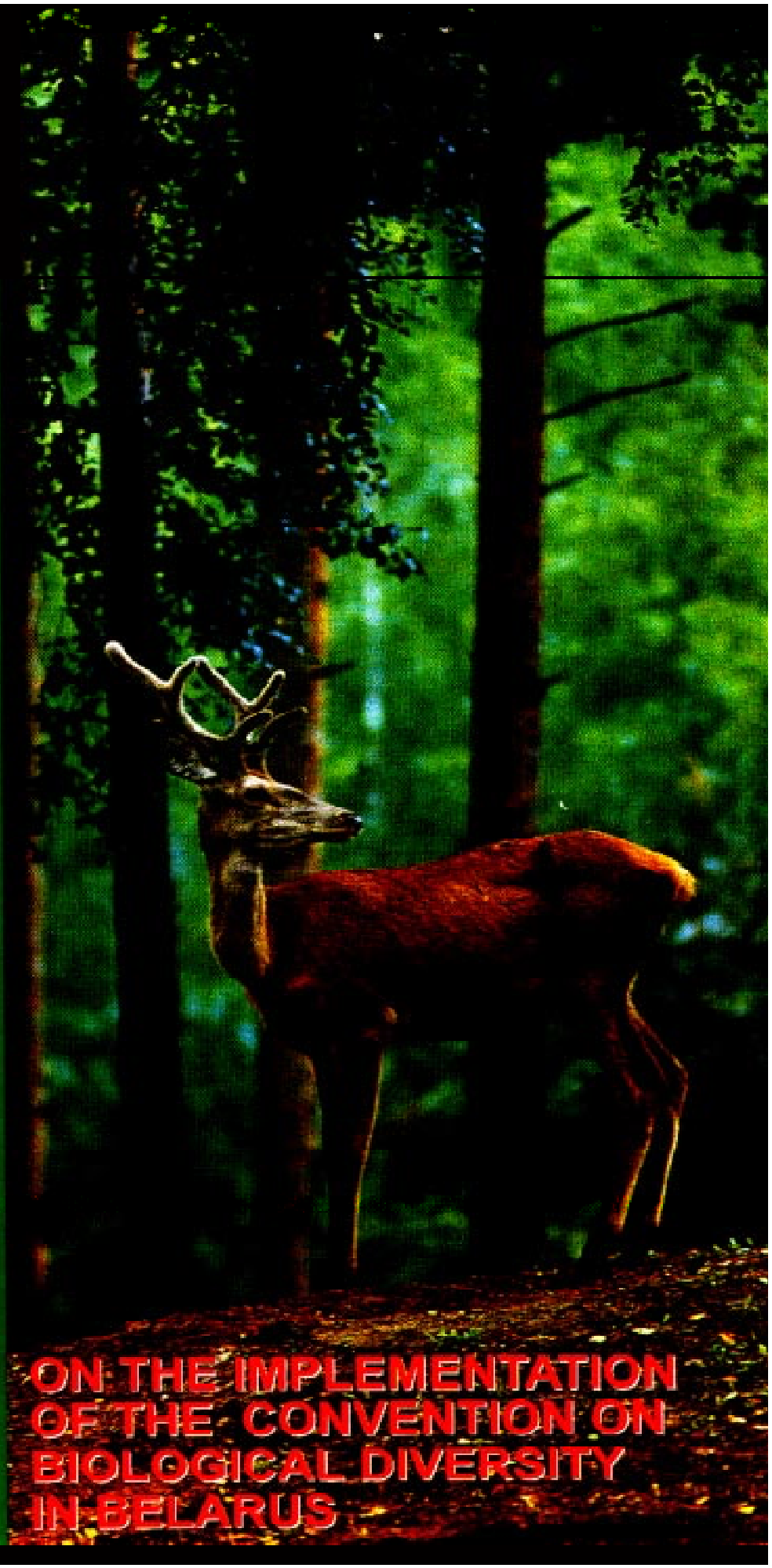
MINISTRY OF NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION OF THE REPUBLIC OF BELARUS

NATIONAL ACADEMY OF SCIENCES OF BELARUS

UNITED NATIONS ENVIRONMENT PROGRAMME



FIRST NATIONAL REPORT

ON THE IMPLEMENTATION OF THE CONVENTION ON BIOLOGICAL DIVERSITY IN BELARUS

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FIRST NATIONAL REPORT ON THE IMPLEMENTATION OF THE CONVENTION ON BIOLOGICAL DIVERSITY IN BELARUS

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The First National Report on the Implementation of the Convention on Biological Diversity has been prepared in compliance with Article 26 according to which each Party shall periodically submit to the Conference of the Parties of the Convention, reports on the measures taken for the implementation of the provisions of the Convention and on their efficiency for attaining the Convention's objectives, The First National Report is focused, as pointed in Decision II/17 of the Conference of the Parties, on the results of implementation of Article 6 which commits the Parties to develop national strategies, plans and programmes for the conservation and sustainable use of biological diversity, as well as to integrate, as far as possible and appropriate, measures for conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes and policies. The First National Report has been developed within the framework of the Project of the United Nations Environment Programme and of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus in co-operation with the National Academy of Sciences of the Republic of Belarus. First of all, it is based on the materials of the National Strategy and Action Plan for the Conservation and Sustainable Use of Biological Diversity in the Republic of Belarus and the Analytical Review called 'The Status and Use of Biological Diversity in the Republic of Belarus".

The Ministry of Natural Resources and Environmental Protection wishes to acknowledge the generous support of the United Nations Environment Programme/Global Environment Facility which helped make the publication of this Report possible. We are also grateful to Mr. Zbigniew Karpowicz, IUCN/Europe Regional Director, for his kind assistance in preparing a draft Report, and to Ms. Carmen Tavera, Task Manager, UNEP, for her continued support and advice through the FNR preparation process,

The authors of the National Strategy and Action Plan for the Conservation and Sustainable Use of Biological Diversity in the Republic of Belarus, the Analytical Review 'The Status and Use of Biological Diversity in the Republic of Belarus" and the First National Report on the Implementation of the Convention on Biological Diversity in Belarus are:

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SUMMARY

The Republic of Belarus ratified the Convention on Biological Diversity in 1993. In compliance with its international commitments Belarus has developed the National Strategy and Action Plan for the Conservation and Sustainable Use of Biological Diversity and identified First-Priority Measures for the Ministries and Departments aimed at implementing the Action Plan. The process of preparation of the above documents was carried out with participation of almost all local bodies of government, ministries, departments and non-governmental organisations.

The processes of development and implementation of the Action Plan are:

- cyclic (periodic assessment of the condition of biological diversity in the Republic, planned revision of the existing priorities and the determination of new priorities for conservation and use of biological diversity, preparation and implementation of measures that correspond to new priorities - every 5 years); and
- multi-sectoral (measures on conservation and sustainable use of biological diversity are implemented with participation of local bodies of government as well as various socio-economic sectors and public organisations).

Chapters IV, V and VI contain detailed analytical information including characterisation of indicators of the status of biological diversity in the country, the assessment of biological resources and trends of their dynamics as well as the main causes of loss of, and threats to biological diversity.

Belarus bears the main responsibility in Europe for conservation of wetland ecosystems that are valuable both as habitats of rare and endangered species and for the prevention of climate change. Despite its difficult economic situation, the need for overcoming the consequences of the Chernobyl incident and the increasing impact exerted by anthropogenic factors on the ecosystems, the Republic has seen a certain progress in the sphere of conservation of biological diversity and restoration of vulnerable ecosystems.

In conformity with the Decree of the Council of Ministers of the Republic of Belarus, control over the fulfilment of first-priority measures by the ministries and departments related to the implementation of the Action Plan has been imposed on the Ministry of Natural Resources and Environmental Protection.

Particular attention in the process of implementation of the Action Plan is paid to the solution of two main problems: conservation of natural resources, i.e., species and ecosystems, and integration of issues of conservation of biological diversity into the sectors of economy.

During the Third Conference of Ministers "Environment for Europe" held in Sofia in 1995, the Republic of Belarus, among other European states, approved the Pan-European Biological and Landscape Diversity Strategy. The provisions of the above Strategy, which can be considered as very important both for our country as well as for Europe, stipulate the development of the ecological network on the territory of Belarus followed by its inclusion into the Pan-European Ecological Network as well as the integral planning of land use and incorporation of issues of conservation and use of biological diversity into agricultural production.

INTRODUCTION

In recent years, the urgent need for increasing the level of study, and the conservation and use of biological diversity as the basis for sustainability and stability of biosphere has become clearly defined. Decrease of biological diversity is considered as one of the basic global ecological problems that mankind faces at the modem stage. As is known, the notion "biological diversity" includes all species of plants, animals and microorganisms as well as ecosystems. The biological diversity is subdivided into 3 independent but, at the same time, interconnected levels:

1) genetic diversity, i.e., intra-species and intra-population heterogeneity (variability);
2) species diversity on the whole as well as diversity of individual large taxons;
3) diversity of ecosystems incorporating the previous levels and representing habitat for biological species.

Biological diversity is given the status of the general type of natural resources, like atmosphere, oceans, etc., that are of vitally important significance for the world community.

Sharing the concerns of many countries of the world regarding the global threat to biological diversity, and being aware of the special responsibility for its conservation within the national boundaries, the Government of the Republic of Belarus, together with the leaders of more than 100 countries of the world, signed the Convention on Biological Diversity in Rio-de-Janeiro in 1992. This Convention was ratified by the Parliament in 1993. In conformity with Article 6 of the Convention, the Republic of Belarus developed the National Strategy and Action Plan for the Conservation and Sustainable Use of Biological Diversity in the Republic of Belarus which was officially approved by the Government in 1997 (Decree No. 789 of the Council of Ministers of the Republic of Belarus dated June 26th, 1997). This document was developed and adopted with a view of determining and justifying, on scientific grounds, the priority directions for activities and measures aimed at conservation and sustainable use of biological diversity for the near and more distant future.

The national reports represent one of the key elements for the implementation of the provisions of the National Strategy and Action Plan. They are designed for informing the bodies of government and the public about the condition of biological diversity, the use of natural biological resources and the measures taken for their conservation within the framework of the Convention.

The First National Report has been elaborated in compliance with Article 26 of the Convention on Biological Diversity according to which all Parties must submit periodic reports on measures taken for the implementation of the Convention and the assessment of efficacy of such measures. In accordance with the Decision II/17 of the Conference of the Parties, the First National Report focuses on the implementation of Article 6 which commits the Parties to develop National Strategies and Action Plans for the conservation and sustainable use of biological diversity as well as to envisage, as far as it is possible and expedient, measures for conservation and sustainable use of biological diversity in the respective sectoral or inter-sectoral plans, programmes and policy.

The First National Report on the Implementation of the Convention on Biological Diversity in Belarus has been prepared, on the whole, in compliance with the recommendations of the Information Document (UNEP/CBD/SBSTTA/Inf.15) presented at the Third Meeting of the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA).

During preparation of the First National Report, the degree and completeness of use of the recommendations contained in the "Information Document" were referenced with the specificity of natural, political and socio-economic conditions of Belarus as well as with the need for accelerated development of the Report. Considering also the present absence of an absolutely versatile plan, international criteria and indicators for the preparation of national reports, the First National Report is devoted, predominantly,

(keeping in mind that this is the first report that will be used as a benchmark for future reports) to characterisation of the status and trends in the dynamics of biological diversity, the assessment of biological resources and their use, the analysis of the basic causes of loss of, and threat to, biological diversity as well as to the development of the most important directions of activities on conservation and sustainable use of biological diversity in Belarus and to their relevance to local, national and international objectives,

I MOST IMPORTANT GENERAL MEASURES TAKEN FOR THE IMPLEMENTATION OF ARTICLE 6 OF THE CONVENTION ON BIOLOGICAL DIVERSITY

For the purpose of effective participation of the Republic of Belarus in solving the global problem of conservation of biological diversity and co-ordination of activities at the national level, the Cabinet of Ministers of the Republic of Belarus passed the Decree (No. 470 dated August 28th, 1995) "On Measures for Ensuring the Implementation by the Republic of Belarus of Commitments Stemming from the Convention on Biological Diversity (Rio-de-Janeiro, 1992)". In compliance with this Decree, the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus, the National Academy of Sciences of the Republic of Belarus, relevant ministries and other central bodies of government concerned were ordered to develop in 19951996 and submit, according to the prescribed procedure, to the Cabinet of Ministers of the Republic of Belarus a draft National Strategy and Action Plan for the Conservation and Sustainable Use of Biological Diversity.

It should be noted that this work had been preceded by a number of Republican Conferences: "Problems of Conservation of Biological Diversity in Belarus" (Minsk, 9-11 November 1993, held by the Ministry of Natural Resources and Environmental Protection and the Academy of Sciences of Belarus); "Problems of Study, Conservation and Use of Wildlife Biological Diversity " (Minsk, 27-29 September 1994, held by the Institute of Zoology of the Academy of Sciences of Belarus and the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus).

The above mentioned Decree of the Cabinet of Ministers of the Republic of Belarus stipulated that the organisation of implementation by the Republic of Belarus of the commitments stemming from the Convention on Biological Diversity should be imposed on the Ministry of Natural Resources and Environmental Protection whereas the scientific grounds for the implementation of the Convention should be provided by the National Academy of Sciences. This Decree also set up the Republican Commission on Problems of Biological Diversity (the Chairman of the Commission is Mr. V.M. Podolyako, Deputy Minister of Natural Resources and Environmental Protection, the Deputy Chairman is Mr. M.M. Pikulik, Director of the Institute of Zoology of the National Academy of Sciences). The Cabinet of Ministers of the Republic of Belarus approved the regulation that specifies that the Republican Commission on Problems of Biological Diversity shall be the co-ordinating body of the concerned ministries and other central bodies of government for securing concerted actions for the fulfilment of the National Strategy and Action Plan for the Conservation and Sustainable Use of Biological Diversity. The main tasks set to the Commission included: examination of proposals on the formulation and implementation of the National Strategy and Action Plan for the Conservation and Sustainable Use of Biological Diversity; analysis of the state of activities and control over the implementation of measures and actions aimed at fulfilling the commitments of the Republic of Belarus stemming from the Convention on Biological Diversity.

Under the auspices of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus, the National Academy of Sciences of Belarus and the Republican Commission on Problems of Biological Diversity,. the structure was developed and the draft National Strategy and Action Plan for the Conservation and Sustainable Use of Biological Diversity in Belarus was prepared. The draft National Strategy (in its brief version) has been widely discussed (published in the newspaper "Naviny Akademiyi Navuk Belarusi" ("News of the Academy of Sciences of Belarus"), No. 43-44, November 1996, pp. 3-8) and agreed by the respective ministries and departments.

Decree No 789 of the Council of Ministers of the Republic of Belarus dated June 26th, 1997, approved the National Strategy and Action Plan for the Conservation and Sustainable Use of Biological Diversity in the Republic of Belarus. This Decree also instructed ministries and other republican bodies of the government, the Oblast Executive Committees and the Minsk City Executive Committee to elaborate and approve, within three months, the list of first-priority measures aimed at implementing the Action Plan

for the Conservation and Sustainable Use of Biological Diversity in the Republic of Belarus. This List was received and summarised by the Ministry of Natural Resources and Environmental Protection Of the Republic of Belarus. A brief analysis of this List is given in Chapter VIII of this Report.

By July 1997, the group of scientists and specialists of Belarus (the leading organisation was the institute of Zoology of the National Academy of Sciences of Belarus; the scientific leader of the work was M.M. Pikulik, the co-ordination and scientific editing was performed by M.Ye. Nikiforov) had prepared and, by now, has published the Analytical Report called "Status and Use of Biological Diversity in the Republic of Belarus" with a view of preparing the First National Report on the Implementation of the Convention on Biological Diversity.

Issues of conservation and sustainable use of biological diversity have been reflected in the Concept of the National Strategy of Sustainable Development of the Republic of Belarus (approved at the meeting of the National Commission on Sustainable Development on September 13th, 1996, Protocol No. 2) and in the National Strategy of Sustainable Development of the Republic of Belarus (Section 3, Conservation and Rational Use of Natural Resources, Protection of the Environment).

A National Seminar devoted to the issues of implementation of the National Strategy and Action Plan for the Conservation and Sustainable Use of Biological Diversity in Belarus and to discuss the main provisions of the First National Report on the Implementation of the Convention on Biological Diversity in Belarus (Minsk, March 26th, 1997) was held within the framework of implementation of the Joint Project GF/1200-96-63 of the UNEP and the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus called "Dissemination of the National Strategy and Action Plan on Biological Diversity and Preparation of the First National Report to the Conference of the Parties to the Convention on Biological Diversity and establishment of the Clearing-House Mechanism". The proposals and amendments put forward at the National Seminar by its participants as well as by the international expert, IUCN Regional Director Mr. Zbigniew Karpowicz, were, mostly, taken into account during the final development of the First National Report on the Implementation of the Convention on Biological Diversity in Belarus.

Issues related to the preparation and implementation of the National Strategy and Action Plan for the Conservation and Sustainable Use of Biological Diversity in Belarus have been included into programmes of basic and applied research, and discussed at a number of conferences: the Regional Scientific-Practical Conference "Conservation of Biological Diversity of the Belarusian Lake District: (held in Vitebsk on 25-25 April 1996); the International Conference "Ten Years after the Chernobyl Catastrophe" (held in Minsk on 7-12 October 1996); the International Conference on Ecology and Protection of Floodplains and Low Mires of Polessye" (held in Minsk on 21-25 May 1997, with the assistance of the Environment Conservation Foundation of Michael Otto, Hamburg); the Sixth Conference of National MAB Committees of Europe and North America) (Euro MAB-VI); the Scientific Symposium 'Use and Conservation of Biological Resources" (held in Minsk on 16-20 September 1997); the International Scientific-Practical Conference "Protected Natural Territories and Facilities of the Belarusian Lake District" (held in Vitebsk on 25-27 November 1997); the International Scientific Conference "Forest Science on the Eve of 21st Century" (held in Gomel on 16-17 December 1997); the International Conference "Conservation of Biological Diversity in Unprotected Natural Territories" (held in Grodno on 21-22 February 1998; Western Belarus Partnership on Protection of Birds); the International Seminar 'Programme of Sustainable Development for Pripyat-Yaselda Region" (held in Minsk on 10-l 1 March 1998) with the assistance of Wetlands International and European Post-Diploma Courses on Ecological Management (Netherlands).

It is planned to hold the International Scientific Conference "Contemporary Problems of Study, Use and Protection of Natural Complexes of Polessye" (Minsk, September 1998).

II ORGANISATION OF, AND PARTICIPATION OF THE STATE STRUCTURES, NON-GOVERNMENTAL ORGANISATIONS AND PUBLIC ORGANISATIONS IN THE PREPARATION AND IMPLEMENTATION OF "THE NATIONAL STRATEGY AND ACTION PLAN FOR THE CONSERVATION AND SUSTAINABLE USE OF BIOLOGICAL DIVERSITY IN THE REPUBLIC OF BELARUS" AND OF "THE FIRST NATIONAL REPORT ON THE IMPLEMENTATION OF THE CONVENTION ON BIOLOGICAL DIVERSITY IN BELARUS"

The National Strategy and Action Plan for the Conservation and Sustainable Use of Biological Diversity in the Republic of Belarus (NBSAP) has been developed in conformity with Decree No. 470 of the Cabinet of Ministers of the Republic of Belarus dated September 28th, 1995, by the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus, the National Academy of Sciences of Belarus and the Republican Commission on Problems of Biological Diversity. At the stage of co-ordination and agreement this work was done with participation of respective organisations as well as of other central bodies of government. The work on the development of the NBSAP has been performed, on instruction of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus (the leading executive organisation was the Institute of Zoology of the NAS of Belarus), by the group of scientists and specialists of the Republic:

scientific leader M.M.Pikulik, member-correspondent of the NAS of Belarus, Institute of Zoology of the NAS of Belarus;

deputy scientific leader,
co-ordinator and executive, M.Ye.Nikiforov, Institute of Zoology of the NAS of Belarus;

co-ordinator and executive V.B.Petukhov, Institute of Zoology of the NAS of Belarus;

co-ordinator V.M.Podolyako,RB Ministry of Natural Resources and Environmental Protection;

executives:
I.V.Voytov, RB Ministry of Natural Resources and Environmental Protection,
A.I.Luchkov and
A.M.Maksimovich, Department of Affairs of the President of the Republic of Belarus;
N.N.Bambalov, Institute of Problems of Use of Natural Resources and Ecology of the NAS of Belarus;
D.S.Golod and
G.F.Rykovsky, Institute of Experimental Botany of the NAS of Belarus;
A.P.Yermishin, Institute of Genetics and Cytology of the NAS of Belarus;
V.N.Doroshkevich and
L.N.Moroz, Belarusian Institute of Town Planning;
B.M.Dyskin and
N.A.Yurgenson, Belarusian Research Institute of Town Planning;
S.B.Kochanovsky and
L.I.Shershen, Research Institute of Economic Problems of the RB Ministry of Economics;
I.K.Lopatin and
V.M.Yatsukhno,Belarusian State University;
A.V.Neverov, Belarusian Technological University.

Other specialists who have taken part in this work:

A.N.Rachevsky, V.K.Savitsky, I.M.Kachanovsky and Z.F.Muravyov,	RB Ministry of Natural Resources and Environmental Protection;
I.P.Vaneyeva and Ye.I.Kislova,	Institute of Economic Problems of the RB Ministry of Economics;
P.G.Kozlo, A.V.Kozulin, V.Ye.Sidorovich, E.I.Khotko, T.M.Shevtsova,	Institute of Zoology of the NAS of Belarus;
A.N.Skuratovich,	Institute of Experimental Botany of the NAS of Belarus;
B.V.Yaminsky,	Scientific and Production Center "Veras-Eco".

A number of provisions of the NBSAP are based on decisions and resolutions of conferences and seminars held in Belarus and devoted to problems connected with issues of conservation and use of biological resources (see Section I).

The Draft National Report on the Implementation of the Convention on Biological Diversity in Belarus has been prepared on the basis on materials of the NBSAP and the published Analytical Report "Condition and Use of Biological Diversity in the Republic of Belarus" by the group of scientists and specialists including:

M.M.Pikulik (scientific leader),
G.G.Baranets,
D.S.Golod,
M.Ye.Nikiforov,
A.V.Kozulin,
M.V.Kuzmenkov,
V.I.Parfenov,
V.F.Pobirushko,
V.Ye.Roshchin,
G.F.Rykovsky,
Ye.P.Khlyustunova,
N.A.Yurgenson,
V.M.Yatsukhno.

The Draft Report was discussed at the National Seminar and then finalised with account of principal remarks and proposals put forward by the Seminar participants (N.I.Astapovich, L.V.Khotyleva, A.Kartel, and others) as well as by the international expert, IUCN Regional Director Mr. Z.Karpowicz.

Primary measures and actions aimed at fulfilling the Action Plan for the Conservation and Sustainable Use of Biological Diversity in the Republic of Belarus have been developed and approved by: the Oblast Executive Committees, Ministries and Departments (see Section VIII). They have been published as a separate publication (500 copies).

Some activities connected with the NBSAP tasks are carried on by certain public organisations: the Scientific Council on Problems of Biosphere of the NAS of Belarus; the Ecological Commission of the NAS of Belarus; the Belarusian National Committee on UNESCO Programme "Man and Biosphere" (MAB); the Belarusian Society of Nature Protection (BSNP) represented by the Republican, Oblast, town and region councils; the Belarusian Society of Hunters and Fishermen (BSHF), the Belarusian Entomology Society, the Belarusian Ornithology Society, and other public organisations.

III MAIN APPROACHES TO THE PREPARATION AND TO THE OBJECTIVES AND PRIORITIES OF "THE NATIONAL STRATEGY AND ACTION PLAN FOR THE CONSERVATION AND SUSTAINABLE USE OF BIOLOGICAL DIVERSITY IN THE REPUBLIC OF BELARUS"

The basic approach to the preparation of the National Strategy and Action Plan and its most important objective is a comprehensive approach to the implementation of three tasks included in the Convention on Biological Diversity: conservation of biological diversity, sustainable use of its components, equitable sharing of benefits of biological diversity (Article 1 of the Convention). In so doing, full account was made of the provisions of the Preamble to the Convention, as well as explanation of the principle stating that the states should have the sovereign right to develop their own resources in compliance with their environmental policy and bear responsibility for assuring that activities exercised within their jurisdiction or under their control should not cause damage to tbe environment of other states or regions that are beyond the national jurisdiction (Article 3 of the Convention).

To be able to conserve biological diversity and make rational use of it, it is necessary to understand the condition, structural and functional organisation, trends of dynamics of biological diversity and their causes. This important approach to the formation of the National Strategy and Action Plan as well as to the preparation of the First National Report on the Implementation of the Convention on Biological Diversity conditioned the necessity for a rather detailed characterisation of biological diversity in Belarus, assessment of biological resources, their use and trends of dynamics, detection of the main causes of loss of, and threat to, the biological diversity.

The most important directions for practical implementation of measures on conservation and maintenance of biological diversity in the Republic of Belarus include the use of the landscape approach. This is connected with the circumstance that at the regional and local levels of environment organisation, species and ecosystem richness of organisms is predetermined by the natural diversity of landscape structures.

The landscape approach is especially important in forming territorial systems for conservation of biological diversity, in particular in defining spatial combinations of differently transformed territories and natural ecosystems.

The most important priorities of the NBSAP are:

- assuring maximum possible biological diversity at different levels of its organisation;
- attaining sustainable and non-exhausting use of natural resources on the basis of optimisation of the comprehensive and harmonious approach that combines protection and use of the most important components of biological diversity;
- delineating unique and conserved large areas of typical ecosystems having important significance for conservation of biological diversity and natural population of Europe;
- along with the development of the system of specially protected natural territories, the ecological optimisation of various types of economic activities should also be assigned the predominant importance in conservation of biological diversity;
- ecological education and awareness.

Approaches to the formation, and objectives and priorities of NBSAP were also based on the assessment of the contemporary state of the problem of conservation and use of biological diversity in Belarus:

a) Change of the policy and socio-economic foundations for conservation and sustainable use of biological diversity

The concept of the ecological policy in Belarus is determined by the dominant and basic Law of the Republic of Belarus "On Protection of the Environment". Predominance of the governmental property on land and prevalence of large land owners represented by collective and state farms, that was seen not long ago, led to an extreme enlargement of plots of land, an increase of the share of natural ecosystems in them, an increase of the number and the density of infrastructure elements in landscapes and a growth of material and energy loads on the land in use. In the long run, this fact conditioned a marked reduction of natural mosaic character of landscapes and the decrease of biological diversity of ecosystems in some regions of Belarus to a critical level.

Passing by the Republic of Belarus of the Code on Land (1991) and the Law of the Republic of Belarus "On the Right of Ownership for Land" (1993) laid the legal foundation for the formation of other forms of land ownership (including private ownership) which can lead, gradually, to a normal change of the spatial structure and the functional purpose of landscapes.

It should be admitted that during the initial stages of land reform in Belarus, it often happens that incorrect territory-planning decisions are taken regarding the formation of new forms of land use. For example, the land fund of private farms is often created on boggy or bush-covered areas that have low fertility of soil. However, such territories play an important environment-protection role including the maintenance of biological diversity of ecosystems. This confirms the necessity to preserve the regulation by the State in the sphere of land planning and use.

b) Legal regulatory basis and its efficiency

Legal regulation of relationship on the conservation of biological diversity in the Republic of Belarus is effected through general and special legislative and other complementary regulatory acts on land use and environmental protection as well as through individual legal standards contained in administrative and criminal legislation. The general legislative acts include the Water Code dated December 27th, 1972, the Code on Subterranean Resources dated June 18th, 1976, the Code on Land dated February 11th, 1990, and the Forestry Code that is being developed now. They stipulate, with a different degree of detailing, the use and protection of water, subterranean resources, forests and lands together with their pertinent growing and inhabiting representatives of flora and fauna.

Special legislative acts on the conservation of biological diversity are the Laws of the Republic of Belarus "On Protection of the Environment" dated November 26th, 1992, "On Specially Protected Natural Territories and Facilities" dated October 20th, 1994, "On Protection and Use of Wildlife" dated September 6th, 1996, and "On State Ecological Expertise" dated June 18th, 1993. The basic standardisation material on biological diversity is concentrated in complementing regulatory acts like decrees, regulations, rules or instructions. However, these documents were, first of all, approved at different time by the Government, ministries or state committees, therefore, they are not always mutually correlated and sometime contain contradictory provisions. Secondly, a part of legal acts is not based on laws or do not correspond to modern general and special legislative acts. Thirdly, until now certain legal acts that have been approved by the former USSR authorities have not been enforced which requires their review and approval on the basis of the passed laws without any delay.

Administrative and criminal legislation incorporate articles on liability for poaching, extermination of rare animals and birds, etc.

Control over the observance of legislation related to the conservation of biological diversity is entrusted to central and local bodies of state power, state government and self-government which makes this management function unclear and decreases its efficacy. This can be explained by a declarative nature of legal ecological-control standards, multiplicity and lack of definition of the powers of controlling entities that often substitute or duplicate each other as well as by the availability of legal voids in issues of control over the condition of biological diversity. Budgetary and financial legislation also needs further improvement. On the whole, expenses allocated for organising environmental protection constitute about 1 % of the gross national income.

International treaties and agreements. In June 1993, the Supreme Council of the Republic of Belarus ratified the Convention on Biological Diversity, Articles 5 and18 of which stipulate co-operation, either direct or through competent international organisation, for the purpose of conservation and sustainable use of biological diversity. These organisations include UNEP, UN/UNESCO Programme "Man and Biosphere" (MAB), International Union on Conservation of Nature (IUCN), etc.

The Republic of Belarus and its representatives represented by governmental and non-governmental organisations carry on international co-operation within the frameworks of the following conventions that are related to biological diversity and its conservation:

- The Convention on Protection of the World Cultural and Natural Heritage also known as the Paris Convention (1972);
- The Convention on Wetlands of International Importance Especially of Waterfowl Habitat, also known as the Ramsar Convention (1971) (Belarus is making preparations for its signing);
- The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), also known as the Washington Convention (1973);
- The Convention on Conservation of Migratory Species of Wild Animals (CMS), also known as Bonn Convention (1979).

The Republic of Belarus ratified Paris (1972) and Washington (1994) conventions. At present, issues related to joining to other conventions and agreements are discussed.

c) Preservation of species in the natural habitat and growth environment ("in-situ")

By 1995 the total area of specially protected natural territories had reached half the area planned and approved by the Government in the "Plan of Rational Location of Specially Protected Natural Territories of the Republic of Belarus" as corrected in 1995. Reserves for further development of the network of protected natural territories remain significant and are represented by the actual implementation of goals included into the plan for expansion and rationalisation of this network.

d) Ex-situ conservation of biological diversity

One of the important ways for conservation and restoration of rare species of plants is the introduction of these species into botanic gardens. Practically the sole organisation that makes serious bioecological studies in the culture of rare and protected species of plants is the Central Botanic Garden of the Academy of Sciences of Belarus. Introduction testing has been applied here to about 100 rare species of local flora, of which about 60 are recorded in the Red Data Book of Belarus.

The Belarusian Research Institute of Fruit-Growing has a collection of wild species and types of apple-trees which includes over 300 specimens as well as 1,500 selected hybrids that have been grown by crossing wild species with cultivated types. This Institute has also collected about 250 types of pears, 200 types of plums, about 160 types of cherries, 40 types of crab cherries, 42 types of apricots, 270 types of grapes and, in addition, types of walnuts and other fruit and berry plants. The Institute possesses hybrid materials that require no expenses for chemical protection against pests and diseases and can be used as the basis for obtaining ecologically pure products.

At present, the Institute of Microbiology of the Academy of Sciences of Belarus maintains about 1,000 strains of microorganisms that are destructors of specially toxic compounds contaminating a substantial part of the territory of Belarus. The collection of the Institute of Microbiology maintains also more than 500 typical, reference and industrially useful strains of microorganisms, including strains that produce ferments (peptinase, cellulase, lipase, esterase) of protein, lipids, caratinoids, ethanol and other microbial diversity. Special attention should be paid to the studies of groups of microorganisms that participate in restoration of ecosystems covered by human activities. The value of this collection is in the unique features of extracted strains characteristic only of the territory of the Republic.

e) Ecological education and public awareness activities

Activities in the sphere of information and education of the population and ecological education programmes. Priority of ecological education, mandatory introduction of environment-protection disciplines in all educational institutions, the principle of taking into consideration of ecological knowledge when certifying managers or heads in the sphere of production are incorporated into the Laws of the Republic of Belarus "On Education" and "On Protection of the Environment". In 1991 the Government approved the Republican Programme on education in the sphere of environmental protection which defines the objectives and principles of organisation of ecological education and sets the task to introduce compulsory environment-protection courses in all forms of education. In compliance with this Programme, elements of knowledge about nature are included into the currently implemented "Programme of Education and Upbringing in the Kindergartens". Vocational schools and secondary educational establishments have a special course "Protection of the Environment and Rational Use of Natural Resources". A number of higher educational institutions have opened new chairs for ecological orientation. The Biological Department of the Belarusian State University has been training ecologists having higher education diplomas for 20 years. Courses of ecology and environmental protection are lectured at the Geographic Department of the Belarusian State University and the Belarusian Technological University.

A serious role in schools and higher educational institutions of the Republic is played by awareness work carried by nature museums. The zoological museum of the Belarusian State University (the Chair of Zoology of the Biology Department) is the centre of storage and study of fauna collections that represent the fund materials.

Ecological topics occupy a definite place at lessons given at various personnel refreshment and skill improvement courses. Important role has been assigned, recently, to national and international seminars and scientific-practical conferences on environmental protection. Belarus, with the participation and financial support by a number of international organisations, has organised seminars on economic reforms and environment, on strategy of the Republic of Belarus in environmental protection, on urgent problems of conservation of biological diversity, decrease of production and use of ozone-depleting substances, practical issues of development of national projects in the sphere of environment, transport, ecology, etc. Detailed information on the condition of natural resources and environment is contained in annual statistical reports as well as in summary reports on the balance stocks of mineral materials provided at the beginning of each year in the book "State Forestry Fund of the Republic of Belarus" (account of the forestry stock is made every 5 years).

