

Nature Conservation Development Plan until 2020

Drawn up by: Ministry of the Environment

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Introduction

The nature of Estonia is highly diverse – it includes both coniferous and broad-leaved forests, coastal cliffs and dunes, sandy and stony beaches. Bogs and old-growth forests, alvars and wooded meadows, which have almost disappeared elsewhere in Europe, have been preserved here. Estonia's coastal sea with numerous small islands, bays and coastal meadows is the most important stopover between nesting and wintering grounds for many migratory birds. Several million birds pass through here every spring and autumn.

Approximately half of the land area of Estonia is covered with forest, which makes Estonia one of the most forested countries in Europe. Various mires (fens, transition mires, raised bogs), which have been virtually destroyed in intensively managed and densely populated regions of Europe, make up approximately a tenth of the territory of Estonia. The forests and mires in Estonia have been preserved in a very natural condition, providing habitat for hundreds of lynx, bears and wolves. However, shrinkage of their area, fragmentation, and impoverishment of the species composition still constitute problems.

Such variety of habitats creates conditions for high species diversity. A total of 26 600 species are known from Estonia but the number may increase to 45 000 as the biota gets studied in more detail. Due to the geographic position of Estonia, many species reach the limit of their distribution here – e.g. a third of vascular plants do. The biggest threats to species are posed by shrinkage of the area of suitable habitats, deterioration of living conditions, and fragmentation, including loss of dispersal routes. Changed land use (e.g. overgrowing of meadows) also reduces the suitability of habitats for many species.

Species diversity is particularly high in semi-natural habitats (wooded meadows, alvars, coastal and alluvial meadows, etc.). For example, 76 plant species have been counted on a square metre at Laelatu wooded meadow in West Estonia. Coastal and wooded meadows have been preserved to a greater extent in Estonia than in any other European country but human assistance is needed to maintain such nature values. Without mowing or grazing, these habitats will grow over with brush and their species diversity will be lost.

Thus, the diversity of the flora and fauna here has not only a local but also a regional and global dimension and significance.

The history of nature conservation in Estonia dates back to more than 100 years ago. It is regarded as having begun in 1910 with the establishment of a bird sanctuary on the Vaika Islands. Next to traditional species conservation, modern nature conservation focuses mainly on maintaining the integrity of habitats and promoting the nature awareness of people. Nature conservation aims to maintain biodiversity at all levels of its organisation.

The more there are functioning and biologically diverse ecosystems, the better we are provided with food, natural resources, clean water and air, and the better we will be able to endure environmental pollution and adapt to climate change. With the loss of biodiversity, nature will lose its ability to provide us with various vital services; it is therefore essential that natural resources be used in a sustainable manner. Nature conservation restrictions are often regarded as obstacles to economic development, disregarding the fact that natural resources largely constitute the basis for development. To preserve biodiversity and take right decisions on resource utilisation, the current state of natural resources and ecosystem services should be documented. The comparable values of ecosystem services have not been assessed in Estonia to date.

To conserve nature, one must realise and understand the relationships therein – it is impossible to effectively protect something remote and unknown. Nature is best protected and conserved when people know how to and want to conserve nature – their daily living environment – in all its diversity. Love for nature evolves mainly from childhood experience. Today, not all people can value and conserve Estonia's nature. The quality of nature education is insufficient and inconsistent between different levels of education.

Protection and conservation of nature is something that anyone can do, and everyone has an impact on the natural environment through their behaviour and attitudes. Nature conservation should therefore be integrated into all sectors. Restoration of already spoiled nature is far more costly than preservation of the initial state. Therefore, the principles of nature conservation need to apply everywhere, both in and outside protected areas.

The Nature Conservation Development Plan (hereinafter the NCDP) is a strategic base document for the development of sectors related to the conservation and use of nature until 2020. The strategic goals of the development plan are as follows:

- People are familiar with, appreciate and conserve nature and know how to use their knowledge in their daily lives.
- The favourable conservation status of species and habitats and diversity of landscapes is ensured and habitats are functioning as a coherent ecological network.
- Long-term sustainability of natural resources is ensured and the principles of the ecosystem approach are followed in the use of natural resources.

The development plan is in line with the Global Biodiversity Strategy of the Biodiversity Convention and the ensuing biodiversity strategy of the European Union (hereinafter EU) and its ten-year target: halting the loss of biodiversity and degradation of ecosystem services in the EU by 2020, and restoring them insofar as possible, while stepping up the EU contribution to averting global biodiversity loss. The NCDP is also in line with the Estonian national sustainable development strategy Sustainable Estonia 21¹ and the Estonian Environmental Strategy 2030² and contributes to achieving their nature conservation objectives.

The government coalition programme³ has set the objective of developing a responsible attitude towards nature in people and maintaining a clean and biologically diverse living environment supporting the sustainability of the nation; special emphasis is to be laid on developing a sustainable public attitude towards nature and on prudent use of earth resources. The goals of the NCDP are in line with the principles of the above programme.

The goals of the development plan will be achieved through enhancing the nature-awareness of people, through effective conservation management, through ensuring the availability and update of nature information, and through establishing conditions for long-term sustainability of natural resources.

To achieve the goals, the development plan specifies measures and activities, which will constitute an input for budgeting the necessary funds and a basis for drawing up an operational programme.

¹ http://www.envir.ee/orb.aw/class=file/action=preview/id=90658/SE21_est_web.pdf.

² http://www.envir.ee/orb.aw/class=file/action=preview/id=1158177/KS_loplil_riigikokku_pdf.pdf.

³ <http://valitsus.ee/UserFiles/valitsus/et/uudised/taustamaterjalid/Valitsusliit%20I.pdf>.

Key definitions related to the Nature Conservation Development Plan

Biosphere reserve – an area of international importance designated by the United Nations Educational, Scientific and Cultural Organisation (UNESCO) for the conservation of natural processes and landscape and for ensuring biological diversity.

Favourable conservation status of a habitat – the conservation status of a natural habitat will be taken as favourable when its natural range, and areas it covers within that range, are stable or increasing, and the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and the conservation status of its typical species is favourable.

Habitat type – a habitat type listed in Annex I to the EC Habitats Directive which is endangered within its natural range or has a small natural range.

Habitat – an area distinct from the surroundings by its natural conditions which is suitable for living for particular animal, plant or fungus species.

Biodiversity – variation among living organisms in both terrestrial and aquatic ecosystems, including diversity within species, between species, and of ecosystems; diversity of species and their habitats.

Ex situ species conservation – species conservation measures applied outside the natural living environment of a species.

Maximum sustainable yield of fish stocks – the largest yield that can be taken from a species' stock over an indefinite period without compromising the natural regeneration capacity of the stock.

Community – assemblage of populations of different species within a habitat.

Favourable conservation status of a species – the conservation status of a species will be taken as favourable when population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Nature's benefits or ecosystem services – attributes of ecosystems necessary for humans, grouped as follows: 1) provisioning services, which are provided to humans by ecosystems in the form of e.g. food, water, timber and other materials; 2) regulating services, which affect the climate; the quality of water, air and soil; water resources; floods; etc.; 3) life-supporting services, such as circulation of substances, soil formation, photosynthesis, insect pollination, habitats; and 4) cultural services – nature offering aesthetic and spiritual enjoyment to people, providing a place for recreation and a source of new scientific knowledge.

Nature education – system of knowledge, skills, attitudes and value judgements for raising awareness of relationships between humans and nature. Nature education is grounded on balanced natural, economic, cultural and social development proceeding from the concept of sustainable development.

Natural resources – environmental components necessary for humankind's existence and economic and cultural development: earth resources, soil, wind and solar energy, air, water, organisms and their communities, etc., including ecological conditions – the climate.

Landscape – part of the environment as perceived by people, with its character determined by the impacts of, and interactions between, natural factors and human activity.

Natura 2000 network – EU-wide protected area network aimed at conserving as well as restoring valuable and threatened habitat types and protecting threatened species and their habitats. The Natura 2000 network consists of **special protection areas (SPA)** selected under Article 4(1) and (2) of the Birds Directive⁴ and **sites of community interest / special areas of conservation (SCI/SAC)** selected under Article 3(1) and Article 4 of the Habitats Directive.

Semi-natural community – area with natural biota developed under the influence of long-term human activity (mowing, grazing). Semi-natural communities include wooded meadows, alvars, paludifying and peat meadows, coastal and alluvial meadows, dry and fresh meadows, and wooded pastures.

Green infrastructure – strategically planned, ecologically functioning network connecting natural areas; green infrastructure includes protected areas, agricultural land, wetlands, river corridors, forests, parks and other green areas as well as marine areas regulating the quality of water, air and ecosystems and helping to buffer the impact of climate change.

Mire – peatland area with a permanently high water level characterised by continuous peat formation and binding of carbon dioxide. **Cut-over peatland** – peat extraction site where extraction has ceased.

Alien species – species, subspecies or lower taxon which has arrived in a new area with direct or indirect human assistance and which would have not arrived there otherwise. Alien species are traditionally understood to include only those that have spread to a new area since a certain time (for plants – since the mid-18th century; for other species – since the end of the 19th century).

Ecological corridor – connection route between patches of habitat facilitating the movement of individuals of plant and animal species between their feeding, breeding and resting grounds and enabling the species to disperse.

Ecosystem – self-regulating and evolving integral whole formed by organisms interconnected through nutrition relationships together with their surrounding environment.

Ecosystem approach – integrated, optimal and research-based use of the available natural resources without causing significant damage to natural values, while ensuring the functioning of different components of the ecosystem, taking into account their established dependencies, and causing minimal damage to them.

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Directive 2009/147/EC of the European Council on the conservation of wild birds and Directive 92/43/EEC of the European Council on the conservation of natural habitats and of wild fauna and flora.

1. Nature education and dissemination of nature information

To conserve nature, one must realise and understand the relationships therein. We can effectively protect only what we know and appreciate. **One of the main goals of the NCDP lies in ensuring that people know, appreciate and conserve nature and know how to use their knowledge in their everyday lives.** The essence of nature education and awareness work lies in promoting more conservation-minded attitudes among the people of Estonia so that the society would understand, support and follow the principles of nature conservation. Great emphasis is placed on value education and dissemination of integral knowledge of the surrounding natural environment. Provision of nature education through positive emotional learning starts already in childhood.

Mediation of nature information has the main objective of providing people with general knowledge, interesting facts and correlations but also giving them guidance for appropriate behaviour in the wild. It is also important to acquaint people with the principle of integrity of nature and the services provided by nature so that they would understand the interlinkage of processes around the world and the role of Estonia's nature and people therein.

Practical conservation management is based on conservation science. As problems in nature largely stem from the society, also their long-term solutions lie primarily in the human society. Therefore, conservation science should be treated as a multidisciplinary science involving not only biological sciences but also a variety of disciplines studying humans, such as sociology, psychology, economics, anthropology, history, etc. Only through integrated application of the methods of many different sciences can the long-term maintenance of natural values be planned and ensured.

By 2020, people will be much more aware of the values of biodiversity and the ways how they can contribute to the conservation of biodiversity. The outcomes to be achieved in the field of nature education and dissemination of nature information by the end of the period of the development plan are specified in the table below.

Goal 1. People are familiar with, appreciate and conserve nature and know how use their knowledge in their everyday lives.		
Indicator	Base level in 2011	Level achieved by 2020
Percentage of people in Estonia who regard their daily behaviour as environmentally aware ⁵	22%	35%
Number of nature education programmes taught in schools and nursery schools	270	340
Number of people who have completed an environmental education programme	133 000	Level achieved by 2014: 145 000 Level achieved by 2020: 175 000
Number of disciplines incorporated into	0	6

⁵ Surveys are periodically conducted to assess the environmental awareness of the Estonian population (see <http://www.envir.ee/378516>).

a conservation research programme		
Number of visitors to nature trails	1.55 million	1.75 million

1.1. Nature education

Caring attitude towards nature starts from the intrinsic attitudes adopted in childhood. Today, not all people can value and conserve Estonia's nature. The quality of nature education is insufficient and inconsistent between different levels of education. The possibilities for reinforcing the gained knowledge in practice (in the wild) are underutilised. Nature-centred value education provided to children has an essential role in the development of nature-aware behaviour. Besides knowledge, a similar role in the development of intrinsic attitudes is played by positive childhood emotions, role models, and attitudes of the surrounding society. Positive emotional learning and the diversity of learning opportunities, as well as the promotion of environmentally sustainable lifestyle, have a particular importance.

National environmental education, including nature education, is developed through the national curriculum. In addition to natural scientific subjects, the document also covers topics related to the environment and sustainable development. On the basis of the national curriculum, every school and nursery school draws up its own curriculum, in which it plans its specific activities. The state supports the organisation of environmental days and weeks in schools as well as student extracurricular activities enhancing environmental awareness, for example through the environmental programme of the Environmental Investment Centre.

Nature education activities supporting the national curriculum have the contribution of both national and local government agencies as well as universities and non-profit associations contribute. The activities of various institutions are characterised by the plurality of learning activities. Local schools are offered a diverse learning environment where the knowledge and skills acquired in lessons are reinforced in the form of active learning. The Ministry of the Environment together with the agencies in its area of government is the largest organisation in Estonia to provide systematic environmental education. In 2011, a total of 133 000 students and teachers participated in the study programmes offered by the above institutions.

An important role in promoting nature education is played by the diversity of methods of providing, as well as providers of, knowledge and value education. It is also important that the information reaches a large variety of target groups in a context understandable to them. Therefore, many institutions, such as zoological gardens, museums, environmental education centres and botanical gardens, have a major role in advancing nature education. The activities of local associations providing nature education are also important.

Government agencies organise round tables, sectoral information days and conferences for parties involved in environmental education, with the aim of spreading new methods and familiarising the participants with environmental education activities of various institutions. Information about various extracurricular nature and environmental education programmes has been consolidated on the portal www.keskkonnaharidus.ee. The above activities are intended to enable teachers to make use of different possibilities for diversifying school work. During the period of the development plan, methodological guidelines for incorporating environmental issues into the teaching process will be drawn up for teachers.

Immediate experience of nature is essential for developing a conservation-minded attitude. Urban nature, too, should be made more skilful use of in providing high quality nature education to children. The tradition of outdoor learning is gaining momentum in Estonian schools, and the current national curricula facilitate the enrichment of the learning environment with outside school activities. During the period of the development plan,

systematic professional in-service training will be developed for people involved in extracurricular environmental education. Network cooperation between schools, nursery schools and extracurricular environmental education centres will be promoted with the aim of specifying the needs and possibilities and offering various learning activities that best meet the needs of the target groups.

