Republika Slovenija
(Republic of Slovenia)

Convention on Biological Diversity

National Report of

the Republic of Slovenia

Prepared by

Ministry of the Environment and Physical Planning
State Authority for Nature Conservation

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- DOPPS (Bird Watching and Bird Study Association of Slovenia)
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- Entomolosko drustvo (Slovenian Entomological Society)
- Societas herpetologica slovenica

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Executive Summary

The Convention on Biological Diversity (CBD) was enacted in Slovenia in 1996, and the Ministry of the Environment and Physical Planning (MOP) then became responsible for the implementation of the Convention. Slovenia is building up a national structure for the implementation of the CBD and conservation principles by combining the CBD with the regional initiatives, especially the Pan-European Biological and Landscape Diversity Strategy (PEBLDS) which was endorsed by the Environmental Ministers in Sofia in 1995.

The main goals of implementing the CBD in Slovenia are to conserve the biological and landscape diversity at the national and local levels and to integrate conservation principles into all related sectors in order to achieve sustainable development. The main objectives include sustainable use of biological diversity and maintenance of landscape diversity as well as co-operative action.

Slovenia is known for its diversity, abundance of various ecosystems and constantly changing landscapes, defined in an area of 20,254 square kilometres. The main characteristics of the country are the following:

- It has rich biological and landscape diversity on a small surface area;
- It shows high diversity and endemism in troglobiontic species;
- It is a *corridor* area and an *ecotone* between the Dinaric mountains and the Alps; the Pannonian plain and the Mediterranean basin;
- It covers a relatively large forest ecosystem complex with vital populations of large mammals;
- It maintains natural and semi-natural ecosystems in relatively good ecological conditions;
- It covers diverse climatic and pedological types.

Slovenia is particularly rich in forests, mountainous landscapes, karst phenomena, very different ecosystems and species. Carbonate rocks form 44 per cent of the bed-rock. Forests cover 53 per cent of the territory. To date, some 22,000 species have been identified in Slovenia. The estimated number of species, however, varies between 50,000 and 120,000 which shows a very rich species diversity for a small country. Endemic species are of particular conservation value. Sixty-six taxa of endemic plants occur in Slovenia, 22 of them are predominantly in the Slovenian territory, and there are about 400 endemic animal species mainly living in the karst underground.

The landscape diversity is a result of both the natural characteristics and the long history of human colonisation and various land-uses on the territory of Slovenia. Its main attribute is the small mosaic structure of landscape units. Farming practices have adapted to the natural conditions and thus have become the main factor in the development of the Slovenian

countryside and local plant and animal races. Slovenia belongs to the Mediterranean and European gene centres of cultivars and has autochthonous varieties of livestock.

Economic growth based on industrial, urban and agricultural development has added to pollution of surface and ground water, soil and air and to a decrease in biological and landscape diversity. As a result of development pressures, the most critical direct consequences on biodiversity occur at the ecosystem, species and gene levels, and include:

- ecosystem and habitat fragmentation
- ecosystem degradation / deterioration and habitat loss
- disturbance of wildlife in natural areas
- genetic pollution and species loss
- genetic erosion

Research shows a decline in plant and animal species. Out of 3,200 known taxa of vascular plants, 330 are included in the national *Red Data List*. Out of the 423 recorded vertebrate taxa of Slovenian *wild fauna,* 238 are threatened, of which amphibians are the most endangered group. Intensive crop and livestock production are not only affecting native species, but also causing hindrance to the production of autochthonous races of plants and animals. Accordingly, the most threatened habitat types include, on the one hand, wetlands, karst waters and dry grasslands, and on the other, coastal, marine, floodplain and mountain ecosystems.

In the 1990s Slovenian environmental policy was changed. The first confirmation of this change was the *Environmental Protection Act* (1993), which was followed by environmental by-laws. In the same year, the *Forest Act* was issued, and further related legislation is in preparation. The *Nature Conservation Strategy*, which started to develop in 1994, when the first draft was prepared, set the basis for long term conservation of nature, including biodiversity. It brings an integrated approach to nature conservation. The focus of this strategy is on the organisation of nature conservation, *in-situ* conservation (setting a system of protected areas and management, species and habitat conservation), and integration of nature conservation principles into other policies. Its main objectives include conservation of species and habitats, establishment of spatial ecological structure and restoration of degraded ecosystems.

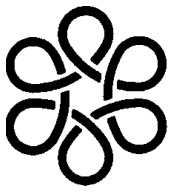
In-situ conservation has been practised, and a number of protected areas have been established, as well as some by-laws passed to provide protection of threatened animals and plants. Currently, about 8 per cent of Slovenia is covered by protected areas. In 1996, a proposal was prepared which plans for 30 per cent of the Slovenian territory to be included in different protected area management categories. Protected areas very often coincide with less favoured areas for intensive agriculture where framers can get financial support for maintaining biodiversity and applying traditional farming methods. Additionally, between 1991 and 1997, the Ministry of Agriculture, Food and Forestry also provided technical and financial support for conservation of autochthonous animal races. This programme supports *in-situ* conservation of domestic animals all over Slovenia. Gene banks of native plants are stored in botanic gardens, and the Slovenian Plant Gene Bank holds *ex-situ* collections of cultivars and landraces.

In spite of these partial activities, sectors related to biodiversity use are still to develop their sectoral strategies which will include conservation and sustainable development. How these sectors include the biodiversity issues into their policies is one of the tasks of the National Biodiversity Strategy and Action Plan (NBS&AP), the National Programme of Environmental Protection (NPVO) and harmonisation of legislation as part of the Approximation Process to the EU which are currently in preparation.

Preparation of the NBS&AP started in 1997. Implementation of the CBD is organised at three levels: political, operational and public. It is anticipated that all the relevant Ministries and sectors will actively participate in the implementation of the CBD in Slovenia. The main sectors requiring priority integration and co-operation are agriculture, forestry and tourism, although other economic sectors and NGOs also cannot be excluded. Currently, we are in the process of establishing the operational level for the implementation of the CBD. On the basis of PEBLDS action themes and the CBD, 18 interdisciplinary working groups have been established. These working groups cover different ecosystem, species and gene issues that are also recognised as priority areas for conservation and the sustainable use of biodiversity in Slovenia.

While international co-operation is well established, the main drawback is in providing adequate resources for practical action. Resources are still scarce and presently dependent on international financial and technical support. In the 1998 state budget, MOP particularly allocated resources for the CBD implementation. Capacity building and raising public awareness are among the priority considerations. Currently, NGOs, research and public institutes are playing an important role in providing information and disseminating information to the general public, school children or decision makers.

To this end, the list of priority domains at MOP includes the conservation of biodiversity and sustainable use of its components, along with waste treatment and water management. Biodiversity is thus one of the key issues in building the environmental policies and can provide a strong basis for sustainable development at the national level.



The logo of nature conservation in Slovenia. The six interweaving loops represent the interacting forces of water, soil, air, fauna, flora and humans.

1. Introduction

In October 1996, the Convention on Biological Diversity (CBD) was enacted in Slovenia after ratification by the Slovenian Parliament. According to the document of ratification (1996), Ministry of the Environment and Physical Planning (MOP) is responsible for the implementation of the Convention on Biological Diversity. The National Focal Points for the CBD and Clearing House Mechanism (CHM), established in 1997, are located at the State Authority for Nature Conservation (ANC) within the MOP. The ANC is considered to be the principal co-ordinating agency in different preparation phases of the biodiversity strategy and involved throughout the implementation process at all levels.

Due to lack of resources and personnel the implementation process has been delayed. Since spring 1997, when work started, the main consideration has been given to the following issues:

- Making an overview of all documents adopted by the Conferences of the Parties to the Convention on Biological Diversity;
- Establishing an operational structure, organise implementation and define measures to be taken for achieving the purpose of the Convention;
- Participating at the CBD meetings in order to become involved in the current considerations and procedures;
- Informing public at large and all sectors about the value and importance of biodiversity;
- Involving other sectors in the implementation of the CBD already in the preparatory phase and throughout the work;
- Including particularly NGOs interested in issues related to biodiversity;
- Combining work of all parallel initiatives to avoid duplication of efforts and activities;
- Preparing the national biodiversity policy and implementation legislation.

