danish stream fauna index) at 91-247 stations examined using a standardised method in the period 1994-2011. Source: DCE.

Small watercourses are under-represented among the approximately 250 stations, which means that the current shares of the different fauna classes cannot directly be ascertained for Danish watercourses overall. However, positive development leading to better ecological conditions in Danish watercourses is a clear trend. To a great extent, improvements are the result of optimised waste water purification, which has led to observed, decreasing concentrations of nutrient salts. However, physical conditions in the watercourses are also hugely important. The fact that many watercourses still fail to achieve good ecological status can be attributed to poor physical conditions.

References

[1] DCE, 2012. Watercourses 2011. NOVANA. Aarhus University, DCE –National Centre for Environment and Energy, 70 pages. - Scientific report no. 32 by DCE - National Centre for Environment and Energy
http://www.dmu.dk/Pub/SR32.pdf

1.5.3 Biodiversity in lakes and water courses

Natural watercourses and lakes sustain rich and varied plant and animal life. In the 19th century, new drainage techniques, damming to create more land area and watercourse straightening meant that Danish water and wetlands were drained at a great rate. Urban development brought about decades of increased water consumption, which, for example on Zealand, entailed significant changes to watercourse systems, and water and wetlands. Since then, large lakes with a rich variety of species and watercourse systems have generally declined and the aquatic environment has deteriorated.

Intensive farming and waste water emissions from urban areas have also led to an increase in nutrient deposition into lakes and watercourses.

To rehabilitate lakes and watercourses, attempts are made to recreate the natural, dynamic ecosystems which provide good living conditions for species of plants and animals, and thus to reinstate biodiversity. Along the banks of lakes and watercourses, new wetlands (meadows, bogs and reed beds) are created.

Rehabilitation also improves the landscape and recreational values of the area. However, the lakes and wetlands continue to be impacted by nutrient substances from agricultural land and, to a lesser extent, by purified waste water emitted from urban areas and industry. Nutrient substances continue to impair conditions in the lakes and, ultimately, also coastal waters and the open sea.

Consistent watercourse maintenance in accordance with the current watercourse regulations means that vegetation is cleared from many watercourses to prevent flooding of adjacent cultivated farmland. Vegetation cutting does, however, produce a lower biodiversity of aquatic plants.

Certain species of fish which are covered by the requirements of the Habitats Directive, such as the houting and the eel, and other species, such as the thick shelled river mussel, continue to decline.

Barriers in watercourses, the isolation of populations, overfishing and a lack of breeding opportunities still constitute serious threats to these species. In efforts to save the houting from extinction, barriers have been removed and physical conditions improved in a number of South West Jutland's watercourses, including Varde Å.

Furthermore, significant attempts have been made to reduce deposition of nutrients, heavy metals, etc. into watercourses and lakes, thus pushing the natural content of these habitats in a favourable direction. Also, changes in watercourse maintenance and amendments to regulations are decisive for the quality of nature in the watercourses.

The number of self-reproductive populations of trout is increasing. Several species of stoneflies, caddisflies and mayflies have been observed, for example, in watercourses on Funen, where water quality has improved significantly [1].

Distribution of otters, whose habitat is closely associated with watercourses and lakes, has increased (1990-2010), especially due to the establishment of passages under roads, a ban on trap fishing, the introduction of trap flaps, and improved habitats [1]. In addition to otters, provision of passages for watercourses and streams under new road systems is beneficial to all the plant life in and along the watercourses.

It is believed that current and future climate changes may lead to increased rainwater drainage, possibly further deposition of nutrient substances from the surrounding area and also more hydrologic dynamism. Climate change could have a negative impact on plant and animal life in watercourses and lakes. Furthermore, species whose southernmost distribution is Denmark may

disappear. This would apply, for example, to a number of specialised watercourse insects and species of fish, adapted to life in low-temperature waters.

References

[1] Wiberg-Larsen, P., Baatrup-Pedersen, A. & E. A. Kristensen, 2011. Watercourses. I Ejrnæs, R., Wiberg-Larsen, P., Holm., T.E., Josefson, A., Strandberg, B., Nygaard, B., Andersen, L.W., Winding, A., Termansen, M., Hansen, M.D.D., Søndergaard, M., Hansen, A. S., Lundsteen, S. , Baatrup-Pedersen, A., Kristensen, E., Krogh, P.H., Simonsen, V., Hasler, B. & Levin, G. 2011. Danmarks biodiversitet – status, udvikling og trusler (Denmark's biodiversity – status, development and threats). Danmarks Miljøundersøgelser (a former Danish research institute), Aarhus University. 152 pages – DMU Scientific Report no. 815.
[2] MST, 2012. Pesticide statistics 2011. The Danish Environmental Protection Agency
[3] DMU, 2009. Screening for selected pesticides in watercourses and groundwater. NOVANA screening. Danmarks Miljøundersøgelser (a former Danish research institute), Aarhus University. 22 pages – DMU Work Report No. 252. http://www.dmu.dk/AR252.pdf.

1.6 The Sea

1.6.1 Conservation status of the sea

- Nutrient deposition from Denmark has halved since 1990.
- Nitrogen concentrations have fallen by 45% in fjords and coastal waters and by 25% in inner, open bodies of water in the period 1990-2011.
- Chlorophyll is the benchmark measurement for the impact of nutrients and fell slightly until 2011 in fjords and coastal waters. In open bodies of water, chlorophyll concentrations have not changed since 1990.

The sea is an important resource for Denmark and a critical part of the country's environment and nature. Many socially important activities impact the marine environment. Nutrient substances from intensive food production and waste water from households and industry end up in the sea together with atmospheric emissions from neighbouring countries. Fisheries, transport, energy and raw materials are important industries and each impacts different parts of the marine ecosystem.

Nutrients and chlorophyll

Denmark's discharge of nutrients into the sea has fallen significantly since 1990 because waste water purification has improved (since 1988) and deposition of nitrogen from cultivated fields is lower. Discharge of nitrogen and phosphorus into the inner marine waters (i.e. the sea areas south and east of Skagen which are most exposed to eutrophication) have fallen from about 80,000 to 40,000 tons of nitrogen and from 5,000 to 2,000 tons of phosphorus (FIGURE 1-24). Annual fluctuations are great due to variable rainfall and outflow from land.

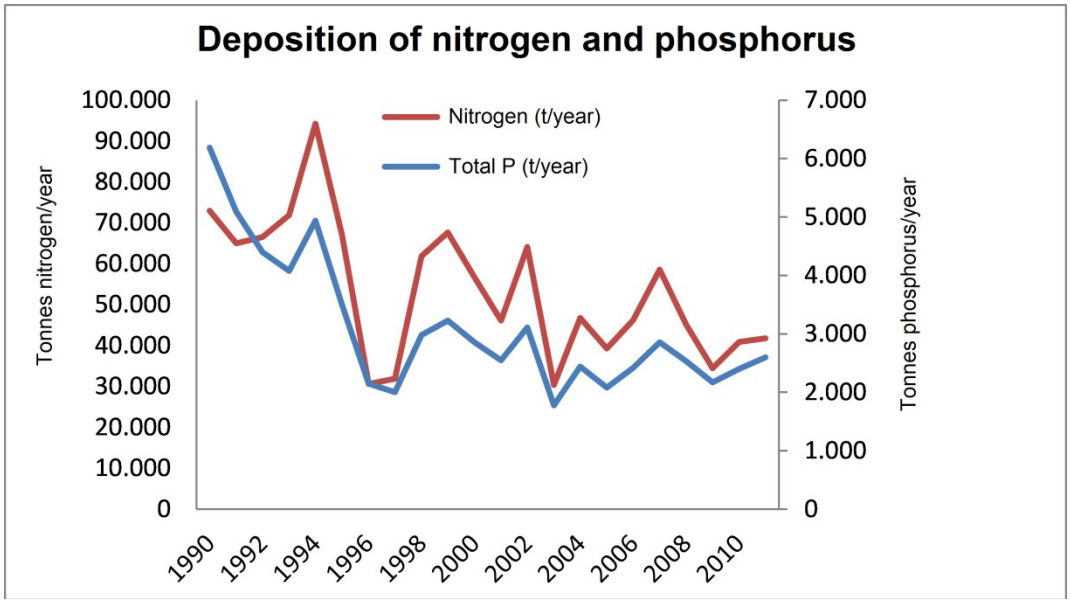


FIGURE 1-24Discharge of nitrogen and phosphorus from Denmark to the inner marine waters. Source: DCE [2].

Concentrations of nitrogen in fjords/coastal waters and open, inner marine waters have fallen in the period 1990-2011, most distinctly in fjords and coastal waters (Figure 1-25). This is explained by a combination of falling depositions originating in Denmark in falling atmospheric depositions (has fallen by about 30% since 1989) and discharges from the Baltic Sea. The fall in Danish depositions is most strongly apparent in the fjords and coastal waters, while the reduction in atmospheric deposition and falling nitrogen concentrations in the Baltic Sea are presumably the main reasons for the reduction observed in the open waters.

Phosphorus concentrations have fallen in fjords/coastal waters, although the level has stagnated since 1998 (Figure 1-26). The fall in concentrations in fjords and coastal waters from 1988-1998 is

the result of Danish efforts, especially improved waste water purification. In open bodies of water there is a trend towards increasing concentrations, which are due to increasing phosphorus concentrations in the Baltic Sea. Concentrations are increasing here due to long-term oxygen depletion and release of phosphorus from constantly increasing areas of the seabed which have de-oxygenated sediment.

Phytoplankton concentrations (measured as chlorophyll) show a slight fall in fjords and coastal waters, while concentrations remain unchanged in open water bodies during the period 1989-2011 (Figure 1-27). A weak connection between phytoplankton and nutrients in open waters indicates that other conditions, particularly grazing animal plankton, are increasingly important for the quantity of algae, when nutrient density is falling [1].

Nitrogen in the sea

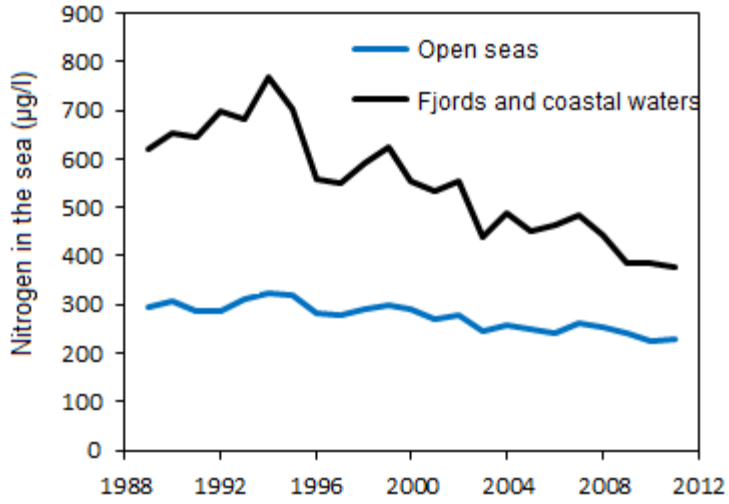


Figure 1-25Concentration of nitrogen in Danish seas (annual average in surface layer) source: DCE [2]

Phosphorus In The Sea

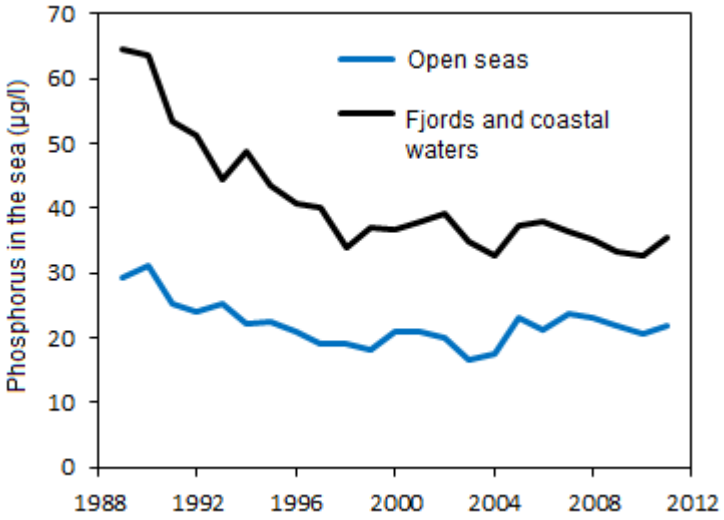


Figure 1-26Concentration of phosphorus in Danish seas (annual average in surface layer) source: DCE [2]

Chlorophyll in Danish seas

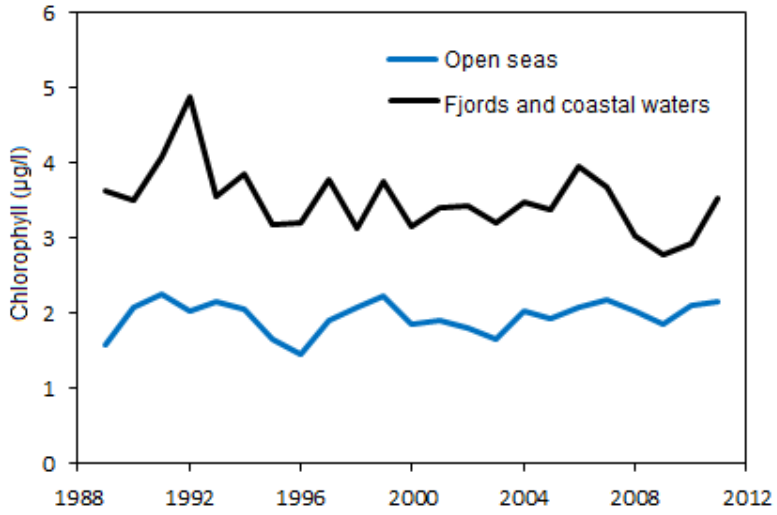


Figure 1-27Concentration of chlorophyll in Danish seas (annual average in surface layer). Source: DCE [2]

References

[1] Duarte et al (2000) Effect of nutrient supply on the biomass structure of planktonic communities: an experimental test on a Mediterranean coastal community. MEPS 206: 87–95,
[2] Hansen, jJ.W. (red.) 2012: Marine areas 2011. Novana. Aarhus University, DCE – National Centre for Environment and Energy, 154 pages. - Scientific report no. 34, DCE – National Centre for Environment and Energy
http://www.dmu.dk/pub/sr34.pdf

Contaminants

Keeping ahead of emerging contaminants

While more conventional contaminants are subject to regulation and as the concentrations are reduced to more or less "safe" levels, new substances with increasingly complex effects are being invented, e.g. endocrine disruptors. Today contaminants are assessed individually, i.e. the hazards and risks are assessed for each substance individually and environmental quality standards are set for each individual high-priority substance. Meanwhile, the environment is impacted simultaneously by more and different substances from a multitude of sources. There is no consensus as to whether the effects of such combinations, the so-called "cocktail effects", should be assessed or regulated.

Concentrations in animals are falling but standards are not met for all contaminants

Concentrations of mercury in fish have been falling in Øresund, where discharges from Copenhagen in the past were high due to inadequately purified waste water (Figure 1-28). Concentrations of mercury have fallen only slightly because high concentrations remain in sediment, which are only gradually released into the water and absorbed by fish. By comparison, concentrations of mercury in fish in the Great Belt have remained stable since 1980. In Øresund and in the Great Belt, concentrations of mercury are significantly in excess of the environmental quality standard 20 µg Hg/kg of fish meat. However, neither here nor in other Danish waters is the threshold limit for human consumption (500 µg Hg/kg) exceeded.

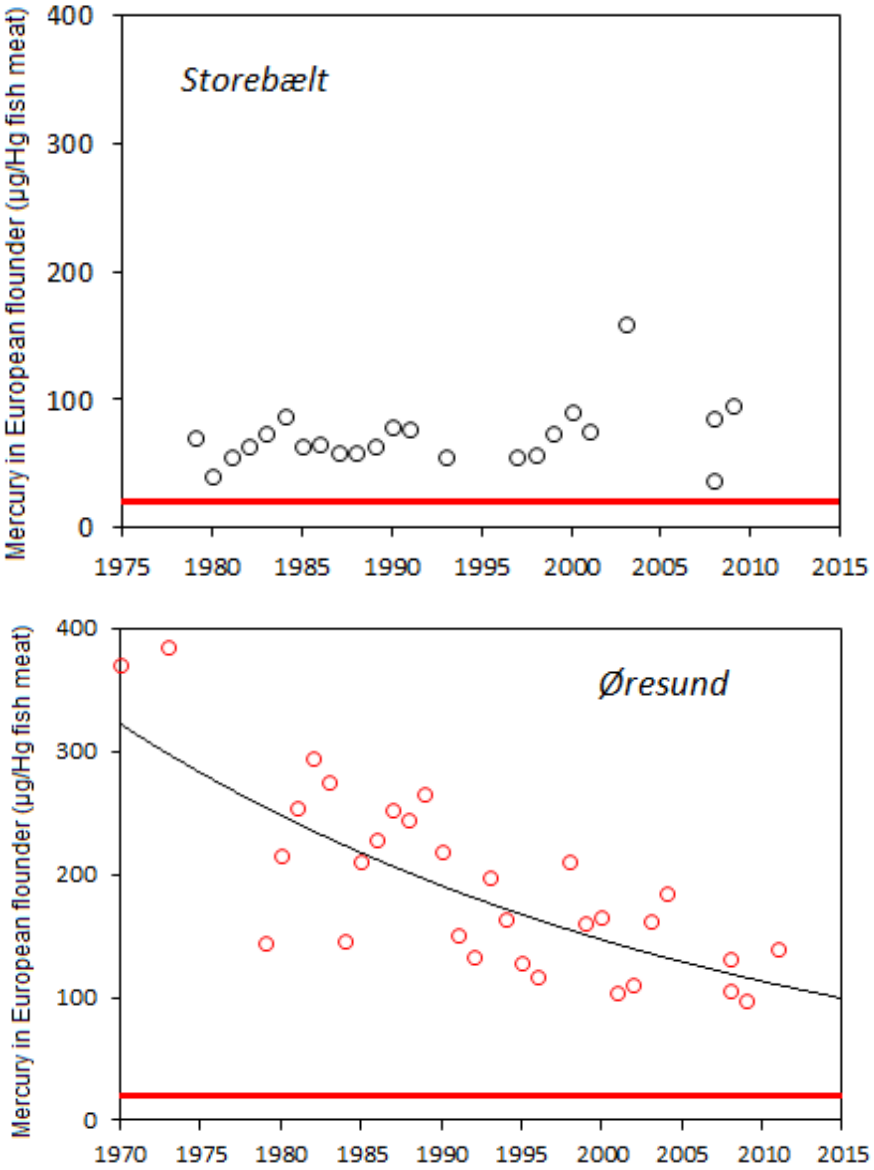


Figure 1-28Temporal variation in mercury found in European flounder caught in the Great Belt (Storebælt) and Øresund. The fall in values in Øresund is expressed as an exponential function. The horizontal lines show the environmental quality standard level (20 µg hg/kg of fish meat).

Concentrations of TST (a biocide) in mussels have fallen dramatically since 2000 as a result of a ban on its use in small boats and commercial fishing vessels. The average value for Danish coastal waters and open sea areas is approaching the recommended threshold value of 12 µg/kg (Figure 1-29). Concentrations of polycyclic aromatic hydrocarbons (PAH) in the Blue Mussel have fallen to about one third since 2000. Based on a tendency line, the reduction seems to be continuing. Concentrations of methyl napthalenes (sub-group of aromatic hydrocarbons, PAH) are far below the environmental quality standard, which is 2,400 µg/kg.

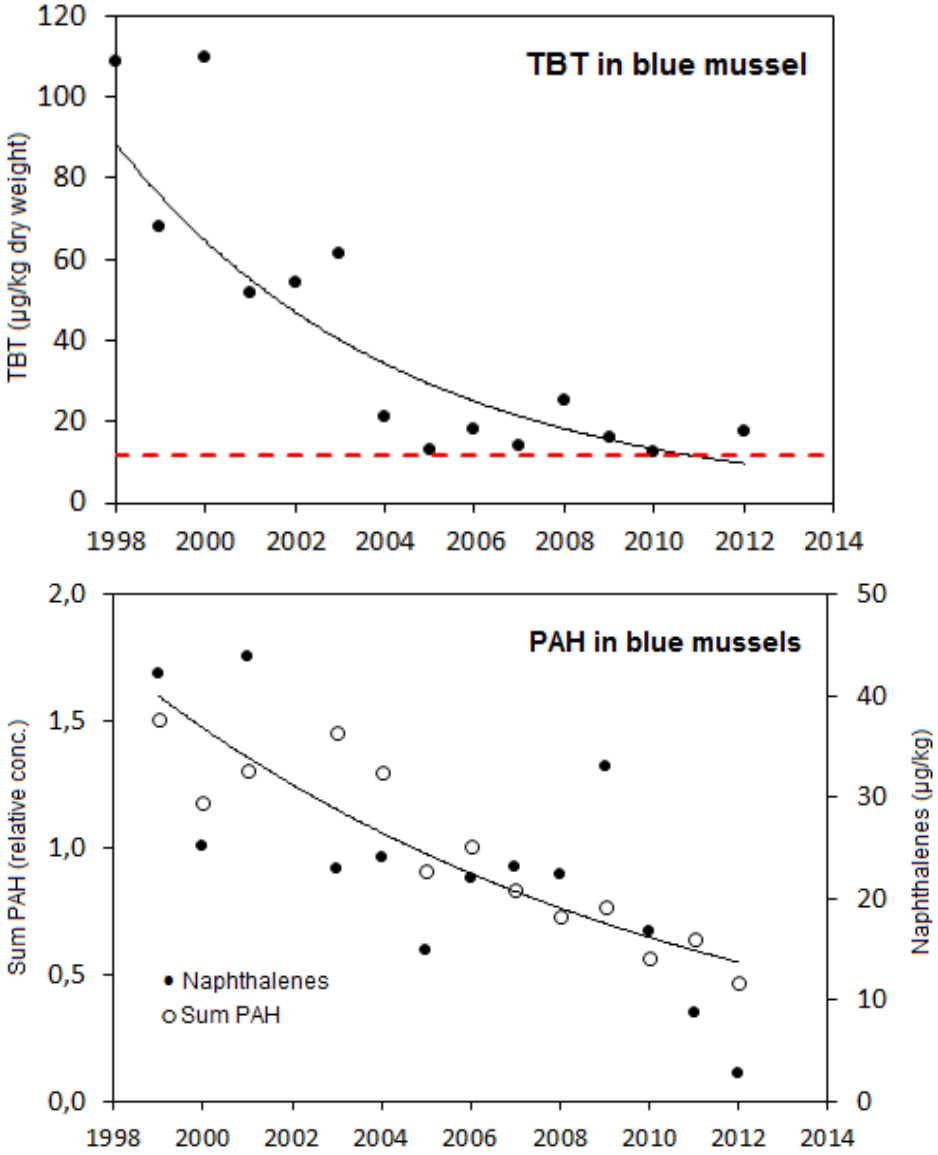


Figure 1-29Temporal variation in organic contaminants in the blue mussel (blåmusling) in Danish waters. The values are an average of the data from 7-16 stations distributed in inner Danish waters and 2 stations in the Wadden Sea. Only stations with more than seven annual values in the period 1999-2012 are included in the average. Tbt and methyl napthalenes are shown as concentrations, whereas total pah is shown as relative values (1996 = 1).