Measure 1.1. Promoting nature education at all levels of education.		
Lines of activity and main activities	Immediate outcome	Target year
1.1.1 Efficient nature education provided through the education system: harmonising the principles and quality of providing conservation education, incorporating conservation education into learning activities at all levels of education (incl. in-service training of teaching staff, development of methodological guidelines)	The principles and quality of providing conservation education have been harmonised and incorporated into learning activities at all levels of education; an operational in-service training system is in place; methodological guidelines are available	2018
1.1.2 Providing in-service training on the application of active learning methods to institutions/specialists providing extracurricular environmental education, developing the relevant study programmes and materials (incl. internet-based study materials); developing the nature education system	The level of regional opportunities for acquiring environmental education is evenly high (competent institutions/specialists providing extracurricular environmental education; relevant study programmes and materials)	Continuous

1.2. Dissemination of nature information

Dissemination of nature information carries the aim of promoting conservation-minded attitudes among the people of Estonia so that they wish to conserve nature and feel responsible for it. This will ensure broader support of the society to the principles of biodiversity conservation. Several studies⁶ show that nature awareness of the population needs to be further enhanced.

Dissemination of nature information gives people guidance for appropriate behaviour in the wild, acquaints them with the unique character of Estonian nature and the opportunities for spending time in the wild, and explains the linkages between ecological processes and our everyday lives. People are insufficiently accustomed to reading nature news and analyses. This habit can be developed through regularly published attractive columns and relevant comments from experts. For this purpose, media publications will be provided with reliable and gripping nature news, using also the possibilities of social media. Nature nights, camps, lecture series, campaigns and other activities aimed at different target groups will be organised. Nature topics need to be addressed in a quality manner in publications targeted at

all social groups. More attention should be paid in the media to familiarising people with Estonian nature and opportunities for spending time in the wild, including disseminating information about nature events and management activities in national parks and other protected areas. It is also important to acquaint people with the principle of integrity of nature and the services provided by nature, so that they would understand the interlinkage of processes around the world and the role of Estonia's nature and people therein. Also, public awareness of conservation problems (alien species, roadkills, environmental violations, etc.) should continue to be raised. Communities need to be informed of the use of the environment and the relevant decisions and processes.

Journalists will be guaranteed an opportunity of regular in-service training in the field of nature (conservation), applying also the principle of outdoor learning. Media staff will be provided with as easy an access to information and contact data for consulting with professional specialists as possible. To improve the quality of nature information, conservation staff will be trained to produce and mediate nature news for the media. Publication of information media intended to raise nature awareness will be supported through the environmental programme of the Environmental Investment Centre. Attention will be paid to delivery of nature information to the Russian-speaking population.

In addition to disseminating nature information targeted at the general public, such as creating and broadcasting TV and radio programmes, creating practical i-applications (such as electronic field guides to mushrooms, plants, etc.) and publishing nature journals (incl. *Eesti Loodus*, *Eesti Mets*, *Loodusesõber*), the state will also support other initiatives targeted at nature education and value education. The Ministry of the Environment and its subordinate institutions will organise regular events to raise the awareness of different target groups (land owners, agricultural producers and undertakings, forest owners, agricultural and forestry advisers, fishermen, nature guides, local government officials, etc.) and to encourage their conservation activities. The contribution of non-governmental environmental organisations and local governments (through various training courses, workshops, etc.) will play a major role in this process. Increased attention will be paid to explanatory work among communities living in national parks and other protected areas and to their involvement in conservation activities. Training of institutions engaged in wildlife rescue will be strengthened.

The system of recognising persons and organisations who have stood out by their conservation and nature education activities will be improved (in addition to the Eerik Kumari Award and conservation badges, credit will be given also to e.g. landowners actively contributing to conservation of rare species on their property, etc.).

Measure 1.2. Effective dissemination of nature information.		
Lines of activity and main activities	Immediate outcome	Target year
1.2.1 Disseminating relevant nature information (incl. conservation information) and raising awareness among various target groups (organising lectures and information days, publishing and distributing materials)	Relevant nature (conservation) information is available, people behave in an environmentally aware manner	Continuous
1.2.2 Extending and improving the system of recognising people and organisations deserving credit for their conservation efforts	The system of recognising people and organisations for their conservation efforts is in place	Continuous

1.3. Conservation science

Conservation science is an interdisciplinary science applying and integrating the possibilities of biological and many other sciences (incl. economics, sociology, psychology, etc.). Nature conservation addresses biological diversity in all its forms, and conservation science aims to study its development, composition, preservation, the causes of its possible loss and possibilities for its conservation and restoration. Conservation science provides the basis for practical conservation management. The results of natural scientific research are being used in planning and carrying out conservation management works as well as assessing the effectiveness of the conservation measures applied. This provides the basis for planning conservation activities, designating protected areas, drawing up species action plans and management plans. Conservation science also constitutes the basis for providing professional conservation education. Conservation research also enables a more detailed understanding of the background of human factors having an impact on nature, as well as of the possibilities for minimising the adverse impact of the human society on the natural environment.

Conservation science is necessary both for finding ways how to ensure the environmentally sparing functioning of the economy and for providing science-based higher education and in-service training to conservation staff. The opportunity to receive systematic and versatile in-service training is to be ensured. The narrow scope of conservation research constitutes a problem. For example, socio-economic issues or subject areas dealing with the coherence of ecosystems are insufficiently covered in conservation research at present. Key subject areas that need to be further developed include, for example, the social aspects of nature conservation, such as the development mechanisms of human value judgements; ascertainment of the status of species and habitat types and development of methods for their maintenance and restoration; the impact of climate change; ecosystem services. More attention needs to be paid to using the possibilities of modelling in nature conservation. The aim is to develop a system for timely and optimal ordering and financing of conservation studies of national importance and using the results. By 2020, knowledge and scientific basis in the field of biodiversity and the factors affecting it will have been improved and applied. A system of training new generations of conservation experts is to be established, covering the key areas of nature conservation and paying increased attention to ensuring their practical knowledge of nature. A scientific council incorporating different parties should be established under the Ministry of the Environment for planning and guiding applied conservation research.

Measure 1.3. Promoting and applying conservation science to achieve the objectives of practical conservation management.		
Lines of activity and main activities	Immediate outcome	Target year
1.3.1 Developing a system of conservation research	A system of timely and optimal ordering and financing of conservation research of national importance	2013
1.3.2 Applying the system of conservation research	Conservation science supports conservation policy decisions	Continuous
1.3.3 Developing an in-service training	In-service training system for	2015

system for conservation staff	conservation staff	
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1.4. Nature tourism

Nature tourism is a form of tourism that uses nature as a resource and an environment for enjoyable experience. The more time people spend in the wild, the more likely they know how to conserve and value nature. In Estonia, people keen on nature have the opportunity to see intact bog landscapes and species-rich wooded meadows together with their characteristic plants and animals. The nature here also attracts broader attention, increasingly drawing nature tourists from abroad. The diverse wildlife of Estonia gives Estonian nature tourism a high growth potential. The Nature Conservation Development Plan addresses nature tourism mainly from the aspect of nature education and environmental impact.

Approximately 500 organisations are engaged in nature tourism in Estonia⁷. Environmental awareness of all tourists spending time in the wild and all tourism operators needs to be raised. It is also important that any nature tourism event delivers the participants a clear and understandable message explaining the need for nature conservation in an embraceable form.

Nature tourism contributes to familiarising people with biological diversity. In order for people to want to spend time in nature and have sufficient information while staying there, the relevant support structures – information signs, points, boards and centres; nature trails and other facilities, such as boardwalks and watching towers – should be in place. I-services, e.g. web-based information on the location of and values found along hiking trails, also need to be developed. The national network of visitor facilities is supplemented by study trails and other facilities created by various organisations (non-profit associations, local governments, etc.) both in and outside protected areas. Nature tourism infrastructure has been developed across Estonia but the process has been inconsistent. In addition to the above passive ways of making nature information available, it is important to promote active delivery of conservation information and the message of nature conservation to target groups through well-trained instructors and tour guides. The volume of information materials targeted at foreign tourists (information boards and internet-based information) also needs to be increased. The increasing number of visitors necessitates more precise control of the movement of tourists and planning of resting sites and tourist facilities. In developing the infrastructure for nature tourism, more attention is to be paid to its sustainability. Visitor infrastructure needs to be planned more efficiently so that all habitats in Estonia can be visited without causing damage to nature. The aim is to create versatile opportunities for people to enjoy and get to know Estonian nature and to engage in active recreation without compromising the preservation of natural values.

Much of the Estonia's nature tourism infrastructure is located in protected areas. The visitor load there is regulated through protection rules and management plans based on the relevant research and monitoring. Management plans specify, for example, the positioning of visitor management infrastructure. By establishing visitor facilities in areas of higher tolerance, visitors can be directed away from more sensitive natural values, such as communities sensitive to trampling and species intolerant to disturbance. On-site marking of protected areas and their values has so far been insufficient in places. All protected areas are to be

⁷ According to the data of a study on nature tourism operators conducted in 2008 by OÜ Consumetric.

marked by 2016, while also reviewing the procedure for marking and updating the marking requirements according to the character of the protected object.

Measure 1.4. Management of sustainable nature tourism.		
Lines of activity and main activities	Immediate outcome	Target year
1.4.1 Studies of the visitor load of protected natural objects	The visitor load of protected natural objects is known	2020
1.4.2 Optimising the nature tourism infrastructure	Optimal infrastructure	Continuous
1.4.3 Raising the awareness of all tourists spending time in nature and all tourism operators	Tourists and tourism operators are environmentally aware	Continuous
1.4.4 Marking of protected areas	All protected areas are marked	2016; thereafter continuous

2. Conservation management to ensure the favourable conservation status of species and habitats and the diversity of landscapes

The presence, consistency, sufficiency and coherence of naturally or semi-naturally developed habitats provide preconditions for the development and preservation of species diversity. The supra-habitat level of biological diversity is known as landscape.

The second main goal of the NCDP is to ensure the favourable conservation status of species and habitats and the diversity of landscapes so that habitats function as a coherent ecological network.

The favourable conservation status of species and habitats and the diversity of landscapes are achieved in two ways – by conserving either the status or the process. The preservation of semi-natural habitats (e.g. alvars, wooded meadows) is ensured through their maintenance, while natural habitats (mires, forests) are conserved through ensuring their intactness.

To maintain biodiversity and ensure the favourable conservation status of threatened species and habitats, 18% of the land area and 31% of the water area of Estonia has been designated for conservation. **The primary goal of conservation management is to establish an up-to-date protection regime for all protected natural values and to achieve the specified protection objectives.** The law also specifies more general restrictions that apply also outside protected areas. For example, to protect shores and banks, the Nature Conservation Act specifies restrictions on their use: limited management zones, no-construction zones and water protection zones.

Efficient conservation management of biodiversity requires sufficient up-to-date information, which provides a basis for planning management activities and assessing their efficiency. Monitoring programmes and scientific studies have been developed and applied to monitor the changes taking place in nature. The collected data need to be available to and usable by target groups. Monitoring data provide a basis for early planning of actions according to the character of predicted changes so as to avoid possible undesirable consequences.

Nature is best protected and conserved when people themselves want to and know how to conserve it. It is important to continue subsidising private owners who conserve nature on their land and contribute to the preservation of natural and semi-natural communities.

By the end of the period of the development plan, the following results will have been achieved in the field of conservation management.

Goal 2. The favourable conservation status of species and habitats and diversity of landscapes is ensured, habitats function as a coherent ecological network.		
Indicator	Base level in 2011	Level achieved by 2020
Number of species of the Habitats Directive with improved conservation status	Favourable status – 23; inadequate status – 41; bad status – 7; unknown status – 25 species ⁸	The conservation status of 28 species has improved, the status of all species is known
Percentage of species in a good conservation status among the species of the Birds Directive	65% ⁹	80%
Number of species with appropriate conservation guidelines	45	155
Number of new invasive alien species in Estonia per year	2...3	0...1
Area of maintained semi-natural communities	25 000 ha	45 000 ha
Percentage of strictly protected typologically representative forests in total forest land	8.7%	10%
Area of mire communities with a restored natural water regime	100 ha	10 000 ha
Number of habitat types endangered at the European level whose conservation status has improved	Favourable status – 25; inadequate status – 21; bad status – 9; unknown status – 5 habitat types ¹⁰	Conservation status of 14 habitat types (incl. their ecological coherence) has improved, the status assessment of all habitat types is known
Number of monitored species and habitat types	Monitored species of the Habitats Directive – 74 Monitored species of the Birds Directive – 120 Monitored habitat types – 26 Monitored Category I species – 54	Monitored species of the Habitats Directive – 96 Monitored species of the Birds Directive – 221 Monitored habitat types 60 All Category I species are being monitored

⁸ Report on the implementation of the Habitats Directive (2007): <http://bd.eionet.europa.eu/article17/speciesreport>.

⁹ Birds in Europe (2004): http://www.birdlife.org/action/science/species/birds_in_europe/index.html.

¹⁰ Report on the implementation of the Habitats Directive (2007): <http://bd.eionet.europa.eu/article17/habitatsreport>.

Number of indicator species indicating the coherence of the ecological network	0	15
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2.1. Ensuring the favourable conservation status of species

An estimated 35 000–45 000 plant, fungus and animal species live in Estonia today, with the occurrence of approx. 26 600 species having been confirmed by research to date. Considering the small area of Estonia, we are among the species-richest regions at our latitude, and many species that have become rare in Europe can be found here (e.g. white-backed woodpecker, corn crake, bear, lynx, lady's slipper orchid).

The major threats to species are shrinkage of suitable habitats, deterioration of living conditions and habitat fragmentation, including loss of dispersal routes. Changed land use (e.g. overgrowing of meadows) also reduces the suitability of habitats for many species.

The main objectives of species conservation in Estonia are as follows: to ensure the favourable conservation status of all native species, including at the level of sub-species and populations; to maintain the diversity of species in all its forms (incl. genetic diversity); to avoid the release and spread of alien species and alien populations and the negative impact of genetically modified organisms.

The degree of threat has been assessed for 8600 species, or approximately a quarter of the biota of Estonia. Threatened species are kept account of on the Red List (former Red Book), which has been drawn up four times: in 1976, 1988, 1998 and 2008. The 1998 Red List of Estonia included a status assessment for approx. 8600 species of the Estonian biota and identified 1314 threatened species. The Red List of 2008 provided an assessment for 5239 species or other taxa. A total of 133 of the assessed species were categorised as critically endangered and 192 as endangered.

The conservation status of plant and animal species threatened at the EU level was assessed in the framework of 2007 reporting under the Habitats Directive. The status of 96 species was assessed in the course of this reporting in Estonia. Of the species of the Habitats Directive found here, 24% (23 species) are in a favourable conservation status, 43% (41 species) are in an inadequate conservation status, and 7% (7 species) are in a bad conservation status. The conservation status of more than a quarter (26% or 25 species) of the species of the Habitats Directive in Estonia is currently unknown according to expert assessment.

The conservation status of bird species threatened in Europe was assessed in 2004 by BirdLife International. 65% of the bird species in Estonia were assessed as having a good conservation status.

Improving the living conditions of species in a bad or inadequate conservation status (e.g. Siberian flying squirrel, freshwater pearl mussel, salmon, natterjack toad, northern crested newt, slender naiad, corn crake, ortolan, Baltic dunlin, black stork) through restoring and conserving their habitats is the first priority.

