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# State of the art on knowledge of PEEN

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R.H.G. Jongman and V. Simeonova



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R.H.G. Jongman and V. Simeonova

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Alterra Wageningen UR  
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This report is an evaluation of the role of the Netherlands in the further development of PEEN and ecological networks in Central and Eastern Europe as part of the international biodiversity policy of the Netherlands. An analysis has been made of the PEEN products and the status of the process at present. Special attention has been given to Russia and Ukraine as well as to the knowledge needed to further support the development of PEEN. The main conclusions are that further strengthening of the knowledge basis in Central and Eastern Europe is essential and that it is important to develop European ecological corridors (east-west and north-south, but that such an initiative lacks an institution that can coordinate this technically and politically.

Trefwoorden: PEEN, Ecological networks, Research agenda, Ukraine, Russia, European Ecological corridors

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**Alterra-report 2033**

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# Abbreviations

BBI	Beleidsprogramma Biodiversiteit Internationaal
CBD	Convention on Biological Diversity
CCD	Convention to Combat Desertification
CEE	Central and eastern European Countries
ECNC	European Centre for Nature Conservation
ECONET	Ecological Network
EEA	European Environmental Agency
NEN	National Ecological Network
PEEN	Pan European Ecological Network
PIN	Programma Internationaal Natuurbeheer
PSO	Vereniging Personele Samenwerking met Ontwikkelingslanden
SCI	Site of Conservation Interest
SMART	Simple, Manageable, Achievable, Realistic, Timely
SPA	Special Protection Area
SPNA	Specially Protected Natura Area (Russia)
UAH	Ukrainian hryvnia
UNEP	United Nations Environmental Programme



# 1 Introduction

One of the questions that are important for determining the investments of the Dutch Ministry of Agriculture Nature and Food Quality in the coming years is the development in Europe concerning Ecological Networks. What is the 'state of the art' of knowledge about the realization of the Pan-European Ecological Network (PEEN) in relation to the Emerald Network strategies, Natura 2000 and NENs? Important is also the question what kind of research has been delivered until now and what, considering the policy objectives, are the knowledge gaps, especially concerning countries such as Ukraine and Russia.

PEEN is an internationally agreed initiative, built upon the ecological network concept and has been in development over the last 12 years. In October 1996 the Pan European Biological and Landscape Diversity Strategy (PEBLDS, Council of Europe et al. 1996) has been adopted in Sofia during the 3rd 'Environment for Europe' Ministerial Conference. Up to 54 European countries, including EU candidates agreed upon the development of PEEN within the next twenty years, as its first objective (Bonnin et al., 2007).

The lead for the establishment of PEEN has been taken by the Council of Europe as their initiative to develop a joint European response on the Convention of Biological Diversity (CBD). Part of the participating countries was candidate members of the European Union and became Member States in the last years. An intergovernmental Pan-European expert committee was established in order to guide the development of PEEN. The Council of Europe together with the European Centre for Nature Conservation (ECNC) were entrusted with the coordination of the establishment of the network in the framework of PEBLDS (Bonnin et al., 2007).

The underlying philosophy of the establishment of the PEBLDS is to promote synergy between the existing nature policies, land use planning and rural and urban development. PEEN as core part of it aims to ensure that:

- A full range of ecosystems, habitats, species and landscapes of European importance are conserved,
- Habitats are large enough to place species in a favourable conservation status,
- There are sufficient opportunities for the dispersal and migration of species,
- Damaged parts of the key environmental systems are restored,
- The key environmental systems are buffered from potential threats.

During the sixth Ministerial conference "Environment for Europe" held in Belgrade in 2007 the first overview on the progress in the constitution of PEEN has been presented. As a follow up of the previous Ministerial conferences, this report has been prepared by the Committee of Experts, composed of governmental delegates from several countries participating in the Pan-European Biological and Landscape Diversity Strategy and experts from European institutions and research institutes. Despite the political and economic changes during the last decade, the importance of PEEN tends to be more widely recognized by the public authorities across Europe. Assessing the state of art of knowledge on PEEN will give an insight on its status, knowledge gaps and future research needs.



## 2 Methods and data

The data has been collected from documents and interviews with the countries' representatives and members of the PEEN committee of experts and in the non-EU countries from the Committee of Expert and ECNC meetings. Also independent experts, officers within the EEA and the European Commission have been interviewed. Information from projects in CEE funded by the Netherlands is collected, both the PSO funded projects on ecological networks before 1997 and the PIN and BBI-Matra projects from 1998 on.

This analysis is based on the present status of PEEN and provides an outlook for the future. The approach includes a review of the existing plans and the phase of implementation of PEEN expressed within national and sub national initiatives on ecological networks, including the Emerald Network and the Natura 2000-network.

Data is gathered on the following issues:

- The countries that have been actively participating in the process;
- Inventory of character and coherence of the networks (especially in Russia and Ukraine);
- Data availability and use for species and habitats;
- Embedding in research and availability of spatial models;
- Legislative situation, integration into nature policy and spatial planning;
- Economic aspects, costs and benefits;
- Implementation process and financing mechanisms;
- Availability of handbooks and guidelines;
- Stakeholder involvement;
- Position of the Emerald network sites.



# 3 Present situation in ecological network development

## 3.1 The knowledge base

The concept of the ecological networks is mainly derived from scientific studies on population dynamics and island biogeography. Subsequently the concept has moved rapidly from scientific research to a conservation policy planning tool and consequently there are yet only few scientific studies of the efficacy of ecological networks and progress achieved in implementation in different countries.

In becoming a policy and planning tool, ecological networks have provided a framework for the integration of sectoral land (and sea) use policies to support and enhance ecological integrity. This framework is inherently scale-free and has been applied at the local to the pan-European level. However, the challenges of ecological network implementation increase as the scale of the concept has increased too. Thus an open question remains as to how the vision of a series of inter-connected landscape elements at larger European scale such as PEEN can be successfully transformed into reality (Kettunen et al., 2007). Especially the issue of international ecological corridors is a challenge for European research cooperation.

## 3.2 The status of PEEN

The status of PEEN is based on the international commitment agreed upon in PEBLDS and reinforced during the European Ministerial Conferences on Environment in Sofia in 1995, in Kyiv in 2003 and in Belgrade in 2007. The implementation of the network is the responsibility of the countries, which are party in this agreement. These are 52 countries in Europe and north-western Asia. The responsibilities for leading the PEEN establishment are shared between the Council of Europe and United Nations Environment Program (UNEP) and supported by the European Centre for Nature Conservation (ECNC). The main objective of PEEN is to ensure the conservation of a full range of ecosystems, habitats, species and their genetic diversity by facilitating the dispersal and migration of species. Currently PEEN is structured as a network of core areas, corridors, buffer zones and restoration areas. The core areas contain important representative examples from characteristic European habitat types across their traditional range and at different stages of ecological succession, viable population of species of European importance (Bonnin et al., 2007).

A Ministerial Statement on PEEN was prepared as annex to the Kyiv Biodiversity Resolution for adoption at the 5th 'Environment for Europe' Conference Kyiv in May 2003. This Resolution states that by 2008, all core areas of PEEN should be adequately conserved and PEEN will give guidance to major national, regional and international land use and planning policies as well as to the operations of relevant economic and financial sectors (Bonnin et al., 2007).

The Statement also confirms that the two major instruments to build PEEN are EU's Natura 2000 and the Emerald Network. The introduction of the international and European regulation on nature conservation and biodiversity has encouraged countries to take coordinated action to identify main problems and set new approaches towards ecological networks within their previous systems of protected areas.

The EU Nature Conservation policy is based on the Habitats and Species Directive and Birds Directives, the enforcement of which requires the creation of the European Natura 2000 Network, consisting of Special Protection Areas (SPA) under the Birds Directive (1979) and Sites of Conservation Interest (SCI) under the Habitats Directive (1992). At present the Natura 2000 Network and a large part of the Emerald Network have been realised. The Marine Protected Areas are the last element to be established.

The Emerald Network is based on the same principles as NATURA 2000 and represents its extension to non-EU countries. Up to date 44 European countries in Europe are contracting parties to the Convention. Currently, the legal basis for the PEEN establishment includes the requirements that arise from major international agreements on nature conservation and legal documents related to sustainable development (Box 1).

**Box 1**

*Most important international agreements for PEEN development.*

- Pan-European Biological and Landscape Diversity Strategy (Sofia, 1995)
- Convention on Wetlands of International Importance (Ramsar, 1971)
- Convention of the Conservation of Migratory Species of Wild Animals (Bonn, 1979), including the separate agreements
- Convention on Biological Diversity (Rio de Janeiro, 1992)
- Convention on the Conservation of European Wildlife and Natural Habitats (including the Emerald Network, Bern, 1979)
- EU Directive on the Conservation of Wild Birds (Birds Directive, 79/409/EEC, 1979, as amended by EU Directives 91/224/EEC and 94/24/EEC)
- EU Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (Habitats Directive, 92/43/EEC, 1992)
- Man and Biosphere Programme (UNESCO, 1971)
- European Diploma of Protected Areas (Council of Europe, 1965)
- European Network of Biogenetic Reserves (Council of Europe, 1976)
- European Spatial Development Perspective
- Environmental Impact Assessment Directive (85/337/EEC)
- European Union Community Instruments on Integrated Coastal Management and Common Agricultural Policy

In January 2008 the European Commission has published the first comprehensive review on the progress made with the ecological network development in Europe as part of the EC Biodiversity Action Plan for Halting the Loss of Biodiversity by 2010. This evaluation shows that most of the progress observed relates to existing commitments in implementation of nature legislation and the establishment of the Natura 2000 Network of conservation areas. Presently covering almost 20% of the EU's terrestrial territory the Natura 2000 Network is at the core of the EU Biodiversity policy (European Commission, 2008). The current focus is on completing the Natura 2000 network for the marine environment.

The PEBLDS (Action point 2) and the European Biodiversity policy aim to integrate nature protection requirements into other EU policies such as agriculture, regional development and transport. However, the issue of connectivity for Natura 2000 remains and is gaining more importance as the designation of sites of community interest is being almost completed.



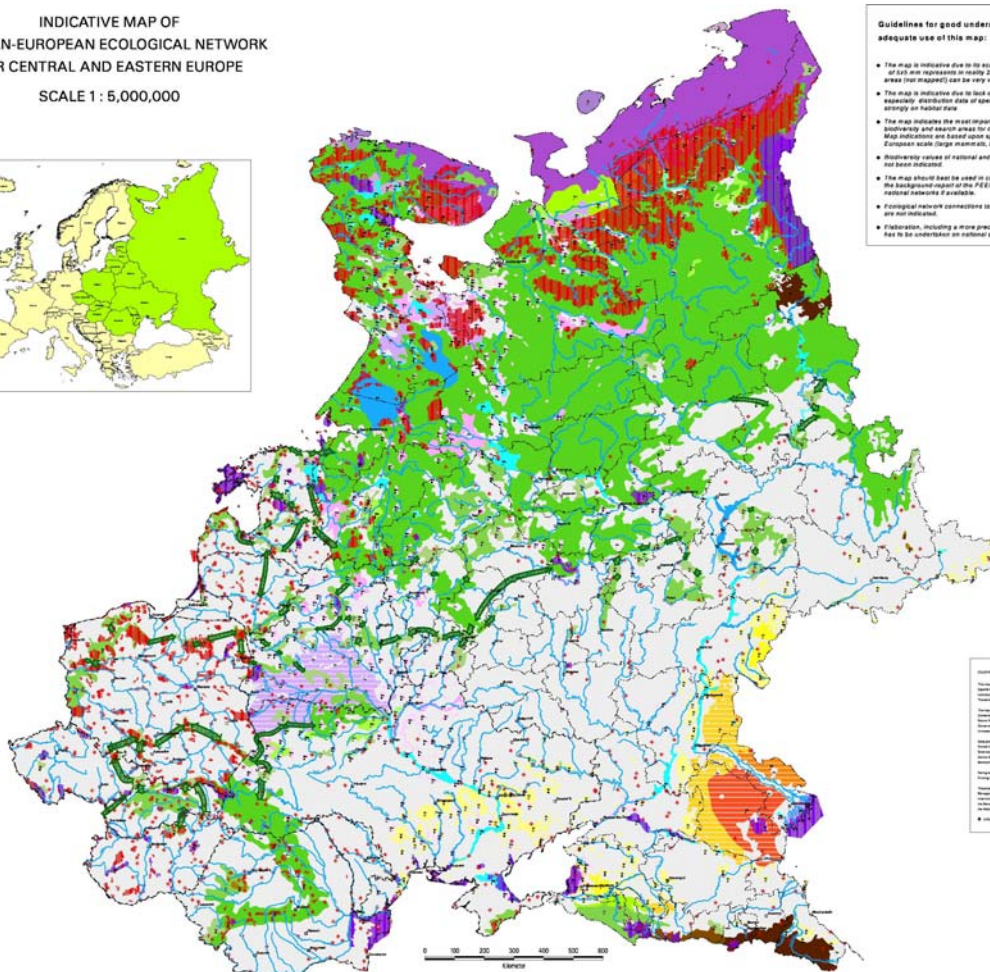
From the evaluation it can be concluded that at present it is still difficult to demonstrate significant progress in the integration of biodiversity into other sectoral policies relating to the conservation and restoration of biodiversity and ecosystems services in the wider EU country side and marine environments and in reinforcing the compatibility of regional and territorial development with biodiversity in the EU (European Commission, 2008).