With regard to the combined effects of chemical substances, Denmark is working hard in favour of building a databank in this field and that combined effects are, where possible, taken into account when individually assessing the risk of chemical substances.

Oxygen depletion

Good oxygen conditions are decisive for varied life at the bottom

Denmark has made great efforts to reduce the input of organic material, chemical and nutrient substances into the sea. While improvements have clearly been made in some respects, certain sea areas and fjords remain dogged by oxygen depletion. Some oxygen depletion is caused by emissions from neighbouring countries.

More than 1000 km^3 of water flows from the brackish Baltic Sea (surface currents to the North) and salty Skagerrak (bottom currents to the South) into the inner marine waters, Kattegat and the Belt

Sea. This forms separate strata of heavy, salty water at the bottom and lighter, brackish water above. Where the inner waters are deepest, the strata are almost permanent in the period from early spring until late autumn, although storms do mix the water column. Stable stratification prevents atmospheric oxygen from reaching the bottom, which means that the inner marine waters are especially vulnerable to oxygen depletion.

Natural oxygen depletion

Stratification also occurs in fjords, especially in hot summers with little wind. In addition to stratification, high oxygen consumption in sediment due to the high temperature of the bottom water and large quantities of organic material in the sediment increases the risk of oxygen depletion. In certain sea areas (southern Little Belt) and fjords (Flensburg Fjord and Mariager Fjord), oxygen depletion will more or less always be present due to natural conditions, e.g. great depth with stagnating bottom water.

Failed to meet goals for good oxygen conditions

In the period 2004-2012, about 70% of the inner waters were affected by oxygen depletion (< 4 mg O2/l) and about 10% by severe oxygen depletion (< 2 mg O2/l) on at least one occasion (Figure 1-30). Severe oxygen depletion is particularly prevalent in deep waters and fjords sheltered from the wind which also have a strong inflow of freshwater and nutrients (e.g. Skive Fjord).

The scope and severity of oxygen depletion varies from year to year, depending primarily on climatic conditions. The long-term trend indicates that oxygen conditions in the open marine waters fluctuate in a 13-14-year cycle. In some years the oxygen concentration falls in the salty bottom water as it flows through Kattegat to the Belt Sea because the oxygen is consumed by the sediment. The oxygen concentration is therefore lower in the Great Belt than in Kattegat. Since 1989 the concentration of oxygen has fallen to less than 2 mg/l in three out of 21 years in Kattegat and seven times in the Great Belt. This means that goals stipulating that concentrations of less than 2 mg O2/l must never occur, are far from being achieved.

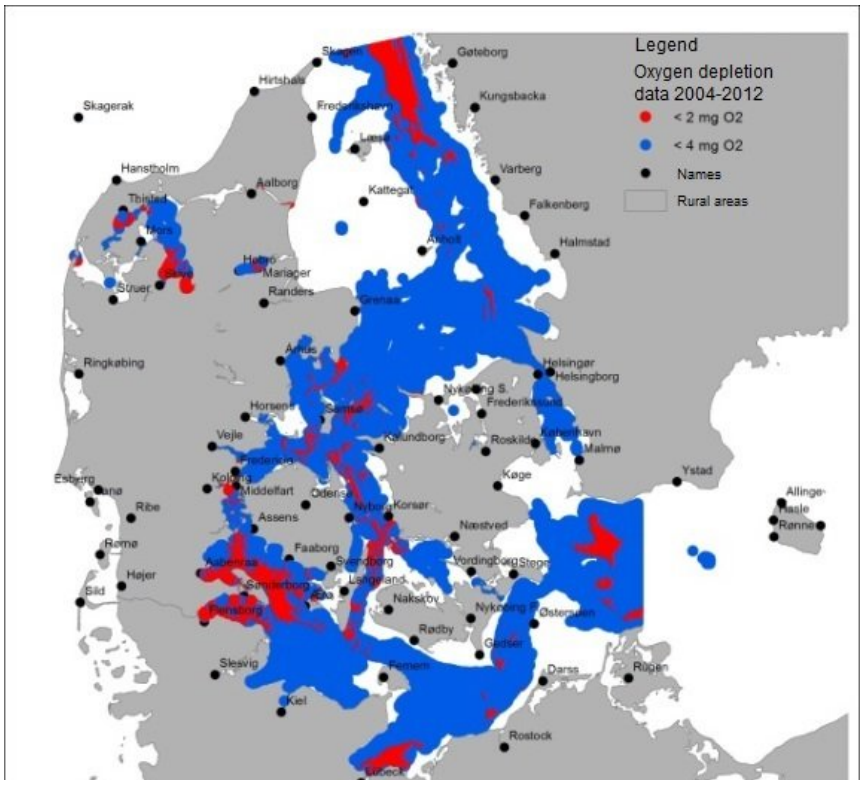


Figure 1-30 Overview of the extent of oxygen depletion (< 4mg o2/l, blue areas) and severe oxygen depletion (< 2 mg o2/l, red areas) in inner marine waters in the period 2004-2012. [2]

References

[1] Danish Ministry of the Environment, 2012. Denmark's Marine Strategy. Environmental Goals Report.

[2] DCE (National Centre for Environment and Energy)
[3] IMO - International Convention on the Control of Harmful Anti-fouling Systems on Ships (enforced October 2001, ban effective from September 2008)

1.6.2 Important fish stocks

- Most of the commercially important fish stocks in Danish waters are exploited sustainably.
- Stocks of cod in the North Sea and Skagerrak have not yet reached a safe, sustainable level but have increased since 2006.
- Cod stocks are critically low in Kattegat.
- Stocks of herring are exploited sustainably in the North Sea. Stocks have been falling in the western part of the Baltic Sea for some years but continue to be exploited at levels close to the sustainable level.
- Plaice stocks are exploited sustainably in the North Sea and have progressed in Kattegat since 2009.

Sustainable fishery

Across the globe overfishing threatens to wipe out fish stocks. In Denmark many species are fished at a sustainable level. However, there are still some species which are not within safe recruitment margins. The challenge facing us in the future is to ensure that fishery remains a profitable business in the long term and, at the same time, that sustainable fish stocks are enlarged and maintained.

Some stocks are not fished sustainably

There are almost 200 species of marine fish in Denmark. As yet we have insufficient data to establish scientifically founded quotas for all the species that are commercially exploited. The scientific basis is is, however, growing and it will gradually become possible to set quotas for more and more species.Fish mortalityof several species in the North Sea has been reduced. For seven out of a total of nine species for which we have sufficient data, it is assessed that stocks are exploited sustainably in the North Sea and Skagerrak. Three out of six species are exploited sustainably in Kattegat and two out of three species in the western part of the Baltic Sea.

Table 1-1Conservation status of important species of fish in Danish waters. Assessments are based on the volume of spawning biomass. (√) indicates that the spawning biomass exceeds the threshold required for good conservation status and (÷) indicates that biomass is under the required threshold. Grey indicates that we have insufficient data to assess conservation status or that there are no stock present in the waters. [1].

	Cod	*Haddock*	*Saithe*	*Norway Pout*	*Herring*	*Sandeel*	*Sprat*	*Mackerel*	*Plaice*	*Common Sole*
North Sea and Skagerrak	÷	√	÷	√	√	√		√	√	√
Kattegat	÷	√	÷	√	√					÷
Western part of the Baltic	√				÷		√			

Cod

Historically speaking, cod, herring and plaice have been some of the commercially most important species for Danish fisheries. Despite growing stocks of cod in the North Sea and Skagerrak, they have yet to reach a safe sustainable level. Stocks of cod in Kattegat are critically low. In the North Sea cod stocks have improved gradually. Spawning biomass was at an all-time low in 2006 but has increased in recent years to around the minimum threshold. In the west part of the Baltic Sea,

stocks have exceeded the sustainability threshold but fish mortality is still too high to be described as sustainable exploitation.

Herring

Herring stocks in the North Sea have favourable conservation status. Stocks of spring-spawning herring, which, with cod and sprat, are the most widespread species of fish in the western part of the Baltic Sea, have shrunk in recent years. In 2012 they were just at the threshold required for sustainable exploitation. Herring has been subjected to intensive commercial fisheries. Herring is a very valuable source of food for other commercially important fish stocks, sea birds and marine mammals.

Plaice

Plaice fishing in Kattegat, the Sound and the Belts has fallen to a low level and the spawning biomass has been increasing since 2009. Current fishing intensity is probably at a level which ensures sustainable exploitation. In the North Sea, fish mortality due to fishing has fallen to a sustainable level and the spawning biomass is far above the critical thresholds and continues to rise.

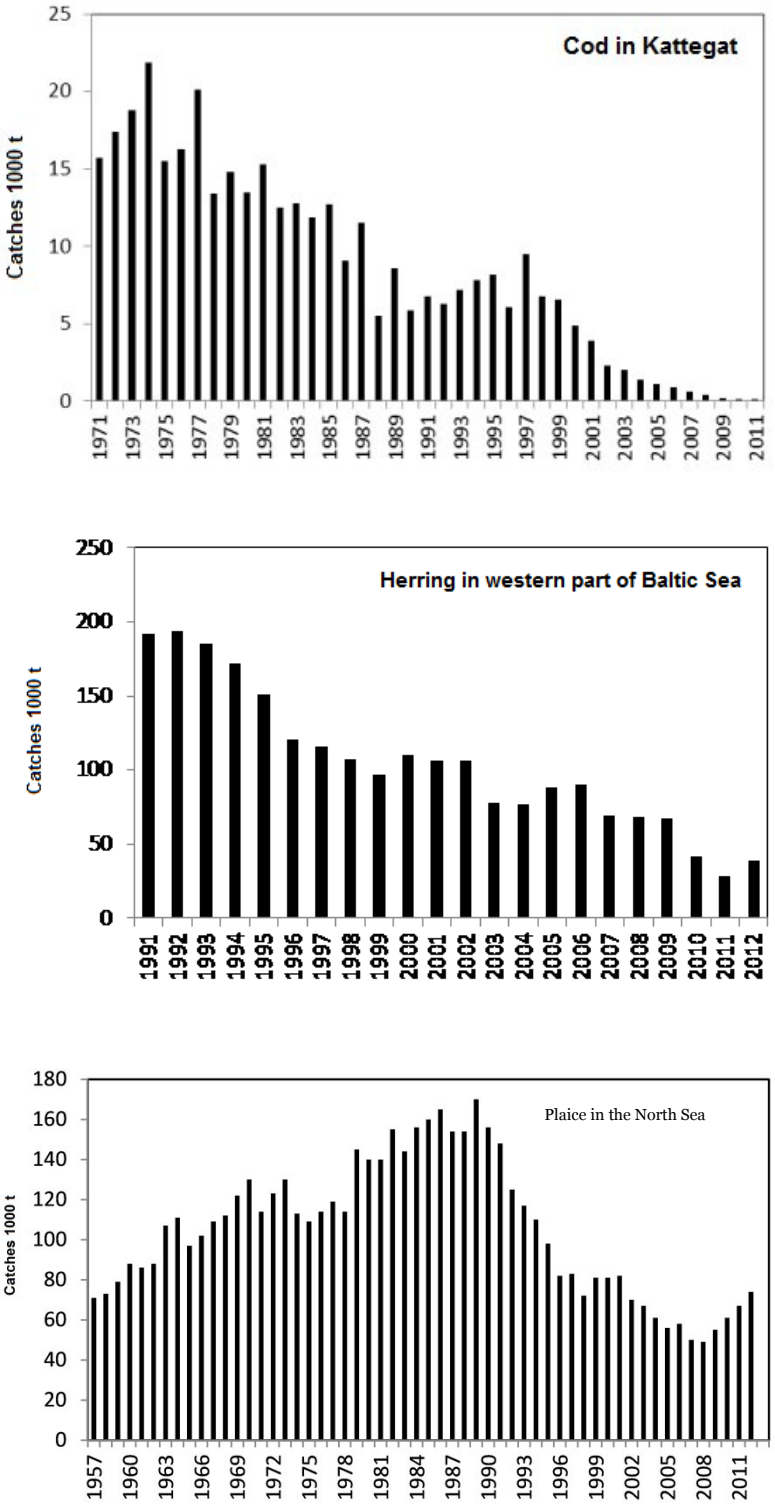


Figure 1-31 Catch development for cod in Kattegat (top), herring in the western part of the Baltic Sea (middle) and plaice in the North Sea (bottom). --- = threshold value for sustainable exploitation of stocks [1].

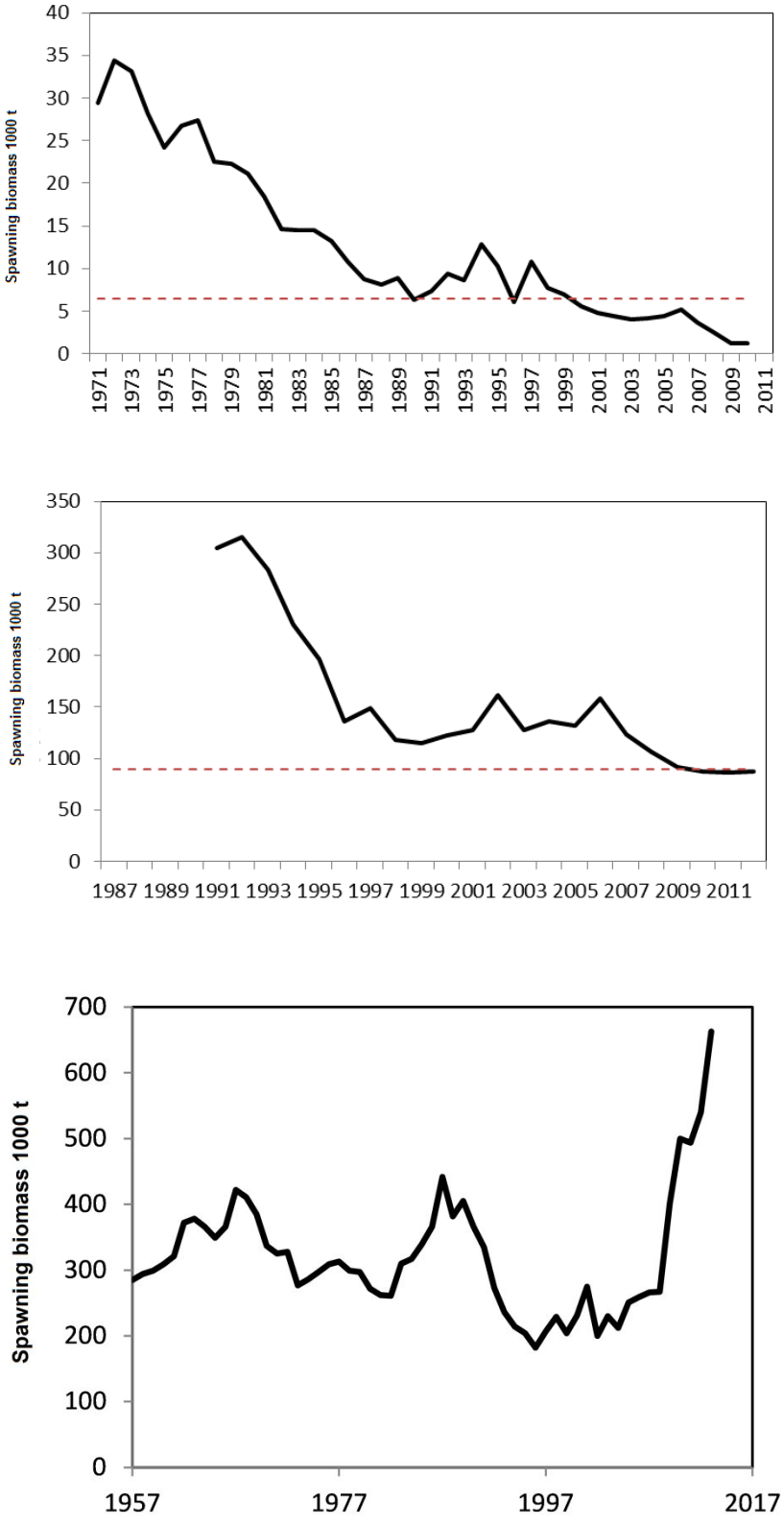


Figure 1-32Spawning biomass for cod in Kattegat (top), herring in the western part of the Baltic Sea (middle) and plaice in the North Sea (bottom). --- = threshold value for sustainable exploitation of stocks [1].

References

[2] ICES Advice 2013 and 2014 (www.ices.dk/advice/icesadvice.asp)

1.6.3 Marine habitats

- Marine habitats are threatened by nutrient discharge, bottom trawling and acidification
- Offshore wind farms have increased the diversity of habitats.
- The restoration of rocky reefs off the island of Læsø have increased the biodiversity of species, including fish and species of large algae (seaweed).

The inner marine waters have been mapped to ascertain the locations of specific marine habitats. The mapping includes sandbanks which are permanently flooded with sea water at low tide, reef formations and bubbling reefs [1].

Marine habitats can be protected, for example, as designated Natura 2000 protection areas which cover 17,7% of total Danish waters (9,573 km²). The sandbanks may be barrier reefs or shallow areas with eelgrass beds or seaweed forests. Reef formations primarily include rocky reefs or bubbling reefs, which are limestone formations created in microbiological processes in areas where gas seeps from the seabed.

Impoverished marine oases

Marine habitats are threatened by the discharge of nutrient substances from land to sea because the presence of nutrients increases plankton production and leads to poor water clarity. Fishery using bottom trawlers is also a threat. Reefs were threatened by rock fishing in the past, which is now forbidden.

Reefs are very valuable marine oases, which are home to a diversity of species. Such reefs are local areas made up of different sized rocks. They were created as the ice withdrew at the end of the last Ice Age. Reefs are attractive locations for fishing as there are often large shoals of different species of fish on and around rocky reefs. Unfortunately, fishing tackle often has a destructive effect on the reefs.

Reefs are protected in accordance with the Habitats Directive and are also listed as sites in the Natura 2000 designation platform. The goal for all reefs and their immediate surroundings in Natura 2000 designated areas is to issue a ban on fishing with fishing gear which scrapes the reef bed. The first prohibition orders came into force in 2013.

Status

In the most recent report to the EU, the conservation status of six of the country's seven marine habitats is described asunfavourable bad.

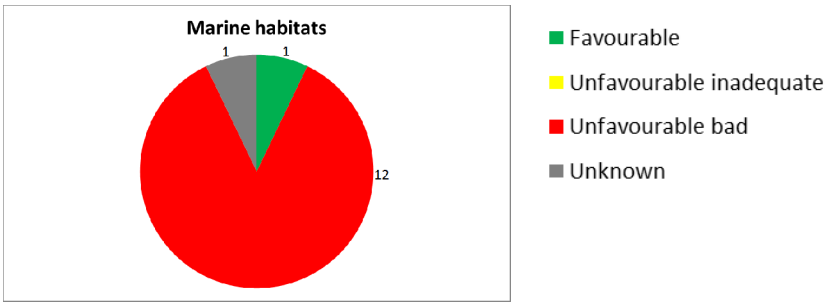


Figure 1-33Conservation status for eight protected marine habitats (occurring in the Annex 1 of the EU Habitets Directive) assessed in the period 2007-2013. Six of these habitats are found in both biogeographical zones in Denmark. Conservation status for the habitat type is assessed for each of the biogeographical zones. A habitat type counts for two observations if it is found in both zones. The sum of the figure of the diagram is therefore greater than 8. Only the rare estuaries habitats are assessed to have favourable conservation status. Source: data from national article 17 reporting.

Reef restoration

The Blue Reef Habitat Restoration Project has restored and protected a large reef (covering almost 7 hectares) at Læsø Trindel in a Natura 2000-designated area 11 kilometres north-east of the island of Læsø in northern Kattegat. An area of about 6 hectares of the pre-existing reef is now stabilised. 86,000 tons of rock were deposited on the reef during the project, which was completed in April 2013. The aim was to rehabilitate the reef and provide good living conditions for creatures living on the benthic (seabed-dwelling) algae and fish.

The effects of the project are monitored, and conditions before and after restoration have been assessed. It is clear that restoration has generally increased biodiversity on the reef and the number of characteristic species has increased. Total biomass on the reef has increased by about 3 tons of animals and 6 tons of algae. Estimates are based on measurements in 2007 and 2012.

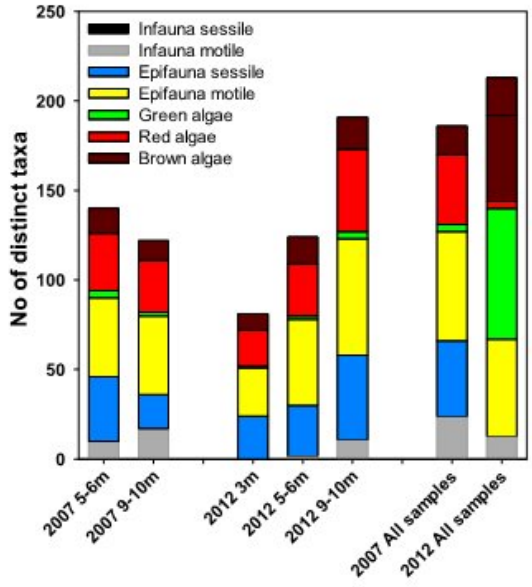


Figure1-34Total numbers of seaweeds and fish as well as sessile and motile animals at three depth intervals and at all three depths totally were investigated at Læsø Trindel in 2007 and 2012. Animal species were divided into four sub-groups: sessile, motile, infauna and epifauna. Source: [2].

Reinstatement of the reef means that there are now more species of perennial seaweeds in the algae communities than there were before restoration and there are signs of greater stability in the

habitat. New species have migrated to the reef. For example, there are now large occurrences of the Plumose Anemone *Metridium senile*), a soft coral which was not previously extant on the reef.

