Biological diversity, protection of species and areas

Nature determines the human life by supplying food, raw materials, oxygen, clean water, unpolluted soil and many other goods. It reduces the amount of carbon dioxide in natural processes, it creates living conditions for the organisms, it is an environment for a healthy life and rest for men. A superior feature of nature involves its biodiversity which ensures balance at the level of individuals, species and ecosystems. Loss of biological diversity of ecosystems poses a threat to the proper functioning of our planet, and as a consequence to the economy and humankind.

A superior objective of the National strategy for biological diversity and sustainable use of biological diversity is “the maintenance of richness of biological diversity on a local, national and global scale, as well as ensuring durability and development possibilities at every level of its organization (intraspecific, interspecies and superspecies), taking account of the needs of social and economic development of Poland, as well as the necessity to ensure proper conditions of living and development of the society” in: “The national strategy for biological biodiversity and sustainable use of biological diversity” with the "Action plan for 2007-2013".

Poland has relatively a reach biological diversity. It is a result of its transitory climate, diversified relief, geological structure and soil, with no natural barriers. Biodiversity in Poland is characterized by a relatively large area of forests (9.1 million hectares), wetlands (1.8 million hectares, including 455 thousand hectares of inland waters), as well as by a relatively extensive use of agricultural areas. The nature state of ecosystems related to the latter group can be assessed using Farmland Bird Index (FBI). In 2000-2003 this index showed a 15% fall in their volume, and a slow growth from 2005 onwards to the starting level from 2000, which indicates an improvement in the natural state of agricultural areas (Fig. 4.1.1.).

Fig. 4.1.1. Changes of the Farmland Bird Index in 2000 - 2008 (source: CIEP/SEM)

485 plant communities were identified in Poland, of which ca 12% are considered to be endemic. According to current data there are 2844 angiospermous species, 13 gymnospermous species, 13 lycophytina species, 10 equisetopsida species, 52 polypodiopsida species, 700 moss species in Poland. Estimated data mention the presence of: 250 hepatics species, ca 10,000 algae species, 1,900 lichen and lichenicolous fungi species, as well as 12,500 fungi species. It is also estimated that in Poland there are 47,000 species of wild living fauna (of which 35,500 were registered), including 98% of invertebrates,
among which insects are the most populous group (as much as 75% of all animals). Vertebrates include: 18 amphibian species, 9 reptile species, 428 bird species and 105 mammal species.

Among all species present in Poland 932 animal species were in danger of extinction [critically endangered (CR), endangered (EN) or vulnerable (VU), including: 852 invertebrate species (including 394 insect species) and 80 vertebrate species (13 mammal species, 35 bird species, 3 reptile species, 29 fresh-water fish species) and 327 vascular plant species, 62 moss species, 545 lichens species, 232 macromycetes species. Compared to other countries the percentage share of all endangered mammals, birds and fish, as well as vascular plants among the species identified in Poland is relatively low (Fig. 4.1.2.).

**Fig. 4.1.2. Percentage share of endangered species: fish, birds and mammals, as well as vascular plants with reference to the number of species identified in selected countries (source: OECD)**

Natural habitats and plant and animal species which are rare and endangered across Europe are subject to protection pursuant to the Habitats Directive. In Poland these are 80 types of natural habitats, 92 plant species, including 7 species which can be taken from the wild and 143 animal species (excluding birds), including 20 species which can be taken from the wild. The Habitats Directive requires that the conservation status of all these habitats and species be supervised, taking account of both their current conservation state, as well as perspectives of protection foreseeable in the future. Conservation status is evaluated on the basis of the results of monitoring and any other knowledge available on a three level scale: FV - favourable status, U1 - inadequate and U2 - bad. Assessments are carried out at the level of the so called biogeographical regions outlined in Europe. Poland is located at the area of three such regions: continental, Alpine and Baltic region.

The existing results of monitoring of species and natural habitats, taking special account of the special areas of conservation, as well as the report on the conservation status of species and natural habitats 2007 point out that the majority of habitats and species at the territory of the continental region (96.2% of Poland's area) have inadequate conservation status (U1). Alpine region (Carpathian Mountains) were identified to have a better conservation status of species and habitats, but it only accounts for 3.2% of Poland's area. The status of species was assessed higher than the status of natural habitats in both regions (Fig. 4.1.3.).