Meanwhile, the progress review on PEEN development published as a result of the Sixth Ministerial conference 'Environment for Europe' in Belgrade in 2007 indicates that the implementation of PEEN has been based until now on national and regional approaches of ecological network development partly supported by cross-border collaboration initiatives. It also shows that many of the European countries followed the European Council's guidance for identification of the PEEN elements and structure for the designation of their NENs (Bonnin et al., 2007).

The various ecological networks developed in Europe at national or supra national levels complement to the constitution of the different PEEN elements. While the Emerald Network of areas of Special Conservation Interest includes the sites in the European Union's Natura 2000 Network, both of these networks constitute the main components of the core areas of PEEN. This indicates that currently PEEN can provide a forum, and a means of integrating, the various existing networks in Europe, based on ecosystem approach and the inclusion of sectoral policies in habitat and species protection.

The indicative maps of PEEN developed for various regions of Europe highlight the potential needs for trans-boundary approaches in establishing or maintaining these core areas and ecological corridors for important species in Europe. The indicative maps of PEEN include maps for three European regions, the Central and Eastern Europe (Figure 1), South-Eastern Europe (Figure 2) and Western Europe (Figure 3).

INDICATIVE MAP OF  
THE PAN-EUROPEAN ECOLOGICAL NETWORK  
FOR CENTRAL AND EASTERN EUROPE  
SCALE 1 : 5,000,000



**Guidelines for good understanding and adequate use of this map:**

- The map is indicative due to its scale (for example, a map unit of 50 km represents on reality 2000 km x 200 km area, so other natural areas (not mapped) can be very valuable or important as stepping stones).
- The map is indicative due to lack of certain data (see background reports: especially, distribution data of species are lacking, the map value strongly on habitat data).
- The map indicates the most important core areas for Pan-European biodiversity and search areas for corridors and nature development. Sharp delineations and based data require that require connectivity on an European scale (large mammals, birds).
- Relative values of national and regional importance have not been indicated.
- The map should best be used in combination with the background report of the PEEN C&E project and maps of national networks if available.
- Ecological network connections to adjacent states and to coastal waters are not indicated.
- Elaboration, including a more precise delineation within search areas, has to be undertaken on national or regional level.

**Notes:**

1. The map is indicative due to its scale (for example, a map unit of 50 km represents on reality 2000 km x 200 km area, so other natural areas (not mapped) can be very valuable or important as stepping stones).

2. The map is indicative due to lack of certain data (see background reports: especially, distribution data of species are lacking, the map value strongly on habitat data).

3. The map indicates the most important core areas for Pan-European biodiversity and search areas for corridors and nature development. Sharp delineations and based data require that require connectivity on an European scale (large mammals, birds).

4. Relative values of national and regional importance have not been indicated.

5. The map should best be used in combination with the background report of the PEEN C&E project and maps of national networks if available.

6. Ecological network connections to adjacent states and to coastal waters are not indicated.

7. Elaboration, including a more precise delineation within search areas, has to be undertaken on national or regional level.

8. The map is indicative due to its scale (for example, a map unit of 50 km represents on reality 2000 km x 200 km area, so other natural areas (not mapped) can be very valuable or important as stepping stones).

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11. Relative values of national and regional importance have not been indicated.

12. The map should best be used in combination with the background report of the PEEN C&E project and maps of national networks if available.

13. Ecological network connections to adjacent states and to coastal waters are not indicated.

14. Elaboration, including a more precise delineation within search areas, has to be undertaken on national or regional level.

**LEGEND**

**NOT CLASSIFIED TO CORE AREAS**

- Water
- Water bodies (not included in the core area)
- Land
- Water bodies (not included in the core area)
- Water bodies (not included in the core area)

**CORE AREAS**

- Tundra (with shrubs, mosses, fern ground, water and forest)
- Marshland and other wetlands (including low, deep, river and near cuttings)
- Marshland and other wetlands, major parts can be cultivated
- Alpine grassland (including meadows, heath ground and glacial)
- All forest types (coniferous, deciduous, mixed and mountain forests)
- Wetland water bodies (small and large rivers)

- Water grassland (small or periodically wet, partly with shrubs)
- Short grassland and heath, major parts can be cultivated (including heath ground and water bodies)
- Heath grassland (natural, semi-natural and cultivated grassland)
- International designated areas (international acknowledged areas (borderless include non-geographical areas))

**SEARCH AREAS FOR NATURE DEVELOPMENT AND CORRIDORS**

**CORRIDORS**

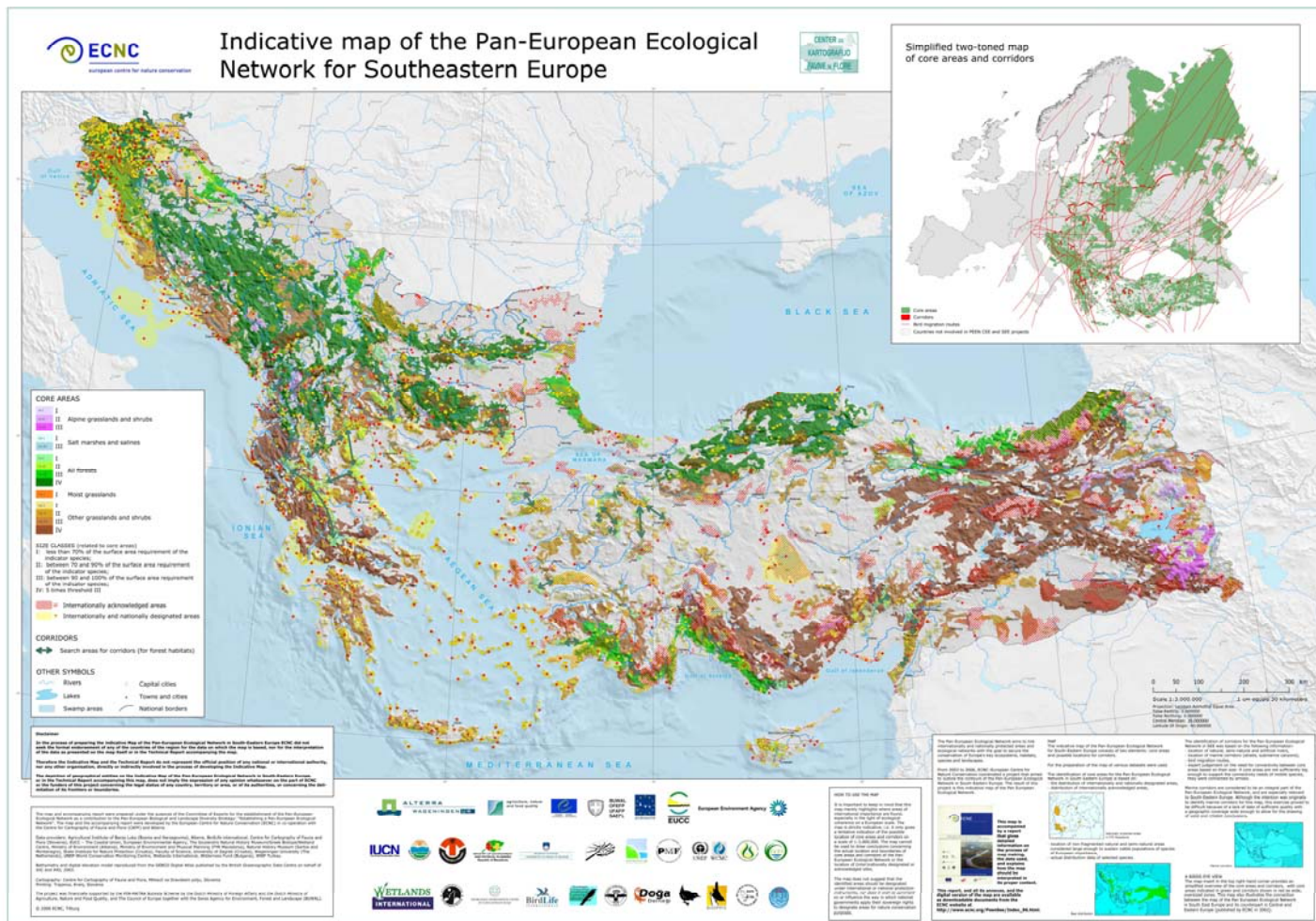
- For forest habitats
- For marshlands, other wetlands, meadows, rivers, waterbodies

**OTHER SYMBOLS:**

- Natural and for Russian Federation regional borders
- Towns and cities
- Cultivated areas or areas with fragmented natural elements (fields, pastures, other with natural elements such as forests)



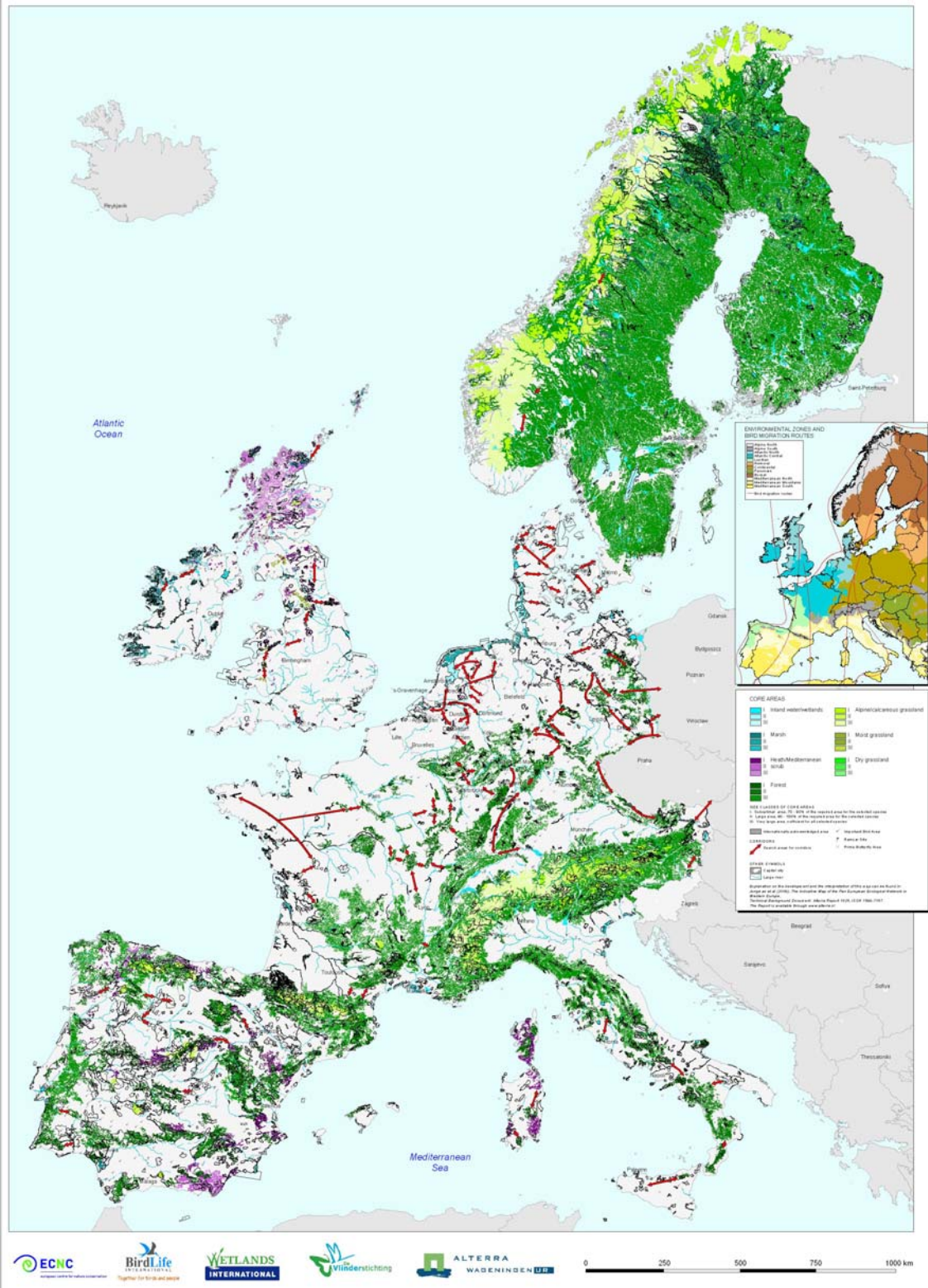
**Figure 1**  
The map of PEEN for Central and Eastern Europe (Bouwma et al., 2002).



