Biodiversity Assessment for Ukraine

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(BIOFOR)

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Chemonics International Inc.
Washington, D.C.
and
Environment International Ltd.
Seattle, Washington

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TABLE OF CONTENTS

Acronyms		i
Executive Summary		iii
SECTION I	INTRODUCTION	1
SECTION II	STATUS OF BIODIVERSITY	3
	A. Overview	3
	B. Major Landscapes and Ecosystems	4
	C. Species Diversity	8
	D. Threats to Biodiversity	11
SECTION III	STATUS OF BIODIVERSITY CONSERVATION	15
	A. Protected Areas	15
	B. Conservation Outside of Protected Areas	17
	C. Ex-situ Conservation	19
SECTION IV	STRATEGIC AND POLICY FRAMEWORK	21
	A. Policy Framework	21
	B. Institutional Framework	22
	C. Legislative Framework	25
	D. International Biodiversity Conservation Projects	28
SECTION V	USAID/UKRAINE	31
	A. Impacts of USAID Program on Biodiversity	31
	B. Recommendations to USAID/Kiev, Ukraine	34
SECTION VI	FINDINGS AND RECOMMENDATIONS	37
	A. Summary of Findings	37
	B. Recommendations for Improved Biodiversity Conservation	39
ANNEX A	SECTIONS 117 AND 119 OF THE FOREIGN ASSISTANCE ACT	A-1
ANNEX B	SCOPE OF WORK	B-1
ANNEX C	CONTACTS	C-1
ANNEX D	MAP OF MAJOR VEGETATION TYPES IN UKRAINE	D-1
ANNEX E	LIST OF ENDANGERED SPECIES FOR UKRAINE: IUCN RED DATA BOOK	E-1
ANNEX F	MAP OF PROTECTED AREAS IN UKRAINE	F-1
ANNEX G	BIBLIOGRAPHY	G-1

ACRONYMS

BIOFOR	Biodiversity and Sustainable Forestry
CITES	Convention on International Trade and Endangered Species
ECC	Ecological and Culture Center
EIA	Environmental Impact Assessment
GEF	Global Environmental Facility
GIS	Geographic Information Systems
IQC	Indefinite Quantity Contract
IUCN	International Union for the Conservation of Nature
MoE	Ministry of Ecology and Natural Resources
NGO	Nongovernmental Organization
SAP	Strategic Action Programme
SFC	State Committee on Forestry
SME	Small and Medium Enterprises
SO	Strategic Objective
ULCRM	Ukrainian Land and Resources Management Center
UNDP	United Nations Development Programme
UTOP	Ukrainian Society for the Protection of Birds

Executive Summary

The Kyiv Regional USAID Mission initiated an assessment of the Regional Program's adherence to legislative guidelines for the protection of natural resources and biological diversity as prescribed in the Foreign Assistance Act (22 CFR 216) and subsequent amendments (Sec. 117 and Sec. 119). The Regional Mission contracted Chemonics International through the Biodiversity, Sustainable Forestry and Climate Change IQC ("BIOFOR") to undertake this assessment between April and July 2001. The project team included a local expert and two international specialists working in Ukraine for three weeks. A third international expert joined them for the final week. This report is based on review of available literature, discussions with USAID staff, interviews with government and non-government stakeholders, visits to field sites, and the experience of the team members.

The scope of work required the team to synthesize and analyze existing information and prepare a report that: (i) describes major ecosystems and species diversity of Ukraine; (ii) identifies key landscape features for the conservation of biodiversity; (iii) describes current and potential threats to biodiversity conservation; (iv) analyzes policies, land use practices, and obstacles to biodiversity conservation; (v) assesses national conservation policies, strategies, commitments to international conventions, and management capacities; (vi) assesses the USAID program's potential impact on biodiversity; and (vii) identifies potential USAID opportunities to support biodiversity conservation.

Major findings of the assessment include:

1. Biodiversity in large parts of Ukraine was systematically erased during the Soviet era, largely to make way for agriculture. Steppe and wetland ecosystems (meadows and marshes) were particularly hard hit. Land conversion activities and dams have seriously impacted biodiversity of rivers, the Black Sea and the Sea of Azov.

2. The protected area system is inadequate. A few large reserves are well managed, while many small reserves are "paper parks."

3. Enforcement of laws and regulations are often inadequate. Data and information are mostly inadequate to determine the condition of biodiversity or to support environmental review in Ukraine. Poorly regulated hunting of game species and uncontrolled collecting of wild plants are serious threats to declining population of native species.

4. Conservation programs at the local level are energized and dynamic but suffer from inadequate capacity and authority to manage natural resources. The NGO community is often too weak to be an effective partner with government and industry to address biodiversity and natural resources issues.

USAID's program in Ukraine focuses on governance and economic issues so is not expected to have a large effect on biodiversity. USAID's past activities in Ukraine have likely had an overall positive influence on biodiversity. Future programs provide even greater opportunities to assist Ukraine to better protect and manage biodiversity, but also introduce risks for negatively impacting biodiversity.

The greatest risks of negative impacts resulting from USAID programs are related to rural land privatization and to the energy program. If changes in the energy sector result in increased energy costs, people may increase the rate of forest harvest to provide winter heating fuel. USAID's assistance to the government's land titling program could contribute to changes in land management practices, including loss of native steppe and wetlands. Furthermore, increasing the number of landowners adds a new burden to regulators and land managers, and presents new hurdles for creation of protected areas. However, too little information is available to accurately predict what effect the program may have or to monitor actual impacts

Ongoing programs of USAID have significant potential to positively impact biodiversity, including within the context of the land titling project. The Small and Medium Enterprise Program could target support to businesses that provide environment benefits in farm communities, such as nurseries selling native tree and shrub stock for use in shelterbelts. Incentives, technology and training directed to farmers could be structured to encourage diversity of crops and shelterbelts, and use low-till methods and less toxic modern chemicals. Efforts to strengthen local governments could be extended to the village level and address issues of small protected areas and biodiversity in general. Efforts to increase NGO participation in environmental issues can have far-reaching positive impacts on biodiversity. The EcoLinks program should continue to help to industry reduce discharges, thereby improving habitat in rivers and the Seas. Cross-cutting initiatives that apply several of these components in the same geographic areas would have the greatest positive impacts on natural resources and the environment.

Activities for USAID – Ukraine to consider incorporating into their programs include:

1. Analyze the impacts of rural land privatization on biological and forestry resources and to identify the best opportunities for improving biodiversity conditions on new small farms. The recent experience in Moldova would provide a useful case study. Within the Land Titling Initiative, develop a monitoring program to assess changes to the landscape and land management practices that impact biodiversity. Provide land title surveyors and village land use planners with training to identify important biodiversity features.

2. Establish pilot programs to improve natural resources management on new private farms and communal lands through integrated components of USAID's strategic objectives. Goals should include reduced soil erosion, proper use of modern chemicals, protection of streamside buffers, and a more biologically diverse landscape. Encourage market-based environmental values, such as certified forest products and organic produce.

The assessment provides general observations and recommendations for the government of Ukraine and other biodiversity conservation stakeholders. These include: (i) Increase protection

of the most threatened ecosystems; (ii) Improve biodiversity in the farm landscape; (iii) Increase the transparency of land use decision-making; (iv) Train surveyors and land use planners to identify environmentally sensitive resources and provide them with maps and other tools to locate and monitor these resources; (v) Study the effects of land privatization on biodiversity; (vi) Create a biodiversity information clearinghouse; (vi) Expand reforestation programs to protect watersheds and to improve biodiversity along streams. Reduce urban, industrial and agricultural impacts on rivers and the Seas.

SECTION I

Introduction

This biodiversity assessment for Ukraine addresses legislative guidelines for the protection of natural resources and biological diversity as prescribed in the Foreign Assistance Act (22 CFR 216) and subsequent amendments (see Annex A, Sec. 117 and Sec. 119). The Regional Mission contracted Chemonics International Inc. through the Biodiversity, Sustainable Forestry and Climate Change IQC (BIOFOR) to undertake biodiversity assessments in Ukraine.

The scope of work (see Annex B) requirements to be met included fielding a team to investigate, synthesize, and analyze existing information on the status of biodiversity. This information was to be made into a report that:

- Describes major ecosystems, species endemism, and key habitats;
- Identifies key landscape features and areas for the conservation of biodiversity;
- Collates information on endangered and threatened species;
- Describes current and potential threats to biodiversity conservation;
- Analyzes policies, land use practices, pest/contamination sources, and transboundary obstacles to biodiversity;
- Assesses national conservation policies, strategies, conventions, and protected area management capacities;
- Identifies bilateral, multilateral, and U.S. government efforts that support or significantly affect biodiversity conservation;
- Assesses the USAID program's potential impact on biodiversity;
- Identifies potential USAID opportunities to support biodiversity conservation.

The biodiversity assessments in Ukraine included an in-country mission from April 17 to May 5, 2001 and from May 18 to May 30, 2001. Local experts supported two international specialists in each of the study countries and a third international expert was fielded to support the team's development of conclusions and recommendations. The team working on the Ukrainian assessment included the following:

- Richard Warner — team leader/natural resources management specialist
- Aron Borok — natural resources and institutional development specialist
- David Gibson — natural resources management specialist/BIOFOR project manager

- Ivan Rusev, Ph.D. — Ukrainian biodiversity specialist

The team conducted an extensive document review and held a large number of interviews with a wide range of government and NGO biodiversity experts (see Annex C for a list of people contacted). In addition to extensive interviews with stakeholders in Kyiv, the team met in Odesa with oblast (territorial) agencies, other governmental institutions, and NGOs. The team also visited the Danube Delta Biosphere Reserve, Askania-Nova Biosphere Reserve, and the Carpathian National Park, which allowed them to experience firsthand many of the major landscapes and biomes in Ukraine and three of the most important types of protected areas.

Due to time constraints, no original research was conducted. Although the team sought to maximize the use of available and accurate, quantitative data, the assessment depended largely on secondary research. The National Report of Ukraine on Conservation of Biodiversity (National Report) was a major source of information for this assessment report.

The authors wish to thank those individuals interviewed in the course of the study and the many experts who provided information to the recent Biodiversity Conservation National Strategy and Action Plan and other reports that facilitated this assessment.

SECTION II

Status of Biodiversity

A. Overview

Ukraine has an area of 603,550 km^2 with a population of approximately 49.1 million. It is the second largest country in area in Europe. Ukraine shares borders with Russia, Belarus, Poland, Slovakia, Hungary, Romania, and Moldova. A 2,800km coastline along the Black Sea and Sea of Azov distinguish Ukraine's south border. Ukraine is in the temperate zone with the exception of a narrow band of the south Crimean coast, which is submediterranean.

There are seven major physiographic landscapes and aquatic ecosystems in Ukraine (Annex D, map 1; adapted from Losekoot, 1998), as follows:

1. Polessia - lowland woody bogs and marshes in the far north of the country
2. Forest-steppe in the west and central portion
3. Steppe in the south
4. Carpathian Mountains in the west
5. Crimean Mountains in the far south
6. Black Sea and Sea of Azov
7. Freshwater systems, including rivers, lakes, and marshes

This report reviews the status of biodiversity at the scale of these landscapes and ecosystems when the available data support such analysis. In some cases the report treats forests in greater depth, because more information is available about forests. It is important to recognize that these landscapes or physiographic provinces are too broad to meet the minimum requirements for land use planning or design and management of individual projects and programs. For example, the National Report of Ukraine of Conservation of Biological Diversity (1997) says there are 53 vegetation formations of bogs and mires, 54 of meadows and 39 of steppe. These variations result from differences in soils and climate among other factors. Each of these formations has a different suite of species, often including some species not found on other formations of the same landscape. The Green Data Book of Ukraine (1987, http://www.grida.no/enrin/biodiv/biodiv/national/ukraine/legis/l2_4.htm) describes 126 rare plant communities. Conservation of biodiversity requires attention at least to the scale of these formations and plant communities.

Information about the extent and condition of biodiversity in Ukraine is poorly developed in comparison to other European countries. While descriptions of plant communities and catalogs of species exist, they are not easily found, synthesized and applied by decision-makers. Information is poorly developed even at the scale of species. For example, the first country-specific field guide is being developed specific to birds; national field guides for other species groups are nonexistent. Information about ecosystem and genetic biodiversity is scant and scattered, although it seems that recently more attention is being given to an ecosystem approach to biodiversity protection. Critically important is the dearth of information on prior land uses and pre-20th century biodiversity against which current conditions can be adequately benchmarked.

The Crimea is a notable exception to the information problem in Ukraine. A project funded by USAID through the Biodiversity Support Program (1999) collected and aggregated biodiversity information for conservation priority-setting in Crimea. Data used in the project were at a scale appropriate for many applications related to conservation and land-use planning. However, it should be noted that even the Crimea project faced inadequate data in some thematic and geographic areas, and that more detailed, site-specific data are often needed for delineating sites and managing biodiversity. The Crimea report uses seven habitat zones and three sub-habitats for assessing biodiversity status and setting conservation priorities (Annex D, map 2). By comparison, this assessment recognizes only two landscapes in the same area.

Unfortunately, information is not available or sufficiently well organized for a more detailed assessment within the scope of this project or most other projects in Ukraine. The lack of useable information about biodiversity is a significant handicap for land use planing, environmental regulation, biodiversity conservation and monitoring programs in Ukraine.

B. Major Landscapes and Ecosystems

B1. Polessia

The polessia region was mostly glaciated during last ice age. Biodiversity in the polessia region is representative of a landscape region that extends far to the north. The native forests are dominated by mixed coniferous (e.g., pines) and broadleaf species (e.g., oaks, hornbeam). Swamps and wetlands are diverse in the polessia region. Sedges (*Carex spp.*) and mosses dominate many wetlands. Specialized wetlands, such as fen mires that depend on constant flow of ground water, harbor many unusual and rare species. Peat can accumulate to a depth of 12 meters below some wetlands. One of the largest, intact wetlands in Europe is found in the polessia region along the Pripyat River in Ukraine and adjacent Belarus. Deforestation (some replanted with non-native species), draining of wetland and harvesting of peat have converted substantial land areas to agriculture and other managed landscapes.

The Chornobyl catastrophe mostly impacted the polessia region. The influence on biodiversity of the radioactive pollution stemming from the Chornobyl disaster is not completely clear. The initial disaster certainly had a harmful effect on the biodiversity of the exclusion zone. Almost 2.2 million ha land were radioactively contaminated. Due to the lack of recent human interventions, however, many species and ecosystems are recovering in the exclusion zone. While the level of radioactive nucleotides remains very high in many plant species, fungi, fruit and other non-timber products, and will remain contaminated for the foreseeable future, there is some speculation that the timber within the area is relatively “clean” and harvests could begin within the decade.

B2. Forest-Steppe

The original vegetation of the forest-steppe region was a mosaic of broadleaf forests and open grasslands. Wetlands were fairly common along the rivers and streams. Oaks (*Quercus petraea*, *Q. rubra*, *Q. pedunculata* and others), basswood (*Tilia tomentosa*), poplar (*Populus sp.*), cherry (*Prunus spinosa*), maples (*Acer sp.*), beach (*Fagus sylvantica*), hornbeam (*Carpinus betulus*), willow (*Salix spp.*) and occasionally other species dominated the native forests. The grasslands

harbored a rich variety of grasses (including *Stipa spp*., *Festuca spp*., *Deschampsia sp*., *Bothriocloa sp*. and *Festuca sp*.) and flowering herbs, such as sage (*Artemisia spp*.). The soils of the forest-steppe are generally deep and rich (often chornozems) ideal for agriculture once the native vegetation was removed.

While reliable data were not found to describe the historical lose of natural vegetation or the current rate of lose, it is apparent that the vast majority of native forest-steppe vegetation has been eliminated to make way for agriculture and managed forests.

B3. Steppe

The steppe region is predominately characterized by grasslands growing on fertile chornozem soils. The original vegetation was predominately grasses and diverse flowering herbs with species composition similar to that described above for the grasslands of the forest-steppe region. The few forests in the region grew along the rivers and swales where moisture would accumulate. Wetlands and wet meadows occurred primarily along the rivers and stream. The steppe region in Ukraine and throughout its range (Southern Moldova, Southern Ukraine and adjacent Russia) has been so intensively converted to agriculture that few remnants of the original vegetation can be found today.