**Fig. 4.1.3. Assessment of the conservation status of species and natural habitats occurring in Poland based on expert knowledge and results of the state environmental monitoring 2006-2009 (source: CIEP/SEM)**

In the Polish continental region 12% of 69 types of natural habitats have a favourable conservation status. The situation is much better in the Alpine region with 38% out of 40 types being in favourable conservation status. The best preserved habitats in Poland have a mountain-like characteristics, they are relatively stable or are related to a specific substratum. The status of seminatural communities is much worse, as they are at risk of no use or intensification of use (e.g. semi-natural dry grasslands and scrubland facies on calcareous substratum and species-rich Nardus grasslands on silicious substrates in mountain areas [and submountain areas in Continental Europe]), as is the status of habitats which are sensitive to changes of hydrological conditions (peat land, spring areas, swamp coniferous forests or riparian forests).

One in two of 42 plant species in the Polish part of the continental region has an inadequate conservation status. These are mainly species related to wet and seminatural habitats, as these plants are the fastest to undergo negative changes. The status of more than 30% was assessed as bad (this applies mostly to the species known only from individual sites), while 19% was assessed as favourable, e.g. Liparis loeselii or Cochlearia polonica (but mainly species with a relatively broad ecological spectrum and almost all that can be taken from the wild according to Habitats Directive). One in two of 22 plant species in the Alpine region has been conserved well (favourable conservation status).

When it comes to animals, 30% of 132 species occurring in the continental region in Poland have a favourable conservation status, 36% inadequate status and 19% bad status. Favourable conservation status in this region applies among others to 7 odonata species, 11 fish species and 16 mammal species (including otter and beaver, 9 bat species). Bad conservation status applies to: 12 species of invertebrates (including Large Blue butterflies), 5 species of fish (including sea lamprey), 1 species of reptiles (European pond terrapin) and 7 species of mammals (e.g. speckled ground squirrel and European hamster). Animal species living in the Alpine biogeographical region enjoy a better conservation status. Here, out of 90 animal species 37% have a favourable status (including 17 species of mammals and 5 species of amphibians), 23% have an inadequate status and 11% a bad status (among others Aesculapian Snake). The conservation status of four species of marine mammals in the Baltic region (among others grey seal and harbour porpoise) was assessed as bad. A significant share of species which it was impossible to define (29% in the Alpine region, 15% in the continental region) shows that the knowledge about Polish fauna resources is insufficient, in particular when it comes to invertebrates.
A relatively high number of well conserved species and well preserved natural habitats, which were considered endangered in Europe, obliges Poland to take special responsibility for their conservation.

One of European SEBI2010 indicators assessing progress in halting the loss of biological diversity is the abundance and distribution of birds. Based on the results of bird monitoring, including monitoring of Natura 2000 special protection areas one may conclude that in 2000-2008 there was an increase in the abundance of the most popular bird species (Fig. 4.1.9.).

A representative example of changes in the natural environment involves changes in the abundance of bird species selected as flagship ones (Fig 4.1.4.), is an indicator of an extensive landscape use:

- in 2005-2008 the domestic population of White Stork (Ciconia ciconia) was 20% lower than in 2004 when its abundance was estimated to be 52500 breeding pairs;
- the population of Common Crane (Grus grus) and Mute Swan (Cygnus olor) has been increasing since 2001 at an annual rate of 7-8%;
- the number of breeding Rook birds (Corvus frugilegus) has been decreasing since 2001 at almost 3% annually;
- the populations of Western Marsh-harrier (Circus aeruginosus) have not shown any clear tendencies in their abundance for the past 7 years.

Changes in the abundance of rare birds species inform the fastest about the changes of the environmental state. The results of bird monitoring point out to the following tendencies:

- population of the Baltic Dunlin (Calidris alpina) is at the verge of extinction within Poland's borders;
- abundance of Ferruginous Duck (Aythya nyroca) has been assessed to be 80-90 pairs in both observed years, which points out to a slight population recovery after a dramatic fall over the past two decades (only about 40 breeding pairs at the end of 1990's);
- Whooper Swan (Cygnus cygnus) has constantly increased its population in Poland - over the last two seasons its breeding population was estimated to be 40-50 and 51-57 pairs;
- Mediterranean Gull (Larus melanocephalus) has continued its expansion in Poland - 2007 saw the highest abundance of its breeding population - 96 pairs, and 55 pairs in 2008;
- the population of Golden Eagle (Aquila chrysaetos) has had a slight growing tendency since the beginning of 21st century; in 2007 and 2008 there were 27 and 28 pairs respectively; its nesting area has also been on the increase in Poland;
- Osprey (Pandion haliaetus) has seen a progressing fall in the abundance of its population down to 31 breeding pairs in 2008 and the its breeding area; from 2000 its domestic population has been shrinking at 3% annually.