**Figure 2**  
The map of PEEN for South-eastern Europe (Biró et al., 2006).



Indicative map of the Pan-European Ecological Network for Western Europe



**Figure 3**  
The map of PEEN for Western Europe (Jongman et al., 2006).

### **3.3 Progress in PEEN development**

#### **3.3.1 Central and Eastern Europe**

The promotion of the PEEN strategy in Central and Eastern Europe is currently progressing as a reaction on the needs for enforcement of the European biodiversity legislation and awareness rising actions in integrating nature conservation in economic development sectors.

Through the implementation of the Birds and Habitat Directives most of the new EU member states in Central and Eastern Europe such as Hungary, Poland, Slovakia, Slovenia, Bulgaria, Romania, Czech Republic, Estonia, Latvia, Lithuania have already initiated development of national and/or regional ecological networks and designation of sites for Natura 2000 Network. By the request of the European Union these countries had a duty to classify Spa's and proposes SCI's by the date of their accession. All countries have submitted their lists of sites to the EC and evaluations of these lists are in progress. The total area of SCI's in Central and Eastern Europe by July 2009 covers about 129,816 km<sup>2</sup>.

In the non-EU member countries such as Croatia, Ukraine, Russia, Moldova, Belarus, Georgia and countries of the Western Balkans the development of national and regional ecological networks is underway and it is a constituting elements of the future PEEN as well.

Through various sources of collaboration such as the EU pre-accession instruments , structural funds and bilateral programs a number of projects for development of regional and trans-boundary ecological networks in Central and Eastern Europe have been implemented. These include as well initiatives for the preparation of the Natura 2000 Network. Examples of regional trans-boundary networks under development are the Carpathian Ecological Network in Hungary, Poland, Czech Republic and Romania, the Bug River Ecological Network in Belarus, Ukraine and Poland, and the Sava River Ecological Network in Croatia, Serbia, Slovenia, Bosnia and Herzegovina.

#### **3.3.2 Western Balkans**

The development of ecological networks in the Western Balkans is based on the program of the Council of Europe for identifying the Emerald Network of Areas of Special Conservation Interest in six countries: Albania, Bosnia and Herzegovina, Croatia, Montenegro, Serbia and Macedonia. The creation of the network in these countries started with series of pilot projects in order to initiate and create the Emerald expert teams in each country and to set up pilot projects data base. The second phase of this program included evaluation of the results of the pilot projects and the introduction of the next steps for developing the network. The total area of the Emerald network sites covers about 5,589,427.88 hectares, which represents approximately 17% of the total area of the six countries. The next initiative planned by the Emerald expert group is to start the full network evaluation within the Western Balkan countries.

Furthermore, at national level there are number of additional ongoing projects for the development of the NENs in the Western Balkans. So far most progress in the first phases of the National Ecological Network (NEN) development was made in Serbia and Macedonia.

#### **3.3.3 Western Europe**

As indicated in the indicative map of PEEN for Western Europe the core areas of the network in this part of Europe include Scandinavian lands, the Alps towards the Apennines in Italy, through the Cevennes and the Massif Central into the Iberian Peninsula, where it is concentrated in the mountain ranges (Jongman et al.,

2006). Characteristic of the network in Western Europe is that there is rich landscape diversity but these are highly fragmented and too small in size to sustain the biodiversity of continental species scale.

In 2003 there were approximately fourteen functional ecological networks in the European Union at national and regional level (Jongman et al., 2004). These networks were developed as part of the European legislative requirements and the national planning strategies. At present Ecological networks do exist in most countries. The latest developments are in France, Ireland and GB.

### **3.4 Implemented bilateral projects supporting PEEN development**

More than thirty bilateral projects which directly contribute to the development of PEEN have been realised from 2004 until currently in Central and Eastern Europe (Proforis Data Base). These projects have been funded by the Dutch government as part of the policy support and development aid in Central and Eastern European region within the national policy plan on biodiversity. Some of the more prominent projects have been implemented in Ukraine, Russia, Bulgaria, Romania, Macedonia, Croatia, Belarus, Serbia etc. The range of issues addressed within the projects varies, including issues such as introduction of specific conservation measures, development of management plans for Natura 2000 areas, identifying important core areas and assessing favourable conservation status and degree of fragmentation of habitats, capacity building for responsible institutions, initiation of regional Econets such as Carpathian Ecological Network, the Bug River Ecological Network and the Bialowieza Forest Pilot Ecological Network in Poland.

#### **3.4.1 Ecological Network development in Russia**

The existing Russian 'System of Specially Protected Areas' has been developed during the last 90 years and currently includes about 238 protected areas with different protection status including terrestrial and water ecosystems (Krever et al., 2009). According to the federal law, regulating the function of this system, the specially protected nature areas in Russia are divided in seven categories of protected status with different territorial significance (Table 1). The Zapovedniks (strict nature reserves) and national parks have a federal status and play a key role in the preservation of unique natural complexes, specific evolutionary and ecological processes. Nevertheless, regional protected areas (nature parks, zakazniks and natural monuments etc.) are of no less importance for the sustainability of semi-natural complexes, biodiversity conservation and the provision of resources for local communities' livelihoods.

The categorization of the protected areas within this national system is based on the main characteristics of their use and regimes, the aims of their formation and the level of their management (Krever et al., 2009). The total area of *Specially Protected Nature Areas* (SPNA's) in Russia is about 140 million hectares (7.6% of the country's total area). Thirty protected areas also have the status of biosphere reserves, 28 are on the Ramsar list and 19 are listed as World Heritage Sites. According to the 2009 analysis of the state of the art of the national system of specially protected areas of Russia there are 238 protected areas covering a total territory of 54.08 million hectares (Krever et al., 2009). The terrestrial areas with fresh water areas covers 44.77 million hectares which is 2.73 % from the Russia's territory. The marine protected areas cover 9.31 million ha (Krever et al., 2009). From these protected areas the federally important areas include 101 zapovedniks (33.8 million ha), 40 national parks (7.74 million ha), 69 zakazniks (12.54 million ha) and 28 natural monuments (34.3 thousands ha).

**Table 1***Categories of specially protected areas in Russia (Krever et al., 2009).*

Categories of protected areas	Territorial level of significance		
	federal	regional	local
Zapovednik	+		
National Park	+		
Nature Park		+	
Zakaznik	+	+	
Nature monuments	+	+	
Dendrological and botanical gardens	+	+	+
Health resorts	+	+	+

Next to the current approach to territory-based nature conservation, proposed and developed during the soviet time, more recently people have expounded the idea of creating ecological networks of nature areas of different status and land use regimes (including SPNA's and other areas with specific restrictions on the use of nature), and the interest in establishment of econets has been renewed. This approach has particular significance for Russia, because of the country's great natural, economic and cultural diversity. Russia is a large, federated state, where environmental protection mechanisms (including SPNA's) are based on division of authority between the federal centre and the administrative regions.

The term 'ecological networks' has been more recently accepted as an operational term to refer to the system of specially protected natural areas in the scientific debates among the Russian ecologists. Andreev (2002) defines the term 'ecological network' in the Russian context as the formation of a system of areas that physically and functionally is connected and ranked by its significance for biodiversity and landscapes conservation and that maintains ecological stability.

### **Policy framework of the Econet development in Russia**

As mentioned above the ecological network in Russia is planned as a system of legally protected areas of federal and regional importance. The national Econet strategy is based on the current structure of the regional administrative units and their development and includes the trans-boundary ecological relations between these regions. Therefore, all regional Econets are seen as constituent elements of the Econet-Russia. This regional approach is based on ranking and designation of the specially protected areas.

The overall goal as defined in the national policy plan on the ecological network of the Russian Federation is to create the ecological conditions, needed for the sustainable socio-economic development of the regions. This means that it will ensure the ecological relationships between of the ecosystems in Russia to support biodiversity conservation based on establishment of natural fundaments for ecological stability (e.g. functional unified complexes of natural viable habitats, taking into account their territorial size and connectivity).

The 1995 federal law - On Specially Protected Nature Areas - along with regional laws and regulations, govern the operation of the distinguished seven categories of protected areas and their establishment, protection and use. The Russian Federation's 89 administrative regions (oblast) have the right to introduce their own categories of SPNA's. Although other protected areas may operate under land, water, forest and wildlife legislation and have SPNA's. Russia's system of SPNA's falls under the authority of the following ministries:

- The Ministry of Natural Resources of the Russian Federation (zapovedniks, national parks, some federal nature reserves and natural monuments) and its regional substructures;
- The Ministry of Agriculture of the Russian Federation (some federal nature reserves) and its regional substructures (regional nature reserves).

Some of the federal SPNA's are protected areas under the authority of the Russian Academy of Sciences. Regional protected areas are managed by regional executive bodies. Local protected areas are managed by local (municipal) administrations.

According to WWF Russia (2003) at present there are favourable conditions in Russia for the enhancing the development of more comprehensive policy on ECONET such as:

- A significant part of natural areas (over 50% of the nation's total area) have retained the ability for natural self-regulation or can be easily restored to this state;
- In the majority of Russia's regions, landscape fragmentation has not reached critical levels;
- Large intact areas exist which can preserve dominant types of ecosystems;
- Environmental protection has a long history in Russia, with great knowledge and long-standing traditions in the theory and practice of nature conservation;
- A network of specially protected nature areas already exists and there are a number of other areas with land use regulations;
- A legal framework exists to govern environmental protection and use of natural resources (including in protected areas) which allows protected areas of different categories.

Meanwhile, the fundamental change in property rights to natural resources in Russia and a focus on raw materials economy pose significant threats to sustaining a high level of biodiversity (Shestakov and Krever, 2003). Russia needs to move towards a system of interlocking natural areas with varied regulations for protection and use of natural resources.

Currently, the Russian Federation is an active participant in international developments in the field of biodiversity conservation, which includes participation in the PEBLDS and is one of the signatories of 54 the European countries in 1995. For the most vital component of PEBLDS, the PEEN the system of protected areas in Russia is considered an important element and needs to be further developed.

Moreover, Russia is an important actor in coordinating trans-border Econet development between its regions and with neighbouring countries. The country's institutions do show sufficient commitment to maintain the ecological value and integrity of its own ecosystems, thereby providing an ecological service of which the benefits will be felt around the world (Shestakov and Krever, 2003). However, Russia also counts on continued assistance from other countries such as the Netherlands in pursuit of this goal, and joins international cooperation initiatives.

### **The needs for development of the NEN of Russia**

The new political, economic and social conditions that have arisen in Russia since 1991 demand new approaches to the long-term development of systems of protected areas. These areas should fulfil two functions: 1) conserving biological diversity *in-situ* and maintaining ecological stability in Russia and Northern Eurasia as a whole and 2) investing in the sustainable use of biodiversity resources in neighbouring areas and integration into regional socio-economic spheres. In order to fulfil these functions, new methods for territorial nature conservation must be developed: the most effective of which is to establish a NEN.

Besides simply taking into account government reforms in the area of conservation and natural resource use, a single document is needed to formalize the process of establishing and managing a system of ecological networks in Russia (WWF Russia, 2003). This document is the Concept of Ecological Networks in the Russian Federation and the elaboration of which has been initiated in 1999. Between 1999 and 2000 drafts of the Concept and related materials were discussed in a number of workshops by the governmental authorities, SPANA administrative bodies, scientific institutions and non-governmental conservation organization. The final draft of the Concept is since 2002 under consideration by the Ministry of Natural Resources of the Russian Federation to become a national strategy for developing ecological networks (Shestakov and Krever, 2003).



Within the current strategic plans of the government the main priorities for the establishment of the regional ecological networks, where the set of protected areas already have been formed as networks and that have all the needed elements for such a network include the following territories:

- Eco-regions with global significance distinguished as areas with high biodiversity such as the Far East of Russia, South Ural (Altaiskie and Sayanskie mountains); Caucasus etc.
- Territories located in developed and densely populated regions of the country such as the Central Russian hills;
- Trans-boundary projects such as Russia-Ukraine, Russia-Latvia and Russia-Mongolia etc.

The elements and the structure of the regional ecological networks must always be formally and legally approved by the regional and local authorities. Such juridical documents are already issued for a number of regions (oblasts) in the Russian federation.