At the beginning of the second millennium A.D., it was estimated that steppe lands covered 32 percent of Ukraine, roughly 20,000,000 ha. *Photo by D. Gibson*.

Reliable data on the status of steppe vegetation today is not available. The National Report (1998) states that the "real state of grass ecosystems often remains insufficiently studied." Opinions of scientists familiar with steppe suggest that less than 1 percent (ca. 200,000 ha) of virgin steppe is found in Ukraine today. Furthermore, intensive grazing and mowing for hay has seriously degrade nearly all remaining steppe, including much of the steppe in "protected areas." Of the landscape systems discussed here, true steppe has suffered the greatest decline in Ukraine and throughout its range.

The largest protected areas of steppe in Ukraine are the 11,000-ha tract in the Askania-Nova Biosphere Reserve in Kherson Oblast and several tracts totaling 2,764 ha of the Ukrainian Steppe Nature Reserve in Donetsk Oblast (though not all of this is native steppe). Important tracts of native steppe are also found in Crimea. Most native steppe in Donetsk and Crimea is regularly grazed and perhaps mowed for hay, interventions that change the character of the vegetation. It is noteworthy that the Biodiversity Support Program (1999) study singled out a 324-hectare tract of steppe as a high priority for conservation, stating "the area has the only remaining steppe communities in the central part of the Peninsula." Most other fragments of native steppe are neither mapped nor protected. None-the-less, they are high priority for conservation.

B4. Carpathian Mountains

The Ukrainian Carpathian Mountains reach an altitude of 2061 meters at Hoverla Mountain. Altitudinal variation, and the diversity of microclimates and geologic substrates presented by the mountainous terrain have led to an extraordinary diversity of habitats and species, including many endemic species. Approximately 2,000 plant species are catalogued from the Carpathians.

Almost 20 percent of Ukraine's forests are located in the Carpathian Mountains. The native forests include hardwoods such as beech (*Fagus sylvatica*) and oaks (Quercus ssp.), and conifers, including fir (*Abies alba*) and spruce (*Picea abies*). including the world's largest remaining stand of virgin beech forest (10,900 ha). This is a remarkable resource for the rest of Europe, which has lost such undisturbed areas. Old-growth beech stands, once predominant in much of the region, have disappeared in most areas. Much of the original forests have been cut and often replaced with less species-rich forest plantations.

Although forests are often given more attention, the highest diversity of plants (and likely other species groups) in the Carpathian Biosphere Reserve is found in the lowland meadows, forest glades and limestone ridges. Grasses (*Festuca rubra*, *Deschmpsia caespitosa* and others) dominate the drier meadows, while wetter meadows are dominated by sedges (*Carex spp.*) and *Juncus spp.* These meadow habitats harbor many rare, protected species.

B5. Crimean Mountains

Highest point in the Crimean Mountains is Roman-Kosh (1542 m). While not as high as the Carpathian Mountains, isolation (which favor evolution of new species) and a warmer, wetter climate account for the remarkable diversity of species in the Crimean Mountains. The International Union for the Conservation of Nature (IUCN) has designated the Crimean as a center of floristic diversity. The peninsula has at least 2775 species of plants, including 279 that are found nowhere else. Most of the endemic species are in the mountains and southern coast.

Crimea is also rich in terrestrial invertebrates, although there is not a full species inventory. Anthropogenic affects have threatened many of the Crimea's ecosystems; primary habitats comprise only 2-3 percent of the territory of Crimea, including remnant forest and mountain meadows. Never the less, the area has maintained much of its unique biodiversity.

B6. Black Sea and Sea of Azov

The Azov-Black Sea Basin covers almost the entire territory of Ukraine, including the watersheds of the Danube, Dnipro, Dnister, Southern Bug and several other rivers. The isolation of the seas from the open ocean has contributed to their rich diversity of flora and fauna. The seas themselves are home to a number of unique zooplankton and phytoplankton. A number of endemic species, including 32 aquatic invertebrates, live in the deltas, estuaries and Black Sea and Sea of Azov shelf along Ukraine's coastline. These coastal areas provide habitat or resting places for huge numbers of waterfowl, many of which are protected under international treaties. The seas are home to a number of endangered marine mammals, including the Mediterranean monk seal (*Monachus monachus*), the grey and bottlenose dolphins (*Grampus griseus* and *Tursiops truncates*), and the harbor porpoise (*Phocoena phocoena*). The wetlands in the coastal

areas, particularly in the deltas of the Danube and Dnister rivers, and along the Azov-Black Sea corridor at the base of the Crimea Peninsula, provide habitat for more than 100 species of waterfowl.

Anthropogenic factors have seriously threatened the Sea's ecological condition. The "Green Revolution" of the 1960s involved the profligate use of a wide variety of fertilizers and pesticides throughout Eastern Europe and Russia. At the same time, intensive animal farms were established to provide a cheap source of protein. Unregulated discharges of waste nutrients from these agricultural activities, under- or untreated sewage, and industrial waste entered the rivers and streams in the Black Sea watershed. The Sea of Azov occupies the first place in the world by the level of pollution on 1 square meter of water surface (see http://www.czp.cuni.cz/values/citanka/marushevska.htm). Sea grass and algae beds typical of these seas - particularly on the Black Sea's northwestern shelf along the coast of Romania and Ukraine - began to die as a result of phytoplankton blooms. Decaying organic matter depleted oxygen supplies, killing bottom-dwelling organisms. Toxic discharges of industrial effluents included extremely high levels of heavy metals. These problems, combined with over fishing, set off a sharp decline in fisheries resources that has continued to the present. Fish catch in the Black Sea and Sea of Azov declined from 850,000 tons in 1985 to 250,000 tons in 1991, despite a slight increase in the number of fishing vessels. Although the catch has recovered somewhat, over fishing may continue to be a problem.

Introduced species, particularly the comb jelly (*Mnemiopsis leidyi*) have flourished in the eutrophic environment, consuming large amounts of zooplankton and exacerbating the deleterious phytoplankton blooms. Recently, there have been signs of a slow recovery in the Black Sea. This has been attributed to the decline of the economies of Eastern Europe and the associated decrease of agrochemical use and the closure of industrial enterprises. Without proper safeguards, these destructive factors could reappear as the economies of these countries improve.

B7. Freshwater Systems and Wetlands

There are more than 22,000 rivers in Ukraine with a total length of more than 170,000 km. Almost all (96 percent) of the rivers in Ukraine drain into the Black Sea or Sea of Azov; the remainder flow to the Baltic Sea. Many rivers provide spawning grounds for globally endangered fish. Twenty-one species of fish are listed in Red Data Book of Ukraine and most of these use the rivers for spawning. According to the Red Data Book (National Academy of Science of Ukraine 1994), the decline of these species is the result of: habitat loss associated with changes in hydrology (including changes to large and small streams throughout the watershed); chemical and biological conditions of the water (including sedimentation); pollution; and over fishing. Most notable is the decline of sturgeon and the drastic decline of commercial catches of this species.

Dams and reservoirs have changed the water regime of many rivers. Most of the length of the Dnipro River within Ukraine, for example, is a cascade of six reservoirs, thus placing barriers to natural spawning routes, submerging a number of floodplains, destabilizing shores and slopes near the water line and destroying previously productive agricultural land.

Dams, sedimentation and pollution from agriculture, urban centers and industry heavily impact biodiversity of the major rivers in Ukraine and the Seas where they drain. The rivers of Ukraine, more than 90 percent of which drain into the Black and Azov Seas, harbor numerous rare and endangered fish species (e.g. sturgeon) that depend on healthy river conditions for spawning. The deltas of these rivers are particularly important as habitat for both resident and migratory waterfowl populations. The Danube River Basin, which runs along the Ukrainian-Romanian border before emptying into the Black Sea, has been recognized as a Global 2000 Ecoregion, based on selection criteria such as species richness, levels of endemism, taxonomic uniqueness, unusual evolutionary phenomena, and global rarity of major habitat types.

Wetlands in river deltas and along the seacoast are refuge for many endangered and protected species.

Photo by D. Gibson.

Ukraine has 22 sites listed as wetlands of international importance under the RAMSAR Convention on Wetlands. The largest and most important are found along the Seas, particularly in the deltas of the large rivers, the Danube, Dnister, Southern Bug and Dnipro.

B8. Forests

Forests are found in all the terrestrial landscape regions. Today, forests cover approximately 14 percent of Ukraine's surface area, as compared with 28 percent in 1850 and approximately 55 percent at the beginning of the last millennium. Much of the remaining forest is occupied by young and middle-aged woods, the result of excessive tree felling between 1920 and 1970 and the mass creation of spruce and pine plantations after World War II, especially in the steppe region. Many of these plantations of exotic species have deteriorated rapidly because they require more precipitation than the local climate provides. While there are attendant environment and economic values, the biological diversity of mature and introduced plantations resembles that of any extensive monoculture.

The State Committee of Forestry (SFC) recently has plans to plant up to 200,000 ha of forest in the next two to three years. These new plantations will be distributed across the country, with a somewhat greater focus in the Carpathian Mountains. In addition, as part of the land privatization effort, approximately 300,000 ha of unproductive agricultural land will be transferred to the SFC. Detailed management plans showing the location and types of newly planned forests were unavailable.

C. Species Diversity

It has been estimated that there are more than 25,000 species of flora and 45,000 species of fauna in Ukraine. Approximately one-third of these species, mostly insects and fungi, has yet to be described. While there are substantial data about the species of Ukraine, the data are mostly scattered in thousands of scientific paper and represented in museum and herbarium archives around the world. There is not a single source that describes the distribution and status of species

for the landscape units treated in this report. Indeed, even the species diversity in many protected areas is inadequately described. One exception is the Crimea, for which a recent report describes the major habitat zones, their condition, threats and conservation status (Biodiversity Support Program. 1999)

The flora and fauna of Ukraine include many species typical of the Eastern European plain. The diverse geomorphology, climate, and topography of Ukraine account for much of the richness of flora and fauna. Areas especially rich in floristic endemism include the Carpathian and Crimean Mountains. The biodiversity in most of the Ukraine is associated with the East European Plain, which occupies 94 percent of the land area of the country, including the polessia, forest-steppe and steppe landscapes. Rainfall and forests generally decreases along a gradient from north to south. Many of these plains, particularly the grasslands in the south and many of the wetlands, have been converted to agriculture with significant losses of biological diversity.

Endemic species are those restricted to a particular area, and so their fate depends entirely on protection and management in that area. Full reports of the number of endemic flora and fauna species within Ukraine are unavailable; however, several areas in the country have been identified as having a high level of endemism. The estuaries and marshes along the Black Sea are home to 32 endemic invertebrates. The Crimean Mountains have between 240-300 endemic species of vascular plants and several endemic fauna species, making this the richest area in Ukraine for endemism.

The Carpathian Mountains have also been identified as being rich in endemic flora. Flora lists for the Carpathian National Park list 17 endemic and 11 subendemic species. Many of these exist only in the eastern or southeastern portion of the Carpathians, whereas others exist throughout the Carpathian range in Ukraine, Poland, Hungary and Romania.

The current status of information in Ukraine regarding the distribution of flora and fauna and the condition of habitat makes estimates of extinction and endangerment difficult. With further research some species will be found to be more widespread and less threatened. However, the experience of the past three decades in the U.S. and discussions with Ukrainian scientists suggest that the situation is worse than actually reported, particularly in some of the most depleted ecosystems. As a result, more species than are reported may be imminently threatened with extinction or are already extinct. Currently, more than one percent of all species are either threatened or endangered according to IUCN (see Annex E).

Table II-1. Number of Species in Ukraine by Taxon

Taxa	Number of Species	Number Listed in Ukraine Red Data Book
Flora (Plants and Fungi)	>25000	541
Mammals	108	41
Birds	Up to 400	67
Reptiles	21	8
Amphibians	17	5
Fish	200	34
Invertebrates	>44000	227
Total	**>70000**	**923**

C1. Flora (Plants and Fungi)

More than 25,000 species of plants, fungi, and lichens exist in Ukraine, of which 541 are listed in the Red Data Book of Ukraine and 34 in the Bern Convention on the Conservation of European Wildlife and Natural Habitats. While most of the vascular plants present in Ukraine have been identified, it appears that much of the data regarding their distribution is old or incomplete. Many additional species, especially fungi, have yet to be described or discovered. Plants in Ukraine include 221 species of red, brown, and green macroalgae in the Ukrainian waters of the Black and Azov Seas. These algae provide habitat for a number of important marine fauna species. It has been estimated that close to 1,100 flora species in Ukraine contain biologically active components of potential medical value; however, only 250 of these are officially recognized as medicinal plants.

C2. Fauna

Approximately 45,000 animal species, including 44,000 invertebrates, are reported for Ukraine. A large number of invertebrates, particularly insects, remain undescribed. The highest level of fauna endemism occurs among marine fauna. Of more than 2,000 marine animals, 237 are endemics. Of the more than 740 terrestrial vertebrates, only 12 are recognized as endemic species.

The Ferruginous Duck is an endangered species protected in Ukraine by national laws and international treaties.

Photo by I. Rusev.

C2a. Mammals

Mammals in Ukraine are represented by 108 species, of which 41 are listed in both the Ukrainian Red Book and on the IUCN Red List. Ukraine has the largest population of European bison (*Bison bonasus*) in the world (659 animals). As clean farming practices have erased virtually all habitats, most of the large terrestrial mammals (e.g., bear, wolves, lynx) are found within Ukraine's declining forest systems. Marine mammals include the Mediterranean monk seal (*Monachus monachus*), the grey and bottlenose dolphins (*Grampus griseus* and *Tursiops truncates*, respectively) and the harbor porpoise (*Phocoena phocoena*).

C2b. Birds

Approximately 400 species of birds reside in Ukraine for at least some part of the year. Of these, 19 are listed on the IUCN red list and 67 in the Red Book of Ukraine. These include a number of important migratory birds. More than 100 of the 170 birds listed in the African-Eurasian Migratory Water Bird Agreement either nest in Ukraine or stop during migration. Loss of wetland nesting habitat is currently threatening bird populations. Currently, local scientists are surveying salt marshes of the Azov-Black Sea corridor to determine the status of the slender-

billed curlew (*Numenius tenuirostris*), one of the birds protected in the African-Eurasian Migratory Water Bird Agreement.

C2c. Reptiles and Amphibians

Reptiles are represented by 21 species in Ukraine. These include four species on the IUCN Red List: the leopard snake, meadow viper, European pond turtle, and the common tortoise. Four additional species are listed in the Red Data Book of Ukraine. In addition, 17 species of amphibians inhabit Ukraine, of which six are listed on the IUCN red list and five in the Red Data Book of Ukraine.

C2d. Fish

Approximately 170 species and subspecies of fish reside in Ukraine and in the section of the Black Sea shelf belonging to Ukraine. Of these, 34 are listed in the Red Data Book of Ukraine, and 43 on the IUCN Red List. One fish species in Ukraine, the Baltic Sturgeon (*Acipenser sturio*), is protected under the Convention on International Trade and Endangered Species (CITES). A number of commercially important fish species (e.g., sturgeon) have become threatened or endangered in the Black-Azov Sea Basin. In the past three decades, the diversity of commercial fish throughout the Black Sea has decreased from 26 species to just six. Although the State Department of Fisheries produces some 60 million fry per year throughout the country, this does not ensure recovery of natural populations. Threats to fish populations include pollution from industrial enterprises along rivers and lakes, low water levels in rivers and reservoirs, overfishing, and agricultural activities. In addition, damming of rivers, particularly the Dnipro, may jeopardize spawning of the anadromous fish of the Black Sea, although little information is available regarding this issue.

C2e. Invertebrates

Approximately 44,000 species of invertebrates are predicted to live in Ukraine, approximately 35,000 of which are insects. Many invertebrates remain undescribed. This is largely due to the lack of experts and resources to conduct surveys. Little information is available regarding invertebrate species of steppe or forest zones. Aquatic invertebrates of the Black and Azov Seas include 32 endemic species.

