

# NATIONAL REPORT ON BIOLOGICAL DIVERSITY

## LATVIA

DABAS DAUDZVEIDĪBA



L A T V I J Ā

# NATIONAL REPORT ON BIOLOGICAL DIVERSITY: LATVIA

**Ministry of Environmental  
Protection and Regional  
Development**



United Nations Development Programme

The preparation of this document has been supported by a GEF/UNDP grant under contract No: LAT/97/G32

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**Riga, 1998**

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## INTRODUCTION

Biological diversity is one of Latvia's most significant national treasures. For many generations most Latvians have lived in close harmony with nature, a lifestyle which has its roots in pre-Christian times when the people believed in natural deities. Elements and expressions of this attitude towards nature, full of respect and love, can be found in the Latvian Dainas - a unique historical collection of folk verse that bears witness to the peoples' way of thinking and perceiving. It is characteristic in the Dainas that even predatory animals such as wolves and crows are referred to in the diminutive form. It is as a result of these pagan attitudes that Latvia is richly endowed with "noble trees", and rivers, lakes, springs, woods, caves, stones, cliffs etc. . . are also sacred and protected.

Today, nature protection is a much more complex issue. Economic development and fifty years of occupation have left significant indelible marks on the landscape and in peoples' actions and perceptions. This has resulted in the destruction or endangering of many species and biotopes. The preservation of biological diversity is a very high national environmental protection priority. Steps to preserve biological diversity are being taken within the Ministry for Environmental Protection and Regional Development, specific nature protection institutions - reserves, national parks, a biosphere reserve and other specially protected nature areas, local governments, informal and other organisations as well as community interest groups. The National Report on **Biological Diversity** is an important piece of work which is necessary for the future development of nature protection policy in the country. The next important step - development of a biological diversity strategy, involving both economic and other interest groups, has already begun.

I would like to express my deep gratitude to all who have participated in developing this document and hope that they will continue their willingness and energy to further develop policies which will preserve biological diversity.

State Minister of Environmental Protection  
I.Emsis

## BIOGEOGRAPHY OF LATVIA

The nature of Latvia is determined by its geographical location in the western part of the East-European plain and on the eastern coast of the Baltic Sea, between 55° 40' - 58° 05' N latitude and 20° 58' - 28° 14' E longitude, The surface area is 64 589 km<sup>2</sup>. Latvia belongs to a temperate zone, mixed forest subzone (boreonemoral province).

The lithological characteristics are very diverse and change in a North-South direction. In north-western and south-western Latvia, the upper layer of sedimentary rocks is sandstone. In other parts of Latvia, carbonate rocks are typical: dolomite, limestone and gypsum. The depth of quaternary deposits varies from 3 to 10 m, to only 1 m, where the role of these sedimentary rocks on the natural habitats increases in importance. In areas where carbonate deposits lie close to the ground surface, the parent soil is calcareous, which determines the different natural habitats.

The surface topography was much changed during the last glacial period. Glacial deposits and landforms cover most of Latvia, which may be macroforms, smaller hills, depressions, or ridges. The main macroforms are uplands and lowlands. The coastal areas were formed more recently by several stages of the development of the Baltic Sea. The dominating soils are podzolic. The climate is influenced by Atlantic air masses but the inland climate becomes more continental. The average precipitation is 500-800 mm per year. The vegetation period (the average daily temperature above +5°C) begins approximately in 15 April and lasts for 180-200 days. The average temperature in July is about +17°C. The diversity of flora and fauna is determined by the climate differences between maritime and the more continental areas. The borders of the distribution ranges of many plant species intersect Latvian territory.

Presently forests cover 44.6% of the territory of Latvia. 22.4% of the forests are on wet soils, about 20% are on drained forests. High diversity of forest types and mosaic distribution is characteristic. Relatively large areas are occupied by mixed and deciduous stands. The dominating species in 39% of the total forest area is Scots Pine *Pinus sylvestris*, and in 21% - Norway Spruce *Picea abies*. Among deciduous trees, the most common species are Silver Birch *Betula pendula*, Downy Birch *B. pubescens* - dominating species in 28% of forest area, Common Alder *Alnus incana* - 6%, Aspen *Populus tremula* - 3%, Black Alder *A. glutinosa* - 2%, hardwoods (Pedunculate Oak *Quercus robur*, Ash *Fraxinus excelsior* etc.) - 1%. Mature (old) stands, which are particularly important for maintenance of biological diversity, occupy 8% of the total forest area. In general, forests contain a high biodiversity due to different soil and hydrological conditions, as well as to rather large areas where intensive forestry methods have not been applied during the last 50 years.

Mires (together with peat fields) occupy 5.6% of the territory of Latvia. 70% of them are relatively undisturbed by human activities. Raised bogs occupy 42% of the total bog area, transitional mires - 9%, fens - 49%. The largest raised bog in Latvia is the Teici Bog (19 587 ha), and the largest fen area is Peikstulnicas - Salas Fen (7606 ha).

For maintenance of biological diversity, some very important habitats are the semi-natural grasslands, which developed during a long period of human influence. In

most of these grasslands, chemical fertilizers have never been applied; thus they are important biotopes for a number of threatened plant and bird species. It is estimated that semi-natural grasslands in Latvia occupy less than 1% of the territory. They can be found mainly in river valleys and in several areas along the seacoast.

About 300 km, out of approximately 500 km of Latvian coastline, are almost undisturbed by human activities. There still remains many sites with natural dune plant communities, which are extinct in most areas along the Baltic Sea coastline.

Freshwater ecosystems cover 3.7% of the state area. There are 12 436 rivers in Latvia, with a total length of 38 000 km, 2256 lakes with a total area of 1001 km<sup>2</sup> and 796 artificial bodies of water with the total area of 148 km<sup>2</sup>. Artificial canals and ditches add another 65 000 km to the total river length. Most (94%) Latvian rivers are small, with lengths less than 10 km (51% of the total river length). Only 2% of rivers are longer than 20 km, and 1% are longer than 50 km. 16 lakes and 3 bodies of water are larger than 10 km<sup>2</sup>. Several shallow coastal lagoon lakes are particularly rich in biological diversity. They are internationally important wetlands according to the Ramsar convention criteria. Very rare and endangered are mesotrophic lakes with communities typical for oligotrophic waters and which are particularly affected by eutrophication. Ponds of the biggest Latvian fish breeding farms are also important sites for waterfowl during breeding and passage.

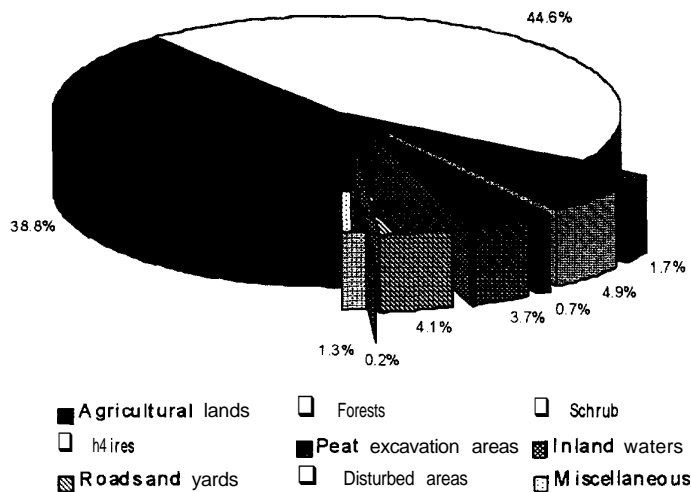


FIGURE 1. Land use in Latvia. Situation in 1997.

Agrocenoses occupy 38.8% of the country's territory. Out of these, 69% are arable lands, 30% are semi-natural meadows and pastures, sown and cultivated grasslands, 1% - orchards. Owing to rather low land use intensity during the last 50 years, as well as to natural conditions (diverse relief and hydrological conditions in relatively large areas), agricultural lands play an important role in the whole spectrum of the biological diversity of Latvia. Agricultural lands provide for the existence of vital populations of White Stork *Ciconia ciconia*, Corncrake *Crex crex* and Lesser Spotted Eagle *Aquila pomarina*. Railroads and roadsides also are important and specific habitats, providing living conditions for a range of animal and plant species.

## HUMAN POPULATION AND LAND MANAGEMENT

In Latvia, fauna, flora, vegetation cover, and ecosystems developed after the end of the last Ice Age, app. 12 000 years ago. Human influence on nature became a significant factor approximately 10 000 years ago; first by using existing natural resources, later by domesticating animals and plants. Human activities created settlements, meadows, pastures, and arable lands. Along with cultivated plants, a complex variety of weeds and adventive species also developed. The number and density of inhabitants fluctuated throughout the centuries, corresponding to the historical situation. The proportion of land managed by humans and natural areas fluctuated with it as well.

In 1996, the human population of Latvia was 2 666 567. The average population density in Latvia is 38.9 individuals per 1 km<sup>2</sup>. About 69% of the population is urban, the remaining 31% living in rural areas. Population density is widely variable between regions, the highest being in Riga, Jelgava and Bauska Districts. one-third of the total population lives in the capital of Riga. Most of the urban population (73.1%) live in cities with a population over 40 000 inhabitants. During the 20<sup>th</sup> century, the population size constantly increased. However, since the end of the eighties, it has leveled out (Figure 2).

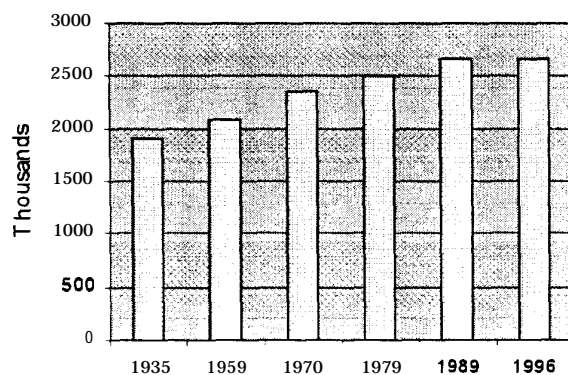


FIGURE 2. Dynamics of human population in Latvia

Before World War II, a high level of agricultural production in Latvia was achieved. Forests covered only 25% of the country's territory. Most of the inhabitants of the countryside lived on farmsteads. During the post-war period, most individual farms were abandoned. Instead, Soviet policy facilitated the development of collective farms. Due to this process, quite different farmland types developed in Latvia, until the end of the eighties. There were regions with large, drained, uniform fields where fertilizers, herbicides and pesticides were heavily used. But areas with more or less mosaic landscape and less intensive land use still remained. In addition, during the last 45 years, large areas of agricultural lands were abandoned - altogether about 2 million hectares. Those areas are now overgrown by scrubs and deciduous trees in different successional stages. These areas now provide a mosaic landscape without considerable human influence. Forest area also increased in Latvia, up to 44% of the country's area. The latest survey of those territories which are important for biological diversity conservation in Latvia showed that the main types of human

activity present in these areas are forestry, fishing, tourism and recreation (Figure 3). This data represents the results of the recently finished CORINE (COoRdination of INformation on the Environment) Biotopes project, designed by the European Commission. The criteria for territory selection are the same as those used in other European countries involved in this project.

Remaining natural habitats and the low management intensity in agricultural and forest lands are the main reasons why Latvia still has large populations of species that are endangered throughout all the rest of Europe, including habitats that are almost extinct in Western Europe and Scandinavia.

Political and economical changes in the beginning of the nineties caused considerable change in the human impact on nature. Due to the land reform, almost all agricultural lands and about half of the forests will become privately owned. The utilization of forest resources has also increased considerably.

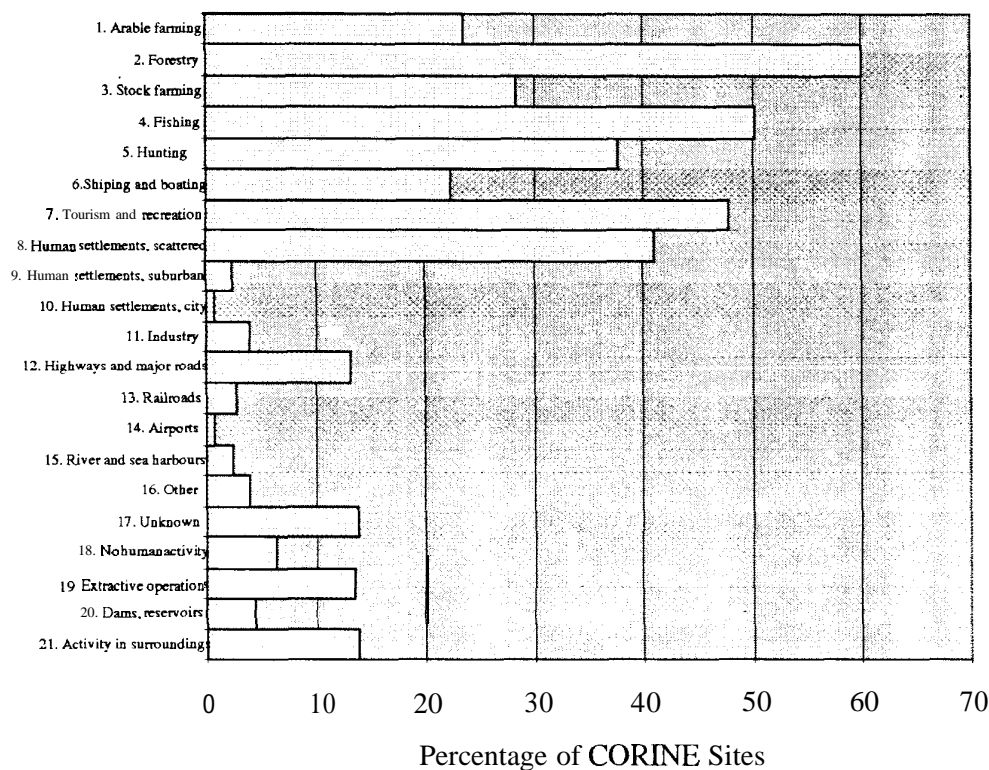


FIGURE 3. Human activities in areas important for biodiversity conservation in Latvia.



