

Report

Norway's Fifth National Report to the Convention on Biological Diversity



NORWEGIAN MINISTRY OF
CLIMATE AND ENVIRONMENT

Executive Summary

Norway's fifth national report to the Convention on Biological Diversity presents information on status and trends for biodiversity in Norway, measures undertaken to implement the Convention since 2009, successes and remaining challenges. Norway's previous national reports were published in 1998, 2001, 2005 and 2009.

Status, trends and pressures

Norwegian nature is very varied, with striking differences between landscapes, habitat types and plant and animal species found in different parts of the country. There is a wide diversity of terrestrial habitat types, ranging from beech forest in the south to Arctic habitats in the north, and from wet coastal habitats to dry inland areas. The sea areas under Norway's jurisdiction are about six times larger than its land territory. They stretch from the temperate waters of the central North Sea to the Arctic Ocean, and from shallow bank areas down to deep sea areas at depths of 4 000–5 000 metres. Norway's biodiversity provides the foundation for a wide range of ecosystem services, of vital importance for human well-being and socio-economic development.

There are many different pressures on Norway's biodiversity. Figure 1 provides an overview of pressures on biological diversity as assessed in the 2010 Norwegian Red List for Species. Chapter 2 presents the main pressures on biodiversity in Norway. The importance of pressures for specific ecosystems is described in Chapter 3 on status and trends for Norwegian ecosystems.

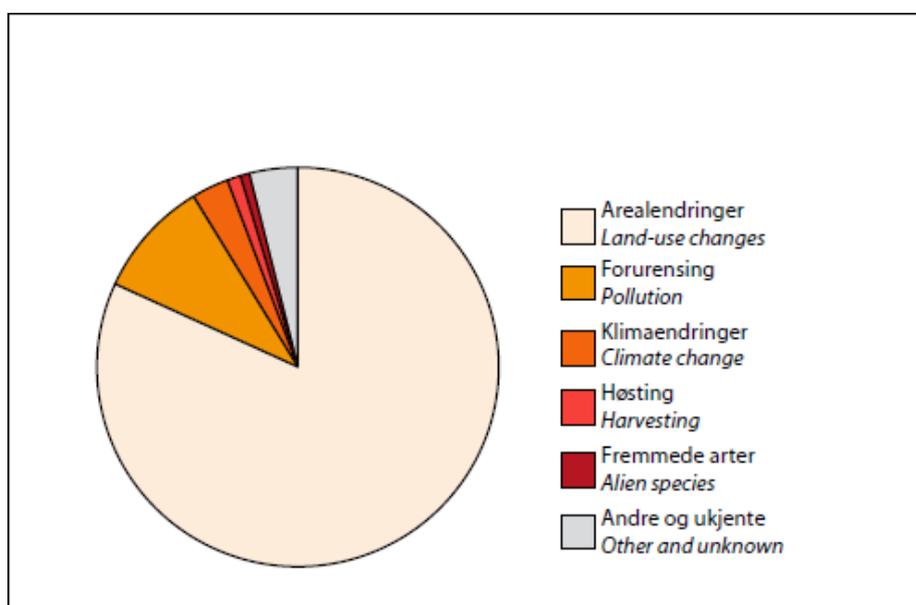


Figure 1: Land-use change, pollution, climate change, harvesting (over-exploitation) and alien species are the five major global pressures on biological diversity. In Norway, land-use change is by far the most significant factor. Other factors include noise, traffic and external pressures (originating outside Norway). Source: Norwegian Biodiversity Information Centre 2010.

Norway's red lists (*2010 Norwegian Red List for Species* and *Norwegian Red List for Ecosystems and Habitat Types*), the Norwegian Nature Index and the National Forest Inventory are the most important sources of information for assessing status and progress.

The Norwegian Nature Index documents overall trends for biodiversity in Norway's major ecosystems based on a large number of indicators (Table 1). Due to challenges concerning calculating the reference state in certain ecosystems, direct comparison between ecosystems should be avoided.

Table 1: Norway's major ecosystems: area, state and trends. The value for each indicator ranges between 1 and 0. The reference state is given the value 1, and approximates to the natural state, with no negative impacts of human activity.

Ecosystem ⁷	Area (km ²) (% of Norway's land area) ¹	Nature Index value in 2010 ² (95 % confidence interval)	Trend 1990–2010	No. of threatened and near-threatened species	No. of threatened and near-threatened habitat types
Open sea	875 995	0.75 (0.65-0.83) (seabed) 0.71 (0.65-0.76) (pelagic)	↗	87 ³	5
Coastal waters	89 091	0.73 (0.69-0.76) (seabed) 0.66 (0.49-0.71) (pelagic)	→		9 ⁴
Freshwater	19 620 (6.0 %)	0.73 (0.68-0.76)	↗	267	7
Forest	120 746 (37.3 %)	0.40 (0.38-0.43)	→	1838	18
Wetlands	17 000 (5.3 %)	0.53 (0.51-0.57)	→	443	15
Mountains	118 740 (36.7 %)	0.63 (0.57-0.69)	→	158 ⁵	

¹ The areas of different ecosystems are based on figures from Statistics Norway. Mountain areas were defined as those above the treeline and open lowland as traditional semi-natural vegetation types such as open grassland in the lowlands, boreal heaths and meadows around summer farms, coastal heaths and naturally open areas below the treeline (Blumentrath and Hanssen 2010) Open sea extends to the boundary of the Economic Zone of Norway (i.e. 200 nautical miles from the baseline).

² Updated Nature Index figures have been calculated for 2012.

³ Figure for open sea and coastal waters combined.

⁴ The figure includes shallow marine waters and the littoral zone.

⁵ Austrheim et al. (2010).

Open lowland	29 080 (9.0 %)	0.40 (0.36-0.44)	↘	741	3 ⁶
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Source unless otherwise specified in the footnotes: Nybø (2010).

Figures were first published for the period 1990–2010 and updated in 2012. The open sea and coastal waters show a clear positive trend, with an average 10 % rise in Nature Index values from 1990 to 2012. The Nature Index value for open lowland declined by 16 % in the same period, while wetlands showed an 8 % decline. There was a weakly negative trend for mountains and freshwaters and a weakly positive trend for forests. According to the red lists, the largest numbers of threatened species are found in forest, wetlands and cultural landscapes, while the largest numbers of threatened habitat types are found in forest and wetland ecosystems. In all, 3 682 species have been red-listed as threatened or near-threatened in Norway, of which 2061 are assumed to be negatively affected by former or current land-use changes due to physical disturbances. 503 of these species are considered naturally rare.

The *Norwegian Red List for Ecosystems and Habitat Types* assesses the status of 80 habitat types. There is no documentation that any habitat types have been lost completely, but 40 habitat types are listed as threatened (2 as critically endangered, 15 as endangered and 23 as vulnerable).

Generally, the state of Norwegian ecosystems is relatively good and, if managed wisely, they will be capable of sustaining a flow of important ecosystem services. The administrative, economic and legal framework in Norway has been identified as an important reason for this situation. However, biodiversity in Norway is under increasing pressure from a variety of sources, as indicated above. The cumulative effects are putting more pressure on the capacity of ecosystems to deliver ecosystem services, making continued monitoring even more important.

Implementation of the Convention and the Strategic Plan for Biodiversity 2011-2020, including the Aichi Biodiversity Targets.

All Norwegian authorities, industrial sectors and other relevant actors are required to play their part in efforts to ensure the conservation and sustainable use of biodiversity. Measures taken since the adoption of Norway's first National Biodiversity Strategy and Action Plan and last national report are described in Part II of this report. Norway has strengthened the knowledge base considerably, substantially improved existing legislative instruments and developed new ones. The Nature Diversity Act and the Planning and Building Act apply

⁶ Assessed at a less detailed level than habitat types in other major ecosystems.

⁷ Due to challenges concerning the calculation the reference state in certain ecosystems, direct comparison between ecosystems should be avoided.

across sectors and facilitate cross-sectoral coordination. The Convention on Biological Diversity inspired the development of the Nature Diversity Act, which entered into force in 2009. The purpose of the Act is to protect biological diversity and ecological processes through conservation and sustainable use. It also introduced new provisions on alien organisms and access to genetic material.

Other cross-sectoral measures include the management plans for Norway's sea areas and the river basin management plans. Such plans also encourage coordinated use of legislative and other instruments to protect the environment, through knowledge generation, clear targets and tools for finding a balance between environmental considerations and other important public interests. The National Budget includes an indicator set designed to monitor progress towards the targets of Norway's sustainable development strategy, some of which are based on Nature Index values.

The economic instruments that are most important in relation to biodiversity can be divided into three main categories: grant schemes, compensation schemes and taxation schemes. There has so far been little development and coordination of economic instruments, which was one of the areas highlighted in the first NBSAP. In 2013, an expert committee submitted an Official Norwegian Report on the values related to ecosystem services to the Minister of the Environment. A broad-based public consultation process has been held on the report's conclusions and recommendations. The Government will use the responses that have been received in deciding how to follow up the work and recommendations of the committee.

It is an important principle that Norway's environmental policy and all management of natural resources are to be knowledge-based. In response to the emphasis on knowledge-based management in the previous NBSAP and as an underlying principle of the Nature Diversity Act, budgets for this purpose have been increased and the Norwegian Biodiversity Information Centre has been established. The Biodiversity Information Centre has developed a new classification system for Norwegian nature, with the aim of using this as a basis for mapping at all levels – landscapes, ecosystems and habitats. The Centre has also established Artskart (Species Map Service), which provides quality-controlled spatial data on species occurrence in Norway. In addition, it runs the website Artsobservasjoner.no, which provides a platform for the public to register species observations. It also publishes Norway's red lists (2010 Norwegian Red List for Species and Norwegian Red List for Ecosystems and Habitat Types). These present assessments of the risk that species will become extinct or ecosystems or habitat types disappear in Norway over time.

Biodiversity monitoring programmes now ensure that there is some monitoring of all Norway's major ecosystems. These are normally long-term programmes that provide valuable information on the fauna and flora. However, publications on the Nature Index point out that the current monitoring system is incomplete. The knowledge base on ecosystem services also needs to be improved.

The authorities maintain a wide range of databases where large amounts of information is compiled, organised by topic, and made readily accessible. They include Naturbase (spatial

data on biodiversity), Villreinbasen (wild reindeer) Lakseregisteret (wild salmon stocks), havmiljø.no (the environmental value of Norway's sea areas at different times of year) Vann-Nett (information on inland water bodies), Elvedeltadatabasen (river deltas), Norsk Marint datasenter (Norwegian Marine Data Centre) and INON-basen (areas without major infrastructure development). For the general public in Norway, the most important source of updated information on the state of the environment and environmental trends is the website Miljostatus.no (State of the Environment Norway).

Many of the Aichi targets have already been included in Norway's environmental targets relating to environmental status. The global targets relating to means of implementation are reflected in processes and instruments that are either already in use or will be used in Norway's new national strategy and action plan. These are generally cross-cutting and applicable to a number of the environmental targets. The budget proposal each year also includes targets for the use of three categories of environmental policy instruments: knowledge and spatial data, legislation and planning procedures, and international cooperation.

Progress is underway to reach the Aichi targets and some of them are already almost fully implemented, for example target 16 on ratification and implementation of the Nagoya Protocol.

At the end of 2013, 16.9 % of the land area of the mainland was protected under the Nature Diversity Act. Overall, the extent of protected areas covers the major ecosystems of mainland Norway reasonably well. A large proportion of the total area protected is however in the mountains. Further, Norway has reported 12 marine protected areas to the Convention for the Protection of the Marine Environment in the North-East Atlantic (OSPAR), covering 85 416 km² (territorial waters and Norwegian Exclusive Economic Zone). Additionally, three new MPAs (74 km²) adopted under the Nature Diversity Act in 2013 are yet to be reported to OSPAR. A number of area based measures within the fisheries sector also contribute towards effective protection.

The Arctic archipelago of Svalbard covers a total land area of about 61 000 km². After extensions from 2002-2008, 65% of Svalbards land area and 87% of its territorial waters are protected as nature reserves and national parks under the Svalbard Environmental Protection Act. In 2010, most of the volcanic island of Jan Mayen, including its territorial waters was designated as a nature reserve.

Implementation of the nationwide national park plan and county protection plans is almost complete. Once the network of national parks is complete, 27 % of Norway's mountain areas will be protected. Since 2005, a total area of 15 000 km² has been given statutory protection in mainland Norway, including 12 new national parks and over 350 nature reserves. In addition, two existing national parks have been expanded and a number of protected landscapes have been established adjoining national parks. Management plans are required for all larger protected areas. These set out management and conservation targets as well as guidelines for use of the area, information, facilities for visitors and so on. On the mainland,

management responsibilities for national parks and other large protected areas have recently been delegated to the local level. Fifteen national park centres have been established to provide information and educate the public about the environmental value of the national parks. A programme on Norway's natural heritage as a value creator was carried out in the period 2009-13. On Svalbard, the management responsibility for protected areas rests with the Governor of Svalbard.

Integrated, ecosystem-based management plans have been drawn up for all Norway's sea areas. Plans for the Barents Sea–Lofoten area, the Norwegian Sea, and the North Sea and Skagerrak were adopted in 2006, 2009 and 2013, respectively, and provide a good basis for achieving important, far-reaching targets such as Aichi target 6. The Marine Resources Act is based on the principle that fisheries management must take place within a sustainable, knowledge-based framework. In 2011, new regulations were introduced restricting bottom fishing activities in the Economic Zone of Norway, the fisheries zone around Jan Mayen and the Fisheries Protection Zone around Svalbard. Their purpose is to protect vulnerable benthic habitats. Nine coral reef complexes have been protected against damage by fisheries activities under the Marine Resources Act. As part of its efforts to combat marine invasive alien species, Norway has ratified the Ballast Water Convention. A number of steps have been taken to reduce the risk of oil and other pollution from offshore oil and gas activities in marine and coastal waters and along the coastline.

In 2007, Norway adopted the Water Management Regulations, which incorporate the EU Water Framework Directive into Norwegian law. Since then, a great deal of work has been done to assess the environmental status of close to 30 000 water bodies in all parts of the country. The status of about one third of all Norway's water bodies is not satisfactory. The assessments will be used as a basis for the river basin management plans that are to be completed by the end of 2015.

Escaped farmed fish and sea lice are still substantial threats to wild salmon and sea trout. Norway has a special responsibility for the Atlantic salmon (*Salmo salar*), since about one fifth of the entire population is found in Norway. In 2013, quality norms were established for wild salmon stocks under the Nature Diversity Act.

A relatively large proportion of the area of wetlands in Norway, about 18 % of the total, is protected under the Nature Diversity Act. Nevertheless, there is considered to be a pressing need to establish more protected areas for most wetland habitat types. The protected wetland areas include 63 that are on the Ramsar list of wetlands of international importance. A national plan for restoration of wetlands up to 2018 is being drawn up.

In the period 2005–14, some 218 nature reserves have been established in Norwegian forests, totalling 580 km² of productive forest. Currently, most protected areas in forests are established in state-owned areas or on a voluntary basis on privately owned land. By January 2014, about 2.5 % of all productive forest in Norway was protected under the Nature Diversity Act.

In order to minimise the impacts of commercial forestry, Norwegian forestry policy gives priority to environmental considerations. Steps that have been taken in recent years include avoiding or tailoring logging operations in areas of particular importance for red-listed species. Valuable species and habitats have been registered in a large proportion of forest areas in Norway. Forest owners are required to take this information into consideration, and to plan forestry activities accordingly. Most productive forest is managed in accordance with the Norwegian PEFC standard. One threat to forest biodiversity is the establishment and spread of invasive non-native tree species. Priority is being given to the removal of such species in protected areas. In addition, new regulations governing the use of non-native tree species for forestry purposes entered into force in 2012.

Norway has retained its dual goals of maintaining livestock grazing in forested and other uncultivated areas and maintaining viable populations of carnivores. The main tool for achieving both goals is a clear division into zones where carnivores are given priority and other zones where livestock have priority. It is still a challenging task to achieve the dual goals.

Norway is using a variety of economic and legislative instruments to maintain the diversity of habitat types and species in the cultural landscape; these include the designation of selected habitat types and priority species, measures to control alien species, and cross-sector cooperation on specific environmental measures in agriculture. A number of economic instruments are being used to maintain areas of importance for species diversity, including pastures, hay meadows, coastal heathlands and tilled fields. These are all semi-natural habitat types, and their management and maintenance requires active use. The environmental strategy published by the Ministry of Agriculture and Food gives priority for 2008–15 to follow up the Government's environmental policy by strengthening and further developing environmental efforts within the agricultural sector. One objective is to maintain cultural landscapes and their environmental value through sustainable agriculture.

Conservation and sustainable use of genetic resources for food and agriculture has been enhanced through the programs of the Norwegian Genetic Resource Centre, through international cooperation and dialogue with industry actors, and through measures to encourage businesses, farmers and voluntary organisations to make use of traditional plant varieties and livestock breeds. Measures have been implemented to ensure the survival of livestock breeds listed as endangered and critically endangered. The long term safety deposit of seeds in the Svalbard Global Seed Vault increased by 4% in 2013. Svalbard Global Seed Vault is a Norwegian initiative to safeguard the plants that are vital to global food security.

There has been growing concern about alien species in recent years, both because of their adverse impacts on ecosystems and because of the economic costs. Norway adopted its *Strategy on Invasive Alien Species* in 2007. Steps have been taken to improve the knowledge base, for example through the publication of *Alien species in Norway – with the Norwegian Black List 2012*, which presents new information on alien species and ecological risk assessments of a wide range of species in Norway.

The Cities of the Future programme (2008–14) involves collaboration between central government bodies, Norway's 13 largest cities and the business sector to reduce greenhouse gas emissions and make urban areas better places to live in. One of the aims has been to develop more compact urban areas where people can walk and cycle rather than using cars. An important principle of urban planning is to retain green spaces to safeguard biodiversity and improve people's welfare, and also as a climate change adaptation measure. In Norway, the state provides financial assistance to set aside areas for outdoor recreation and make arrangements for public access, and funding for areas in and near towns and urban settlements is given priority.

In 2012, as a party to the Gothenburg Protocol, Norway took on further commitments to reduce emissions of SO₂, NO_x, VOCs, ammonia and particulate matter (PM_{2.5}) by 2020. There are extensive monitoring programmes for long-range transboundary air pollutants. Norway is working actively towards global reductions in the use and emissions of hazardous substances, and has in addition banned certain substances nationally.

Communication and outreach activities by the Ministry of Climate and Environment and other parts of the public administration are important tools for implementing the Strategic Plan 2011-2020 and Norway's own environmental targets. The Ministry of Education and Research has adopted and published a revised strategy for education for sustainable development for the period 2012–15. One of the main initiatives in the school sector is the "environmental rucksack" (*Den naturlige skolesekken*). This funds projects that make use of new methods and other learning arenas than the classroom, involve cooperation with local communities and promote sustainable development.

Environmental- and outdoor recreation organisations in Norway play an important part in raising awareness and spreading information on biodiversity, providing new ideas and running projects.

The Ministry of Local Government and Modernisation is responsible for providing a framework that will enable the Sami to further develop and strengthen their culture, language, way of life and economic activities. The Sámediggi (Sami parliament), together with the central government authorities, has initiated work on traditional knowledge as a means of implementing Article 8j of the CBD. The Árbiediehtu project on traditional knowledge and the international research project Community Adaptation and Vulnerability in Arctic Regions (CAVIAR) are examples of this.

Norway's ambition is to be at the forefront in developing ambitious, binding international cooperation on environmental issues. Norway has ratified a range of multilateral environmental agreements, and national implementation of these also contributes to achievement of the Aichi targets. They include the Ramsar Convention, the Bern Convention, the Bonn Convention, the Convention on Climate Change, the World Heritage Convention, the Convention to Combat Desertification, the OSPAR Convention, the Polar Bear Agreement, the European Landscape Convention, the North Atlantic Salmon Convention, the

International Treaty on Plant Genetic Resources for Food and Agriculture and the Protocol on Environmental Protection to the Antarctic Treaty.

Norway also actively engages in the work of the Commission on Genetic Resources for Food and Agriculture (CGRFA) of the UN Food and Agricultural Organisation and participates in the United Nations Forum on Forests and the Forest Europe process

Norway was the first developed country to ratify the Nagoya Protocol, on 1 October 2013. Regulations on traditional knowledge associated with genetic resources and on the access to and utilisation of genetic resources are being drawn up. In addition, work to establish effective checkpoints to monitor the utilisation of genetic material is under way, so that the protocol becomes fully operational in Norway.

Norway focuses on enhancing the knowledge base and strengthening the links between science and policy-making in its international cooperation. For example, Norway has been hosting the Trondheim Conferences on biodiversity every three or four years since 1993. They give policy makers, managers and scientists the opportunity to have an open and constructive dialogue and develop a transparent and scientifically sound basis for key issues being discussed under the CBD.

Norway has strongly supported the establishment of the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES). This has included involvement in developing the first work programme and providing financial support for its implementation. The Norwegian research community has been encouraged to take part in IPBES. Norway considers capacity building to be a key element of IPBES' work, and has therefore offered to host and finance a technical support unit for capacity building in Trondheim.

Norway and the EU cooperate in a number of areas of relevance to biodiversity, for example through the system of EEA and Norway Grants. Norway will provide roughly NOK 14 billion during the period 2009-2014 for projects in the 13 most recent EU member states plus Greece, Portugal and Spain. In all, 30 % of the funding allocated to each beneficiary country must go to environmental measures. There are specific projects on integrated marine and inland water management, biodiversity and ecosystem services, renewable energy, climate change adaptation, and cultural heritage and ecotourism.

Development cooperation is an important way for Norway to help developing countries build capacity to protect and sustainably manage their biodiversity. The Norwegian Government's International Climate and Forest Initiative is Norway's single most important contribution to safeguarding biodiversity in the tropics. The initiative's budget is around USD 500 million a year. The funding is used to support projects that improve conditions for the world's biodiversity both directly and indirectly.

Norway is now in the process of developing its new National Biodiversity Strategy and Action Plan (NBSAP) in order to implement its national targets and the corresponding Aichi targets, but at this stage it is difficult to assess how much progress will be made by 2020. In

addition, the progress that has been made varies from one target to another (see Part III of the report).

List of contents

Part I - An update on biodiversity status, trends, and pressures and implications for human well-being	17
1. Introduction	17
1.1. Biodiversity in Norway	17
1.2. Ecosystem services.....	17
2. Main pressures on biodiversity in Norway	19
2.1. Indirect drivers of change for Norwegian biodiversity	19
2.1.1. Population and demographic factors.....	19
2.1.2. Production, consumption, energy use and transport.....	20
2.1.3. Technological developments	20
2.2. Direct drivers of change for Norwegian biodiversity.....	21
2.2.1. Land conversion and land-use change.....	21
2.2.2. Climate change.....	21
2.2.3. Pollution	21
2.2.4. Invasive alien species	22
2.2.5. Harvesting	22
3. Status and trends for Norwegian ecosystems	23
3.1. Mapping and monitoring of biodiversity	23
3.1.1. Red lists	23
3.1.2. The Norwegian Nature Index.....	24
3.1.3. Water Management Regulations.....	27
3.2. Norway's main ecosystems.....	27
3.2.1. Open sea	27
3.2.2. Coastal waters.....	29
3.2.3. Freshwaters.....	31
3.2.4. Forest	34
3.2.5. Wetlands	35
3.2.6. Mountains	36
3.2.7. Arctic ecosystems.....	37
3.2.7.1. Arctic terrestrial ecosystems on Svalbard and Jan Mayen	37
3.2.7.2. Arctic coastal and marine ecosystems.....	38
3.2.8. Cultural landscape.....	39
3.2.8.1. Open lowland.....	39

3.2.8.2. Agricultural areas	40
3.2.9 Urban ecosystems (Norway's larger towns)	41
Part II: The national biodiversity strategy and action plan, its implementation and the mainstreaming of biodiversity	43
4. Environmental targets	43
5. Norwegian biodiversity policy and action plan – cross-sectoral responsibilities and coordination. 48	
5.1. Mapping and monitoring biodiversity as a basis for knowledge-based management.....	48
5.1.1. Mapping and monitoring	48
5.1.2. Research.....	50
5.1.3. Making information accessible	50
5.2. Legislative instruments	52
5.2.1. The Nature Diversity Act	52
5.2.2. The Nagoya Protocol and relevant national legislation	54
5.2.3. Register of environmental decisions.....	54
5.2.4. The Planning and Building Act	54
5.2.5. Regulations relating to environmental impact assessment.....	55
5.2.6. Strategic environmental assessment for offshore windpower	55
5.2.7. The Oslo Forest and Countryside Act.....	56
5.2.8. The Marine Resources Act	56
5.2.9 The Aquaculture Act	56
5.3. Economic instruments	56
5.4. New biodiversity strategy and action plan	58
6. Actions taken under each national priority area to implement the Convention	58
6.1. Mainstreaming biodiversity into relevant sectoral and cross-sectoral strategies, plans and programmes.....	58
6.2. Priority area 1 Living seas and coastal environments.....	58
6.2.1. Integrated management plans for Norway's sea areas.....	58
6.2.2. Marine protection areas	59
6.2.2.1 Management measures for marine and coastal waters around Svalbard and Jan Mayen	59
6.2.3. Fisheries management.....	59
6.2.4. Marine invasive alien species.....	60
6.2.5. Coral reefs and other vulnerable benthic ecosystems	61
6.2.6. Aquaculture management	61
6.2.7. Reducing the risks related to shipping and offshore oil and gas activities.....	62

6.2.8. International cooperation to protect marine areas.....	62
6.3. Priority area 2 Healthy lakes and rivers	63
6.3.1. Implementation of the Water Framework Directive	63
6.3.2. Integrated river basin management	63
6.3.3. Management of wild Atlantic salmon.....	64
6.3.4. Sustainable energy production	64
6.4. Priority area 3 Rich and varied wetlands	64
6.4.1. Wetland conservation.....	64
6.4.2. Maintaining the conservation value of protected wetlands	65
6.4.3. Restoration of wetlands.....	65
6.4.4. Knowledge and information about wetlands	65
6.5. Priority area 4 Forest diversity.....	65
6.5.1. Protection of forest biodiversity	65
6.5.2. Sustainable management of forests	66
6.5.3. Preventing the spread of alien organisms	66
6.5.4. Enhancing the knowledge base	67
6.5.5. Cooperation with the European Union on Forest Law Enforcement, Governance and Trade	67
6.6. Priority area 5 Spectacular mountain landscapes	68
6.6.1. New national parks and other protected areas.....	68
6.6.2. Safeguarding the value of protected areas.....	68
6.6.3. Local management.....	68
6.6.4. The value of protected areas to society	68
6.6.5. Land-use planning in mountain areas.....	69
6.6.6. Safeguarding areas without major infrastructure development.....	69
6.6.7. Managing individual species and selected habitat types in the mountains	69
6.6.8. Restoration.....	70
6.7. Priority area 6 A valuable cultural heritage	70
6.7.1. Cultural landscape.....	70
6.7.1.1. Protecting biodiversity in the cultural landscape	70
6.7.1.2. Genetic resources	72
6.7.1.3. Runoff from agriculture	72
6.8. Priority area 7 A good urban environment.....	73
6.8.1. Cities of the Future.....	73

6.8.2. The Groruddalen programme in Oslo	73
6.8.3. Nature close to home	74
6.9. Priority area 9 and 10 A non-toxic environment and clean air	74
6.9.1. Reductions in long-range transboundary air pollution	74
6.9.2. Hazardous substances	75
6.9.3. Contaminated soils and sediments	75
6.9.4. Waste	76
7. Information, public awareness and outreach activities	76
7.1. The International Year of Biodiversity	76
7.2. Activities in schools	77
7.3. Nature information centres	77
7.4. The man and nature heritage programme	77
7.5. The Buzzing garden campaign	78
7.3. Civil society	78
8. Traditional knowledge and biological diversity related to Sami use	79
8.1. The Árbiediehtu project	79
8.3. The CAVIAR approach: Sharing and integrating local indigenous knowledge and scientific knowledge	80
9. International cooperation	80
9.1. Science-policy interface	81
9.1.1. Trondheim Conferences	81
9.1.2. The Intergovernmental Platform on Biodiversity and Ecosystem Services	81
9.2. Cooperation in the High North	81
9.3. Cooperation with the EU	82
9.4. Norway's environmental development cooperation	82
9.4.1. Norwegian Government's International Climate and Forest Initiative	83
9.5. Quito dialogue	84
9.6. Wealth Accounting and the Valuation of Ecosystem Services (WAVES)	85
9.7. Trade and investment	85
Part III: Progress towards the 2020 Aichi Biodiversity Targets and contributions to the relevant 2015 Targets of the Millennium Development Goals	86
10. Implementation of the Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets	86
10.1. Aichi target 1	86
10.2. Aichi target 2	88

10.3. Aichi target 3	89
10.4. Aichi target 4	90
10.5. Aichi target 5	91
10.6. Aichi target 6	92
10.7. Aichi-mål 7	95
10.8. Aichi target 8	96
10.9. Aichi target 9	98
10.10. Aichi target 10	99
10.11. Aichi target 11	101
10.12. Aichi target 12	104
10.13. Aichi target 13	105
10.14. Aichi target 14	106
10.15. Aichi target 15	108
10.16 Aichi target 16	109
10.17. Aichi target 17	109
10.18. Aichi target 18	109
10.19. Aichi target 19	110
10.20 Aichi target 20	110
11. How actions to implement the Convention have contributed towards the achievement of the relevant 2015 targets of the Millennium Development Goals in Norway	111
12. Challenges and lessons learned from implementation of the convention, and remaining challenges	112
Appendix I - Information concerning the reporting Party and preparation of the fifth national report.	114
Appendix II - Further sources of information.	114

Part I - An update on biodiversity status, trends, and pressures and implications for human well-being

1. Introduction

The first part of this national report starts with an introduction to biodiversity in Norway and the values associated with biodiversity. It then presents the main pressures on biodiversity in Norway, and concludes with a review of the status and trends for biodiversity.

1.1. Biodiversity in Norway

Norwegian nature is very varied, with striking differences between the landscapes, habitat types and plant and animal species found in different parts of the country. Such wide variation over relatively short distances is rare not only in the Nordic region, but also globally (Moen 1998). The cold climate in the northern parts of the country makes for difficult living conditions, and species that are found here are well-adapted to low temperatures, a short growing season and a damp climate.

About 40 000 species of multicellular organisms have been recorded in Norway, and it is estimated that there are 55 000 species in all. The most species-rich terrestrial taxon is the insects, about 16 000 species of which have been recorded in Norway (Aagaard 2011). In global terms, species diversity in Norway is low, but there are exceptions. Mosses and lichens are well adapted to a damp climate and low evaporation rate, and 6–10 % of all the world's species are found in Norway (Moen 1998). There are 50 European species of *Sphagnum* moss, 47 of which occur in Norway. Bumble bees (*Bombus*) are also well adapted to a cold climate, and 14 % of all the world's species (34 of 250 species) have been recorded in Norway (Ødegård et al. 2009).

There is a wide diversity of terrestrial habitat types in Norway, ranging from beech (*Fagus sylvatica*) forest in the south to Arctic habitats in the north, and from wet coastal habitats to dry inland areas. Marine habitats range from warm land-locked pools in the south, which were traditionally used for oyster farming, to cold waters and fjords in the far north that support Arctic species. Norway's sea areas are very much larger than its land territory, and contain a high species diversity. They stretch from the temperate waters of the central North Sea to the Arctic Ocean, and from shallow bank areas down to deep sea areas at depths of 4 000–5 000 metres. In the Northeast Atlantic, 12 270 different species have been recorded, of which 9 % are fish. The rest is to a large extent undescribed invertebrate species. The sea floor mapping programme MAREANO records new species, mainly in the target areas of the Barents Sea and north-eastern shelf of the Norwegian sea every year.

1.2. Ecosystem services

The rich diversity of living organisms is the basis for our existence, for economic growth and for the quality of people's lives and their wellbeing. Norway's biodiversity provides the

foundation for a wide range of ecosystem services, which are of vital importance for human well-being and socio-economic development.

The overall value of ecosystem services is very large and many of them are irreplaceable. It is therefore of crucial importance to promote public awareness of both the breadth and scale of their value. Certain species play a key role in ecosystems and thus for the ecosystem services they provide, for example *Calanus finmarchicus* (Figure 1 and Box 1). For a further treatment of ecosystem services we refer to the Official Norwegian Report (NOU 2013:10) on the values related to ecosystem services in Norway, the TEEB study on Nordic ecosystem services (Kettunen et al. 2012), and reports published as contributions to NOU 2013:10, e.g. on wild salmon and aquaculture (Van der Meeren 2013), urban ecosystem services (Lindhjem and Sørheim 2012), the plant genetic resources of wild flora, Norwegian impact on ecosystems abroad (Reinvang and Vennemo 2013) and the value of ecosystem services from forests (Lindhjem and Magnussen 2012)). Reports have also recently been published on ecosystem services from Norway's sea areas (Magnussen et al. 2010; 2012; 2013), on ecosystem services from deep seas (Armstrong et al. 2012), on the potential of Norwegian ecosystems for climate mitigation and adaptation (Rusch 2012) and on ecosystem services from Nordic river systems (Barton et al. 2012).



Figure 1: Three species of copepods that play key roles in Norway's marine ecosystems. *Calanus finmarchicus* (the smallest) is perhaps the most important species in Norway. Climate change is having impacts on all three species. Photo: Janne Søreide

Box 1 *Calanus finmarchicus* – a key species

Phytoplankton form the basis for all marine life, and the oceans contain a far greater biomass of phytoplankton than of fish. They are heavily grazed by zooplankton, including the copepod *Calanus finmarchicus*, which has been called Norway's most important species and is probably the most abundant species anywhere in the world. It is a key species in the ecosystem, providing food for fish such as herring and capelin and larvae of many fish species, which in turn are eaten by larger fish such as cod. Fish are preyed on by seabirds, seals and whales. Right at the top of this trophic pyramid we find polar bears – and humans.

The rise in sea temperature appears to be accompanied by a change in the North Sea, where the smaller, late-summer spawning *Calanus helgolandicus* seems to replace the *Calanus finmarchicus* as the dominant species. *C. Finmarchicus* is also to some extent extending its range northwards into the warming Barents Sea, where it is replacing other, larger species. There is concern if this will have major impacts on the entire marine ecosystem and important marine ecosystem services.

Source: Institute of Marine Research⁷ 2014, Solhaug 2010 og Frederiksen et al. 2013.

2. Main pressures on biodiversity in Norway

This chapter presents central indirect and direct drivers of change for biodiversity in Norway. The importance of the drivers for specific ecosystems is described in chapter 3 on status and trends in Norwegian ecosystems. Together these chapters outline some impacts of changes in biodiversity on ecosystem services, their socio-economic and cultural implications, and possible future changes in biodiversity. Further information on the different direct drivers of change and their mechanisms of action can be found in Kålås et al. 2010a.