D. Threats to Biodiversity

Converting natural habitats to other uses, including agriculture, forest plantations, and reservoirs continues to be a major threat to natural resources and biodiversity in Ukraine. Agrarian reform during Soviet rule substantially changed the spatial structure and functional features of biodiversity in Ukraine. Widespread destruction of steppe, reclamation of bogs and wetlands, an increase in the application of fertilizers and pesticides, and the introduction of large-scale cultivation technology destroyed vast natural areas. Less than 1 percent of the original vegetation remains for some kinds of steppe ecosystems. The resulting fragmentation of natural ecosystems has significantly decreased the ability for natural maintenance of biodiversity and has facilitated the spread of invasive species. Although hard data are lacking, available studies from other countries show that changes in land ownership sometimes result in further conversion of native

ecosystems to other uses. Thus, Ukraine's plans to divide large communal farms into small private farms may lead to further loss of already rare ecosystems in the steppe and forest steppe regions.

The principal threats to biodiversity in the Carpathian region are related to post-World War II timber harvesting and transformation of these areas into spruce monocultures. In addition, the young monocultures are subject to severe soil erosion in the mountains. Erosion has in turn caused the siltation on the reservoir of the Cherna Rika (Black River) as well as frequent flooding that has destroyed farmland and taken lives in western Ukraine and elsewhere in Eastern Europe. In addition, the young and middle-aged tree stands are subject to large windfalls. During a windstorm in 1989, approximately 1500 hectares of young- and middle-aged tree stands in and around Synevyr National Park were destroyed.

In spite of an overall increase of protected areas in the Carpathians over the last ten years, there is still a need to protect certain ecosystems and communities. This is particularly true for the Zakarpatska lowlands and some of the mountain massifs of the Carpathians. In addition, the discontinuity, isolation and small surfaces of protected areas make it difficult to ensure preservation of certain species within reserve land, particularly birds and predatory animals, which require larger continuous habitat for survival. These issues may be at least partially solved with the expansion of the system of nature reserves and designation of corridors under the Law on the Ecological Network of Ukraine (see Section IV-C1).

Point and non-point pollution into aquatic systems are serious threats to biodiversity in the rivers, lakes, Black Sea and Azov Sea, and associate wetlands. The collapse of the economies of Eastern Europe and the former Soviet Union has caused the current load of nutrients and pollutants to decrease in recent years, allowing limited recovery of aquatic ecosystems. Nevertheless, discharge of nutrients from agricultural, industrial, and domestic sources remains a problem, and may begin to increase as the economy recovers. This is especially important in light of Ukraine's effort to privatize agricultural land around the country. As the state-run farms are converted to thousands of smaller, private farms, efforts to train agricultural workers on proper use of fertilizers and pesticides will be a challenge. Monitoring of pesticide and fertilizer usage will also become more difficult.

Discharge of under- and untreated wastewater, agrochemicals and other pollutants directly into the Black and Azov Sea watersheds are seriously threatening biodiversity in the seas and their associated wetlands. Most of the pollution is discharged through rivers on the north and northwest shelves of the Black Sea (i.e., Danube, Dnister, Dnipro). Much of this discharge is from upstream countries of the Danube, but a significant portion is discharged from Ukraine. Widespread eutrophication (blooms of certain algae and subsequent oxygen depletion from the water supply) that result from discharge of pollutants (especially nitrates and phosphates) has crowded out unique communities of macroalgae in the Black Sea. Eutrophication has also caused the disappearance of several commercially important fish, resulting in millions of dollars of loss to the Ukrainian economy and a severe decline in the fishing industry.

Damming of rivers, especially along the Dnipro, for hydroelectric power production has seriously compromised the ecology and biodiversity of rivers in Ukraine. Except for a few short

distances, the entire section of the Dnipro River within Ukraine is a series of managed reservoirs. This may have serious consequences for spawning of anadromous species making their way up the river from the Black Sea.

The introduction of exotic species has exacerbated the situation in the Black Sea. The bivalve mollusks *Mya arenaria* and *Scapharca inaequivalvis*, and a comb jelly, *Mnemiopsis leidyi* have become dominant species in many areas, especially on muddy sediments in coastal zones in the northwestern and western Black Sea. The comb jelly's intensive consumption of zooplankton and fish larvae has produced a rapid transformation of species in open-sea communities. Since its introduction from the ballast water of a ship from the eastern US in 1989, the comb jelly has spread so rapidly that its mass has exceeded the total mass of fish in the Black Sea during spring months. As of yet, little has been done in any of the Black Sea countries to manage the comb jelly invasion; most proposals to eradicate the problem involve introduction of natural predators of the comb jelly, which itself may cause further transformation of Black Sea ecosystems. Another species of comb jelly, *Beroe ovata* was introduced from ship ballast water from the Mediterranean in 1997. Ironically, *B. ovata* has begun to consume *M. leidyi*, and there has been some indication of zooplankton recovery in some sections of the Black Sea.

Transformers using PCBs are common along irrigation canals, where leakage is a threat to local terrestrial biodiversity and aquatic biodiversity far downstream. *Photo by D. Gibson*.

Poaching of endangered fish species may be posing an additional threat to biodiversity; however, little information is readily available to determine the extent of this practice. Sturgeon species are available at many eating establishments and markets throughout Ukraine, but it is impossible to determine whether these are from state-run fisheries or from the endangered natural populations. Over fishing and the use of inappropriate fishing methods also threaten commercial stocks of fish in the Seas and rivers of Ukraine.

SECTION III

Status of Biodiversity Conservation

A. Protected Areas

There are 6,808 protected areas in Ukraine, covering 2.4 million ha, or approximately 4 percent of the country (see Table III-1 on the next page, and map in Annex F). The protected land area has increased from 2 percent since 1992. The vast majority of protected territories are managed at the oblast or local level.

The management structure of state protected natural areas lacks a clear central authority. The State Nature Protection Service within the Ministry of Ecology (MoE) is responsible for general policy and oversight of natural protected areas. During Soviet rule, different ministries and institutions were given responsibility for one or more natural reserves, biosphere reserves, or national parks; this remains true even today. For example, the National Academy of Sciences manages the Danube Biosphere Reserve, whereas the MoE runs the Carpathian Biosphere Reserve. However, according to the Law on the Nature Conservation Fund, all new protected areas are under the responsibility of the MoE.

Askania-Nova Biosphere Reserve harbors the largest tract of protected native steppe in Ukraine. *Photo by D. Gibson*.

In 1999, Ukraine's Parliament passed a program for forming a National Ecological Network, in part as Ukraine's response to the Pan-European ecological network of landscape reserves. The law stipulates increasing the total area of protected areas to approximately 10.4 percent of Ukraine by 2015. This will include the creation of 29 new national parks and seven biosphere reserves as well as expansion of three nature reserves, three biosphere reserves, and five national parks. Priority is given to the protection of biodiversity as well as the creation of recreational opportunities and jobs for local populations. While the law is a step in the right direction for forming a protected areas system, the law itself does not adequately define borders of new protected areas, or responsibility for implementation of the law. Funding for the program has not been allocated as specified in the law.

Table III-1. Biosphere Reserves, Natural Reserves, and National Natural Parks of Ukraine

Name	Administrative Unit	Total Area, Ha
Biosphere Reserves		
Askania-Nova	Ukrainian Academy for Agricultural Science (UAAS)	33907
Black Sea	National Academy of Sciences (NAS)	89129
Carpathian	Ministry of Ecology	57880
Danube Flood Plain	NAS	46403
Nature Reserves		
Crimean	State Committee of Forestry	44175
Kaniv	Kyiv University	2049
Ukrainian Steppe	NAS	2768
Luhansk	NAS	1576
Polissya	State Committee of Forestry	20104
Yalta mountain-forest	State Committee of Forestry	14523
Cape Martyan	UAAS	240
Karadagh	NAS	2855
Poztochchya	Ministry of Education	2080
Medobory	State Committee of Forestry	10455
Dnipro-Oril	State Committee of Forestry	3766
Yelanets steppe	Ministry of Ecology	1676
Gorgany	Ministry of Ecology	5344
Kazantyp	Ministry of Ecology	450
Opuk	Ministry of Ecology	1592
Rivne	State Committee of Forestry	47046.8
National Natural Parks		
Carpathian	Ministry of Ecology	50303
Shaty	State Committee of Forestry	48977
Synevyr	Ministry of Ecology	40400
Azov-Syvash	State Committee of Forestry	52154
Vyzhnytsya	Ministry of Ecology	7928
Podilski Tovtry	Ministry of Ecology	261316
Svyati Gory	Ministry of Ecology	40589
Yavoriv	Ministry of Ecology	7079
Skolivski Beskydy	State Committee of Forestry	35684
Desna-Stara Guta	Ministry of Ecology	16215.1

Ukraine has worked effectively with neighboring countries to cooperate on management of nature protection. Two Biosphere Reserves in Ukraine are multinational projects: the Danube Delta Biosphere Reserve (with Romania) and the Eastern Carpathian (with Poland and Slovakia) Reserve. Other multilateral projects are in the works, including expansion of the Danube project to a trilateral Romanian-Moldovan-Ukrainian biosphere reserve that will include the lower Prut River. Other future projects include the Ukrainian-Polish Western Polessia biosphere reserve, a Russian-Ukrainian Stara Guta and Bryansk Forests biosphere reserve, and in coordination with Belarus a project to protect biodiversity along the upper Prypiat River. Despite progress, the multilateral biosphere reserves lack resources to sufficiently coordinate management functions. At the Danube Delta, for example, there is only occasional communication with staff from Romania.

An effort has been made in the past few years to establish protected areas at the regional (sub-national) and local levels. Regional and local authorities manage approximately 46 percent of the total area of the natural protected system, including 22 Ramsar sites. Unfortunately, areas

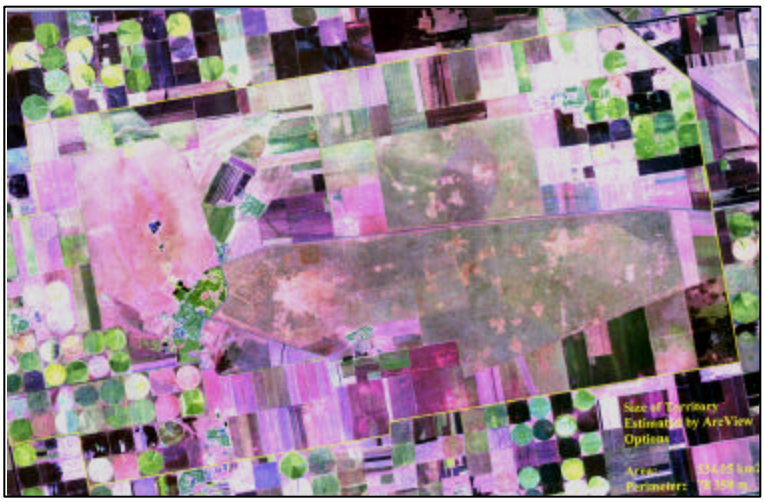
managed at a regional or local level do not have permanent staff. As a result, the extent to which these areas are managed, if they are managed at all, is unclear.

Tourism has increased in several parks in recent years, in part as a result of improvement to the infrastructure to accommodate local tourists and school groups. Additional tourism development is needed; however, better information about current tourist use of the parks is needed. As recent as 1997 almost no tourism statistics were collected, except for Carpathian National Park (Pederson 1997). Even the more developed protected areas lack basic lists of species to provide to visitors. The Danube Delta Biosphere Reserve has established a program for tourists, including boat trips to the delta for bird watching. The park headquarters also has a few rooms for visitors, as well as an information center with displays on nature and local history. However, it appears that visitors come sporadically. The Carpathian National Park has several well-developed hiking trails that are becoming increasingly popular for visitors from Eastern Europe. However, there are no trail maps, and the process for obtaining a hiking permit — even on the more popular trails — is arduous and discourages higher yielding international tourism.

B. Conservation Outside of Protected Areas

Even a well-designed and integrated protected area system will be insufficient to ensure the conservation of all important species and habitats. Seasonally migratory animals (migratory fish, birds, bats, etc.), or species that normally range over large distances (birds and most large mammals) will be among those insufficiently protected by parks. Many endemic species of plants and animals may also remain outside protected areas. Therefore, other conservation tools will be necessary to ensure the protection of biodiversity throughout the country.

Management of the agricultural landscape, including remaining native steppe and wetlands, is inadequate. The actual distribution and condition of native grass and wetland ecosystems in many regions is not adequately documented and are therefore difficult to monitor and manage. Moreover, the paucity of historical information disallows any appreciation of the large land-use changes incurred during the Soviet era. Enormous agricultural fields separate simple windbreaks, which are often of exotic species. The few remaining tracts of native steppe and wetlands are grazed and mowed. Quite simply, over much of Ukraine, almost no place remains for the native biota to live.



Intensive agriculture with irrigation surrounds native steppe of Askania-Nova Biosphere Reserve. *Image by ULCRM*

Environmental impact assessments (EIA) and the process of acquiring project/building permits are all tools that can potentially provide opportunities for protecting biodiversity. The 1995 Ukrainian Law on Ecological Expertise requires an EIA for major public projects. The law allows for a public hearing by request. However, the procedures for conducting such a hearing are not well

defined. According to the MoE, 5,243 projects underwent some type of EIA process in 1999 alone. Of these, 753 plans were rejected outright or returned for revision because they were environmentally unsound (Ministry of Ecology and Natural Resources 1999). Despite these numbers, there is very good evidence that environmentally questionable projects are not sufficiently reviewed or bypass the EIA process altogether. For example, in May 2001, construction was initiated on a road crossing the wetlands of the Dnister delta, a protected area and RAMSAR site. There was no EIA or other formal approval mechanism in spite of the fact that government officials were aware of the biological importance of the site. Work was eventually halted after several weeks of protests by environmental NGOs from Ukraine, Moldova and Russia.

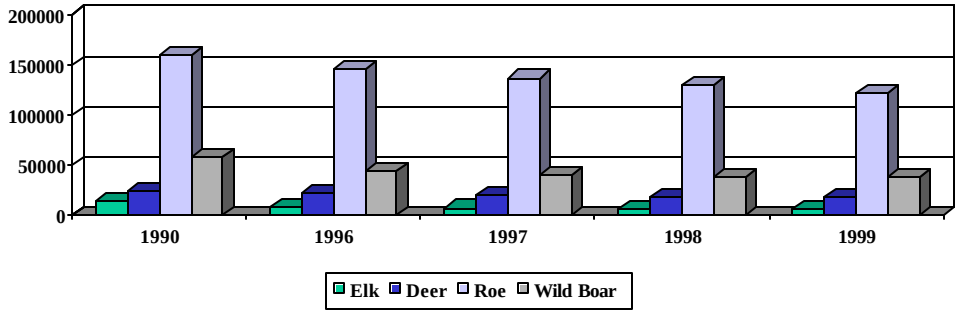
The dependence on EIAs without the use of environmental management systems (EMS) that emphasize continual improvements for industrial and agriculture businesses is equally disturbing. EMS holds much promise to integrate production with environmental best practices and voluntary trade-based environmental procedures.

Forests outside of protected areas can be managed for forest products and biological diversity. According to the Forest Code, forest conservation lies with MoE. In reality, however, this division of management is blurry, given that the SFC manages several national protected areas. The SFC manages the production functions of approximately 70 percent of the state's forests. The Ministry of Agriculture manages most of the remainder. According to the Forestry Code, about half of the forests under the SFC are managed for their environmental, scientific, and recreational values. The other half is managed for both commercial and environmental purposes. The definition of the latter group in the Forest Code is not totally clear. There are no standards or metrics for environmental functions thus biodiversity, hydrological and recreation values continue to be systematically understated and are overshadowed by current timber prices.

The SFC has created a plan for afforestation of up to 200,000 ha over the next two or three years. In addition, as a part of Ukraine's land privatization efforts, the Ministry of Agriculture will transfer 300,000 ha of unproductive agricultural lands to the SFC for afforestation. It is uncertain whether this program is attempting to create monoculture plantations or recreate natural conditions. According to the land privatization program, forest tracts of 5 ha or larger will be transferred to the SFC. The smaller tracts of forest will be privatized. As of yet, there have been no studies regarding whether this will result in increased fragmentation of forests, and there is no indication of whether any cutting restrictions will be placed on these forest plots.