Figure 1-35Typical seaweed forest on Læsø Trindel at a depth of 9.5 metres. Image: Karsten Dahl, DCE.

Shoals of cod near the reef have increased since its restoration. The number of fish more closely associated with reefs, primarily wrasses (Labridae), has also increased while numbers of flatfish have fallen in the shallow parts of the reef. No new species of fish have migrated to the reef but the constellation of species has changed.

The results of fish investigations show that Læsø Trindel is increasingly becoming a growth area for several species of fish, such as Cod and Atlantic Pollock, and these tend to attract more fish from local areas which find food on the reef. Reefs are also a favourite habitat for lobster. However, as lobsters grow slowly, it is too early to determine if restoration has been beneficial for this species. Porpoise have been observed more frequently and for longer periods since than before restoration. This is interpreted as an improvement of the reef's ecological standard.

Offshore wind turbines as a habitat

In the past 22 years, 14 offshore wind farms have been built in Danish waters. There are more in the pipeline. The wind farms' effect on the surrounding marine habitat is being monitored.

Figure 1-36 Existing offshore wind farms in Danish waters. Source: ENS.

Wind farms have generally increased the diversity of habitats in the marine areas in which they are built. The number of animals and biomass have increased in these areas. The offshore wind farms are established primarily in sea areas with a sandy bed. The wind turbine foundations act as spots of hard seabed, which change conditions on the seabed from a predominance of animals accustomed to living in the sand, to create environments similar to reef communities.

Offshore wind farms do not generally increase the number of fish in the area nor do they cause a change in the species which live there. The construction of the Horns Rev wind farm led only to minor changes in the constellation of different species of fish in the area. Close to each wind turbine foundation more species of the types that normally inhabit reefs, including Goldsinny Wrass (Ctenolabrus rupestris), Viviparous Blenny (Zoarces viviparous) and Lumpfish (Cyclopterus lumpus), were observed.

Offshore wind farms can affect the behaviour of sea birds as they cease to frequent the local areas after the installation of wind turbines. Effectively, the sea birds lose a habitat. Offshore wind farms may also act as a barrier to migratory birds and constitute a collision risk. Birds tend generally to avoid wind turbines, which means that, even after the installation phase, collisions rarely occur.

The behaviour of seals and porpoise has been monitored intensively in connection with the installation of offshore wind farms and their subsequent operation. It transpires that seals do not change behaviour as a result of an offshore wind farm. Porpoise at the Horns Rev offshore wind farm were not observed to have changed behaviour. At Nysted offshore wind farm porpoise activity was reduced not only during installation but also for a period of two years following commissioning. After the first two years, there were no further significant changes in porpoise behaviour [3].

References

[1] NST, 2012. Marine raw materials and habitat mapping in Kattegat and the western part of the Baltic Sea 2011. The Danish Nature Agency.

[2] Dahl, K. 2013. Blue Reef - Status for biological immigration on the new Læsø Trindel reef in 2011. Aarhus University, DCE – National Centre for Environment and Energy Date: 20 June 2013

[3] Danish Energy Agency, 2007. Location of future offshore wind turbines – 2025. Committee for future offshore wind turbine location April 2007

1.6.4 Marine mammals

- The population of Harbour Seal has been growing since 1980.
- Estimates of the porpoise population in the North Sea vary from 41,000 to 57,000 and in inner Danish waters from 13,500 to 22,000. As porpoise have only been counted for a few years, it is not possible to assess their development.
- The porpoise population in the Baltic Sea is thought to be small and vulnerable.

Marine mammals as indicators of conservation status

Large animals, including marine mammals such as seals and whales, are an important part of the ecosystem in both coastal and open waters. They are the highest level in the food chain and are thus indicators of the structure and function of and degree of malfunction in the food chain. These animals are therefore chosen as key indicators of conservation status in proposals for Denmark's Marine Strategy.

Two species of seal are common to Danish waters: the Harbour Seal and the Grey Seal, as are three species of whale: porpoise, the White-Beaked Dolphin and the Minke Whale. The Harbour Seal is Denmark's commonest seal and porpoise the most common species of whale.

Threats facing seals include epidemic outbreaks which have caused a severe decline in the Harbour Seal population in the past. One of the threats facing porpoise is bycatching. Porpoise live in productive areas of the sea, often in conjunction with good fishing areas. Fisherman often risk finding porpoise in their nets as bycatches.

There is also an accumulation of contaminants in the food chain, which means that concentrations in whales and seals at the top of the food chain is much larger than in their prey. The porpoise is also particularly sensitive to noise and the disruptions caused when building bridges or wind farms and by shipping.

Seal populations aregrowing

The total population of the Harbour Seal in Denmark has advanced during the last 30 years. Even though, on occasions during this period (1988 and 2002), there were epidemics which killed large numbers of seals, the long-term trend is a rapidly growing population, developing from about 2,000 individuals in the mid-1970s to more than 16,000 individuals in 2012 [1].

The four most important populations are found in the Baltic Sea, Kattegat, Limfjord and Wadden Sea. The number of seals in Limfjord varies widely from year to year, presumably in line with variable access to food. Seal numbers are increasing in the remaining areas.

Grey Seals are uncommon in Denmark but there are groups at Rødsand (Læsø), on two islands (Anholt and Christiansø) and in the Wadden Sea. The total Danish Grey Seal population is estimated at 240-430 individuals [1]. The Grey Seal has bred in Denmark since 2003.

Seals are sensitive to disturbances in their resting places on beaches, sandbanks and reefs, especially during breeding and moulting periods. Seal pups are prone to entanglement in fishing nets and traps.

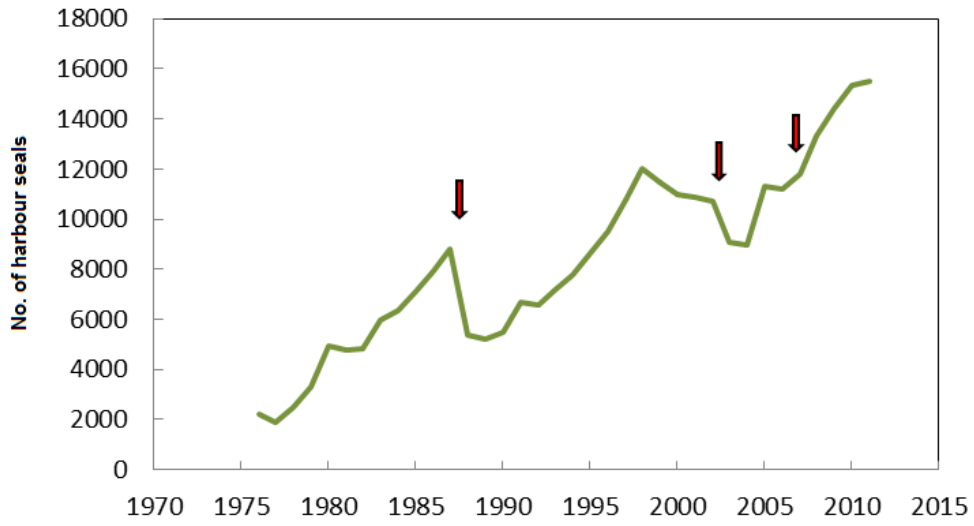


Figure 1-37 The total number of harbour seals in Danish waters based on aerial counts made in August. The figures for 1976-1978 are estimates (due to non-standard methods of counting). The figures stated for 1993, 1995, 1997 and 1999 are the result of interpolation. Red arrows indicate epidemic years. Source: Henriksen et al. 2011 [2]

Danish whales

The porpoise is the only type of whale to breed in Denmark. It is presumed that there are three populations in Danish waters; one in the North Sea, one in the inner Danish waters and one in the Baltic Sea. Whales are generally difficult to count and whale counts for the North Sea and inner Danish waters are unreliable.

In 1994 the population in the Danish sector of the North Sea was estimated at about 57,000 porpoise. In 2005, the estimate was about 41,000 [2] [3]. In 1994, the population in Kattegat, Øresund, the Belt Sea and the western part of the Baltic Sea was estimated at about 22,100 porpoise. In 2005, the estimate was about 13,600 [2] [3]. A new investigation from 2012 estimates that this population is a little over 18,000 porpoise [4]. The fact that there are relatively few, unreliable counts means that it is impossible to assess development in the porpoise population.

The population of porpoise in the Baltic Sea is very small, just a few thousand individuals. The population is thought to be vulnerable.

The White-Beaked Dolphin and the Minke Whale live in open seas in the North Sea and Skagerrak. There is a total population of about 10,000 whales. The Danish share is unknown, although the population is thought to have favourable conservation status (DCE, 2013).

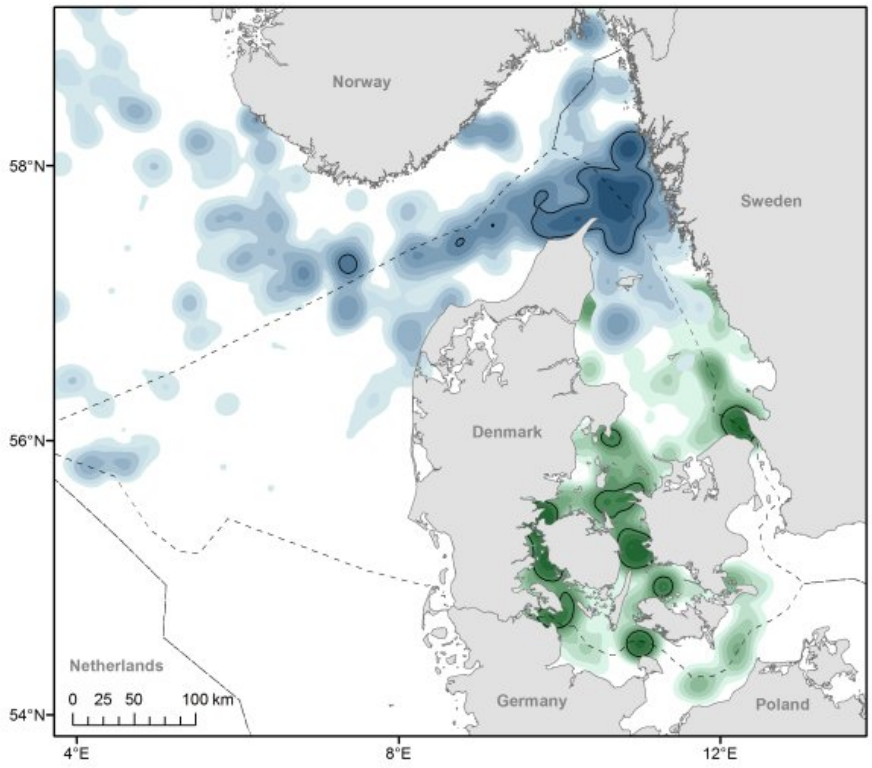


Figure 1-38Distribution of porpoise in the period 1997-2007. The figure shows density of satellite-tracked porpoise. Green colour denotes porpoise from the population in inner Danish waters. Blue colour denotes porpoise from the North Sea population. There are black lines around high-density areas [5].

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1.7 Endangered species

1.7.1 Species in decline

- 27% of Denmark's plant and animal species which have been studied or assessed are Red-Listed..
- 54% of Red-Listed species are associated with forest habitats.
- Threats facing these species include fragmentation of populations, deteriorating habitats, disturbances and climate change.

The biodiversity on our planet has always fluctuatedaccording to changing living conditions. Natural processes and events, such as climate change, fire, storms and plate tectonics have meant that some species disappear, others evolve and others migrate to new locations. In recent millennia humankind has brought about radical changes to plant and animal habitats. A dramatically increasing human population and the need for more space, energy and raw materials are repressing natural flora and fauna.

The best scientific estimates calculate that species are currently becoming extinct at 100 times the rate at which they would have become extinct without humanity [1]. The primary cause of the problems facing endangered species, globally and in Denmark, is that their habitats are deteriorating due to overgrowth, nutrient loads, disruption, fragmentation and unnatural hydrology.

Today 1.7 million different species of animals, plants, fungi and micro-organisms are identified on our planet, although the true figures are believed to be much higher. Denmark is home to about 30,000 species of plants, animals and fungi [1].

It is assumed that current and future climate changes will exacerbate some of the issues caused by human activity that constitute a threat to biodiversity. We may see changes in birds' migratory patterns. We may also see species whose southernmost distribution is currently Denmark emigrating northwards and other species, which were previously indigenous to southern and mid-European countries, coming to Denmark.

Some immigrating species may be invasive, i.e. they could outperform local species of plants and animals that are indigenous to Denmark. Similarly, pressure on existing populations may increase as new diseases evolve in the shape of fungi, parasites and bacteria not previously occurring in Denmark.

27% of Danish species assessed are Red-Listed

Status for endangered and rare species is given in accordance with IUCN (International Union for Conservation of Nature) guidelines, which, by means of the Red List, assess the extent to which individual species risk extinction. In Denmark the Red List is drawn up by DCE – National Centre for Environment and Energy at Aarhus University. A total of 8,119 species have been assessed in accordance with the international Red List criteria (bios.au.dk, 2013) compared to 5,656 species in 2009. Of these, 2,226 species (corresponding to 27%) are Red-Listed. Of the Red-Listed species, 303 are extinct, 366 are critically endangered, 493 moderately endangered, 640 vulnerable and 415 near threatened. More than half (54%) of the Red-Listed species belong to forest habitats.

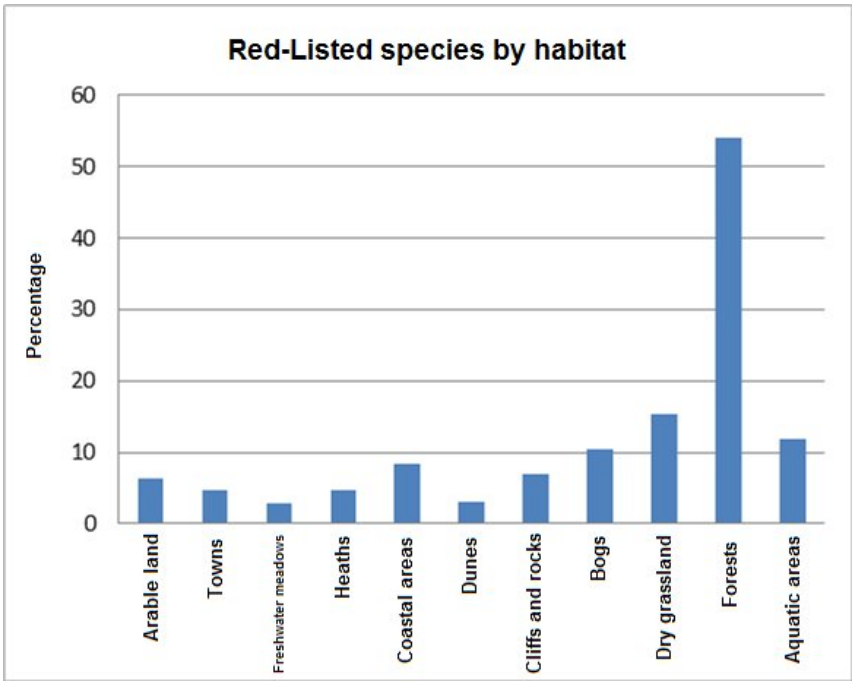

Figure 1-39Percentage share of all red-listed species by habitat the total sum is more than 100% as several species have more than one habitat[2].

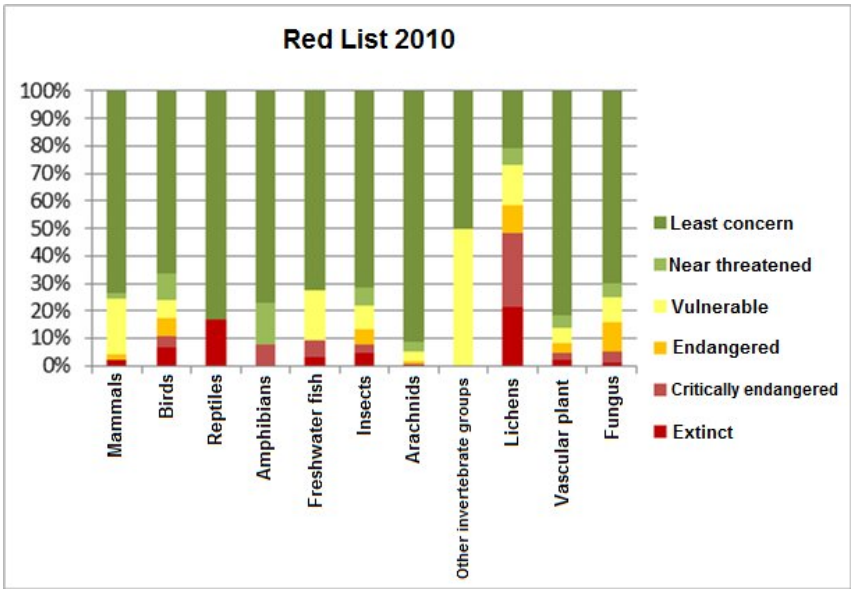

Figure 1-40List of 8119 species assessed in line with Red List principles [2].

An article entitled "Danmarks Biodiversitet" (Denmark's Biodiversity, 2010) estimated that 72 % of a selection of Danish species were in decline. These in particular include species which require open, low-nutrient habitats (commons, bogs, heath, sand dunes and meadows) with varied vegetation. Other species associated with old-growth forests and large volumes of deadwood are also in decline. Development was described as stable or positive for only 17% of plant and animal groups.

Some species are now so rare at the European level that Denmark has an international co-responsibility to protect and conserve them. These species are also managed by means of the Natura 2000 directives, popularly known as the Habitats and Birds Directives. For internationally protected species which have dramatically declined in distribution or numbers and which were assessed in the last report to the EU to remain in decline, the Natura 2000 plans stipulate that specific steps must be taken by 2015. This applies, for example, to the following species: the hermit

beetle, marsh fritillary, marsh Saxifrage, Buxbaumia Viridis and the thick shelled river mussel, and birds, such as the common eider, dunlin, sandwich tern and tawny pipit.

In the latest report on protected species in the EU (Habitats Directive, Appendix II, IV and V species), about one third of a total of 83 species (or group of species) is assessed to have favourable conservation status. This applies notably to mammals (17 of the total 27 species). By contrast, the vast majority of plants, fish and invertebrates have unfavourable conservation status, while the conservation status of a further 25 species is unknown.

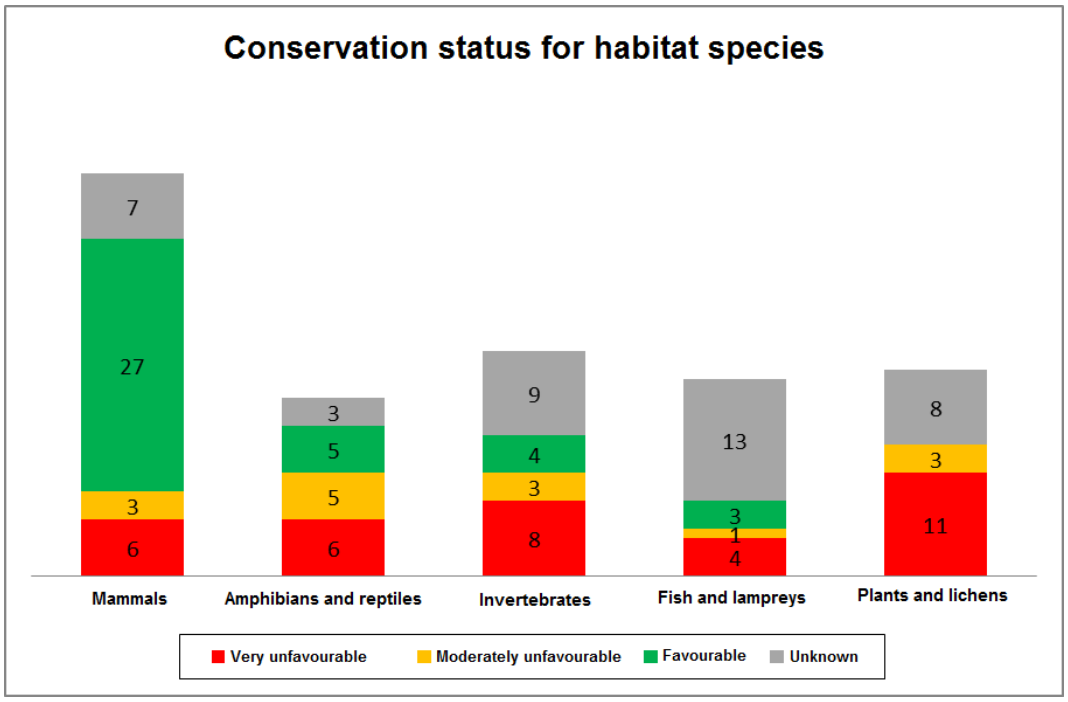

Figure 1-41Conservation status of 83 different protected species in the EC, distributed as five groups of species. Conservation status evaluated in the period 2007-2013. Most bats have favourable conservation status, while species in other groups of species primarily have unfavourable status. Denmark is divided into two biogeographical zones, an atlantic and a continental zone. Species found in both zones are counted twice and the sum of the columns is therefore more than 83. Source: data from article 17 reporting.

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1.8 Ecosystem services and the recreational use of the natural environment

1.8.1 Ecosystem services

- Many parts of Danish commerce and industry depend on Danish nature
- Key industries are dependent on ecosystem services.
- Outdoor activities are good for the health of the human population.
- Outdoor activities are growing and have indeed done so since 1975.

Denmark's natural environment offers a large number of services, commonly known as"ecosystem services". Ecosystem services are essential to individual human beings and our society. Ecosystem services give us food, fresh air and clean water, fuel and building materials, as well as the pleasure of engaging in recreational activities. Many parts of Danish commerce and industry depend on Danish nature (agriculture, fisheries, forestry, etc.) and many Danes work with and in nature. Ecosystem services are therefore essential for health, well-being, and the economy.

Ecosystem services are typically subdivided into four categories; provisioning, regulating, supporting and cultural services.

The EU has a headline target of its own for biodiversity in 2020: "Halting the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, and restoring them in so far as feasible, while stepping up the EU contribution to averting global biodiversity loss." The strategy expresses a desire within the EC to encourage sustainable development and nature management in the Member States.

The European Union's biodiversity strategy 2010 includes specific goals to ensure that ecosystem services are maintained and enhanced by 2020. In 2014, the Danish Ministry of the Environment will implement a project to map Danish ecosystems and ecosystem services. This exercise will be based on an analytic framwework provided by the EU Commision in 2013.