2.1. Indirect drivers of change for Norwegian biodiversity

Demographic change, changes in economic activity and growing prosperity, technological change and various cultural and sociopolitical factors have been identified as the main indirect drivers of change globally (e.g. MA 2005a, b and c, CBD 2010 and UNEP 2012). Some indirect drivers that are resulting in growing pressure on Norwegian ecosystems and their capacity to deliver ecosystem services are presented below.

2.1.1. Population and demographic factors

Norway's population has grown from 2 million in 1890 to 3 million in 1942 and 5 million in 2012. Growth is expected to continue, with the population reaching about 6 million in 2030 and 6.9 million in 2060. However, there is considerable uncertainty associated with these estimates. Population growth will result in an increase in production and consumption, but the effects on Norwegian ecosystems will depend on the rate and composition of growth. *Urbanisation* is another key process, and the trend towards a more and more centralised population distribution is expected to continue.

Population growth in Norway will increase demand for services delivered by ecosystems both in Norway and in other countries. A larger urban population will in addition put more

⁷ Institute of Marine Research, 2013. website:
http://www.imr.no/filarkiv/2014/03/havforskningsrapporten_2014_web.pdf/nn-no

pressure on land in towns and built-up areas, and is expected to increase the demand for ecosystem services that are important for a more urbanised population, like clean water and air and access to nature/green areas (see also section 3.2.9.).

2.1.2. Production, consumption, energy use and transport

The impacts of economic growth and a rising population on the environment and ecosystems depend among other things on how goods and services are produced and on the scale and structure of production and consumption. As incomes and standards of living have risen, consumption in Norway has shifted towards a larger proportion of services and a smaller proportion of goods. However, both production of goods and services have environmental impacts, in some cases both on ecosystems and directly on human health (hazardous chemicals, for example). Three broad categories of household consumption in Norway have particularly large environmental impacts – housing, food and transport. International trends, for example in market prices, have a considerable influence on Norwegian production patterns.

Industries and sectors that have particularly strong impacts on specific ecosystems are discussed in the sections on the relevant ecosystems. Two sectors, energy and transport, stand out as having impacts on many different ecosystems. However, energy use, and therefore emissions from energy use, is falling relative to value creation, partly as a result of technological developments. For the energy sector, the ecosystems where impacts are greatest and the types of impact will be determined by the mix of energy use and production.

The construction of roads, railways and airports in undeveloped areas results in the loss and degradation of habitats for plants and animals. It is not only the areas covered by such structures that are affected – other impacts include habitat fragmentation, noise, pollution and the spread of alien species. Maritime transport provides a pathway for the spread of alien organisms, either in ballast water or attached to ships' hulls. This is largely a problem in connection with international shipping, particularly long-distance routes. The transport sector accounts for about 33 % of Norway' greenhouse gas emissions.

The *primary industries* – agriculture, forestry, fisheries and aquaculture –also have impact on natural ecosystems. This is further discussed in the sections on the various direct drivers of change for biodiversity.

Norway has so far not succeeded in a full decoupling of growth in waste generation from general economic growth (BNP). However, waste recovery rates are satisfactory and above target, and emissions from waste treatment are going down. Around 95% of hazardous waste is collected and taken proper care of. Waste generation and handling is therefore not seen as any imminent threat to biodiversity, although some waste categories still need close attention and may merit further development of policy measures.

2.1.3. Technological developments

In general, technological developments have improved resource efficiency in the Norwegian economy and reduced various forms of emissions per unit of production. Moreover, technological developments often result in new solutions that meet human needs and can replace or reduce the use of more environmentally harmful solutions. However, there are also

many instances where new technology in practice adds to pressure on the environment, either because the technology in itself has environmental impacts or because it results in an increase in the production of goods and services that have adverse impacts.

2.2. Direct drivers of change for Norwegian biodiversity

Land conversion and land-use change, climate change, invasive alien species, harvesting and pollution have been identified as the most important direct drivers for biodiversity loss and ecosystem degradation. The following sections present status and trends for these drivers.

2.2.1. Land conversion and land-use change

The impacts of earlier and present-day human activities on species' habitats are the most important factor in Norway influencing the risk of species going extinct. This factor affects 87 % of the 3682 threatened and near-threatened species on the 2010 Norwegian Red List. Of these, 2061 are thought to be negatively affected by land-use change such as housing and infrastructure development. A further 1406 are affected by forestry activities, and 661 by land-use change in agricultural areas (arable land, including sown grassland, meadows and pastures), which include changes in farming practices and the abandonment of farmland. Even apparently minor changes may have a considerable overall impact over time if there are a number of changes in the same area, for example leading to habitat fragmentation. Further details are given below under the presentation of each of the major ecosystems.

2.2.2. Climate change

In the long term, climate change will be an important driver of change for Norwegian marine, terrestrial and freshwater ecosystems. For some ecosystems, in particular in the Arctic parts of Norway, climate change already is the strongest driver of change. According to the 2012 white paper *Norwegian Climate Policy*, (Meld. St. 21 (2011–2012)), the annual mean temperature in Norway is estimated to rise by 2.3–4.6 °C towards the end of the century relative to the value for the normal period 1961–90. Climatic changes of this magnitude and pace is likely to drive ecological transformations of a scale unprecedented since the end of the last ice age, bringing a wide range of species and ecosystems at risk. The temperature rise and climate change are expected to be most dominant in the Arctic, and is by far the most serious threat to biodiversity in the Arctic part of Norway, but will induce large scale shifts in the distribution of ecosystems and species through all Norwegian land- and sea-areas, with the risk of severe range reductions and possible extinctions. Emissions of CO₂ is also increasing the CO₂ concentration in seawater, which in turn leads to ocean acidification, adding to the risk of severe impacts on marine biodiversity, in particular in Arctic waters. These and other impacts of climate change are further described in Chapter 3 on status and trends for Norwegian ecosystems. The Official Norwegian Report NOU 2010:10 and the white paper nr. 33 (Meld. St. 33 (2012-2013)) gives an account of the impacts of climate change on Norwegian ecosystems. It is further referred to Norway's sixth National Communication under the Framework Convention on Climate Change regarding national circumstances, policies and measures related to climate change under the Framework Convention on Climate Change (UNFCCC) (KLD, 2014).

2.2.3. Pollution

In recent decades, a variety of measures have been taken to control releases of polluting substances to the environment, but pollution is still a serious threat to biodiversity in affected areas. Acid rain and nitrogen pollution have particularly serious effects on ecosystems in the south-western part of Norway. Emissions of hazardous substances and phosphorus may also seriously affect ecosystems, and yet other pollutants give rise to climate change. Several of the indirect drivers discussed above also influence pollution levels.

Acidifying substances may be transported over long distances, and about 90 % per cent of acid deposition in Norway originates from other European countries. In Norway, freshwater ecosystems are most sensitive to acidification. Despite improvements in the past 10–15 years, critical loads for acidification of freshwater are still being exceeded in about 10 % of the country.

Excessive inputs of nutrients, causing eutrophication, is still a substantial problem. The largest inputs come from agriculture, municipal waste water and industry.

Hazardous substances⁸ in Norwegian ecosystems may originate from national sources, imported goods or long-range transport of pollutants. The information available on hazardous substances in Norway largely concerns pollution levels, and for many of the chemical substances in the European market there is only limited knowledge of potential harmful effects on the environment (or on human health). The current pollution situation is complex, both because new substances are constantly being introduced and because there are so many different pollution sources. Understanding of interactions (cocktail effects) of the many substances in our environment is inadequate and needs further study. International regulation, cooperation and research is critical to improving the situation.

2.2.4. Invasive alien species

Globally alien species are recognised as one of the most severe threats towards biodiversity. According to the Norwegian Red List for Species, alien species are thought to pose little threat for threatened or near threatened species in Norway (<1%). However, an investigation of the threat status towards Norwegian protected areas revealed that invasive alien species are judged as a direct threat in over 30% of the protected areas (Riksrevisjonen 2006), suggesting that the effect may not have yet manifested itself at the species level, but also that the knowledge about invasive alien species in Norway is still under development. Further, the ecological risk assessment undertaken by the Norwegian Biodiversity Information Centre (NBIC) in 2012, points out that monitoring need to be improved considerably in order to get a clearer picture of the current state (Gederaas et al. 2012).

There has been growing concern about alien species in recent years, both because of their adverse impacts on ecosystems and because of the economic costs. For example, in 2006 it was estimated that the salmon parasite *Gyrodactylus salaris* in Norwegian river systems was causing annual losses of the order of NOK 242 million. The publication *Alien species in Norway – with the Norwegian Black List 2012* presents more information on alien species and ecological risk assessments of a wide range of species (Gederaas et al. 2012). In all, 1880 species that reproduce in Norway were assessed, and of these, 106 were assigned to the “severe impact” category and 111 to the “high impact” category. The vast majority of alien species in Norway have entered the country by unintentional introduction: “hitchhikers” on imported plants make up more than one third of the total. Shipping, including ballast water discharges, and imports of timber are also important pathways of introduction. Various types of horticultural and park and garden design and maintenance activities is the largest source of deliberate introductions of alien species.

2.2.5. Harvesting

Norway has a long tradition of harvesting natural resources, both on land and at sea. It is an important principle that hunting and other forms of harvesting should only take the surplus production from a species or ecosystem. The impacts of harvesting on ecosystems depend on

⁸ ”Hazardous substances” are to be understood as chemical compounds that have persistent, bioaccumulative and toxic properties.

how it is carried out as well as on how much is harvested. No species are threatened as a consequence of harvesting, but some are yetare negatively affected. Harvesting and use are discussed below for the ecosystems where different types of use of biological resources are particularly relevant.

3. Status and trends for Norwegian ecosystems

This chapter presents biodiversity status and trends for Norway's major ecosystems, using the categories open sea, coastal waters, freshwaters, forests, wetlands, mountains, arctic ecosystems, cultural landscape and urban ecosystems. The status of habitats used by particular species or specific ecosystem services may depend on trends in several ecosystems. The knowledge base on Norwegian biodiversity has been significantly strengthened since the previous national report. It was therefore considered appropriate to assess trends for a wider time frame than the period from 2009. The time frame is indicated in each case. The state of an ecosystem determines which ecosystem services it can deliver and the quality of these services. Overall, the state of Norwegian ecosystems is relatively good, but there are many different pressures on Norway's biodiversity. This chapter gives a brief presentation of different types of mapping and monitoring in Norway as background for the data presented under each of the major ecosystems.

3.1. Mapping and monitoring of biodiversity

Mapping and monitoring programmes for biodiversity in Norway are performed by the universities, a number of university colleges and research institutes, and also by amateurs. Since the establishment of the Norwegian Biodiversity Information Centre in 2005, information on Norwegian biodiversity has been systematically organised and made much more readily available than before (see also section 5.1.).

Biodiversity monitoring is conducted in all Norwegian major ecosystems: seas and coastal waters, rivers and lakes, wetlands, forests, open lowland⁹ and mountains. Many of the monitoring programmes have been in progress for several decades, so that long time series are available.

3.1.1. Red lists

Red lists present assessments of the risk that species will become extinct or ecosystems or habitat types disappear. The Norwegian red lists are published by the Norwegian Biodiversity Information Centre and have been drawn up in collaboration with key experts. The *2010 Norwegian Red List for Species* (Kålås et al. 2010b) shows that the largest numbers of threatened species are found in forest and semi-natural grasslands while the *Norwegian Red List for Ecosystems and Habitat Types* (Lindgaard and Henriksen 2011) lists the largest numbers of threatened habitat types in forest and wetland ecosystems. Several semi-natural habitat types were combined and given an overall threat assessment in this first edition of the red list for ecosystems and habitat types. Thus, Table 1 does not provide the same level of detail for all ecosystems.

⁹ Open lowland consists mainly of semi-natural habitats, that is formerly cultivated meadows and coastal heathlands that are dependent on management such as grazing, heather burning or haymaking.

3.1.2. The Norwegian Nature Index

The Nature Index (see Box 2) documents overall trends for biodiversity in Norway. Table 1 shows the state and trends for biodiversity in different ecosystems, based on the Nature Index values calculated for the following major ecosystems: open sea, coastal waters, freshwater, wetlands, mountains, forest and open lowland. The open sea and coastal waters show a clear positive trend, with an average 10 % rise in Nature Index values from 1990 to 2012. The Nature Index value for open lowland declined by 16 % in the same period, while wetlands showed an 8 % decline. There was a weakly negative trend for mountains and freshwaters and a weakly positive trend for forests. Due to challenges concerning calculating the reference state in certain ecosystems, direct comparison between ecosystems should be avoided.

Box 2: The Norwegian Nature Index

The Nature Index gives an overall picture of the state of Norwegian nature and of trends over time. It is based on international methodology for biodiversity indexes, but with a considerable amount of further development. Norway was the first country to introduce an official biodiversity index. In the Nature Index, values are calculated for the state of biodiversity in major ecosystems relative to a reference state (see Table 1). For each ecosystem, a set of indicators has been chosen, for example data on populations of selected species. These are selected to be representative of the different ecosystems, and include both common and rare species and a range of species groups. By using many different indicators, it is possible to provide a picture of the state of biodiversity in each ecosystem and for Norwegian nature as a whole. The Nature Index uses 309 indicators split between nine major ecosystems.

The value for each indicator is between 1 and 0. The reference state is given the value 1, and approximates to the natural state, with no negative impacts of human activity. The value 0 means that the state is very poor (for example, a species may be extinct in that area). By combining the values of all indicators associated with a particular ecosystem, it is possible to obtain an average value for the state of biodiversity in that ecosystem.

Even if Nature Index values show a positive trend or no change in an ecosystem, there may be properties that are not revealed by the aggregated data. Steps are therefore being taken to obtain detailed information on trends for individual species and vulnerable areas as a supplement to information from the Nature Index. There have been difficulties in collecting adequate data for many of the ecosystems, which adds to the uncertainty of the calculations. Nevertheless, this is the most extensive compilation of information on Norway's biodiversity that has been produced. Due to challenges concerning calculating the reference state in the exact similar way in different ecosystems, direct comparison between ecosystems should be avoided. Work is continuing to improve the methodology and indicators used in the Nature Index.

Table 1: Norway's major ecosystems: area, state and trends.

Ecosystem ¹⁰	Area (km ²) (% of Norway's land area) ¹¹	Nature Index value in 2010 ¹² (95 % confidence interval)	Trend 1990–2010	No. of threatened and near-threatened species	No. of threatened and near-threatened habitat types
Open sea	875 995	0.75 (0.65-0.83) (seabed) 0.71 (0.65-0.76) (pelagic)	↗	87 ¹³	5
Coastal waters	89 091	0.73 (0.69-0.76) (seabed) 0.66 (0.49-0.71) (pelagic)	→		9 ¹⁴
Freshwater	19 620 (6.0 %)	0.73 (0.68-0.76)	↗	267	7
Forest	120 746 (37.3 %)	0.40 (0.38-0.43)	→	1838	18
Wetlands	17 000 (5.3 %)	0.53 (0.51-0.57)	→	443	15
Mountains	118 740 (36.7 %)	0.63 (0.57-0.69)	→	158 ¹⁵	
Open lowland	29 080 (9.0 %)	0.40 (0.36-0.44)	↘	741	3 ¹⁶

Source unless otherwise specified in the footnotes: Nybø (2010).

Figure 2 shows regional variation in Nature Index values for the different major ecosystems. The text below gives further information on the state of each of the major ecosystems and on which direct drivers of change or pressures to biodiversity tend to depress the Nature Index values for the different ecosystems. The state of ecosystems that are not included in the

¹⁰ Due to challenges concerning the calculation of the reference state in certain ecosystems, a direct comparison between ecosystems should be avoided

The areas of different ecosystems are based on figures from Statistics Norway. Mountain areas were defined as those above the treeline and open lowland as traditional semi-natural vegetation types such as open grassland in the lowlands, boreal heaths and meadows around summer farms, coastal heaths and naturally open areas below the treeline (Blumentrath and Hanssen 2010) Open sea extends to the boundary of the Economic Zone of Norway (i.e. 200 nautical miles from the baseline).

¹² Updated Nature Index figures have been calculated for 2012

¹³ Figure for open sea and coastal waters combined.

¹⁴ The figure includes shallow marine waters and the littoral zone. ¹⁵ Austrheim et al. (2010)

¹⁵ Austrheim et al. (2010)

¹⁶ Assessed at a less detailed level than habitat types in other main ecosystems¹⁷ Substances that are hazardous to health and the environment, in particular priority substances that are persistent, bioaccumulative and toxic.

Nature Index – Arctic ecosystems, agricultural areas and green spaces in towns (urban ecosystems) is also discussed.

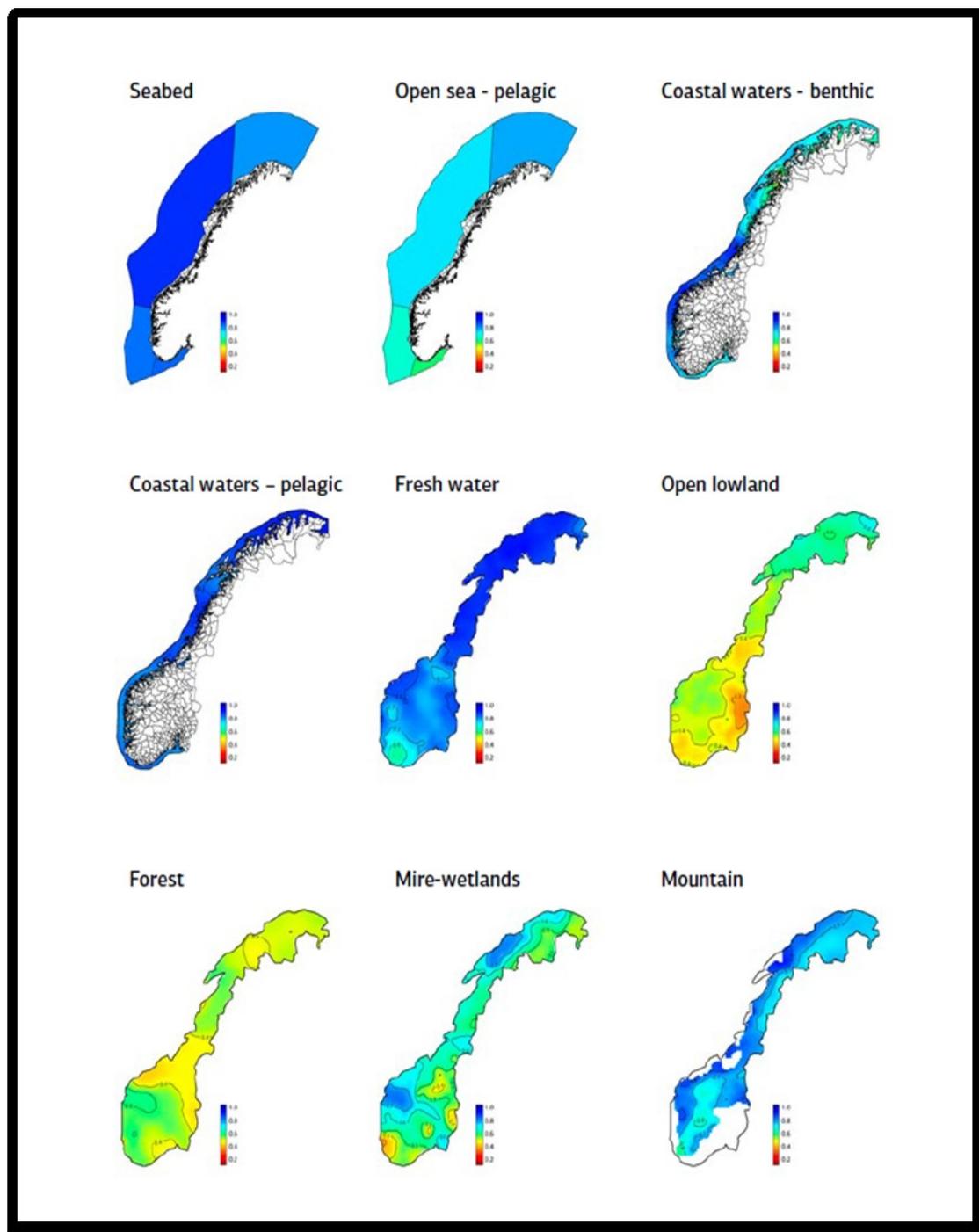


Figure 2: State of biodiversity for major Norwegian ecosystems in 2010, as measured by the Nature Index. The scale runs from dark blue (high Nature Index values, 0.8–1) to red (low values, 0–0.2). Updated values were calculated in 2013 using a revised indicator set, but this gave only small changes in the results. Source: Nybø, S., Certain, G. & Skarpaas, O. 2011

3.1.3. Water Management Regulations

Assessments of the ecological status of inland waters (freshwaters) and coastal waters are also required under Norway's Water Management Regulations, which incorporate the EU Water Framework Directive into Norwegian law. These assessments use only a few biological indicators, supported by some chemical parameters, and the methodology is different from that used in the Nature Index.

3.2. Norway's main ecosystems

3.2.1. Open sea

The sea areas under Norway's jurisdiction are about six times larger than its land territory. The Norwegian territorial sea (which extends from the baseline to the territorial limit, 12 nautical miles seaward of the baseline) covers an area of 115 000 km². In addition, Norway's economic zone (from the territorial limit to the 200-nautical-mile limit) covers 870 000 km² of sea, and there is a further 715 000 km² in the fisheries protection zone around Svalbard and 290 000 km² in the fisheries zone around Jan Mayen. The assessment below deals with the Norwegian sea areas delimited for management purposes (the Barents Sea–Lofoten area; the Norwegian Sea; and the North Sea and Skagerrak, see figure 3) and discusses pelagic and seabed ecosystems in the open sea (following the Nature Index system of major ecosystems).

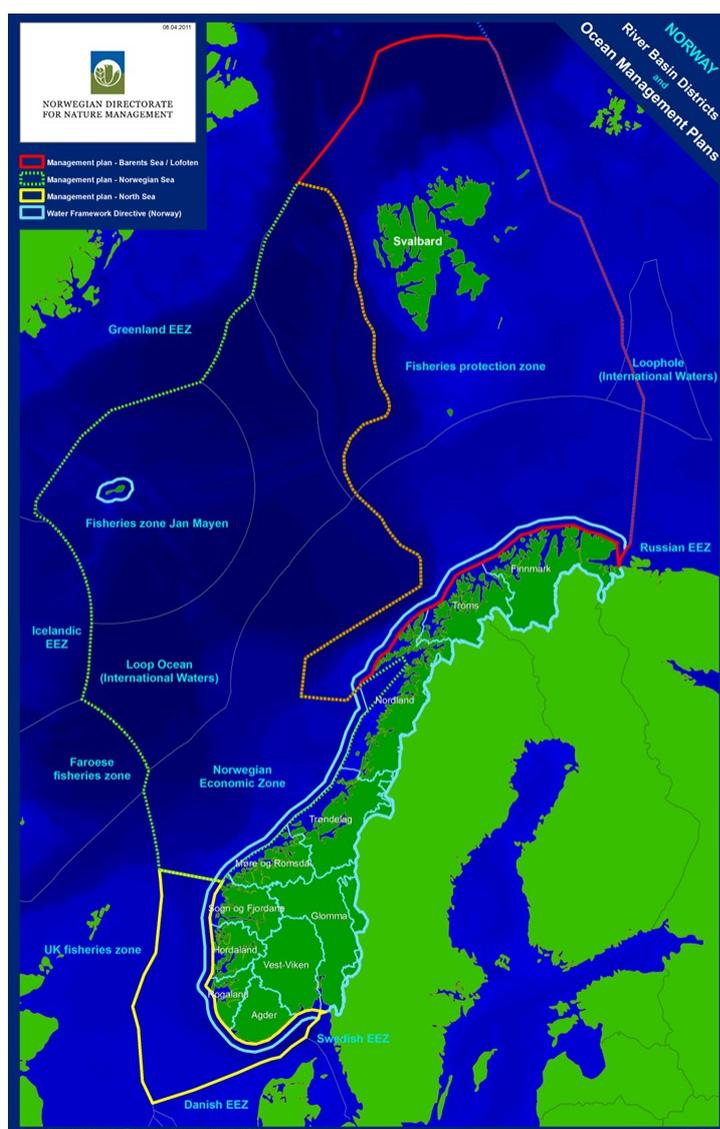


Figure 3: Norwegian maritime boundaries for ocean management plans (Source: Norwegian Environmental Agency).

The state of the Barents Sea–Lofoten area and the Norwegian Sea is considered to be generally good, except for certain fish stocks and seabird populations, whereas there are clear negative impacts of human activity in the North Sea and Skagerrak. In all, 87 species are red-listed as threatened or near-threatened in Norway's sea areas, of which 11 are considered naturally rare (Kålås et al. 2010b). The situation is most serious for breeding seabirds and other birds that are more or less closely associated with the marine environment: 25 % of these species (13 of 52 species) are threatened or near-threatened. Five habitat types in marine deep sea areas have been red-listed. The best-known habitat type – cold-water coral reefs – is classified as vulnerable (Lindgaard and Henriksen 2011). The Nature Index value for seabed for all sea areas combined rose by 10 % from 1990 to 2010. This improvement is partly explained by a doubling of demersal fish stocks from the late 1980s to 2010 (Directorate of Fisheries 2013). Historically, over-exploitation has been the strongest direct human pressure on marine ecosystems. This affects commercial species most strongly, but has ecological domino effects as well. The fisheries also have impacts on the marine environment through bycatches and bottom trawling. A more restrictive management regime was introduced for coastal cod in 2003/04. From 2006, better control of illegal fishing was achieved through more closely targeted inspection and control. Norway introduced a general ban on discards of cod (*Gadus morhua*) and haddock (*Melanogrammus aeglefinus*) in 1987. The duty to land catches was extended when the Marine Resources Act, entered into force in 2009; this is important in reducing the discard problem and promoting sound resource utilisation (see also 6.2.). Oil spills and releases of hazardous substances also have negative environmental impacts in the marine environment. Generally, levels of "traditional" hazardous substances are declining. However, a wide range of new man-made hazardous substances are found in worrying levels, especially in some species at higher trophic levels. With higher sea temperatures, various species are being observed further north than previously. A number of changes in the quantity and composition of zooplankton have been recorded in the past 25 years, and these are probably explained by higher seawater temperatures. Climate change is contributing to increased CO₂ concentrations in the seawater, which in turn causes ocean acidification. This may have serious impacts on marine ecosystems, particularly for species that build calcium carbonate shells and other structures. Further information on possible effects of sea acidification is at the present a prioritised research topic. Alien species such as the red king crab (*Paralithodes camtschatica*) have impacts on the composition of communities of native species and on species numbers. Recruitment to some fish stocks is still low: this may be a result of natural environmental fluctuations, but could also be related to climate change. However, most of the important fish stocks in Norwegian waters are abundant and in good condition. Nature Index values for pelagic open sea areas were moderate to high in 2010 (see Table 1). This is largely explained by the increase in commercial fish stocks such as the Northeast arctic cod in the Barents Sea and spawning stock of North Sea herring. It is estimated that pelagic fish stocks have tripled in size since the late 1980s. Figure 4 shows the development of spawning stock biomass for key pelagic fish stocks in Norwegian waters in the period 1985–2012, using pooled figures for capelin (*Mallotus villosus*) in the Barents Sea, mackerel (*Scomber scombrus*), Norwegian spring-spawning herring and North Sea herring (both *Clupea harengus*) and blue whiting (*Micromesistius poutassou*). Figure 5 shows the development of key demersal fish stocks in the same period, using pooled figures for cod, haddock, saithe (*Pollachius virens*) and Greenland halibut (*Reinhardtius hippoglossoides*).

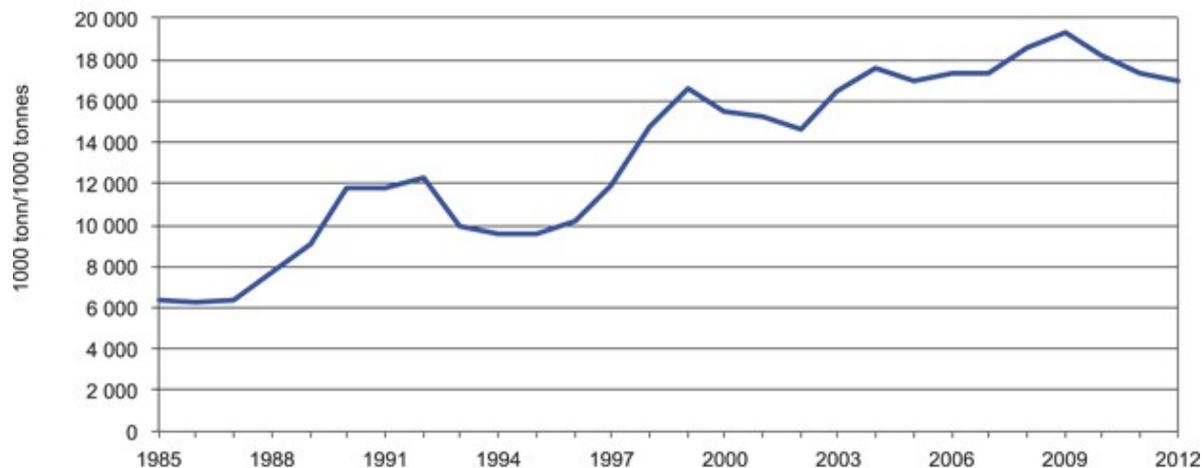


Figure 4: Total spawning stock biomass of key Norwegian pelagic fish stocks, 1985–2012.

Source: Directorate of Fisheries (2013)

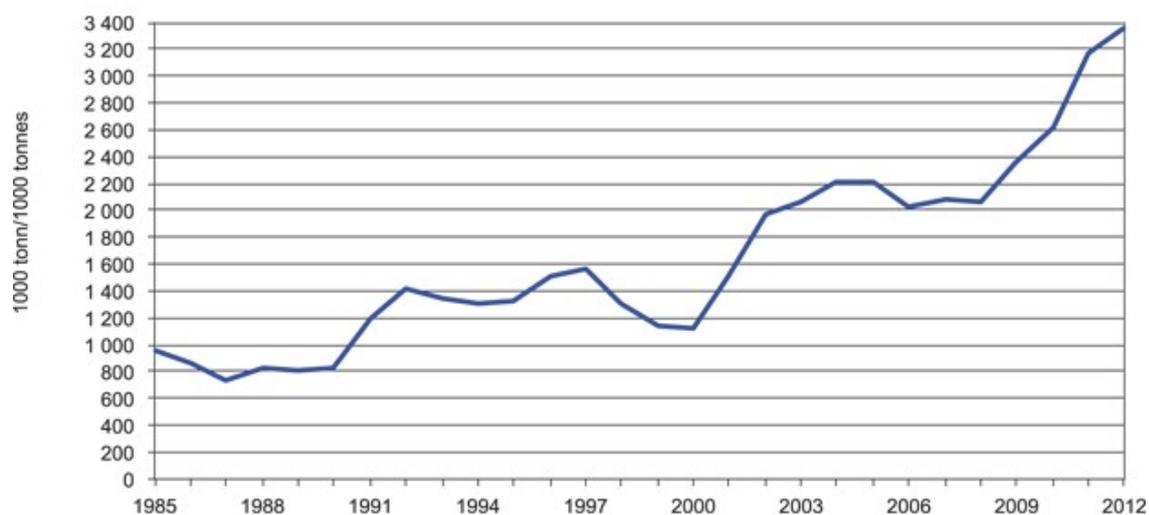


Figure 5: Total spawning stock biomass of key Norwegian demersal fish stocks, 1985–2012.

Source: Directorate of Fisheries (2013)

Overall, the Nature Index values for pelagic and seabed ecosystems in the open sea have risen in period 1990-2010. However, populations of common guillemot (*Uria aalge*) and kittiwake (*Rissa tridactyla*) have declined steeply in the past 30–40 years and their numbers are now less than 30 % of what they were in the early 1980s. Poorer food supplies are believed to be an important reason for this decline.

3.2.2. Coastal waters

Norway's coastal waters (or internal waters) cover an area of 89 091 km², from the heads of the fjords out to the baseline (see Table 1). These waters include a wide range of habitat types from the littoral zone to very deep water (as much as 1 300 m in the Sognefjorden). Coastal waters are generally shallow, but with wide variations in topography, depth and bottom types. There are no reliable data on the number of species in coastal waters, but estimates suggest around 10 000 species (Brattegard and Holte 2001). In all, 150 fish species have been observed in Norwegian coastal waters, and around 60 bird species and about 10 mammals

(seals, whales, otter (*Lutra lutra*) and American mink (*Neovison vison*)) are associated more or less strongly with coastal waters (Oug et al. 2010).

The state of coastal waters is very variable, and kelp forests and coastal cod stocks are depleted in some areas. The Nature Index value for the pelagic ecosystem in coastal waters was moderate (0.66, see Table 1) for the country as a whole in 2010. However, the index for this ecosystem is based on only 32 indicators. Three key elements – zooplankton, phytoplankton and herring – account for about half the overall score for this ecosystem, while seabirds account for about 14 %. The skewed set of indicators reflects the fact that we lack good time series for many groups of organisms. Furthermore, the Nature Index mainly reflects ecosystem status in outer coastal waters rather than the inner parts of the fjords, where there are few indicators available that provide sufficiently good data. The indicators that have been selected show that for the country as a whole, the state of the pelagic ecosystem in coastal waters has been stable from 2010 to 2012.

About three-quarters of all species in coastal waters are associated with benthic habitats. The overall Nature Index value for the seabed ecosystem of coastal waters was relatively high in 2010 (0.73, see Table 1). The index for this ecosystem is based on 45 indicators including sessile algae, vascular plants (dwarf spike-rush (*Eleocharis parvula*) and eelgrass (*Zostera marina*)), anthozoans, molluscs, crustaceans, sea urchins, fish, seabirds and marine mammals. As for the other marine nature indexes, the set of indicators are skewed towards vertebrates and fish are the group that is best represented also for coastal waters, with 19 indicators. The state of coastal cod and European eel (*Anguilla anguilla*) is poor to very poor, while the lobster (*Homarus gammarus*) stock is growing slowly (see box 3) and numbers of halibut (*Hippoglossus hippoglossus*) have risen in North Norway (Dahl 2013).

Box 3: Closure of areas to lobster and cod fisheries

There are now four lobster protection areas in Aust-Agder, Vestfold and Østfold where no lobster trapping is permitted and there are strict restrictions on the gear that may be used to fish cod (rod and handline only). The purpose is to see what effect such closures have on resources – in this case stocks of lobster and coastal cod. A fifth area in Aust-Agder is closed for all fisheries to protect the local coastal cod stock. This approach has not previously been tried so far north. Research shows that there has been a positive impact for both species. Numbers have increased, individuals have grown larger, and there have been spillover effects on the ecosystem outside the closed areas.