Due to their high position in the trophic levels birds of prey form a group of birds which are very sensitive to environmental changes, thus being good indicators of the environmental state. It is estimated that in 2008 there were: ca 60 110 Common Buzzard pairs (Buteo buteo), 10 730 Marsh Harrier pairs (Circus aeruginosus), 7 580 Hawk pairs (Accipiter gentilis) 7 560 Common Kestrel pairs (Falco tinnunculus), 3 300 Montagu's Harrier pairs (Circus pygargus), almost 3 400 Honey Buzzard pairs (Pernis apivorus), 3 100 Eurasian Hobby pairs (Falco subbuteo), more than 2 900 Lesser Spotted Eagle pairs (Aquila pomarina), 2 110 Black Stork pairs (Ciconia nigra), 1 400 White-tailed Eagle pairs (Haliaetus albicilla), 1 000 Black Kite (Milvus migrans) and Red Kite pairs (Milvus milvus) (Fig. 4.1.5.) in Poland. There has been a significant growth in the abundance of population of these species since 2000, except for Black Kite and Common Kestrel whose abundance has fallen, and Marsh Harrier whose abundance can be referred to as stable.

The main adverse changes in nature, observed among others within the framework of monitoring of species and natural habitats, include: loss of birds habitats especially non-forest and wetland, fragmentation of habitats, including breaking down of ecological corridors, distortion of composition of species in natural habitats (in particular non-forest, marsh and seminatural habitats), secondary succession of non-forest habitats via tree and bush encroachments, as well as eutrification of lakes and plant communities, displacement of typical and native species by invasive and foreign ones, pollution of waters as flora and fauna environment, mechanical damages to the rare plants and natural habitats, degradation of landscape features.

The main driving forces which may pose a threat in the future include: melioration, abandonment of agricultural use, improper hydro-technical development and regulation of rivers, construction of communication and tourist infrastructure, urbanization, excessive fertilization, as well as hurricanes and forest fires.

An extremely fast development of communication and transport significantly facilitates moving of species across the world, and thus contributes to an increased number of foreign species. In Poland almost one in five of new species are invasive. The impact of 2/3 of foreign species is not known (Fig. 4.1.6.).
The most numerous species which are foreign to the Polish biocenosis include 466 plant and 348 invertebrate species. Arthropods were the most numerous in the latter group (267 species), as well as: 85 species of fungi, 44 species of birds, 36 species of fish, 19 species of mammals and 6 species of reptiles. New foreign species are constantly identified (table 4.1.1.).

Table 4.1.1. Number of foreign species of fungi, plants and animals in Poland in 2009 (source: Nature Protection Institute, Polish Academy of Sciences PAN)

<table>
<thead>
<tr>
<th>Vertebrates</th>
<th>Mammals</th>
<th>19</th>
</tr>
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<tbody>
<tr>
<td>Birds</td>
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<td></td>
</tr>
<tr>
<td>Reptiles</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Fish</td>
<td>37</td>
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<td>Invertebrates</td>
<td>Molluscs</td>
<td>34</td>
</tr>
<tr>
<td>Arthropods</td>
<td>267</td>
<td></td>
</tr>
<tr>
<td>Other invertebrates</td>
<td>44</td>
<td></td>
</tr>
<tr>
<td>Vascular plants</td>
<td>466</td>
<td></td>
</tr>
<tr>
<td>Fungi</td>
<td>85</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>44</td>
<td></td>
</tr>
</tbody>
</table>

In order to preserve Poland's natural heritage 10102 thousand hectares of Poland's area was covered with the national forms of nature conservation at the end of 2008 (according do data of the Central Statistical Office), which comprised 3.1% national parks, 24.9% landscape parks, 1.7% nature reserves and 70% of areas of protected landscape. In 1998-2008 384 thousand hectares new high nature value areas were covered with national forms of nature conservation (Fig. 4.1.7.). In 2001 Warta Mouth National Park was established with the area of 8 074 hectares. It is one of the most important wetland bird areas in Poland. Moreover, new nature reserves with the total area of 32.4 thousand hectares and protected landscape areas covering 198.2 thousand hectares and new forms of conservation, i.e. documentation posts, ecological sites, as well as nature-landscape complexes and landscape communities covering a total of 34.5 thousand hectares were established in the period 1998-2008.

