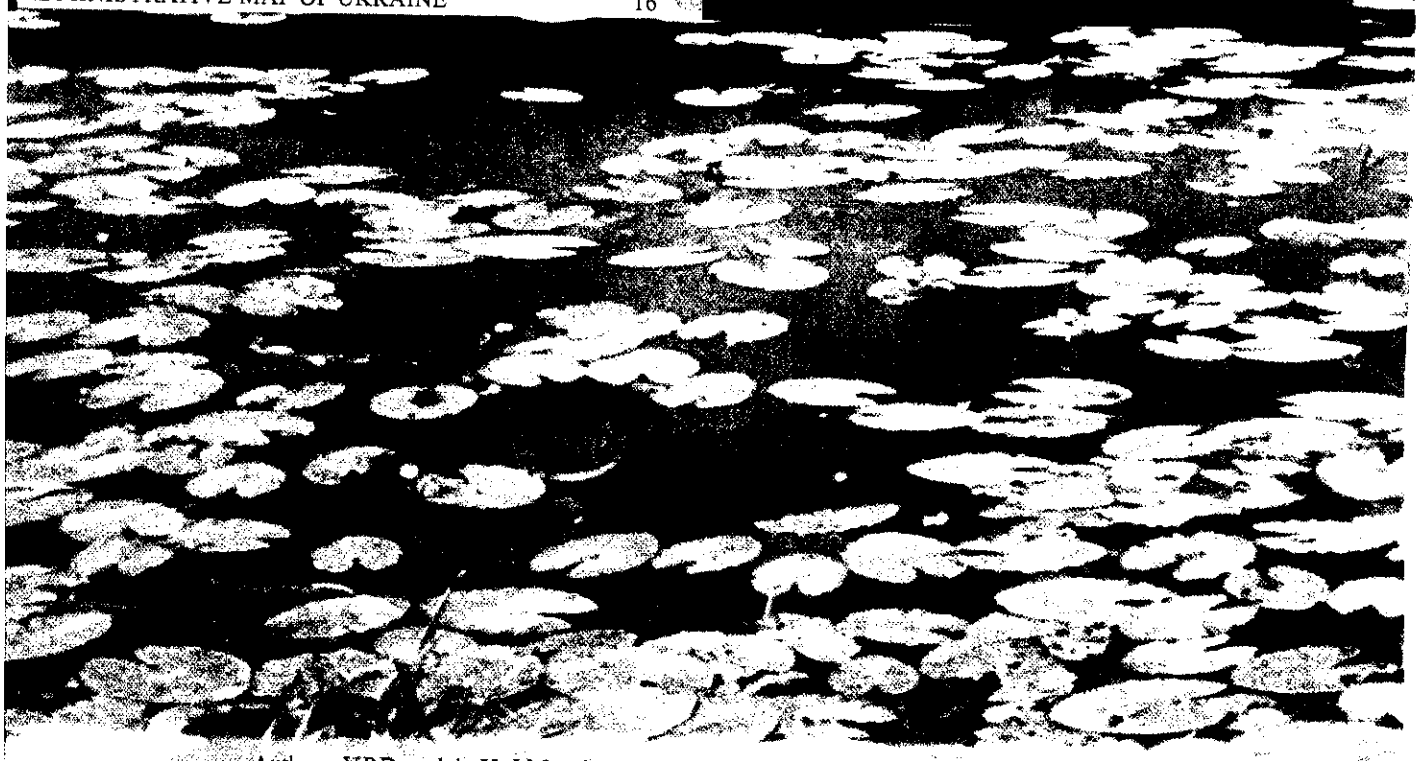
MINISTRY FOR ENVIRONMENTAL PROTECTION
AND NUCLEAR SAFETY OF UKRAINE
INTER-AGENCY CO-ORDINATION COMMISSION ON CONSERVATION
OF BIOLOGICAL AND LANDSCAPE DIVERSITY

NATIONAL REPORT OF UKRAINE ON CONSERVATION OF BIOLOGICAL DIVERSITY

Kyiv - 1997

CONTENTS



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The authors are grateful to Albina Arkhipova, Natalya Smolina, Vira Romanchuk, Larisa Romanova, Irina Bardina (Ministry for Environmental Protection and Nuclear Safety), Leonid Protsenko (InterEcoCenter), Oksana Tarasova, Oksana Demkiv, Oleksandr Cherkas (U.S. Peace Corps), Andrew Bond, Basil Kavalsky, Phil Brylsky, Margory Bromhead, Kathleen Stephenson (World Bank) for their assistance.

Additional comments and official information were provided by relevant ministries and agencies, research institutions, NGOs, and independent experts. Their help and cooperation are greatly appreciated. Materials of the National Report on State of Environment in Ukraine for 1994--1995 were used in the present publication.

Translated by Sergei L.Mosyakin (M.G.Kholodny Institute of Botany, National Academy of Sciences of Ukraine, Kyiv). Special thanks are due to Jane Garron (U.S. Peace Corps) for her linguistic revision and comments on the style of the manuscript.

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Printed by «Prospect Ltd., Vlasi Spravi», Kyiv, 1997.

This publication was made possible by the financial support of the Global Environment Facility (GEF).

SUMMARY

The First National Report on Conservation of Biological Diversity has been prepared in accordance with the Resolution by and recommendations of the 2nd Conference of the Parties (Jakarta, Indonesia, November 1995) and covers the present status of Ukraine's responsibilities as described in Article 6 of the Convention on Biological Diversity (CBD) regarding measures for conservation and sustainable use of biodiversity.

The biological diversity of Ukraine is the national heritage of our country. Thus, biodiversity conservation and sustainable use become priority issues of a national conservational policy and are necessary prerequisites for sustainable, balanced socioeconomic development of the country.

The former Soviet-style system of management of the national economy and environmental policy, which was dominant in Ukraine for almost the whole XX century, resulted in profound changes of landscapes and habitats. In particular, the area occupied by natural plant communities decreased to ca. 29% of the total territory of the country. Now the forested areas occupy ca. 14.3%, as compared to 45% at the beginning of the century. The steppe almost disappeared as a natural biome; hydrology of the territory dramatically changed as a result of construction of power-station dams on rivers, creation of huge water reservoirs ("artificial seas"), amelioration of mires, swamps and wetlands in the northern forest regions (Ukrainian Polissya) and irrigation of southern steppe territories. Other serious problems created include pollution of vast territories with such pollutants as heavy metals, radionuclides, stable organic compounds; devastation and synanthropization of ecosystems, etc. All this has led to the decline of genetic, coenotic and ecological diversity and stability while, at the same time, creating social and ecological discomfort for the local population.

Ukraine has a rich biota, which consists of more than 25,000 species of plants and fungi (including 5,100 vascular plants, more than 15,000 fungi and myxomycetes, more than 1,000 lichens, almost 800 mosses and ca. 4,000 algae) and 45,000 species of animals (more than 44,000 invertebrates, including more than 35,000 insects, about 3,500 other arthropods, 1,800 protozoans, 1,600 roundworms, 1,280 flatworms and 440 segmented worms; and vertebrates, including ca. 200 species of fish and lampreys, 17 amphibians, 21 reptiles, ca. 400 birds and 108 mammals). Some of these species are endemics and relicts.

Ratification of the Convention on Biological Diversity (hereafter, the Convention or the Biodiversity Convention) by the Verkhovna Rada (Parliament) of Ukraine on 29 November 1994 created a new impetus and momentum for further development of environmental and conservational activities, strengthening inter-agency and government-NGO cooperation at the national and local levels. It also promoted the international cooperation, involvement and participation of Ukraine in global environmental concerns and actions.

National activities on biological conservation are based on the Constitution of Ukraine (adopted in 1996) and are implemented in accordance with the existing national legal basis (environmental and conservational legislation, international conventions ratified by Ukraine, as well as the Pan-European Biological and Landscape Diversity Strategy.

On 12 May 1997, the Cabinet of Ministers of Ukraine, by its Decree No. 439, has approved the Concept (Strategy) for Conservation of Biological Diversity in Ukraine. In order to achieve the goals of the Concept, the National Action Plan for 1998--2015 is being developed. The main goals in this respect are the following:

- conservation, improvement and restoration of natural and disturbed ecosystems, landscape components, and habitats of some species;
- promoting a transition to sustainable, well-balanced use of natural resources;
- minimizing any indirect negative influences on ecosystems, their components and ecological complexes;
- strengthening public awareness, improving availability of information on biodiversity, involving more of local population in conservational activities;
- defining and strengthening responsibility for biodiversity conservation, especially the responsibilities of institutions, organizations, land users, companies and individuals that use or affect natural resources.

For achieving the above goals, it will be necessary to implement and develop adequate legal, financial, organizational, scientific, educational and informational measures. Thus, the major aspects of biodiversity conservation activities are:

- conservation and restoration of coastal, maritime, riparian, floodplain, lacustrine, mire, wetland, meadow, steppe, forest and montane ecosystems;
- preservation of species and populations;
- ecological optimization of urban landscapes and other highly disturbed territories;
- "ecologization" of agricultural landscapes and agricultural technologies, as well as existing practices in forestry, fishery, game, land and water management;
- development of the national ecological network (a system of "green corridors") as a constituent part of the EECONET (European EcoNet).

Financial resources for the program are payments, compensations and fees for using natural resources; funds of institutions and organizations; the State Budget of Ukraine; local and regional budgets, and some other sources. The organizational base for implementation of the Concept, through required measures and action plans, is the system of bodies of the Ministry for Environmental Protection and Nuclear Safety, other ministries and agencies involved in conservation and use of natural resources. A well-developed system of research institutions, nature and biosphere reserves, national parks, botanical gardens, departments and chairs at educational institutions creates the scientific and educational base for implementation of environmental programs. Ukraine has all the necessary possibilities for successfully implementing the National Strategy through long-term action plans for conservation and ecological recovery. These plans are based on principles of sustainable development and balanced use of natural resources.

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INTRODUCTION

Five years that elapsed after the Rio Summit demonstrated the exceptional importance of principles of sustainable development. The Conference, which declared these principles, will be remembered in history as a forum where the basis was formed for global environmental and economic partnerships for survival and further development of human civilization. One of the main results of the Conference is the Convention on Biological Diversity.

Ukraine is eager to respond adequately to global challenges, and to support all progressive international initiatives and agreements. Our country was among the Parties-founders of the United Nations Organization, and also signed in Rio the Agenda for the XXI century (Agenda 21) and the Convention on Biological Diversity. At present, approaching the third millennium, Ukraine appears as an independent, unified state, a reliable European partner within the world community working towards the solution of global and regional environmental problems. Ukraine's abundant wealth of natural resources, its highly educated population, well-developed industry and infrastructure create all necessary prerequisites for implementation of the Biodiversity Convention in our country.

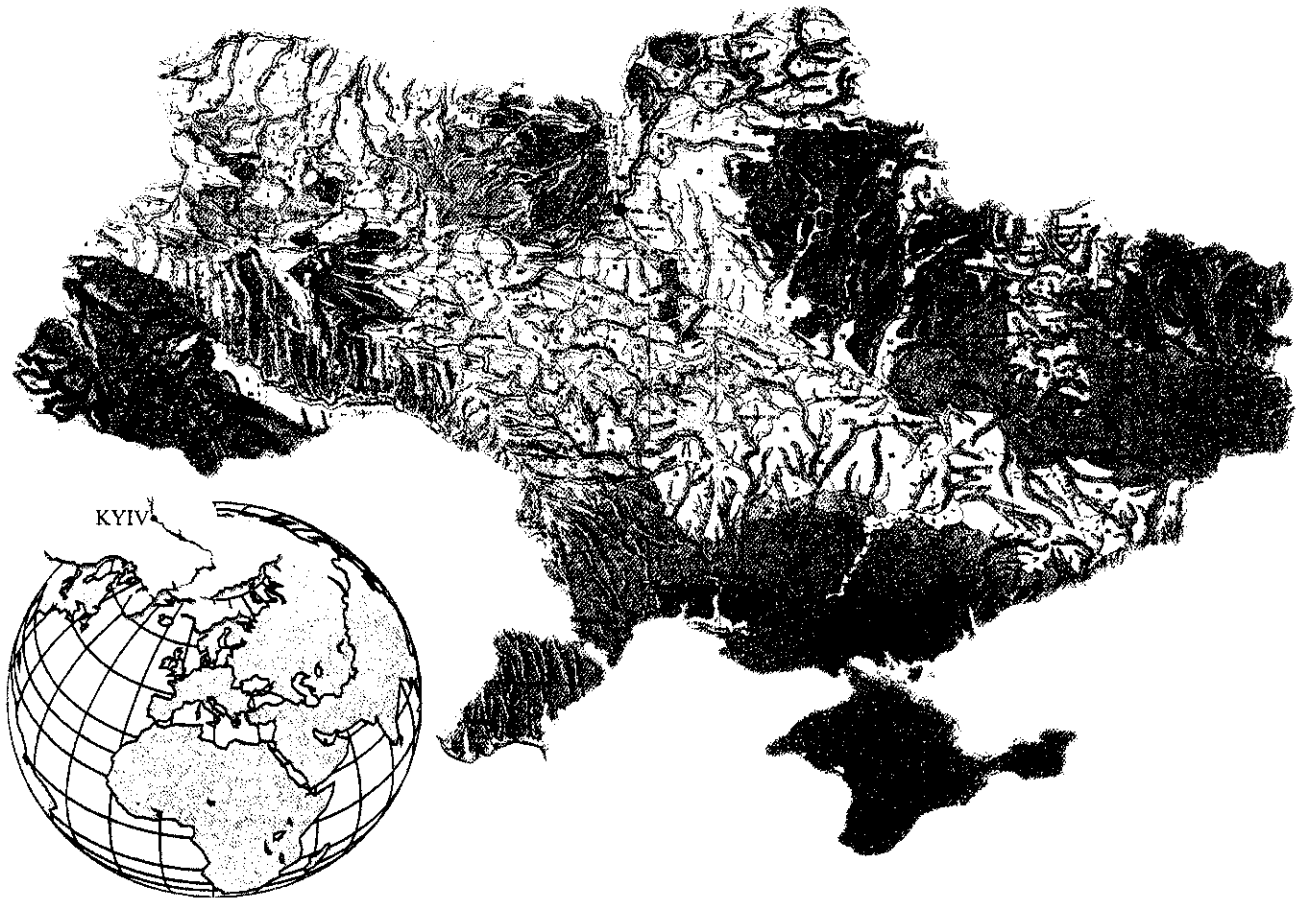
As evident from the previous experience, it could be quite difficult to implement the national sustainable development policy even under favorable conditions of a prosperous national economy. Thus, it is even more difficult to pursue this goal in Ukraine, since this country is now undergoing dramatic changes, trying to overcome a profound crisis and to solve numerous particular problems.

