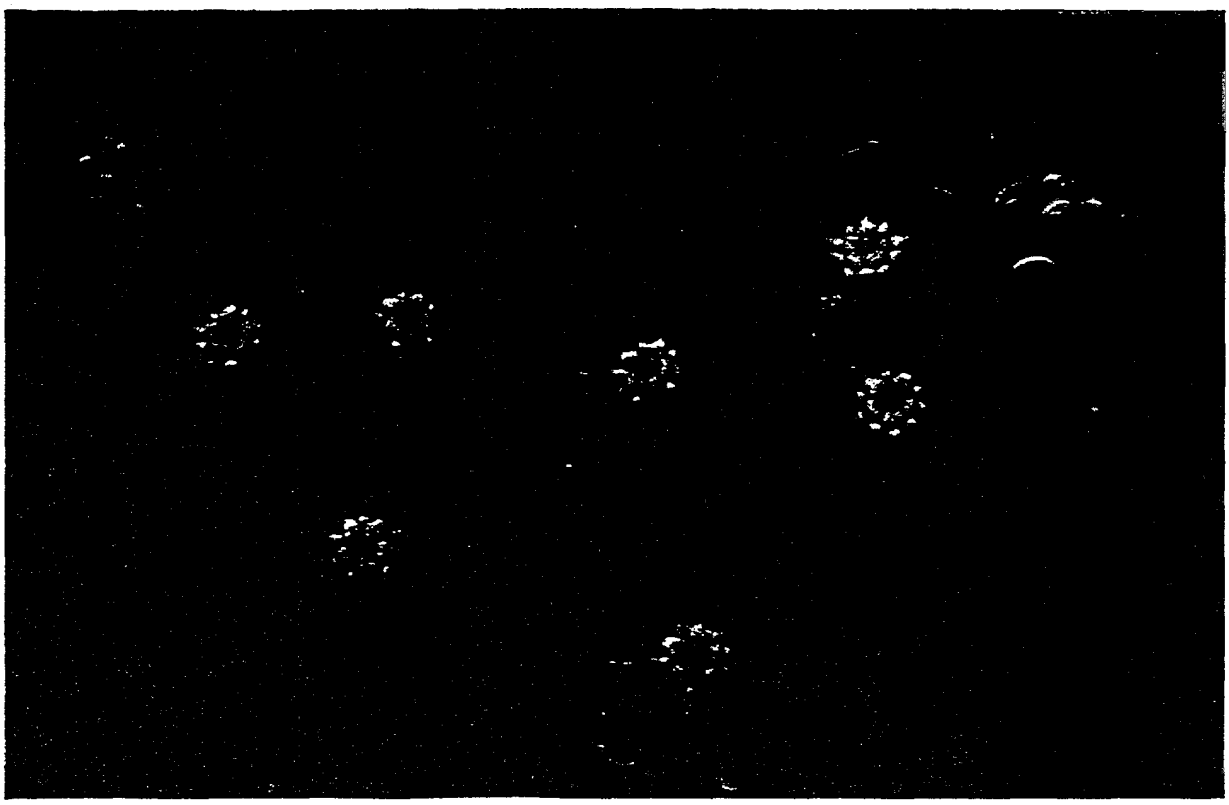
UNEP

FIRST NATIONAL REPORT TO THE CONVENTION ON BIOLOGICAL DIVERSITY

ESTONIA



FIRST NATIONAL REPQRTTO THE

CONVENTION ON BIOLOGICAL DIVERSITY

ESTONIA

Tallinn 1998

ESTONIA - General statistics (due 1 January 1997)

Area:	**45,227 km²**
Population:	**1,462,130**
Population density:	**32.3** persons per sq km
Capital city:	Tallinn (427,100 inh.)
Ethniccomposition:	**64.6%** Estonians, 28.5% Russians, 6.9% other nationalities
Official language:	**Estonian**
Administrative structure:	**15 counties, 47** towns and 207 municipalities
GDP in 1996:	**4.33** billion USD
National currency:	Estonian kroon EEK, pegged to German Mark: 1 DEM= 8.00 EEK

- 4 national parks
- 217 other protected areas
- various types of protection regimes are applied on ca 12% of the territory
- strict protection regime is applied on 1.7% of the territory
- app. 20,000 species, 539 (2.7%) of them are under protection

Estonian Ministry of the Environment

FIRST NATIONAL REPORT TO THE CONVENTION ON BIOLOGICAL DIVERSITY. ESTONIA

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List of Abbreviations

CBD	-	Convention on Biological Diversity
APNO	-	Act on Protected Natural Objects
NES	-	National Environmental Strategy
NEAP	-	National Environmental Action Plan
RT	-	*Riigi Teataja* (State Gazette)

Executive Summary

The Republic of Estonia signed the Convention Biodiversity (CBD) in 1992. The Estonian Parliame(*Riigikogu*) ratified the convention on 11 May 1994. The Convention is enacted as a law since 25 October 1994.

Estonia is the smallest (45,227 sq km) and northern-most of the Baltic States, located on the coast of the Baltic Sea. Compared to other European countries, the population density is low 32.3 persons per sq km, in rural areas in the southern part of the country even up 6 persons per sq km.

Estonia is rich in biodiversity, abundant in landscapes, ecosystems and species. There are about 20,000 wild species, comprising 539 species, which are under protection, which form about 2.7% of all species recorded in Estonia.

Estonia is particularly rich in forests. Forested land for 47%, and agricultural land 25% of the territory of the country.

8 vegetation types comprising 80 site types have been identified.

There are four national parks, 217 other protected areas, which form about 12% of the territory of the country. The coverage of strictly protected areas is abou 1.7% today, but is supposed to increase up to 5% by the year 2010.

Estonia has also joined the Bern, Ramsar, Washington, Helsinki and Paris Convention.

The current report aims at providing the preliminary results of the progress made in the implementation of the Convention on the Biological Diversity in Estonia in the period 1994-1997.

This is the logo of the studies on diversity of the Estonian nature

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1. State of the Nature

1.1. Territory, climate and resources

The Republic of Estonia covers 45.227 sq km to the east of the Baltic Sea, including the two large islands Saaremaa (2,922 sq km) and Hiiumaa (1,023 sq km). Its coastline totals about 3,780 km. It is the northern-most of the Baltic States. In the north and west its overseas neighbours are Finland and Sweden, in the south and east it borders on Latvia and Russian Federation, respectively.

Estonia is a unified state, divided administratively into 15 counties (*maakond*). There are 47 towns and 207 municipalities (*vald*).

Hydrographically, the whole territory of Estonia lies within the Baltic Sea catchment area. Most of its 420 rivers are short, the longest being the Pärnu River, which is 144 km long. There are some 1500, mostly small lakes. The largest, lake Peipsi (1,529 sq km in the Estonian part), on the eastern border, is the fifth largest in Europe. Rich mineral resources abound in several places and are used for therapy and as drinking water.

Estonia has a moderate Atlantic-continental climate with frequent changes in weather conditions, relatively warm summers, and moderately mild winters, and milder climate on the islands. South-westerly and southerly winds are typical throughout the year. Annual rainfall averages 500-700 mm. The temperature ranges from a monthly average of -6.6°C in February to 16.3°C in July, the annual average is 4-6°C. The winter snow cover stays for about three months.

Estonia is rich in mineral resources. The world's largest exploited deposits of oil-shale are located on its northern coast. They provide raw materials for power production and the chemical industry. Other mineral resources of high quality are phosphorite, limestone and dolomite.

Estonia is the smallest of the Baltic States, having a pooulation of 1.462.130 people due 1 January 1997. The overall population density is 32.3 oeoole oer sq km. Since as over 70% of the population is concentrated in urban areas, the population density in rural south is less than 6 persons per sq km. The capital, Tallinn, with its immediate surroundings counts more than 427,000 inhabitants.

1.2. Landscapes, habitats and species

In terms of land use, 25% of the country is covered by agricultural lands (grasslands, meadows ors semi-natural pastures), while the forest land constitute about 47%. Mires (fens, bogs and swamps), which cover about 20% of the whole country, are deep: hundreds of bogs have peat layer of more than 5 m. The extensive system of agriculture has resulted in the pre-servation of biodiversity.

Estonia is a lowland country, its highest point is 318 metres (Suur-Munamägi). It has a mosaic landscape, with plains (in particular karstic plains with their specific landforms) in the northern and western parts, and hills and numemus lakes in the south-east.

According to the classification, eight types of vegetation sites have been identified (Paal, 1997). Each of the type may comprise up to six type groups, which again may be subdivided into subtypes.

BOX 1. Classification of vegetation site types of Estonia (Paal, 1997).

1. Forests
2. Grasslands
3. Mires
4. Vegetation of outcrops
5. Vegetation of dunes and sandy plains
6. Vegetation of water bodies
7. Ruderal vegetation
8. Cultivated vegetation

Estonia is rich in forests. Estonian forests have been managed less intensively than those in Western Europe over the past 50 years. The drainage is less efficient, whereas 68% of forests is reported to suffer from permanent or temporary excess of moisture.

Estonia belongs to the temperate hardwood-coniferous forest zone. 25 site-types and 71 forest types have been identified within the territory. The biological diversity of forests is often high, having a large numbers of carnivores, such as the brown bear, grey wolf and lynx. It reveals the high capacity of the forest ecosystems. Among the vertebrate species indicating the value of the forests, also the European mink, flying squirrel (both endangered), lesser spotted eagle (200 pairs), black stork (200 pairs) and white-backed woodpecker could be mentioned.

Many rivers in Estonia are still unregulated, or their courses are modified to a moderate extent, and a considerable share of floodplains have been preserved in (semi)natural condition. Despite the rather eutmphicated water of the inland water-bodies the status of many freshwater animal species is quite good.

Undisturbed coastal areas are one of the other interesting features of the Estonian nature. Estonia is an important spot on the East-Atlantic flyway of the birds migration mute (e.g. over a half of the world population of Barnacle geese up to 100 000 specimens are counted migrating through Estonia). Undisturbed parts of the coast are also favourable for grey seals and ringed seals whose number in Estonia is relatively high. In spring about 500 new-born pups of grey seals are recorded.