## SPECIES RICHNESS AND REDUCTION OF BIODIVERSITY

18 047 animal species have been recorded in Latvia. According to the most recent scientific assessments, there could be more than 30 000 animal species in Latvia altogether, including 20 000 insect species.

The number of bird species (about 320) is determined by migration routes crossing the territory of Latvia. In this perspective, the coastal areas and wetlands, where large concentrations of migrating birds can be observed during migration, play a particular role. During August-September, along the Baltic Sea coast in the SW part of Latvia, large numbers of migrating bats concentrate as well. Table 1 shows the number of wild species in the main taxonomic groups and the number of species included in the Red Data Book (RDB) of Latvia.

TABLE 1. Number of wild species and their status in Latvia

| Taxon                  | Number of<br>described<br>species | Number of<br>additional<br>estimated<br>species | Number of species in the<br>Latvian Red Data Book |
|------------------------|-----------------------------------|---|---|
| <b>FUNGI</b>           | <i>4000</i>                       |   | 38  |
| <b>PLANTS</b>          |                                   |   |   |
| <i>Vascular plants</i> | 1678                              |   | 320   |
| <i>Ferns</i>           | 49                                |   | 23  |
| <i>Mosses</i>          | 497                               |   | 203   |
| <i>Lichens</i>         | 492                               |   | 34  |
| <i>Algae</i>           | 2680                              |   |   |
| <b>ANIMALS</b>         |                                   |   |   |
| <b>VERTEBRATES</b>     |                                   |   |   |
| <i>Mammals</i>         | 69                                |   | 19  |
| <i>Birds</i>           | 320                               |   | 79  |
| <i>Reptiles</i>        | 7                                 |   | 4   |
| <i>Amphibians</i>      | 13                                |   | 5   |
| <i>Fishes</i>          | 95                                |   | 15  |
| <i>Lampreys</i>        | 3                                 |   |   |
| <b>INVERTEBRATES</b>   |                                   |   |   |
| <i>Protozoa</i>        | ~200                              | 140   |   |
| <i>Spongia</i>         | 5                                 |   |   |
| <i>Cnidaria</i>        | 7                                 |   |   |
| <i>Ctenophora</i>      | 1                                 |   |   |
| <i>Nemathelminthes</i> | -450                              | 1500  |   |
| <i>Plathelminthes</i>  | -280                              |   |   |
| <i>Annelida</i>        | 90                                | 350   | 1   |
| <i>Mollusca</i>        | 178                               | 11  | 29  |
| <i>Crustacea</i>       | 280                               | 30  | 2   |
| <i>Arachnida</i>       | >1000                             | 5000  | 4   |
| <i>Insecta</i>         | 15 000                            | 5000  | 131   |
| <i>Myriapoda</i>       | 40                                |   |   |
| <i>Bryozoa</i>         | 8                                 |   |   |
| <i>Linguatulida</i>    | 1                                 |   |   |
| <i>Tardigrada</i>      | ?                                 | 50  |   |
| <b>TOTAL</b>           | 18047                             | 12081   | 907   |

There are several threatened species in Europe, or even globally, whose Latvian population constitutes a substantial part of the global population. Thus, the deterioration of the Latvian population is likely to influence the status of species in the wider region. For example, in the beginning of the nineties, there were 1000 breeding pairs of Black Stork *Ciconia nigra* in Latvia, which constitutes about 10% of the World's population of this species. There are also vital populations of Comcrake *Crex crex*, Lesser Spotted Eagle *Aquila pomarina*, White-backed Woodpecker *Dendrocopos Zeocotos*, Crane *Grus grus*, among mammals - Beaver *Castor fiber*, Otter *Lutra lutra*, Wolf *Canis lupus* and Lynx *Lynx lynx*. There are big colonies and important hibernating sites for several bat species. Protection of these sites is crucial for the conservation of species in a considerable part of their distribution range.

The Gulf of Riga and the Irbe Strait are internationally important waterfowl wintering areas, where the total amount of birds during the autumn-winter period exceeds 2 million individuals. According to recent research data, the Gulf of Riga holds 24% of North and Western Europe's population of Red-throated Diver *Gavia stellata*, 23% of Long-tailed Duck *Clangula hyemalis* (more than 1 million individuals), 36% of Velvet Scoter *Melanitta fusca*, and 15% of Black Guillemot *Cepphus grylle* population.

Regarding fish, the Gulf of Riga's population of Eelpout *Zoarces viviparus*, the biggest population in the Eastern Baltic, should be considered. The Gulf of Riga plays a very important role for the maintenance of this Baltic Sea endemic species. For the Salmon *Salmo salar*, Latvia (basin of Salaca River) is the only natural spawning site in the Eastern Baltic region. Young salmon, bred in Latvian fish farms, make up a considerable part of those needed for the maintenance of Baltic populations.

Population dynamics in plants and animals are closely connected with the dynamics in their habitats. The present status and trends in the biodiversity of Latvia's 5 main ecosystems (habitat groups) are summarised in the overview matrix (Appendix 1). During the last century, probably the most significant changes have happened within the forest areas and agricultural lands. Since the thirties the total area of forests has constantly increased (Figure 4), but the total area of agricultural lands has decreased (Figure 5). In addition, it must be stressed that the most remarkable decrease has been observed in grasslands (Figure 5). All these changes have had an effect on the fluctuations of the whole diversity of organisms and populations.

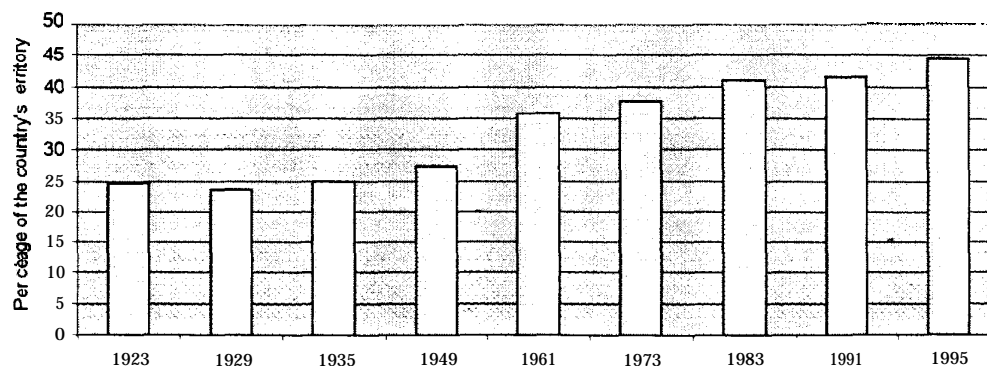


FIGURE 4. Area dynamics of forests in Latvia.

Unfortunately, it is estimated that since the 19<sup>th</sup> century, Latvian fauna and flora have lost several species. This appears to be an alarming sign. This data is summarised in Table 2. This list represents the situation in the eighties and nineties. In mammals, other possibly extinct species are the European Mink *Mustela lutreola* and the Flying Squirrel *Pteromys volans*. *These* species have only had a few recorded sightings during the last decades. As in other neighbouring countries, the disappearance of the European Mink is linked with an introduction of the American Mink *Mustela vison*, which has now been deemed as the most dangerous enemy ever introduced for other mammals and birds.

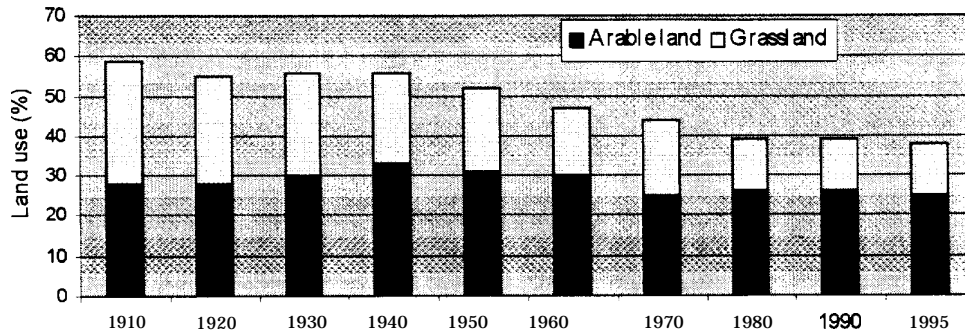


FIGURE 5. Area dynamics of arable land and grassland in Latvia.

One of the most recent examples of bird species extinction in Latvia is the Peregrine Falcon *Falco peregrinus*. In the forties and fifties, 20-30 pairs nested in Latvia. Since then, the number of breeding pairs has substantially decreased and the last breeding was recorded in 1974. The decrease in numbers was linked to poisoning with pesticides. However, it should be noted that some bird species have been estimated as extinct or near-extinct due to our insufficient knowledge about their behaviour and distribution pattern. This seems to be the case with the globally threatened Great Snipe *Gallinago media*, which was considered as nearly extinct, However, new sightings have been appearing during the last years.

During the last 50 years, a sighting of 53 species of mosses has not been reported.

Seventeen vascular plant species have also become extinct during the last 50 years (Table 2). This has been caused by several reasons. Bodies of water from hydroelectric power stations, built in the middle of the 20<sup>th</sup> century on the Daugava River, have flooded unique habitats, causing the loss of the only recorded site for Sandwort species *Moehringia lateriflora* on the very western border of its distribution area. In addition there were isolated localities on the northern and north-westren border of the distribution areas of Kaufmann's Lousewort *Pedicularis kaufmanii*, Wall Germander *Teucrium chamaedrys*, and Hog's Fennel species *Peucedunum cervaria*. *The* unique freshwater tuff scale, a habitat for postglacial relic species Alpine Butterwort *Pinguicula alpina*, has been lost due to rising water levels. Also the only locality for Rosket species *Sisymbrium supinum* on the Lake Kanieris shore has been disturbed by artificial changing of the water level. Drainage works disturbed the only locality of the Fringed Water-lily *Nymphoides peltata* in the River Ziemupe's

mouth. During the last 50 years, Bur-reed species *Sparganium glomeratum*, Ghost Orchid *Epipogium aphyllum*, and Water Tillaea *Tillaea aquatica* have not been found. The decrease in area of wet meadows (Figure 5), due to cultivation or draining, was the main reason for the critical population decrease of the Saxifrage species *Saxifraga hirculus*, Alpine Bistort *Polygonum viviparum*, and Moor-king *Pedicularis sceptrum-carolinum*.

TABLE 2. Species in Category 0 (Extinct species) in the Red Data Book of Latvia

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|                                 |                                 |
|---------------------------------|---------------------------------|
|                                 | <b>MAMMALS</b>                  |
| <i>Phocoena phocoena</i>        |                                 |
|                                 | <b>BIRDS</b>                    |
| <i>Gavia stellata</i>           | <i>Lymnocyptes minimus</i>      |
| <i>Falco peregrinus</i>         | <i>Lanius minor</i>             |
|                                 | <b>FISH</b>                     |
| <i>Accipenser sturio</i>        |                                 |
|                                 | <b>INSECTS</b>                  |
| <i>Ammobiota festiva</i>        | <i>Lytta vesicatoria</i>        |
| <i>Bryodemus tuberculatum</i>   | <i>Lucanus cervus</i>           |
| <i>Carabus intricatus</i>       | <i>Xylocopa valga</i>           |
|                                 | <b>MOLUSCS</b>                  |
| <i>Truncatellina cylindrica</i> | <i>Helicigona lapicida</i>      |
|                                 | <b>VASCULAR PLANTS</b>          |
| <i>Pilularia globulifera</i>    | <i>Swertia perennis</i>         |
| <i>Polygonum oxyspermum</i>     | <i>Nymphoides peltata</i>       |
| <i>Moehringia lateriflora</i>   | <i>Teucrium chamaedrys</i>      |
| <i>Homungia petraea</i>         | <i>Odontites litoralis</i>      |
| <i>Sisymbrium supinum</i>       | <i>Pedicularis kaufmannii</i>   |
| <i>Tillaea aquatica</i>         | <i>Pycnus flavescens</i>        |
| <i>Rubus arcticus</i>           | <i>Cephalanthera longifolia</i> |
| <i>Rubus plicatw</i>            | <i>Epipogium aphyllum</i>       |
| <i>Peucedanum cervaria</i>      |                                 |

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## NATIONAL NATURE CONSERVATION LEGISLATION

### *Introduction and the system*

One of the environmental policy goals of Latvia is to “maintain and protect the current level of biodiversity and landscape characteristics”. It should be added to this statement from the National Environmental Policy Plan that the biodiversity in Latvia is of great importance in the international perspective and should be an important issue in relation to EC-law and the approximation process.