For Norway as a whole, the state of the coastal seabed ecosystem showed a slight improvement from 2010 to 2012. From Trøndelag northwards, the status of the kelp species *Laminaria hyperborea* has a particularly market negative effect on the Nature Index. This species has been heavily overgrazed by sea urchins along stretches of the coastline that are protected from wave action. *L. hyperborea* kelp forests provide a habitat for a wide variety of small animals and sessile algae and are expected to offer an important nursery area for coastal fish species (Oug et al. 2010). The kelp forests are recovering in Central Norway in areas that have been severely overgrazed. At the beginning of 2013, kelp forests were generally in good condition from Rogaland to Nord-Trøndelag, and the situation was improving in Nordland (Dahl 2013).

Ecosystem status in some waters closer to the shore and in fjords can differ quite markedly from the general picture. Locally, inputs of hazardous substances and other pollutants from heavy industry, smelters and mining over many years have had severe impacts on the seabed ecosystem. In parts of many fjords, hazardous substances accumulated in the sediments over time are being released through disturbances, plant uptake and feeding, and may pose a threat to biodiversity. Priority areas with polluted sediments are in process for remediation – primarily through capping and dredging. Eutrophication due to excessive nutrients is a challenge in some coastal- and fjord areas. Eutrophication in coastal and fjord areas may occur as a result of runoff from agricultural areas, industrial and municipal wastewater, and also discharges of nutrients from fish farming. In addition nutrients are transported to the Norwegian coast with ocean currents. Early in the 2000s, sugar kelp (*Saccharina latissima*) forests almost disappeared along parts of the Norwegian coast, and were replaced by dense mats of turf algae. It is believed that this loss was caused by a combination of inputs of nutrients and particulate matter from land and some summers with unusually high water temperatures. With the disappearance of the kelp forests, many other species lost both food supplies and shelter. In 2013, the situation had improved although it is still unstable, and sugar kelp forests have been red-listed in several areas (Lindgaard and Henriksen 2011).

In all, 164 species in coastal waters and the littoral zone have been red-listed as threatened or near-threatened (Kålås et al. 2010b). Information on population trends and the causes of population increase or decline are only available for a small number of these.

The information on pressures on marine species given in the 2010 Norwegian Red List for Species indicates that habitat destruction is the most widespread threat, followed by pollution and harvesting. Threats to habitats and the impacts of pollution are important for algae and many invertebrates in coastal waters. The proportion of species in Norway classified as threatened or near-threatened is considerably lower for marine species than for terrestrial and freshwater species, whereas the proportion classified as “data deficient” is considerably higher for marine species. Aquaculture is an important factor in coastal waters and fjords, and can have environmental impacts through the escape of farmed salmon and the transmission of salmon lice, discharges of nutrients, organic matter and chemicals, and because fish farms and other aquaculture facilities occupy areas where they may come into conflict with other interests (Office of the Auditor General, 2012). Increasing numbers of alien species appear to be spreading to Norwegian coastal waters. According to the most recent ecological risk assessments of alien species in Norway (Gederaas et al. 2012), 16 established sessile algae and invertebrates in coastal waters are considered to pose a high or very high risk of ecological effects.

3.2.3. Freshwaters

Norway's rivers and lakes provide a rich and varied freshwater environment, covering a total area of 19 620 km² (Table 1). Norway's freshwater bodies are generally very nutrient-poor, and are therefore sensitive to any increase in inputs of nutrients (eutrophication) or acidifying substances.

About 2 800 species have been registered in freshwater habitats in Norway, and 267 species are classified as threatened or near-threatened (Kålås et al. 2010b). Most red-listed species are aquatic insects and plants, but four of the six amphibians that are found in Norway are threatened or near-threatened. In addition, seven freshwater species are regionally extinct. Three habitat types are listed as endangered on the Red List of Ecosystems and Habitat Types: calcareous lakes, lime-rich ponds and small lakes, and oxbow lakes, meanders and flood channels (Lindgaard and Henriksen 2011). Action plans have been drawn up for freshwater pearl mussel (*Margaritifera margaritifera*), pool frog (*Rana lessonae*), northern

crested newt (*Triturus cristatus*), Slavonian grebe (*Podiceps auritus*) and calcareous lakes. Priority species and selected habitat types can be designated under the Nature Diversity Act. In freshwater ecosystems, the dune tiger beetle (*Cicindela maritima*) has been designated as a priority species and calcareous lakes as a selected habitat type.

Ecological status in freshwater bodies is assessed both through the Nature Index and under the Water Management Regulations. The Nature Index uses a weighted mean of the indicators for an ecosystem to produce a score, whereas the Water Management Regulations uses the “one out – all out” principle, meaning that the indicator or quality element that is most severely affected by human activity determines the overall ecological status. The regulations also use a rather narrower set of indicators than the Nature Index. As a result of these differences, the ecological status of freshwater bodies assessed by the Nature Index is considerably better than the status measured by the Water Management Regulations. When river systems do not meet the criteria for good ecological status under the Water Management Regulations, the most frequent causes for the country as a whole are hydropower regulation, long-range transboundary pollution, runoff from agriculture and waste water discharges from private sewage treatment facilities (e.g. septic tanks). However, there are wide regional variations.

Nature Index values for freshwater were relatively high in 2010 (0.73 overall, see Table 1). The average improvement in Nature Index values for freshwater for the period 1990–2010 was 10 %. There was an improvement in all regions except Central Norway, where there was a slight deterioration, probably as a result of several new hydropower developments and the expansion of existing schemes. There have also been negative trends locally as a result of eutrophication and habitat change. Biodiversity in river systems in low-lying areas, for example in Eastern Norway, differs considerably from the biological reference conditions that have been established, and in some instances showing a negative trend. Two factors that may be important are intensification of agriculture, including increased use of manure and mineral fertiliser, and urbanisation. Long-range transport of pollutants has resulted in detectable cadmium, lead and mercury pollution in the southern half of Norway, and mercury levels are so high that people are advised not to eat large predatory fish in certain areas. In recent years, new hazardous substances such as brominated flame retardants have also been detected in the environment.

In future, acidification and eutrophication will probably stabilise at their current levels or decrease, provided that the introduced measures are maintained or intensified. The situation has been gradually improved by reduced inputs of acidifying substances, liming rivers and lakes that have been affected by acidification, the introduction of measures in agriculture and waste water management to reduce eutrophication, and changing fishery rules, including closing areas to fishing. Characterisation of Norway’s surface water bodies as required by the Water Management Regulations shows that just under half of all water bodies meet the requirements set out in the regulations (and thus in the Water Framework Directive), i.e. they are classified as having very good or good status (see Figure 6).

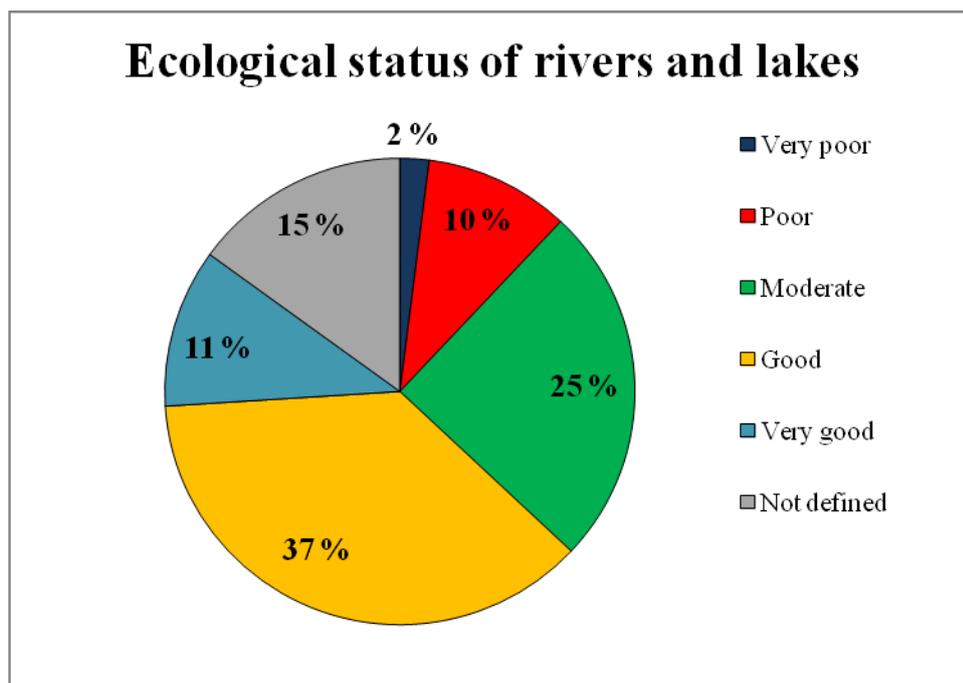


Figure 6: Ecological status of Norway's surface water bodies (rivers and lakes). Source: Vann-Nett 2013 (modified).

However, the scale of new renewable energy developments (small-scale power plants and larger projects) may increase, with possible impacts on freshwater biodiversity. Climate change may also result in changes in biodiversity, for example facilitating further establishing and spreading of alien species that already represents a growing problem in freshwater. The salmon parasite *Gyrodactylus salaris* and signal crayfish (*Pacifastacus leniusculus*) are examples of species that impact Norway's freshwater ecosystems negatively.

Norway's river systems and coastal and marine waters are some of the most important habitats for wild Atlantic salmon (*Salmo salar*). About one fifth of the entire Atlantic salmon population is found here, giving Norway a special international responsibility for this species. Since 1970, wild salmon stocks have shown a negative trend in all parts of the North Atlantic, and total catches in Norway have dropped by about 75 %. The population decline is explained by interactions between several factors. According to the Norwegian Scientific Advisory Committee for Atlantic Salmon Management, the two most serious pressures on wild salmon that are not under satisfactory control are now salmon lice and escaped farmed salmon. *Gyrodactylus salaris* and acidification are also serious threats to a number of salmon stocks. Historically, hydropower regulation was one of the greatest threats to wild salmon, and resulted in the loss of a number of stocks. In recent years, strict environmental standards have been introduced to ensure that the needs of wild salmon are taken more fully into account in hydropower projects. In Western and Central Norway, catches of sea trout (*Salmo trutta*) have dropped by almost half in recent years. According to the Norwegian Environment Agency, there are indications that this is a result of poorer survival at sea. The main factors involved are probably salmon lice, poorer food supplies and possibly climate change.

3.2.4. Forest

About 38 % of mainland Norway is covered by forest covering a broad range of forest types. Total area is 121 822 km² of which about 86 567 km² is productive forest. Approximately 40 – 45 % of the natural increment is logged yearly. Approximately 60 % of all species recorded in Norway (about 24 000 species) are found in forests, most of them are fungi and insects (Gundersen and Rolstad 1998) and many of them depending on dead wood. About half the threatened and near threatened species on the Red List (1838 species) have a significant proportion of their population in woodland and forest (Kålås et al. 2010b). The proportion of such species on the Red List probably reflects the proportion of such species of all species.

Some habitat types in Norwegian forests have a unique biodiversity and are also of international importance. Coastal spruce forest is a habitat type for which Norway has an international responsibility, and many of the localities where it is best developed are protected. This type of forest has a rich diversity of lichens and mosses. It has been listed as endangered on the Red List of Ecosystems and Habitat Types, together with coastal thermophilous Scots pine woodland and ultramafic woodland. Three habitat types in forest are listed as vulnerable: lime-rich beech woodland, lime-rich small-leaved lime woodland and lime-rich low-herb Norway spruce forest. Twelve other forest habitat types are considered to be near-threatened (Lindgaard and Henriksen 2011). Action plans have been drawn up for agrarian woodland, calcareous lime forest and coastal Norway spruce forest, aiming to maintain these habitat types for the future. By January 2014, about 2.5 % of all productive forest in Norway was protected under the Nature Diversity Act. Forest conservation efforts are being continued to ensure that areas of forest of great value for biodiversity are protected and that a representative selection of forest habitat types is protected. Protection is mainly conducted through voluntary agreements with forest owners. Reference is made to section 6.5.1 regarding efforts to protect forest biodiversity.

The Nature Index for forest is based on 72 indicators (insects, fungi, plants, birds and mammals), and indirect indicators from the National Forest Inventory. The results show that both forestry activities and the management of predators and cervids influence Nature Index values for forest.

Forestry is the most important factor influencing forest biodiversity. According to the 2010 Norwegian Red List, 1406 of the 1838 forest species that are threatened or near-threatened (Kålås et al. 2010b) are considered to be negatively affected by former or current forestry activities. Clear-cutting in particular is reported as having negative impacts, but selection cutting, planting of new tree species and the construction of forest roads also play a part. In order to minimise these impacts, Norwegian forestry policy emphasizes environmental considerations.

Statistics from Norway's National Forest Inventory show an increasing volume of trees of all dimensions and age classes in spruce, pine and broad-leaved forest. The volume of dead wood in Norwegian forests is also increasing, but is still far lower than in forests that are not influenced by forestry. Larger numbers of old trees and a greater quantity of dead wood provide more favourable conditions for many red-listed species. The number of threatened and near-threatened species registered in forests rose from 2006 to 2010, as more species have been evaluated. However, it can not be concluded from the 2010 red list that the situation for threatened and nearly threatened species has changed negatively from 2006 to 2010.

In the period 2005–10, the total forest area in Norway increased by 0.78 % per year. In some areas, forests are under pressure because of the expansion of urban areas and to some extent the expansion of agricultural areas.

Forests are important habitats for three of Norway's four large carnivore species: wolf (*Canis lupus*), brown bear (*Ursus arctos*) and lynx (*Lynx lynx*). Norway's national target is for three wolf litters to be born each year within the designated management area for breeding wolves. In winter 2012/13, tracking identified about 30 wolves, including three family groups, four territorial pairs, and single individuals. In addition, five family groups and two territorial pairs were observed in territories straddling the Norwegian-Swedish border. Litters were recorded in three territories entirely in Norway in winter 2012/13. In 2012, the Norwegian brown bear population was estimated at 137, and the number of litters at six. The national target was reduced from 15 to 13 litters a year in 2011. In 2013, there were 59 litters of lynx, which is equivalent to a total population of about 350 animals. The national target is 65 litters a year.

To predict future trends in forest biodiversity is challenging. Climate change and possible increased exploitation of tree biomass will have an impact on forest species. The way in which management measures such as tree planting, other climate-related measures and felling are carried out can strongly influence developments. It will also be of crucial importance to gain control of the spread of non-native tree species.

3.2.5. Wetlands

The overall Nature Index value for wetlands is 0.54 (see Table 1), but there are wide geographical variations within Norway (Figure 2). One reason for low values in parts of the country is the previously widespread practice of ditching and draining lowland mires and bogs. Low values in mountain areas are partly explained by the tendency for the permafrost in palsa mires in Finnmark and Troms to thaw (Figure 3). The Norwegian Red List for Species lists 443 wetland species as threatened or near-threatened (Kålås et al. 2010b). According to the Norwegian Red List of Ecosystems and Habitat Types, there are 14 threatened and near-threatened mire types, one of which is critically endangered (hay fen margin), while four are classified as endangered (palsa mire, lime-rich lowland mire expanse, hay fen expanse and lime-rich lowland mire margin) (Lindgaard and Henriksen 2011). Traditional hay meadows (including both the hay fen habitats above) have been designated as a selected habitat type under the Nature Diversity Act. When a habitat type has been designated in this way, special care must be taken to avoid reduction of its range or deterioration of the ecological status of areas of habitat. Four of the six Norwegian bird species that are on the international IUCN Red List are associated with wetlands: the lesser white-fronted goose (*Anser erythropus*), great snipe (*Gallinago media*), curlew (*Numenius arquata*) and black-tailed godwit (*Limosa limosa*).

Many bogs and mires were traditionally used as pasture and for haymaking. Now that these forms of use have largely been discontinued, such areas are often being invaded by shrubs and trees. Long-range transport of nitrogen and thus higher inputs in Norway also promotes overgrowing of such areas, particularly ombrotrophic (rain-fed) mires in the southern half of Norway in areas where critical loads for nitrogen are exceeded (Aarrestad and Stabbetorp 2010). In the future, climate change may affect further development of these mires and bogs, both as a result of higher temperatures and also because of changes in precipitation patterns.

So far, alien species appear to be a marginal threat for bog and mire habitats, but there are alien species that could invade nutrient-rich mire margins, springs and floodplains (Gederaas et al. 2007 and 2012). Floodplains include river deltas, which have suffered large-scale

alteration in connection with the growth of towns and industrial developments. There are now only 23 undisturbed river deltas covering an area of more than 25 hectares left in the southern half of Norway (www.miljostatus.no). The general conclusion is that for wetlands, the largest-scale changes in land-use and other developments have already taken place, but that their impacts (overgrowing, drying out) will become clearer in a long-term perspective.

3.2.6. Mountains

Norway has large areas of mountain habitat. The ecological status of these habitats seems to have been fairly stable from 1990 to 2010 (see Table 1). Nature Index values were moderate (overall value 0.63) in 2010.

Two mountain habitats, Caves and Earthpyramids are threatened according to Norwegian Red List for nature types, (Lindgaard og Henriksen 2011). In all, 147 mountain species are red-listed as threatened or near-threatened, making up about 4 % of the species on the Norwegian Red List (Kålås et al. 2010b). Mosses (23 %) and vascular plants (16 %) account for the largest proportion of these species. The number of species in the mountain ecosystem is in itself low, and is probably one explanation for the low number of red-listed species (Kålås et al. 2010). The Arctic fox (*Vulpes lagopus*) population in Norway is estimated at approximately 140 adult individuals on the mainland. Since 2008, the breeding distribution has changed, and most litters are now born in the southern half of Norway, in areas where the species was previously extinct. It is now considered to be re-established in some of these areas. According to data from the national predator-monitoring programme, the winter population of wolverine (*Gulo gulo*) in Norway numbered an estimated 350 individuals in 2012/13. In 2012 there were 44 confirmed litters of wolverine in Norway. The national target is 39 litters a year.

Land-use changes are the most important factor for threatened and near-threatened species in the mountains (about 40 % of these species). These include the construction of roads and holiday cabins, hydropower developments and power lines, and the accompanying direct and indirect impacts of disturbance. Particularly in the past 50 years, such changes have resulted in the fragmentation of formerly large continuous areas of mountain habitat. This creates major problems for the management of some species, especially wild reindeer (*Rangifer tarandus*). More than 50 % of the European population of wild reindeer is found in Norway. The main problem is that the seasonal migration of reindeer between winter and summer grazing grounds is hampered by man-made barriers such as roads, hydropower infrastructure, alpine skiing facilities and holiday cabins (Nelleman et al. 2001). There is likely to be further fragmentation of mountain ecosystems as more roads, holiday cabins and power lines are constructed. Climate change is also expected to cause increasing problems for wild reindeer. Both the loss of arctic-alpine tundra due to the spread of trees and shrubs, as well as changes in snowpack and ice cover properties can reduce reindeer food availability and breeding success.

These ecosystems are also particularly sensitive to climate change, which may result in the changes in vegetation – and snow cover. It is expected that the altitude of the timber line will increase, which may suppress the native mountain vegetation. Also, more frequent freezing and thawing of the snow surface is expected, resulting in the formation of a hard ice crust which will make conditions less favourable for mountain species such as small rodents, wild reindeer and Arctic fox. The higher inputs of nitrogen to southern parts of Norway in the atmosphere and with precipitation may also encourage the expansion of forested areas in the mountains.

3.2.7. Arctic ecosystems

Polar ecosystems are found both in the Arctic and in Antarctica. The Norwegian Arctic includes the Svalbard archipelago and the island of Jan Mayen as well as adjacent Arctic sea-areas under Norwegian jurisdiction in the Barents- and Norwegian seas. Norway has territorial claims in Antarctica and is a party to the Antarctic Treaty, but Antarctic ecosystems are not discussed here. The discussion below overlaps to some extent with the account of Norwegian marine ecosystems earlier, but this section focuses on the characteristic features of the Arctic parts of Norwegian marine ecosystems. Historically, fishing, sealing, whaling and hunting have caused major changes in Arctic ecosystems. Populations of a number of species of birds and mammals were severely depleted as a result, and some were driven close to extinction. This was particularly true in the Atlantic part of the Arctic, including Svalbard and Jan Mayen. Today, populations of many of these species, such as polar bear (*Ursus maritimus*), walrus (*Odobenus rosmarus*) and Svalbard reindeer (*Rangifer tarandus platyrhynchus*), have recovered or are increasing as a result of comprehensive protection measures. Others, such as the bowhead whale (*Balaena mysticetus*), are still very rare. Considering the earlier far-reaching changes, the ecological status of the Norwegian parts of Arctic ecosystems is generally good, but there are certain trends that give cause for serious concern. These are particularly related to the impacts of rising temperatures, the decrease in the extent of sea ice and ocean acidification. In this connection, it is important to consider the cumulative environmental effects of the various pressures and impacts. The recent Arctic Biodiversity Assessment (CAFF 2013) concludes that climate change is by far the most serious threat to Arctic ecosystems, but that land-use change, disturbance and pollution are also important in parts of the Arctic.

3.2.7.1. Arctic terrestrial ecosystems on Svalbard and Jan Mayen

On the Svalbard archipelago, 65% of the land-areas and 87% of the territorial waters are protected as nature reserves and national parks. In 2010, most of the volcanic island of Jan Mayen was designated as a nature reserve.

The Svalbard archipelago covers a total land area of about 61 000 km², and is remarkably diverse in geological, topographical and climatic terms. There are roughly 370 moss species, 1300 species of lichens and fungi and 140 species of vascular plants, and about 1100 invertebrates have been recorded. Moreover, 19 species of marine mammals and just over 200 species of birds have been registered in and around Svalbard. The terrestrial environment of Svalbard has been warming in recent decades, as shown for example by retreating glaciers, the decreasing duration of snow cover and higher temperatures in the permafrost. The tundra is expected to change as a result of the higher temperatures: over time species that prefer a warmer climate may become more common, with more southerly species becoming established in Svalbard and displacing characteristic arctic plants. Climate change will have impacts on habitats and living conditions for a range of species. So far, habitat disturbance and land-use change have been of little significance in Svalbard and Jan Mayen, but levels of long-range hazardous substances are relatively high compared with those in other parts of the Arctic. Nine reproducing alien species have been registered in Svalbard. Several of these are expected to spread more quickly as the climate warms.

Separate red-list assessments have been made for selected species groups in Svalbard. In all, 270 species have been assessed: 71 of these have been red-listed, and 47 are considered to be threatened. More than three-quarters of them have been red-listed because their populations are very small, which puts them at greater risk of extinction.

Climate change and land-use change are the factors that are listed as threatening the largest number of red-listed species in Svalbard. The importance of land-use change is linked to the

fact that many red-listed species have small populations and are found in areas near the coast where tourism and traffic are increasing.

The volcanic island of Jan Mayen has characteristic and often vulnerable vegetation dominated by mosses and including a number of endemic species. There are 27 regularly breeding bird species. There is little activity or traffic outside the area around the radio and meteorological station in the central part of the island, and it is presumed to have little ecological effect.

3.2.7.2. Arctic coastal and marine ecosystems

Svalbard is surrounded by shallow waters above the continental shelf, and the marine ecosystem around the archipelago varies from relatively temperate waters in the southern part around Bjørnøya to high arctic areas strongly influenced by the sea ice north and east of Svalbard. Both ice-associated algae and phytoplankton drifting in the water column are sources of primary production in these waters. Primary production by ice algae starts under the ice early in the year. When the ice begins to melt in spring, large quantities of nutrients become available, especially as light levels increase, and primary production is therefore particularly high in the marginal ice zone. Satellite measurements indicate that spring blooms are occurring progressively earlier in parts of the Arctic, and this may have a number of different impacts on various species and on the food chain (see for example Kahru et al. 2011). For the Barents Sea as a whole, there are reports that several seabird populations are declining, but in the Svalbard area the picture is more mixed. Here, there are several examples of species with a more southerly distribution that are shifting northwards. In the Barents Sea, the inflow of relatively warm Atlantic water has increased in recent years, and there is a long-term upward trend in temperature. In the last few decades, sea ice cover has declined in the Barents Sea, the Fram Strait and around Jan Mayen. After the year 2000 there have been several years where the waters around Svalbard have been completely ice-free in summer. Measurements on Hopen and in the Fram Strait show that the amount of old sea ice is declining and the remaining also has become thinner in recent years, and such changes in ice type alter the habitat that the ice provides for various species.

A clear link has been found between the reduction in sea ice extent around Hopen and Kong Karls Land in autumn, when female polar bears return to land, and a reduction in the number of polar bear dens counted in spring. There has been very little ice in the fjords on the west coast of Svalbard in recent years. As a result, pup survival has been poor in ringed seals (*Pusa hispida*), which are dependent on stable ice and accumulations of snow on the ice in front of glacier snouts so that they can dig snow lairs as protection against polar bears and glaucous gulls (*Larus hyperboreus*). There is no longer any sea ice in winter around Jan Mayen. And when there is no drift ice, species that are dependent on it are also absent. The Arctic fox, for instance, was wiped out on Jan Mayen by hunting, and can no longer recolonise the island by travelling across the sea ice from Greenland.

The observed trends and modelling results for the extent of the sea ice in the future indicate that the entire Arctic Basin may be more or less ice-free in summer by the middle of this century, and that ice cover in winter will also continue to decrease. In the long term, climate change is expected to result in major changes in ecosystems and species composition in the Arctic, both in the marine environment and on land. There is likely to be severe negative impacts on many Arctic species, particularly those that are dependent on sea ice.

Rising greenhouse gas emissions are also contributing to ocean acidification, and the effects will be greater in the Arctic than further south because cold water can absorb more CO₂ and because the reduction in ice cover means that a greater area of sea surface is in direct contact with the air. The commercial fish stocks in the Barents Sea are being harvested within

sustainable limits and in general in accordance with the total allowable catches set each year. The main species caught around Svalbard and in the northern Barents Sea are the shrimp *Pandalus borealis*, cod and haddock, and stocks of all of these are large and healthy. Stocks of Greenland halibut and redfish (*Sebastes marinus*) are low and have remained low for many years because of earlier overexploitation. Although the Greenland halibut stock is showing signs of recovery, there is still cause for concern about redfish stocks. The International Council for the Exploration of the Sea (ICES) recommends continued and stricter regulatory measures to prevent the collapse of the stocks of *Sebastes marinus*. Hazardous substances in the Arctic largely originate further south, and are transported with air and ocean currents. Many persistent organic compounds bind to fats and therefore accumulate in the long Arctic marine food chains. Levels of contaminants in species at the top of food chains thus become high enough to have adverse impacts on the immune and hormone system, which in turn can affect survival and reproduction. Reductions in the concentrations of some regulated substances have been measured in Svalbard in recent years, but trends vary, and there is constant concern about new and inadequately regulated substances. Marine litter, like plastic particles, are now found as stomach content in most arctic fauna, from crabs to sea birds.

3.2.8. Cultural landscape

The Norwegian cultural landscape includes primarily the ecosystems categorised as “open lowland” and “agricultural areas”. The assessments for open lowland (which consists mainly of semi-natural habitat types) are based largely on the Nature Index results, while assessments of the state of and trends for agricultural areas are based more on physical conditions and production. About 30 % of species associated with the cultural landscape are threatened, and there are also several threatened habitat types in these areas.

3.2.8.1. Open lowland

Open lowland as defined in the Nature Index is dominated by traditional semi-natural vegetation types such as open grassland in the lowlands, boreal heaths and meadows around summer farms, and coastal heaths. In addition, it includes naturally open areas below the treeline. These are the main habitats for many flowering plants and insects, although the same species are also found in the modern agricultural landscape, for example in boundary areas between fields, in habitat islands in fields, and in and around ponds. Semi-natural grasslands were created by grazing by livestock or mowing for coarse or winter fodder over long periods of time; other semi-natural habitats were by harvesting timber, firewood or foliage for fodder. Meadow vegetation consists mainly of wild light-demanding species that are crowded out if open areas become overgrown with trees and shrubs. Many traditional hay meadows and pastures are no longer used for agricultural purposes and are therefore at risk of becoming overgrown. Both a warmer climate and eutrophication probably tend to speed up this process (Bryn 2008, Pykälä 2000). Cultivation and fertilisation change the species composition of species-rich grassland. In addition, alien species are an increasing threat to biological diversity in open lowland areas, for example giant hogweed (*Heracleum mantegazzianum*), Persian hogweed (*H. persicum*), Canada goldenrod (*Solidago canadensis*) and garden lupin (*Lupinus polyphyllus*). Both native tree species and non-native species such as Sitka spruce (*Picea sitchensis*) are spreading to new areas, including coastal heaths. From 1990 to 2010, the Nature Index value for open lowland for the country as a whole dropped by 12 % (see Table 1). The map in Figure 2 shows that Nature Index values for open lowland are higher in North Norway than further south. This is mainly because trees and shrubs encroach more slowly on open areas further north, where the climate is generally colder.

Two semi-natural habitat types, hay meadows and coastal heaths, have been listed as endangered on the Red List of Ecosystems and Habitat Types, and semi-natural grasslands generally are listed as vulnerable (Lindgaard and Henriksen 2011). About 20 % of the species associated with semi-natural habitats are red-listed, the dominant species groups being beetles, butterflies and vascular plants (Kålås et al. 2010b). Five of the first group of eight species designated as priority species under the Nature Diversity Act are associated with open lowlands. More action plans for threatened species and habitat types apply to open lowland than to any of the other main ecosystems. For example, there is an action plan for hay meadows, and funds have been made available for their management.

Grazing by livestock and mowing are central for the maintenance of many species-rich and characteristic cultural landscape types, for example the pastures around summer farms. In 2012, the total number of livestock on outlying rough grazing was 6 % lower than in 1999. However, in a number of areas summer farms are still in use, making use of local fodder resources and helping to maintain species-rich meadows and pastures. There are several economic instruments applied supporting outlying rough grazing as a part of ordinary livestock production as well as for maintaining areas of particular value.

European coastal heathlands are found in a belt along the Atlantic coastline from northern Portugal to northern Norway, and almost one third of this north-south belt is in Norway (NEA 2012). Coastal heath is one of 15 habitat types that have been classified as endangered in Norway (Lindgaard and Henriksen 2011), and a draft action plan to safeguard these areas has been published (NEA 2012).

3.2.8.2. Agricultural areas

This section focus on agricultural areas that are intensively farmed today. Agricultural areas cover only about 3 % of the land area of Norway and are not included in the major ecosystems for which Nature Index values are calculated. Sustainable agricultural practices, and grazing and management of the cultural landscape, are essential for maintaining biodiversity (for further description of measures see section 6.7).

There is a risk of runoff of nutrients and pesticides to river systems from farmland. Various measures have been introduced to reduce this form of pollution, including amended soil management techniques and hydrotechnical measures. Consumption of mineral fertiliser has been considerably reduced in recent years, and the risks associated with the use of pesticides have also been reduced. Nutrient runoff and pesticide consumption vary widely, partly because weather conditions are variable. In 2011, agriculture accounted for 8 % of Norway's greenhouse gas emissions.

About 5 % of Norway's cultivated land is farmed ecologically. The objective of ecological farming is to operate as sustainably as possible and important principles include sustaining nutrient cycles and making minimal use of external inputs. The organic farming sector can also be the spearhead of a more sustainable agricultural industry generally. Retail sales of organic food products in Norway reached a record level in 2012. Sales totalled about NOK 1.17 billion, or 1.2 % of total food sales.

A great deal of crop and livestock genetic diversity was lost during the 20th century. Programs for conservation and sustainable use of genetic resources for food and agriculture has been organized by the Norwegian Genetic Resource Centre, through international cooperation and dialogue with industry actors, and through measures to encourage businesses, farmers and voluntary organisations to make use of traditional plant varieties and livestock breeds. Systematic conservation work for endangered livestock breeds in Norway

started in 1990, and there has been a general improvement in status since then, although certain threatened horse and cattle breeds have shown a negative trend. Of the 35 livestock breeds classified as native to Norway, 17 are considered to be critically endangered. The Svalbard Global Seed Vault, which is the world's largest long-term back up facility for plants of importance to humanity, is an important Norwegian contribution to the global conservation system. By the end of 2013, 56 institutions had deposited about 800 000 seed samples. Further information on genetic resources for food and agriculture in Norway can be found in the status reports submitted by Norway to FAO on plant genetic resources (Asdal 2008) and forest genetic resources (Skrøppa 2012)

3.2.9 Urban ecosystems (Norway's larger towns)

Norway is experiencing increasing urbanisation and centralisation, and by January 2012, four fifths of Norway's population of 5 million lived in towns and built-up areas. According to Statistics Norway, 90 % of population growth in 2011 was in urban areas, and Oslo and the surrounding county of Akershus is the area where urbanisation and population growth are happening most rapid. There is little in the way of suitable statistics or studies that can provide information on status and trends for Norwegian urban ecosystems. Pressure on green spaces is greatest in the largest towns. The pressure on the natural environment close to urban areas has been increasing over the past 40–50 years, and the total area covered by towns and other built-up areas in Norway has almost doubled. In addition, green spaces in and near towns have tended to become more park-like. Statistics Norway has fairly recently defined and started to record data for indicators of access to green spaces for outdoor recreation in and near towns (using two size categories of green spaces, larger than 0.5 hectares and larger than 20 hectares). For many towns, there is sufficient geographical data available to display the green structure on maps. Figure 7 shows the extent of different types of green spaces, forest adjacent to the built-up areas and designated “quiet areas” in Oslo.