Alvar biotooes, coastal and wooded meadows which are relatively widely spread in Western Estonia and in the islands of Saaremaa and Hiiumaa provide habitats for a high variety of plant species. The wooded meadow in Laelatu, one of our managed reserves where 163 species of vascular plants have

been recorded in an area of only 100 sq m, is one of richest plant communities in our latitude.

The restricted use of the coastal areas and islands in the years of the Soviet occupation, has resulted in a relatively undisturbed state of the coastal ecosystems. However, the changes in the economic and social life of the country, the land and property reform in particular, have a major impact on the areas, both in the biodiversity and cultural heritage point of view. A comprehensive survey of coastal meadows was conducted by the Estonian Fund for Nature in the years of 1994-I 996. The survey enhanced the understanding of status and the coverage of these (semi-)natural biotopes to a considerable extent.

212 CORINE biotopes have been selected all over the country in the course of a project in 1994-1998. The total area of these sites is 3411 sq km (i.e. 7% of the territory of Estonia) Most of the sites are less than 1 sq km, 10 sites each cover area more than 10 sq km. As to the protection status of these areas, 86 (46%) are not protected. It should be noted that an area may contain more than one CORINE biotope.

The total number of wild species in Estonia is about20 thousand. 5,353 plant species, 3,461 fungi species, 11,000 species of invertebrates and 500 species of vertebrates have been registered in Estonia (BOX 2, Table 1).

BOX 2. Species composition

Group	No ofspecies	Protected species
Plants	5,353	210
Fungi	3,461	30
Animals	11,500	299
	ca 20,000	539 (2.7%)

2. National System for Conservation and Sustainable Use of Components of Biodiversity

2.7. Legislation regulating *the* conservation and *sustainable* use *of biodiversity*

After restoration of independence in 1991, Estonia has been in a process of building up its new legal system including also the legislation for preservation and maintenance of biodiversity.

The legislation is based on the Constitution of the Republic of Estonia approved in 1992. Article 53 it states:"...everyone shall be obliged to preserve human and natural environment and to compensate for damages caused by him or her to the environment. The procedures for compensation shall be determined by law....". At the same time, Article 32 of the Constitution establishes that "..everyone shall have the right to freely manage, use and command his or her property. Restrictions shall be determined by law...".

The *Act on* Sustainable *Development* (approved in February 1995) provides legal framework for preservation and sustainable use of biodiversity as well as other resources. The Act emphasises the necessity to take into account environmental (ind. biodiversity) considerations in physical planning and in compiling and drawing up of management plans.

BOX 3. Acts of the Estonian Parliament supporting to the implementation oCBD (due April 1998)

- Constitution of the Republic of Estonia (1992)
- Act on the Convention on Biological Diversity (1994)
- Act on Sustainable Development (1994)
- Act on Protected Natural Objects (1994, amend ments 1998)
- Act on Protection of Marine and Freshwater Coasts, Shores and Banks (1995)
  Forest Act (1993, new draft
  Act on Hunting Management *(1994)*
- Fishery Act (1995)
- Planning and Construction Act (1995)
- Environmental Supervision Act (1997)
  Act on Eugenics (1998)
- Act on Plant Varieties Protection (1998)
- Wildlife Act - draft
- Monitoring Act - draft
- Landscape Act-draft
  Act on Genetically Modified Organisms - draft

The nature conservation in Estonia is based on the system of protected objects, species and protected areas. The system is provided in the *Act on Protected* Natural Objects (APNO). It establishes the procedures for taking natural objects of conservation value under protection, determines the terms of protection as well as rights and obligations of landowners, land users and other persons in regard to protected natural objects. Compensation for economic losses due to protection regimes in protected areas is also determined by the Act. The Act on Protected Natural Objects defines the types and zones for protected areas, provides the categories of protected species and establishes the principles of species protection (Appendix 2,3).

APNO also prohibits release of any alien species to the territory of Estonia and r-e-introduction of species can be undertaken on scientific bases and only after the issuance of the permit from the Ministry of Environment

The *amendment* to the Act on Protected Objects from 199 introduces the need for a management plan for national parks,' nature reserves and gives to the Ministry of Environment the

right and obligation to initiate the process for preparation of recovery plans and the implementation of these plans to the species which recovery or preservation need active conservation actions.

For the implementation of APNO several regulations have been established:

1) Government Regulation on Procedures of Taking Natural Objects under Protection, and on the list of species of plants, fungi and animals and fossils in the Category II (1994);
2) Regulation of the Minister of the Environment on the III Category of Protected Species of Animals, Fungi, Plants and Fossils (1995);
3) Regulation of the Minister of the Environment on Procedures for Determining of Compensation for the Damage Made by Protected Wild Animal Species (1995).

The Act on *Protection of Marine* and Freshwater Coasts, Shores and Banks (approved in February 1995) enacts the principles of the use and protection of Estonian coasts, shores and banks. The Act sets restrictions for economic use of coast, shores and banks and thus also preconditions for maintaining coastal habitats.

The Forest *Act* (approved in October 1993) establishes the requirement that all forest management activities in protected areas have to be performed in accordance with protection rules. Currently an amendment to the Forest Act is under preparation. The draft introduces several new tools also for biodiversity conservation, e.g. the protection of key-biotopes (source-biotopes) through establishing agreements between the landowners and the state. Also the felling procedures will be modified in order to take into consideration biodiversity conservation.

The Act on Planning and Construction (approved in June 1995) introduced the biodiversity aspect into planning process. One of its aims at the state-level planning is to maintain the diverse ecosystems and landscapes, and also to develop a network of semi-natural and natural areas capable of compensating and balancing human impact.

The wildlife Act (draft due April 1998) is going to regulate the use and protection of wildlife remaining outside of the scope of the Act on Protected Natural Objects. It includes a number of provisions which specifically address the protection of wildlife and its habitats. The goals of the act are defined as to regulate:
1) preservation and restoration of the species richness and its habitats,
2) protection and restoration of habitats and migration routes,
3) preservation of integrity of communities,
4) sustainable use of wildlife.

The draft act also comprises a provision requiring measures to be taken to guarantee the preservation of habitats of special importance. The list of sites with habitats of special importance will be established by the Minister of Environment. The habitats of special importance are preserved *via* contracts between the landowners and the state. The Act also regulates the type and intensity of economic activities adjacent to the habitats important for the protection of wildlife. Also a number of restrictions to maintain the migration mutes of animals have been provided in the act.

The Monitoring Act (draft) provides the principles and the order for state environmental monitoring system. According to the draft act one of the aims for state environmental monitoring is to 'evaluate and analyse the state of biodiversity in the country." This act will form the bases for the new biodiversity monitoring system currently under formation (further discussed in ch.2.11).

The aim of the *Landscape Act* (draft) is to regulate the use of landscapes on the basis of the concept of sustainable development and for maintenance and restoration of the biodiversity and cultural values. One of the tools for the management of landscapes is the establishment of ecological network of ecologically valuable areas capable of balancing and compensating the human impact

The Governmental Decree on the implementation of the CBD passed by Government on April 1 1, 1995 aimed at convening:

1) a permanent task force at the government level with certain responsibilities on CBD implementation (Governmental Commission) and
2) to give the responsibility to the Minister of the Environment for taking practical steps concerning administration, auditing, research, monitoring, and reporting of the national process of CBD implementation. This Decree foresees *i.a. the* preparation of the National Biodiversity Action Plan.

Other acts, providing the legislative basis for the maintenance and sustainable use of biodiversity are listed in BOX 3.

The National Environmental Strategy (NES) (approved by the Parliament in March 1997) sets the policy goals of the environmental protection in Estonia. NES identifies 10 main objectives of the Estonian envimnmental policy. Biodiversity and landscape protection is also one of the main policy issues (BOX 4).

The Environmental Action Plan (NEAP) has been completed in April 1998. The document, prior to its adoption, would be negotiated within the Government first. NEAP comprises short-term (1997-2000) and long-term (until 2010) policy goals for all ten topic areas (BOX 4). Both phases contain 630 single actions requiring about 512 million USD in its initial, short-term phase. Preliminary estimations show that another975 million USD would be needed to complete the long-term activities. Conserving the biodiversity and landscape diversity and implementing the 110 corresponding actions listed in NEAP would cost about 36.5 million USD in short run.

BOX 4. Ten environmental policy goals (NES)

1. Promotion of environmental awareness.
2. Clean technologies.
3. Reduction of adverse environmental effects of the energy sector.
4. Improvement of air quality.
5. Reduction of waste generation and improvement of waste management.
6. Elimination of past pollution.
7. Better use and protection of gmund water resources.
8. Protection of surface water bodies and coastal seas.
9. Maintenance of landscapes and biodiversity. Ensurance of the preservation of viable populations of local plant and animal species, natural and semi-natural communities and landscapes typical of Estonia.
10. Improvement of the quality of built environment.

A significant driving force for the implementation of environmental (inc. national) policy is the joining process of Estonia with the European Union. Approximation process of the Estonian legislation to the EU corresponding directives and regulations is in special focus.

As Estonia still builds up its legal system for nature conservation since the restoration of its independence in 1991, a large number of legal acts have been adopted recently and several acts will be further updated to keep pace with the rapid changes in the society, as well as with the changing needs for nature conservation both nationally and globally. The enforcement and supervision of the implementation of the acts and regulations is a demanding task and an effort for the state and local environmental authorities.

2.2. *Organisational structure*

The main environmental authorities of Estonia responsible for implementation of the CBD include the Ministry of Foreign Affairs, which is the focal point, and the Ministry of Environment, which is the responsible ministry.

Ministry of the Environment (MoE) (Figure 1) is the largest ministry in the Estonian Government. MoE comprises six departments, several boards (such as the Forestry Board, Land Board), subordinated authorities and academic institutions. The Department of Nature Protection, the Division of Nature Conservation, in particular, is responsible for the implementation of CBD. 15 County Environmental Departments, subordinated to the Ministry of Internal Affairs, act as the implementation authorities at the regional level.

The Nature Conservation Bureau, was established at the Environmental Information Centre of MoE in 1997. The Bureau aims at working out protection rules for the protected areas. The latter task was set by the Act on Protected Natural Objects in 1995 and further elaborated in 1998.

The Forestry Board and the Fisheries Department are responsible for solving problems in corresponding areas. The Bureau of Ecosystems Protection at the Forestry Board was established in 1997. The Bureau aims at introducing the biodiversity concept into forest management.