In the constitutional law of 1991 of the Republic of Latvia on “Human and civil rights and duties”, there is the following provision: “The protection of nature, cultural environments, landscapes, historical and architectural monuments and the environment shall be the duty of every individual, the general public and the State”.

General legislation on nature conservation is ensured by the provisions of the Law on Environmental Protection. One of these provisions is to ensure maintenance of natural diversity of the gene fund, habitats and landscape. The law concerns protected areas, species, habitats, environment, natural resources, and protective zones. Article 34 calls for protection of all natural species and habitats in order to ensure biodiversity and natural phylogenesis.

The responsibility for nature conservation on the National level belongs to the Ministry for Environmental Protection and Regional Development (MEPRD), the Environmental Protection department. The tasks of the Department are to develop policies, establish new legislation, carry out work connected with international conventions, and supervise field conservation projects.

Supervision and enforcement at the regional level is carried out by the State Environmental Inspectorate, the Flora and Fauna Division and 8 Regional Environmental Boards. Five administrative authorities have been established for the administration of protected areas. Slitere State Reserve, Teici State Reserve, Ziemeļvidzeme Biosphere Reserve, Kemeru National Park are subordinated to the MEPRD, and Gauja National Park to the Ministry for Agriculture. Regarding hunting, the State Forest Service and Forest and Hunting Inspectorate (under Ministry for Agriculture) are the responsible bodies.

### *International conventions*

The following international treaties directly connected with nature conservation have been ratified by the Parliament of Latvia:

- Convention on Wetlands of International Importance Especially as Waterfowl Habitat, Ramsar, 1971;
- Convention on International Trade with Endangered Species of Wild Fauna and Flora, Washington, 1973;
- Convention on Fishing and the Protection of Living Natural Resources in the Baltic Sea and Coastal Zones, Gdansk, 1973;
- Convention on the Conservation of European Wildlife and Natural Habitats, Bern, 1979;

- Convention on the Protection of the Marine Environment of the Baltic Sea Area. Helsinki, 1974, 1992:
- Convention on Climate Change, New York United Nations General Convention, 1992;
- Convention on Biological Diversity, Rio de Janeiro United Nations General Convention, 1992.

Latvia has joined the HELCOM convention and more importantly has **participated** in the Environmental Committee for Nature. It is aimed at coordinating the efforts of countries in order to ensure maintenance of biodiversity in the Baltic region. The Environmental Committee is established under the Baltic Council of Ministers. It is working on establishing bilateral agreements in nature conservation between Latvia and Estonia, and between Latvia and Lithuania.

Since the Latvian Parliament has ratified the European Agreement in 1995, an overall approximation to the EU legislation has been started. The approximation is scheduled to be finished by the year 2000.

## System of protected territories

### Law on Particularly Protected Nature Territories, 1993.

The goal of this law is to “protect and preserve natural diversity”. Its goals include, “to protect rare and typical ecosystems, habitats of protected species, peculiar and beautiful landscape characteristics of Latvia, geological and geomorphological formations and to ensure scientific research, recreation and education”.

The law applies to all of Latvia. All types of land and water areas are, in principle, subject to protection, if they contain the nature values.

The law provides legal mechanisms and procedures for nature territory protection. Within the environmental legal system, there is a very close connection between legal acts on land use and the Regulations on Territorial Planning. According to the Law on Ecological Expertise, when assessing the location of new enterprises or changes to ongoing facilities, it is important if the place of the location (or existing facility) or the surroundings is a specially protected nature area. Legislation concerning the use and control of chemicals and the legislation on protection against pollution have complementary functions.

- a) The law provides several categories of protected areas – State Nature Reserves (IUCN category I), National Parks (category II), Nature Parks (category V), Natural Monuments (category III), Nature Reserves (IV), Protected Landscape Areas (V), Biosphere Reserves (IX). These categories have different purposes and scopes of protection. The law allocates power to state and local authorities to establish specific protected areas, as well as provides the procedure for their establishment. Information on all protected areas is stored in the register State Cadastre of Protected Areas. Altogether 6.8 % of the country’s territory have been declared as protected areas. Latvia has five State Nature Reserves (Table 3) and two National Parks.
- b) The law sets out the basis for restrictions in each protected territory. These may be called by-laws, including both “general rules” defining the activities permitted and prohibited, and “specific rules” on the protection and use of the territories. Also public access to the area can be restricted. A management plan shall be formed,

- including the administration of protection of the territory and its zonal subdivision.
- c) Protected territories may be state and privately owned. If the territory is privately owned, the law sets out important restrictions and obligations for land owners and users. These have to conform to the use of the land property, according to the **limitations** prescribed for the protected territory. They also have to “carry out protection and maintenance projects in their respective areas”.
  - d) Authorities, financed by state budget or non-profit organizations, may be established for the management of protected territories.
  - e) Traditional sanctions in the form of criminal and administrative liability are regulated in the Criminal and Administrative Law. In addition, the violator may be deemed responsible for restoration operations and for compensation of losses. A special form of sanction is connected to private property rights to land within a reserve. In case of violation of the protection rules, the right to use the land may be suspended and private land expropriated.
  - f) Protected areas may be established by the State or by a local government. If protected areas include private land, the owner or user has the right to demand a tax reduction from the local government for financial losses, resulting from the legal restrictions and obligations. Tax exemption is one form of available compensation. If no agreement can be reached, the owner or user can bring the matter to court.
  - g) The state has last refusal rights to purchase private land in protected territories. It is also possible to expropriate land for nature conservation purposes, according to the Law on Land Use and Survey. Conversely, state land within protected territory may be transferred to private ownership in connection with the land reform, but only if the person “agrees to respect the rules on the protection and use of the protected area and the plan on nature protection”.

In general, the land reform should not weaken existing protected areas.

TABLE 3. State Nature Reserves of Latvia.

| No            | Name         | Year of establishment | Total area (ha) | Area of the strictly protected zone (ha) |
|---------------|--------------|-----------------------|-----------------|--|
| 1.            | Moricsala    | 1912                  | 818             | 112                                      |
| 2.            | Slitere      | 1921                  | 15 037          | 1414                                     |
| 3.            | <b>Griņi</b> | 1936                  | 1457            | 210                                      |
| 4.            | Krustkalni   | 1977                  | 2902            | 446                                      |
| 5.            | Teici        | 1982                  | 19 047          | 4699                                     |
| <b>Total:</b> |              |                       | <b>39 261</b>   | <b>6881</b>                              |

**Resolution on Particularly Protected Nature Objects in the Territory of the Latvian SSR, 1987 (approved by Cabinet of Ministers in 1994).**

The resolution lists the different protected territories, describing the size, year of foundation, location, land users and characteristics of the object and general

rules for protection. An updated summary of this list is given in Table 4. This is the last officially approved list. The new list of protected territories is still in preparation in the Ministry of Environmental Protection and Regional Development. It will include the new protected territories that were investigated in the eighties and nineties. Some changes will be made in the categories of protected areas according to the 1993 law "On particularly protected nature territories". Most of the Complex, Botanical, Bog, Cranberry and Zoological Reserves (Table 4) will fall into one category, Nature Reserves, which corresponds to the category IV "Managed Nature Reserve", according to the IUCN classification.

TABLE 4. Protected Nature Areas of Latvia

| Category of protected territories | IUCN Category | Number | Total area (ha) |
|-----------------------------------|---------------|--------|-----------------|
| State Nature Reserves             | I             | 5      | 39 261          |
| National Parks                    | II            | 2      | 134840          |
| Complex Nature Reserves           | IV or V       | 40     | 41 646          |
| Botanical Reserves                | IV            | 46     | 4367            |
| Bog Reserves                      | IV            | 28     | 26 889          |
| Cranberry Reserves                | IV            | 51     | 21611           |
| Zoological Reserves               | IV            | 15     | 15 870          |
| Nature Parks                      | II            | 11     | 25 602          |
| Protected Landscape Areas         | V             | 5      | 100 018         |
| Biosphere Reserves*               | I x           | 1      | 400000          |

\* 5.2% of its territory is included in categories mentioned above

#### **General rules for protection and management of particularly protected nature territories. Resolution of Cabinet of Ministers, 1997.**

This resolution is aimed at ensuring the preservation of nature and cultural values in protected territories. The regulation states the general restrictions for all protected territories and for particular categories, establishes the procedure for elaboration and approval of individual rules for protection and management plans. The resolution also provides penalties for violation of rules of protected territories.

#### **Legal acts for establishment of particular protected nature territories.**

In addition to the Resolution of 1987, several legal acts have been approved for establishment of protected territories. They are: decision of the Council of Ministers from 1990, No. 25 'On Establishment of Protected Landscape Area Augsdaugava and Nature Park Daugavas loki'; Kemeru National Park law, 1997. Ziemeļvidzme Biosphere Reserve law, 1997.



## *General protection of species and habitats*

### **Resolution on Particularly Protected Nature Objects in the Territory of the Latvian SSR, 1987**

Apart from the list of protected territories, this legislation regulates the protection of threatened species. To some extent, habitats and ecosystems are protected as well.

The resolution is closely connected with the Red Data Book of the Latvian SSR from 1985, worked out by the Latvian Academy of Sciences, Institute of Biology. The species are divided into five categories, following the classification of IUCN: evidently extinct species (0), species that are endangered (2), rare species (II), decreasing (III) and insufficiently known species (IV).

Chapter VI of the resolution deals with specially protected vascular plants, fungi and lichens. It is prohibited to gather and market examples of such species, as well as to carry out “any action that may lead to direct extinction of the specially protected species ... or may change the ecological conditions required for their existence”.

The legal protection of certain plant species includes not only the plants themselves, but also their living conditions which should include the whole ecosystem concerned.

Article VII of the resolution applies to the specially protected wild species, both permanently inhabiting, temporarily found within the territory of Latvia, or belonging to the natural resources of the continental shelf of Latvia.

The protection of game and other wildlife species differs between three categories. As regards the first, rare and endangered species, which are included in the Red Data Book, it is prohibited “to pursue, to catch and exterminate, to keep in captivity, to sell, to destroy their breeding and nesting places, nests and eggs or to interfere with hatching in nests”.

The second category, wildlife species not considered objects of hunting and fishing, may be caught if special licenses are obtained. It is prohibited to destroy or damage their habitat.

The third category includes game and fish that are hunted or caught otherwise. The control is carried out by the hunting and fishing legislation.

Article VII 3 provides for the issuing of licenses to acquire specimens under specific conditions when human health or safety is in danger or for a scientific reason. Licenses are issued by the MEPRD.

### **Hunting Act, 1995 and Hunting Regulations, 1995**

The goal of the hunting legislation is to regulate game management in Latvia.

The scope of the law is all “hunting resources” in Latvia, including all animals in Latvia subject to hunting. The Hunting Regulations provide a full list of the animals subject to hunting. Only listed species may be subject to hunting.

The function of the legislation is to control the hunting practices, as regards the number of animals to be killed, hunting seasons and the methods of hunting. The law is closely connected with the other legislation on species protection (mentioned above) and with all the statutes of importance for the preservation of biodiversity.

The law requires a “Hunter’s certificate”, a main document giving the right, in principle, to hunt (in all of Latvia), to acquire hunting weapons and to receive the hunting permits. The certificates are issued by the State Forest Service. Another precondition for hunting is to have access to land and contracts with owners of the hunting rights.

A permit is required in addition to the certificate. Hunting resources are divided into two main categories. For limited resources, a hunting permit is required, even for the hunting of one individual. For unlimited resources, the seasonal hunting permit is required. The permit specifies the maximum amount of animals to be killed and also other conditions of hunting.

As regards animals that are not subject to hunting from the list in the Hunting Regulations, there is a possibility in exceptional cases for MEPRD to issue a special permit for one hunting occasion.

It is an obligation to notify the State Forestry Service before commencing the hunting.

Hunting Regulations also provide time limits for the hunting period for particular species, which takes into account their breeding season. Exceptions from these rules must be signed by State Forest service and the MEPRD. Also, allowed weapons and other tools are listed. All tools not listed are prohibited.

Supervision and administration of hunting and protection of hunting resources is the responsibility of the state, carried out by the State Forest Service, primarily, and the MEPRD. The State Forest service supervises all hunting territories, but also the MEPRD institutions, i.e. the regional boards shall control and act against illegal hunting. The land owner or user also has a responsibility to control hunting on his territory.

### **Fishery law, 1995.**

Fish resources and their use are subject to the Fishery law. It is stated that fish resources are all fish in inland waters, territorial sea waters of the Republic of Latvia and economical zone of the RL. The Republic of Latvia has sovereign rights to catch, utilize, research, maintain and breed them. Fishing is licensed in public waters, angling is controlled by an anglers license (except children under 16 and persons over 65).

Administration of fish resources is under the administration of the-Ministry for Agriculture, State Fishery Board. Control functions are carried out by the Regional Environmental boards and the Sea Environmental Board.

There are important legal acts which regulate species of fish and invertebrates-subject to fishing, legal tools for fishing, seasons and territories for fishing. These include the decisions of the Cabinet of Ministers regulating fishing: Fishing rules for Inland waters of the Republic of Latvia, 1991, On Fishing in Territorial Waters, Economic Zone and Gulf of Riga of the Republic of Latvia, 1994, Sport Fishing (angling) Rules, 1997.