Assessment of ecological activity and ecological education level of various social strata of population. Citizens respond differently to the problem of conservation of wild nature and, in general, to change of the environment quality. However, according to social surveys the majority of people are indifferent to ecological problems. And, although recent years have been marked by a growing interest of the public in this problem, nevertheless, domination of user-type orientation and of efforts aimed at achieving a higher standard of living remain, mostly, unchanged.

Participation of mass media in ecological education and propaganda. Periodicals, -radio and television are able to fulfil the educational function among the broad strata of population in the most effective way, but so far, the ecological theme in the work of the mass media occupies a subordinated place. Fast information on ecological problems is brought to the population through mass media: the oldest ecological magazine "Rodnaya Priroda" ("Our Nature"), the republican newspaper "Ekologichesky Vestnik" ("Ecological News"), the newspapers "Ekologia Minska" ("Ecology of Minsk"), monthly radio magazine "Rodnaya Priroda" ("Our Nature"). These issues are discussed, on a more or less regular basis, by the television and some republican newspapers.

f) The degree of study and problems of understanding biological diversity

The state of study and inventory of various taxonomic groups. At present, the results have been summarised that are related to the study of species composition of flora of higher plants and fauna of vertebrate animals (fish, amphibians, reptiles, birds and mammals) of Belarus. There are summaries and definitions although most of them require updating and bettering. A number of collective monographs and definitions on individual groups of insects have been published.

As regards availability of specialists, the least manned sphere is the one dealing with study of biological diversity of invertebrates. For majority of classes, there are no systemic specialists who are not trained in the Republic, with few exceptions. There is no a single region with a studied fauna including reserves. Hence, difficulties in defining the population of specific species, including rare and endangered species. In such conditions, populations and even species may vanish unnoticed.

Organisation of monitoring of the biological diversity condition. The Republic does not have a uniform system of biological diversity monitoring. However, at present, active preliminary work is under way to organise such monitoring within the frameworks of creation of the National System of environment monitoring. Irrespective of this, already in existence are the state and departmental local networks of forest monitoring as well as elements of networks for monitoring of meadow and water vegetation. However, there are no special programmes for monitoring of water, meadow and other categories of vegetation.

Systems that most of all correspond to the tasks of monitoring at present are the system of observation over the condition of a series of populations, first of all, economically valuable species of animals (hooves and mammals living near water, hens and waterfowls, as well as some others) and rare and endangered species. Such system exists in reserves, the National Park 'Belovezhskaya Pushcha" and individual, though small, game facilities (Babinovichskoye, Moshanskoye, Negorelskoye, Teterinskoye, etc.) that have efficacious hunting departments. As regards fish, only industrial monitoring has been carried on.

Development of scientific grounds of state control over The Status and Use of Biological diversitv. For the purpose of better organisation of state control over the condition and use of natural resources in Belarus, there has been introduced the practice of the following state cadasters: forest, wildlife, vegetation and peat-reserve cadasters.

The most pertinent to the preservation of biological diversity are the state cadasters of wildlife and vegetation. It should be noted that at present the development and formation of the wildlife cadaster is at the final stage.

g) Scientific information on biological diversity in Belarus, its basic places of keeping, forms of keeping, updating and processing

Gathering of scientific information on biological diversity in Belarus is carried out by the following institutions that are also the basic places of its keeping: the research institutions of the Belarusian Academy of Sciences (Institute of Zoology, Institute of Forestry, Institute of Problems of Use of Natural Resources and Ecology, Institute of Experimental Botany, etc.), the Academy of Agrarian Sciences, the Ministry of Health, higher educational institutions of the Ministry of Education, institutions and divisions of the Ministry of Natural Resources and Environmental Protection (the Belarusian Research Centre "Ecology", the Chief Committee on Hydrometeorology, the Republican Centre of Radiation Control and Monitoring of Contamination of the Environment, and others), National Parks and Reserves, research and production enterprises, centres and amalgamations (Scientific and Production Amalgamation "Forestry Sericulture", Scientific and Production Enterprise "Animal Breeding Centre" ("Zverocentre"), Scientific and Production Ecological Centre "Veras-Eco", etc.).

Scientific collections and herbariums of species. The Central Botanic Garden of the Academy of Sciences of Belarus has more than 9 thousand species, forms and kinds of trees and bushes, ornamental, technical, fodder, spice-aromatic and medicinal plants. Dendrological collections include more than 1,500 taxons. An arboretum has been organised that houses about 500 species and forms of East Asian flora and more than 400 species of North American flora. Collections of introduced plants have also been compiled in the Belarusian Agricultural Academy, Zhornovo Forestry Experimental Station, in botanic gardens of the Belarusian State University (Minsk Region), the Belarusian Technological University (Negoreloye Forestry), in old parks (Gomel, Nesvizh, village of Porechye of Pinsk Region, village of Verdolichi of Svisloch Region, etc.). Collection of introduced herbaceous plants are located in the Institute of Genetics and Cytology of the Academy of Sciences of Belarus, the Belarusian Research Institute of Potato Growing, the Belarusian Research Institute of Farming, the Belarusian Research Institute of Land Cultivation, etc.

Collection reserves of Belarus constitute up to 400 thousand herbarium specimens. The Institute of Experimental Botany of the National Academy of Sciences of Belarus includes about 300 thousand herbarium specimens of natural flora including more than 100 thousand vascular plants, 30 thousand mosses, 140 thousand lichens, and 40 thousand fungi. A herbarium of introduced species is kept in the Central Botanic Garden of the National Academy of Sciences of Belarus; herbariums of local plants and of neighbouring countries are kept in the Belarusian State University (Minsk), Gomel University, Brest Pedagogical University, Vitebsk Pedagogical University as well as in the Forestry Reserves (Berezina and Pripyat) and the National Natural Park “Belovezhskaya Pushcha”.

Mass-scale zoological collections are concentrated in the Zoological Museum of the Belarusian State University and the Institute of Zoology of the National Academy of Sciences (NAS) of Belarus.

IV GENERAL CHARACTERISATION OF BIOLOGICAL DIVERSITY IN BELARUS

1. Formation of biological diversity

After the Dnieper glacial period and the follow-up period of warming, glacials invaded the territory of Belarus two times, radically transforming the landscapes, vegetation and animal worlds. This happened 220-110 thousand years ago, respectively, (Sozh or Moscow glacial period) and 95-10 thousand years ago (Lake or Valday glacial period). Therefore, the final formation of the contemporary flora and fauna took place in the post-glacial period: Holocene that came about IO-8 thousand years ago.

Since the last glacials did not cover the entire territory of Belarus, some natural complexes in the south (Polessye) have a more ancient history of formation than complexes of the northern Belarus, the Lake District.

The whole territory of Belarus includes boundaries not only of the ancient glacial periods but also of the largest water sheds between the Black and Baltic sea basins. These determining historic and geographic factors have exerted and continue to exert a huge impact on the formation, differentiation and dynamics of biological diversity of the country.

Beginning from the early 17th century, more than 20 species of terrestrial vertebrates have vanished from the territory of Belarus because of changes of abiotic factors and impact of human activities. This has been especially felt over the last one hundred years.

Over the last 80 years, 60 species of terrestrial vertebrates that were known to occur in Belarus in the past have not been detected; over the last 50-60 years, 106 other species have not been registered, and, in the last 20 years, 72 other species of terrestrial invertebrates have not been detected meaning that they either have vanished or have become very rare. Thus, 238 species that inhabited Belarus in the past have not been confirmed on its territory.

Over the last 100-120 years, under the influence of a number of anthropogenic factors, 46 species of indigenous vascular plants have been withdrawn from the Belarusian flora, although over this same time, and especially over the last few decades, this flora has been complemented with a significantly larger amount of adventitious species as a result of a widely developed synanthropisation process representing the main tendency of the modern dynamics of flora.

2. Contemporary condition of flora and trends of its dynamics

The vegetation world of Belarus includes up to 11.5 thousand species of plants, among which higher plants constitute up to 2,100 species and lower plants constitute about 9,000-9,400 species (Fig. IV.l). Vascular plant flora includes 1,638 species with the herb plants being absolutely dominant constituting about 1,500 species. Of wood plants, 107 are wild indigenous species, of which 28 are trees and others are bushes, shrubs, and dwarf shrubs.

Relicts and restricted-spreading species

Endemic species of plants in the Belarusian flora are absent, however, there are relicts that represent various flora of past epochs and had, here, suitable conditions for their development, therefore, they were more widely spread. Among vascular plants, rare relict species represent more than 130 (8 % of flora) of which 124 are included into the Red Data Book of the Republic of Belarus (1993).

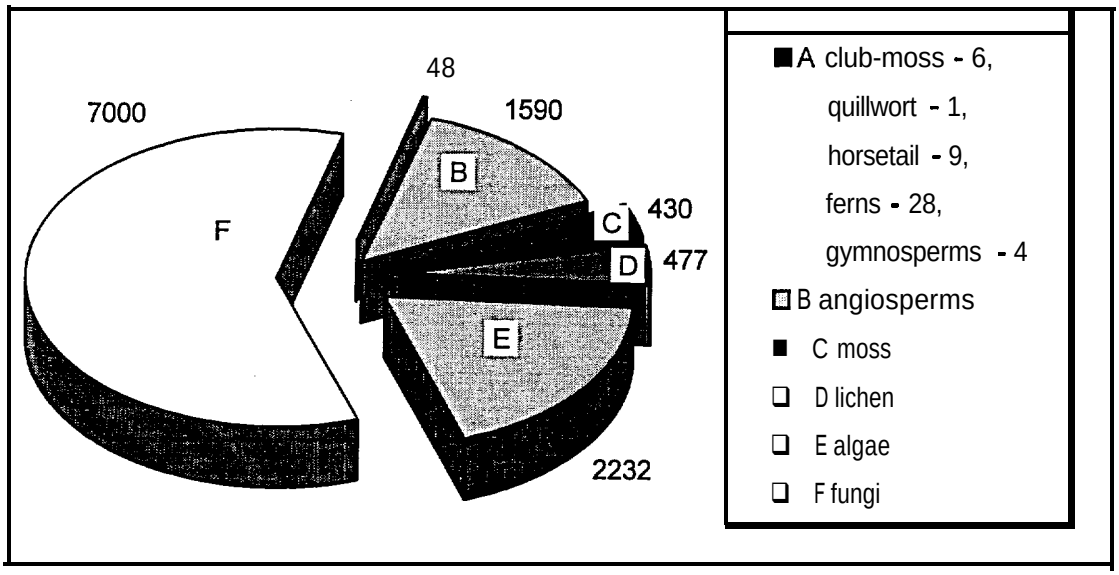


Fig. IV.l: Diversity of Belarusian flora (ratio of the number of species per taxon)

Rare and endangered species

At the national level, the number of plant species under protection constitutes 214 species that are in danger of vanishing to a greater or smaller extent and, therefore, included into the Red Data Book of Belarus (1992). Of them, 171 higher plants and 43 lower plants (Fig. IV.2).

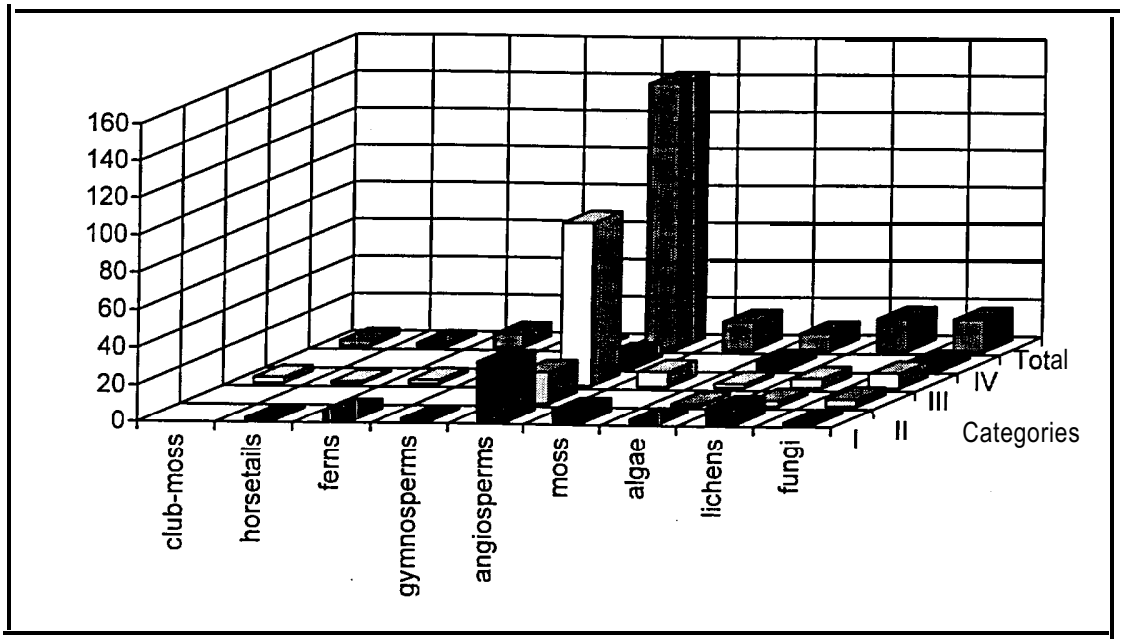


Fig. IV.2: Number of species of plants of various taxons in the Red Data Book

Invasive and introduced species

Only in the last decade in Belarus have been found more than 120 species of new, predominantly invasive (adventitious) plants. Adventitious plants are connected with the leading tendency in the modem development of Belarusian flora, that is, synanthropisation. Over a relatively brief period of time (about 100 years) the number of synanthropic species has increased by more than 2.5 times. Invasive plants among them constitute 317 new species.

On the territory of Belarus, the number of introduced species includes 1.5 thousand species and forms of wood, bush and shrub plants and more than 5 thousand species, forms and kinds of herbaceous plants. Important among them are food plants (rye, wheat, potato, buckwheat, carrot, cucumbers, kidney beans, tomatoes, pears, plums, etc.), fodder plants (oats, barley, vetch, beans, peas, corn), technical plants (sugar beet, mustard, Russian turnip, etc.), and decorative plants (pine, fir, spruce fir, larch, lilac, roses, tulips, gladiolus, etc.).

3. Contemporary condition of fauna and tendency of its dynamics

Fauna of Belarus is characterised by absence of endemic species since, due to devastating glacial periods of the Pleistocene epoch, all species penetrated here from the neighbouring territories in different times. At present, this flora represents a mixture of faunistic complexes belonging to 3 types of endemic fauna: European, Siberian and Mediterranean. A number of axonomic groups have preserved a small amount of relict species.

An indicator of biological diversity of the wildlife in Belarus is the presence of 453 species of vertebrate animals (Fig. IV.3) and more than 30 thousand species of invertebrates from different groups (protozoans, peariwort, mollusks, worms, insects, spiders, crustaceans and other arthropods).

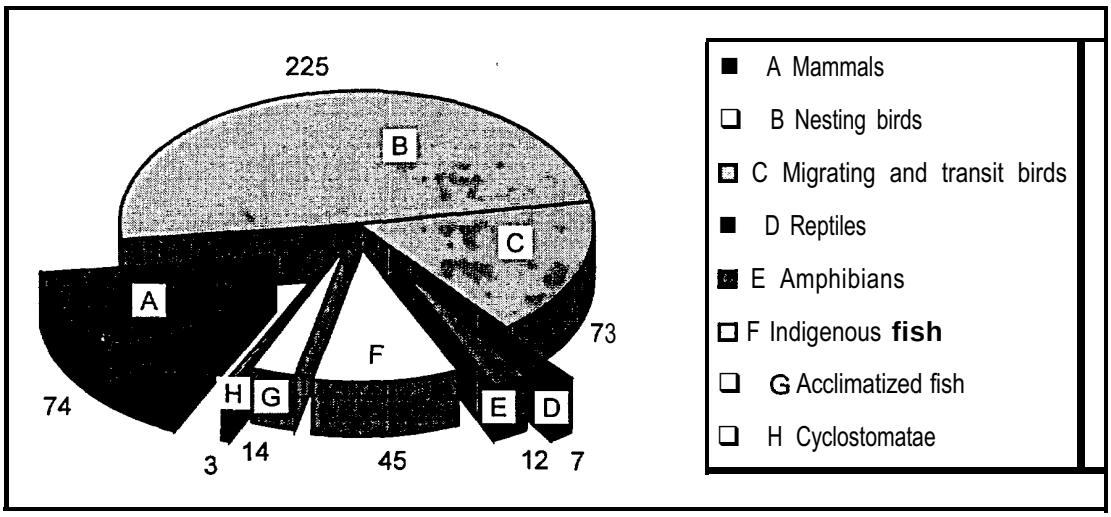


Fig. IV.3: Diversity of fauna of vertebrates in Belarus (ratio of the number of species per taxon)

Rare and endangered species

The Red Data Book of the Republic of Belarus includes 97 species of vertebrates and 85 species invertebrates (Fig. IV.4) that are present in the territory of the country in the most endangered state.

Such species as Central European wood cat, desman and bustard that were excluded from the second edition of the Red Data Book are referred to the species that have vanished from the territory of Belarus. However, if discovered, they come under the status of protected species and are liable to mandatory protection.

A great number of species of animals, especially of birds, have, in addition to the national, the international protection status (global or European) and are liable to protection in accordance with different international conventions (Table IV.I).

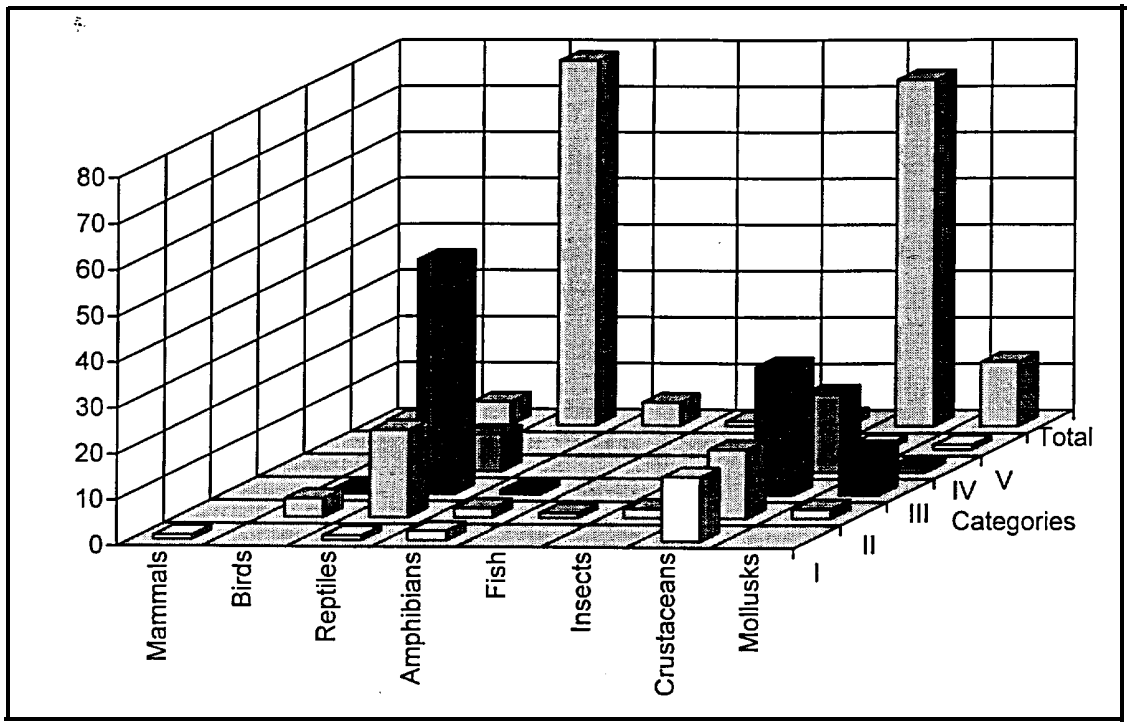


Fig. IV.4: Number of species of animals of different taxons registered in the Red Data **Book**

Table IV.I: Number of species of animals having international protection status

Convention	Taxonomic groups	Status category	Number of species
Species of European Conservation Concern (SPEC)	Birds	I II II IV	7 15 74 56
CITES	Mammals	I	1
		II	3
	Birds	I	2
		II	42
Bern Convention	Birds	II	113
		III	34
Bonn Convention	Birds	I	2
		II	156

Invasive and introduced species

Fauna of Belarus is not characterised by a great diversity of invasive or introduced species. The latter include 4 species of mammals that have been successfully acclimatised as hunting species: racoon dog (Nyctereutes procyonoides), common racoon (Procyon lotor), American mink (mustela lutreola) and musk beaver (Ondatra zibethica). Attempts made in 1951 to acclimatise the Siberian form of squirrel failed. The noble deer (Cerphus elaphus) was re-acclimatised in the middle of last century after it had been exterminated. Attempts to re-acclimatise another species, i.e., desman (Desmana moschata) made in 1955, 1959 and 1961-62, evidently, turned out to be unsuccessful.

At present, the ichthyofauna includes 14 species of fish that were introduced, at different times, into water reservoirs of Belarus for pisciculture purposes.

Of the total number of fish, invasive species include ratan gob (Eleotris family), inhabiting water reservoirs of the Far East and the Amur River basin, that was introduced into Belarusian water reservoirs as a result of uncontrolled spreading of aqueous invertebrates and fish.

In 1997 in the western part of Belarus, a new species of decapod crayfish was detected, i.e., American crayfish (Orconectes limosus) that is spreading to this area from Western Europe as an invasive species.

Migratory species

Of all groups of animals of Belarus, migratory, i.e. those who make regular movement for significant distances, include a number of birds and, from mammals, bats. Part of migratory birds make their nests on the territory of the country and make regular flies for winter seasons and back (104 species), whereas some birds do not make their nests here, but only fly in transit during period of seasonal migration (22 species).

The flood area of the Pripyat River is one of the most important European migration river beds for waterfowl. According to preliminary assessment, this way is used every year for migration by 50 thousand geese, 30-50 thousand wigeons, 70 thousand ruffs and a great number of other water and marsh species. Another important river bed for migratory birds is the floodplain of the Dnieper River that flows from north to south, however, additional researches are needed to determine the importance of this flying way.

4. Structural and functional diversity of ecosystems

Geographic situation and climatic conditions of Belarus have stipulated the predominance on its territory of forest and aqueous bog-related ecosystems (Fig. IV.5). As early as in the middle of 18th century, the area of forests was 2 times larger than today and constituted more than 74% of the entire territory.

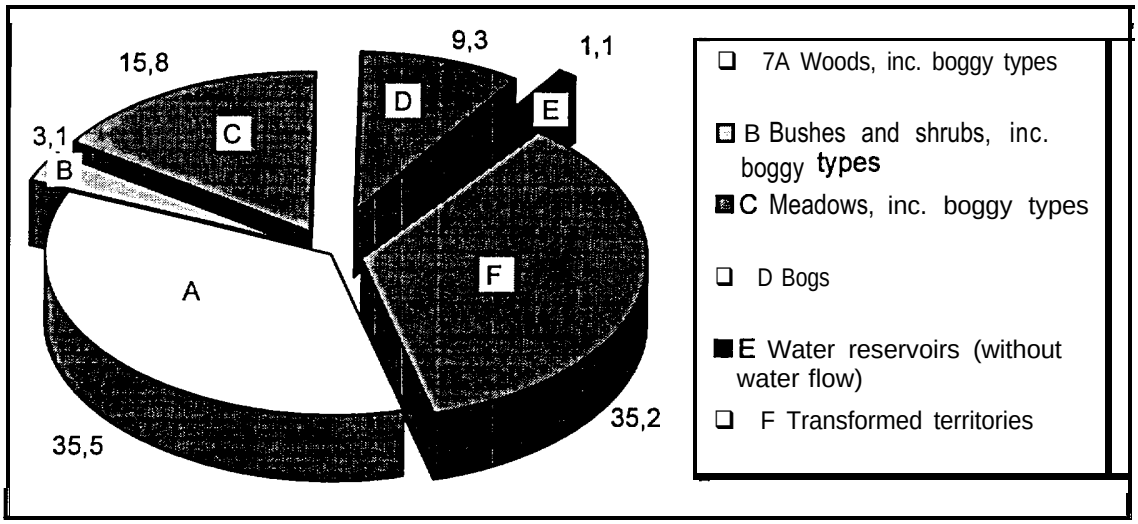


Fig. IV.5: Ratio of territories occupied by different types of ecosystems

Forests remain even today the dominant type of vegetation cover in Belarus. They cover 35,5% of the territory of Belarus which constitutes 7.3 million hectares. The main wood-forming species are pine, fir, oak, common and white birch, aspen, black and speckled alder, etc. The forest vegetation structure has four groups of formations: coniferous, broad-leaved, derived small-leaved and small-leaved woods on bogs. In general, pine woods are dominating (55 % of the total wood area). Then, with a big gap go birch woods (12,1%), fir woods (10,7%), black alder (7,9%), and others. In the direction from north to south, the share of coniferous (mainly fir) woods reduces while the share of broad-leaved (oak and hornbeam) increases.

Bushes and shrubs represent the only species of vegetation characterised by progressive spreading despite the fact that only in the last 30 years about 150 thousand hectares of such areas have been transformed into agricultural land. Today, bushes and shrubs occupy more than 600 thousand hectares (3,0 % of the Belarusian territory). Bushes and shrubs are represented by large ecological groups: xerophitic shrubs (32.2 %) found near sandy heathland (mainly juniper thickets formed after tree felling), hydrophytic shrubs (52,5 %) formed on boggy areas (mostly low bogs) and boggy lowlands (mainly willow thickets) and mesophytic shrubs in river floodplains which account only for 13,3 %.

Meadow ecosystems occupy 3,286,100 hectares (15,8 % of the Belarusian territory). The structure of the vegetation cover includes about 24,4 % of meadows. According to their composition, they are divided into river floodplain or water meadows (5.2 %) and upland meadows (94.8 %). According to their economic use, they are divided into hey areas (53.2 %) and pastures (46.8 %). As habitats of meadow species of vegetation, meadows are divided into rough, steppe, depleted, natural, rich wet and poor wet (peat-land), boggy, peat (open grass bogs). In the recent 35-40 years, meadow areas alongside boggy areas have been subjected to a severe transformation and their area has been cut by almost 50 %.

Bogs are exclusively complex natural formations that have been subjected to anthropogenic transformation most of all. Until the end of the 50-s of this century the total area of bogs in Belarus had constituted about 4.13 million hectares (19.9 % of the entire territory). Of them, the share of open-type bogs totalled 2.08 million hectares (50.3 %), wood-covered bogs - 1.49 million hectares (36.1 %), shrub-covered bogs - 0,36 million hectares (8.8 %), and boggy meadows - 0.2 million hectares (4.8 %). According to their genesis, stratigraphy and nature of the vegetation cover, bogs are divided into eutrophic grass and hypnum grass or low bogs (61.1 % of the total bog area), mesotrophic or upper sphagnum (18.2 %) bogs. As a result of land reclamation transformation, 1.775 million hectares (42.4 %) of bogs and boggy lands have been transformed into other agricultural land. Large-scale and intensive drainage of bogs and boggy land had been carried on from 1965 till 1975, later on this process was less intensive till 1985, or even later. Today, the area of bogs and boggy land in natural condition constitutes about 2.3 million hectares, of which only 795.5 thousand hectares (33.5 %) or 3.8 % of the Belarusian territory are open bogs. About 1.15 million hectares (48.3 %) are occupied by wood bogs which constitutes about 5.5 % of the country territory.

The territory of Belarus is characterised by a high percentage of water areas with a great diversity of water and wetland ecosystems, which is provided for by 20.8 thousand rivers with the total length of over 90 thousand kilometres. These rivers refer to the water catchment areas of the Black Sea (Dnieper and Pripyat which gather water from 56 % of the territory of the Republic) and the Baltic sea (Narev with Bug, Niemen, Western Dvina and Lovat that drain 44% of the territory). The water division is represented by the Belarusian ridge. Six rivers have their length over 500 km: Berezina, Niemen, Sozh, Pripyat, Western Dvina, and Dnieper. Belarus has more than 10 thousand lakes with a total area of about 2,000 square kilometres and 9 relative large lakes with an area of over 20 square kilometers (Naroch, Osveyskoye, Chervonoye, Lukomlskoye, Drivyaty, Neshcherdo, Vygoshchanskoye, Snudy, and Svir).

Large importance is attributed to ecosystems that appeared as a result of formation of artificial water reservoirs. To regulate ground water and humidity of adjacent reclaimed land, about 130 water reservoirs have been formed. The largest of them are: Vileyskoye, Zaslavskoye, Krasnoslobodskoye, Soligorskoye, Lyubanskoye, Chigirinskoye, Pogost, Loktyshi, and Osipovichskoye. The total area of water reservoirs constitutes 799 square kilometres. For pisciculture purposes, 11 large fish farms have been organised with a total area of 173 square kilometres. A significant part of Belarus is covered with a network of land-reclamation canals with a total length of 17,051 km, of which 9,095 km are located in the basin of the Pripyat River.

Various types of wetland ecosystems are spread over the territory of the Republic in a uniform manner. In the northern part of Belarus dominant are weak eutrophic lakes located in woods, large upper bogs and rivers with little water-supply river floodplains. In the south and south-east of Belarus, the most widely spread water ecosystems include high and average water-supply rivers (Pripyat, Dnieper and their tributaries in the lower parts). This area includes also a relatively large number of pisciculture farms. In the central part, water reservoirs are represented mainly by little water-supply rivers and artificial water reservoirs.

Relationship between natural and anthropogenic ecosystems. At present, the ratio of areas of natural and man-transformed ecosystems is about 55 % to 45 %, respectively. It is known that the loss of 20 % (or even 10 %, depending on their ecological importance) of species leads to a disturbance of ecological equilibrium whereas preservation of 10 % of natural ecosystems allows preservation of about 5 % of species. Today, the results of scientific developments have shown that for Belarus, on condition of taking measures for providing a definite ecological optimisation of extensively and especially of intensively used lands, the optimum ratio between natural, disturbed and transformed ecosystems shall be as follows: specially protected natural territories – 10%, extensively used natural lands – 40-45%, and intensively used lands - 45-50 %.

Priority ecosystems and communities to be protected

The main types of natural complexes that include practically the whole range of rare and anthropogenically vulnerable species as well as the main landscapes of natural origin, hence, mostly needing protection, are represented by the following complexes:

- low bogs of the Belarusian Polessye region;
- mesotrophic (transitory) bogs of Belarusian Polessye region;
- oligotrophic (upper) bogs of the Belarusian Lake District;
- moraine landscapes of the Belarusian Lake District;
- open spaces with the remnants Pontic (steppe) faunistic element;
- European broad-leaved woods;
- taiga and fir and small-leaved woods,

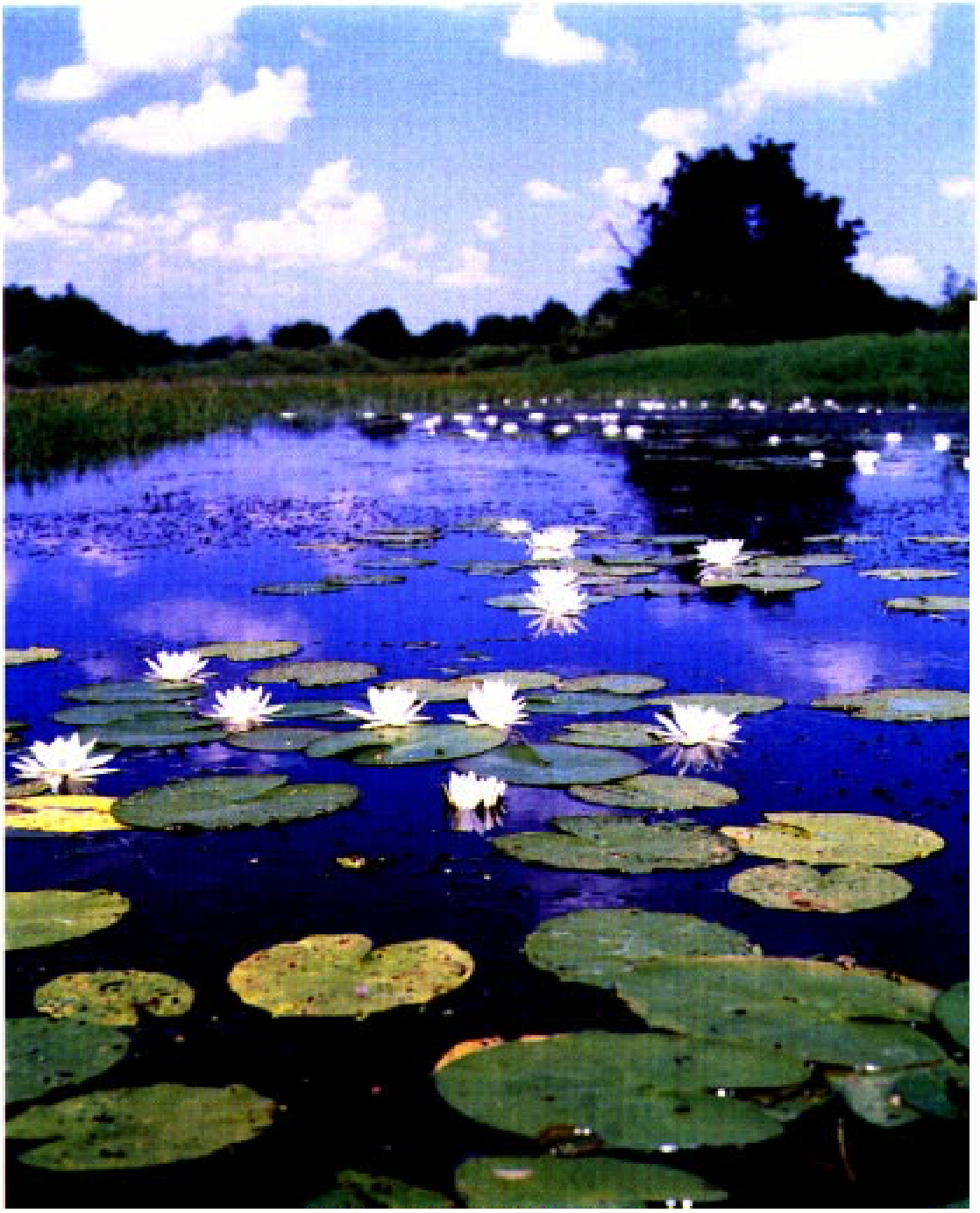
Of them, the priority protection should be given to ecosystems that have been least of all subjected to anthropogenic transformation and that reflect the natural historic character as well as the relationship between biological diversity in the territory of the country.