The Chief Inspector of the Environment with his office performs enforcement function. The Environmental Supervision Act (1997) sets the authority and tasks of the Environmental Inspection.

The Nature Conservation Research Centre (NCRC) at University of Agriculture in Tartu contributes to the implementation of practical issues related to nature conservation (classical nature protection), including those concerning the Biodiversity Convention. NCRC provides the MoE with information on the status of endangered species and assists in the development of nature conservation policies.

A significant role is played by the NGOs. There is a number of NGOs, which are active in the nature conservation both locally and at national level (BOX 5). The Ministry of the Environment and subordinated institutions work in a good co-operation with them. Estonian Fund for Nature has conducted several surveys, such as the wetland survey, mire survey and forest survey. Estonian Ornithological Society, together with state institutions is participating in the biomonitoring scheme, etc.

BOX 5. NGOs active in nature conservation

- Estonian Fund for Nature
  Estonian Ornithological Society
- Estonian Nature Conservation Society
- Estonian Naturalists' Society
- Union of Protected Areas of Estonia
- "Buteo" -Ornithological Club of Pärnu County
- Ornithological Club of Lääne County
- Ornithological Club of Saare County
  Estonian Green Movement
- Virtsu Society for Environmental Education
  Estonian Forest Youth
- European Youth Forest Action-Estonia
- Estonian Association for Protection of Seminatural Landscapes
- Estonian Orchids Society
- REC-Estonia

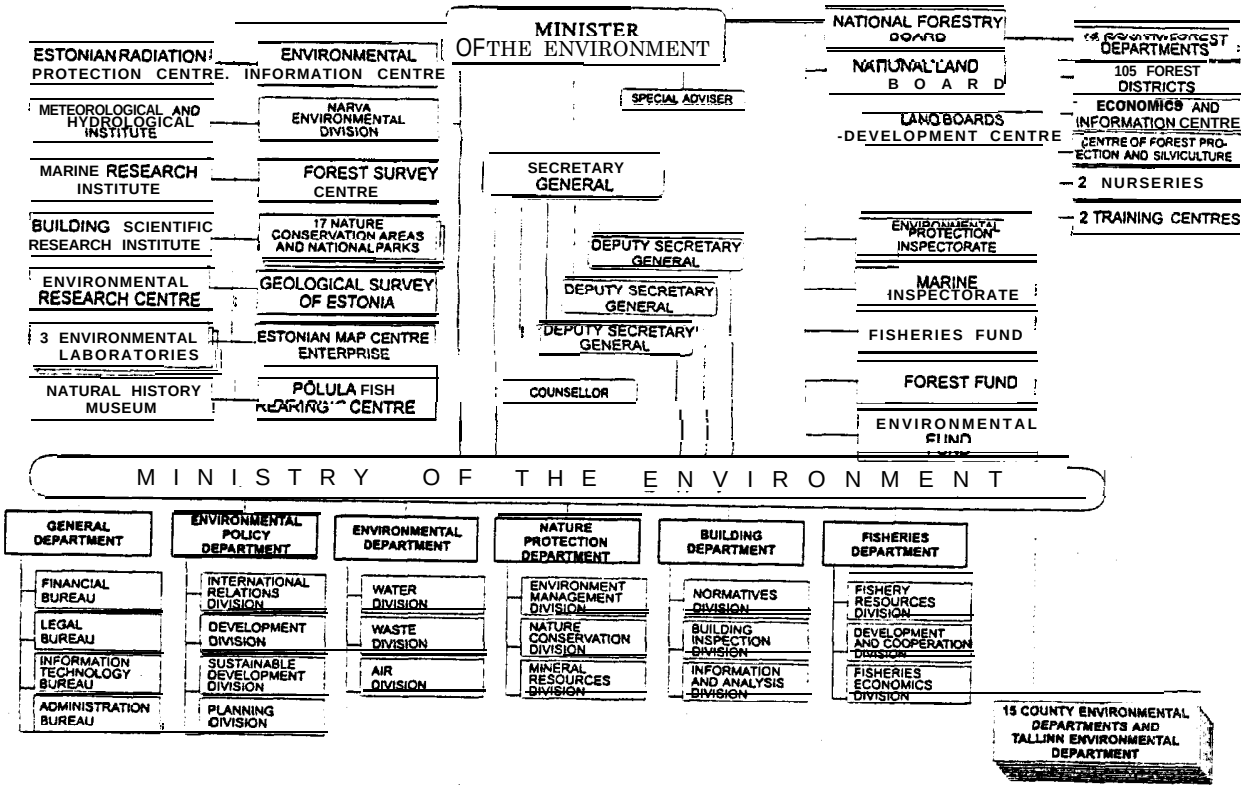

Figure 1. Organisational structure of the Ministry of the Environment of Estonia

2.3. *Historical snapshot of CBD implementation* in Estonia

Estonian Parliament ratified the Act on the joining the Convention on Biological Diversity in 1994.

For the implementation of the CBD, the Government of Estonia has established a special Governmental *Commission* to deal with issues related to biological diversity, and has developed a concrete agenda for implementation. The Commission is directed by the Minister of the Environment and the members include other ministers as well as the directors of Forestry Board and Fisheries Department.

The *inter-ministerial ad hoc group on sustainable development, the Council of Sustainable Development,* established in 1995, has also been involved in issues related to the CBD. The main task of the group has been to influence governmental policies to consider sustainable development principles.

Soon after the UNEP Workshop in Tallinn and the First Conference of the Parties to the CBD in Nassau, the *National ad hoc CBD Task* Group assembled in January 1995 and held first two meetings. The first meeting aimed reaching consensus concerning the goals and strategies among participants representing different sectors. The second meeting heard the status reports from different sectors and formed two sub-groups, one for parliamental lobby on the draft Act on Sustainable Development (especially concerning the aspects relevant for BD in it) and the other for governmental regulation on BD.

In the autumn of 1995 drafting of the two important national policy papers was started: the *Estonian Environmental Strategy* and *the Estonian forest Policy.* Both of them included a biodiversity section and the documents position the biodiversity to an important level.

In March 1997 the Estonian Parliament adopted *National Environmental Strategy*, in which the requirement for the protection and sustainable use of the biodiversity is determined.

In March 1998, the final draft *National Environmental Action Plan* has been completed. Specific activities to implement the ten policy goals highlighted in the Strategy have been described, and financial calculations and estimates supplied.

The signing of the *Association Agreement* between *Estonia and* European *Union* in 1995 was politically a significant step in implementation of the requirements of the CBD in Estonia. For example, in order to meet the requirements of this agreement, the resolution to work out corresponding legislation concerning biotechnology and GMOs was passed.

The *national environmental monitoring system (inc. biomonitoring),* financed from the state budget, was established in 1994. The system aims at monitoring the use of the natural resources (forest, fish, mineral resources, water), as well as monitoring the protected and endangered species and communities. Monitoring is coordinated by the Environment Information Centre and reports are published annually.

As for the work concerning the implementation of the CBD at the national level, contacts have been promoted between authorities in different sectors, which deal with issues related to biodiversity: agriculture, fisheries, forestry, and scientific institutions. Various activities have been going on in those

sectors such as the in-situ and ex-situ conservation of species, maintaining and breeding of local animal breeds and cultivars of plants, spatial and land use planning in areas with protected landscapes, etc. The existing infrastructure includes well-developed network of protected areas, databases concerning local cultivated plant species and animal breeds, seed banks of forest trees, gene banks established for different plant varities, specific programmes for species protection managed by botanical gardens and the zoo, and national monitoring programmes concerning fisheries, forests, biological resources in general, etc.

All the mentioned activities would have been impossible without learning from international experience and participating CBD process at the international level.

A step of special importance in the launch of CBD implementation in the region was made by conducting *UNEP Workshop on the* Practical *Implementation* of the Convention on Biological Diversity *in the Baltic Countries* in *Tallinn on October 16-18, 1994* .The meeting was organised by the United Nations Environment Programme (UNEP), through its Regional Office for Europe, in co-operation with the Interim Secretariat for the Convention on Biological Diversity, The Estonian Ministry of the Environment hosted the Workshop with the assistance of the Resident Representative of the UNDP.

Two background papers were presented concerning the implementation of the CBD at the national level in all Baltic States, prepared in co-operation between consultants from Estonia, Latvia, Lithuania, Finland and Norway. Representatives from the Baltic countries discussed their national views on bicdiversity, highlighting state-of-the-.art approaches, the research on biological diversity, and the role of the non-governmental organisations (NGOs) in the process. As an input into their national biodiversity pmgrammes, the three countries discussed recommendations for national and sub-regional strategies for implementing the Convention. The workshop produced a list of recommendations on strategies and follow-up in the three Baltic countries.

Another example of the co-operation between the Baltic States is the workshop on *status and implementation of the CITES* and *the Convention on Biological* Diversity *in the Baltic States, Hiiumaa 26-29 June 1996.* The Workshop was organised by the Ministry of Environment of Estonia and Baltic Environmental Forum. The joint meeting was held to exchange information and experience about the implementation of the CITES and the Convention on Biological Diversity in the Baltic States, to discuss difficulties arising from the practical implementation of the CITES and the CBD and to find ways of solving these problems. Another aim was to plan co-operation between the Baltic States and also with other bordering states and the Secretariat of the CITES and the Convention on Biological Diversity.

The international regional conferences title *"Environmental* Conventions *and the Baltic* States" held in 1993-1997, Estonia, organised by the Stockholm Environment Institute -Tallinn have contributed to the regional co-operation in the implementation of international obligations, including CBD. The conferences have been focusing on the problems of implementation, such legal, economic and social issues.

Among others, co-operation with the UN Environmental Programme, *the World Bank and a number of bilateral partners* have been of high importance for dealing with issues, the approach to which is relatively new for both Estonia and the other countries. The UNDP and World Bank funded projects which have played a great role in stimulating discussion concerning possibilities for integration of efforts and activities in related sectors and areas to biodiversity.

The most important initiatives relevant to the maintenance and sustainable use of biological diversity in Estonia, which have been and are supported by international and regional institutions, as well as by the bilateral agreements), include:

- *Keypoints for National Biodiversity* Action *Plan* for *Estonia,* a triple project for the three Baltic Countries funded by the World Bank, implemented via WWF Baltic Program and was completed in 1995. This project paved the way for preparation of Biodiversity Country Study.