Conservation of threatened species includes determining the degree of threat to them, identifying the threats, and identifying and applying protection measures. In addition to conserving individuals, species are conserved through maintaining and restoring the habitats of their populations and limiting human impact, while species associated with semi-natural

habitats are conserved through the continuation of traditional land use. To ensure the preservation or recovery of some populations, the populations need to be augmented or local populations restored. Activities aimed at the benefit of protected species also benefit non-protected species with similar needs. Protected species are ranked into three categories according to the degree of threat to them and strictness of protection. Category I, the one with the strictest protection, includes 66 species; Category II includes 262 species; and Category III – 243 species. To protect the habitats of species, species protection sites are established in addition to traditional nature protection areas. Protection rules for these sites are drawn up according to the needs of the species.

Effective conservation management of species requires a consistent and systematic overview of the diversity of and degree of threat to the species here. For this purpose, the inventories of little-studied groups of species that were commenced in 2008 need to continue and a continuously updated scientific overview of the degree of threat to species – a systematically updated Red List meeting the international requirements – is to be organised in parallel. A procedure for updating the Red List will be developed for that purpose, with assessments of the conservation status of species to be regularly revised by experts. On the basis of the conservation status of species, the list and category ranking of protected species is to be updated, if necessary. For example, the conservation status of the white stork has improved to an extent that allowed the bird to be transferred from Category II to Category III. Applied research needs to be conducted to solve the current issues of species conservation.

Consistent monitoring using appropriate methods is an important tool for obtaining an overview of the conservation status of species.

To achieve or maintain a favourable conservation status of protected species, action plans are drawn up, specifying the threats, conservation objectives and prioritised conservation measures for the species. The adequacy of current conservation measures also needs to be analysed. Drawing up an action plan is mandatory for all protected species of Category I (66 species). Species action plans also need to be drawn up for 89 species of Annexes II, IV, and V to the Habitats Directive. Action plans for protected species of Categories II and III are to be drawn up in accordance with research results (incl. monitoring results) or international obligations. To date, action plans have been approved for 45 species (as of 01.01.2012), while no clear conservation measures have been established yet for many threatened species. By 2020, action plans are to be approved at least for species of Category I and the annexes of the Habitats Directive. The aim is that, by the next reporting under the Habitats Directive (2019), the conservation status of at least 28 species threatened at the European level will have improved.

Action plans (conservation and control plans) are to be drawn up also for the so-called conflict species (the cormorant, large carnivores, etc.). The control plans are intended to avoid and mitigate possible conflicts between these species and humans.

***Ex situ* conservation** is understood as species conservation measures applied outside the natural living environment of the species concerned. This method is used mainly for establishing and maintaining captive populations of species so as to safeguard the gene pool of a species/population in danger of extinction, as well as a possibility for reintroducing the species or augmenting their natural populations (e.g. the European mink in Tallinn Zoo and the gene pools of the original salmon of Estonian salmon rivers in Põlula Fish Farming Centre). *Ex situ* methods are expensive and do not substitute for species conservation in the wild but support it. *Ex situ* species conservation measures are to be developed as part of action plans for threatened species. *Ex situ* measures are applied mainly for species of Category I but

also of Category II if the relevant activities have been assessed under the species action plan as being efficient and essential for achieving the favourable conservation status of the species.

Invasive alien species are defined as species that reproduce successfully in a new area and expand their range. Invasive alien species decrease biodiversity by outcompeting native species, endanger human health and cause economic damage. The current list of species endangering the ecological balance contains 13 plants, 23 vertebrates, and 7 invertebrates. The import of live specimens of these species into Estonia is prohibited. The list is updated as necessary.

The aim is to prevent the release of alien species into the wild, regulate their use and raise the relevant awareness, and also to control invasive alien species (e.g. Sosnowsky's hogweed, signal crayfish), draw up control plans for and conduct research into invasive species. The alien species control plan for Sosnowsky's hogweed is being implemented since 2005. A monitoring system needs to be developed for alien species. First and foremost, it is necessary to introduce the monitoring of the pathways of alien species and improve the monitoring of terrestrial alien species, including invasive hogweeds, and crayfish species. Efficient measures are to be taken on the pathways of species to prevent the arrival and spread of new invasive species. To prevent further spread of alien hogweed species, a system involving the active participation of private land owners and local governments is to be developed.

Most aquatic alien species spread with ships' ballast water and sediments or by attaching themselves to the hulls of vessels. It is important to avoid these species getting into Estonian waters because species that have already been introduced are almost impossible to eliminate. The International Convention for the Control and Management of Ships' Ballast Water and Sediments and the International Convention on the Control of Harmful Anti-fouling Systems on Ships have been adopted. Estonia has joined the latter and is preparing for joining the ballast water convention in 2015.

By 2020, the immigration of invasive alien species to Estonia is to be minimised (to 0–1 alien species per year).

Rehabilitation of **animals in a helpless state** is organised by the Environmental Board. It would be practical to increase the involvement of the non-governmental sector in these activities, while also improving the necessary legal space for that purpose. As the capacity of the non-governmental sector for rehabilitating wild animals increases, the role of public service should be diminished. In future, national conservation authorities should be responsible mainly for protected species of Categories I and II, but also for coordinating the area, licensing non-governmental rehabilitation institutions and informing the public.

Maintaining the highest possible level of genetic diversity is one of the objectives under the biodiversity convention. In addition to species conservation, attention should be paid also to conserving the specific genetic profiles of subspecies and populations by creating the conditions for the preservation of genetic variation. A central role in *ex situ* conservation of the genetic diversity of species and populations is played by the activities of zoological and botanical gardens and their international cooperation. In addition, single organisms, their cells or DNA are stored in the collections of various research institutions. Besides the genetic diversity of wild plant and animal species, it is important to maintain also the genetic diversity of the varieties and breeds of cultivated plants and domestic animals, thereby ensuring also their higher adaptability to changing environmental conditions. It is important to preserve

genetic variation, which would help to adjust plant and animal breeding to emerging needs¹¹. In Estonia, conservation of genetic diversity in agriculture is addressed in the development plan “Collection and conservation of plant genetic resources of agricultural crops for 2007–2013” and its follow-up plan for 2014–2020. Conservation of forest genetic resources is addressed in the Forestry Development Plan until 2020.

Measure 2.1. Ensuring the favourable conservation status of species.		
Lines of activity and main activities	Immediate outcome	Target year
2.1.1 Determining the conservation status of threatened and little-studied species, periodic updating of data (incl. establishing and applying a system for regular updating of the Red List)	Data on threatened and little-studied species (incl. the Red List) are periodically updated, the lists of protected species have been updated	Continuous, the system for updating the Red List applied by 2015
2.1.2 Implementing appropriate conservation measures for endangered species (establishing species protection sites, drawing up and implementing action plans, analysing the effectiveness of conservation management, etc.)	The conservation status of endangered species has improved, appropriate protection rules have been approved for species protection sites	Continuous
2.1.3 Mitigating and preventing conflicts between conflict species (seals, cormorant, large carnivores, etc.) and humans	Action plans (conservation and control plans) and compensation measures have been developed and are applied	Continuous
2.1.4 Organising <i>ex situ</i> species conservation: development and application of <i>ex situ</i> species conservation measures as part of action plans for threatened species	The status of the natural populations of the European mink, natterjack toad, freshwater pearl mussel, oblong woodsia, asp, Atlantic sturgeon, salmon and other threatened species of Protection Categories I and II has improved	2018
2.1.5 Preventing the release of invasive alien species into the wild, regulating their use, research into alien species, developing a monitoring system, developing and applying control measures (control plans)	Prevention systems for invasive alien species are in place, an adequate monitoring system is in place, alien species are being controlled pursuant to control plans	Continuous
2.1.6 Organising the rehabilitation of animals in a helpless state, incl. dissemination of information, effectiveness analysis	Rehabilitation of animals in a helpless state is efficiently organised	Continuous
2.1.7 Ensuring the genetic diversity of species	Mechanisms to ensure the genetic diversity of species have been	2020

¹¹ Five threatened local breeds are officially recognised in Estonia: Estonian native cattle breed and Estonian horse, Estonian draught horse, the population of the universal strain of Tori horse, and Estonian quail. It is also important to preserve the Estonian indigenous sheep, old-type Tori horse and the Estonian hound as threatened local breeds.

2.2. Ensuring the favourable conservation status of habitats

The alternating and diverse landscapes and geographic position of Estonia provide a basis for a high diversity and high nature value of the habitats here. Rare and declining habitats as well as those typical of Estonia need to be protected and conserved. Changes in land use over the last century have had strong impact on habitats. Characteristically, the use of agricultural land, mainly semi-natural grasslands, has decreased (from 65% in the early 20th century to 30% by the end of the century) and the share of forests has increased (from 21% to 50%). In Estonia, like elsewhere in the world, some habitats have been destroyed or their condition has deteriorated as a result of human activity (or its cessation). Shrinkage of the area of habitats as well as fragmentation and impoverishment of their species composition constitute problems. Past land improvement operations have had a serious impact on flowing-water habitats. Ensuring the favourable conservation status of habitats is one of the key objectives of the development plan.

Conservation of **semi-natural communities** (alvars, floodplains, dry and fresh meadows, peat meadows, wooded meadows, coastal meadows, wooded pastures, but also heaths and sands) is a major area of responsibility of our nature conservation. The semi-natural communities of Estonia are among the species-rich habitats in the world. Such natural values, however, can be preserved only with human help. Without mowing or grazing, semi-natural communities will grow over with brush and their species diversity will be lost. Growing over with brush or reed after the cessation of traditional mowing or grazing is the main threat to the biodiversity of meadow communities.

An estimated 60 000 ha of various meadow communities need to be conserved in protected areas in Estonia. Many of these are in a state where the conditions for meadow biota first need to be restored. It is important to ensure that restoration is followed by regular maintenance, which is the basis for achieving the favourable conservation status of such communities. Restoration and maintenance of meadows has been subsidised from the state budget since 2001. Since 2007, mainly the funds of the European Agricultural Fund for Rural Development (EAFRD) have been used for site maintenance. In 2011, about 25 000 ha of meadows across Estonia were maintained through subsidy schemes. The condition of coastal and alluvial meadows is improving thanks to the restoration and maintenance activities in recent years. In future, increased attention needs to be paid to the restoration and maintenance of wooded meadows and alvars. As of 2011, approximately 2000 ha of alvars and only 700 ha of wooded meadows were maintained in Estonia, which is too small an area to ensure the preservation of these habitat types. As of 2010, approx. 2035 ha of dry and fresh meadows, approx. 9000 ha of coastal meadows and 7000 ha of alluvial meadows were maintained and 1500 ha of wooded pastures regularly grazed. By 2020, the area of maintained wooded meadows is to be increased to at least 3300 ha, the area of maintained alvars – to 7700 ha, the area of maintained coastal meadows – to 10 800 ha, that of maintained alluvial meadows – to 12200 ha, and 1650 ha of wooded pastures and 6290 ha of dry and fresh meadows is to be maintained. To increase the area of semi-natural communities, investments into the development of infrastructure need to be increased because many semi-natural communities are inaccessible to modern equipment. It is also important to improve the accessibility of already maintained areas, and it is essential to find possibilities for utilising the mowed hay

and invest into equipment and livestock appropriate for the maintenance of these areas. Possibilities need to be found for more sustainable counselling of persons who maintain semi-natural communities. In addition to the increasing the area of maintained communities, more attention should also be paid to the quality of maintenance, taking into account the habitat requirements of species. By 2020, regular maintenance is to be ensured for a total of at least 45 000 ha of semi-natural communities. Conservation management of the remaining 15 000 ha of semi-natural communities is to be resolved by 2030. Maintenance of semi-natural communities managed through other agricultural subsidy schemes than maintenance subsidies for semi-natural communities has to follow the requirements for maintenance of semi-natural communities (mowing date, chopping restrictions, etc.) to avoid damage to their conservation value due to inappropriate techniques.

More than half of the land territory of Estonia is covered with **forest**, making Estonia one of the most forested countries in Europe. Forests also provide habitat to half of our native species. To ensure the maintenance of natural processes in forests and viable populations of native forest species characteristic of Estonia, especially threatened species, 8.7%¹² of forest land has been designated for strict protection, human impact in threatened forest habitats has been minimised and management restrictions have been imposed. According to studies to identify the minimum need for strictly protected forests, by 2020, the set of strictly protected forests is to be typologically representative and cover at least 10% of forest land¹³. The calculation of minimum need for strictly protected forests is based on the estimated potential quantity of old-growth forests as a consequence of natural forest dynamics, as forest management mainly affects the preservation of old (> 100-year) forests and their biota. Habitat requirements of old-growth forest species and the degree of protection of different forest site types need further research. Nearly 400 000 ha of forest land is protected to ensure the favourable conservation status of forest habitat types and species, with a quarter of this area being private forest land. It is important, *inter alia*, to continue and further develop the subsidy schemes for private forest owners, mainly in Natura 2000 areas but also in other protected forest areas.

In forests managed without conservation restrictions, forest sections of up to 7 ha with a high likelihood of occurrence of threatened or rare species are protected as forest key habitats under the Forest Act.

The oldest biological communities in our climate zone are raised bogs. In addition to their importance for biodiversity conservation, **mires** (fens, transition mires, and raised bogs) are also important as regulators of global carbon circulation and reservoirs of clean water. Peat-producing mires are the most important terrestrial sinks of carbon. Covering only 3–5% of Earth's land area, they bind up to 40% of the carbon contained in the soil, thus being vital sinks of greenhouse gas CO₂ and buffers of climate change. A century ago, the area of bogs in Estonia amounted to approx. 1 million ha. Today, natural bogs in Estonia cover approximately 350 000 ha. Almost 90% of former fens have been cultivated or lost due to extensive drainage; the situation is better for bogs: over 70% of them have been preserved. 175 000 ha of mire communities (mainly raised bogs) are protected.

Although the formerly undrained mires are not being extensively drained today, also the existing catch drains and drainage of the edge communities of mires have a negative impact

¹² Data of statistical forest inventory (SMI) 2010.

¹³ Lõhmus, A., Kohv, K., Palo, A., Viilma, K. 2004. *Loss of oldgrowth, and the minimum need for strictly protected forests in Estonia. Ecological Bulletins*, 51: 401–411. Lõhmus, A. 2005. *Miks peaks künnendik Eesti metsadest olema range kaitse all?* Eesti Mets 2: 34–38.

on the conservation status of mire habitats (incl. protected mires). Conservation of mires means ensuring their natural water regime and restoring the natural state of degraded mires. In recent years, restoration of mires, including removal of drainage ditches and opening the mire landscape where necessary, has commenced in protected areas (Soomaa, Nigula, Endla, Lahemaa). Fens, transition mires and mire margins of bogs need to be restored as the first priority. By 2020, an estimated 10 000 ha of fen and transition mire habitats and mire margins of bogs will have been restored in protected areas.

Conservation of **aquatic habitats** (lakes, rivers, streams, springs) is possible only in cooperation between different sectors. Conservation management of aquatic habitats needs to take account of the fact that all aquatic habitats form an integral whole. Therefore, it should be addressed as conservation of a single aquatic ecosystem rather than lake or river conservation. Clean-up of water bodies is a very long-term process.