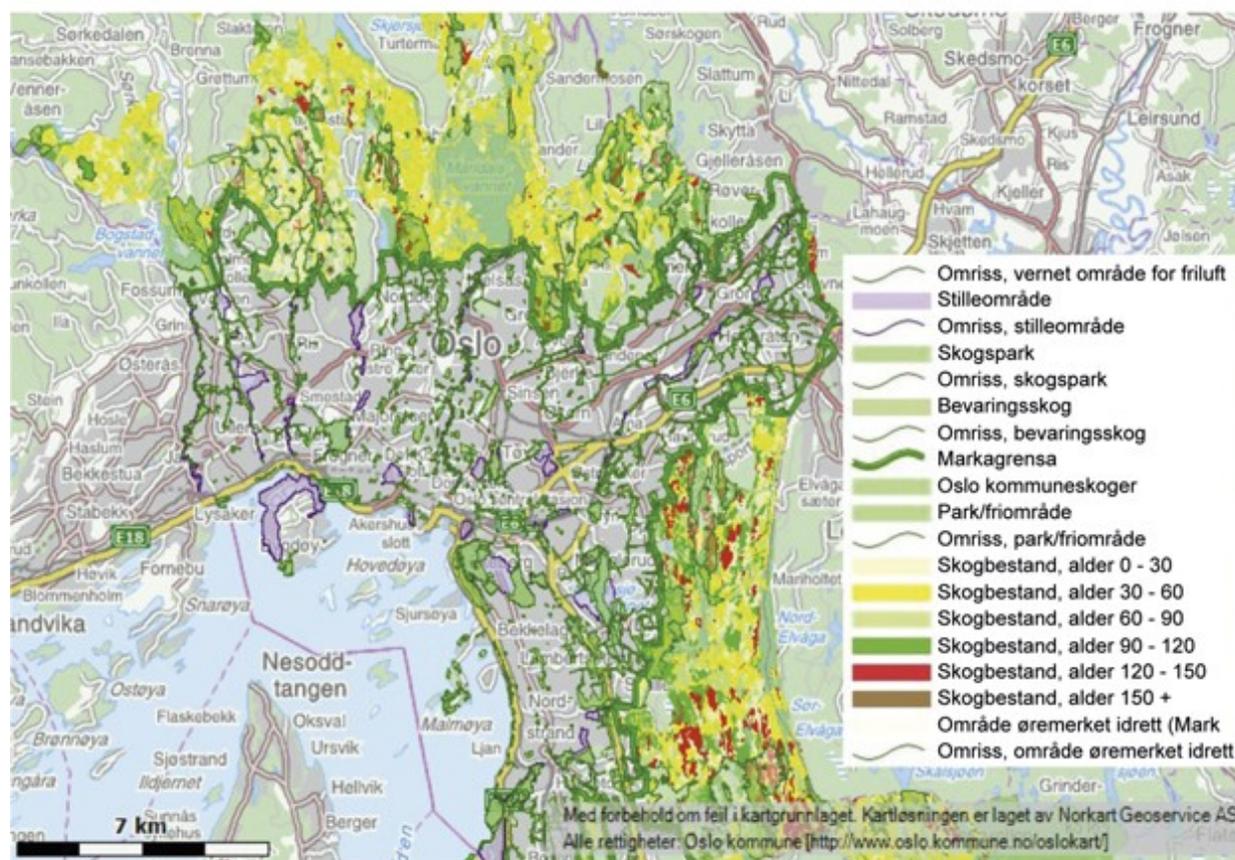


Figure 7: Parks, designated quiet areas (marked in purple) and various types of forest adjacent to the built-up zone in the City of Oslo, 2012. Source: City of Oslo

Some areas of natural environment in or close to towns are important for particular species or habitats, and protection measures may be appropriate. The 2010 Norwegian Red List for Species lists a large number of species that are found in or near Norwegian towns, among other things because many of the larger Norwegian towns are on the coast (Kålås et al. 2010b). The Inner Oslofjord is for example one of the most species-rich areas of Norway, but also under a great deal of pressure. The ten largest towns in Norway have mapped their biodiversity and use this information together with for instance maps of green area in urban planning processes. In Trondheim, the restoration of the stream Ilabekken is an example of an urban project to enhance biodiversity and important ecosystem services. See also section 6.8 presenting the The Grorud Valley Programme.

Box 4: Opening up a culverted stream in Trondheim

Ilabekken in Trondheim is a small stream that responds rapidly to rainfall and is liable to flash flooding. For many years, its lower stretches were culverted. After several years' work involving planning, engineering, hydrological and ecological expertise, the City of Trondheim re-opened the stream in 2005. The flood risk is now under control, the water quality is good, sea trout have returned to the stream and it supports higher biodiversity. The area is also popular for recreation. This is a good example of how water as an asset in the environment and how it can be used to improve well-being, giving people a sense of place, while also providing habitats for a range of species. The project also illustrates the different benefits that restoration of ecosystems can bring and the importance of drawing upon a wide range of expertise from different sectors.

There are also many introduced species in urban areas, particularly plants in parks and gardens. Some of these are capable of spreading to the natural environment and can become invasive and thus pose a threat to native biodiversity. Examples include garden lupin (*Lupinus polyphyllus*), Japanese knotweed (*Fallopia japonica*) and Japanese rose (*Rosa rugosa*). Green spaces provide a range of ecosystem services that benefit people in and around towns, including opportunities to enjoy natural surroundings in peoples' everyday lives, flood protection and temperature regulation. Urban green spaces are becoming increasingly important for many people's health and quality of life as the urban population continues to expand. Urban ecosystems are also important for a local sense of identity, and provide opportunities for learning and developing an understanding of nature and biodiversity.

Part II: The national biodiversity strategy and action plan, its implementation and the mainstreaming of biodiversity

Part II starts by presenting Norway's national environmental targets, and then gives an outline of the first national strategy and action plan and how this has been implemented and has shaped Norwegian environmental management. It also gives an account of progress in preparing a new strategy and action plan. Other actions taken to implement the convention since the fourth report and outcomes of these actions are presented next, including how biodiversity is integrated into relevant sectors. Part II ends with a presentation of our international cooperation of relevance to implementation of the convention.

4. Environmental targets

This section presents the priority areas of Norway's environmental policy. The budget proposition from the Ministry of Climate and Environment divides environmental policy into 11 priority areas. A set of national targets has been drawn up for each priority area, based on government policy as set out in white papers, the Aichi targets and other policy documents. Indicators and progress associated with the targets are presented in at the website State of the Environment Norway with some information also available in English. A presentation of Norway's environmental targets in English can be found at the following address: <http://www.regjeringen.no/pages/35176012/T-1508E.pdf>.

Table 2 presents an overview of how Norway's national environmental targets correspond to the Aichi targets adopted at CBD COP10 as part of the Strategic Plan for Biodiversity with the aim of taking "effective and urgent action to halt the loss of biodiversity in order to ensure that by 2020 ecosystems are resilient and continue to provide essential services". Many of the Aichi targets have already been included in Norway's environmental targets related to environmental status. The global targets relating to means of implementation and other processes are reflected in processes and instruments that are either already in use or will

be used in Norway's national strategy and action plan. These are generally cross-cutting and applicable to a number of the environmental targets. The budget proposal each year also includes targets for the use of three categories of environmental policy instruments: knowledge and spatial data, legislation and planning procedures, and international cooperation.

Table 2: An overview of how Norway's environmental targets correspond to the Aichi targets. Norwegian targets that do not correspond to any of the Aichi targets are not included. Targets with similar content focused on different ecosystems have been merged and numbering indicates which targets have been included.

Aichi targets	Norway's environmental targets
<p>4. By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.</p>	<p>7.1. Towns and urban areas will be sustainable and attractive, will conform to the principles of functional design, and will promote health and a good quality of life.</p> <p>5.4. Management of all harvested stocks of mountain animals and plants will be ecosystem-based, and they will be harvested sustainably by 2020.</p> <p>See also targets listed as directly related to Aichi target 6 (1.1, 1.6, 2.5) on keeping the use of aquatic resources within safe ecological limits and the equivalent target for forest (4.5) under Aichi target 7</p>
<p>5. By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.</p>	<p>1.9. The current extent of wilderness-like areas in Svalbard will be retained, biological and landscape diversity will be maintained virtually untouched by local human activity, and the value of protected areas for research will be safeguarded. It will be possible to enjoy the natural environment undisturbed by motor traffic and noise even in areas that are easily accessible from the settlements.</p> <p>2.1., 3.1., 4.1., 5.1 and 6.5. By 2020, the diversity of habitat types in freshwater, forest, wetlands, mountain and in cultural landscapes will be maintained or restored; this will include safeguarding genetic diversity and important ecological functions and services.</p> <p>See also targets focusing on protection as a tool for reducing the rate of loss of habitats and listed as related to Aichi target 11.</p>

<p>6. By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.</p>	<p>1.1. The structure, functioning, productivity and diversity of marine ecosystems will be maintained or restored and they will provide a basis for value creation through the sustainable use of natural resources and ecosystem services.</p> <p>1.6. Management of all harvested marine species will be ecosystem-based, and they will be harvested sustainably.</p> <p>2.5. Management of all harvested freshwater animals and plants will be ecosystem-based, and they will be harvested sustainably by 2020.</p> <p>See also targets listed as related to Aichi targets 10 and 12 and that are relevant to avoiding significant adverse impacts of fisheries on threatened species and vulnerable ecosystems (1.4, 1.5, 2.4 and 2.6).</p>
<p>7. By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.</p>	<p>4.2. All forestry areas will be sustainably managed by 2020.</p> <p>4.1. By 2020, the diversity of habitat types in forests will be maintained or restored; this will include safeguarding genetic diversity and important ecological functions and services.</p> <p>4.5. Management of all harvested stocks of forest animals and plants will be ecosystem-based, and they will be harvested sustainably by 2020.</p> <p>6.7. All agricultural areas will be sustainably managed by 2020</p>
<p>8. By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.</p>	<p>1.2. All coastal waters will have good ecological and chemical status by 2021.</p> <p>1.8. Operational discharges will not result in damage to health or the environment, or result in a rise in background levels of oil or other environmentally hazardous substances. A low level of risk of acute pollution will be maintained, and continuous efforts will be made to reduce the level of risk.</p> <p>2.2. All water bodies will have good ecological and chemical status by 2021.</p> <p>9.1. Releases and use of substances that pose a serious threat to health or the environment will be continuously reduced with a view to eliminating them by 2020.</p> <p>9.2. The risk that releases and use of chemicals will cause damage to health or the environment will be minimised.</p> <p>9.3. The dispersal of substances that are persistent, bioaccumulative and toxic, and of other substances that give rise to an equivalent level of concern, from contaminated soil will be stopped or substantially</p>

	<p>reduced. Steps to reduce the dispersal of other substances that may cause injury to health or environmental damage will be taken on the basis of case-by-case risk assessments.</p>
	<p>9.4. Contamination of seabed sediments with substances that are hazardous to health or the environment will not give rise to serious pollution problems.</p>
	<p>9.5. Releases, the risk of releases and the spread of radioactive substances that may cause damage to health or the environment will be minimised. All radioactive waste will be handled safely and in an approved manner.</p>
	<p>10.1. Air pollution (SO₂, NO_x, VOCs, ammonia and particulate matter) will not cause health or environmental damage.</p>
<p>9. By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.</p>	<p>1.7., 2.7., 3.4., 4.7., 5.7., and 6.9. Substantial adverse impacts of alien organisms on marine biodiversity and biodiversity in freshwater, wetlands, forest, mountains and in cultural landscapes will be avoided.</p>
<p>10. By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.</p>	<p>1.1 The structure, functioning, productivity and diversity of marine ecosystems will be maintained or restored and they will provide a basis for value creation through the sustainable use of natural resources and ecosystem services.</p> <p>1.4. Maintain ecosystem functioning in coral reefs and other vulnerable ecosystems.</p>
<p>11. By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.</p>	<p>1.3. A representative selection of marine areas will be protected for future generations.</p> <p>1.9. The current extent of wilderness-like areas in Svalbard will be retained, biological and landscape diversity will be maintained virtually untouched by local human activity, and the value of protected areas for research will be safeguarded. It will be possible to enjoy the natural environment undisturbed by motor traffic and noise even in areas that are easily accessible from the settlements.</p> <p>2.3. A representative selection of Norwegian lakes and rivers will be protected for future generations, and the conservation value of protected areas, protected river systems and national salmon rivers and fjords will be maintained or restored.</p> <p>3.2., 4.3., 5.2. and 6.6. A representative selection of wetlands, forest habitat, mountain habitat and habitat types in the cultural landscape will be protected for future generations, and the conservation value of protected areas will be maintained or restored.</p>

	See also national targets related to Aichi target 5 that may also be relevant to Aichi target 11.
12. By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.	<p>1.5., 2.4., 3.3., 4.4., 5.3. and 6.8. Losses of threatened marine species, threatened species in freshwater, wetlands, forest, mountains and threatened species associated with cultural landscapes will be halted and the status of declining species will be improved by 2020.</p> <p>2.6. Wild stocks of anadromous salmonids (including their genetic diversity) will be viable.</p> <p>4.6. There will be 65 litters of lynx, 13 litters of brown bear and 3 litters of wolf a year, and 850–1200 breeding pairs of golden eagle.</p> <p>5.5. Viable populations of wild reindeer will be maintained within the natural range of the species in the southern half of Norway.</p> <p>5.6. There will be 39 litters of wolverine a year</p>
13. By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.	<p>6.5. By 2020, the diversity of habitat types in cultural landscapes will be maintained or restored; this will include safeguarding genetic diversity and important ecological functions and services.</p> <p>2.6. Wild stocks of anadromous salmonids (including their genetic diversity) will be viable.</p>
14. By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.	<p>1.1 The structure, functioning, productivity and diversity of marine ecosystems will be maintained or restored and they will provide a basis for value creation through the sustainable use of natural resources and ecosystem services.</p> <p>1.2. All coastal waters will have good ecological and chemical status by 2021.</p> <p>2.1., 3.1., 4.1., 5.1 and 6.5. By 2020, the diversity of habitat types in freshwater, forest, wetlands, mountain and in cultural landscapes will be maintained or restored; this will include safeguarding genetic diversity and important ecological functions and services.</p> <p>8.3. Access rights to uncultivated land will be maintained.</p> <p>7.1. Towns and urban areas will be sustainable and attractive, will conform to the principles of functional design, and will promote health and a good quality of life.</p> <p>8.2. Areas of value for outdoor recreation will be safeguarded and managed in a way that maintains the natural environment.</p>

	8.1. Everyone will have the opportunity to take part in outdoor recreation as a healthy and environmentally sound leisure activity that provides a sense of well-being both in their local communities and further afield in the countryside.
15. By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.	See also targets listed as directly related to Aichi target 14 on safeguarding essential ecosystem functions and services, including their function as carbon stocks (1.1, 1.2, 2.1, 3.1, 4.1, 5.1 and 6.5).

5. Norwegian biodiversity policy and action plan – cross-sectoral responsibilities and coordination

In 2001, Norway adopted its first National Biodiversity Strategy and Action Plan (NBSAP), as required by Article 6 of the CBD, and the Government is now in the process of drawing up an action plan to halt the loss of biodiversity and implement national goals and the Aichi targets (see section 5.4).

Norway’s current NBSAP was adopted in the form of a white paper: *Norwegian biodiversity policy and action plan – cross-sectoral responsibilities and coordination* (Meld. St. 42 (2000-2001)), and forms an integral part of broader national environmental policy. The white paper concluded that it was necessary to establish a new knowledge-based management system for biodiversity and emphasised the need for mapping and monitoring biodiversity as a basis for knowledge-based management and coordination of legislative and economic instruments.

In accordance with earlier guidance on updating NBSAPs, Norway’s National Biodiversity Strategy and Action Plan has been revised by two later white papers, both entitled *The Government’s Environmental Policy and the State of the Environment in Norway* (Reports to the Storting 21 (2004–2005) and 26 (2006–2007)). Since adopting its first NBSAP, Norway has considerably strengthened the knowledge base and substantially improved the coordination of legislative instruments. In particular, the Nature Diversity Act and the Planning and Building Act apply across sectors and facilitate cross-sectoral coordination (see section 5.2). Other cross-sectoral measures include the management plans for Norway’s sea areas and the river basin management plans. Such plans also encourage coordinated use of legislative and other instruments to protect the environment, through knowledge generation, clear targets and tools for finding a balance between environmental considerations and other important public interests. However, there has so far been little coordination of economic instruments.

5.1. Mapping and monitoring biodiversity as a basis for knowledge-based management

5.1.1. Mapping and monitoring

It is an important principle that Norway’s environmental policy and all management of natural resources are to be knowledge-based. An improved knowledge base is essential for more accurate, effective and clearly targeted management. In response to the emphasis on

knowledge-based management in the previous NBSAP, budgets for this purpose were increased and the Norwegian Biodiversity Information Centre (NBIC) was established.

NBIC is responsible for assembling, compiling, and making publicly available information on species and nature types in Norway. This includes the work with red lists of threatened species and threatened habitat types, as well as the black list of alien species (including ecological risk assessment). For some species groups in Norway, including birds, mammals, vascular plants and freshwater fish, relatively detailed information is available. There is also much information available on mosses, lichens, macrofungi and some invertebrate groups such as beetles, butterflies, wasps and bees, and marine animals such as fish and some groups of crustaceans and molluscs. In 2009, the Centre established a project specifically to increase knowledge of less well known species groups. So far, 1 165 new species have been recorded in Norway through the project. Activities run by the NBIC includes the project to gather information on on less well known species groups mentioned earlier, and a portal called *Artsobservasjoner* where both scientists and the general public can report species observations. Volunteers provide a great deal of the information and are helping to build up knowledge of species distribution in Norway. On average, 5000 observations are recorded every day, and the database already includes about 10 million observations. When records are uploaded by volunteers, they are assessed by experts on the different organismal groups. NBIC has also developed a new classification system for Norwegian nature, with the aim of using this as a basis for mapping. It has made a first assessment of the status of ecosystems and habitats, and in 2011 published the *Norwegian Red List for Ecosystems and Habitat Types*, using national and international Red Lists for species as a template.

In recent years, a number of programmes have been initiated to obtain more comprehensive data on ecosystems and species groups. The MAREANO programme has generated a great deal of new knowledge through systematic mapping of the seabed. New marine habitat types have been discovered, and features such as cold seeps, black smokers and new coral reef complexes have been found on the continental shelf. The SEAPOP programme (mapping and monitoring of seabird populations) is gathering important data on populations and on the reasons for the decline in many seabird populations. *Rovdata* was established in 2010 to run the national monitoring programme for predators in Norway and is an independent provider of monitoring data regarding large carnivores. A national programme for mapping and monitoring biodiversity was started in 2003, and has since then been compiling important data on terrestrial, freshwater and coastal habitat types. Information is made available through the portal *Naturbase*, but no specific monitoring programmes have been initiated through this programme. The Institute of Marine Research has since 2003 designed annual ecosystem surveys for the Barents Sea, and later also for the Norwegian Sea. The ecosystem assessments based on these surveys cover physical data and oceanography, sampling and counting of all trophic levels and produce lists of sampled species, as well as data on distribution, biomass, recruitment and age-distribution on selected species. The ecosystem assessments are presented in annual IMR-reports, ICES ecosystem reports, Arctic Council reports and more. The data is also made available for the Norwegian Nature Index which is one example of an initiative for more systematic compilation and presentation of information. Others are the red lists for species and for ecosystems and habitats, and the overview of alien species in Norway and Black List of alien species mentioned above, all which are published by the Biodiversity Information Centre. Quality norms for wild salmon stocks have been established under the Nature Diversity Act (see Chapter 5.2.1 and 6.3.3) and are a good example of how such tools can be used to build a common understanding of the situation in different sectors.

Biodiversity monitoring programmes now ensure that there is some extent of monitoring of all Norway's main ecosystems (the major ecosystems used for the Norwegian Nature Index). These are normally long-term programmes that provide valuable information on the fauna and flora. However, publications on the Nature Index point out that the current monitoring system is incomplete: a number of species groups are not being monitored, monitoring of certain ecosystems (particularly coastal waters) is incomplete, and the present monitoring programmes do not provide representative or complete geographical coverage. This is because environmental monitoring in Norway has tended to focus either on species that are harvested (game, wild salmon, etc) or on specific environmental problems (for example acid rain). We have fairly satisfactory information about vertebrates (fish, birds, mammals), but there are serious gaps in our knowledge of fungi, lichens, mosses, vascular plants and invertebrates. The Norwegian Environment Agency has the overall responsibility for coordinating monitoring in Norway, and the Norwegian Polar Institute is responsible for monitoring in Norway's Arctic areas. The county governors also play a key role in setting priorities and administration of monitoring programmes.

Universities and university colleges, research institutes, societies, consultants and individuals carry out monitoring tasks on behalf of the public administration. A number of government agencies also run monitoring programmes that are relevant to biodiversity. The fisheries sector is responsible for most monitoring of living marine resources. All these monitoring activities also provide input for Norwegian reporting on biodiversity to international conventions, agreements and cooperation forums, and for the calculation of Nature Index values.

Since 2005, the Norwegian Environment Agency has been drawing up action plans for selected habitat types and red-listed species. So far, there are more than 70 action plans dealing with some 150 red-listed species and 15 action plans for habitat types. Mapping and building up knowledge about these species and habitat types is an important element of the action plans.

5.1.2. Research

The Ministry of Climate and Environment channels most of its research funding through the Research Council of Norway. Two key research programmes are *Norwegian environmental research towards 2015*, and *The Oceans and Coastal Areas (2006–15)*. Several other programmes also include work on biodiversity in connection with research in areas such as business development and climate change. Important contributions to research on biodiversity are also made through the basic funding allocated to environmental research institutes. The Research Council programmes have an increasingly strong focus on international collaboration, particularly targeting EU instruments such as ERA-NET (for example BiodivERsA) and Joint Programming Initiatives (JPI).

5.1.3. Making information accessible

Norway has made good progress in developing databases and tools to communicate environmental information. The environmental authorities maintain a wide range of databases where large amounts of information is compiled, organised by topic, and made readily accessible. They include *Naturbase* (see below), *Villreinbasen* (wild reindeer) *Lakseregisteret* (wild salmon stocks), *havmiljø.no* (the environmental value of Norway's sea areas at different times of year) *Vann-Nett* (inland water bodies), *Elvedeltadatabasen* (river deltas), and *INON-basen* (areas without major infrastructure development).

The Norwegian Marine Data Centre (NMD) at the Institute of Marine Research maintains the largest collection of marine environmental and fisheries data in Norway. Its most important tasks are to collect, quality-assure and store marine environmental and fisheries data, and to make these data available for research. The Norwegian Environment Agency maintains the *Naturbase* portal, which provides spatial data on biodiversity, protected areas and areas set aside for outdoor recreational activities. The portal was established specifically as a land-use management tool, especially at municipal level (for example in connection with development projects and zoning plans). A new version of *Naturbase* was launched in 2013 with large quantities of new data and a faster and more user-friendly service. For the general public in Norway, the most important source of updated information on the state of the environment and environmental trends is the website *Miljostatus.no* (State of the Environment Norway). It includes a map service where large amounts of updated environmental information on a variety of topics can be displayed. In 2012, the website was also customised for tablets and smartphones. The Norwegian Biodiversity Information Centre also plays an important role in coordinating and providing access to environmental information. *Artskart* (Species Map Service) provides quality-controlled spatial data on species in Norway.

Norway's red lists (*2010 Norwegian Red List for Species* (Kålås et al. 2010b) and *Norwegian Red List for Ecosystems and Habitat Types* (Lindgaard and Henriksen 2011)) present assessments of the risk that species will become extinct or ecosystems or habitat types disappear in Norway over time (see Chapter 3.1.1). The assessments are based on international criteria developed by the IUCN, and provide a good basis for choosing appropriate policy instruments to improve the status of species and habitats. The red-list assessments are available in searchable databases on the Biodiversity Information Centre's website. The risk assessments carried out in connection with the Norwegian Black List of alien species (see Chapter 2.2.4) are available in a searchable database, and the same information is also available on the NOBANIS website (European Network on Invasive Alien Species). The Norwegian red lists and black list are all updated every five years.

During work on the Nature Index (presented in Chapter 3.1.2), a database has been built up containing all the information and assessments on which the index is based. This is to be further developed and made publicly available. It will then be possible to find information on all the Nature Index indicators, including status, trends relative to the reference state for the ecosystem, and pressures and impacts.

Norway Digital (*Norge digitalt*) is a broad-based initiative involving cooperation between municipalities, government agencies and other bodies that are responsible for providing spatial data. In addition to basic geographical data, it includes information on a variety of themes including land use, natural resources, and general environmental topics and planning data.

Statistics Norway cooperates with the environmental authorities to produce land-use and environmental statistics for Norway. In recent years, the availability of more detailed data has made it possible to produce land use and land cover statistics for the entire country using information from the register of real property, digital mapping data, and land cover maps from the Norwegian Forest and Landscape Institute.

5.2. Legislative instruments

The white paper *Norwegian biodiversity policy and action plan – cross-sectoral responsibilities and coordination* (St.mld. 42 2000-2001) focused on knowledge-based management of biodiversity and sectoral responsibilities combined with coordination of legal and economic instruments. It emphasised the need to safeguard areas of great value for biodiversity across sectors. After this action plan was published, two cross-sectoral legal instruments have been adopted that promote coordination across sectors. One is the Nature Diversity Act (see 5.2.1 below) and the other is the new Planning and Building Act (see 5.2.3 below). In addition, the Oslo Forest and Countryside Act (see 5.2.7 below) was adopted in 2009 and the Spatial Data Act in 2010. The latter is of crucial importance in ensuring access to and sharing of data for environmental and land-use management. Figure 8 shows other relevant legislation and how it relates to the priority areas of Norway’s environmental policy.

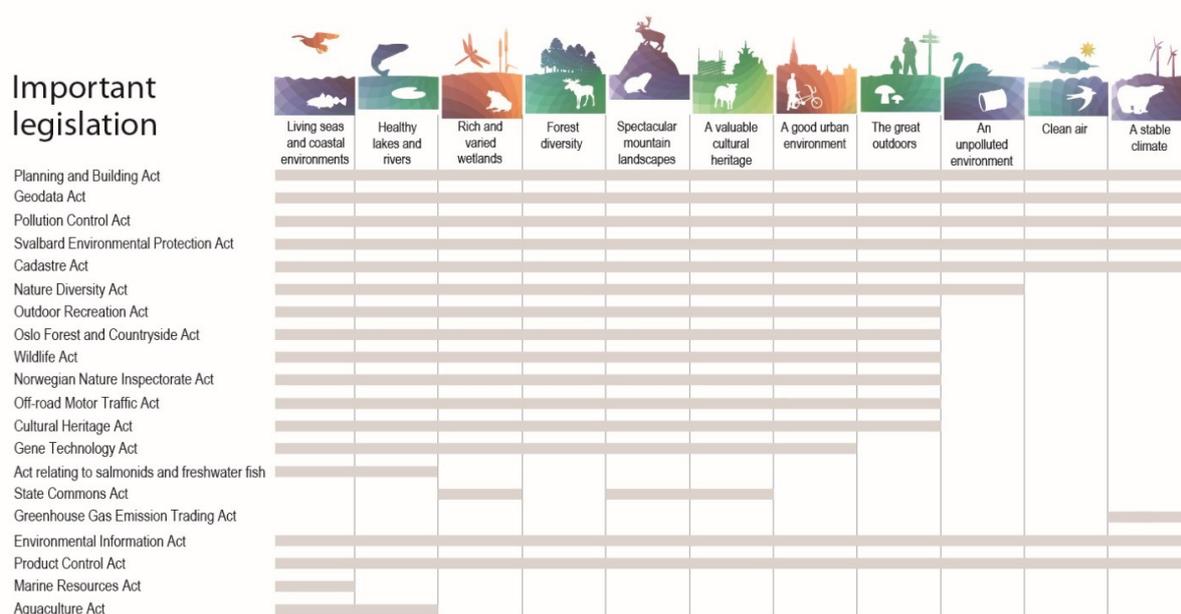


Figure 8: Overview of how Norwegian legislation relates to the priority areas of environmental policy.

5.2.1. The Nature Diversity Act

The Nature Diversity Act entered into force on 1 July 2009 and was nominated for the Future Policy Award 2010, which celebrated the best biodiversity policies. The Act was developed through an extensive consultation process involving all relevant economic sectors and other stakeholders. There was also a consultation process with the Sami parliament (see further information in Norway’s fourth national report). The purpose of this Act is to protect biological, geological and landscape diversity and ecological processes through conservation and sustainable use, and in such a way that the environment provides a basis for human activity, culture, health and well-being, now and in the future, including a basis for Sami culture. It is based on the concept of the intrinsic value of nature and recognition that biodiversity is the world’s most important resource and is also vital for people’s well-being. The act sets out rules and policy instruments for the management and protection of

biodiversity, including provisions on protected areas, priority species and selected habitat types.

The Act makes it possible to tailor the use of instruments to the status of a particular species, habitat type or ecosystem, to the relevant pressures or threats in a specific case, or to find a balance between environmental considerations and other public interests. The provisions on protected areas and priority species are intended to be used for distinctive or representative areas and for threatened or particularly valuable species or habitats, and in cases where Norway has international responsibilities. Once it has been decided to establish a protected area or designate a priority species, the environmental authorities and local management boards are responsible for their management.

It is also possible to designate selected habitat types under the Nature Diversity Act. This is a less strict designation, which is intended to safeguard habitat types through sustainable use rather than protection and to ensure that existing instruments are used across sectors to safeguard areas of great value to biodiversity. In addition, the Act includes provisions restricting the release of alien organisms (sections 28–32).

The principles for official decision-making set out in sections 8 to 12 of the Nature Diversity Act are intended to ensure a coordinated approach to safeguarding biodiversity across sectors. In addition to the requirement for knowledge-based management, these are the precautionary principle, the requirement to take an ecosystem approach and consider cumulative environmental effects, the user-pays principle and the requirement to use environmentally sound techniques and methods of operation. These principles ensure that there is a common approach to sustainable use. Guidance documents have been produced to ensure that the principles are applied in the same way across sectors.

Sections 4 and 5 of the Nature Diversity Act set out general management objectives for habitat types, ecosystems and species. They allow for the exercise of discretion and for a management approach where goals can be achieved in a variety of ways and using different time frames for different species and habitat types. Ultimately, if the objectives of sections 4 and 5 are to be achieved, certain decisions may be precluded – for example decisions that would in practice result in the extinction or loss of a species or habitat type. Nevertheless, when other important public interests need to be taken into consideration, it may be necessary to choose other ways of achieving the management objectives than those that would be ideal if the only consideration was the needs of the species or habitat type involved. To specify more clearly what is meant by good status for a species or habitat type, quality norms can be established under section 13 of the Nature Diversity Act. This has been done for wild salmon stocks in order to provide a target that is agreed by the Ministry of Climate and Environment and the different sectors that have impacts on wild salmon, and to build up a common understanding of the situation of the different stocks. Section 6 of the Nature Diversity Act lays down a general duty of care that applies both to the public administration and to private companies and individuals, and that requires everyone to take all reasonable steps to avoid damage that is contrary to the management objectives.

In addition to the elements of the Act that promote coordination, it contains new provisions in a number of other areas:

- it consolidates provisions on harvesting and other removal of species (with the exception of marine species);

- it consolidates provisions on alien species (so far only in force for non-native tree species);
- it clarifies the categories of protected areas, with one new category (marine protected area) and contains clearer provisions for all categories (national park, protected landscape, nature reserve, habitat management area, marine protected area) on when they can be used and the legal effect of establishing different categories;
- it establishes a better system of compensation for owners whose property is designated as a protected area, and simpler procedures that will provide a higher level of compensation;
- it includes provisions on access to genetic material.

A recent review of the application of the Nature Diversity Act by the municipalities (NINA rapport 964) concludes that although the legislation is widely and frequently used, it is uncertain what effect this has had on the decisions that are taken. An evaluation of the effects is therefore in progress.

5.2.2. The Nagoya Protocol and relevant national legislation

Chapter VII of the Nature Diversity Act incorporates Norway's commitments on genetic resources under the CBD. Norway ratified the Nagoya Protocol on Access and Benefit-sharing in October 2013. The Storting has adopted an amendment to the Nature Diversity Act providing the legal authority for regulations on traditional knowledge associated with genetic resources. To implement the Protocol fully, one or more effective checkpoints must also be designated. These developments are consistent with Aichi target 16. The Marine Resources Act regulates the use of marine genetic material. The King may prescribe that harvesting and investigations in the sea in connection with marine bioprospecting require a permit from the Ministry of Trade, Industry and Fisheries.

5.2.3. Register of environmental decisions

Regulations relating to the establishment of a register of environmental decisions were adopted in 2013 under section 68 of the Nature Diversity Act, and entered into force on 1 April 2014. They will be a tool for meeting the obligation of the public authorities to hold environmental information and make it accessible to the public, which is set out in section 8 of the Environmental Information Act. The duty applies primarily to regulations adopted and decisions made under the Nature Diversity Act, but also to decisions under other legislation if they affect an area of a selected habitat type. The municipalities will be required to publish all such decisions in the register.

5.2.4. The Planning and Building Act

A new Planning and Building Act entered into force in 2009 and paved the way for a better division of responsibilities between the central government, counties and municipalities. In mainland Norway (i.e. excluding Svalbard), 83 % of the total area is managed under the Planning and Building Act. According to the principles for official decision-making set out in the Nature Diversity Act, planning processes must include documentation of values related to the biological, geological and landscape diversity and the pressures and impacts in the area concerned.

The Act introduced several new instruments to ensure that biodiversity considerations and other important issues are taken more fully into account in land-use planning processes. The responsibility for land-use planning in Norway lies with the municipalities, but planning

processes must take place within the framework of national guidelines. Central government authorities can for example raise objections to plans that do not conform with national environmental targets. If objections are put forward, the Ministry of Local Government and Modernisation makes the final decision. One of the new instruments in the Act is the designation of zones where special considerations apply, in other words where particular factors must be given weight or there are restrictions on the way the area can be used. The Act also sets out more clearly defined land-use purposes and the types of provisions that may be included in zoning plans, and authorises the inclusion of requirements for further investigations prior to the implementation of plans and investigations with a view to monitoring and clarifying environmental and other impacts.

The Norwegian red lists provide the municipalities with a good overview of habitat types and species that need special consideration in land-use management given their status, trends or the pressures and impacts affecting them. The Government can make use of the planning tools described above to identify species, habitat types or ecosystems that it is particularly important to take into account in land-use management. This has for example been done in the river basin management plans and regional management plans for wild reindeer.

The Planning and Building Act also requires the preparation of Government expectations for regional and municipal planning every four years. This was done for the first time in 2011, and the document focused on the following topics: climate, climate change and energy; urban development; transport and infrastructure; value creation and business development; the natural and cultural environment and landscapes; and health, quality of life and the situation of children and young people.

5.2.5. Regulations relating to environmental impact assessment

Norway's Regulations relating to environmental impact assessment were updated in 2009. They implement the EU directives on environmental impact assessment (EIA) and strategic environmental assessment (SEA) in Norwegian law, and apply to plans and projects in all sectors except offshore petroleum activities. The revised regulations also introduced elements from the Nature Diversity Act as a basis for screening projects listed in Annex II of the EIA directive. In the same way as for planning under the Planning and Building Act, it has been a challenge to ensure that EIA and SEA processes take the requirements of the Nature Diversity Act into account, particularly section 10 on using an ecosystem approach and considering cumulative environmental effects. A need for guidance and practical methodology has been identified, both for assessment of individual projects (EIA) and for assessment of public plans and programmes (SEA). The regulations are currently being revised.

5.4.6. Strategic environmental assessment for offshore windpower

Norway adopted an Act on offshore renewable energy production (the Offshore Energy Act) in spring 2010. This introduced a two-stage system for considerations of any establishment of wind farms or other renewable energy production offshore. First, an assessment of which areas are suitable for wind power is required, together with a strategic environmental assessment as a basis for deciding which areas should be opened. Next, environmental impact assessments are required in connection with applications for specific projects in areas that have been opened. An SEA has been drawn up, involving close cooperation between the energy, environment, fisheries, petroleum and shipping authorities, and was published in December 2012. It presents an assessment of 15 areas off the Norwegian coast that had previously been found to be suitable for wind power developments. The potential impacts on seabirds, fish, marine mammals and benthic organisms were assessed, together with the

environmental risk associated with wind farms. A new approach has been developed for assessing and ranking the different areas, which is also considered to be of interest for other types of strategic environmental assessments.