- the UNEP supported *Biodiversity Country Study* project which has been finalised; the project defines the basic needs for effective conservation and rational use of national biodiversity at a desired level, it estimates the costs and benefits related to the implementation of these "basic needs' plus defines the necessary supportive measures required to fulfil them. Country Study together with the NEAP lay down the foundations for preparation and implementation of a National Biodivers Strategy and Action Plan (NBSAP). Compilation of NBSAP is shortly being started. The process of Country Study-project has enabled to form a strong team of experts to work on other biodiversity-related issues.

- The project "Implementation of the *Act on* Sustainable *Development and the Biodiversity* Convention in *Estonia"* funded by the EU LIFE programme which is currently being finalised. This gives a possibility to evaluate the ways of integrating the requirements of the Convention on the biological diversity into the management plans of the protected areas.

- Finally, the financial support for the preparation of National Biodiversity Strategy and Action Plan (NBSAP) has arrived and the work can start. The NBSAP would provide an important opportunity for Estonia to establish a comprehensive cross-sectoral framework, which can in future be used for *alia* r project identification and acquisition of funding for activities aiming at the preservation and sustainable management of biodiversity. The document would also be important for the preparation of background documents for integrated biodiversity management planning process, as well as assist promoting public involvement and participation in this process, and encourage local initiative. For national authorities, it will be yet another impetus for improving the sustainability of development planning. is certainly of high importance to advance the development management methods suitable for maintenance of biological resources of Estonia.

NBSAP would also provide the basis for determining the priorities for future investments to be considered both by the Government and possible donors.

The preparation of the *first* national *report* to the *CBD* enables Estonia to meet the obligations under Article 26 of the Convention as stipulated in Decision II/17 adopted by the second meeting of the Conference of the Parties to the CBD (COP 2).

2.4. In-situ conservation

Nature conservation has long traditions in Estonia. According to historical records, the King of Denmark prohibited to cut coastal woods as marine navigation signs on four islands near Tallinn already in 1297. The coastal forests have been protected both under the Swedish and Russian order from the 16th to 19th century.

BOX 6. Categories of protected natural objects (APNO)

- areas
- natural and natural-historical monuments
- species, fossils and minerals

The first bird sanctuary on the Vaika islets near the west coast of the island of Saaremaa and the island of Vilsandi was established in 1910. The first Nature Conservation Act in Estonia was passed in 1935. By 1940, there were 47 nature reserves in Estonia, During the Soviet period, another nature conservation act was passed in 1957.

In 1971, the Lahemaa National Park was established, being the first of the kind in the former Soviet Union.

Since 1991 Estonia has been in continuous process of updating its nature conservation system according to the modem understanding about the maintenance and sustainable use ofbiiiersity. The process is still underway and, thus, the current review is likely to change over the next years.

2.4.1. Protected areas

Since 1995, a general certification and inventory of the protected areas is under way. This work is connected with the implementation of the land and property reform, but also with the need to update the status of protected areas in accordance to the needs stemming from the development of biodiversity preservation concept in Estonia.

BOX 7. Categories of protected areas

National park
Nature reserve
Protected landscape reserve
(also inc. nature park),
Programme area

As of January I, 1998, there are 4 national parks (all with full-time staff), 11 nature reserves (5 with full-time staff; the number of nature reserved are likely to increase around 100 with the years coming) and 26 (2 with full-time staff) nature parks .The number of nature parks will increase to around 200 within the coming years. The increase of protected areas in number is the result of restructuring of former reserves accordance to the new nature conservation legislation. Thus, the former specialised protected areas (botanical, ornithological reserves, etc.) are reclassified to landscape reserves or to nature reserves.

In total, *app.* 12% *of the territory is protected,* various restrictions in economic and/or public use (including the West-Estonian Archipelago Biosphere Reserve established in 1990) are applied. The strict protection regime *is* valid on ca 1.7% of the *territory* (01.03.1998. According to the Estonian National Environmental Strategy it is planned to increase this figure to 5% of the country's territory by the year 2010.

Since 1996 the preparation of management plans for protected area has been launched. The first of its kind was made for Matsalu Reserve and currently elaboration of the new revised version has been completed. In 1996 the preparation of management plan for Alam-Pedja Nature Reserve started in the frame of EU LIFE project 'Implementation of Convention of Biodiversity and the Act on Sustainable Development in Estonia".

In 1997 another nine Estonian wetlands had been designated as Ramsar-sites of the Ramsar List of Wetlands of International Importance additionally to the Matsalu Nature Reserve, which was the very first Ramsar-site designed already in 1975 (BOX 8).

BOX 8. Ramsar sites

1. Matsalu Nature Reserve
2. Endla Nature Reserve,
3. Muraka bog,
4. Nigula bog,
5. Islets of Hiiumaa and Käina Bay,
6. Emajõe Suursoo (Great Bog of Emajõe),
7. Puhtu-Laelatu-Nehatu Reserve,
8. Alam-Pedja (Lower-Pedja) Nature Reserve,
9. Soomaa National Park,
10. Vilsandi National Park.

BOX 9. National parks

- *Lahemaa* National *Park* - for the preservation of nature and cultural landscapescharacteristic of North Estonia;
- *Karula* National Park - for the preservation of hilly landscapes rich in forests and lakes, typical of South Estonia;
- *Soomaa National Park*- for the preservation of the largest bogs in Estonia and the floodplain meadows and forests in the south-western transitional part of Estonia;
- *Vilsandi National Park - serves* for the preservation of West Estonian coastal landscapes and sea, as well as islets rich in birds.

A NATIONAL PARK is a protected area of special national importance for the preservation, protection, investigation, and promotion of awareness of the natural and cultural inheritance; it includes ecosystems, examples of biological diversity, landscapes, national culture, and is subject to sustainable nature management.

The National Parks of Estonia as of January 1, 1998, are listed in BOX 9.

A NATURE RESERVE is an area protected for its nature conservation or scientific value set aside for the preservation, protection, and investigation of natural processes and endangered or protected plant, animal and fungus species and their habitats, inanimate objects, as well as landscapes and natural monuments.

A PROTECTED LANDSCAPE RESERVE is an area of natural or cultural heritage value, which is rare ortypical of Estonia, and is established for nature conservation, cultural or recreational purposes. Parks, arboreta and botanical gardens which have been taken into protection are also considered protected landscapes. Management plans are developed to determine the scope and intensity of tourism, forestry and agricultural exploitation, as well as industrial development and urban construction. The protected landscapes may include limited management zones and special protection zones. Landscape reserves are protected parts of the countryside which contribute to its beauty and variety, where nature and the landscape features receive the priority.

A PROGRAMME AREA is managed under a local, national or international programme for monitoring, investigation, or educational purposes as well as combining conservation and management of natural resources. The West-Estonian Archipelago Biosphere Reserve and the Pandivere Hydrological Reserve are considered as programme areas in Estonia.

2.42. Protected species.

A PROTECTED WILD SPECIES is defined as a plant, fungus, or animal species or its taxonomic unit, a fossil or a mineral, which is found in Estonia in its natural state, is endangered, rare or of scientific, nature conservation, aesthetic or local historical value, and which has been taken into protection. Protected species, fossils and minerals are divided into Protection Categories I, II, and III according to the strictness and specific terms of protection requirements (Table 1).

According to the Act on Protected Natural Objects and its amendment from 1998, the protection of species is arranged *via* passive and active conservation measures. The APNO divides the protected species into three categories depending upon how endangered they are. As in several cases the passive protections via prohibitions may not prove to be effective enough to maintain or restore the endangered species. APNO also establishes the use of recovery plan as a management tool for these species.

The Ministry of the Environment establishes the list of species in need of recovery plan and also the procedure for preparation and implementation of the recovery plans. Currently a subproject for elaboration of the procedure for preparation and implementation of the recovery plans for threatened species is underway in the frame of EU LIFE project 'Implementation of Convention on Biodiversity and the Act on Sustainable Development in Estonia".

The large carnivores as wolf (300 ind.), brown bear (600 ind.) and lynx (1200 ind.) have relatively large and wealthy populations in Estonia, which demands culling of these species to certain extent. As at the same time these species are highly endangered or extinct in number of other regions in Europe the regulation of the species needs comprehensive analysis and planning to guarantee the maintenance of the sustainable populations. For that purpose a project for preparation of management plans for large carnivores has been initiated in Estonia in 1998. This project is facilitated by the funds of the Danish Government.

In addition to the above mentioned, the Red Data Book of Estonia has been compiled which has retained its advisory function. Currently, the revised version of the Red Data Book is under preparation by the Nature Conservation Commission of the Academy of Sciences.

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2.5. Ex-situ conservation

Relatively new initiative in biodiversity conservation in Estonia is the elaboration legal and management tools for the maintenance of biodiversity outside protected areas. The legal bases for these are provided in the Act of Planning and Construction, Act of Landscape (draft), Wildlife Act (draft) and new Act on Forestry (draft). The first emphasises the importance of biodiversity consideration to be included into planning proc-

Table 1. Protected species

Species group	No of species	Categories		
		I	II	III
TOTAL (exc. Protozoa)	20 546	32	228	279
Plant kingdom	5 353	22	145	43
Vascular plants	1 560	22	122	41
Mosses	507		23	2
Lichens	786			
Algae (blue algae)	2500			
Fungi	3461		24	6
Animal kingdom	11732	10	59	230
Vertebrates	487	9	58	204
Mammals	64	2	15	12
Birds (breeding 213)	331	7	36	179
Reptiles	5		1	4
Amphibians	11		4	7
Fish (Cyclostomata+Piscies)	76		2	2
Invertebrates	11245	1	1	26
Arthropoda	10 200			26
Mollusca	136	1		
Bryozoa	7			
Annelida	130		1	
Priapulida	1			
Nemertini	4			
Nemathelmintes	451			
Plathelmintes	304			
Ctenophora	1			
Coelenterata	8			
Porifera	3			
Protozoa	11 600			

ess. The latter two introduce a new management tool: key-biotopes in the Act of Forestry and habitats of special importance in the Wildlife Act. The key-biotopes are defined as "sites in protected or economy forest where the likelihood for the existence of rare or threatened species is high". The habitats of special importance are the sites which are important for the survival of wildlife species. Both are regarded as source areas, which are important for maintenance of biodiversity in surrounding areas under economic use of various type. The protection of these areas will be, among other tools, achieved through the contracts between landowners and the state forming thus a soft form of biodiversity protection as a parallel tool to the protected areas.