The value of ecosystem services
While a more comprehensive mapping and analysis of ecosystems and ecosystem services have still to be carried out several studies have already confirmed the value of specific ecosystem services in forestry, agriculture and fisheries [1].

A recent Danish study sought to calculate the value of insect pollination of arable crops (Figure 1-42). This study shows that insect pollination is very valuable and can be calculated at DKK 421-690 million a year [2]. Most of this value is accumulated in the spring, when fruit trees, oilseed rape and berry bushes are pollinated.

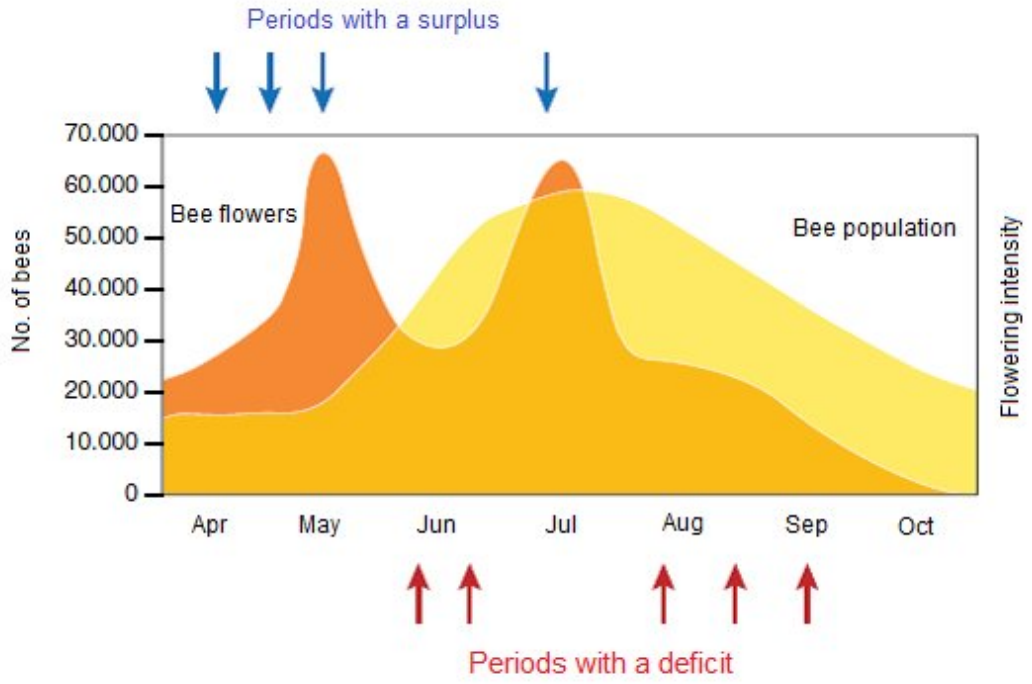

Figure 1-42Development of bee population throughout the season compared to flowering plants visited by bees (Axelsen et al. 2011).

In 1997, in connection with planting a total of 160 hectares of forest on agricultural land at Vollerup Skov on West Zealand, the socio-economic and budgetary effects of afforestation were calculated. Total socio-economic benefits were calculated at 1,085 DKK/ha/year, or DKK 173,500 a year for the entire forest [8]. Environmental benefits include, in particular, a reduction in nutrient loads, a reduction in pollutants, C02 binding, improved opportunities for outdoor pursuits and increased biological diversity. The value of binding C02 alone accounted for DKK 117,800 a year.

If this had been at a location closer to a town where groundwater protection was more important, the socio-economic benefits would have been significantly greater. C02 binding is an ecosystem service, which in principle is of nationwide benefit, while the recreational value of the ecosystem and its groundwater-protective functions are relatively narrowly associated with benefits for the local population.

In a multifunctional experimental farm that operates as a net energy-producing agro-ecosystem featuring broad belts of protective shelter belt with fast-growing deciduous trees, it is calculated that the total value of ecosystem services may add up to DKK 5,000-8,000 per hectare [9]. The largest contribution from the ecosystem comes from regulation of nitrogen turnover (N-fixation and mineralisation) and production of animal feed and biomass (in shelter belts). Landscape aesthetics is another value which can be attributed to belts of deciduous trees. Some ecosystem values can be attributed to the presence of an insect population, which pollinates plants and combats insects regarded as pests.

Nature protection and nature rehabilitation also provide socio-economic benefits, when they are calculated based on ecosystem services. In 2003 it was assessed [10] that the current value of net benefits, i.e. the socio-economic benefits of restoring Skjern River to its natural course would be as much as DKK 200 million over an eternal time horizon, or DKK 30 million on a 20-year time horizon. The value depends on the social discount rate.

1.8.1 Outdoor pursuits, recreational activities and health

Outdoor pursuits in Denmark are many and various. The Danish Ministry of the Environment's definition describes "outdoor pursuits" as "pleasurable human leisure activities, which take place outside the home, workplace and sports stadium, and which are a matter of choice. People engage in outdoor pursuits, for example, at sea, along the coast, in the forest and woods, in urban parks, close to lakes and a number of other locations in the open countryside" [3]. People's motivations for engaging in outdoor pursuits are manifold. In this section we will focus on the health-giving effects of outdoor pursuits.

A lack of physical activity is one of the most important factors creating a higher risk of developing lifestyle-related conditions, such as cardiovascular diseases, type 2 diabetes, stress, etc. Research has shown that spending time in a green environment can have a prophylactic and curative effect[4]. This means in effect that outdoor pursuits generally promote public health.

Research has shown that there is often a direct correlation between the distance from peoples residence to the closest nature area including parks and how often they use the area for walkings etc. as well as with their experiences with stress.. It is therefore important that there are nature areas close to where people live.

Research also shows that even though many animals, plants and nature areas are negatively impacted by outdoor activities the society generallyl benefits from increase in outdoor activities . Only in cases with very sensible speciesor ecosystems the negative effects can be so severe that access must be regulated or prohibited.

The range of outdoor pursuits activities is increasing
According to Danish laws access to nature is free and unhindered, but only for walks and cycling. Further access depends largely on land owners acceptance.

The number of outdoor pursuits activities and facilities is growing. The total number of outdoor pursuits facilities in the state owned nature areas managed by the Ministry of Environment has increased from 2,045 to 2,706 in the period 2003-2009[5]. Examples of outdoor pursuits facilities include birdwatching towers, exercise routes with lighting and signs, mountain bike tracks, shelters and camping sites. If facilities provided for outdoor pursuits, recreation, exercise, etc. are improved, activity levels and frequency of visits can reasonably be expected to increase and impact positively on health and life quality.

Nature is used more often for exercise purposes than fitness centres[6]. The forest is the preferred natural habitat for outdoor pursuits, followed by beach and coast. The popularity of forests may reflect that Danish forests are relatively widespread and easily accessible, and that there are many potential experiences to be gained and activities to engage in forests and woods [7].

Outdoor pursuits organisations are not only working to improve the opportunities for using the natural environment but can also help to protect the natural environment and understanding of nature by providing more information about nature and by better controlling how people use natural areas. For example, if a off-leash dog area is established in a forest the level of dog-walking activities in other parts of the forest is reduced and the wild fauna becomes less disturbed by dogs running loose.

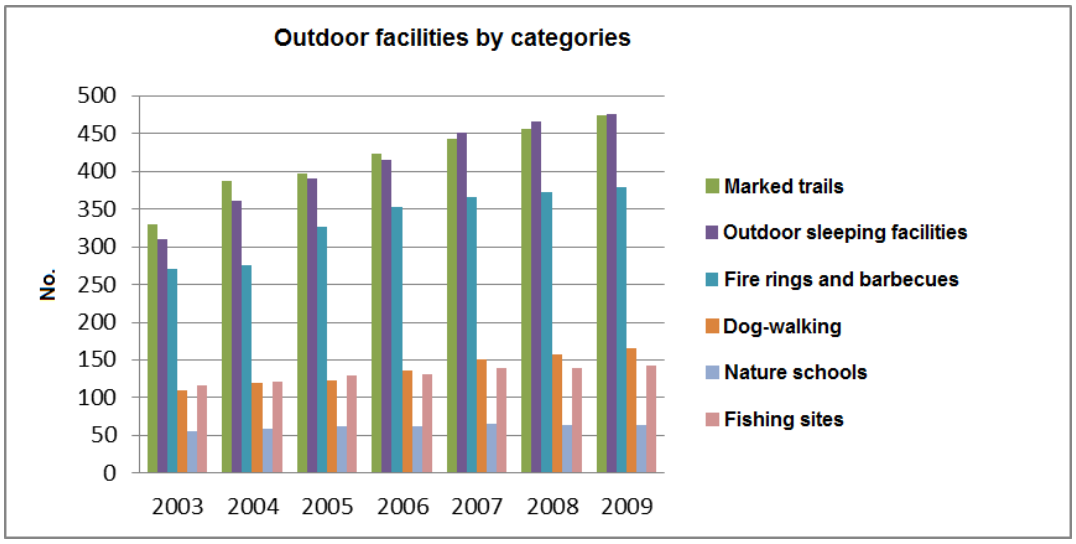

Figure 1-43The Danish Nature Agency's outdoor pursuits facilities [5]

With the exception of nature schools, which fell by 2 in the period 2007-2009, all facilities increased from 2003-2009 [3]. The most important reasons for using the natural environment are to experience nature and the landscape and to exercise [11].

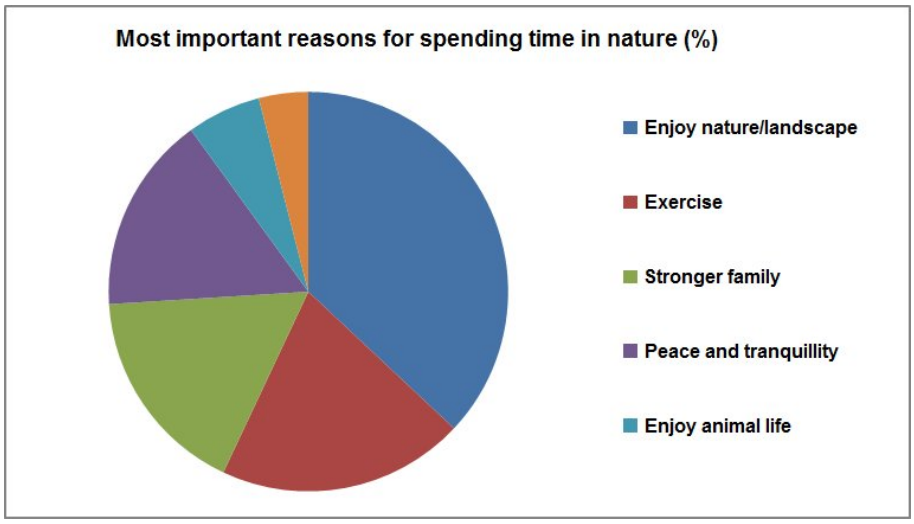

Figure 1-44Most important reasons for using the natural environment.

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2. Chapter

National Biodiversity Policies, Legislation, Strategies, Actions and Financing

2.1 International, EU and national policy framework

The UN Biodiversity Convention from 1992 has exerted strong international influence, not least on the development of European Union and national policies. In addition to the UN Convention, there are many more international and regional agreements and conventions in the natural sphere, of which the Bern, Bonn, Ramsar and Washington (Cites) conventions are some of the most important.

In continuation of work with the UN Biodiversity Convention, as a Member State of the EU, Denmark is politically committed to comply with EU policies and legislation in the natural sphere. Some of the most important EU instruments are the 1979 Birds Directive and the 1992 Habitats Directive. The Water Framework and Marine Strategy Directives are also important. New directives concerning profit-sharing in connection with the exploitation of genetic resources and invasive species will be important in the future.

In March 2010, in the build-up to global negotiations related to the Biodiversity Convention, EU Environment Ministers adopted a long-term vision for 2050 and new goals for protecting biodiversity until 2020. The EU 2020 goals for biodiversity include halting the loss of biodiversity and erosion of ecosystem services in the European Union by the end of 2020.

Denmark is strongly engaged and works in multiple ways to halt the decline of biodiversity. Policies, strategies and practical activities across sectors like planning, agriculture, forestry and marine management contribute to achieve the target.

This chapter will introduce some of the most important current and emerging national and overall nature strategies as well as provide information on how the major components of the national biodiversity (protected areas, species and genetic resources) are managed through specific policies, legislation and actions.

Currently, Denmark does not have one specific “National Biodiversity Strategy and Action Plan”. The government platform (October 2011) drawn up by the present Danish government, however , clearly states that it will work to meet international and EU biodiversity goals to halt the loss of biodiversity and ensure that nature becomes more cohesive and resistant to climate-related impacts.

Nature policies and actions are also addressed in several other national policies, strategies and financial schemes, some of the most important are:

- Green Growth (2009/2010)
- Green Transition (2013)
- The Government’s Climate Strategy (2013)
- Action Plan for Climate Proof Denmark (2012)
- The National Rural Development Programme (2014-2020)
- The National Forestry Programme (2002)
- The Danish Climate Policy Plan – Towards aLlow Carbon Society (2013)
- The Marine Strategy (2012)
- The Pesticide Strategy (2013-2015)
- National Planning Report (2013)
- Den Danske Naturfond (national nature preservation foundation) (2013)

Important new nature policy initiatives are under way, most importantly:

- A national sustainability strategy (2014)
- A new National Forestry Programme (2014)
- Nature Plan Denmark (2014)

In 2009 the previous Danish government launched a "Green Growth" agreement. This agreement grants a total budget spending of DKK 13.5 billion on nature and the environment towards 2015.

Green Growth has been realised as legislative amendments, adjustments to subsidy schemes and through the Danish state's aquatic environment and Natura 2000 plans.

With respect to pesticides, the Green Growth agreement was replaced by the “Pesticide Strategy 2013-15” in 2012, without major changes in the goals or tools as lined out in Green Growth.

Some of themain biodiversity-related goals to be achieved by the nature and aquatic plans as well as by other initiaitves are:

- reducing total N discharge by 9,000 tons by 2015.
- reducing discharge of phosphorus from agriculture into the environment by 210 tons by 2015.
- reducing ammonia emissions from farm buildings, etc. by means of amendments to the Livestock Act and investments in environmental technologies.
- reducing utilization and load of pesticides, e.g. by introducing an increased tax on pesticides, which is graduated based on the properties of the pesticides with respect to human health and the environment[1].
- stimulating a doubling of the organic farming sector by 2020 by means of additional subsidy schemes, etc.

Additionally,50.000 hectares of new nature areas in the shape of buffer zones along watercourses and lakes is being established and more forests are created and wetlands restored.

The buffer zones comprise 10 metre-wide areas along watercourses and large lakes, which is to be neither cultivated, fertilized nor sprayed. The objective is to create more and cohesive nature and to reduce discharges of nitrogen, phosphorus and pesticides into the aquatic environment.

The agreement also included measures to improve management and maintenance of nature areas within and outside existing Natura 2000 areas.

Furthermore, in its 2012 Finance Act, the present government decided, via additional state-funding for wetlands initiatives, to create a further 1,600 hectares of new nature areas in the period 2012-2013 and ahead, and to make more funding available for state afforestation projects, which have resulted in 700 hectares of new state-owned forests. A number of these initiatives are co-financed by either the Danish Rural Development scheme or the EU Fisheries Development scheme. In addition to the state initiatives, other players make an active contribution to the creation of new natural habitats. These are primarily local authorities, private landowners, NGOs and private foundations, etc.

The first generation of plans of “Natura 2000 plans” (for the period 2009-2015) is currently under implementation and preparations for the second generation of nature plans for the period 2016-2020 are in progress. The”aquatic environment plans” are delayed. A hearing related to the first generation of aquatic environment plans was concluded at the end of 2013.

In 2013, the present government adopteda "Green Transition agreement” as part of the 2014 Finance Act. This agreement provides funds of DKK 200 mill. annually in 2014-2017 for development of environmentally friendly technologies, organic farming and other activites that can contribute to the green transition.

[1] For pesticides, the Pesticide Strategy 2013-15 has replaced Green Growth

The possible impacts of climate change in Denmark have been evaluated, most recently in a 2012 report by a Task Force on Climate Change Adaptation: “Mapping climate change – barriers and opportunities for action”, where also the most important impacts for Danish nature are described.

In December 2012 an “Action Plan for a Climate-proof Denmark” was launched, which contains several initiatives related to the Danish nature. One of the main features evolving in this regard is to create synergies between effective local rainwater management and the creation of recreational and valuable natural areas.

In 2013 the current government launched “The Danish Climate Policy Plan”. The climate policy plan states that Denmarkss greenhouse gas emissions should be reduced by 40% in 2020 compared to the level in 1990. Furthermore,the plan emphasize that greenhouse gas mitigation policies should be achieved as synergies to other policy areas, such as nature and forestry polivcies.

The municipalities took over the tasks of nature protection and planning from the former counties in 2007 when the Danish governance system were reduced from three to two levels: state level and local council level. As part of the planning and management of nature areas and the associated wildlife the municipalities carry out specific projects to maintain or restore important nature sites and ecological connectivity e.g. by restoring watercourses, reducing the impact of invasive species or reintroducing cattle grazing or traditional hay cutting.

For around 25% of the generally protected nature areas the municipalities have made assessment of the natural condition, the negative impact and the need for active management in order to target their actions for improving nature and biodiversity.

2.2 New and emerging nature protection strategies

In the current government platform (October 2011), the Danish government announced its intention to set up an independentNational Commission for Nature and Agriculture charged to preparing recommendations for resolving the structural, financial and environmental challenges facing agriculture, including recommendations as to how the agricultural sector can help to reduce the carbon footprint and benefit nature and the environment.

The commission was set up in March 2012. In September 2012, it presented its vision for Danish nature and agriculture, and seven indicators towards realising this vision. One of the indicators tackles the space issue, including finding space for more and larger natural areas and more cohesive nature.

In April 2013, the Commission presented its recommendations for comprehensive, interdisciplinary methods and initiatives which can help to realised an holistic strategy for the green transition of Danish agriculture and a strengthening of nature in Denmark. The recommendations propose giving nature in Denmark a significant boost, e.g. by establishing an independent nature foundation and a national nature network. The recommendations are founded on an assessment that there is a need for more nature in Denmark and for more cohesive links between natural habitats so that animals and plants can disperse more easily. There is also a need for better quality in nature and for more, large natural areas with natural variation and dynamism, including more undisturbed forests.

The Commission also recommended the introduction of new measures to regulate the environmental impact of agriculture to benefit the industry itself, as well as the aquatic environment, nature and climate so that Denmark can set new standards in sustainable agricultural production.

New National Forestry Programme
A new National Forestry Programme is to also to be launched in December 2014. The programme shall help to balance and where possible to create synergy among the many interests in forestry (timber and energy production, biodiversity, securing ground water, carbon sequestration, recreational values etc). One of the major challenges will be to improve the biological status of the forests.

Den Danske Naturfond (national nature preservation foundation)
As part of negotiations in connection with the 2014 Finance Act, the Danish government and two opposition parties, Venstre (The Liberal Party of Denmark) and Det Konservative Folkeparti (conservative people's party), agreed to set up Den Danske Naturfond (national nature preservation foundation). The foundation will carry out nature and environment projects which will add to natural biodiversity, protect endangered species, as well as produce a cleaner aquatic environment and reduce greenhouse gas emissions. The foundation will also encourage more public interest and ensure that there is public backing for nature rehabilitation and protection measures.

Den Danske Naturfond will be set up as a partnership between the state and two private benevolent funds: VILLUM FOUNDATION and Aage V. Jensen Naturfond. Den Danske Naturfond will have total capital of DKK 875 million to spend on activities, of which sum the state is placing DKK 500 million at its disposal. The VILLUM FOUNDATION is donating DKK 250 million and the Aage V. Jensen Naturfond is donating DKK 125 million.

Den Danske Naturfond will aim to raise more capital, at least DKK 125 million by 2016, from non-profit-making foundations, and corporate and private donors.

Nature Plan Denmark
In accordance with its government platform, the Danish government will present a "Nature Plan Denmark", which will include relevant recommendations from The National Commission for Nature and Agriculture. The objectives of Nature Plan Denmark will be:

- to ensure that natural diversity, variation and beauty are preserved and developed in ways that are sustainable and beneficial to public welfare and human well-being in Denmark
- to create more nature and more forests – including urban woodlands
- to ensure that Denmark remains a varied, interesting and attractive country with rich natural resources, cohesive natural habitats and a clean environment – including the marine environment
- to help fortify Danish nature and to make it less vulnerable to the effects of climate change which would seem to be inevitable
- to help reduce Denmark's carbon footprint and
- to take as its point of departure EU and UN decisions and legislation regarding the marine and aquatic environments, natural conservation and biodiversity.

The Danish government proposes that Denmark will follow up on and strengthen the implementation of the national, the EU and the international biodiversity targets by means of Nature Plan Denmark. Nature Plan Denmark will therefore become Denmark's official biodiversity strategy and will determine how EU goals to halt the loss of biodiversity will be reached at the national level.

Nature Plan Denmark is expected to be published in autumn 2014.

2.3 Protected nature areas

This section will present current policies, legislation strategies and actions targeted at different types of nature areas (which biological and ecological status were described in chapter 1)

2.3.1 Nature areas protected by paragraph 3 of the National Nature Conservation Act

Policy and legislation
The regulations in paragraph 3 of the Nature Conservation Act concerning generally protected natural habitats, which provide protection for natural habitats all over the country, are one of the cornerstones of nature conservation in Denmark. Para 3 regulations protect lakes of more than 100 m², designated watercourses, heaths, salt marshes, freshwater meadows and biological commons when the individual habitat or group of habitats covers an area larger than 2,500 m². Once an area meets the Act's criteria for plant growth, soil, area, etc., it is automatically protected.

Protection measures have been extended successively since 1972 to include more natural habitats and reduce minimum area requirements in response to shrinking numbers of natural habitats, primarily resulting from more intense agriculture, urbanisation and infrastructural systems.

Strategy and actions
Following local government reorganisation in 2007, in which the Danish counties were abolished and most of their nature-related tasks reassigned to the municipalities, and in the wake of prolonged public debate about local councils' handling of para 3 protection issues, in February 2010, the Minister of the Environment announced that there was to be a thorough investigation of the implementation of para 3 of the Nature Conservation Act.

The results of the investigation were published in autumn 2010. The investigation established generally that practice with regard to dispensation has not changed and that most changes in status, for which dispensation is given, are related to improving the natural environment.