5.2.7. The Oslo Forest and Countryside Act

The Oslo Forest and Countryside Act applies to the large areas of forest and other countryside in Oslo and neighbouring municipalities, which are popular outdoor recreation areas for about 1.2 million people. The Act gives the boundaries of these areas legal status, and is intended to encourage and provide opportunities for outdoor recreation, enjoyment of the natural environment and sport.

5.2.8. The Marine Resources Act

The aim of the Marine Resources Act is to ensure sustainable and economically profitable management of wild living marine resources and genetic material derived from them, and to promote employment and settlement in Norway's coastal communities. Core elements in the act are highly relevant to maintaining biodiversity (three principles from section 7): a) a precautionary approach, in accordance with international agreements and guidelines, b) an ecosystem approach that takes into account habitats and biodiversity, f) ensuring that harvesting methods and the way gear is used take into account the need to reduce possible negative impacts on living marine resources

5.2.9 The Aquaculture Act

The Aquaculture Act promotes the profitability and competitiveness of the aquaculture industry within the framework of a sustainable development and contributes to the creation of value on the coast. The acts comprise a legal base for regulations on the ecological impact of aquaculture and thereby safeguard biodiversity. A series of regulations based on this legal base have entered into force to promote environmental sustainable aquaculture.

5.3. Economic instruments

The economic instruments that are most important in relation to biodiversity can be divided into three main categories: grant schemes, compensation schemes and taxation schemes.

Grant schemes receive allocations from the Storting, and the rules governing them are generally in the form of regulations, normally one set of regulations for each grant scheme. The different grant schemes can be grouped into categories according to how they influence biodiversity:

Grant schemes that safeguard biodiversity or promote biodiversity concerns. Grants are awarded to people or organisations whose activities have a positive impact on biodiversity. For example, grants can be paid towards the management of selected habitat types and priority species, thus safeguarding biodiversity. Other examples are grants for measures to maintain the environmental value of forestry areas and for management of the cultural landscape. Grants are also available for mapping biodiversity and preventing losses of livestock to predators.

Furthermore, there are grant schemes whose main purpose is not related to biodiversity. Some schemes may in fact have a negative impact on biodiversity. Examples are grants for forest road construction which are important for the forestry industry but may also have negative impacts on biodiversity. Forest road construction is therefore regulated by law, in order to secure that environmental concerns are duly considered.

There are also grant schemes that may have indirect impacts on biodiversity. For example, grants are available for wool production. These encourage farmers to keep sheep, making it easier to maintain open cultural landscapes that are dependent on grazing.

The second category of economic instruments is compensation schemes. Some of these provide monetary compensation to parties who are affected by decisions or official policy: for example landowners whose property is designated as a protected area or farmers who lose livestock to predators. Other compensation schemes are intended to restore the environment to its original state or prevent further damage. The Nature Diversity Act's rules on the duty to pay environmental compensation mean that anyone who contravenes the Act in a way that causes environmental damage may be liable to pay compensation. People who are responsible for environmental damage may also be required to cover the costs of remedial measures or mitigation of the damage and these are also ways of penalising the offence (see Chapter IX of the Nature Diversity Act).

Taxation schemes are the third category of economic instruments, and may have either positive or negative effects on biodiversity. In the environmental field, taxes are used mainly to encourage a shift to more environmentally friendly behaviour, but there are also cases where taxes are intended to fund environmental protection measures. However, there are also elements of the taxation system that have negative effects on biodiversity. For example, some industries are entitled to tax deductions or are exempt from certain taxes, which can encourage activities with negative impacts on biodiversity.

Norway's national budget includes a set of indicators that are used to monitor progress towards the targets of its sustainable development strategy. Some of the indicators are related to biodiversity, including two for trends in Nature Index values (for open seas and coastal waters, and for freshwaters, wetlands and the mountains; forests; and open lowland) (see also part III: Aichi targets 2 and 3).

No general steps have been taken to improve the coordination of economic instruments since Norway published its first NBSAP. The new system of selected habitat types under the Nature Diversity Act was intended to coordinate how considerations relating to such habitat types are weighted. So far, Norway has only achieved limited success in coordinating such decisions across sectors. Possible ways of coordinating economic instruments in order to improve protection of biodiversity have been discussed in the legislative history of the Nature Diversity Act and in the Official Norwegian Report presented below and under aichi target 14, part III.

The rich diversity of living organisms is the basis for our existence, for economic growth and for the quality of people's lives and their wellbeing. Norway's biodiversity provides the foundation for a wide range of ecosystem services, which are of vital importance for human well-being and socio-economic development.

In August 2013, an expert committee submitted its recommendations to the Minister of the Environment in the form of an Official Norwegian Report entitled *Natural benefits – on the values of ecosystem services* (NOU 2013.10). A broad-based public consultation process has been held on the report's conclusions and recommendations, with 1 January 2014 as the deadline for responses. The Government will use the responses that have been received in deciding how to follow up the work and recommendations of the committee.

The committee's summary and conclusions are available in English:

http://www.regjeringen.no/pages/38495570/PDFS/NOU201320130010000EN_PDFS.pdf

Further information about the committee's mandate and work is available here:

www.regjeringen.no/okosystemtjenester.

5.4. New biodiversity strategy and action plan

The Norwegian Government is in the process of drawing up its new National Biodiversity Strategy and Action Plan (NBSAP) to halt the loss of biodiversity and implement national environmental targets and the Aichi targets. Plans for this is further presented under Aichi target 17 in part III of the report.

6. Actions taken under each national priority area to implement the Convention

This chapter describes what actions Norway has taken since its fourth report to implement the Convention, and the outcomes of these actions. This adds to the discussion of knowledge-based management, legislative instruments and economic instruments in Chapter 5 and the measures presented in Part I. The first section describes how biodiversity is being mainstreamed in sectoral strategies, plans and programmes, and this is followed by a presentation of actions under each of the priority areas of Norwegian environmental policy.

6.1. Mainstreaming biodiversity into relevant sectoral and cross-sectoral strategies, plans and programmes

The cross-cutting nature of many environmental policy issues means that it is essential to consider the whole picture and find a balance between different public interests to gain support for action. The origins of many environmental problems and their effects and the possible solutions involve a variety of sectors. Norway's first NBSAP (see Chapter 5) established that all authorities, industrial sectors and other relevant actors must play their part in efforts to ensure the conservation and sustainable use of biodiversity. The ministries are responsible for integrating biodiversity concerns into their work, and for encouraging subordinate agencies, industrial sectors and voluntary organisations in areas related to their spheres of responsibility to follow up the national biodiversity targets. The ministries are also responsible for long-term development of expertise and for management-oriented monitoring and research activities within environment-related areas of responsibility in their own sectors. A common understanding and knowledge base among the environmental authorities and other ministries and important actors is key for a constructive dialogue and an integrated approach to environmental problems. As mentioned in Chapter 5.3, Norway's national budget contains sustainability indicators, including biodiversity indicators based on the Nature Index. Sectoral responsibilities are further described in Norway's first NBSAP and fourth national report to the CBD. Steps to integrate biodiversity into relevant sectoral and cross-sectoral strategies, plans and programmes are described under each of the ecosystems presented below.

6.2. Priority area 1 Living seas and coastal environments

6.2.1. Integrated management plans for Norway's sea areas

Integrated, ecosystem-based management plans have been drawn up for all Norway's open sea areas. They strike a balance between facilitating value creation and the need to safeguard

marine ecosystems. Particularly valuable and vulnerable areas of great importance for biodiversity and for biological production in the sea areas are identified on the basis of scientific assessments, using predefined criteria. The designation of areas as particularly valuable and vulnerable does not have any direct effect in the form of restrictions on commercial activities, but indicates that these are areas where it is important to show special caution – e.g. by making activities in such areas subject to special requirements.

6.2.2. Marine protection areas

The establishment of marine protected areas (MPAs) is an important tool of an integrated policy for the marine environment and of ecosystem-based management. In addition to preventing the loss of biodiversity, MPAs are intended to maintain a representative selection of marine environments for future generations, in accordance with Aichi target 11, and also as reference areas for research and environmental monitoring. Norway is developing the work on MPAs. The first three MPAs under the Nature Management Act were established in 2013. The national parks Hvaler and Færder in southeastern Norway covers both marine and terrestrial areas. Furthermore, nine coral reef complexes have been protected under the Marine Resources Act against damage by activities in the fisheries.

6.2.2.1 Management measures for marine and coastal waters around Svalbard and Jan Mayen

After extension of the protected areas between 2002 and 2008, 87 % of the territorial waters of Svalbard out to the 12-nautical-mile territorial limit and most of the internal waters of the archipelago (inside the baseline) are protected as nature reserves or national parks. Inside these areas, vessels are only allowed to carry light marine diesel on board. The ban on heavy oil reduces the possible consequences of a spill considerably. The environmental authorities have drawn up a draft management plan for the two large nature reserves that cover most of the eastern part of the archipelago. In these nature reserves the seabed is also protected (with the exception of schrimp fishing at depths below 100 meters). Work on a management plan for the national parks in the western half of the archipelago has been started. The territorial waters of Jan Mayen are also protected as a nature reserve. Polar bears are particularly vulnerable to the impacts of climate change, and the Polar Bear Specialist Group, which has members from all the polar bear range states and is chaired by Norway, has drawn up a joint monitoring plan for the species. Norway has also drawn up a national action plan for polar bears. Norway is currently assessing the current arrangements for species management in and around Svalbard, focusing particularly on species that are harvested and red-listed. The likely implications for environmental management on Svalbard of projected future climate change is also being assessed.

6.2.3. Fisheries management

The most important part of the legislative framework for Norwegian fisheries management is the 2009 Marine Resources Act. In contrast to earlier legislation, it applies to all living marine resources and genetic material derived from them, and not only to resources exploited by traditional fisheries. The Act makes it clear that management decisions must be taken within a sustainable framework, and based on sound technical and scientific knowledge.

According to the Act, importance must be attached to the following fundamental considerations: taking a precautionary approach and an ecosystem approach, ensuring effective control of harvesting and other forms of utilisation, appropriate allocation of resources, optimal utilisation of resources, reducing possible negative impacts of harvesting methods, and maintaining the material basis for Sami culture.

This approach has been implemented in fisheries management. Every year the Directorate of Fisheries and the Institute of Marine Research draw up a list of stocks that need to be particularly carefully managed. Up-to-date research data for these stocks are evaluated and new management measures are considered. If complete closure of a fishery is likely to have severe effects on other public interests or coastal communities, the fisheries authorities may instead draw up plans that will allow a stock to rebuild, but more slowly. Instead of stopping all catches, quotas can for example be reduced for 5–10 years. Norway seeks to ensure sustainable harvesting of all commercial stocks, and has therefore introduced a ban on fishing for some species, including European eel (*Anguilla anguilla*), spiny dogfish (*Squalus acanthias*) and basking shark (*Cetorhinus maximus*).

Norway prohibits discards of fish in its Economic Zone, requiring all catches to be landed. The focus on the problem of discards has encouraged the development of more selective gear. In 2009 further gear restrictions were introduced in coastal waters. The main aim was to protect coastal cod, but the restrictions have also had positive effects on other species. In 2011, new regulations were introduced restricting bottom fishing activities in the Economic Zone of Norway, the fisheries zone around Jan Mayen and the Fisheries Protection Zone around Svalbard. Their purpose is to protect vulnerable benthic habitats, including all areas where the water depth is more than 1000 metres. Only vessels holding a special permit are allowed to fish in areas deeper than 1000 metres. The regulations also require vessels to record quantities of live coral or live sponge in their catches as indicators of vulnerable habitats, and to leave the area if the quantities specified in the regulations are exceeded.

6.2.4. Marine invasive alien species

It is a challenging task to deal with the spread of invasive alien species in the marine environment. Norway is focusing particularly on two invasive species at present and the red king crab (*Paralithodes camtschatica*). The red king crab was intentionally introduced into western Russian waters (the eastern Barents Sea) from the northern Pacific in the 1960s, and is considered impossible to eradicate completely since it has been fully integrated in all life stages in the East-Finnmark and Russian water ecosystems. Norway has therefore chosen a management regime with commercial catches in its most easterly waters and catches intended to control the size of the population in all other areas. King crabs feed on benthic species such as sea stars, brittle stars and bivalves and change the species-, size- and age distribution of the native prey species on the areas they inhabit. Changes in water temperature may also lead to the spread of new species such as the Pacific oyster (*Crassostrea gigas*) and marine algae, which could affect existing trophic networks. The Norwegian Environment Agency has published recommendations regarding marine invasive alien species (NEA 2013). Climate change will make the marine and coastal waters of Svalbard more vulnerable to alien organisms from more temperate areas, such as the snow crab, and an action plan for dealing with alien organisms in and around Svalbard is being drawn up.

Norway has ratified the International Convention for the Control and Management of Ships' Ballast Water and Sediments (the Ballast Water Convention). When the convention, which includes requirements for treatment of ballast water before it is discharged, enters into force, the risk of the spread of alien species via ballast water is expected to be considerably reduced. When the convention enters into force, the risk of the spread of alien species via ballast water is expected to be considerably reduced. Norway has already adopted its own regulations on ballast water, which entered into force in 2010. They require ballast water exchange to take place at specified distances from the coast or in specified zones to avoid the introduction of

alien species. The regulations provide for ballast water treatment on a voluntary basis before the convention is in force so that new technology can be tested.

6.2.5. Coral reefs and other vulnerable benthic ecosystems

A number of the measures mentioned in the preceding sections, such as the requirement for fishing vessels to leave an area if there is too much live coral or sponges in their catches or establishing protection of coral reef complexes, help to protect vulnerable benthic ecosystems. However, better protection of such ecosystems is still to be developed. . Mapping of the seabed, including new discoveries of vulnerable ecosystems, is therefore very important. Systematic mapping of the seabed is being carried out through the MAREANO programme (further described in section 5.1.1).

Section 6.2.1 on the integrated management plans for Norway's sea areas mentions "particularly valuable and vulnerable areas", which are relatively large areas where biodiversity is high and there are vulnerable ecosystems. In these areas, special caution is required when carrying out commercial activities, and there may be restrictions on the types of activities that are permitted.

The sugar kelp (*Saccharina latissima*) forests along Norway's Skagerrak coast have proved to be vulnerable. It is important to improve knowledge of such vulnerable ecosystems, for example through monitoring. The Norwegian Environment Agency has been monitoring sugar kelp since 2009. Action plans are being drawn up for dwarf eelgrass (*Zostera noltei*), seabirds and European flat oyster (*Ostrea edulis*).

6.2.6. Aquaculture management

In 2009 the Government published the *Strategy for an Environmentally Sustainable Norwegian Aquaculture Industry*. Five main ways in which aquaculture may have negative impacts on the environment have been identified: genetic interaction/escapes, pollution, diseases and parasites, use of coastal waters, feed and feed resources.

Escaped farmed fish and sea lice (*Lepeophtheirus salmonis*) are regarded as the most important threats to wild salmon and sea trout. Norway has therefore focused on preventing the escape of farmed fish. The regulations on technical requirements for floating aquaculture installations (NYTEK) were revised in 2011, and similar instruments for land based aquaculture facilities are being implemented. Indicators and thresholds for acceptable levels of farmed fish on salmon spawning grounds in rivers are also being developed.

The Aquaculture Act was amended in 2013 to provide a legal basis for introducing requirements to identify/tag aquaculture organisms. This is important as a basis for distinguishing between wild and escaped salmon, and so that the owner can be identified if salmon do escape. The amendments also provide a legal basis for introducing requirements to use aquatic organisms that cannot reproduce, such as sterile fish. This would reduce the consequences of escapes of farmed salmon. Both these measures must be carefully evaluated before they are made compulsory.

To promote new and more environmentally friendly solutions in the aquaculture industry green licences are being allocated to operators who are willing to use technology and operating techniques that are more eco-friendly than those used in normal commercial operations today. To be allocated one of these licences, an operator must undertake to operate in a way that results in less environmental pressure than ordinary commercial operations, either by reducing the risk of escapes or by keeping the incidence of sea lice below a specified level.

6.2.7. Reducing the risks related to shipping and offshore oil and gas activities

Pollution can arise during normal activities (operational discharges) or as a result of accidents (spills from offshore installations, shipping or from onshore sources).

6.2.7.1. Reducing pollution and other impacts of offshore oil and gas activities

According to the zero-discharge targets for the petroleum industry on the Norwegian continental shelf, there should as a general rule be no discharges of oil and environmentally hazardous substances. This applies to both added and naturally occurring hazardous substances. Through application of the health, environment and safety regulations for the petroleum sector and conditions in discharge permits, the Norwegian Environment Agency limits discharges from oil and gas activities. The industry is subject to strict requirements to substitute hazardous chemicals with less hazardous chemicals, reduce discharges of pollutants and develop new technology. This approach has reduced pollution from the oil and gas industry. The zero-discharge target is considered to have been achieved for added hazardous chemicals. The operating companies are required to carry out environmental monitoring to obtain information on the actual and potential impacts of their activities. If drilling is to take place in areas where there are corals or other vulnerable benthic organisms, strict conditions are set to prevent sediment deposition that can damage the fauna.

6.2.7.2. Reducing the risk of maritime accidents and acute pollution

Emergency preparedness and response to oil spills is organised in cooperation between the state, municipalities and the private sector. Various measures have been implemented both by the authorities and the petroleum industry to reduce the risk of maritime accidents and the risk of oil and other pollution in coastal habitats. They include traffic separation schemes that route high-risk traffic further away from the coast. With the new schemes established off Western and Southern Norway in 2011, there is now a continuous system along the whole Norwegian coast. In 2012, a mandatory ship reporting system was established in the Barents area (the Barents SRS). Vessel monitoring around Svalbard is also being improved through satellite-based AIS and compulsory pilotageis being implemented. Strict regulation and an effective inspection and enforcement system for petroleum activities are important in preventing oil spills and minimising their impact. Furthermore, oil spill preparedness and response related to shipping and offshore oil and gas activities has been improved through substantial new funding for response equipment and vessels and measures to improve coordination among relevant actors.

6.2.8. International cooperation to protect marine areas

Norway takes part in international cooperation relating to the marine environment in a number of forums, including under the Convention for the Protection of the Marine Environment of the North-East Atlantic (the OSPAR Convention). Conservation of ecosystems and biodiversity is an important element of OSPAR's work.

Increasing economic activity and climate change are putting pressure on the Arctic environment, and an integrated approach is required to deal with both new and existing problems. As a member of the Arctic Council, Norway is also involved in the work of PAME (Protection of the Arctic Marine Environment Working Group), which among other things is exploring options for protection of areas of heightened ecological significance. Norway is also involved in the Circumpolar Biodiversity Monitoring Program (CBMP). Monitoring marine ecosystems and species is an important part of its work.

Norway is member of the Northeast Atlantic Fisheries Commission (NEAFC), where the process of BBNJ has been promoted and debated based on fisheries scientific perspectives.

This contributes to increase common understanding and close the gap between different competent authorities. Norway is also member of other RFMOs (ICCAT, NASCO NAFO and SEAFO).

Norway has concluded several bilateral and multilateral agreements on fisheries quotas. FAO's Code of Conduct for Responsible Fisheries is central to both fisheries and aquaculture management. Norway has played an active part in international efforts to reduce the problem of discards, and therefore welcomed the adoption of the FAO International Guidelines on Bycatch Management and Reduction of Discards in 2010. Norway is also part of the World Bank initiative Global Partnership for Oceans (GPO), which among other things seeks to protect biodiversity.

6.3. Priority area 2 Healthy lakes and rivers

6.3.1. Implementation of the Water Framework Directive

In 2007, Norway adopted the Water Regulation, which incorporates the EU Water Framework Directive into Norwegian law. The directive and the regulation are important tools for determining and achieving environmental objectives for groundwater, rivers, lakes and coastal waters. Since then, a great deal of work has been done to assess the environmental status of close to 30 000 water bodies (groundwater, rivers, lakes and coastal waters) in all parts of the country. These assessments will be used as a basis for the river basin management plans that are to be completed by the end of 2015. Norway has been divided into 11 river basin districts, and environmental objectives and programmes of measures for achieving them are being drawn up for each of them. Unlike many other environmental goals, the objectives of the Water Management Regulations are linked to ecological function, although limits for physical and chemical parameters provide useful support. This means that much of the monitoring that will be required in future will be linked to biological quality elements, which will require adjustments of sampling and analytical methods.

6.3.2. Integrated river basin management

In 2012–13, a review of the environmental status of Norway's water bodies and the risk of not achieving the environmental objectives was carried out. This showed that the status of about one third of all Norway's water bodies is not satisfactory.

In 2014, management plans for each river basin district are to be drawn up or updated. A public consultation process will be held for each plan before it is adopted by the competent authority (county council). According to the timetable, the Government will give the plans final approval towards the end of 2015. By 2018, programmes of measures must be in place so that they can be implemented by 2021, the deadline for achieving the environmental objectives. After this, the river basin management plans will be updated as necessary every six years.

There is no general ban on building along rivers and lakes, but municipalities can include provisions prohibiting building in these areas in their master plans. Most municipalities have done this.

6.3.3. Management of wild Atlantic salmon

About one fifth of the entire Atlantic salmon (*Salmo salar*) population is found in Norway, and we therefore have a special responsibility for the species. Management of wild salmon stocks is based on a policy document published in 2006 (Proposition No. 32 (2006–2007) to the Storting) on the protection of wild Atlantic salmon and completion of a system of national salmon rivers and fjords. This document described action to be taken in all sectors that have impacts on wild salmon. In 2013, quality norms were established for wild salmon stocks. These are intended as a tool for measuring the status of each stock, and to improve management efficiency. This is the first time quality norms have been established for a species under the Nature Diversity Act.

6.3.4. Sustainable energy production

Norway's hydropower industry is dominated by large-scale plants with storage reservoirs, constructed during the 20th century. Many of these developments were carried out without much weight being given to environmental considerations. This means that there is a relatively large potential for improving environmental conditions in Norwegian rivers where hydropower resources have already been developed.

According to the legislation, older hydropower licences can be revised to bring them better into line with current environmental standards. It will be possible to revise many of the existing licences before 2022. In 2013, the energy and environmental authorities carried out a general review of most of the developed rivers in preparation for the revision process. This showed that in many rivers, somewhat stricter environmental requirements in the licences could improve environmental status without much reduction in energy production.

The EU Renewable Energy Directive has been incorporated into the EEA Agreement. Norway must therefore fulfil major commitments to increase the share of renewable energy in the energy mix by the 2020 deadline. This will require both energy efficiency and energy saving measures and increased production from renewable sources. Since most larger rivers have already been developed, this has resulted in many applications and licenses for smaller-scale developments. It is scientifically difficult to assess the cumulative environmental effects of many small new developments in an area, especially in the longer term. The Norwegian authorities are therefore working on the development of better methodology. In addition, the energy authorities are now ensuring better coordination of applications for small-scale hydropower developments in the same geographical area so that assessments of the cumulative environmental effects can be improved.

6.4. Priority area 3 Rich and varied wetlands

6.4.1. Wetland conservation

A relatively large proportion of the area of wetlands in Norway, about 18 % of the total, is protected under the Nature Diversity Act. Nevertheless, there is considered to be a pressing need to establish more protected areas for most wetland habitat types. The protected wetland areas include 63 that are on the Ramsar list of wetlands of international importance. An overall evaluation of Norway's protected areas has been made, and a strategy for achieving protection of a representative selection of Norwegian nature, including wetlands, is to be drawn up (cf Aichi target 11). Implementation of the strategy may involve planning or initiating protection procedures for new areas in the course of 2014.

6.4.2. Maintaining the conservation value of protected wetlands

Management plans have been drawn up for most of the older Ramsar areas, but some of the areas that were designated in the period 2011–13 still lack management plans. This work will be continued in 2014. Management plans are also to be drawn up for other protected wetlands.

One priority species associated with wetlands and one selected wetland habitat type have been designated under the Nature Diversity Act, and action plans have been drawn up for both of these. Grants are available towards the management of selected habitat types and priority species.

6.4.3. Restoration of wetlands

Norway's goal is to restore at least half of the wetlands that have been damaged by 2020, and a national plan for restoration work up to 2018 is being drawn up.

6.4.4. Knowledge and information about wetlands

So far, Norway has five authorised wetland education centres. Many wetlands have a potential for nature-based tourism and suitable arrangements can be made for outdoor recreation, nature-based tourism and associated information activities. Projects to enhance value creation related to wetlands are being given priority, and support is available for arrangements for public access in wetlands, such as hides for bird-watching and photography, paths and boardwalks, and information boards. Such facilities attract tourists who are interested in birds and in nature generally, and can thus strengthen tourism and other commercial activities in surrounding areas. Arrangements for access also channel people to particular areas and can prevent disturbance in more vulnerable parts of the wetlands. In addition, they are likely to increase local people's interest in wetlands and their protection.

6.5. Priority area 4 Forest diversity

6.5.1. Protection of forest biodiversity

In the period 2005–14 some 218 nature reserves have been established in Norwegian forests, totalling 580 km² of productive forest. The largest of these, the Trillemarka–Rollagsfjell reserve, covers 147 km². The process of establishing reserves involves close dialogue with the municipalities involved and other relevant stakeholders. Currently, most protected areas in forests are established in state-owned areas or on a voluntary basis on privately owned land. There is a great deal of interest from landowners in voluntary protection, and there is broad political agreement that more forest needs to be protected in Norway. Allocations for forest conservation totalled NOK 331.1 million for 2014.

Norway's large carnivore management regime is based on the Bern Convention, the Nature Diversity Act and an agreement on large carnivore management concluded between the political parties in 2011. Ever since the first time a white paper on large carnivore management was published in the early 1990s, Norway has retained its dual goals of maintaining livestock grazing in forested and other uncultivated areas and maintaining viable populations of carnivores. The main tool for achieving both goals is a clear division into

zones where carnivores are given priority and other zones where livestock have priority. It is still a challenging task to achieve the dual goals.

6.5.2. Sustainable management of forests

An element in sustainable forest management is maintaining populations of naturally occurring species. The Forestry Act includes provisions giving forest owners responsibility for environmental measures. In the framework of forest management plans, there are provisions for registration of key biotopes and other environmental values. This provides a good basis for sustainable management of forest properties. Key biotopes and other environmental values have been registered in a large proportion of forest areas in Norway. Forest owners are required to take this information into consideration, and to plan forestry activities accordingly by for example avoiding logging where there are many red-listed species. Of the productive forest registered, approximately 1.8 % of the area is protected from logging in key biotopes as defined in the voluntary forest certification systems and in the legislation under The Forestry Act. The total area protected from logging in key biotopes is roughly 65000 hectares.

Most forest properties in Norway are certified through the Programme for the Endorsement of Forest Certification (PEFC), and some through the Forest Stewardship Council (FSC). A review of all certified forest properties has been carried out to ensure that there is no logging in areas set aside as key biotopes. If logging has reduced the value of key biotopes, compensatory areas must be set aside, and control and monitoring systems are to be established to prevent any recurrence. Efforts to develop a sustainable forestry industry are continuing, among other things by ensuring that logging is avoided in areas of high conservation value, as defined by the Nature Diversity Act.

Forestry management planning, environmental inventories in forests and the National Forest Inventory are key elements of Norway's forestry policy, together with R&D related to forestry and biodiversity. Two key approaches to biodiversity conservation in forests are cooperation between the public authorities and private landowners on voluntary protection and the development of standards for sustainable forest management

In 2012, forestry management plans including environmental inventories covering roughly 500 000 hectares were finalised and approved. The total area of commercially exploitable forests is 6.7 million hectares, and environmental inventories have been carried out for about 83 % of this area. New projects to develop forestry management plans have been started up in areas where environmental inventories have already been carried out. Existing data are being quality-assured and revised before they are incorporated into new plans. It will then be determined whether new inventories are needed.

6.5.3. Preventing the spread of alien organisms

One threat to forest biodiversity is the establishment and spread of invasive non-native tree species. Priority is being given to the removal of such species in protected areas to avoid habitat degradation and species loss.

It is also a requirement of sustainable forest management that the use of non-native tree species is under control. It has been documented that certain non-native tree species that have been planted in the past are spreading widely, including non-native tree species that have been planted. The Government's goal is for measures to contain and control the most invasive alien organisms that are established in forests to be initiated by 2015. In some protected areas, the environmental authorities have taken steps to remove non-native trees, mainly Sitka spruce (*Picea sitchensis*).

In 2012, new regulations were adopted under the Nature Diversity Act governing the use of non-native tree species for forestry purposes. By requiring a permit from the county governor for any new planting or sowing of non-native tree species, the regulations tighten control of their use. The goal is to prevent potentially adverse impacts on biological and landscape diversity. Regulations relating to the import and release of alien organisms are being drafted, and may introduce requirements to exercise due care and take reasonable steps to avoid the spread of other alien organisms in forests.

6.5.4. Enhancing the knowledge base

In order to identify the forest areas of most value for biodiversity, it is vital to improve the knowledge base, for example by mapping and documenting important areas. Once the areas of highest conservation value have been identified, it is possible to give them priority in conservation efforts and to take the information into account in municipal planning processes. Habitat mapping and the Norwegian red lists provide valuable information for forest conservation work and for finding key areas for threatened species and habitat types in forests. This kind of knowledge is made available to a variety of stakeholders and facilitates sound management and effective application of the principles of the Nature Diversity Act, such as assessing cumulative environmental effects and applying the precautionary principle.

6.5.5. Cooperation with the European Union on Forest Law Enforcement, Governance and Trade

In autumn 2010 the EU adopted a regulation prohibiting the import of illegally harvested timber. The legislation, which entered into force on 3 March 2013, requires EU traders who place timber products on the EU market for the first time to ensure that products have been harvested in accordance with the laws of the country of origin. This legislation is EEA-relevant, and national legislation to implement the EU Timber Regulation will enter into force as soon as the Timber regulation is finally included in the EEA Agreement. This is foreseen to take place in 2014. Importers and exporters have been informed of the regulations. The EU/EEA legislation complements Norway's other work at international level to reduce deforestation and ensure that timber is harvested legally, which is carried out in close cooperation with the Ministry of Agriculture and Food. Reference is made to section 9.4.1. regarding the Norwegian Government's International Climate and Forest Initiative.

6.6. Priority area 5 Spectacular mountain landscapes

6.6.1. New national parks and other protected areas

Since 2005, a total area of 15 000 km² has been given statutory protection in Norway, including 12 new national parks and over 350 nature reserves. In addition, two existing national parks have been expanded and a number of protected landscapes have been established adjoining national parks. Implementation of the nationwide national park plan and county protection plans is almost complete; as of January 2014, four proposals in the national park plan and one county protection plan remain to be dealt with. Once the network of national parks is complete, 27 % of Norway's mountain areas will be protected.

6.6.2. Safeguarding the value of protected areas

Management plans are required for all larger protected areas. These set out management and conservation targets as well as guidelines for use of the area, information, facilities for visitors and so on. In this way management plans can help to maintain and promote the environmental value of protected areas. The volume of traffic can make it difficult to safeguard the value of mountain areas that are particularly popular with visitors. In a number of places, paths are therefore being constructed to steer people away from vulnerable areas. The Norwegian Nature Inspectorate plays an important role in safeguarding species and habitats in the mountains.

Fifteen national park centres have been established to provide information and educate the public about the environmental value of the national parks. The aim is to establish an authorised national park centre for each of the national parks.

6.6.3. Local management

Management responsibilities for national parks and other large protected areas have recently been delegated to the local level, which gives the municipalities involved a greater sense of ownership and responsibility. So far, 43 local management bodies have been established. They include representatives from municipalities and county councils, and also from the Sámediggi (Sami parliament) in areas where there are Sami interests. In addition, people are being appointed to secretariats for the management bodies. They will be responsible for ensuring that the conservation value of protected areas is safeguarded in accordance with the regulations for each area and national objectives. Management must be based on sound scientific knowledge, and one approach being used to achieve this is to build up local or regional management hubs, generally sited together with national park centres or other kinds of nature information centres. The national park centres will thus become local knowledge hubs for managing protected areas, where a combination of management expertise and expertise in areas such as public education, guiding and nature-based tourism is available.

6.6.4. The value of protected areas to society

To increase the value of protected areas and other valuable areas of natural environment as a resource for social and economic development, a programme on Norway's natural heritage as a value creator was carried out in the period 2009–13. The programme has strengthened the position of existing businesses and resulted in the establishment of new ones close to protected areas, and it has fostered mutual understanding between those responsible for

environmental management and local businesses and communities. Norway now has five authorised wetland education centres and three predator information centres designed to help people to enjoy nature and learn about biodiversity. In 2014, experience gained from the value creation programme is being used in developing a grant scheme for value creation based on the natural heritage, a practical guide for how municipalities and others can use the natural heritage as a value creator, and a new branding and communication strategy for the national parks.

6.6.5. Land-use planning in mountain areas

The Planning and Building Act is the key instrument for land-use planning in mountain areas, and is important for managing the use of areas bordering protected areas. The Act provides for the designation of zones where special considerations apply adjacent to national parks and landscape protection areas to maintain conservation value. In areas where new holiday cabins are planned, priority must be given to ensuring that a continuous green structure is maintained.

6.6.6. Safeguarding areas without major infrastructure development

Although an individual development may not have major environmental impacts on the mountain environment, the cumulative effects of many small developments may include gradual fragmentation and increasing pressure on vulnerable mountain habitats. This is a key concern in mountain areas, for example in connection with the construction of energy infrastructure, and guidelines have therefore been drawn up for such developments. It is essential to avoid irreversible impacts in mountain areas that may harm the fundamental capital for Norway's nature-based tourist industry.

Svalbard, with the exception of a few settlements and areas where there is mining activity, still consists mainly of a large continuous area without major infrastructure development. One of Norway's targets is to retain the extent of wilderness-like areas in Svalbard. This is being achieved by the establishment of extensive protected areas (covering 65 % of the land area of the archipelago) and strict restrictions on developments in areas without major infrastructure development that are outside the protected areas. There has been no significant reduction in the area of Svalbard without major infrastructure development in the past ten years.

6.6.7. Managing individual species and selected habitat types in the mountains

One priority species, the lesser white-fronted goose (*Anser erythropus*), and several selected habitat types associated with the mountains have been designated under the Nature Diversity Act. Steps to implement action plans for these are being continued in 2014, and additional priority species and selected habitat types will be designated.

Norway has a special responsibility for managing wild reindeer (*Rangifer tarandus*). Their living areas include much more than the protected areas in the mountains. To ensure sustainable management of wild reindeer, regional management plans are being drawn up, and these will be used as a basis in further regional and municipal planning. There are now 23 management areas for wild reindeer populations in the southern half of Norway, ten of which have been designated a national conservation status where wild reindeer populations are to be

given special priority. There are also plans to establish larger conservation areas that reflect the original pattern of reindeer migration within Norway.