There are 2763 lakes in Estonia, with a total area of 210 427 ha. The main threat to lake habitats is eutrophication due to human activities, which leads to overgrowing of lakes and degradation of their ecosystems. To avoid this, the amount of pollutants reaching both stagnant and flowing waters is to be reduced (by limiting the use of fertilizers and their discharge into the aquatic environment, by treating municipal wastewater, by creating vegetation buffer zones around water bodies, restoring or creating wetlands for binding agricultural plant nutrients, constructing sediment ponds in the course of reconstructing land improvement systems, etc.). The treatment plants of settlements are to be upgraded and their continuous high-quality operation ensured. Industrial enterprises connected with the use of water need increased attention. Water pollution is often seasonal and its volume is difficult to monitor. Special attention is to be paid to rivers flowing into protected lakes. 24% of the lakes of Estonia are located in protected areas.

Sediments from drainage ditches washed into rivers with flood water represent a major threat to the biota of river ecosystems. Regular clearing of recipients of drainage systems has a local but long-term effect. To minimise the impact of sediments washed into rivers from drainage ditches, it is important to build sediment barriers at the mouths of new drainage ditches. It is equally important to prevent sediment inwash from the existing drainage ditches by building sediment barriers there. In planning the clearing of recipients, account is to be taken of the need to preserve the biota of watercourses, and modern measures should be applied in maintaining recipients.

Dams constructed on rivers are impassable barriers for fish and other aquatic biota, preventing their access to spawning areas and other habitats and thereby deteriorating the condition of rivers. There are over 300 dams on the rivers of Estonia (155 on salmon rivers and about 150 on other important fish rivers). The aim is to enable the access of species to disused potential habitats and breeding sites. The government coalition programme envisages ensuring the viability and good status of traditional fish rivers and the passage of fish to spawning areas through dam fishways. A total of 4436 km of rivers is protected as important salmon habitat. Salmon habitats are protected with the aim of conserving and restoring the populations of salmon, brown trout, grayling and river trout.

The original salmon populations of Estonia¹⁴ are essential for the preservation of natural salmon in the entire Baltic Sea. Only the salmon population of the Keila River is in a good

¹⁴ Salmon populations with the original gene pool adapted to our conditions have been preserved in four rivers (Kunda, Keila, Vasalemma and Pärnu); these populations need the strictest protection and strongest support, as the genetic diversity of salmon is at the greatest risk among those of our salmonids.

condition today. In addition to restoring wild salmon populations, the aim is to restore natural reproduction of salmon at a sustainable level in former salmon rivers, such as the Pirita, Jägala, Valgejõgi, Loobu, Selja and Purtse Rivers. Restoration of the spawning areas of salmon and other migratory fishes in the Narva River is possible only through international cooperation. Besides salmon rivers, protected areas also encompass 2180 km of rivers and streams that provide habitats and breeding areas for other threatened fish species.

The management plans of aquatic habitats are to be integrated with water management plans, addressing the river as an integral whole, taking account of, *inter alia*, the conservation needs of species associated with river corridors. Diffuse pollution from agricultural production continues to be an obstacle to achieving and maintaining the good status of water bodies. Therefore, it is important to channel more funds through various subsidy schemes into reducing agricultural diffuse pollution.

The natural state of rivers is restored by constructing fishways on dams, restoring oxbows, restoring rapids that provide spawning areas for salmon, and removing unnecessary dams and dam ruins.

Conservation of springs in Estonia is regulated by the Nature Conservation Act and Water Act. It is important to ascertain the condition of springs and improve the condition of degraded springs.

The area of Estonia's **marine areas**, including the territorial sea and the exclusive economic zone¹⁵, is 3 600 000 ha, of which marine protected areas make up 735 809 ha or approximately 20%. All current marine protected areas are located in the territorial sea of Estonia. Protected areas have been established for the protection of species, their habitats and marine landscapes. The main focus of conservation is on the most biodiverse open sea shallows – sandbanks and reefs. Today, approximately 1/3 of the area of the territorial sea of Estonia has been covered by biodiversity inventories. Marine inventories need to continue, including in the exclusive economic zone, which has been little studied to date. Inventory results will provide the basis for determining specific measures to ensure the favourable conservation status of marine habitats, including for creating additional marine protected areas, if necessary.

Marine habitats are threatened by the overabundance of nutrients and direct pollution, intense boat traffic, construction in the sea and other increasingly intensive uses of the sea. National-level spatial planning of marine areas has been commenced; to date, activities affecting the sea have been regulated and organised on a sectoral basis.

Estonia has a long and articulated coastline, whose habitats are very sensitive to external impacts. The conservation status of **coastal habitats** in Estonia is mostly favourable thanks to past and current restrictions applied in coastal areas but restoration of coastal habitats is necessary in certain places. Coastal and riparian habitats are conserved both in protected areas and through the limited management zones, no-construction zones and water protection zones under the Shore and Bank Protection Act. It would be practical to leave the unreformed state land in coastal and riparian areas in state ownership as recreation areas of high public interest.

Outcrops and caves provide habitats for many endangered and rare species. The status of these habitats, too, is being monitored and measures are taken to improve their status, if necessary.

¹⁵ According to the Maritime Boundaries Act (RT 1993, 14, 217) the breadth of the territorial sea of Estonia is 12 nautical miles, measured from an imaginary line which, in the case of low water, connects the points on land, islands, islets, rock formations and single rocks above the water level that are furthest from the shoreline.

The conservation status of habitat types of the EU Habitats Directive was assessed in 2007. According to the assessment report, the conservation status of 25 of the 60 habitat types of the Habitats Directive found in Estonia has been assessed as favourable, that of 21 habitat types has been assessed as inadequate, that of 9 habitat types – as bad, and the conservation status of 5 habitat types is unknown. The aim is to achieve the favourable conservation status of all habitat types of the EU Habitats Directive, but it is equally important to ensure that the already achieved favourable conservation status is retained.

The distribution and/or conservation status of several habitat types (e.g. marine habitats, karst lakes, heaths, petrifying springs, alluvial forests) has been insufficiently studied to date. Further clarification of the distribution and conservation status of threatened and little-studied habitat types and periodical updating of data through both inventories and regular monitoring is one of the main prerequisites for achieving the favourable conservation status of habitats.

More representative habitats have been designated for protection by establishing protected areas and limited-conservation areas. In order for habitat conservation to be effective, protected areas need to form a coherent ecological network enabling free movement of species between all habitats suitable to them. The efficiency of current conservation measures needs to be further analysed. Indicators for assessing the current ecological coherence of our protected areas need to be developed first.

To ensure integral protection for habitat types, action plans for individual habitat types are to be drawn up during the period of the development plan. The plans include an analysis of the conservation status of the habitat type across the country, including the coherence of the habitat type and effectiveness of activities to date, and make specific conservation recommendations together with prioritised activities and areas. Pursuant to Estonia's international obligations in protecting several habitat types (first of all the EU Habitats Directive), such plans are also to take account of Estonia's responsibilities in protecting the relevant habitat type at the European level. On the basis of the action plans for individual habitat types, specific activities are to be planned in the relevant management plans of protected areas.

The target by 2020: the conservation status of at least 14 habitat types in Estonia will have been improved thanks to the applied protection measures.

Measure 2.2. Ensuring the favourable conservation status of habitats.		
Lines of activity and main activities	Immediate outcome	Target year
2.2.1 Restoring and maintaining semi-natural communities	45 000 ha of semi-natural communities restored and maintained (maintainers have the necessary equipment, access to maintained areas is ensured)	2020
2.2.2 Ensuring the conservation of forest habitats (incl. further clarifying the typological representativeness of strictly protected forests, assessing and resolving deficiencies, research into the habitat requirements of old-growth forest species)	Due protection is ensured for a typologically representative set of forests (10%), the habitat requirements of old-growth forest species are known	2020

2.2.3 Restoring threatened mire habitats in protected areas	10 000 ha of fen and transition mire habitats and raised bog margins (lagg-zones, mixotrophic and ombrotrophic forests, degraded raised bogs still capable of natural regeneration) in protected areas	2020
2.2.4 Restoring the natural state of river habitats (opening migration routes of the aquatic fauna, restoring oxbows, etc.)	Ecologically functioning river habitats have been restored	2020
2.2.5 Mapping threatened marine habitat types and ensuring their protection	Threatened marine habitat types have been mapped and conservation of valuable marine areas is ensured	2020
2.2.6 Determining the conservation status of little-studied habitat types (karst lakes, heaths, petrifying springs, alluvial forests, etc.) and threatened habitat types	Data on little-studied and threatened habitat types are periodically updated	Little-studied habitats – by 2015, threatened habitats – continuous
2.2.7 Analysing the efficiency of shore and bank protection measures and applying additional measures, if necessary	Efficient shore and bank protection	2020
2.2.8 Analysing and developing ecological coherence of the habitat network, incl. developing indicators	Ecological coherence of the habitat network has been analysed, measures necessary to improve its coherence have been developed and are being applied	2020
2.2.9 Planning general conservation measures for threatened habitat types: drawing up action plans for habitat types, incl. general guidance for restoration/maintenance, analysing the sufficiency of current conservation measures, prioritising areas on the basis of the importance of conservation activities	Efficient conservation measures have been planned for threatened habitat types across the country	2020

2.3. Landscape conservation

Landscape is the supra-habitat level of biodiversity. Today's landscapes have developed in historically varying interaction between humans and nature, thus being heavily dependent on socio-economic changes.

Landscape as a living environment has an ecological, economic as well as cultural (incl. scientific) value. Landscape conservation is thus a cross-sectoral activity. At the international level, the most important framework for landscape conservation is provided by the European Landscape Convention, whose key concept is aimed at maintaining the various values of landscapes, combining the natural and cultural heritage. Estonia is rich in diverse and unspoilt landscapes, which provide living space for many species next to humans.

A decrease in landscape diversity is a general problem. Landscape conservation aims to value and maintain the landscapes characteristic of Estonia and improve their visual aspect. Maintenance and enhancement of the diversity and functioning of natural and cultural landscapes through traditional settlement and land use patterns ensures the preservation of cultural heritage in rural areas and creates preconditions for the preservation of landscape and biological diversity. The most representative landscapes of Estonia are located in protected areas, mainly in national parks and landscape protection areas. For such areas, landscape conservation has been specified as a separate conservation objective. It is essential to preserve natural and semi-natural landscapes and prevent their fragmentation.

Parks are unique gateways between humans and nature. Thanks to their diverse landscape (open and closed areas, big old trees, water bodies, etc.), parks provide habitat for a large variety of plant and animal species. The aim is to ensure the preservation of values in all protected parks by annual mowing of open areas and appropriate maintenance of the stand.

Trees, springs, boulders, waterfalls, rapids, cliffs, caves and karst forms of scientific, aesthetic or cultural-historical value that add visual interest to landscapes are protected as nature monuments. Sacred groves, cross trees, sacred springs and stones and other sacred natural sites are some of the rarest and most threatened components of Estonia's landscapes. Largely destroyed elsewhere in Europe, these historical sites hold an essential part of the landscape and cultural heritage of all Europe. Sacred sites face the problem of being undervalued and understudied.

Coastal and riparian areas are highly diverse regions where notably varying environmental conditions within a small area create suitable conditions for the presence of a variety of species. Limited management zones and no-construction zones have been established for the preservation of natural coastal and riparian areas. Like parks, publicly owned coastal and riparian areas are popular recreation areas.

Problems lie in littering of landscapes (abandoned buildings, agricultural and military facilities), polarisation of land use (part of the land is degraded wasteland, while part of it suffers from overly intensive use – e.g. urban sprawl, building pressure and increasing visitor load in coastal areas), limited restoration/rehabilitation of degraded landscapes, and overgrowing of small meadows that diversify the landscape.

The concept and functioning of the green network¹⁶ is to be analysed on the basis of the EU Green Infrastructure Strategy. The green infrastructure has the primary objective of ensuring

¹⁶ At the county level, landscapes are protected under the thematic plans of county plans, such as „Environmental conditions affecting the settlement structure and land use“, whose subthemes include valuable landscapes and the green network.

the ecological coherence of habitats and sufficiency of dispersal corridors for habitats and species between them.

Maintenance and strengthening of the green infrastructure is also very important in urban and suburban space. Over 70% of the population of Estonia live in cities and urban settlements. Thus, the diversity and good condition of urban biota is essential to ensure the quality of the urban environment and buffer adverse impacts. Few studies on urban biota have been conducted as yet (some have been launched in Tallinn).

To complement a functioning green infrastructure, agricultural and forest lands of high nature value need to be identified and measures taken for their preservation. This does not mean establishing new protected areas or additional restrictions but rather analysing (and improving, if necessary) the existing production methods and subsidy schemes in order to recognise and support landowners and land users whose activities have contributed to the maintenance of nature values. When identifying agricultural lands of high nature value, account is to be taken of the share of semi-natural communities, production methods, the mosaic character of landscape and the occurrence of threatened species. Forest lands of high nature value are understood as forests whose conservation and management (either historical or current) supports the diversity of native species and habitats as well as the preservation of threatened species.

Measure 2.3. Ensuring landscape diversity.		
Lines of activity and main activities	Immediate outcome	Target year
2.3.1 Preserving landscape values	Landscape values are protected	Continuous
2.3.2 Ensuring the preservation of protected landscapes, incl. parks	Preservation of protected landscapes is ensured	Continuous
2.3.3 Cleaning up littered areas and removing littering single elements	Littered areas have been cleaned up and littering elements removed	Continuous
2.3.4 Analysing the functioning of the green network and planning additional measures as necessary (e.g. landscape maintenance plans, the concept of areas of high nature value, developing planning guidelines taking account of biodiversity, including urban biodiversity, etc.). Implementing the EU concept of green infrastructure	The existing green network has been analysed, additional measures have been applied as necessary	2016, additional measures by 2020

2.4. Conservation management of protected natural objects and Natura 2000

The main principles of current organisation of nature conservation in Estonia were specified in 1994 by the Protected Natural Objects Act and further specified in 2004 by the Nature Conservation Act, which takes account of the EU nature conservation legislation, first of all the Birds Directive and Habitats Directive. Under the Nature Conservation Act, nature is protected through regulating the use of valuable areas – establishing protected areas, limited-

conservation areas and species protection sites, regulating transactions with individuals of protected species, promoting nature education and research, and establishing liability for violations. Protected natural objects include protected areas, limited-conservation areas, protected species, fossils, species protection sites, protected nature monuments, and natural objects protected at the municipal level.

To maintain biodiversity and ensure the favourable conservation status of threatened species and habitats, 18% of the land area and 31% of the water area of Estonia has been designated for conservation. As of January 1, 2012, there were 3705 areal protected natural objects in Estonia, 5 of which were national parks, 131 – nature protection areas, 150 – landscape protection areas, 540 – special types of landscape protection area (parks and forest stands), 116 – areas with unrevised protection rules (from the Soviet time), 344 – limited-conservation areas, 1201 – species protection sites, 20 – natural objects protected at the municipal level, and 1198 – protected nature monuments.