Country study and gap analysis are still in preparation. This report is mainly based on the activities underlined in the Nature Conservation Strategy, which is in the process of adoption, and on activities carried out during the preparation of CBD implementation, the first year of enforcement of the CBD, the Environmental performance review for Slovenia as well as other ongoing activities (National Environmental Action Programme - NEAP, Approximation Process to the European Union).

Plate 1:
Position of Slovenia in Europe.

2. Goals and Objectives

The main goals of implementing the CBD in Slovenia are to conserve the biological and landscape diversity at the national and local levels and to integrate biodiversity principles into all related sectors in order to achieve sustainable development. The main objectives include sustainable use of biological diversity and maintenance of landscape diversity as well as co-operative action towards achieving the aims. The Biodiversity Strategy and Action Plan are in preparation and will underline priority issues and actions needed to address conservation and sustainable use of biodiversity and its components. The participatory process includes understanding and involvement in biodiversity conservation and planning, which means on the one hand, responsible stakeholder participation in all activities and, on the other, raising public awareness of the benefits and importance of biodiversity in general.

The CBD implementation process is closely linked with the Pan-European Biological and Landscape Diversity Strategy (PEBLDS) which was endorsed by the Environmental Ministers in Sofia (1995) as a pan-European response towards the implementation of the CBD. Together with the REC (Regional Environmental Centre) and IUCN, Slovenia plays an active role in the implementation of the Sofia Biodiversity Initiative for the Central and East European countries. The regional initiatives are used as a framework for the implementation of the common objectives at national and local levels.

3. Background

In the application of these documents at the national level, the following issues are also given consideration:

- State and trends in biodiversity, which are strongly related to the natural and cultural characteristics;
- Threats to and loss of biodiversity, depending on the state of the environment and natural resources, their ecological and social values and economic use; *as well as*
- Policy directions, implementation legislation and practical application.

3.1 Current Status and Trends in Biological and Landscape Diversity

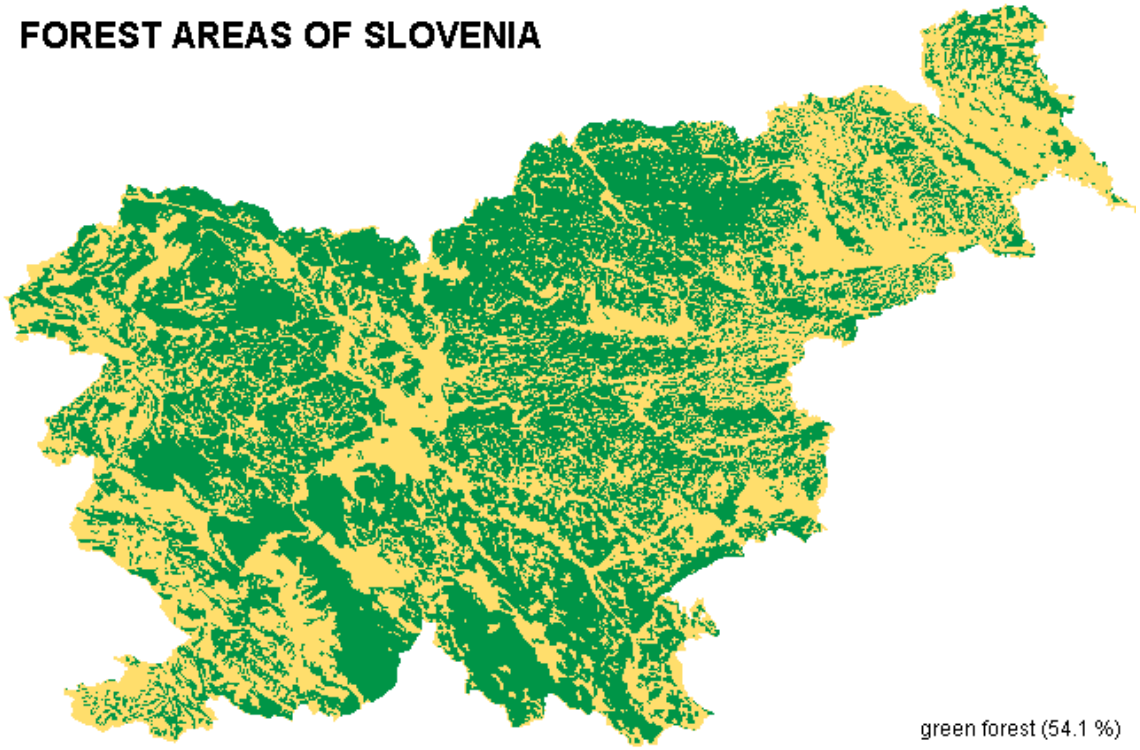
It is always difficult to find one main characteristic of Slovenia. Its particularity lies in the considerable diversity, abundance of various ecosystems and constantly changing landscapes, contained in an area of 20,254 square kilometres. Slovenia is particularly rich in forests, mountainous landscapes, karst phenomena, highly diverse ecosystems and species (Table 1). However, due to the transition character of the Slovenian regions there are not high numbers of any one species or large areas of one ecosystem type, yet some components of Slovenian diversity can very often be representative or unique at international level (e.g., cave fauna, karst phenomena).

Plate 2: Bio-geographic regions of Slovenia: the Alps (North), the Dinaric mountains (South), the Pannonian plain (East) and the Mediterranean basin (South-West). Source: Geographic Institute (ZRC-SAZU)

Table 1: Main Natural Characteristics of Slovenia.

Natural phenomenon	Main characteristics
Bio-geographic regions:	- the Alps (30%), the Dinaric Mountains (30%), the Mediterranean Basin (10%), the Pannonian Plain (30%) all in 20,254 sq km give the country an *ecotone* character
Relief and geology:	- predominantly mountainous, altitude from 0 to 2864 metres, - 1/6 of the territory is Quaternary deposition - geotectonic faults, orogenesis (Alpine, Dinaric, Pannonian); - about 44 per cent carbonate bed-rock, mainly karstified areas (over 7,000 caves are registered),
Hydrological characteristics	- two drainage systems: 2/3 to the Black Sea, 1/3 to the Mediterranean Sea - five catchment areas: the Soca, Sava, Drava and Mura rivers, and the Slovenian Littoral - relatively large area with no surface streams
Vegetation cover	- 53 per cent of the territory covered by forests - 36 per cent of the territory agricultural land
Flora	- about 3,200 vascular plants - 22 narrow endemics with predominant distribution in Slovenia
Fauna	- about 13,000-15,000 species known (50,000 to up-to 100,000 estimated) - about 400 endemic animal species (especially cave animals)

Plate 3: The area covered with forests exceeds 53 per cent of the surface area.



Although data are still incomplete, some recent studies show that Slovenia, covering a small surface area, is extremely rich in species diversity. Currently, the number of known species in Slovenia is small compared to the estimated number of species expected to live in this territory. To date, some 22,000 species have been identified (Table 2). The estimated number of species, however, varies between 50,000 and 120,000 which shows a very rich species diversity for a small country (Mrsi□1997).

Table 2: Estimated data on biodiversity in the world and data compiled for Slovenia, after Mrsi□1997 and corrected by Sket, 1997.