Since 2009 the most important ways of improving the status of the Arctic fox (*Vulpes lagopus*) in Norway have been the release of foxes from a captive breeding programme, supplementary feeding in the wild and control of red foxes. In 2009, the Arctic fox population in Norway was estimated to be at least 44 individuals. In 2013, the minimum population size was estimated at 118 individuals (see further information on the Arctic fox in Chapter 3.2.6).

6.6.8. Restoration

In 1999 the Storting decided to close the Hjerkin artillery range in the Dovrefjell mountains and establish a new site further south. Establishing a new artillery range always entails major environmental disturbance, and it was therefore decided to compensate for the disruption caused by the new artillery range through environmental restoration in the Dovrefjell area. The restoration programme began in 2006 and will continue until 2020. The area has been cleared of military waste (including undetonated explosives) and efforts are underway to revegetate the areas previously used by the defence forces. An environmental monitoring programme is being carried out to ensure that this work does not cause unnecessary damage to the natural environment and cultural heritage of the area.

6.7. Priority area 6 A valuable cultural heritage

6.7.1. Cultural landscape

6.7.1.1. Protecting biodiversity in the cultural landscape

Norway is using a variety of economic and legislative instruments to maintain the diversity of habitat types and species in the cultural landscape; these include the designation of selected habitat types and priority species, measures to control alien species, and cross-sector cooperation on specific environmental measures in agriculture. Various instruments used by the agricultural and environmental authorities encourage management and restoration of the cultural landscape and its biodiversity and help to prevent overgrowing and reduce the negative effects of intensive agriculture on areas of high conservation value. A number of economic instruments are being used to maintain areas of importance for species diversity, including pastures, hay meadows, coastal heathlands and tilled fields. These are all semi-natural habitat types, and their management and maintenance requires active use.

Legislative instruments for safeguarding biodiversity in the cultural landscape include the Nature Diversity Act, the Planning and Building Act and the Land Act. A good deal has already been done by designating priority species and selected habitat types associated with the cultural landscape under the Nature Diversity Act and drawing up and implementing action plans for these and the work on designating priority species and selected habitat types is continuing in 2014.



Figure 9: The corncrake (*Crex crex*) (picture), black-tailed godwit (*Limosa limosa*), least moonwort (*Botrychium simplex*) and black vanilla orchid (*Nigritella nigra*) are some of the species that now have their own action plans. Photo: Bård Bredesen

The Nature Diversity Act includes provisions restricting the release of alien organisms (for further details see section 5.2.1). Every year, management measures are carried out to contain and control alien organisms, including many escaped garden plants. Action plans have been drawn up for dealing with certain invasive alien species, as well as a system for detecting invasive alien organisms at an early stage of establishment so that action can be taken promptly. Steps have also been taken to enable more volunteers to report observations of invasive alien organisms through the national portal for species observations, *Artsobservasjoner*. Several counties have drawn up their own action plans for dealing with invasive alien organisms. Regulations on the import and release of alien organisms are expected to be finalised in 2014/15.

It is an ongoing task to ensure that agricultural policy instruments are designed so that they also help to achieve Norway's environmental policy targets. The environmental strategy published by the Ministry of Agriculture and Food gives priority for 2008–15 to following up the Government's environmental policy by strengthening and further developing environmental efforts within the agricultural sector. One objective is to maintain cultural landscapes and their environmental value through sustainable agriculture. It is important to ensure that environmental policy instruments such as are set out in the Nature Diversity Act and agriculture and food policy instruments are mutually supportive. Instruments under the Nature Diversity Act supplement the agricultural sector's environmental instruments in safeguarding selected habitat types and priority species.

The agricultural sector has introduced a range of measures to maintain and manage particularly valuable biotopes and habitat types and cultural monuments, sites and environments. The agricultural sector currently manages more than 15 000 hectares of coastal heathlands, and 10 000 animals are covered by a grant scheme for keeping livestock at pasture in these areas. In 2014 grant schemes apply to the following habitat types: hay meadows (including wooded hay meadows), mires traditionally used for haymaking, coastal heathlands, agrarian woodland and hollow oak trees. Coastal heaths are formed over the

centuries by clearing, grazing, burning and cutting. Both environmental and agricultural grant schemes provide support for managing coastal heaths.

A representative selection of 22 cultural landscapes of national importance has been established in Norway, using a classification of landscape regions in Norway developed by the Norwegian Forest and Landscape Institute. These selected agricultural landscapes are of great biological and historical value. Management plans are developed to maintain these values in cooperation with the farmers in the areas. In 2013, a total of NOK 14 million was allocated to the project on selected agricultural landscapes (nearly all of these are included in the national list). Mapping and knowledge generation are crucial to maintaining biodiversity in the cultural landscape. As part of the national programme for mapping and monitoring biodiversity, a project ran from 2003 to 2010 to map habitat types in the cultural landscape. This supplemented the habitat mapping for which the municipalities are responsible. The 3Q monitoring programme for the agricultural landscape is using birds and vascular plants as indicators of changes in biodiversity in the cultural landscape.

The county environmental protection departments are responsible for drawing up management plans for the highest-priority areas of cultural landscape, but the extent to which this has been completed varies. Cooperation between the agricultural and environmental sectors is vital in management work.

6.7.1.2. Genetic resources

The Svalbard Global Seed Vault is the world's largest seed repository for plants vital to global food security. This specially designed freezer facility contains duplicates of seeds from national and international gene banks all around the world. By the end of 2013, 56 institutions had deposited over 800 000 seed samples, representing roughly a third of the number of plant varieties currently stored in the world's gene banks.

The Ministry of Agriculture and Food has also contributed to the conservation and sustainable use of genetic resources for food and agriculture by strengthening the Norwegian Genetic Resource Centre, through international cooperation and dialogue with industry actors, and through measures to encourage businesses, farmers and voluntary organisations to make use of traditional plant varieties and livestock breeds. Priority has been given to following up and implementing strategies and guidelines under the Commission on Genetic Resources for Food and Agriculture and the International Treaty on Plant Genetic Resources for Food and Agriculture. Measures have been implemented to ensure the survival of livestock breeds listed as endangered and critically endangered. There are breeding programmes for a total of 13 plant species, including cereals, potatoes, fodder plants, fruits and berries. Gene banks for traditional varieties of cereals and potatoes have also been established, where interested farmers can obtain trial material. A strategy has been drawn up for *in situ* conservation of wild relatives of crop plants in the Norwegian flora.

Traditional varieties of plants that are cultivated from seed and potato varieties can be approved for inclusion on the Norwegian Official List of Varieties as conservation varieties. One of the EU directives on conservation varieties was incorporated into Norwegian regulations from 2010. The Norwegian Genetic Resource Centre approves varieties as conservation varieties so that seeds or seed potatoes can legally be produced and sold.

6.7.1.3. Runoff from agriculture

Nutrient runoff from agricultural areas is a threat to the water quality of vulnerable rivers, lakes and coastal areas. Milder winters and shorter frost periods have exacerbated problems related to runoff. In accordance with the objective of achieving good ecological status set out

in Norway's Water Management Regulations, the agricultural authorities are working at national, regional and local level to ensure that the agricultural sector is meeting its obligations.

Chemical pesticides can have harmful effects on health and the environment. A second Norwegian action plan, for the period 2010–14, retains the previous goal of reducing the risks associated with the use of pesticides.

6.8. Priority area 7 A good urban environment

Growth in towns is largely taking place through urban renewal and compact forms of development, making it very important to retain nature areas and maintain the quality of the outdoor areas that are available. Green spaces near people's homes are considered very important and is the setting for most everyday physical activity. It is further considered important to safeguard areas that support biodiversity in towns. In addition to forest and other nature areas adjoining towns, remaining stands of trees, old single trees, parks and rivers and streams are all important habitats for a wide range of plants and animals.

6.8.1. Cities of the Future

The Cities of the Future programme (2008–14) involves collaboration between central government bodies, the 13 largest cities in Norway and the business sector to reduce greenhouse gas emissions and make urban areas better places to live. One of its aims has been to develop more compact urban areas where people can walk and cycle rather than using cars. Fewer cars and less space used for roads will reduce pollution and make more room for cycle paths and green areas, which is good for people's health and contributes to climate change mitigation and adaptation. The urban population in Norway is expected to grow strongly in the next few decades. A new initiative is therefore being planned, and will target the urban areas where growth is fastest. Its aim will be to promote progressive urban planning and to meet growth by improving regional planning, improving public transport across municipal boundaries, enhancing urban centres and increased construction of housing. Better land-use management will improve the quality of life for the urban population in terms of more accessible residential buildings, less fragmentation/degradation of nature, improving the urban environment, and reducing travel times and pollution.

6.8.2. The Groruddalen programme in Oslo

The Groruddalen programme is a 10-year urban development programme in Oslo. Various projects are running until the end of 2016 and are being funded jointly by the Government and the City of Oslo.

The Groruddalen is a built-up area covering 40 km², a population of approximately 130 000, and comprises the eastern districts of Oslo. It lies in a shallow valley running east-west, with large areas of forest to the north and south that are popular for outdoor recreation.

The goals of the programme include enhancing biodiversity, opening up the Alnaelva river, improving water quality and further improving opportunities for outdoor recreation by establishing new parks and green corridors close to where people live. In the 1970s and 1980s, long stretches of the Alnaelva river were culverted. In addition the river has been heavily polluted. Opening up as much of the Alnaelva and its tributaries as possible, from its source in the forest to the Oslofjord, and reducing pollution are central elements of the programme, and this work is in progress. A wide variety of plants and animals has been registered in the Groruddalen area. Abundant and varied vegetation can add value to recreational activities. Projects that are ongoing include tree planting, maintaining

biodiversity and eradicating and controlling alien species.

Several parks have been established in the area as part of the programme. In one of them, called the Grorud park, the river flows into a lake where native wetland plants are used to improve water quality absorbing pollutants in surface runoff from roads and industrial areas (Figure 10 below). A new footpath/cycle track has also been constructed through the park along the riverside.



Figure 10: The river Alnaelva has been opened and runs partly as a waterfall that ends into a lake where native wetland plants are used to improve water quality in Grorud park. Photo: Marianne Gjørsv.

6.8.3. Nature close to home

Both the forest and countryside near urban areas and green spaces within them are important recreation areas for the population, and need to be safeguarded. In Norway, the state provides financial assistance to set aside areas for outdoor recreation areas and make arrangements for public access, and funding for areas in and near towns and urban settlements is given priority. Designated outdoor recreation areas include both spaces that are attractive for picnicking, bathing and other activities, and green corridors and other important parts of a continuous green structure near where people live. Relevant sectors of the government administration will cooperate with each other and with outdoor recreation organisations to establish continuous networks of footpaths. The aim is to ensure that it is never more than 500 metres from people's homes in towns and built-up areas to a network of routes and trails. Some of the funding for outdoor recreation areas and arrangements for access will be used for this purpose. In 2011, the Norwegian Environment Agency started a programme to encourage physical activity and safeguard more outdoor recreation areas close to and within population centres. Several pilot projects are being carried out to identify the measures that most effectively promote activity in green spaces near people's homes.

6.9. Priority area 9 and 10 A non-toxic environment and clean air

6.9.1. Reductions in long-range transboundary air pollution

In 2012, as a party to the Gothenburg Protocol, Norway took on further commitments to reduce emissions of SO₂, NO_x, VOCs, ammonia and particulate matter (PM_{2.5}) by 2020. The reduction of transport to Norway of transboundary air pollutants which may have adverse impacts on biodiversity, requires international regulation and cooperation. Norway has extensive monitoring of these substances and cooperates internationally on enhancing knowledge about emissions, transfers and effects. A number of policy measures have been implemented at national level in order to reduce pollutant emissions to air. Discharge permits

under the Pollution Control Act are an important tool for emission reductions of SO₂ and have in recent years been of particular importance in reducing emissions of non-methane volatile organic compounds (NMVOCs) from the loading and storage of crude oil offshore. A tax on NO_x emissions has been introduced. The Ministry of Climate and Environment and a range of trade organisations have adopted an agreement on reducing NO_x emissions; enterprises that commit themselves to the agreement are exempt from the NO_x tax. A tax on the sulphur content in mineral oils has been in force since 1993. The Ministry of Agriculture and Food has enacted new requirements relating to livestock accommodation and manure storage facilities in order to reduce ammonia emissions. Within the framework of the International Maritime Organization (IMO), Norway is working towards more effective rules to reduce emissions to air from shipping.

6.9.2. Hazardous substances

Norway is working actively towards global reductions in the use and emissions of hazardous substances¹⁷, and has in addition banned certain substances nationally, such as perfluorooctanoic acid (PFOA). Norwegian emissions from industry and other sources are regulated by means of prohibitions and through discharge permits under the Pollution Control Act. Since a large part of hazardous substances in Norway originates from other countries via imports of products and transport of long-range air pollution, international rules and cooperation are crucial. Norway plays an active role in international efforts, and is for instance seeking the introduction of bans and restrictions on more substances under the Stockholm Convention on Persistent Organic Pollutants (POPs), the Rotterdam Convention on the Prior Informed Consent (PIC) Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, and the heavy metals and POPs protocols under the Convention on Long-range Transboundary Air Pollution. Norway is also advocating steps to strengthen the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal. Norway played an active role in developing the new Minamata Mercury Convention. Moreover, Norway has endorsed the Strategic Approach to International Chemicals Management (SAICM), which promotes fundamental capacity-building for chemicals management in developing countries and is important in Norway's efforts to reduce global emissions of hazardous substances. The EU's REACH regulation on registration, evaluation, authorisation and restriction of chemicals has been incorporated into the EEA Agreement and into Norwegian legislation. Norway is playing an active role in further developing and improving this chemicals legislation. Norway has also been instrumental in international efforts towards stricter regulation of pollution associated with ships and shipping, such as the International Convention for the Prevention of Pollution from Ships (MARPOL) and the 2009 IMO convention for the safe and environmentally sound recycling of ships. Emissions from radioactive sources and the management of radioactive waste are governed by the Pollution Control Act and are under satisfactory control.

6.9.3. Contaminated soils and sediments

Remediation of polluted sediments is being carried out in accordance with an action plan for the 17 highest-priority sites in Norway. Activities have been initiated at all the priority sites. Such activities range from mapping, planning, coordination and pilot projects, up to full-scale remediation through capping or dredging and containment, and surveillance programmes. The Norwegian Environment Agency is also monitoring other contaminated sites. Remediation of sediments is a demanding task with high priority and substantial government funding. Steps are also being taken to deal with priority sites on land where there are

¹⁷ Substances that are hazardous to health and the environment, in particular priority substances that are persistent, bioaccumulative and toxic.

contaminated soils, including monitoring, mapping, examination and remediation. The main instruments in use are orders under the Pollution Control Act and the provision of government funding.

6.9.4. Waste

The management of non-hazardous and hazardous waste in Norway is well regulated and functions satisfactorily. However, Norway has not yet succeeded in any significant reduction in the total quantity of waste generated. Some specific types of waste will be targeted for further efforts. In 2013 a waste strategy was issued proposing various new measures, for example for dealing with end-of-life leisure craft, reducing food waste, and improving the collection of plastic waste from industry.

7. Information, public awareness and outreach activities

Communication and outreach activities by the Ministry of Climate and Environment and other parts of the public administration are important tools for implementing the Strategic Plan 2011-2020 and achieving the Aichi targets and Norway's own environmental targets. (See also Chapter 5.1.2 on making information accessible). Important efforts are also made by civil society in Norway. One key aspect of the work on outreach to the public is the continuous communication on political actions and decisions. Further efforts in outreach are presented below.

7.1. The International Year of Biodiversity

The UN declared 2010 to be the International Year of Biodiversity, and Norway organised a wide range of activities, coordinated by the environmental authorities. Some were aimed at the public in general while others were more specifically designed for children and young people, and many voluntary organisations were involved. A broad range of communication channels was used, and government support was provided for many events. Some of the activities that took place during the year were:

- A photo exhibition toured the country;
- A campaign targeted schools, including lectures and Norway's version of "species of the day". Schoolchildren were encouraged to record species observations and take part in a national competition to see how many species observations could be collected during the year. The competition was run in partnership with the media, including the national broadcaster.
- An interactive website was set up.
- A coordinated series of events was held to celebrate the International Day for Biological Diversity
- Activities were organised in public arenas such as music festivals, libraries, zoos, museums and science centres.
- The climate awareness campaign *Klimaløftet* focused particularly on biodiversity in 2010: schools could book a talk on the impacts of climate change on Norwegian nature, and other educational material was made available.

7.2. Activities in schools

The Ministry of Education and Research has adopted and published a revised strategy for education for sustainable development for the period 2012–15. It forms an integral part of the curricula for primary and secondary education. This strategy is the basis for the different educational learning resources that promote and educate pupils in biodiversity.

One of the main initiatives in the school sector is the “environmental rucksack” (*Den naturlige skolesekken*). This is a joint initiative of the Ministry of Education and Research and the Ministry of Climate and Environment. It funds projects in primary and secondary schools. The pedagogical approach is to develop new learning methods and arenas in biodiversity, from the classroom to the outdoor in local communities. Schools are encouraged to cooperate with local communities, voluntary organisations and other partners in outdoor education and to use a multidisciplinary approach.

A variety of websites are available for teachers as tools in their work; miljolare.no (some of the information is available on the English version of the website, sustain.no) is a tool for education on sustainable development, whereas miljostatus.no provides information to the general public, including an interactive map service, on e.g. endangered and invasive species (see more information on work to make information accessible in chapter 5.1.3.).

The Ministry of Climate and Environment also runs the project “green generation” (*Generasjon grønn*, <http://generasjongronn.no/>). Young people (“environmental ambassadors”) travel to schools to talk about environmental issues such as climate change and biodiversity loss, making use of their own experience and trying to inspire and interest secondary school pupils.

7.3. Nature information centres

National park centres and other kinds of nature information centres help raising public awareness about nature management and biodiversity. Each centre runs educational programmes, which combine training in practical outdoor skills with theoretical knowledge on local biodiversity. The idea is that experiencing nature at first hand can be an eye-opener and lead to a better understanding of ecological interactions. In addition to the 15 national park centres that have been established, there are several other centres dealing with specific topics that have been established with government funding. There are now five wetland education centres, three centres on predators, and one each for salmon, seabirds and wild reindeer.

7.4. The man and nature heritage programme

A national programme on local and traditional knowledge concerning the conservation and sustainable use of biological diversity called the “Man and nature heritage” (*Mennesket og naturarven*) was launched in 2011 by the Norwegian government. The programme is a direct result of the ongoing discussions concerning article 8j and 10 c in the Convention on biological diversity (CBD). The programme aims at safeguarding relevant traditional ecological knowledge, innovations and practices and systematise and communicate this. The project also offers information and advice that schools can use in their teaching, and is intended to raise awareness and enhance understanding of the environment and nature management. The Norwegian Nature Inspectorate (part of the Norwegian Environment

Agency) runs the project and collaborates with the The Árbiediehtu project on Sami traditional knowledge presented in chapter 8.1.

7.5. The Buzzing garden campaign

A national campaign to save the bees was launched by Norway's Minister of the Environment in May 2013. The campaign is being run by the Norwegian Horticultural Society in cooperation with The Norwegian Environmental Agency. In the campaign, people are being encouraged to help save the bees and other pollinating insects by making their gardens "bee-friendly".

The 2013 campaign was organised mainly on social media. Information on pollination and biodiversity in gardens was provided in video presentations and bloggers were recruited to spread information more widely. The campaign created a broad buzz in the social media and also gained a great deal of attention in mainstream media. It put the pollination issue firmly on the agenda.



Figure 11: Minister of climate and environment Tine Sundtoft and director of the Norwegian Horticultural Society Tove Berg planting a willow (*Salix* sp.), a popular plant to visit for bumblebees.

7.3. Civil society

Environmental groups and outdoor recreation organisations in Norway play an important role in raising awareness and spreading information on biodiversity, providing new ideas and running projects (see e.g. box 5). They also act as a corrective to the authorities. Friends of the Earth Norway, the Rainforest Foundation Norway and the Development Fund hold an annual seminar where topics related to the convention is presented and discussed. In 2013, the seminar focused on the Aichi targets, ecosystem services in the light of the recently published Official Norwegian Report (NOU 2013:10), and Norway's ecological footprint abroad.

Many volunteers play an important part in improving the knowledge base by registering species observations. To provide the voluntary sector with a more predictable level of support, the Ministry of Climate and Environment adopted regulations on grants to non-profit environmental organisations in 2011. Total funding for such organisations has risen from NOK 30 million in 2005 to NOK 58 million in the budget proposal for 2014.

Box 5: SABIMA and invasive alien species

The Norwegian Biodiversity Network (SABIMA) is an umbrella NGO for nine biological associations, which works to strengthen the protection of biodiversity in Norway. The nine associations cover the whole spectrum of plant and animal life, and their members carry out a great deal of biodiversity mapping and species registration on a voluntary basis. In 2013, one of SABIMA's priority areas was invasive alien species, and their work has received financial support from the Ministry of Climate and Environment. See Chapter 2.2.4 for more about the risks associated with invasive alien species in Norway.

SABIMA has also been cooperating with FAGUS, an umbrella organisation for the professional gardening and horticultural sector, to promote the use of native plant species in parks and green spaces. SABIMA is continuing work on good plant choices, planning and establishment of vegetation, and examples of best practice in the choice of native vegetation for gardens and urban green spaces in Norway. The organisation is also actively disseminating information on alien species, for example to the municipalities, which are responsible for dealing with garden waste, and to the general public.

8. Traditional knowledge and biological diversity related to Sami use

From 2013, the Ministry of Local Government and Modernisation has been responsible for Norway's Sami policy and policy vis-à-vis national minorities. The Ministry is responsible for providing a framework that will enable the Sami to further develop and strengthen their culture, language, way of life and economic activities. The Sámediggi (Sami parliament), together with the central government authorities, has initiated work on traditional knowledge as a means of implementing Article 8j of the CBD. Examples of initiatives on traditional knowledge and Sami use are presented below.

8.1. The Árbiediehtu project

Árbiediehtu is a Sami word meaning "traditional knowledge". The Árbiediehtu project started in 2008, and involves cooperation between the Ministry of Local Government and Modernisation, the Sámediggi and the Sami University College. The project's vision is that Sami traditional knowledge in Norway shall form the basis for viable local Sami communities and for public decision-making processes. This is to be achieved by furthering traditional knowledge as a local resource. The Sami University College has been focusing on capacity building, cooperation and partnership, and the importance of local knowledge bearers.

In May 2011, the Sami University College and the Sámediggi held the first Nordic conference dealing with Sami traditional knowledge, about people in a changing world. It was attended by researchers and representatives of the Sami parliaments and Sami

communities in the Nordic countries, and paved the way for Nordic cooperation in the field of traditional knowledge.

8.3. The CAVIAR approach: Sharing and integrating local indigenous knowledge and scientific knowledge

Arctic peoples are experiencing rapid changes in climatic, ecological, societal and economic conditions. The project Community Adaptation and Vulnerability in Arctic Regions (CAVIAR) started as part of the International Polar Year, and ran from 2007 to 2011. It was an international applied research consortium consisting of partners from the eight Arctic nations, including Norway.

CAVIAR's main goal was to identify the ways in which Arctic communities are being affected by changing environmental and social conditions, which is an important step towards the development of adaptive management strategies and policies.

Project partners conducted place-based field research across the Arctic, in close cooperation with local communities. Local voices and experiences were combined with scientific input to document and explain vulnerability and adaptation. A community perspective facilitates connections with local decision making and policy. The CAVIAR approach was to integrate local and indigenous knowledge with scientific knowledge, and to synthesise results of field studies in different communities. This approach is vital to understand how Arctic peoples can better deal with changing conditions. The project has published a number of reports on community adaptation and vulnerability in arctic regions.

9. International cooperation

Norway's ambition is to be at the forefront in developing ambitious, binding international cooperation on environmental issues. Norway's targets for international cooperation include playing a leading role in efforts to develop new and stricter environmental agreements, assisting partner countries to enhance their capacity and willingness to undertake and implement international commitments, and contributing to greener development and to the development of capacity and expertise in environmental and natural resource management through its development policy.

Norway has ratified a range of multilateral environmental agreements, and national implementation of these also contributes to achievement of the Aichi targets. They include the Ramsar Convention, the Bern Convention, the Bonn Convention, the Convention on Climate Change, the World Heritage Convention, the Convention to Combat Desertification, the OSPAR Convention, the Polar Bear Agreement, the European Landscape Convention, the North Atlantic Salmon Convention, the International Treaty on Plant Genetic Resources for Food and Agriculture and the Protocol on Environmental Protection to the Antarctic Treaty.

9.1. Science-policy interface

9.1.1. Trondheim Conferences

In its international cooperation, Norway focuses on enhancing the knowledge base and strengthening the links between science and policy-making. Norway has been hosting the Trondheim Conferences on biodiversity every three or four years since 1993. These conferences provide an opportunity for policy makers, managers and scientists to have an open and constructive dialogue and develop a transparent and scientifically sound basis for key issues being discussed under the CBD. The Trondheim Conferences are a result of collaboration between the CBD Secretariat, UNEP and the Norwegian Government. The conferences have proved to provide valuable input to the CBD by seeking to establish the best possible scientific basis for its implementation. The 2013 conference explored challenges involved in achieving Goal A in the Strategic Plan for Biodiversity 2011–2020. Goal A commits countries to address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society. In 2013 FAO, UNDP and the World Bank joined in as co-hosts of the conference. The Ministry of Climate and Environment cooperated closely with the Norwegian Environment Agency, the Ministry of Foreign Affairs, the Ministry of Finance, the Ministry of Agriculture and Food and the Ministry of Trade, Industry and Fisheries in arranging the conference.

9.1.2. The Intergovernmental Platform on Biodiversity and Ecosystem Services

Norway strongly supports the establishment of the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) and has been involved in developing the first work programme including through providing financial support for implementation of the programme. Norway considers capacity building a key element in IPBES's endeavours and the offer to host and finance a technical support unit for capacity building in Trondheim, Norway, is now being implemented. The unit will consist of 3 persons and will focus on capacity building in developing countries in support of IPBES efforts and work in line with decisions taken by the IPBES Plenary under the oversight of the IPBES secretariat in Bonn. In response to the call from the IPBES chairman, the Norwegian research community has been encouraged to take part in IPBES international work. These nominees will thus in various ways and capacities take active part in the development of international environmental policy.

9.2. Cooperation in the High North

Cooperation between the countries in the High North is intended to promote sustainable development through closer international cooperation on the use of natural resources, environmental management and research. The last remaining large areas without major infrastructure development and intact ecosystems in our part of the world are in the High North (see Chapter 3.2.7 on Arctic ecosystems). Through the Barents cooperation and participation in the Arctic Council, Norway is building up knowledge on climate change and the environment, and facilitating its use in management, climate change adaptation and planning in the High North. Cooperation also makes it possible to improve coordination of work on biodiversity conservation, hazardous substances and pollution generally, and climate change. Norway will continue its active role in the Arctic Council with these goals in mind. Environmental cooperation with Russia is a key element of Norway's work in the High

North. The marine environment, cross-border cooperation, biodiversity in the Barents region and reduction of pollution are some important fields where Norway and Russia are cooperating. Norway and Russia have for several years had a joint collaboration on monitoring and ecosystem assessments in the Barents and Polar Seas.

9.3. Cooperation with the EU

Norway will promote a sound environmental policy in Europe as a whole, and will continue its cooperation with the EU, which plays a leading role in the development of global environmental policy. Norway and the EU cooperate in a number of areas of relevance to biodiversity. The EEA and Norway Grants were first established when 10 new countries in Central Europe joined the EU in May 2004. The schemes are intended to reduce economic and social disparities in the EU and EEA (more information is available on <http://eeagrants.org/>) and to strengthen capacity building and implementation of EU's directives in different sectors. They are also intended to strengthen bilateral relations between Norway and the beneficiary countries. New agreements for the period 2009–14 were signed in 2010. Norway will provide roughly NOK 14 billion during this period for projects in the 13 most recent EU member states plus Greece, Portugal and Spain. In all, 30 % of the funding allocated to each beneficiary country must go to environmental measures. The agreement defines 32 programme areas, 13 of which are directly or indirectly important to the environment, climate change and cultural heritage areas. There are specific projects on integrated marine and inland water management, biodiversity and ecosystem services, renewable energy, climate change adaptation, and cultural heritage and ecotourism.

There is a long tradition of Nordic environmental cooperation, including the, Nordic Council and the Nordic Council of Ministers, and this continues to be important today.

9.4. Norway's environmental development cooperation

Development aid is an important measure for Norway to contribute to developing countries access to resources to protect biodiversity. This work shall contribute to sustainable development ensuring that in the long term nature can continue to provide the vital ecosystem services as a basis for improving living conditions. Norway's environmental development cooperation is based on recognition of the close links between environment and poverty.

Norway has bilateral environmental cooperation arrangements with China, India, South Africa and Brazil, which include a framework for the implementation of specific environmental projects and platforms for a scientific and political dialogue on global environmental problems. These countries have a large and increasing share of the responsibility for global environmental problems, but are also becoming pioneers in various environmental fields, and building up experience that both developing and developed country can benefit from. The bilateral cooperation arrangements are designed to build up environmental expertise and enhance the partner countries' capacity for sound environmental management and for implementing international commitments in the fields of climate change, biodiversity and hazardous chemicals.

The white paper *Towards greener development* (Meld. St. 14 (2010–2011)) provides a framework for cooperation between the Ministry of Climate and Environment and the Ministry of Foreign Affairs on environment in development cooperation. A sound knowledge base, the necessary institutions and adequate legislation are an essential basis for achieving greener development. Norway seeks to assist developing countries in finding a low-emission path of development and developing systems that ensure sustainable use of natural resources.

The government's initiative on climate and energy (Energy+), the Clean Energy for Development initiative and Norway's International Climate and Forest Initiative are elements in this effort.

The programme Oil for Development aims to transfer Norwegian expertise assisting developing countries to manage their petroleum resources in a way that promotes lasting poverty alleviation and incorporates environmental concerns. Biodiversity considerations are incorporated through land-use planning, environmental impact assessments, mapping and monitoring of species and habitats and vulnerability analyses. Organising environmental information and making it accessible is another key element of the Oil for Development programme.

9.4.1. Norwegian Government's International Climate and Forest Initiative

Norway has been supporting efforts to reduce deforestation and forest degradation in developing countries through the Norwegian Government's International Climate and Forest Initiative since 2008. The initiative's budget is around USD 500 million a year, making it Norway's single most important contribution to safeguarding biodiversity in the tropics. The funding is used to support projects that improve conditions for the world's biodiversity both directly and indirectly.

The overall goals of the initiative are:

- 1: To work towards the inclusion of emissions from deforestation and forest degradation in a new international climate regime under the UN Framework Convention on Climate Change.
- 2: To take early action to achieve cost-effective and verifiable emission reductions.
- 3: To promote the conservation of natural forests to maintain their carbon storage capacity and biodiversity.

Norway's objective is to achieve these goals while promoting sustainable development and poverty reduction.

Millions of people, including indigenous peoples and local communities, rely on the world's tropical forests for their livelihoods, and their rights and interests are also a fundamental element of the Climate and Forest Initiative. However, since it includes activities at several levels and focuses mainly on reducing emissions from deforestation and degradation, it is difficult to identify exactly how much of the total funding can be said to benefit biodiversity and forest dwellers directly.

The examples below show some of the ways in which the Initiative is helping to safeguard biodiversity and promoting the rights and interests of indigenous peoples and local communities.

- The secretariat of the CBD has received funding to explore relationships between REDD+ and biodiversity, develop indicators, publish a newsletter, and other activities.
- Norway is the largest donor to the UN-REDD Programme. One of its six work areas is ensuring multiple benefits of forests and REDD+. The UN-REDD programme has received funding to develop tools for integrating biodiversity considerations into national plans for REDD+ and for workshops and reports on multiple benefits (specifically biodiversity benefits) from REDD+. As part of this work, the UNEP World Conservation Monitoring Centre has developed a series of mapping tools for REDD+ multiple benefit analyses.
- In discussions within the framework of the UNFCCC, Norway is a supporter of robust social and environmental safeguards, for example to ensure the conservation of natural forests.
- Norway supports the UN-REDD programme and the World Bank's Forest Carbon Partnership Facility. Environmental and social issues such as designing an information system for multiple benefits, good governance and developing safeguards are an important part of the national plans being developed under these initiatives.
- Benefits for Biodiversity is emphasized in all of Norway's bilateral agreements with tropical countries, but is also supported indirectly through the chosen REDD+ methodology. Please see Norway's input of 20 February 2014 to the CBD notification Submission on views regarding follow-up to decision XI/19 on biodiversity and climate change related issues. It is Norway's view that REDD+ should focus activities on the reduction of gross deforestation in the short term. If the target is a reduction in net deforestation, this allows deforestation of high-biodiversity natural forest to be masked by increased regrowth and plantations of low-biodiversity commercial trees. Thus, the goal of reducing gross deforestation may serve as a rough interim safeguard against biodiversity loss, particularly in countries and areas with limited data.
- Norad (the Norwegian Agency for Development Cooperation) manages a climate and forest funding scheme for civil society. This provides support to a range of civil society organisations that are contributing to work on REDD+. Many of these are also working with indigenous peoples and biodiversity topics in the context of REDD+.

These are some examples of projects that are already under way. However, the greatest *potential* benefit to biodiversity from the Climate and Forest Initiative would be the development of an international framework that succeeds in slowing and ultimately halting deforestation and forest degradation in the tropics.

9.5. Quito dialogue

The governments of Ecuador, Sweden, India, Japan and Norway and the CBD Secretariat convened the Quito dialogue seminar in March 2012 "Scaling up Biodiversity Finance" to to

explore and contribute to understanding and seek to clarify areas of convergence and divergence regarding ways to scale up the mobilization of financial resources to support the achievement of the 2020 Aichi Biodiversity Targets. Norway was also one of the convenors of the second Quito Dialogue Seminar, in April 2014, “Scaling up biodiversity finance – with a focus on the value of biodiversity for policy choices, mainstreaming and funding”.

9.6. Wealth Accounting and the Valuation of Ecosystem Services (WAVES)

The WAVES project was launched by the World Bank in 2010, initially for a five-year pilot period. It is a global partnership aiming to promote sustainable development by ensuring that natural resources are mainstreamed in development planning and national economic accounts. Norway has been involved as a donor partner since the launch of the project, and is seeking to highlight the values of ecosystems in national decision-making processes

9.7. Trade and investment

Norway, together with Switzerland, Iceland and Liechtenstein, is a member of EFTA (the European Free Trade Association). In June 2010, the EFTA ministers decided that a chapter on trade and sustainable development was to be included in all future trade agreements, starting with those that were being negotiated at the time. The objective of mutual supportiveness between trade and environmental policies is a key component of these provisions, and such chapters include an article reaffirming the parties’ commitment to effective implementation of multilateral environmental agreements to which they are party, including the CBD and its protocols. The agreement between EFTA and Peru, which was concluded prior to this decision, includes an article on measures related to biodiversity in the chapter on protection of intellectual property. Similarly, the agreement between EFTA and Costa Rica and Panama incorporates a similar article on measures related to the protection of biodiversity and traditional knowledge in the annex on intellectual property rights, in addition to the chapter on trade and sustainable development in the main agreement.