Despite these numerous problems, the process of realizing the principles of sustainable development in Ukraine started almost simultaneously with proclaiming independence of the country. Since 1991, economic and environmental reforms in our country have been aimed first of all at reaching a compromise between national economy and the needs of nature, then, in that perspective, creating a harmony of nature and society for their mutual benefit. According to the basic principle of the new policy, environmental safety of the country becomes an important element and a necessary part of both national and global safety.

The Concept and "Basic Principles of Ecological Policy of the State" were developed in Ukraine in accordance with resolutions of the Rio Summit-92. These documents include not only goals and priorities of environmental protection, but also concrete mechanisms and recommendations for their implementation. Trends and ways to harmonize and integrate Ukraine's ecological policy within the framework of the "Environment for Europe" and global ecological processes are also defined. The mentioned national document is the base for all other programs of the Government in the field of environmental protection and ecosafety. After creation of the special Ministry for Environmental Protection and Nuclear Safety, a unified system of legal regulations and management was developed in Ukraine in the sectors of environmental protection, use of natural resources, and ecological and nuclear safety. According to international experts, this system meets all modern requirements. Legal instruments for solving ecological problems were created in a very short period of time; new economically based mechanisms of nature use were implemented. In accordance with international requirements, the national system of standards of ecological and nuclear safety and use of natural resources is being created.

Protection and conservation of nature is one of the main priorities for our young nation. We understand that conservation of biological and landscape diversity is the necessary base for any use of nature and development of the country and society.

Thus, Ukraine has every opportunity to successfully implement the National Strategy, other urgent and long-term action plans for conservation of biological diversity based on principles of sustainable development and balanced use of natural resources.



1.1. Natural conditions and a history of the use of nature in Ukraine

Ukraine lies in the central and eastern portions of Europe, occupying the southwestern and southern parts of the East European Plain (more than 94% of the area). The country stretches 1,316 kilometers (km) from west to east (from 22 to 40 degrees E) and almost 900 km from north to south (from 44 to 52 degrees N). The total area of Ukraine is 603,550 square kilometers.

Three main physiographical zones can be recognized within the flatland portion of Ukraine: mixed forests (Ukrainian Polissya), forest-steppe, and steppe. The highland and montane regions of Ukraine include the Ukrainian Carpathians in the west and the Crimean Mountains in the southern part of the country. The highest altitudes within the plain part of Ukraine reach 300--475 m above sea level (a.s.l.); the highest peaks are Hoverla (2061 m) in the Carpathians and Roman-Kosh (1542 m) in the Crimean Main Range. Almost all of the territory of Ukraine lies within the temperate climatic zone, with the exception of the Crimean South Coast, which belongs to the submediterranean zone and shows some subtropical climatic features. The average temperatures of January vary from -8 degrees Centigrade in the northeastern part to +2 or +4 degrees Centigrade in the southern part (the South Coast of Crimea). The average July temperature varies in these regions from +18--19 to +23--24 degrees Centigrade respectively. The annual precipitation in the northwestern plains is ca. 600--700 mm; the southeastern steppe regions receive as little as 300 mm of rainfall a year. Yet, in the mountains there are regions in which up to 1000--1200 mm (the Crimea) or 1600 mm (the Carpathians) of rain falls annually.

The water resources of Ukraine include rivers, lakes, ponds, reservoirs, swamps and mires, and underground waters. There are more than 22,000 rivers in Ukraine; their total length is more than 170,000 km. The main rivers are: the Dnipro (= Dnieper) with its largest tributaries the Prypyat and the Desna; the Dunai (= Danube), the Dnister, the Pivdenny Bug (= Southern Bug), the Zahidny Bug (= Western Bug), and the Siversky Dinets (= Siversky Donets). Almost all these rivers belong to the Black and Azov Seas basins; only 4% of Ukrainian rivers flow to the Baltic Sea. The water regime of many rivers is deeply transformed by artificial water reservoirs. The largest of them (a cascade of six reservoirs) are on the Dnipro. Ukraine has more than 3,000 lakes and estuaries (coastal salt lakes, limans) covering a total area of 200,000 hectares (ha). Forty lakes are comparatively large, covering an area of more than 10 square km each. The largest lakes are the Svityaz and the Turske in the northwestern part of the Ukrainian Polissya. The largest estuary lake is the Dnister Liman. The coastal lines of the Black and Azov Seas in Ukraine stretch for 1,050 km.

Soils of Ukraine are diverse; approximately 650 types and varieties of soil are currently recognized by soli scientists. The most fertile soils, chernozems (black soil), occupy ca. 60% of all agricultural lands of the country, especially in the forest-steppe and steppe zones. Arable lands cover 57.5% of the country's territory.

Starting from the prehistoric times of the Tripillya (= Tripolye) culture, the basic mode of use of natural resources in Ukraine was agriculture, the cultivation of crops. This is clearly reflected in the nation's mentality, its attitude and profound respect for nature.

However, there have been examples of some extremities and abuses in the use of nature and natural resources in Ukraine. These were especially dramatic at the end of the XIX century and in the first half of the XX century, when land resources were used in an unwise and exhaustive way. The steppes were extensively transformed into arable lands; new mines and quarries for developing deposits and extracting minerals were created; new industrial objects were created, etc. According to contemporary expert eval-

uations by O. Subtelny, Ukraine provided ca. 70% of raw materials in the former Russian Empire, but only 15% of goods production.

A very important factor in changing the society-environment relationships in the former Russian Empire was created by changes in the land use structure as a result of implementation of Stolypin's land reform in 1909 (Note: P.A.Stolypin, 1862--1911, Russian statesman and political reformer; Russian Prime Minister and Minister of Internal Affairs from 1906 to 1911). In this period, every peasant had an opportunity to become a landowner; only forests, meadows, wetlands and water bodies were usually retained as community ownership. This land reform was especially successful and popular in Ukraine. It promoted independent farming and traditional Ukrainian modes of a rural economy, including traditional land use, such as rotation and alternation of crops, better agricultural production, use of natural fertilizers. At the same time, the reform stimulated a strong agricultural expansion resulting in destruction of forests, ploughing of virgin lands, and devastation of some other natural ecosystems.

Negative changes in the environment during a rapid economic development of Russia caused a certain concern among scientists and the general public that led to development of nature conservation activities, especially in Ukraine. The first nature reserve in the country (Russian Empire) has been created in Ukraine. It was the well-known steppe reserve Askania-Nova. This was soon followed by the Pilyavin Reserve in Volhynia; Stuzhytsya, Tysa, Knyazh-Dvir, Pip Ivan Marmaroshsky (the Carpathians) and some other protected territories, e.g. in the Vorskla River valley.

Unfortunately, after the well-known events of 1917, "new" methods and modes were introduced into the national economy, which were often in conflict with both traditional and scientifically justified approaches to the use of natural resources. The process of "industrialization" in the USSR was in fact aimed primarily at extensive, wasteful use of both natural and human resources. The total obligatory collectivization forcefully introduced into agricultural sectors in 1929 resulted in a dramatic decline and degradation of agricultural production. One of the tragic results of this policy was the terrible famine in Ukraine in 1932--1933. Despite all political proclamations, slogans and calls "to improve and conquer nature", traditional land use methods were lost, and the natural stability and equilibrium of the environment were severely violated. Nature conservation actions were very limited in scope. The main features of the Ukrainian mentality, love of the native land and respect for nature, were also destroyed.

The Decree of the Soviet Government "On the plan for planting field-protecting forests and forest shelter belts, introduction of grassland crop rotation, creation of ponds and water bodies in order to ensure high and stable harvests in the steppe and forest-steppe regions of the European part of the USSR" (1948) and some other similar decrees were intended to signify the overwhelming triumph of the "new ideology" in using nature and natural resources. Indeed, it was a step forward, if we consider afforestation efforts (more than 1,000,000 ha of field-protecting forests and 430,000 shelter belts). However, all these measures were implemented with

the usual Soviet gigantomania, and they greatly ignored basic laws of nature and traditional land use practices. In addition, some protected natural territories in Ukraine were liquidated. The same years were marked by a campaign to combat so-called "harmful animals and pests". The administrative and bureaucratic approach favoured gigantic projects of nature transformation. Construction of huge dams and water reservoirs on the Dnipro is a good example; it resulted in considerable losses of lands that were extremely valuable from agricultural, ecological and cultural viewpoints. Ambitious plans were implemented for irrigation, amelioration and "better use" of land resources (use of chemical fertilizers, pest control chemicals, etc: the so-called "chemisation of agriculture"). The unrestricted desire to expand the areas of arable lands resulted in the virtual disappearance of ca. 300 small rivers in Ukraine, as well as in land erosion and black dust storms.

The nuclear catastrophe at the Chornobyl Nuclear Power Plant on 26 April 1986 was the ultimate point of the ecological disaster in Ukraine. The Chornobyl aftermaths extend far beyond strictly environmental issues to a whole complex of socioeconomic, medical, biological, psychological, ethical, ideological and cultural problems. The Chornobyl catastrophe emphasizes the close ties between the ethnos and environment, and the tragic results caused by violation and destruction of these ties. In the mid-1980s Ukraine was at the brink of ecological crisis.

The right of Ukrainian citizens to a favorable environment was first proclaimed in the Declaration of State Sovereignty of Ukraine. Starting from 1991, independent Ukraine is forming its environmental policy as a part of the national policy.

1.2. An outline of the present state of the environment

Land. The Land Fund of Ukraine is 60,350,000 ha, including ca. 58,000,000 ha of land. The lands classified as "not disturbed by human activity" constitute 27.4% of the land fund. The percentage of arable lands has declined somewhat during recent years, but still remains high (57.5%).

Areas occupied by industrial and transportation objects and facilities are growing; e.g. in 1995 industry occupied an additional 121,000 ha and transport, 201,000 ha. At the same time, areas of lands managed by the Defence Ministry are becoming progressively smaller. In 1995 the military sector returned 145,000 ha to the state land stock. Every year ca. 4,000 ha of agricultural lands (including almost 3,000 ha of arable lands) are withdrawn for non-agricultural purposes.

According to the State Land Cadastre (data of 1 January 1997), Ukraine has ca. 15,500,000 ha of productive lands of special value, mostly in the area of distribution of non-eroded loamy chernozem soils (11,900,000 ha, or 76.8%). It is the basic natural heritage of the country. At the same time, continuing degradation of these valuable and fertile soils is caused by such factors as overuse of mineral fertilizers, predominance of intertilled crops, low interest in cultivating herbaceous perennials and grasses, exhausting use of chernozems and other types of soils, overuse of heavy agricultural machines, etc. Intensive ravine and badland erosion affects 18% of Ukraine (mostly in the Khmelnitsky, Vinnitsya, Chernivtsi, Odessa, Kyiv, Cherkassy, Kirovograd Regions [administrative units, Oblasts in Ukrainian] and the Autonomous Republic of Crimea. About 17% of the territory is affected by floods; 11 to 25% of irrigated lands suffer from secondary salinization of soils.

Forests. The Forest Fund of Ukraine, including forested and non-forested areas reserved for forestry and forest management, amounts to ca. 10,000,000 ha. Of this total area, 8,600,000 ha are covered by forest vegetation. The rest consists of lands for agricultural use, as well as bogs, wetlands, sands, and areas planned to be forested in the future. The percentage of forest area in Ukraine is 14.3% of the total land area of the country (compared to 28% in 1850 and 45% by the end of the first millennium A.D.). Forest plantations and artificial forests constitute 40% of the total forested area. The total amount of timber resources is estimated at 1,300,000,000 (1.3 billion) cubic meters. Average timber amount is ca. 153 cubic m per 1 ha, and average annual increase is ca. 4.2 cubic m.

Almost all of the forests of Ukraine are situated in zones of negative impact from industrial pollution. Much harm was done to forests by the Chornobyl catastrophe. More than 3,500,000 ha of forests have been affected by radioactive contamination. During recent years, the forests of Ukrainian Polissya (forest zone) provide considerably less timber and non-timber (mushrooms, wild berries and nuts, medicinal plants, etc.) production than before the catastrophe.

Water resources and wetlands. In 1995, ca. 25 billion cubic m of water was used for industry, agriculture, and needs of the population (incl. 4.3 billion cubic m from the underground sources). More than 37% of this amount was used without return to the natural water bodies. As compared to the figures for 1990, the water use was characterized by 25% decline due to the decline of production.