The most presentable areas of the Estonian protected area network are protected as national parks. National parks combine the conservation of, research into and introduction to nature, landscapes and cultural heritage. In the conservation management of national parks, as in that of other protected areas, special attention is to be paid to the consistency of activities and cooperation between different parties.

For protected areas, species protection sites and protected nature monuments, the protection regime required for the preservation of the natural values is established by protection rules, which specify the conservation objectives and measures needed to achieve them. The conservation objectives of limited-conservation areas are specified in the designation decision and their protection regime proceeds from the Nature Conservation Act.

Conservation management has the primary goal of achieving the conservation objectives of the existing protected natural objects. In planning the protection regime, account should be taken of the proportionality of restrictions, i.e. conservation measures should be efficient enough to conserve the natural values without imposing unnecessary restrictions on the use of land ownership and natural resources. An updated protection regime needs to be established for all protected natural values. The first priority is the actual implementation of conservation management with the aim of ensuring effective protection for areas designated for conservation. The network of protected areas should be developed on the basis of representativeness and the principle of ecological coherence.

To ensure efficient conservation management and achieve the conservation objectives, management plans are drawn up for protected objects. Management plans specify the significant environmental factors and their impacts on the natural object, activities necessary for achieving the conservation objectives, including their priority ranking, time schedule and volume, and the budget for the implementation of the plan.

The understandings of management planners and their partners in conservation concerning the appropriate protection and restoration techniques are to be harmonised. Management planning is to build on assessments of the effectiveness of conservation. The methodology for assessing the effectiveness of conservation and restoration measures needs to be improved and applied.

Natura 2000

Nature conservation in the EU is based on two directives: the Birds Directive and the Habitats Directive. To meet the requirements of these directives, an EU network of protected areas – **Natura 2000** – has been established. The Natura 2000 network consists of special protection

areas (SPA) selected under Article 4 (1) and (2) of the Birds Directive and sites of community importance (SCI) selected under Article 3 (1) and Article 4 of the Habitats Directive.

In Estonia, the Natura 2000 network (as of January 1, 2012) consists of 542 SCIs with a total area of 1 149 000 ha and 66 SPAs with a total area of 1 259 200 ha. 60 habitat types (18 of which are priority habitat types) and the habitats of 51 plant and animal species (4 of which are priority species) are protected in SCIs. The habitats of 136 bird species are protected in SPAs. As SCIs and SPAs overlap partially or completely, the total area of Natura 2000 sites is 1 475 200 ha, almost half of which is a marine area. In the case of some habitat types, achieving the favourable conservation status requires additional designation of some of their more representative sites for conservation. For example, to conserve marine habitat types, karst lakes and alluvial forests, at least one additional site per each habitat type is to be added to the Natura 2000 network in Estonia.

Natura 2000 areas are protected under the Nature Conservation Act as protected areas, limited-conservation areas, species protection sites or protected nature monuments. To meet the goal of the EU Habitats Directive (to ensure the favourable conservation status of all species and habitat types endangered in the EU), maintenance or restoration of conservation target species and habitat types is to be ensured in Natura 2000 areas and appropriate conservation measures ensuring the achievement of the favourable conservation status of their values are to be established. For that purpose, it is necessary to finalise the sufficiency assessment (and, if necessary, revision) of protection regimes, drawing up of management plans, and designation of some single Natura 2000 sites currently lacking national protection as protected, which would also ensure compliance with the requirements for designating special areas of conservation¹⁷.

Every six years, Member States draw up a report on the conservation status of the habitat types and species of the Habitats Directive and the Natura 2000 network, including information on the conservation measures applied. Similar reports are to be drawn up under the Birds Directive.

In addition to national funds, various financial mechanisms of the EU (the European Regional Development Fund, the European Agricultural Fund for Rural Development, LIFE, etc.) also play a major role in achieving the goals of Natura 2000.

The Habitats Directive also lays down the obligation to **assess the impact of planned activities on the conservation objectives of and maintenance of the integrity of Natura 2000 sites**. The assessment is to cover the potential impact of both the activities planned within Natura 2000 sites and those that are planned outside Natura 2000 sites but could have an impact on the nature values of a Natura 2000 site. In Estonia, the impact assessment for Natura 2000 is part of environmental impact assessment (including strategic impact assessment). The quality of assessing the impact of development activities, including their impact on protected areas and Natura 2000 sites, needs to be improved and the competency levels of experts evened out. For this purpose, it is important to analyse the optimality of the conservation practice to date, to elaborate it, if necessary, to draw up additional guidelines, and to organise training for both experts and officials. Capacity building of local governments plays a major role in improving the quality of impact assessment for Natura 2000.

¹⁷ Member States are to designate sites of community importance as special areas of conservation within six years from the adoption of the lists of sites of community importance by the European Commission, adopting also their conservation objectives and specific measures to achieve the conservation objectives.

Supervision over the lawful use of the natural environment and natural resources is exercised by the Environmental Inspectorate. The main violations in protected areas consist in driving a motor vehicle outside designated roads and illegal building activities. An important role in controlling illegal building is played by local governments, who enact detailed plans and exercise direct construction supervision. In general, the number of violations and fines and the extent of environmental damage have decreased over the years, mainly thanks to clarification of legislation, strengthening of supervision, and cooperation between law enforcement authorities, but also the increased awareness of people.

Measure 2.4. Conservation management of natural objects.		
Lines of activity and main activities	Immediate outcome	Target year
2.4.1 Ensuring appropriate protection of all protected nature values (analyses of the efficiency of conservation, adjusting the protection regime, as appropriate, incl. ensuring a protection regime for Natura 2000 sites)	Appropriate conservation management of all protected natural objects	Protection rules for all protected areas have been approved under the Nature Conservation Act – 2016; management plans are in place for all Natura 2000 sites of community importance by 2014, for all protected areas and limited-conservation areas – by 2020
2.4.2 Ensuring the protection of areas of high nature value (inventories, designating areas or objects for conservation)	Sufficient representation of all endangered species and habitat types is ensured in protected areas	Continuous
2.4.3 Selecting additional Natura 2000 sites and submitting them to the European Commission together with the relevant set of data	Sites have been submitted	2016
2.4.4 Improving the impact assessment system for Natura 2000, drawing up additional guidelines and organising training	Impact on Natura 2000 is being assessed as appropriate	2016

2.5. Collecting, storing and ensuring the availability of nature data

Determination of the conservation status of threatened and little-studied species and habitat types and periodic updating of data are some of the key prerequisites for the conservation of biodiversity.

Nature data are collected within the framework of systematic national monitoring and, if necessary, also through additional inventories. Base data for monitoring are collected through

inventories of protected species and habitat types and are also used for national-level conservation status assessment and analysis. The monitoring programme is developed on the basis of international and domestic obligations, including action plans and management plans developed for the conservation and management of species, the Red List, but also the need to update the data characterising the conservation status of species, communities and landscapes.

Today's wildlife monitoring in Estonia does not provide sufficient data for making science-based decisions and fulfilling the country's international obligations, e.g. for reporting on the conservation status of habitat types and species under the Birds Directive and Habitats Directive, about changes in the biodiversity of commercial forests, etc. Species and habitat types with data deficiencies need to be mapped and possible overlaps between different monitoring programmes identified. The objective is to create a well-functioning coherent and optimal monitoring system. Monitoring methodologies are to be improved, including using remote sensing. Coherence is to be developed between wildlife monitoring and other sub-programmes of national monitoring, between different subareas of wildlife monitoring, and between national monitoring and conservation management monitoring and inventories. Proceeding from the above, it is also necessary to improve the structure and coherence of the network of monitoring stations and sites and of the set of monitored parameters, which is often not representative enough to provide information about changes at the national level.

Single organisms, their cells or DNA are stored in the scientific collections of various research institutions of Estonia and the relevant metadata are stored in the databases of the collections. It is essential to consolidate such data into a common network.

Nature data stored in different databases have to be usable together. This requires analysing and interfacing the structure, data composition and functions (in the sense of both the use and the objectives) of so far separate databases (database of habitat types of the Habitats Directive, Natura 2000 standard database, database of alien species, etc.). The applications already in use (such as the biodiversity database, the nature observations database, the biodiversity information network, the Estonian nature information system (EELIS), the application for management and action plans, the single monitoring information system, etc.) need to be further developed to ensure effective use of data. Internet availability of environmental permits and various decisions concerning the environment needs to be simplified.

Information exchange between databases for managing nature conservation data and other databases containing the necessary background information (land cadastre, population register, etc.) needs to be in place, so as to ensure the availability of data and increase the efficiency of generating information from the collected data in the form of overviews and analyses targeted at various user groups. To improve the delivery of data and information to the users and enhance the use of monitoring data, web-based integral data retrieval and analysis services are to be developed.

Measure 2.5. Ensuring the availability of nature data and storing scientific collections.		
Lines of activity and main activities	Immediate outcome	Target year
2.5.1 Analysis of the wildlife monitoring system (data collection mechanisms, representativeness, etc.), determining deficiencies and overlaps and elaborating the methodologies, creating and	Optimal monitoring has been introduced, research-based data are available for decision-making	Methodologies elaborated by 2016, monitoring – continuous

implementing an optimal monitoring network		
2.5.2 Consolidating data of scientific collections into a single network	The dataset of scientific collections is usable together	2020
2.5.3 Developing databases (including spatial data) and the relevant applications, and improving technical and content interfacing	Availability of existing data at different levels is ensured	Continuous

2.6. International cooperation to conserve biodiversity

Areas inhabited by various native species, as well as the ranges of various habitats, usually do not coincide with national borders. Millions of Arctic waterfowl who stop in Estonia during their spring and autumn migration winter in Southern Europe and nest in polar areas. Such species can be effectively protected only in cooperation between the countries along their migratory routes. There are many such examples. Therefore, nature conservation can be effective only through international cooperation. International cooperation in nature conservation aims to contribute to improving the condition of nature and raising environmental awareness, and to implementing the principles of sustainable development in Estonia, Europe, and worldwide.

Estonia has joined the following key international agreements establishing the obligation to conserve biodiversity beyond the EU requirements: the Ramsar Convention on the conservation of wetlands, the Rio de Janeiro Convention on Biological Diversity, the Washington Convention (CITES) regulating international trade in endangered animal and plant species, the Convention on the Protection of the Marine Environment of the Baltic Sea Area (HELCOM), the Bern Convention on the Conservation of European Wildlife and Natural Habitats, the Bonn Convention on the conservation of migratory species, and the UNESCO Convention on the Protection of World Cultural and Natural Heritage. In 2007, Estonia joined the International Union for Conservation of Nature (IUCN) and, in December 2010, the Organisation for Economic Cooperation and Development (OECD). Under international conventions, the parties undertake various obligations to protect biodiversity: for example, countries that have joined the Ramsar Convention undertake to designate and conserve wetlands of international importance; signatories to the HELCOM convention engage in active cooperation within the framework of the Baltic Sea Strategy on issues concerning environmental sustainability and safety of the Baltic Sea, including improving the safety of vessel traffic and reducing pollution. All the above agreements are aimed at effective international cooperation in the fields of conservation research, information exchange and conservation management.

The Environmental Inspectorate exercises supervision over the conformity of trade in internationally protected species and their derivatives with the rules established under the CITES convention. Within the framework of supervision over transactions with species listed in the appendices of CITES, countries are to verify the legality of transactions made not only in shops and markets but also over the internet.

The Man and the Biosphere Programme of UNESCO was created to implement and promote the principles of sustainable development. Estonia has been participating in this programme since 1990 with the West Estonian Archipelago Biosphere Reserve¹⁸. The West Estonian Archipelago Biosphere Reserve Programme is to be drawn up and implemented in cooperation between various stakeholders (researchers, local governments, NGOs, etc.) following the ecosystem approach to balancing the economy and nature at the local level making use of international experience.

Exchange of nature conservation information with other countries, e.g. for sharing scientific data, socio-economic studies, training programmes, etc., is increasing year by year. Governments, NGOs and international organisations act in cooperation to achieve their common objectives.

Measure 2.6. International cooperation to conserve biodiversity.		
Lines of activity and main activities	Immediate outcome	Target year
2.6.1 International cooperation in conservation research, information exchange and conservation management, incl. fulfilling the obligations undertaken under international conventions (incl. submitting new wetlands of international importance to the secretariat of the Ramsar Convention and transposing the requirements of the ASCOBANS agreement of the Bonn Convention)	International cooperation in conservation research, information exchange and conservation management is in place (wetlands of international importance have been submitted to the Ramsar list, requirements of the ASCOBANS agreement have been transposed)	Continuous, Ramsar sites will have been submitted by 2015, requirements of the ASCOBANS agreement will have been transposed by 2014
2.6.2 Joining the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilisation (ABS) ¹⁹	The Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilisation has been ratified	2015
2.6.3 Improving the efficiency of supervision within the framework of CITES (the Washington Convention)	Supervision is efficient	Continuous
2.6.4 Developing and implementing the West Estonian Archipelago Biosphere Reserve Programme	The programme has been developed and implemented	Programme by 2014, implementation continuous

2.7. Compensating for conservation restrictions and providing financial support to conservation activities

¹⁸ Established by Regulation No 426 of 27 December 1989 of the Government of the ESSR.

¹⁹ The Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization.

Nature conservation is effective only with the contribution of all stakeholders. A major role is played by private owners who conserve nature on their land and contribute to the preservation of natural and semi-natural communities. Conservation of biodiversity is critically dependent on the availability of funds. To achieve the maximum result, various existing financial mechanisms should be used in an integrated manner and new ones developed.

Maintenance of biodiversity can be significantly supported through the common agricultural policy of the EU. One of the most important measures from the conservation point of view under the Estonian Rural Development Plan 2007–2013 (RDP) envisages subsidising the maintenance of semi-natural communities. This agri-environmental subsidy is paid for the maintenance of semi-natural communities located in Natura 2000 sites. In 2011, this subsidy was paid for a total of more than 4.4 million euros, which enabled the maintenance of 24 000 ha of communities. The total available funds for subsidising the maintenance of semi-natural communities from the European Agricultural Fund for Rural Development for the period of 2007–2013 amount to 26.8 million euros. It needs to be further analysed whether the subsidy requirements and rates meet the demands of all endangered species and communities, and the requirements and rates need to be revised, if necessary. Subsidy schemes are also in place for keeping endangered breeds of farm animals and growing local varieties of agricultural plants, and partially also for water protection. Attention needs to be paid also to species that were formerly widespread in fields of agricultural crops but are now threatened with extinction, such as cornflower, corncockle, etc.

The RDP also provides a framework for compensating agricultural producers and private forest owners for restrictions established for the conservation of Natura 2000 sites. In 2011, the Natura 2000 subsidy for agricultural land was paid for a total of 23 000 ha and amounted to 0.7 million euros (total amount allocated for 2007–2013 is 8.6 million euros). The Natura 2000 private forest subsidy was paid in 2011 for 54 450 ha, totalling 3.7 million euros (total amount allocated for 2007–2013 is 31.4 million euros). Subsidy schemes need long-term and stable further financing. The subsidy rates are not always in accordance with the restrictions. A fairer subsidy rate is to be ensured for such cases. Today, private forest owners in protected areas outside the Natura 2000 network are not compensated for forest management restrictions. To ensure equal treatment, a subsidy scheme needs to be established also for protected areas outside the Natura 2000 network.