Part III: Progress towards the 2020 Aichi Biodiversity Targets and contributions to the relevant 2015 Targets of the Millennium Development Goals

Part III starts by presenting Norway's progress in implementing the Strategic Plan for Biodiversity and the Aichi Biodiversity Targets (Chapter 10). Chapter 11 describes how actions to implement the Convention have contributed to the achievement of the relevant 2015 targets of the Millennium Development Goals. Chapter 12 provides an overview of the challenges and lessons learned in implementation of the Convention in Norway.

10. Implementation of the Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets

This chapter presents Norway's progress in implementing each of the Aichi targets of the Strategic Plan for Biodiversity. Most of the steps taken to implement the convention presented in Part II are also relevant here.

10.1. Aichi target 1

By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.

There are no national environmental targets that correspond directly to Aichi target 1. At present, the lack of precise indicators makes it difficult to draw conclusions about the extent to which this target has been achieved. However, Norway is taking action in various ways to raise awareness of the value of biodiversity (see also Chapter 7).

The national curriculum for both primary and secondary schools requires pupils to learn about biodiversity and human pressures on ecosystems. The Ministry of Education and Research and the Ministry of Climate and Environment run a joint initiative called the "environmental rucksack" (*Den naturlige skolesekken*), which includes a wide range of activities from local field studies to projects on energy efficiency.

The national portal State of the Environment Norway (Miljostatus.no) includes information on biodiversity and presents Norway's environmental targets and progress towards them using the associated indicators. An educational programme called "environmental journalists" (*Miljøjournalistene*) was started in 2011 to encourage schools to use Miljostatus.no and raise the level of knowledge about the environment in the school system.

Norway now has 23 authorised nature information centres: 15 national park centres, three centres on predators and five wetland centres (see chapter 7.3). These centres are open to

visitors and provide information on the natural world and outdoor activities people can enjoy. Staff from the Norwegian Nature Inspectorate have provided information and advice to almost 75 000 visitors in the period 2010–13.

In 2012, the Norwegian Environment Agency published webpages on ecosystem services, and in autumn 2013 an expert committee appointed to review the values related to ecosystem services in Norway delivered its recommendations in the form of an Official Norwegian Report (NOU 2013:10, see Chapter 5.3). The resulting debate in civil society forums and the media has resulted in a stronger focus on the goods and services society obtains from nature.

Norway has played an active part in the establishment of the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES), and hopes that in the long term it will be instrumental in achieving Aichi target 1, just as the IPCC has helped to raise awareness of climate change and its impacts.

Norway organised a wide range of activities in connection with the International Year of Biodiversity 2010. For further information, see Chapter 7.1.

Few public opinion surveys give direct information on progress in achieving Aichi target 1, but relevant findings from specific polls are discussed below. An analysis by the media monitoring service Opoint shows that the frequency of references to biodiversity has been rising since 2007, especially after the adoption of the Nature Diversity Act in 2009. In the period 2009–13, Opoint registered more than 6 000 items a year where biodiversity was mentioned.

Using case studies from Norway, Seippel et al. (2012) found that 41 % of the population was in favour of giving priority to biodiversity protection over other public interests, while half of the respondents had mixed views.

In 2013, almost 400 users took a web-based course on the Nature Diversity Act offered by the Norwegian Environment Agency. The course is intended mainly for municipal employees and others who use the legislation in their work. In addition the website miljokommune.no is a one-stop shop for municipal planning and environmental management, and for instance provides guidance and information on implementation of the Nature Diversity Act. Courses have also been held for a wide range of authorities in other sectors.

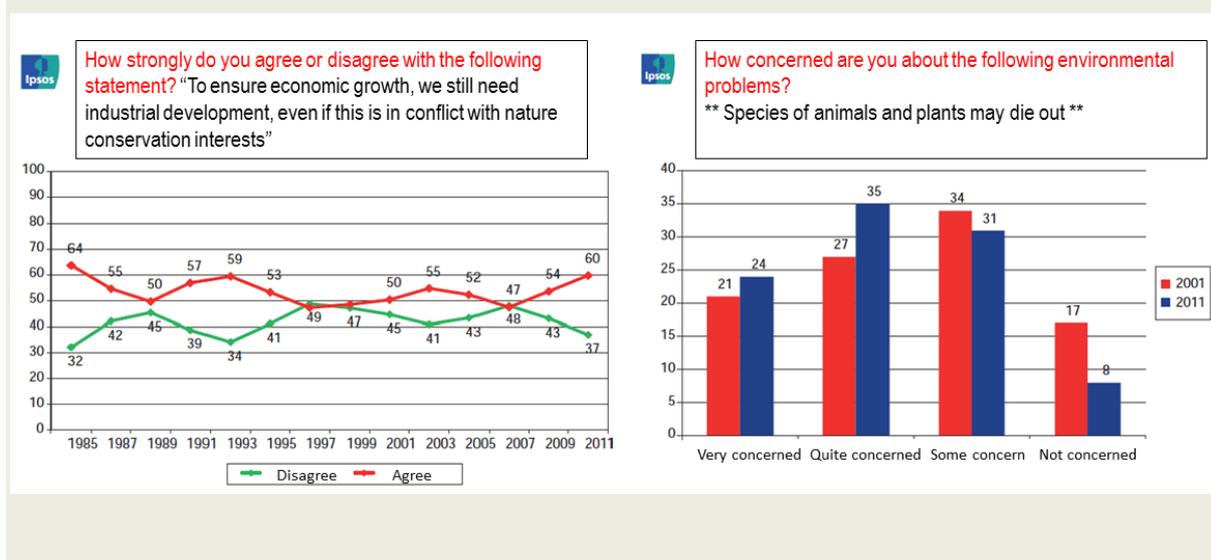
It is further referred to box 6 on Norwegians' attitudes towards the environment, as reported in the survey Norsk Monitor.

Box 6: Norwegians' attitudes to the environment

Norsk Monitor is a large-scale opinion survey that is carried out every two years to give a picture of Norwegians' attitudes and behaviour in key areas, including their attitudes to the environment. One question deals with the relative priority they give to industrial development and nature conservation. The figure below shows that 1997 and 2007 were the only years when a majority of the respondents said that nature conservation should be given higher priority than industrial development.

The answers to the survey also give an indication of the importance people attach to biodiversity. The proportion of the respondents who are very concerned about the loss of species is consistently larger than the proportion who are not concerned at all. From 2001 to 2003, the percentage of respondents

who said they were very concerned rose sharply and remained high until 2007, after which it has dropped significantly. The proportion who are not concerned at all has remained low ever since 2003. It is difficult to determine the reason why 2001 stood out in this way.



In connection with the preparation of Norway’s new biodiversity strategy and action plan, it is being considered considering whether to draw up an overall communication strategy. In addition, a large-scale survey will be started in 2014 to measure status and trends for public awareness and knowledge of biodiversity. The plan is to repeat the survey every three to five years.

10.2. Aichi target 2

By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.

There are no national environmental targets that correspond directly to Aichi target 2. At present, it is mainly the ecological value of biodiversity that is evaluated. The concept of ecosystem services has only been integrated into environmental management to a limited degree, although the extent to which the concept is used has been increasing during the preparation of the report on the values related to ecosystem services in Norway and after its publication (NOU 2013:10, see Chapter 5.3). The value of regulating and supporting ecosystem services has not been incorporated into Norway’s management systems to any great extent, but more progress has been made regarding provisioning and cultural services. The amenity and recreational value of biodiversity is incorporated into the impact assessment system (see Chapter 5.2.5), which includes requirements to assess impacts on outdoor recreation and the landscape. At present, there are no direct requirements in Norwegian legislation or the planning system generally to assess the economic value of biodiversity.

A national indicator set has been developed to monitor progress towards the targets of Norway’s sustainable development strategy, and these are reported on annually as part of the National Budget. They were first presented in 2005 in the National Budget for 2006 (Meld. St. 1 (2005-2006)). Of the 17 indicators in the most recent National Budget (Meld. St. 1

(2013-2014)), nine are relevant to the environmental pillar of sustainable development, including two for trends in Nature Index values (for open seas and coastal waters, and for freshwaters, wetlands and the mountains; forests; and open lowland). See Chapter 3.1.2 for a presentation of the Norwegian Nature Index.

Norway's International Climate and Forest Initiative and the UN-REDD Programme are examples of activities involving the valuation of and payment for ecosystem services (see Chapter 9.4.1.). Norway is also supporting other international work that is relevant to Aichi target 2, such as the preparation and outreach of the TEEB special report on water and wetlands. Norway is also one of the donor partners of the WAVES project (Wealth Accounting and the Valuation of Ecosystem Services) (see chapter 9.6). In cooperation with TEEB and UNSD, Norway is supporting a project for Advancing natural capital accounting, aiming to test the experimental ecosystem accounting under the System of Environmental-Economic Accounting (SEEA) framework. Through its support to IPBES, Norway is assisting developing countries with institutional development to better incorporate biodiversity values into national planning and decision-making processes. IPBES and its work are also mentioned under Aichi target 1.

10.3. Aichi target 3

By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio economic conditions.

There are no national environmental targets that correspond directly to Aichi target 3. The assessment in this section concerns economic instruments only, since Norway largely has the necessary legislative instruments in place. Knowledge and communication are dealt with under other targets. See also Chapter 5.3 on economic instruments.

Some grant schemes may have negative impacts on biodiversity. This problem was reviewed in a report commissioned by the Ministry of Finance on central government grant schemes that may have negative environmental impacts (Magnussen et al. 2008). However, many grant schemes have positive effects. For example, grants can be paid towards the management of selected habitat types and priority species, thus safeguarding biodiversity. More than 500 hay meadows are now being managed with the help of funding from the Norwegian Environment Agency. There are also a number of important grant schemes in the agricultural sector (for more information see Chapter 6.7).

The report from the expert committee appointed to review the values related to ecosystem services in Norway (c.f. section 5.3.) includes proposals for measures in certain sectors, for example forestry and agriculture, that are relevant to Aichi target 3. Implementing these will require the involvement of several sectors that are responsible for important economic instruments. A broad-based public consultation process has been held on the report's

conclusions and recommendations. The Government will use the responses that have been received in deciding how to follow up the work and recommendations of the committee, including the issue of the use of incentives and subsidies. The Government will appoint a green tax commission to review options for a shift to a taxation regime that provides greater incentives for green efforts.

Norway is also supporting international efforts that are relevant to Aichi target 3. Through the Nordic Council of Ministers, Norway has provided active support for reforming and reducing environmentally harmful subsidies, for example by producing and distributing the report *Reforming environmentally harmful subsidies: How to counteract distributional impacts* (Nordic Council of Ministers 2011), which provides advice and recommendations based on a large number of cases, including examples drawn from both developed and developing countries.

10.4. Aichi target 4

By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.

Several of Norway's national targets are relevant to Aichi target 4, see Table 2. All of Norway's national targets, the corresponding indicators and information on status can be found on the website State of the Environment Norway (www.environment.no/Goals-and-indicators/). A major effort is now under way to reduce fossil fuel use and avoid climate change. It is also essential to ensure that the use of other natural resources is kept within sustainable and ecologically safe limits. Norway is working on the development of instruments to promote green products, including using environmental standards and eco-labelling and developing and using environmental technology and more environmentally friendly goods and services.

Norway's waste management strategy was published in August 2013, and focuses on the use of the resources in waste. It calls for a binding agreement with the food products industry to reduce food waste and sets out plans for increasing recovery of plastic and construction waste and ensuring that a larger proportion of textile waste and waste electrical and electronic equipment is collected separately.

Many initiatives relevant to Aichi target 4 are also being taken by different actors. The Norwegian Armed Forces have chosen to set a good example by introducing a "meat-free day" each week to reduce meat consumption. In recent years, Norwegian environmental organisations such as the Rainforest Foundation Norway have done a great deal of work to draw attention to the negative impacts of palm oil. This has resulted in consumer pressure for palm oil to be removed from products and for clear labelling of products containing palm oil. Norwegian consumption of palm oil has been considerably reduced.

Information on various sectors, including forestry, fisheries, agriculture and aquaculture, can also be found in Chapter 6 and under Aichi targets 6 and 7. One of the goals of the transport

sector, as set out in the *National Transport Plan 2014–2023* (Meld. St. 2012-2013), is to reduce the loss of biodiversity by minimising or mitigating the negative environmental impacts of road and railway developments. Ways of compensating for losses of biodiversity and cultivated land have been reviewed, for example the restoration of damaged habitat, the creation of new habitat or steps to safeguard another equivalent area. The transport sector is now assessing their practical implementation in the form of pilot projects. When planning new transport infrastructure, the transport authorities seek to avoid developments in protected areas, large continuous areas without major infrastructure development, vulnerable habitat types, valuable cultural landscape and cultivated areas. The preliminary and follow-up studies required as part of major development projects include studies of impacts on biodiversity. The Norwegian Water Resources and Energy Directorate is responsible for ensuring integrated, environmentally sound management of Norway's river systems. This includes managing river systems that are protected under the Protection Plan for Water Resources in a way that maintains their biodiversity and undisturbed character and opportunities for outdoor recreation.

The Government published a strategy for Norway's mineral industry in 2013, which states that the industry aims to be one of the most environmentally sound in the world and will actively seek innovative solutions. Norway's new tourism strategy was published in 2012, and includes development of Norway as a sustainable tourism destination as an essential basis for promotion of the industry. The Government is therefore encouraging wider use of labelling and certification schemes that encourage tourism companies to make their operations more sustainable. Norway's urban policy is to develop compact towns around public transport nodes to ensure transport systems and land use are effective, while at the same maintaining local green spaces that make towns attractive places to live in (see Chapter 6.8).

10.5. Aichi target 5

By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.

A number of Norway's national targets are relevant to Aichi target 5, see Table 2. All of Norway's national target, the corresponding indicators and information on status can be found on the website State of the Environment Norway (www.environment.no/Goals-and-indicators/). Progress towards this target varies among ecosystems.

Various steps have been taken to reduce the loss and degradation (including fragmentation) of habitats that will have an important bearing on how much progress is made up to 2020. See Part II for an account of the different ecosystems, and the sections on other relevant Aichi targets, including target 11, in this part of the report. Measures to implement this target are taken across all the main ecosystems presented in Chapter 6. The Nature Diversity Act is the most important tool for achieving integrated management of Norwegian nature and thus ensuring conservation and sustainable use (see Chapter 5.2.1).

Norway's red list for species (Kålås 2010b) and *the Norwegian red list for ecosystems and habitat types* (Lindgaard and Henriksen, 2011), the Norwegian Nature Index (Nybø 2010)

are the most important sources of information for assessing status and progress towards Aichi target 5 (see Chapter 3.1). According to the red list, the largest numbers of threatened species are found in forest, wetlands and cultural landscapes, while the largest numbers of threatened habitat types are found in forest and wetland ecosystems. In all, 3 682 species have been red-listed as threatened or near-threatened in Norway. The red list for ecosystems and habitat types assesses the status of 80 habitat types, of which 40 are listed as threatened. See Chapter 2 on the main threats to biodiversity in Norway, and particularly 2.2.1 on land conversion and land use change. The importance of drivers for specific ecosystems is described in Chapter 3 on status and trends for Norwegian ecosystems.

Overall, the state of Norwegian ecosystems appears to be relatively good, but they are subject to pressure from many different sources. The Norwegian Nature Index documents overall trends for biodiversity in Norway (see table 1, Chapter 3). The open sea and coastal waters show a clear positive trend, with an average 10 % rise in Nature Index values from 1990 to 2012. The Nature Index values for open lowland and wetlands declined by 16 % and 8 %, respectively, in the same period. There was a weakly negative trend for mountains and freshwaters and a weakly positive trend for forests. The overall Nature Index value for forest is fairly low, but several indicators (for example the presence of dead wood) show a positive trend. There may be properties that are not revealed by the aggregated data. Steps are therefore being taken to obtain detailed information on trends for individual species and vulnerable areas as a supplement to the Nature Index.

The change in the total area of land without major infrastructure development is used as an indicator for two of the national targets that are relevant to Aichi target 5. According to the latest figures losses of undisturbed areas are still too high. The main causes of this are the construction of power lines, forestry roads, other roads and holiday housing. The Norwegian Environment Agency has recently published survey results showing that the total area without major infrastructure development declined by just under 900 km² in the period 2008–12, and that wilderness-like areas are being lost more rapidly than before. Areas without major infrastructure development are defined as being at least 1 km from such developments, while wilderness-like areas are at least 5 km from such developments.

10.6. Aichi target 6

By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.

Several of Norway's national targets are relevant to Aichi target 6, see Table 2. All of Norway's national targets, the corresponding indicators and information on status can be found on the website State of the Environment Norway (www.environment.no/Goals-and-indicators/).

The integrated management plans for the Barents Sea–Lofoten area, the Norwegian Sea, and the North Sea and Skagerrak include management goals that are relevant to Aichi target 6. For the Norwegian Sea, goals for biodiversity include the following:

- *Naturally occurring species will exist in viable populations and genetic diversity will be maintained.*

- *Management of living marine resources will be based on the principles of sustainable harvesting.*
- *Populations of endangered and vulnerable species and species for which Norway has a special responsibility will be maintained or restored to viable levels. Unintentional negative pressures on such species as a result of activity in the Norwegian Sea will be avoided.*

The second of these is worded differently in the management plan for the Barents Sea–Lofoten area:

- *Harvested species will be managed within safe biological limits so that their spawning stocks have good reproductive capacity.*

A number of measures that have been implemented or planned will have an important influence on developments up to 2020. For more information see Part II, particularly Chapter 6.2.1 on the integrated management plans for Norway's sea areas, 6.2.2 on the marine protection plan and marine protected areas, 6.2.3 on fisheries management and 6.2.8 on international cooperation to protect marine areas.

An ecosystem-based approach is fundamental to the legislation governing Norwegian fisheries management. The fisheries authorities must also regularly assess what measures are needed to safeguard individual stocks that are harvested. A great deal of work has been done at both national and international level to reduce illegal, unreported and unregulated fishing (IUU fishing) through port state controls when catches are landed. Nevertheless, single-species management is still the dominant approach in fisheries management. Steps are being taken to learn more about interactions between stocks and develop a more integrated ecosystem-based management regime for marine resources. Thus, some stocks are now being given multi-species based advice for the fishing quotas (e.g. capelin, north-east arctic haddock and north-east arctic cod, as well as herring, mackerel and blue whiting in the Norwegian Sea).

Norway's integrated marine management plans are cross-sectoral, and include other biodiversity goals in addition to those mentioned above. The purpose of this management plan is to provide a framework for the sustainable use of natural resources and ecosystem services derived from the sea areas and at the same time maintain the structure, functioning, productivity and diversity of the area's ecosystems. The management plan is thus a tool for both facilitating value creation and maintaining the environmental values of the sea areas.

The management plans are intended to promote integrated, ecosystem-based management of Norwegian sea areas. They clarify the overall framework and encourage closer coordination and clear management priorities. They increase predictability and facilitate coexistence between industries that are based on the use of these sea areas and their natural resources. The management plans are also intended to be instrumental in ensuring that business interests, local, regional and central authorities, environmental organisations and other interest groups all have a common understanding of the goals for the management of the area in question.

Freshwater species

No harvesting of threatened species or stocks of freshwater fish species is permitted. Salmon stocks are managed on the basis of spawning stock management targets, based on the number of female fish needed for the river to produce the maximum sustainable yield of smolt. The

goal is for target levels to be reached in three of every four years, and fishing in each salmon river is regulated with the aim of achieving the defined spawning stock level. This management regime has resulted in an increase in salmon stocks (Forseth 2013).

Since 1970, wild salmon stocks have shown a negative trend in all parts of the North Atlantic. The aquaculture-related measures described under Aichi target 7 and in Part II (Chapters 6.2.6 and 6.3.3) may in the long term reduce pressure on wild salmon and sea trout from this sector.

Assessment of progress – the Barents Sea–Lofoten area

Progress towards the biodiversity-related goals mentioned above was evaluated for the Barents Sea–Lofoten area when the first update of the management plan was published in a white paper in 2011 (Meld. St. 10 (2010–2011)). Viable populations have been achieved for cod, haddock, saithe, capelin, herring and marine mammals. Beaked redfish and possibly also Greenland halibut are now under recovery while golden redfish, and coastal cod have been at low levels and therefore not reached their full reproductive potential. The target has not been achieved for seabird populations. In 2005, there was extensive illegal, unreported and unregulated (IUU) fishing of Northeast Arctic cod. Norway took the initiative for cooperation with other countries to reduce fishing pressure. This was successful, and IUU fishing has been greatly reduced. The target of maintaining populations of threatened species and species for which Norway has a special responsibility or restoring them to viable levels as soon as possible has not been achieved. Populations of many such species are not considered to be viable at present.

Assessment of progress – the Norwegian Sea

An assessment of progress towards the targets for the Norwegian Sea will be completed in summer 2014, as part of the first update of the management plan for this area. However, as regards progress towards Aichi target 6, it is already possible to say that most species for which Norway has a special responsibility and important large fish stocks are being soundly managed. A number of endangered and vulnerable species are still under pressure and showing negative trends. The exception is the beaked redfish stock, which is now considered to be at a sustainable level, although the species was red-listed in 2010. This conclusion is based on updated information, and the assessment for this species may well be changed when Norway's next red list is published in 2015.

General measures implemented by Norway in marine areas include further development of systematic monitoring and management of living marine resources in accordance with the Marine Resources Act and continuing the development of an ecosystem-based management regime for living marine resources. Norway supplies data on fish stocks to the International Council for the Exploration of the Sea (ICES), which collates and analyses data from all countries that harvest and carry out research on these stocks. Norway is also taking part in international efforts to build up knowledge of individual fish stocks so that the overall harvest is sustainable. ICES bases its advice on the best available knowledge and Norway is working actively to ensure that the overall harvest is in accordance with this advice.

10.7. Aichi-mål 7

By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.

Several of Norway's national targets are relevant to Aichi target 7, see Table 2. All of Norway's national targets, the corresponding indicators and information on status can be found on the website State of the Environment Norway (www.environment.no/Goals-and-indicators/). Norway's implementation of this target is ongoing.

Status and trends for forest are presented in chapter 3.2.4. It is further referred to part 2 of the report for a consideration of measures contributing to achieving the target, particularly 6.5. regarding sustainable forestry. Forestry is the most important factor influencing forest biodiversity. According to the 2010 Norwegian Red List, 1400 of the 1840 forest species that are threatened or near-threatened are believed to be negatively affected by former or current forestry activities. Key biotopes and other environmental values have been registered in a large proportion of forest areas in Norway. Forest owners are required to take this information into consideration, and to plan forestry activities accordingly. Most productive forest is managed in accordance with the Norwegian PEFC standard. The Nature Index for Norway 2010 gives the status for biodiversity in forests an index value of 0.40 (index value 1 is for old growth forests/forests with little human influence). However, larger numbers of old trees and a greater quantity of dead wood provide more favourable conditions for many red-listed species.

The government's planned increase in harvesting of tree biomass could significantly impact forest biodiversity. The way in which logging and climate related measures such as tree planting are carried out could strongly influence the status of forest biodiversity.

The proportion of forest area registered as protected from logging in key biotopes, is at present nearly 1,8 % of the total productive forest area, will be of great importance. It will also be important to control and avoid the ongoing spread of non-native tree species.

Regarding sustainable agriculture, reference is made to section 3.2.8. on the status and trends for the cultural landscape in Norway. Sustainable agricultural practices, including grazing and management of the cultural landscape, are essential for maintaining biodiversity and it is an ongoing task to ensure that agricultural policy instruments are designed to assist in achieving environmental policy targets. Norway is using a variety of economic and legislative instruments to maintain the diversity of habitat types and species in the cultural landscape; these include the designation of selected habitat types and priority species, measures to control alien species, and cross-sector cooperation on specific environmental measures in agriculture. Reference is made to section 6.7.1.1. regarding measures to protect biodiversity in the cultural landscape. The Nature Index value for open lowland is 0,40 (cfr. Table 1). Section 6.7.1.2. and aichi target 13 further presents measures taken related to conserving genetic diversity. Nutrient runoff from agricultural areas is a threat to water quality and section 6.7.1.3. presents related measures.

Norway published its strategy for an environmentally sustainable aquaculture industry in 2009. One of its goals is for the industry to develop a structure and locate facilities in a way that reduces environmental impacts and the risk of spreading disease. See Chapter 6.2.6. on aquaculture management.

As mentioned in Chapter 3.2.2., aquaculture has important impacts in coastal waters and fjords, for example as a result of the escape of farmed salmon and the transmission of salmon lice. Indicators and thresholds for determining acceptable levels of impact on wild salmon spawning grounds are being developed. The Aquaculture Act was amended in 2013 to provide a legal basis for introducing requirements to identify/tag aquaculture organisms. This will make it possible to distinguish between wild and escaped farmed salmon, and track the origin of escaped salmon, but the provision has not yet been applied. About one fifth of the entire Atlantic salmon population is found in Norway, and we therefore have a major international responsibility for managing the species. Since 1970, wild salmon stocks have shown a negative trend in all parts of the North Atlantic. The aquaculture-related measures described in Part II may reduce pressure on wild salmon and sea trout from this sector. Nevertheless, it is a challenging task to reconcile the national target of ensuring viable wild stocks of anadromous salmonids with the objective of ensuring that the aquaculture industry grows sustainably. The authorities, the industries and interest groups will have to cooperate to find solutions that reduce the overall pressure on wild fish stocks.

10.8. Aichi target 8

By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.

Several of Norway's national targets are relevant to Aichi target 8, see Table 2. All of Norway's national targets, the corresponding indicators and information on status can be found on the website State of the Environment Norway (www.environment.no/Goals-and-indicators/). Implementation of Aichi target 8 is under way and in some areas significant progress has been made.

In recent decades, a great deal has been done to control releases of pollutants to the environment, as discussed in part II. Chapter 6.9.1 presents the action being taken to reduce long-range transboundary air pollution. International regulation and cooperation are essential to achieve these reductions. Norway has extensive monitoring of these substances and cooperates internationally on enhancing knowledge about emissions, transfer and effects. Chapter 6.9.2 presents work on hazardous substances, including radioactivity and radioactive waste. Norwegian emissions from industry and other sources are regulated by means of prohibitions and through discharge permits under the Pollution Control Act. Chapter 6.9.3 describes remediation efforts for contaminated soils and sediments, and Chapter 6.9.4 describes waste management

Pollution is still a serious threat to biodiversity in certain areas (see Chapters 2.2.3 and 3). For example, excessive inputs of nutrients are a substantial problem, and emissions of hazardous substances may also have serious impacts on ecosystems. However, emissions of most of the hazardous substances on Norway's priority list have been reduced by more than half since 1995. This is largely a result of reductions in industrial emissions, regulation of hazardous substances in products and requirements for proper handling of waste. Estimates indicate that emissions of hazardous substances other than those on the priority list have increased somewhat since 2009 for three of the four main substance groups¹⁸. Hazardous waste is under

¹⁸ Substances dangerous to the environment; chronically toxic substances; sensitising substances; CMR substances (CMR= carcinogenic, mutagenic, reprotoxic)

control and poses little or no threat to biodiversity at present. Acidification has been a serious problem in lakes and rivers in parts of Norway, but inputs of SO₂, NO_x and ammonia have been reduced, and the areas where critical loads are exceeded have decreased over the past 20–30 years

Freshwater

The national targets under the Water Management Regulations (Water Framework Directive), which use biological indicators of eutrophication (see Table 2), are related to Aichi target 8. Environmental objectives designed to achieve good ecological status have been set for most types of Norwegian lakes and rivers. A great deal of work has been done to assess the environmental status of approximately 26 000 water bodies in Norway. These assessments are being used as a basis for river basin management plans under the EU Water framework directive that are to be completed by the end of 2015. In 2012–13, a review of the environmental status of Norway's water bodies was carried out. This showed that the status of about one third of all Norway's water bodies was not satisfactory.

Marine and coastal waters

Eutrophication as a result of inputs of nutrients and organic matter is primarily a problem in certain coastal waters and fjords. The eutrophication status of the outer zone of coastal waters and the open sea is considered to be good. In accordance with its international obligations, Norway has over the past 20–30 years implemented a range of measures to reduce discharges of nutrients. In order to achieve the zero-discharge targets for the petroleum industry, work is still in progress to halt or minimise discharges of oil and hazardous substances from offshore activities (see Chapter 6.2.7.1). Discharges of drill cuttings that may cause environmental damage are also to be halted or minimised as part of this work. The conditions in discharge permits take into account the need to protect vulnerable benthic habitats such as spawning grounds, coral reefs and sponge communities.

Despite wide-ranging measures and years of international cooperation, there are still considerable inputs of hazardous substances to certain sea areas. This has more impact on the North Sea and Skagerrak than on the Norwegian Sea and the Barents Sea–Lofoten area. Levels of such substances that are high enough to give cause for concern are being found in fish, seabirds and marine mammals in certain marine and coastal waters. It will be necessary to maintain strict regulation and continually reduce the use and releases of priority substances in order to achieve the target of eliminating releases and use of substances that pose a serious threat to health or the environment by 2020.

According to the zero-discharge goals for the offshore petroleum industry, discharges of naturally occurring radioactive substances are to be gradually reduced so that the concentrations in the environment are close to the natural background levels by 2020. Levels of radioactivity in seawater, sediments and biota are generally low.

Sediments in many harbours and fjords in Norway are polluted by heavy metals and persistent organic pollutants. An action plan for the highest-priority sites is being followed up with mapping, planning, remediation and monitoring.

Plastic debris is a growing threat to the marine environment, and can cause considerable harm and suffering to marine animals. Quantities of microplastics in the sea are steadily increasing. There is a general prohibition against littering in Norway. Systems are in place for collecting, sorting, re-using and recovering waste, including plastics. There is close cooperation between

the authorities and relevant branches of industry, and application of the extended producer responsibility approach highlights the responsibility of producers throughout the product life cycle. Beach clean-up days and litter picking sessions on land are organised every year. Fishermen who lose gear at sea are required to search for it and retrieve it if possible. In addition, the fisheries authorities organise an annual retrieval programme for lost gear. Other arrangements for active retrieval of marine litter are also being considered. Dumping of waste from ships is explicitly prohibited both in Norwegian waters and in the Northeast Atlantic as a whole. Norway gives high priority to regional and international cooperation to deal with marine litter.

Terrestrial ecosystems

In 2011, the regional environmental programmes for the agricultural sector provided grants totalling NOK 183 million for projects to prevent nutrient runoff from agricultural areas. In 2013, a national waste strategy was published proposing various new measures, for example for municipal waste management. The agricultural authorities also provide grants for reducing weed spraying in areas used to grow cereals and oil seeds. Known or suspected sites with contaminated soil have been mapped and the need for remediation has been assessed on the basis of the risk to human health and/or the environment.

10.9. Aichi target 9

By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.

Several of Norway's national targets are relevant to Aichi target 9, see Table 2. All of Norway's national targets, the corresponding indicators and information on status can be found on the website State of the Environment Norway (www.environment.no/Goals-and-indicators/). Implementation of Aichi target 9 is under way, and a range of different measures have been put in place for this purpose. The status of invasive alien species as a driver of biodiversity loss is presented in Chapter 2.2.4, whereas measures related to invasive alien species are presented in Chapter 5 and under the different priority areas in Chapter 6.

One important task that Norway has undertaken is the development of a new ecological risk assessment method for alien species, which should improve the process of setting priorities for dealing with these species and enable more effective action. The publication *Alien species in Norway – with the Norwegian Black List 2012* (Gederaas et al. 2012) presents an overview of alien species in Norway, 2320 in all. The Norwegian Biodiversity Information Centre has performed risk assessments for 1180 of these, and also for a further 203 species that have not yet established in Norway. The 1180 species were assigned to different categories as follows: “severe impact” category, 106 species; “high impact”, 111 species; “potentially high impact”, 198 species; “low impact”, 399 species; and “no known impact”, 366 species.

Norway has improved coordination across sectors on information and research activities, and has built up expertise (see also Chapter 5.1), for example through implementation of the *Strategy on Invasive Alien Species* (Ministry of Climate and Environment et al., 2007). The strategy includes both measures to be taken by the individual sectors and joint measures on which they are to cooperate. The Nature Diversity Act contains a chapter on the import and release of alien organisms, which will enter into force once the necessary regulations have been adopted. National action plans have also been drawn up to deal with several invasive alien species. The provisions of the Nature Diversity Act are in force for non-native tree

species, which means that an application must be sent to the environmental authorities before any new planting or sowing of non-native tree species for forestry purposes. Norway has also ratified the Ballast Water Convention, and adopted national ballast water regulations in 2009 (see Chapter 6.2.4). Funding is provided at county level for various types of action to deal with invasive alien species, including courses, information activities, mapping and action to contain, control and eradicate alien species. Since it is often not feasible to eradicate or contain and control established taxa, Norway gives priority to preventing new species from becoming established by focusing on pathways of introduction. The ecological risk assessments presented in *Alien species in Norway* (Gederaas et al. 2012) show that the import of plants and plant products for horticulture is the most important pathway for unintentional introductions (organisms are brought in as stowaways on plants and soil). In 2012, Norway therefore commissioned a pilot study on the unintentional introduction of alien organisms with imports of plants and timber, which was to recommend and develop methods for monitoring this pathway (Hagen et al. 2012). Based upon the results of this project, Norway has implemented more standardised monitoring of unintentional introductions via this pathway for the period 2014–16.

Invasive alien species also pose a severe threat to the marine environment. So far, Norway has focused particularly on the red king crab (*Paralithodes camtschaticus*) and the snow crab (*Chionoecetes opilio*) and on the development of effective mapping methods (NEA 2013). Norway has ratified the International Convention for the Control and Management of Ships' Ballast Water and Sediments which is expected to considerably reduce the risk of the spread of alien species via ballast water when it enters into force. Norway has already adopted its own regulations on ballast water, which entered into force in 2010 (see also section 6.2.4). Climate change will increase the risk that new alien species will become established and that already established species will spread further. Both research and awareness raising are essential to deal with these problems.

A Norwegian study is now in progress to analyse known pathways for the introduction of alien species, using detailed data from the earlier ecological risk assessments (Gederaas et al 2012). Norway is also participating in a similar project through the European Network on Invasive Alien Species (NOBANIS), which should result in recommendations at regional level. Both projects are due to be completed 2014, and the results will make it easier to decide which pathways of introduction should be given priority. In addition, a project looking at the economic costs of alien species in Norway was started in 2014, and will provide complementary data on costs and pathways. Norway also participates in European research programmes and the new EU COST Action on alien species.

10.10. Aichi target 10

By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.