Based on the results of the random sample investigation, the Ministry of the Environment and Local Government Denmark agreed on 23 November 2010 to update the registry of para 3 natural habitats in the period 2011-2013 – at a total cost of DKK 36 million. The Danish Nature Agency is now updating para 3 registration in each municipality using aerial photography supplemented by field trips. A total of approximately 310,000 localities have been analysed using aerial photography and about 39,500 field trips have been undertaken.

All para 3 protected natural habitats are registered in the Danish Environment web-portal. In places where nature has potentially disappeared, the local authority is obliged to uncover whether this is in line with para 3 protection and the authorities own administration. From autumn 2014, an updated para 3 registry will form the foundation for local authorities' administration and planning of areas of natural interest. The updated registry will also be highly beneficial for landowners and other stakeholders.

In 2012 the Danish Government formed the Commission on Nature and Agriculture and asked for their recommendations for a richer nature and new environmental regulations and growth opportunities for the agricultural sector. Some of the recommendations from the Commission focused on better protection of the para 3 protected nature areas with actions such as designation of these areas, improved acces for the NGOs to file complaints on whether an area is registered as protected or not, and to prohibit or reduce the use of fertilizers and pesticides in the protected meadows, saltmarshes and commons. An improved protection in urban areas and areas designated for holiday homes are also recommended. Heavier penalties on violation of the nature protection is

also a suggestion from the commission. The recommendations and actions are under further investigation and consideration by the government.

2.3.2 Forests

Policy and legislation
Denmark was originally covered by forests and Danish forests are therefore important for indigenous biological diversity. The National Forestry Programme (2002) outlines Denmark's policy for the forestry sector. The programme has six overall objectives. The programme , including a strategy for natural forests, will be revised in 2014.

The programme's objectives with specific relation to nature and biodiversity are:

- Promote efforts for the protection of biological diversity and secure the physical environment and the basis for forest management
    - Develop and promote a conversion to near-to-nature forest management
    - Conserve natural forest and nature in the forest, including wetlands and key biotopes
    - Before 2040, 10 % of the total forest area has biodiversity conversation as the primary management objective
- The objectives for afforestation area maintained and developed with a view towards strengthening of the potential for natural habitats and processes in afforestation
    - Increase the forest area so forest landscapes cover 20-25 % of Denmark after one tree-generation (80-100 years)
    - The concept of multiple forest management will be further integrated into the afforestation with dur consideration to production, biodiversity, outdoor recreation, cultural heritage, landscape and environmental protection.

Since 1989 approx. 42,000 hectares forest has been established of which 31,000 hectares are established with public grants as private owned forests and about 11,000 hectares are established as public owned (mostly state owned) forests. From satellite photos a larger area, (approx. 67-95.000 ha) is registered as new forest for the period 1990-2011.

The previous government's Green Growth agreement (2009) contains goals to create a total of 800 hectares of new state forests close to urban areas and 6,900 hectares of new private forests by 2015. In 2012 and 2013 the present government has granted more funding to support afforestation.

Approx. 7.500 ha forest is conserved as “untouched forest”, and a larger area, approx. 40.000 ha are managed as uneven aged untouched forest.

Strategy and actions
State afforestation has focused primarily on establishing new urban forests with a view to providing spaces for outdoor recreational activities s and natural experiences, as well as forests which can help to protect vulnerable groundwater resources. Afforestation is a very long term investment in high biodiversity as it usually takes a very long time (> 100 years) to re-establish nature and biodiversity corresponding to old-growth forests.

In 2013 the Danish Nature Agency commissioned an independent evaluation of biodiversity initiatives in the Danish forests in the period 1992-2012. The evaluation showed that about 35,000 hectares of forest (6% of total forest area) were protected in the period, with protection of biodiversity the primary or secondary goal. The protected forests comprise untouched, natural forests, grazing forests, oak coppices and other forest types of high importance to nature.

A large proportion of these areas are on land owned by the Danish Nature Agency. Furthermore, since 2005, all the agency's forested land, an area of about 107,000 hectares, has been subject to a transition to near-natural forest management and certification by both the FSC and PEFC standards.

While the Danish Nature Agency uses several millions of DKK annually for biodiversity projects in the state owned forests t the evaluation concluded that the forest initiatives could have been more focussed and have targeted more on especially threatened species. At the same time the evaluation acknowledged that in the long term many of the initiatives will result in better conditions for nature, including better conditions for a number of endangered species.

Biodiversity data from around 1992 is too scanty to allow a direct assessment of the effect of the initiatives, with the exception of data concerning endangered birds. Threatened and red listed species of woodland birds have shown a positive population trend during the last 20 years in Denmark.

Future initiatives should focus more on securing the survival of threatened species, structures and habitats based on better data mapping of the locations in which threatened species are found.

The Danish forests were hit twice by storms in the autumn of 2013. Most of the downed deciduous wood and a proportion of the conifers were decided left for biodiversity purposes in the State owned forests after the storms. In this way the amount of deadwood in the forests will grow for the benefit of special saproxylic species besides for birds and animals eating insects.

Different grant schemes for protection of biodiversity in private owned forests has been launched, and resulted in approx. 2.700 ha forest with special care and 2.200 ha of protected oak coppice. Grants for private owners to draw green management plans has resulted in approx. 200.000 ha with green management plans, which are considered as a first step towards certification

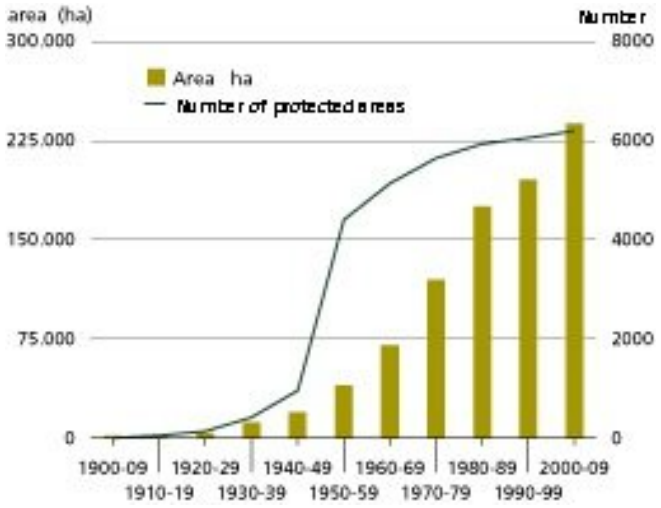
2.3.3 Areas conserved by preservation orders

Policy and legislation

The Nature Conservation Act gives authorities a provision to designate individual sites by preservation order. The registered areas are an important tool for natural conservation as they are home to wild animals and plants, and offer some of the most important landscape, cultural and historical, biological, scientific and educational values. Moreover, para 3 in the National Nature Protection Law ensures that the general public has access to enjoy these values.

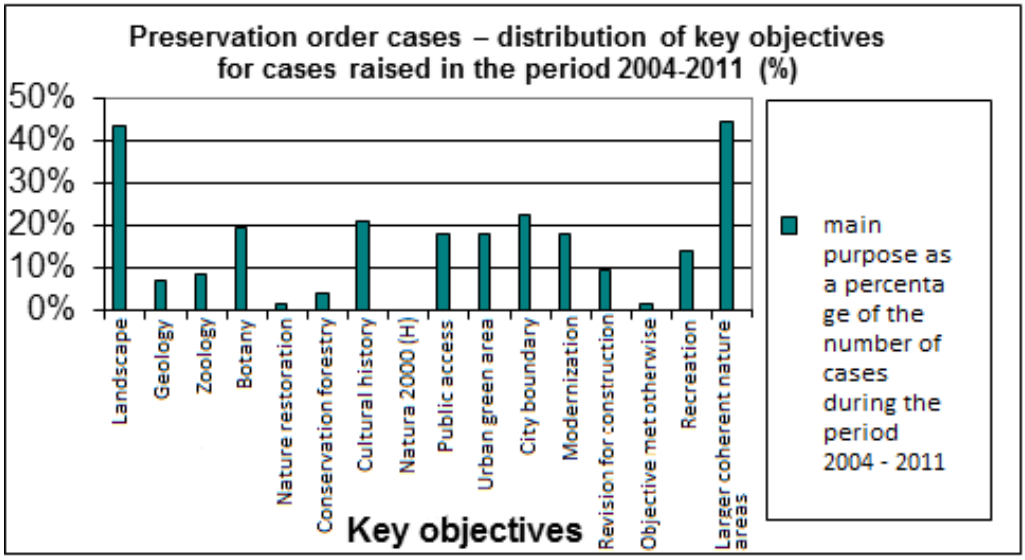
Preservation orders can be served to safeguard the objectives of the Nature Conservation Act. Preservation orders are primarily issued if protection is not provided by other legislation. In Denmark there are about 5,000 preservation orders, which cover a total area of about 230,000 hectares, corresponding to just less than 5% of Denmark's total land area. Every year new preservation areas safeguard an additional 2,000 hectares.

Only the municipalities, The Danish Society for Nature Conservation (a private organisation with 125.000 members) and The Danish Nature Agency can propose new preservation orders. The Danish Society for Nature Conservation in the period 2004-2011 put forward about 50% of the proposals and was involved in 69 % of all proposals.



The number and area of preservation orders 1900-2010.

Preservation orders may be issued for different purposes. The key objectives of new proposed preservation orders in the period 2004-2011 are listed below. Categorisation of the key objectives of preservation orders is subject to interpretation, and individual cases often have multiple objectives. The sum of percentage shares in the figure is therefore more than 100.



Strategy and actions

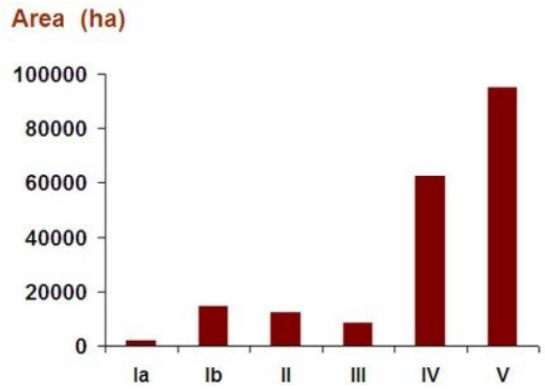
In cooperation with The Danish Society for Nature Conservation and Local Government Denmark, The Danish Nature Agency has prepared a Preservation Order Action Plan (2013).

The Action Plan proposes prioritisation of the following key objectives in work with preservation orders:

- Gems – unique localities of national value and importance, setting additional focus on maintaining these with stringent preservation orders.
- Larger, cohesive nature areas. This proposal is intended to counteract a tendency towards fragmentation of natural habitats, to ensure more robust natural conditions, in which species can live and disperse and to allow the general public to enjoy nature.

- Preservation orders to protect large areas of virgin landscape, including protection of particularly beautiful and characteristic landscapes from urbanisation, cultivation, changes to terrain, etc.

Preservation orders distributed by IUCN categories



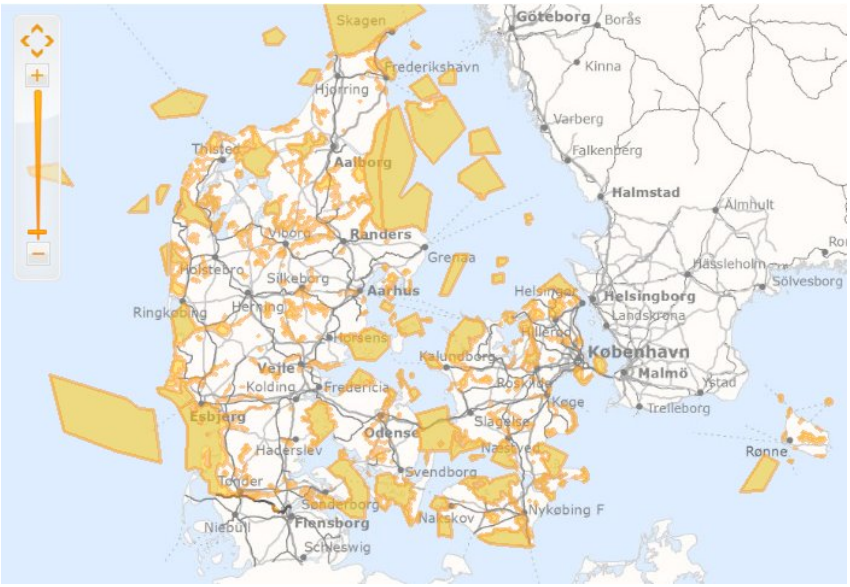
The figure shows the number of preservation orders distributed by the IUCN categories.. Protected churches and areas surrounding churches, urban parks, individual trees and monuments are not included in the figure as they are not categorised in the IUCN categories. The figure is based on 1,843 preservation orders.

IUCN subcategories include the following types used in the figure:
Ia –Strict Nature reserve)
Ib - Wilderness Area)
II - National park)
III –Natural Monument)
IV -Habitat/Species Management Area)
V - Protected Landscape)

2.3.4 Natura 2000 areas and plans

Policy and regulation
The term "Natura 2000 " describes a network of protected natural habitats in the European Union. Natura 2000 areas are designated in accordance with the EU Habitats and Birds Directives. The designated areas must preserve and protect natural habitats and wildlife (flora and fauna) species which are rare, endangered or characteristic for EU Member States. There are 252 Natura 2000 designated areas in Denmark.

They account for about 8.4% of Denmark's land area. Marine Natura 2000 areas account for about 17% of Danish waters.



Danish Nature 2000 areas.

Denmark is one of those countries which have designated the lowest relative share of its land area but also one of the countries that has designated the highest share of its waters. To a great extent, the designations reflect the Danish landscape, in which, due to intensive exploitation (especially agriculture), there remain few nature areas with species and natural habitats that, in the EU context, can be described as sufficiently worthy of protection to be designated. Similarly, the high proportion of marine areas reflects the international importance of Danish waters, e.g. for large flocks of migrating birds. Protected areas of habitat and protected birds' habitats tend to coincide.

In Denmark there are legal regulations pertaining to environmental assessment of the consequences of new plans and projects which may affect the Natura 2000 areas and permission is not given to activities which may compromise the integrity of Natura 2000 area.

Denmark's obligation to protect and manage Natura 2000 areas in accordance with the EU Directive has resulted in six-year Natura 2000 plans for each individual Natura 2000 area (there is an exception for woodlands and forests protected by Danish protected forest regulations, which are managed through 12-years plans).

Natura 2000 planning processes are provided for by law. These plans are subject to wide public consultations and include long-term goals for the individual Natura 2000 area and identify requirements and prioritise a list of conservation methods which may be used to accommodate the organic needs of species and natural habitats.

Natura 2000 plans are to ensure resolute and active management by local and state authorities..

Strategy and actions
The first-generation Natura 2000 plans (for the period 2010-2015) stipulate first and foremost that initiatives must halt the decline in species and habitats indicated in their Natura 2000 designation. The basic initiatives are the first inevitable steps towards meeting the Directive's goal to secure or re-establish favourable conservation status. Standard initiatives comprise not only comprehensive maintenance but also "one-off" events, e.g. improved hydrology, reducing disturbances and taking steps to prevent the destruction of forest habitats and marine reefs. The initiatives actually performed in individual area rely on a specific assessment.

The Natura 2000 plans for the first plan period (2010-2015) stipulate the following:

- Maintenance of about 130,000 hectares (all registered open natural habitats including peripheral fragmented areas, etc.).
- More natural water conditions will be established in a further 14-16,000 hectares (in particular raised bogs, fens and salt marshes).
- 30-34,000 hectares will be cleared with a view to subsequent improvements to aquatic conditions or in preparation for maintenance work.
- 20,000 hectares of forest are protected from felling, and extensive forestry is ensured (all registered forest areas). Initiatives will continue until the end of 2021.
- Disturbances reduced for birds and marine mammals. (The Hunting and Wildlife Management Act's provisions relating to reserves).
- Marine reefs will be protected from bottom-trawling equipment (Fisheries Act).
- Impact of ammonia will be reduced (Livestock approval legislation was toughened in 2011).

Instruments include voluntary subsidy schemes under the auspices of the Rural Development Programme, which makes available subsidies for eco-friendly agriculture to support grazing and cutting, subsidies to improve hydrology and subsidies to encourage more extensive forestry and protection of woodland habitats. Furthermore, there are also initiatives to prohibit hunting and to create disturbance-free zones. The scope of active nature administration stipulated in current plans costs a total of about DKK 1.8 billion. It is too early to evaluate the effect of the plans.

The second-generation Natura 2000 plans (for the period 2016-2021) are currently on the drawing board.

2.3.5 Aquatic environment plans

Policy and legislation
The EU Water Framework Directive established a firm framework within which to protect surface water and groundwater. One of the key objectives of the directive is to prevent deterioration and improve the status of surface water and groundwater. The EU Member States are required to introduce programmes of initiatives with a view to achieving specific environmental goals. In this connection, the Member States are obliged to ensuring that aquatic environment plans are drawn up for the aquatic environment in every relevant district.

Requirements in the directive to achieve “good ecological conditions” in surface water ecosystems will subsequently benefit e.g. the status of natural habitats and wild populations of plants and animals.

The Water Framework Directive stipulates that the first generation of aquatic environment plans were to be published in December 2009, and subsequently revised and updated every six years, i.e. the plan periods are 2009-2015, 2015-2021 and 2021-2027.

Strategy and Action
The first generation of aquatic environment plans are delayed. The draft version of first generation of aquatic environment plans was overrules and declared null and void as, in December 2012, the Environmental Board of Appeal determined that The Danish Nature Agency had set too short a deadline for the public hearing of the plan.. The first generation of aquatic environment plans has just been sent for a second public hearing. The Danish Nature Agency is currently evaluating the hearing statements received and it is expected that the aquatic environment plans will be passed during autumn 2014.

While work on the first generation of aquatic environment plans is still in progress, a preparation for the second generation of aquatic environment plays is already under way. New water planning

legislation has also been drawn up to create a new water planning concept in Denmark, which is more closely aligned with the EU Water Framework Directive.

2.3.6 Wildlife reserves

A total of 95 reserves have been created in Denmark. Most of these (75) are inside Natura 2000 areas. These reserves cover a total area of about 340,000 hectares, of which about 30,000 hectares are rural.

Wildlife reserves can be set up in pursuance of the Hunting and Wildlife Management Act and/or The Nature Protection Act in land areas, in fresh water and in fishing territories to protect and aid wildlife populations and to ensure that there are resting and foraging areas for migrant birds.

Wildlife reserves may be established in private and publicly-owned areas. On private areas, owners and users may be entitled to compensation for any loss incurred. Compensation, establishment, maintenance and inspection of wildlife reserves are financed by the Danish Nature Agency.

Strategy and actions

The Nature Agency has initiated a process to align the management and activities in the wildlife reserves with the implementation of the Natura 2000 plans. This process is expected to be finalized before the end of 2016. The amendments of the purposes and of management activities in the wildlife reserve will ensure a focus on the protection of Natura 2000 nature types and species against human disturbance, for instance by prohibition of public access during birds breeding seasons on small islands.

2.3.7 Ramsar Sites

Policy and legislation

The Kingdom of Denmark has under the Ramsar Convention designated 43 wetlands of international importance covering app. 23.150 km2 (within the geographical coordinates 54◦,38'N to 81◦,10'N and 54◦,14'E to 08◦09'W) – including large coastal areas. 3 sites are designated in the Faroe Islands (63 km2) and 12 sites are designated in Greenland (15.600 km2). The 28 sites designated in Denmark (7.500 km2) are legally managed as Nature 2000 sites.

Strategy and actions

In 2013 the 43rd Danish Wetland of International Importance – *Lille Vildmose* – was designated. 73,4 km2 blend of bogs, forest, lakes and meadows holding important flora and fauna characteristic of large bogs, including Sphagnum mosses and rich in European protected bird species. This site is also important for carbon storage, groundwater recharge and climate regulation. It is worth noting that the site has been designated in part under Criterion 1 in the Convention, especially under the specification that wetlands can be selected for their hydrological importance including influence in the context of at least regional climate regulation or stability. Thus the designation of Lille Vildmose as a Ramsar Wetland of International Importance signals that the Ramsar Convention reflects the growing need to protect nature sites helping to combat the consequences of Climate Change.
A large part of the raised bog has been drained, cultivated and used for at turf industry. Peat extraction ceased in 2011, however, and restoration plans supported by the EU LIFE+ funds have implemented by the owner (Aage V. Jensen Foundation for nature conservation and wildlife protection). The restoration of Lille Vildmose is expected to reduce CO2 emission with 14.000 tons per year.

Denmark is an active player in the Ramsar Convention. In the Ministerial Council Declaration at the Trilateral Danish-Dutch-German Governmental Conference on the Protection of the Wadden Sea in February 2014 is stated the intend to list the Wadden Sea Ramsar sites as *Trans-boundary Ramsar site "Wadden Sea"* on the Ramsar List of international importance and thus contribute to the ongoing efforts of the Ramsar Convention to promote the trans-boundary aspect of the protection

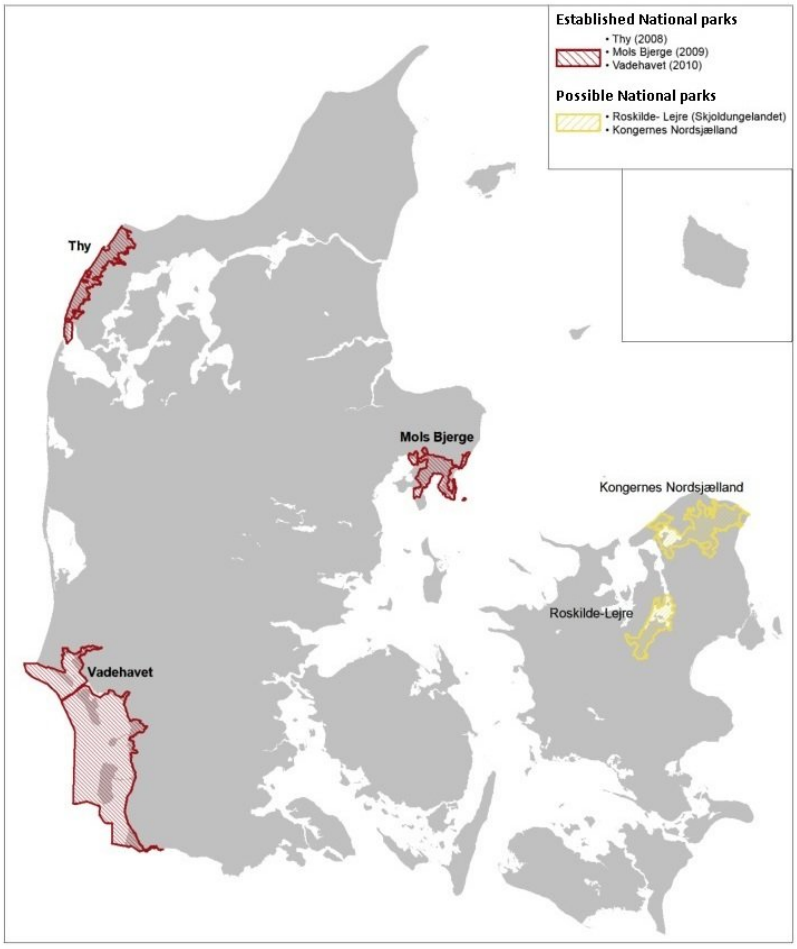
and the management of wetlands (Article 5 of the Convention and Resolution VII19(1999) on international cooperation).