As a result of construction of dams and water reservoirs of the Dnipro cascade, the water level in the Dnipro has risen (plus 2--12 m in different regions), causing flooding and submersion of floodplains and river terraces, and destabilization of shores and slopes at and near the water line. The present area of the Dnipro reservoirs is ca. 700,000 ha. Much of this territory was used before as highly productive and fertile agricultural (265,000 ha) and forest (270,000 ha) lands. Ca. 150,000 ha of the aquatory of reservoirs are shallow waters. About 60,000 ha of adjacent agricultural lands are affected by flooding. Changing the riverbanks caused destruction of an additional 6,000 ha of agricultural lands.

Now natural mires and bogs cover not less than 2% of Ukraine's territory. Only in the northern part of the country (Polissya) this figure reaches 6%.

Karst and erosion. About 30% of Ukraine's territory is affected by karst processes, including 27% of lands with open karst. These processes are especially active in the Volhynian, Ternopil, Vinnytsya and Mykolayiv Regions, and in the Autonomous Republic of Crimea. More than 50% of the area of disturbed slopes is affected by landslips.

Seas. Technogenous impact on the natural processes of the Black and Azov Seas shoreline development, especially near large seaports, river deltas and large cities, is accompanied by active abrasion, land degradation, and doing great damage to ecologically and recreationally valuable territories.

1. BIOLOGICAL DIVERSITY IN UKRAINE WITHIN THE CONTEXT OF NATURAL SETTING, HISTORY OF USES OF NATURAL RESOURCES, AND THE PRESENT STATE OF THE ENVIRONMENT

1.3. Biological diversity in Ukraine: the present state

Brief characteristics of flora and fauna. The geographic position, the climate and physiographical setting enhance the richness of flora and fauna of Ukraine, which comprises more than 70,000 species. According to preliminary estimates, ca. 1/3 of species (especially among insects and fungi) still remains undescribed. However, the intensive human influence on biodiversity of Ukraine is apparent.

Formation of the present species composition and biodiversity patterns in Ukraine started from the mid-Paleogene and in main features reached its modern state by the mid-Holocene, i.e., 5,000 years ago (see Tab. 1).

Climatic changes, together with processes of geological transformations and biological evolution, were largely responsible for formation of the species composition (including local endemic and relict taxa), making possible a considerable coenotic diversity of vegetation (see Fig. 1).

There are more than 25,000 species of plants, fungi, myx-

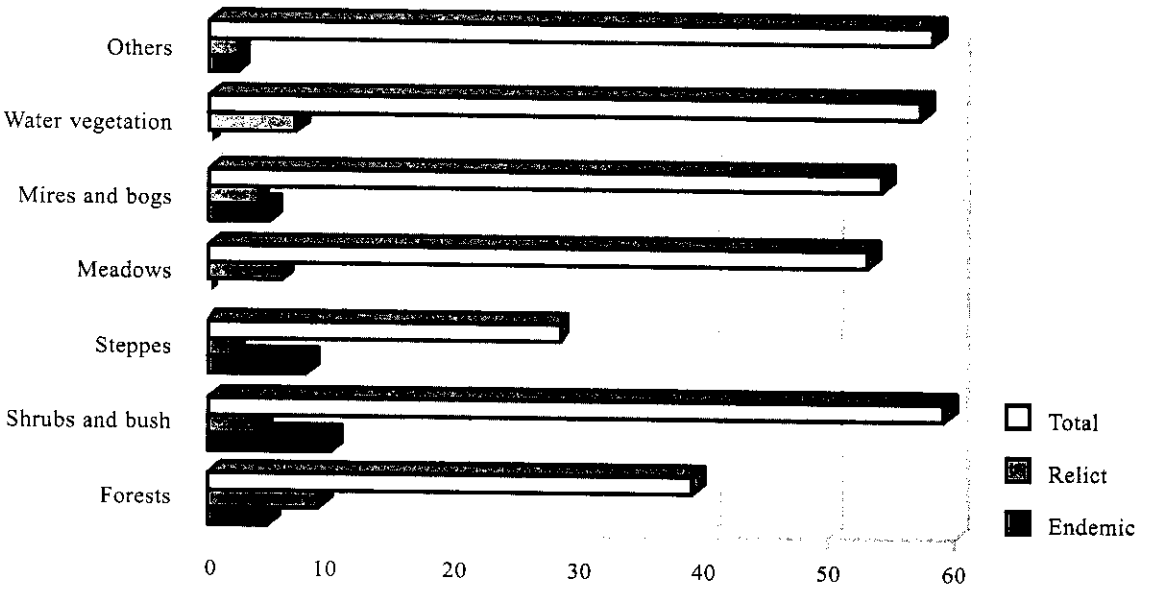
Table 1. Number of species in major taxonomic groups of the Ukrainian biota

Taxa	Number of species	Listed in the Red Data Book of Ukraine	Protection category*					
			I	II	III	IV	V	VI
BIOTA (Total)	**>70000**	**923**	**232**	**327**	**318**	**42**	**2**	**2**
FLORA (Plants and fungi)	>25000	541	169	191	173	5	1	1
Vascular plants	5100	439**	154	171	106	5	1	1
Mosses	800	28	1	27				
Lichens	1000	27	2	11	14			
Algae	4000	17	1	7	9			
FUNGI AND MYXOMYCETES	>15000	30	11	2	17			
FAUNA (Animals)	>45000	382	63	136	145	37	1	1
CHORDATA	>340	155	25	57	47	25	1	1
Mammals	108	41	6	12	18	4	1	1
Birds	до 400	67	10	28	18	11		
Reptiles	21	8		2	4	2		
Amphibians	17	5		4	1			
Fishes (with Cyclostomata)	200	34	7	9	8	10		
INVERTEBRATES	>44000	227	38	79	98	12		
Arrowworms (Chaetognatha)	2							
Echinoderms (Echinodermata)	12							
Lophophorates	28							
Molluscs	600	12	3	4	5			
Arthropods (excluding insects)	3440	31	16	2	9	4		
Insects	>35000	173	18	69	78	8		
Sipunculids	2							
Segmented worms (Annelida)	440	7		1	2	4		
Spiny-headed worms (Acanthocephala)	57							
Roundworms (Nematoda)	1600	2		1	1			
Ribbon worms (Nemertina)	33							
Flatworms	1280							
Ctenophora	2							
Coelenterata	36	2		1	1			
Sponges	39							
Protozoa	1800							

*– I – endangered, II– threatened, III– rare, IV– indefinite, V– insufficiently known, VI– recovered;
** – two species of vascular plants belong to the category 0 (extinct from the territory of Ukraine)

Coenotic diversity of the vegetation of Ukraine

(numbers of formations)



omycets and lichens in Ukraine (fungal organisms are usually segregated now into their own biotic kingdom). There are ca. 5,100 species of vascular plants (including the most important cultivated species). If we include here other cultivated taxa of vascular plants (e.g., those growing in open ground cultivation in botanical gardens and arboreta), this number would reach 7,500 species. Other major taxonomic groups are fungi and myxomycetes (more than 15,000 species), lichens (more than 1000 species), algae (ca. 4,000 species), mosses and hepatics (ca. 800 species). Only 250 species are officially recognized as medicinal plants; however, almost 1100 species of the Ukrainian flora contain biologically active components of potential medical value. Many of them are used in international medical practice for preparation of drugs and medicines. Most of the valuable medicinal plants are components of forest and shrub plant communities; ca. 25% of species occur in meadows and steppes, and 20--25% of them are representatives of the synanthropic flora (commonly known as ruderal or segetal weeds).

The most floristically rich regions of Ukraine are the Crimean and Carpathian Mountains (2,220 and 2,012 species of vascular plants respectively). The Crimean Mountains are especially rich in endemic taxa (240 to 300 endemics, according to different estimations).

Natural or semi-natural vegetation covers about 29% of Ukraine's territory and is represented mostly by forests (14.3%), meadows (9.7%), mires (2%), steppes and saline habitats (3%). Almost 1/4 of the species of Ukrainian flora are concentrated in forests (in particular, 15.5% in the broadleaved forests), and ca. 20% – in steppes. Useful plants are also well represented and include medicinal (more than 1000 species), vitamin-producing (200), oil-producing (300), melliferous (more than 1000), tannin- and natural dye-producing (up to 100 species) plants. These taxa are of special interest for economic botany. There are more than 100 species of trees in Ukraine.

The animal world of Ukraine consists of ca. 45,000 species, of which more than 44,000 are invertebrates (including more than 35,000 species of insects) (see Fig. 2 and 3). About 190 invertebrate species (including 32 endemics) from the hydrofauna of the Black and Azov Seas belong to the so-called "Pontic-Caspian complex" and are in need of urgent conservation in their habitats, especially in river deltas and estuaries.

Vertebrates are represented by fish species and lampreys (ca. 170 species and subspecies), amphibians (17 species), reptiles (21 species), birds (ca. 400 species), mammals (108 species) (see Fig. 4). Twelve species of vertebrates are endemics.

There are 221 species of green, red and brown macroalgae in the Black and Azov Seas. The number of species of marine animals is much more than 2000; 237 of them occur only in this region (endemics and subendemics).

Fig. 2.

Invertebrates (numbers of species)

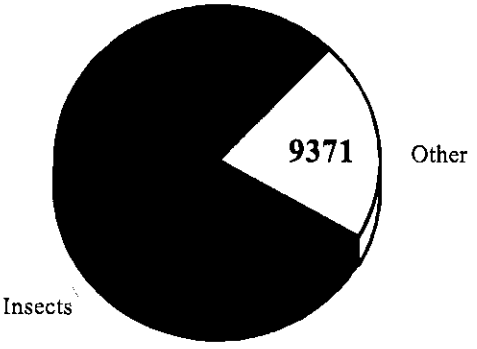


Fig. 3.

Invertebrates without insects (numbers of species)

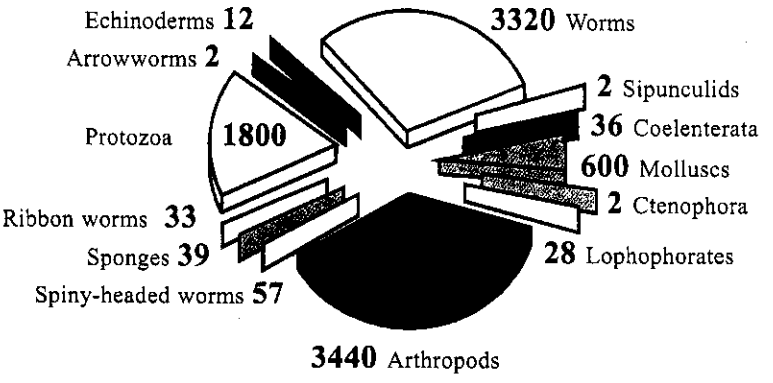
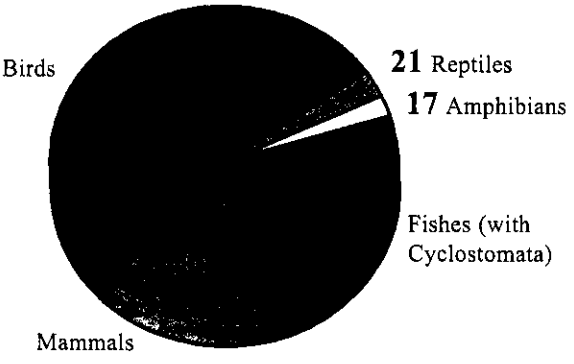


Fig. 4.

Chordata (numbers of species)



Much attention is paid in Ukraine to protection, conservation, recovery and rational use of vertebrate animals, mostly due to their vulnerability and value for man. The total catch of fish in all water bodies of Ukraine in 1990--1994 was estimated at 41,000--110,500 metric tons. The main game animals are:

elk (Alces alces), deer (Cervus elaphus and C. nippon), wild hog (Sus scrofa), roe deer (Capreolus capreolus), hare (Lepus sp.sp.), red fox (Vulpes vulpes), etc. Ukraine has the largest population of European bison (aurochs, Bison bonasus) in the world (659 animals).

Almost 80% of vascular plant species of the flora of Ukrainian Polissya and Steppe are represented in protected territories. Conservation of flora and vegetation in the Ukrainian Carpathians and Mountain Crimea is also quite reasonably ensured. Unfortunately, the conservational measures aimed at protection of animal species are less adequate.

The UNESCO scientific concept "at least one nature reserve per one physiographical province" is still not completely met in Ukraine. There are still no nature reserves in the Middle Russian Forest-Steppe and Crimean Plains Steppe provinces.

Aftermaths of the Chornobyl catastrophe and their impact on biodiversity. The Chornobyl catastrophe, with its radioactive pollution of vast territories, caused radioactive impact on populations of animals, plants, fungi and microorganisms. The influence of these processes on biodiversity is not yet completely clear. Such a situation of our knowledge is not only a result of evident scientific and technical difficulties, but also results from the lack of attention paid to this problem by the international community.

2.1. Legal aspects and legislative background

General legal approaches to the biodiversity conservation. The adoption of the Constitution of Ukraine on 28 June 1996 was an important step towards improvement of conservational sectors in our country. The Constitution proclaims the responsibility of the State to ensure ecological safety and to maintain ecological stability and equilibrium in Ukraine (Article 16), confirms the right of free and unrestricted access to information on environmental issues (Article 50), and assigns the responsibility to all citizens to cause no harm to nature and to compensate for any harm caused by their actions (Article 66).