Special importance, from the point of view of preservation of diversity of wildlife, shall be given to high eutrophic lakes and medium and large rivers with a high water supply plain (2.6 % of the total river length) that are least of all represented on the territories under protection, but that characterised by the highest uniqueness and diversity of fauna.

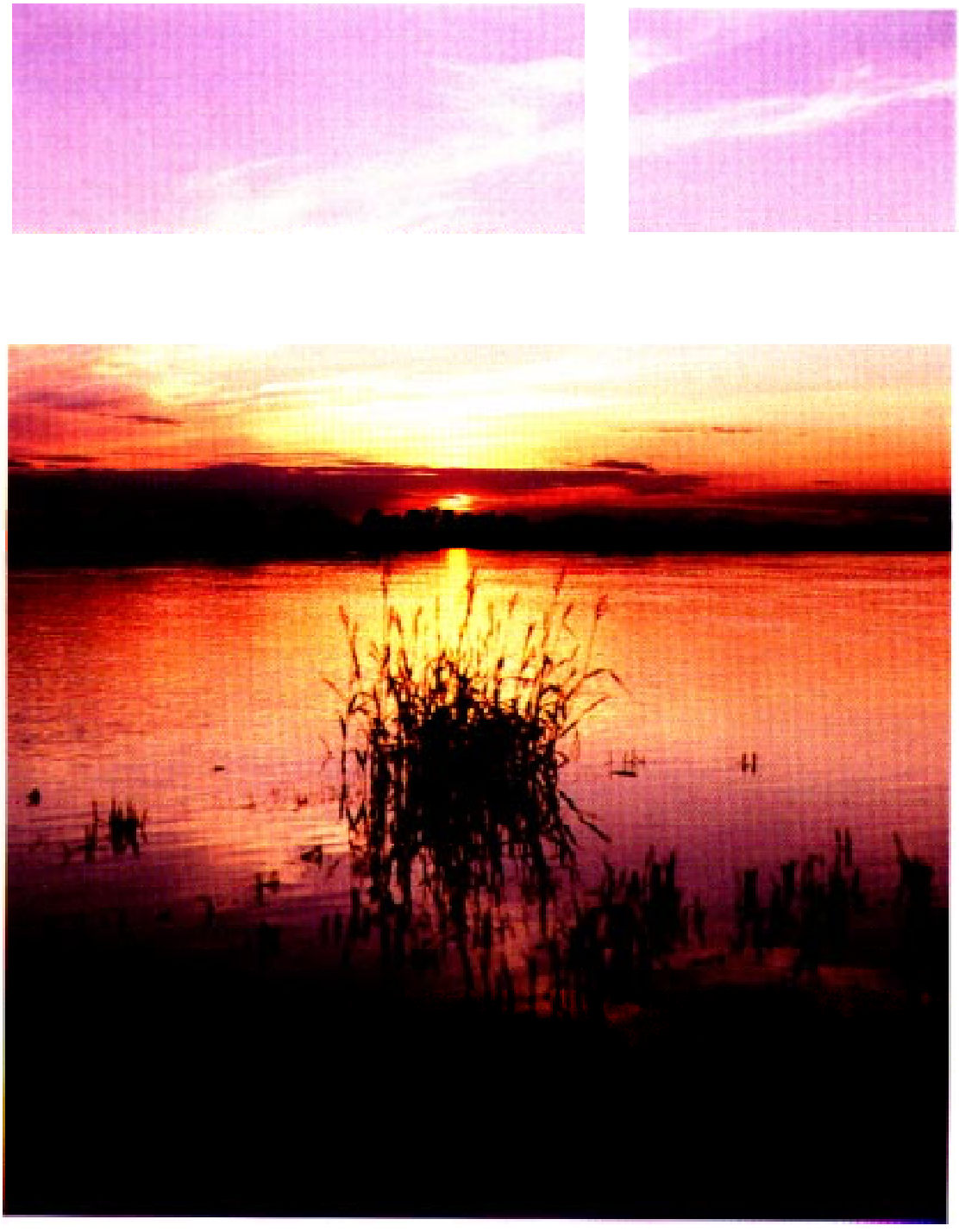
By their biological diversity of vegetation especially important are the existing reserves and national nature parks as well as the massive forest area "Nalibokskaya Pushcha" and the proposed Svisloch-Berezina reserve in which the species composition of flora can be, probably, compared to that of the reserve forests of Belarus.

In modem conditions of anthropogenic transformations of nature and their consequences, it is very important to pay attention not only to the preserved ecosystems that remain in a relatively undisturbed state, but also to the most valuable, as regards the diversity of flora and territories that have been modified by human activities. At present, about 30% of species of animals registered in the Red Data Book of the Republic of Belarus have their habitats in places modified by man. More than half of them prefer such places or can be found exclusively on such territories.

Among various types of anthropogenically transformed territories the greatest importance for the preservation of diversity of fauna species is attributed to: many artificial water reservoirs and fish-breeding ponds that are analogous to natural lakes in the most productive eutrophic stage if we analyse the composition of fauna (mainly, that of birds); open reclaimed territories of former bogs, or of previously drained shrub-covered plains or river floodplains; various, including unique, aged standing trees of natural origin, first of all large old parks of landscape types similar to natural woods that, however, have a more diverse composition and structure of vegetation and other ecological characteristics, and that are habitats of original or rich fauna complexes; agro-ecological zones representing specific and rather large territories with a traditional system of land use and other types of economic activities and with the established biotic complex that is usually rather rich, specific in nature and, often, has no analogies in the natural environment.



White water lily (*Nymphaea alba*) -
a species recorded into the Red Data Book of the Republic of Belarus
(photo by M.Ye.Nikiforov)



The Pripyat River, one of the largest rivers in Belarus
(photo by M.Yc. Nikiforov)

V ASSESSMENT OF BIOLOGICAL RESOURCES, THEIR USE AND DYNAMICS

1. Forest resources

Important indicators of the condition of forest resources traditionally are the density of forests on the territory and their structure as well as the dynamics of such characteristics.

The forest cover area vanes from 10 to 62 % depending on the administrative region of Belarus. most forested is Gomel Oblast (42.3 %) whereas the least forested is Brest Oblast (32.4 %) (Fig. V.1).

Table V.1: Distribution of forested land as it was on the 1st of January 1994

Land user	Area of forest resources (thousand hectares)	Area covered with forest (thousand hectares)
Ministry of Forestry of RB	6,733.1 (77.6%)	5,862.2 (79.5%)
Ministry of Defence of RB	437.4 (5.0%)	226.6 (3.1%)
Ministry of Agriculture and Food of RB	942.7 (10.9%)	898.6 (12.2%)
Administration of Affairs of President of the RB	242.3 (2,8%)	211,0 (2.9%)
Ministry on Emergencies	215.4 (2.5%)	82.5 (2.5%)
Executive Committees of Councils of People's Deputies	43.9 (0.5%)	35.1 (0.5%)
Ministry of People's Education of RB	24.5 (0.3%)	22.2 (0.3%)
Institute of Forestry of NAS of Belarus	36,8 (0,4%)	33,5 (0,4%)
TOTAL:	8 676.1 (100%)	7 371,7 (100%)

Table V.2: Age structure of Belarusian woods

middle-aged mation woods	In % from the area of the formation			
	near-mature woods		mature overmature	or woods
Coniferous woods (total)	41.1	40.5	14.8	3.6
Pine	41.6	40.1	14.5	3.8
Fir	38.3	42.6	16.5	2.6
Broad-leaved woods (total)	40.7	35.1	14.8	9.3
Oak	42.2	31.4	16.4	10.0
Hornbeam	4.1	84.4	5.7	5.7
Ash	44.0	49.8	3.5	2.6
Maple	75.0	--	--	25.0
Small-leaved woods (total)	24.7	55.2	13.6	6.5
Birch (white and common)	21.7	63.8	11.1	3.4
Black alder	25.5	47.5	16.8	10.2
Speckled alder	46.0	35.2	17.0	1.8
Aspen	30.8	26.9	20.5	21.8
Basswood	7.2	85.7	--	7.1
Total in Belarus	36.8	44.3	14.2	4.7

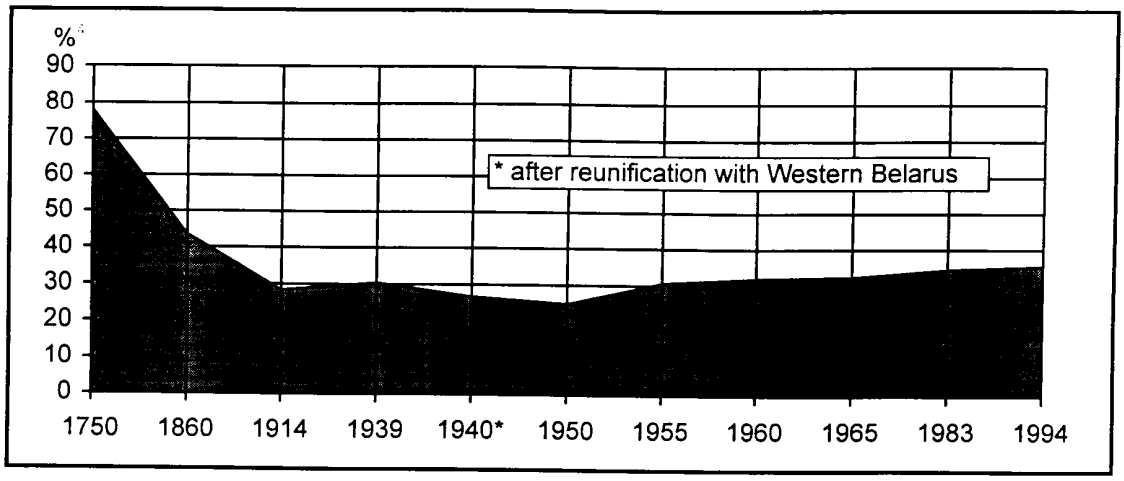


Fig. V.1: Dynamics of forest cover (%) of the Belarusian territory

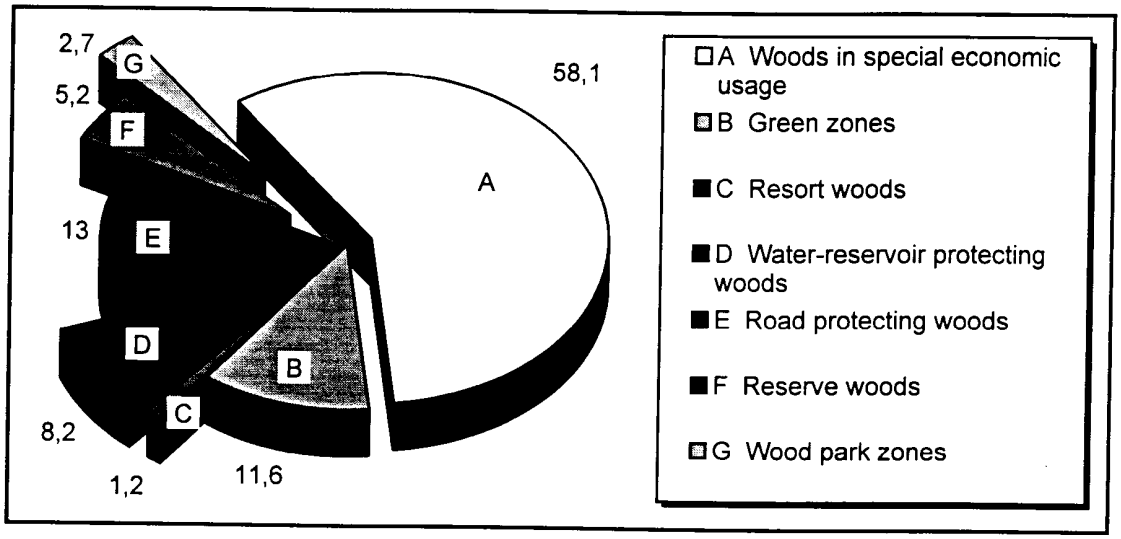


Fig. V.2: Structure of the forestry resources according to their economic use (%)

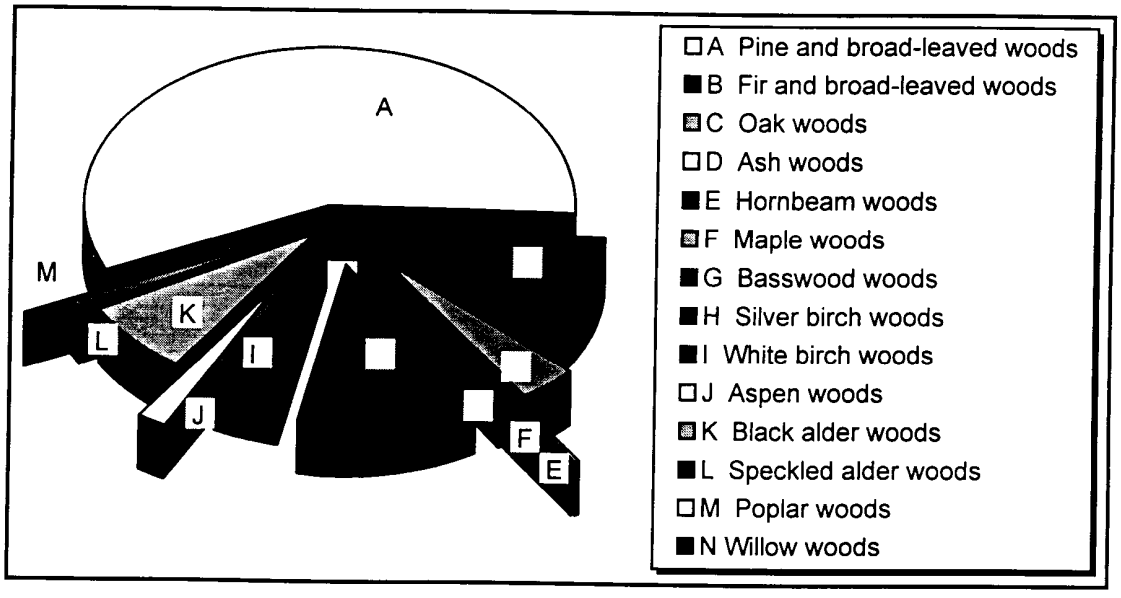


Fig. V.3: Formation structure of Belarusian woods

Cutting and use of wood resources

In recent years, the average annual volume of wood cut in forests of the Republic of Belarus constitutes 9.5-9.6 million cubic meters, of which the share of wood cutting for the purpose of the main wood management programme (in mature standing woods) is 4.0-4.1 million cubic meters (43%), that of wood cutting as sanitation clearing (in young woods, average-age woods and near-mature plantations) - 4.1 million cubic meters (43%) and other types of cutting (clearing for road lines, electricity transmission lines, etc.) is 1.0-l .3 million cubic meters of wood (14%).

When sanitation cutting is performed, thin-size industrial wood stock is prepared (up to 30%), part of which is exported, as well as fire woods (up to 70%) sold to local enterprises and population. In general, the nature of distribution of cut and prepared wood stock is reflected in Table V.3.

Table V.3: Distribution of the prepared wood stock according to the users

Main users of wood stock	Share (%)
Wood industry enterprises of the "Bellesbumprom" Concern (Wood and Paper Industrial Concern)	25
Construction, agricultural and other local enterprises of governmental and non-governmental forms of property	48
Population	27

Fig. V.4 shows the natural structure of cut wood stock in comparison to the natural structure of forests.

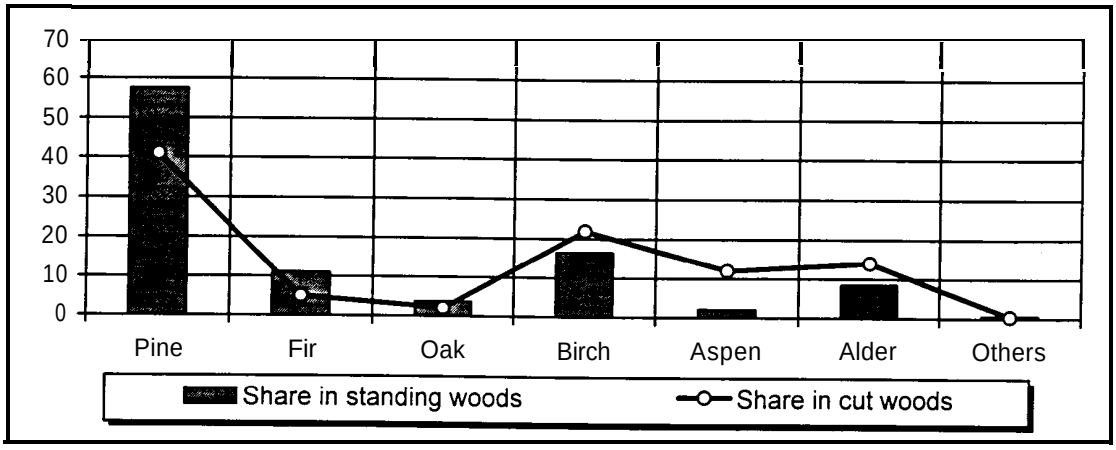


Fig. V.4: Relationship between the wood type structure and the cut wood stock

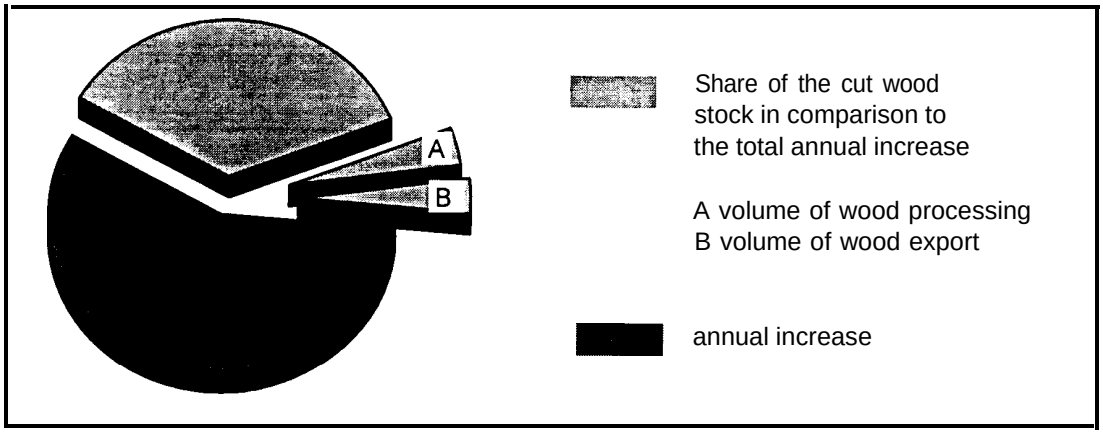


Fig. V.5: Relationship between the volume of annual increase and the use of wood

2. Resource of natural flora

Natural flora, especially flora of forests, represents an extremely valuable and important resource for the economy of Belarus as a source of food and raw materials. Economically useful plants are divided four main groups:

- alimentary;
- technical;
- medicinal;
- melliferous.

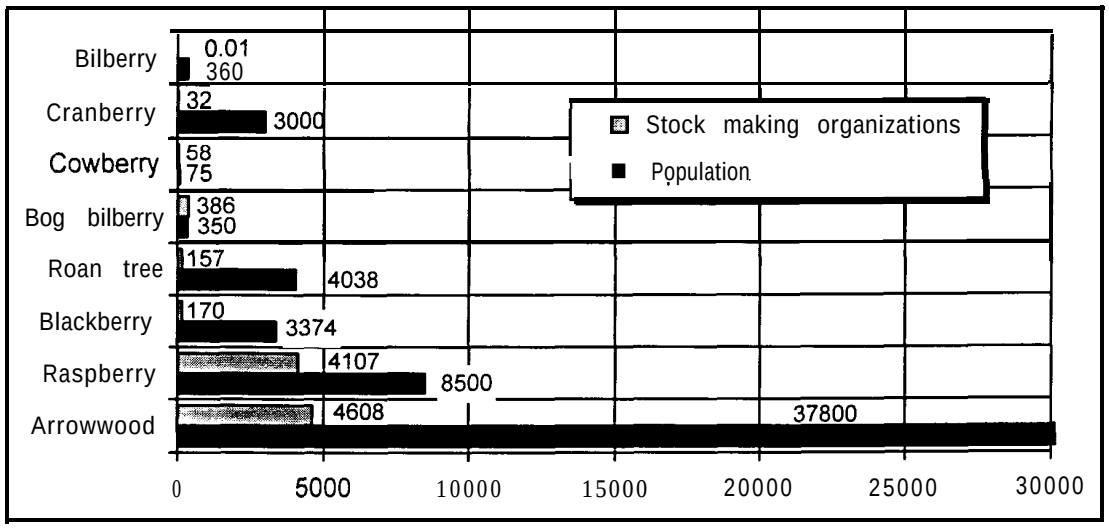


Fig. V.6: Volumes of gathered wild berries and fruits (in tons)

Table V.4: Number of mushroom species in different possible groups of usage

Groups of mushroom species	Number of species
Edible:	300
giving the best mushroom products	32
gathered by population and having known edible properties	79
Inedible	16
Poisonous	22
Species having no alimentary use	191
Species with unstudied properties	671

Biological diversity of medicinal plants is represented by 266 species, of which 190 species are used in scientific and popular medicine and 76 other species are used only in popular medicine. Biological stocks of medicinal plants are estimated approximately for 48 main species of plants that are gathered in the country.

In Belarusian woods, over 60 species of medicinal and commercial plants are gathered; their annual stock constitutes 250-300 tons. This is about 1% of all available resources of such plants.

In forest formations of Belarus, there are 440 species of melliferous plants.

Spicy and aromatic plants in the Belarusian flora include 40 species many of which are also used as medicinal plants.

3. Game and commercial resources of fauna

The game and commercial vertebrate animals present in the territory of Belarus include 22 species of mammals, 31 species of birds and 1 species of reptile while the invertebrate class includes an edible snail that has been bred in substantial amounts.

The total area of game hunting constitutes 17.8 million hectares, of which 39 % is occupied by woods, 54 % by fields and 7 % by wetlands.

Belarus has 212 hunting facilities, including 62 forest hunting facilities. An important sphere of their operation is the maintenance of the population of game animals.

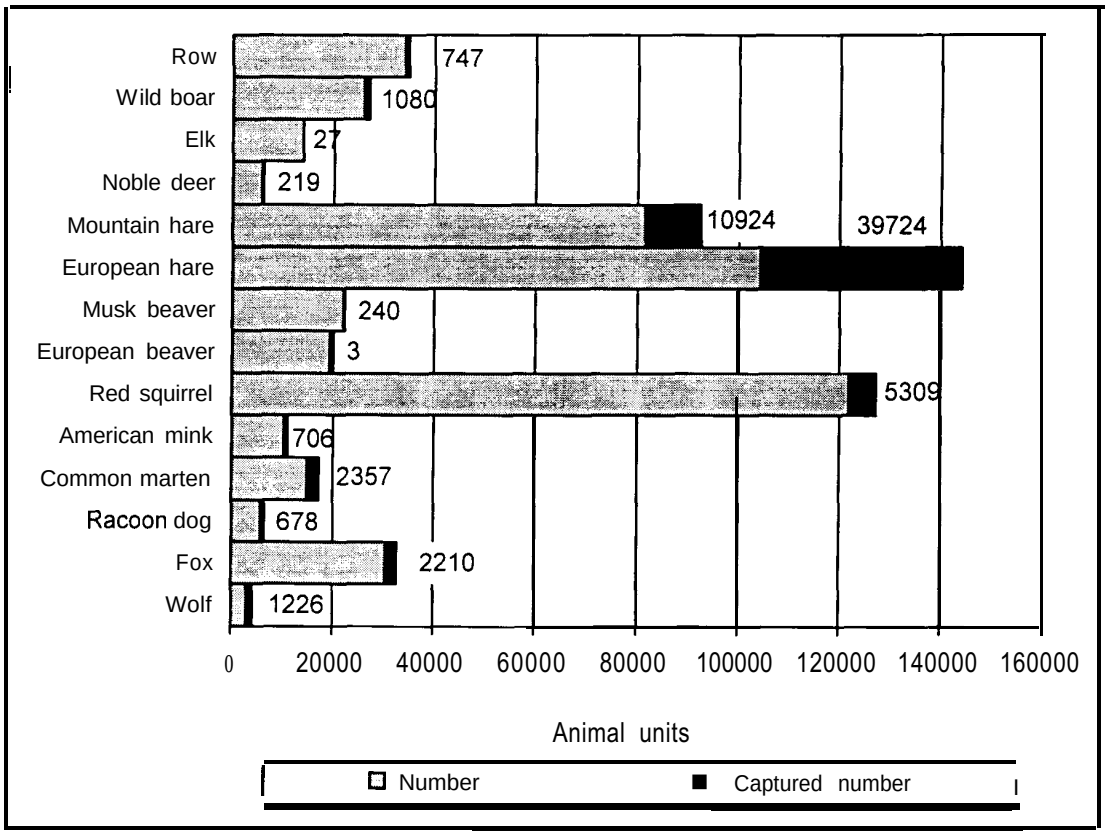


Fig. V.7: Population and killing of the basic species of game mammals in 1996

The most massive group of birds used for sportive hunting are water-fowls. A noticeable reduction of the population of the majority of species of waterfowl in Belarus and in all adjacent regions took place in the 1950 to the 1960-s. In the 1970-s the population of the basic game species of ducks began to stabilise whereas the population of rare protected species and some unpopular hunting species even went up. The main causes of this are considered to be:

- the development in Belarus of the network of protected wetlands and the enhancement of general bird protection measures;
- the improvement of the system of hunting management, regulation of hunting seasons and the amount of game captured;
- the improved bird adaptation to the environment changed by economic activities;
- the expansion in the region for winter stay of waterfowl on the territory of the Republic that led to a fast increase of species diversity of winter birds and their number.

The most mass-spread nesting game waterfowl include 6 species among which the absolutely dominant is the mallard duck (Fig. V.10).

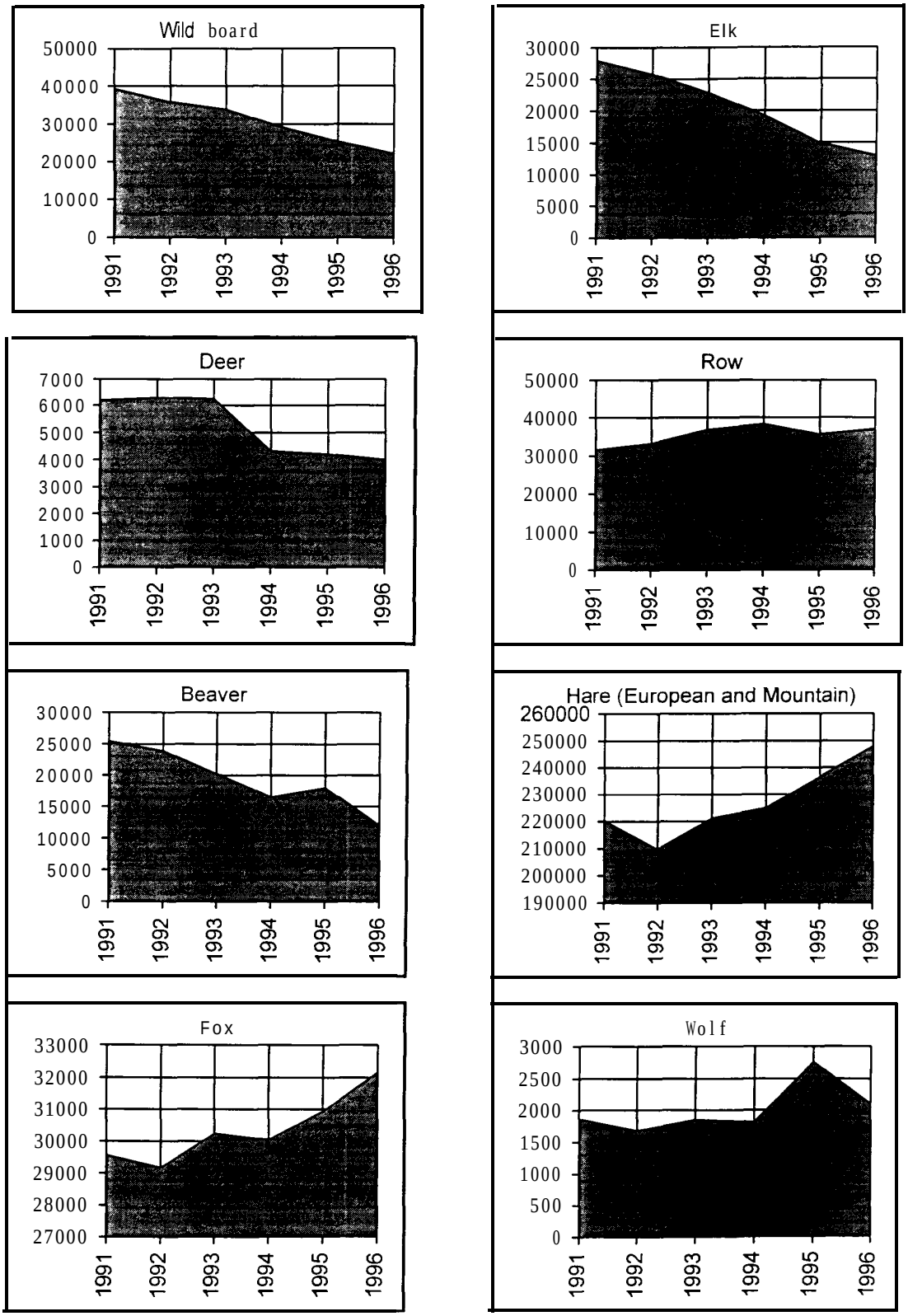


Fig. V.8: Dynamics of the population of basic game species of mammals

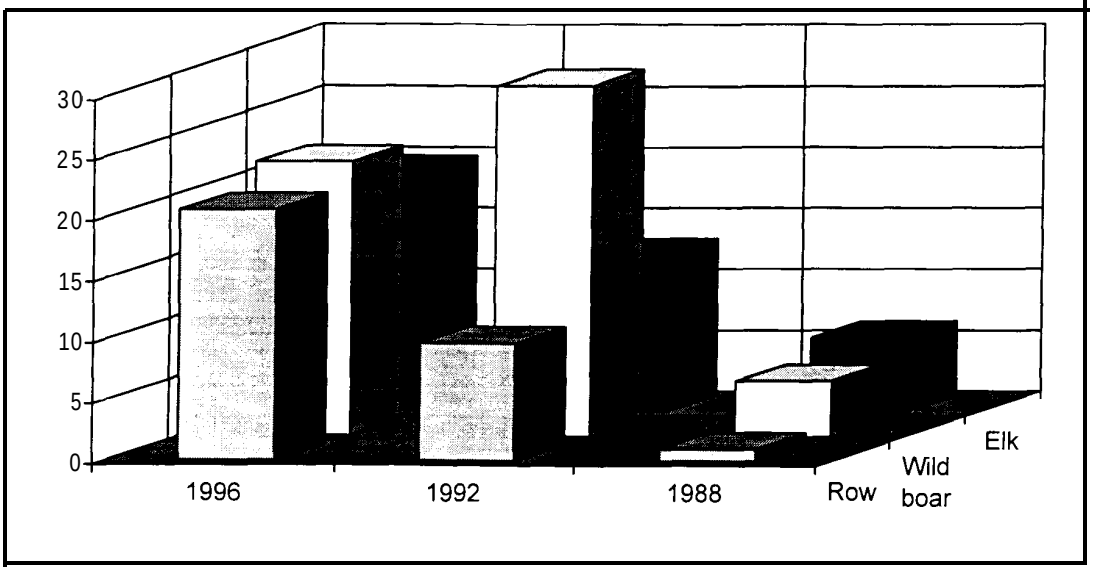


Fig. V.9: Dynamics of the population of certain species of game mammals in the Chernobyl NPP alienation area

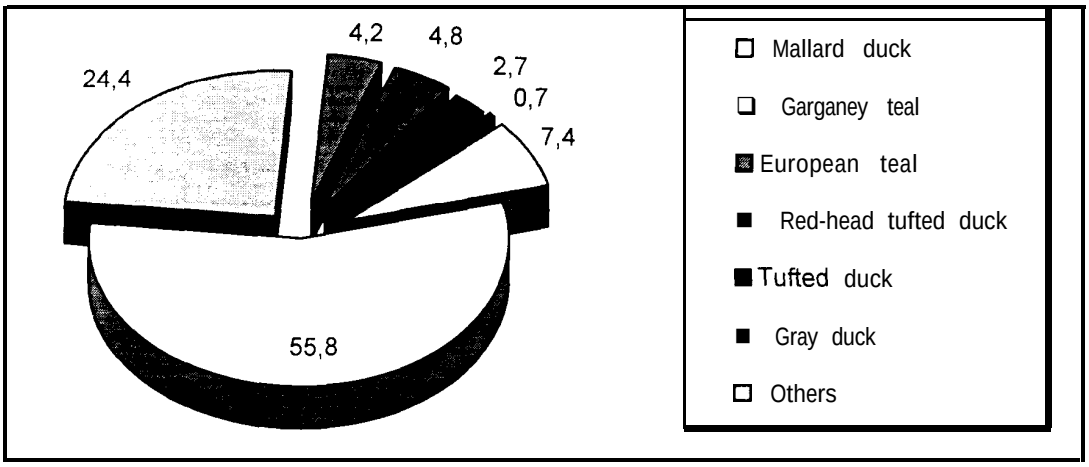


Fig. **V.10:** Relationship (%) between **game species of waterfowl**

At present, the total number of popular hunting species of ducks in the post-nesting period varies from 700 to 1,000 thousand units. About 30-40% of the above number are killed during the period of summer and autumn hunting seasons

Commercial species of fauna

Common vioer (*Vipera berus*) is one of valuable land vertebrate animals of Belarus whose poison is most often used for producing vipraxin and other medicinal preparations.