Currently in Russia about 22 regional networks can be identified as potential elements of the future Russian Econet (Bennett and Mulongoy, 2006). These networks have been initiated by international or regional initiatives such as WWF, Universities and regional Biodiversity Conservation Centres (Appendix 1). The information concerning the status of these networks is still scarce. WWF Russia has presented in its report from 2003 entitled '*Ecological Network of Russia: an eco-regional approach*' the state of the art at that moment of the regional ecological networks in the following eco-regions: the Russian Far East Eco-region, Altay-Sayan Mountains, Ural Mountains, Forest-Steppe Ecosystems of Central and European Russia, Wetlands of the Northern Kazakhstan and the Marine and Coastal Ecological Network in Russia. Two additional networks are described in this report as networks under planning i.e. the Dauria econet located at the border of Russia with Mongolia and China and the Caucasus ecoregional network.

The creation of a database on biodiversity of regional protected areas is very relevant for the Central European part of Russia as many unique natural complexes are situated within its territory including wetlands with Ramsar status, Important Bird Areas (IBA's), wetlands included in the TELMA Programme for conservation and wise use of peat land. Although the network of protected areas in the Central European part of Russia is relatively well developed, the current functional state and technical basis, as well as the practical input into preserving biological diversity and implementing principles of sustainable development in regional protected areas, is complex. Descriptions of regional ecological networks often are made in the framework documents of the regional authorities who have initiated the development of the networks such as the Thelyabinsk econet (Box 2).

**Box.2**

*Econet Thelyabinsk region (oblast).*

The econet Thelyabinska has been formed spontaneously without a previously prepared plan and consists currently of four zapovedniks (Ilmenskij, East-Ural, South Ural and Arkaim), two national parks (Taganai and Zuratkul), 23 zakazniks (from which one botanical and 22 zoological) and about 200 cultural-natural monuments.

In the region there are 45 genetically valuable forests, one micro zakaznik and thirteen<sup>13</sup> urban green zones (Lagunov, 2004). The Thelyabinsk region has a high number of different types of SPNA's and in territory exceeds the average nation wide level (9% of the region's territory), the distribution of the areas is uneven in different zones.

In order to create the Russian ECONET based on the current SPNS System including different categories of protected areas, a number of overlapping mechanisms are necessary, including legal, scientific, organizational, economic and social. Particularly essential is the process of management of these transformations within the Russian administrative structures where different elements of the network may fall under the jurisdiction of different administrative and sectoral authorities.

Within the Federal program 'Ecology and natural resources of Russia' 2002-2010 the national government underlines the need for improving the management and the organization of the federal system of SPNA's as well as making deeper analysis and inventory of the currently used approaches for designation of the areas and their status of use and management at different administrative levels. One of the challenges in this is to actualize and optimize the criteria for categorization and designation of the protected areas in Russia. Currently the functioning of some of the protected areas does not correspond to their protection status. As indicated by Stepanitzkij et al. (2009) this is the result of the numerous changes of the categorization approach for protected areas during the last 100 years of existence of the system of protected areas in Russia.

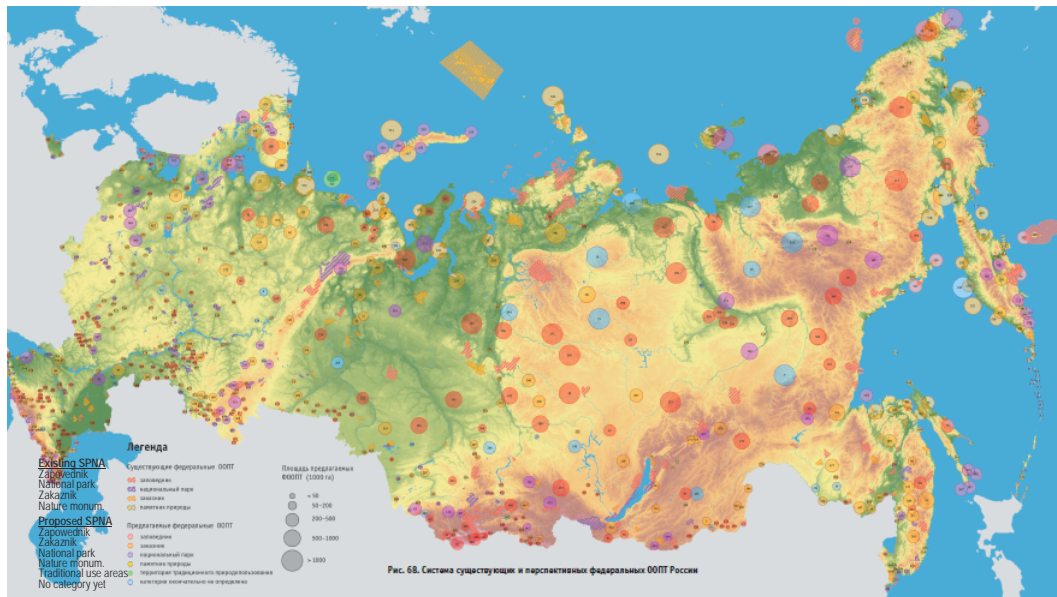
Furthermore, based on the analysis carried out in 2009 by a group of Russian and international experts on the completeness and functioning of the current SPNA System it has been suggested to expand or optimize 108 protected areas (Table 2), (Stishov and Onufrenya, 2009). It is recommended to develop about 476 new protected areas from which 422 terrestrial, 41 marine and 13 mixed. From these new areas 270 are suggested to be developed on currently unprotected territories, while 206 are already part of the current system but need change in the protection status and regime.

The current consideration of the expansion and upgrade of the SPNA System in Russia aims to improve its completeness and functioning as such. This can be done by improving the representativeness of the system in terms of geographical eco-regions and groups of species and the protection of rare species. The current and the potential representativeness of the system are presented in Appendix 4.

**Table 2**

*Proposed actions for expansion of current protected areas (Stishov and Onufrenya, 2009).*

Protected areas	Expansion of existing parts of the area	Establishment of new clusters of parts of the areas	Expansion of existing parts and establishment of clusters of parts of the area	Total
Zapovednik	33	6	30	69
National Park	18	1	1	20
Zakaznik	17	1	1	19
Total	68	8	32	108



**Figure 4**  
 Current and proposed areas under the system of SPNA's in Russia.  
 (270 new sites and 206 sites to be improved in status and category)

### 3.4.2 Ecological Network development in Ukraine

The rich biodiversity of Ukraine, the growing international interest for the development of PEEN, socio-economic transition process in Ukraine to the principles of sustainable development, wide experience in protected areas management and the potential of the national scientific capacity, have created the necessary prerequisites for the initiation of the planning process of the NEN, which is meant to be an essential part of PEEN.

Ukraine is still at the beginning of the development of the NEN. While institutionally and conceptually a number of questions regarding the planning process of the network have already been addressed, many issues remain undecided such as concerning data base management and methodology for linking the elements of the Ecological Network and its implementation (Simeonova et al., 2009). This summary reviews the progress that has been made by Ukraine in the creation of the NEN as part of PEEN. Based on the identified needs and problems a brief description is provided of the potential contribution of the Dutch Ministry of Agriculture Nature and Food Quality in the coming years in the development in strengthening further the development and implementation of the Ukrainian ecological network as part of the Pan European Ecological Network.

#### Policy framework for the Econet development in Ukraine

The biota of Ukraine comprises more than 25,000 species of plants and fungi and 45,000 species of animals, some of which are endemic. Under particular pressure is the steppe landscape, mostly threatened by the fragmentation of habitats, agricultural pressure, development of infrastructure, and the conflicting interests of environmental preservation on the one hand and of agricultural and forestry activities on the other. Two major bird migration routes pass across Ukraine and some nesting sites are of great international importance. For instance, 90% of the global population of martins is nesting on the islands of the Black Sea Biosphere Reserve. Ukraine ratified the UN Convention on Biological Diversity (CBD) in 1994. Under the framework of the Convention, the Ukrainian government has been working to provide protection, environmentally sustainable use and restoration of biological and landscape diversity.

The legislative basis for the conservation of biological and landscape diversity in Ukraine has been redeveloped since 2002. The main changes are the transition in the methodological approach from creation of a network of separate protected territories to a coherent system of integrated landscape elements into an ecological network. The already established system of protected areas in the country including the well elaborated legal framework for it, serves as the main basis for the development of the NEN (Simeonova et al., 2009). The system of protected areas in Ukraine is composed of state reserves, national parks, sanctuaries, nature monuments, botanical gardens, dendrological and zoological parks (zoos), monuments of landscape architecture, and protected tracts.

In 2001 an action plan has been developed and approved by the Ministry of Environment and Natural resources on creation of new conservation areas, for ecosystems conservation and fulfilling requirements of the flora and fauna cadastre, elaboration of the legislative framework and defining further priority actions for the period of 2001-2005. The Ministry of the Environment and Natural Resources approved in 2001 the Regulation 'About forming of Coordinating Board of National Ecological Network of Ukraine'. The Coordinating Board consists of representatives of regional authorities of Ukraine and Crimean autonomous, legislative and executive power representatives, representatives of President's administration and representatives of scientific and non-governmental organizations. The Coordinating Board is a deliberative body with the right of consideration of all initiatives and proposals concerning further development of the NEN.

The planning process for the establishment of the ecological network in Ukraine is based on the top down regulation i.e. from creating the legal framework at national level to the on-site implementation of the ecological network in different regions by the Cabinet of Ministers of Ukraine, the Ministry of the Environment and Natural Resources to authorities and agencies in the oblasts (regions). At this stage co-ordination committees are being established contributing to the development of the ecological network at oblast level (regional level) and number of regional ecological networks programmes and strategies have been elaborated.

Meanwhile, the Parliament of Ukraine has approved the National Program for the formation of the Ecological Network of Ukraine in 2000-2015, which is used as a mechanism for implementation of the Pan-European Biological and Landscape Diversity Strategy and meets the requirements of Theme 1 of the Strategy concerning the development of the Pan-European ecological network. The Ministry of the environment is currently reviewing the existing Econet program and considering redeveloping it into a new programme to be approved in 2009 with the inclusion of the regional programs as an integrated part of it.

The general scheme for spatial development of the ecological network in Ukraine is part of the General Scheme of Land Use Planning of Ukraine approved by the Parliament. Next to that a law has been drafted on the Ecological Network of Ukraine aiming to provide a legal basis for the formation and functioning of the NEN. The Department of Nature Protection responsible for developing nature reserves is actively involved in the preparation of this legislation. The Department has regional branches and cooperates with the State service of the protected areas 'Zapovedniks'. Zapovedniks are the core areas for the Ukrainian Econet.

During the last years a number of projects have been funded by the Ministry of the Environment and Natural Resources within the national programme for establishing the ecological network (Box 3). Some of these projects have been accomplished and their results taken into consideration into the planning process of the Econet.

Next to these projects the State Service for Protected Areas of Ukraine has already conducted a number of inventories of the nature reserves of national importance such as the Volyn, Zakarpatye, Ivano-Frankivsk, Chernivtsy and Lviv regions. Data is being collected for the maintenance of the cadastre and for identifying the areas for inclusion into the Emerald Network. It is the ambition of the Ukrainian national policy on biodiversity to contribute to the Pan European Ecological Network through project initiative to be realized in cross border

cooperation with neighbouring countries. The Dunajsky Biosphere Reserve became part of transboundary Romanian-Ukrainian Biosphere Reserve 'Danube Delta' and Uzhansky National Natural Park became a part of trilateral Polish-Slovakian-Ukrainian Biosphere Reserve 'Eastern Carpathians'.

The establishment of following international biosphere reserves is in progress:

- Ukrainian-Belarusian Polish 'Western Polissia' (on the basis of Shatsky National Natural Park in Volyn region);
- Ukrainian-Polish 'Roztochchia' (on the basis of Javorivsky NNP and 'Roztochchia' Nature Reserve in Lviv region);
- Ukrainian-Russian 'Starogutsky and Bryansky Forests' (on the basis of 'Desniansko-Starogutsky' NNP in Sumy region).

A more detailed list of projects initiatives is provided in Appendix 2 and 3.