### **Law On the Management and Use of Forest Resources, 1994, and On the Use of State Forests, 1995.**

The goal of the law “On the Management and Use of Forest Resources” is to ensure protection of forests as an ecosystem, to regulate management and utilization of forest, and to protect the rights of forest managers and users. The basic principle in forest management is sustainable use. This means using forest resources in volumes which provide for the biodiversity, productivity, and recovery ability of forests for today and into the future.

All forests are divided into three management categories: I - protected forests (State Nature Reserves, National Parks, Nature Parks, Managed Nature Reserves, antierosion forests), II - restricted forests (Protected Landscape Areas, green zones of cities and other forests important for environmental protection), III - commercial forests. Management plans are created for every forestry district. Cutting limits are approved every year for state forests. Currently, approximately 60 % of Latvian forests are state owned.

The law allows for the establishment of specially protected forest parcels for protection of listed animal and plant species and habitats.

Also very important are the Rules of the Cabinet of Ministers ‘On Including Forests in Forest Categories and Specially Protected Forest Areas’, 1994, ‘The Rules on Aforestation’, 1995, ‘On Environmental Impact Assessment’, 1996, which oblige evaluation of all forest management plans and ‘Regulations on Final Felling’ and ‘Regulations on Intermediate Felling’, both in 1997.

### *Integrated legislation*

#### **Law on Protective Zones, 1997**

Legal acts on protection of land around the Baltic Sea coast, watercourses and bodies of water have been in force since 1987. In 1997, a new law was accepted.

The coastal protective zone of the Baltic Sea and the Gulf of Riga was established to reduce the effect of pollution, retain the protective functions of the forest, prevent development of soil erosion, protect seaside scenery, and protect natural resources of the seaside and recreational resources. It is divided into a 300 m zone landwards from the mean tide line and 300 m zone seawards, and a restricted terrestrial belt up to 5 km. Restrictions ensure free access to the sea coast and restrictions on building, drainage, clear cutting, and transformation of forest land into agricultural land or for mining operations. Exceptions are allowed only after a positive evaluation from an impact assessment.

The protective zones of bodies of water and water courses are established in order to reduce the negative impact of pollution, to prevent soil erosion and to retain the scenery characteristics of the region. The minimum width is determined in accordance with the length and size of rivers or lakes and differs from between 500 to 10 meters. There are similar restrictions for the sea coast.

#### **Territorial Planning Regulation, 1994.**

This regulation establishes procedures for planning and determines responsibilities and general provisions. In accordance with it, all levels of planning

have to take into account protected territories and their rules. Also in all new legal acts concerning nature protection territorial planning, it is considered as a serious tool for implementation.

**Environmental Impact assessment**

Environmental Impact assessment in Latvia is regulated by the 1990 law “On the State Ecological Expertise”. The law provides the procedure for assessing projects which may have significant impact on the environment. When assessing projects, the legal acts for nature conservation must be considered. The Board for State Ecological Expertise, which is a subordinate institution to the MEPRD, is responsible for carrying out the procedure. A new law On Environmental Impact Assessment, which has recently been drafted, will correspond to the EU directives.

## BIODIVERSITY RESEARCH AND MONITORING

The Environmental Consulting and Monitoring Centre (ECMC) is responsible for the institution of the management of biodiversity, landscape and related monitoring programmes. The Monitoring Commission was established in March 1997 to coordinate environmental monitoring programmes and to exchange information among different ministries.

It is difficult for the ECMC to coordinate biodiversity programmes because of their complexity and because biodiversity research institutions are not subordinated to the MEPRD. The MEPRD expects to include in the state monitoring programme only those programmes implemented by MEPRD subordinated institutions. The other programmes are seen as the **sectoral** programmes, financed by **sectoral** ministries. Specifically this refers to the Ministry of Education and Science (University of Latvia, University of Agriculture of Latvia and scientific institutes), and the Ministry of Agriculture (agriculture, fishery and forestry institutions).

Financing sources:

- limited state budget to support the single monitoring programmes (MEPRD);
- limited part of state budget of **sectoral** ministries used for monitoring (agriculture, forests);
- research grants for programmes, projects, surveys;
- Latvian Environmental Protection Fund, resources available starting from 1997, the income of Fund is derived from taxes and penalties from resource use;
- a significant role of **NGOs**, most importantly the Latvian Fund for Nature, Latvian Ornithological Society and others, supported mainly by foreign donors.

The different constituent parts of biodiversity are monitored by different weakly interrelated institutions. Some overlap of programmes still exists. **NGOs** have also played a significant role. It was proposed that the Biodiversity Information Centre should be established and undertake the responsibility to coordinate biodiversity monitoring and research programmes in Latvia. This proposal is still under discussion.

Although an overall system for biodiversity monitoring has not been established in Latvia, there are a number of projects or programmes (Appendix 2), which could be regarded as parts of a nature monitoring scheme. Data is available from about 55 projects: 43 monitoring projects, 7 surveys and 5 programmes of “unclear” nature. Only seven monitoring projects address habitats or communities. The majority, 36 projects, are concerned with species or taxonomic groups of species. Birds, with 15 projects, are the most widely monitored group, followed by invertebrates (10 projects). Mammals are objects for 8 monitoring projects, while the amphibians/reptiles (3 projects) and vascular plants (1 project) are covered quite moderately. There are no special monitoring projects on fungi, lichens and mosses.

The scientific studies, which are important to determine the theoretical basis and practical actions for conservation of biodiversity, can be divided into 3 levels: genetic, species and ecosystem. Though the state financing has been reduced to a critical minimum since 1990 and studies have been significantly reduced, the most important studies and laboratories (groups of investigators) have remained.

The most important scientific institutions which are working on the genetic level are the Institute of Biology (plant genetic), the Institute of Forest Sciences "Silava" (tree genetics), the Faculty of Biology, University of Latvia (genetics of microorganisms), the Institute of Scientific Studies in Cattle Breeding and Veterinary and Agricultural University of Latvia (breed genetics of domestic animals).

The scientific studies and experiments in conservation and improvement of cultivated plants and domestic animal breeds are very important. They are being conducted in the Agricultural University of Latvia, the Institute of Scientific Studies in Cattle Breeding and Veterinary, the Institute of Scientific Studies in Crop-growing, the State Plant Selection Stations and the Cattle Breeding Experimental Stations. The national system of conservation of genetic plant resources has developed since 1993. The data base on varieties and existing collections has been created. The gene bank of varieties of cultivated plants is in the process of establishment as well. The coordinated system for breed descriptions is being developed within the Baltic states.

The faunistic and floristic overviews are still among current tasks in several taxonomic groups. The new issue of the Flora of Vascular Plants is under preparation by the Laboratory of Botany (Institute of Biology). The first floras of mosses and woody plants, Atlases of Mammals, Reptiles and Amphibians are being prepared. Studies of the situation of endangered species are done in the Faculty of Biology (Museum of Zoology, the Departments of Zoology and Genetics, and Botany and Ecology) University of Latvia, the Institute of Biology (the Laboratory of Ornithology and the Laboratory of Botany), the Laboratory of Ecology of Riga Zoo. The programs of the Latvian Fund for Nature and Latvian ornithological Society have been of special importance since 1990 (Black Stork, endangered woodpeckers, Comcrake, White Stork, Osprey, artificial nests for the large eagles, Otter, bats).

Scientific studies on the level of separate habitats and ecosystems are done in the Institute of Biology (Laboratories of Ornithology, Botany and Bioindication), the Faculty of Biology, University of Latvia, Latvian Fund for Nature (Peatland Inventory, Vegetation of Dunes, Flora and Fauna of the Coastal Lakes, Forests, etc.). Several complex programs need to be mentioned which during the last years were implemented by the Latvian Fund for Nature. These involved the leading specialists of various fields: Kemeru National Park, Sustainable Management of Coastal Wetlands, Conservation of Biodiversity in Agricultural Lands. These projects were based on complex studies and assessments. They dealt with sustainable development plans, providing recommendations for regional development and they intended to involve local people in the process of maintenance of biological diversity. The investigations financed by the State Science Council are listed in Appendix 3.

## BIODIVERSITY INFORMATION MANAGEMENT

The information on biological diversity characteristics on different levels (genetic, species, ecosystems) exists in data bases, project reports and scientific publications. The data holders are both state and non-governmental institutions. The general problem is that only part of the data bases are computerized and, in many cases, it is difficult to compare and integrate them. The level of standardization, completeness of the data, geographical grid, and employed software differs from one research program to another.

Besides the ordinary data bases, the GIS-linked databases have been developed and their role in species and habitat distribution analysis is growing. The best example is the CORINE Biotopes database (completed in 1997 by the Latvian Fund for Nature). This is the most recent and complete database on valuable nature territories for biodiversity conservation. This database could be used to compare information among the different regions of Latvia as well as the rest of Europe.

The main holder of data bases is the Latvian Environment Data Center, subordinated to the Ministry of Environmental Protection and Regional Development. Its main tasks are:

- to establish an Environmental Data and Information System and to manage environment quality data by means of development of common software for data processing;
- to compile and process environmental data;
- to coordinate the work of the environment quality testing and to develop the common environment pollution control system;
- to establish the analytical testing methodology by means of working out the volume of environment pollution analytical methods that are officially accepted by and compulsory for the Republic of Latvia;
- to provide supervision, accreditation and intercalibration of the laboratories dealing with environment quality analyses;
- to conduct the analyses of the most complicated polluting sources.

The main data bases concern: water protection (Annual State Statistical Report "Z-Water"; Permissions for Water consumption; Waste Water Analyses; Register of Lakes), air protection (Annual State Statistical Report "2-Air"; Data on Greenhouse Gases; Annual State Statistical Report "4-KP"; Radioactive waste), terrestrial problems (Protected plant species; Noble Trees in Latvia; Latvia Forest Reserves; Mating Places and Nests of Rare and Protected Bird Species; Account and Use of Animals for Hunting; Mineral Deposits in Latvia; Annual State Statistical Report "Nr.3-BA"; Waste Dumps in Latvia; Particularly Protected Natural Territories; Agreement for Notices Regime in Special Protection Area) and miscellaneous (Reports of Regional Environment Boards, Accidents and Limit Registrations of Activities of Enterprises; Assessment of the Pollution of Beta Radioactivity; Review of Snow Pollution; Watersheds of Latvia; Enterprises and Organizations in Latvia; Bibliography of Analytical Methods).

Spatial data bases include: The Digital map of Latvia (Scale 1:500 000); The Digital map of Olaine (Scale 1:10 000); The Digital map of Latvia (Scale 1:200 000); The Soil Digital map of Latvia (Scale 1:400 000).



## MANAGEMENT PLANS FOR TERRITORIES, SPECIES AND HABITATS

Latvian legislation provides a legal basis for the creation of management plans for all protected territories. Although Latvia has a rather large number of protected territories, an establishment of management plans for all protected territories has recently been started. Table 5 provides a list of those territories whose management plans have been created recently. Management plans have been prepared for territories of different conservational purposes. The smaller territories (Table 5) are usually created for the protection of certain species. In this case, these plans can be considered also as action plans for certain species preservation. Larger sites usually are concerned with the protection of non-fragmentated habitats and ecosystems which are be very crucial for different species and communities.

TABLE 5. Recent management plan projects carried out in Latvia.

| Region                   | Territory  | Area covered<br>(ha) | Year              |
|--------------------------|--|----------------------|-------------------|
| Kuldiga                  | Riezupe Nature Park  | 418                  | 1996              |
| Saldus                   | <b>Satini</b> fish-pond complex  | 625                  | 1996              |
| Ventspils                | Natterjack Toad site in Puze   | 15                   | 1996              |
| Talsi                    | Talsi hilly landscape  | 2827                 | 1996              |
| Dobele                   | Natterjack Toad site in <b>Garaiskalns</b>                               | <b>34,9</b>          | 1996              |
| Bauska                   | Fire-bellied Toad site in <b>Islice</b>                                  | <b>0,5</b>           | 1996              |
| Dobele                   | Lakes Zebrus and Svetes  | 928                  | 1996              |
| <b>Riga</b>              | Coastal Nature Park  | 1629                 | 1996              |
| Limbazi                  | Randu coastal meadows  | 198                  | 1996              |
| Madona                   | <b>Gaizinkalna</b> Nature Park   | 1500                 | 1996              |
| Gulbene                  | Pededze oak stand  | 22.2                 | 1996              |
| Rezekne                  | Great Liepu Hill   | 45                   | 1996              |
| Kraslava                 | Piloru oak stand   | 19.6                 | 1996              |
| Preili                   | Great Pelecares bog  | 4546                 | 1996              |
| Tukums                   | Cuzu mire  | <b>131,2</b>         | 1997              |
| Tukums                   | Plienciems dune  | 51                   | 1997              |
| Rezekne                  | Lake Adamovas with landscape   | 441                  | 1997              |
| Jekabpils                | Klaucanu and Priekulanu lakes<br>(record site of <b>Trapa natans</b> )   | 205.3                | 1997              |
| Daugavpils,<br>Kraslavas | Valley of River Daugava: Daugavas Loki<br>Nature Park                    | 10500                | 1997              |
| Tukums                   | Lake Kanieris  | 1130                 | 1997              |
| Tukums, Talsi            | Integrated Coastal zone Management Plan<br>for Engure-Kanieris Task Area | 72800                | 1996              |
| Madona                   | Teici State Reserve  | 19047                | 1996              |
| Talsi                    | Slitere State Reserve  | 15037                | Under preparation |
| Liepaja                  | Lake Pape and Nidas Bog  | 27300                | 1995-1997         |
| Madona                   | <b>Krustkalni</b> State Reserve  | 2902                 | 1997              |

## **BIODIVERSITY EDUCATION**

### **Schools and Universities**

General environmental education in schools starts with Class 1 (age 7 years) as 'Studies of Surroundings'. However, not all primary schools have this subject. More specific and biodiversity-related subjects appear starting with Class 5 (age 11 years): botany, geography and zoology. In secondary school, the most biodiversity-related subject is General Biology, where the main issues include ecology and genetics.