Two of Norway's national targets are relevant to Aichi target 9, see Table 2. All of Norway's national targets, the corresponding indicators and information on status can be found on the website State of the Environment Norway (www.environment.no/Goals-and-indicators/).

Apart from climate change, the greatest pressure on Norway's coral reefs comes from damage caused by fisheries activities. New regulations relating to bottom fishing activities in the Economic Zone of Norway, the fisheries zone around Jan Mayen and the Fisheries Protection Zone around Svalbard entered into force in 2011. Using the precautionary principle as a basis, the regulations define the seabed in all areas where the water depth is more than 1000 metres as vulnerable, and therefore liable to be damaged by fishing gear. For Norwegian vessels, the rules also apply in the international waters of the "Banana Hole". Thus, Norway has led the way by giving the same level of protection to vulnerable habitats across a large sea area that is partly under Norwegian jurisdiction and partly in international waters. Fishing vessels are required to record any contact with vulnerable habitats during fishing, and have to move if the bycatch of live corals or sponges are above a certain threshold. The regulations relating to sea-water fisheries contain a general requirement to show special care during fishing operations near known coral reefs.

The authorities are responsible for ensuring that updated maps and other information on coral reefs and other vulnerable benthic animals are available. In addition, routines will be established for regular evaluation of measures and to protect reported or mapped coral habitats, sponge communities, sea pen communities and other vulnerable benthic organisms and habitat types.

Norway has been systematically mapping the seabed in recent years (see Chapter 5.1.1 for more information about the MAREANO programme). This work has revealed a number of areas where there are coral reefs, sponge communities and other vulnerable habitat types. The 2011 *Norwegian Red List for Ecosystems and Habitat Types* (Lindgaard and Henriksen, 2011) includes a first assessment of the status of marine habitat types. Mud volcanos and coral reefs are listed as vulnerable, while hydrothermal vents and coral gardens are listed as near threatened. A large proportion of the reefs of *Lophelia pertusa* that have been documented globally are in Norwegian waters, which gives Norway a special responsibility for the species. *L. pertusa* reefs are considered to be biodiversity hotspots and also offer great potential for bioprospecting. Although *Lophelia pertusa* appears to handle single stressors reasonably well, at least over short time periods, studies indicate that exposure to several pressures at once is very likely to have detrimental effects. It is considered vital to gain more knowledge regarding this.

10.11. Aichi target 11

By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.

A number of Norway's national targets are relevant to Aichi target 11, see Table 2. All of Norway's national targets, the corresponding indicators and status can be found on the website State of the Environment Norway (www.environment.no/Goals-and-indicators/).

The national targets that are relevant to Aichi target 11 deal with the protection of a representative selection of Norwegian nature for future generations, and the maintenance or restoration of the conservation value of these areas. The targets apply to all Norway's major ecosystems, including open sea, coastal waters, freshwater, wetlands, open lowland, forest and mountains. So far, only protection under the Nature Diversity Act and the Svalbard Environmental Protection Act have been used as a basis for assessing progress towards achieving Aichi target 11. See also Chapter 4 on Norway's environmental targets in Part II of this report.

Protected areas

Norway has reported 12 marine protected areas to the Convention for the Protection of the Marine Environment in the North-East Atlantic (OSPAR), covering a total of 85 416 km² -2402 km² lies outside territorial waters. This includes marine parts of nature reserves under the Nature Diversity Act, as well as nine coral reefs complexes protected against harmful fishing practices under the Marine Resources Act. Additionally, 2013 saw the establishment of the first three marine protected areas (MPAs) under the Nature Diversity Act (see Chapter 6.2.2), which are yet to be reported as components of the OSPAR network, covering a total area of 74 km². Further, a number of area based measures in the fisheries sector such as lobster reserves, trawl free zones, areas closed for fisheries ect. throughout the Economic Zone contribute towards an effective protection.

Mainland Norway

At the end of 2013, 16.9 % of the land area of the mainland was protected under the Nature Diversity Act. The largest proportion is as national parks, followed by protected landscapes, and then nature reserves. A large proportion of the total area protected is in the mountains. Figure 9 shows the proportions of the different major ecosystems of mainland Norway currently under protection.

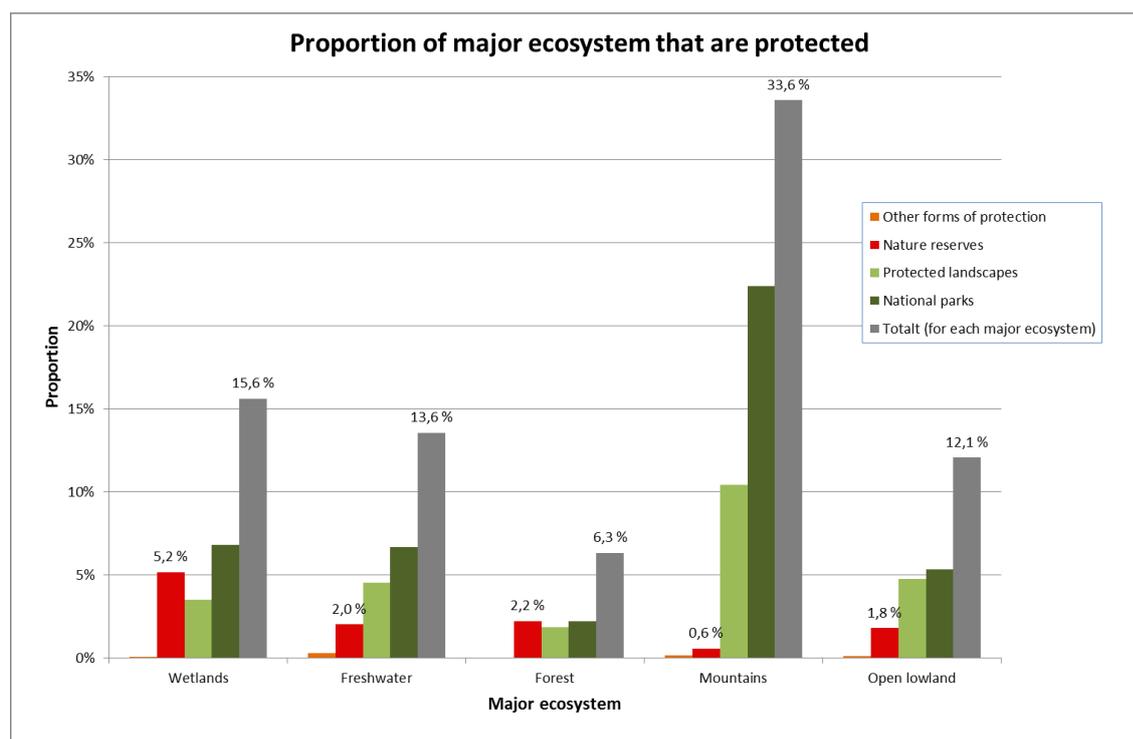


Figure 12: Proportion of different major ecosystems of mainland Norway being protected, split by protection category.

Overall, the extent of protected areas covers the range of variation of ecosystems in mainland Norway reasonably well. However, a scientific assessment shows that the goal of creating ecologically representative systems has not been satisfactorily achieved in all ecosystems (Framstad et al. 2010). The distribution of protected areas does not coincide well with habitats that are important for threatened species. According to the report, there is still a considerable need for further protection of open lowland, freshwater, wetlands and forest. Allocations for forest conservation totalled NOK 331.1 million for 2014. More knowledge is needed about the conservation value of existing protected areas of freshwater and wetlands, and there are gaps in our knowledge of valuable and vulnerable freshwater ecosystems.

Marine and coastal waters

At the end of 2013, 2.6 % of Norway's territorial waters (the whole area landward of 12 nautical miles from the baseline) was protected under the Nature Diversity Act, see Table 3.

Table 3:

Zone (area off mainland Norway)	Total area (km ²)	Protected area (km ²)	% protected
Territorial waters (whole area inside 12 nm)	145 458	3 798	2.6 %
Internal waters (inside the baseline)	89 091	3 719	4.2 %
Territorial sea (baseline to 12 nm)	56 367	79	0.1 %

2013 saw the establishment of the first marine protected areas (MPAs), a new category of protected area created by the Nature Diversity Act (see Chapter 6.2.2). However, other types of protected areas, such as nature reserves, so far account for a much larger proportion of the

total protected areas shown in Table 3. So far, nine coral reef complexes with a total area of på 2422 km² have been protected under the Marine Resources Act. Most of this area, 2361 km², lies outside the Norwegian territorial limit. This constitutes 0,3 % of the Norwegian Economic Zone (in total 787 640 km²). There is now a process to consider whether other areabased protection measures also should be included in evaluations of progress for aichi target 11.

Further, a number of proposed marine protected areas are being considered, corresponding to up to 10.7 % of Norway's territorial waters (0.4 % of Economic Zone of Norway). This may contribute to achieving the Aichi target of protecting 10 % of coastal and marine areas for Norway's territorial waters. Nevertheless, the protected areas will not be entirely representative, and certain ecosystems will be underrepresented. In addition to work on marine protected areas, several locally initiated processes aiming at establishing new national parks have been initiated (Raet in Aust-Agder, Jomfruland in Telemark and Lofotodden in Nordland). These would also add to the total area of protected marine and coastal waters. There has not yet been any evaluation of how representative the protected areas in marine and coastal waters are in ecological terms, as has been done for terrestrial ecosystems.

Svalbard and Jan Mayen

About 65 % of the land area of Svalbard is protected as nature reserves and national parks. In addition, 87 % of the territorial waters around Svalbard are included in the protected areas. Nearly all of Jan Mayen, together with the surrounding territorial waters, is a nature reserve. Given that such a high proportion of these areas are protected, it is assumed that all major ecosystems are adequately represented. However, the knowledge base is not good enough to determine whether the protected areas are ecologically representative of all Svalbard's nature.

Management of protected areas

The budgets for management of protected areas have been increased considerably in recent years, and there have been major changes in management systems that have strengthened planning processes, inspection and advice, and habitat management.

Several projects have been carried out or are in progress to gather more information as a basis for developing a knowledge-based management system and maintaining the conservation value of protected areas:

- mapping of habitat types in protected areas has been started;
- conservation targets have been developed as a key part of management plans;
- a system has been developed for monitoring the state of the environment on the basis of conservation targets;
- an assessment of the degree to which the conservation value of protected areas is threatened has been carried out to provide a basis for monitoring changes in their status. Important threats include overgrowing, alien species and disturbance.

As mentioned in Chapter 6.6.3, responsibility for the management of national parks and some other protected areas has been delegated to management bodies appointed at local level. A programme on Norway's natural heritage as a value creator was carried out in the period 2009–13 (see Chapter 6.6.4).

10.12. Aichi target 12

By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.

A number of Norway's national targets are relevant to Aichi target 12, see Table 2. All of Norway's national targets, the corresponding indicators and information on status can be found on the website State of the Environment Norway (www.environment.no/Goals-and-indicators/).

The Nature Diversity Act, includes the principle of sustainable use, provisions on safeguarding priority species and selected habitat types and the establishment of protected areas, and is a key instrument for achieving Aichi target 12.

Norway did not manage to achieve the target of halting the loss of biodiversity by 2010. In 2010, there were 4 599 species on the Red List (22 % of all the species assessed). Of these, 2 398 were considered to be threatened (11 % of the species assessed). The main threats to species in Norway are discussed in chapter 2. A number of species on the 2006 Red List were re-classified in the 2010 edition. This was mainly because a great deal of new information has been compiled on Norwegian species; real changes in populations only explain a small proportion of the changes in classification.

There is no documentation that any species have become extinct in Norway since the previous national report was submitted. It is reasonable to assume that there will still be many threatened species in 2020, since many of the pressures on them will continue to operate. However, the actions being taken to safeguard particular species and habitats should mean that the population status of some threatened species will improve and that they may not be classified as threatened by 2020.

Many red-listed species are closely associated with the cultural landscape. About 44 % of the threatened species on the 2010 Red List are mainly found in semi-natural habitat types, and of these, 60 % are threatened primarily because such habitats are no longer actively used and are becoming overgrown.

The amount of forested area in Norway is expanding, and dead and dying trees are increasingly left in place. Dead wood is a vital habitat for many species. Even so, many forest species are under serious threat (see Chapter 3.2.4). About half of the threatened and near threatened species on the Red List 2010 have a significant proportion of their population in woodlands and forests (Kålås et al. 2010; see Chapter 3.2.4). See Chapter 3 for further information on status and trends for Norwegian ecosystems. In addition to protecting species through habitat conservation (see Aichi target 11), species can also be protected directly. In Norway, terrestrial vertebrates (mammals, birds, amphibians and reptiles) are protected unless specifically defined as game species. Some freshwater species are also specifically protected, and there are regulations making it illegal to pick or harvest 70 species of plants and a few moss and invertebrate species. The Red List provides important information on many species and is a valuable tool in land use planning. Action plans have also been drawn up to safeguard specific species.

Several projects have been started to map the occurrence of threatened species. However, there is still a pressing need for digital mapping of the distribution of many threatened and

near threatened species, especially invertebrates. Systematic monitoring of animal populations including large carnivores, golden eagles and seabirds has been going on for several decades. Several of the threatened species for which action plans have been drawn up are also monitored. Mapping and monitoring provides important information that can be used in species management and land-use planning.

A number of seabird populations in Norway are declining. Marine ecosystems are complex, and in most cases this is probably due to several factors, like climate change and reduced availability of prey. Several species are classified as threatened in the 2010 Red List. Generally, the trend is that populations of pelagic seabirds and of many coastal species are declining. An expert group has been established to investigate the links between the decline in seabird populations and their food supply, and to suggest measures to improve food availability for seabirds.

10.13. Aichi target 13

By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.

There are no national targets that correspond directly to Aichi target 13, but the overall goals of Norwegian agricultural policy include enhancing conservation and use of genetic resources in agriculture and safeguarding as large a proportion as possible of global seed diversity in the Svalbard Global Seed Vault. For more information on the seed vault, see Chapter 6.7.1.2 on genetic resources or the following link:

<http://www.regjeringen.no/en/dep/lmd/campaign/svalbard-global-seed-vault.html?id=462220>.

Norway has implemented various measures to help achieving this target, including steps to ensure the survival of threatened livestock breeds (see Chapter 6.7.1).

The Norwegian Genetic Resource Centre is responsible for contributing to effective management of animal and plant genetic resources for food, agriculture and forest genetic resources. The Centre's overall strategic plan and plans of action for the three sectors set out a framework with priorities and activities to safeguard cultivated plants and farm animals, and forest trees that are native to Norway.

There are breeding programmes for a total of 13 plant species, including cereals, potatoes, fodder plants, fruits and berries. In 2012, 13 new varieties were included on the Norwegian Official List of Varieties, four of which were developed in Norway. The list contains plant varieties that are approved for commercial production in Norway. Before a new variety is included, it must have been through systematic tests that show that it is different from existing varieties and that it has acceptable cultivation and use value in Norway.

Systematic conservation work for endangered livestock breeds in Norway started in 1990, and there has been a general improvement in status since then, although certain threatened horse and cattle breeds have shown a negative trend. Of the 35 livestock breeds classified as native to Norway, 17 are considered to be critically endangered (on the basis of FAO guidelines on the characterisation of livestock breeds

Conservation of various plant genetic resources is being assured through national field gene banks, which have been established for fruit crops, berries and potatoes. The Genetic

Resource Centre has also drawn up a strategy for *in situ* conservation of wild relatives of crop plants in the Norwegian flora. Conservation of semi-natural habitats like hay meadows can contribute to safeguarding genetic resources in wild relatives of crop plants.

Norway is a member of the FAO Commission on Genetic Resources for Food and Agriculture and a party to the International Treaty on Plant Genetic Resources for Food and Agriculture, and is therefore implementing the Global Plans of Action for plant, animal and forest genetic resources adopted by the Commission. These plans also contribute to the implementation of Aichi target 13.

Norway has started the preparation of its country report on the state of biodiversity for food and agriculture as its contribution to the planned FAO report *State of the World's Biodiversity for Food and Agriculture*. Norway's report will also include information on actions to achieve the Aichi targets (particularly targets 7 and 13). The report will be completed by the end of 2014.

Norway's fisheries and aquaculture regulations include provisions to safeguard aquatic genetic resources. The need for a systematic approach to mapping and control of pollution, diseases and parasites, and genetic interaction between farmed aquaculture organisms (e.g. salmon) and wild populations resulted in the preparation of the *Strategy for an Environmentally Sustainable Norwegian Aquaculture Industry* and the Aquaculture Act, both presented in Part II (see Chapter 6.2.6). The fisheries and aquaculture authorities are responsible for identifying relevant indicators and establishing mapping programmes and systematic action to reduce negative effects on wild populations, and for maintaining and enhancing the genetic resources of farmed aquatic organisms. This work must be carried out in cooperation with the environmental authorities, which are responsible for safeguarding wild populations.

The Norwegian environmental authorities are maintaining the genetic diversity of Atlantic salmon by keeping genetic material from 170 stocks in gene banks. Stock enhancement measures and steps to protect or restore habitats for other threatened and vulnerable aquatic species are also being organised by the environmental authorities and are relevant to this Aichi target.

The Nature Diversity Act sets out management objectives for species. The genetic diversity of domesticated species is also to be maintained. The need for additional measures to achieve Aichi target 13 will be assessed during the preparation of the new National Biodiversity Strategy and Action Plan.

10.14. Aichi target 14

By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.

A number of Norway's national targets are relevant to Aichi target 14, see Table 2. All of Norway's national targets, the corresponding indicators and information on status can be found on the website State of the Environment Norway (www.environment.no/Goals-and-indicators/). Information on Norway's implementation of the EU Water Framework Directive (through its own Water Management Regulations) can be found on the website

www.vannportalen.no (some information is provided in English), and the National Budget (Ministry of Finance) includes information on status and trends for a set of indicators for sustainable development in Norway. A government-appointed committee recently concluded that the state of Norwegian ecosystems is relatively good and that if they are managed wisely, they will be capable of sustaining a flow of important ecosystem services in the long term.

There is also relevant information to this target elsewhere in this report: see the presentation of status and trends for Norwegian ecosystems in Chapter 3 and information on measures taken to implement the convention (particularly Chapters 5, 6, and 8). Several ecosystems and a number of ecosystem services are more explicitly dealt with under other Aichi targets, and the reader is referred to the discussion of Aichi targets 6, 7, 10, 11, 13 and 15. See also the text on Aichi target 18 on indigenous peoples.

Each of the national targets are linked to one or more indicators. Corresponding indicators to the targets listed as relevant in table 2 can indicate status and progress related to the fulfilment of the Aichi target. The full set of indicators is quite comprehensive, but there are only three key indicators for which systematic reporting provide information on progress towards Aichi target 14. These are the change in total area of land without major infrastructure development (related to maintaining habitat diversity), the number of new outdoor recreation areas designated each year (an indicator of whether areas of value for outdoor recreation are being maintained and safeguarded) and the proportion of the population taking part in outdoor recreation activities (one of two indicators of participation in outdoor activities). Data on other indicators that are relevant to Aichi target 14 is collected and managed by the various sector authorities, but there is currently no central and systematic reporting to the environmental authorities.

Key issues related to Norwegian ecosystem services were considered in detail in the recent Official Norwegian Report (NOU 2013:10) on the values related to ecosystem services in Norway. In the report, a Government-appointed committee presented information on status and trends for Norwegian ecosystem services and findings and recommendations on the implementation of the ecosystem services approach in Norway. It also discussed how the values related to ecosystem services can be better recognised and demonstrated in Norwegian policy development and environmental management, and ways of raising awareness of these values. The Government is now considering how to follow up the committee's recommendations, some of which may be presented in the new Norwegian NBSAP later in 2014 (see Aichi target 17).

An important part of the committee's terms of reference was to evaluate the state and trends of Norwegian ecosystems, and to identify and describe factors that are having significant impacts on ecosystems and ecosystem services. The committee evaluated all Norway's main ecosystems, including Arctic ecosystems, cultural landscapes and green areas in towns and built-up areas (urban ecosystems), thus providing an overview across sectors. The committee's overall conclusion was that the state of Norwegian ecosystems is relatively good and that if they are managed wisely, they will be capable of sustaining a flow of important ecosystem services in the long term. The committee identified the administrative, economic and legislative framework (see Chapter 5.2) in Norway as an important reason why the status of Norwegian ecosystems is relatively good. However, the committee also pointed out that biodiversity and ecosystems in Norway are under increasing pressure from a variety of sources. These include land use and land-use change, climate change and ocean acidification, pollution and invasive alien species. These impacts, often with combined and cumulative effects are putting more pressure on the capacity of ecosystems to deliver ecosystem services,

making it important to continue monitoring of this capacity. Issues related to water management, outdoor recreation, public health and sustainable urban development have been identified as being of particular relevance to achieving Aichi target 14 in Norway.

10.15. Aichi target 15

By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.

A number of Norway's national targets are relevant to Aichi target 15, see Table 2. All of Norway's national targets, the corresponding indicators and information on status can be found on the website State of the Environment Norway (www.environment.no/Goals-and-indicators/).

Until now, restoration of ecosystems has been of minor importance in Norway, which has much larger areas of relatively undisturbed nature than more densely populated and heavily industrialised countries. However, ecosystem restoration is becoming more important in Norway too, partly in response to Aichi target 15. We are currently working on operationalization of the 15 % restoration target. Maintenance of healthy and intact ecosystems is considered to be essential for ecosystem resilience. The Norwegian Nature Index, which has been developed to provide an overview of the state of and trends in biodiversity in the major ecosystems in Norway, will help to quantify ecosystem intactness.

It is referred to information on status and trends for Norwegian ecosystems that is presented in Part I of this report, and action to implement the convention is discussed in Part II. The principles for official decision-making in the Nature Diversity Act will also play a key role in achieving Aichi target 15.

The presentation of Nature Index values for the different major ecosystems (see Chapter 3.1.2) shows that the progress made towards Aichi target 15 varies from one ecosystem to another.

Wetlands and forests are important for climate change mitigation and adaptation because they regulate water flow in the landscape and store large quantities of carbon. Human activity, for example construction and other developments in river deltas and draining of mires, has resulted in substantial losses of Norwegian wetlands. Norway's goal is to restore at least half of the wetlands that have been damaged by 2020. At the request of the Ministry of Climate and Environment, the Norwegian Environment Agency has drawn up a four-year plan for wetland restoration, giving priority to wetlands within existing protected areas. The plan identifies the 10 highest-priority localities. It covers the period 2014–18, and implementation has begun. Continuation of this work will be discussed in Norway's new NBSAP (see Aichi target 17).

In 2013, the Nordic Council of Ministers started a project on ecological restoration designed to help achieve Aichi target 15. Norway, Sweden, Finland, Denmark, Iceland and Estonia are all participants. The countries will first map the status of their ecosystems and then use the four-level model of degradation developed by the EU to draw up a restoration plan. The model is to be used as a basis for setting targets and proposing specific restoration projects. The countries are also to propose priorities and assess how much can realistically be done

given different time limits and cost ceilings. The final report from the project is due in summer 2014.

10.16 Aichi target 16

By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.

There are no national targets that correspond directly to Aichi target 16. Chapter VII of the Nature Diversity Act implements Norway's commitments relating to genetic resources under the CBD and sets out user country measures as required under the Nagoya Protocol. Norway was the first developed country to ratify the Nagoya Protocol, in October 2013. The Storting has adopted amendments to the Nature Diversity Act providing the legal authority to issue regulations on traditional knowledge associated with genetic resources. Work to designate one or more effective checkpoints is underway. Furthermore, regulations on the utilisation of Norwegian genetic material and on traditional knowledge associated with genetic resources are being drawn up. The Marine Resources Act also contains provisions on the use of marine genetic material. Thus, Norway has almost achieved Aichi target 16, although more legislative and administrative work needs to be done to make the Nagoya Protocol fully operational in Norway.

10.17. Aichi target 17

By 2015 each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.

There are no national targets that correspond directly to Aichi target 17. The Government is in the process of drawing up its new National Biodiversity Strategy and Action Plan (NBSAP), which will be designed to halt the loss of biodiversity and implement national environmental targets and the Aichi targets. All new and proposed measures in the NBSAP will be subject to cost-benefit analysis.

10.18. Aichi target 18

By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.

There are no national targets that correspond directly to Aichi target 18. The Sami Act and the provision of Article 110a of the Constitution form the basis for Norway's Sami policy and efforts to preserve and maintain the traditional knowledge of the Sami people.

As a state party to ILO Convention 169, Norway has implemented the consultation procedures it specifies. The Norwegian consultation arrangements establish the right of the Sami, the indigenous people in Norway, to be consulted in matters that may affect them directly. To ensure that this work is carried out satisfactorily, the Government and the Sámediggi (Sami parliament) reached agreement in 2005 on the procedures to be followed

for consultations between central government authorities and the Sámediggi. These apply to the Government and to ministries, directorates and other subordinate agencies. The consultation procedure was followed during the preparation of the 2009 Nature Diversity Act.

The adoption of the Nature Diversity signalled the start of a new era in Norwegian management of natural resources (see Chapter 5.2.1). The purpose of the Act is to protect biological, geological and landscape diversity and ecological processes through conservation and sustainable use, and in such a way that the environment provides a basis for human activity, culture, health and well-being, now and in the future, including a basis for Sami culture.

Section 8 of the Act requires official decisions that affect biological, geological and landscape diversity to be based on scientific knowledge to the extent reasonable. The authorities must also attach importance to traditional knowledge acquired through the use of and interaction with the natural environment, including traditional Sami use, and that can promote the conservation and sustainable use of biological, geological and landscape diversity. To meet Norway's commitments under the Nagoya Protocol, regulations on traditional knowledge associated with genetic resources are being drawn up under the Nature Diversity Act.

The 2005 Finnmark Act established the Finnmark Estate, governed by a board with representatives from the Sámediggi and Finnmark County Council. Management responsibilities for national parks and other large protected areas have recently been delegated to the local level, which gives the municipalities involved a greater sense of ownership and responsibility (see Chapter 6.6.3). The management bodies include representatives from municipalities and county councils, and also from the Sámediggi in areas where there are Sami interests. For further information, see Chapter 8 on traditional knowledge and Sami use of biodiversity.

10.19. Aichi target 19

By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.

There are no national targets that correspond directly to Aichi target 19. The Government has considerably strengthened research, mapping and monitoring of biodiversity in recent years. For further information, see Chapter 5.1. The presentation of status and trends for Norwegian ecosystems in part I of this report also reflects these processes.

10.20 Aichi target 20

By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization, should increase substantially from the current levels. This target will be subject to changes contingent to resource needs assessments to be developed and reported by Parties.

There are no national targets that correspond directly to Aichi target 20. However, substantial funding has been provided for projects that are relevant to implementation of the Strategic

Plan. Please see Norway's input of 7 March 2014 to the CBD Secretariat using the preliminary reporting framework and the information on domestic and expenditure on biodiversity and international financial flows submitted in of 2012. The information on international expenditures on biodiversity from Norway is based on the OECD/DAC Creditor Reporting System, which uses a biodiversity marker (see figure 13).

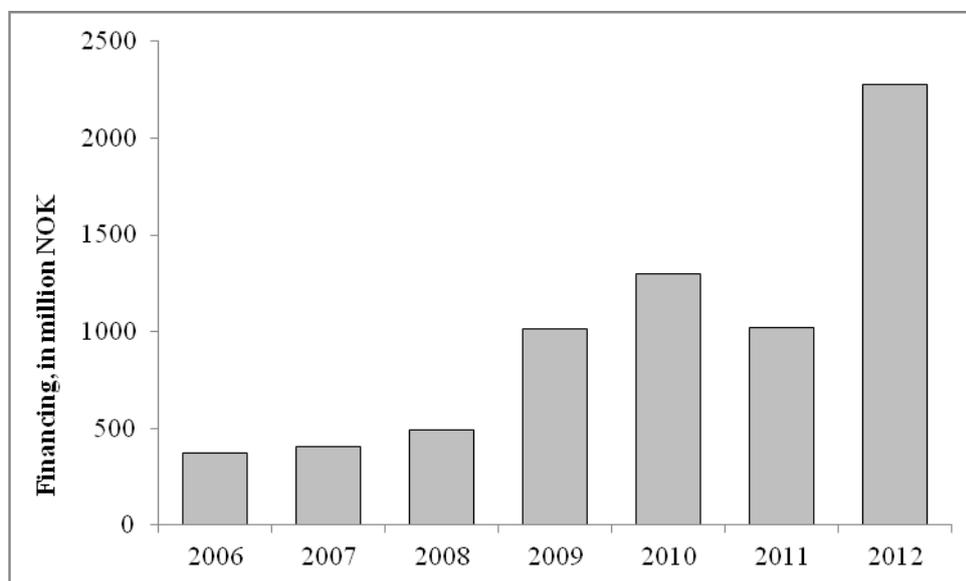


Figure 13: International expenditures on Official Development Aid related to biodiversity from Norway in the period 2006-2012.

11. How actions to implement the Convention have contributed towards the achievement of the relevant 2015 targets of the Millennium Development Goals in Norway

The goal most oriented towards biodiversity is number 7 (environmental sustainability), with the most relevant targets being:

- 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 (it should be remembered that this target was set before the CBD adopted the target of halting the decline in biodiversity by 2020)

Norway has been working to achieve this goal and its targets ever since they were adopted in 2000 (see Part II for an overview of policies and strategies at national and international level, particularly Chapter 9.4 on Norway's environmental development cooperation).

One initiative that should be highlighted here is the Norwegian Government's International Climate and Forest Initiative, which was started in 2008. The initiative has established a series of ground-breaking partnerships with key forest countries, and is further described in Chapter 9.4.1.

In this context we would also like to mention Norway's input of 7 March 2014 to the CBD Secretariat using the preliminary reporting framework (see aichi target 20, Part III).

12. Challenges and lessons learned from implementation of the convention, and remaining challenges

All three of the Convention's objectives (conservation of biodiversity, its sustainable use, and access to genetic resources and benefit-sharing) have played a role in shaping policy development in Norway.

Since adopting its first NBSAP Norway has strengthened the knowledge base considerably, and developed and substantially improved the coordination of legislative instruments. In particular, the Nature Diversity Act and the Planning and Building Act (both from 2009) apply across sectors and facilitate cross-sector coordination. The Nature Diversity Act was inspired by the Convention, its purpose to protect biological, geological and landscape diversity and ecological processes through conservation and sustainable use. It also introduced new provisions on alien species and access to genetic material.

Other cross-sector measures include the management plans for Norway's sea areas and the river basin management plans. Such plans also encourage coordinated use of legislative and other instruments to protect the environment, through knowledge generation, clear targets and tools for finding a balance between environmental considerations and other important public interests. However, there has so far been little coordination of economic instruments, although Norway's first NBSAP identified this as one of the main areas where new policy was needed to provide a better basis for joint management of biodiversity.

The requirements of the Convention have also made it necessary to consider new policy tools such as the valuation of ecosystem services (Aichi target 2) in biodiversity management. In response to the publication of the TEEB study (TEEB 2010), the Norwegian Government appointed an expert committee to review the values related to ecosystem services in Norway (cf. section 5.3). In August 2013, the committee submitted its recommendations in the form of an Official Norwegian Report entitled *Natural benefits – on the values of ecosystem services* (NOU 2013:10). A broad-based public consultation process has been held on the report's conclusions and recommendations. The Government will use the responses that have been received in deciding how to follow up the work and recommendations of the committee.

It is an important principle that Norway's environmental policy and all management of natural resources are to be knowledge-based. In response to the emphasis on knowledge-based management in Norway's first NBSAP, budgets for this purpose were increased and the Norwegian Biodiversity Information Centre was established.

Biodiversity monitoring programmes now ensure that there is some extent of monitoring of all Norway's major ecosystems (the major ecosystems used for the Norwegian Nature Index). These are normally long-term programmes that provide valuable information on the fauna and flora. However, publications on the Nature Index point out that the current monitoring system is incomplete: a number of species groups are not being monitored, monitoring of certain ecosystems (particularly coastal waters and open lowland) is incomplete, and the present monitoring programmes do not provide representative or complete geographical coverage. This is because environmental monitoring in Norway has tended to focus either on species that are harvested (game, wild salmon, etc) or on specific environmental problems (for example acid rain). We have fairly satisfactory information about some vertebrates

(some commercial fish stocks, birds, mammals), but there are serious gaps in our knowledge of fungi, lichens, mosses, vascular plants and invertebrates.

With the improvement of the knowledge base on biodiversity, the need for closer coordination across sectors has become even more apparent. Cross-cutting instruments and measures are frequently needed in priority policy areas related to biodiversity, and the public administration needs to integrate biodiversity concerns into activities in various sectors of society, which is a challenging task.

Norway did not manage to achieve the target of halting the loss of biodiversity by 2010, and it is clear that implementing the Convention involves a number of major challenges. We must ensure that key sectors of society shoulder their share of responsibility for implementation. It is also important to improve coordination and synergies between the CBD and the UN Framework Convention on Climate Change and other biodiversity-related multilateral environmental agreements.

The Programme of Work on Protected Areas under the CBD also gave a boost to Norway's efforts to improve the management of protected areas and develop a representative system of protected areas. At the end of 2013, 16.9 % of the land area of the mainland was protected under the Nature Diversity Act. A large proportion of the total area protected is in the mountains. Although the extent of protected areas covers the range of variation in habitats in mainland Norway reasonably well, a scientific assessment of Norwegian protected areas shows that the goal of creating ecologically representative systems has not been satisfactorily achieved in all ecosystems (Framstad et al. 2010). Only 2.6 % of Norway's territorial waters were protected under the Nature Diversity Act at the end of 2013.

One lesson from the work on outreach during the Biodiversity Year 2010 was that business and industry needs to be involved in such campaigns. The sector has valuable contributions to make and can be part of the solution to the problems facing biodiversity. It is also vital to enhance public awareness and knowledge of how important biodiversity is in our everyday lives, and of the fact that ecosystem services are essential to the economy and human welfare. A local approach makes it easier for people to understand how they benefit from biodiversity and ecosystem services. Public attention and the media spotlight need to focus on biodiversity issues just as much as they do on climate change. We will continue to make use of the elements that proved to be most successful in 2010 in future information activities.

Norway ratified the Nagoya Protocol on 1 October 2013, and is drawing up regulations on traditional knowledge associated with genetic resources. Regulations on access to and utilisation of genetic material are also being prepared. The Nature Diversity Act contains provisions on access to genetic material, including user country measures to implement requirements of both the CBD and the Nagoya Protocol.

Norway considers that a voluntary review mechanism would enhance implementation of the Convention and the Strategic Plan for Biodiversity and Aichi targets, and will pursue this issue further within the framework of the CBD.

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

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The Report was prepared by the Ministry of Climate and Environment with input from the The Norwegian Environmental Agency and in collaboration with other relevant ministries. An open consultation meeting on the preparations of the report was held for stakeholders. The draft report was also sent to Sámediggi (Sami parliament) for comments.

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