2.3.8 National parks

Policy and legislation

Denmark's national parks include some of Denmark's most outstanding areas of natural beauty and landscapes. These are areas of importance to the Danish people and which either gain or will gain international attention and importance. Our national parks help to develop, protect and conserve Denmark's nature and landscapes as well as our cultural and historical values. By setting up national parks, we seek to prevent the loss of landscapes, geological formations as well as of cultural and historical values, and to ensure that these features are preserved, well-known and of benefit to many.

The National Park Act was adopted by the Danish Parliament in May 2007. The National Park Act sets up the rules for the establishment and development of Danish national parks. In June 2007 the Danish Government decided to begin the establishment of a network of national parks and selected Thy in North West Jutland as the first national park. "Thy National Park" was established in August 2008. In August 2009 the area, Mols Bjerge, was also established as a national park. In September 2010 the third national park was established in and around the Danish part of the Wadden Sea. Each national park is established by a designation order which determines the boundary and sets up the objective and goals for the development of the park.



Strategy and actions

Each national park is governed by a National Park Board which is tasked to elaborate and implement a national park plan. .Each national parks have to make 6 year plan for the development

of the parks including all purposes outlined in the Danish National Park act. Each of the national parks receives DKK 7,5 mill. a year to undertake their work.

In National Park Thy there have been projects concerning reestablishment of natural hydrology on heat land. In National Park Mols Bjerge there have been projects concerning improvement of status of commons and in National Park Vadehavet there have been projects regarding conservation of meadow birds.

At the moment 2 more areas have been selected as potential national parks – Roskilde-Lejre and Kongernes Nordsjælland. These will be established step by step over the next couple of years under the condition, that public consent is achieved.

2.3.9 The sea

Policy and legislation
The first Danish Marine Strategy was finalized in 2012. The marine strategy comprises an initial assessment of the environmental status of Danish waters, an economic and social analysis of the use of the waters, a determination of good environmental status and a set of environmental targets and associated indicators.

On March 13, 2012 the EU Commission proposed legislation to create a common framework for Maritime Spatial Planning and Integrated Coastal Management

The aim of the Commission's proposal is to ensure a better coordinated use of marine and coastal areas and help clarify the uncertainties on access to the maritime space in order to promote sustainable growth in the marine sectors, in particular by improving cross-border cooperation. The Commission expects that Maritime Spatial Planning and Integrated Coastal Management will boost sustainable maritime growth by facilitating the spatial development of emerging sectors, such as renewable energy or aquaculture, whilst taking into account the health of marine eco-systems.

Danish legislation in this area is expected to deliver an integrated approach to the management of maritime activities. This approach will be governed by ecosystem-based management. Integrated management of all maritime activities is also expected to encourage investment in the maritime based businesses by instilling predictability and transparency.
In Denmark, Maritime Spatial Planning and Integrated Coastal Management are still tools in their infancy. Work in this area is ongoing and will evolve over the coming years to better meet the needs of all stakeholders while ensuring good environmental status in the marine waters.

A marine monitoring programme by mid-2014
Adequate monitoring must be implemented to ensure ongoing assessment of the environmental targets and associated indicators so that they may be adapted to the situation concerned, e.g. the effects of climate change. Adequate marine monitoring is also expected to deliver an ongoing assessment of the environmental status of Danish marine waters in general. Denmark is undergoing work to this effect and expects to have a marine monitoring program in force by mid-2014.

Marine Natura 2000 areas
For many of the other impact areas, a raft of rules and regulating mechanisms are already in force, which in the long term will contribute to the achievement of good environmental status in marine waters. These regulations comprise existing marine protected areas – the marine Natura 2000 which covers 18 pct. of the Danish marine waters.

Strategy and actions
Programme for good environmental status by 2016

By 2016 Denmark is also expected to have in place a program of measures to achieve or maintain good environmental status. The initial assessment and years of national surveillance has shown that for certain aspects of securing the marine environment, new measures may be foreseen. For example measures may be necessary in order to mitigate the effects of fishing activities in order not to threaten the overall distribution and biological diversity of the bottom dwelling fauna. A national working group is considering measures in the form of protected areas to this effect.

Discarding (i.e. the practice of throwing unwanted fish overboard)- will be phased out with a precise timeline for implementation (progressively between 2015 and 2019) and the individual EU member states will have to ensure that the fleet capacity (number and size of vessels) is in balance with the fishing opportunities in a given area. Targeted actionplans are in place to address the needs of the critically dangered cod in the Kattegat.

Other challenges

There is a need for more knowledge and a better understanding of the scope of the challenges that we face and the opportunities to reduce the effects, particularly with regard to non-indigenous species, effects of fishing activities on marine ecosystems, marine litter and underwater noise. Work as to gaining insight on these subjects is being undertaken towards the next marine strategy that will be finalized in 2018.

In a report from this year the EU Commission assesses the first phase of implementation of the Marine Strategy Framework Directive and emphazises on the need for more knowledge and a better better understanding of the challenges member states face in securing healthy oceans for the next generations to come whilst stating that European Seas are not in “good environmental status”. This report will serve as guidance for present efforts and for the efforts to finalize the next marine strategy.

2.4 Species management and protection

Policy and legislation

The legislative protection of Danish plant and animal life is assured primarily by the Nature Conservation Act, the Hunting and Wildlife Management Act and by provisions in the Fisheries Act. A large number of species have also achieved protection via EU directives and international conventions. Species-specific initiatives are achieved by means of direct conservation initiatives, e.g. preservation orders or prohibition applicable to hunting and fishing, special initiatives defined in specific species management plans as well as by means of indirect protection, i.e. conservation of habitats.

About 310 species are covered by the Preservation of Species Executive Order, the legal basis of which is the Nature Conservation Act and the Hunting and Wildlife Management Act. Some of these species are also covered by the provisions of the EU habitats and birds directives. The directives protect these species, for example, from collection. Furthermore, trees that are the nesting places of specific species must not be felled at certain times of the year. Hollow trees are also protected by special regulations. Protected plants may neither be removed from their habitat nor damaged.

Whole areas can also be protected in order to preserve specific species and e.g. to determine special care and maintenance measures to benefit these species. For example, in 2004 a preservation order was issued on a specific area to protect the marsh fritillary, an endangered butterfly.

Strategy and actions

There are specific national management plans for a number of individual species. Management plans are conventionally prepared with a view to protecting the relevant species. To date, there are issued management plans for the following species: The common dormouse, northern birch mouse, beavers, otters, porpoise, seals (grey seal and harbour seal), hare, partridge, all 17 Danish species of

bat, the cormorant, corncrake, meadow birds (primarily the dunlin, the black-tailed godwit and the ruff), the red kite, salmon, the houting, the marsh fritillary and the marsh saxifrage.

In addition to management plans, special *plans of action* have been prepared to combat invasive alien species. There are such plans for to combat raccoon dogs and mink.

As extraordinary follow-ups on the EU Habitats Directive, management plans are being prepared for the sand lizard, European green toad and natterjack toad.

I 2012, the wolf re-migrated from the Eastern part of Germany and Western part of Poland to Denmark. Denmark expects to adopt a management plan for wolves in 2014, which establishes the framework for management of wolves in Denmark. A draft management plan has been made by the relevant organizations and associations and the plan has been sent to the Minister of Environment. According to this the wolves may only be regulated in exceptional circumstances, for instance if regulation is justified by prevention of serious damage to livestock or humans. The final management plan may also address the issue of an permanent compensation for damages for loss of livestock caused by wolves and the possibility to receive subsidies to protect livestock.

Denmark expects to revise the management plans for seals by 2016. The revision will be carried out on the basis of research projects investigating among other issues, damages on fishery caused by seals.

The management plan for cormorants and the management plan for beavers will also be revised on the basis of the latest data.

In 2014, the hunting seasons will be revised, as is the case every 4th year, to ensure that hunting is conducted in a sustainable manner. The revision is based on recommendations from an independent board of represenrtatives of the larger relevant NGO´s, and is expected to change especially the hunting season for geese, gulls, common eider, goosander and smew.

Specific projects for threatened species

Apart from the above initiatives, in recent years, a number of projects have been targeted to protect specific threatened species. These projects are funded by the state, local authorities, foundations and privately, often with support from subsidy schemes, etc., including EU co-funding, in particular from EU LIFE.

Meadow birds are some of the most seriously endangered species of birds in Denmark. Since the 1970s numbers of breeding meadow birds and suitable breeding areas have declined dramatically. In the period 2006-2009, a project improved conditions in particular for the dunlin and the ruff in four of Denmark's most important breeding grounds for meadow birds: Vestlige Vejler, Harboøre Tange, Nyord and Vestamager. The project has also provided aid to complete the national management plan for meadow birds in Denmark. The project was carried out by the Danish Nature Agency in cooperation with The Danish Ornithological Association. The total budget for this project was DKK 10.6 million. It was co-funded by the EU LIFE Nature Fund.

The North Sea houting is a white fish which lives only in the Wadden Sea area. It is one of the most seriously endangered species of fish in the EU. It is Red-Listed and also on the EU list of animal and plant species of community interest in need of strict protection (Annex IV). Denmark received support from the EU LIFE Nature Fund to complete a project costing about DKK 120 million, which aims to prevent the houting from becoming extinct. Support from EU LIFE was about DKK 60 million. Other projects which received LIFE support include a project to save the marsh fritillary butterfly and a salmon project financed by nature management funding.

Re-introduction of species

Denmark has reintroduced species to enrich the Danish biodiversity with native species, which have become extinct in Denmark, and to ensure a positive effect on the biodiversity in general.

In 1999 was the European beaver reintroduced in Klosterheden Forest District in Jutland and in 2009-2010 in the landscape of Northern Zeeland. Since then the beaver populations have grown and there is now an estimated population of 160 individuals in Jutland and about 25 individuals in in Zeeland. The beaver contributes to biodiversity in the landscape by damming streams and swamp forests.

In 2012 was the European Bison introduced on Bornholm. Seven bisons from Poland were released and the first calf was born in 2013. The bisons were released into a 200 hectare area of fenced forest and the plan is to take away the fence within a period of five years. The bison creates a dynamic ecosystem conducive to biodiversity for instance by creation of openings in the forest.

In 2013 was lucanus servus (the most well-known stag beetle) reintroduced by release of adult individuals and larvae in Dyrehaven north of Copenhagen while at the same time efforts were made to create more dead wood at the location (the habitat of lucanus servus).

New initiatives regarding invasive species

A number of species present in Danish nature are not indigenous but have rather been introduced by human beings. A small number of these species are invasive, i.e. they can repress indigenous species and thus represent a threat to their survival.

There is a Danish plan of action against invasive species, which recommends many possible ways in which to react. Special initiatives have been drawn up to combat two invasive species, the American mink and the raccoon dog.

In September 2013, the European Commission announced proposals for regulations governing invasive alien species (IAS), the purpose of which is to prevent, minimise and contain the loss of biodiversity and the degradation of ecosystem services in the wake of the introduction and dissemination (whether intended or inadvertent) of alien invasive species. The Member States are obliged to combat invasive species. With certain reservations, the regulations propose a ban on entry , transport, trade, cultivation, keeping, using, allowing to escape and planting, etc. of the listed alien invasive species.

2.5 Conservation of genetic resources

Policy and legislation
In 2004 Denmark ratified the International Treaty on Plant Genetic Resources for Food and Agriculture and in 2007 Denmark ratified the Interlaken Declaration on global action plan for conservation of animal genetic resources.

The Ministry of Food, Agriculture and Fisheries (MAFF) is responsible for conservation and use of genetic resources for food and agriculture. The Danish AgriFish Agency is the acting authority on the matter.

Plant genetic resources for food and agriculture
In 2004, a strategy for future work on plant genetic resources for food and agriculture was published. It has been followed-up by action plans for periods of thee years which guide MAFF's activities on plant genetic resources for food and agriculture. The current action plan covers the period 2011-13, which will be prolonged to 2014 and contains activities on conservation and use of plant genetic resources as well as awareness-raising and research. To guide its activities, MAFF has established a plant genetic resources advisory board where relevant stakeholders are represented.

National and Nordic activities
Danish Plant genetic resources for food and agriculture are conserved both *ex situ* and *in situ* in Denmark and *ex situ* though NordGens vault on Svalbard.

a) *Ex situ* conservation
In Denmark, vegetative propagated material like fruit and berries are to a large extent conserved in national clone archives, whereas seed propagated material is conserved in the joint Nordic gene bank, NordGen. NordGen is an institution under the Nordic Council of Ministers. Nordic cooperation plays a very important role in the field of ensuring the maintaining of the variety of Nordic genetic resources for food and agriculture.

b) *In situ* conservation
A large number of wild or weedy Danish species are related to crop plants and are thus plant genetic resources for food and agriculture. A list of high priority species has been selected and the status of conservation of these species is currently being mapped. In Pometet at Copenhagen University there is a collection of native apple- and pear trees

c) Legislative matters
Legislation allowing for the marketing of old crop varieties has been implemented.

Strategy and actions
International activities
As a consequense of the ratification of the FAO International Treaty on Plant Genetic Resources for Food and Agriculture Denmark participates in meetings of its governing body. The treaty's access conditions are applied to plant material in NordGen. Denmark is also member of the European Cooperative Program on plant genetic resources, ECPGR, and Denmark is involved in various EU-activities relating to plant genetic resources.

Animal genetic resources for food and agriculture
The Danish Minister for Food, Agriculture and Fisheries has newly approved a new Committee: The Committee for the Conservation of Animal Genetic Resources of Rare Danish Breeds (CC), which has a breeder majority elected though direct election. The task of the Committee will be to take care of and coordinates all governmental efforts on Conservation of Animal Genetic Resources in Denmark, including Gene bank, breeder support and information activities.

In 2014, CC will prepare a new Strategy for the future work on conservation of animal genetic resources for food and agriculture. The Strategy will be structured in accordance with the 4 Strategic Priority Areas, which can be found in FAOs Global Plan of Action for Farm Animal Genetic Resources and Interlaken Declaration.

National activities

Farm animal genetic resources for food and agriculture are conserved both *ex situ* and *in situ* in Denmark

a) *Ex situ* conservation

The Danish Gene bank is financed though the Danish Budget and managed though CC. It contains semen from native bulls, boars, stallions, billy goats and rams of endangered breeds and embryos from native endangered cattle, pigs and sheep. Each year, new material is collected and stored in the Gene bank.

b) *In situ* conservation

In Denmark, around 150 breeders (private and public) participate in the *in situ* conservation of the endangered native Danish Breeds. CC supports the endangered breeds every year, by providing the breeders with national funds. Furthermore, support is provided to approx. 20 beekeepers and their organization engaged in the breeding of the small, remaining population of the black (A. m. *mellifera*) subspecies of honeybee.

c) Legislative matters

CC has made a national scheme to support the endangered breeds and the various small societies for breeders.

International activities

Denmark is represented at meetings arranged by the European Regional Focal Point.
The Danish National Coordinators for Animal Genetic Resources is a member of the expert group under NordGens division for Farm Animal Genetic Resources, which gives advice to NordGens Board.

Conservation and exploitation of woodland genetic resources.

The Danish Nature Agency has set up a genetic conservation programme specifically for trees and bushes. Various initiatives, including an established network of conservation areas and a series of propagation programmes for trees and bushes, may be utilised in connection with afforestation and other planting initiatives in nature and landscape contexts. These initiatives will continue and they will be further developed in the light of challenges that certain issues, such as climate change, are expected to present.

2.6 The national monitoring programmes for environment and nature

Policy and legislation

In 2004 Denmark established a system by which to monitor both aquatic and terrestrial nature and environments, called NOVANA (National Aquatic Environment and Nature Monitoring Programme). The programme comprises eight sub-programmes and administered a total budget of DKK 242 million in 2012.

In addition to the national NOVANA monitoring programme, there is an independent national programme which monitors Danish forests and woodlands. The framework for monitoring the forests is established in the Forestry Act's Section 35.

Strategy and actions

NOVANA

In connection with local government reorganisation in 2007, the former counties' ' monitoring initiatives were transferred to the state. The overall planning and structure of monitoring nature and the environment has been adjusted as a response to e.g. the implementation of the EU Water Framework and Habitats Directives. The NOVANA 2011-2015 programme ensures that the monitoring programme is even more closely synchronised and adapted to implementation of the Water Framework and Natura 2000 Directives, including an objective to ensure that the necessary know-how is available to prepare both Water Framework and Natura 2000 plans.

In connection with the monitoring programme, a needs assessment was conducted by the Ministry of the Environment to study the political/administrative requirements of monitoring. NOVANA 2011-15 states that the programme aims to make available the necessary material and knowledge to substantiate the following:

- Denmark's obligations vis-à-vis EU and national legislation regarding the monitoring of nature, the aquatic environment and air quality.
- The effects of and degree to which the goals of national plans of action for the aquatic environment and nature, including the Aquatic Environment and Natura 2000 plans in pursuance of the Act on Environmental Goals, initiatives in the agricultural field and the Danish Air Quality Monitoring Programme, are achieved.
- Monitoring in pursuance of international conventions on nature and the environment.

The NOVANA monitoring program was revised in 2011 and while there was a reduction in costs the programme became at the same time more targettet and efficient. The programme for 2011-2015 includes eight sub-programmes for lakes, watercourses, seas and fjords, species and terrestrial nature, land use monitoring, groundwater, air and specific sources of pollution. All are described in this report.

National forest inventory (NFI)

The forest inventory programme meets a requirement stipulating that sustainable forestry must be documented. This requirement resulted from several ministerial conferences on the protection of forests in Europe. Data collection and reporting are structured in accordance with the ministerial conferences' requirements. Data is collected under the following headings: Forest resources, (area, deadwood and carbon stock), forest health (loss of needles/leaves, forest damage, air pollution), productive functions (growth, felling, carbon sequestration, etc.), biological diversity (diversity of species, operations and biodiversity, peripheral areas, deadwood, native species, preserved and protected forests, etc.), the forest's protective functions (groundwater and aquatic environment), socio-economic functions (timber consumption, finance and employment, education, outdoor pursuits, cultural values, etc.) and international conditions (area and deadwood mass). The forest inverntory is assimilated into the NOVANA forest monitoring programme.

An overall report is published for each five-year measurement period. Forest inventory is conducted for The Danish Nature Agency by the Department of Geosciences and Natural Resourc Management at the University of Copenhagen.

2.7 Integration of nature considerations into spatial planning

Denmark has a simple, unequivocal planning system which maintains a strictly decentralised distribution of responsibility. The local council is responsible for overall area-regulating municipal planning and local planning, which is binding on landowners. The regional council prepares a strategic regional development plan. The Minister of the Environment is responsible for ensuring that national planning work is conducted in line with the state's best interests.

Objectives of the Planning Act
The Planning Act ensures that the overall planning reconciles the interests of society with respect to land use and helps to protect the country's nature and environment so that sustainable social development with respect for human living conditions and the conservation of wildlife and vegetation is secured.

National planning
National planning regulations were introduced in 1974 and stepped up in connection with the local government reform in 2007. National planning is realised as reports, binding guidelines, instructions and intervention in planning at the municipal level when topics or projects are of international, national or regional interest.

National Planning Report: After every general election, the Minister of the Environment must present a national planning report. This is a periodical report on comprehensive regional policy for use in municipal planning. The national planning report must be tabled as a motion. The Minister then invites public debate and finally, on behalf of the government, the Minister presents the final report. The national planning report contains visions and perspectives for current planning themes with a plan of action for their realisation.

Nature and environment policy report: At least every four years, the Minister of the Environment must publish one or more reports on Denmark's environmental status, and nature and environment policy. National environmental, industrial, labour market and consumer organisations are actively involved in the process.

List of state interests – specifically in relation to nature conservation: Every four years the Minister of the Environment must publish a list of matters of state interest in municipal planning. The list reiterates the requirements, to which municipal planning must comply in order to accommodate state interests. The requirements have legal basis in the Planning Act, in other legislation, or in parliamentary decisions. They may also originate from political agreements between the government and Local Government Denmark.

The state goals for nature conservation by 2020 are to secure high biological diversity, protect ecosystems and halt the loss of biodiversity. Nature and biological diversity must be protected by protecting ecosystems so that the natural habitats of endemic species of plants and animals are improved and recreated. A further goal is to ensure that municipal plans do not compromise international nature conservation areas, and thus to ensure that Denmark meets EU obligations, the Habitats Directive, etc.

The state also aims to ensure that planning creates cohesion between Natura 2000 areas, the national parks, protected areas in general (para 3 areas) and preservation areas by connecting them with ecological/dispersal corridors. Ecological corridors between natural areas will be expanded and supplemented in municipal planning initiatives, e.g. planned "new" natural areas, more extensive land exploitation, nature rehabilitation and in planning initiatives towards the realisation of Aquatic Environment and Natura 2000 plans. The local authorities are encouraged to establish quality goals for their ecological corridors.

When they establish general nature management goals, the local authorities are also encouraged to apply "nature quality planning" measures as a basis on which to prioritise specific nature management initiatives. Nature quality planning must correlate closely with the preconditions for municipal planning established in the Natura 2000 plans and Aquatic Environment plans in accordance with the Act on Environmental Goals.

Objections and injunctions: The Minister of the Environment is responsible for coordinating and securing state interests in municipal planning. The Minister of the Environment is obliged to voice objections to any proposed municipal planning initiative that contravenes general state interests. The Minister of the Environment's authority is delegated to The Danish Nature Agency.

Municipal planning

The local councils are obliged to revise their municipal plan on an ongoing basis. During the first half of a four-year election period, the local council must present a political municipal planning strategy – known as a "plan strategy" – and make necessary revisions to the municipal plan. The municipal plan then functions as a reference framework for the preparation of local plans and for handling individual cases.

A municipal plan comprises:

- A main structure including general goals for development and land use in the municipality.
- Land use guidelines in many fields
- Framework for the content of local plans for individual areas of the municipality.
-

Land use guidelines – specifically in relation to nature conservation.