Higher education in the field of nature research, protection and management is offered by several universities: University of Latvia (Riga), University of Agriculture (Jelgava), Daugavpils Pedagogical University and Liepaja Pedagogical University. In addition, the Centre of Environmental Science and Management (University of Latvia) offers a postgraduate masters programme in environmental management. These universities provide Latvian environmental institutions with qualified staff.

### **Public awareness development**

Several governmental and non-governmental organizations, as well as some private companies, are active in the production of informative materials and the organization of lectures and campaigns to increase public awareness on biodiversity conservation issues. The most important state organizations in the education sector are:

- Riga Zoological Garden
- Administrations of protected areas (Gauja National Park, States Reserves Slitere and Teiči, North Vidzeme Regional Nature protection complex)
- Faculty of Biology, University of Latvia
- Farmers Consultancy Center

Non-governmental organizations whose activities are important for education and public awareness concerning biological diversity are the following:

- Latvian Fund for Nature
- Latvian Ornithological Society
- WWF programme for Latvia
- Children's Environmental School
- Coalition Clean Baltic (Latvia)
- Environmental Protection Club
- Ecological Center, University of Latvia
- Latvian Association of Forest Owners and Managers

Important printed materials for education on biological diversity issues were also produced by the private publishing company Gandrs.

However the amount of information on the importance of biological diversity is insufficient in comparison to the information on other environmental problems. The state program for education in schools concerning the environment and nature protection problems is still lacking. There is also no strategy for the general ecological education of society. This problem becomes particularly important due to the fact that in the course of land reform many people are receiving ownership of forest and agricultural lands. They begin to use the natural resources without necessary knowledge on sustainable methods and the importance of biodiversity protection. Improvement in public awareness was a recent project of the Environmental Film Studio. It provides regular environmental programmes on national television.

## FINANCIAL CAPACITY

A sufficient financial base is a prerequisite for successful implementation of biodiversity policy and special conservation measures. For example, the guarding and management of specially protected territories is impossible without educated and well equipped staff of the State Environmental Inspectorate and the Regional Environment Boards.

We must be aware that protection of the existing biological diversity and improvement and implementation of the sustainable development concepts will need considerably less funds than would be necessary for the restoration of degraded biotopes, populations of wild plants, and animal species in the future.

It is difficult to estimate an exact financial amount spent on biodiversity conservation and research projects each year because different programmes are carried out by a number of state, local municipality and non-governmental institutions., In addition, there is also a considerable amount of work carried out on a voluntary basis and this usually remains unknown to the wider public and statistics.

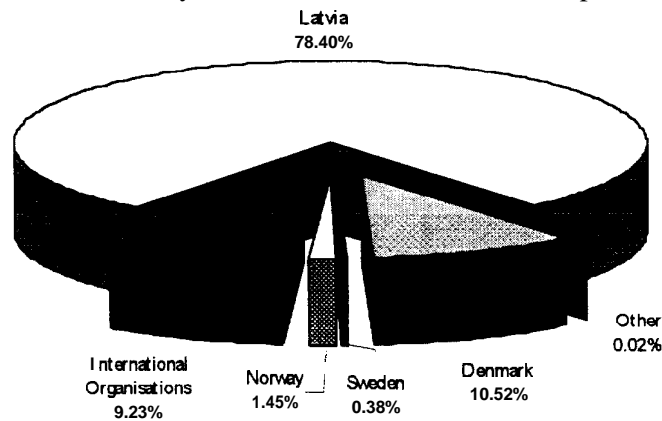


FIGURE 6. Financial sources for biodiversity conservation in Latvia in 1996.

The main sources of financing are the state budget, the Latvian Environmental Protection Fund, bilateral programmes and international funding. The statistics of 1996 show that 685 167 Ls (1 181 322 US dollars) have been spent in total. The main contributors were the state budget ( 537 232 Ls), Denmark (72 103 Ls) and international organisations (63 266 Ls). Figure 6 shows the contribution proportions of each country or other source. However, it must be noted that this figure includes only the budgets of the Ministry of Environmental Protection and Regional Development and the State Nature Reserves. The budgets of the Gauja National Park and biodiversity-related non-governmental organisations are not included, because it was not possible to obtain representative data.

An analysis of the finances available for biodiversity conservation through the years shows that the role of the Latvian contribution (state budget mainly) has constantly increased. It has been noted that most of all the Regional Environmental Boards and local municipalities experience lack of finances. In these institutions only a few (or none at all in some cases) people are responsible for biodiversity conservation, and often these people have an inadequate education.

## **THE NEED FOR AND OBJECTIVES OF THE NATIONAL BIODIVERSITY STRATEGY AND ACTION PLAN**

The close ties between cultural and natural heritage give rise to ethical, aesthetic and moral arguments when deciding to protect biodiversity. Presently Latvian territory supports self-supporting populations of many species, habitats and ecosystems that have become endangered or extinct in Europe. This fact alone increases Latvia's international responsibility to biodiversity preservation for all the European continent. Additionally, the decrease of biodiversity or natural diversity is a priority problem because:

- the national culture and consciousness was formed in a diverse natural environment and cultural landscape;
- the disappearance of any species creates a chain reaction of hard-to-predict negative changes in nature as a whole;
- the current generation doesn't have the moral right to reduce the level of biodiversity for future generations.

The National Environmental Policy Plan (NEPP) for Latvia was adopted by the Government in 1995. It analyses the environmental situation in Latvia. Among the priority problems which need an urgent solution is the prevention of the decrease in biological diversity. The National Biodiversity Strategy and Action Plan can be considered as the next step after the NEPP to solve this problem. It is also a programme for the practical implementation of the Convention on Biological Diversity in Latvia, which was ratified by the Saeima (Parliament) of the Republic of Latvia on August 31, 1995. It is necessary to establish and implement a complex set of measures to maintain the existing biodiversity at all levels: genes, species, and ecosystems, with a particular attention to the last.

In this stage of the implementation of environmental policy in Latvia and the current economic situation in the country, the following points show the needs for and objectives of the National Biodiversity Strategy and Action Plan:

- 1) a background for negotiations with sectors managing biological resources;
- 2) a background for negotiations with local communities and land owners;
- 3) the necessity for actions to implement the National Environmental Policy Plan for Latvia;
- 4) a basis for financial needs and the necessity for rational use of limited financial sources.

The success of the strategy planning and implementation process largely depends on how limited human and financial resources are used and on positive public awareness development in the strongly market oriented society.

## **PARTICIPATION IN PLANNING AND REPORTING PROCESSES**

In October, 1997 the project 'National Biodiversity Strategy and Action Plan (NBSAP)' was approved by the Global Environmental Facility (GEF). The National Biodiversity Strategy will be based on a long-term environmental strategy established by the National Environmental Policy Plan (NEPP). The National Biodiversity Strategy will define specific long-term goals for conservation of biodiversity. The Action Plan will specify necessary actions, along with time frames, responsible institutions and financing for implementation of the Biodiversity Strategy. It is planned that the Latvian National Biodiversity Strategy and Action Plan will be created by the end of 1998. In order to ensure planning for the sustainable use of biodiversity, it is expected to involve governmental institutions as the responsible organizations for sector-al policies and the private sector. The Ministry of Environmental Protection and Regional Development will be the National Executing Agency and will take a leading role in the development of the project.

A Steering Committee will be established by the MEPRD to oversee the entire activity and to ensure compatibility with the government processes and modalities. This body will concern itself primarily with the policy and administrative procedure. The Committee will be chaired by the MEPRD and will consist of representatives from other government agencies, directly or indirectly related to biodiversity issues. Representation will take into consideration the need for policy decisions and should be at a senior (e.g. Principal or Permanent Secretary) level. Non-governmental agencies or qualified persons will be invited as observers on the Committee.

The principal tasks of the project (the final output of which will be the National Biodiversity Strategy and Action Plan NBSAP) will be the following:

- to conduct a comprehensive assessment of the existing information on biodiversity in Latvia;
- to implement a participatory strategic planning process and develop priorities for action in protecting Latvia's biodiversity, culminating in the National Biodiversity Strategy and Action Plan;
- to conduct a public information campaign to encourage participation in the strategic planning exercises and to reach a good public awareness of the need for sustainable use of biodiversity.

A team of national consultants (Technical Task Force, **TTF**) will conduct the initial survey and assessment of existing information. There will be five separate consultations (seminars), each focusing on one general habitat group: inland freshwater, coastal waters, forests, agricultural land, swamp and marshland. They shall discuss possible goals and objectives and identify measures to achieve them. Representatives from key stakeholder groups (the private business sector, local government officials and **NGO's**) will participate in these local consultations, the inputs from which will form the basis for developing a **first** draft of the National Biodiversity Strategy and Action Plan. A campaign will be held throughout the planning exercise to inform the general public of Latvia's commitments to the CBD,

and the participatory nature of the formulation of the NBSAP. The campaign will consist of a series of newspaper, TV and radio advertisements.

The Steering Committee will meet on four occasions. National experts will be employed as consultants, but an international consultant will be hired to introduce the TTF and the national Technical Coordinator to the necessary participatory methodologies.

As the first step in the creation of the NBSAP and integration of its ideas, in October of 1997, the MEPRD organized the Round Table on Convention of Biological Diversity and the EU requirements concerning biological diversity. The state secretaries of all the relevant ministries, as well as authorities involved in the biodiversity implementation process, were invited to the round table discussions. During the discussion, participants decided that, in order to stimulate commitment of the **sectoral** ministries, the Regulation of the Cabinet of Ministers has to be introduced. By this regulation:

- The Ministry of Environmental Protection and Regional Development will be appointed as the coordinator of the implementation of Convention on Biological Diversity in Latvia;
- The Steering Group (or Committee) will be established for the process of strategic planning for biodiversity. The Steering Group (Committee) will consist of all relevant **sectoral** authorities;
- The Ministry of Environmental Protection and Regional Development will be authorized to establish guidelines ensuring integration of biodiversity protection measures in **sectoral** strategies. These guidelines will help to assess the impact of different sectors of economy on biological diversity and **define** measures which could diminish or mitigate the respective impacts;
- The Ministry of Environmental Protection and Regional Development will also be appointed as the responsible organisation for the CBD.

It was stressed during the discussion that complete integration cannot be achieved without broad participation of **sectoral** ministries in the establishment of the biodiversity conservation strategy and action plan. Thus the necessity of an **inter-ministerial** working group was stressed. The process of implementation of the biodiversity conservation strategy and action plan itself was also discussed.

## PRIORITIES FOR ACTION

The Latvian National Biodiversity Strategy and Action Plan will be created by the end of 1998. One of the main tasks during the preparation of this document will be to develop goals, objectives and priorities for action in protecting the biodiversity of Latvia. This chapter reflects the priority actions in the field of biodiversity conservation from the National Environmental Policy Plan (1995) as well as the latest views of involved experts. However, it must be noted that they may change during the conduction of a comprehensive assessment of the existing information and status of biodiversity in Latvia.

### *Reform of existing legislation and regulations*

An ongoing reform of the legal system in order to integrate it to EU legislation is under way in Latvia. The legislation which regulates nature conservation has been **recognised** by the EU experts as one of the most advanced parts of the Latvian environmental legislation system. Nevertheless, it still needs improvement and additional acts, like the law 'On Species and Habitat Protection'.

The importance of the protection of biodiversity should be integrated into sectoral policies and legal acts regulating the use of natural resources and land use. An important task is to improve the coordination between environmental legislation and acts which regulate the responsibilities and rights of municipalities and landowners.

### *Recommended actions for the preservation of biodiversity in Latvia:*

#### **Protection of species (in situ).**

Protecting the biodiversity of the plant and animal kingdoms should be ensured both by tested methods, such as the creation of protected territories and reserves, and by the introduction of new methods, such as the protection of species outside reserves. Actions to ensure protection of species might include the following:

- \* drafting a law 'On the Protection of Species and Habitats' that will provide general principles for the protection of wild plants and animals, as well as regulations for the trade of these species, and will integrate the requirements of international conventions into the legislation of the Republic of Latvia:

- \* drafting a regulation 'On Particularly Protected Species and Habitats' to provide general regulations for the management of locations where protected species have been recorded, as well as to approve new lists of protected species;

- \* signing of contracts and contractual commitments between local governments and land users to preserve the recorded locations of protected species;

- \* **introducing** tax reliefs as incentives for land owners to protect values of nature;

- \* establishing a regular inventory and monitoring system of the most endangered species in order to prepare methods for their protection:



- \* regularly revising and editing of the Red Book of Latvia (endangered species) in accordance with changes in nature and the national economy;
- \* preparing management plans for internationally and nationally threatened species;
- \* teaching of a caring and understanding attitude towards nature, starting at the pre-school level, revising the curriculums of schools and higher educational institutions, and the inclusion of principles of biodiversity conservation into curriculums (especially for professions connected with agriculture, forestry, and energy);
- \* preparing nature protection specialists; including into curriculums the latest information about habitat management and preparing of economically-substantiated management plans; providing local nature protection organisations with qualified staff.
- \* organising educational and informative activities with the public, involving the mass media.