2.5.1. zoo

Tallinn Zoo is the main breeding facility involved in ex *situ* conservation and has since its foundation in 1939 has gained a diverse experience in conservation breeding and management of small populations. The collection of Tallinn Zoo consists of various species as indicated in the Table 2 (as of January 1, 1998). The threatened species form noteworthy part of the collection (Table 3). Tallinn Zoo follows in its development the guidelines of the World Zoo Strategy(l993) and is a member of the Association of European Zoos and Aquariums.

Currently the Tallinn Zoo participates in the 27 European Endangered Species Programme (EEP). These are:

Aegypius monachus, Bison *bonasus*, *Bos javanicus*, Cacatua *molluccensis*, *Capra cylindricornis*, *Ciconia nigra*, *Grus japonensis*, *Grus vipio*, *Sanguinus Oedipus Oedipus*,

Table 2. Taxonomic structure of the captive stock in Tallinn Zoo (as of January 1, 1998)

	Order	Family	Genus	Species	Specimen
Amphibians	2	6	6	5	41
Reptiles	5	13	20	31	104
Birds	12	21	62	102	583
Mammals	10	25	53	114	558
Total	29	65	141	252	1286

Table 3. Endangered species in Tallinn Zoo according to IUCN Red List of Threatened Animals (1994)

	Mammals	Birds	Reptiles	Amphibians	Total
Extinct EX	1	0	0	0	1
Endangered E	9	3	1	0	13
Vulnerable V	15	9	2	0	26
Rare R	4	4	0	0	8
Indeterminate I	4	0	0	0	4
Insufficiently known K	1	1	1	0	3
Total	34	17	4	0	55

Haliaeetus albicilla, Haliaeetus pelagicus, Chrysocyon brachyurus, Pelecanus *crispus,* Speothos *venaticus, Lohpura edwardsi, Mustela lutreola, Panthera pardus orientalis, Panthera pardus saxicolor, Panthera tigris altaica, Uncia uncia, Loxodonta africana, Hexaprodoton liberiensis, Oiceros bicomis, Equus hemionus kulan, Equus przewalskii,* Ovibos *moschatus and Bos javanicus.*

Considerable success has been reached in the breeding of *Aegypius monachus, Grus japonensis, Grus vipio, Ursus arctos arctos, Crysocyon brachyurus, Mustela lutreola, Equus hemionus kulan, Equus przewalskii, Bos javanicus, Capra cylindricomis, Cervus elaphus bactrianis.* The biggest of 3 captive populations of *Capra cylindricomis* is maintained in the Tallinn zoo.

Tallinn Zoo hosts the European Mink Conservation Breeding Committee (EMCC), the international non-governmental organisation established (1992) to promote the preservation and recovery of the European mink, which is currently one of the most endangered mammals in Europe. Tallinn Zoo and EMCC integrate the traditional ex situ conservation with the *in situ* conservation actions and aim to construct a special facility for breeding of the European mink and restoration of the species in the wild. This endangered animal has been bred successfully in Tallinn Zoo since fate 1980ies. Also, the European mink EEP programme is co-ordinated by Tallinn Zoo and EMCC. Tallinn Zoo actively contributes to *ex-situ* actions for the conservation of Amur leopard (*Panthera pardus amurensis*).

In 1997 a small zoo was established in Estonia *Elistvere* Zoological Garden. It forms a part of Vooremaa Nature Education Centre. Although still looking for its specified objectives and aims Elistvere Zoo has a full potential to contribute to *ex-situ* conservation of wildlife. Its provisional aim is to maintain wildlife and serve as and educational centre for local inhabitants.

2.5.2. Eugenics

Herd-books for the *Estonian Native* Cattle were founded in 1885 and have been kept till nowadays. Active breeding of this unique cattle took place a relatively short period (1920-1947, which was interupted, but started again in 1989 when the Society of Estonian Cattle Breed was restituted. The per cent of pure breed cows of the Estonian Native Cattle is decreasing due to the spread of other breeds. The Animal Breeding Inspection at the Ministry of Agriculture has financially supported the pure breed cows' reproduction, there is no international support. The breed has been included in the FAO list of endangered breeds.

Herd-books for the Estonian *Native Horse were* founded in 1921. The breeders society was founded in 1920. The Animal Breeding Inspection at the Ministry of Agriculture provides financial support to the programme that enables to support financially the owner of pure breed mare, if the mare is reproducing and giving foal.

Herd-books also exist for all our local breeds. For example, the herd-books for Estonian Red Cattle Breed and Estonian Black and White Cattle Breed were founded in 1885 and respectively and are maintained until now.

2.5.3. Plant varieties

The Plant Varieties Protection Act (1998) regulates procedures of applying protection to plant varieties and ensuring the rights of the owners of plant varieties. The act also regulates the procedures of registration and keeping registers as well as issuing licences of varieties. The act implies to all plant varieties, including trees.

To protect the genetic resources of Estonian forest genetic reserves, seed orchards and seed storages have been established.

In different parts of Estonia 10 genetic reserves (protected forest areas where natural regeneration is permitted only) have deen separated *with the total area of 3,540 ha. Among them, 5 reserves are in spruce woods, 4 in pine woods and one in a birch wood.

Among seed orchards, vegetative seed orchards are most widely spread. They are established according to the principles of clone archive- the origin of each graft is known, location in the plantation is mapped. The establishment of seed orchards started in 1965, the total area of seed plantations is approximately 250 ha today (180 ha of pine seed and 32 ha of spruce seed plantations) (Estonian Forest Policy, 1997).

The seeds of coniferous tree species are stored in two great seed storages: in Kullenga and in Marana. Since the seed years of pine are quite frequent, the pine seed supply is not

great, but the spruce seed supply is sufficient for more than ten years.

There is no national genebankfor agricultural plants currently in Estonia. However, the Estonian Plant Biotechnology Research Centre, EVIKA, situated in Saku, has got a major in vitro collection of 350 potato cultivars of which 40 are Estonian. Besides 500 potato mericlones, this centre has also got an in *vitro* collection of chrysanthemum, carnation, plum, sweet cherry and various berries. The potato collections may be considered to be global collections including many old cultivars. The centre has got excellent tissue culture facilities and has offered to carry out projects concerning virus eradication for various crops.

Other plant genetic resources collections are housed at the Jõgeva Plant Breeding Institute (field, pasture, and vegetable crops), at the Polli Experimental Station (fruit trees and berry bushes), and at the Tallinn Botanical Gardens (decorative plants).

The Jõgeva Plant Breeding Institute was founded in 1920. The working collection of barley includes 620 accessions, there are 45 of these in the wheat collection, 30 in the rye collection, 190 in the collection of oats, 320 in the potato collection, 450 in the collection of forage grasses and 125 accessions in the collection of vegetables.

The Polli Experimental Station was founded in 1945. The working collection includes 250 cultivars and 150 'landraces" of apple, 50 cultivars and 'landraces" of pear, 60 cultivars of plum, 70 cultivars and selection of cherries (mostly of sweet cherry), 90 cultivars of currant, 95 cultivars of gooseberry, 30 cultivars of raspberry, and 50 cultivars of strawberry.

The Estonian collections mainly contain material of the major crops of the country, which are replicated elsewhere. But some unique material is also collected from local farms and it has great value for plant breeding.

Only in a few cases the specimens of agriculturally important species/accessions or their progenitors have been taken under in *situ* conservation. One protected area to maintain a natural grove of wild apple (*Malus sylvestris*) is located in the island of Saaremaa. Some very old cultivar trees (for example 'Oti apple-tree" in South Estonia) are under protection as single objects.

The Tallinn Botanical Garden, which was established in 1961, has currently got over 6,000 plant species and cultivars. 1700 of which are greenhouse plants and are grown under glass. Most of the plants of the Estonian flora and horticulture are represented. The present collections are mainly improved with the help of special expeditions as well as the seed exchange on the basis of 'Index Seminum" with other botanical institutions in the world. The plant collections of the Botanical Garden serve as research basis for scientists, including the monitoring of the Estonian flora, the improvement of outdoor and indoor plants, agrotechnology, multiplication and plant protection. In addition, the Botanical Garden is also aiming at the popularization of natural sciences, the spread of plant information and the education c people aesthetically.

The Botanical Garden of Tartu University was established i 1803 already. About 6,400 plant species and cultivars repre senting all continents are grown in six greenhouses and oper ground (1996).

A computerized lists of all the taxa maintained in the garden have been compiled.

2.6. *Inter-sectoral and multi-disciplinary approach to conservation and sustainable use o biodiversity*

2.6. 1. Forestry

The Forestry Board of the Ministry of the Environment has initiated the development of criteria and indicators for sustainable forest management. The Estonian Forestry Board is responsible for the development of national forest policy and its implementation, monitoring, analysis and accounting of the forest resources It promotes the forest management and wood production and the multiple use of other forest resources in a sustainable way.

Several projects have been focusing on the biodiversity issues' in forest management, a special focus has also been on' biodiversity aspects in commercial forest management. As the extension to the Helsinki process of the protection European forests, a project titled "Criteria and indicators of sustainable forestry in Estonia", has been conducted in 1997-1998. The relevance and applicability of All-European criteria were assessed and a set of criteria and sustainable forest management indicators for Estonia was worked out.

2.6.2. Fisheries

Fishing is an important economic sector in Estonia. 95% of catches come from the Baltic Sea, the contribution of internal waters is only 5% (NES). Fish farming produces 350 tones of fish annually, where as the quota for sea fish was 56,800 t of sprat, 51,500 t of Baltic Herring, 1286 t of Cod and 101 t of Baltic Salmon. The endangered marine fish species are the powan and the smelt. The wels and the grayling are in decline in internal waters. The vital spawning sites of the salmon have survived only in six rivers.

A new Fisheries Act is being drafted, to be in-line with EU directives. The document will include biodiversity component. Breeding stocks will be established, which are used for salmon, brown trout and grayling incubation and introduction to the natural rivers.