Municipal planning guidelines describe the main structure's goal in more detail. Guidelines must be presented for every topic and field listed in the municipal plan catalogue in the Planning Act. The municipal plan must, for example, contain guidelines for safeguarding nature conservation interests, including the location of natural areas which have specific nature conservation issues. Among others, the term "specific issues" covers Natura 2000 areas, nature areas that are generally protected under Section 3 of the Nature Conservation Act, areas with protected dunes and protected natural habitats.

The municipal plan must also contain guidelines for safeguarding the nature conservation interests of current and future ecological corridors and for potential natural habitats. Designated areas must be pinpointed on a map and coordinated with neighbouring municipalities.

The objective of designating natural habitats and ecological corridors, etc. is to ensure that natural habitats are connected and that it is possible for species of wild animals and plants to migrate and disperse. Designating and safeguarding these areas must also be coordinated with action plans prepared for Aquatic Environment and Natura 2000 planning.

Coastal zone

The Planning Act contains special regulations for municipal planning, e.g. in coastal areas. Within a (theoretically) 3 kilometres-wide coastal zone, areas may only be appropriated into the urban zone or planned for land zone development if there is specific planning or functional reasons for a coastal location. The state goals for planning in the coastal zone are to ensure that open stretches of coastline continue to constitute an important natural and landscape resource.

Open Danish coastal landscapes are a threatened and limited resource, which is unique in Europe due to its variation and scope. The state goal and national planning task is to preserve open Danish coastlines so that they continue to be continuous landscapes, in which natural and landscape values are given high priority. The state also intends that these areas are used for well-founded, most often recreational, purposes. The state's aim remains also to preserve open, undeveloped coastal areas

while ensuring that development and buildings which require coastal locations are assimilated and that coastal towns can still be developed.

The state aims to ensure that coastal zone development is achieved by directing urban development away from the coast and coastline, to ensure that cohesive stretches of undeveloped coastline remain intact.

The Nature Conservation Act and planning
In pursuance of the Nature Conservation Act's Section 20, development in open countryside must be designed such that as much attention as possible is paid to landscape values and other interests stated in Section 1 of the Act.

An executive order determines that no public road development, aerial cable and above-ground pipelines may be built in the open landscape unless approved by the Ministry of the Environment or the relevant local council.

Major public works presuppose that there are both EIA and Section 20 approvals. In some specific cases, public works may need to apply for dispensation, etc. from provisions in the Nature Conservation Act.

State roads are approved by The Danish Nature Agency based on negotiations with the Danish Road Directorate. Major aerial cable and pipelines must also be approved by The Danish Nature Agency. Approval is required in order to safeguard the landscape itself and specific issues stipulated in the Nature Conservation Act regarding the protection of nature including the population of wild animals and plants and their habitats, and improving, restoring and providing areas which are important to wild animals and plants. Local roads and minor aerial cable lines may be approved by the local council.

If development will cause changes to the status of a Natura 2000 area, the local council must submit the project and local council recommendations to The Danish Nature Agency with a view to achieving the agency's approval. The recommendations must be based on an Environmental Impact Assessment (EIA).

In a Section 20 approval, the establishment e.g. of fauna passages, may be required to protect endangered species.

Afforestation and planning
According the Planning Act, municipal plans must contain guidelines for the location of afforestation areas and of areas where afforestation is undesirable.

The objective of nominating afforestation areas is to ensure that more private landowners plant forests are planted in areas that, from the general social perspective, can be regarded as most suitable. New forests must meet a range of objectives, including increased timber production, promoting outdoor pursuits, biodiversity and environmental protection.

Areas nominated for tree planting must, for example, be coordinated, via municipal planning, with urban green areas and ecological corridors in the rural landscape.

The so-called "negative areas", i.e. those in which afforestation is undesirable, are nominated so as to ensure that values related to nature, landscape, geology, as well as cultural history, which are not compatible with forestry, are exempt from tree planting. Amendments or new nominations of negative areas are based on specific assessments of how afforestation will conflict with other important issues. E.g. important conservation issues.

2.8 Financing biodiversity conservation

The table below summarizes Danish national expenditure on biodiversity and the amount of overseas development assistance (ODA) related to nature and biodiversity conservation Denmark spends per year since 2006-2012. Furthermore, private funding in terms of Foundations' contributions as well as NGO's are shown. The amounts will be further explained in the sections below.

Table 1. Summary of national and international expenditure on biodiversity

Year: 2006-2012		**Currency: million DKK**						
		2006	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*
National public expenditures[2]	*Central*	*863*	*965*	*1,315*	*1,179*	*841*	*1,253*[1]	*1,591*[1]
	State/Provincial	*267*[5]	-	-	-	-	-	-
	Local/ Municipal	*83*	*180*	*232*	*267*	*278*	*298*	*340*
Total national public expenditure		***1,213***	***1,145***	***1,547***	***1,446***	***1,119***	***1,551***	***1,931***
Official Development Assistance [3]	Bilateral	*812*	*560*	*856*	*621*	*1,796*	*876*	*1,874*
	Multilateral	*1,153*	*1,286*	*1,532*	*1,253*	*1,490*	*1,336*	*1,455*
Total national public and ODA expenditure		***3,178***	***2,991***	***3,935***	***3,320***	***4,403***	***3,825***	***5,312***
Private and NGO funding[4]		*7*	*9*	*7*	*5*	*21*	*239*	*200*

1) Greenland in not included in the data.

2) Source: Own calculations based on data received from The Ministry of Environment, The Ministry of Agriculture, The Ministry Higher Education and Science, the Ministry of Defence and the 98 municipalities in Denmark.

3) Source: 'The Danish Assistance in relation to the Convention on Biological Diversity', The Ministry of Foreign affairs (2013).

4) Data cover only a part of the funding to biodiversity managed by NGO's and private foundations. The main explanation for the increase from 2010 to 2012 is an increase in the number of private foundations which have provided data. The data for 2011 and 2012 cover The Danish Society for Nature Conservation (DN) and the Danish Bird Life Foundation (DOF), The 15. June Foundation, The Vilum and Velux Foundations, The Nordea Foundation, and The Bikuben Foundation.

5) Provinces were demolished in 2007.

National expenditure for nature and biodiversity conservation

Financing for nature and biodiversity protection in Denmark mainly comes from government budgets and the European Common Agricultural Policy (CAP). Government budgets include direct public spending, expenditure at the municipality level and financing received through EU's Rural Development Program, the European Fishery Fond, and EU LIFE program. Activities both directly and indirectly improving or conserving biodiversity have been accounted for. For the years 2011 and 2012 research on biodiversity related matters has been included in the data.

In 2012, Denmark spent DKK 1,9 billion on national public activities related to biodiversity. The trend in expenditure has been increasing in the period 2006-2012, the majority of which stems from the inclusion of research expenditure in 2011 and 2012.

Government funding

About one quarter of public spending on biodiversity stems from the municipal level. This reflects the decentralised structure of the Danish public sector, see Chapter 2.1).

Another main chunk of public expenditure is related to biodiversity-related research activities. In 2012 research amounted to DKK 420 million; corresponding to 22 % of national public expenditure on biodiversity related matters.

Nature management and sustainable management of forests as well as planting of forest, management of meadows is an area of focus in public spending.

Some government funding directly targets improvement of habitats and threatened species. One example is part of the revenue from fees on hunting permits (approximately 95 million DKK per year.) This includes management initiatives and plans for hare and grey partridge, action plan for mink, eradication of raccoon dog, action plans for species listed in Habitats Directive Annex IV, action plan for the great cormorant, management efforts for colony nesting birds, management of red deer, contingency plan for marine mammals, projects regarding the hazel dormouse, harbor porpoise and the Montagu's harrier, surveillance of beavers and establishment of advisory service on bats. Furthermore spending targeting specific species have been implemented such as for bats, northern birch mouse and hazel dormouse, European green toad and the natter jack toad.

In 2013 the government decided to establish The Danish Nature Fund. The purpose of the foundation is investment in high nature value land to protect biodiversity, the water and to reduce emissions of greenhouse gasses. The government provides 500 million DKK for its work. Two large foundations are also providing financing the fund, The Villum Foundation donates 250 million DKK and Aage V. Jensens Nature Foundation donates 125 million DKK.

Funding through EU

Since 1999 Denmark has benefited from EU funding for many projects associated with nature and biodiversity.

The agricultural expenditure is financed primarily by two funds, which form part of the EU's general budget: the European Agricultural Guarantee Fund (EAGF) finances direct payments to farmers and measures to regulate agricultural markets such as public or private storage and export refunds, while the European Agricultural Fund for Rural Development (EAFRD) finances the rural development programs of the Member States.

Especially the Rural Development Program exerts a strong influence on nature by improving competitiveness for farming and forestry and by providing funding for a variety of specified nature improving activities (e.g. protection of certain threatened species of animals, planting of hedgerows, grazing of semi-natural habitats, and restoration of wetlands).

In addition, the EU LIFE program contributes significantly to nature and biodiversity conservation. To date, the LIFE Nature component (now called Nature and Biodiversity) has co-financed 28 projects in Denmark. These projects represent a total investment of Eur 86 million, of which Eur 45 million has been contributed by the European Union since 1999.

The projects completed focused mainly on the restoration of habitats (grey dunes, coastal lagoons, dry grasslands, heaths and fjords, marine cavernous boulder reefs in Kattegat, and the Mølleåen river system) and the implementation of actions to sustain specific endangered species (marsh fritillary, meadow birds, fire-bellied toad, dormouse). These projects were mainly carried out by the Danish Nature Agency, as well as by three of the former shires, Aarhus, Fyn and North Jutland.

There is a range of ongoing LIFE+ Nature and Biodiversity projects in Denmark. Except for one project, which aims to restore and maintain the favorable conservation status of the houting in four Danish river systems, these projects focus exclusively on the conservation and restoration of habitats. These are:

Ongoing projects	Amount in million Euro
Semi-natural habitat at Helnæs	2,5
Atlantic heaths and inland dunes project	4,1
Sølsted Mose project	1,9
Lille Vildmose and Eastern Denmark project	5,6
Birdlife and natural habitats project on Læsø	2,1
Rare wetlands habitats of national importance in Southern Denmark	4,4

On average the EU funded approximately 50% of the project costs. The remainder is typically funded by the state, municipal authorities, foundations and NGOs.

International expenditure for nature and biodiversity conservation (ODA)

Denmark is involved in development activities in less developed countries and contributes yearly to both multilaterally and bilaterally financed activities. Biodiversity and nature is an integrated part of the Danish government´s development strategy, "The right to a better life".

Official Development Assistance [3]	Bilateral	*812*	*560*	*856*	*621*	*1,796*	*876*	*1,874*
	Multilateral	*1,153*	*1,286*	*1,532*	*1,253*	*1,490*	*1,336*	*1,455*

Denmark seeks to support activities which combat poverty and create sustainable development based on principles of sustainable management and use of natural resources. Biodiversity related aid is defined as activities that promote at least one of the three objectives of the Convention on Biological Diversity (CBD): the conservation of biodiversity, the sustainable use of its components (ecosystems, species or genetic resources) and the fair and equitable sharing of the benefits of the utilization of genetic resources.

All the statistical summaries of Danish bilateral assistance presented here are calculated on the basis of the OECD DAC Rio markers on aid targeting the objectives of the Rio Conventions (Conventions on climate, desertification and biodiversity). Multilateral aid has been examined. There is no known way of estimating how many of the activities of the different multilateral organisations are actually supporting CBD. The statistical summaries include the full contribution to organisations and projects that support activities targeting the objectives of CBD. This may lead to overestimates of the ODA.

On average Denmark provided an estimated DKK 2,4 billion annually from 2006 to 2012 for development assistance in support of developing countries' efforts related to the objectives of the CBD. The expenditures on ODA vary from year to year. Even though there was decrease in the expenditures in 2011 the amount has generally increased since 2006. The higher level of CBD relevant aid in recent years may be partly due to the efforts of mainstreaming environment as a cross-cutting issue in the sector-programs through which ODA is channelized. In average multilateral aid represents 56 % of the total amount of ODA in the years 2006-2012.

Private foundations and NGO funding

There is a general trend that private foundations are financing an increasing amount of activities and projects which relates to the objectives of the Biodiversity Conventions. The main part of the increase, however, in the expenditure on biodiversity provided by foundations from 2010-2012 is due to the number of foundations which reported on their activities.
The foundations engage in various activities related to biodiversity and nature. Improving public awareness, ecological restoration, establishing a marine centre are just a few of the activities, for which these foundations have provided financial support.

Some Danish NGOs, such as the Danish birdlife foundation (DOF) and the The Danish Society for Nature Conservation (DN) are also directly engaged in nature protection and conservation.

Volunteers are engaged in different activities and work for the organisations which provide funds and petitions for funding for biodiversity and nature conservation projects.

3. Chapter

Achieving the Millennium Development and the Aichi Targets

While the Millennium Targets are to be achieved by 2015 most of the Aichi Targets are to be achieved by 2020.

In the EU a systematic and thorough assessment of the progress towards achievement of the Aichi targets is planned to take place in 2015 and several processes involving the EU Commission and the EU member states have been initiated to establish common procedures and methods to make this assessment.

Thus, this chapter only presents a preliminary and indicative assessment of the Millennium Development and the Aichi targets.

Contributions towards achievements of the Millennium Development Goals and Targets 2015

The most biodiversity-oriented goal is goal 7 (Environmental Sustainability) and the most relevant targets under this goal are:

- Target 7.A: Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources
- Target 7.B: Reduce biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss (pls. note that this target is from before UN extended its overaching goal of halting the decline in biodiversity from 2010 to 2020)

Since the goal on environmental sustainability and the targets were adopted in 2000 Denmark has worked towards their fulfilment (see chapter 2 for an overview of policies and strategies).

In 2011 Denmark adopted the EU's biodiversity strategy including a new overall target for biodiversity: "Halting the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, and restoring them in so far as feasible, while stepping up the EU contribution to averting global biodiversity loss". Denmark is now working towards fulfilling the EU Strategy's 6 goals aiming at obtaining the overarching target.

Achievement of the Aichi Targets

The Aichi targets are supposed to be achieved by 2020 (except target 10 and 17 which are supposed to be achieved by 2015). Below follows a brief presentation of important activities which support the achievements of the targets as well as brief assessments of the progress.

Target 1
The population will be familiar with the values related to biological diversity by no later than 2020, along with the steps they can take to protect and make use of biodiversity.

Work is going on in Denmark in many areas to increase public awareness of the values related to biological diversity. The campaign will be aimed at the population at large, children, adolescents, landowners, the authorities, stakeholder groups etc.

The following activities have been launched:

- The start of an international citizens involvement project ("World Wide Views on Biodiversity") , with over 3,000 residents of over 25 different countries concerning the key issues negotiated at the last Biodiversity Convention held in India, in 2012
- A national 'citizens' summit' held in 2012, with 200 representatives selected from the population to raise awareness of nature and dialogue concerning central political challenges on nature.

- The Danish Nature Agency has published information materials, folders, posters, videos and YouTube clips on biodiversity, highly endangered species and invasive species, nature protection, care etc.
- The Nature Guide scheme provides information via around 300 guides all over the country on natural habitats and biodiversity through over 30,000 events p.a., with the participation of around 1 million people, of which 2/3rds are children. There are also daily items on national radio on natural habitats and biodiversity (DR P1).
- The national Green Flag, Green School project focusses on active education for children on biodiversity and sustainability.
- The Nature Agency has published educational material for all classes in primary school, and a nature directory published in 2009 has been followed up with educational material in the form of themed books focusing on Denmark's nature.
- Awareness of nature is promoted by easier access to nature at locations where there is normally no public access - the "Clues in the Landscape" project.
- "Woodland's Day" is held every year in private and public-owned woodlands, designed to increase awareness of the diversity of woodland, and sustainable exploitation of their resources. (The Danish Forest Association, private and public-owned woodland, supported by private funds).
- “Nature’s day” is held every year and focusses on public awareness of nature and biodiversity.
- To promote public debate on nature and biodiversity, the Ministry of the Environment published "Biodiversity, a Public Issue" in 2011.
- Many Danish NOG’s make a valuable contribution to public awareness of nature and public engagement within the field.

Continued efforts to increase public awareness (and particularly that of youngsters) of the importance and value of biological diversity are expected to help Denmark reach this target.

Target 2
The value of biological diversity will be integrated in national and local development, anti-poverty and planning strategies by 2020, and will be incorporated into national accounts and reporting systems in a suitable manner.

Biological diversity is integrated into a number of strategies and policies, and represents a central element of physical planning (see also chapter 1 and 2). Nature is a major element of the government's strategy for sustainable development "Considerate Growth" dating from 2009, and thus integrates regard for biological diversity across all sectors. Through its national contribution to IUCN, Denmark has provided financial support to the international TEEB programme (The Economics of Ecosystems and Biodiversity), which has helped create the scientific and practical foundation to be able to appreciate the value of natural resources with the aim of compiling green accounts and other measures.

Other relevant initiatives:

- The government took part in a survey of Nordic ecosystems, their services and social value in 2012 (TEEB Nordic 2012).
- Work in progress regarding development of green national accounting (Danish National Statistics Institute, 2013)
- Financial support has been granted for the development of green national accounts in collaboration with the World Bank.
- Consideration for biological diversity and combating poverty is an integrated element in Danish foreign aid policies.
- Consideration for biodiversity is integrated in several parts of the Danish legal and physical planning systems.

- A national project to survey and evaluate ecosystems and ecosystem services will be launched in 2014.

Denmark is in the process of integrating the value of biodiversity into a range of policies, strategies and programmes in order to achieve the target.

Target 3
Incentives and subsidies that are detrimental to biological diversity will be eliminated, phased-out or converted by no later than 2020 to minimise or avoid their negative effects, and positive incentives for the protection and sustainable use of biodiversity are being developed in accordance and harmony with the Biodiversity Convention and other relevant international obligations, with regard to national socio-economic status.

The majority of Denmark's rural natural and semi-natural habitats are found or linked to farming and forestry areas, and the majority of national grant schemes for nature are co-financed by funds from the EU's rural development programme (RDP). A new Common Agricultural Policy (CAP) and RDP for 2016-2020 are being compiled, and the EU is working on analysing how negative incentives and subsidies can be phased out. There is growing focus under the CAP on "greening elements," concerning consideration for nature, protection of permanent grasslands, crop diversification etc.

The Ministry of the Environment has commissioned a survey of nature-related legislation to focus, simplify and strengthen it. Work is also in progress to promote biodiversity in towns and cities, and many local authorities are putting more emphasis on ensuring green, multifunctional spaces in urban areas.

The government's National Commission for Nature and Agriculture published a range of recommendations in 2013 which could bolster biological diversity, including the setting up of a Nature Trust for the re-establishment of natural habitat areas. The trust has been given the political green light and obtained financing from the government and two private charitable trusts (Villum Fonden and Aage V. Jensens Naturfond)

Other mentionables:

- Negative incentives such as subsidies for draining have been removed from agricultural grant schemes, and subsidies for draining and building roads in woodlands under the woodland improvement scheme have been stopped.
- Pesticide tax has been reallocated to stimulate the reduced use of those pesticides resulting in the highest load with respect to human health and the environment.
- Specific subsidy schemes under the national Rural Development Programme have been set up for protection of threatened species living on open land and in woodland.
- The Nature Agency has set up an advisory scheme with information on the national subsidy schemes under the RDP, and a special campaign for highly endangered species is to be launched in early 2014.
- Through the Green Growth Agreement (2009) and co-financing from the EU's Rural Development Programme funds, significant amounts have been earmarked in recent years for protection and care of Natura 2000 and Article 3 areas, for restoration of nature and to improve the aquatic environment, and ensure more water in the countryside.
- The first generation of nature plans (2010-2015) are being implemented and the next generation is being drawn up. The first generation of water plans has been sent for consultation and is expected to become law in 2014.

- The development of more nature-friendly farming and organic farming has been promoted by financial subsidy schemes. 5 year environment and organic schemes have been promoted by caring for grass and natural areas, including 1-year subsidy schemes for extensive farming.

Denmark has established several schemes and regulations to reduce harmful subsidies and to provide positive economic incentives of importance for biodiversity. Among other endeavours Denmark is active in the EU negotiation on establishment of a greener subsidy system for the agricultural sector.

Target 4
The government, business and industry and other stakeholders at all levels will have taken measures to achieve or have implemented plans for sustainable production and consumption, and have kept the effects of consumption of natural resources within ecological constraints by no later than 2020.

The government is currently working on a Strategy for Sustainable Development, which will bring targets and initiatives together within economic, social and green areas. The Minister of the Environment will publish a report in 2014 on which initiatives within nature and the environment the government has launched. The report will be followed by a further report on the status of nature and the environment in Denmark.

The Green Growth Agreement (2009) and the agreement on Green Conversion (2013) aim to promote sustainable production and the National Commission for Nature and Agriculture launched a series of initiatives in 2013 designed to promote more sustainable agricultural production, to the benefit of biodiversity. The government is currently considering how it can best follow up its recommendations.

Denmark has launched the following:

- Funds have been earmarked as part of the annual budget to “the Environment and Demonstration Programme (MUDP)”, under which grants are provides for the development and demonstration of solutions for prioritised problems within the fields of environment and nature.
- A proposal for a resource strategy has been published with the overall principle of increasing recycling and reducing the amount of refuse incinerated. The strategy includes a target of 50% recycling of domestic refuse.
- A resource strategy for prevention currently under production will contain a number of specific initiatives designed to prevent the loss of resources.
- Binding requirements will be placed on government purchasers stipulating that wood for furniture, construction and paper shall originate from sustainable forestry.
- The Partnership for Green Public Procurement, Forum for Sustainable Procurement and several specific projects, including the "Responsible Purchaser" web portal are in place to promote consideration for the environment in public sector procurement.
- Schemes have been set up to support the use of 'eco labels' (including via public sector procurement) and increase their use (e.g. through labelling grocery products).
- The Green Growth Agreement (2009) and Agreement on Green Transition (2013) are both designed to develop the economic and environmental criteria for sustainable agricultural production, and the National Commission for Nature and Agriculture (2013) has formulated recommendations for the same purpose. The government will be publishing its proposals for following-up on these recommendations in 2014.
- The government has set a target of 50% of livestock manure, instead of being utilized as fertilizer, will be used for energy production by 2020.

- The Chemical Programme for 2014-17 contains a number of initiatives, including on the substitution of problem chemicals in materials and products in small and medium-sized enterprises.

Denmark has established several national incentive schemes and regulations to support development of sustainable production and consumption and Denmark is active in the EU and in international fora which makes efforts to achieve more sustainable and green development and transition.