The Hunting Department of the SFC regulates game hunting in Ukraine. Hunting is controlled using a permit scheme. The Hunting Department, along with hunting and fishing associations in the country, conducts an annual survey to determine hunting quotas and the number of permits which will be issued. Hunting without a permit is a criminal offense. In 1999, 5,920 violations of hunting rules were recorded; 19 percent of these were handed out to officials of the country's various hunting associations. Poaching continues to increase due to the financial situation of the Ukrainian population and the lack of resources to adequately monitor and enforce laws. As a result of illegal poaching, populations of ungulates have declined significantly (see Table III-2 on the next page).

Table III-2. Population Changes in Hunted Species, 1990-1999



It is very easy to overstate the accuracy or completeness of this information as much of the infrastructure for monitoring wildlife populations has declined since 1990. Permitting services and fee structures have evidently not been well maintained under civil service declines and there is good reason to believe that populations are overestimated and off-take rates are underestimated.

The Land Code of 1992 governs protection and control of land utilization, including use of agrochemicals. Responsibility for management of land resources, including control of agrochemicals, is shared among the Ministry of Ecology, the State Committee for Land, the Ministry of Agriculture, local councils and other specially authorized institutions. As the National Report on the State of the Environment states,

> "The Ukrainian legislation has not yet instituted land management procedures, nor have the responsibilities been distributed among the quoted governmental bodies. This leads to a certain duplication of control functions and a lower efficiency of the governmental control."

To prevent the negative effects of land use, a draft National Program for Land Protection through the year 2010 was prepared and submitted to the Ukrainian Parliament. The document outlines legal, ecological, and organizational aspects for the state, landowners, and land users regarding conservation, rational use, and restoration of lands. The plan includes surveying approximately 42 million ha of land.

C. Ex-situ Conservation

Ex-situ conservation is the protection of biodiversity outside their natural environment. Some components of Ukraine's biological resources are maintained in gene banks, botanical gardens, arboreta, and zoos. There are 24 botanical gardens and 15 major arboreta in Ukraine. The Botanical Garden of the National Academy of Sciences of Ukraine has a collection of 13,000 species, varieties, forms, and cultivars of ornamental, medicinal, fodder, timber, edible, and other useful plants native to Ukraine and other regions of the world. The E.M. Kondratyuk Donetsk Botanical Garden has a collection representing primarily southeastern Ukraine. Other important

collections include the Nikita State Botanical Garden at the Ukrainian Agricultural Academy and the O.V. Fomin Botanical Garden of Kyiv University.

Other collections of flora, fauna and microorganisms include:

- Institute of Plant Physiology and Genetics
- Institute of Medicinal Plants
- Askania-Nova Zoo and Breeding Station
- Animal Genetic Resources Bank
- V. Ya. Yur'yev Institute of Plant-growing
- Institute of Pomology
- V.E. Tairov Institute of Viticulture and Wine Production
- D.K. Zabolotny Institute of Microbiology and Virology

SECTION IV

Strategic and Policy Framework

A. Policy Framework

Environmental and natural resource policy in Ukraine reflects the national laws and international agreements described below. The National Report of Ukraine on Conservation of Biological Diversity (1997), the National Report on the State of the Environment of Ukraine (1999), and the Strategy of Conservation of Ukraine's Biological Diversity (= the Strategy 1998) provide an overview of environmental policy and how it should be implemented.

The National Report on the State of the Environment of Ukraine (1999) provides an overview of environmental conditions in Ukraine, including a brief description of biological diversity and the legal and administrative mechanisms for biodiversity protection. The state of the environment report (chapter 12) mentions the "Basic Lines of Government Policy for Environmental Protection, Utilization of Natural Resources and Ecological Safety" being approved by the Parliament. This is cited as the framework for ecological policy. The policy "implies the development of regional ecological policy (local action plans) and its integration in the sectoral policy of the national social and economic development and the performance of Ukraine's international obligations."

The Strategy provides details of the policy and investment strategies for biodiversity conservation. The Parliament adopted the Strategy in 1998. General strategic objectives outlined in the Strategy are:

- Preservation, restoration, and improvement of natural, seminatural and disturbed ecosystems, habitats, individual species, and landscapes;
- Promotion of sustainable use of natural resources;
- Informing the population on biological diversity issues and involving an ever greater number of people in biodiversity conservation activities;
- Improving responsibility for preservation of biological diversity among enterprises, organizations and establishments whose activities are linked with the utilization of natural resources and affects the environment.

Specific strategies are organized under the following categories:

- Ecosystem conservation
  - Coastal and marine ecosystems
  - River and floodplain ecosystems
  - Lacustrine and marshland ecosystems
  - Meadow and steppe ecosystems

- Preservation of species and populations
- Creation of a National Ecological Network
- Strengthening of instruments for implementation of the Strategy
  - Financial instruments
  - Institutional instruments
  - Scientific instruments
  - Information and educational instruments

The Strategy provides a basic framework for improved conservation of biological diversity in Ukraine. The Economic Commission of Europe, in its Environmental Program Review for Ukraine, notes that "knowing the Strategy's implementing program and financial implications would certainly shed light on the efforts that Ukraine can realistically sustain." The Strategy provides few details. In order to implement the Strategy, detailed action plans are needed for each component, including a timeline and budget for implementation, as well as identification of priority areas for biodiversity protection.

B. Institutional Framework

The Ministry of Ecology and Natural Resources (MoE) was formed in 1999 by combining environmental units from several state agencies including: the Ministry of Environmental Protection and Nuclear Safety; the State Administration for Nuclear Regulation; the Committee for Geology and Mineral Resources; the Committee for Hydrometeorology; the Main Department of Geodesy, Mapping and Cadastre; and the State Commission on Test and Registration of Plants and Fertilizers Protectors and Regulators. Additionally, MoE directs and coordinates activities of the State Committee on Forestry (SFC), State Committee for Land Management and the State Committee for Water Management. The creation of the MoE represented a substantial reorganization and consolidation of the state's environmental programs.

The MoE takes primary responsibility for implementation of all national environmental policy in Ukraine, management of natural resources, and implementation of the major international conventions to which Ukraine is a party. Specific tasks of the MoE relating to biodiversity and natural resource conservation include the following:

- Development of environmental laws and regulations;
- Conducting environmental impact assessments;
- Developing rational mechanisms for management of nature;
- Regulation of natural resource use and environmental protection;
- Development and utilization of environmental protection funds;
- Environmental auditing;
- Coordination of scientific and technical policy for environmental protection, and rational use and reproduction of natural resources;
- Implementation of the state policy on preservation of flora and fauna;
- Implementation of international agreements; establishment of intergovernmental relations in the area of the environmental protection;
- Environmental education.

Ukraine is divided into 24 territories (oblasts), one autonomous region (Crimea) and two municipalities (Kyiv and Sevastopol). The laws "On Local Administration" and the legislative act, "Main aspects of national policy of Ukraine for environmental protection and natural resource use," govern the division of environmental management functions between state, territorial, and local administrations. Under the law, each territorial administration as well as those of the autonomous region and municipalities has a regional office of the MoE. The regional offices have the following responsibilities:

- Regulation of local natural resource use;
- Development of environmental standards;
- Implementation of rational mechanisms for nature management;
- Monitoring and inventory of the environment;
- Conducting environmental impact assessments;
- Overseeing adherence to environmental laws;
- Developing programs for environmental protection, and formulation and implementation of investment policy;
- Dissemination of environmental information to the public and other stakeholders.

The division of responsibilities between state and territorial governments is a positive step in decentralization of environmental management authority. However, the role of the regional offices is often ambiguous because they are subordinate to both the regional administration and the national MoE. Ukraine's National Report on the State of the Environment admits that the resolution of this conflict would considerably improve control of the environmental sector.

Dissemination of environmental information to the Ukrainian people is the responsibility of MOE regional offices. *Photo by I. Rusev*.

The State Committee on Forestry (SFC) manages approximately 70 percent of Ukraine's forests. The SFC, while officially functioning under the MoE, receives its budget independently of the ministry and therefore has a significant degree of autonomy. The SFC employs approximately 100,000 people in 300 enterprises throughout the country, who are responsible for forest production and protection, reforestation efforts, and research activities. In meetings, representatives of the SFC complained of outdated methods and technology and a general lack of resources to perform adequate inventories of forests and forest biodiversity outside of protected areas.

The Ministry of Agriculture (MoA) manages 26 percent of the forests in Ukraine as well as an unknown size land area of native steppe ecosystems. The MoA shares responsibility for environmentally rational use of agricultural lands with the MoE and the State Committee for

Land Resources. The ECE Environmental Program Report for Ukraine recognized a need for better coordination of management and information dissemination regarding environmental issues on agricultural lands among these different agencies.

Other agencies that manage activities directly or indirectly related to biodiversity conservation include the Ministry of Foreign Affairs (international agreements and cooperation), the Ministry of Finance (financial support of nature conservation activities), Ministry of Transportation (zones along transportation routes), Ministry of Defense (military areas), and the Ministry of Education (environmental education).

The academic and research institutions in Ukraine are a critical part of the institutional support for biodiversity protection. They train scientists, conduct research and inventories, manage scientific collections and archives, and serve on public and NGO committees and commissions. Among the most important institutions are:

- National Academy of Sciences
  - Institute of Botany
  - Institute of Zoology
  - Institute of Hydrobiology
  - Institute of Biology of the Southern Seas
  - Institute of Ecology of the Carpathians
- Kyiv National Taras Shevchenko University
- Ukrainian Academy of Agricultural Sciences
  - Institute of Land Resources
  - Institute of Plant-Growing
  - Institute of Fisheries
  - Institute of Agroecology

Although the universities and research institutions provide a critical source of professional biologists, they fall far short of meeting current and future demand. Biologists are well trained in identification of species, but resources are not adequate to conduct research, monitor the government's conservation programs, or prepare physical and management plans. Because of the lack of resources, many talented scientists have moved abroad, creating a potential "brain drain" in the scientific aspects of biodiversity conservation.

Nongovernmental organizations (NGOs) play a critical and active role in environmental and conservational activities. There are more than 20 NGOs that work at the national level in Ukraine and more than 300 local and regional NGOs. However, only a few of these have more than one full-time staff person. The Ecological and Culture Center (ECC) is actively involved in expansion of the protected areas network. Through ECC's efforts, scores of local protected areas have been created in several territories of the country. ECC also actively participates in dissemination of environmental information and publishes a scientific journal focusing on protection of avian species as well as numerous other brochures, magazines, and books dealing with environmental issues.

The Ukrainian Society for the Protection of Birds (UTOP) is the Ukrainian partner of Bird Life International. UTOP is one of the strongest NGOs in Ukraine, with approximately 2,500 members, 5 full-time staff in its central office in Kyiv, and branch organizations in 24 territories and 56 localities. UTOP publishes a newsletter about its activities as well as a biannual publication regarding Important Bird Areas. Currently, UTOP is authoring the first ever bird identification guide specific to Ukraine.

Ecopravo has been working since 1993 on issues surrounding environmental law. Ecopravo's activities include providing legal advice on environmental issues, representing citizens in court cases surrounding environmental issues, conducting seminars on environmental and NGO legislation, and conducting a clinical legal education program. The organization has main offices in Lviv and Kharkov, both staffed by professional lawyers.

Many NGOs in Ukraine are fighting to survive. International donors are largely responsible for funding for the better-established NGOs, and there are few prospects for the same level of funding from indigenous sources. The NGO community has yet to develop sophisticated fundraising methods that are well established in their western counterparts. There is an acute need for programs to train NGOs to raise funds from sources outside of the international community.

C. Legislative Framework

C1. National Laws

Since independence in 1991, Ukraine has approved a series of new legal acts that regulate utilization, protection, and regeneration of natural resources. The Constitution adopted in 1996 ensures the responsibility of the state to maintain ecological stability in Ukraine, confirms the right of free and unrestricted access to information on environmental issues, and assigns the responsibility to all citizens to refrain from harming nature and to compensate for any harm caused by their actions.

Laws and legislative acts in Ukraine related to the conservation of biodiversity and natural resources include:

- Law on the Protection of the Natural Environment (1991)
- Law on Nature Conservation Fund of Ukraine (1992)
- Statute on the Red Data Book of Ukraine (1992)
- The Land Code (1992), Forest Code (1994), Water Code (1995), and Mineral Resources Code (1994)
- Law on the Animal World
- Law on Ecological Examination (Impact Assessment)

- National Program of Perspective Development of Reserves in Ukraine (1994)
- Strategy for Maintaining Biological Diversity in Ukraine (1997)
- Strategy for Protection and Reproduction of the Environment of the Sea of Azov and Black Sea (1998)
- Law on the Development of the National Environmental Network for 2000-2015 (2000)

The accession of the above laws indicates that the legal framework for management of biodiversity has improved since independence. However, priorities for funding the various programs of the above laws and the Strategy need to be realistically defined to prevent the problem that only half of "priority" funds are available (ECE 1999). While some laws do specify funding needs, actual implementation can only occur with funding through the Parliamentary budgetary process.

Major Environmental Agreements

Ukraine has ratified or signed the major environmental agreements related to natural resources, including:

- Convention on Biological Diversity (Rio) – Ratified
- Convention on Wetlands on International Importance as Waterfowl Habitat (Ramsar) – Ratified
- Convention on the Conservation of Migratory Species of Wild Animals (Bonn) – Ratified
- Convention on the Conservation of European Wildlife and Natural Habitats (Bern) –Ratified
- Convention Concerning the Protection of World Cultural and Natural Heritage (Paris) – Ratifed
- Convention on International Trade in Endangered Species (CITES) – Acceded, not Ratified
- Agreement on the Preservation of Bats in Europe – Ratified
- Agreements to protect and manage trans-boundary watercourses - Ratified
- Convention on access to information, public participation in decision-making and access to justice in environmental matters (Aarhus) – Ratified

Ukraine has also ratified or signed major international agreements regarding pollution, climate change, hazardous materials and environmental impact assessments.

Many of the laws, while providing a basic framework, require a more precise definition of roles and responsibilities for implementation, or, at the least, a deadline to develop such definitions. The Law on the Development of the National Environmental Network for 2000-2015 assigns responsibility for implementation to "the specially authorized central body of executive power in charge of environment and natural resources together with interested central and local bodies of executive power." The law specifies timelines for creation of new protected territories and expansion of already existing territories, but does not show specific locations of such territories.

There may be a lack of willingness on the part of the government to implement environmental laws and comply with the obligations under international agreements. While working in Ukraine, the team saw evidence of a road being built across the Dnister Delta. Apparently, this road was being constructed without an environmental impact assessment (as required by the Law on Ecological Examination). Fortunately, public attempts to require that an EIA be completed were eventually successful; the project was temporarily delayed in part by invoking Ukraine's adoption of the Aarhus Convention (see agreements in box above).

C2. International Agreements

The national laws discussed above are written in part to address requirements of international agreements, many of which the government of Ukraine has signed or ratified in the last 10 years. To implement these international agreements and new laws, the government of Ukraine and other stakeholders face substantial challenges. Implementation will be expensive and requires a long-term plan to train and deploy people with the required expertise.

As one of the requirements of the Convention on Biological Diversity (Rio Convention), in 1996 Ukraine drafted the First National Report of Ukraine on the Conservation of Biological Diversity, followed by the 1998 Strategy. To implement the Rio Convention, Ukraine set up the Inter-Agency Coordination Commission on Conservation of Biological and Landscape Diversity, consisting of representatives of the MOE, research institutions and NGOs. The Strategy needs to address steps and financial requirements as well as set a realistic timeline for implementation of the Convention of Biodiversity.

Wetlands of the Dnister River Delta provide international protection as a RAMSAR site. *Photo by I. Rusev.*

In 1992, Ukraine, Russia, Georgia, Turkey, Bulgaria and Romania (the Black Sea countries) drafted the Convention for the Protection of the Black Sea against Pollution (Bucharest Convention), which was ratified by all six countries by 1994. The Bucharest Convention was created in recognition that the transboundary nature of these problems required more coordinated efforts. It includes specific protocols for: 1) the control of land-based sources of pollution; 2) dumping of waste; and 3) joint action in the case of accidents (such as oil spills). In 1993, the Black Sea countries launched the Black Sea Environmental Program (BSEP) to implement the Convention. The work of the BSEP resulted in the Transboundary Diagnostic Analysis (TDA), which identifies and analyses the root causes of perceived and real transboundary problems contributing to the Black Sea's demise, and areas where action is required. Based on the findings of the TDA, the Black Sea countries adopted a regional Strategic Action Plan for the Rehabilitation and Protection of the Black Sea (BS-SAP). The BS-SAP commits the Black Sea countries to actions under three categories: 1) Reduction of Pollution; 2) Living Resources Management; and 3) Sustainable Human Development. According to BSEP's website, the reduction of nutrient loading is currently the top priority in the BS-SAP.