2.6.3. Eco-Tourism

Estonian Tourism Board is currently working out the Estonian tourism concept The document will also include the vision of eco-tourism. The Estonian Ecotourism Association (ESTECAS), which assembles a number of businesses oriented into eco-tourism, contributes to the work as well. ESTECAS was established in 1996. The organisation joins individuals, organisations and authorities for tourism development, and it works togetherwith the local communities aiming at conserving the natural and cultural heritage of Estonia. Objectives of ESTECAS, is to develop principles for eco-tourism, strategies and action plans, industry guidelines and standards, to promote the ideas of ecot-ourism and sustainable tourism. Togetherwith the Estonian Tourism Board, ESTECAS is involved in the drafting of the Estonian @o-tourism Strategy.

2.7. The legislation concerning biotechnology and GMOs

The legislation on the deliberate release of genetically modified organisms in Estonia is currently missing. The draft act on the Genetically Modified Organisms has been submitted to the Parliament for adoption. The draft act is complied in-line with the EU directive 90/220/EEC. The only piece of legislation, which currently regulates an aspect of the handling of GMOs, is the regulation of the Minister of Communications and Transportation on the Transportation of Hazardous Substances (1997). The regulation sets the requirements of the packaging and transportation of GMOs.Some pieces of legislation are still valid from the perido before 1991.

The draft Act on the Release of GMOs into the Environment will regulate the release of genetically modified organisms into the environment and the marketing of GMOs and other products containing GMOs.

According to the draft Act, the Government will establish a Commission on Gene-Technology. The Commission will maintain an inter-sectoral membership, consisting of people from the MoE, Ministry of the Economic Affairs, Ministry of the Agriculture, Ministry of the Social Affairs, two members will be appointed by the rector of the Tartu University, and three members from the Academy of Sciences or its subordinated institutes.

The responsible authority for the implementation of the Act will be the Ministry of the Environment.

As a positive tendency, it should also be mentioned that Estonia joined the Budapest Convention in 1996. Entering the Convention it obligates the Government of Estonia *inter alia* to store the microorganisms only within reliable deposits. This will be giving easier control over the potential risk of GMOs release into the environment.

2.8. Scientific research and biodiversity conservation

From the scientific viewpoint, Estonia has got a vast and long-term experience in describing and monitoring the components of biological diversity.

Among the first scientific programmes in Estonia containing also some projects related to environmental and biodiversity protection problems was adopted in 1968 by the Estonian Academy of Sciences. It was the *International Biological Programme (IBP).* 17 research institutes and other establishments were involved in this programme. The programme had operated about 10 years.

In 1978 the Republican Committee for *MAB was* set up. It was the first organisation coordinated by UNESCO. The Republican Committee was reorganized into the National Committee in 1990 while now it is attached to the Estonian National Commission for UNESCO. From 1978 to 1990 the Estonian Programme for "Man and the Biosphere" comprised 11 internationally coordinated projects and one national project EST-MAB 15.

The main role of the Estonian MAB Programme and the Committee has been organizational, but also publishing, promoting international contacts and information exchange through conferences and publications as well as accelerating the advance and solution of ecologically and environmentally important research topics (e.g. organisation and research support of the West-Estonian Archipelago Biosphere Reserve).

The Helsinki Commission has been one of the promoters of applied research assembling Estonian research institutes and universities.

The first government-supported environmental research programme was launched in 1975 by the Commission for Environmental Protection of the Estonian S.S.R. Council of Ministers. This five-year programme had 10 research areas: complex use of terrestrial, surface waters and coastal sea resources: prognosis of the status of resources and environmental protection practices; soil conservation and management air and water pollution inventory; rational use and restoration of the biological resources; nature conservation including protected areas, conservation of rare and threatened species conservation; issues of human ecology; human impact on atmospheric processes and methodology of global climate changes; socialeconomic and legal aspects of the management of natural resources: genetic impact of environmental pollution. The main results of the realisation of this state-supported programme was the publication of the monographic study 'State of the Environment of the Estonian S.S.R. and Tendencies of its Changes" published in 1977.

In 1986 a new type of scientific-technological state-pmgramme was created for environmental research and protection, entitled as ER-10, "Rational utilization of natural resources and environmental protection". The programme covered seven,

research and technological areas, and the main goals were to study the migration and accumulation of pollutants in different terrestrial and aquatic ecosystems, to work out a conception for environmental monitoring, to create a national data bank of information concerning environment and the utilisation of natural resources, to elaborate and implement the methodology of environmental assessment, to create a basis for environmental standardisation, to apply new technologies of environmental mapping and to support environmentally sound technologies specially connected with oil-shale mining and processing.

In 1986 the state funding policies changed dramatically followed by the political and administrative collapse of the former Soviet Union, which led to the necessity for the initiation of a national approach to environmental problems as part the governmental policy of an independent state.

Beginning with the early 90-ies, participation of scientific community in the CBD process has become active. Several research institutions and universities have included different aspects of biodiversity and sustainable use of natural resources in their research programme.

During the preparation of the Estonian Biodiversity Country Study 1996-1997 many of eminent scientists contributed to this work. As an example a new updated and CBD-devoted nomenclature of vascular plants, fungi and vegetation site types was compiled under the umbrella of this project.

2.9. Education and public awareness

The public opinion about the nature conservation issues is generally supportive. An all-country survey (1500 respondents) conducted in 1994 somewhat surprisingly revealed that the excessive forest cutting occurred to be the biggest environmental pmblem in the country, scoring for 7.35 points of Io-score scale, followed by human health issues (6.28) and air pollution (6.16). Deterioration of nature reserves and decreasing number of animal and plant species were placed on the seventh and eighth position, respectively, in the list of ten major environmental problems in Estonia.

Tine teaching of diversity of nature and of how to conserve it has always been important in Estonian folk traditions. This is reflected in proverbs, folklore, traditions and customs.

During recent times the printed press/media, radio and TV are playing an important role in promoting ecological awareness. The reference books an encyclopaedias where biodiversity constitutes an important part as well taxonomic guides for plants, birds and lichens have been published. Quiz games concerning nature, programmes introducing nature and wildlife to people (for example, Jüssi Ratas records of birdsongs) are popular among people. Films introducing local nature, for example Re Maran's films about animals unfamiliar to people (spiders, vipers, frogs, etc.) have also gained international recognition.

The Environmental Protection Day (5 June) and the Nature Conservation Month (May), which are dedicated to different topics each year, have been celebrated for over 35 years already.

In the public education system different aspects of biodiversity are partly included in the curricula of biology, geography, languages, physics and chemistry and nature lore.

Special courses for nature and environmental protection in the establishments of higher education were introduced in the 1970ies, in particular at the departments of biology and geography at Tartu University. Currently in four universities the ecological and biodiversity subjects are being taught.

Sustainble forest management with courses biidiiersity aspects have been taught also at the Higher Forest School of Luua, Jõgeva County.

National Environmental Action Plan emphasizes the importance of education and public awareness for preservation biodiversity. It foresees a number of actions to improve the status of education and public awareness about biodiversity among general public and in specific groups. The planned actic could be divided into two categories:

1. Immediate actions to raise the current level of education and public awareness: regular training wurses on biodiversity and nature conservation issues for biodiversity managers, natural resource (e.g. forestry) managers, secondary school teachers; training courses for custom officers on the implementation of Washington Convention, wurses on the Nature 2000 for private and public landowners, elaboration of concept for public awareness campaign on biodiversity issues and its implementation.

2. Actions to advance the level of education and public awareness in the future: teaching programme on biodiversity and nature conservation for the high school, textbook on biodiversity and nature conservation for secondary school, establishment of multimedia package on the biodiversity and landscape issues for high schools, foundation of the chair on the conservation biology at universities, wurses on biodiversity in university, publication of textbook on biodiversity and nature conservation for university students.

2.10. *Existing information and* data banks

As many other countries, Estonia has got considerable experience in describing and monitoring the components of biological diversity. Despite of the large amount of scientific data on biodiversity and on the functioning of biological systems gathered, there is not enough information, which is easily available to decision-makers or general public. Therefore, for Estonia the issue is not so much of the missing information, but the necessity of assembling the existing data into a usable form needed for the implementing of the Convention.

The keeping of data and information on protected species and areas (according to APNO) is regulated by the Governmental Regulation 'Establishment of the Nature Conservation Register" from 1996. The Nature Conservation Bureau at Environment Information Centre is the responsible institutions to keep the central register. The regional registers are kept in the county environmental departments of County Governments.

Data acquired by biomonitoring programme are stored in the Environmental Information Centre.

As to the status of monitoring the components of biodiversity in Estonia, continuity is one of the main problems: one scientist may devise a system of monitoring, but in some years people tend to be replaced and the system might be abandoned. Another difficulty is that many of the existing databases are not good for identifying conservation measures for those species and ecosystems, which require urgent action.

2.71. Monitoring of biodiversity

In 1994 a national monitoring programme was initiated under supervision and co-ordination of the Ministry of the Environment. The national programme has the following structure:

1) Programme of meteorological monitoring;
2) Programme of physical and chemic monitoring;
3) Pmgramme of biological monitoring;
4) Programme of integrated monitoring.

The biological monitoring consisting of six sub-pmgrammes contains features of biodiversity monitoring (Table).

The species and community composition sub-pmgramme is the closest to the biodiversity monitoring. It encompasses arou 50 different projects and sets abou 600 sample plots with about 40 000 analysis. The projects are carried out by various institutions: research institutes, universities, museums, reserves, NGO-s. The projects address the statu of the communities an specific groups of species.

The number of various nature monitoring projects is high at present. Although at the very beginnin of the monitoring process (1994), a provisional attempt to establish a natio programme on nature monitoring was made, the existing projects have been to date loosely, if at all, interrelated and not form a consistent system for biodiversity monitoring. However, the idea to establish a conceptual base for nature monitoring and a specific pmgramme for that has always been discussed amex pens involved in monitoring activities and the importance of this has been acknowledged by most of the stakeholders.