A large part of legally protected natural sites, in particular all national parks and some landscape parks form a part of the Natura 2000 network (Fig. 4.1.7).

Due to the obligations resulting from Poland's EU accession Natura 2000 network has been designed from 2001 and implemented from 2004. The network comprises special protection areas (SPAs) and sites of Community importance (SCIs) which will become special areas of conservation (SACs) under the regulation of the Minister of Environment. Natural habitats, as well as rare species of plants and animals on a European scale, listed in Annexes to the Habitats and Birds Directive, are protected within the framework of Natura 2000 sites. A network of "bird" sites was established by the end of 2008. It provides sufficient protection to bird species occuring in Poland and protected under the Birds Directive. The network comprises 141 special protection areas covering a total of 4 862.8 thousand hectares, which accounts for 15.6% of Poland's land area (Fig. 4.1.7). In 2009 the European Commission approved 364 sites of Community importance (SCI) which cover 2 531 thousand hectares, which accounts for 8.1% of Poland's land area (Fig. 4.1.8 and 4.1.10).

It is foretasted that a complete Natura 2000 network will be approved in 2010 after it has been completed with the missing special protection areas and special areas of conservation. The network will cover 823 SCIs with the total area of 3432 thousand hectares, which will account for 11% of Poland's land area and 144 SPAs covering 4 923 thousand hectares (enlarged due to the necessity to compensate investments), which will account for 15.8% of Poland's land area. SCI and SPA networks overlap in ca 25% of surface.

Correctness of Natura 2000 special protection areas designation is proven by the results of common breeding birds monitoring (CBBM) (Fig. 4.1.9.). The results show that the abundance trend for 87 most common species registered under the programme (being above 10%) is higher in SPA sites than outside them.
Fig. 4.1.9. Changes of aggregated abundance indicator of 87 common bird species registered in the CBBM programme, broken down into protection areas: SPAs, sites outside SPA network and the whole country (source: CIEP/SEM)

Since 1998 the area of other international valuable natural sites has been extended. Ramsar list was extended with five new wetland sites which are important as a waterfowl habitat, covering a total of 35 305 hectares (Wigierski National Park, Poleski National Park, Narwiański National Park, Drużno Lake Reserve and Subalpine peat land in the Karkonoski National
Moreover, two new biosphere reserves were established: Kampinoska Forest (covering 76,232 hectares) and Polesie Zachodnie (covering 139,917 hectares).

New species and their habitats were granted protection, genetic resources in zoological and botanical gardens were enriched, restitution was carried out in selected sites, involving among others Peregrine Falcon in Pieniny Mountains, wisent in Karpatian mountains, Atlantic sturgeon, the Zarte, Atlantic salmon and brown trout in Northern Poland and in the drainage area of upper Vistula river, European Silver Fir in Sudety mountains, Taxus in Poland; there was reintroduction of Eurasian lynx in Polesie region, Apollo butterfly in Peninski National Park, Black Grouse and Western Capercaille in Wisła forest division, plant species in Western Poland (e.g. Gladiolus palustris or Saxifraga nivalis in the South).

It needs pointing out that in Poland there is relatively a lot of rare species on a European or global scale, which obliges Poland to take special responsibility for their protection. A spectacular example involves Aquatic Warbler (Acrocephalus paludicola), a bird endangered globally, whose 25% of global population occurs in Poland (Fig. 4.1.11.).

![Fig. 4.1.11. Abundance of Aquatic Warbler "pairs in Poland over 12 years - results of national stocktaking dated 1997, 2003 and 2009 (source: OTOP)](image1)

In spite of the fact that the abundance of Aquatic Warbler on a national scale maintains at a level of 3,070 "pairs" (Fig. 4.1.11.), with minor fluctuations, its status has been dramatically deteriorating since 2003. This is proven by a reduction of abundance or disappearance of Aquatic Warbler in the so called small sites. They include an isolated Western-Pomeranian population which reduced dramatically from 142 "pairs" in 1998 to 61 in 2008, thus posing a risk of extinction in this region (Fig. 4.1.12.).

![Fig. 4.1.12. Population of Aquatic Warbler "pairs" (Acrocephalus paludicola) in Western Pomeranian region in 1999-2008 (source: OTOP)](image2)

Reintroduction of Peregrine Falcon (Falco peregrinus) has been carried out from 1990. The first nest of free living individuals (active pairs) was observed in 1998. The first pairs with breeding success were recorded already in 1999. The population oscillated at the level of 11 active pairs, 9 pairs with yield and 15 young individuals in 2009 (Fig. 4.1.13.).