### **Box 3**

*List of project within the national program for establishing Ecological Network in Ukraine.*

Classification of ecological systems in Ukraine and their complex assessment

- The elaboration of the Law 'On the Ecological Network of Ukraine'
- Justification and elaboration of standard acts concerning the protection of land and restoration of soil fertility
- Justifications for the spatial parameters of the elements of the national ecological network and elaboration of local patterns for its developments (typical technology, prototypes)
- Elaboration of the concept of the national program of measures concerning sustainable land use
- Development of the cadastre for the flora and fauna
- Elaboration of a concept for the conservation of migrating animals
- Determination of criteria for entering species of animals and plants to the Red Data Book of Ukraine and the elaboration of the structure and model of its electronic version
- Preparation of the ecological/economical justification of establishing the national nature park (NNP) 'Nyzhnyosulsk' in Cherkasy and Poltava oblasts
- Inventory of natural complexes of protected areas and objects in Ukraine (with the application of directives of the European Union)
- Creation of a system for completing the state cadastre for protected areas in Ukraine
- Establishment of the 'Pryazovski' NNP
- Preparation of scientific grounds and cartographic materials for the projects for establishing the NNPs 'Sevastopolski', 'Pereyaslav-Khmelnytski', 'Kinburnska Kosa', 'Trostyanetsko-Vorsklyanski'

### **The need for development of the NEN Ukraine**

Based on the state of the art analysis an assessment has been made to identify the most important issues and concerns within the process of development of the National Econet in Ukraine as part of the PEEN. Seven important issues have been identified as priory such as the following:

- *Land degradation.* Ukraine owns rich biological diversity, the conservation of which has a great meaning for Europe. However, large parts of the natural landscapes of Ukraine have been destroyed or exposed to serious anthropogenic transformation, which complicate the creation of the ecological network in some regions of the country. Considerable areas of degraded land, the cultivation of which now is not economically beneficial, could be used for creation of the ecological network.
- *Sectoral Integration.* There is a need to introduce ecological network concerns in sectoral policy documents, first of all for forestry, agriculture and transport. Effective mechanisms for realization of the

new laws and regulations concerning the ecological network in Ukraine are still to be developed. There is still lack of agreement on the integration of the ecological networks in the spatial planning process. The authorities responsible for that i.e. the territorial administration, regional administration and the Ministry need to be supported in building their capacity for collaboration.

- *Implementation at regional level and in trans-boundary areas.* The ecological network formation process becomes more significant at regional and international level. At the regional level, in some provinces the schemes of ecological network are being elaborated. However, there is a lack of methodological and knowledge capacity within the regional authorities for this type of work. Only 4.7% of Ukraine's territory is currently protected, whereas the Academy of Sciences recommends at least 10%. With this regard, in 2008 a draft scheme for the expansion of the protected areas has been proposed. The land privatization process that is now actively developing in Ukraine might be a serious obstacle for the formation of the NEN, in particular of its core areas. At the international level the focus is currently on the transboundary nature conservation areas of international significance, which are assessed as the transboundary elements of the NEN.
- *Funding needs.* At present scientific research and practical actions on the development of the NEN are financed from different sources such as the State budget, budget of the Autonomous Republic Crimea and local budgets of different administrative levels, State Fund for Environmental Protection and relevant local funds. But this financing is not enough for the realization of all the scheduled actions and work on the ecological network. The present state of the economy of Ukraine does not leave hope for a fast increase in financing in the near future. That is why most perspectives for development are to use more effectively the available funds, to acquire foreign funds in the form of grants, to reduce the price of works on the ecological network implementation, particularly by creation of a system of privileges for land users/owners, which are or will become part of the ecological network.
- *Research and training needs.* Development of a methodological basis for the formation of NEN is not completed yet, and requires more efforts in order to be adapted to the specific regional features. At the same time, a number of principles, criteria and practical decisions, that are used for the formation of ecological networks are universal enough and can be totally or partially adopted from the experience of other countries. So far in Ukraine there is no practical experience of ecological network development even at local and regional levels. However, there is a great experience in designation and management of nature areas. For the development of the ecological network, for its further monitoring and maintenance it is still necessary to gather, process and analyse more data and review in detail the methodological, organizational and technical approaches currently used. Also it is necessary to organize specialized trainings, particularly for the regional authorities and their experts who will take part in formation of the NEN. One of the main priorities is the creation of a comprehensive GIS database. Recently maps were made as first fulfilments of the GIS database. Yet, there is limited up-to-date information on biodiversity. No inventories were done since 1996 on forests, protected areas, and environmental conditions. There is a national Register of Flora and Fauna of Ukraine and a cadastre responsible for flora, forestry and tree lines, but with many gaps. Some of the fauna species have been covered, but from the flora only medicinal plants and the Red Book species are filled in. Yet there is a need to achieve an agreement on the total list of areas to be protected.
- *Human Capacity and expertise.* The lack of human capacity in terms of number of experts engaged in the process of the ecological network development within the competent authorities and institutions and in terms of the knowledge and experience available is an essential impediment for the success of this process. Often only one or two experts are appointed to conduct this task at national level. Similarly at regional level only one or two experts are available in each Oblast administration.
- *Participation and collaboration.* Successful development of NEN and its functioning is impossible without wide public support, and without rise of awareness of the stakeholders about the purpose and significance of the network. In this connection, in the years to come more active popularization of the ecological network ideas is needed including explanation of its importance for conservation of biological diversity and maintenance and restoration of the habitats.

## 4 Policy supporting research

### 4.1 Introduction

In the past decades new landscape ecological concepts have changed the policy context of nature conservation in Europe. Knowledge is under development on meta-population concepts, spatial-temporal relations, ecosystem dynamics, short term impact of use processes such as landscape fragmentation, homogenization through intensification and abandonment and the long term impact through climate change as well as the changing perception and valuation of nature. We are starting to know better now that we need knowledge on how species and ecosystems develop under the pressure of these processes and the causes of ineffectiveness of nature conservation policies. This knowledge, including its perception and political acceptance, needs further development in all Europe into new conservation policies, agricultural policies and land use planning strategies to be more effective than at present. This is especially important in the fast developing political environment of Central and Eastern Europe.

In many Central and Eastern European countries now the ecological network strategy is included in legislation or policy documents (Jongman et al., 2004). These new policies imply that biodiversity conservation is not only a societal benefit set aside in reserves, but that it is integrated in society. This is epitomized in the concept of ecosystem service put forward by the Millennium Ecosystem Assessment. This also means that stakeholder involvement is essential as other land users will have to share common space with biodiversity and allow species to use land that is not especially set aside for them.

We are now only starting to transfer scientific insights from landscape ecology into policy and the planning of ecological networks. How this is done differs depending on societal context in which biodiversity management and nature conservation planning is applied. There are also differences between countries and continents depending on ecological differences (species diversity), geographical differences (location, geomorphology and urbanisation pattern), political and scientific history, economic conditions, cultural differences and population density. Therefore it is needed to develop not only an agenda for implementation, but also for scientific research, monitoring and evaluation.

### 4.2 The applied research agenda

In a workshop held in Oisterwijk on 1-2 October 2008, organised by ECNC the societal aspects of ecological networks have been emphasised as has been its planning and the role of stakeholders and their knowledge. For the development of ecological networks, it is assumed that there is a minimum area required. In the CBD 10% of protected areas is mentioned as a minimum per country. In Germany it is concluded that the area used for core areas and linking corridors should at least be 10% of the area of a region. In Ukraine 10% is the goal to be reached. In Russia the SPNA system covers 7.8% of its territory. The 10% as minimum area is an assumed figure and not yet proven fact based on effectiveness for biodiversity conservation nor have they been elaborated in proposals for network configuration. Land use change, road planning and climate change are important challenges for the development of effective ecological networks as a new biodiversity strategy world wide. This requires not only renewal of national and regional strategies and international, cross-border cooperation, but also knowledge and facts on their effectiveness. The first element is a challenge for policy makers, land managers and planners. The second is a challenge for the research community that supports them.

Eight key questions on connectivity and landscape structure related to the ecological networks implementation were recently identified as being amongst the 100 most important ecological questions of high policy relevance in the UK (Sutherland et al., 2006). These questions are relevant for most of the European countries and illustrate the research needs:

- What are the lag times between habitat fragmentation and the loss of species of different taxonomic and functional groups?
- Is it better to extend existing habitat patches or create further patches within the landscape?
- How should we manage landscape mosaics for the conservation of diverse taxa that operate on different spatial scales?
- What are the relative merits of different indices of habitat connectivity? Which of them best predict conservation value?
- What is the value of linear habitats, such as hedgerows, railways, road verges and riparian strips, as corridors for dispersal between fragmented habitat patches?
- What is the impact of linear barriers such as roads and railroads on the functioning of the ecological networks?
- For species where the concept is applicable, how can 'source' and 'sink' populations be identified and how should their status affect conservation management?
- How important are core versus peripheral areas in the conservation strategy of a species?
- How reliant are animal and plant populations in small nature reserves on the maintenance of habitat in surrounding non-protected areas?

The listed above questions are also highly important for central and eastern European countries, but not programmed in a coherent way, or nationally, or internationally. This is especially important as this part of Europe is the source for many of the species that are re-colonising Western Europe. Further work is also urgently required concerning the likely impacts of climate change on ecosystems, habitats and species, and the need for habitats and species to move in response to climate changes at the European level.

According to the progress evaluation of the European Biodiversity Action Plan implementation the European Commission stresses that the greatest immediate need for research in the context of the objectives of the Habitats and Birds directives is on the efficacy and efficiency of practical connectivity measures. It is therefore recommended that at European scale research should be undertaken on monitoring projects (in collaboration where this is feasible) that aim to (European Commission, 2008):

- Increase our understanding of the interrelationships between connectivity and landscape structure for habitats and species;
- Identify and quantify the cost-effectiveness of practical measures that can be taken to increase matrix permeability;
- Establish which habitats and species of Community Importance are particularly at risk at a national and biogeographic scale from habitat fragmentation and the likely impacts of climate change;
- Examine the relationships between landscape permeability and the provisions of ecosystem services;
- Develop and implement monitoring schemes that aim to measure the actual impacts of ecological networks and other connectivity measures in relation to specific quantifiable biodiversity related objectives (including the coherence of the Natura 2000 network and the wider maintenance and restoration of habitats and species of Community interest).

Yet, the ongoing scientific research in the field of ecological networks needs to be strengthened and coordinated at the European level in order to ensure that its results are accessible and available for the policy makers and experts across Europe and can be adequately applied.



Research priorities related to ecological networks have been discussed focussing on the following questions:

- How can the intrinsic dynamics of biodiversity in relation to the higher dynamics of land use change, landscape fragmentation and climate change be integrated into (species and habitat) oriented conservation policies?
- How can biodiversity conservation policy be integrated into other sectors?
- How can scientific knowledge and its application to ecological networks used as a tool for nature conservation/sustainable development.

In elaborating these issues, core concepts are meant to lead to innovative methodological approaches for ecological and social aspects of ecological networks. They should aim for comparative appraisal of the drivers of as well as the opportunities for solving competing claims for land. In the end they should open up space for innovation at different scales to make landscapes function well ecologically.

It has become clear that the traditional approach to nature conservation is doomed to fail in its objectives as no account is made for the integration of natural processes at different spatial scales, from local and regional to continental. This failure appears to be a common feature of the protected areas systems worldwide (Stattersfield et al., 1998).

Therefore the further development of ecological networks and green veining on multiple scales in Europe as well as the application of ecologically sustainable land use including low and high dynamic functions is a conceptual challenge for the near future. Its underpinning requires various kinds of research and experiments that have not been or restrictedly carried out at present and that should cover cooperative research in all Europe.

### **4.3 Policy frameworks and spatial planning**

As the reports on PEEN indicate, progress has been made at the European and at the national level in addressing the ecological connectivity in different policy instruments at all levels (Bonnin et al., 2007). The European Spatial Development Perspective is an example of this. It is based on an economic approach, while at national level some countries have used different approaches to integrate ecological concerns into spatial planning policies. However, there is a scope to explore and further strengthen the integration of PEEN and its related concepts into spatial planning policies and in an economic and infrastructure development. The design of functional networks in this relation will involve many stakeholders. Yet the functionality of the established networks has to be demonstrated in terms of spatially related elements and in terms of policy support at different levels. This will require additional research during the coming years.

During the last years several projects were realized at European level to illustrate the relation and the links between spatial planning processes and establishment of ecological networks. Some of these include the project initiative of 'Spatial Planning and Ecological Networks'. Based on the assessment of the spatial planning policies and ecological networks initiatives in few European countries the main knowledge gaps have been identified in this field and recommendations for the future have been developed (Civic et al., 2009).

For the further development of ecological networks it is important to develop an appealing and challenging European vision on ecological networks, linking to special planning frameworks and taking into account the dynamics of society and land use. This should give a legally binding status to ecological networks at all geographical levels with Europe as a pilot, but not excluding this experience for other regions. This can ensure coherence between the planning and establishment of ecological networks. At the European level this means a need for a cross-sectoral approach on ecological network and landscape connectivity implementation such as between DG Environment, DG Agriculture and DG Transport.

## 4.4 Practical implementation

For implementation of ecological networks nowadays often stakeholder analyses are being carried out including an analysis of the cultural settings (and where appropriate involve them as early as possible in the process) particularly when implementing ecological networks (Siebert et al., 2008). Embedding of ecological networks in a societal context is seen as a key issue for maintaining multifunctional landscapes that deliver a range of ecosystem services.