Grey or common toad (*Bufo bufo*) and green toad (*Bufo viridis*) has potential commercial importance in view of the use of toad's poison for producing cardiostimulating medicinal drug.

Edible snail (*Helix pomatia*). This species was first used in Belarus as a commercial species in the early 90-s. Such snails are mainly exported.

At present, about 100 snail localities have been detected and registered in the territory of Grodno Oblast and about 75 localities in Vitebsk Oblast. The estimated biological stock of snails constituted, in 1996, over 130 tons on the territory of Grodno Oblast and 244 tons in Vitebsk Oblast which totals to over 70 % of the anticipated general stock of this species in Belarus.

4. Fish and other commercial resources of water reservoirs

Fish commercial reserves

The Republic of Belarus possesses over 10 thousand lakes with a total area of about 150,000 hectares, 130 water reservoirs with a total area of over 80,000 hectares and more than 20,000 rivers with a total length of 90,600 km. These water bodies are inhabited by 59 species of fish representing 18 families, including 12 species brought for acclimatisation and breeding.

The pisciculture facilities of the natural water reservoirs of the Republic of Belarus include more than 1,000 lakes with a total area of over 130,000 hectares, 115 artificial water reservoirs with a total area of about 45,000 hectares and the river sections with a total length of over 40,000 km.

The average annual fish catch from lakes, water reservoirs and rivers of the Republic constitutes 1.5 to 2.0 thousand tons, with the average fish productivity of lakes being about 10 kg/hectare (that of commercial lakes about 30 kg/hectare), of water reservoirs - 10-15 kg/hectare and of rivers - 100-120 kg/km. The main stock of fish is caught from lakes, i.e., 74,2 % of the total catch amount; 17.2 % fish are caught from rivers and 8.6% from water reservoirs. River pisciculture facilities are concentrated mainly in Gomel, Mogilev, Grodno and Brest Oblasts whereas lake facilities are located mainly in Vitebsk and Minsk Oblasts.

Structure and dynamics of catch

The typical feature of the present day ichthyocomplexes of natural water reservoirs of Belarus is a high population of low-value and a low population of valuable commercial species of fish. The basis (up to 80 %) of commercial catch of lake and river fish over the last years has been constituted by low-value species of fish (roach, perch, silver bream, ruff, etc.), whereas the catch of valuable species (pike, bream, sander, eel, etc.) rarely exceeded 20 % of the total amount of catch. Among low-valuable fish species roach was dominant (over 50 %); among valuable species pike and bream dominated (up to 60-70 %). Other valuable commercial fish (eel, sander, etc.) have been caught in insignificant amounts; over the last 10-15 years the average annual catch of eel has totalled 25-30 tons, that of sander has been 30-35 tons

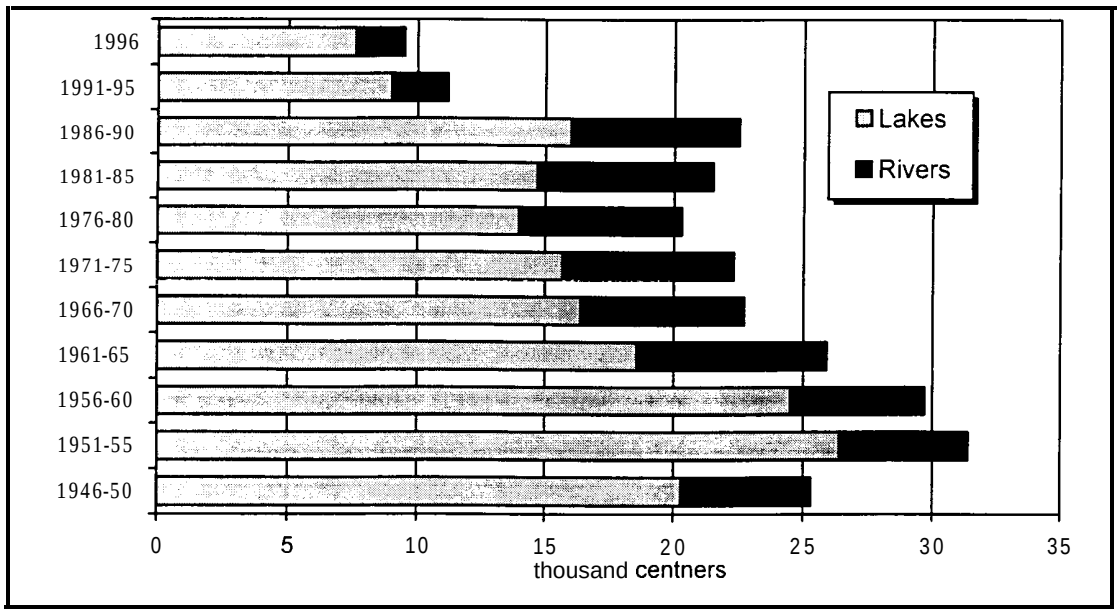


Fig. V.II: Commercial catch of fish in natural water reservoirs of Belarus

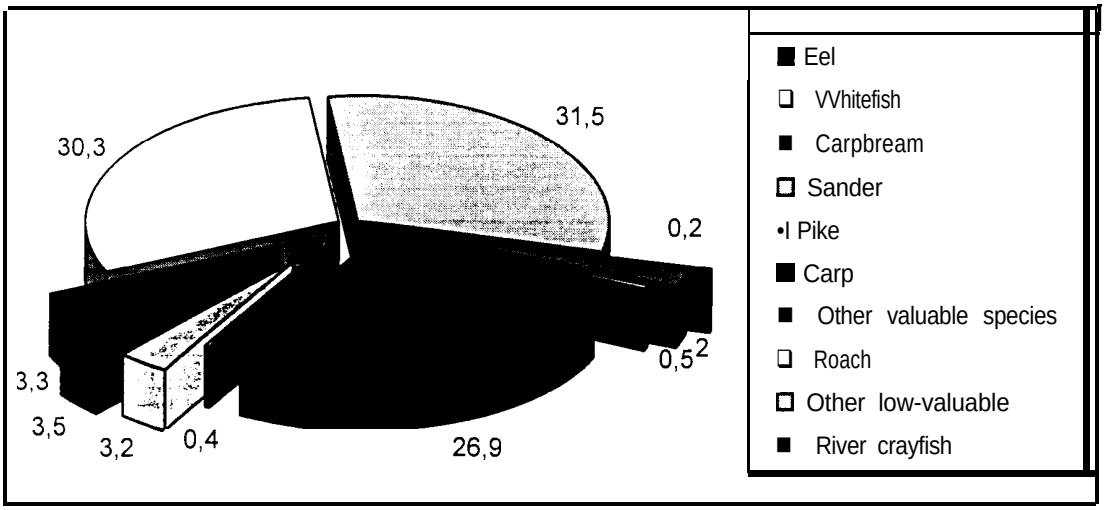


Fig. V.12: Structure of the total catch of fish and crayfish in 1996

5. Genetic resources

Genetic resources of the Republic of Belarus at present are kept in different research institutions and higher educational institutions that carry on selection and genetic work. The main genetic resources of rye, wheat, triticale, oats, barley, flax, corn, buckwheat, lupine, pea, vetch, Russian turnip, fodder beet, clover, perennial herb cereal are concentrated in the Belarusian Research Institute of Land Cultivation and Fodder where selection work is performed with these species. A significant genetic stock of these crops is kept in the Belarusian Agricultural Academy. Genetic resources for potato, fruit-bearing plants and vegetables are available in specialised research institutes, A valuable genetic stock of trees, bushes and flower plants is collected in the Botanic3 Garden of the NAS of Belarus. Some genetic stocks of plants are available in the Belarusian State University and at pilot stations. Original genetic collections of cereals, leguminous plants and potato have been formed in the Institute of Genetics and Cytology of the NAS of Belarus.

However, the available national genetic stocks of agricultural and medicinal plants, of rare and endangered species of plants are not systematically arranged and have been insufficiently studied as regards their genetics. At present, there is no single databank on genetic resources.

6. Recreational (non-exhausting) use of natural biological resources

Favourable combination of natural, landscape, historic and cultural factors allow us to consider Belarus as a perspective region for culture-learning rest including ecological tourism. High landscape diversity and preservation of natural landscapes, rich history, availability of museum facilities and monuments of history and culture allow the organisation of various topic excursions and tourist routes, including those for foreign tourists, so as to give knowledge about the natural, historic and cultural heritage.

At the same time, the speed of development of ecological tourism in Belarus is extremely low. This is not only unfavourable for the environmental culture of the people on the whole, but also results in the loss of substantial material resources that could be used for a more efficient preservation of biological diversity. The main objectives and restricting factors for development of ecological tourism are reflected in Table V.6.

Table V.5: Structure and parameters of recreation territories (determined in the Master Plan for development and location of resorts and recreational areas)

Categories of recreation territories	Number of facilities	Area, thousand hectares
Republican resorts	**6**	**102.0**
Republican resorts (standby)	**2**	**7.0**
Local resorts	**5**	19.8
Republican rest areas	12	319.4
Republican rest areas (standby)	2	71.6
Local rest areas	30	829.8
Local rest areas (suburban, standby)	44	278
Total number of recreation territories	**101**	**1627.6**

Table V.6: Main objectives of development of ecological tourism in Belarus and its restricting factors

Main objectives for development of tourism and recreation of the population:	Main factors restricting development of tourism in the Republic of Belarus
Providing conditions for efficient use, on a stable basis, of national resources of landscape and biological diversity as well as of historic and cultural recreation resources; Boosting of local economy, creation of enterprises and institutions for rendering services to the people at rest; Creation of new jobs.	Weak study of the problem (The issue *of development of* tourism *as a separate sector of the national economy has never been analysed. Work related to the analysis of national tourism and recreational resources has not been financially supported over the last 15 years. The state statistics in this sphere are incomplete or, on certain issues, not available);* Absence of a state policy and of the required legal basis in the sphere of protection and rational use of natural recreational resources (Practically, *there is no legal mechanism for establishing a special status for resorts and rest* areas. *The p/an of future development of tourism in the Belarusian SSR was approved on 14.14.1983 and has lost its importance today);* Economic and political instability (*At present, the Republic of Belarus is not a sufficient/y attractive region for investments. including investments into the tourism sphere);* Low speed of privatisation and undeveloped market of recreation and tourist services *(The Republic does not have traditions of entrepreneurship in the sphere of tourism. Special training of personnel shall be arranged with due account of Belarusian specific features);* Low purchasing power of the population *(The overwhelming majority of the population is not able to pay the full cost of recreation and tourist services. Children's rest, treatment and health-oriented rest is subsidised, to* a *great degree, from the state budget and by trade unions).*

VI MAIN THREATS TO BIOLOGICAL DIVERSITY IN THE TERRITORY OF BELARUS

1. Natural threats

Global changes in the environmental conditions. Analysis of the temperature trends over the last one hundred years has shown an increase of air temperature in different regions of the Republic of Belarus by the magnitude of 0.2 to 0.9 °C. In the last three decades, the annual fallout has increased by more than 100 mm (that constitutes about 20 % of the standard).

The noted natural tendency towards the reduction of the habitat humidity is aggravated by a man-induced (anthropogenic) impact (drainage of the predominant part of boggy and low lands) which leads to degradation of populations of hydrophilic and, later on, of mesomorphic species of plants and, in the long run, to xerophytisation and pauperisation of the vegetation cover, thereby making it more 'southern" as to its ecological appearance (formation of steppe).

Examples of obvious impact of the global warming of climate on fauna include a fast reduction of the habitat area and of the population of white grouse, the appearance on the territory of Belarus of new species of birds that are typical of the steppe and wood-steppe areas. One of the most noticeable changes in the ecology of a number of bird species caused by man-induced thermal contamination of water reservoirs and by a global warming of the climate is represented by a fast increase of the species composition and the number of waterfowl that stay here in winter time.If until 1970 the number of winter-staying birds in Belarus included only 12 species, then in the later years this number has gone up to 35 species. Although the process of formation of winter groups of various bird species has some positive aspects, nevertheless, it can have catastrophic effects for them during some especially cold winter seasons.

Introduction, invasion (intervention) and hybridisation. A rather substantial natural threat to biological diversity of animals, in a number of cases, is impact exerted by competitive relations between introduced species, on the one hand, and rare or low-plasticity species, on the other hand. Examples of such mutually excluding relations among species of fauna are: competitive ousting of European mink by American mink; a hybrid absorption of rarefied populations of European mink by the population of the wood polecat; competitive pressure exerted by the introduced racoon dog on the populations of indigenous martens (wood polecat, wood marten, badger).

2. Anthropogenic threats to biological diversity by various socio-economic sectors

General data. The most significant adverse changes in the condition of the wildlife have happened and continue to happen in Belarus as a result of a powerful anthropogenic impact both direct (hunting and extermination of animals) and indirect (liquidation or alteration of their habitat). Especially negative impact is exerted by such factors as the extensive inclusion of new natural territories into different spheres of human activities, ecologically unjustifiable drainage reclamation of boggy land and use of reclaimed facilities, non-observance of technology of use of poisonous chemicals and fertilisers, contamination of natural ecosystems by industrial waste, poaching, and the stress factor related to recreation and development of the road network. Impacts exerted by the above factors are aggravated by a lack of ecological education and lack of responsibility on behalf many economic leaders and significant strata of the population, by the absence of efficient legal and economic leverage stimulating environment-conservation activities.

Almost all the above factors related to the wildlife have an adverse impact on the vegetation too (with the exception of the poaching and stress factors). Ecologically incorrect use of vegetation resources

(berries, medicinal resources, mushrooms), gathering of these resources using forbidden techniques and devices without observation of the stipulated harvesting time periods may cause a significant damage to these irrecoverable resources.

Territorial planning and town construction. Contamination of the environment by towns and industrial centres is especially revealed as regards river ecosystems that are contaminated by a discharge into rivers of types of sewage that, even after their biological decontamination, bring about an enhanced eutrophication of water ecosystems followed by a deformation of the species composition of flora and fauna. Eutrophication causes a fast development of blue and green algae (water "florescence") which represents a real ecological calamity for rivers and water reservoirs created on them.

Even more powerful contaminant of river ecosystems is a surface runoff (rain and snow-melting water) from the territories of towns (up to 95 % of the total amount of substances that contaminate river ecosystems) that, as a rule, flows into them without any decontamination and contain predominantly suspended substances, oil products and heavy metals. According to the data provided by the Belarusian Committee on Hydrometeorology, the total contamination of river water (about 20-25 km downstream from sewage discharge from large towns and cities) defined by the water contamination indicator is by 40-45 % higher as compared to the sections located upstream from the towns.

Transport and road construction. The most intensive main transport roads of Belarus are sections of the trans-European transport corridors Brest-Minsk-Russian border and Vitebsk-Mogilev-Gomel as well as Brest-Pinsk-Kalinkovichi-Gomel. Threat to biological diversity and populations of some species presented by transport and road construction on the territory of Belarus is revealed predominantly in violation of the historically, established conditions of functioning of natural ecosystems, by roads and other engineering structures on motor roads and railways as well as by physical extermination of animals in the process of their daily or seasonal movement. The threat becomes especially strong when main transport lines are laid across protected natural territories as, for example, the Berezina Biosphere Reserve.

Agriculture. Agrarian land use is considered to be one of the most territorially expressed factors that influences biological diversity of ecosystems. Agricultural lands occupy 8,758,300 hectares (over 40 % of the Belarusian territory). Besides, agrarian use of nature is one of the ancient intense kind of economic activities that has substantially changed the spatial structure and functional features of the vegetation cover in the Republic. In general, ploughing of land, especially when accompanied by a preliminary drainage, decreases the number of natural localities for many species of plants and animals which, 'in the long run, brings to a reduction of habitat areas and alteration of their boundaries. On the other hand, the agrarian communities, that are formed, facilitate spreading of both indigenous and invasive species of cultured landscape as well as a change of their areas.

Above all, this is revealed in the formation of large and relatively uniform agricultural lands with homogeneous agrophytocenoses that are characterised by a low biological diversity. This circumstance is especially typical of the post-war (after 1945) period of intensification and specialisation of agriculture. Enlargement of crop rotation fields, expansion of agricultural land areas through land reclamation, increase of the dose of applied fertilisers, introduction of industrial technologies of land cultivation not only have changed the spatial outlook of landscapes but also have brought to liquidation of natural ecotones on the agrarian territories. The latter have become the sole natural formations that have preserved biological diversity of the ecosystem. This phenomenon has resulted in fragmentation of landscape into large-area land use facilities and large-area woods which does not allow the proper maintenance of biological diversity of ecosystems. This is especially typical of the Central and Eastern parts of Belarus where the degree of agricultural land use constitutes over 75 % while the share of pasture reaches 60 %. Only in the last 25 years, the average size of the arable land boundaries has increased from 7.0 to 11.2 hectares, and that of agricultural lands from 4.0 to 7.2 hectares. A specially adverse impact on biological diversity at the species and ecosystem levels has been exerted by hydrotechnical land reclamation that was widely spread in Belarus in the 60-s and 70-s. The total area of drained agricultural land was 2,641,800 hectares, of which 1,140,000 hectares were covered by arable land, The largest land reclamation was carried in the southern part of Belarus, i.e., in the Polessye Region. This led to extermination of natural ecosystems of the entire unique natural region. Here, we see disturbance not only of the spatial integrity of the geobotanic surface layer, but this also has resulted in its deep structural and functional transformation. This has been reflected in the spatial simplification of landscape structures, liquidation of wetland

vegetation and use of bogs and low lands for agricultural purposes. One of the causes that brought such circumstances was ignoring the tasks for preservation of natural ecosystems among reclaimed territories as elements needed for maintenance of biological diversity. Thus, in compliance with the project and planning standards on land reclamation, the land use coefficient must constitute not less than 90 %. This means that after reclamation, 90 % of land must be compulsorily used as agricultural territories. In the long run, this has exerted an extremely adverse impact on preservation of vegetation communities and maintenance of biological diversity in the region.

However, Belarus has territories with an optimum territorial combination of agricultural, wood and meadow lands. Their mosaic spreading has been predetermined by the natural landscape structures that still contain small areas with woods, natural meadows and small arable territories. Examples of this can be found in some regions of the Belarusian Lake District and in the central part of Belarus. Here, the area of natural ecosystems reaches 35-50 % which, in combination with meadow-oriented use of land, allows the steady maintenance of biological diversity both at the level of species and at the level of the ecosystem.

Forestry. At present, forest vegetation, flora and fauna undergo important changes in connection with intensification of forestry management. Uneven distribution of woods remains: part of regions have been significantly deforested. Over 18 % of the area covered with wood vegetation is under wood crops, i.e., phy-tocenoses with an incomplete basic and simplified floristic structure. It should be pointed that the share of wood crops in the composition of wood plantations is constantly growing. Planting of woods inevitably results in the depletion of the natural genetic stock of wood-forming species, reducing its resistance to pests and disturbing the micro-developmental process. Disturbances of the natural conditions for restoration of woods will bring about the reduction of communities in which broad-leaved trees (oak, hornbeam, etc.) and fir trees (located in certain areas of the Belarusian territory) are dominant. At the same time, there is an increase of areas covered with pine woods which does not facilitate maintenance of the floristic features of the low layers of phytocenoses. The age structure of woods is dominated by young trees (about half the area covered with woods) whereas aged standing trees have been preserved only on approximately 5 % of the forested territory. This leads to a succession “rejuvenescence” of phytocenoses not allowing them to reach their climax phase of development characterised by the most rich flora composition.

A significant factor of change in the natural composition of biological diversity is the use of woods for pasture and hey making which, as a result, disturbs the process of renewal of many species of plants. Similarly is displayed the impact exerted on the wood associations when hoofed animals become in abundance. This is expressed, above all, in extermination of young trees and, hence, in degradation of forest ecosystems. This phenomenon is observed, for example, on the territory of the Natural Park “Belovezhskaya Pushcha”. A high recreation load (in wood parks of large towns and in other places of mass recreation) causes degradation of woods, disturbance of their cenosis integrity, internal structure and synanthropisation of flora composition.

One of the vivid examples of adverse effects resulting from nonobservance of the wood usage rules is the process of fast and inevitable disappearance in Polessye of the population of the wood-grouses who are located here on the border of the habitat area and are especially sensitive to unfavourable impacts.

Hunting and pisciculture facilities. The mostly felt impact on the majority of economically valuable species of fauna is exerted by a direct withdrawal of animals in the process of hunting as well as by enhancement of the stress factor. These precise factors have been connected with the significant reduction of population and the decrease of habitat areas of large predators (brown bear, lynx) who are especially sensitive to stress. Badly controlled hunting and poaching often result in an excessive killing of species and a sharp reduction of their number or in a local disappearance of some valuable species (otter, elk, wood-grouse, beaver). It is quite clear that the withdrawal of some part of the population of endangered species as a result of hunting accelerates this process (process of vanishing).

Human impact on the composition of ichthyofauna began already at the time when man began to select large fish from the population which resulted in rejuvenescence of the commercial stock: the age structure of the fish population and of ichthyocenosis as a whole changed. Introduction into water reservoirs of new fish has a serious impact on the ichthyocenosis which entails a catastrophic drop in the number of some indigenous species. Introduction of new fish into water reservoirs started in the 20th century and has been especially active in the recent 30-40 years.

Water facilities and drainase land reclamation. Reclamation of boggy territories of the Belarusian Polessye, creation of a network of water reservoirs, ploughing of waste lands and many other measures have changed the composition of ichthyofauna and its number. The reduction of the fish catch from Polessye lakes, undoubtedly, has been caused by the impact of land reclamation that was carried on in water catchment areas of these lakes and by the lowering of the ground water level.

Alteration of the water content, increased turbidity of water, precipitation of silt and sludge in fish breeding areas caused by wood felling, bog drainage and regulation of the river runoff, all these are negative results of negligent economic activities. Over the last 50-100 years, a number of fish species have disappeared from water reservoirs of the Republic, the number of valuable fish species has gone down while the number of low-value species has increased.

Special attention shall be paid to salinisation of water of the Soligorsk Water Reservoir caused by operation of the potassium producing enterprises. Their work changes the hydrochemical conditions of the water reservoir and withdraws stenobiontic fish species from its ichthyocenosis composition.

Especially strong impact is exerted on biological diversity by the drainage land reclamation that was widely spread predominantly in the southern part of Belarus in 60-s and 70-s. The total area of drained land and land put into agricultural use was over 2,641,800 hectares of boggy lands, of which 1,140,000 hectares were allotted for arable use. This caused extermination of natural ecosystems of the entire unique natural region. It not only disturbed the spatial integrity of the geobotanic cover layer, but also caused its deep structural and functioning transformation.

One of the causes of catastrophic impact of land reclamation in Belarus is the neglect of scientifically justified requirements related to the preservation of some areas including natural ecosystems as elements that are needed for the maintenance of biological diversity.

Generally speaking, the consequences of large-scale drainage reclamation combined with a tendency towards decrease of climate humidity and draining effect of tectonic movements on certain part of the Belarusian territory brings about an accelerated degradation of hydrophilic phytocenoses, their substitution by mesophylous and, then, by xerophylous cenoses. This is fraught with the reduction of biological diversity and the loss of part of the genetic stock of the natural flora (including rare and relict plants), which, in turn, causes a further destabilisation of natural and man-made complexes.

Fuel and energy complex and industry. Large industrial enterprises such as Production Amalgamation "Belaruskaliy", Novopolotsk and Mozyr Oil Refineries, Mogilev and Svetlogorsk Production Amalgamations "Khimvolokno", Gomel and Grodno Chemical Plants have become known not only due to their products but also in connection with unfavourable impact they exert on the environment. In the number of Belarusian regions, a stressed ecological situation has evolved. Stationary sources alone release to the atmosphere about 1,5 million tons of harmful emissions and about the same amount is released by transport facilities. The condition of the environment is further aggravated by the Vans-border transfer of harmful substances into the territory of the Republic by dominant western air flows.

Further development of industries and agriculture made chemical contamination of water reservoirs more intensive and hazardous due to the increase of the amount of toxic substances released into them, such as heavy metal salts, oil products, phenols, surfactants, etc.

The fuel and energy complex and industry, together with transport facilities, represent the most large-scale pollutants of the environment through air. This contamination is especially felt by such plants as lichen and mosses that are capable to absorb by their entire surface moisture together with all substances dissolved in it.

Main adverse impacts are caused by contamination of the habitat with toxic industrial and home waste, especially with heavy metals. They can be accumulated in organs and tissues, transferred along the food chain and may cause various impairments including those at the genetic level.

Thermal impact on the water reservoirs exerted by TPPs and NPPs, although at present of a narrow nature, has already caused serious changes in biological cycles in the area of impact of snow-melting water.

Defence. The Republic of Belarus which was in the past on the border of confrontation between the largest military blocs has become owner of a great number of military facilities which are too numerous for its territory, Not seldom, these territories represent almost entirely indigenous woods and bogs that had not been touched by irreversible transformation and possess unique communities of animals that were typical of such regions at the time before the intense economic use was started and natural landscapes were transformed. Economic use of such territories will, inevitably, cause their radical changes (as a result of land reclamation, ploughing, use of woods) and create a threat to stability of biological diversity. On the other hand, many plots of demilitarised territories represent partially or completely transformed zones, that are often chemically or technogenically contaminated and require ecologically correct approaches to their rehabilitation.

Tourism and recreation activities. At present, we see not only the process of revival of monuments of material and spiritual culture of the past, but also the process of better understanding of the fact that Belarus possesses a unique ecological capital. The foundations of the latter are constituted by the national parks, reserves and other protected natural territories. Their use for tourist purposes creates, at least, two problems. The first problem concerns preservation of these territories for tourism and prevention of pressure by economic subjects, while the second problem means the protection of the territories against the tourists and those who use them for recreation purposes. Unorganised flows of people may, by themselves, become a factor of destruction of the natural complexes.

Insufficient elaboration and efficiency of measures regulating tourism and recreation load on natural ecosystems have a negative impact on the condition of a range of animal and plant species.

3. Radiation contamination of the Belarusian territory as a result of the Chernobyl NPP incident

As a result of the Chernobyl NPP incident 23 % of the Belarusian territory including 3,668 places of residence have become contaminated with radionuclides (with the density of Cesium-137 being over 1 Ci/km²). After the Chernobyl NPP catastrophe concentration of Strontium-98 in the lower parts of the Pripyat River exceeded the MAC and reached 4.0-l 0.0 Ci/l constituting at present 1.0-l 0.0 Ci/l. Today, the level of contamination of the water systems is determined by secondary processes: exchange with the bottom sediments, washing of radionuclides from the river water catchment surface as well as by thawing and flood water.

Radioactive contamination of soil at present is determined by Cesium-137, Strontium-90 and Plutonium-238,239, 240, 241. The highest density of contamination with Cesium-137, except for the area from which population have been moved, is known to be in the Cherikov region of Mogilev Oblast (146 Ci/km²). Radionuclides contaminate about 1.6 million hectares of forests.

Contamination of vast territories of Belarus with radionuclides due to the Chernobyl NPP incident has caused certain disturbances of the biological communities. Study of radiation sensitivity of a number of representatives of the natural flora of different genetic systems has shown that species of plants characterised by a low ecological plasticity and a high number of chromosomes are especially sensitive to ionisation radiation. This is also true about apomictic as well as perennial plants (above all, species that grow on the border of the geographic spreading). Precisely these species when affected by extreme factors may be modified as regards the population structures, the reduction of their number and stability and, in the long run, the possible exclusion from the natural communities.

4. Most vulnerable ecosystems and species

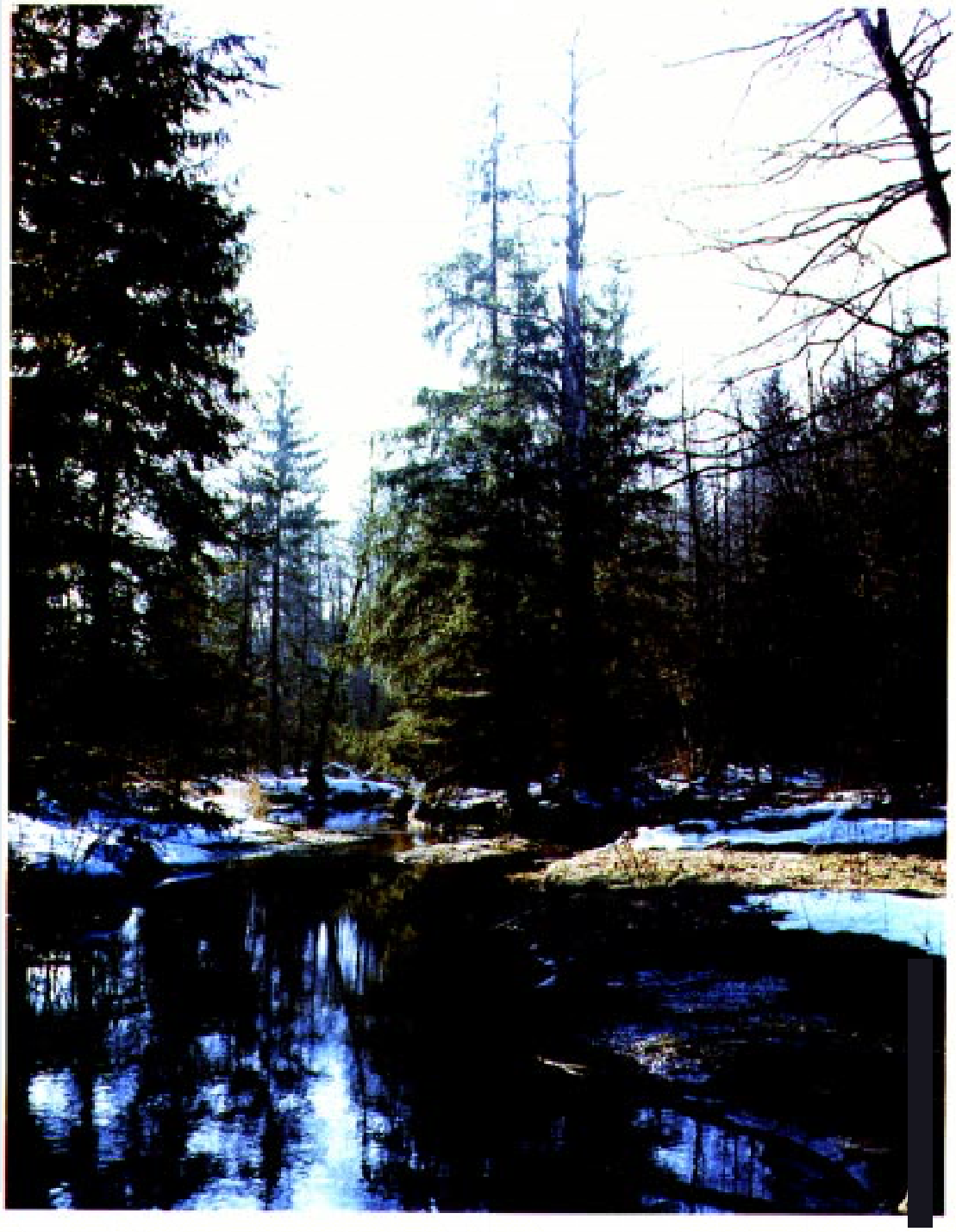
In the process of historic development, the main anthropogenic processes that affect the biological diversity of terrestrial animals most of all have been: felling of trees and changing of the structure of woods, drainage of bogs and strong transformation of various elements of natural landscapes as a result of agricultural activities. Aquatic animals have been affected most of all by changes in hydrological

conditions and contamination of water reservoirs. The area of wood habitats was reduced, to the greatest degree, in the first years after the Second World War. At that time this area constituted 22 % of the territory, but later on it was increased through artificial plantation of woods to 33,7 %. Transformation of boggy habitats has turned to be more catastrophic. As a result of drainage, open bogs that covered about 10 % of the Belarusian territory and constituted half of the entire bog areas were drained at about two thirds and transformed into agricultural lands. Thus today, for example, about half of the birds that prefer to inhabit boggy or lowland places have become rare and registered in the Red Data Book of the Republic of Belarus.

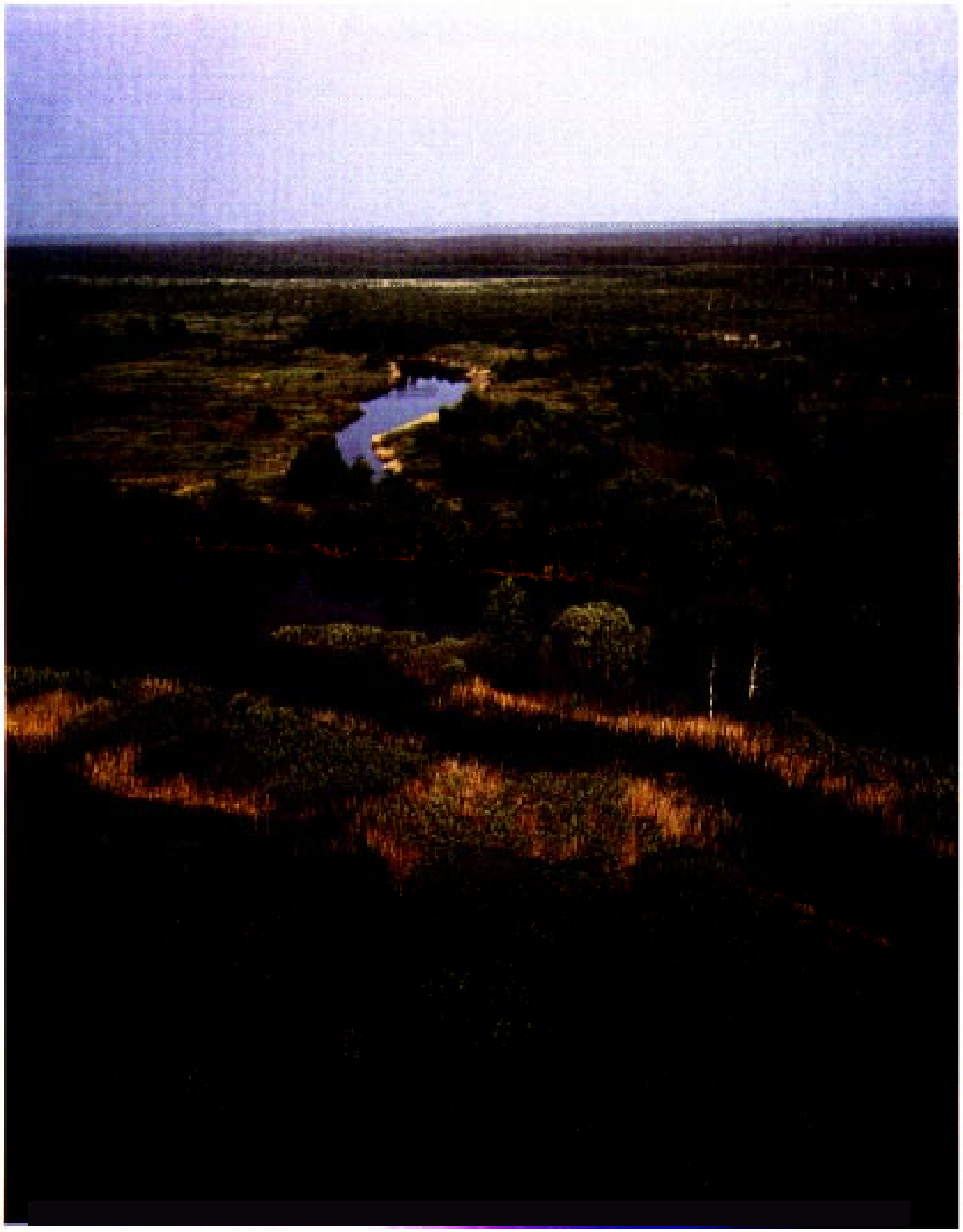
Relict species of the steppe complex are also under threat of complete vanishing from the territory of Belarus. It is precisely this complex that has suffered more than others from intense anthropogenic transformation of open landscapes. Parts of fauna species of this complex either has already vanished from the territory of Belarus or are under the threat of vanishing.