Taxonomic Group[1]	Species on the Earth[2]	Slovenia terrestrial[3]	Slovenia-sea[4]	Degree of knowledge[5]	Endemic species & subspecies)[6]
Bacteria + Archebacteria	4,670	X	X	1	0
(Cyanobacteria)[7]		308	8	3	X
"Phycobionta"	29,900	1,050	178	3	X
"Mycota"	64,120[8]	3,000	X	2	X
"Lichenes"	20,000	600	X	2	0
Bryophyta	22,960	755	0	4	0
Pteridophyta	9,650	75	0	4	0
Spermatophyta	250,000	3,100	X	4	22
"Protozoa"	31,900	9	45	1	5

Porifera	6,000	**4**	**55**	3	0 (+ 1)
Cnidaria	15,000	**7**	**82**	3	0
Kamptozoa	150	**0**	**3**	1	0
Plathelminthes	15,000	**280**	**30**	2	13 (+ 1)
Nemathelminthes	24,600	**165**	**10**	1	8[9]
Nemertina	950	**1**	**1**	1	0
Mollusca	50,000	**720**	**95**	3	55
Sipunculida	320	**0**	**3**	2	0
Annelida	18,740	**180**	**470**	2	37
Tardigrada	530	**50**	**X**	2	0
Onychophora	70	**0**	**0**	-	0
Arachnida	73,730	**975**	**X**	2	49 (+ 4)
Pycnogonida	1,000	**0**	**X**	1	0
Crustacea	55,360	**300**	**305**	3	40 (+ 30)
Myriapoda	13,160	**240**	**0**	3	89
Insecta	850,000	**10,130**	**X**	2	>100 (+ 100)
Echinodermata	6,700	**0**	**35**	4	0
Bryozoa	5,000	**8**	**X**	1	0
Tunicata	3,000	**0**	**55**	3	0
Chaetognatha	110	**0**	**7**	3	0
Cyclostomata	75	**3**	**1**	3	0
Pisces	21,650	**95**	**105**	4	0
Amphibia	4,015	**20**	**0**	4	0 (+ 1)
Reptilia	5,955	**22**	**3**	3	0
Aves	9,090	**360**	**0**	4	0
Mammalia	4,215	**75**	**4**	4	0
Total	**about 1,800,000**	**about 19,530**	**1,495**		

Key: [1] Taxonomic groups belong to different levels, some names are made up (names in quotation marks), the small groups which are not present in Slovenia are omitted.
[2] Data mainly after Minelli, 1993.
[3-6] Data mainly after Mrsi, 1997, include published data and animals in collections - not directly comparable with (2).
[3] Includes land and inland waters.
[5] *Knowledge:* 1 - *insufficient* (lack of data), 2 - *sufficient* (data on about 50% of species present), 3 - *good* (data on 50%-90% of species), 4 very good or excellent (more than 90% expected species known and described).
(0) Means that these species do not exist in Slovenia.
(X) Means that data are lacking.
[7] Cyanobacteria belong to Bacteria.
[8] The estimated number of species according to WCMC is up to 1.5 million.
[9] Data are vague and figures not reliable.

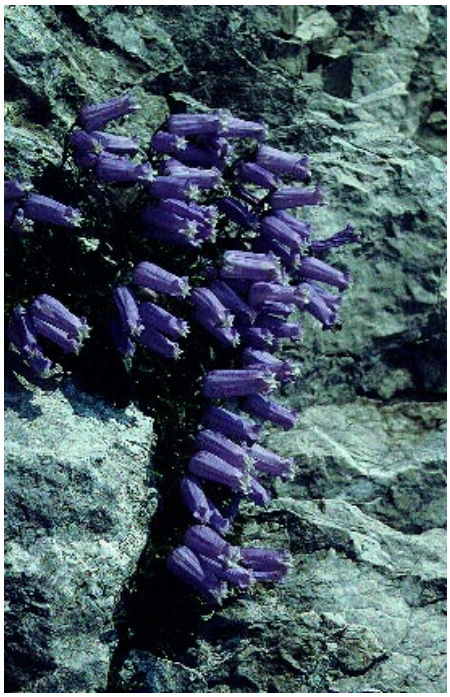


Plate 4:
Campanula zoysii is one of the endemic plants of the South-East Alps (PS).

Endemic species are of particular conservation value. Sixty-six taxa of endemic plants occur in Slovenia (Wraber, 1996), 22 of them are predominantly in the Slovenian territory (Mrsi, 1997), including *Hladnikia pastinacifolia, Gentiana froelichii, Primula carniolica, Campanula zoysii, Moehringia villosa*. Hypogean taxa are extremely valuable for biodiversity and need to be conserved. For instance, more than 170 taxa living in interstitial and cave water systems in Slovenia show that, relatively, this area has the richest stygobitic fauna in the world (Sket, 1995). Many of the species are endemic, some covering a markedly restricted range ('narrow endemics'). *Proteus anguinus,* for example, is a subterranean endemic species discovered in Slovenia, yet well known internationally.

Plate 5:
Proteus anguinus, which was discovered in Slovenia, is a subterranean species endemic to the Dinaric region (PS).

Originally, mixed *forests* prevailed and some 70 tree species are indigenous to the Slovenian territory (Brus & Kraigher, 1996). Our forests have also increased in the area they cover, from 47 per cent in 1961 to 53 per cent in 1990. High coverage with forests in the 1960s was the result of good forestry practices. In addition to traditionally sustainable forest management the increase in surface area since then has mainly been due to the spreading of forests on marginal agricultural

land. As a result, 85 per cent of the forests regenerate naturally, thus supporting conservation of native populations of tree species and enhancing genetic diversity. Moreover, in the last 50 years the biomass has increased by 100 cubic metres per hectare (Golob, per. comm., MKGP). The species composition in 87 per cent of the Slovenian forests is close to the potential distribution. Nine per cent of all forests have a significantly modified species composition and 4 per cent of all forests are completely modified by humans (Smolej *et al.,* 1997).

The highly diverse ecological conditions have supported a high biodiversity at the ecosystem, species and gene levels. The common beech is the most naturally widespread tree species in Slovenia. It represents 29 per cent of the current growing stock in the country. Out of the seven native oaks, three species lie within the boundary of their natural distribution and therefore are less numerous.

Plate 6:
Up to 70 per cent of the agricultural land in Slovenia, classified as “less favoured areas”, belongs to the upland and mountain farms (PS).

At present, 36 per cent of the Slovenian territory is *agricultural land*, of which 70 per cent belongs to the upland and mountain farms. The Ministry of Agriculture, Forestry and Food classified most of this land as “less favoured areas”, not being suitable for intensive agricultural production (1992); however, these areas are to be considered important for maintenance of biodiversity. According to the structure of land use in 1996, arable land represented less than 30 per cent, orchards and vineyards almost 7 per cent, meadows over 42 per cent and pastures 21 per cent of all agricultural land (Ministry of Agriculture, Forestry and Food, 1997).

Slovenia belongs to the Mediterranean and European gene centres of cultivars. Slovenia can be considered a gene centre for certain species, for example: *Brassicaceae* (cabbage, turnip), *Alliaceae* (onion, garlic), *Asteraceae* (lettuce, chicory), *Valerianaceae* (corn lettuce) and some fruits and vines, as well as grasses, clovers, medicinal and aromatic plants. In the wild we can find relatives of crop plants such as, *Mycelis muralis, Lactuca serriola* and *Cichorium intybus*. Due to the extensive grassland areas in Slovenia, there are many different ecotypes of grasses and clovers.

Plate 7:
Trifolium incarnatum is a cultivar which has been produced by breeding with the autochthonous Slovenian material (KIS).

There is also a considerable number of landraces among those crops that were introduced to Slovenia more than a century ago from other parts of the world. Maize, beans and potatoes were introduced from America during the Austro-Hungarian Monarchy. Due to the different ecological conditions in Slovenia, farmers selected many different populations adapted to the less favourable growing conditions. For example, two populations of corn named 'Bohinjska' and 'Koroska' can be cultivated for grain in the Alpine region. Many of the autochthonous populations and old cultivars got their names after their place of origin. For example, lettuce 'Ljubljanska ledenka' (also included in the European cultivar register under the name 'Laibacher Eis'), garlic 'Ptujski turnip', 'Kranjska okrogla', buckwheat 'Siva dolenjska', to mention just a few.

Slovenia has autochthonous varieties of livestock which include four breeds of sheep, three breeds of horses and one breed of cattle, pig, pigeons and rabbits (Kompan *et al.*, 1996), as well as one local bee species.

Plate 8:
The tertiary hills in Eastern, Southern and Western part of Slovenia provide good growing conditions for wine production (GB).

The *landscape diversity* is a result of both the natural characteristics and the long history of human colonisation and various land-uses on the territory of Slovenia. Its main attribute is the small mosaic structure of landscape units. By application of different methods, farming practices have adapted to the natural conditions and thus have become the main factor in the development of the Slovenian countryside. The combination of different factors has considerably contributed to the changing face of the Slovenian landscapes.

Plate 9

Plate 10

Plate 11

Plate 9-11: The diversity of Slovenian landscapes from west to east: the coastal cliffs (PS), the karst poljes (GB), the Alps (PS) and the lowlands of the Panonnian plane (Plate 8).

The main bio-regions are shown in the diversity of Slovenian landscapes. The transition between the Alps and the other regions is most distinct and considered as "the pre-alpine landscapes" (Marusic, 1996).