Quantification of economic benefits of ecological networks and creating a societal basis with inspiring best practice cases and methodologies including wider countryside applications is theoretically seen as a good way to embed ecological networks, but not much implemented. Developing a better understanding of the costs and benefits of ecological networks to society in order to support effective decision making regarding activities and projects with a possible impact on ecological connectivity is being recognised as an important issue. However, it is yet not implemented (Simeonova et al., 2009).

Therefore it is needed to invest in efforts and resources for research, which accurately describes and quantifies the costs and benefits and the ecological impacts of economic activities and to develop sound methodologies to assess and monitor the effectiveness of policies in relation to the planning of rural areas, including the implementation of ecological networks. Monitoring and assessment programmes for ecological network planning and implementation should be defined at the earliest possible stage of policy implementation and be as SMART (Simple, Manageable, Achievable, Realistic, Timely) as possible.

The planning of rural (and urban) space, and the role of ecological networks within them, is reflecting the major changes in society that are presently taking place. These changes include a strong urbanization, increasing urban lifestyles disconnected from nature, land abandonment, communication technologies, increased transport and travel. The planning and implementation of ecological networks should therefore compensate not only the loss of ecological connectivity as the result of homogenization and intensification of land use and increased fragmentation, but also the process of disconnecting society from nature.

Knowledge and information of ecological pressures such as habitat fragmentation through road construction and their quantification, linked to location are known in Europe, but not yet part of assessment procedures, land use and spatial planning. This calls for innovative, creative, inclusive and participative approaches to restore multifunctional landscapes; the development of knowledge about ecosystem services and other benefits to society can help define roles for ecological networks in such approaches. This even goes beyond Europe, but is a global issue.

Therefore knowledge is needed and recognition of the gaps in ecological, economic and social sciences. It is important to build bridges between science and practice, between policy making and landscape management on the one hand and conservation biology and landscape ecology on the other.

It is also required to know, how bottom-up and top-down approaches can be integrated as the development of ecological networks takes place at the bottom (in the field), but has to be coordinated at the top (national and European coherence). How can scientific knowledge be embedded in this kind of decision making processes and which issues should be identified to belong into the biodiversity conservation toolkit.

How the economic benefits of ecological networks can be made explicit for stakeholders at all levels, but in particular for involved land users and local actors. It is important to carry out more policy science research on the organization of biodiversity conservation of public institutions and stakeholder interaction, including cross-sectoral and multi-scale analysis of mechanisms and messages, e.g. what are the key messages for different sectors and what works best at different scales in different countries.

## **5 Dutch support for PEEN development in Ukraine and Russia**

Bilateral cooperation between the Netherlands and the Russian Federation and Ukraine exists since 1991. Information will be nearly completely available on Ukraine, while information on Dutch-Russian cooperation has been more recently compiled and reviewed in the LNV report 'Russian Dutch cooperation on nature conservation 1991-2006 (Boere, 2007). Until now about twenty bilateral project initiatives have been realized in Russia and thirty in Ukraine to support biodiversity conservation. Respectively eight and twelve of these directly contribute to the development of PEEN.

### **5.1 Development of policy to prevent land degradation in Ukraine**

In the Netherlands a number of practices has been developed in dealing with land degradation such as soil erosion and pollution. This is currently a significant problem in Ukraine. There is expertise available in the Netherlands on assessment methods for land degradation severity by integrating biophysical and social parameters (population density) in spatial approach which can show the severity of the land degradation and serve as a decision support system to policy makers, resource managers as well as local communities and farmers. The Dutch government (Ministry of foreign affairs/DGIS, later OS) together with the European Commission has been involved in policy development process for land degradation, integrating it within the broader theme of sustainable land use. There have been number of initiatives undertaken to support international organizations in developing countries to enhance land care. Based on such initiatives local farmers and civil society organizations in different countries have developed alternative land management strategies; in many cases based on land use practices that rest on local knowledge.

In July 2002, the Parliament of Ukraine ratified the UN Convention to Combat Desertification (CCD). Approved by the Cabinet of Ministers of Ukraine the National Action Plan on CCD implementation is being implemented now with having the Ministry of Environmental Protection as a key player. The potential input of the Dutch government is to adopt the successful practices for land degradation and ecological networks into the Ukrainian institutional framework and develop approaches to address the main land degradation issues impeding the landscape connectivity of the ecological network. Few issues can be address with this regard:

- Bringing land care into the spatial development policies;
- Establishing linkages between climate change, biodiversity loss and land degradation;
- Addressing desertification;
- Identifying opportunities for making financial commitments and investments both by local land users and external investors into land restoration.

### **5.2 Advising on sectoral policy integration process**

The Netherlands is one of the forerunners in implementing the ecological networks strategy and developing integrated approaches for optimizing the functions of its NEN as part of the spatial developments at national and regional level. The Dutch National Nature Policy Plan developed in 1990 has introduced the priorities for development of a NEN while later the integrated spatial structure of the 'robust connections' and a national ecological infrastructure plan were developed.

Dutch ecologists and policy makers in the field of biodiversity conservation are continuously faced with the challenge to plan ecological development in a densely populated country such as the Netherlands and are actively engaged in linking the socio-economic and ecological parameters in this planning process. Different approaches to balance between the economic and ecological interests have been developed and applied in the Netherlands such as multiple land use planning, Red for Green planning and ecological infrastructure planning. This type of practices and knowledge can be highly relevant for dealing with the constraints of integrating the ecological network development process into the spatial planning in Ukraine and Russia in dealing with issues such as fragmentation and land degradation.

### **5.3 Support the implementation of ecological networks at regional and trans-boundary level**

The provincial authorities in the Netherlands are actively involved in the implementation of the Dutch policy on biodiversity conservation and ecological networks. During the last years there is significant amount of best practices accumulated by the regional authorities in the Netherlands in supporting the development of the NEN by contributing to sustainable spatial development at regional level, distribution of land use functions for red and green purposes, establishing robust connections between nature areas and their restoration. Dutch governments should provide a compilation of such a best practices at regional level in order to make it available and accessible examples of the Dutch experiences to Ukraine and Russia. There is not much experience yet with trans-national project for ecological networks in the Netherlands. There are a few examples of developing ecological corridors between the regions of Limburg (bordering Belgium) and the cross-border regions between the Netherlands and Germany.

#### **Funding needs**

During the last decade the Dutch Ministry of Agriculture, Nature and Food Quality has been providing a large part of investments for development and strengthening the implementation of the European conventions and legislation on biodiversity, particularly on the enforcement of the Habitats and Birds Directives in Eastern Europe. A number of projects have been implemented in Eastern Europe including few in Ukraine and Russia on ecological networks development within the framework of the BBI MATRA Action Plan and funding program. The funding opportunities on a bilateral base are currently operational and can be beneficial for supporting the progress with the ecological network development in Ukraine and Russia. The opportunities for such cooperation within the Dutch funding programmes are usually reviewed and communicated between the Dutch embassy in Ukraine and Russia and the potential partners from Ukrainian, Russian and Dutch organizations.

#### **Knowledge sharing**

As a large part of the research on the ecological networks strategy and methodology has been conducted by Dutch scientists, including the development of the indicative map of the Pan-European Ecological Network in Western and South-East Europe the Dutch Government and Research Institutions can provide a suitable know how to Ukrainian and Russian researchers and experts. Particular interest can be the knowledge share with Dutch experts in the field of establishment and use of ecological databases on habitats and species in both Ukraine and Russia. Conducting research and developing models for data assessment and GIS mapping is indicated as an emerging need by both countries.

Furthermore, support might be welcomed in the development of a suitable methodology for the establishment and the operation of the Econet of Ukraine and the optimization of the connectivity of the system of specially protected areas in Russia. The system of specially protected areas in Russia is of particular interest for research as it is still based on different approach of territorial nature conservation compare to the common methods used in Europe such as national Econets and Natura 2000 system of protected areas. Issues such as

habitat fragmentation need to be more explicitly included in the research and policy agenda in Ukraine and Russia. Dutch contribution can have an added value in knowledge sharing in this field.

Relevant publications from research projects conducted by Dutch organizations can serve as a basis to update the knowledge base on ecological networks functions to connect habitats and establish migration corridors for particular species. Last but not least is the knowledge exchange in developing institutional models for supporting the implementation of the Econet at national and regional level and involvement of multiple stakeholders in the decision making process. Exchange of practices in participatory research and collaboration practices is highly needed.

### **Human capacity and expertise**

The Dutch Government can play an essential role in strengthening the process of organizational capacity building of the Ukrainian institutions and individual experts involved in the development of the NEN. Specific investments by the Dutch government with this regard can be in the form of funding of short training programs and workshops, exchange visits between experts for field work and research assignments to take place in Ukraine and Russia or in the Netherlands and traineeships for young Ukrainian and Russian experts and researchers at Dutch research organizations.

### **Participation and collaboration**

Despite the increase in the number of project initiatives promoting ecological networks in Ukraine and Russia, stakeholder involvement is not yet a common practice. The initiation of stakeholder involvement processes in the development of the NEN still needs to be addressed. Particular attention within the Dutch bilateral cooperation in this field should be made on the identification of different private and public interests and exploring the opportunities for establishing public-private partnerships practice that can improve decision making and collaboration between different governmental authorities and private organizations. Specific issues in this respect are the land use planning and the powerful private actors currently influencing the land use by focusing on maximizing their profits and obstructing the development of NENs. The currently observed weakness of the public authorities and fallibility of the legislation towards the private actors both in Russia and Ukraine create difficulties in incorporating the ecological networks development in land use planning. Additional issues are the transparency of the policy decisions, public involvement and awareness rising. The Dutch government can play a role in supporting the inter-institutional collaboration and offering knowledge from the Netherlands or other European countries in resolving these issues. This can be valuable contribution in the attempt to promote an integrated approach to planning and implementation of ecological networks.



## 6 Conclusions

From the overview presented here it can be concluded that the vision development through PEEN has been successful. Most European countries do develop ecological networks. However, the implementation of the connectivity objectives for the coherence of these networks and of PEEN as a whole is still not sufficient. One of the reasons for this is that the international cooperation in the field of ecological networks is still in a development phase and there is no common institutional framework to lead this process. Currently, the Natura 2000 and the Emerald Network initiated by EC play an important role in bringing countries together in their efforts to design their NENs. It still remains an open question, however, as to how the developed vision for a series of inter-connected landscape elements at larger European scale such as PEEN can be successfully transformed into reality and how cross-border connectivity can be realised.

The projects carried out under the Dutch biodiversity supporting programmes have contributed to development of Econet policy plans and programmes. However, as observed only during the last few years more focus has been given in these initiatives to stakeholder involvement, planning mechanisms and implementation of the Econet. Furthermore, the needed cost and benefit analysis of Econet implementation has not yet been included in these projects.

Concerning ecological corridors the development of international ecological corridors is still in initial phase. Some experts meetings have been organized for discussing international connectivity and coherence of PEEN such as the 2005 Vilm meetings and the Bialowieza meeting in 2009, but more concrete projects and initiative have not yet been undertaken as there is no international initiator organisation.

The Econet developments in Russia are in progress. A more detailed inventory of the current System of Specially Protected Nature Areas has been initiated by the Russian experts with the aim to propose measures for further development and upgrade of the protected areas and the approach for their designation. From the overview of the state of the art of the SPNA's it can be concluded that it is important to further improve the functionality of the SPNA's, the management of the protected areas and the institutional framework that supports it. Considerable initiatives in this field can be started within the bilateral cooperation between the Netherlands and Russia.

With regard to the further progress of the Econet development in Ukraine it can be concluded that the Dutch Government can play an essential role in strengthening the process of organizational capacity building of the Ukrainian institutions and individual experts involved in the development of the NEN.

A UK workshop in 2005 concluded that there are eight ecological key questions on connectivity and landscape structure related to the functional implementation of the ecological networks being amongst the 100 most important ecological questions of high policy relevance in the UK. These questions concern among others lag times between habitat fragmentation and the loss of species and the planning strategies for conservation areas. These issues are also highly important for CEE countries, but are not yet programmed, nor nationally, nor internationally. A joint research programme can be a relevant activity to address these issues as this part of Europe is the source for many of the species that are re-colonising Western Europe.

The European Commission confirmed the UK conclusions in their latest evaluation. They conclude that more research is needed particularly on monitoring projects that aim to increase our understanding of the interrelationships between connectivity and landscape structure for habitats and species, cost-effectiveness,

connectivity at national and bio-geographic scales and development and implementation of monitoring schemes to measure the actual impacts of ecological networks and other connectivity measures.