While the adoption of the BS-SAP is a positive step forward in dealing with the Black Sea's environmental programs, it does not appear that any concrete actions have resulted under the BS-SAP's framework. Eight years after the Bucharest Convention was drafted, all countries are still stuck in the planning phases. Reduction of nutrients will require large sums of money invested in wastewater treatment improvements, agrochemical control and other technological improvements. Ukraine and the other countries involved may not have the resources to implement these actions, and are looking for assistance for implementation of the BS-SAP.

D. International Biodiversity Conservation Projects

The World Bank has supported the Danube River Delta Biosphere Reserve with a major Global Environmental Facility (GEF) project. The grant of $1,500,000 supported infrastructure building, equipment, training, and a management plan, including consultation with local stakeholders in the Ukrainian portion of this internationally recognized protected area. The Ukrainian National Academy of Sciences executes the project and provides salaries and other support to the reserve staff. Another World Bank GEF project provided $500,000 for training, research, and equipment (GIS-Geographic Information Systems) for the Trans-Carpathian Biosphere Reserve. The World Bank GEF program also supports enabling activities of the Convention on Biological Diversity. Grants under this program in the past three years have supported preparation of the National Report on Biological Diversity. All three of these projects are completed.

The World Bank is currently supporting a $7.15 million GEF project, "Conservation of the Biodiversity in the Azov-Black Sea Ecological Corridor." Specific project objectives are to: (i) establish a network of regional and national protected marine, wetland, and upland areas within the Ukraine Black Sea coastal zone; (ii) promote sustainable agriculture compatible with biodiversity conservation in agricultural landscapes; (iii) build capacity and awareness in biodiversity conservation and sustainable development; (iv) improve water quality and monitoring of water quality and biodiversity in the wetland and marine communities of the project region; and (v) support international cooperation activities under the Ramsar, Bonn, and Bern Conventions. The United States Trade and Development Agency (TDA) is supporting this project through a $197,500 study on the establishment of a biodiversity protection zone along the Azov-Black Sea corridor. The USAID-funded Ukrainian Land and Resource Management Center (ULRMC), a joint venture of the Environmental and Resources Research Institute of Ukraine and the Environmental Research Institute of Michigan, is conducting this study.

The United Nations Development Programme (UNDP) has several biodiversity projects ongoing and others in preparation. UNDP and the Canadian government are collaborating on "Preparation of a Strategic Action Programme (SAP) for the Dnipro River Basin and Development of SAP Implementation Mechanisms. This project runs from 1999 to 2002 with $5,000,000 from UNDP-GEF and $2,000,000 from IDRC. The transnational project is improving protection and management of this important river. Another international project of UNDP is "Creation of the Protected Areas in the Upper Pripyat River." This project is funded with a $25,000 GEF grant for project preparation. A parallel project is anticipated for the Pripyat in Belarus. UNDP is considering preparation of a large GEF transboundary project for the Pripyat. UNDP is also developing a project, "Sustainable Development of Mountain Ecosystems in Potentially Crisis Regions of Ukrainian Carpathians." Preparation of this project is supported by a $20,000 PDF-A grant from GEF and the final proposal will be submitted to GEF later this year for a medium-size

grant. The project will address forest and watershed management. A project for “Improving Biodiversity Conservation in Priority Protected Areas” is also being prepared for GEF. The project would help protect and manage World Heritage sites of Podilski Tovtry, Svyati Gory, and Karadag. Yet another request to the GEF is being considered for a project, “Biosphere Properties of Black Soils (Chornozems) and Integrated Management of Agrosystems of Ukraine.” These latter two projects may be combined as a single request for a large GEF grant.

TACIS is working in western Ukraine on a project supporting the Carpathian Transfrontier Ecological Network. This project will conserve biodiversity in the Bukovyna Carpathians, where many Bern-listed species occur. Another TACIS project with Odesa University and Odesa Oblast is focused on restoration and conservation of wetlands along the Black Sea.

The Dutch Ministry of Agriculture, Nature Conservation and Fisheries, and the Dutch Ministry of Foreign Affairs (MATRA Fund) provide support to various projects in Ukraine, including the national office reporting on Important Bird Areas (a program of BirdLife International).

SECTION V

USAID/Ukraine

The USAID assistance program in Ukraine for the period 1999-2002 has two overarching objectives: "1) help Ukraine realize its potential in building a strong, independent, democratic and economically viable country by increasing its self-reliance; and 2) further Ukraine's effort to integrate into the global community and forge stronger ties with the West." (USAID 1999). This assessment is based on review of the documents provided by USAID and interviews with USAID staff. The seven strategic objectives of the Mission are described below. The Mission's activities of the past few years and upcoming projects brought to the attention of the assessment team are also described, at least for activities those potentially impacting biodiversity. Finally, opportunities are identified that would help to minimize impacts on biological diversity or, within the context of the strategic objectives, would assist Ukraine to better protect and manage biodiversity.

A. Impacts of USAID Program on Biodiversity

A1. Privatization And Financial Markets Development

The vast majority of state-owned enterprises in Ukraine were privatized over the past five years. Hence, most of USAID's support for this objective is ending or being transferred to other objectives. Privatization work continues in the following areas; unfinished construction sites, housing, urban land and the private provision of residential maintenance services. Financial markets development assistance includes providing technical assistance, training and equipment to support Ukraine's Securities Commission, improving the framework for private companies, increasing transparency in accordance with international accounting standards, and other related activities.

The financial market assistance is unlikely to have major direct impacts on biodiversity. There is a remote possibility that privatization of some industries or service companies (e.g., those related to agriculture or forestry) might indirectly impact biodiversity, but none where identified during the course of this review. During the past decade ownership of agricultural land was transferred from the state to collective agricultural enterprises and 6.5 million land share titles issued to individual collective members. Additionally, the number of private farms rose from under 2,000 in 1992 to 36,000 in 1997. This accounts for more than 900,000 hectares transferred and land titles issued to more than 155,000 people. The implications of privatizing agricultural lands are discussed under 1.4 below.

There is a continuing strategic objective to assist with privatization of the energy sector, with potential implications for biological diversity. If there is a real rise in the cost of energy, more people will heat their homes with wood, increasing pressure on Ukraine's dwindling forest resources. Neighboring Moldova is blaming their decline in forest cover, in part, to increasing energy costs and corresponding increases in harvest of wood for home heating.

A2. Business Development

This strategic objective supports private small and medium enterprises (SME) through transfer of business skills, reforms to legal and regulatory environment, and increasing access to financing. A network of 15 business centers reaches businesses all over the country. Access to finance has been improved largely through coordinated programs of other donors.

This program could impact biological diversity, negatively or positively depending on what sorts of businesses are supported. Support to businesses impacting the rural agriculture or forestry sectors could inadvertently have a negative impact on biodiversity. Alternatively, intentional targeting of support to environment-friendly businesses in these sectors could have a positive impact on natural resources. For example, support could go to businesses promoting tourism in protected areas and the surrounding buffer zones (e.g., bed and breakfast, tour guides, sport fishing in the Danube Biosphere Reserve). There are also indications that development of commercial nurseries for forest and fruit tree species would be both profitable and help to diversify current monoculture landscapes.

A3. Economic Restructuring

This strategic objective aims to reform the tax structure, improve budget estimates, strengthen business skills at the national bank, provide policy research, strengthen the legal framework regarding financial issues, reform regulation of private businesses, and promote public access to the legislative process. This program is unlikely to have a substantial, direct impact on the environment. There may be opportunities to recommend changes to the tax code that would favor the environment, for example, reduced taxes for maintaining natural features on private land set aside through conservation easements.

A4. Agriculture

The strategic objective for the agricultural sector addresses the areas of: 1) developing private sector business for agriculture inputs and outputs; 2) privatizing agricultural land; 3) reducing impacts from agricultural chemicals; 4) privatization of agriculture industry complexes such as grain storage and marketing; and 5) agriculture policies to facilitate private-sector market economy. This strategic objective may have significant impacts on biodiversity in Ukraine.

In the past decade, the USAID-supported program assisted with the transfer of land from the state to collective farms and provided members of the collective farms with share-titles. Share titles may give members the impression that they are entitled to a specific number of hectares. Furthermore, the cooperative might provisionally assign specific tracts of land to individuals, with the expectation that ownership of the assigned lands will be confirmed at the time of titling. This was the case in some areas of Moldova and was cited there as a factor that foreclosed on options for protecting natural resources. In the course of this assessment, the team did not learn if this problem has developed in Ukraine, though it would be surprising if some variation of the problem is not encountered during the land titling process.

Changes in land tenure frequently lead to changes in land management practices. Of particular concern are the potential losses of native steppe, wetlands and forests from the agriculture

landscape. Anecdotal information abounds about the environmental impacts of the breakup of large state-run farms into small private farms. Possible positive environmental impacts that have been mentioned in Ukraine or other countries include: 1) land ownership motivates better environmental management because the owner has a vested interest in the long-term health of the land; 2) independent farmers are more cost-sensitive than state subsidized farms and so will apply fewer chemicals, plough less; 3) areas that are underproductive (e.g., wetlands, steep slopes) are not farmed and returned to other habitat types; 4) smaller farms tend to be more diversified as landowners try to meet a wider variety of subsistence needs; and 5) the relative abundance of "edge" generally increases with a decline in farm size which improves wildlife diversity. However, little data exists to support these assumptions in Ukraine. There is evidence from elsewhere that found some of these assumptions do not hold water. For example, a case study in Honduras (Bonnard, 1996) found that land privatization and land titling did not promote investment in the land.

The other components of this strategic objective could be directed to avoid or minimize potential negative impacts of land privatization. For example, programs to train farmers and provide them with incentives and technology could encourage them to plant more diverse crops and shelter belts, use low-till methods and modern chemicals, which most often are less toxic than chemicals currently being used.

A5. Energy and Environment

The energy component of this strategic objective focuses on: 1) restructuring the power sector; 2) privatizing companies in the power sector, 3) development of a coal bed methane industry, 4) improving energy production and conservation, and 5) nuclear safety. The environment component focuses on: 1) strengthening institutions within government, private sector and NGO community; 2) assisting governments to improve operations and management of infrastructure, particularly water systems; 3) improving environmental assessment capacity within industry and promoting development of eco-efficient businesses; and 4) assisting with issues related to closure of the Chornobyl Nuclear Power Plant.

The energy component of this objective will not likely impact natural resources on a large scale. Mining and processing related coal methane production will have local impacts that should be addressed through appropriate impact assessment and mitigation programs. Improving energy efficiency, thereby reducing energy consumption will have long-term positive impacts on the environment, including forests and biodiversity.

The environment component of this objective should have positive impacts on biodiversity. In particular, efforts to increase private sector and NGO participation in environmental issues can have far reaching positive impacts and is supportive of Ukraine's obligations under the Aarhus Convention (Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters). Additionally, the programs support to eco-friendly business practices will indirectly improve conditions for biodiversity.

A6. Democratic Reforms

Programs to promote democratic reform are intended to: 1) promote competitive and fair elections; 2) support laws and regulations supportive of the democratic process; 3) strengthen local government to be responsive and accountable to citizens; 4) empower citizens, NGO and political parties; and 5) strengthen independent media. This objective supports NGOs and local governments, mostly in urban areas. Nevertheless, these activities have a positive impact on biodiversity, particularly as they facilitate public participation in solving Ukraine's environmental problems.

A7. Social Protection

This strategic objective is designed to help protect the most vulnerable members of Ukraine's population. Activities focus on the most urgent humanitarian and health needs by: 1) supporting changes from universal housing and communal services to those based on income; 2) providing humanitarian assistance and strengthening NGO capacity to deliver social services; 3) laying the foundation for a system of pensions and social security; and 4) support to improve quality and access to reproductive health care, including emergency medical assistance. These programs are not expected to have an impact on biodiversity.

Cross-cutting initiatives that incorporate components from two or more of the programs described above in the same geographic areas are the most likely to have positive impacts on natural resources and the environment.

B. Recommendations to USAID/Kiev, Ukraine

The following recommendations are made within the framework of USAID's current programs in Ukraine. The actions recommended would be most effective if USAID were to implement them as an integrated program. A moderate investment targeted to a crosscutting theme of biodiversity conservation could realize substantial success within the context of USAID's primary portfolio.

1. Conduct a comprehensive analysis of the impacts of land titling on biological resources including recent studies, current guidelines, and legislation and field-level practices. The study should compare and contrast stewardship changes on private land with the communal lands and should be made available to a broad privatization constituency including GOU officials and multilateral donors.

2. Within the Land Titling Initiative, develop a monitoring and mitigation component that will: 1) establish a baseline that enables USAID and the World Bank to assess the changes to the landscape and land management practices; 2) identify land-use change parameters and indicators of biodiversity improvement/loss; and 3) periodically collect and report data regarding changes in wetland, forest, steppe, and aquatic habitats. The Ukraine Land and Resource Management Center, a USAID supported program, could provide remote sensing and GIS support to this effort.

3. Based on 1 and 2 above, develop and implement a natural resources management mapping and training program for commercial and public sector surveyors and village land use planners. Specify training tools and field manuals for the identification and delineation of potential and gazetted protected areas including sites for potential restoration of critical habitats. Identify fragile or degraded areas including wetlands and riparian zones and erosion-prone sites, community-managed forests and pasturelands, and areas potentially contaminated through overuse of agrochemicals or proximal to other toxic sources.

4. In 2-3 rural regions establish pilot programs to improve natural resources management through integrated components of USAID's strategic objectives, including privatization, decentralization, local governance, support to new enterprises, energy efficiency, and public participation through civil societies. Consider focusing on buffer zones adjacent to protected areas. Develop a farm store program similar to the program in Moldova with focus on forest and fruit tree production for profit and environmental values. Support programs to strengthen extension services related to improving the status of biological diversity on small private farms. Goals should include measures to reduce runoff of soil and nutrients from fields and feedlots (soil conservation improves water quality of rivers and the seas), promote use of modern pesticides and appropriate application methods, restoration and protection of streamside buffers, etc. Evaluate the potential for eco-friendly businesses that utilize, in a sustainable way, resources from the natural landscape.

5. Encourage market-based certification instruments that promote environmental values into internationally traded products. Analysis and targeted support for development of internationally recognized forest and organic produce standards will improve access to increasingly discriminating markets. Moreover, accelerating multinational company application of environment, social, and corporate accountability standards (e.g., FSC, ISO 14001, and SA 8000) will be increasingly important in attracting international investment.

SECTION VI

Findings and Recommendations

This section summarizes the findings of the assessment and offers general recommendations to the government of Ukraine, international donors and other stakeholders working in Ukraine.

A. Summary of Findings

1. Biodiversity in Ukraine was systematically erased during the Soviet era, largely to make way for large-scaled, mechanized agriculture. Steppe and steppe-associated wetland ecosystems (meadows and marshes) were particularly hard hit, with perhaps a 99 percent loss of mesic to semi-arid steppe. Wetlands in the steppe and forest-steppe biomes have undergone similarly drastic declines. Today's simplified agricultural landscapes unnecessarily diminish biological diversity. Where the entire landscape is reduced to large monocultures, simple windbreaks, and engineered hydrological systems, there remain few opportunities for biodiversity to exist.

2. Privatization of agricultural land may have a significant impact on the biodiversity and natural resources, particularly in the steppe and steppe-associated wetland ecosystems that have already been drastically reduced. In the past 80 years there has been a substantial loss of awareness of the values and roles of biodiversity in the context of the local economy and traditions. Anticipated changes in land tenure create a need to reestablish awareness and improve values for environmental services and sustainable natural resource production at the local scale. Given the appropriate tools and training, farmers may use pesticides and other chemicals more rationally, as well as employ cultivation techniques that conserve soil and promote crop diversification, all to the benefit of biodiversity and the overall environment.

3. Land-based activities and construction of dams have seriously impacted biodiversity of rivers. Pollution and sedimentation result in poor water quality in nearly all of Ukraine's rivers. Dams have eliminated river habitats and reduced natural flow rates required for reproduction of numerous fish species.