Among the most endangered species of fauna (besides species the low number of which in Belarus can be explained by their habitat location along the border of the area of their distribution) the predominant position is occupied by representatives of various types that live in lowland and boggy places and aged forests. For the majority of species that are under threat of vanishing in Europe and that have significant populations in Belarus, the main habitats are river floodplains with abundant water flow and flooded woods. At present, the unique feature of the Belarusian territory and its importance for the preservation of biological diversity of Europe is the availability in the Republic, mainly in its Polessye Region, of a still large area of river floodplains with strong water flows and low bogs.

As regards flora of Belarus, the largest losses are characteristic of those species that grow on bogs and in water reservoirs as well as of species that inhabit shadowy broad-leaved woods, natural meadows or meadows that are slightly used (especially boggy meadows) and areas located nearby springs and rivulets. These are the habitats characterised by the most humid ecological conditions that have maximum concentrations of diverse relict, rare and endangered species of plants.

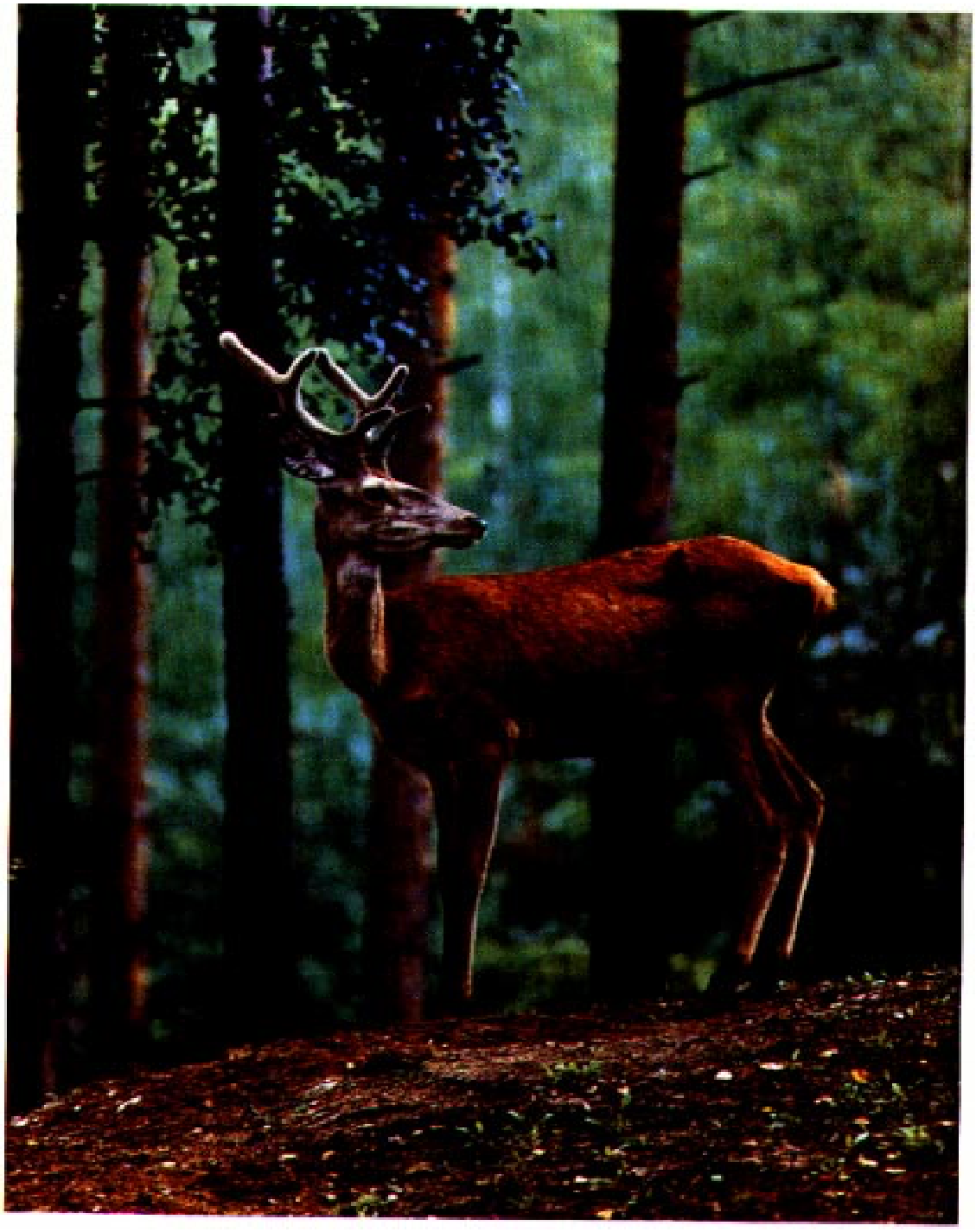


Small rivers are elements of ecosystems typical of coniferous taiga forests of Central and Northern Belarus (photo by M.Ya. Nikiforov)



The Lva River is one of a few in Belarus preserved in its natural condition. (photo by M.Ye. Nikiforov)

Oak woods along the Polessye rivers are characterised by a rich vegetation and wildlife (photo by M.Ye.Nikiforov)



Red deer (*Cervus elaphus*) is a species reintroduced in Belarus (photo by I.I.Byshnev)

VII THE MOST IMPORTANT DIRECTIONS OF ACTIVITY FOR THE CONSERVATION AND SUSTAINABLE USE OF BIOLOGICAL DIVERSITY AND THEIR CORRESPONDENCE TO LOCAL, NATIONAL AND INTERNATIONAL OBJECTIVES

1. Formation of the State policy and further development of legislation

The State policy in the sphere of conservation and sustainable use of biological diversity includes the development and implementation of an aggregate of political, organisational, economic, technical, legal and other measures for securing rational, comprehensive and non-exhausting use, improvement of the condition, restoration and reproduction of biological resources. This policy must be formed:

- with due account of the principles and norms of international law as well as of conventions, treaties and other international agreements to which the Republic of Belarus is a Party;
- without infringement upon the interests of sovereign states in the process of use and protection of national biological resources;
- proceeding from the orientation of the mankind towards the noosphere way of development and the co-evolutional strategy, i.e., equilibrium of socio-economic, demographic and ecological processes;
- on the basis of conventions, republican, regional and local programmes on biological diversity;
- with due account of combination of economic and ecological interests when the priority should be given, if required, to the latter;
- exclusively on legal grounds, i.e., observing the supremacy of laws over complementary regulatory acts;
- development and perfection of common legislation on the use of nature and protection of the environment as well as of special legislation on biological diversity;
- following environmental impact assessment (EIA) of exploitation and expediency of use of biological resources;
- by determining directions and general objectives of the use biological diversity facilities and measures for their protection;
- proceeding from the right of ownership of biological resources and the derivative nature of the right to use such resources;
- responsibility for rare, unique or typical biological diversity facilities must be borne by concrete departments and environment users;
- on the basis of standardisation, limitation and licensing of use of biological resources;
- after the expertise of programs, plans, projects and other documents related to the operation and use of biological diversity facilities;
- introduction of an efficacious ecological control by the State over the conservation and sustainable use of biological resources.

Further development of legislation on conservation and sustainable use of biological diversity must be directed towards introduction of amendments and additions to the existing legislative and complementary regulatory acts on the use of nature and the protection of environment, cancellation of such acts or some of their individual standards, passing of new codes, laws, rules, instructions, methods and other complementary regulatory acts on the use of natural resources including biological resources.

It is necessary to update the existing legislation of the Republic of Belarus related to the natural resources as the basis for conservation and sustainable use of biological diversity. Important acts of such legislation are the Water Code dated September 27th, 1972, the Forestry Code dated June 21 st, 1979, the Code on Land dated December 1 lth, 1991, and the Code on Subterranean Resources dated December 15th, 1997. These acts incorporate and stipulate the grounds, conditions and procedures for use of water,

forests, land and subterranean resources together with representatives of flora and fauna. The common drawback of the above regulatory acts is the dominance of their economic objective over the environmental protection. They stipulate the use and protection of, predominantly, water, forests and other concrete natural resources irrespective of the problems of conservation and better use of biological diversity. It is expedient to include into the above codes standards related to biological diversity.

Amendments and additions shall also be made into laws "On Protection of the Environment" and "On Specially Protected Natural Territories and Facilities" with due account of the real conditions for environment use and protection work in the Republic as well as of social and economic transformations that are taking place.

The Criminal Code of the Republic of Belarus and the Code of the Republic of Belarus "On Administrative Offences" must include the relevant sections 'On Ecological Crimes" and "On Ecological Administrative Offences". The Civil Code of the Republic of Belarus must be complemented with the commitment related to compensation for the ecological damage caused.

2. Optimisation of control, management and economic regulation of the use of biological diversity

Strengthening of institutional structure and development of inter-departmental co-ordination must envisage, above all, a further improvement of the organisational structure and raising the qualification level of specialists of the Ministry of Natural Resources and Environmental Protection as well as increasing the role and activity of the Republican Commission on Problems of Biological Diversity.

In recent time, activities of non-governmental ecological organisations and movements have been reduced due to the unfavourable economic situation and ungrounded rigid state tax policy towards them. As a result of this, many organisations and movements have discontinued all together their activities in the last 2-3 years.

To increase the role of the public in solving the problems of preservation of biological diversity, it is necessary to strengthen relations between governmental structures and non-governmental organisations. To this end, it would be expedient to set up, within relevant ministries, departments and institutions, public relations divisions (offices). It is necessary to involve representatives of non-governmental organisations in the ecological expertise of various projects that exert impact on the environment and into discussions of state environment-protection programmes. It is also expedient to provide to them opportunities to participate, on the basis of competition, in the implementation of scientific-technical, educational and other state programmes connected with the solution of biological diversity problems.

For effective conservation and sustainable use of biological diversity, it is necessary to set up two levels of management. The first (top) level of management shall define general conditions for conservation of biological diversity and stipulate the necessity for spinning-off and independent functioning of a new subsystem, i.e., the ecological subsystem, within the national economy structure alongside the material production and non-production spheres. The lower level of management shall provide for the development of a special economic mechanism for conservation of biological diversity.

Both levels must be connected by a new system of cost-related environment-usage relationships based on the ecological rent that should guarantee, and, at the same time, must stimulate the reproduction of live nature and of its individual elements, In so doing, it is also necessary to incorporate into legislation the minimum level rate of ecological rent including it into the gross domestic product and the national income.

The function of a strong organisational manager for target-oriented and orderly flow of ecological investments that is required for solving environment-protection problems may be assigned to the Ecobank which should be created under the Ministry of Natural Resources and Environmental Protection. The main part of the banks capital will be constituted, on one side, by ecological payments, and on the other side, by deductions made from profits that will be brought by ecologically pure products obtained as a result of introduction of environment-conservation technologies.

The basis of the ecological capital of Belarus is determined by forest, wetland systems. This ecological resource has a practical importance not only for the Belarusian nation. Forest and mire specificity of our country attracts attention of the international community in the context of problems of sustainable development of the European continent. Therefore, it is necessary to define, at the international level, a stable basis for financing specially protected natural territories that incorporate unique ecological values. This basis is represented by the international ecological rent. Its constituent component or, perhaps, the determining component must constitute an extra-governmental (extra-state) foundation for conservation of the genetic stock of the Earth and of untouched nature. Belarus must take active part in the setting up of such foundation at the international level.

One of the most important organisational and economic measures that can be used for successful solution of the complex of tasks on conservation and maintenance of biological diversity in Belarus is the modification of the form of ownership of land resources. Dominance of the state ownership for land that prevailed not long ago as well as prevailing large land users in the Republic represented by collective and Soviet farms have had a substantial impact on the territorial planning structure of landscapes. This has been expressed by a too great enlargement of land lots (estates), a decrease of the share of natural ecosystems among these lands, an increase of the number and the density of the infrastructure elements in landscapes, and a growth of material and energy impact on the land in use. In the long run, it has led to a decreased natural mosaic pattern of landscapes and a reduction, in some regions of Belarus, of biological diversity of ecosystems to the critical level.

Passing by the Republic of Belarus of the Code on Land (1991) and the special Law "On the Right of Ownership for Land" (1993) laid a legal foundation for development of new forms of land ownership along with the state ownership (i.e., lease, inherited for life land ownership, and private land ownership). Thereby, the state monopoly on the property of land in the Republic was terminated which may gradually lead to a normal change in the spatial structure and functional designation of landscapes. Today, the Republic already has more than 3.5 thousand private farms and their number is constantly growing. The average land area of a private farm is about 20.0 hectares. This change in the land relations results in the split of large land estates which provides for more favourable natural and territorial conditions for conservation of biological diversity of ecosystems. It anticipates the formation of more mosaic landscape structures within which there will be a frequent alternation of agricultural estates with other estates. Besides, this will bring about a further splitting (fragmentation) of landscapes and increase the role of ecotones among actively used territories that would allow for the maintenance of biological diversity of ecosystems. As a result of implementation of the land reform, the areas of land in possession or use of the citizens have significantly increased. The total area of such land constitutes 1,447,000 hectares, of which 500,000 hectares have been allocated to citizens in the last 5 years. Considering the fact that these land estates are located among estates of agricultural enterprises and have small sizes, they serve as a substantial factor of further increase of biological diversity of agricultural ecosystems.

It should be admitted that at the initial stages of land reforms in Belarus, the territory planning decisions for the formation of new forms of land use are often incorrect. Thus, the land fund of private farms is often formed on boggy soils or soils covered with shrubs and bushes with a low fertility. However, these territories play an important nature-conservation role, including the role in maintaining biological diversity of ecosystems. This confirms the need for preservation of the state regulation in the sphere of planning and use of land. The above planning must be based on scientifically grounded plans of rational land use and protection at the republican, regional or local levels.

One of the constituent parts of such plans must be specification and territorial referencing of zones of conservation of natural ecosystems as well as territory planning measures for maintaining biological diversity at the species and ecosystem levels.

The National Red Data Book of rare and endangered species of animals and plants

In compliance with the Regulation on the Red Data Book of the Republic of Belarus, this book constitutes a scientific document which determines the contemporary condition of rare and endangered species of animals and plants of the country and is used as a basis for making long-term prognosis and developing practical measures aimed at their protection, reproduction and rational use.

The creation of the Red Data Book of the Belarusian SSR and the regulation on it were approved in 1979 by the decree of the Council of Ministers of the Belarusian SSR.

Table VII.1: Number of species of plants and animals under protection in the 1st (1981) and 2nd (1993) editions of the National Red Data Book

Name 'of animal Taxons	1st edition	2nd edition	Name of plant taxons	1st edition	2nd edition
Mammals	10	14	Club-moss	2	3
Birds	45	75	Horsetail	1	2
Reptiles	2	2	Ferns	3	7
Amphibians	1	1	Gymnosperms	1	1
Fish and cyclostomatae	7	5	Angiosperms	78	143
insects	9	79	Moss	-	15
Crustaceans	5	5	Algae	-	9
Arc shells	1	1	TOTAL plant species	85	180
TOTAL animal species	80	182	Fungi	-	17
			Lichen	-	17

New proposals for the inclusion of species of animals and plants into the Red Data Book of the Republic of Belarus made by scientific and other state institutions and individual scientists are under consideration at the National Academy of Sciences of Belarus. The registration in the Book is made by the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus. When the threat of vanishing of some species has been removed, this species shall be excluded from the Red Data Book of the Republic of Belarus. Proposals and registration of the exclusion shall be made using the same procedure.

In ten years after the first edition of the Red Data Book of the Republic of Belarus, the targeted work carried by the state and public organisations of the country helped to find out and handover for protection by land users 1,046 habitats of 47 rare species of animals and 230 places of growth of 65 rare species of plants. Eighty eight local reserves have been formed for their protection.

Creation of the national network for monitoring the status of the biological diversity

In conformity with the Law of the Republic of Belarus "On Protection of the Environment", the Council of Ministers of the Republic of Belarus passed, on April 20, 1993, Decree No. 247 "On Creation of the National System of Environment Monitoring in the Republic of Belarus (NSEM)" with a view of observing, assessing and predicting the status of the environment, providing at all levels of management the information required for determination of the land use strategy and taking fast-response management decisions.

Organisation of the NSEM has been imposed on the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus including the development of a programme for its implementation in the country.

A Programme of the NSEM (general part) has been developed under managerial control of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus (by its leading organisation Belarusian Scientific Research Centre "Ecology") in 1994; it specifies, among general provisions, the mechanism of management and scientific work, its structure, information and mathematical materials, software as well as mechanism of implementation of the programme. Observation of the dynamics of biological diversity is reflected in the section "Biological Monitoring", including monitoring of the vegetation and wildlife. Performance of biological monitoring has been entrusted to the National Academy of Sciences of Belarus, the Ministry of Forestry, the Ministry of Natural Resources and Environmental Protection, the Ministry of Education and Science and the Department of Management of Affairs of the President.

Monitorino of venetation is a system of long-term and regular observations over the condition of ecosystems based on the phytoindication methods with a view of assessing their condition and quality of the environment and predicting changes in future at the existing levels of operation, use and impact on ecosystems or in conditions when no impact is exerted.

The vegetation monitoring system in the Republic of Belarus is formed by units that correspond to the basic monitoring types: forest vegetation, meadow vegetation, water vegetation and vegetation of special protective plantations.

The goal of the vegetation monitoring is to obtain information on the current condition of natural ecosystems, the quality of the environment and prediction of their development in different scenarios of anthropogenic impact for ecological justification of managerial, project and technological decisions so as to secure ecological safety of the population, preserve and make rational use of the natural vegetation cover and maintain quality of the environment.

The leading organisation in this work is the National Academy of Sciences of Belarus (through its Institute of Experimental Botany).

Monitorino of wildlife represents a long-term making of regular, complex and comparative assessments of the condition and trends in the dynamics of the most important ecological and systematic groups of wild animals in conditions of contemporary anthropogenic impact and of landscape differentiation of the natural environment.

Its purpose is to assess the conditions of populations and communities of the most representative species of animals that allows for a close observation of changes in the diversity of wildlife in the country and in specific types of habitats, as well as to create a reference network for controlling the condition of the natural environment by using wildlife representatives.

The leading organisation in this work is the National Academy of Sciences of Belarus (through its Institute of Zoology).

Introduction of the wildlife monitoring is stipulated also by the Law of the Republic of Belarus "On Protection and Use of Wildlife" (Article 15) as a state system of regular observations over the spreading, number, physical condition of wildlife population, structure, quality and area of their habitat for the purpose of timely detection, prevention and elimination of consequences of adverse processes and phenomena so as to preserve biological diversity and assure a scientifically grounded use of wildlife representatives.

Also, of great importance for the analysis of factorial cause-and-effect dependencies of the biological diversity dynamics are other types of monitoring defined in the NSEM Programme (atmospheric air, hydrosphere, soils, etc.). Issues related to the organisation of the NSEM, including biological monitoring aspects, are defined in the National Programme of Rational Use of Natural Resources and Protection of the Environment in 1996-2000 approved by Decree No.667 of the Cabinet of Ministers of the Republic of Belarus on October 15th, 1996 as well as in the National Strategy and Action Plan for the Conservation and Sustainable Use of Biological Diversity in the Republic of Belarus approved by the Council of Ministers of the Republic of Belarus (Decree No.789 dated July 26th, 1997).

Creation of the State account system and vegetation and wildlife cadasters

The Law of the Republic of Belarus "On Protection and Use of Wildlife" specifies that for assuring the protection and the organisation of rational use of wildlife, it is necessary to make the state account of animals. The state cadaster of wildlife contains data on the geographic spreading of species (groups) of animals, their population, characterisations of the conditions needed for them, characterisation of the contemporary economic and other use of animals as well as other required data (Article 13).

In conformity with the Regulation on the State Wildlife Cadaster approved by Decree No.78 of the Cabinet of Ministers of the Republic of Belarus on February 3rd, 1995, this cadaster shall represent a systematic summary of regularly updated data that characterise the distribution, biological condition, population dynamics trends, nature and intensity of economic use of species (species groups) of wildlife inhabiting, constantly or temporarily, the country's territory in conditions of natural freedom, in custody or partial custody conditions as well as of the basic data on conditions of animal life, on biotechnical, protective and other measures applied.

At present, the institute of Zoology of the NAS of Belarus, on instruction of the Ministry of Natural Resources and Environmental Protection, has developed the Rules for keeping the State Wildlife Cadaster of Belarus that are to be approved in the near future.

As specified by the Rules, the keeping of the State Wildlife Cadaster shall include the state accounting of wildlife as well as the reports submitted by economic subjects that make use of the wildlife. Depending on the biocenotic and economic status of species and the specific features of their determination and account in natural conditions, the state accounting shall include: departmental accounting (control), special control and scientific monitoring.

The state accounting of wildlife is mandatory for all users of wildlife resources. The scientific and methodological basis for the state accounting of wildlife is "Methodological Instructions on Wildlife Accounting by the State" developed by the National Academy of Sciences of Belarus and approved according to the established procedure by the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus.

A similar procedure is used now to develop and create the System of state accounting and the state cadaster of vegetation of Belarus.

3. Development of fundamental and applied science

The implementation of the provisions of the Convention on Biological Diversity, the National Strategy of Sustainable Development of the Republic of Belarus, the National Strategy and Action Plan for the Conservation and Sustainable Use of Biological Diversity in the Republic of Belarus, programs and regulations in the sphere of conservation and use of natural biological resources is not feasible without a fundamental scientific and scientific-technical support by the national scientific specialists. A special place among them is assigned to the National Academy of Sciences which has always led and co-ordinated fundamental and applied developments devoted to problems of protection and use of live natural resources.

The main tasks of fundamental and applied science in the sphere discussed here include study of the condition and prognosis of the dynamics of biological diversity. To allow for a fast analysis of materials accumulated in the process of study of impacts exerted by different factors on wildlife and vegetation, it is extremely important to have databanks that would concentrate information on the condition of the main components of faunistic and floristic complexes and the environment in which they live or grow with due account given to the degree of anthropogenic transformation. These data represent an important foundation for future modelling and forecast of the dynamics of species and groups of animals and plants as well as of faunistic and floristic complexes depending on the impacts exerted by natural and anthropogenic factors.

At present, the main fundamental developments devoted to the problems of assessment of condition, conservation and rational use of biological diversity are connected with the implementation of the Republican Complex Programme of Fundamental Researches in 1996-2000 called 'Structural and Functional Condition and Scientific Grounds for Conservation and Use of Biological Diversity of Vegetation and Wildlife on the Territory of Belarus (Biological Diversity)". The main part of this Programme is fulfilled by the Institute of Experimental Botany and the Institute of Zoology of the NAS of Belarus as well as by a number of other institutions.

At the same time, issues related to study, conservation and use of biological diversity are developed within the framework of the National Complex Scientific and Technical Programme (NCSTP) called "Use of Nature and Protection of the Environment of the Republic of Belarus in 1996-2000".

Out of 130 tasks of the Programme implemented today and connected with the development of scientific grounds and technical decisions that assure the increase of the level of self-provision with the available natural resources and the introduction of ecologically safe and resource-saving technologies aimed at diminishing the anthropogenic impact on natural ecosystems, more than 30 tasks are directly related to issues of conservation and sustainable use of biological diversity in Belarus.

Great work on the issues of study and rational use of microbial diversity is performed by the Institute of Microbiology of the National Academy of Sciences of Belarus.

It is planned to continue studies of microbial diversity of Belarus and of its functional features; the formation of the National Collection with a view of conserving the genetic stock of species diversity of microorganisms; and the creation of ecologically safe microbial preparations for increasing the soil fertility and the yield of agricultural plants and for protecting the environment.

In recent years, the successful development of gene engineering has become the ground for extensive development of biotechnologies, including the technology of creation of genetically modified organisms (GMO) into the hereditary structure of which are introduced genes of systematically distant species of plants, animals, microorganisms and viruses. Uncontrollable construction and use of GMOs may bring about serious unfavourable ecological effects. In this connection arises an urgent necessity for development of safety measures that would assure an efficacious use of modem science achievements excluding, at the same time, possible unfavourable ecological consequences and risks for human health.

Highly important for assessing the dynamics of biological diversity in Belarus in conditions of radioactive contamination of the environment and for creation of alienation zones, from which the population shall be evacuated, are scientific state programmes on problems of overcoming the consequences of the catastrophe that happened at the Chernobyl Nuclear Power Plant. The results of scientific studies of impact by the Chernobyl NPP incident and the results of application of practical measures that have been worked out have been analysed during a series of conferences and in a number of important publications:

a) Conferences:

I International Conference “Biological and Radioecological Aspects of Consequences of the Chernobyl NPP Incident”, Zelyony Mys, Ukraine, 1990;

II Radiobiological Congress, Kiev, 1993;

II International Conference “Radiobiological Consequences of Nuclear Incidents”, Moscow, 1994;

Belarusian-Japanese Symposium “Basic and Distant Consequences of Nuclear Catastrophes: Hiroshima-Nagasaki and Chernobyl”, Minsk, 1994;

International Conference in the line of MAB “Dynamics of Biological Diversity on Territories Contaminated with Radionuclides as a Result of the Chernobyl Incident”, Moscow, 1994;

International Working Meeting “Ecological Status of Contaminated Territories” held within the framework of the Chernobyl Ecological Research Network, Minsk, 1995;

International Conference “Ten Years After the Chernobyl Catastrophe”, Minsk, 1996;

International Conference “Ten Years After Chernobyl”, Vienna, 1996;

b) the main publications:

Radioactive Contamination of Vegetation of Belarus, Institute of Experimental Biology, 1995;

Wildlife in the Area of the Chernobyl NPP Incident, Institute of Zoology, 1995.

Chernobyl, Belarusian Encyclopedia, 1996.

Chernobyl Catastrophe. Consequences for the Republic of Belarus. National Report of 1996;

Ecological, Medico-Biological and Socio-Economic Consequences of the Chernobyl NPP Catastrophe in Belarus, 1996.

Condition of the Environment of Belarus. Ecological Bulletin, 1993, 1994, 1997;

Series of popular scientific articles in the magazines “Belarus” and ‘Rodnaya Pryroda” (“Our Nature”) and in the newspaper “Naviny of Akademiyi Navuk” (“News of the Academy of Sciences”).

The National Programme of Rational Use of Natural Resources and Protection of the Environment in 1996-2000 has stipulated the development of scientific programmes for study and conservation of biological diversity for reserves and national parks.

4. Further development of the network of specially protected natural territories and regions with limited anthropogenic impact

Protected natural territories

Specially protected natural territories (SPNT) and facilities are defined in the legislation of the Republic of Belarus as plots of land and parts of water space including natural complexes having special ecological, scientific, cultural, aesthetic and historic importance that have been given a special status of protection and use. Such territories and facilities include territories of reserves, national parks, partial reserves, monuments of nature as well as the monuments of nature themselves. Depending on the ecological and scientific value, partial reserves and monuments of nature are created at the republican or local level of state government. The may be of republican or local importance, respectively, as regards their administrative and legal status.

The existing network of specially protected natural territories (SPNT) of Belarus does not possess a space planning structure that should be sufficiently justified from the ecological point of view, elaborated in details and, which is especially important, should have legal foundations and should unite individual protected territorial entities into a single entity that would provide the necessary conditions for migration of live organisms. For solving this problem, it is necessary to undertake the following scientific and technical tasks:

1. To develop scientific and technical justification of territorial and spatial parameters that would assure a sustainable conservation of biological diversity at the levels of population, species and ecosystems.
2. To develop scientific and practical justification of the expediency of restoration of natural ecosystems on lands that are used in some areas of the Republic for economic purposes.
3. To determine the degree and conditions for conservation of biological diversity in the landscapes that are used in agriculture, forestry, hunting facilities, recreational facilities as well as in different territorial and spatial combinations of protected natural territories with landscapes used for economic and recreational purposes.
4. To determine the limit anthropogenic loads on functionally different landscapes that would assure the required levels of preservation of biological diversity.
5. To implement functional and ecological zoning of the territory of the Republic and justify the optimisation of the space planning structure and of the conditions of use of delineated zones including the system of territories under protection.

Development of a system of specially protected natural territories

In 1995, after the passing of the Law of the Republic of Belarus 'On Specially Protected Natural Territories and Facilities", the Ministry of Natural Resources developed, as required by the Decree stipulating the procedure of putting into force of this Law, a new document called "Plan of Rational Placement of Specially Protected Natural Territories of the Republic of Belarus" (Plan for 1995) that was approved by Decree No.132 of the Cabinet of Ministers of the Republic of Belarus dated March 13th, 1995 which determined the list of national parks, reserves and partial reserves of republican importance to be created by 2000 and 2005. In compliance with the new legislation, partial reserves shall include three categories of the four: landscape, hydrological and biological reserves (territories and facilities for formation of paleontologic reserves were not specified).

By January lst, 1995 (when the Plan for 1995 was developed) the Belarusian territory included 79 SPNTs with a total area of 794,157 hectares (about 3.8% of the country's territory) including: 2 reserves with an area of 145,270 hectares, the National Park "Belovezhskaya Pushcha" (87,363 hectares) formed on the basis of the formed state reserve and hunting facility; and 76 partial reserves with a total area of 561,524 hectares. The State reserve and hunting facility Telekhanskoye was transformed into an experimental forestry and hunting facility.

Dynamics of development of SPNTs of republican importance in comparison to the planned indicators defined for the relevant periods in the Plans is represented in Figures VII.1 and VII.2. Some reduction of the total area of the SPNTs by 1995 had been caused by their inspection made in view of the amendments in the legislation and the development of the Plan for 1995.

After-the approval of the Plan for 1995, the National Park "Braslav Lakes" (71,490) and 6 partial reserves (total area - 32,883 hectares) had been organised by January 1st, 1997. The system of SPNTs of republican importance, as it was on January 1st, 1997, included two reserves, two national parks and 82 partial reserves whose total area constituted 898,530 hectares or 4.33% of the Belarusian territory (Fig. V11.3). Work is under way to organise new SPNTs: several new partial reserves have already been established in 1997.

At present, implementation of the proposals included into the Plan for 1995 has met with some difficulties connected with serious changes that are taking place in the state system of planning and management.

Reserves and national parks

Reserves and national parks are included into SPNTs of the Republic of Belarus. Reserves represent exclusively nature-conservation and scientific-research institutions of republican importance whose tasks are: conservation in the natural condition of the natural'complex that constitutes the reserve; making of scientific researches; organisation of monitoring of the environment; assistance in training scientific specialists and specialists in the sphere of nature protection; popularisation of environment-conservation ideas and nature-protection actions. Unlike reserves, national parks represent complex environment-conservation, economic and scientific-research institutions whose tasks are: conservation of reference and unique natural complexes and facilities; organisation of ecological awareness and education of the population; making of scientific researches; development and introduction of scientific methods of nature conservation and use; preservation of cultural heritage (monuments of history, architecture, archeology, ethnography facilities, etc.); organisation of recreational activities; and management of complex economic and other activities based on traditional methods and ecologically safe technologies.