The currently observed weakness of the public authorities and fallibility of legislation towards the private actors create difficulties in incorporating the ecological networks development in land use planning. The Dutch government can play important role in supporting the inter-institutional collaboration and sharing knowledge from the Netherlands and other European countries in resolving these issues.

Furthermore, based on this review we can conclude that until present there is no sufficient institutional framework at the European level, which embeds the shared responsibility for the development of PEEN. There is lack of sufficient leadership in this process in Europe which impedes the sufficient share of knowledge and practices on implementing PEEN between different European regions and counties. International cooperation at European level and establishment of such leadership needs to be further addressed in the European agenda on ecological networks.



## 7 Recommendations

The following recommendations can be formulated based on this report:

1. The focus of the PEEN process should not only include planning but also implementation and institution building.
2. Connectivity issues and establishment of trans-boundary ecological corridors at European level need special attention as this is not yet included in the planning and implementation process.
3. As the CEE countries are an important source of species reintroduction in Western Europe, it is important to give extra attention to east-west connectivity of PEEN and propose measures for its improvement.
4. It is important to strengthen the European research agenda on ecological networks knowledge base in Central and Eastern Europe including Russia and Ukraine.
5. Propose and initiate a common European institutional framework for coordinating, monitoring and supporting the progress with PEEN and the ecological networks at national and regional level.



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# Appendix 1 List of currently identified networks of protected areas in Russia

- Heart of Russia-Central Russian Plan (Ministry of natural resources of the Russian federation, Biodiversity conservation centre, WWF Russia)
- Natural Ecological Frame of Moscow Oblast (Biodiversity Conservation Center)
- Natural Complex of Moscow City (Department of Nature Use and Environmental Protection of Moscow City Government, Institute of the General Plan of the Moscow City)
- System of Reserved Natural Lands of Ryazan Oblast (Biodiversity Conservation Centre, Esenin Ryazan State Pedagogical University)
- Natural Ecological Frame of Ryazan City (Biodiversity Conservation Centre, Esenin Ryazan State Pedagogical University)
- System of Protected Natural Areas of Bryansk, Kaluga and Orel Oblasts (WWF Russia, Orel State University, Kovyl Centre)
- Ecological Network of Orel Oblast (Orel Oblast Branch of the Federal Supervisory Natural Resources Management Service, Orel State University, Kovyl Centre, WWF Russia)
- Ecological Network of the Volga-Viatka Region (Biodiversity Centre)
- Ecological Network of the Nizhniy Novgorod Oblast (Federal Supervisory Natural Resources Management Service, Inspection in Povolzhie Federal District, Nizhniy Novgorod Branch of the Russian Bird Conservation Union)
- Ecological Network of Chuvash Republic (Ministry of Nature Use of Chuvash Republic, Prisursky State Nature Reserve, the Institute of Urbanistic)
- Volga-Ural Econet (the Volga-Ural ECONET Assistance Centre)
- Ecological Network of the Southern Ural (WWF Russia, the Volga-Ural ECONET Assistance Centre)
- System of Protected Natural Areas of the Republic of Bashkiristan (Ministry of Natural Resources of the Republic of Bashkortostan, the Volga-Ural ECONET Assistance Centre, WWF Russia)
- Landscape and Ecological Network of Orenbourg Oblast (the Steppe Institute of the Ural Branch of the Russian Academy of Sciences)
- Ecological Network of the Lower Volga Region (Biodiversity Conservation Centre);
- Caucasus Econet (WWF Russia)
- Ecological Network of Altai-Sayan Ecoregion (WWF Russia)
- Ecological Network of Baikal Lake Basin (Institute of Geography of the Siberian Branch of the Russian Academy of Sciences)
- Ecological Network of Goloustnaya River Basin (Administration of Irkutsk Oblast, Baikalo-Lensky State Natural Reserve)
- Ecological Network of Khilok River Basin (Institute of Natural Resources of the Siberian Branch of the Russian Academy of Sciences)
- Sacred Earth Network - the Republican System of Specially Protected Natural, Areas (Ministry of Nature Conservation of the Republic of Sakha-Yakutia, WWF Russia)
- Ecological Network of the Russian Far East (WWF Russia) WWF is most active through its ecoregion conservation programme. Ecoregion programmes that were underway at the time of writing include the following terrestrial and coastal regions.





## Appendix 2 Projects in 2000-2001 in the framework of the NEN of Ukraine

In particular, during the years 2000-2001 the following projects were accomplished within the framework of the referred Programme:

- 'Classification of ecological systems in Ukraine and their complex assessment' (total spending 20 thousand UAH, State Fund) - principles have been distinguished for selecting unified criteria for classifying ecosystems in Ukraine, methodical provisions have been set for developing the cadastre of ecosystems. The elaborated classification covers complexes of various ranks, including both natural and anthropogenic, and is based primarily on the dominant type of vegetation. Sixteen main ecosystem categories have been distinguished. The classification integrates into a unified hierarchical system the array of ecosystems met in Ukraine, reflects the present state of diversity of the biotic component of its landscapes and is the basis for maintaining the ecological stability of the country and ground for continuing work on the development of the NEN.
- The elaboration of the Law of Ukraine 'On the Ecological Network of Ukraine' (total spending 30 thousand UAH, State Budget) - justifications have been made for the structure and content of the draft law, which has been brought into accord with international and national standards in the sphere of protection of biological and landscape diversity, and which should create the legal basis for the development and performance of the NEN. Conceptual approaches to the elaboration of the draft law 'On the Ecological Network of Ukraine' have been considered and approved by resolution No.27 of the collegium of the Ministry of the Environment and Natural Resources of Ukraine on the 22.11.01. By order (No.486, 24.12.01) a Work Group has been organised for preparing the draft of this law.
- "Justification and elaboration of standard acts concerning the protection of land and restoration of soil fertility' (total spending 45 thousand UAH, State Fund) - an information basis has been created for carrying out work on the justification and elaboration of draft standard acts concerning land use of areas that perform important ecosystem functions. Justifications have been made on the methodical approaches to the regulating land use in this case. The draft has been elaborated of the Law of Ukraine 'On the use of land that performs important ecosystem functions' and a draft has been drawn up of the State standards of Ukraine, 'the nomenclature of ecological standards for land use and protection'. 'Justifications for the spatial parameters of the elements of the NEN and elaboration of local patterns for its developments, typical technology, prototypes' (total spending 100 thousand UAH (40 thousand UAH during 2001 and 60 thousand UAH during 2002) State Budget) - as far as the formation of the ecological network requires changes to be made to the structure of available land, an analysis has been carried out of the composition and quality of farmland in various natural/agricultural regions that need to be excluded from use for farming purposes and comprise a forward-looking basis for developing the ecological network.



# Appendix 3 National Programme for the formation of the NEN in Ukraine

## **Cherkasy region**

The Plan of realization of the Programme for 2001-2005 has been detailed by the Ministry of the Environment and Natural Resources of Ukraine and approved by Board of regional state administration. Data has been collected for an environmental map of the region. The work on determination and survey of little used and unchanged areas with the purpose of their further conservation is being carried out. The work on the creation of national natural parks 'Kholodny Yar' and 'Cherkassky byr' is in process. On the 1st January 2002, natural reserve fund of the region consists of 413 objects on the territory of 39,706.77 hectares, out of which twenty hectares have national status. In the region there is: natural reserve area 'Kanivsky pryrodny' (2,027 hectares), regional landscape park 'Trahtemyryv' (5,562.5 hectares), 163 botanical gardens, hydrological, entomological, zoological and combined objects on the territory of 470.1 hectares, one dendrological park 'Sofiyvka' (152 hectares), and 33 parks - monuments of landscape architecture (6,205.88 hectares).

## **Chernihiv region**

The work on documents concerning Ichnyansky (76.840 hectares) and Mesinsky (31.200 hectares) national natural parks is in process. By means of creation of these parks the percentage of protected areas will meet the requirements of the Programme for 2005 (7.5%). Also two natural reserve areas are being created: Desnyansky (54 thousand hectares) and Dniprovsky (55 thousand hectares). The documents of preliminary consideration about the creation of a regional landscape park between Desna and Dniپر - 'Mizhirichinsky' (90 thousand hectares) are in a preparatory stage. Thanks to the creation of the above-mentioned parks, the percentage of protected areas in the region in 2003 will amount to approximately 10%. All the necessary documentation concerning inclusion of landscape game-reserve 'Zamglay' (4.5 thousand hectares) into Cadastre of water-marsh rights of national importance has been prepared. About 331 hectares of ravines, gullies, riverside areas, sandy areas and former agricultural lands have been afforested; about 400 hectares of radioactive contaminated zone has been alkalisied.

## **Chernivtsy region**

A survey was conducted into the possibility of extending the territory of natural reserve fund by means of forest areas situated at a height of more than 1100 metres above sea level, in 150 metres zone along drains, which were excluded out of major harvest in accordance with the Law of Ukraine 'About moratorium on final harvesting on mountainsides in firry-beech forests in Carpathian region'. Various measures for extending the territory of Vizhnitsky national natural park as an element of an Econet have been put into practice.

## **City of Kiev**

According to the plan of measures of Kiev municipal administration aimed at the creation of NEN for 2001, the project of national natural park 'Golosiyyv' has been detailed and passed to the relevant city authority for further approval. In 2001, a computer-based system of state cadastre of natural reserve areas and inventory of natural reserve complexes of Kiev will be created. Also it is planned to estimate the animal and plant species' population and include this into the Red Book of Ukraine.

## **City of Sevastopol**

Grounds for the creation of Sevastopol national natural park and regional landscape park 'Heracleya' (coastal territory of Heracleya peninsula with adjoining water area of the Black Sea) have been prepared and submitted

under consideration of land users and local administration. A floristic survey of the territory of Sevastopol was conducted. A project of Chernorichensky reservoir water protection zones and sanitary protection zones was designed. The process of certification of Sevastopol's ponds was completed. Development of network of natural reserve fund has been stipulated in the Conception of development of Sevastopol until 2020.

### **Dnipropetrosk region**

Work was started on the creation of 5 new national game-reserves with an approximate area of 8.5 thousand hectares (Petropavlovsky firths, Mariya grove, Debaltsyvsky firths, Bakay and Preobrazhensky); elaboration of the project of Oryl national natural park. Scientific guidelines for the conservation of natural complex 'Samara Pinery' were also prepared, designated as an object of conservation fund by the Decree of President of Ukraine. In Novomoskovsk military forestry major harvest for 2000-2009 was prohibited as the territories have been designated National Natural Park.

### **Donetsk region**

An inventory of natural complexes and objects of nature conservation fund is being carried out. All the necessary materials for the creation of national natural park 'Meotida' have been prepared. An inventory of plant habitats and plant associations was completed and included into the Green Book of Ukraine. An evaluation of the state of species populations has been included into the Red Book of Ukraine.

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### **Ivano-Frankiv region**

The regional board approved the Programme of regional ecological network forming in Ivano-Frankiv region for 2001-2010'. The programme stipulates creation of 3 national parks: 'Galytsky', 'Gutsulshyna' and 'Verkhovyna' with a total area of around 90 thousand hectares, a number of local nature reserve areas (5.5 thousand hectares) and extension of nature reserve 'Gorgany' and the Carpathian national natural park. Renewable territories will be created and added to the ecological network, including agricultural lands developed from naturalized eroded areas. The base of regional ecological network consists of 438 nature reserve objects and territories with a total area of 186.5 thousand hectares (13.4% of territory). In 2002, 22 new local nature reserve areas with a total area of 5.5 thousand hectares will be created. The ecological network will also include renewable and naturalized agricultural lands. Alkalization and afforestation of 30 thousand hectares of plough-land on the slopes with the angle above 7 degrees is planned. The Regional forestry fund amounts to 622.2 thousand hectares, of which 280 thousand hectares is forest of group I. Rivers (total length 15.6 thousand kilometres) with protective lines will serve as ecological corridors.

### **Kiev region**

Documentation for the creation of new objects of natural reserve fund has been prepared:

- Local hydrological reserve 'Dniprovo-teterivsky' (3.2 thousand hectares) with the purpose of conservation of the water-marsh landscape of river Teteryv floodplain with its considerable flora and fauna diversity;
- National landscape game-reserve 'Pripyatsky' (3.0 thousand hectares) in delta of river Pripyat in restricted radioactive contamination zone;
- Work on the creation of the 'Pereyaslav-Khemelnytsky' national park has started.

### **Kharkyv region**

The Programme of NEN formation in the Kharkyv region for 2002-2015, including interregional practical scientific programme 'Conservation of steppe and renewal of West-European population of bustard in Ukraine' has been prepared. A practical scientific conference 'International community for conservation of bustard' was conducted, at which a decision was taken to transform the regional landscape park 'Pechenizke pole' into a national natural park. Work on documents concerning the 'Gomilshanskylysiy' national natural park is in process. In 2002 creation of Pridonetsky and Siverdonetsky natural corridors is planned. Work on development of natural reserve fund network is in process.