4. Poorly regulated hunting of game species and uncontrolled collecting of wild plants for horticultural, culinary and medicinal use are serious threats to declining population of native species on the few remaining natural areas. Endangered plants species are particularly threatened by these activities.

5. Biodiversity of the Black Sea and Sea of Azov, and of the coastal wetlands, is severely compromised, largely as a result of land-based activities and the introduction of exotic species. Nutrient loading, sedimentation, and industrial contamination are all contributing to dramatic declines in commercial fisheries and important coastal habitats. The single greatest threat to these seas is eutrophication caused by nutrients introduced from the mainland. The main sources of this problem are agriculture (50 percent), industry (25

percent), and human and urban waste (25 percent). Loss of biodiversity in rivers and seas can be directly tied to decline of fisheries.

6. Over the past 10 years there has been a substantial reduction in pollution from industry and agrochemicals, largely due to the general economic decline. Biodiversity has undoubtedly benefited from cleaner air, water and soils. However, localized but serious contamination associated with the use and storage of agrochemicals, agriculture infrastructure, and neighboring industry is significant, but poorly mapped. The transfer of environmental liabilities during privatization does not currently include methods to evaluate pollution and remediation costs nor does it include investment required to improve biodiversity within farmscapes.

7. The protected area system is inadequate in ecological coverage. Although the geographic coverage may be adequate, most protected areas would be more ecologically viable if supported by broader landscape initiatives. A few of the larger reserves are well managed (largely with international assistance) but scores or hundreds of small reserves are “paper parks.” Protection is urgently needed for many unique habitats and endemic species in Crimea.

8. Data and information are mostly inadequate, or too poorly organized, to determine the distribution and condition of biodiversity in Ukraine. Wide variations in management objectives, reporting formats, and research protocols make comparative analysis difficult.

9. Considering that the country began writing legislation only 10 years ago, the legal and policy framework is mostly adequate and improving. However, the continued destruction of the few remaining wetlands and native steppe has gone practically unnoticed, suggesting that the laws, regulations or enforcement programs are inadequate to protect these critically endangered ecosystems. In contrast, forests are specifically protected and their management regulated by laws. Specific guidelines need to be written regarding how to implement many of the newer laws.

10. Implementation and enforcement of laws and regulations are often inadequate. Low wages and inadequate resources (e.g., insufficient transportation) for inspectors, as well as low penalties for illegal actions hinder enforcement of laws intended to protect natural resources. Ukraine is a signatory to most of the international environment agreements, but multiple requirements of the many international agreements and related national laws may be overwhelming implementation capacity.

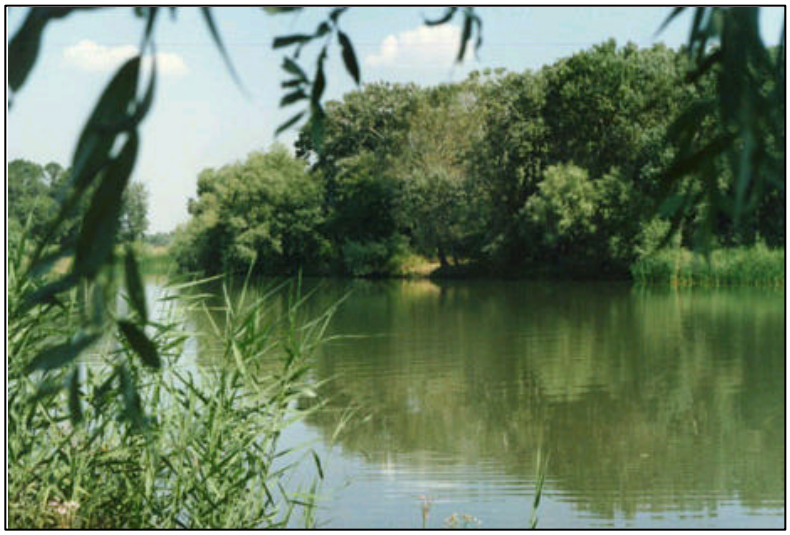
11. Conservation at the local level is energized and dynamic but suffers from inadequate organizational capacity and a paucity of information. Available data are inadequate for people to gauge how their lives have been impacted by decisions made by government and industries. The authority and capacity to manage natural resources at the local (village) level is inadequate and should be supported through integration of conservation programming in land titling and other economic development activities.

12. Evolving nongovernmental organizations working on natural resources issues and civil society remain too weak to effectively participate and lead in the broad range of biodiversity and natural resources issues. There are several effective NGOs working on specific issues (e.g., bird conservation issues), showing that these organizations can operate in Ukraine. There are effective environmental education and awareness programs directed at children.

13. The high literacy rate and a well-educated population make it possible to use outreach and extension programs to effectively change how people view and use natural resources.

B. Recommendations for Improved Biodiversity Conservation

1. Increase protection of remaining examples of the most threatened ecosystems, including steppe and steppe-associated wetlands (wet meadows, ephemeral wetlands, small streams with marsh edges). Implement the National Environmental Network, adding selected properties to the national systems of protected areas. Clarify the role, authority and obligations of oblast and village officials to manage protected areas. Strengthen management programs of protected areas at the local level. Identify and support national policies that promote establishment of conservation easements, community set-asides, and other less-than-fee conservation measures for protection of additional priority sites that could be protected or reclaimed on private and communal lands.



Maintaining forests along rivers and stream in agricultural lands provides diverse resources for people and habitat for animals, and helps protect rivers, wetlands and seas from chemical pollution and sedimentation. *Photo by I. Rusev*.

2. Heighten and diversify agriculture biodiversity values by improving fiscal incentives and public and private extension capacity for conservation, farm forestry, and commercial distribution of multiple use species. Use commercial and public extension programs to encourage the establishment of multipurpose shelterbelts and woodlots and the restoration of gallery forests and wetlands in newly privatized areas and remaining communal lands. Use of native species should be promoted whenever possible.

3. Increase the transparency of land use decision-making as a tool to reduce environmentally abusive land use planning and permitting. Gain consensus on the definitions of and the areas to be excluded from the land titling exercise. Document land-use decisions, include them on maps, and make these accessible to the public.

4. In the land titling initiative, develop systems and training for surveyors and local land use planners in broader environmental analysis with particular attention to conserving fragile wetlands, native steppe and forests, and identification of contaminated lands. Require management plans that place conservation easements and establish restoration goals for lands identified as degraded during the land titling initiative. Use satellite imagery, Geographic Information Systems (GIS), and coordinated field surveys to identify sites of native vegetation and to monitor progress on management programs on new private farms and communal lands. The Ukraine Land and Resource Management Center could provide remote sensing and GIS support to this effort.

5. Develop the regional capacity to collate, analyze, and disseminate applied research on the effects of land privatization on biodiversity and natural resources management. Identifying landscape scale changes in stewardship practices will require forging of multidisciplinary teams of local practitioners, scientists, and policy makers and should be undertaken as soon as possible.

6. Support creation of a national biodiversity information clearinghouse and service center to collect and organize information about biodiversity and to provide all stakeholders with information products. The program should inventory and monitor the status of ecosystem and natural communities, endangered species and exotic species. An ongoing inventory of biodiversity would greatly facilitate Ukrainian reporting requirements under international treaties, such as the Convention on Biological Diversity. Inventory data would also provide products useful for development activities, including species lists of birds and other groups for the more popular eco-tourism destinations in national parks and reserves.

7. Expand reforestation programs, particularly in the Carpathian and Crimean Mountains, in watersheds with high potential for flooding and erosion, and along streams and rivers throughout the county. Help private landowners and managers of communal lands to increase forest cover in the agricultural landscape and manage these forests for economic gain and wildlife values. In all cases, encourage use of native species and use of multiple species with diverse economic uses and wildlife values.

8. Prepare and implement a more aggressive program for recovery and protection of the Black Sea and Sea of Azov. This program must be tied to land management practices, urban and industrial environmental practices across all of Ukraine.

9. Continue to monitor biodiversity in the Chornobyl Exclusion Zone to learn how species and ecosystems are changing, and if and how they might impact biodiversity outside the impacted area.

ANNEX A

Sections 117 and 119 of the Foreign Assistance Act

Foreign Assistance Act, Part I, Section 117 — Environment and Natural Resources

Sec. 117\71\ Environment and Natural Resources

(a) The Congress finds that if current trends in the degradation of natural resources in developing countries continue, they will severely undermine the best efforts to meet basic human needs, to achieve sustained economic growth, and to prevent international tension and conflict. The Congress also finds that the world faces enormous, urgent, and complex problems, with respect to natural resources, which require new forms of cooperation between the United States and developing countries to prevent such problems from becoming unmanageable. It is, therefore, in the economic and security interests of the United States to provide leadership both in thoroughly reassessing policies relating to natural resources and the environment, and in cooperating extensively with developing countries in order to achieve environmentally sound development.

\71\ 22 U.S.C. 2151p. Sec. 117 was redesignated from being sec. 118 by sec. 301(1) of Public Law 99-529, resulting in the creation of two sections 117. Sec. 301(2) of Public Law 99-529 (100 Stat. 3014) further deleted subsec. (d) of that section, which dealt with tropical forests, and then sec. 301(3) of Public Law 99-529 added a new section 118 entitled “Tropical Forests”. This section, as added by sec. 113 of Public Law 95-88 (91 Stat. 537) and amended by sec. 110 of Public Law 95-424 (92 Stat. 948) and sec. 122 of Public Law 96-53 (93 Stat. 948), was further amended and restated by sec. 307 of the International Security and Development Cooperation Act of 1981 (Public Law 97-113; 95 Stat. 1533). This section previously read as follows: “Sec. 118. Environment and Natural Resources--
(a) The President is authorized to furnish assistance under this part for developing and strengthening the capacity of less developed countries to protect and manage their environment and natural resources. Special efforts shall be made to maintain and where possible restore the land, vegetation, water, wildlife and other resources upon which depend economic growth and human well-being especially that of the poor.”

(b) In carrying out programs under this chapter, the President shall take into consideration the environmental consequence of development actions.” See also sec. 534 of the Foreign Operations, Export Financing, and Related Programs Appropriations Act, 1990 (Public Law 101-167; 103 Stat. 1228), as amended, relating to “Global Warming Initiative”. See also sec. 533 of the Foreign Operations, Export Financing, and Related Programs Appropriations Act, 1991 (Public Law 101-513; 104 Stat. 2013), as amended, relating to “Environment and Global Warming”. See also sec. 532 of the Foreign Operations, Export Financing, and Related Programs Appropriations Act, 1993 (Public Law 102-391; 106 Stat. 1666), relating to “Environment”.

(b) In order to address the serious problems described in subsection (a), the President is authorized to furnish assistance under this part for developing and strengthening the capacity of developing countries to protect and manage their environment and natural resources. Special

efforts shall be made to maintain and where possible to restore the land, vegetation, water, wildlife, and other resources upon which depend economic growth and human well-being, especially of the poor.
(c)(1) The President, in implementing programs and projects under this chapter and chapter 10 of this part,\72\ shall take fully into account the impact of such programs and projects upon the environment and natural resources of developing countries. Subject to such procedures as the President considers appropriate, the President shall require all agencies and officials responsible for programs or projects under this chapter—

\72\ Sec. 562 of the Foreign Operations, Export Financing, and Related Programs Appropriations Act, 1991 (Public Law 101-513; 104 Stat. 2026), added a new chapter 10 to part I of this Act, providing for long-term development in sub-Saharan Africa, and made a conforming amendment by inserting “and chapter 10 of this part” here.

(A) to prepare and take fully into account an environmental impact statement for any program or project under this chapter significantly affecting the environment of the global commons outside the jurisdiction of any country, the environment of the United States, or other aspects of the environment which the President may specify; and
(B) to prepare and take fully into account an environmental assessment of any proposed program or project under this chapter significantly affecting the environment of any foreign country. Such agencies and officials should, where appropriate, use local technical resources in preparing environmental impact statements and environmental assessments pursuant to this subsection.
(2) The President may establish exceptions from the requirements of this subsection for emergency conditions and for cases in which compliance with those requirements would be seriously detrimental to the foreign policy interests of the United States.

Foreign Assistance Act, Part I, Section 119 — Endangered Species

Sec. 119\75\ Endangered Species

(a) The Congress finds the survival of many animal and plant species is endangered by overhunting, by the presence of toxic chemicals in water, air and soil, and by the destruction of habitats. The Congress further finds that the extinction of animal and plant species is an irreparable loss with potentially serious environmental and economic consequences for developing and developed countries alike. Accordingly, the preservation of animal and plant species through the regulation of the hunting and trade in endangered species, through limitations on the pollution of natural ecosystems, and through the protection of wildlife habitats should be an important objective of the United States development assistance.

\75\ 22 U.S.C. 2151q. Sec. 119, pars. (a) and (b) were added by sec. 702 of the International Environment Protection Act of 1983 (title VII of the Department of State Authorization Act, Fiscal Years 1984 and 1985, Public Law 98-164; 97 Stat. 1045).

(b) \75\ In order to preserve biological diversity, the President is authorized to furnish assistance under this part, notwithstanding section 660,\76\ to assist countries in protecting and maintaining wildlife habitats and in developing sound wildlife management and plant conservation programs. Special efforts should be made to establish and maintain wildlife sanctuaries, reserves, and

parks; to enact and enforce anti-poaching measures; and to identify, study, and catalog animal and plant species, especially in tropical environments.
\76\ Section 533(d)(4)(A) of the Foreign Operations, Export Financing, and Related Programs Appropriations Act, 1990 (Public Law 101-167; 103 Stat. 1227), added “notwithstanding section 660” at this point.

(c) \77\ Funding Level.--For fiscal year 1987, not less than $2,500,000 of the funds available to carry out this part (excluding funds made available to carry out section 104(c)(2), relating to the Child Survival Fund) shall be allocated for assistance pursuant to subsection (b) for activities which were not funded prior to fiscal year 1987. In addition, the Agency for International Development shall, to the fullest extent possible, continue and increase assistance pursuant to subsection (b) for activities for which assistance was provided in fiscal years prior to fiscal year 1987.

\77\ Pars. (c) through (h) were added by sec. 302 of Public Law 99- 529 (100 Stat. 3017).

(d) \77\ Country Analysis Requirements.--Each country development strategy statement or other country plan prepared by the Agency for International Development shall include an analysis of-

(1) the actions necessary in that country to conserve biological diversity, and

(2) the extent to which the actions proposed for support by the Agency meet the needs thus identified.

(e) \77\ Local Involvement.--To the fullest extent possible, projects supported under this section shall include close consultation with and involvement of local people at all stages of design and implementation.

(f) \77\ PVOs and Other Nongovernmental Organizations.-- Whenever feasible, the objectives of this section shall be accomplished through projects managed by appropriate private and voluntary organizations, or international, regional, or national nongovernmental organizations, which are active in the region or country where the project is located.

(g) \77\ Actions by AID.--The Administrator of the Agency for International Development shall-

(1) cooperate with appropriate international organizations, both governmental and nongovernmental;
(2) look to the World Conservation Strategy as an overall guide for actions to conserve biological diversity;
(3) engage in dialogues and exchanges of information with recipient countries which stress the importance of conserving biological diversity for the long-term economic benefit of those countries and which identify and focus on policies of those countries which directly or indirectly contribute to loss of biological diversity;
(4) support training and education efforts which improve the capacity of recipient countries to prevent loss of biological diversity;
(5) whenever possible, enter into long-term agreements in which the recipient country agrees to protect ecosystems or other wildlife habitats recommended for protection by relevant governmental or nongovernmental organizations or as a result of activities

undertaken pursuant to paragraph, and the United States agrees to provide, subject to obtaining the necessary appropriations, additional assistance necessary for the establishment and maintenance of such protected areas;
(6) support, as necessary and in cooperation with the appropriate governmental and nongovernmental organizations, efforts to identify and survey ecosystems in recipient countries worthy of protection;
(7) cooperate with and support the relevant efforts of other agencies of the United States Government, including the United States Fish and Wildlife Service, the National Park Service, the Forest Service, and the Peace Corps;
(8) review the Agency's environmental regulations and revise them as necessary to ensure that ongoing and proposed actions by the Agency do not inadvertently endanger wildlife species or their critical habitats, harm protected areas, or have other adverse impacts on biological diversity (and shall report to the Congress within a year after the date of enactment of this paragraph on the actions taken pursuant to this paragraph);
(9) ensure that environmental profiles sponsored by the Agency include information needed for conservation of biological diversity; and
(10) deny any direct or indirect assistance under this chapter for actions which significantly degrade national parks or similar protected areas or introduce exotic plants or animals into such areas.