Biodiversity needs to be conserved also outside protected areas. Measures supporting the conservation of biodiversity outside the Natura 2000 network and protected areas are insufficient. The mosaic landscape creates conditions for a wide variety of habitats and thereby also for a great diversity of species. To conserve biodiversity, additional financing schemes need to be developed and applied both for maintaining species with specific habitat requirements and for maintaining the diversity of landscapes (including water bodies). The rural development policy of the EU common agricultural policy requires Member States to identify agricultural and forest lands of high nature value and to take measures to conserve them. It is important to develop subsidy schemes for agricultural and forest land of high nature value.

Conservation activities are supported also through the EU structural funds. 21.7 million euros have been allocated for the period of 2007–2013 from the European Regional Development Fund for drawing up management plans and action plans and for developing the infrastructure and making investments in protected areas pursuant to the plans. The supported activities include habitat restoration, purchase of maintenance equipment and livestock needed for the preservation of habitats, control of alien species, restoration and reconstruction of protected

parks, and creation and maintenance of infrastructure for directing visitors. The availability of funds will continue to be essential for improving the conservation status of habitat types also in future.

19 million euros have been allocated from the Cohesion Fund for the period 2007–2013 for removal of barrier structures from watercourses and reconstruction and construction of fishways at dams to ensure free movement of fish in watercourses. Preference should be given to improving the status of fish fauna in watercourses important for conserving the habitats of salmonids, as listed in regulations of the Minister of the Environment²⁰. It is important to ensure the continuation of the above funding for improving the status of fish fauna and water bodies, which will ensure compliance with the requirements of the Water Framework Directive and the Habitats Directive.

The EU LIFE programme supports projects aimed at nature conservation, environmental policy-making and environmental awareness. The volume of aid granted to Estonia from the programme depends on the quality of the applications submitted. To date, aid to conservation projects has totalled 0.7–1.3 million euros per year, which is far lower than the amount allocated to Estonia for that purpose. Considering that LIFE is the only programme for solving specific nature conservation problems, preparation of high-quality projects is to be supported by any means.

Nature conservation projects are also funded through the financial mechanisms of the Estonian-Swiss cooperation programme, Norway and the EEA.

The nature conservation programme of the Environmental Investment Centre supports activities in the fields of conservation development planning, maintenance and conservation management of protected natural objects and development of nature conservation infrastructure.

The state supports the conservation of biodiversity in commercial forests outside protected natural objects, compensating landowners for loss of profit due to management restrictions imposed on forest key habitats. Key habitats in private forests are conserved on a contractual basis.

The Land Tax Act establishes full exemption from land tax on land falling within strict nature reserves and conservation zones of protected natural objects and 50% exemption on land falling within limited management zones of protected natural objects and limited-conservation areas. The system of compensating for land tax reduction due to nature conservation restrictions is to be analysed and further developed, if necessary.

The Nature Conservation Act establishes a compensation mechanism for immovables located within a protected natural object: if the intended use of such immovables is significantly limited by the protection regime of the area, they can be sold to the state in agreement with the owner of the immovable. To date, the state has spent approx. 3.2 million euros annually on the purchase of land of nature value. Increased funds are to be planned for that purpose in future.

Sufficiency of funds and the related administrative capacity are the keys to achieving the objectives of nature conservation as a whole (incl. the Natura 2000 network). It is important to find innovative ways of financing for biodiversity conservation.

²⁰ „List of water bodies protected as habitats of salmonids and cyprinids and quality and monitoring requirements for the water of these water bodies and stations of national environmental monitoring of salmonids and cyprinids“ and „List of spawning grounds and habitats of salmon, river trout, brown trout and grayling“.

Damage caused to agricultural producers and fishermen by animal species of conservation significance in Estonia and in the EU (wolf, bear, lynx, grey seal, ringed seal, European mink, white-tailed eagle, osprey) and by migratory bird species (common crane, geese), as well as expenditures on measures to prevent the damage, are compensated for under the Nature Conservation Act. Compensation for damage is treated as *de minimis* aid, which inhibits paying compensation to the victims of damage. The system of preventing and compensating for damage is to be analysed and elaborated. In compensating for damage, more account should be taken of preventive measures, and the share of compensating for expenditures on preventive measures must be increased. Establishment of compensation fields for geese and cranes is to be analysed as a preventive measure.

Measure 2.7. Compensating for nature conservation restrictions and providing financial support to conservation activities.		
Lines of activity and main activities	Immediate outcome	Target year
2.7.1 Developing and paying Natura private forest subsidies, agricultural subsidies, maintenance subsidies for semi-natural communities and nature conservation subsidies	Improved system of subsidies for the Natura 2000 network is in place	Development by 2016, payment continuous
2.7.2 Developing subsidy schemes for protected areas outside Natura 2000 sites: developing and implementing measures for compensating for forest management restrictions	Forestry subsidy scheme for national protected areas is in place	Measures implemented by 2014, payment continuous
2.7.3 Developing and implementing national economic instruments for biodiversity conservation: promoting environment-friendly agricultural practices (incl. practices supporting water protection); developing and implementing the concept of areas of high nature value and subsidy mechanisms for these areas; developing and implementing subsidy schemes for species conservation (corncrake, etc.)	National economic instruments for biodiversity conservation have been developed and implemented	Measures implemented by 2017, payment continuous
2.7.4 Analysing and, if necessary, improving the system of exemption from land tax	Improved system of exemption from land tax is in place	2015
2.7.5 Public purchase of protected land whose intended use is significantly limited by the protection regime of the area	Protected land whose intended use is significantly limited by the protection regime of the area is state-owned	Continuous
2.7.6 Analysing and improving the system of preventing and compensating for damage caused by species	The system of preventing and compensation for damage caused by species has been improved, updated and implemented	Improved system by 2013, compensation continuous

3. Use of natural resources and other human activities having an impact on the environment

Biological diversity is one of the key foundations for economic and social welfare. The more there are functioning and biologically diverse ecosystems, the better we are provided with food, fuel, clean air and water and the better we are able to combat environmental pollution and climate change. With the loss of biodiversity, nature will lose its ability to provide us with various services. It is therefore essential that natural resources be used in a sustainable manner.

The third main goal of the NCDP is as follows: long-term sustainability of natural resources, and the preconditions for this, are ensured and the principles of ecosystem approach are followed in the use of natural resources. Natural resources are used in a sparing and sustainable manner, without compromising the achievement of a favourable conservation status of ecosystems. The use of natural resources must integrate the use and conservation of nature so that the available stock is used optimally, without causing significant damage to nature values. Renewable natural resources are to be used in such a way that their stock does not run out; non-renewable resources are used in such a way that they do not run low before we are able to replace them with other natural resources. Such long-term, sustainable and knowledge-based use of natural resources will ensure both the economic welfare and maintenance of biodiversity for the coming generations.

In using natural resources and in other human activities having an impact on the environment, it is important to consider not just the direct economic benefit but also the services provided by nature – the so-called ecosystem services (e.g. clean water, food, recreation). Activities with a significant impact on the environment, such as mining, building, or creation of infrastructures, should be planned taking into consideration the need to conserve habitats and their coherence. The principles of biodiversity conservation need to be taken into account everywhere, both in and outside protected areas.

The outcomes specified in the table below will have been achieved by the end of the period of the development plan.

Goal 3. Long-term sustainability of natural resources, and the preconditions for this, are ensured and the principles of the ecosystem approach are followed in the use of natural resources.		
Indicator	Base level in 2011	Level achieved by 2020
Number of habitat type groups (mires, forests, meadows, etc.) whose ecosystem services have been assessed	0	6
Area of rehabilitated cut-over peatlands ²¹	0 ha	1000 ha
Size of selected game populations	Wolf 200, lynx 700	Wolf 200, lynx 700
Share of fish stocks in a good status in the	41%	60%

²¹ Peatlands which were exploited during the period of the ESSR but are now abandoned.

total stocks of economically important fish species		
Number of functioning ecoducts and small game tunnels	0 10	Ecoducts 4 Small game tunnels 20

3.1. Taking account of the value of nature's benefits (ecosystem services) in the use of the environment

Healthy and biologically diverse ecosystems provide vital services – ecosystem services. Ecosystem services or nature's benefits represent the attributes of ecosystems necessary for humans, grouped as follows: 1) provisioning services, received by humans from nature in the form of e.g. food, water, timber and other materials; 2) regulating services, which have an impact on the climate; on the quality of water, air and soil; on water resources, floods; etc.; 3) life-supporting services, such as circulation of substances, soil formation, photosynthesis, insect pollination, habitats; and 4) cultural services – nature offering aesthetic and spiritual enjoyment, providing a place for recreation and a source of new scientific knowledge. Recognition, appreciation and consideration of the values (incl. the economic value) of ecosystem services is becoming increasingly important in nature conservation. Nature conservation restrictions are often regarded as obstacles to economic development, disregarding the fact that natural resources largely provide the basis for the development. Restoration of nature is far more costly than lack of protection.

The comparable values of ecosystem services have not been assessed in Estonia to date. The extent to which the current fees for the use of natural resources take account of the preservation and status of ecosystems needs to be analysed. To maintain biodiversity and make right decisions on the use of natural resources, the current status of natural resources and ecosystem services is to be documented. The base levels necessary to maintain ecosystem services are to be determined for this purpose. This is done through spatial inventories of natural wealth as well as through modelling and determining the levels needed for maintaining the services and the current status of limiting factors. The preparatory work includes developing the necessary principles and methodologies.

The status of ecosystems is to be assessed and the services provided by ecosystems mapped by 2018. The values of ecosystem services are to be assessed by 2020 and taken into account in national and local decision-making processes and reporting systems. The ecosystems providing essential services must be conserved and restored.

Measure 3.1. Taking account of the value of ecosystem services in the use of the environment.		
Lines of activity and main activities	Immediate outcome	Target year
3.1.1 Developing methodologies for calculating/assessing the services from various components of biodiversity (mire, forest, meadow, inland water and marine, etc. habitats)	Methodologies for calculating/assessing the services from various components of biodiversity are available	2014
3.1.2 Assessing the base levels of the current	Base levels of the current status	2018

status of ecosystem services (mires, forests, meadows, etc.)	of ecosystem services have been assessed	
3.1.3 Informing the public of the values (incl. the economic value) of and systemic relationships between ecosystem services and taking account of the values and relationships at different levels of resource use (incl. assessing and, if necessary, improving the adequacy of environmental charges)	The public is aware of the values of ecosystem services, the values are taken into account at different levels of resource use (the adequacy of environmental charges has been assessed and, if necessary, improved)	2020

3.2. Non-renewable natural resources

Earth resources and the soil are non-renewable natural resources. The main earth resources in Estonia are oil shale, construction minerals and peat. Nature conservation objectives in the use of non-renewable natural resources are aimed at minimising the negative environmental impact and restoring the natural processes and the visual character of landscapes after the completion of economic activities.

Peat. Deposition of peat has stopped due to drainage in approximately two thirds of the nearly one million hectares of former mire areas of Estonia, and organic matter is decomposing there. Therefore, the drained bogs of Estonia represent the second most important source of carbon dioxide emissions into the atmosphere after industry. The annual peat increment has been overestimated: as the calculations include also, for example, already drained bogs, where peat accumulation has stopped, peat has been over-extracted, especially in raised bogs. The actual annual increment of peat is insignificant, i.e. no extractable resource is generated. Peat is therefore regarded as a non-renewable natural resource and the extraction volumes need to be revised accordingly in future.

Cut-over peatlands with exhausted peat reserves have not been restored/rehabilitated and self-recovery of paludification processes in cut-over peatlands is too slow. Also, the restoration of paludification processes by current methods is time-consuming and expensive. The current methods need to be improved.

Areas degraded by drainage (incl. abandoned peat extraction areas) need to be prioritised to identify the needs for and sequence of their rehabilitation and/or restoration. Further draining of natural peatlands must be avoided, preferring the continuation of peat extraction from areas already degraded by drainage.

The use of **oil shale** is regulated by the National Development Plan for the Use of Oil Shale for 2008–2015²² and the use of **construction minerals** is regulated by the National Development Plan for the Use of Construction Minerals for 2010–2020²³. Extraction of oil shale and other earth resources leads to the expansion of degraded landscapes, destruction of the natural hydrological network and deterioration of groundwater quality, expansion of territories occupied by landfill sites, and potential increase in the emissions of hazardous substances into the air and water. The problems associated with these earth resources, as well as solutions to the problems, have been scrutinised in the relevant development plans. The

²² Approved in October 2008: <https://www.riigiteataja.ee/akt/13057849>.

²³ Approved in March 2011: <https://www.riigiteataja.ee/akt/317032011003>; <http://www.envir.ee/ehitusmaavarad>.

most important objective under these plans for the purposes of the NCDP aims to reduce the negative environmental impact of extraction.

Non-renewable natural resources should be used in line with the principles of sustainable development. The already opened mines are to be exhausted first. Every decision to extract an earth resource must be preceded by a comprehensive impact assessment and subjected to the requirement to use the best available techniques. Extraction should be permitted only on the condition that the extraction sites will be rehabilitated to a level equivalent to the pre-extraction landscape. Minimisation of the negative impact of extraction is to be planned already before commencing the extraction. This is to include the later rehabilitation of extraction sites as well as protection of nature values in the surrounding areas and compensating for negative impacts during the extraction. Extraction of earth resources must not have an impact on protected values; extraction must not be permitted unless the impact is prevented.

Subsequent to extraction, the site must be returned to as near natural a state as possible. For example, raised bogs should be restored into ecologically functioning bog habitats. A regulation needs to be developed that would motivate private owners to rehabilitate and restore abandoned extraction sites in their possession. Several rational approaches to the use of former quarries have been found: they can be used as recreation areas, lake systems, fish ponds, habitats of natterjack toad, rehabilitated farmland or forest land, etc.

The **soil** is the main regulator of the biogeochemical cycle in ecosystems. Soils are damaged by factors such as erosion, construction, a decrease in organic matter, pollution, acidification, compaction and sealing. Cultivation of peaty soils leads to the decomposition and mineralisation of peat. Cultivation of peaty soils therefore needs to be avoided and restoration of peat extraction sites as wetlands promoted. In cultivating and using different types of soil, the condition of field and forest soils can be deteriorated by the use of (agro)techniques unsuitable for the specific soil type, which is to be avoided. It is important to continue monitoring the condition of soils (incl. field soils) and create preconditions for the recovery of soil formation in degraded areas. Soil protection measures have been planned in the Estonian Rural Development Plan 2007–2013 (RDP).