Table VII.2: Actual parameters of development of the network of reserves and national parks in comparison to the planned indicators

	Reserves				National parks			
	Number of facilities		Area, hectares		Number of facilities		Area, hectares	
	Actual	Planned	Actual	Planned	Actual	Planned	Actual	Planned
Before 1980	4		236,538					
1980-84	4	4	237,839	236,538		1		178,000
1985-89	4	4	237,839	237,839		1		178,000
1990-94	*2	4	145,270	237,839	1	3	87,363	442,000
1995-99		3		168,470	2	5	158,835	426,277
1.01.1997	**2		145,270		2		158,835	
2000-2004		2		103,414		8		768,277

** Decrease of the number and the area of reserves had been caused by the creation of the National Park on the basis of the former State Reserve and Hunting Facility "Belovezhskaya Pushcha" and realignment of the Telekhanskoye State Reserve and Hunting Facilify info the Experimental Forestry and Hunting Facility which a branch of the "Belovezhskaya Pushcha".*

*** Including Pripyat Landscape and Hydrology Reserve*

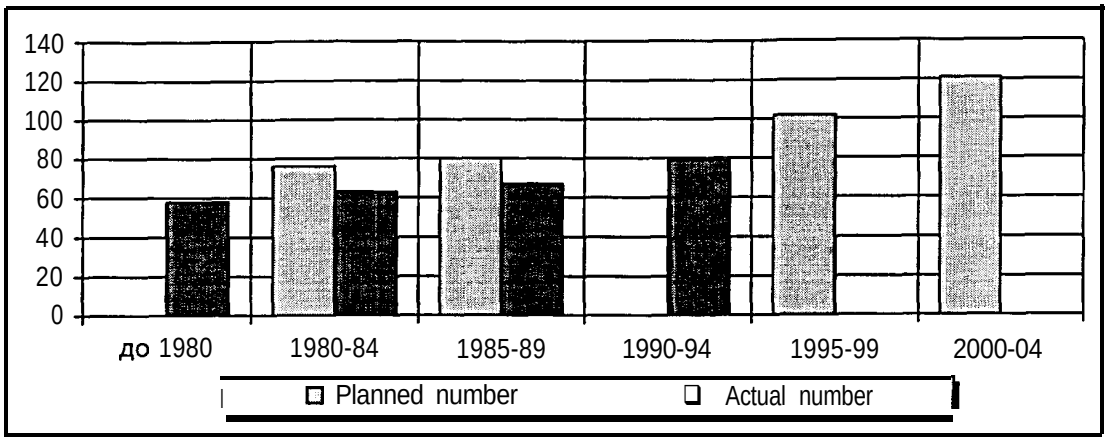


Fig. VII.1: Dynamics of development of the SPNT system of republican importance in comparison to the planned indicators (number of facilities)

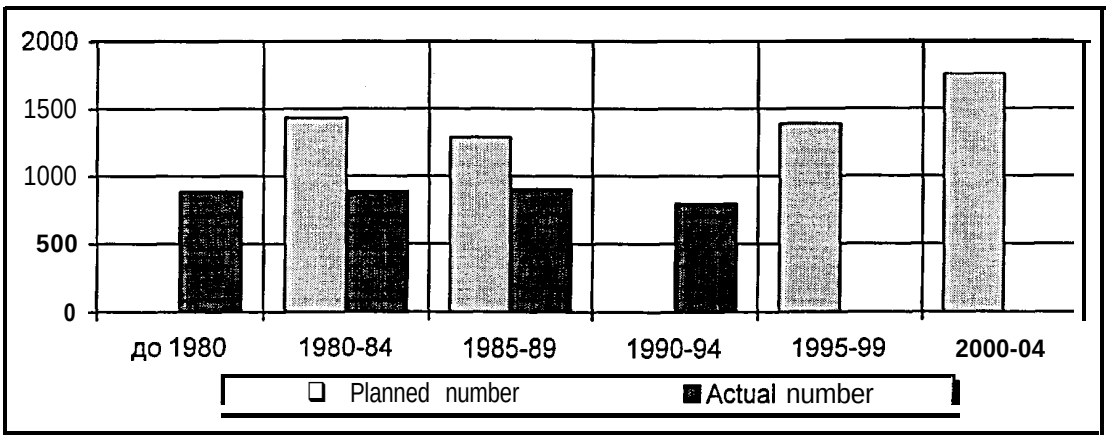


Fig. VII.2: Dynamics of development of the SPNT system of republican importance in comparison to the planned indicators (area in thousand hectares)

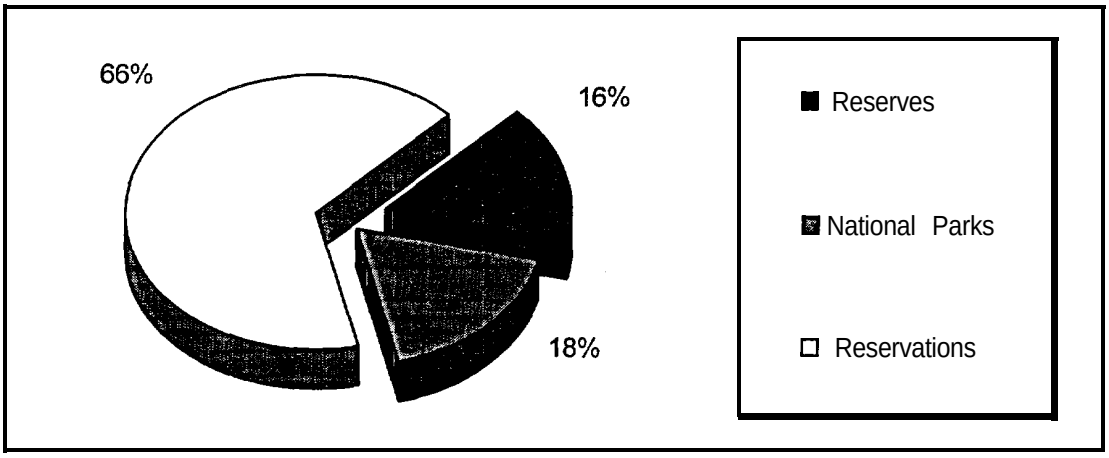


Fig. VII.3: Structure of SPNTs of republican importance as it was on January 1st, 1997

Reservations and other protected facilities

Legislation of the Republic of Belarus has defined partial reserves as territories delineated for the purpose of conservation and restoration of one or several types of natural resources and maintenance of the general ecological balance.

Until 1995, the country had had the following categories of special-purpose or partial reserves: landscape, geomorphologic, hydrological, lake, forestry, meadow, faunistic (hunting and zoological), cranberry, botany and biological reserves. After the Law of the Republic of Belarus "On Specially Protected Natural Territories and Facilities" was passed, partial reserves have been subdivided according to their purpose into:

- landscape or complex partial reserves designed for conservation and restoration of special valuable natural landscapes and complexes;
- biological (botany and zoological) partial reserves designed for conservation and restoration of species of plants and animals that are valuable from economic, scientific and cultural points of view as well as of rare and endangered species;
- paleontologic partial reserves designed for conservation of individual fossil facilities and their complexes (reservations of this category have not been organised so far);
- hydrological partial reserves (bog, lake and river reserves) designed for conservation and restoration of valuable water facilities and complexes of nature.

By January 1st, 1997, the network of partial reserves of republican importance included 11 landscape reserves with a total area of 62,090 hectares, 17 hydrological reserves with a total area of 107,979 hectares and 54 biological reserves with a total area of 424,338 hectares (Fig. VII.5) as well as 2 more biological reserves included into the National Park "Braslav Lakes".

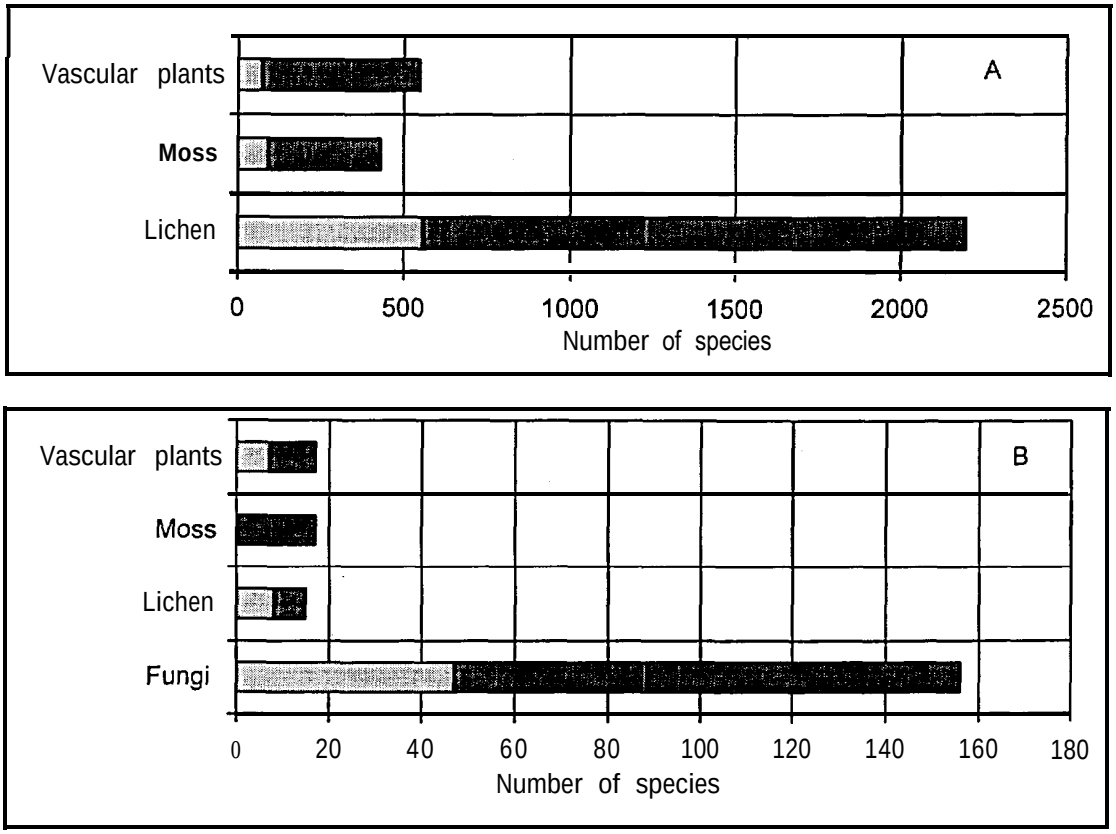


Fig. VII.4: Share of flora species of the reserves and national parks in the general composition of flora of Belarus (A) and in the composition of species included into the Red Data Book of the Republic of Belarus (B)

Table VII.3: Main indicators of biological diversity of the reserves and national parks

Biota	Berezina Reserve (62,370 hectares)	NP "Belovezhskaya Pushcha" (87,363 hectares)	NP "Braslav Lakes" (71,490 hectares)*	NP "Pripyat" (63,166 hectares)
Species of flora,	1,431	2,200	over 800	1,482
including: vascular plants	800	925	?	811
moss	220	270	?	196
lichen	224	292	?	184
fungi	?	570	?	?
algae	187	140	?	291
Species of vertebrate fauna,	329	331		360
including: mammals	51	59	?	50
birds	220 (173)	227	about 190	256 (195)
reptiles	5	7	6	7
amphibians	9	11	10	11
fish	34	27	30	36

* *Work on inventory of the natural complex of the "Braslav Lakes" National Park is under way*

Table VII.4: Dynamics of development of the network of republican reserves in comparison to the planned indicators

		Before 1980	1980-84	1985-89	1990-94	1995-99	2000-04
Landscape reserves							
Actual	Number of facilities	4	4	4	10		
	Area, hectares	3089	3089	3989	51533		
Planned	Number of facilities		9	10	14	16	22
	Area, hectares		204085	123368	192568	249801	270414
Hydrological reserves							
Actual	Number of facilities	11	16	16	14		
	Area, hectares	78235	106775	106775	97425		
Planned	Number of facilities		18	19	17	19	22
	Area, hectares		149705	154655	196931	140984	163384
Biological reserves							
Actual	Number of facilities	39	39	43	52		
	Area, hectares	566670	535247	553050	412566		
Planned	Number of facilities		44	46	62	59	67
	Area, hectares		663527	590420	697094	401981	452215
Total for partial reserves							
Actual	Number of facilities	54	59	63	76		
	Area, hectares	647994	645111	662914	561524		
Planned	Number of facilities		71	75	93	94	111
	Area, hectares		1017317	868443	1086593	792766	886013

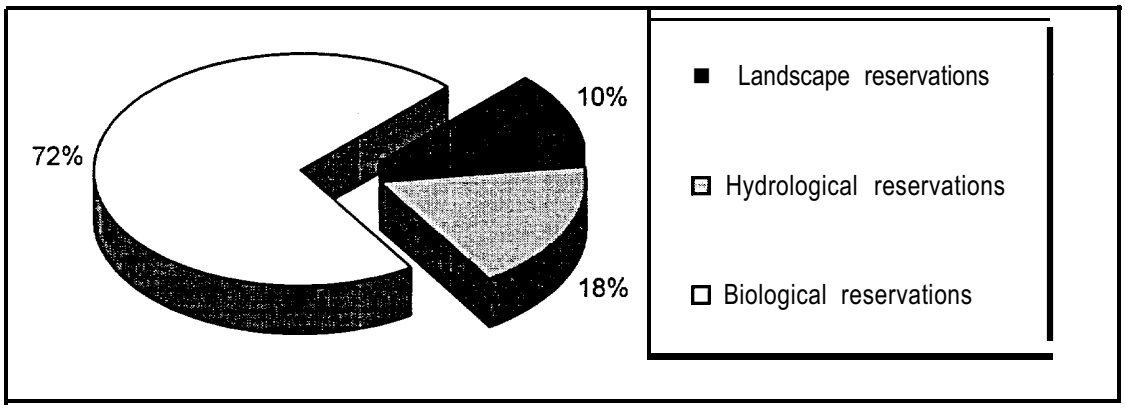


Fig. VII.5: Structure of the republican partial reserves for January lst, 1997

This network of the republican partial reserves is complemented by local reserves: 29 landscape reserves with a total area of 50,179.5 hectares, 21 hydrological reserves with a total area of 36,205 hectares, 71 biological reserves with a total area of 201,523.5 hectares, and 405 geological reserves with a total area of 108,730.5 hectares.

The priority objective for the organisation of the majority of partial or special-purpose reserves was to ensure the protection of valuable vegetation complexes, unique and valuable landscapes and hydrological facilities. Protection of fauna which is one of the main tasks of formation of the partial reserves was taken into consideration when at least 20 facilities were created. Seven facilities were organised particularly for the protection of fauna, of which 5 facilities were arranged as hunting reserves and only 2 were organised for protection of unique zoological complexes (biological reserves Antonovo and Lebyazhy).

The ecological structure of the existing network of partial reserves is far from being homogeneous. Proceeding from the most general analysis, we can state that the largest group of facilities as regards their area is represented by ecosystems of predominantly dry-valley forests: 23 facilities with a total area of 306 thousand hectares or 51.7 % of the total area of Belarusian reserves, A special group among them is constituted by biological reserves organised by Decree No. 252 of Council of Ministers of the Belarusian SSR of August 22nd, 1978, for the protection of valuable medicinal plants: 12 reserves with a total area of 132,900 thousand hectares,

The greatest number of facilities are constituted by partial reserves representing predominantly forest and bog complexes: 27 reserves with a total area of 92.6 thousand hectares or 15.7 % of the total area of the Belarusian reserves.

The main objective for the organisation of 17 facilities with a total area of 137.6 thousand hectares (23.3 %) was to guarantee the protection of lakes and lake ecosystems.

Forestry and lake complexes are represented by 6 partial reserves with a total area of 25.8 thousand hectares or 4.4 % of the total area of Belarusian reserves.

The group of facilities representing river ecosystems and floodplain complexes are constituted by 9 partial reserves with a total area of 31.6 thousand hectares (5.3 % of the total area of Belarusian reserves). The vegetation and wildlife of river valley complexes are characterised by a specific biological diversity and include 6 partial reserves with a total area of 21.5 thousand hectares.

Reservations representing meadow complexes should be considered as unique facilities. There are only four such facilities in the territory of Belarus.

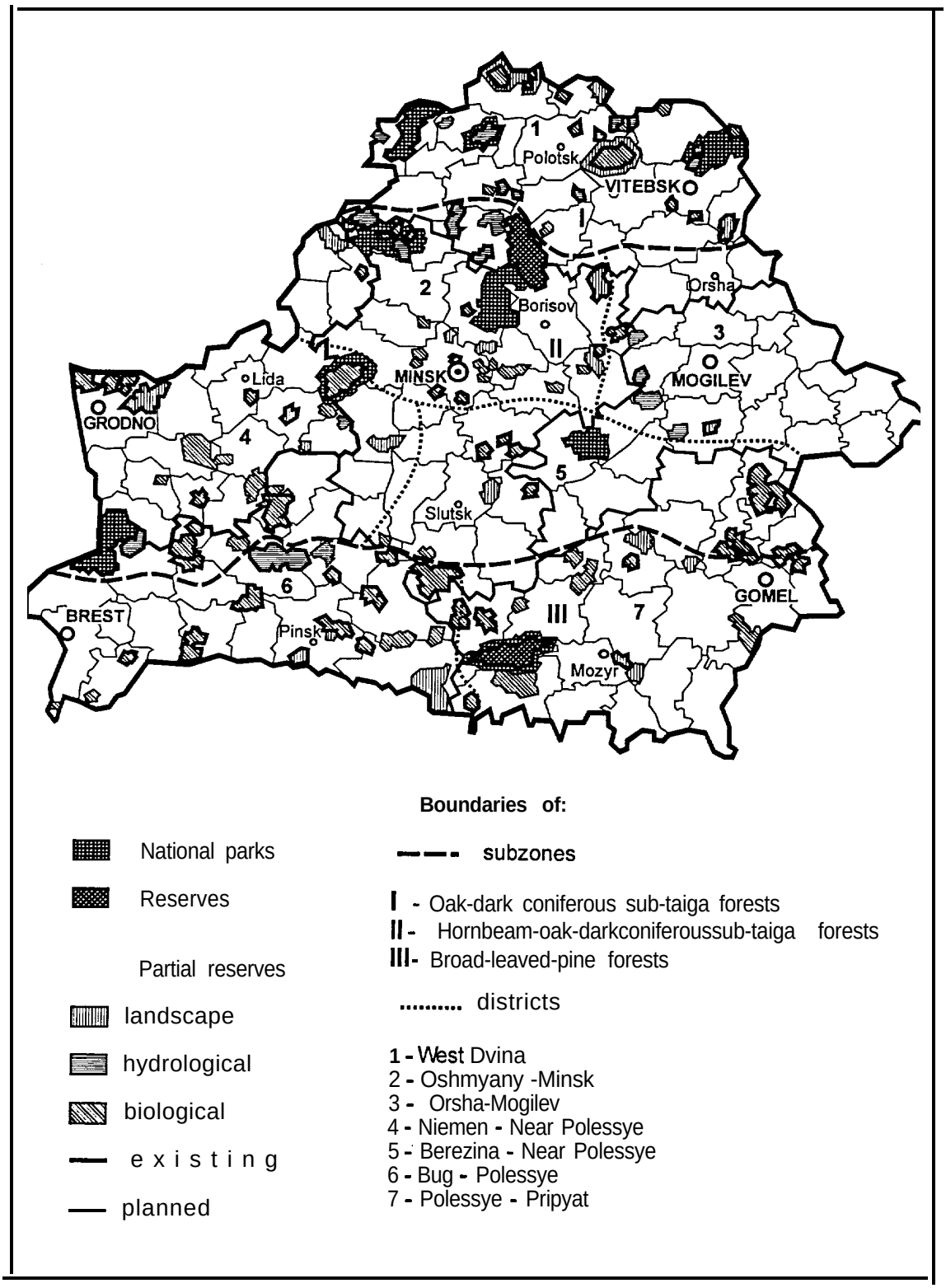


Fig. VII.6.A: Location of specially protected territories as regards forest vegetation zoning

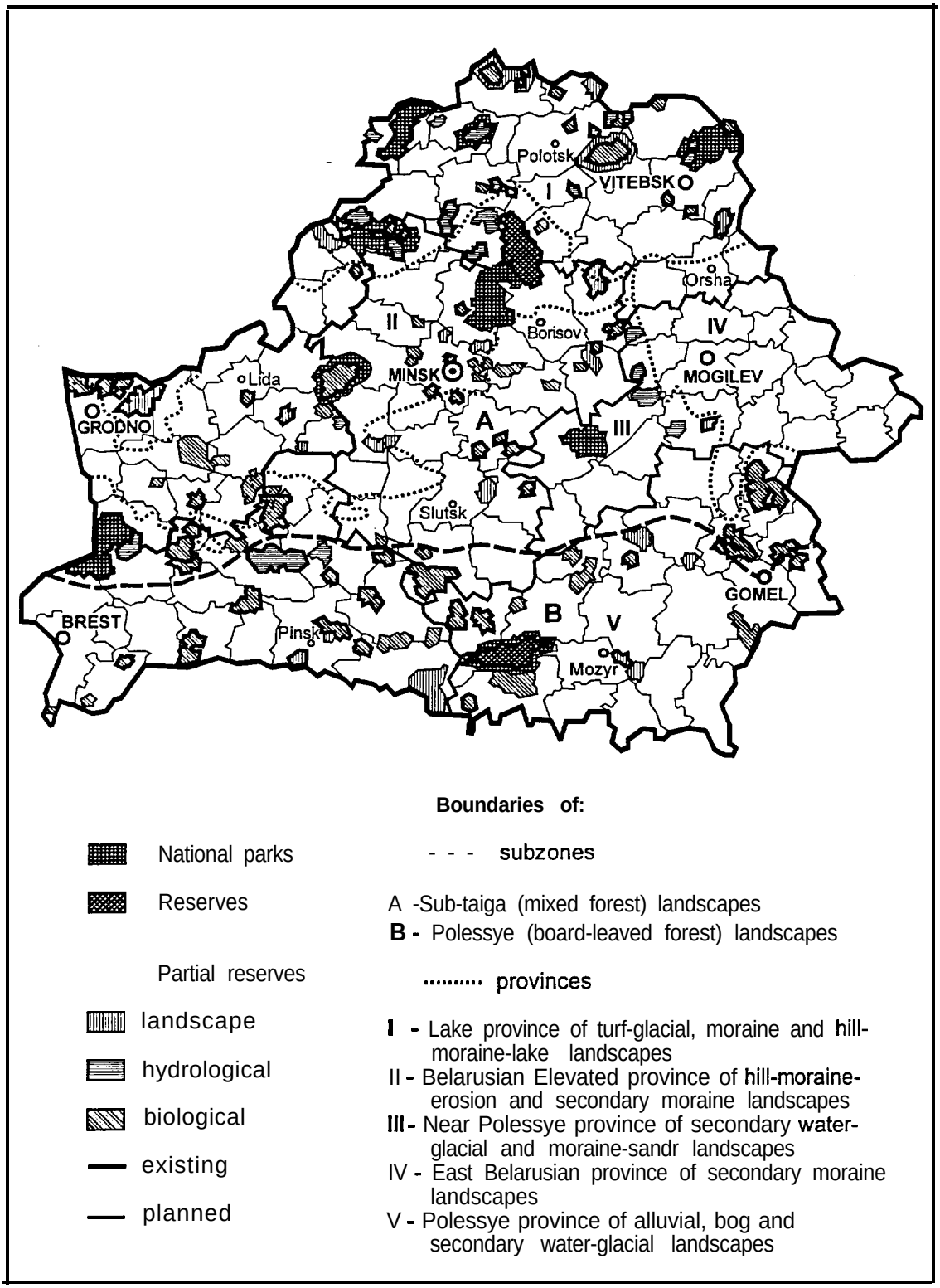


Fig. VII.6.B.: Location of specially protected territories as regards landscape zoning

. Assessment of representativeness of the network of specially protected natural territories

At present, the total area of SPNTs constitutes 4.3 % of the country's territory; territorial facilities of higher category of protection, i.e., reserves and national parks, are organised on 1.3 % of the Belarusian territory. At the same time, it is known that conservation of 10 % of natural ecosystems allows for the retention of 50 % of biota species. A small share of SPNTs in the entire territory of the country with mostly isolated locations of protected facilities is made even more problematic because of insufficient functionality of their substantial part since inside the partial reserves (except for complex landscape reserves) the protection covers only certain components of natural ecosystems and of their complexes which may have an adverse impact on conservation of biological diversity as a whole. In addition, the regime of their maintenance is not always secured.

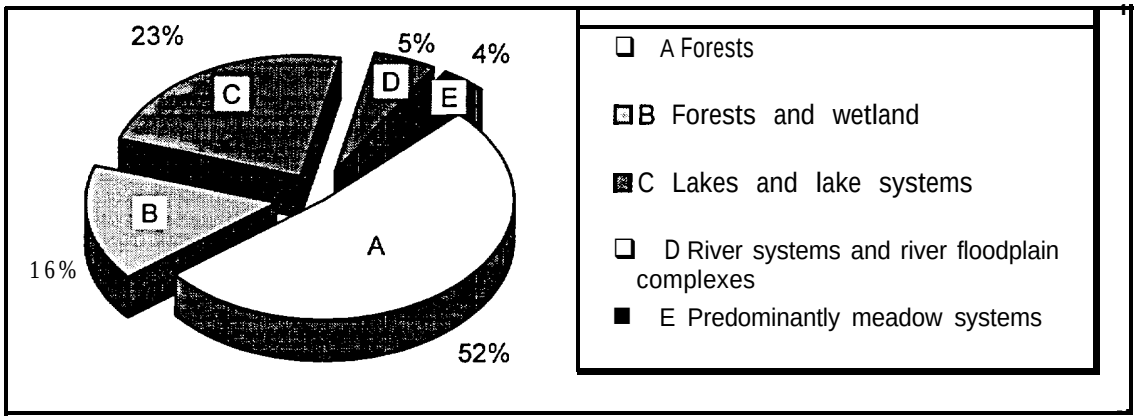


Fig. VII.7: Relationship **between different types of natural complexes on specially protected natural territories**

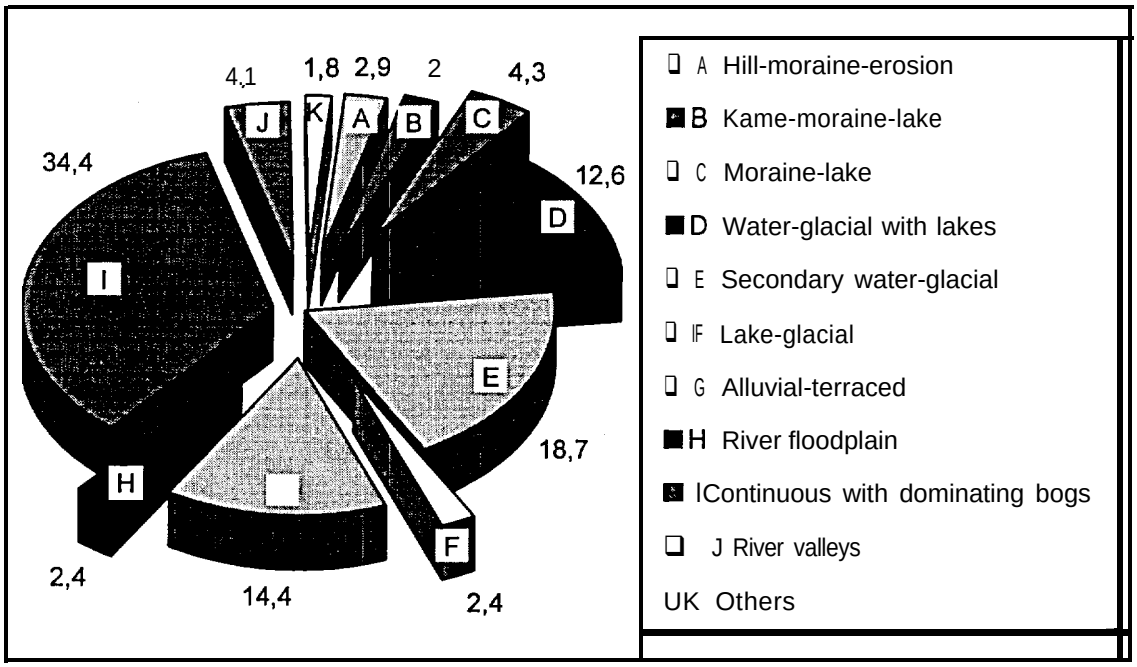


Fig. VII.8: Relationship between different landscapes (%) on specially protected natural territories of Belarus

Biological diversity on the territories with limited anthropogenic impact

Beside specially protected natural territories that are established particularly for the protection of natural biological diversity against unfavourable anthropogenic impact, the territory of Belarus includes a

number of other territories with different regime conditions whose specific features stipulate the limitation of human impact on the environment. They include the evacuation and alienation zone defined as such after the incident at the Chernobyl NPP as well as territories of military facilities (grounds, ranges, etc.). On such territories, favourable conditions are created for the whole range of protected species of flora and fauna, rare and unique communities, and ecosystems.

Zones of alienation and evacuation after the Chernobyl NPP incident

The territory of the alienation zone includes about 170 thousand hectares and is located inside the Polessye State Radiation and Ecological Reserve (PSRER) whose total area today constitutes 215.5 thousand hectares. The evacuation zone has an area of 450 thousand hectares covering territories located mainly in Gomel and Mogilev Oblasts.

In these zones, the basic anthropogenic factors conditioned by the life of people and by their agricultural and forest management (including territories with a density of contamination of soil with Cesium-137 over 15 Ci/km^2) activities do not exist. Despite the fact that before the incident the greater part of this territory had been under rather active use and, therefore, transformed, today we can see here very intensive processes of post-anthropogenic succession leading to the formation of self-regulating natural ecosystems. This has a favourable impact on the condition of many species of flora and fauna that are susceptive to anthropogenic impacts.

Already now we can observe many-fold increase of population not only of most game mammals (elk, wild boar, row) but also of a number of rare species of animals, including those that are registered in the Red Data Book (badger, eme, Circaetus gallicus, grey shrike, common crane, etc.). In future, the role of the alienation and evacuation zone in conservation of biological diversity of this region will be increasing.

The level of synanthropisation of some natural territorial complexes, located within the evacuation zone, was extremely high before the Chernobyl NPP incident, especially on urbanised territories and territories that were in active economic use. However today, more than 10 years after the time when anthropogenic impact was interrupted, there is a noticeable nearing of the gap between the species diversity of previously transformed ecosystems and of the natural ecosystems. Many species of weeds are becoming rare, some of them even dropping out from the vegetation. On the other hand, the decrease of the absolute number of plant species on such territories in reality represents a stable and favourable process of restoration of the natural vegetation cover. Thus in recent years, 35 species of weeds have become more rare whereas on former arable territories have appeared such rare or endangered species as orchis, short birch, club-moss, etc.

Militarised special-regime natural territories

An active demilitarisation process that was started as a result of the reduced military confrontation of the states conditioned the opportunity for studying and analysing the ecological situation on previously closed natural territories on which were located, or are located today, military facilities, first of all, military ranges. In 1995, these territories occupied 428 thousand hectares or 2 % of the Belarusian territory. In addition to a specific impact exerted during military training, such territories have almost been devoid of traditional forms of anthropogenic pressure and did not suffer from radical ecosystem transformations. As a result, some of them have preserved unique natural landscape and ecological complexes that deserve special protection.

The structure of forests located on military ranges includes up to 1 % of ovennature woods that practically cannot be found on the forested territories in use. The share of bogs in the structure of the land fund (13.9 %) also exceeds the average figures. The share of all natural biological cenoses in the territorial structure of military ranges reaches 69.3 % which determines their similarity to the national parks as regards the environment-protection effect.

The value of such territories is confirmed also by a high diversity of flora and fauna species, including protected ones. For example, on the territory of the projected Olman Bog Reserve that is located within the boundaries of the largest Polessye Military Range, 687 species of plants have been found of which 12 species are registered in the Red Data Book of the Republic of Belarus. Of 225 insect species inhabiting this area, 13 species have been recorded into the Red Data Book, whereas of 192 land vertebrate species that are also present here, 31 are in the Red Data Book.

5. Formation of the ecological network of the Republic of Belarus

The ecological network is one of the main elements of the planning framework of the Republic. The ecological network means a unity of natural territorial complexes and ecosystems playing an important role in maintaining the ecological equilibrium and assuring a sustainable development of the territory and conservation of biological and landscape diversity. It is expedient to assure special nature-management regimes for the elements that constitute this ecological network.

Principal requirements to the organisation of the national ecological network are defined by global and regional multilateral international conservation agreements (UN Convention on Biological Diversity, Rio-de-Janeiro, 1993; Ramsar Convention on Wetlands, 1971, as well as international and national ecological programmes: "Declaration on Environment and Development" and "21st Century Agenda", "The National Strategy of Sustainable Development of the Republic of Belarus", Pan-European Biological and Landscape Diversity Strategy, the National Strategy and Action Plan for the Conservation of Biological Diversity):

- preservation of an acceptable ratio between natural and urbanised territories;.
- preservation, improvement of the status and restoration of the affected elements of the key ecosystems in the structure of the united ecological network;
- creation of conditions favourable for conservation of species, and of sufficient opportunities for their spreading and migration by forming corridors or continuous transitional zones;
- creation, Within the united ecological' network, of specially protected natural territories and securing of ecologically safe development around such territories;
- restoration of degraded ecosystems;
- protection of the ecological network against threats, and organisation and control over the formation and stable functioning of the ecological network when directions and parameters are determined for the development of urban areas, agriculture, transport, tourism and recreational and of other economic branches of the Republic;
- guaranteeing integration of the national ecological network into the Pan-European Ecological Network, the formation of which will allow conservation of the whole complex of ecosystems, habitats, species and their genetic diversity as well as of landscapes of European significance.

The ecological network of the Republic is at the stage of formation. In accordance with the preliminary development work, the ecological network has a complex functional and spatial structure. Its basic elements are natural complexes that have been least of all transformed by anthropogenic factors and that are characterised by high indicators of biological diversity which are the nuclei of the ecological network and the interconnecting ways of migration of the genetic stocks. There should be differentiated elements of European, international, national and local importance. It has been defined that the ecological network represents a special aspect of territorial planning. Its formation and development must be carried on the basis of a system of special scientific and project documents.

The most important (key) elements that form the nuclei of the ecological network are large and well-preserved natural complexes part of which, at present, have the status of reserves and national parks (territories belonging to protection categories I and II according to the international classification) whereas another part requires the establishment of special protection regimes. Structure-forming elements of the zoological network of a lower hierarchy level include smaller natural complexes that have the status of partial reserves of republican and local importance (categories IV-V according to international classification) or need a special protection regime.

Interconnecting elements of the ecological network, i.e., ways for migratory genetic stocks of European and inter-state importance, are valleys of big and medium rivers. They include territories that have the status of republican and local reserves as well as those that require such status. The role of migration ways of national or local importance is played, as a rule, by valleys of small rivers, forests as well as by certain parts of agricultural land and natural recreational territories.

Preliminary research data have been used as a basis for including the complexes of the Berezina Biosphere Reserve, the National Park "Belovezhskaya Pushcha" and the Pripyat Polessye with the valley of the Pripyat River into the key components of the ecological network having European importance.

The key components of the ecological network that are important for several states are:

- the valley of the West Dvina, the Surazh forest, the northern and central part of the Polotsk plain lands including natural complexes of Rosson and Osveya lake groups, the forest and bog complex Yelnya and Braslav Ridge;
- the valley of the Vilya River with the natural complex of the Naroch lake groups as well as the valley of the Niemen River with Nalibokskaya and Grodno reserve forests;
- the valley of the Dnieper river.

The most important structures that constitute the ecological network of national importance are the valley of the Berezina River with Svisloch and Berezina forests, the Minsk Hills with the Logoysk natural complex.