Altogether, Slovenia has a significant biodiversity value, which is due to the following characteristics:

- It has rich biological and landscape diversity on a small surface area;
- It shows high diversity and endemism in troglobiontic species;
- It is a *corridor* area and an *ecotone* between the Dinaric mountains and the Alps; the Pannonian plain and the Mediterranean basin;
- It covers a relatively large forest ecosystem complex with vital populations of large mammals (brown bear, lynx, wolf);
- It maintains natural and semi-natural ecosystems in relatively good ecological conditions;
- It covers diverse climatic and pedological types.

3.2 Threats to and Loss of Biodiversity

Economic growth based on industrial, urban and agricultural development has contributed to the pollution of surface and ground water, soil and air and to a decrease in biological and landscape diversity. As a result of development pressures, *the main threats* to biodiversity are:

- Changes in agriculture practices (technology, intensification; abandonment of less favoured areas for agriculture, use of new cultivars and hybrids, promotion of mono-culture);
- Introduction of agriculture practices in the wilderness areas (virgin forest area of Kocevje);
- Infrastructure development (motor-way construction);
- Drainage of wetlands (land reclamation for economic development);
- Uncontrolled urbanisation;
- Lack of control measures and non-compliance with legal measures;
- Lack of public awareness;
- Introduction of alien and invasive species to and between regions within the country;
- Air and water pollution.

The most critical direct consequences on biodiversity occur at the ecosystem, species and gene levels, and include:

- Ecosystem and habitat fragmentation (due to development);
- Ecosystem degradation / deterioration and habitat loss (due to pollution);
- Disturbance of wildlife in natural areas (due to infrastructure development in remote mountain and forest areas);
- Genetic pollution and species loss;
- Genetic erosion.

Plate 12-14:
Wetland dependent species (e.g., *Fritillaria meleagris,* different dragonfly species, amphibians - *Rana temporaria*) are threatened due to land reclamation, drainage and constructions (PS).

Decline in plant and animal species has been shown by application of the IUCN categories of threatened species. Slovenian *flora* consisting of some 3,200 known taxa of vascular plants (3,216 listed according to Trpin & Vres, 1995) 330 of which are included in the national *Red Data List* (Wraber & Skoberne, 1989). Of these threatened species 30 are ranked extinct (Ex), 34 endangered (E), 77 vulnerable (V), 189 rare (R) (Figure 1).

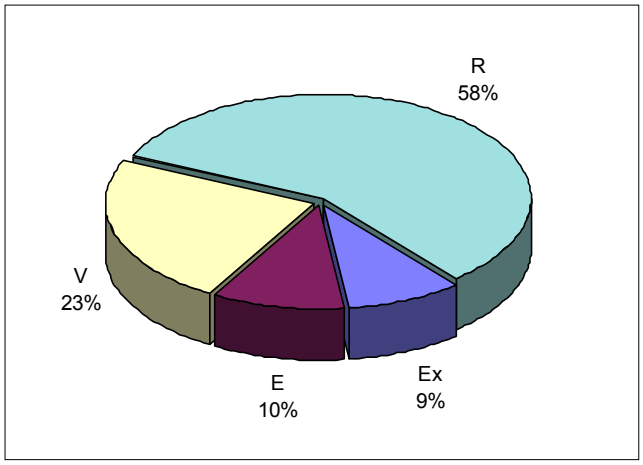


Fig. 1: Vascular plant species included in the national *Red Data List* according to the IUCN categories of threatened species (Wraber & Skoberne, 1989).

Of the 423 recorded vertebrate taxa of Slovenian *wild fauna* (Vidic, 1992) 238 are threatened (Ex-19, E-56, V-116, R-47) (Figure 2). Amphibians are the most endangered group. Data on invertebrates are incomplete and available data are restricted to some groups only.

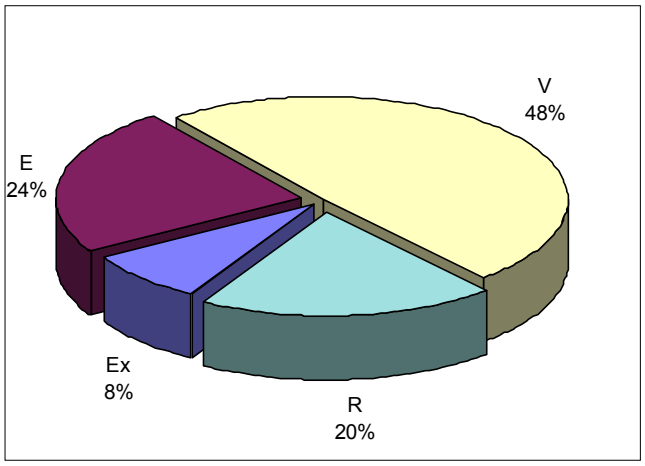


Fig. 2: Slovenian vertebrate taxa included in the national *Red Data List* according to the IUCN categories of threatened species (Vidic, 1992).

Table 3: Threatened species in Slovenia ranked by the IUCN categories (Vidic, 1992).

Group	Known Species in Slovenia	IUCN category				
		Ex	E	V	R	Total
Mammalia	79	8	4	26	5	43
Aves	360	5	21	53	35	114
Reptilia	25	1	8	11	2	22
Amphibia	20	1		18	1	20
Pisces - freshwater	95	4	23	8	4	39
Pisces - marine	105					
Bryophyta	775	-	-	-	-	-

Musci	598	10	46	83	74	213
Fungi	-	-	-	-	-	-
Lichenes	600	2	4	50	16	72
Pterydophyta&Sperm.	3,175	30	34	77	189	330

In spite of the increase in surface area, the quality of forests has been jeopardised due to air pollution as well as to the promotion of monoculture stands of conifers (Table 4). Furthermore, some forestry practices also affected forest ecosystems due to the way forest roads were constructed and exploitation was carried out.

Table 4: Percentage of different tree species for Slovenia's timber production of (Ministrstvo za kmetijstvo, gozdarstvo in prehrano, 1995).

Vegetation	*Fagus sylvatica* L.	*Quercus* spp.	other deciduous	*Abies alba*	*Picea abies*	*Pinus* spp.
Potential in %	58	8	14	10	8	2
Current in %	29	8	10	11	35	7

Although the majority of felling is selective thinning, heavy snows and ice-breaks have increased the sanitary felling in the last few years. Studies on particular species show that air pollution caused a slight decline in beech over the last 10 years, and remarkable damage to oaks since 1990. However, when based on a single study of impacts on the genetic diversity of beech populations the difference was not significant (Smolej *et al*, 1997).

Plate 15:
Monoculture intensive crop production causes direct and indirect loss of biodiversity (PS).

Agricultural development caused tremendous changes in the agricultural areas. The impacts mainly occurred after World War 2 and are twofold:

- *Direct loss of biodiversity* by land reclamation: particularly after the 1960s, agriculture development increased and, gradually, agriculture reclaimed areas in the floodplains. Water courses were straightened, canals built and riparian vegetation cleared and large areas ploughed for monocropping. Many habitats were lost, mainly wetlands, and consequently the wetland dependent species became endangered (Beltram, 1992). On the Slovenian Red Data Lists of plant and animal species the wetland dependent species

prevail (e.g. *Fritillaria meleagris, Utricularia intermedia, Pedicularis palustris, Orchis palustris, Pilularia globulifera, Hydrocotyle vulgaris*). Between 1973 and 1991 over 70,000 hectares of lowlands were drained (Maticic, 1986, 1993).

- *Indirect loss of biodiversity* by supporting intensive crop and livestock production (including increase in chemical use, mechanisation of production, specialisation of farmers towards monocultural production) and thus increasing levels of water and soil pollution, in particular, as well as causing hindrance to production of autochthonous races of plants and animals.

As a result of past and current economic development, analysis of the state of Slovenian natural and semi-natural habitats shows that the most threatened habitat types are:

- Wetlands, coastal and marine ecosystems;
- Rivers
- Dry grasslands;
- Cave waters (with particular reference to hypogean fauna);
- Mountain ecosystems.