There is no special law on conservation and sustainable use of biodiversity in Ukraine yet, but at present all corresponding issues are regulated by other active laws of the country. For example, according to the basic Law of Ukraine "On protection of environment" (1991), all entities of the plant and animal world of the country are subjects of the state protection, and any special use of living natural resources should be based on the principles of compensation and special permits. Particular aspects of conservation, use and restoration of entities and objects of the animal world are covered by the Law of Ukraine "On the animal world"; a similar law on plants has been prepared and submitted to the Verkhovna Rada (Parliament) of Ukraine for subsequent approval and ratification. All aspects of biodiversity conservation in natural protected territories are covered by the Law of Ukraine "On Nature Conservation Fund of Ukraine" (1992); preservation and protection of rare, threatened and endangered species of plants and animals is regulated by the Statute [Regulations] "On the Red Data Book of Ukraine" (1992); rare plant communities are covered by the Statute "On the Green Data Book of Ukraine" (1997) (Appendix 1).

The legal basis for biodiversity conservation in Ukraine is formed in accordance with international conventions and oter international acts and agreements (Appendix 2).

Conservation of biodiversity in Ukraine greatly benefits from Ukraine's participation in the international environmental conventions and other agreements (international legal documents) and following their provisions.

Ukraine also follows the requirements of the Pan-European Biological and Landscape Diversity Strategy (signed in 1995 in Sofia, Bulgaria). Provisions of this Strategy are the base of the Concept of Biodiversity Conservation in Ukraine (adopted by the Cabinet of Ministers of Ukraine on 12 May 1997). Subsequently, this Concept will form the basis for the National Program of Biodiversity Conservation to the Year 2015, which has to be prepared by the end of 1997.

The legal basis for biodiversity conservation in the sectors using nature resources. Many conservation issues regarding natural environment and habitats are regulated by the Land Code (1992), Forest Code (1994), Water Code (1995) and Mineral Resources Code (1994). For example, according to Article 78 of the Land Code and Article 4 of the Water Code, water bodies should be surrounded by protection belts and zones. According to Article 36 of the Forest Code, the forests of the so-called Category I (those performing mostly conservational, land protecting and recreational functions) are subjects to special legal regulations and management.

For implementing the provisions of these laws, many additional legal and administrative regulations have been issued. Particularly, in accordance with the Laws of Ukraine "On protection of natural environment" and "On the animal world", the Ministry for Environmental Protection and Nuclear Safety and the Ministry of Fishery prepared and adopted in 1995 the Instruction on limits of use of living objects of fishery and permits for using such organisms. In 1996 the Cabinet of Ministers approved the resolution "On payments and fees for special use of fish resources and other water living organisms, and on temporary payment regulations for special use of these resources". Unfortunately, not all environmental laws and codes of Ukraine have such good coverage or detailed legal and administrative regulations. Instructions on botanical and zoological collections, on an inventory of protected entities and objects of the plant and animal world have yet to be prepared and adopted.

Legislation on biotechnology and genetically modified organisms. Ukraine does not have any special laws covering these issues and problems yet. To a limited extent, the trans-border crossing of living modified organisms is regulated by the existing laws, particularly the Laws of Ukraine "On protection of natural environment" (Articles 53, 57, 58, 71, 72), "On the animal world" (Articles 45, 46, 48, 52, 53, 58, 59), "On ecological expertise" (Articles 1, 5, 7, 14, 51).

Legislation on the nature conservation fund (protected objects and territories). Conservation and protection of biological and landscape diversity in Ukraine is regarded as one of the most important tasks of the State. The main goal in this respect is formation of a representative, scientifically justified network of nature conservation territories and objects.

The Law "On Nature Conservation Fund [protected territories and objects] of Ukraine" (1992) provides, in its Article 3, a classification of nature conservation territories and objects. There are two major groups: 1) natural territories and objects and 2) artificially created objects and complexes. The first group includes the following categories: nature reserve, biosphere reserve, national nature park, regional landscape park, reservate, nature monument, protected locality. The second group includes botanical garden, dendrological park (dendropark, arboretum), zoological park (zoo), park-monument of landscape architecture and horticultural art. This classification of protected objects in general corresponds to the international nature conservation practice and concepts.

The Red Data Book of Ukraine. On 29 October 1992, the Verkhovna Rada of Ukraine adopted the Statute "On the Red Data Book of Ukraine". The Book is published in two volumes. The first volume is devoted to plants and fungi and provides brief descriptions, illustrations and other data on 541 taxa (mostly species, in some cases also subspecies, varieties, forms) of plants and fungi, including vascular plants (439 species), mosses (28), algae (17), lichens (27), and fungi (30). The second volume includes 382 species of animals: hydroids (2 species), roundworms (2), segmented worms (7), crustaceans (26), arachnids (2), myriapods (3), insects (173), molluscs (12), jawless fish (2), fish (32), amphibians (5), reptiles (8), birds (67), and mammals (41) (see Fig. 5). In particular, the following well-known species of plants are listed in the Red Data Book: Taxus baccata, Betula borysthenica, B. humilis, B. obscura, B. klokovii, Paeonia daurica, P. tenuifoila, Viola alba, Salix herbacea, S. reticulata, S. starkeana, Oxycoccus microcarpus, Daphne cneorum, Drosera anglica, D. intermedia, Trapa natans s.l., Atropa belladonna, 13 species of Centaurea, 8 species of Crocus, 26 species of Stipa, 6 species of Carex, etc. (see Fig. 6).

Examples of protected animals include the following taxa: 2 species of pelicans (Pelicanus onocrotalus and P. crispus), black stork (Ciconia nigra), birds of prey (Aegypius monachus, Gyps fulvus, Aquila chrysaetos, A. heliaca, A. rapax, Haliaeetus albicilla, Falco peregrinus, etc.), cranes (Grus grus, Anthropoides virgo), some other birds (Otis tarda, Himantopus himantopus, Numenius

tenuirostris, Bubo bubo, etc.), 12 species of bats, all three dolphins of the Black and Azov Seas, ermine, otter, badger, lynx, monk seal, European bison, etc.

It is the second, updated and expanded edition of the Red Data Book of Ukraine. The first edition (1980) listed only 151 species of vascular plants and 85 species of animals (29 mammals, 28 birds, 6 reptiles, 4 amphibians and 18 insects). Protection of species listed in the Red Data Book is ensured by such measures as complete prohibition or partial restriction of their use, severe responsibilities for illegal activities aimed at protected taxa, establishing protected territories and objects in key areas and localities important for survival of these species.

Protection and conservation of rare plant communities (The Green Data Book of Ukraine). The Green Data Book of

Fig. 5. **Fauna**

Species listed in the Red Data Book of Ukraine
(number of species)

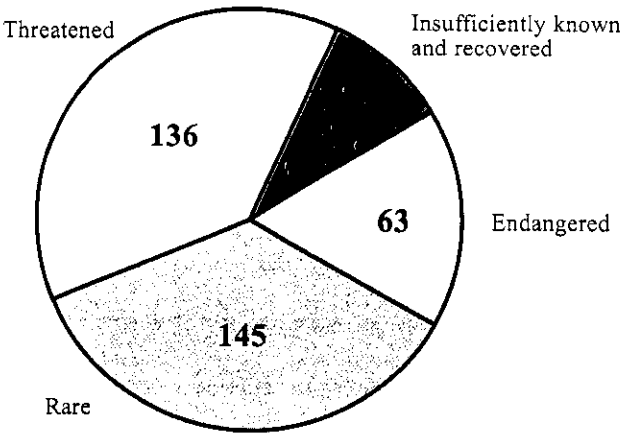
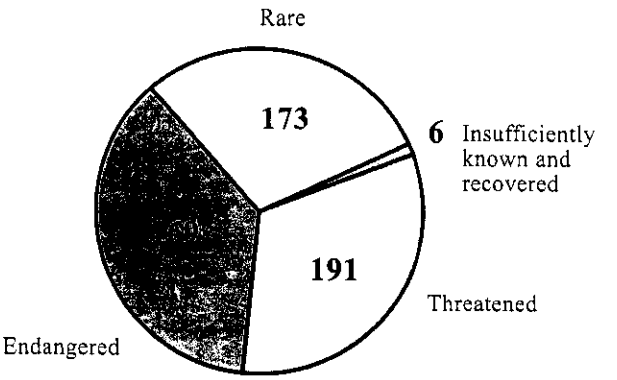


Fig. 6. **Flora**

Species listed in the Red Data Book of Ukraine
(number of species)



Ukraine, which was prepared and published by scientists of the Institute of Botany of the National Academy of Sciences of Ukraine in 1987, was recognized as a legal document at the beginning of 1997, following the decision of the Government. As a result, there is now a legal justification for conservation of rare plant communities listed in the book, mostly by means of establishing a relevant regime of their protection and rational use.

The Green Data Book is the unique example in the world conservational practice, since it applies a new conceptual approach to conservation of biodiversity with the main stress on its coenotic aspect. The book provides information about 126 rare plant communities in need of conservation and protection. The following types of vegetation are listed there: forest (51 communities), steppe (26), meadow (16), water vegetation (16), mire and swamp (12) and shrub (5) plant communities. The mentioned figures reflect the coenotic diversity and degree of changes and degradation in the main vegetational types of Ukraine. A new updated edition of this book is being prepared.

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2. NATIONAL SYSTEM OF BIODIVERSITY CONSERVATION

2.2. Institutional and organizational background

The system of the Ministry for Environmental Protection and Nuclear Safety of Ukraine. The Ministry for Environmental Protection and Nuclear Safety of Ukraine (MinEcoSafety) is the primary agency responsible for implementing national environmental policy, managing natural resources, etc., including all issues related to biodiversity and the Biodiversity Convention. In particular, the duties of the Ministry are to guide and control the preservation of biological diversity and natural ecosystems, to define the government strategy and legal aspects of the use and conservation of natural resources and objects of the plant and animal world, etc. The Ministry includes such bodies as the Central Environmental Inspection, Board of National Nature Parks and Preservation, Department of Use of Natural Resources, State Committee of the Autonomous Republic of Crimea for Environmental Protection, local departments in administrative regions, in the cities of Kyiv and Sevastopol, State ecological inspections for protection of the Black and Azov Seas, several research institutes, nature reserves and national nature parks.

Other governmental agencies responsible for conservation and use of natural resources are: the Ministry of Forestry, Ministry of Agriculture and Food, State Committee of Land Resources, State Committee of Water Management, State Committee of Geology.

The Ministry of Forestry is responsible for carrying out state policy for the management, protection and use of the country's forests. The forests are classified in two groups. Forests of the first group (51% of all forests) are managed for their environmental, scientific and recreational values. Forests of the second group are managed mainly for commercial (timber production) and environmental purposes. The Ministry of Fishery directs and coordinates issues of sustainable use and restoration of fish resources in inland water bodies of Ukraine and within the continental shelf and exclusive marine economic zone of the Black and Azov Seas. Among many functions and responsibilities of the Ministry of Agriculture and Food, there are those concerning rational use of agricultural lands and "ecologization" of agriculture. Some of these functions are also performed by the State Committee of Land Resources. The State Committee of Water Management is responsible for issues and programs that involve management and use of water bodies and adjacent lands, including mires and bogs, islands, riverside protected zones, etc. These territories and aquatories are of major importance as natural habitats for many species of plants and animals, and also as ecological corridors between different ecosystems.

Some aspects directly or indirectly connected to conservation of biodiversity are covered and managed by other governmental bodies: the Ministry of Foreign Affairs (international agreements and cooperation); Ministry of Economics (economics of use of natural resources); Ministry of Finance (financial support of nature conservation sectors); Ministry of Transportation (zones along transportation routes, roads, railroads, etc.); Defence Ministry (military areas and polygons); Ministry of Education (environmental education); Ministry for Science and Technology (scientific research); Ministry of Culture and Arts (natural objects belonging to national cultural heritage), etc.

Scientific research institutions and NGOs. Scientific research in biodiversity conservation is carried out by scientists of institutes and scientific centers of the National Academy of Sciences of Ukraine (NASU: the Institute of Botany, the Institute of Zoology, the Institute of Hydrobiology, the Institute of Geography, the Institute of Biology of Southern Seas, the Institute of Ecology of the Carpathians, the Institute of Molecular Biology, the Institute of Microbiology, the Institute of Cell Biology and Genetic Engineering, the Council for the Study of Productive Resources, the Central Botanical Garden, the Donetsk Botanical Garden, etc.), research institutions of the Ukrainian Academy of Agricultural Sciences (UAAS: Institutes of Land Resources, Plant-Growing, Fishery, Agroecology, Veterinary, Breeding and Genetics of Animals, Domestic Fowl, Genetics and Selection, Viticulture and Wine Production, etc.), and departments and chairs at universities and colleges, etc. Some environmental issues are covered by scientific centers, laboratories and institutes managed directly by the state administration.

Non-governmental organizations (NGOs) play a critical and active role in environmental and conservational activities. Many new NGOs (associations, societies, foundations, groups, etc.) have emerged quite recently, including more than 20 NGOs at the national level and more than 300 local and regional ones. The following influential NGOs should be mentioned here: the National Ecological Center, Ukrainian Society for Nature Conservation, Ukrainian Association of Hunters and Fishermen; "Zeleny Svit" (Green World) Association, Ukrainian Society for Protection of Birds, Ukrainian Botanical Society, Ukrainian Geographic Society, "Zelena Ukraina" (Green Ukraine) Society, some scientific societies and independent public "academies", etc. In order to coordinate environmental and conservational activities of NGOs and their cooperation with state agencies, the Ministry for Environmental Protection and Nuclear Safety has established the Public Ecological Council.