The preliminary analysis of the compliance of the established ecological network with the international requirements and specific requirements of the territory of the Republic has helped find out a number of substantial drawbacks; the most important among them are:

1. There is seen a negative tendency in the balance between urbanised territories and territories preserved in their natural condition (expansion of towns predominantly at the expense of extensive use of the territory). Centres of urbanisation and communication systems exert various unfavourable impacts on the valuable natural ecosystems located in-between residential areas. Such impacts are represented by release of contaminants into air and water basins, construction work and unorganised recreational activities of the people. Further increase of threats posed to natural landscapes is revealed most of all in the territorial expansion of towns. Since the early 90-s, there has been an intensive growth of towns at the expense of activation of individual housing construction within 5-20 km from the town boundaries as well as the development of rural residential areas located not far away from towns.

2. The established system of specially protected natural territories of republican importance has not become representative. By far not all valuable natural territories have been given the due protection status. The greatest number of specially protected natural territories of republican importance is represented by predominantly forest ecosystems (mainly, woods located in dry valleys). At the same time, ecosystems of open (without woods) territories are represented here extremely weakly. An obviously low share belongs to such ecosystems as river floodplain complexes that are exclusively rich in species diversity; they have been included only partially into the Pripyat National Park and 5 reserves. One of the indicators of representativeness of the system of specially protected territories is the inclusion of the existing landscape diversity. Imposition of the Plan on the map of landscape zoning has shown that the composition of specially protected natural territories of republican importance includes only 59 out of 105 types of landscapes that have been defined in the Republic. Practically, they do not include kame-moraine-erosion and forest landscape complexes. This can be explained, in part, by the extensive agricultural use of such territories and a weak conservation of natural complexes. The absence of specially protected natural territories of republican importance within the East Belarusian province of secondary moraine landscapes should also be pointed out.

3. The required relations between individual elements of the ecological network and the elements of the Pan-European Ecological Network have not been established. Thus far, integral systems of environment-protection territories have not been formed in the valleys of the rivers Pripyat, Niemen, Dnieper, West Dvina, Berezina, Svisloch and Sozh. Threats to migratory species still remain.

4. By far not all most valuable natural territories that constitute elements of the now formed ecological network have been assigned the due protection status. Such elements of the Pan-European Ecological Network as the Surazh forests, the Nalibokskaya reserve forest, the Grodno reserve forest and the Yelnya forest and bog facility need a higher protection status; the same is pertinent to the ecological network elements of the regional level, i.e., Naroch natural complex, and of the national level, i.e., Svisloch and Berezina forests and Logoysk natural complex. It is necessary to establish a protection regime for zones of medium and large rivers. Protection has not been ensured for natural complexes located in river sources, in particular, for big and medium rivers such as Berezina, Viliya and Niemen.

5. Threat persists in relation to individual elements of the ecological network as a result of intensive development of economic and other activities that are connected with the use of natural resources.

6. Ecological optimisation of activities of different social and economic sectors

The need to review measures aimed at reducing the adverse impact of various forms of economic activities on biological diversity is conditioned by the fact that such activities are carried on, at present, on 95 % of the Belarusian territory whereas their impact affects, to some degree, specially protected natural territories. Besides, natural ecosystems are, to some extent, affected by total adverse consequences of economic activities of other countries (above all; this includes global contamination of the environment).

Efficient conservation of biological diversity is not possible without ecologically optimised land use planning of the region which should determine the most important significance of further territorial ***and town*** planning Practically, this means the need for a critical analysis and a review of the established location of various planning zones of the region that are different in their functions. The process of formation of ecologically optimised territorial-planning structure in the Republic is further complicated by the need for re-distribution of land resources among land users. This process takes a long time and must be planned for many decades.

Development of *transport* and *road construction* must be closely connected with the solution of tasks for reducing the impact of the road network that isolates natural ecosystems from each other and makes difficult the process of migration of biota. In this respect, it is necessary to work out a system of ecologically justified measures and requirements to the transport and road planning and construction. First of all, it is necessary to secure opportunity of free migration of biota in conditions of river floodplains. To this end, it is required to construct road trestles across the river floodplain so as not to block them with solid road embankments. Similar measures should be taken in other places where migration ways and transit paths are located. In this connection, all projects of construction of large transport arteries have to include qualified ecological expertise. The areas that constitute the right-of-way belts along main transport roads designed for special needs should include natural vegetation whereas agricultural land must be withdrawn from such zones of alienation. This will form a natural barrier for diaspora of adventitious plants since they usually have low competition properties. The existing mad network of the Republic should be modified as required. On the existing roads, it is necessary to build engineering structures that will facilitate migration of animals. To solve all these tasks, it is necessary to make pertinent research and design.

Development of the prospective direction in the sphere of tourism *and recreations activities* and the use of specially protected territories create at least two problems if we keep in mind the absence of experience in organisation and management of national natural parks. The first problem is the protection of such territories against influence of economic subjects (service facilities) whereas the second is the protection of tourists. To have these problems solved, it is necessary to pay attention to the location of tourist facilities and the limitation of recreational impacts. Here, foreign experience may be useful that could be used for successful solution of all these problems.

Taking into consideration the current state of the economy of the Republic of Belarus and the relatively low level of income of the people, the development of tourism should be oriented, above all, to international co-operation attracting foreign capital and setting up joint ventures.

In the sphere of ***agriculture*** which is the dominant sector as regards impact on biological diversity of the measures on preservation of biological diversity must be developed along the following directions.

Improvement of the ecological capacity of vast uniform agricultural territories as habitats of animals and plants by increasing their landscape diversity, changing their planning structure, and combining annual crops with perennial crops.

Soil cultivation methods should include only such methods that cause a minimum level of destruction and erosion of soils and reduce the transfer (washout) of the fertile layer from the cultivated land.

It is necessary to provide special devices for agricultural machines that often cause death of animals and apply methods for stimulating farms and enterprises as well as individual workers to take measures aimed at protecting animals when mechanical operations are used.

It is required to stimulate the limited use of chemicals hazardous to animals, observe the fertiliser introduction techniques and exclude the use of chemical treatment from aircraft.

To assure the maximum prevention of erosion and depletion of soils, i.e., the processes that increase the area of waste land, thus, making it necessary to use new land with natural vegetation.

The main principle of ***forestry management*** shall be organisation of continuous and non-exhausting use of forests which is acknowledged today in the whole world, thereby assuring conservation of biological diversity. Management of forest use practices must be performed by state bodies irrespective of the existing forms of ownership. Forest planning and management must be switched over to the new technology (the so-called continuous forest planning and management) that assures the keeping of a forest cadaster and the monitoring of the condition of forests and of the environment.

Although in the next two decades the dominant role will be played by forest restoration methods through creation of wood crops, nevertheless, it is necessary to substantially increase the area of naturally regenerated forests. The scope of artificial and natural afforestation must be approximately the same.

It is necessary to create dust-protective windbreaks (about 15 thousand hectares), protective wood plantations on ravines and depressions (about 20 thousand hectares), on sands (about 100 thousand hectares) as well as protective and sanitation wood zones around some towns and villages as well as around ecologically hazardous industrial enterprises. Such strips or zones will alleviate adverse impact on biological diversity of natural and more valuable facilities provided they are assigned recreational and protective functions.

It is necessary to organise a united system of seed selection services that would include a selection and tree nursery, horticulture and arboretum facilities, and wood plantations.

When major cutting of wood is planned, it is expedient to leave untouched sections of forests, groups of trees and individual trees determined by specialists as the most important for the conservation of biological diversity and most valuable in ecological, biological and genetic respects. The main determinant factor in wood cutting practice (especially for major cutting planning) must be maximum possible conservation of natural underwood, first of all, underwood of valuable trees as well as the forest litter. This can be done by applying gradual cutting procedures using the necessary machinery that is lighter and of smaller dimensions. This would reduce the need for planting wood crops with a preliminary ploughing of soil that usually causes its destruction and drying and, sometime, a strong development of a grass layer that hinders the process of forest restoration,

For better conservation of biological diversity, it would be advisable to hand over wood areas managed by collective farms to the control of the Ministry of Forestry which has skilled specialists on its staff.

Improvement of the methods of conservation of biological diversity and, in particular, of the sustainable use of natural resources in the sphere of ***game hunting*** and ***pisciculture*** may be very effective provided that new and more ecology-oriented legal standards are developed and implemented in practice and that ecological education of population is carried on with a large-scale campaign emphasising the conservation of rare species of fauna. When new rules of hunting and fishery are developed, it is necessary to foresee measures for prevention of unintentional or erroneous destruction of rare or endangered species.

In the sphere of ***water management and land reclamation*** it is recommended to apply maximum efforts to prevent contamination of water reservoirs, since such contamination, among other impacts, facilitates the process of ousting of rare and relict species of plants and animals by ubiquists. Hydraulic land amelioration being a powerful factor of impact on ecosystems must not be used unidirectionally. At present, it is necessary to speak only about bidirectional regulation of the water regime for maintaining the optimum level of soil humidity, above all, on ameliorated peat areas. It is advisable to concentrate attention on the increase of productivity of previously ameliorated land areas by restoring previous, sometime degraded, amelioration systems, in particular on the territory of Polessye. This would allow for avoidance of unjustified involvement of new areas of natural complexes into the economic sphere and intensive agricultural use that bring about a further reduction of biological diversity.

Since Polessye water reservoirs include, as main commercial species, the fish species with spring spawning season, it is necessary to maintain a rather stable level of water during spawning season. During the summer season this level may be gradually decreased and maintained lower. The water level should be increased before the ice-formation season, and in winter time it is essential to prevent seyere reduction of the water level so as to prevent perish of fish in winter time. Besides, it is necessary to

minimise the income of used and thaw water from the territory of the potassium enterprises of Soligorsk so as to prevent the inflow of a large amount of chlorides into the Soligorsk Water Reservoir. Otherwise, chlorides may adversely affect the reproduction of aquatic invertebrates and fish.

Adverse impact on the condition of biological diversity, exerted by large enterprises of the fuel and energy, mining and chemical industries for example by Production Amalgamation "Belaruskaliy", Novopolotsk and Mozyr Oil Refineries, Mogilev and Svetlogorsk Production Amalgamations "Khimvolokno", Gomel and Grodno Chemical Plants, cannot be changed through limited partial measures. Huge state programmes are needed to reduce the volume and the level of toxicity of waste of such enterprises and for decrease of the general level of contamination of the environment by the above enterprises. Serious arguments justifying such programmes could be found after a special scientific investigations, a comprehensive analysis of the data that have already been gathered and the preparation of a report on impact exerted by large industrial enterprises on biological diversity.

Since at present significant areas of the Belarusian territory that are managed by the Ministry of Defence (about 20-25 km downstream from sewage discharge from large towns and cities) are subjected to intensive demilitarisation, an important aspect of measures on conservation of biological diversity is the development and implementation of measures on ecological rehabilitation of post-militarised zones and other facilities of the military-industrial complex. Taking into account specific features of the larger part of militarised and post-militarised territories (scarcity of population, absence of traditional economic activities, and, as a result, preservation of unique conditions for rare species of flora and fauna), it is necessary to make an all-round assessment of their ecological importance and opportunities of conservation of their natural conditions.

7. Training of staff, ecological education and awareness activities

The Republic Programme related to education in the sphere of protection of the environment approved in 1992 needs a significant revision as regards determination of new objectives and principles of organisation of ecological education, upbringing and awareness activities in conformity with new political and economic conditions and with due account of current problems of conservation and sustainable use of biological diversity on the basis of modem knowledge and ideas about biological diversity.

The key link in the system of training of ecologically educated managers and specialists must be the higher educational system. Higher educational institutions should open new chairs of ecological orientation whereas curricula and plans must include both general and special courses and practical classes with due account of the problems of conservation and use of biological diversity.

It is necessary to develop and create a system of compulsory ecological education on the basis of a united programme and standard manuals for elementary and secondary (high) schools.

Ecological topics covering problems of conservation and use of biological diversity must be included as compulsory parts into curricula and class plans with different forms of training, refreshment training and improvement of skills of managers and specialists of various profiles, first of all, those employed in branches connected with the use of natural resources.

An important role in the education work has been played, in recent time, by national and international seminars and scientific-practical conferences devoted to environment conservation topics. It is planned to develop programmes of such events with participation and financial support of a number of international organisations.

Specialists and state bodies of government should publish a series of information publications and materials to inform the population about the condition of the environment and the use of natural resources.

Great role shall be assigned to museums of nature which must carry on ecological education and upbringing work among students and people at large. Such museums are projected in different regions.

Problems of ecological education and awareness work devoted to the spreading of ecological information must take an important place in mass media. Such work will facilitate better understanding of the problems related to the use and protection of natural resources and will allow for a more active participation of the public in the process of making ecological decisions, first of all, at the local level.

VIII IMMEDIATE PLANNED MEASURES FOR SOCIAL AND ECONOMIC SECTORS ON THE IMPLEMENTATION OF "THE ACTION PLANFOR THE CONSERVATIONAND SUSTAINABLE USE OF BIOLOGICAL DIVERSITY IN THE REPUBLIC OF BELARUS"

In compliance with the Decree of the Council of Ministers of the Republic of Belarus of June 26th, 1997, "On Approval of the National Strategy and Action Plan for the Conservation and Sustainable Use of Biological Diversity in the Republic of Belarus", the ministries, other republican bodies of state government, the Oblast Executive Committees and the Minsk City Executive Committee were ordered to develop and approve, within three months, the list of immediate measures aimed at fulfilling the Action Plan. This order of the Government has been fulfilled by all executive committees and almost by all Ministries and Concerns (except by the Ministry of Industry and the Ministry of Fuel and Energy). The immediate measures and actions have been prepared, approved and submitted to the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus which was assigned the control over the fulfilment of the above actions. All measures have been included into the book published and distributed among the participants of the National Seminar devoted to issues of implementation of the National Strategy and Action Plan on Biological Diversity. Development of immediate measures as well as their approval by executive committees and ministries have been based on a realistic understanding of their economic opportunities, Therefore, it is quite natural that by far not all the departments have included into this Plan large-scale and long-term measures as well as measures that unite activities of a number of departments. The overwhelming majority of mapped out measures are concrete and essential, therefore, their implementation will allow the fulfilment of tasks defined by the National Strategy and Action Plan for the Conservation and Sustainable Use of Biological Diversity in Belarus, mainly those that relate to the decrease of adverse impact of anthropogenic factors on the condition of the natural environment. At the same time, however, the lists of immediate measures elaborated by some departments (for example, by the State Committee on Land Resources) practically duplicate the provisions of the Action Plan without concrete specification or mentioning of the terms of fulfilment. The term of implementation of immediate measures is, as a rule, limited by two-three years. Terms for fulfilment of measures, the responsible executives and the projected sources of finance are also detailed.

Immediate measures have been developed, approved and submitted to the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus by:

I. Oblast and town executive committees
(Brest, Vitebsk, Gomel, Grodno, Mogilev and Minsk Oblasts
and the City of Minsk Executive Committees);

II. Departments and Ministries:

- Department of Affairs of the President of the Republic of Belarus
(Berezina Biosphere Reserve,
National Parks "Belovezhskaya Pushcha", "Braslav Lakes" and "Pripyat");
- Ministry of Housing and Communal Facilities;
- Ministry of Defence;
- Ministry of Education;
- Ministry of Health;
- Ministry of Forestry;
- Ministry of Natural Resources and Environmental Protection;
- Ministry of Agriculture and Food;
- Ministry of Sport and Tourism;
- Ministry of Transport and Transportation Facilities;
- Ministry on Emergency Affairs:

III. State Committee on Land Resources;

IV. Concerns and Societies:

- Belarusian Concern on Production and Realisation of Light Industry Commodities ("Bellegprom");
- Concern of Forest, Wood-Working and Wood-Pulp and Paper Industry;
- Belarusian State Concern on Oil and Chemistry ('Belneftkhim");
- Belarusian Railways;
- Belarusian Society of Hunters and Fishermen.

Materials submitted by authors have been summarised, published and distributed as the book entitled 'Immediate Measures of Ministries and Departments Aimed at Fulfilling 'The Action Plan for the Conservation and Sustainable Use of Biological Diversity in the Republic of Belarus" (Minsk, 1998,253 p.), a publication of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus designed for practical production spheres.

In conformity with the priorities mapped out in the Pan-European Strategy in the sphere of biological and landscape diversity that were emphasised during the National Seminar devoted to issues of implementation of the National Strategy and Action Plan for the Conservation and Sustainable Use of Biological Diversity in the Republic of Belarus, the main measures and actions for the solution of immediate tasks must be concentrated along the following directions:

- solution of the problem of use and conservation of biological diversity in the aararian sector which exerts the greatest impact on The Status and Use of Biological diversity;
- creation of the National ecological network and introduction of this network into the Pan-European Ecological Network.

These common European priorities will be integrated into the national policy and activities of all socioeconomic sectors of Belarus.

Incorporation of the solution of issues of conservation of biological diversity into the agrarian sector is planned within the framework of the following events (for 1998-2000):

- implementation of measures aimed at improving the state of purification and decontamination of manure sewage and preventing contamination with such sewage of water facilities in a number of economic facilities of Brest and Mogilev Oblasts (Ministry of Agriculture and Food, Oblast departments of agriculture and food, district and regional executive committees);
- formation and restoration of field-protective wood belts and fulfilment of other erosion-protective measures in collective and state farms of Brest, Gomel and Mogilev Oblasts (Ministry of Agriculture and Food, Oblast departments of agriculture and food);
- protection of agricultural crops against pests and diseases by means of biological methods (Oblast departments of agriculture and food, Belarusian Agricultural Academy);
- remediation of disturbed land (Oblast departments of agriculture and food);
- limitation of the expansion of agricultural estates at the expense of natural territories (Oblast departments of agriculture and food, Belarusian Agricultural Academy);
- introduction of the system of pasture and hay land surface improvement with preservation of natural herbs, transformation of grass communities into leguminous grass communities through adding into the turf of perennial leguminous herb species (Ministry of Agriculture and Food, Oblast departments of agriculture and food);
- introduction of ecologically safe technologies and means of application of fertilisers and chemical meliorants on the basis of precise differentiation of forms, doses and ratios of nutrition elements for each field located in various landscapes (Oblast departments of agriculture and food, Belarusian Agricultural Academy);
- introduction of a complex of measures for increasing ecological safety of agricultural machines and units as well as of operations performed with such machines and units so as to protect wildlife (Academy of Agrarian Sciences, Belarusian Agricultural Academy);
- publication and distribution of methodological and promotional materials, organisation of seminars with a view of increasing the culture and ecological safety of agricultural production (Oblast departments of agriculture and food, Academy of Agrarian Sciences, Oblast Committees on Nature);

- restoration of forest ecosystems on unused lands, particularly in Goretsk, Krichev, Mstislavl, Mogilev and Shklov regions where the forests cover less than 25 percent (Oblast departments of agriculture and food, departments of land resources of the Oblast Executive Committees, production forestry amalgamations);
- transfer of collective farm woods to the State Forest Fund (Oblast departments of agriculture and food, departments of land resources of the Oblast Executive Committees, production forestry amalgamations);
- introduction of measures for the conservation of habitats for wildlife and vegetation during construction or reconstruction of land-reclamation systems and main canals (Ministry of Agriculture and Food, Oblast departments of agriculture and food);
- development of the "Concept of Ecological Optimisation of Water Facilities and Land-Reclamation Construction" (Belarusian Concern on Land reclamation and Water Resources 'Belmeliovodkhoz").

Priority directions of development of the ecological network (1998-2005)

1. Development of a system of specially protected natural territories by:
   - organisation or reorganisation of SPNTs that function as key elements of the ecological network (see Section 5, Chapter VII);
   - complementing the system of SPNTs by including the following natural complexes that require priority protection: lowland mires of the Belarusian Polessye Region, mesotrophic (transitory) bogs of the Belarusian Polessye Region, oligotrophic (upper) bogs of the Belarusian Lake District, moraine landscapes of the Belarusian Lake District, open spaces with relicts of the Pontic (steppe) faunistic element, and European broad-leaved forests;
   - increasing representativeness of the system of SPNTs by including ecosystems that are either weakly represented or not currently represented. Above all, this includes natural complexes of highly eutrophic lakes and floodplains of medium and large rivers with a great water flow, natural and weakly used meadows (in particular, bog meadows), spring and rivulet areas.

2. Formation of water-protection zones and a system of natural protected facilities in river valleys and river sources, particularly all, of big and medium rivers.

3. Assuring the protection of valuable man-modified territories that are characterised by a high biological diversity: artificial water reservoirs, open ameliorated territories on places of former bogs, previously drained shrub-covered plains or river floodplains, artificially-planted high-aged standing woods, ancient parks, and agro-ecological zones.

4. Assuring integration of the ecological network of the Republic into the common European network. Very important task in the sphere of protection of biological and landscape diversity at the international (inter-state) level is the formation of a united system of specially protected natural territories integrated into the Pan-European Ecological Network which is planned to be created by 2007 in conformity with the European strategy of conservation of biological and landscape diversity. Along with the floodplain of Pripyat that plays an important role in ensuring the protection of biological diversity on the European continent, other territories of international significance include valleys of the rivers Dnieper, West Bug, West Dvina, Niemen as well as Grodno Reserve Forest, etc. To ensure sustainable functioning of one of the most important natural facilities in Europe which is the National Park "Belovezhskaya Pushcha" as a single territorial forestry entity, joint efforts of Belarus and Poland are needed.

5. Restoration and revival of degraded ecosystems.

6. Minimising the threat presented by the developing system of settlements and transport infrastructure.

7. Preparation of draft amendments and additions into the Law of the Republic of Belarus "On Specially Protected Natural Territories and Facilities".

8. Organisation of elaboration of requirements regarding the protection and use of biological diversity during design and planning of land-reclamation, water-management and construction facilities (Ministry of Natural Resources and Environmental Protection).

9. Organisation of thœlaboration of requirements regarding the protection and use of biological diversity during designing and planning of road-construction facilities (Ministry of Natural Resources and Environmental Protection).

10. Submission to the Council of Ministers for approval of the draft "Regulation on Water-Protection Zones and Land Strips along Rivers and other Water Reservoirs within the Boundaries of Towns and Town-like Settlements" (Ministry of Natural Resources and Environmental Protection).

11. Submission to the Council of Ministers for approval of the draft "Regulation on Water-Protection and Land Strips along Big and Medium Rivers of the Republic of Belarus" (Ministry of Natural Resources and Environmental Protection),

12. Exercise control over the implementation of the projected measures within water-protection zones and land strips along small rivers so as to assure conservation of biological diversity (Ministry of Natural Resources and Environmental Protection).

13. Development and organisation of a conjugated network of transborder specially-protected natural territories within the framework of co-operation with the Ministry of Environmental Protection of Lithuania (Ministry of Natural Resources and Environmental Protection).

14. Study of the issue and development of projects for organisation of transborder specially-protected natural territories together with the Ministry of Environmental Protection and Ecological Safety of Ukraine (Ministry of Natural Resources and Environmental Protection),

15. Organisation, within the framework of co-operation with the Michael Otto Foundation (Germany), of the Republican Reserve "Middle Pripyat" that is of international significance for conservation of biological diversity (Ministry of Natural Resources and Environmental Protection).

16. Organisation on a pilot basis of a forestry management facility related to introduction of methods on conservation of biological diversity and landscape planning into forestry-management practical work. Organisation of an educational centre on this basis (Ministry of Natural Resources and Environmental Protection).

IX ROLE OF THE NATIONAL STRATEGY AND ACTION PLAN IN ATTRACTING SUPPORT OF INTERNATIONAL AGREEMENTS, ORGANISATIONS AND FOUNDATIONS FOR THE IMPLEMENTATION OF THE PROVISIONS OF THE CONVENTION ON BIOLOGICAL DIVERSITY

The Section "Sources and Means of Attraction of Financial and Technical Resources" of the National Action Plan for the Conservation and Sustainable Use of Biological Diversity in Belarus, in addition to the use of sources and mechanisms of long-term financing of projects within the framework of the National Action Plan by way of organisation of the Ecological Foundation and/or the State Ecological Bank, provides for the attraction of foreign finance and technical aid for developing and implementing projects stipulated within the priority directions of activities aimed at conservation and sustainable use of biological diversity.

Translation of the National Strategy and Action Plan for the Conservation and Sustainable Use of Biological Diversity in Belarus (NBSAP) into English and its distribution will allow Belarus to exchange her experience in the implementation of the Convention on Biological Diversity with other countries and discuss opportunities for foreign financing of projects, actions and information mechanisms by donor states and financial institutions.

In so doing, it should be taken into consideration that the Republic of Belarus maintains constant contacts with a number of inter-governmental organisations whose activities are connected with the problems of environmental protection: United Nations Environment Programme; UN Economic Commission for Europe (ECE) on problems of environment and water resources; international system of environment information sources, INFOTERRA; Organisation of Economic Co-operation and Development (OECD); European Community Commission, and others. Co-operation is also maintained with the Council of Europe, UNESCO, IAEA, World Bank, European Bank, and International Union on Protection of Nature. Thus, for example, in conformity with the decision taken by VI International Conference of National Committees of Europe and North America of the UNESCO Programme "Man and Biosphere" (EuroMAB - VI), held in Minsk on 16-20 September 1997, the EuroMAB Secretariat was formed at the National Academy of Sciences of Belarus that will operate till the next conference.

Dissemination of objectives and tasks of the NBSAP will be facilitated also by the fact that permanent representatives, experts and advisers of the Republic of Belarus are taking part in the work of sessions, symposiums, conferences and meetings of the above international organisations to assure future co-operation and development of joint programmes of actions, use of international experience as well as presentation of proposals put forward by our Republic.

The Global Environmental Facility (GEF) represented by UNEP has ensured the implementation of the joint project called "Dissemination of the National Strategy and Action Plan on Biological Diversity, Preparation of the First National Report to the Convention of the Parties of the Convention on Biological Diversity, and Establishment of the Clearing-House Mechanism" (February-July 1998; with the budget of 81,300 US$) which has been realised with assistance of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus. Dissemination of this First National Report among governmental organisations and respective groups will form new basis for activation of co-operation on fulfilment of the NBSAP and opportunities for receiving public, political, institutional and financial support.

We should not ignore such argument as dissemination through NBSAP of facts on availability in Belarus of unique ecosystems of important significance for conservation of biological diversity and natural heritage of Europe (vast forests, wetland areas, etc.) which helps increase attention of potential international investors to the problems of study, conservation and use of biological diversity in Belarus. Conservation of floodplains, bogs and vast forests having unique complexes of diversity of flora, fauna and ecosystems is a serious contribution to global sustainable development. Understanding of the need for efficacious management of the most significant natural complexes of Belarus that are of international

significance has been demonstrated, for example, at the International Conference on Ecology and Protection of Floodplains and Mires of Polessye (organised by the national Academy of Sciences of Belarus together with the Michael Otto Foundation of Germany in May 1997). In September 1992, the Republic of Belarus and the International Bank for Reconstruction and Development signed the agreement that stipulated a grant to Belarus from the Global Environment Facility in the amount of 1 million US dollars for the implementation of the Project called "Protection of Biological Diversity of Belovezhskaya Pushcha Forests". This NBSAP and the First National Report describe in details the system of specially protected natural territories of Belarus (biosphere reserves, national parks, special-purpose reserves), include the assessment of representativeness of this system and its reference significance as natural ecosystem, which will, undoubtedly, help in planning the process of development of international projects on modelling and prognosis of anthropogenic transformation of European landscapes. Of particular importance for international co-operation is the territory of the Polessye Radiation Ecological Reserve (the zone of evacuation and alienation as a result of Chernobyl NPP incident) which can be used as a test ground for assessing natural dynamics of biological diversity in specific conditions of interruption of economic and similar impacts and of chronic low-radiation impact.

Of important significance for conservation and use of biological diversity may be the organisation and development in Belarus of an infrastructure for international nature-study tourism which is one of the sources of constant financing for environment conservation organisations in many European countries,

X IMPORTANT SPECIFIC MEASURES CONTAINED IN THE NATIONAL STRATEGY AND ACTION PLAN ON BIOLOGICAL DIVERSITY AND OTHER STATE DOCUMENTS ON DEVELOPMENT AND STIMULATION OF SUSTAINABLE USE AND EQUITABLE SHARING OF BIOLOGICAL RESOURCES

The National Action Plan for the Conservation and Sustainable Use of Biological Diversity in the Republic of Belarus includes a list of the most important measures and actions for the implementation of the basic provisions of the National Strategy both today and in future. This Plan defines priority direction for attaining practical results for the current period of economic reforms as well as for the period of transition to new forms of management and control of conservation and use of biological resources. The National Action Plan in the course of implementation of its provisions (in particular, immediate measures and actions) shall be revised every 5 years in accordance with the development and improvement of the National Strategy that is determined by the concrete socio-economic situation and the state of affairs related to the protection and use of natural resources,

A broad range of specific measures stipulated in the Action Plan for the Conservation and Sustainable Use of Biological Diversity in Belarus is subdivided into the following main directions:

- formation of the state policy and improvement of the legal basis in the sphere of conservation and use of biological diversity;
- improvement of the organisation for the management of, and state control over conservation and use of biological diversity;
- organisation of ecological and economic foundations for regulation of conservation and use of biological diversity;
- development of fundamental and applied sciences in the sphere of conservation and sustainable use of biological diversity;
- development of the system of specially protected territories and measures for conservation of rare and endangered species;
- ecological improvement of scientific-technical and technological activities, optimisation of use of natural resources in various social and economic sectors (territorial and town planning and construction; transport and road construction; agriculture; forestry; hunting and pisciculture; water resources and land reclamation; industry and fuel and energy complex; defence complex; tourism and recreational activities);
- ecological education and awareness work and training of specialists;
- sources and means for attracting financial and technical resources.

It is important to underline a number of provisions of the Law of the Republic of Belarus 'On Protection of Environment" that are related to the problems of conservation and sustainable use of biological diversity. Article 2 specifies, among other main principles of environmental protection, the priority of the state management of nature use practices and protection of the environment, and points to the combination of national and international interests in the environment-conservation sphere. Issues related to stimulation of further participation of citizens and public associations in conservation and use of biological diversity are reflected in Articles 5 and 6, respectively. Economic stimulation of environmental protection is defined in Article 21 that provided for tax, credit and other privileges to legal and physical entities who take efficacious measures for environmental protection. Issues of ecological awareness and education are reflected in Section III (Article 8. Universal, comprehensive and continuing nature of ecological education; Article 9. Compulsory teaching of ecological subjects in educational institutions and other organisations; Article 10. Professional ecological training of managers and specialists).

"The National Programme of Rational Use of Natural Resources and Environmental Protection in 1996-2000" approved by Decree No.667 of the Cabinet of Ministers of the Republic of Belarus on October

15th, 1996 is based on recommendations of the Programme Concept as well as On proposals of the Ministries of the Republic, Oblast, city (town) and regional (district) environment-conservation departments and agencies and of various economic entities. The most important direction for optimisation of sustainable use of biological resources are the following:

- provision of information (ecological monitoring, cadasters, certification);
- economic regulation of environment use and management;
- protection and rational use of vegetation and wildlife (including preparation of a package of regulatory and legal documents that assure the fulfilment of the existing laws; increase of the number of game hunting and commercial species; introduction of valuable (indigenous) fish species into natural water reservoirs; study of impact exerted by animals, determination of optimum density for different regions and justification of standards of exclusion on the basis of landscape zoning; prevention of anthropogenic destruction and contamination of land and water habitats for wildlife; implementation of biotechnical measures and improvement of methods of breeding of valuable wildlife and propagation of vegetation species;
- assuring of organisation of reserves, national parks and special-purpose reserves in 1996-2000 in conformity with the Plan on Rational Location of Specially Protected Natural Territories of the Republic of Belarus approved by Decree No. 132 of the Cabinet of Ministers of the Republic of Belarus on March 13th, 1995; elaboration of the system of co-operation between the national parks and other land users and land owners located on the territory of the parks related to organisation of protection and rational use and reproduction of natural resources;
- elaboration of a package of regulatory and legal documents for assuring the fulfilment of commitments of the Republic of Belarus on conservation of biological diversity and sustainable use of biological natural resources.

The Law of the Republic of Belarus 'On State Ecological Expertise" (approved by the Decree of the Supreme Council on June 18th, 1993) and "The Instruction on Procedure of the State Ecological Expertise of Design Documentation in the Republic of Belarus" (approved by the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus on January 18th, 1995) state that the most important provisions of these documents are: the right of all people to have environment favourable for their health and conditions of life, the necessity of conservation of the genetic stock and diversity of live nature in the interests of the present and future generations when economic or other activities are carried on, principles of law, independence, objectivity, scientific justification and public openness, complex assessment of probable impact by the projected economic activities on the environment as well as international commitments of the Republic of Belarus. Undoubtedly, this is very important for the implementation of the National Strategy and Action Plan for the Conservation and Sustainable Use of Biological Diversity in the Republic of Belarus. Ecological certificates of projects and designs must include the assessment of: availability of specially protected natural territories, places of growth of rare species of plants, places of habitat of rare animals and impact of the planned project on their condition as well as a number of other parameters describing the environment condition. Measures and actions are specified for the prevention of perish of wildlife and preservation of places of growth of rare plants,

Procedure of issue of permits for exclusion of wildlife facilities, their products, birds' nests, eggs and egg-laying places from the environment for scientific, cultural, educational and aesthetic purposes (approved by the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus on March 26th, 1997) in execution of the Law of the Republic of Belarus "On Protection and Use of Wildlife" dated September 19th; 1996. This Law regulates the grounds and terms for arrangement of applications and issue of permits for the exclusion of wildlife facilities (species) for research institutions, zoological parks, zoological gardens, museums, etc. This procedure does not cover the hunting and catch of rare and endangered species of animals included into the Red Data Book of the Republic of Belarus. If required, the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus should co-ordinate and agree on these issues with the National Academy of Sciences of Belarus.

"Regulation on Zoological Collections" was approved by Decree No. 581 of the Council of Ministers of the Republic of Belarus dated May 26th, 1997 as stipulated in the Law of the Republic of Belarus "On Protection and Use of Wildlife".