While fauna of the *karst ecosystems* (including caves) are mainly threatened through water pollution and tourism development, *wetlands* are mostly altered due to intensification of agriculture in the last decades, and currently *dry grasslands* are under threat due to increasing interest in livestock production (uncontrolled grazing, fertilisers) on the one hand, and abandonment of economically less attractive areas on the other (vegetation succession). *Coastal and marine* ecosystems are declining due to industrial and urban pressures, *rivers* and *adjacent wetlands* through soil and water pollution and construction works (Box 1). *Mountain ecosystems* are threatened through tourism development and long-distance air pollution.

Box 1: An example of human induced changes to natural ecosystems (after Beltram, 1996.

Loss of wetland and coastal habitats

A rough estimation of wetland deterioration in Slovenia, can be made by taking into account the dominant human activities that could have affected wetlands and by considering the land-use changes accordingly. Recorded data show that the main changes have occurred during the last two hundred years and particularly during the post-Second World War socio-economic development. In the last fifty years drainage has transformed many lowland wetlands into arable land. Flood control schemes have caused canalisation of natural meandering streams or tamed many torrents.

In Slovenia, as in other parts of Europe, the human induced pressures have mostly affected *coastal* and *lowland* wet habitats. Factors affecting wetlands have changed depending on the region and dominant human activities. According to the available data, *agriculture* intensification has been the main human factor causing wetland loss and degradation all over Slovenia. Additionally, industrial development, urbanisation, expansion of tourism and recreation have affected Slovenian wetlands, especially coastal areas. But recently, the increasing demand for tourism, recreation and outdoor activities has initiated an additional threat to natural areas, which also include different inland wetlands that up to now could resist the development pressures, e.g., raised bogs on the high plateaux, mountain river streams. All these activities have caused a decline in wetland areas by drainage of wetlands, flood control schemes, dams, water extraction, pollution, introduction of alien species, disturbance, etc. The consequences are demonstrated in increasingly fragmented and

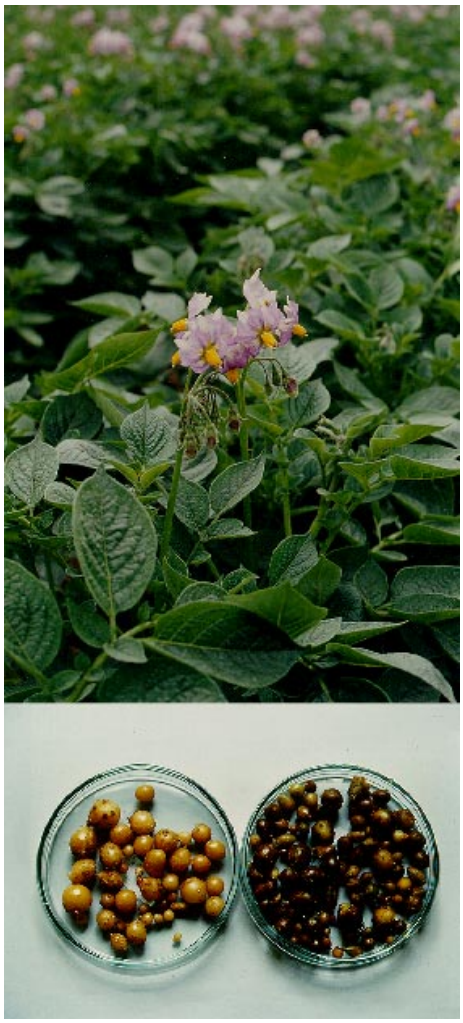
disturbed natural wetlands on the one hand and, on the other, an increase in artificial wetlands, particularly, canals and reservoirs.

Many threats to biodiversity are due to the sectoral policy directions of economic sectors. Forestry, agriculture and tourism are the key sectors when considering conservation and the sustainable use of biodiversity in Slovenia. Additionally, Slovenia is the smallest of the countries with economies in transition. To date, close to 80 per cent of forests (until 1990, 62 per cent, according to the Forest Development Programme, 1995) and 89 per cent of agricultural land (in 1990, 83 per cent) are privately owned (Statistical Yearbook, 1995).

3.3 Current Status of Biodiversity Related Legislation and Policy

Slovenia signed the CBD at the Rio Summit and already during preparation for ratification of the Convention its principles were considered in certain legal documents which have been adopted in the last five years.

The first results of the changing policies in the early 1990s appeared in the *Environmental Protection Act* (1993), which was followed by environmental by-laws mainly on air quality standards. The *Forest Act* was also issued in 1993. More related legislation is in preparation.



This environmental framework legislation passed in 1993, was to create a regulatory system for both environmental protection and nature conservation. A special *Nature Conservation Act* (Table 5) which is currently in preparation will, among other provisions, establish the legal basis for integration of nature conservation principles into other sectors as foreseen in the Nature Conservation Strategy. Currently, the *Natural and Cultural Heritage Act* passed in 1981 is still enforced in the field of nature conservation, but it only partly includes the CBD objectives and cannot adequately address the current environmental situation. This has been influenced by recent economic changes, such as, transition from a centralised to a market economy and changes in property rights. Consequently, threatened (red data) species, habitat conservation, trade and control mechanisms, among others, are only partly covered by existing laws. Nevertheless, a number of the protected areas established, and the by-laws passed to provide protection of threatened animals and plants, are based on this legislation.

A Decree issued in 1976 and listing 28 vascular plants is still enforced, yet mostly used to raise public awareness and respect for certain popular plants. In view of the new policy directions, the Slovenian government passed a Decree on Protection of Threatened Animal Species in 1993, and in 1994, a Decree on Protection of Threatened Fungi. The Regional Park Skocjanske jame was protected by a decree passed in 1996, while a decree protecting caves and cave ecosystems is being presented to parliament for adoption. A decree imposing restrictions on

motor vehicles when used off roads was passed in 1995, and provides control measures for traffic in the countryside. A decree on implementation of the EIA was adopted in 1996. This document listed activities which are subject to EIA procedure, and particularly refers to interventions in protected areas.

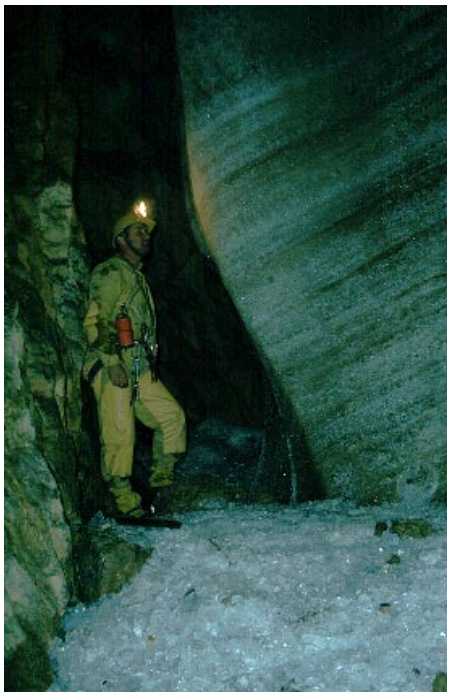


Plate 16:
Protecting caves and cave ecosystems is of critical importance due to increasing pressures to these ecosystems (PS).

In 1994, the first draft of the *Nature Conservation Strategy* was prepared as a long term vision for activities at international, national and local levels, based on European and global strategic documents. The focus of the Strategy is on organisation of nature conservation, *in-situ* conservation (setting a system of protected areas and management, species and habitat conservation), and integration of nature conservation principles into other policies. It introduces the concept of an integrated approach in the application of nature conservation. Its main objectives thus include:

- Conservation of:
  - Native plant and animal species (including landraces and autochthonous livestock breeds) as well as exceptional specimens or populations;
  - Habitat types, biocoenoses and ecosystems and related processes;
  - geotopes and outstanding geologic, paleontologic and geomorphologic phenomena;
  - All types of landscapes through sustainable development;
- *Establishment* and development of a spatial ecological structure;
- *Restoration of* degraded natural features, habitats and ecosystems.