Scientific institutions and NGOs were actively involved in many conservational campaigns and activities during 1995--1997. Issues related to biodiversity conservation were discussed at national and international seminars and conferences, in particular within the activities during the European Nature Conservation Year (ENCY-95), observation of Earth Day, International Environment Day, and Day of Biodiversity Conservation, etc.

Institutions providing scientific justification and expertise. There are 14 nature reserves, 3 biosphere reserves and 7 national nature parks in Ukraine. According to the national legislation, these are scientific research institutions of national importance (see Appendix. 3). Their personnel consists of 1,100 people, including 120 researchers.

There are 24 botanical gardens in Ukraine (see Appendix 4), 15 major arboreta (belonging to forestry institutions and research stations, see Appendix 5) and 84 memorial parks (parks-monuments of landscape architecture and horticultural art). Of the memorial parks, 65 (80%) were founded in XVIII and XIX centuries. Ukraine also has 7 zoos (see Appendix 6).

Resources for genetics, breeding and selection. Ukraine possesses rich genetic resources of species, varieties, forms, breeds, lines and strains of plants, animals and microorganisms representing both native and non-native taxa. These resources are deposited and conserved in their natural environment and habitats, in cultivation, collections, gene banks (including cryobanks), in numerous reserves, parks, botanical gardens, institutes, universities, etc. Ukraine has 478 genetic reservates (total area ca. 24,000 ha). These reservates represent major forest types and plant communities, including common oak and Scots pine (57.3%), European beech (13.3%), spruce (11.5%), fir (5.4%), oak Quercus petraea (2.6%), Crimean beech (0.6%), etc. The genetic reservates are also represented in forests with participation of rare and endangered species, such as Pinus stankewiczii, P. cembra, Taxus baccata, Arbutus andrachne, Pistacia mutica, etc. There are 3,079 ha of elite forests in Ukraine; the state inventory lists 4,065 elite trees.

The M. M. Hryshko Central Botanical Garden of the NASU houses unique collections consisting of ca. 13,000 species, varieties, forms and cultivars of ornamental, medicinal, fodder, edible and other useful plants native to Ukraine and many other regions of the Globe, large pomological collections, etc. Of special value are the collections of tropical and subtropical plants (more than 3,000 species and cultivars), one of the best in Europe orchid collections,

4,500 species and cultivars of ornamental plants, 1,800 species and forms of trees and shrubs. The Nikita State Botanical Garden of the Ukrainian Agricultural Academy has a unique collection of ca. 9,300 species and cultivars of plants; it is one of the best representations of the flora of Mediterranean dry subtropics. The E. M. Kondratyuk Donetsk Botanical Garden has a collection representing mostly plants of the Southeast of Ukraine: about 9,000 species and cultivars, ca. 500 taxa of trees and shrubs, populations of 169 species listed in the Red Data Book of Ukraine, including 16 species of feathergrass (Stipa). The collection of the O. V. Fomin Botanical Garden of Taras Shevchenko Kyiv University consists of 8,000 species and forms (4,500 in greenhouses and conservatoria and 3,500 in open ground cultivation). Collections of rhododendrons, ferns, spiraeas and magnolias are especially valuable. Rich collections of ornamental and rare plants are represented in the arboreta "Sofiyivka", "Oleksandriya" (Alexandria), "Trostyanets" (500--800 species of trees and shrubs), the Botanical Garden of I. Ya. Franko Lviv University, and some other gardens and parks.

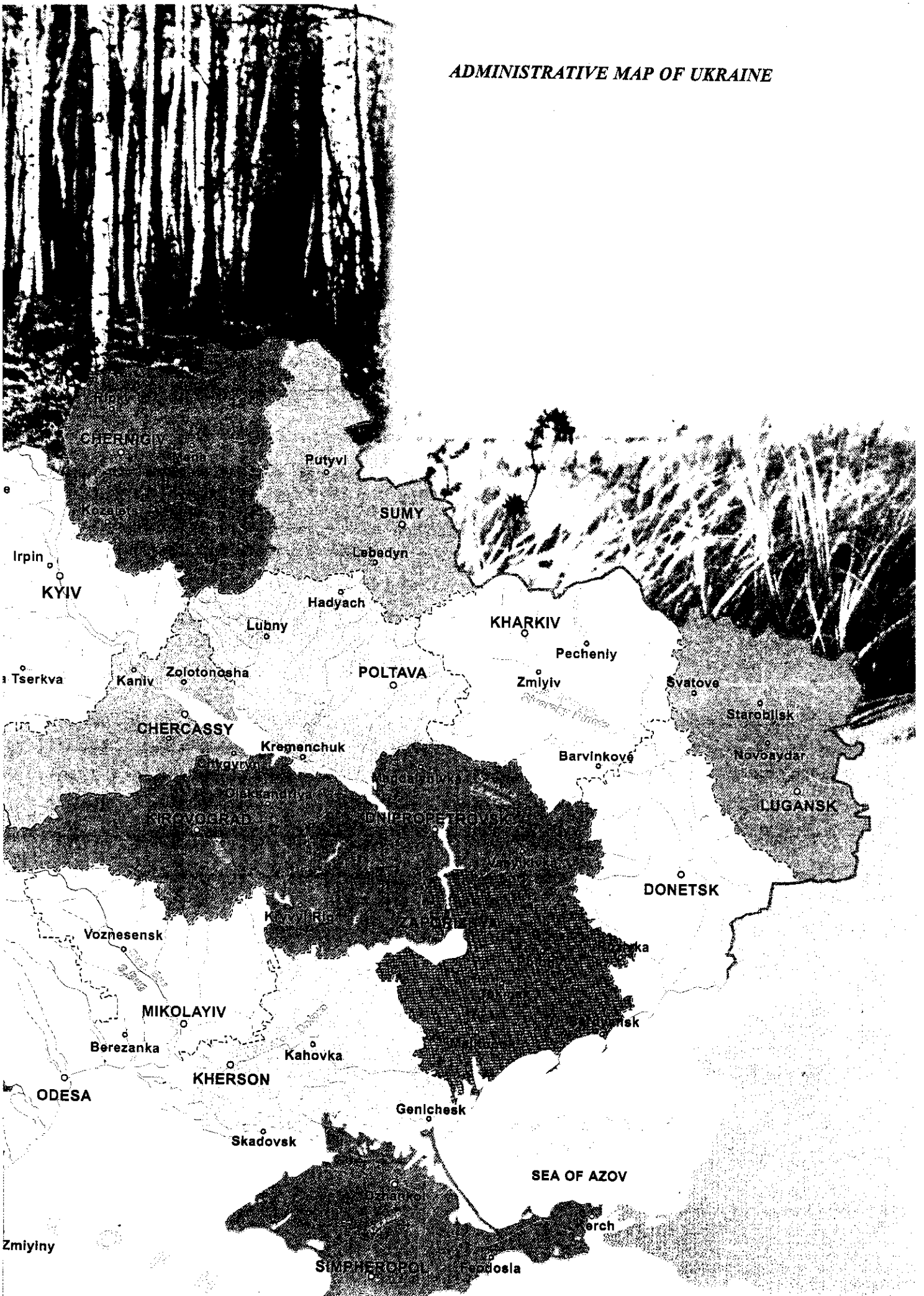
Genetic collections and gene banks at some institutes of the NASU are extremely rich and in many aspects unique. The collection of microbial cultures at the D. K. Zabolotny Institute of Microbiology and Virology contains 20,000 strains, including unique samples of phytopathogenic microflora, parasitic fungi, etc. The unique collection of cultivars, forms, hybrids, strains and lines of agricultural crops (rye, wheat, maize, sugar beet, etc.) at the Institute of Plant Physiology and Genetics contains more than 20,000 specimens and can be used for breeding and selection of the mentioned crops both in Ukraine and other countries. The gene bank (100 units), collections of recombinant DNA (200 units) and microbes-producers of medicinal substances (200 units) are created at the Institute of Molecular Biology and Genetics. The bank of cell lines at the P. E. Kavetsky Institute of Experimental Pathology, Oncology and Radiobiology contains 14,000 lines of human and animal cells; ca. 200 of these lines are unique. The Center of Genetic Resources of the V. Ya. Yur'yev Institute of Plant-Growing unites several unique collections into the integrated system of genetic resources of cultivated plants, which includes the following most important parts: – collection of field crops at the Institute of Plant-Growing (42,000 specimens); – collection of medicinal plants at the Institute of Medicinal Plants (ca. 500 specimens); – pomology collection at the Institute of Pomology (7,000 specimens); – ampelographic (grape) collection at the V. E. Tairov Institute of Viticulture and Wine Production (485 specimens). Every one of the mentioned collections is at least third in the world by its value.

The main task of the Animal Genetic Resources Bank is conservation and improvement of local breeds of cattle (Grey Ukrainian, Ukrainian Whitehead, Brown Carpathian, etc.) and their use in cattle breeding. The bank contains ca. 1,700,000 sperm doses of bulls belonging to 20 milk breeds, 10 meat breeds and more than 12 synthetic populations. The collection of rare breeds and populations of fowl [chicken] at the Institute of Fowl of the Ukrainian Agricultural Academy consists of 15 breeds, breed groups and populations. The collection of microbial strains used in wine production consists of 1,076 specimens; the Strain Bank of microorganisms of veterinarian importance unites unique collections (more than 500 specimens) into an integrated resource system. The Askania-Nova Zoo is regarded as the leading institution in the CIS countries, and one of the best ten in the world, for its practical activities, experience and theoretical achievements in acclimatization and re-acclimatization of animals. The Zoo is specialized in biology of ruminant mammals native to steppes, savannas, deserts and mountains, as well as waterfowl and rare steppe birds. The zoo keeps in captivity 3 species of large flightless birds (ostriches, emus and rheas) and 72 species of other birds, including 15 species listed in the Red Data Book of Ukraine (steppe eagle, common crane, demoiselle crane, ruddy shelduck, etc.). There are 36 species of non-native mammals (total number 900 animals), including 7 extremely rare species (370 animals), such as Przewalski's wild horse (Equus caballus), saiga antelope (Saiga tatarica), Siberian wild goat (Capra sibirica), markhur goat (Capra falconeri), desert zebra (Zebra grevyi), etc.

Thus, collections and gene banks of many research institutions, ministries and agencies are extremely important for conservation of both natural and cultivated genetic and species biodiversity. According to the "Regulations for procedure of selecting national heritage scientific objects" (1997), the State Register of such objects has been established. In 1997 the National Academy of Sciences of Ukraine and Ukrainian Agricultural Academy proposed to include into the Register additional objects (see Appendix 7).

National organization for conservation of biodiversity. To ensure implementation of the Biodiversity Convention and for coordination of activities aimed at biodiversity conservation, the special Department of Biodiversity Conservation has been created at the ministry for Environmental Protection and Nuclear Safety. The department operates under direct supervision of the Deputy Minister. For development of the Concept of Biodiversity Conservation in Ukraine (approved by Decree of the Cabinet of Ministers on 12 May 1997), preparation of the present National Report and the National Program for Biodiversity Conservation to the year 2015, an interagency coordination committee will be established in nearest future. It includes representatives of the Ministry, research institutions and NGOs. The National Coordinating Committee on conservation of biological and landscape diversity.

ADMINISTRATIVE MAP OF UKRAINE


ADMINISTRATIVE MAP OF UKRAINE
CHERNIGIV
Putyvl
SUMY
Lebedyn
Irpin
KYIV
Hadyach
KHARKIV
Lubny
Pechenly
Tserkva
Kaniv
Zolotonosha
POLTAVA
Zmiyiv
Svatove
Starobilsk
CHERCASSY
Kremenchuk
Barvinkove
Novoaydar
LUGANSK
DONETSK
Voznesensk
MIKOLAYIV
Berezanka
Kahovka
KHERSON
ODESA
Genichesk
Skadovsk
SEA OF AZOV
Zmiyiny
SIMFEROPOL
Feodosia

2.3. Financial and economic aspects

During the process of environmental and economic reforms in Ukraine, costs and payments for use of natural resources were established and financial responsibility and fees for pollution of the environment were endorsed. The partial financial support for biodiversity conservation is provided through institutions and organizations, the State Budget of Ukraine, regional and local budgets, extra-budget conservational funds (e.g., the Vidrodzhennya Foundation) and other sources. Available financial support is directed mostly to improvement of the system of protected territories, urgent measures and actions for protection and rational use of land resources, development of field-protecting forests and forest shelter belts, conservation and restoration of species and populations of plants and animals, environmental monitoring, development of information and education systems, etc. The financial support for these activities through the State Budget of Ukraine is provided with reference to available financial possibilities of the country. The Draft State Budget for 1997 secures 15,500,000 Ukrainian hryvnas (= USD 8,300,000) for the activities aimed at conservation of biodiversity in Ukraine.

2.4. Scientific and technical aspects

Conceptual background and achievements. In addition to the Biodiversity Convention, another basic document in this environmental and conservational field is the Pan-European Biological and Landscape Diversity Strategy. These international agreements and other relevant documents created the base for the Concept for Conservation of Biological Diversity in Ukraine (National Strategy), which was approved by the Cabinet of Ministers of Ukraine in 1997.

Ukrainian researchers thoroughly analyzed the biodiversity problem; in particular, their leading role was evident in developing such documents and publications as "Prospective network of protected territories", the "Green Data Book of Ukraine", floristic and faunistic inventories, taxonomic manuals of plants, fungi and animals, the "Red Data Book of Ukraine", etc. Series of monographic publications cover almost all taxonomic, ecological and geobotanical (phytosociological) aspects of Ukraine's natural world.