Target 5
The loss of all natural habitats, including those in woodlands, is to be halved as a minimum by 2020 and where possible brought close to zero, and the degrading and fragmentation of nature is to be significantly reduced.

Focus in Denmark has been placed on the protection of habitats as a cornerstone of existing nature conservation efforts. Denmark's natural landscape areas represent 26% of the total, of which woodlands account for around 14%, but both types of area are on the increase.

Some of the most significant programmes to improve and increase the area of habitats are the designation of habitat areas (Natura 2000), general protection of nature types, conservation, forestry planting, setting up no-cultivation zones along lakes and watercourses, and the establishment of new wetlands.

The newly established Nature Fund and the forthcoming Nature Plan Denmark are also expected to make significant contributions to the establishment of more - and more cohesive - natural landscapes, and to prevent further fragmentation of natural habitats.

Major initiatives include:

- Just under 9% of Denmark's land area and approx. 18% of total territorial waters have been designated as Natura 2000 areas.
- The Green Growth Agreement included the protection of 20,000 ha of particularly valuable woodland against felling and conversion.
- The Nature Agency will conclude the national updated surveying of general protected areas (Article 3 areas) in 2014, which will give good grounds for future protection.
- In connection with the first generation of the Nature Plans, activities will be initiated with a focus on stopping the loss of habitats within Natura 2000 areas.
- The Green Growth Agreement earmarked funds for caring for 110,000 ha within the Natura 2000 areas, and 40,000 ha of Article 3 land outside Natura 2000 areas.
- State-owned forests have been tasked with ensuring natural values and biodiversity as a key operational objective. Areas of untouched woodland or traditional management have been designated, equivalent to around 12% of the state forests.
- The state forests are being converted to close-to-nature management, including giving more consideration to nature and biodiversity.
- Government nature programmes have resulted in around 77,000 ha of new natural landscape being created since 1989.
- Defragmentation of nature is also being countered by the creation of up to 75,000 ha of new natural landscapes by 2015.
- A long-term target within forestry is the doubling of woodland areas within a tree generation, to extent the amount of afforested land to 20-25% of Denmarks area.
- Several private trusts are making a significant contribution to the promotion of biodiversity by re-establishing former natural landscape areas in their own projects and in partnership within ministries, local authorities, NGOs etc.

During the last decades Denmark has initiated a series of concrete initiatives to halt the loss of biodiversity and for some types of nature areas like wetlands and forests there is an increase in numbers and area.

Target 6
All stocks of fish, invertebrates and aquatic plants are to be sustainably managed and exploited legally and using eco-system based methods to avoid over-fishing by 2020. Re-establishment plans and targets are in place for all threatened species, fishing has no significant negative effect on threatened species and vulnerable ecosystems, and the effect of fishing on stocks, species and ecosystems is within safe ecological limits.

The management of Danish fish stocks is primarily determined by the EU's Common Fisheries Policy (CFP). As such, the EU sets overall quotas and devises management plans to ensure that targets for fishing at Maximum Sustainable Yields are reached. The EU also stipulates control measures and data gathering criteria for scientific advice. A common fisheries development fund allows the financing of necessary fisheries-related plans and projects in relation to the CFP and fisheries measures within the Natura 2000 and the EU's Marine Strategy Framework Directive. The government has recently adopted a national mussel policy, that limits the scraped area in Natura 2000 zones to 15%.

Work on sustainable stocks in the seas includes:

- New fisheries policy and reform of the Common Fisheries Policy.
- Discard ban in the Baltic Sea by 2015.
- Political agreement with Sweden on no-go areas for fishing in the Kattegat, for the sake of preserving cod stocks.
- Effective fisheries control via the EU's 2009 Fisheries Control Scheme.
- Management plans for various fish stocks: cod, sole, plaice, northern hake and eel.
- The EU's management plans are intended to ensure that stocks are maintained or restored to the benefit of fishermen and the fish.
- Combating illegal, unreported and unregulated fishing.
- Sustainability certification of Danish fisheries.
- Annual action plans for fish recovery (annual funds are earmarked to promote the natural reproduction of fish stocks, including the release of farmed stocks).
- Protected zones at sea, where 18% of the area is designated as Natura 2000 zones.
- Denmark's Marine Strategy (2012) sets targets for good environmental status in the sea by 2020. Programmes will be defined in 2015.
- The first major maritime nature restoration project has been completed, with the restoration of a 7 ha area of grotto-forming rocky reef off Læsø, a rare and very biodiversity-rich type of natural habitat in Denmark.

Most of the commercially utilized Danish fish stock are harvested sustainably (re chapter 1), while initiatives have been launched to address situations where this is not yet achieved.

Target 7
Agricultural, forestry and aquaculture areas managed sustainably by 2020, to ensure biological diversity.

Denmark has launched a series of initiatives designed to support sustainable development of agriculture, forestry and aquaculture. For example: the state forests (18% of Denmark's total afforested area) are run on near-natural principles, and certified to FSC and PEFC standards. Hunting is a popular pursuit/hobby in Denmark, and generates around DKK 88 million in licence

fees, of which a large portion goes to financing programmes to conserve and improve specific species and natural landscapes.

In addition:

- The majority of Danish woodlands are subject to a preservation order, protecting them against conversion to other purposes.
- The 2004 Danish Woodlands Act was designed to promote sustainable forestry, including the preservation and increase of biological diversity. Along with certification of the state forests, the act means that Danish woodlands are run in a more sustainable manner now than 10 years ago to the benefit of biodiversity.
- In relation to aquaculture, the agreement contains a sub-agreement that earmarks an additional DKK 100 million for the period of 2010-2015, to promote eco-friendly aquaculture production. In accordance with the EU's Common Fisheries Policy, a strategy is to be developed for sustainable development of the aquaculture sector for 2014-2020.
- Tougher regulation of fish farming and salt water fish farms that will include threshold limits for maximum emissions of nitrogen and phosphorus, as well as substances.
- Denmark has decided to fully utilize the funds from the European Agricultural Fund for Rural Development (RDP) which contain several schemes for financing of nature management, nature restoration activities and for protection of threatened species.

A series of national initiatives have been launched to facilitate the development of sustainable agriculture, fishery and forestry and more initiatives have been planned.

Target 8
Pollution, including the surplus of nutrients, will be brought down to levels which are harmless to ecosystem functions and biological diversity by 2020.

- The aquatic plans has as an overall target to reduce reduction by 9,000 tons by 2015.
- Emissions of phosphorus are to be reduced by 210 tons.
- Changes to the Livestock Act in 2011 laid down maximum ammonia amount requirements for vulnerable nature.
- The effect on nature of ammonia emissions and pesticides must be reduced, i.e. through technological environmental solutions.
- The designation of 50,000 ha with 10 metre-wide buffer zones along their edges in which spraying and cultivation is banned along all watercourses and lakes with a surface area of over 100 m².
- The scope of PLI for pesticides is to be reduced even further, through reorganisation of the pesticide tax.
- No pesticides are used in principle in state forests. In addition, there are subsidy schemes for private woodland planting that favour cultivation without pesticides.
- Efforts to improve water quality, primarily in watercourses and lakes by focusing on waste water processing.

Several initiatives have been launched to reduce the pressure of nutrients and pesticides on the national nature. The pressure from nutrients have been reduced substantially and efforts will be made to further ensure reduction. It is still a challenge to turn around a trend of increasing utilization of pesticides, but new and targeted regulations have been established. The target is expected to be reached by 2020.

Target 9
Invasive species and their spreading routes are identified and prioritised, prioritised species are under control or exterminated and systems for controlling

their spreading routes are in place to prevent their introduction and establishment by 2020.

Denmark has concentrated for many years on combating invasive species through targeted campaigns at species level, more long-term management and the provision of information (for more detail please see chapter 2

Major activities include:

- Plans to deal with mink (2012) and raccoon dogs (2010).
- The Executive Order on raccoon dog prevention (2011).
- Via the NOBANIS network, information on problem species on their way into the region is shared. Denmark therefore has a good idea of which species could be in the process of introducing themselves into the country.
- The Nature Agency runs regular information campaigns on invasive species and will conclude a project in 2014 that gives a detailed understanding of the spreading routes used by them.
- An amendment to the Executive Order on combating giant hogweed (2009) means improved opportunities for effective eradication of this invasive species.
- Denmark became a signatory to the International Maritime Organisation's Ballast Water Convention in 2012, designed to reduce the discharge of invasive species from ship ballast water.
- Denmark's Marine Strategy sets targets concerning programmes to combat invasive species. Programmes will be defined in 2015.

Several national initiatives have been launched to analyse invasive species pathways and dispersal patterns and to reduce populations and at EU level new legislation will be implemented and strengthen efforts in near future.

Target 10
The various types of pressure from human activities and on coral reefs and other vulnerable ecosystems affected by climate change or ocean acidification shall be minimised with regard to preserving their integrity and functions by 2015.

Denmark's territorial waters do not contain coral reefs, and the target is therefore of less relevance to the country.

- Another vulnerable marine ecosystem with large scale biodiversity is rocky reefs. One such example is the almost 7 ha grotto-forming reef north east of the island of Læsø in the Kattegat, which was restored by depositing 86,000 stones in late spring 2013 (Læsø Trindel, Natura 2000 area).
- As from 2015, shipping will be required to use fuel with a lower sulphur content and the use of scrubbers in designated coastal areas (cf. the EU sulphur directive) to reduce ocean acidity
- The government's Climate Strategy (2013) includes a number of CO_2 reduction targets and initiatives to help reduce sea CO_2 content, and thus acidity.
- Studies were conducted during definition of the Climate Strategy and by the Nature Agency on the relationship between climate change and its effect on biodiversity, the results of which will be used in future nature preservation policies, including Nature Plan Denmark.

Work is being done at national and international level to reduce ocean acidity, but will involve a long process, which will be highly dependent on global climate initiatives (CO_2 reduction etc.).

Target 11
At least 17% of the land area, including fresh water areas and 10% of sea and coastal areas - especially those that are very important to biological diversity and ecosystem services - will be protected by effective and evenly-applied, ecologically representative and well-linked systems of protected areas and other effective zone-based measures, and integrated into broader sea- and landscapes by 2020.

Denmark has designated a large number of protected zones at land and in the sea, including in connection with the Natura 2000 programme. On land, over 8% of the total area is protected as Natura 2000 areas. 18% of territorial waters are protected. Protection includes rocky reefs and biogenic mussel reefs. Four zones have been designated to date that will protect 30 coastal habitat areas.

All Natura 2000 protected zones have management plans designed to halt the decline in biological diversity. The government has also launched an initiative to boost care and restoration of open natural habitats.

Other mentionables:

- Over 14% of Danish land is covered by woodland.
- Fresh and salt meadows, commons, lakes, heaths, watercourses and bogs account for 9% of the land area, and are protected throughout the country (approx. 40% of these types of natural habitats are within Natura 2000 zones).
- In addition are the buffer zones along watercourses, lakes, coasts and woods, conservation areas, nature reserves, national parks etc., which also provide various forms of protection.
- The establishment of 50.000 hectares of pesticide, cultivation and fertiliser free bufferzones along water courses and lakes and of more forests and wetlands.
- Denmark's Marine Strategy (2012) sets targets for good environmental conditions in the sea by 2020. New programmes are to be decided in 2015, which could include the establishment of a cohesive, representative network of protected sea zones.

Much of the terrestrial, aquatic and marine nature is already protected and more protected areas will be established in near future.

Target 12
The eradication of known threatened species will be prevented and their protected status improved and maintained, especially for species in the steepest decline by 2020.

Denmark is working to halt the decline of species at many different levels. In addition to the habitat species covered by the EU's habitat and bird protection directive and Natura 2000 plans, a number of other species will also be protected. The aim is to protect the habitats, breeding and resting areas used by such species. The population of certain threatened species will also be boosted through translocation. The reintroduction of disappeared species which play a major role in the dynamics of nature, or which can put focus on certain elements of nature has also been performed.

Although a number of species have disappeared, such as the white stork and black grouse, others have returned in recent years, such as the sea eagle and red kite.

Other relevant schemes and initiatives worth mention:

- Around DKK 88 million p.a. from hunting licence fees goes to subsidies for schemes to protect species that are threatened or in need of protection.

- The INTERREG project for the dormouse, northern birch mouse and bats on Funen and in Southern Jutland (2010-2013).
- The LIFE project for the establishment of habitats for threatened species including the European fire bellied toad, natterjack toad and fen orchid (concluded 2014).
- Management plans are in place for all Danish species of the bat, dormouse and northern birch mouse, large blue butterfly, otters, seals (grey seal and harbour seal), porpoise, beaver, partridge, hare, salmon, houting, marsh fritillary and marsh saxifrage. Management plans for the sand lizard, European green toad and natterjack toad are expected to be in place by the spring of 2014. The objective for all such plans is that the species in question should be ensured a beneficial preservation status.
- Management plans for birds cover the cormorant, white stork, pink-footed goose, red kite, sea eagle, Montagu's harrier, golden eagle, osprey, peregrine falcon, corn crake, dunlin and ruff.
- The Nature Agency expects to launch a project concerning the surveying of "high nature value zones" in woods in 2014 or 2015.
- Programmes for red-listed species in state forests are expected to be started in 2015 based on the mapping project.
- Subsidies under the Rural Development Programme (RDP) for the protection of breeding and rest areas for bats, dormouse, northern birch mouse, sand lizard and toads.
- Information materials designed to promote species protection: Best practices for woodland areas with bats, a folder sent to 95,000 farm owners, electronic map showing the spread of threatened species etc.
- Re-introduction of European bison (2013), stag beetle (2013) and beaver (West Jutland - 1999, North Zealand - 2009).
- Subsidies for hedge planting with bee-friendly plants (proviens) and the sowing of bee and wildlife-friendly field margins.
- The Ministry of the Environment has granted a subsidy to the Danish Hunters Association for a project to form a voluntary field wildlife league. The project will identify and facilitate setting up the league with the intention of supporting the recommendations of the management plans for hares and partridges. 100 leagues are expected to be set up around the country by 2016.

Focussed measures are deemed to still be required for species protection to prevent the decline in biological diversity. The NOVANA monitoring scheme has shown that certain species are on the increase, but that many of the threatened species continue to decline, e.g. the sand lizard, European green toad, dormouse and northern birch mouse.

Target 13
The genetic diversity of cultivated plants, livestock and their cousins in the wild, including species deemed to be of socio-economic and cultural value, will be preserved and strategies for minimising genetic erosion and protection of their genetic variation will be developed and implemented by 2020.

The government is prioritising efforts in NordGen, the Nordic Gene Bank, for plant material, and a programme to locate and register the wild cousins of crops and their preservation status was started in 2010. The government devised an action plan in 2011, entitled 'From Gene Bank to Table'. The government has also supported the provision of information in the form of teaching material for schools, and the publication of a culture-historical cooking book.

- Denmark has ratified the FAO's international treaty on genetic plant resources for agriculture, and has signed the FAO's Global Plan of Action for Animal Genetic Resources and the Interlaken Declaration.
- Strategies for the preservation of plant and animal genetic resources are described in:

The Ministry of Food, Agriculture and Fisheries' action plan 2011-13 for agriculture's plant genetic resources, The Gene Resource Committee's strategy 2009-2012 for preservation of genetic resources for Danish livestock and in tThe Ministry of Food, Agriculture and Fisheries bee breeding strategy 2009 – 2013.

- Denmark is taking part in a major re-establishment programme for the European Bison – and has reintroduced this species on the island of Bornholm
- The Ministry of Food, Agriculture and Fisheries has earmarked specific funds for the preservation of agriculture's genetic resources. Funds have also been obtained from other sources, such as via the ministry's agreement with Aarhus University on consultancy.
- A gene preservation programme for trees and bushes has been set up, to ensure the preservation and use of genetic resources. A total of 81 species are the subject of a network of preservation zones on the Nature Agency's areas, approx. 2900 ha have been registered as gene preservation zones, approx. 1550 ha are designated for seed supply, and around 32 seed nurseries have been set up through the Nature Agency's bush programme since 2000.
- Copenhagen University's 'Pomet' programme has collected around 750 species of apple since 1956, of which 250 are Danish.
- A new national committee has been established for Conservation of Animal Genetic Resources and Rare Danish Breeds. The committee is to coordinate and take care of all genetic resources conservation activities, including a gene bank, breeder support and information activities. The committee has been tasked to develop a new national strategy for conservation of animal genetic resources for food and agriculture in 2014.

A series of initiatives have been launched to protect genetic resources of cultivated plants and livestock and their wild relatives.

Target14
Ecosystems that provide basic services - including those related to water and that contribute to health, subsistence and wellbeing - will be restored and protected with regard to women, original and local communities, the poor and vulnerable by 2020.

&

Target 15
The robustness of ecosystems and contribution from biodiversity to carbon dioxide retention will be increased by 2020, through preservation and restoration, entailing the restoration of at least 15% of the deteriorated ecosystems, thus helping minimise climate change and adaptation, plus the spread of deserts.

Denmark focuses heavily on protection of habitats and ecosystems, and a large element of existing efforts is aimed at retaining and improving them.

Including:

- Nature protection of natural habitat types and species covered by the EU's habitat and bird protection directive, protection of natural habitat areas covered by Article 3 of the Nature Conservation Act, protected areas, national parks etc.
- The general running of state-owned woodland areas, which are conversed to close-to-nature management. The woodland improvement scheme and replanting after storm damage also help to establish or re-establish ecosystems that are robust to climate change.
- Woodland planting and an increase in wooded areas help towards CO2 retention and thus make a positive contribution to the CO2 accounts, protect groundwater and ensure high quality drinking water.

- Establishment of 50.000 hectares of pesticide, cultivation and fertiliser free buffer zones along watercourses and lakes, plus the establishment of wetlands and woods.
- Continous national monitoring of carbon stocks and emissions from forests and agricultural areas in accordance with IPCC guidelines for LULUFC
- A national project to survey and evaluate ecosystems and ecosystem services will be launched in 2014.
- Local authority plans include the designation of ecological links, valuable landscapes etc., which can be used as the basis for continuous expansion, planning and focusing of nature management to boost ecological cohesion.
- A number of recreational activities such as mountain biking in hilly areas, hiking in remote, quiet areas and hunting can already be enjoyed in many scenic areas, contributing to health and wellbeing. More work is also being done in state forests to improve access for the handicapped.

Many initiatives have been launched to achieve this target and a national project on mapping national ecosystems and ecosystem services will take of in 2014.

Target 16
The Nagoya Protocol on access to genetic resources and equal distribution of their benefits will be in effect and operational in accordance with national legislation by 2015.

In recent years, intense negotiations on the Nagoya Protocol have been taking place at UN and EU level. The protocol was ratified by the UN in 2012, and agreement reached in the EU on a new directive to fulfil its provisions.

- Denmark has been one of the leading proponents for ratification of the Nagoya Protocol within the EU and internationally. We will continue to strive nationally, within the EU and globally to ensure the goal can be reached.
- Parliament passed a new law in December 2012 on regulation of the use of genetic resources from abroad by domestic consumers (businesses and scientists). The law is designed to protect developing countries from exploitation of their genetic resources from rainforests, coral reefs etc. for the development of medicines, enzymes, cosmetics, food products etc. without their prior consent or agreement on benefit-sharing.
- The government has supported African countries in negotiations on the Nagoya Protocol, and continues to support focus on the development of good governance in this area in developing countries, with a subsidy of DKK 15 million for the period of 2013-2015. The subsidy is managed by the Ministry of Foreign Affairs in the form of co-financing of an ABS Capacity Development Initiative.
- A survey of Danish businesses and academic institutions affected was performed in 2013, and the Nature Agency is currently preparing to implement the new national legislation, plus new EU and UN rules within this area as from late 2014.

Denmark is well down the road to support and prepare the implementation of the Nagoya Protocol.

Target 17
Every party involved will have devised, adopted as a political instrument and commenced implementation of an effective, participatory and updated biodiversity strategy and action plan by 2015.

Denmark's does not have one specific biodiversity strategy . The white paper on 'Biodiversity - a Public Issue' was published in 2011 to create public dialogue on the future of natural habitats in Denmark.

The government set up the National Commission for Nature and Agriculture in 2012, tasked with arriving at proposals for solutions to the structural, financial and environmental problems of the agriculture industry, including how it can contribute to climate, environment and nature preservation. The commission published a number of recommendations in 2013, including clear targets and strategies for the natural habitat. Denmark's Biodiversity Strategy is being devised along with Nature Plan Denmark, expected to be completed by the end of 2014.

Target 18
The traditional knowledge, discoveries and methods for protection and sustainable use of biological resources of the indigenous people and local communities will be respected by 2020, in line with national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the convention with complete, effective participation of the indigenous people and local communities at all relevant levels.

Denmark believes in protection of the rights and living conditions of indigenous peoples, and in promoting their knowledge and methods as an important contribution to protection and sustainable use of biodiversity. As such, Denmark and Greenland played an important role in ratifying the UN's Declaration on the Rights of Indigenous Peoples (UNDRIP) from 2007.

Target 19
The knowledge base and technologies related to biodiversity, the value, functions, status and trends of biodiversity and consequences of its loss will be improved, widely distributed, transferred and utilised by 2020.

Denmark has implemented a monitoring system for certain types of natural habitat and species (NOVANA and the National Woodland Monitoring Scheme). The system is designed to provide an understanding of the status of natural habitats and the environment in the country. That understanding is part of the management data for national natural habitat and environmental policies and for decision-making on environmental initiatives. Data gathered by stakeholder organisations will be incorporated when possible.

A national project to survey and evaluate ecosystems and ecosystem services will be launched in 2014.

Target 20
Mobilisation of financial resources from all sources and in line with the consolidated processes decided for the strategy of resource mobilisation is to be significantly increased from the current level, to effectively be able to implement the strategic plan by 2020.

The latest Danish report to the Biodiversity Convention Secretariat on resource mobilisation for nature preservation purposes states and annual contribution of DKK 2.3 billion, equivalent to USD 390 million p.a. (average for 2006-2010). This amount corresponds to approx. DKK 410 per person per year, or 0.13% of GNP.

As such, Denmark's contribution per capita is one of the very highest compared to other developed nations. In addition, ratification and implementation of the Nagoya Protocol plays a vital role, as implementation will facilitate benefit-sharing with the developing countries supplying the genetic resources for new medicines, enzymes, cosmetics etc.

Miljøministeriet
Miljøstyrelsen

Strandgade 29
DK - 1401 København K
Tlf.: (+45) 72 54 40 00

www.mst.dk