### **Kherson region**

In accordance with the administrative decree, the Coordinating Board on questions of realization of the Programme in the region was created and Board regulations and work plan approved. A local landscape reserve 'Kairska balka (665 hectares) was created, and documents prepared of the preliminary review for creation of local landscape reserve areas: 'Bolgarska balka', 'Balka Yanchekrak', 'Chernecha balka', reserved tract 'Viriovychna balka', regional landscape park 'Kardashinsky marsh', local ornithological reserve 'Behter colony of Ardea cinerea' and the local hydrological reserve 'Behter lakes'. The work to create the national park 'Dzharylgach' has been started. Until the end of 2001 it is planned to design a regional scheme of ecological network formation in the Kherson region.

### **Kirovograd region**

It is planned to draw up a contract for realization of measures aimed at regional ecological network formation.

### **Lugansk region**

The following actions have been undertaken:

- The Ministry of the Environment and Natural Resources of Ukraine hold a conference 'State Programme of NEN forming for 2000-2015 - public opinion';
- Creation of forest and field-protecting forest plantations at agricultural lands (115 hectares); waterside shelter belts (126 hectares); afforestation of lands at the territory of the State Forestry Fund (2,418 hectares);
- 36 thousand hectares have been taken out of cultivation for further alkalization;
- More than 20 thousand hectares of prospective territories for further conservation have been inspected;
- The drawing up of flora and fauna cadastre and monitoring of natural reserve objects (10) has started;
- With the purpose of improvement of environmental education and enlightenment, a book 'Natural reserve areas of Luganschina' ('Zapovidna Luganschina') has been published, an information bulletin 'Ecosvit' is being publishing every quarter and there has been a wide coverage of environmental problems in mass media, etc.;
- On demand of State Department of Ecological Safety 'The Cadastre of flora and fauna resources of Lugansk region' was elaborated by Lugansk branch of NECU together with self-sustained scientific Laboratory for Natural Resources Cadastre. The Cadastre is assumed as a basis of ecological network creation.

### **Lviv region**

The Ministry of the Environment and Natural Resources of Ukraine has established the 'Programme of development of natural reserve areas network of Lviv for 2001-2005'. Detailed project documentation has been produced (skeleton map, scientific ground, draft opinion of landowners and provincial government) for creation of landscape game-reserve 'Chonovyny' (2000 hectares), an area that is included in the IBA list. The following proposals were submitted:

- Creation of Zhovkivsky regional landscape park on the range Roztocchya (16540 hectares), which is supposed to be one of the crucial elements in the transboundary Poland-Ukrainian ecological network;
- Extension of the area of national natural park 'Skolivsky Beskydy' to the limits approved by the Decree of the President of Ukraine<sup>1</sup> 79/94 of 10th March 1994.

### **Mykolaev region**

The Programme of ecological network formation was established in the Mykolaev region. With the assistance of Institute of Zoology (National Academy of Sciences) a scheme of territorial planning of ecological network of the Mykolajiv region was developed. Scientific background for extension of natural reserve area 'Elanetsky steppe' was developed. The process of elaboration of draft project of the regional landscape park 'Pryingulsky' has been started. On 1st January 2002, the natural reserve fund consists of 123 objects with total area of 52.8 thousand hectares (2.06% of total region area). Included in this total is natural reserve 'Elanetsky steppe'

(1,675.7 hectares), three regional landscape parks: 'Kinburn spit' (17,890.2 hectares), 'Granite-steppe Pobuhgya' (50.34 hectares) and 'Tyligulsky' (8,195.4 hectares). An area amounting to more than 1.2% of the region is expected to be given a status of natural reserve.

### **Odessa region**

Works were conducted on:

- Negotiations with landowners and land users of the region that will form part of national natural park 'Nyzhnyodnistrovsky' (more than 21,000 hectares);
- Danube biosphere reserve extension;
- Creation of game-reserve of local significance 'Aliyaga' (landscape, 665 hectares), 'Vasilivka' (general zoological, 400 hectares).

### **Poltava region**

In 2001 the area of natural reserve fund increased by more than 3,700 hectares. The Regional Board has approved a decision about the creation of regional landscape park 'Kremenchutsky plavni' (5,080 hectares) to conserve the unique, unspoilt Dniپر floodplain areas whose nature was almost destroyed. More than 5,600 hectares of territories were examined with the purpose of further conservation.

A project document regarding the creation of regional landscape park 'Nyzhnyovorsklyansky' (10,000 hectares) was also drafted. Many natural reserve objects of local significance have been reconstructed. More than 1,000 hectares of territory has been afforested and more than 3,500 hectares of hillsides and solonetzic soils in flood-lands have been alkalised. Documents have been prepared concerning the inclusion of water rights 'Biletsky plavny' (2980 hectares) and 'Sulynske' (23290) into the List of water-marsh rights of national significance.

### **Ryvno region**

Protective afforestation covering an area of 1705 hectares has been planted. Preparation of materials regarding the creation of the Dermansko-Mostivsky regional landscape park has been completed. The draft decision of the Regional Board concerning the creation of 18 new objects of natural reserve fund comprising a total area of 707 hectares has been prepared. An inventory of natural complexes of natural reserve fund is in process.

### **Sumy region**

Measures for the extension of national natural park territory 'Desnyansko-Starogudsky' have been taken. Work on the creation of national natural parks 'Serednyoseymsky' (35 thousand hectares) and 'Vorsklyansko-Trostryanetsky' has started. About 313 hectares have been afforested and about 2.4 thousand hectares have been alkalised.

A survey of biodiversity in ecological river corridors was conducted. The Centre of artificial growing of genetic material of rare and endangered plant species was organized on the basis of the local botanical gardens. Scientific ground for the creation of ornithological reserve system in Desna floodplain was prepared; the documentation for creation of intergovernmental Ukrainian-Russian biosphere reserve 'Bryansk and Starogut forests'.

### **Ternopyl region**

The programme of ecological network forming in the Ternopyl region for 2002-2015 was established covering the prospective scheme of national natural park 'Kremenetsky Mountains'. It has been determined that 59 prospective territories should be given a status of natural reserve. During the year 29 hectares have been afforested.

**Volyn region**

The following has been achieved: Enlargement of the 'Pripyat-Stokhid' regional landscape park. Work on establishing national park 'Prypyat-Stohyd' has started. Game-reserves in areas of concentration of Aquatic warbler have been created. An inventory of flora and fauna at the nature conservation area of national importance has been produced. In 2001, the area of nature reserve increased by 1,000 hectares and now amounts to 163 thousand hectares (constituting 8% of the total region).

**Zakarpatye region**

Protective afforestation has been planted in an area of 138 hectares. Work on soil alkalisation was not carried out because of lack of funds. The work on establishing national park 'Svydovetsky' has started.

**Zaporozhye region**

The process of inclusion of water and land areas into national natural park 'Priazovsky', one of the largest elements of littoral natural corridor (about 200 thousand hectares), has been started. The functional zoning of park territory was established.

**Zhitomir region**

In common with state forestry association 'Zhitomyrlys' the work on problems concerning Polissya conservation area enlargement began. The means for the conduction of flora and man-made landscape modifications survey in Gorodnitsky Regional Park were assigned (the regional State Environmental Protection Fund has assigned 15 thousand UAH). In order to produce an inventory of flora and fauna of the national nature reserve fund, the regional State Environmental Protection Fund has assigned 7 thousand UAH. 15 nature reserve objects (8 botany, 1 hydrological, 2 ornithological and 1 forest reserve; there have been extended borders of 3 existing local nature reserve objects) have been created. The territory of special reserved areas has increased by 43,245.8 hectares and amounts to 80,514.67 hectares (3.5 % of protected areas). Work on the extension of territory of the Polissky natural reserve was conducted.





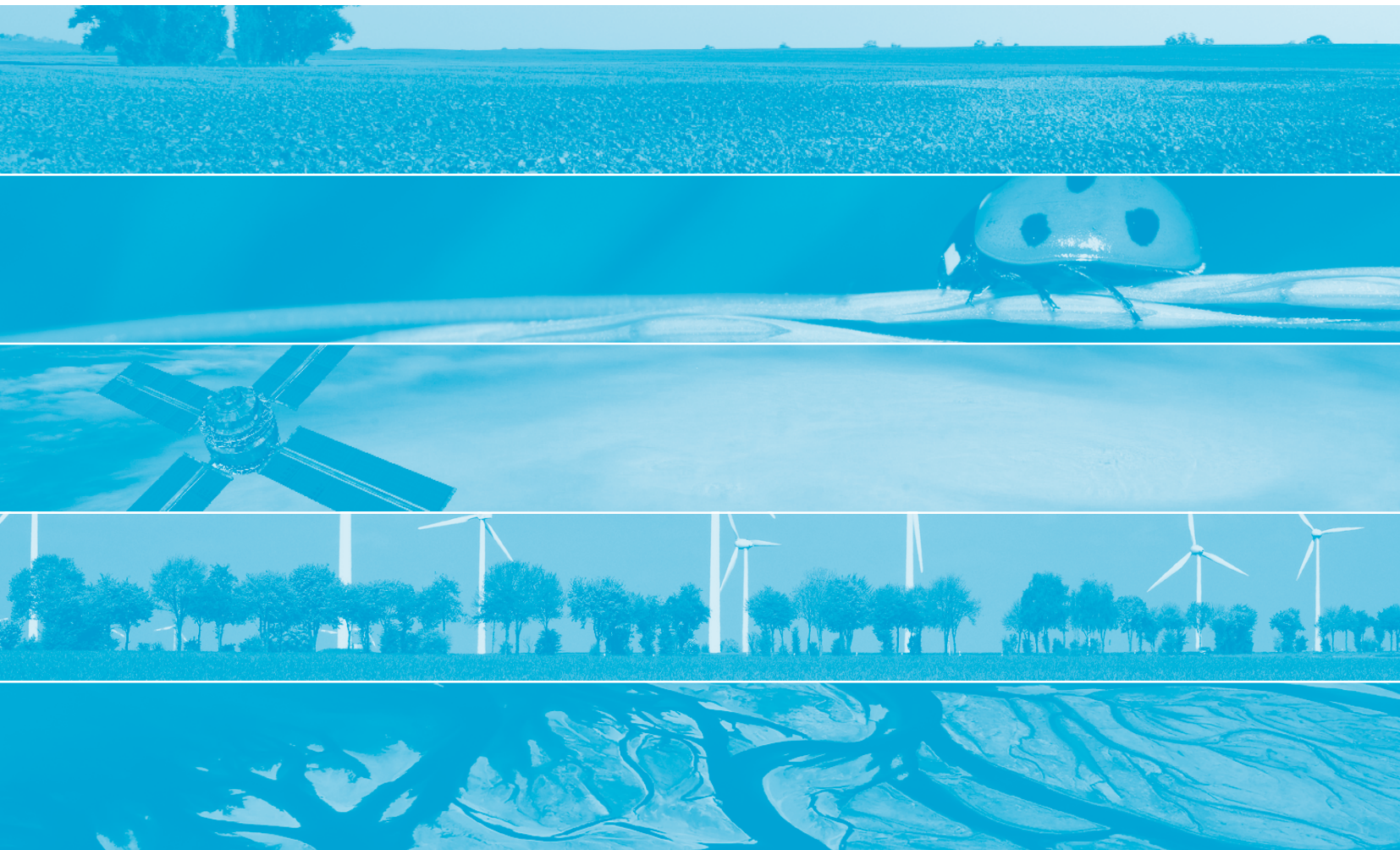
## Appendix 4 Representativeness of species in the System of SPNA's Russia

For the optimization of the representativeness of the flora and fauna and the protection of threatened species of plants and animals the current priority in the development of the Russian system of specially protected areas is its expansion of its current territory. It is estimated that the implementation of the indicated in the table expansion actions will ensure 30% of the protection of all species which need conservation (Stishov and Onufrenya, 2009).

Groups of species	Number of species needing protection	Expansion of current protected areas	Current and potential protected areas (including clusters of current areas)			Current protected areas + proposed for expansion + all potential areas
			Category 1	Category 2	All	
Terrestrial vertebrates species not included in the red list	22	7 32%	13 59 %	19 86,4 %	22 100 %	22 100 %
Terrestrial fresh water species included in the red list	169	55 32,5 %	57 33,7 %	126 74,5 %	158 93,5 %	169 100 %
Plants and lichen included in the red list	246	76 30,9 %	74 30,1 %	146 59,3 %	198 80,5 %	246 100 %
Endemic species not included in the red list	19	6 32,6 %	1 5,3 %	8 42 %	19 100 %	19 100 %







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