![Fig. 4.1.13. Population of Peregrine Falcon (Falco peregrinus) pairs in 1998-2008 (source: (Sokół Association for Wild Animals)](image3)

The number of wisents (Bison bonasus) individuals grew from 704 in 1995 to 1007 individuals in 2008, number of chamois (Rupicapra rupicapra) increased from 87 individuals in 2000 to 150 in 2008 and the number of brown bears (Ursus arctos) from 69 individuals in 1995 to 156 in 1998 (Fig. 4.1.14.).

![Fig. 4.1.14. Wisent (Bison bonasus), chamois (Rupicapra rupicapra) and brown bear (Ursus arctos) population in Poland in 1995-2008 (source: CSO)](image4)

There was a very big increase in the number of beavers (Castor fiber) from ca 12,740 in 1995 to ca 58,847 in 2008 (Fig. 4.1.15.). It needs pointing out that the increase in beaver population is on the one hand related to the improved state of nature (among others improvement of water relations) and on the other hand to intensification of damages done by beaver (among others drowning of land, in particular meadows and crops, as well as by cutting and damaging of trees).

![Fig. 4.1.15. Beaver (Castor fiber) population in Poland in 1995-2008 (source: CSO)](image5)

In order to increase knowledge about the resources and condition of nature in 2006 two national monitoring programmes were launched, adjusted to the requirements of the Habitats Directive and Birds Directive, i.e. monitoring with the assessment of species and natural habitats conservation status, as well as bird monitoring. National nature-forest inventory of species and natural habitats was also carried out and a database of foreign species was developed along with more precise principles of handling these species.

Some important changes in nature conservation management were implemented. General Directorate for Environmental Protection (GDEP) and regional directorates for environmental protection (RDEP) reporting to it were created. They are responsible for managing Natura 2000 network, handling the environmental impact assessments and species protection. RDEP substituted the existing the voivodship nature conservator which comprised the services of voivods (heads of voivodship). Landscape parks and protected landscape sites matters were shifted from competences of voivods to voivodship assemblies, while ecological sites, natural and landscape communities and natural monuments matters were shifted to the competences of municipality councils.
The management of site and species protection was simplified among others by facilitating the method of working out conservation plans. In order to facilitate the protection of species and natural habitats covered by Natura 2000 network 55 preliminary conservation plans of selected Natura 2000 sites were worked out, as well as 15 preliminary conservation programs of selected plant and animal species listed in the Annexes of the Habitats Directive. A mechanism of nature compensation of investments with negative environmental impact was also implemented. Launching agri-environmental programmes that promote pro-natural agricultural use in rural high nature value areas is of great importance for the protection of species and habitats. A broad environmental education, among others in schools, at the territory of protected sites and in forests has an important impact on the social awareness and as a consequence on the decisions taken in the future.

Poland is characterized by big natural values, including large biological diversity. The number of protected valuable natural sites has been increasing. A large area of Natura 2000 sites which is being designed and covers 20% of Poland’s area is also a proof of the values of nature. The sites were created to protect species and natural habitats endangered on a European scale. Growing populations of many bird species point out to the improvement of the natural status of agricultural areas and other extensively utilized areas.

However, the conservation status of the majority of species and natural habitats endangered on a European scale is assessed as inadequate. Since it is an intermediate assessment, there is a large chance that after implementing respective conservation measures the status may improve to a favourable level. The state of threat of species, assessed in line with IUCN classification, is not big when compared to other countries. The presence of many rare flora and fauna species (e.g. Aquatic Warbler, bear, wisent or chamois, many rare plants on a European scale, e.g. Polish scurvy-grass, liparis loeselii) imposes a special responsibility on Poland for the protection of natural heritage, particularly when the conservation status is bad (e.g. Aesculapian Snake) or is vehemently deteriorating (e.g. Aquatic Warbler). At the same time, resignation from the use of valuable non-forest sites, meliorations, development of road-, turist-, industrial- and energy infrastructure (small water power plants, wind power plants) pose some serious threats to the maintenance of habitats and species, contributing in particular to the fragmentation of habitats and secondary succession. Those negative phenomena are supposed to be prevented among others by agri-environmental programmes supporting environmentally friendly agriculture, by working out and implementing conservation tasks, as well as by conservation plans for the protected sites and species, and by facilitating the process of issuing of decisions on the location of projects which may have a major environmental impact, as well as by nature compensation.