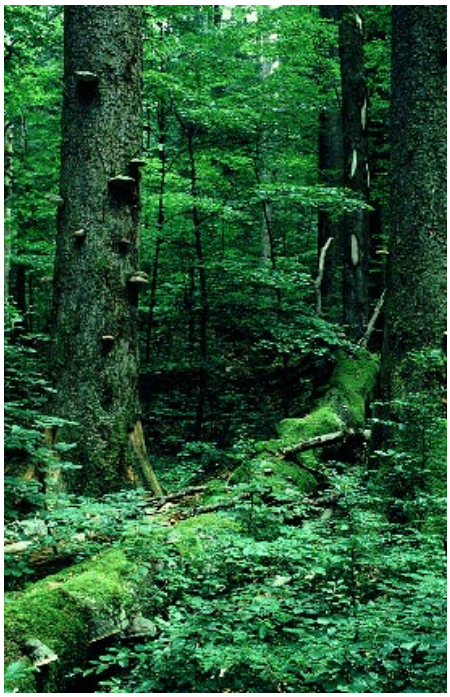


Plate 17:
The relatively large forest complex of Kocevje provides good habitat and shelter to large mammals like brown bear, lynx and wolf (PS).

The *Forest Act* (1993) and Forest Development Programme of Slovenia (1995) both take into account the CBD principles. These two documents are in the process of implementation but are suppressed by the general political changes and institutional restructuring. The *Forest Act* supports a policy that includes nature conservation principles. In addition to the prohibition of clear-cuts it also prohibits planting monoculture stands. While planning is a prerequisite for sustainable use of forest resources, indirect-use values of forest ecosystems are considered at least as important as timber exploitation, which is a direct-use value. Provisions are applied to private and state owned forests alike. By incorporating such provisions the law gives a good example of the integration of sustainability principles into sectoral implementation legislation.

In addition to the Forest Act, which also regulates the management of forest genetic resources, the Act on Plant Protection was adopted in 1994, while all regulations on seed testing, seed stands and seedlings have been developed since the 1960s. The Act on Seeds and Seedlings was adopted in 1973. Currently it has been revised according to the relevant Directives of the European Commission as well as including the OECD scheme. A Decree on financing and co-financing investments in forests (1994) and the Forest Development Programme for Slovenia (1996) can also provide some practical guidelines for biodiversity conservation and use (Kraigher, 1997).

The *Agricultural Law* (in preparation) and the Agriculture Development Programme (1993) are both development and consumption oriented and need considerable changes in order to incorporate CBD principles and goals. The Slovenian Programme for Plant Gene Banks, however, aims to promote sustainable use of germplasm. Altogether, Slovenian agriculture still has to consider how to incorporate the biodiversity principles into its implementation policy.

The *Tourism Development Strategy* was drafted in the early 1990s. The Resolution on Strategic Aims in Tourism Development (1995) stresses the importance of biodiversity rich areas, yet it still has to include CBD principles.

Plate 18:
Sustainable tourism development can be based on Slovenian local and natural characteristics (GB).

Biosafety is considered in the preparation of an act dealing with genetically modified organisms (GMOs). It regulates every production and use of GMOs, deliberate release, risk management and marketing. The draft (Table 5), issued by the Ministry of Science and Technology in December 1997, was also considered satisfactory in the approximation of Slovenian regulations to those in the EU. With regard to 'contained use', it also considers higher organisms, which means that not only genetically modified micro-organisms are included, but also plants, animals and humans. Moreover, it is an instrument to ensure the safe development of modern biotechnology in Slovenia.

Paragraph 8 of the new Constitution adopted in 1991 provides grounds for the harmonisation of Slovenia's legislation with the basic principles of international law and the direct applicability of international agreements ratified by the State.

Table 5: Current situation of policy and legal measures for the implementation of the CBD *(Article 6)*.

National Policy Requirements and Implementation Legislation	Timetable	Current Situation
Policy development:		
-National Nature Conservation Strategy	1998	under adoption
-National Environmental Action Programme (NEAP) &	1998	in drafting
-National Programme of Environmental Protection (NPVO)	1998	sectoral co-ordination
National Biodiversity Strategy & Action Plans	1998	in preparation
Implementation legislation:		
-Natural and Cultural Heritage Act	1981	insufficient
-Environmental Protection Act	1993	enforced
-Nature Conservation Act	1998	draft version
-Biosafety legislation - Act on handling and use of GMOs		draft version
Scheme for integration into sectors, sectoral programmes and plans	1998	in preparation
Related National Legislation and Policy		

Water Management: -Water Act -Inland waters and wetlands* -Coastal and marine ecosystems*	1998	draft version
Cultural heritage conservation: -Cultural Heritage Conservation Act	1998	draft
Agriculture: Agricultural Land Law Agricultural Development Strategy National Plant Genetic Resources Programme Hunting and Fishing Acts	 1998 1992 1999	 in the process endorsed in preparation draft
Forestry: Forest Act Forest Development Programme	 1993 1995	 enacted endorsed
Tourism: Strategy for tourism development Tourism Act	 1995 1998	 endorsed under adoption
Related International Documents and Conventions		
Implementation of conventions: -Ramsar Convention -World Heritage Convention -Barcelona Convention (Geneva Protocol) -Alpine Convention (Protocol on Nature and Landscape Conservation, and other protocols)		in the process of implementation
Ratification of other conventions related to CBD, particularly: -Bonn Convention (CMS), -Bern Convention -CITES	 1998 1998 1998	 in the process in the process in preparation
EAP - Environment for Europe - Ministerial process		participating
PEBLDS and the Action Themes		participating
Protection of Forests in Europe - Ministerial process		participating
Accession process to the EU Environmental Pre-accession Strategy of Slovenia for Integration with the EU	1998	second draft Oct 1997
Bilateral agreements		

** included into nature conservation and water legislation*

3.3.1 Related International Conventions

Slovenia has endorsed several conventions ratified by former Yugoslavia including the Ramsar, Word Heritage and Barcelona Conventions. In addition to the CBD, Slovenia has so far ratified also the Alpine Convention (1991).

Convention Concerning the Protection of World Cultural and Natural Heritage (1972):

In Slovenia, there is one World Heritage site, listed in 1986, the Skocjan Caves. In 1996, the surface area of 413 hectares was designated a regional park and the management authority was established (Table 6).

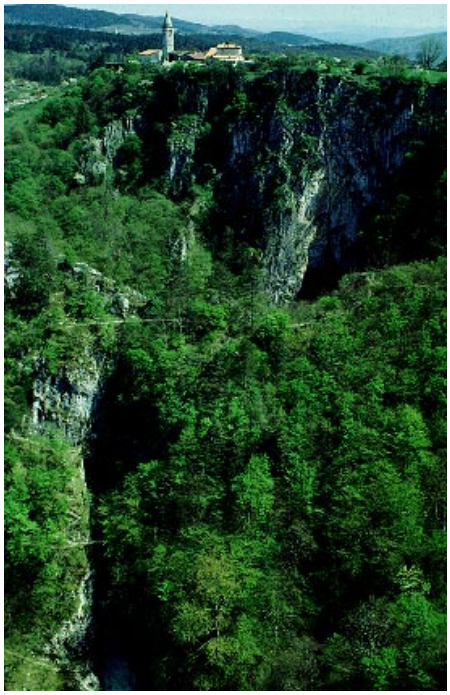


Plate 19:
The village of Skocjan and Velika dolina in the Regional Park Skocjanske jame and an integral part of the World Heritage Site (1986) Skocjanske jame (PS).

Convention on Wetlands of International Importance Especially as Waterfowl Habitat (1971):
One wetland site, Secovlje Salina, is included on the List of Internationally important wetlands and three more are to be included in 1998. The National Wetland Committee was established in 1996. Slovenia is very active in implementation of this convention and is currently preparing the wetland programme and an inventory of wetland sites.

Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean (1995) of the Barcelona Convention (1976) and the Annexes adopted in Monaco (1996) have been endorsed to propose Slovenian sites for the list of SPAMI.

The following international agreements are in the process of ratification:
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973): Although this convention has not been ratified by Slovenia the MOP respects the convention and works according to the resolution adopted (Resolution conf. 9.5 of COP9) considering import of listed species or animal trophies. An import permit has to be issued by the MOP to accompany the export permit and the material imported to the country.

Convention on the Conservation of Migratory Species of Wild Animals (CMS, 1979):
According to the Convention, the range states of listed species can comply with the implementation of separate Agreements in spite of Slovenia's not being a Contracting Party to the Convention. The Bonn convention is in the process of ratification and currently being discussed in the parliament.