Informational potential. Basic knowledge about biodiversity is stored in databases of research institutions (mostly within the system of the National Academy of Sciences), in state cadastres, bulletins of the Ministry of Statistics, scientific publications (journals, books, etc.), library and archive holdings, numerous herbaria, other natural history collections, official reports, materials of ministries, other governmental agencies and non-governmental organizations, national reports on environment, etc.

Human resources and expertise. Ukraine has many possibilities to use highly qualified scientific personnel and expertise as the base for scientific justification of decisions on conservation, restoration and sustainable use of biodiversity. The process of decision-making usually involves numerous experts from academies, research and educational institutions, universities, and the State Center for Scientific and Technical Expertise at the Ministry for Science and Technology. Bodies of qualified experts also exist at almost all administrative levels. More than 20 universities and educational institutes have departments and chairs of ecological and environmental orientation.

2.5. Informational aspects, ecological education and public support

Sources of information. The state of our knowledge on species diversity of plants and fungi can be regarded as satisfactory. This is an achievement of long-term works and studies by many Ukrainian botanists and mycologists, experts in floristics and taxonomy. Results of this work are reflected in 12 volumes of the monographic "Flora of the Ukrainian SSR" (1938--1963), three editions of the "Manual of vascular plants of Ukraine", regional plant manuals for the Crimea (1982) and the Ukrainian Carpathians (1977), four volumes of the "Vegetation of the Ukrainian SSR", "Manual of fungi of Ukraine" (5 volumes in 7 books; 1967--1979), "Manual of freshwater algae" (12 volumes in 16 books; 1938--1993), publications on lichens and mosses, the prodromus of the vegetation of Ukraine, etc. The Ukrainian Botanical Journal is published starting from 1921.

Of the three basic levels of biodiversity (viz. genetic, species and ecosystem levels), the species level is the most thoroughly studied in Ukraine. Our knowledge on genetic and ecosystem levels is less detailed. The coenotic aspects of biodiversity are well understood, while the knowledge on populational aspects is unsatisfactory.

The largest herbarium collections are deposited in Kyiv (international Index Herbariorum acronyms – KW and KWHA) and Lviv (LW, LWS); the Herbarium of the M. G. Kholodny Institute of Botany of the National Academy of Sciences of Ukraine (KW, ca. 2,000,000 herbarium specimens) is among the ten largest herbaria of the world.

The monographic serial publication "Fauna of Ukraine" is devoted to the biodiversity of the animal world. It is expected to consist of 40 volumes (200 separate issues); in 1957–1997, 57 issues were published, as well as some monographs, e.g. "Nature of the Ukrainian SSR: Animal world" (1985), "Birds of Ukraine" (1984), "Mammals of Ukraine and their economic importance" (1960).

The scientific journals "Vestnik zoologii" (Monitor of Zoology) and "Hydrobiological Journal" are published starting from 1967 and 1964 respectively. The largest natural history museums in Ukraine are the National Natural History Museum of the National Academy of Sciences of Ukraine (NASU) in Kyiv, and Natural History Museum of the NASU in Lviv. The first museum (Kyiv) houses more than 200,000 specimens of vertebrates and ca. 1,500,000 invertebrate animals; the collection of tropical butterflies (Lepidoptera) is especially valuable. The Museum also has ca. 3,500 plants on exposition, including many unique and valuable specimens (plants of the Cape flora, etc.). Valuable specimens at the Lviv museum are the complete skeleton and organ fragments of the fossil mammoth and woolly rhinoceros. Among other faunistic collections, it is necessary to mention holdings of the I. I. Schmalhausen Institute of Zoology of the NASU, with more than 1,400 holotypes and up to 15,000 specimens of nomenclatural type series.

Important information on biodiversity of cultivated plants is deposited at the Central Scientific Library of the NASU, Central Scientific Agricultural Library of the Ukrainian Agricultural Academy (ca. 1,000,000 books, journals and other publications).

One of the major priorities in promoting public awareness and participation in environmental and conservational activities is availability of environmental information. To pursue this goal, The Ministry for Environmental Protection and Nuclear Safety prepares and publishes the Annual National Report on the Environment of Ukraine. Many representatives of research institutions and NGOs are involved in the preparation of the Report, which is available to anyone interested in obtaining this information.

Monitoring system. By the relevant Decree of the Cabinet of Ministers, the Statute of State Environmental Monitoring has been approved. Environmental monitoring is seen as a system of observations and data collected, processed, transferred, analyzed and stored as information on the present state of the environment, including its biodiversity components. These aspects of State monitoring are covered by the Ministry for Environmental Protection and Nuclear Safety (terrestrial and marine ecosystems), Ministry of Forestry (forests and game animals), Ministry of Agriculture and Food and the State Land Committee (agricultural lands). Basic monitoring of biota is also performed in nature and biosphere reserves and other protected territories.

According to the Law of Ukraine "On Nature Conservation Fund of Ukraine" (1992, Article 43), the main document reflecting results of observations on state and changes of natural complexes of protected territories (including their biodiversity) is the so-called Chronicles of Nature [Nature Diary].

Monitoring of waterfowl species spending winters in coastal territories and aquatories of the Black and Azov Seas is performed every year in accordance with the international program for monitoring of wild waterfowl (water birds).

Environmental and ecological education. During recent years, efforts have been made in Ukraine to involve all age groups of the population in ecological education (including biodiversity aspects). However, attention is paid principally to the ecological education of the younger generations. Almost all pre-school educational institutions provide programs for initial environmental education and basic knowledge about plants and animals. Public secondary and high schools have special obligatory courses, such as Natural History, Botany, Zoology, General Biology, etc. Schools also provide some additional programs and courses. For example, programs and teaching recommendations "The world around us" (for kindergarten level), "Human beings and the environment" (for 4th grade), "The environment and human health" (for 9th grade), reference materials on environmental education have been developed and published in the Mykolayiv Region. There are also Young Naturalist Centers in every administrative region of Ukraine. The main tasks of the Ukrainian State Ecological and Naturalistic Center, and the Little Academy of Sciences ("Youth Academy") are the development of ecological and environmental education, and the active promotion of care for the Earth. Environmental problems are discussed in some issues of the journals "Doshkilne Vykhovannya" ("Pre-School Education"), "Pochatkova Shkola" ("Elementary School"), and "Ridna Shkola" ("National School"), "Parostok" ("Seedling"), which are available at all basic educational institutions of the country.

These activities are also supported within the international project "The Blue Danube", and the programs "Ecology and Labor", "Green Halo of Ukraine", as well as projects and activities "Welfare and Beauty for Cities, Towns and Villages", "Fir-tree", "Primrose", "Spawning", "Stork", "Tulip", "Clear Spring", "Forest Pharmacy", etc.

The speciality "Ecology" has been recently added to the official List of Specialities of higher education in Ukraine. The new obligatory course "Principles of Ecology" has been added to curriculums of higher education; relevant programs and manuals have been prepared and published.

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3. GENERAL EVALUATION OF THE IMPLEMENTATION OF THE BIODIVERSITY CONVENTION IN UKRAINE: INTERNATIONAL AND NATIONAL ASPECTS, TRENDS IN BIODIVERSITY CHANGES

3.1. Conservation and protected territories

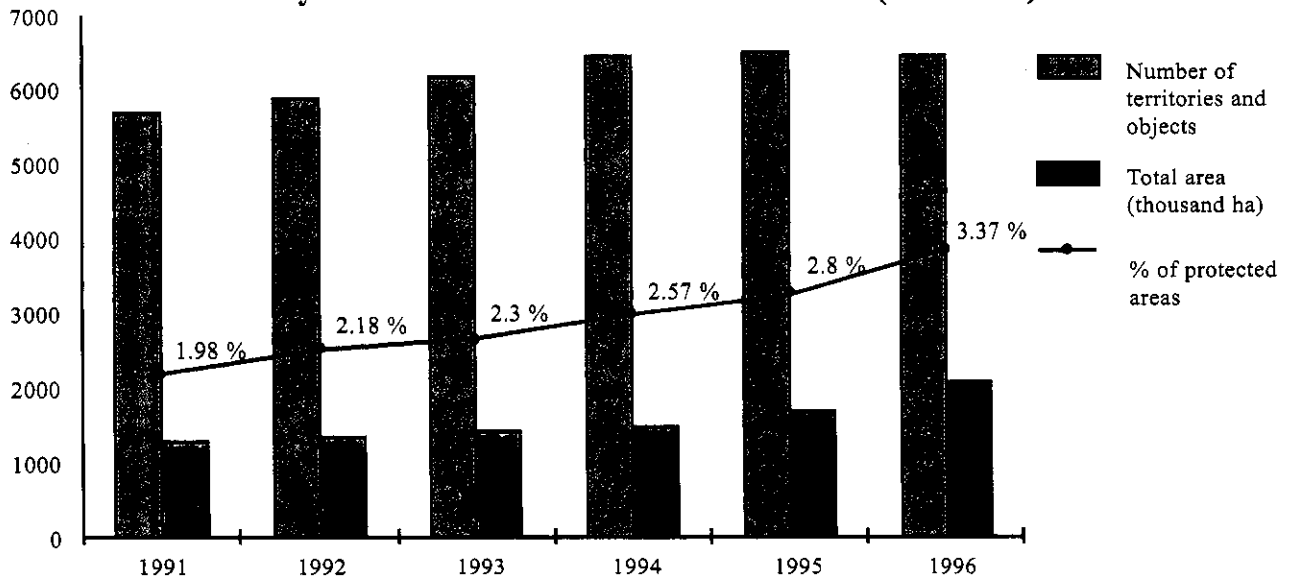
At present (data of 1 January 1997), the network of natural protected territories consists of 6572 territories and conservation objects that cover 2,037,200 ha, or 3.37% of the territory of Ukraine (see Fig. 7).

In order to expand areas of protected territories, optimize the conservational network, improve its management and prevent privatization of valuable natural objects and territories, the Program of Prospective Development of Nature Conservation in Ukraine has been adopted and the Presidential Decree "On reserving valuable natural territories for subsequent conservation" has been issued in 1994. Before that, in 1993, the Verkhovna Rada of Ukraine adopted the Resolution "On optimization of management of nature reserves and national nature parks".

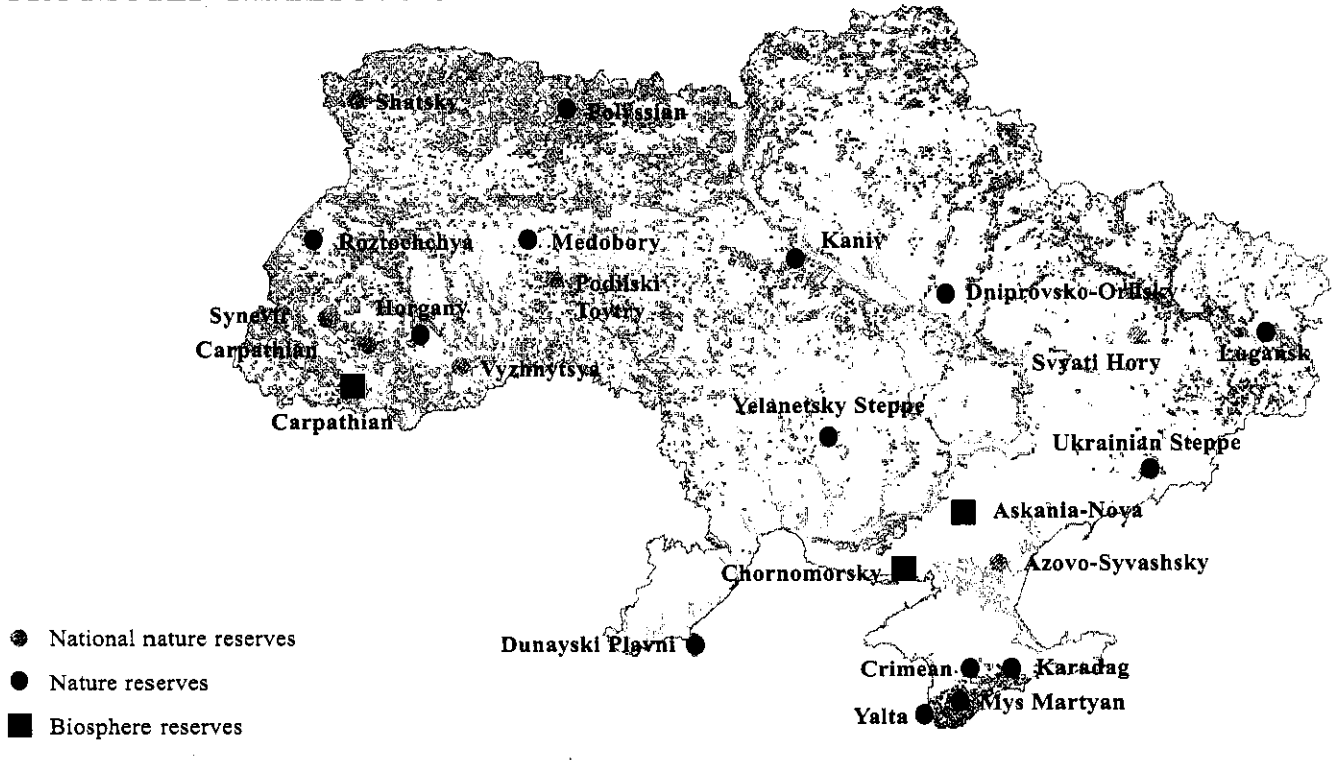
Preservation of wetlands, mires and water bodies. Water bodies and remnants of bogs and mires require special conservational attention. Moreover, Ukraine has already joined the Ramsar Convention (1996) and recognizes the country's responsibility for conservation of 22 water and wetland areas of international importance (total area 688,000 ha) in accordance with the resolution of the Cabinet of Ministers "On measures for strengthening protection of wetland and mire areas of international importance" (1995). Ukraine intends to increase the areas of protected wetlands, mire and aquatic ecosystems.