#### **Protection of species (ex situ).**

Together with the protection of endangered species in situ, a protection system should be created for that part of the genetic fund that is not found in reserves, or whose protection it is only possible to ensure with special methods (animal husbandry, plant cultivation or culturing of micro-organisms). The achievements of selective breeding programmes of previous generations have ensured the basis for work in the future. Different protection techniques should be used according to the specific requirements of different places:

- \* recording and evaluation of cultivated plants, domestic animals and collections of micro-organisms, certification of national collections and **ensurance** of funding;
- \* preparation of a list of rare and endangered weeds, the creation of test farms;
- \* preparation of legislation for the protection of collections;
- \* drafting of legislation for protection against genetically modified organisms;
- \* in exceptional cases, the preservation of wild species in botanical and zoological gardens, to ensure their survival and reintroduction;
- \* supporting the involvement of Latvian botanical and zoological gardens in international programs for species protection;
- \* continuing development of the National system of conservation of genetic resources of cultivated plants and domestic animals;
- \* complete the establishment of a gene bank of varieties of cultivated plants.

#### **Protection of habitats.**

In order to ensure the protection of species' diversity under natural conditions, it is necessary to protect the natural habitats of wild plants and animals and those biotopes created by traditional cultivation methods. In order to be successful in this field, Latvia should use the following instruments:

- \* drafting a law 'On the Protection of Species and Habitats' that will provide general principles for the protection of habitats, and will integrate the requirements of international conventions into the legislation of the Republic of Latvia;
- \* drafting the regulation 'On Particularly Protected Species and Habitats' to provide general regulations for the management of locations where threatened habitat types have been recorded, as well as to create a list of threatened/protected habitat types;
- \* establishing and implementing conservation methods in forestry and agriculture;
- \* preparation of a classification of habitats in **correspondance** with the EU system;

- \* identification of endangered habitats, and preparation of management plans for the needs of land users, owners, and environmental officials;
- \* signing of contracts and contractual commitments between local governments and land users, introduction of tax relief to support the correct management of endangered habitats;
- \* coordination of educational and teaching efforts, according to the latest scientific findings.

### **Protection and restoration of migratory paths.**

Latvia and the **Baltics** as a whole is a region of particular importance on the Paleo-arctic migratory paths of birds, bats, butterflies and dragon-flies. International responsibility to ensure migration between Europe and Africa forces us to pay particular attention to the maintenance of environmental quality and habitats in Latvia. In addition, the retention of the migratory paths of fish and the ensurance of good water quality are important factors in the development of national fish-farming in the future, including that of the Baltic region as a whole. The following instruments should be used to ensure migratory paths:

1. Enforcement of the law 'On Protection Belts' providing protection belts for the coastal zone of the Baltic Sea and the Gulf of **Riga**, as well as the procedure for setting protection belts for water bodies and water courses, and their status. This law is of particular importance in preservation of the habitats of migratory species and ensurance of the continuity of migratory paths, as well as preservation of water quality. It will also contain actions on permitted and prohibited activities in the above-mentioned belts.
2. Mapping of migratory paths of animal species, determination of locations of intersections and their protection.
3. Mapping of the spreading of plant species and protection of important river valleys and sea coastal zones.
4. Elaboration of the concept of a network of ecological corridors (the ECONET) for Latvia, and its introduction in territorial planning.
5. Distribution of information on the specifics of the biology of migratory animals.

### *Establishment of an integrated protected areas system*

Improvement of the existing protected areas system should be based on the concept of an Ecological Network where the most valuable natural territories are surrounded by buffer zones and connected by corridors, which have a compensatory effect against the unfavourable impact of fragmentation of natural habitats. These also help to protect migration corridors of wild species, support the stability of ecosystems and support the planning of sustainable biodiversity friendly development on the landscape level. The following measures should be taken:

- \* drafting a regulation "List of protected areas"
  - \* selecting of priority protected areas for special actions to keep their value.
- Establishment and implementation of management plans starting with priority areas.

\* improving of the protection of coastal areas and wetlands, particularly those important for migrating species are of the highest priority. The main reasons for this are growing threats due to rapidly increasing pressure from recreation and increasing problems connected with land privatization and legal reform, which gives more responsibilities for nature conservation measures to local municipalities.

\* increasing the understanding of the local people on the importance of protected areas, their involvement in management activities and the development of nature tourism.

\* integrating measures of biodiversity conservation in regional development plans. The measures needed for the protection of nature values of national and international importance should be coordinated with the interests of local societies. Compensatory mechanisms have to be implemented where appropriate.

\* improving the system of protected areas should be closely coordinated with the neighbouring countries (particularly with Estonia and Lithuania) to ensure transboundary links of valuable natural territories and accordance with the system of the European Ecological Network. Cooperation between the Baltic States is very important considering the significance of the region (particularly its unique complex of wetlands) for exclusively high concentrations of migrating birds using the SE-Baltic flyway.

### *Needs for intensification and development of scientific research activities*

Long-term research programs exist for a number of habitats and species. Therefore the natural values of Latvia are fairly well studied (Appendixes 1, 2). They allow us to estimate the trends in species and habitat status and distribution, particularly for forests and wetlands. However, during the nineties, the amount of information obtained annually on permanent study plots in different monitoring programs has decreased considerably.

It is necessary to ensure appropriate monitoring of effects caused by rapid changes in land use, farming, and forestry in recent years, and on the status of threatened habitats and species. For the most threatened species, special studies are needed to determine the crucial influences and to implement effective programs to restore their populations. The number of the species covered by the monitoring programmes should be increased.

To monitor the changes in the distribution of important habitats for biodiversity protection, modern methods of analyses of satellite images and GIS technology should be introduced.

Particularly important are studies for the selection of the best management methods and schemes for the most threatened biotopes - coastal areas, wetlands, natural and seminatural meadows. It is necessary to assess the effectiveness and suitability of different ways of cutting, grazing and burning of grasslands and **reedbeds** for the maintenance of their value for biodiversity conservation. Recommendations for management methods and practices should be created, taking into account the costs and the possibility to involve the local people. Proposed actions should be balanced with the needs and interests of the local community.

The highest priority should be given to complex studies of the most valuable areas, where nature values of international importance are concentrated but

maintenance of them is uncertain due to different interests of further development of these territories. International support is needed in particular when it is necessary to ensure a high level of expertise in different sectors, modern methods, and technologies used. Such projects should lead to an **overall** integrated development and management plan which would take into account the different interests on the regional, national and international levels and ensure the long-lasting sustainable use of these territories. Two such territories, the Engure Lake area and the surroundings of Kemeris, already have integrated management plans in the process of development.

### *Improvement of information and monitoring system*

A complex research and monitoring system must be created. A representative biodiversity indicator for the country in total and for high nature value territories must be selected. For the long-term sustainable use of natural resources, scientifically reliable information on the current status of biodiversity needs to be easily accessible. This means that it is necessary to achieve a compatibility and a unified interpretation of the data collected by different institutions and agencies. The Biodiversity Information Centre should be established for the coordination of research, monitoring programmes and the storage of information.

### *Intensification of education, study programs and sources according to previously mentioned sectors*

A positive attitude towards nature must be cultivated, starting with pre-school children's institutions.

Education programs at the university level must be revised and the principles of conservation of biological diversity must be integrated into the curriculum (especially in fields connected with forestry, agriculture, energy). Specialists in the nature conservation field should be prepared, including in their study programmes the newest conclusions concerning habitat management and creation of feasible management plans. Eventually the State nature protection institutions must be provided with qualified specialists.

### *Participation in regional activities for biodiversity conservation*

Joint and coordinated actions between the three Baltic States as well as in the whole Baltic region could increase the effectiveness of biodiversity conservation considerably. It has been determined that joint marine, coastal and inland ecosystems in the Baltics have remained much less harmfully affected by economic activities than in other regions around the Baltic Sea.

Latvia has joined the HELCOM convention and the Environmental Committee for Nature. It is aimed at coordinating efforts of countries in order to ensure maintenance of biodiversity in the Baltic region.

An Environmental Committee has been established under the Baltic Council of Ministers. It is working on establishment of bilateral agreements in nature conservation between Latvia and Estonia, and between Latvia and Lithuania.

The priority activities which should be coordinated between Latvia, Estonia and Lithuania are the following:

- to fulfill the requirements of international conventions important for biodiversity conservation (e.g. Ramsar, Washington, Bern conventions);
- to implement joint actions to promote sustainable use and protection of migrating species;
- to establish trans-boundary protected areas, particularly those important for migrating birds and to coordinate their management.

It should be stressed that good and regular contacts already exist among the environmental ministries of the Baltic States as well as among the scientists working on biodiversity conservation problems.

Joint meetings, workshops and seminars should be regarded as important forms of regional activities to exchange experience. The established practice of joint workshops and seminars, held in one of the three countries, should be continued in the main directions of:

- harmonizing of legislation with EU,
- creating management plans for large carnivores,
- creating and managing trans-boundary protected areas.

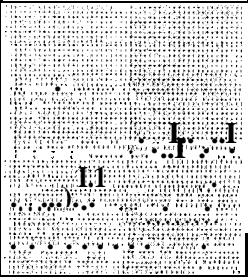
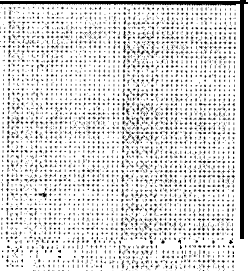
State authorities, experts, local decision makers, as well as representatives from NGO's and other target groups should be involved.

The most important joint action of the three Baltic States for biodiversity conservation in the next few years could become the implementation of the integrated coastal zone management plan. It was started in 1998 and will also involve Poland. The project is financed by the EU PHARE programme. As a member country of the Council of Europe, Latvia is involved in implementation of the "Paneuropean Biological and Landscape Diversity Strategy" which was approved by the European Environmental Ministers conference in Sofia 1995. Latvia has been representing the geographical region since 1996.

Latvia should be active in all regional and global treaties to exchange experience and participate in different activities in order to give its contribution to the preservation of global biodiversity.

### Appendix 1. An overview matrix on ecosystem status and trends in Latvia.

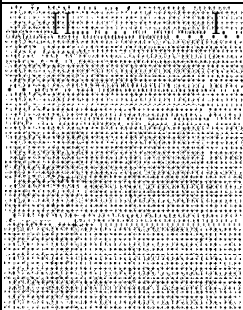
| BIODIVERSITY COMPONENTS  | RELATIVE MAGNITUDE<br>High/medium/low | KEY INDICATORS/<br>STATISTICS  |
|--|---------------------------------------|--|
| <b>FORESTS:<br/>STATUS/TRENDS</b>  | I                                     | <p><b>Current status</b><br/>Extent of forest estate: 2869,7 thousands ha (44.6% of State's territory). State owned forests comprise 56.6%, private forests - 18.6% of total forest area. About 60% of trees are conifers; 40% - deciduos. Primary stands comprise 14.0% of tototal area, medium age stands 48.4%, old forests 15.7%, very old – 17.1 %. At present. there are 900- 1300 Black Storks <i>Ciconia nigra</i> nesting in Latvia, 300-400 in Lithuania, one pair in Denmark, none in Sweden and the Netherlands. All kinds of protected forest areas cover 18.7%.</p> <p><b>Recent trends</b><br/>Since the beginning of the nineties, intensity of forest resources use has remarkably increased. In 1995-1999 2.2 times higher (than forecasted in 1990) amounts of forest were cut. Checking the nest sites of threatened species in 1994 showed a decline in numbers of several species (Black Stork <i>Ciconia nigra</i>, Capercaillie <i>Tetrao urogallus</i>) could have already started. The number of Moose <i>Alces alces</i> has declined remarkably.</p> |
| <b>FORESTS: PRESSURES</b>  | II                                    |  |
| Timber production  |                                       | 4.7 million cubic meters of timber were cut in 1994; a yearly permitted timber cut is 8.3 million cubic meters for the period from 1995 to 1999.   |
| Relatively large forest areas w-e being privatized during the <i>Land Reform</i> . |                                       | It is not allowed to use the private forest without a management plan, however, preparation of them goes on rapidly, what is not true for the mapping of nature values in these areas.   |
| Hunting pressure on game animals   |                                       | Since 1990, the hunting pressure on populations of game animals has generally increased. According to expert estimations, it is due to illegal hunting. Organisation of commercial hunting for foreigners has started.   |