Measure 3.2. Analysing the impacts of earth resource extraction causing the loss of biodiversity; developing and implementing mitigation measures.		
Lines of activity and main activities	Immediate outcome	Target year
3.2.1 Developing and applying a methodology for determining extraction volumes for peat based on the concept of peat as a non-renewable natural resource	Extraction volumes have been determined using the new methodology	2015
3.2.2 Developing mechanisms for motivating the rehabilitation and restoration of abandoned extraction sites in private ownership	Motivation mechanisms are in place	2015
3.2.3 Rehabilitating degraded ecosystems, e.g. degraded peatlands (prioritising sites to be rehabilitated, designing and implementing rehabilitation projects for cut-over peatlands, improving restoration methodologies)	Degraded ecosystems have been rehabilitated, e.g. degraded peatlands rehabilitated or restored	Continuous

3.2.4 Maintaining soil diversity	Soil diversity has been maintained	Continuous
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3.3. Renewable natural resources

Timber, fish stocks and game are regarded as renewable natural resources. The Nature Conservation Development Plan does not plan the use of these resources because this is covered in the relevant sectoral development plans.

Timber is one of the most important renewable natural resources in Estonia. The key goal of the Forestry Development Plan for the purposes of the NCDP lays down the principle that timber should be logged in a way and to an extent that ensures the biological diversity, productivity, regeneration capacity, viability and potential of forests. In forests managed without conservation restrictions, key habitats with a high likelihood of occurrence of endangered or rare forest species are protected under the Forest Act. In commercial forests, forest management needs to follow additional restrictions supporting the preservation of forest biota, such as leaving seed trees, live and dead old crop trees (biodiversity trees), avoiding monoculture stands, foregoing the use of fertilisers and harmful pesticides (glyphosates) in forests, avoiding the construction of new drainage systems.

The conservation objective of **hunting** aims to maintain the diversity of game species and ecological balance between habitats and species, taking account of the expectations of different stakeholders and the recreational, social and economic aspects of hunting. From the nature conservation point of view, hunting is an important tool for regulating the numbers of small carnivores (incl. the non-native raccoon dog and American mink) and wild boar, in order to minimise their negative impact on the fauna, first of all the ground-nesting bird species. To protect such bird species (capercaillie, black grouse, hazel grouse, eagle-owl, etc.), additional feeding of game is to be further limited in their nesting grounds.

Wolf, beaver and lynx populations are protected in the EU under the Habitats Directive but, due to the favourable conservation status of these species in Estonia, they can still be hunted on the basis of action plans. The brown bear population of Estonia is listed in Annex IV to the Habitats Directive, which means that the numbers of brown bear can be regulated in exceptional cases, informing the European Commission thereof.

According to the Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA), waterfowl hunting with lead pellets, which cause poisoning in birds, is to be phased out by no later than January 1, 2013.

Compensating for damage caused by protected species (including large carnivores) is addressed in Section 2 of the NCDP.

The use of **fish stocks** is addressed in the Estonian Fisheries Strategy 2007–2013 and the Operational Programme for the European Fisheries Fund 2007–2013. Additional plans are drawn up at the level of the European Commission for organising the long-term sustainable use and restoration of the stocks of the most important marine commercial fishes. The Development Programme for Recreational Fishing 2010–2013 (with a perspective until 2018) includes activities for further development of environmentally sustainable recreational fishing.

A decrease in habitats suitable for spawning constitutes a major problem. The access of migratory and semi-migratory fishes (salmon, brown trout, semi-migratory Baltic whitefish, river lamprey, vimba, eel, etc.) to their spawning sites and nursery areas is often obstructed by dams. To improve the situation, the EU aid funds and national funds support the opening of fish migration routes at dams and activities aimed at improving the quality of spawning sites and habitats (e.g. opening of river mouths). Providing salmon with access to their spawning areas is also a major precondition for fulfilling the objectives set in the draft Baltic Sea salmon management plan²⁴. In addition, activities to restore the spawning areas and improve the habitats of fish are supported from various international and national funds.

The status of the populations of some fish species (salmon, brown trout, asp, European catfish, Atlantic sturgeon) as well as the European crayfish has deteriorated. The stocks of the above species need to be restored through fish farming until sufficient natural regeneration of their populations has been achieved, while also ensuring that the genetic diversity of the stocks is maintained.

To maintain fish stocks, the fishing effort needs to be limited and overfishing prevented so that the maximum sustainable yield of fish stocks is ensured. The characteristic age and size composition of fish stocks is to be achieved through fisheries management that has no significant impact on other biota. To achieve this objective, account is to be taken of the negative impacts of both fisheries and other human activities on water bodies, as well as of the interrelationships of species in the food chain.

Measure 3.3. Analysing the impacts of renewable natural resources management causing the loss of biodiversity; developing and applying mitigation measures.		
Lines of activity and main activities	Immediate outcome	Target year
3.3.1 Conserving ecosystems in commercial forests	Commercial forest ecosystems are diverse and function as ecological dispersal corridors between larger protected forest areas	Continuous
3.3.2 Maintaining ecological balance between habitats and species in hunting: limiting the numbers of small carnivores (first of all alien species), minimising the negative impacts of additional feeding of game	Additional feeding of game has no negative impact on other species, the numbers of ground-nesting bird species have increased	2020
3.3.3 Ensuring the favourable conservation status of the populations of large carnivores	The favourable conservation status of the populations of large carnivores is ensured	Continuous
3.3.4 Banning the use of lead pellets in waterfowl hunting	The use of lead pellets in waterfowl hunting has been banned	2013
3.3.5 Restoring and qualitatively improving the spawning areas of fish;	The quality of fish spawning areas in rivers has improved, migratory	Salmon rivers – by 2013, other

²⁴ Proposal for a Regulation of the European Parliament and of the Council establishing a multiannual plan for the Baltic salmon stock and the fisheries exploiting that stock. <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0470:FIN:ET:HTML>.

opening migratory routes and maintaining and restoring the favourable conservation status of habitats	routes of fish have been opened and habitats have a favourable conservation status	important rivers – by 2015, opening of migratory routes – by 2020
3.3.6 Restoring the stocks of endangered fish species by fish farming until sufficient natural regeneration of their populations has been achieved	Natural regeneration of the populations of endangered fish species is sufficient	2020

3.4. Impact of transport

Transport may have a negative impact on wildlife mainly through causing the fragmentation of habitats and obstructing the natural dispersal of species. Transport may also facilitate the spread of invasive alien species. To maintain biodiversity, these issues need to be taken into account in planning new transport facilities.

Water transport is accompanied by dredging of shipping lanes and harbours, construction activities, and release of pollutants into the environment. Accidents with hazardous loads may destroy sensitive coastal communities and biota. Dense boat traffic also causes the movement of bottom sediments and erosion of the coastline. Handling of ship waste, including ballast water, may result in the discharge of hazardous substances and spread of alien species.

The impact of **land transport** on biodiversity is regarded as the highest among all types of transport. The road and rail network of Estonia occupies approximately 570 square kilometres of land, or almost 1.3%²⁵ of the area of Estonia. The transport network causes the fragmentation of habitats, obstructs free movement of animals and may generate a barrier effect. The barrier effect is emerging at major roads (whose traffic density has increased to 10–15 thousand vehicles per day and whose width has been extended to at least four lanes). The barrier effect can be significantly reduced by carefully planned mitigation measures: ecoducts for different species – bridges covered with soil and plants as well as small tunnels (e.g. on the migration routes of frogs) which ensure the preservation of dispersal routes of species. Planning and implementation of mitigation measures must become a standard mandatory part of transport infrastructure design.

The main problem of **air transport** lies in the intersection of flight corridors with the migration corridors of birds.

The aim for all modes of transport is to plan and direct traffic in a way that would avoid a conflict with wildlife. Also, a higher capacity to respond to accidents causing environmental damage is to be ensured.

Measure 3.4. Analysing and mitigating the negative impacts of transport.

²⁵ According to 2009 data of the Road Administration, the length of road network is approximately 58 000 km (see <http://www.mnt.ee/atp/?id=217>), the average width of the road area of national roads is 15 m (total area approx. 250 km²), the average width of local and private roads and city streets is 7 m (approx. 300 km²), plus the estimated area of the rail network – approx. 20 km² (taking the total length of railway lines as 1026 km and the average width of the lines as 10 m). Thus, the figure represents a per cent of the land area of Estonia (43 432 km²).

Lines of activity and main activities	Immediate outcome	Target year
3.4.1 Preventing pollution from transport, incl. improving and maintaining preparedness for responding to marine pollution	Preventive measures are being applied, response preparedness is sufficient	Continuous
3.4.2 Drawing up a wildlife rescue plan and integrating it into the national contingency plan for marine pollution	A wildlife rescue plan has been integrated into the national contingency plan for marine pollution	2013
3.4.3 Determining and mitigating the impact of vessels causing wave action and movement of sediments	Impact has been determined, mitigation measures have been developed and implemented	Impact determined by 2016, measures applied by 2018
3.4.4 Preventing the fragmentation of habitats and migratory routes of biota (development and integrated application of prevention, mitigation and compensation measures)	Prevention, mitigation and compensation measures have been developed and applied	2018
3.4.5 Mitigating conflicts between air traffic and the nesting and aggregation sites of birds	Conflict areas have been determined, mitigation measures (safe flight height, safe spacing of flight corridors) have been developed and applied	2015

3.5. Impact of climate change

Climate change has a direct impact on biodiversity. In Estonia (as everywhere in the temperate zone of Europe²⁶), biotic effects will most likely be relatively small but, in combination with other environmental changes, the impact of climate change may cause problems here, too. The Nature Conservation Development Plan addresses the impact of climate change from the aspect of nature conservation.

Climate change is associated with increased frequency of invasion of alien species. Problems concern also migratory birds and other seasonally migrating species – it is important to maintain both their nesting and wintering habitats as well as their feeding grounds along the migratory routes. The impact of climate change on particular populations, species and habitat types is not exactly known. Adaptation to climate change should be considered at least as important as measures to halt climate change. Conservation of biodiversity is an important tool for buffering climate change; functioning ecosystems are more resilient to the adverse impacts of climate change and essential for the maintenance of the carbon stock. Ecosystem

²⁶ Climate change and territorial effects on regions and local economies.
<http://www.lote.ut.ee/orb.aw/class=file/action=preview/id=1096081/ESPON+Climate+kommenteeritud+kokkuv%F5te.pdf>.

approach to combating climate change is often more cost-effective than technological solutions.

The objective is to ascertain the impact of climate change on biodiversity through monitoring particular sensitive habitat types and populations of species, analysing the trends and developing and applying mitigation measures, such as ecologically coherent green infrastructure buffering environmental changes, conservation and restoration of mires and forests, which remove carbon from the global cycle, and maintenance of semi-natural communities. Pursuant to the Global Biodiversity Strategy, human impact on sensitive ecosystems affected by climate change is to be minimised, maintaining their integrity and functioning.

Measure 3.5. Mitigating the negative impacts of climate change on biological diversity.		
Lines of activity and main activities	Immediate outcome	Target year
3.5.1 Ascertaining the impact of climate change on the spread of invasive species	The impact of climate change on the spread of invasive species has been ascertained	2020
3.5. Ascertaining the impact of climate change on the conservation status of sensitive habitats and species	The impact of climate change on sensitive habitats and species has been ascertained	2020
3.5.3 Developing and applying mitigation measures contributing to the reduction of climate change impacts	Mitigation measures have been developed and are applied	Continuous

3.6. Biological safety and GMOs

Biological safety covers the following issues: food safety and infectious diseases transmitted from animals to humans, plant and animal health and the associated environmental risks, as well as hazards posed by chemicals, genetically modified organisms (GMOs) and alien species. To ensure biological safety in Estonia, it is important to control, prevent and eliminate environmental and health risks, including health risks to animals and plants, and prevent the negative impact of GMOs.

GMO crops are not known to be cultivated outdoors in Estonia. The products allowed in the EU can be marketed in all Member States and are labelled accordingly. The international Cartagena Protocol on Biosafety to the Convention on Biological Diversity regulates also the safe cross-border traffic of GMOs and sets the general objective of ensuring the safe use of genetically modified organisms.

The general goal in this field is control of biological safety risks, which requires increasing the efficiency of research, supervision and inter-agency cooperation. Concerning plant health, the aim is to develop research into pests and the forecasting and counselling services. The efficiency of control of pesticide and fertilizer residues needs to be enhanced. Supervision over the import and local use of GMOs is to be strengthened.

Measure 3.6. Ensuring biological safety.

Lines of activity and main activities	Immediate outcome	Target year
3.6.1 Organising biosafety activities, carrying out monitoring and research, and creating the necessary preconditions	Biological safety activities have been organised, data have been collected and monitoring is continuous	Continuous
3.6.2 Increasing the efficiency of control of biological safety (the relevant training, guidelines, regulations)	Control of biological safety is efficient through training and drawing up various guidelines and regulations	Continuous

3.7. Renewable energy

The National Renewable Energy Action Plan of Estonia until 2020 specifies that, by 2020, the share of renewable energy in Estonia is to make up 25% of total end use. The renewable energy potential of Estonia relies mainly on combined heat and power production based on bioenergy and wind power, while the hydropower industry is also being developed on a small scale.

Biofuels available for energy production in Estonia mainly include wood, logging and timber industry waste, scrub, straw, energy grass, reed, energy crops (rape, turnip rape), and biogas produced from biowaste. The use of biofuels is addressed in the Development Plan for Enhancing the Use of Biomass and Bioenergy 2007–2013. The possibilities for harvesting bioenergy in forest lands are addressed in the Forestry Development Plan until 2020. The use of biofuels (first of all grass and reed) is hindered by unreasonable total costs due to long transportation distances of raw material and low density of consumers. The objective is to plan and improve environment-friendly technologies for more active use of biofuels in the entire value chain.

Hydropower industry is associated with several adverse impacts on the environment: dams isolate river sections, sever the migration routes of fish and alter the living conditions in the river; upstream of dams, the water temperature increases and the amount of oxygen decreases; dams trap sediments, the diversity of zoobenthos and vegetation in water bodies decreases; dams obstruct the ice run and natural removal of sediments from the river bed; fluctuation of the water level in low water periods has an adverse impact on fish and other aquatic biota, especially in the period of their migration and spawning (breeding and egg development). Damming has an impact on the level of both surface water and groundwater. It is important to achieve a situation where the use of hydropower does not pose a threat to the biodiversity of rivers. Hydropower production has to incorporate compensation mechanisms for damage caused to wildlife. Constructing new dams for hydropower production and raising the current water level is to be avoided.

The use of **wind power** generally enables a reduction of emissions of greenhouse gases and other harmful pollutants. Adverse environmental impact of wind turbines is mainly connected with their potential impact on birds and bats, especially if turbines are located on their migratory routes²⁷. The impact of wind power facilities on birds is site-specific and species-

²⁷

Promotion of the use of power from renewable energy sources (TTÜ, 2005).

specific. Planned offshore wind parks are often sited on shoals valuable from the marine life point of view. The above problems can be mitigated by a comprehensive EIA process which assesses the abundance of species, the importance of habitats and the impact of wind parks and minimises the negative impacts through optimal siting of wind turbines. To prevent conflicts and avoid the construction of wind parks in migratory areas, thematic plans for wind power are to be drawn up (incl. a plan for marine areas), with the aim of preventing the construction of wind parks in important bird areas, on migratory routes of birds and in other biologically diverse habitats. The use of wind power also has to take account of the landscape values, avoiding the construction of wind parks in valuable landscapes.