Current sub-programme on species and community monitoring has provided several pre-requisites for the establishment of an effective biodiversity monitoring system. Operating teams have gained wide experience of nature monitoring and the contacts between people as well as between institutions involved in monitoring projects have been developed during the last thr four

Table 4. Programme on biological monitoring

Subprogramme	Responsible implementator	Stations
Bioindication	Tallinn Botanical Gardens	1 0 0
Marine biota :	Estonian Marine Research institut (EMI)	
* Eutrophication		* 36
• Fishes		4
* Bottom plants		6
Freshwater biota :	Estonian Academy of Sciences, Institute of Zoology	
* Rivers	and Botany, Vôrtsjärve Limnological Station	5 5
• Lakes		30 annually
Forest monitoring	Estonian Forest Research Institute (EFI)	9 1
Species & community composition		730
* Plant communities	* Estonian Environmental Information Centre (EEIC)	• 22
* Plant species composition	* Environmental Protection institute	* 101
* Birds	• Estonian Ornithological Society	• 487
* Animals	• Estonian Forest Management Centre	* 98
• Insects	• Environmental Protection Institute	* 22
Aerobiology	Estonian Academy of Sciences (EAS)	1

years. The methodological experience in collecting data in the course of various projects must not be under-estimated. Furthermore, the newly established Estonian legislation contains a number of important notations on that.

One of the very first steps in the process of establishing an updated national biodiversity monitoring programme was the evaluation of the current status on nature monitoring. A comprehensive analysis on that was made in the frame of EU Phare project 'Environmental monitoring and enforcement" in 1996. A report resulting from this project evidenced the following:

1. Estonia has a very high number of monitoring projects, which could be regarded as biodiversity monitoring.
2. In several projects the scientific interests clearly prevail over the management needs.
3. There is no clear understanding among the stakeholders over the purpose (aim and objectives) of the nature monitoring.
4. Several projects lack clearly defined objectives.
5. Number of projects extensively overlap.
6. The end-users of the data and the information flow schemes have not been identified and, thus, the data collected often remain to the databases without any active use in the management.
7. The process of data processing and the distribution of final results have elaborated insufficiently.
8. The feedback-loops in the information-flow scheme granting the improvement in the quality of data have not been developed.

The report stated as the final conclusion the need to initiate a special project with the aim to establish a cost-effective and well-operational national Biodiversity Monitoring System as a separate programme aside of other biological monitor sub-programmes. In 1998 a one-year EU Phare project "Establishment of GIS-based biodiversity monitoring system" was initiated for that purpose.

A strong emphasise in the project is also on construction of effective data-flow scheme from data collectors to end-users of the information, establishment of GIS-based data storing, processing and presenting system. The primary data originating from monitoring is to be stored by the institute/organisation (data host). The secondary data (aggregated or calculated data) are to be relayed to central database on an annual basis according to the standard transfer format. These secondary data will be stored in the central database (State Register for Nature Conservation). The central database are to be established in the status of state register.

The Geographical Biodiversity Information System (GBIS) will contain three different sets of digital data layers:

1) Basic Geographical Layers to be used as different backgrounds for biodiversity,
2) Biodiversity relevant surveys and inventory layers to be used as spatial value-added information, that can be used as together with the basic geographical layers, or backgrounds for monitoring information,
3) Biodiversity Monitoring Layers which will provide access to the annually upgraded secondary data from monitoring and provide processed information on biodiversity.

The procedures how to disseminate information to other end-users like public, media is still under discussion.

Biodiversity indicators form an important tool to evaluate the status of biodiversity in the country. However, construction of comprehensive set of indicators for biodiversity is not an easy task due to the complexity of the biodiversity itself. Since 1996 Estonia has been actively involved in the project of Baltic Environmental Forum for elaboration of the Baltic Environmental Indicators. Among other topics also the biodiversity and landscape indicators were addressed in the frame of this project. The provisional set of indicators has been compiled:

Pressure indicators, such as - Arable land, Area of build up land, Area of peat cutting and other mining activities, Road density and number of cars;
Status *indicators* - Land use structure, Forest stand area, Threatened species;
Response indicators - Protected areas. Current set of indicators clearly do not cover all the components and attributes of biodiversity. Therefore it is planned to further elaborate the biodiversity indicators within the next years.

2.72. International Commitments and Cooperation

Estonia has signed and, thus, made the commitment to follow the provisions of the following conventions:

- Helsinki (197411992) Convention on the Protection of the Marine Environment of the Baltic Sea (entered into force in Estonia on Jan 22, 1992);
- Helsinki (1992) Convention on the Protection and Use of Transboundary Watercourses and International Lakes (signed by Estonia in 1992);
  Ramsar (1971) Convention on Wetlands of International Importance Especially as Waterfowl Habitat (ratified on Apr. 21, 1993);
  Washington (1973) Convention on International Trade in Endangered Species of Wild Fauna and Flora (ratified on Oct 21, 1993);
- Berne (1979) Convention on the Protection of European Wildlife and Natural Habitats (entered into force in Estonia on Aug 31, 1993);
- Gdansk (1973) Convention on Fishing and the Conservation of the Living Resources of the Baltic Sea and the Belts (ratified on Feb. 25 1993);

Additionally, Estonia has signed bilateral contracts in the field of environmental protection with some of the countries in Europe (e.g. Nordic countries, Latvia, Lithuania, Poland, Germany etc.).

Estonia is also the party to the Convention on Protection of the World Cultural and Natural Heritage (1972) since 27.01.1997.

The accession process of Estonia with the European Union has accelerated the process of integrating Estonia into EU environmental (including nature conservation) infrastructure. The approximation of legislation has already started. The completion of the CORINE biotopes survey and the preparations for the NATURA 2000 work are one of the examples. Participation in the Pan-European Biological and Landscape Strategy process enables Estonia to keep pace with the regional development in biodiversity and landscape protection.

3. Further action

In 1997 a National Environment Strategy was approved by the Parliament It identifies the policy goals for the maintenance of landscapes and biodiversity for up to the year2000 and further until the year 2010.

The main goal is to ".. ensure the preservation of viable population fo local plant and animal species, natural and semi-natural communities and landscapes typical for Estonia."

Tasks bv the vear 2000 include:

- to improve protection of plant and animal species, their habitats and landscapes in accordance with revised legislation, bearing in mind international agreements and European Union requirements;

-to improve the existing network of natures reserves in accordance with EU recommendations in order to ensure protection of ecosystems;

- to establish a network of forests protected according to nature conservation criteria thus ensuring preservation of all natural and semi-natural forest types and communities.

Tasks bv the years 2010 include:

-to establish a network of nature reserves corresponding to EU recommendations where zones of strict protection (strict nature reserves and special management zones) would cover up to 5% of the terrestrial area of Estonia

In 1997 an EU Phare project "National Environmental Action Plan for Estonia" (NEAP) was initiated. It elaborates further the policy goals and tasks provided in the strategy and translates them into concrete actions. Altogether 110 single actions have been identified for biodiversity needs by the action plan (divided to short-term actions [1998-2000] and long-term actions [2001-2006] correspondingly).

As the biodiversity is relatively well preserved in Estonia, majority of the actions listed have a precautionary and inter-sectoral character to avoid the degradation of the biodiversity by fast-developing economicand social sector. According to the applied prioritisation criteria in NEAP, the priority action in the biodiversity and landscape protection are (Table 5):

-the reform of management system: advancement of monitoring system, physical planning and institutional framework (including the network of protected areas);
-further development of legislation:
- elaboration of concepts as a bases for management procedures for protection and sustainable use of species, communities, habitats, and landscapes;
-elaboration and implementation of management plans for protected areas and recovery plans for endangered species and habiik;
- systematising of existing information on biodiversity and invent-ortes: inventories of species richness, communities, habitats etc.;
- advancement of education and training, public awareness: publication of textbooks for secondary schools, universities, training of resource managers, conservation managers, landowners etc. ;
- applied research on biodiversity;
-development of sectoral and inter-sectoral biodiversity strategies: elaboration of strategies for all sectors, foundation of coordinating inter-sectoral committee *for* elaboration and implementation of the strategies;
-obligations stemming from international treaties: Washington Convention, Ramsar Convention, Bern Convention, Paris Convention
- approximation of the existing nature conservation system to the European Union requirements.

Envimnmental action plans enwmpasses also the financial plan. According to that the costs of short-term actions on biodiversity and landscapes equal half a billion Estonian. It forms a 7% of the overall financial requirements for short-term actions in NEAP. The cost of actions are higher in the next four priority goals reduction of environmental impacts of Energy sector, Improvement of air quality, Waste management Surface water protection.

The evaluation of the human resources needed for the actions on biodiversity and landscapes reveals that the enforcement actions on biodiversity and landscapeswill require more that 300 full-time specialists, which forms more than 33% (the highest among other policy goals followed by "Clean up of past pollution" with 16.6%) of the overall human resource requirement for the implementation of NEAP. This surprisingly high need of human resources clearly depicts the rapid changes underway in the maintenance and management of biodiversity and landscapes in Estonia.

Typology of actions listed in NEAP in biodiversity and landscape protection show that main efforts aredesigned for management and organisation of the current system (Table 5). 38 activities could be related to management issues. However, it should be noted that many of the activities could be listed under other types as well.

Table 5. Types of activities designed by National Environmental Action Plan in biodiversity and landscape protection

Type of action	Number of actions
Institutional improvement	5
Educational improvement, public awareness	18
Scientific and applied research	4
Improvement of legislation	6
Investments	3
Information collection (inc. inventories)	14
Improvement of management (inc. conceptual bases for management)	38
Inter-sectoral activities	11
Approximation to European Union requirements	8
International obligations	6

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Appendix 1. List of protected areas with newly established protection rules due 21 April 1998

Protected area	Area (ha)	Sea area (ha)	Date of (re)- establishment
National Parks	**178532**		
Karula	11197		1995
Soomaa	37 169		1995
Vilsandi	18 155	10 500	1996
Lahemaa	112011	47096	1997
Nature Reserves	**131598**		
Alam-Pedja	26 000		1995
Haanja	16867		1995
Niguia	4651		1995
Endla	8100		1997
Matsalu	48 640	26 200	1997
Paadenunne	340		1997
Muraka	12500		1997
Ohepalu	4500		1997
Marimeka	4600		1997
Viieristi	400		1997
Tahkuna	1700		1997
Pihla-Kaibaldi	3300		1998
Nature **parks(protected** landscape)	91595		
Haanja	16867		1995
Naissaare	1856		1995
Osmussaare	494		1996
Paganamaa	1107		1996
Üügu	6		1996
Ohesaare	4.5		1996
Kisejärve	469		1996
Paganamaa	810		1996
Väike-Palkna	23		1996
Sarve	600		1996
Ontika	1300		1996
Smolnitsa	242		1996
Järvevälja	586		1996
Kivinõmme	380		1996
Otepää	22300		1997
Viitna	310		1997
Loodi	3500		1997
Viljandi	230		1997
Nõva	1440		1997
Põhja-Kõrvemaa	12000		1997
Oru pargi	70		1997
Luidja	50		1997
Tudusoo	2790		1997

Piusa River Valley	1200		1997
Agusalu	9000		1997
Kellavere	70		1997
Navesti	180		1998
Papioru	4		1998
Muti	83		1998
Kullamäe	5.5		1998
Varesemägede	23		1998
Läänemaa Suursoo	9650		1998
Käina Bay-Kasari	3200		1998
Õisu	520		1998
Kukka	160		1998
Rattagu	65		1998
Programme areas'			
West Estonian Archipelago Biosphere Reserve	1,560,078	1,160,078	1990
Pandivere Hydrological Reserve	350,000		
Total *	401725	1,243,874	

*The area of programme areas is not included in total as they include reserves and areas without considerable management restrictions.