(h) \77\ Annual Reports.--Each annual report required by section 634(a) of this Act shall include, in a separate volume, a report on the implementation of this section.

ANNEX B

Scope of Work

The Contractor shall perform the following activities:

A. Hold meetings with the Bureau Environmental Officer (BEO) of USAID's E&E Bureau in Washington, the E&E Desk Officers, and others suggested by the Desk Officers to ensure full understanding of EE's program in Ukraine, Belarus and Moldova, USAID environmental procedures and purpose of this assignment. These discussions shall include any policy decisions and approaches which the BEO and Agency Environmental Advisor are taking as per their authority under Reg. 216, which may not be explicit in general legal documentation. The Contractor also shall meet with a representative of EE/EEST environment and energy divisions familiar with the USAID program as well as with a representative of the Bureau's democracy and governance office to cover to civil society-related issues. The Contractor also shall include meetings with relevant World Bank officials and with appropriate international NGOs to obtain current information on relevant studies, projects and initiatives.

B. The Contractor shall review and become familiar with materials provided by USAID and other important literature that is available on the internationally-funded Global Environmental Facility activities on international waterways, including the Danube, the Dnipro and Black Sea programs.

C. The contractor will also become familiar with the Moldova and Ukraine Programmatic Environmental Assessments that have been done for the agricultural sector and should be able to use them as a major resource.

D. Field a team to investigate and synthesize existing information and analyze the status of each country's biodiversity. The written report of this investigation shall include description of:

   1. Major ecosystem types highlighting important, unique aspects of the country's biodiversity, including important endemic species and their habitats.

   2. Natural areas of particular importance to biodiversity conservation, such as key wetlands, remaining old-growth or coastal areas critical for species reproduction, feeding or migration, if relevant.

   3. Plant and animal species which are endangered or threatened with extinction. Endangered species of particular social, economic or environmental importance should be highlighted and described, as should their habitats. An updated list, such as the IUCN red list should be included as an annex.

   4. Current and potential future threats to biodiversity including a general assessment of overall health of ecosystems and major factors affecting ecosystem health such as land use, pests, and/or contamination, etc. or major institutional or policy failures or

transboundary issues as appropriate. Special attention should be given to the long-term impact of the Chernobyl disaster, the forest industry in the Carpatians, the development of international transportation infrastructure, and Ukraine's plans to privatize agricultural land.

5. Conservation efforts including national policies and strategies, the status of financing for conservation, the status of country participation in major international treaties (with particular attention to the Convention on International Trade in Endangered Species – CITES), the country's protected area system, and botanical gardens/gene banks (if relevant) and their status, and monitoring systems. This section should also include recent, current and planned activities by donor and multilateral lending organizations (IFIs), international conservation NGOs, and agencies of the USG that support or significantly impact biodiversity conservation, including sustainable forestry, soil conservation, and efforts to combat desertification and establishment of parks. Identify NGOs, universities and other local organizations involved in conservation, and a general description of responsible government agencies. A general assessment of the effectiveness of these policies, institutions and activities to achieve biodiversity conservation should be included. Priority conservation needs which lack donor or local support should be highlighted.

6. USAID's program in general and, if relevant, 1) any perceived potential areas of concern related to biodiversity impacts with current or planned program activities, or 2) any potential opportunities for USAID to support biodiversity conservation consistent with Mission program objectives.

E. Prepare a report for Ukraine, Belarus and Moldova that incorporates and summarizes the information obtained and analysis required in the above activities on the status of biodiversity and conservation efforts and the implications for USAID programming and environmental monitoring to ensure compliance with 22 CFR 216 and Section 119(d). This report shall recommend actions that may be taken by Ukraine, Belarus and Moldova to conserve biodiversity, as well as activities that may be useful for USAID to support to ensure compliance with 22 CFR 216 and Section 119(d).

ANNEX C

Contacts

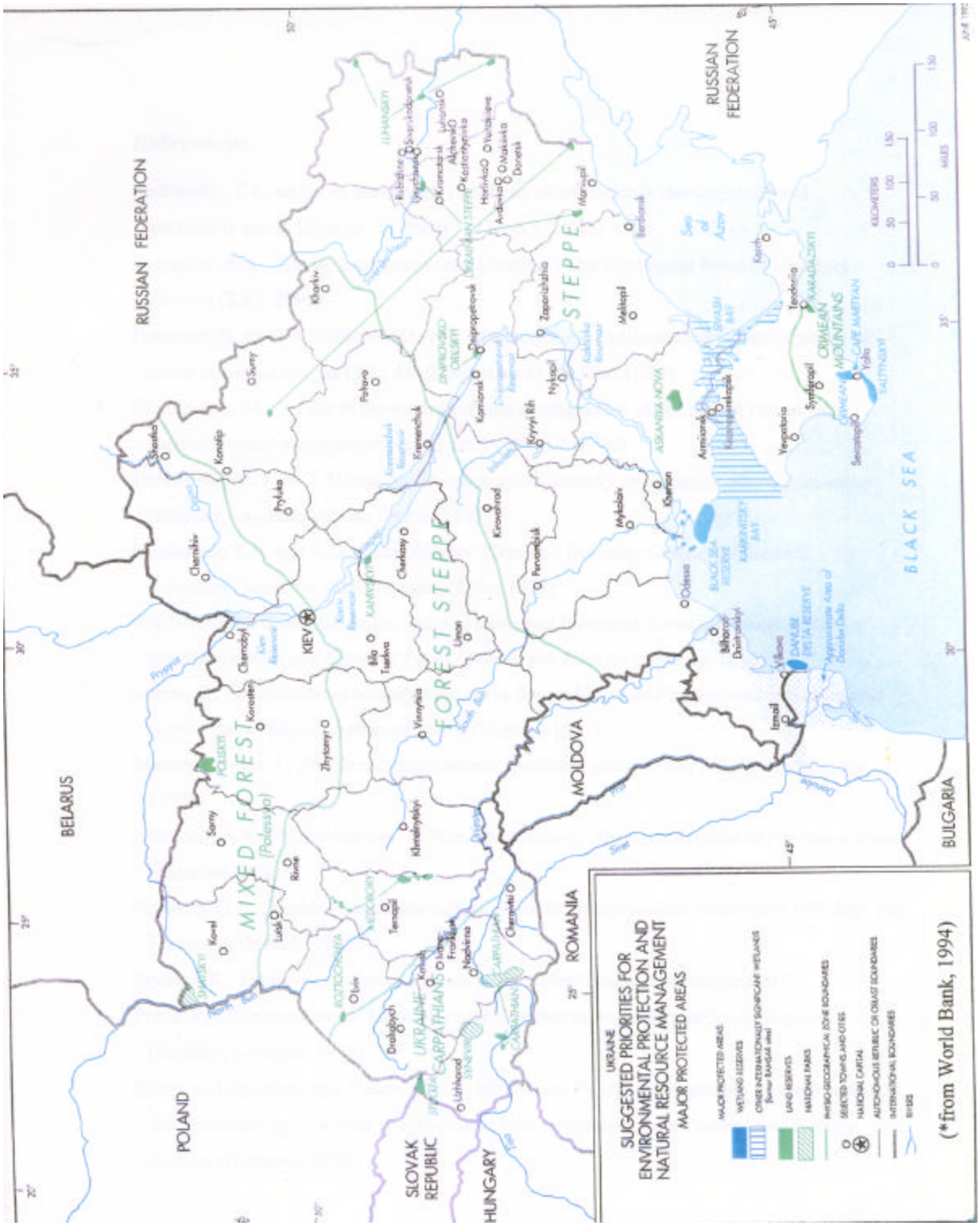
1. Volodymyr Balinsky, Director, Alvona Tourist Company
2. Vladimir Boreiko, Director, Ecological and Cultural Center
3. Rieks Bosch, Director, Interantional Ecological Consultancy, Odesa
4. John Brannaman, Program Manager, Small Enterprise Development, CNFA, Kyiv
5. Phillip Brylski, Biodiversity and Forestry Specialist, Europe and Central Asia Region, World Bank
6. Oleksander Cherkas, Environment Program Management Specialist, Office of Democracy and Social Transition, USAID-Kyiv
7. Bohdan Chomiak, Agriculture Regional and Policy Specialist, USAID Mission for Ukraine, Belarus and Moldova
8. David Diamonon, Deputy Program Manager, Ukrainian Land and Resource Management Center
9. Vladimir Domashlinets, Senior expert, Fauna Division, Bioresources Department, Ukrainian Ministry of Ecology and Nature Resources
10. Oleg Dudkin, Secretary, Ukrainian Society for the Protection of Birds
11. Akulina Fedorenko, Danube Biosphere Reserve Information Center
12. Alexei Gaivanenko, Director, Odesa Territory Branch, Ukrainian State Committee of Forestry
13. Elena Gubar, Director, ISAR
14. Sergei Gubar, Deputy Head, Department of the Protection, Use and Restoration of Natural Resources, Ministry of the Environment and Natural Resources of Ukraine
15. Boris Gudima, Deputy Head, Department of Science, Natural Resources, Fish Production and Marketing, State Committee of Fishery, Ukrainian Ministry of Agriculture
16. Mikhail Gunia, Deputy Head, Department of Science, Natural Resources, Fish Production and Marketing, State Committee of Fishery, Ukrainian Ministry of Agriculture
17. Judy Hansen, Munipal Development Advisor, AID office of Democratic and Social Transition
18. Dr. Viktor Havrylenko, Director, Ascania-Nova Biosphere Reserve
19. Igor Ivanenko, Vice Director, Department of Water Resources of Ukraine, Ukrainian Ministry of Ecology and Nature Resources

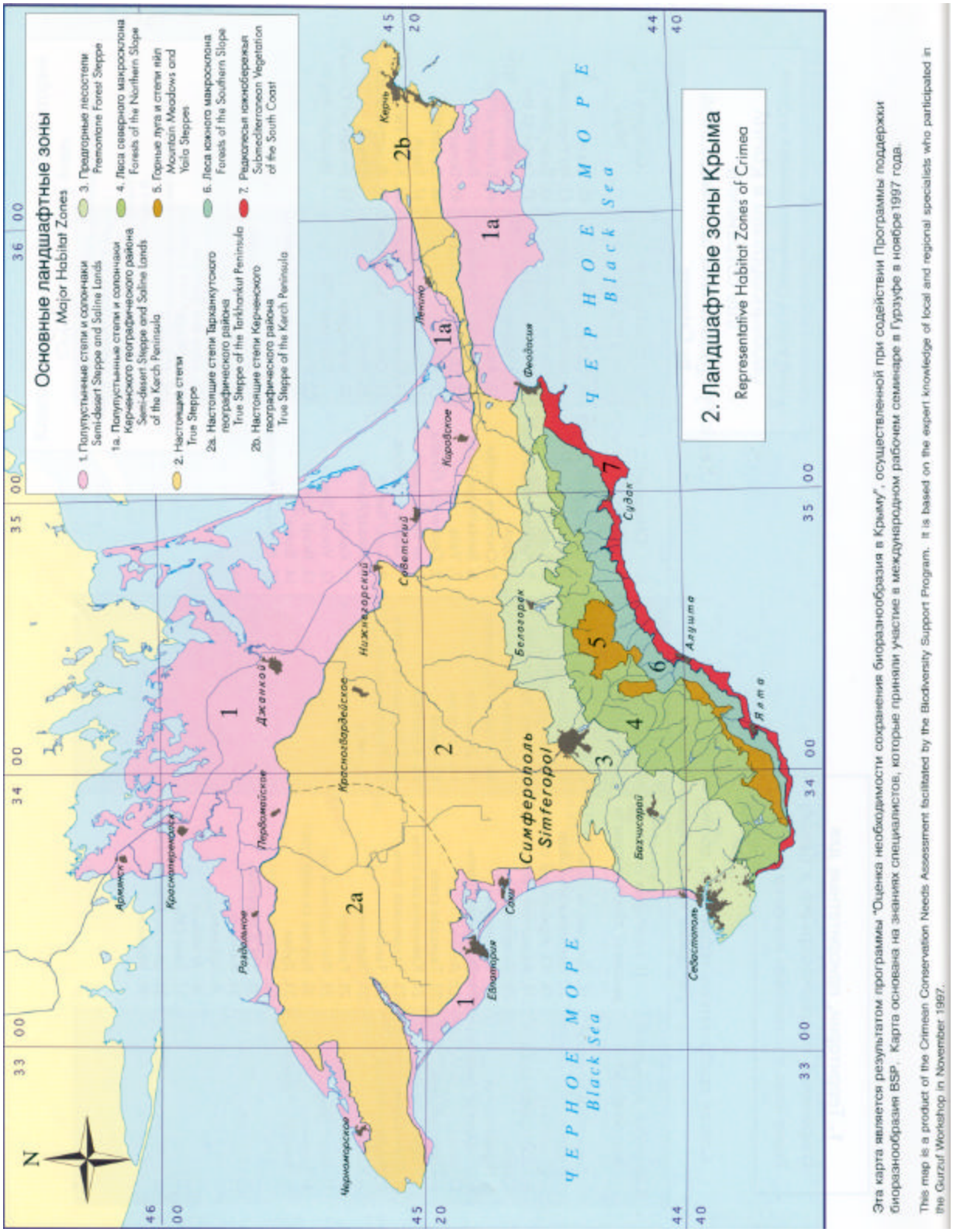
20. Olexandr Kolodyazhnyy, Technical Director, Ukrainian Land and Resource Management Center
21. Victor Kornienko, Head of the Science and Information Department, Ukrainian State Forestry Committee
22. Anatoliy Korzukov, Associate Professor of Zoology, Odesa National University
23. Ivan Kyssekyuk, Senior Scientist, Carpathian National Park
24. Mohammad A. Latif, Regional Environmental Officer, USAID, EE/EEST/ENR Bureau
25. Victor Los, Director, Development and Marketing Program, Ukrainian Land and Resource Management Center
26. Volodimir Maksymchuk, Adviser, Committee on Environmental Policy of the Verkhovna Rada of Ukraine
27. Yuriy Marchuk, Deputy Director of Committee, Ukrainian State Forestry Committee
28. Sergiy Matveyev, Vice Director, State Nature Protection Service, Ukrainian Ministry of Ecology and Nature Resources
29. Olexander Mazurkevich, General Director, Ukrainian Land and Resource Management Center
30. Olexander Mykitiuk, Director, National NGO Council of Ukraine, Director, Local Environmental Action Plan (LEAP) Program
31. Dr. Vyacheslav Oleschenko, First Deputy-Chief of the Legal Department, Administration of the President of Ukraine
32. Grygoriy Parchuk, Senior expert, International Cooperation Division, State Nature Protection Service, Ukrainian Ministry of Ecology and Nature Resources
33. Dr. Petro Pavlishenko, Executive Director, Regional Environmental Centre in Ukraine
34. Vasyl Pridatko, Specialist, Biodiversity And Sustainable Development, Ukrainian Land and Resource Management Center
35. Mikhail Popkov, Director, Scientific Information Center, Ukrainian State Forestry Committee
36. Tamara Ruseva, President, Natural Heritage Fund for Conservation of Wildlife on the Black Sea Coast
37. Yuri Samoilenko, Deputy of Verkhovna Rada of Ukraine, Chairman, Committee on Environmental Policy, Natural Recourse Utilization and Elimination of Chornobyl Catastrophe, Verkhovna Rada of Ukraine
38. Valentyn Serebryakov, President and Associate Professor of Zoology, Shevchenko National University

39. Yuriy Shelyag-Sosonko, Director, Institute of Botany, Ukrainian Academy of Sciences; Director, UNEP-Ukraine
40. Alexei Slenzak, Operations Officer, Environmental Sector, World Bank
41. Yurii Sobko, Deputy Director, Odesa Territory Branch, Ukrainian Ministry of Ecology and Natural Resources
42. Galina Storozheva, Director, Nature Reserve Department, Odesa Territory Branch, Ukrainian Ministry of Ecology and Natural Resources
43. Dan Thompson, Environmental Advisor, USAID-Kyiv
44. Dumenko Vitaliy, Zoologist, Askania-Nova Biosphere Reserve
45. Alexander Voloshkevich, Director, Danube Biosphere Reserve
46. Dr. Valentin Voloshyn, Director, Department of Problems of Nature Use and Environmental Protection, National Academy of Sciences Of Ukraine
47. Oksana Volosko-Demkiv, Programme Officer on Enironmental Issue, United Nations Development Programme
48. Oksana Volosko-Demkiv, UNDP Environmental Programme Officer, Kyiv
49. Bob Wallin, Officer-in-Charge, Ukraine, Moldova, Belarus, USAID /Ukraine
50. Mykola Zalogin, Senior Marketing And Research Specialist, Ukrainian Land and Resource Management Center
51. Dr. Mykhailo Zhmud, Senior Researcher, Danube Biosphere Reserve

ANNEX D

Maps of Major Vegetation Types in Ukraine


RUSSIAN FEDERATION
BELARUS
POLAND
SLOVAK REPUBLIC
HUNGARY
ROMANIA
MOLDOVA
BULGARIA
RUSSIAN FEDERATION
BLACK SEA
Sea of Azov
KIEV
Kharkiv
Odessa
Donetsk
Dnipropetrovsk
Zaporizhzhia
Mariupol
Simferopol
Sevastopol
Yalta
Kerch
Yevpatoria
Feodosiya
Ismail
Izmail
Kherson
Mykolaiv
Nikopol
Kryvyi Rih
Kremenchuk
Poltava
Pryluka
Chernihiv
Konotop
Sumy
Shostka
Zhytomyr
Korosten
Rivne
Lutsk
Ternopil
Khmelnytskyi
Vinnytsia
Uman
Cherkasy
Kanivskyi Reservoir
Kaniv Reservoir
Kremenchuk Reservoir
Dnipropetrovsk Reservoir
Kakhovka Reservoir
Kyiv Reservoir
Dnipro
Pripyat
Desna
Siret
Prut
Dniester
Danube
Ukraine
Ukraine
Ukraine



Эта карта является результатом программы "Оценка необходимости сохранения биоразнообразия в Крыму", осуществленной при содействии Программы поддержки биоразнообразия BSP. Карта основана на знаниях специалистов, которые приняли участие в международном рабочем семинаре в Гурзуфе в ноябре 1997 года.