"Regulation on the Republican Expert Commission on Zoological Collections", its composition and the "Rules of Account of Zoological Collection" as well as the "Procedure of Issue of Permits for Exportation from the Territory of the Republic of Belarus of Zoological Collections or of Their Parts" was approved by the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus (Order No. 168 dated July 28th, 1997). These documents facilitate optimisation of use of facilities (species) of biological diversity for scientific, educational, cultural and aesthetic purposes.

In conformity with the provisional methodology for determination of the size of economic damage caused by contamination, degradation and disturbance of lands (Methodology 0212.4.-97) approved by Order No. 112 of the Minister of Natural Resources and Environmental Protection of the Republic of Belarus on May 20th, 1997, it is stated that degradation of lands means a gradual deterioration of their properties under the impact of economic and other activities carried by man: wrong selection of agrotechnology, depletion accompanied by non-compensated removal of nutrients with vegetation products, modification of the soil structure, water regimen, etc. This results in enhancement of processes of erosion, deterioration of the composition of the soil flora and fauna and formation of deserted and inconvenient land.

XI ROLE OF THE NATIONAL STRATEGY AND ACTION PLAN IN INCREASING PUBLIC AWARENESS ON THE BENEFITS AND IMPORTANCE OF BIOLOGICAL DIVERSITY (condition and prospects)

One of the basic principles of environmental protection mapped out in Chapter 2 of the Law of the Republic of Belarus "On Protection of the Environment" is public openness in the work of state bodies and relations with public associations and the population in solving environment-conservation tasks. In Section III of this Law "Ecological Education and Upbringing" it is pointed that in the Republic of Belarus the system of comprehensive, complex and continuing ecological education and upbringing shall be maintained and developed within the framework of the national system of education as well as information shall be provided to the population on issues of environmental protection through mass media (Article 8). To provide for the minimum ecological knowledge that is required for the formation of ecological awareness of the citizens, it is envisaged that compulsory teaching of basic ecological knowledge shall be arranged in children's pre-school institutions, schools, vocational schools, secondary and higher educational institutions as well as in extra-school establishments and other organisations.

Even before the Convention on Biological Diversity was passed, some work had been performed in Belarus within the framework of provisions of the above Law on Protection of the Environment for the purpose of including some scope of ecological information related to problems of protection and rational use of vegetation and wildlife. However, as stated in the Preamble to the Convention on Biological Diversity, there is a general lack of information and knowledge concerning biological diversity as well as an urgent need for development of the scientific, technical and organisational potential with a view to implement the respective measures and actions. The Preamble also indicates the need of acknowledging a great and traditional dependence of the indigenous population on biological resources and recommends the joint possession, on an equitable basis, of benefits connected with the use of traditional knowledge, innovations and practices pertinent to conservation of biological diversity and sustainable use of its components.

Given account of the above, the NBSAP and the First National Report (Section VI) of Belarus include an assessment of the condition of ecological education, upbringing and educational work related to Biological Diversity in the Republic of Belarus.

Ecological information and education

One of the directions of work of the Ministry of Natural Resources and Environmental Protection is the provision to the population of information on the condition of the environment and on the measures taken for its improvement. In this respect, the Ministry started, in 1991, the publication of the annual ecological bulletin 'Condition of the Natural Environment of Belarus" and of statistical and other informative materials on this issue. These materials were used as a basis for publication in 1992 and 1995 (in Russian and English) of state reports on the condition of the environment in Belarus. Besides, basic indicators on the issues of the use of nature and condition of the environment are included into a separate section of the annual statistical record published by the Ministry of Statistics and Analysis. Fast information on condition of the environment is provided to the population through mass media: republican newspapers, television and radio. Active work is performed in this direction by the departmental magazine 'Rodnaya Pryroda" ("Our Nature") and the newspaper 'Ekologichesky Vesnik" ("Ecological News") as well as by the radio magazine "Rodnaya Priroda" ("Our Nature").

The Ministry of Natural Resources and Environmental Protection has also arranged a regular publication of collections of regulatory documents (17 publications have been issued), information bulletins

and reviews on separate ecological problems. Work is under way for providing the users with information materials on magnetic media (mainly, through the use of e-mail).

An important condition for solution of problems in the sphere of nature use and environmental protection is the increase of the level of ecological knowledge of specialists from different sectors, in particular from the production sphere, and the increase of ecological culture of the entire population of the Republic. To attain this goal, the legislation of the Republic of Belarus has proclaimed the priority of education in the sphere of environment and the compulsory teaching of environmental disciplines in all forms of education and upbringing. This task was in the focus of the Republican Programme on education in the sphere of environment approved by the Government of the Republic of Belarus in 1991. Most successfully these issues are tackled in secondary special and higher educational institutions of the country which train specialists for industrial sphere. Two higher educational institutions of the country (Belarusian State University and Belarusian Technological University) have begun programmes of training of specialists in the sphere of nature management and environmental protection. Great work on ecological education of school pupils is carried out by the Republican Centre of Students.

Public environment conservation associations

At present, 4 main republican public nature-conservation associations have been registered in Belarus. The oldest of them is the Belarusian Society of Nature Protection (BSNP) which has been active for more than 30 years and has its regional organisations in all Oblasts, towns and regions of the country as well as primary organisations in many labour collectives.

One of the oldest public associations is the Belarusian Society of Hunters and Fishermen (BSHF) which also has a developed network of Oblast, town, regional and primary organisations. Hunting collectives that are members of this Society have been given on lease the main area of game hunting facilities.

The Belarusian Youth Ecological Movement "Belaya Rus" has good conservationist traditions. Its specific feature is absence of clearly defined organisational structure and fixed membership. Many town and regional structures of this Movement and its Republican Co-ordination Council are very active in initiating and participating in different conservationist actions and maintaining constant relations with foreign conservationist public associations.

The Belarusian Socio-Ecological Union concentrates its attention on problems connected with adverse consequences of the Chernobyl Nuclear Plant incident.

More than 30 other registered associations carry on their work having as the main goal the solution of various social, ecological and economic problems that appeared after the Chernobyl NPP incident. However, on the whole, the public conservationist movement in the country is weak. The reason for this is the unfavourable economic situation in the Republic of Belarus which has become the cause for termination of activities, in recent years, by the majority of clubs, museums and circles of nature, conservationist patrols and teams, "blue" and "green" patrols and other conservationist public organisations that used to operate at production enterprises, in educational establishments, cultural institutions, etc.

At the same time, the NBSAP includes directions for development of ecological education, upbringing and educational work and training of specialists in issues of conservation and sustainable use of biological diversity in Belarus. All sections of the NBSAP may become programme documents and sources (together with materials of the First National Report) for successful implementation of the above directions. All this will enhance the qualitative foundation for ecological educational and upbringing work in Belarus.

XII EFFICIENCY OF REQUIREMENTS, CO-ORDINATION AND CONTROL OF IMPLEMENTATION OF THE CONVENTION ON BIOLOGICAL DIVERSITY REFLECTED IN THE NATIONAL STRATEGY AND ACTION PLAN FOR THE CONSERVATION AND SUSTAINABLE USE OF BIOLOGICAL DIVERSITY IN THE REPUBLIC OF BELARUS

The National Strategy and Action Plan for the Conservation and Sustainable Use of Biological Diversity in Belarus (NBSAP) are the first state documents which reflect, in a concentrated and comprehensive form, the condition and dynamics trends of, and threats to, biological diversity in Belarus and shall be, in the near future, the fundamental, targeted and co-ordinating guideline for the bodies of state government, regional and local executive committees, ministries and departments on conservation and use of biological diversity in Belarus in the interests of present and future generations.

Implementation of the requirements and directions of actions stated in the NBSAP will elevate effectively the level of awareness of the need for measures and actions on conservation of biological diversity both among the managers and leading specialists of state bodies, ministries and departments as well as among the public. This, taken in combination with optimum organisation of implementation of the Action Plan (including immediate measures worked out and approved by the executive committees, ministries and concerns) will allow for a radical and real turn towards implementation of the principle of priority of ecological interests over economic interests. Requirements included into the NBSAP will, no doubt, attract attention of international organisations and foundations on protection of environment which may significantly increase the effectiveness of Belarus participation in the fulfilment of the Convention on Biological Diversity.

In conformity with Decree No. 789 of the Council of Ministers of the Republic of Belarus dated June 26th, 1997, control over the fulfilment of measures and actions on implementation of the Action Plan for the Conservation and Sustainable Use of Biological Diversity in Belarus was imposed on the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus. This Ministry carries on its work using a broad network of Oblast, town, regional and district (over 100) inspections of natural resources and protection of the environment. The Ministry of Natural Resources and Environmental Protection of the Republic of Belarus is planning to perform, already in 1998, verification of the fulfilment of the immediate measures aimed at implementing the Action Plan on Biological Diversity which have been elaborated and approved by the Oblast and City (town) executive committees, ministries and concerns. At the same time, in accordance with Article 53 of the Law of the Republic of Belarus “On Protection of the Environment”, departmental and production control shall be exercised that obliges the ministries and republican bodies of state government supervise the fulfilment by their subordinated enterprises, organisations and institutions of the plans and measures for protection of the environment, the requirements of the nature conservation legislation, as well as orders issued by the state body on protection of he environment and by other specially authorised bodies.

The Republican Commission on Problems of Biological Diversity (instituted by Decree No. 470 of the Cabinet of Ministers of the Republic of Belarus dated August 28th, 1995) represents the co-ordination body of respective ministries and other central bodies of government for assuring concerted actions in the sphere of conservation and sustainable use of biological diversity. The main tasks of the Commission are: examination of proposals on the formation and implementation of the NBSAP, analysis of the state of activities and control over implementation of measures for fulfilment of the commitments of Beiarus stipulated in the Convention on Biological Diversity. The Commission has the right to: a) make hearing of reports and information of the ministries and other central bodies of government on issues of biological diversity, b) request from the ministries and other central bodies of government and economic subjects, irrespective of their form of ownership, information on the issues that are within competence of the Commission, and c) analyse draft programmes, standards and methodological documents and other materials on issues of conservation and sustainable use of biological diversity. The Chairman of the

Commission is Mr. V.M.Podolyako (Deputy Minister of Natural Resources and Environmental Protection of the Republic of Belarus) and the Deputy Chairman is Mr. M.M.Pikulik (Director of the Institute of Zoology of the National Academy of Sciences of Belarus), The Commission also includes representatives of the Government, the National Academy of Sciences, the Department of Affairs of the President of the Republic of Belarus, the Union of Entrepreneurs and Lessees, and representatives of public organisations.

For the purpose of improvement of organisation of management and state control of the conservation and use of biological diversity, the NBSAP stipulates the following:

- strengthening of institutional (departmental) structure, better co-ordination between the departments and ministries on the basis of formation and development inside the national economy of the new ecological subsystem with the pertinent mechanisms for its functioning;
- organisation and introduction of wildlife and vegetation cadasters, as well as forestry, peat and other cadasters;
- monitoring of the condition of biological diversity and prognosis of its dynamics (within the frameworks of the national system of monitoring of the environment);
- optimisation of the state control over the activities of hunting facilities;
- organisation of a regular information provision to the bodies of state government and to the public on the condition and use of natural biological resources.

In accordance with Article 54 of the Law of the Republic of Belarus “On Protection of the Environment”, public control in the sphere of environmental protection is exercised by public associations and labour collectives and has, as its task, execution of public checking of observation by legal and physical entities of nature-protection legislation as well as the fulfilment of measures for protection of the environment and for rational use and reproduction of natural resources.

XIII ECONOMIC PROBLEMS RELATED TO THE IMPLEMENTATION OF THE ACTION PLAN FOR THE CONSERVATION AND SUSTAINABLE USE OF BIOLOGICAL DIVERSITY AND ITS INTEGRATION INTO SOCIAL AND ECONOMIC SECTORS OF THE REPUBLIC OF BELARUS

Economic problems of implementation of the Action Plan have been expressed, mostly, in the system of sustainable financing of biological diversity of nature.

Biological diversity represents the ecological resources of the State that are of strategic significance Therefore, financing of its conservation and reproduction must be, predominantly, centralised and exercised under strict control of executive bodies of government, first of all, of the Ministry of Natural Resources and Environmental Protection.

At present, there is no targeted financing by the State for the purpose of conservation of biological diversity. This problem is solved indirectly through financing of the SPNTs development at the expense of funds received mainly from the budget. As regards other sources of finances, including extra-budgetary nature protection funds, they are not practically involved in conservation of biological diversity.

The modem system of nature conservation financing does not provide for the normal functioning of the SPNTs. Significant part of funds provided by the State (about 60 %) are used for maintaining the production infrastructure.

In future, the amount of financing shall be connected with the interest rate on the ecological capital of a definite nature-conservation territory. The latter shall be determined on the basis of the ecological rent.

The foundation of the ecological capital of Belarus is constituted by its forest and bog systems. This ecological resource is of practical importance not only for the Belarusian nation. Forest and bog specificity of our country attracts the attention of the international community in view of ecologically sustainable development of the European continent. Therefore, a stable foundation for financing specially protected natural territories that includes unique ecological values must be determined at the international level. Such foundation is represented by the international ecological rent (IER). The source of the IER is determined by monopoly of the given state for the unique natural facility that is of interest for the international community. The latter arises due to exclusive natural conditions that create opportunity for obtaining rare productions of nature. Mechanism of acquisition by the given state of the international ecological rent shall be determined not only by free market relations but, to a higher extent, by the world states understanding the need for financing the steady functioning of the earth nature reference representative features that contain valuable ecological information. Hence, the constituent, or maybe, the determining part of the international ecological rent must be extra-governmental (extra-state) foundation for conservation of the genetic fund (stock) of Earth and of untouched nature. At the international level, Belarus must put forward initiatives and take active part in the formation of such foundation.

At the current stage, the most acceptable form for establishment of the IER roots is international tourism. Allocation by the world community of preferential credits for the development of international tourism on SPNTs with the future return of the established part of profits is one of the most suitable ways for institution of the international ecological rent in the world practice of conservation of biological diversity and economic activities.

The price of the “product” in this case is formed by the cost of maintenance of tourism (including the required profit amount) and by the ecological rent. The latter shall be differentiated depending on the value of the certain nature-conservation territory, including, in addition to the assessment of the country’s ecological capital, such characteristics as the location, cultural, aesthetic and historic significance, in particular that of landscapes, etc. Income represented by the ecological rent must not remain inside the tourism sector but must be returned into reserve areas and become a steady financial source for development of specially protected natural territories.

An additional source of financing shall be the ecological component in the taxes on ownership of weaponry or other means of hunting and fishery as well as in incomes from services and products that are directly or indirectly connected with the use of live natural resources (advertisement, recreation, safe of special literature, printed products, etc.).

One of the sources of financing may be the ecological tax on products obtained as a result of use of local natural resources. The more the resources used are connected with the problem of conservation of biological diversity, the higher should be ecological rent. To supplement targeted financial resources, Belarus must actively participate, in the near future, in international trade in certain species of wildlife and plants and products made on their basis.

Functions of the strong organisational source and organised flow of financial resources may be assigned to the Ecobank. The main part of its capital shall be constituted by profits from ecologically pure products obtained as a result of introduction of nature-conservation technologies. Ecobank must work under the Ministry of Natural Resources and Environmental Protection.

To reflect ecological and economic processes connected with the productivity of ecosystems and conservation of biological diversity, the relevant system of indicators shall be adopted including:

- assessment of the current state of ecological capital and the productivity of ecosystems; value (price) of rare and endangered species;
- assessment and ranking of long-term internal and external factors of destabilisation of ecosystems functioning;
- assessment of damage caused to the sustainable use of biological diversity. This damage (actual, forecast, potential, compensated and non-compensated) may be displayed at the local (within the nature-conservation territory), national and trans-national levels.

It is time to use international biostatistics that would reflect the ecological capital of each country (productive capacity of live nature less the used ecological resources including clean air, water as well as climatic resources). Special place in this statistics must be occupied by the payment of stable cost rates established by the world community for definite categories of SPNTs in various regions of the globe.

Ecological and economic regulation of conservation of biological diversity shall be analysed in the context of implementation of the National Strategy of Sustainable Development.

Effective integration of the Action Plan into social and economic sectors of the country will take place only if the national economy and state statistics include, alongside material production and non-productive sphere, the new subsystem, i.e., the ecological sphere or sphere of nature-conservation labour. A vivid example of this new sphere is represented by SPNTs.

In contrast to material production, in the ecological sphere the market does not have direct correlation to the degree of correspondence of reproduction of natural goods to public needs. In this view, the state regulation of reproduction processes in the ecological sphere is the main distinctive feature of its economic mechanism.

Support and stimulation of sustainable use of biological diversity must be performed not only by direct budgetary financing and subsidising but also by way of use of various indirect methods of taxation, monetary, currency and foreign economic regulation as well as by ecological insurance of biological resources of nature-conservation territories.

Economic mechanisms for protection of the environment are reflected in Section V of the Law of the Republic of Belarus "On Protection of the Environment" (planning and financing of nature-conservation actions, establishment of limits on the use of definite natural resources, density of nature users payment for temporary impact exerted on the environment, extra-budgetary funds for environmental protection, etc.).

Procedure for deduction and payment into the budget of the tax on the use of natural resources (ecological tax) is defined in the Methodological Instructions of the Chief State Tax Inspection dated April 19th, 1996.

In conformity with the Regulation on the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus (approved by Decree No. 81 of the Council of Ministers of the Republic of

Belarus dated February 2nd, 1996 and as presented in the version of Decree N o. 475 Of the Council of Ministers of the Republic of Belarus dated May 13th, 1997) one of the tasks is the development of proposals on improvement of the economic mechanism of nature use and management, ecological standards and rules of protection of the environment and regulation of the natural resources use.

Economic damage resulting from contamination, degradation and disturbance of land shall be exacted from the respective enterprises, institutions and organisations irrespective of their forms Of ownership and subordination, including joint ventures with foreign legal and physical entities as well as citizens of the Republic. The factor of nature-protection amounts collected for the damage shall constitute from 1.5 to 10.0 in relation to specially protected natural territories. These funds shall be used for nature-protection measures and actions (Provisional Methodology 0212.4.-97).

Decree No 1038 of the Council of Ministers of the Republic of Belarus "On Measures for Improvement of State Regulation of Activities Connected with Use of Ozone-Destroying Substances" dated August 8th, 1997, states that for the issue of a single permit for import of ozone-destroying substances the Ministry of Natural Resources and Environmental Protection shall collect duties in the amount of 0.6 minimum salary per each kg of such substances and this amount shall be transferred to the republican extra-budgetary fund designed for the environmental protection .

In conformity with the "Methods for Calculation of Losses Caused to the State by Violation of the Water Legislation" (approved by the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus on January 6th,1995), the resources paid as compensation for losses, as stipulated by the Law "On Protection of the Environment", shall be transferred according to the established procedure to extra-budgetary funds for nature protection and shall be used for water protection measures.

In view of this fact, the Methods establish the rules for calculation of economic damage and determine the procedure of collection and use of exacted funds that have been developed proceeding from the requirements of the legislation of the Republic of Belarus on protection of the environment and the Code on Land of the Republic of Belarus. Economic damage shall be calculated using the factor that accounts for nature-conservation and other purpose of the land. In relation to specially protected territories, it shall constitute: 5.1-10.0 for reserves, reserved zones of national parks, botanic gardens, monuments of nature and sanitary protection zones; 2.6-5.0 for special-purpose reserves, water-protected strips along rivers and water reservoirs, forestry parks inside green belts; 1.5-2.5 for land designed for recreational, historic and cultural use; 1 .O for other kinds of land.

Funds received as a result of compensation of damage caused by contamination, degradation and disturbance of land shall be forwarded, according to the established manner, to extra-budgetary funds for nature protection and shall be used in conformity with the regulation on Extra-Budgetary Funds designated for protection of Nature of the Republic of Belarus, i.e., for conservationist actions.

XIV MAIN INDICATORS PLANNED FOR MONITORING THE IMPLEMENTATION (EFFECTIVENESS) OF THE NATIONAL STRATEGY AND ACTION PLAN FOR THE CONSERVATION AND SUSTAINABLE USE OF BIOLOGICAL DIVERSITY IN BELARUS

The Concept and the National Strategy of Sustainable Development of the Republic of Belarus define the system of socio-economic, ecological and organisational indicators of sustainable development.

The most important indicators of sustainable development determined by the indicators of the condition of environment, ecosystems and specially protected natural territories that are most pertinent to the problems of biological diversity include:

- wood areas;
- the share of the total area of specially protected natural territories (reserves and national parks);
- the share of wild animals and plant (of the entire number of species of basic taxons) that have the status of rare or endangered species (registered in the Red Data Book);
- area of water facilities under protection;
- land in use including agricultural land, land covered with forests, water facilities, roads and towns and villages.

Organisational indicators of sustainable development pertinent to the issues of biological diversity include:

- providing regulatory acts and methodological recommendations for assessment of ecological damage;
- ratifying international agreement related to environmental protection ;
- availability of governmental, non-governmental and public organisations.

Approaches to the assessment of efficacy of measures on the fulfilment of the Convention on Biological Diversity are assured, in general, trough the indicators or indicators recommended in Article 7 of the Convention, According to this Article each Party, as far as possible and appropriate in particular for the purposes of Articles 8-10: in-situ conservation: ex-situ conservation; sustainable use of the biological diversity components), shall:

- identify components of biological diversity important for its conservation and sustainable use having regard to the indicative list of categories (Annex 1);
- monitor components of biological diversity paying particular attention to the those requiring urgent conservation measures and those which offer the greatest potential for sustainable use;
- identify processes and categories of activities which have or are likely to have adverse impacts on the conservation and sustainable use of biological diversity;
- maintain and organise data derived from activities (pursuant subparagraphs a, b and c).

Below is Table XIV.l. of a set of key biological diversity indicators that are planned to be used in conformity with concrete conditions and opportunities of Belarus as the basis of the programme for long-term monitoring of the process of implementation of the Convention on Biological Diversity as well as for the cyclic and multi-sectoral planning process.

Table XIV.1: Main indicators for monitoring the efficiency of implementation of the Convention on Biological Diversity in conformity with the National Strategy and Action Plan for the Conservation and Sustainable Use of Biological Diversity in Belarus

Levels and components of assessment, conservation and use of biological diversity	Key indicators (1996-1997)		Main results attained and projected
	Type of the indicator	Indication parameters	
1	2	3	4
I. Landscape and ecosystem	Ratio of territories occupied by various ecosystems in %: • woods • bushes and shrubs • meadows . bogs • water reservoirs (without flow) • transformed territories	 35.5 3.1 15.8 9.3 1.1 35.2	Conservation of the share of priority natural landscapes and ecosystems; optimisation 0 transformation of territories at the expense of greater mosaic nature by restoring woods, meadows, bush and shrub areas and wetlands.
• Woods	• total area (hectares) • wood density • variation of wood density acc. to administrative region (%)	7,371.7 35.5 10-62	Increasing the total area and density of woods (especially in areas with low parameters). Priority conservation of European broad-leaved, taiga and fir woods.
• Meadows	Ratio (%) of • low or flooded and . upland or off-river floodplain meadows	 5.2 94.8	Maximum possible conservation of floodplain meadows: prevention of man-induced transformatior of all meadows
Bogs	Ratio (%) of • low • transitory • upper bogs	 61.1 20.7 18.2	Conservation of low, transitory and upper bogs; prevention of man-induced transformation of all wetlands.
Water and water-related natural ecosystems	• number (thousands) • river length (km) • number (thousand) and • total area of lakes (km')	20.8 > 90,000 > 10 > 2000	Conservation of natural river beds, floodplains and land strips along rivers and lakes; prevention of contamination, optimisation of water-protection zones.
Artificial water reservoirs	• water reservoirs • total area (km^2) • fishery farms • with total area of water reservoirs (km^2) • melioration canals (length), (km) • of them in Pripyat river basin	130 799 11 173 17,051 9,095	Ecological optimisation of areas adjacent to water reservoirs and melioration canals by increasing the mosaic nature of landscapes (woods, shrubs, bushes, meadows).

Table XIV.I: (continued)

1	2	3	4
II. Resourc utilisatio level	Ratio (%) of • natural and • anthropogenic landscapes	 55 45	On condition of ecological optimisa tion of land use, to reach maximum possible increase of mosaic nature of anthropogenic landscapes by including woods, meadows and wetlands. in addition to specially protected natural territories.
• Forestry resources	Distribution of forestry lands among users (%): • Ministry of Forestry of RB • Ministry of Agriculture of RB • Ministry of Defence • others Structure of forestry acc. to economic use (%): • woods in use • green areas • resort woods • water reservoir protecting woods . road protection wood strips • reserve forests • wood parks Ratio (%) of • dry valley and • wetland woods Wood stock prepared (1996) (in m^3 per hectare) • average annual increment	 77.6 10.9 5.0 6.4 58.1 11.6 1.2 8.2 13.0 5.2 2.7 87.1 12.9 1.6 3.6	Gradual transfer of woods from collective and state farms to the State Forestry Fund (Ministry of Forestry). Increasing the share of wood-protective strips along water reservoirs, roads, green zones, reserve forests and wood parks. Preventing the tendency of wetland woods reduction. Extensive cutting of wood is caused to-day, by the wood age structure, smaller domestic wood use and insufficient export.
Natural flora resources	Medicinal and technical plant stock prepared: • number of species • tons a year	 > 60 50-300	About 1% of all available stocks.
Game and commer-cial fauna resources	structure of hunting areas: • total area (million hectares) • in woods (%) • in fields (%) • in wetlands (%) number of hunting facilities, of them wood-located Population and hunting catch of basic mammals cf. Fig. V.7 and V.8) Total population (thousand species) and share of hunted catch (%) of the most popular tame species of ducks	 17.8 39.0 54.0 7.0 212 62 700-1000 30-40	mportant tasks are (in addition to naintaining the number of game opulation): co-ordination of nterests of game facilities, forestry griculture and fishery facilities; ntensive activities on conservation f the entire complex of biological liversity of faunas and flora. nterests of the facilities are epresented by the current process f game hunting areas reformation. o prevent a sharp drop of the opulation of hoof and beavers (due poaching and strong pressure by olves) hunting for elk and beaver as closed in 1996; and was stricted for other species.

Table XIV.1: (continued)

1	2	3	4
• Fish and other commercial resources of water reservoirs	Fishery stock of water reservoirs: • lakes (number and area in hectares) • water reservoirs (number and area in hectares) • river sections (length in km) Structure of commercial fish catch (%): • lakes • rivers • water reservoirs Structure and dynamics of catch of fish and crayfish	1000 130,000 115 45,000 > 40,000 74.2 17.2 8.6 (cf. Fig. V. 11 and V.12)	More intense use of fish resources is possible at the expense of compensation measures: introduction of young indigenous ichthyofauna, which is ruled out without large capital investments. Important is ecological optimisation of water reservoirs (protection of spawn places and prevention of contamination by industrial and agricultural sewage).
• Genetic resources	Structure of genetic stock of agricultural, medicinal, rare and endangered species of plants, animals and microorganisms		Important task if formation of the National Centre of genetic Resources.
III. Flora and fauna	Flora diversity: • ratio of taxon species • share of relict plants in vascular plants (% and total number of species) • number of plant species included into the Red Data Book as rare or endangered species • number of new invasive species Fauna diversity: • ratio of taxon species of vertebrates • number of species in the Red Data Book Number of species with international protection status	(cf. Fig. IV.1) 8 > 130 214 (of them higher- 171, lower- 43 (cf. Fin. IV.21 100 (over recent 10 years) (cf. Fig. IV.3) 182 (of them vertebrates – 97, invertebrates – 85) cf. Fig. IV.4) cf. Fig. IV.1)	They are indicators for the entire complex of nature conservation measures taken in different economic sectors for conservation of habitat and growth conditions. Development of co-ordinated international measures, see-king of investors for specific scientific and protection projects.
V. Threats to biological diversity (Concrete indicators are not sufficiently developed in relation to quantitative assessment of impact exerted by different factors (with due consideration of diversity and ecological specificity of various taxons of flora and fauna) General characterisation of the main causes and threats to biological diversity is given in Section VI)			Goals: ecological optimisation of work of various social and economic sectors (cf. Section VII.6 and Section VIII)

Table XIV.l: (continued)

1	2	3	4
V. Protection level (important indicators of protection measures)	Number, total area and share in the territory of the country taken by specially protected territories: • reserves • national parks • special reserves • total area • share in the country's area (%) Dynamics of development of the system of specially protected natural territories of Republican importance. (cf. Fio. VII.l. VII.2, Table. Vll.2, VII.4)	1 (16%) 3 (66%) 82 (18%) 898 530 4.33	Implementation of the Plan of development of specially protected territories in conformity with the Law "On Specially Protected Natural Territories and facilities".
	Ratio of different types of natural landscapes on specially protected natural territories.	(cf. Fig. VII.7, VIII.8)	
	Parameters of the ecological network: • formation and conservation of optimum ratio of natural and transformed territories and other measures for optimisation landscapes and their structures		cf. Section Vll.5)
	Degree of integration into the Pan-European Ecological Network		cf. Section VIII)
VI. Controlling level	Decrees by the Government	Measures by the state authority, i.e., Ministry of Natural Resources and Invironmenta Protection	Control over the fulfilmen of the Convention on Biological Diversity.
	National Reports on the mplementation of the Convention on Biological Diversity.	Degree of commitment mplementatior	Control over the nplementation of the Convention on Biological Diversity.
	Red Data Book of rare and endangered species of plants and animals	Periodicity of publication	Control over the endan-gered component of the biological diversity; devel opment of scientific programmes and meas-ures on conservation.
	National system of environment monitoring Biological monitoring.	Rate of real rganisation Of I monitoring (system of indicators)	Additional assessment of the condition and lynamics of biological esources.
	State wildlife and vegetation cadasters.	Rate of real organisation of cadasters (system of indicators).	Additional summarised lata that characterise the ondition and use of vildlife and vegetation.

Table XIV.l: (continued)

1	2	3	4
	Departmental and public control		In conformity with the law on Protection of the Environment.
VII. Organisational level	Provisions of the Convention on Biological Diversity, the National Strategy and Action Plan for the Conservation and Sustainable Use of Biological Diversity.	Terms and degree of implement-ation of priority provisions.	Implementation of the basic provisions of the Convention on Biological Diversity.
	Immediate actions by local bodies of power, ministries and departments, National Reports on the fulfilment of the Convention on Biological Diversitv.		

Most of the indicators are used in analytical sections (IV, V, VI, VII); the complete set of key indicators will be of paramount importance for preparation of future National Reports on implementation of the Convention on Biological Diversity so as to assure the information grounds for political decisions, operation of key structures and for providing information to public. A more comprehensive list of indicators (parameters) should be used in programmes of the Republic of Belarus that are at the state development (organisational stage): the national system of monitoring of the environment (the section devoted to the biological monitoring) and the completing of the natural resources cadaster (wildlife and vegetation cadaster).

CONCLUSION

The First National Report on the Implementation of the Convention on Biological Diversity in Belarus is the result of the first stage connected with the implementation of Article 6 of the Convention on Biological Diversity in the Republic of Belarus. In the course of the development and implementation of the National Strategy and Action Plan for the Conservation and Sustainable Use of Biological Diversity, its condition and dynamics were assessed and the structure, status, nature and degree of use of natural resources were analysed. The causes and factors that endanger biological diversity in the territory of the country were defined. The notion "biological diversity" has been included into numerous governmental and departmental plans and state and scientific programmes. The necessity of measures on its conservation and rational use has been mapped out in the National Strategy of Sustainable Development of the Republic of Belarus. At the same time, the complex transitional stage in the socio-economic and political development of Belarus brings about a number of difficulties and problems related to the solution of the issues of conservation and use of biological diversity. This was bound to be reflected in the structure and nature of materials represented in the First National Report. At present, there is no opportunity to present complete data on certain issues and parameters recommended in Decision II/17 of the Conference of the Parties. However, the practical experience gained during the preparation of this Report will be used as a basis for optimum assessment of the condition, use and trends of dynamics of biological diversity in future. Of importance is that despite social and economic difficulties, a significant work has been done to define the directions for future activities, including the incorporation of issues of biological diversity into the sectors of economy and state government in the Republic of Belarus. This represents a definite contribution into the solution of the global environmental problem in conformity with the objectives of the Convention on Biological Diversity as well as a new important step forward in the implementation of the tasks of the European strategy in the sphere of biological and landscape diversity.

The unique nature and international significance of the whole number of natural ecosystems of Belarus related to the problem of conservation of biological diversity gives opportunities for attraction of investments of international organisations and foundations which will be facilitate successful implementation in future of the tasks set in the Convention on Biological Diversity.

The present First National Report is aimed at implementing the immediate objectives stated in it: provide the foundation for taking political and organisational decisions; and secure the extensive provision of information to the state structures and public on the problems of conservation and sustainable use of biological diversity.

CONTENTS

Scientific edition

**FIRST NATIONAL REPORT
ON THE IMPLEMENTATION OF THE
CONVENTION ON BIOLOGICAL DIVERSITY
IN BELARUS**

Scientific Editor: M.M.Pikulik, correspondent member of the NAS of Belarus

Научное издание

**ПЕРВЫЙ НАЦИОНАЛЬНЫЙ ДОКЛАД
ПО ВЫПОЛНЕНИЮ КОНВЕНЦИИ О
БИОЛОГИЧЕСКОМ РАЗНООБРАЗИИ
В БЕЛАРУСИ**

(На английском языке)

Под редакцией члена-корреспондента НАН Беларуси М.М. Пикулика

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The First National Report on the Implementation of the Convention on Biological Diversity has been prepared in compliance with Article 26 according to which each Party shall periodically submit to the Conference of the Parties of the Convention, reports on the measures taken for the implementation of the provisions of the Convention and on their efficiency for attaining the Convention's objectives.

The First National Report is focused, as pointed in Decision II/17 of the Conference of the Parties, on the results of implementation of Article 6 which commits the Parties to develop national strategies, plans and programmes for the conservation and sustainable use of biological diversity, as well as to integrate, as far as possible and appropriate, measures for conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes and policies.

The First National Report has been developed within the framework of the Project of the United Nations Environment Programme and of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus in co-operation with the National Academy of Sciences of the Republic of Belarus. First of all, it is based on the materials of the National Strategy and Action Plan for the Conservation and Sustainable Use of Biological Diversity in the Republic of Belarus and the Analytical Review called The Status and Use of Biological Diversity in the Republic of Belarus".