Convention on the Conservation of European Wildlife and Natural Habitats (Bern, 1979):
Slovenia is following the meetings and activities of the Council of Europe (CoE) related to this convention. This convention is to be ratified in 1998. Currently it is being discussed in the Slovenian parliament.

3.3.2 *In-situ* Conservation

Plate 20-21:
Some information on existing and planned protected areas in Slovenia.

According to the existing legislation system of the protected areas the following management categories are included:

National Park - IUCN equivalent: II or II/V
Regional Park - IUCN equivalent: V
Landscape Park - IUCN equivalent: V
Nature Reserve - IUCN equivalent: I or IV
Nature Monument - IUCN equivalent: III

About 8 per cent of the national territory is under special protection, including one National Park, 10 State Nature Reserves, 31 Landscape Parks and a long list of Natural Monuments. Out of all

these protected areas or sites only the Triglav National Park and, since 1997, the Regional Park Skocjanske jame have management authorities. The practical implementation structure, however, is still to be established and management plans adopted.

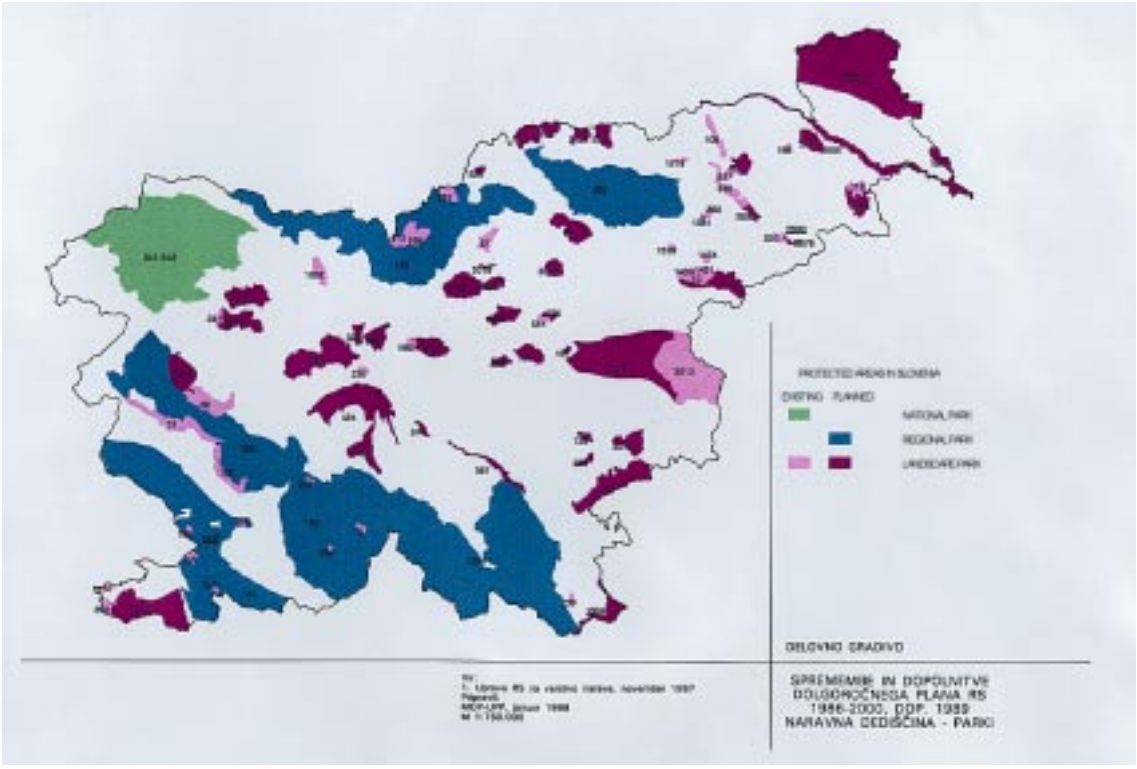
Table 6: Number of different types of protected areas in Slovenia (MOP-UVN, 1996).

Nature Conservation Category	IUCN	Number of Sites	Area in hectares
National protection			
National Park (NP)	II/ V	1	83,807.00
Regional Park (RP)	V/III	1	413.00
Landscape Parks (LP)	V	31 (5)	36,742.90*
Nature Reserves (NR)	I, IV	49	-
Nature Monuments (NM)	III	623	-
Designed Sites of Natural Heritage		77	-
Sites of Combined Natural and Cultural Heritage		10	-
International protection			
The World Heritage Convention		1 (1986)	413.00
The Ramsar Convention		1 (1993)	650.00

*The figure does not include all Landscape Parks; - No reliable data.

In 1995, the Slovenian parliament endorsed a programme for the designation of protected areas in Slovenia which provided the basis for a different concept of protected areas. Consequently, in 1996, a proposal was prepared which introduced changes to the National land-use plan. According to this proposal up to 30 per cent of the Slovenian territory will be included in different protected area management categories (Fig. 3). Since 1995, international donors have been financing projects and the preparation of management plans for the three largest protected areas to be established. Currently, the management plan for the Triglav National Park is also in preparation. Parallel to these activities studies on particular issues are also being carried out.

Fig. 3: A map of existing and planned protected areas in Slovenia which will cover up to 30 per cent of the territory.



Protected areas very often coincide with less favourable areas for agricultural production where farmers can get financial support for maintaining biodiversity and applying traditional farming methods. The support can be provided either for maintenance of certain conditions in areas rich in biodiversity or for maintenance of traditional landscape diversity. Assistance can be given in different forms, and financial support is usually provided as subventions (in protected areas), incentives (sustainable - traditional use) or compensation (damage caused by wildlife). *For example*, in 1995, support was provided for traditional mowing in the Triglav National Park as well as for setting aside land in the Eastern part of the country (the breeding area of grey herons). In 1997, subventions were allocated for maintenance of dry grasslands in the karst areas.

Between 1991 and 1997, the Ministry of Agriculture, Food and Forestry also provided technical and financial support for conservation of autochthonous animal races. This programme supports *in-situ* conservation of domestic animals all over Slovenia (Table 7).

Table 7: *In-situ* conservation of some autochthonous animal races in Slovenia (Kompan, per.com.).

Species	Breed	Number	location
Sheep	Bovska Jezersko-solcavska Istrska pramenka Belokranjska pramenka	600 600 350 180	21 farms 14 farms 6 farms 12 locations
Pigs	Krskopoljski	25	2 locations
Poultry	Stajerska	200	4 farms
Horses	Posavski Lipicaner	37 mares 300 mares	40 locations 50 locations
Cattle	Cikasta	90 cows	15 farms

Additionally, the Zootechnical Department at the Biotechnical Faculty, University of Ljubljana, studies the autochthonous Slovenian breeds of cattle, sheep, poultry, pigs and horses in the framework of the European Zootechnical Federation (FEZ) and FAO.

Plate 22:
Lipicaner is an autochthonous horse bred in the stables of Lipica (PS).

3.3.3 *Ex-situ* Conservation

In 1995, the Ministry of Agriculture, Forestry and Food (MKGP) nominated a Commission for 'Preparation and Operation of the Programme for National Plant Genetic Resources'. Members of this commission are specialists working at the Agricultural Institute of Slovenia, Biotechnical Faculty of the University of Ljubljana, Zalec Institute for Hops and Brewing, Slovenian Forestry Institute and the MKGP. Its first task was to establish the National Programme and to reassess ongoing projects. The commission presented the activities of the National Programme through the Directory of European Institutions Holding Crop Genetic Resources Collection (FAO/IPGRI, 1995), Country Report for the Fourth International Technical Conference on Plant Genetic

Resources (Leipzig, 1996) and Eucarpia Genetic Resources Section Meeting in Budapest (1996). The main objectives of the programme include collection, characterisation, evaluation, regeneration and conservation of autochthonous germplasm, Slovenian cultivars and endangered, vulnerable or rare native tree species. The Slovenian Plant Gene Bank holds *ex-situ* accessions and conducts research on: lettuce, onion, cabbage, beans, potato, buckwheat, wheat, corn, grasses, clovers, small fruits, fruit trees, vines, medicinal and aromatic plants and hops. In this context, mention should be made of a collection of approximately 120 apple, 40 pear and 10 walnut varieties.

Plate 23:
Different accessions of lettuce developed with the native gene material (MC).