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|---|---|---|
| <i>Drainage</i>                               |   | Melioration activities during the last years have remarkably decreased, yet there is a possibility that it will be <b>intensified</b> soon. 23% of forests are drained.   |
| <b>AGRO-ECOSYSTEMS: STATUS / TRENDS</b>       |    | <p>Current status<br/>Agricultural lands occupy 25.4 thousands sqkm (38.8% of State's territory). 69% of agricultural lands are arable, 30% - pastures, 1% - orchards.</p> <p>Recent trends<br/>The total area has not changed <b>significantly</b> during the last years. <b>However</b>, area of cereals, sown grasslands and pastures has remarkably decreased due to land abandonment. Since 1990 the use of fertilizers has remarkably reduced (from <b>95%</b>), however, in some areas it can still be considered as quite high. Latvian agricultural lands hold 26-30 000 pairs of the Globally Threatened Corncrake <i>Crex crex</i> population.</p>       |
| <b>AGRO-ECOSYSTEMS: PRESSURES</b>             | M   |   |
| <i>Abandonment of meadows</i>                 |   | Populations of many species (mainly plant and bird) inhabiting natural meadows and seminatural grasslands <b>decreased</b> due to changes in land use. Such threats exist because of overgrowing of grasslands due to cessation of traditional management: cattle grazing and mowing. In some areas also an adoption of intensive methods of farming (ploughing) has reduced biodiversity. <b>The</b> most remarkable reduction of species diversity has been observed in the meadow bird community, which includes threatened species: Ruff <i>Philomachus pugnax</i> , Baltic Dunlin <i>Calidris alpina schinzii</i> , Black-tailed Godwit <i>Limosa limosa</i> . |
| <i>Increase of edge use in private lands</i>  |   | Loss of ecological corridors which are important for species migration.   |
| <i>Possible intensification in future</i>     |   | In spite of the remarkable decrease of agricultural activities during the past years, an intensification in the near future is expected.  |
| <b>LAND AQUATIC ECOSYSTEMS: STATUS TRENDS</b> |  | <p><b>Current</b> status<br/>Latvia has 12 436 rivers in total, but only 17 are longer than 100 km. About 35% of rivers exceeding 10 km in length are regulated).<br/>Latvia holds 2256 lakes larger than 1 ha with total area approximately 1000 sqkm. 792 lakes exceed areas of 10 ha.<br/>Data from the Latvian CORINE Biotopes database shows that 20.3 % of selected sites with rivers are protected, and 22.6% sites with lakes are protected.</p> <p><b>Recent</b> trends<br/>Water quality in 80% of Latvian rivers is estimated as good or satisfactory. Since the use of</p>  |

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|  |     | <p>fertilisers in agriculture has drastically decreased, the situation is stable.</p> <p>Many mesotrophic lakes (in the 50s and 60s) have turned into eutrophic. This occurred both due to natural <b>etrophication</b> and nutrient leakage from agricultural lands. About 40% of lakes suffer from heavy antropogenic influence. Occasionally drainage along shores has caused <b>significant</b> decrease in number of waterfowl both breeding and migrating. A-particular critical situation has occurred inland, where <b>due</b> to wide hydrotechnical works and melioration, biotopes were partly damaged. Widely distributed and expansive species are ousting the ones whose ecological amplitude is narrower and with limited ability of competition. Presently these species have disappeared completely or only small populations have remained in some lakes. Commercial fishing is comparatively small in inland waters and most of it is related to fish catch in ponds (mostly carps). In the first 4 months of 1995 the inland catch was 234.4 tons which is 0.64% of the total fish catch. If compared to <b>the same period</b> of 1994, the increase is <b>58.2</b> tons.</p> |
| INLAND AQUATIC ECOSYSTEMS: PRESSURES         | MII |  |
| <i>Drainage</i>                              |     | The drainage was made in quite a large percentage of wetlands, and important intervention in natural ecosystems has occurred.  |
| <i>Recreation</i>                            |     | Recreation causes disturbance of breeding birds and other animals and may destroy rare plant communities.  |
| <i>Eutrophication</i>                        |     | The increase of the amount of biogenic substances in water has caused qualitative and quantitative changes in habitats. <b>However</b> , pollution from agricultural lands and industrial waste waters in recent years has decreased due to economical reasons, which gives a overall positive effect.   |
| <i>Increase of illegal jishing</i>           |     | The main problem during the last live years concerning fish resources was the increase of illegal fishing (fishing in forbidden places and time, using illegal methods, especially electro-fishing).   |
| <i>Blocking fish migration routes</i>        |     | Extension of a power stations network started during the last years (mainly on small rivers) can limit the migration possibilities of fish to spawning sites in the future.  |
| MARINE AND COASTAL ECOSYSTEMS: STATUS/TRENDS |     | <p>Current status</p> <p>Latvia has approximately a 490 km long shoreline. A coastal protective belt along the shore of the Baltic Sea and the Gulf of Riga has been created (300 m to both sides from waterline) with the <b>purpose of maintaining protective functions of the forest, to conserve coastal landscapes and to ensure sustainable use of natural (including recreation) resources.</b> Clearcutting of forest, transformation of forest areas, and other restrictions are in force in the protected belt. It favours <b>maintenance of biological diversity in coastal areas.</b> There are <b>4 internationally important marine</b></p>  |



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|  |    | <p>areas designated by HELCOM along the Latvian seashore (approx. 95 000 ha in total). In addition, the coast is covered by more than ten restricted nature areas, nature parks, Important Bird Areas and 2 Ramsar sites.</p> <p><b>Recent trends</b></p> <p>Due to the former USSR border zone status, about half of the Latvian coastline has remained in a very good natural state. However, during the last 10 years, human activities have increased substantially. Occasionally high recreation intensities occur even in protected areas, causing disturbance to breeding birds and trampling of vulnerable dune plant communities. Although statistics show the decrease of fish caught during the period from 1990 to 1994, according to the opinion of some experts, could be due to the increase of unregistered catches, especially for coastal fishing.</p> |
| <b>MARINE AND COASTAL ECOSYSTEMS: PRESSURES</b>        | II |  |
| <i>Blocking fish migration routes and overfishing</i>  |    | <p>Scientific investigations show features of overexploitation of Plaice <i>Pleuronectes platessa</i> populations (size reduction of the fish caught, decrease of the number of young fishes). Resources of Cod <i>Gadus morhua</i>, Salmon, Zander <i>Lucioperca lucioperca</i> and European Whitefish <i>Coregonus lavaretus</i> continue to decrease. The Riga Gulf population of Ides <i>Leuciscus idus</i> (they have spawned mainly in the Engure Lake up till now) is in a particularly critical situation. The main cause of decrease is overfishing and blocking of the migration path (the use of fishing nets in Mersraga Channel which is the only connection between Riga Gulf and Engure Lake).</p>  |
| <i>Increase of recreation</i>                          |    | <p>Recreation causes low nesting success in beach nesting birds, trampling of dune habitats and pollution of coastal zones.</p>  |
| <i>New harbour development and building activities</i> |    | <p>Harbour development near the Town Ainazi has destroyed breeding sites of colonial birds and recorded sites of rare and protected plant species. Problems can also be caused by the blocking up of the bird and bat migration routes with unreasonably located wind generators.</p>  |

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| <i>Oil pollution in the sea</i>                      |  | <i>Pollution</i> with oil products (especially in cases of large accidents) can destroy the last growths of Brown algae in the Latvian west coast which is also an important spawning site of herrings. It could cause a mass mortality of birds wintering in the sea, which would seriously affect the European populations of several species.   |
| <i>Other sea pollution, eutrophication of coasts</i> |  | The salmon population of the Baltic sea has been seriously endangered during the last years by the M-74 syndrome, or mass death of salmon fingerlings. Pollution accumulated in the south-western part of the Baltic sea is considered to be the likely cause. In beaches on the Gulf of <b>Riga</b> , water eutrophication has stimulated permanent vegetation development which has destroyed different types of beaches as habitats.  |
| <i>Building of oil terminals</i>                     |  | Very big threats to the coastal ecosystems exist because of the plans to launch building activities of oil terminals (at <b>Liepaja</b> in addition to that already existing in Ventspils). Especially dangerous there would be the construction of a terminal in the open sea in Butinge (Lithuania).   |
| SWAMP AND MARSHLAND: STATUS/TRENDS                   |  | <p><b>Current status</b></p> <p>Mires occupy 5.6% of the territory of Latvia. 70% of them are relatively untouched by human activities. Raised <b>bogs are 42% of the total bog area, transition mires - 9%, fens - 49%. The largest raised bog in Latvia is the Bog Teiči (19 587 ha), largest fen Peikstulnicas – Salas (7606 ha).</b> According to Latvian CORINE Biotopes database, 75.2 % of selected mires (important for conservation of <b>biodiversity</b>) are protected.</p> <p><b>Recent trends</b></p> <p>During the last decades of the Latvian SSR, peat extraction was very extensive in most of the Latvian regions. In the beginning of the nineics, the intensity of peat extraction reduced, though it is expected that it will increase in the <i>coming</i> years.</p> |
| SWAMP AND MARSHLAND: PRESSURES                       | M  |  |
| <i>Peat extraction</i>                               |  | Quite a lot of mires are already almost extracted (total area around 20 000 ha). At least 37 <b>massifs</b> of mires with the total area of around 74 000 ha are extracted partly. It has been decided in the State Program of Energy to increase the use of local resources of fuel.  |
| <i>Changing hydrological regime</i>                  |  | In many cases melioration works in bog surroundings lower water levels in the bog causing alterations in vegetation and bird abundance   |
| <i>Hunting</i>                                       |  | <b>Hunting</b> in areas which are important for migrating birds during passage may cause decrease of these birds   |

## Appendix 2. Monitoring subprogrammes in Latvia

### Abbreviations:

|  |   |
|--|---|
| ESF – Environmental Support Fund                     | NCM – Nordic Council of Ministers               |
| ETS – Latvian Theriological Society                  | NEHC – National Environmental Health Centre     |
| FB – Faculty of Biology, University of Latvia        | NVRNPC – Ziemeļvidzeme Biosphere Reserve        |
| IB – Institute of Biology, University of Latvia      | SNR – Slitere Nature Reserve                    |
| LEDC – Latvian Environment Data Centre               | TNR – Teici Nature Reserve                      |
| LFII – Latvian Forest Inventories Institute          | UAL – University of Agriculture of Latvia       |
| LFN – Latvian Fund for Nature                        | LTS – Latvian Theriological Society             |
| LFRI – Latvian Forest Research Institute<br>'Silava' | UL MCZ University of Latvia, Mus. of<br>Zoology |
| LHMA – Latvian Hydrometeorological Agency            | LBS – Latvian Botanical Society                 |
| LMNH – Latvian Museum of Natural History             |   |
| LOS – Latvian Ornithological Society                 |   |

| No | PROGRAMME/<br>PROJECT  | OBJECTIVE/METHODS  | NUMBER OF<br>STATIONS,<br>COVERAGE                                   | FUNDING /<br>RESP.<br>INSTIT. -<br>TIME  |
|----|--|--|--|--|
| 1  | ICP Forests Regional<br>Forest monitoring ICP<br>Forests   | Assessment and Monitoring of Air Pollution<br>Effects on Forests. Methods ICP manuals,<br>yearly. Methods: ICP Forests.  | 280 sites  | LFII, LFRI,<br>1990  |
| 2  | Forest health monitoring<br>EMAPFHM  | Monitoring the state of forest ecosystems,<br>recording interval 4 years. Methods: Forest<br>Health Monitoring. 1994. Field Methods<br>Guide. US EPA.                            | 200 sites  | LFRI, LFII/<br>1994  |
| 3  | Forest inventory   | Survey of the state of Latvian forests.<br>Recording interval 5 years.   | 92 sites   | state<br>budget/LFRI,<br>LFII/ 3 6   |
| 4  | Inventory of protected<br>territories, selected<br>wetlands, microreserves,<br>bogs, dune vegetation,<br>noble trees | Survey of the state of Latvian wetlands mainly<br>wet forests and bogs, marshes. Various<br>projects.  | Whole territory.   | Local<br>companies,<br>local<br>communities,<br>variety of<br>foreign<br>support/ LFN/<br>1993- 1996 |
| 5  | Complex monitoring of<br>vegetation and fauna  | To get information on the state of ecosystems<br>and of their components. A part of a larger<br>programme.   | 3 reserves, with<br>complicated<br>infrastructure of<br>observations | State budget<br>/since: 1981-<br>1984 in<br>Slitere<br>reserve, since<br>1984-1987 in<br>Teici.      |
| 6  | Pine Forest Monitoring   | To observe Scots Pine stand structure and<br>dynamics in anthropogenic environment.  | Different number o<br>sites  | State budget<br>/Fac. Geogr.<br>And Earth Sc.<br>/since 80ies  |
| 7  | ICP Integrated<br>monitoring   | Effects of air pollution on ecosystems in the<br>catch area. Methods: "Manual for Integrated<br>Monitoring, Programme Phase 1993-1996".  | 2 A plots  | LHMA/ 1994   |
| 8  | Pine forest ecosystems   | Developing methods for biomonitoring,<br>monitoring the course of natural successions.<br>Methods: Manual for Integrated Monitoring.   | 1 B plot unofficial  | State budget<br>/IB/ since<br>1991   |
| 9  | Coastal meadows  | Monitoring the changes in the species<br>composition of coastal communities, etc.<br>Method: monitoring of plant cover, mosses,<br>fungi, bird census, grass invertebrates, soil | 5 transects  | State budget<br>/IB/ started ir<br>1994  |