Appendix 2. Categories of protected areas

National Parks

zones: strict nature reserves, special and limited management zones:

establishment procedure: will be established by the Parliament:

objective: is a protected area of special national importance for preservation, protection, investigation, and promotion of awareness of the natural and cultural inheritance; it includes ecosystems, examples of biological diversity, landscapes, national culture, and is subject to sustainable nature management.

Nature Reserves

zones: strict nature reserves, special and limited management zones:

establishment procedure: will be established by the procedure of the Government of Estonia[Government Decree No462 of 15.12.1994; No 172 of 18.06.1996]).

objective: is an area protected for its nature conservation or scientific value set aside for the preservation, protection, and investigation of natural processes and endangered species or protected plants, animal and fungus species and their habitats, inanimate objects, as well as landscapes and natural monuments.

Protected landscapes **(landscape reserves)**

zones: special and limited management zones;

establishment procedure: will be established by the procedure of the Government of Estonia[Government Decree No 462 of 15.12.1994; No 172 of 18.06.1996]).

objective: **is an** area of natural or cultural heritage value which is rare or typical for Estonia, and is established for nature conservation, cultural or recreation purposes.

Programme areas (may contain natures reserves)

zones: strict nature reserves, special and limited management zones; general management zones;

establishment procedure: will be established by the procedure of the Government of Estonia[Government Decree No 462 of 15.12.1994; No 172 of 18.06.1996]).

objective; is managed under a local, national or international programme for monitoring, investigation or education purposes as well as combining conservation and management of natural resources

Appendix 3. Categories of protected species

Category 1

Listing: will be listed by Parliament

Restrictions: It is prohibited to cause any damage to the species or their habitats, nesting, breeding and maturation sites and migration routes; the use for scientific of educational purposes require special permits from official appointed by the minister of environment(Gov. Regulation . No 172 (18.06.1996)); investigation, marking, improvement of living conditions, extraction from natural environment, artificial reproduction, keeping and breeding in non-natural (artificial) conditions; taking photos, making films or recording voice in nesting and breeding sites, is forbidden except under license issued by official appointed by the *minister* of environment(Gov. Regulation . No 172 (18.06.1996)); publication of the information concerning the exact site of growth or habitat of a species is prohibited where the subject might be endangered as a result of this. Temporary protection zone(50m diameter for plants, 200m diameter for animals) may be established for two months around the newly discovered site with all economic activities prohibited.

Category 2

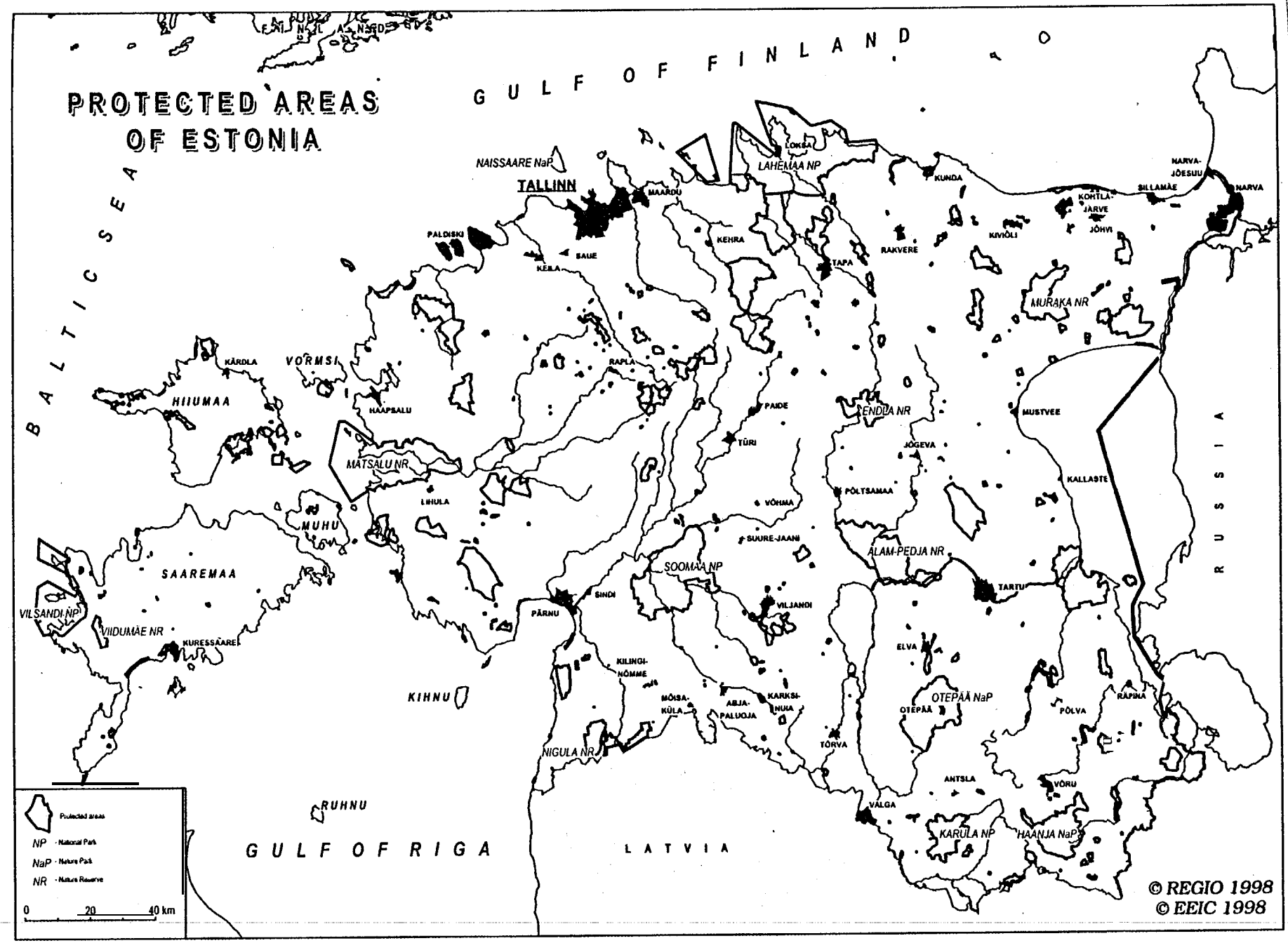
Listing: will be listed according to the procedure established by the Government of Estonia and approved by the Government.

Resrricrions: Picking of plants and fungi; purchase, sales another movements of these, and destroying or causing damage to their sites of growth to an extent which endangers the survival of the relevant species at this site, is prohibited: catching, keeping, killing, chasing, causing a disturbance, likely to endanger animals species; purchase, sales and other movements of these, and destroying of or causing damage to their nesting and other permanent living sites to an extent which endangers the survival relevant species at this site, is prohibited; special permits for performing the listed above activities for scientific or educational purposes are issued by official appointed by the Minister of Environment (Gov. Regulation. No 172 (18.06.1996))

Category 3

Listing: will be listed according to the procedure established by the Government of Estonia and approved by the Minister of Environment(Gov. Regulation. No 172 (18.06.1996))

Resrricrions: Causing damage to, picking in natural sites, and selling of plants and fungi is prohibited; catching, keeping, killing, chasing, causing disturbance likely to endanger animals and purchase, sales and other movements of these, is prohibited; special permits for performing the listed above activities for scientific or educational purposes are issued according to the procedure established by the Government of Estonia(Gov. Regulation No 462(15.12.1994); Gov. Regulation. No 172 (18.06.1996); Environment Minister's Reg. No 18)


PROTECTED AREAS
OF ESTONIA
GULF OF FINLAND
BALTIC SEA
NAISSAARE NaP
TALLINN
MAARDU
LAHEMAA NP
LOKSA
KUNDA
NARVA-JÕESUU
SILLAMÄE
NARVA
KOHTLA-JÄRVE
JÕHVI
KIVIÕLI
RAKVERE
KEHRA
PALDISKI
KEILA
SAUE
TAPA
MURAKA NR
KÄRDLA
VÕRMSI
RAPLA
HIIUMAA
HAAPSALU
PAIDE
ENDLA NR
MUSTVEE
TÜRI
JÕGEVA
MATSALU NR
LIHULA
PÕLTSAMAA
KALLASTE
VÕHMA
MUHU
SUURE-JAANI
ÄLAM-PEDJA NR
SOOMAA NP
SAAREMAA
TARTU
SINDI
VILJANDI
VILSANDI NP
PÄRNU
VIIDUMÄE NR
KURESSAARE
ELVA
KILINGI-NÕMME
KIHNU
MÕISA-KÜLA
ABJA-PALUOJA
KARKSI-NUIA
OTEPÄÄ NaP
OTEPÄÄ
PÕLVA
RÄPINA
TÕRVA
NIGULA NR
ANTSLA
VÕRU
VÄLGA
RUHNU
KARULA NP
HAANJA NaP
GULF OF RIGA
LATVIA
RUSSIA
Protected areas
NP - National Park
NaP - Nature Park
NR - Nature Reserve
0
20
40 km
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