Conservation of species and populations. The measures for protection of species listed in the Red Data Book of Ukraine are actively implemented. Ukraine also participates in the implementation of the European action plans aimed at protection of 12 of 23 endangered species of birds, according to the provisions of the Bern Convention.

Dynamics of the nature conservation fund (1991-1996)



PROTECTED TERRITORIES



3.2. Sectors involved in the use of nature

Use and restoration of forest resources. Use of forest resources in Ukraine is classified into the so-called general and special use. The general use includes free access of citizens to forests, free of charge use of recreational resources, non-commercial collecting flowers, berries, fruits, mushrooms, etc.

The special use is performed by specialized forest-using bodies and includes all aspects of commercial use of forests, including timber and non-timber resources.

Restoration of forests in Ukraine is performed mostly by creating forest plantations. One half of Ukrainian forests are artificial; the percentage of artificial forests and forest plantations is especially high in the steppe zone (more than 60% of all forests in the region). In 1995 forest renovation measures involved 38,600 ha. New forests were planted in ravines, sandy areas, etc. (12,900 ha), and 1,900 ha of field-protecting forests were created. In general, 1,400,000 ha of anti-erosion forests (including 150,000 ha along banks of rivers and other water bodies) and 440,000 ha of field-protecting forest shelter belts, which protect more than 13,000,000 ha of arable lands, were created in Ukraine.

At the present stage of development of the Ukrainian society, the forestry practice is shifting from "resource-oriented" towards "biosphere-oriented" approaches. Forest ecosystems are regarded primarily as important components of the biosphere, which are crucial for stabilization and restoration of the natural equilibrium. A permanent solution lies in the sustainable use of forest resources, intensification of forest renovation, and efficient protection of forests. This will require the following measures: expanding forested areas by means of gradual estrange-

3. GENERAL EVALUATION OF THE IMPLEMENTATION OF THE BIODIVERSITY CONVENTION IN UKRAINE: INTERNATIONAL AND NATIONAL ASPECTS, TRENDS IN BIODIVERSITY CHANGES

plant resources, as well as research and practical measures aimed at renovation of populations of medicinal plants and establishment of semi-wild plantations. It is especially important for taxa listed in the Red Data Book of Ukraine, such as *Adonis vernalis* L., *Astragalus dasyanthus* Pall., *Galanthus nivalis* L., species of the genus *Pulsatilla* Mill., *etc.*, which are very important to the pharmaceutical industry.

Game hunting and measures for protection and restoration of game animals. Analysis of data on populational dynamics of main game animals during 1991–1995 (see Tab. 2) gives evidence on some stabilization of number of deer and of the largest in the world free-living population of European bison; populations of foxes and hares are growing. As compared to previous years, populations and numbers of game kills of elks and wild hogs declined.

Ukraine traditionally performs a complex of biotechnical measures for stabilization and recovery of populations of game animals (breeding in captivity with subsequent release in new and scarcely populated regions; re-introduction and acclimatization). For example, 75 ungulates and 858 fur-bearing animals, as well as 12,000 game birds (including 7,000 pheasants) were released in 1995. Unfortunately, illegal hunting and fishing (poaching) continues to increase due to such evident reasons as the worsening financial and economical situation of game land users, unsatisfactory material and technical support for nature conservation bodies, and the declining quality of living of an overwhelming majority of the country's population.

Table 2. Populational dynamics and number of game animals killed in 1991--1995

Species animals	1991		1992		1993		1994		1995	
	population (number of animals)	game kills	population (number of animals)	game kills	population (number of animals)	game kills	population (number of animals)	game kills	population (number of animals)	game kills
Elk	14796	1380	13845	1029	12194	669	10839	428	9068	211
Deer	24925	1083	23408	902	22315	936	21956	867	22673	649
Wild hog	59757	7354	58067	6554	53680	5074	49788	4433	47070	3372
Roe	172348	7396	171677	7410	161963	6382	159626	6444	157035	5208
European bison	619	12	685	8	633	8	664	16	659	7
Hare (Lepus europaeus)	1956813	350877	2036849	345574	2007725	302110	2029187	317251	2062599	309308
Fox	82881	10169	77122	11851	77460	12797	81029	16076	87086	20859

ment (reservation) of agricultural lands of low productivity with their subsequent afforestation (in areas where forests grew initially) or formation of meadows (in regions where forests were absent in the past); rational, or even restricted, use of timber and wood in the consumption sphere (to be achieved partly via optimization of the structure of forestry sector).

The main goal of these measures is to create regional protected environmental systems that will then be merged into a national network of nature conservation systems protecting a total area 6,000,000 -- 6,500,000 ha, and the well-organized ecological monitoring of natural resources and environment.

Medicinal plants. Ukraine has rich resources of medicinal plants. However, there is a measurable trend towards the decline of their populations and shrinking areas of their distribution, which is typical for most medicinal plants except some weedy species. In order to ensure preservation of medicinal plants, more than 100,000 ha were reserved and are now under protection. The proposals for establishing reservates and preserves with special regimes of use of medicinal plants are being developed. Regimes of such reservates will require limited use of

Agriculture. To prevent negative trends in land use, a draft National Program of Land Protection to the year 2010 was prepared and submitted in 1997 to the Verkhovna Rada of Ukraine. The document outlines legal, ecological and organizational aspects of the activities of the State, land owners and users regarding conservation, rational use and restoration of ecological values of lands regardless of their allocation, status, forms of ownership and modes of land use. It is planned to improve the territorial organization of agrolandscapes by means of land surveys on an area of 41,800,000 ha and to decrease agricultural use of some territories. More than 2,000,000 ha of degraded, eroded and radioactively contaminated lands will be excluded from agricultural use and then conserved by planting meadows (1,500,000 ha) and forests (ca. 600,000 ha). The system of nature territories within the agrolandscape structure will increase to the level of 5% of agricultural lands. It will be spatially integrated into agrolandscapes.

To ensure stability, sustainability and high productivity of agrolandscapes, the soil protecting system of agriculture is being

developed and implemented. Regional programs for prevention of wind and water erosion are introduced; these programs stipulate measures for prevention of degradation of landscape and biological diversity in agricultural lands, taking into consideration peculiarities of the land reform.

Fisheries, conservation and restoration of fish resources. According to the fisheries statistics, a trend towards decline of catches of fish and other marine and freshwater living organisms was observed in 1991--1995. It is caused mainly by degradation of habitats due to pollution of coastal aquatories, decline of water quality and critical levels of freshwater flow to the Black and Azov Seas. Alien marine animals also cause serious problems and threaten native species and ecosystems.

Catches of freshwater species of fish are also declining. The most important negative factors are: pollution of water bodies, inappropriate water management, insufficient control of fish populations, etc. In order to improve the situation in the fisheries, in 1994 more than 50,000,000 individuals of plant-eating fish species, 1,500,000 individuals of sturgeon, 3,200,000 young plaice, etc., were released into Ukrainian waters.

An increase of fish resources is possible only by minimizing the negative impact of man on ecological situation in water bodies and by providing necessary efficient protection of natural resources of fish and other fishery objects. Equally necessary measures include preventing industrial pollution of water and proper management of water resources.

Water resources management . In the process of water management and protection of waters, much attention is paid to restoration of the hydrologic regime of rivers (mostly small), creation of water protection zones and riverside forests, restoration and improvement of floodplain ecosystems, and increasing species diversity of plants and animals in water bodies. A whole complex of such measures and actions is being realized and implemented within the scope of the National Program for Ecological Optimization of the Dnipro River Basin and Improvement of Potable Water Quality (1997), the main activities of the State Committee of Ukraine on Water Management, and according to international programs aimed at protection and conservation of the river basins of the Danube, Western Bug, Prypyat and Desna.

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3. GENERAL EVALUATION OF THE IMPLEMENTATION OF THE BIODIVERSITY CONVENTION IN UKRAINE: INTERNATIONAL AND NATIONAL ASPECTS, TRENDS IN BIODIVERSITY CHANGES

3.3. Aspects of some specific activities

The Chornobyl catastrophe: the radioactive impact and its minimization. Because large populations of many species were subjected to considerable doses of radioactivity, it is expected that long-term results will be different from those predicted in cases of radioactive impact on small populations. The expected number of mutant forms grows proportionately to the number of individuals affected by radioactive impact. We can expect to find new strains of phytopathogenic fungi characterized by higher degrees of virulence, as indicated by preliminary results of study of some races of rust fungi parasitizing grasses. A population of Scots pine occupying an area of 1,500 ha died out because of high direct doses of radiation. Serious disruptions in the gene pools of some species are also among the expected results of the Chornobyl catastrophe. This negative impact of the catastrophe will last for a long time, and special genetic monitoring is required in order to follow and study this process.

To minimize radiation aftermaths, a large-scale deactivation of the Chornobyl zone was carried out in 1986--1987. The most affected areas were covered with a layer of sand, and then special mixtures of seeds of grasses and herbaceous plants were dispersed over the territory. A large-scale renovation of forests has been started in the Chornobyl zone in order to replace the affected forest ecosystems and agricultural plant communities. It is known that the dense vegetation cover prevents further dispersal of radionuclides and binds radioactive elements. Many experiments were performed in order to find the most active natural mineral adsorbents of radionuclides.

International cooperation. One of the necessary conditions for implementation of the Biodiversity Convention in Ukraine is the rapid integration of our country with other countries of Europe and the world involved in the processes of solving environmental problems.

After joining the Convention on Biological Diversity, Ukraine became a Party to several other important environmentally oriented conventions and treaties, such as the Convention on the Protection of the Black Sea against Pollution (1994), Bern (1996) and Ramsar (1996) Conventions. Ukraine is planning to join the Bonn Convention on Protection of Migratory Animals (1979) and corresponding agreements, which are viewed as important instruments for conservation of biodiversity of migratory animals. Ukraine is also planning to sign the Convention on International Trade in Endangered Species (CITES); Convention to Combat Desertification in the countries suffering from draught and desertification, especially in Africa; Convention on Protection and Use of Trans-border Waterflows and International Lakes. Ukraine's activity in the Council of Europe extends its abilities of cooperation with this authoritative international body, especially in implementing the Pan-European Biological and Landscape Diversity Strategy. Besides, the Carpathian Biosphere Reserve for the first time in Ukraine received in 1997 the diploma of the Council of Europe.

The shortage of available funds is the most serious serious obstacle to the proper execution of Ukraine's responsibilities as a Party of the Biodiversity Convention. The difficult financial situation in the country prevents the proper use of existing opportunities and complicates application of new instruments for conservation and restoration of biodiversity in Ukraine. Because of that, international technical and financial aid and support for implementation of concrete projects provided by international bodies and institutions (Global Environment Facility, World Bank for Reconstruction and Development, UN Environment Programme, Council of Europe, etc.) and developed countries (the USA, Canada, the Netherlands, Germany, Denmark, the United Kingdom, Switzerland, France, Austria, etc.) are especially important and greatly appreciated by our country.

With support from the Global Environment Facility and according to agreements between Ukraine and the World Bank for Reconstruction and Development, the following important biodiversity projects are being financed on the non-commercial gratis base:

Conservation of biodiversity in the Carpathians. Cost of the project: USD 500,000. Duration: 1993-1996 (project completed). The project was aimed at improving conservation of valuable Carpathian ecosystems, mostly within the Carpathian Biosphere Reserve and adjacent territories;

Biodiversity conservation in the Ukrainian part of the Danube delta. Cost of the project: USD 1,500,000. Duration: 1994--1998. The goal of the project is optimization of natural resources management in the Danube delta area, and extension

of the territory of the Nature Reserve "Dunaiski Plavni" and its transformation into a Biosphere Reserve;

"Preparation of the National Strategy/Action Plan and National Report on Conservation of Biological Diversity". Cost of the project: USD 112,000. Duration: 1997--1998. The goal of the project is to help the Ministry for Environmental Protection and Nuclear Safety in its activities for preparation and publication of the mentioned documents.

Biodiversity problems are constituent parts of the international program "Management and protection of the Black Sea" supported in part by the Global Environment Facility via UNDP and involving countries of the Black Sea region, including Ukraine.

Ukrainian experts, in cooperation with the IUCN, participated and continue to participate in the projects "Conservation and wise use of forests in Central and East Europe" (1995--1996) and "Sustainable agriculture and biodiversity conservation in the steppe zone of Russia and Ukraine" (1996--1998).