|    |   |  |   |   |
|----|---|--|---|---|
|    |   | fauna in permanent sampling plots. Yearly.   |   |   |
| 10 | Complex monitoring of Engure reserve    | To get information on the state of the Ramsar site. Monitoring of waterfowl, herbaceous vegetation and threatened plants in the terrestrial part of the reserve and in the lake; entomofauna - grass invertebrates, soil fauna in terrestrial part, light trapping of water insects, integrated monitoring of water biota. | Engure lake   | State budget /IB/ waterfowl since 1956, biota since 1995                |
| 11 | Agricultural lands                      | To observe and evaluate the impact of agricultural activities on biodiversity of agroecosystems. Biodiversity indicators of soil – herbs, bushes, earthworms, ground beetles, grass invertebrates, activity of microbial degradation of cellulose.   | 189 farms, 4- 10 complex stations                                     | State budget /UAL, IB/ 1992   |
| 12 | Flora of Latvia.                        | Survey of vascular plants distribution in Latvia. Method: distribution mapping according to original 7x10 km grid.   | Whole territory.  | State budget /IB/70-80ies   |
| 13 | Protected Plant Species.                | Monitoring the status of protected plant species. No special system developed.   | Various species in reserves   | State budget /TNR, SNR,./ since 1984                                    |
| 14 | Lichens and mosses                      | To get information on the composition and abundance of species, the impact of air pollution. Methods: measuring the coverage of trunk epiphytic species. Recording interval 5 to 10 years.   | 12 cities and some forest sites                                       | ESF, local communities/ NVRNPC, IB, FB since 80ies, regularly from 1995 |
| 15 | Latvian Breeding Bird Atlas             | Mapping the distribution of breeding birds in Latvia. Method of distributed checksheets (by European Ornithological Atlas Committee) with species names and nesting categories in 10x10 km UTM-grid.   | Whole Latvia by UTM-grid (10x10 km)                                   | State budget/IB, FB, LOS, etc. compiled 1989                            |
| 16 | Game birds.                             | Get data about species, sex and age composition of hunted waterfowl, as well as other wetland birds. Methods: point-counting and collecting the wings of hunted birds.   | Engure and Lubana hunting areas                                       | State budget /LFRI, IB, started in 1950s                                |
| 17 | Hole-nesting birds                      | To get ecological data of nesting. Mainly 2 species <i>Parus major</i> and <i>Ficedula hypoleuca</i> .   | 20 sites  | LFRI, started in 80ies  |
| 18 | Various species of raptors              | To monitor the status of raptors, their ecology and feeding, nests occupancy and breeding in permanent areas. Mapping method of raptors.   | At different places all over the territory                            | State budget, Halle University/ LFRI, LOS, IB, LFN/started in 1980s     |
| 19 | Corncrake <i>Crex crex</i>              | To get information on status of populations with the impact of agricultural management of various intensity.   | Whole country   | Royal Society for Bird Protection/ LFN, since 80ies/                    |
| 20 | Common Lapwing <i>Vanellus vanellus</i> | To get information on status of populations with the impact of agricultural management of various intensity.   | 11 sample plots all over the territory                                | LFN/ since 80ies  |
| 21 | Phenology of birds.                     | To monitor the migratory birds. Recording interval is one year. Method: Recording the dates of arrival and departure of migratory birds, their abundance by amateur ornithologists.  | Whole country, Differs by years, depending of the number of observers | LOS/  |
| 22 | Wintering waterfowl census              | To monitor the abundance of wintering waterfowl. Recording interval is one year.   | Whole country   | LFN, IB, LOS, started   |

|    |   |   |   |   |
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|    |   | <u>Method</u> , mid-winter fixed-time <b>absolute-counts</b> of wintering waterfowl.  |   | in 1967   |
| 23 | Survey on coastal dead waterfowl  | <u>Method</u> : fixed-time counting of birds floated to the coast by waves after the ice drift.   | Whole Latvian coastline   | LOS/ started in 1995  |
| 24 | White stork <i>Ciconia ciconia</i>  | To monitor the abundance, distribution and fertility of white stork in Latvia. Whole country covered after every 10 years. International <u>method</u> of absolute-counting of pairs, nests and hatches.                      | By counties   | ESF/IB, LFN, LOS/ started in 80ies                                      |
| 25 | Migration of terrestrial birds  | To monitor the migration of terrestrial birds. <u>Method</u> : catching by bird net.  | At the Baltic sea coast area near <b>Pape</b>                           | State budget /IB, started in 60ies                                      |
| 26 | Large migratory birds   | To monitor the state of the populations and the habitats of wild geese, swans and common crane in Latvia. <u>Method</u> : absolute-counting of individuals and/or pairs in stationary sites or in the whole country.          | Concentration or wintering areas and main habitats of different species | IB, LOS, different years  |
| 27 | Black stork <i>Ciconia nigra</i>  | To monitor the state of the populations and the habitats of black stork. Yearly. <u>Method</u> : inventory of nesting territories and discovering the status of nesting.  | Whole country   | Government of Denmark, <b>BirdLife</b> Denmark/U% , LOS started in 1970 |
| 28 | Bird communities  | Monitoring the state of bird populations with indicative value determines negative influence of the changes of terrestrial ecosystems on birds. <u>Method</u> : census of individuals and/or pairs on <b>permanent</b> areas. | 7-10 permanent observation sites in forests, 4-6 in agricultural areas  | LFN, LOS, since 1983  |
| 29 | Bog birds.  | Monitoring the composition, abundance and population density of bog birds. Yearly.  | <b>2 areas</b>  | Voome Ornithologica Station/TNR, SNR, since 1980s                       |
| 30 | Grouses   | Monitoring the status and abundance of populations of <i>Capercaillie</i> . Yearly. <u>Method</u> : counting of hunted birds.   | Forest districts  | LFRI/ since 1990s.  |
| 31 | Atlas of Mammals  | Mapping the distribution of mammals in Latvia. <u>Method</u> : 50x.50 km UTM-grid.  | Whole Latvia by <b>UTM-grid</b> (10x10 km)                              | <b>Local</b> forestries, WWF <b>Finland/LTS/</b> since 1990             |
| 32 | Damage the game causes to Latvian forest stands                               | Assessment of the state of the game populations and of the food resources, and damages of trees. <u>Method</u> : counting of forest damage along permanent <b>transects</b> .   | About 300 plots   | State budget /LFRI/ since 1960s   |
| 33 | Game animals, <b>incl.</b> large carnivores, ungulates, small carnivores etc. | Census of game animal populations: number of killed animals and common counting method, made by hunters and mid-winter transect-track-counting. Recording interval is one year.   | Forest districts  | State budget /LFRI/Statistics since 1930s; <b>Censi</b> since 1960s.    |
| 34 | Hedgehogs <i>Erinaceus europaeus</i>  | Assessment of hedgehog population. Common counting method made by specialists.  | Whole country   | LTS/ since 1980s  |
| 35 | Otter <i>Lutra lutra</i>  | Assessment of otter population. Common counting method prepared by local specialists.   | <b>All over the territory</b>   | LTS/ since 1980s  |
| 36 | Beaver <i>Castor fiber</i>  | Assessment of beaver population. Common counting method prepared by hunters.  | By forest districts covering the whole <b>country</b>                   | LFRI, LTS/ since 1930s  |
| 37 | Smallmammals.   | Monitoring the state and <b>composition</b> of small  | <b>b' areas in forests</b>  | TNR, SNR,   |

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|    |   | mammal communities. <u>Method</u> : trapping-lines in five different habitats. Recording interval is one year.  |   | IB started in 80-90ies  |
| 38 | Bats                                    | Monitoring the state of bats communities. <u>Method</u> : summer -recording voices by bat-detector; winter-time - counting bats in wintering colonies. Recording interval is one Year   | Whole country   | Swedish Environmental Protection Agency, Natur Schutzbund Deutschland/ LTS/ started in 1994 |
| 39 | seals                                   | Monitoring the state and abundance of seals.  | collecting of dead or juvenile seals on the coast                         | LTS/ started in 1980s   |
| 40 | Atlas of amphibians and reptiles        | Mapping the distribution of amphibians and reptiles in Latvia.  | Whole Latvia by UTM-grid (10x10 km)                                       | LFN/still under completion.   |
| 41 | Natterjack Toad <i>Bufo calamita</i>    | No special monitoring programmes.   | Randa meadows and adjacent areas.   | NVRNPC/ since 1980s.  |
| 42 | Common Treefrog <i>Hyla arborea</i>     | Monitoring of the results of reintroduction of <i>Hyla arborea arborea</i> .  | Some ponds in southern Latvia.  | Local companies/Riga Zoo/since 1980s.   |
| 43 | Reptiles                                | Monitoring the state and abundance of amphibians and reptiles. <u>Methods</u> : transect-counts.  | Various sites   | State budget/ Riga Zoo/Since 1980s.   |
| 44 | Spiders                                 | Monitoring the state of spider communities. <u>Method</u> : usually 10 pit-fall traps, diameter 7 cm. Yearly.   | Moricšala, Teiai, Sļģtere reserves and some other biologically rich sites | State budget/FB/ Since 1976   |
| 45 | Edible snail <i>Helix pomatia</i>       | Monitoring the population as a resource in Latvia. <u>Methods</u> : counting per areas and estimating abundance. Yearly.  | Various places  | Local companies/ LMNH/since 1993.   |
| 46 | Terrestrial molluscs                    | Monitoring the state of terrestrial molluscs. <u>Methods</u> : volume samples of 31, under development. No special monitoring programmes.   | Various places  | State budget/ FB, LMNH/since 1980s.   |
| 47 | Ants                                    | To monitor the status of ants. <u>Method</u> : counting of nests. Recording interval is one year.   | 3 stations  | State budget/FB/ Since 1991   |
| 48 | Soil biota (part of complex programmes) | Monitoring the state of soils by the physical, chemical and biological parameters. <u>Methods</u> : 30 soil-samples from the 30-cm-deep soil-drilling agricultural sampling plots, or 100 small samples from forests. Recording interval is one year.       | 4 agricultural and 3 forest stations                                      | IB/Since 1995 and 1991 respectively   |
| 49 | Pheromone monitoring of insects         | To monitor the dynamics of different pest species. <u>Method</u> : catch by pheromone-traps. Recording interval is one year. No special monitoring programmes.  | Various sites   | LFRI/ since 70ies.  |
| 50 | Agricultural pests                      | Monitoring the quality of environment under various agricultural practices, to forecast the outbreaks of pests. No special monitoring programs. <u>Method</u> : observation, counting, using of different traps, incl. three Rothamsted type suction traps. | Different places, Rothamsted 3 sites                                      | Since 1975 UAL, Rothamsted since 1995   |
| 51 | Forest pests                            | No special monitoring programmes. <u>Method</u> : observation, counting, using of various traps.  | By forestry districts   | State budget/ LFRI/ since 1950s   |

|    |                  |   |         |                            |
|----|------------------|---|---------|----------------------------|
| 52 | COFUNE Landcover | Mapping of landcover according to international standards.  |         | EU PHARE/LED C/ since 1997 |
| 53 | CORINE Biotopes  | To identify the areas having biotopes with protection value as stated in EU biotope lists.  |         | EU PHARE/LDF/ 1994-1'997   |
| 54 | Pollinators      | Monitoring the status of pollinators. <u>Method:</u> color trapping in the frame of the pilot programme on monitoring of bumblebees and other pollinator insects; the same sites as on moth monitoring programme. | 8 sites | NCM/LMNH/ since 1997       |
| 55 | Moths            | Monitoring the changes in moth populations and in their habitats over a long time period. Methodology: automatic light trapping in accordance with NCM's moth monitoring <b>scheme</b> .                          | 8 sites | NCM/LMNH/ since 1995       |

### Appendix 3. Research projects financed by state, the Science Council.

Abbreviations:

UL FB - University of Latvia, Faculty of Biology  
 UL FG - University of Latvia, Faculty of Geography and Earth Sciences  
 UL IB - University of Latvia, Institute of Biology  
 NBG - National Botanical Gardens of Latvia

| No  | Title   | Institution                                |
|-----|---|--|
| 1.  | Moss flora of Latvia  | State Forestry Research institute "Silava" |
| 2.  | Distribution pattern and population trends of nesting birds in different ecosystems in Latvia: possibility of integrated <b>analyses</b> with GIS <b>programmes</b> | UL FB                                      |
| 3.  | Biology and ecology of plant communities with rare and protected plant species  | UL FB                                      |
| 4.  | Investigation and evaluation of mire vegetation of Latvia   | UL FB                                      |
| 5.  | <b>Dinamic</b> of avifauna of Latvia : qualitative and quantitative aspects   | UL IB                                      |
| 6.  | Flora of vascular plant species of Latvia   | UL IB                                      |
| 7.  | Dendroflora of Latvia   | NBG  |
| 8.  | Rare and threatened plant and animal species: Red Data Book of Latvia   | UL IB                                      |
| 9.  | Biodiversity in freshwater ecosystems   | UL IB                                      |
| 10. | Ecology and geography of vegetation of Latvia: dynamic and classification of communities and <b>habitats</b>  | ULFG                                       |

State financed research projects partly related to biodiversity

| No | Title  | Institution |
|----|--|-------------|
| 1. | Ethology, ecology and taxonomy of small mammals  | UL FB       |
| 2. | Waterfowl population ecology   | UL IB       |
| 3. | Genetic diversity of local forms of barley   | ULIB        |
| 4. | Taxonomy. morphology, anatomy and phylogenesis of <i>Allium</i>  | NBG         |
| 5. | Breeding of ornamental and fruit plants: methods of breeding, databases and gene banks                   | NBG         |
| 6. | Development of criteria for sustainable use of Latvian lakes according to biofunctional <b>character</b> | UL IB       |
| 7. | Long term changes of biocenotic parameters as indicators of status of ecosystems                         | UL IB       |



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