Measure 3.7. Analysing the negative impacts of the use of renewable energy on biodiversity; developing and applying mitigation measures.		
Lines of activity and main activities	Immediate outcome	Target year
3.7.1 Minimising the negative environmental impact of renewable energy (developing standard restrictions and requirements)	The negative environmental impact of renewable energy has been ascertained, restrictions, guidelines, and requirements have been developed	2015
3.7.2 Applying standard restrictions, requirements and compensation mechanisms to minimise the negative environmental impact of renewable energy	Standard restrictions, requirements and compensation mechanisms for the use of renewable energy are being applied	2018
3.7.3 Developing new technologies for the use of renewable energy in line with nature conservation objectives (for the use of grass, reed, etc.)	More effective technologies have been developed	2020

4. Estimated cost of the development plan

The development plan includes three strategic goals as well as measures and activities to achieve these goals. The total cost of the development plan for 2012–2020 is 582.2 million euros. The cost of the development plan (in euros) is broken down between individual strategic goals as follows:

Year	2012	2013	2014	2015	2016–2020
Goal 1. People are familiar with, appreciate and conserve nature and know how to use their knowledge in their everyday lives.					
Measure 1.1. Enhancing nature education at all levels of education.	3 219 000	4 083 000	4 055 000	3 632 000	15 806 000
Measure 1.2. Efficient dissemination of nature information.	210 000	419 000	486 000	491 000	2 300 000
Measure 1.3. Promoting and applying conservation science to achieve the objectives of practical conservation management.		530 000	2 035 000	2 535 000	15 175 000
Measure 1.4. Management of sustainable nature tourism.	2 710 000	2 720 000	3 715 000	3 715 000	20 660 000
Goal 2. The favourable conservation status of species and habitats and diversity of landscapes is ensured, habitats function as a coherent ecological network.					
Measure 2.1. Ensuring the favourable conservation status of species.	3 125 000	3 390 000	3 746 000	4 250 000	23 630 000
Measure 2.2. Ensuring the favourable conservation status of habitats.	9 632 000	10 603 000	14 790 000	16 810 000	116 330 000
Measure 2.3. Ensuring landscape diversity.	2 705 000	3 805 000	3 855 000	3 865 000	19 135 000
Measure 2.4. Conservation management of natural objects.	2 673 000	2 701 000	4 196 000	3 196 000	18 370 000
Measure 2.5. Ensuring the availability of nature data and storing scientific collections.	760 000	1 070 000	1 070 000	1 120 000	5 650 000
Measure 2.6. International cooperation to conserve biodiversity.	231 000	245 000	236 000	236 000	1 233 000
Measure 2.7. Compensating for nature conservation restrictions and providing financial support to conservation activities.	9 452 000	10 280 000	14 185 000	14 930 000	91 450 000

Goal 3. Long-term sustainability of natural resources, and the preconditions for this, are ensured and the principles of the ecosystem approach are followed in the use of natural resources.					
Measure 3.1. Taking account of the value of ecosystem services in the use of the environment.	45 000	135 000	145 000	145 000	600 000
Measure 3.2. Analysing the impacts of earth resource extraction causing the loss of biodiversity; developing and implementing mitigation measures.	285 000	1 301 000	1 336 000	1 355 000	6 600 000
Measure 3.3. Analysing the impacts of renewable natural resources management causing the loss of biodiversity; developing and applying mitigation measures.	2 690 000	2 775 000	3 835 000	3 835 000	26 765 000
Measure 3.4. Analysing and mitigating the negative impacts of transport.	1 055 000	1 130 000	1 525 000	2 055 000	10 630 000
Measure 3.5. Mitigating the negative impacts of climate change on biological diversity.		150 000	150 000	150 000	750 000
Measure 3.6. Ensuring biological safety.	29 000	69 000	69 000	69 000	345 000
Measure 3.7. Analysing the negative impacts of the use of renewable energy on biodiversity; developing and applying mitigation measures.		115 000	115 000	115 000	375 000
Total	38 820 000	45 521 000	59 544 000	62 503 000	375 804 000

5. Description of management structure

The Government of the Republic approved the drawing up of the Nature Conservation Development Plan by Order No 499 of December 11, 2008. The Ministry of the Environment was appointed the responsible ministry, and the Ministry of Agriculture, Ministry of Internal Affairs, Ministry of Economic Affairs and Communications, Ministry of Education and Research, Ministry of Culture and Ministry of Finance were appointed to participate in the process. The plan was drawn up with active participation of research institutions and representatives of NGOs and local governments.

The Ministry of the Environment is to submit the development plan to the Government of the Republic for approval.

The Ministry of the Environment is responsible for drawing up an operational programme for the Nature Conservation Development Plan. As nature conservation is a cross-sectoral issue, the objectives set in the NCDP can be achieved only in cooperation with other ministries that are directly or indirectly engaged in the same fields and have a direct impact on nature and its conservation. In addition to the Ministry of the Environment, important roles in implementing the development plan will be played by the Ministry of Agriculture, because agriculture is directly linked with sustainable use of the environment and genetic resources, and several support schemes financed through the Ministry of Agriculture are directly conservation-oriented; the Ministry of Education and Research because nature conservation is tightly connected with the awareness and education of people; the Ministry of Economic Affairs and Communications, whose administrative area includes energy, tourism, transport, industry and other sectors directly concerning the environment; the Ministry of Internal Affairs, which is responsible for spatial planning as well as ensuring internal security in the country, in which developing the national rescue and crisis regulation policy, including ensuring a higher capacity to respond to accidents causing environmental damage, is established as a priority; the Ministry of Foreign Affairs, as nature conservation is tightly connected with international information exchange and cooperation as well as with the delivery of development aid; and the Ministry of Finance as the coordinator of national strategic planning.

The implementation period of the Nature Conservation Development Plan is nine years. The development plan will be implemented through an operational programme drawn up for 2012–2020. Progress under the Nature Conservation Development Plan will be reported to the Government of the Republic once a year. The reporting will cover progress towards implementing the development plan and achieving the goals set in the development plan and the operational programme, as well as the effectiveness of the measures. The reporting may reveal the need to revise the development plan or its operational programme during the implementation period of the development plan. In such case, the Minister of the Environment will initiate the revision of the development plan, involving all relevant ministries and parties. The revised development plan will be coordinated with the State Chancellery and the Ministry of Finance and other relevant ministries and will then be approved by and order of the Government of the Republic.

Appendix 1: Linkage between the development plan and other strategic documents

The NCDP to 2020 was drawn up in line with other key strategic documents, while not duplicating other development plans.

The **Global Biodiversity Strategy 2011–2020** and the **EU Biodiversity Strategy to 2020** are the base documents for the NCDP, establishing guidelines for biodiversity conservation at the regional and global level for the coming ten years. The EU Biodiversity Strategy to 2020 sets the following targets:

1. To fully implement the Birds and Habitats Directives.

To halt the deterioration in the status of all species and habitat types covered by the EU Birds and Habitats Directives and achieve a significant and measurable improvement in their status, so that, by 2020, compared to current assessments²⁸, 100% more habitat assessments and 50% more species assessments show a secure or improved conservation status.

2. To maintain and restore ecosystems and their services (nature's benefits).

By 2020, ecosystems and their services are maintained and enhanced by establishing a coherent green infrastructure and restoring at least 15% of degraded ecosystems.

3. To increase the contribution of agriculture and forestry to maintaining and enhancing biodiversity.

3A) Agriculture: By 2020, maximise areas under agriculture across grasslands, arable land and permanent crops that are covered by biodiversity-related measures under the CAP so as to bring about a measurable improvement²⁹ in the conservation status of species and habitats that depend on or are affected by agriculture and in the provision of ecosystem services, thus contributing to enhance sustainable management.

3B) Forests: by 2020, Forest Management Plans or equivalent instruments, in line with the Sustainable Forest Management, are in place for all forests that are publicly owned and for forest holdings above a certain size³⁰ (which receive funding under the EU Rural Development Policy), so as to bring about a measurable improvement in the conservation status of species and habitats that depend on or are affected by forestry and in the provision of related ecosystem services.

4. To ensure the sustainable use of fisheries resources.

To achieve the Maximum Sustainable Yield (MSY) by 2015. A population age and size distribution indicative of a healthy stock is to be achieved through fisheries management with no significant adverse impacts on other stocks, species and ecosystems, in support of achieving a Good Environmental Status by 2020, as required under the Marine Strategy Framework Directive.

5. To combat invasive alien species.

²⁸ http://ec.europa.eu/environment/nature/knowledge/rep_habitats/docs/com_2009_358_en.pdf.

²⁹ For both targets, improvement of the situation is to be assessed against the quantified targets for the conservation status of species and habitats of EU interest in Target 1 and for restoration of degraded ecosystems in Target 2.

³⁰ To encourage the adoption of forest management plans (or equivalent documents) in line with sustainable management for smaller forest holdings, Member States may provide additional incentives. Member States will specify the size of such private forests in the Rural Development Plan.

By 2020, Invasive Alien Species (IAS) and their pathways are identified and prioritised, priority species are controlled or eradicated, and pathways are managed to prevent the introduction and establishment of new IAS.

6. To help avert global biodiversity loss.

By 2020, the EU has stepped up its contribution to averting global biodiversity loss.

Many different strategies and development and action plans are directly or indirectly concerned with nature conservation. The most important of these are listed below:

The **UN Millennium Development Goals** (2000), which establish the obligation of ensuring the sustainability of the natural environment, are directly linked with the goals of the Nature Conservation Development Plan.

The **Estonian National Strategy on Sustainable Development “Sustainable Estonia 21”** (2005) is a base document for the NCDP, providing general development guidance for nature conservation.

The **Environmental Strategy until 2030** (2007) and its operational programme **“Environmental Action Plan 2007–2013”** set out the key development priorities for nature conservation. The NCDP 2020 builds on the general goals set out in the environmental strategy.

The **Estonian Rural Development Plan 2007–2013** includes several support measures important for nature conservation, such as the Natura 2000 subsidy for maintenance of semi-natural communities, the Natura subsidy for arable land and the Natura private forest subsidy.

The **Forestry Development Plan until 2020** (2011) is tightly connected with the Nature Conservation Development Plan. The NCDP addresses the issues of nature conservation, while the issues of forest management are dealt with in the Forestry Development Plan.

The most important conservation-related goal of the **National Development Plan for the Use of Oil Shale 2008–2015** (2008) and the **National Development Plan for Construction Minerals for 2011–2020** (2011) is reduction of environmental impact, which is also directly linked with the issues of degraded landscapes and their rehabilitation in the NCDP.

The development plan **“Collection and Conservation of Plant Genetic Resources for Food and Agriculture in 2007–2013”** (2007) is directly linked with the issue of genetic resources and their use.

The **Fisheries Development Plan 2007–2013** (2007) addresses the sustainable use of fish stocks.

The **Operational Programme for the Development of the Living Environment 2007–2013** (2008) covers a variety of environmental activities, including developing the environmental education infrastructure, improving environmental monitoring and supervision, activities to support biodiversity, improving preparedness for environmental emergencies, and improving the ecological status of watercourses.

In the **Operational Programme for Human Resource Development 2007–2013**, the programme “Development of Environmental Education” financed through the measure “Development of Environmental Education” under the priority axis “Lifelong Learning”

supports the implementation of Measure 1.1. Implementation of Measure 1.1 in the school system is directly supported by the **National Curriculum for Pre-School Child Care Institutions**, which includes the study area “Me and the Environment”; the **National Curriculum for Middle Schools**; the **National Curriculum for Upper Secondary Schools**; and national curricula for vocational education, which cover the topic “The Environment and Sustainable Development”. The measures of nature education in the development plan are also in line with the **Estonian Research and Development and Innovation Strategy 2007–2013 “Knowledge-based Estonia”**.

The **Competitiveness Strategy “Estonia 2020”**, which describes the main policies and measures for raising the competitiveness of Estonia, envisages also the development of a methodology for valuation of ecosystem services.

The biodiversity section of the **Baltic Sea Action Plan** (2007) addresses the conservation of biodiversity in marine areas. The action plan is linked with the **Operational Programme for the Baltic Sea Action Plan 2008–2011** (2008). These documents provide a framework for implementing the principles of the EU Baltic Sea Strategy in Estonia.

The **Transport Development Plan 2006–2013** (2007) has a direct and indirect impact on the environment and includes several conservation-related goals and measures for the transport sector. The **Estonian National Tourism Development Plan 2007–2013** addresses also nature tourism.

The sectoral development plan of the Ministry of Culture **“Sacred Natural Sites in Estonia 2008–2012”** is aimed at studying, conserving and restoring valuable landscapes and promoting the related nature education.

The goals and measures in the **Renewable Energy Action Plan until 2020** (2010) are tightly connected with the conservation and use of ecosystems and mitigation of climate change and its adverse impact.

The **action plan “Resource-efficient Europe”** (2011) is aimed at the sustainable use of natural resources. It includes goals and measures which are directly connected with the valuation, conservation and restoration of biodiversity and ecosystems (and their services).

Appendix 2. Ministries and agencies involved

The Government of the Republic, by its Order No 499 of December 11, 2008, appointed the Ministry of the Environment as the ministry responsible for drawing up the NCDP, appointing the Ministry of Agriculture, Ministry of Internal Affairs, Ministry of Economic Affairs and Communications, Ministry of Education and Research, Ministry of Culture and Ministry of Finance to participate in the process. Representatives of NGOs, researchers and other interested parties were also involved in drawing up the NCDP.

An inter-agency management group was established for drawing up the development plan, incorporating specialists from different institutions: representatives of the Ministry of the Environment, Ministry of Education and Research, Ministry of Economic Affairs and Communications, Ministry of Agriculture and Ministry of Internal Affairs, as well as representatives from NGOs, the Academy of Sciences, the Chamber of Agriculture and Commerce, the Estonian Association of Cities, and the Association of Municipalities of Estonia

(16 members in total). The management group coordinated the work of working groups and the drafting of the development plan.

The draft NCDP was published on the public participation website osale.ee from July 24 to August 25, 2009. It was also sent to the heads of working groups for drafting the initial version of the NCDP (to 2035) for their proposals. The draft was also sent for comments to the Central Union of Estonian Farmers and the Estonian Farmers Federation, the Estonian Naturalists' Society, the Private Forest Union, and the Forest and Wood Industries Association. Various topics were consulted with experts from the Estonian University of Life Sciences, the Estonian Soil Science Society, the Estonian Hunters' Society, the Private Forest Union, etc.

The final version of the Nature Conservation Development Plan was drawn up with active participation of NGO representatives from the Estonian Council of Environmental NGOs, the Estonian Nature Conservation Society, Wildlife Estonia, as well as Tallinn Zoo, the Estonian Chamber of Commerce and Industry, and the Estonian Heritage Society.

The draft Nature Conservation Development Plan was introduced to the public from March 27 to April 18, 2012 on the public participation website www.osale.ee and coordinated with other ministries through the drafts information system (EIS).