This map is a product of the Crimean Conservation Needs Assessment facilitated by the Biodiversity Support Program. It is based on the expert knowledge of local and regional specialists who participated in the Gurzuf Workshop in November 1997.

Map courtesy of: Biodiversity Support Program. 1999. Priority-setting in Conservation: A new approach for Crimea. Results of the Conservation Needs Assessment in Crimea. Biodiversity Support Program. Washington, D.C.

ANNEX E

List of Endangered Species for Ukraine: IUCN Red Data Book

Data from: Hilton-Taylor, C. (compiler) 2000. *2000 IUCN Red List of Threatened Species.* IUCN, Gland, Switzerland and Cambridge, UK. xviii + 61pp. Downloaded April 2001. http://www.redlist.org/.

Amphibians

Scientific Name	Common Name	Red List
Bombina bombina	European Fire-bellied Toad	LR/cd
Hyla arborea	European Common Tree	LR/nt
Triturus cristatus	Great Crested Newt	LR/cd
Triturus dobrogicus	Danube Crested Newt	DD
Triturus karelinii	Southern Crested Newt	DD
Triturus vulgaris ssp. ampelensis		DD

Birds

Scientific Name	Common Name	Red List
Anser erythropus	Lesser White-fronted Goose	VU A1acd+2bcd
Aythya nyroca	Ferruginous Duck	LR/nt
Branta ruficollis	Red-breasted Goose	VU B1+2c
Oxyura leucocephala	White-headed Duck	EN A1acde
Glareola nordmanni	Black-winged Pratincole	DD
Gallinago media	Great Snipe	LR/nt
Numenius tenuirostris	Long-billed Curlew	CR C2b, D
Aegypius monachus	Black Vulture	LR/nt
Aquila clanga	Greater Spotted Eagle	VU C1
Aquila heliaca	Imperial Eagle	VU C1
Circus macrourus	Pale Harrier	LR/nt
Haliaeetus albicilla	Grey Sea Eagle	LR/nt
Falco naumanni	Lesser Kestrel	VU A1bce+2bce
Otis tarda	Great Bustard	VU A2c
Tetrax tetrax	Little Bustard	LR/nt
Crex crex	Corn Crake	VU A2c
Acrocephalus paludicola	Aquatic Warbler	VU A1c+2c
Pelecanus crispus	Dalmatian Pelican	LR/cd
Phalacrocorax pygmeus	Pygmy Cormorant	LR/nt

Fish

Scientific Name	Common Name	Red List
Acipenser gueldenstaedtii	Russian Sturgeon	EN A2d
Acipenser nudiventris	Bastard Sturgeon	EN A1acde+2d
Acipenser ruthenus	Sterlet	VU A1c+2d
Acipenser stellatus	Stellate Sturgeon	EN A1acde+2d
Acipenser sturio	Baltic Sturgeon	CR A2d
Huso huso	Beluga	EN A2d
Alosa maeotica		DD
Alosa pontica		DD
Clupeonella cultriventris		DD
Misgurnus fossilis	Weatherfish	LR/nt
Sabanejewia aurata	Goldside Loach	DD
Aspius aspius	Asp	DD
Barbus cyclolepis		DD
Barbus plebejus	Italian Barbel	LR/nt
Carassius carassius	Crucian Carp	LR/nt
Cyprinus carpio	Wild Common Carp	DD
Gobio albipinnatus	White-finned Gudgeon	DD
Gobio kessleri	Kessler's Gudgeon	DD
Gobio uranoscopus	Danube Gudgeon	DD
Leuciscus borysthenicus	Black Sea Chub	DD
Pelecus cultratus	Ziege	DD
Phoxinus percnurus	Swamp Minnow	DD
Rutilus frisii	Black Sea Roach	DD
Rutilus pigus	Danube Roach	DD
Benthophiloides brauneri		DD
Mesogobius batrachocephalus		DD
Neogobius fluviatilis		DD
Neogobius gymnotrachelus		DD
Neogobius kessleri	Kessler's Goby	DD
Neogobius melanostomus		DD
Neogobius syrman		DD
Zosterisessor ophiocephalus		DD
Gymnocephalus acerina		DD
Gymnocephalus schraetzer	Schraetzer	VU A1ace
Percarina demidoffi		VU D2
Stizostedion marinum		DD
Stizostedion volgensis	Volga Zander	DD
Zingel streber	Streber	VU A1ce+2ce
Zingel zingel	Zingel	VU A1ce+2ce
Coregonus lavaretus	Lavaret	DD
Hucho hucho	Danube Salmon	EN A2bcde, B1+2bce
Umbra krameri	European Mud-minnow	VU A1ace

Eudontomyzon danfordi	Carpathian Brook Lamprey	LR/nt
Eudontomyzon mariae	Ukranian Brook Lamprey	DD

Mammals

Scientific Name	Common Name	Red List
Bison bonasus	European Bison	EN A2ce, C2a
Saiga tatarica	Saiga	LR/cd
Saiga tatarica ssp. tatarica	Russian Saiga	LR/cd
Lutra lutra	Common Otter	VU A2cde
Vormela peregusna ssp. peregusna	European Marbled Polecat	VU A1cd
Monachus monachus	Mediterranean Monk Seal	CR C2a
Grampus griseus	Grey Dolphin	DD
Tursiops truncatus	Bottlenose Dolphin	DD
Phocoena phocoena	Common Porpoise	VU A1cd
Rhinolophus euryale	Mediterranean Horseshoe Bat	VU A2c
Rhinolophus ferrumequinum	Greater Horseshoe Bat	LR/nt
Rhinolophus hipposideros	Lesser Horseshoe Bat	VU A2c
Barbastella barbastellus	Western Barbastelle	VU A2c
Miniopterus schreibersi	Common Bentwing Bat	LR/nt
Myotis bechsteini	Bechstein's Bat	VU A2c
Myotis dasycneme	Pond Bat	VU A2c
Myotis emarginatus	Geoffroy's Bat	VU A2c
Myotis myotis	Greater Mouse-eared Bat	LR/nt
Nyctalus lasiopterus	Giant Noctule	LR/nt
Nyctalus leisleri	Lesser Noctule	LR/nt
Desmana moschata	Russian Desman	VU B1+2c
Castor fiber	Eurasian Beaver	LR/nt
Sicista betulina	Northern Birch Mouse	LR/nt
Sicista subtilis	Southern Birch Mouse	LR/nt
Chionomys nivalis	Snow Vole	LR/nt
Cricetulus migratorius	Grey Hamster	LR/nt
Micromys minutus	Harvest Mouse	LR/nt
Microtus oeconomus	Root Vole	LR/nt
Microtus tatricus	Tatra Vole	LR/nt
Mus spicilegus	Steppe Mouse	LR/nt
Nannospalax leucodon		VU D2
Spalax arenarius		VU A1c, B1+2c
Spalax graecus	Balkan Mole Rat	VU D2
Spalax microphthalmus		VU D2
Dryomys nitedula	Forest Dormouse	LR/nt
Eliomys quercinus	Garden Dormouse	VU A1c
Glis glis	Fat Dormouse	LR/nt
Muscardinus avellanarius	Common Dormouse	LR/nt
Marmota bobak		LR/cd
Sciurus vulgaris	Red Squirrel	LR/nt
Spermophilus citellus	European Souslik	VU A1c
Spermophilus suslicus	Spotted Souslik	VU A1c

Reptiles

Scientific Name	Common Name	Red List
Elaphe situla	Leopard Snake	DD
Vipera ursinii	Meadow Viper	EN A1c+2c
Emys orbicularis	European Pond Turtle	LR/nt
Testudo graeca	Common Tortoise	

The text below gives summary definitions of the categories in the new system.

EXTINCT (EX) A taxon is Extinct when there is no reasonable doubt that the last individual has died.

EXTINCT IN THE WILD (EW) A taxon is Extinct in the wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A taxon is presumed extinct in the wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

CRITICALLY ENDANGERED (CR) A taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild in the immediate future, as defined by any of the criteria A to E.

ENDANGERED (EN) A taxon is endangered when it is not Critically Endangered but is facing a very high risk of extinction in the wild in the near future, as defined by any of the criteria A to E.

VULNERABLE (VU) A taxon is Vulnerable when it is not Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium-term future, as defined by any of the criteria A to E.

LOWER RISK (LR) A taxon is Lower Risk when it has been evaluated, but does not satisfy the criteria for any of the categories Critically Endangered, Endangered or Vulnerable. Taxa included in the Lower Risk category can be separated into three subcategories:

1. Conservation Dependent (cd). Taxa which are the focus of a continuing taxon-specific or habitat-specific conservation program targeted towards the taxon in question, the cessation of which would result in the taxon qualifying for one of the threatened categories above within a period of five years.
2. Near Threatened (nt). Taxa that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable.
3. Least Concern (lc). Taxa that do not qualify for Conservation Dependent or Near Threatened.

DATA DEFICIENT (DD) A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or

population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat or Lower Risk. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate. It is important to make positive use of whatever data are available. In many cases great care should be exercised in choosing between DD and threatened status. If the range of a taxon is suspected to be relatively circumscribed, if a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified.

NOT EVALUATED (NE) A taxon is Not Evaluated when it is has not yet been assessed against the criteria.

Plant listing from the UNEP/WCMC Threatened Plants Database 1997 on the WWW at:\
http://www.unep-wcmc.org/index.html?http://www.unep-wcmc.org/resources/index.htm~main

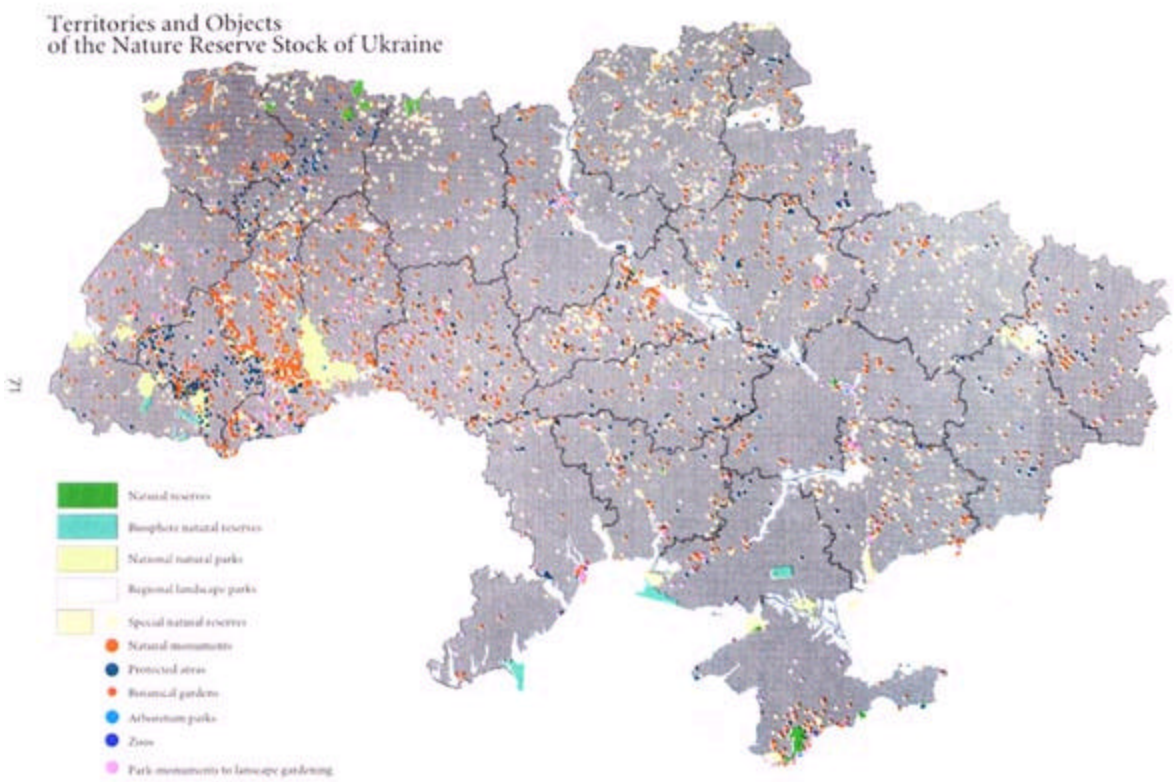
All these plant species are listed as I (= Indeterminate); their conservation status is not known.

Androsace koso-poljanskii Ovcz.
Brassica sylvestris (L.) Mill. ssp. taurica Tzvelev
Carlina cirsioides Klokov
Centaurea taliewii Kleopow
Colchicum fominii Bordz
Crambe steveniana Rupr.
Crataegus pojarkovae Kossych
Crocus angustifolius Weston
Daphne sophia Kalen.
Delphinium fissum Waldst. & Kit
Dianthus hypanicus Andrz.
Elytrigia stipifolia (Czern. ex Nevski)
Eremogone cephalotes (M. Bieb.) Fenzl
Galanthus elwesii Hook.f.
Genista tanaitica P.A.Smirn
Gladiolus palustris Gaudin
Gymnospermium odessanum (DC.) Takht.
Gymnospermium smirnowii (Trautv.) Takht.
Moehringia hypanica Grynj & Klokov
Nectaroscordum dioscoridis (Sibth. & Sm.) Zahar.
Onosma polyphylla Ledeb.
Ophrys oestrifera M.Bieb.
Pinus sylvestris L. var. cretacea (Kalen.) Komarov
Schivereckia podolica (Besser) Andrz.
Scrophularia cretacea Fisch. ex Spreng.
Stipa anomala P.A.Smirn.
Stipa syreistschikowii P. Smirn.
Zingeria biebersteiniana (Claus) P. Smirn

ANNEX F

Map of Protected Areas in Ukraine

Map from Ministry of Environment and Natural Resources, 1999. National Report on the State of Environment in Ukraine, 1999. Rayevsky Scientific Publishers, Kyiv.



ANNEX G

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