Public support and major events after ratification of the Convention on Biological Diversity by Ukraine. The Convention on Biological Diversity has been ratified by the Verkhovna Rada (Parliament) of Ukraine on 29 November 1994. During 1995-1997, several national and international scientific and public seminars devoted to many aspects of biodiversity conservation were held, e.g., a special session of the Council of Botanical Gardens of Ukraine "Botanical gardens as centres of biodiversity conservation" (Yalta, July 1995), the regional Conference of the European Program of IUCN (Kyiv, May 1995). Establishing the National Steering Committee (chairman: I. F. Kuras, Vice Prime Minister of Ukraine) for coordinating activities during the European Nature Conservation Year 1995 (ENCY-95) also promoted the implementation of provisions of the Biodiversity Convention in Ukraine. Much organizational work has been done by the Ministry for Environmental Protection and Nuclear Safety, especially in the fields of development of the legal aspects (see Appendix 1), institutional support and practical measures and actions. In particular, the Board of National Nature Parks and Preservation has been established within the system of the Ministry. That resulted in improvement of conservation activities; e.g., more than 1 million ha of land was reserved for nature conservation object and territories. Much work has been done also by environmental NGOs. For example, the public association "Zelena Ukraina" ("Green Ukraine") of the National Ecological Centre in close cooperation with other NGOs (Ukrainian Society for Nature Conservation, UkrUNEPCOM, etc.) organized several seminars: "Green Basis" (December 1995), "Ecological and educational importance of protected natural territories" (November 1996), "Convention on Biodiversity: public awareness and participation" (January-February 1997). These seminars were supported by the Ministry for Environmental Protection and Nuclear Safety of Ukraine and Embassies of some countries to Ukraine (the Netherlands, the United Kingdom, Austria). The Ministry supervises the implementation of the Biodiversity Convention in Ukraine in close contact and cooperation with the Committee of Verkhovna Rada on Environmental Policy, the Administration of President of Ukraine, and the Cabinet of Ministers of Ukraine, as well as with other central and local administrative bodies, ministries and governmental agencies (Ministries of: Forestry; Fishery; Agriculture and Food; Finance; National Economy; Foreign Affairs; Justice; Education; Science and Technology; Culture; state committees, etc.), research institutions, users of natural resources, the Public Environmental Council, etc. By the resolution of Mr. I. Kostenko, Minister for Environmental Protection and Nuclear Safety of Ukraine, the Inter-Agency Co-ordination Commission on Conservation of Biological and Landscape Diversity has been created in December 1996. This Commission consists of representatives of relevant ministries, agencies, research institutions and NGOs, as well as independent experts and scientists.

Ukraine meets the obligations placed upon her by the Convention on Biological Diversity. The main national concepts and activities in this sphere were developed on the base of critical re-evaluation of national policy and practice and study of relevant international experiences with active public support and scientific expertise. This document has been prepared by the Ministry for Environmental Protection and Nuclear Safety of Ukraine with participation of central legislative and administrative bodies, scientific institutions and NGOs, and independent experts. The National Report has been approved by participants to the International Conference "5 years after Rio" (Eupatoria, 10--12 June 1997), following the initiative of the Ukrainian Committee for Support of UNEP (UkrUNEPCOM).

The next essential steps in this direction will be the following:

- preparation of the National Program for Biodiversity Conservation and its approval by the Verkhovna Rada (Parliament);
- strengthening institutional, scientific, legal, financial, technical, educational and informational base for further development of activities aimed at biodiversity conservation;
- urgent actions for conservation, protection and recovery of plant and animal species, especially endangered and threatened ones;
- development of the national EcoNet and providing links with ecological networks of adjacent countries and development and implementation of inter-agency projects for conservation of biodiversity in regions of special value and national and international importance in sustainable manner;
- further development of the conservational practice based on multifunctional principles instead of the principle of absolute protection; urgent measures aimed at reservation of valuable natural territories for their subsequent conservation and exclusion from privatization;
- development of scientific research, optimization of the monitoring system, including inventories of natural resources, their cadastres using databases and GIS;
- further development of the system of environmental education; strengthening the public awareness, public support; improving availability of information.

Ukraine understands its role and responsibility and will pursue the conservation and sustainable use of biodiversity in recognition of our national interests and international obligations and responsibilities.

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APPENDICES

List of basic legal acts and documents on biodiversity conservation in Ukraine

- The Law of Ukraine "On protection of environment" (25 June 1991).
- The Land Code of Ukraine of 13 March 1992.
- The Law of Ukraine "On Nature Conservation Fund of Ukraine" (16 June 1992).
- The Law of Ukraine "On the animal world" (3 March 1993).
- The Forest Code of Ukraine of 21 January 1994.
- The Mineral Resources Code of Ukraine of 27 July 1994.
- The Law of Ukraine "On ecological expertise" (9 February 1995).
- The Law of Ukraine "On Exclusive Marine Economic Zone of Ukraine" (16 May 1995).
- The Water Code of Ukraine of 6 June 1995.
- The Resolution of the Verkhovna Rada (Parliament) of Ukraine "On the Red Data Book of Ukraine" (29 October 1992).
- The Resolution of the Verkhovna Rada (Parliament) of Ukraine "On the Program for Further Development of the Nature Conservation in Ukraine" (22 September 1994).
- The Decree of the President of Ukraine "On creation of the Azovo-Syvashsky National Nature Park", No. 62/93 of 25 February 1993.
- The Decree of the President of Ukraine "On preservation and further development of the Nature Conservation Fund of Ukraine", No. 361/93 of 8 September 1993.
- The Decree of the President of Ukraine "On biosphere reserves in Ukraine", No. 563/93 of 26 November 1993.
- The Decree of the President of Ukraine "On the National Research Program and use of resources of the Azov and Black Seas basin and other regions of the World Ocean to the year 2000", No.595/93 of 16 December 1993.
- The Decree of the President of Ukraine "On reservation of valuable natural territories for their subsequent conservation", No.79/94 of 10 April 1994.
- The Decree of the President of Ukraine "On creation of nature reservates of national importance", No. 750/94 of 10 December 1994.
- The Decree of the President of Ukraine "On creation of the Vyzhnytsky National Nature Park", No. 810/95 of 30 August 1995.
- The Decree of the President of Ukraine "On creation of the Podilsky Tovtry National Nature Park", No. 474/96 of 27 June 1996.
- The Decree of the President of Ukraine "On creation of the Yelanetsky Steppe Nature Reserve", No. 575/96 of 17 July 1996.
- The Decree of the President of Ukraine "On organization of nature conservation territories and objects of national importance", No.715/96 of 20 August 1996.
- The Decree of the President of Ukraine "On creation of the Svyati Hory (Holy Mountains) National Nature Park", No. 135/97 of 13 February 1997.
- The Decree of the President of Ukraine "On extending the territory of the Carpathian Biosphere Reserve", No. 325/97 of 11 April 1997.

Participation of Ukraine in international conventions and agreements on biodiversity conservation

1. Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention)	Paris, 1972; ratified in 1988
2. Convention on Conservation of Marine Living Resources of Antarctica	Geneva, 1958; joined in 1994
3. Convention on Biological Diversity	Rio de Janeiro, 1992; ratified in 1994
4. Convention on the Protection of the Black Sea against Pollution	Bucharest, 1992; ratified in 1994
5. International Convention on Conservation of New Breeds of Plants	Paris, 1961; joined in 1995
6. Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention)	Ramsar, 1971; joined in 1996
7. Convention for the Protection of Wild Fauna and Flora and Natural Habitats in Europe (Bern Convention)	Bern, 1979; joined in 1996
8. Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, or Washington Convention)	Washington, DC., 1973; to be joined
9. Convention for the Protection of Environment of the Danube Basin	Sofia, 1994; signed in 1994, to be ratified
10. Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention)	Bonn, 1979; to be signed and ratified
11. Agreement on the Conservation of Bats in Europe	Bonn, 1991; to be signed and ratified
12. Agreement on the Conservation of African-Eurasian Migratory Waterbirds	Hague, 1995; to be signed and ratified
13. Agreement on the Conservation of Whales and Dolphins of the Black and Mediterranean Seas and Adjacent Regions of the Atlantic	Monaco, 1996; to be signed and ratified

Network of nature reserves, biosphere reserves and national nature parks in Ukraine

Name	Established	Area (ha)
Biosphere reserves		
F. E. Falz-Fein "Askania-Nova" Reserve	1898	33307
Chornomorsky (Black Sea Reserve)	1927	87348
Carpathian	1968	63245
Nature reserves:		
Crimean	1923	44175
Kaniv	1925	2027
Ukrainian Steppe	1961	2764
Lugansk	1968	1608
Polyssian	1968	20104
Yalta	1973	14523
Mys Martyan	1973	240
Karadag	1979	2855
Dunaiski Plavni (Danube Delta)	1981	14851

Назва	Established	Area (ha)
Nature reserves:		
Roztochchya	1984	2080
Medobory	1990	10455
Dniprovsko-Orilsky	1990	3766
Yelanetsky Steppe	1996	1700
Horhany (Gorgany Range)	1996	5300
National nature parks:		
Carpathian	1980	50300
Shatsky	1983	32515
Synevirsky (Synevir Lake)	1989	40400
Azovo-Syvashsky	1993	54000
Vyzhnytsya	1996	7900
Podilski Tovtry	1996	261300
Svyati Hory (Holy Mountains)	1997	40600

Name	Established	Area (ha)	Number of species and cultivars
[illegible]	[illegible]	5,5	1,700
[illegible]	[illegible]	[illegible]7,9 (876,6 with branches)	15 000
[illegible]	[illegible]	22,5	10 000
[illegible]	[illegible]	3,5	1,300
[illegible]	[illegible]	16	2
[illegible]	[illegible]	[illegible]	1,200
[illegible]	[illegible]	[illegible]	3000
[illegible] Garden, [illegible] Region	1930	[illegible]	[illegible]
[illegible] culture	1933	[illegible]	[illegible]
[illegible] Garden, Kyiv	1936	[illegible]	[illegible]
[illegible]	1946	[illegible]	[illegible]
[illegible]	1965	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

[redacted]

Major arboreta (dendrological parks) of Ukraine

Dendrological parks	Established	Area (ha)	Number of species and cultivars
Sofiyivka (Sophiyivka)	[illegible]	[illegible]	[illegible]
Trostyanetsky	[illegible]	[illegible]	[illegible]
Syretsky	[illegible]	[illegible]	[illegible]
Arboretum of Chernivtsi University	[illegible]	[illegible]	[illegible]
Askania-Nova	1887	[illegible]	[illegible]
Veseli Bokovenki	1893	[illegible]	800
[illegible]	1912	[illegible]	800
[illegible]	1956	56	[illegible]
Vysokogirny	1967	100	200
Rudkivsky	1967	59	280
Druzhba	1970	10	2000
Dibrova	1972	8	300
Horostkivsky	1972	18	1500
Ustymivsky	1983	8,9	470

[redacted]

Zoos of Ukraine

Zoo	Established	Area (ha)	Total number of animals	Number of species
Kharkiv	1895	22,0	1000	240
Askania-Nova	[illegible]	2300,0	5400	[illegible]
Mykolayiv	[illegible]	[illegible]	2000	300
[illegible]	[illegible]	[illegible]	2500	[illegible]
[illegible]	[illegible]	[illegible]	1500	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

List of scientific objects of the Ministry for Environmental Protection and Nuclear Safety of Ukraine (MEP), the National Academy of Sciences of Ukraine (NASU) and Ukrainian Agricultural Academy (UAA) proposed for inclusion into the State Register of Natural Heritage Scientific Objects

Name of object	Responsible institution
1. Carpathian Biosphere Reserve	MEP
2. Nature Reserve Yelanetsky Steppe	MEP
3. Nature Reserve Horhany (Gorgany)	MEP
4. National Nature Park Synevir	MEP
5. National Nature Park Vyzhnytsky	MEP
6. National Nature Park Podilsky Tovtry	MEP
7. National Nature Park Svyati Hory (Holy Mountains)	MEP
8. Carpathian National Nature Park	MEP
9. Ukrainian Steppe Nature Reserve	NASU
10. Chornomorsky (Black Sea) Biosphere Reserve	NASU
11. Nature Reserve "Dunayski Plavni"	NASU
12. Lugansk Nature Reserve	NASU
13. Karadag Nature Reserve	NASU
14. Dendrological Park Oleksandriya (Alexandria)	NASU
15. Dendrological Park Sofiyivka (Sophiyivka)	NASU
16. Dendrological Park Trostyanets	NASU
17. Collections and expositions	National Natural History Museum, Kyiv
18. Collections of cultivars, hybrids, lines and strains of agricultural crops	Institute of Plant Physiology and Genetics NASU
19. Herbarium, collections and expositions	State Natural History Museum NASU, Lviv
20. Dolphinarium	A. A. Kovalevsky Institute of Biology of Southern Seas NASU
21. Collection of plants (KW Herbarium)	M. G. Kholodny Institute of Botany NASU
22. Greenhouses, herbarium and living collections	M. M. Hryshko Central Botanical Garden NASU
23. Greenhouses, herbarium and living collections	Donetsk Botanical Garden NASU
24. Greenhouses, herbarium and collections	Kryvyi Rig Botanical Garden NASU
25. Collection of microbial cultures	D. K. Zabolotny Institute of Microbiology and Virology NASU
26. Gene bank, collection of recombinant DNA, collection of microbes-producers of medicinal substances	Institute of Molecular Biology and Genetics NASU
27. Cryobank of biological objects	Institute of Problems of Cryobiology and Cryomedicine NASU
28. Bank of cell lines	P. E. Kavetsky Institute of Experimental Pathology, Oncology and Radiobiology NASU
29. Bank of cell lines	O. O. Bogomolets Institute of Physiology NASU
30. F. E. Falz-Fein Biosphere Reserve "Askania-Nova"	UAA
31. Arboretum	State Nikita Botanical Garden UAA
32. Center of plant genetic resources	V. Ya. Yur'yev Institute of Plant-Growing UAA
33. Collection of microbial strains for wine production	The "Magarach" Institute of Grape and Wine UAA
34. Bank of microbial strains of veterinarian importance	Institute of Veterinary UAA
35. Bank of animal genetic resources	Institute of Animal Breeding and Genetics UAA
36. Collection of rare breeds of chicken	Institute of Fowl Breeding UAA
37. Biotechnology complex	Institute of Selection and Genetics UAA