Out of the three botanic gardens in Slovenia used for *ex-situ* conservation of native plant species, the most important is the botanic garden in Ljubljana. It was established in 1810 to preserve plant species indigenous to Slovenia with particular reference to endemic and threatened species. The *Index seminum* has been issued since 1889, and also includes information on seeds collected at the Alpine botanic garden Juliana (established in the late 1920s and managed by the Slovenian Natural History Museum). In 1997, the collection held seeds of 795 plant species. Additionally, it plays an important role in raising public awareness as, for example, in autumn 1997 the number of visitors to the garden exceeded 2500. The University in Maribor has also established a botanic garden to encourage conservation of locally threatened plants. Both botanic gardens are members of the Botanic Gardens Conservation International.

A culture collection of Microbial Genetic Resources in Slovenia is in preparation.

3.3.4 Raising Public Awareness

In 1995, several NGOs, public institutions and specialists were involved in the European Nature Conservation Year (ENCY). Consequently, a publication was issued by the MOP compiling all the on-going or very recent projects on nature conservation carried out by the GOs or NGOs.

Plate 24:
Some leaflets produced for information and for raising public awareness.

In 1996, MOP organised a seminar on environmental education. The Recommendations were clearly spelt out. The most important one was related to the preparation of strategic directions for environmental education and raising public awareness. On the one hand, MOP and the Ministry of Education and Sport have to prepare a common strategic plan for environmental education in all schools, while, on the other, NGOs and media have to be included in programmes for raising public awareness.

At the moment no organised campaign is taking place. There are, however, several sporadic actions organised by the NGOs; *for instance,* every year the Natural History Society of Slovenia (PDS) organises a special event dedicated to the International Biodiversity Day, and the

Slovenian Forestry Institute (ZGS) organises a forest week mainly intended to reach school children. Additionally, schools have "nature education days" on their schedules. The MOP yearly organises a Geotrip. The Slovenian Genetics Society works on promoting and raising awareness of genetic diversity and the consequences occurring due to genetic erosion.

Increasingly, periodicals issued by some active NGOs (see also Table 10) include biodiversity topics, and editors invite members and experts to write about biodiversity and related issues. Additionally, posters, leaflets and postcards are dedicated to biodiversity, which are prepared by either the GOs or the NGOs.

3.3.5 Institutional responsibility and capacity - Organisation of Nature Conservation

Following the CBD ratification act the implementation of the CBD is a matter for the Ministry of the Environment and Physical Planning. Consequently, the National CBD Secretariat has been organised at the Nature Conservation Authority (National Focal Point and Clearing-House Mechanism Focal Point).

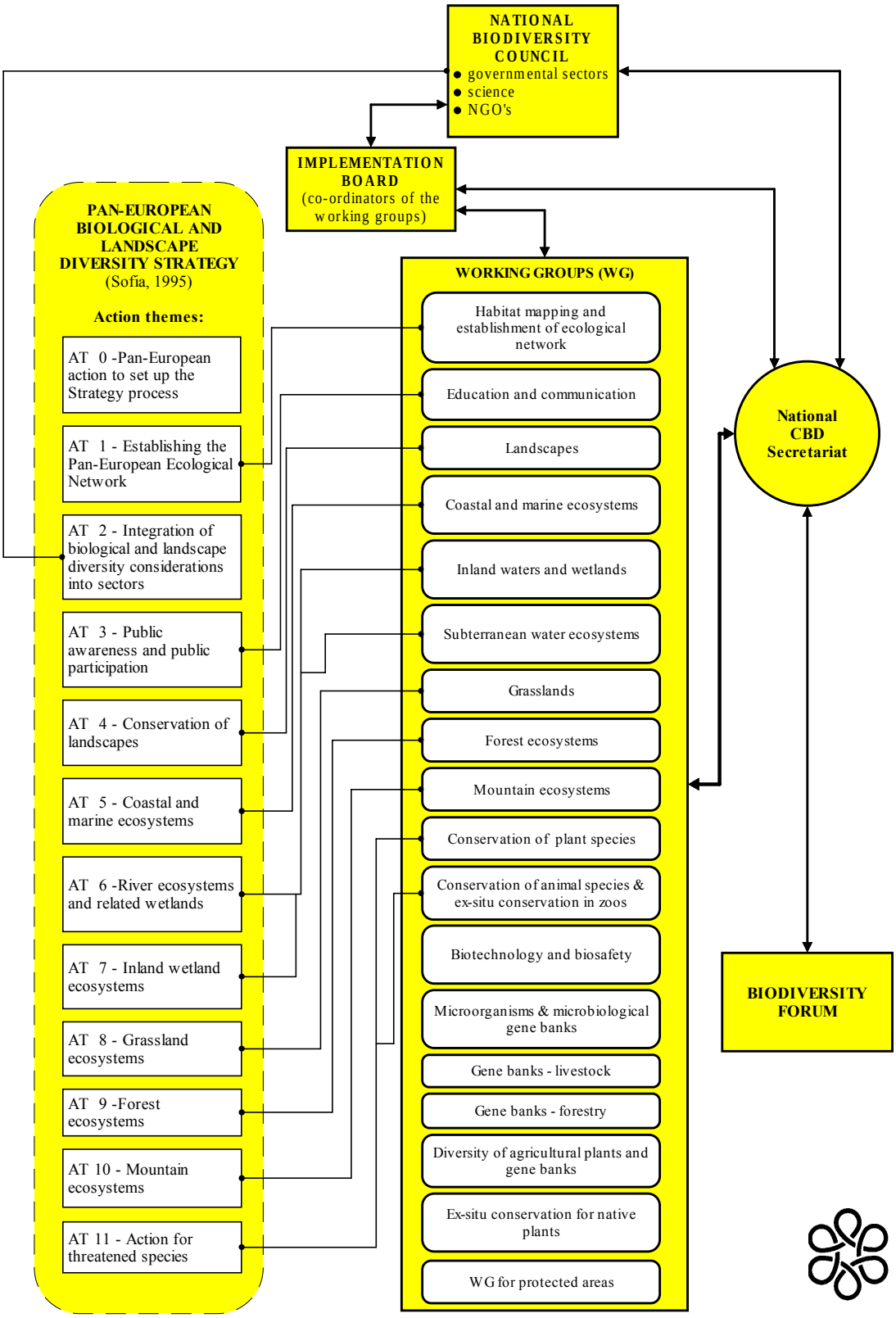
The Slovenian Ministry of the Environment and Physical Planning is responsible for nature conservation issues. Its administrative and technical advisory body is the State Authority for Nature Conservation, consisting of three sub-sectors (nature conservation, environment, water management). Seven regional Institutes for conservation of the natural and cultural heritage act as technical supervisory bodies at the local level.

The overall capacity for CBD implementation is restricted to a few people within the Slovenian Ministry of the Environment and Physical Planning, and commitment of the other sectors is still lacking.

A special environmental board within the Slovenian Parliament deals with the environment, nature conservation and infrastructure. In 1997, the Slovenian government established the Council for Sustainable Development, and the planned National Biodiversity Council will form part of this body (Fig. 4).

At the *local level*, communities have some limited responsibilities in nature conservation issues.

Fig. 4: Basic structure of the CBD implementation at the national level, combining requirements of the CBD and PEBLDS.



4. The Biodiversity Strategy and Action Plan

The National Biodiversity Strategy and Action Plan (NBS&AP) are currently in preparation and are planned to be completed by mid-1998.

In the preliminary phase of preparing the NBS&AP a participatory approach has been introduced. In June 1997, a questionnaire was sent to different institutions, governmental and non-governmental organisations (GOs and NGOs) that might have an interest in the biodiversity issues. It is anticipated that - co-ordinated by the MOP and represented by the key economic sectors, research institutes and leading NGOs - a council and board will have to be established to provide political and general guidance for the implementation of the Convention, to enable intersectoral co-operation and to direct cross-sectoral co-operation carried out in the working groups. The working groups are the basic units of the practical application which has to be carried out at all levels, from national to local, and be implemented by specific projects.

Already during the preparation of the NBS&AP the scheme for implementation of the CBD was drafted. Implementation is organised at three levels: political (involving GOs, NGOs, private sector), operational (including individual experts, institutes and organisations) and public (organising the biodiversity forum).

Since the work was initiated, in June 1997, we are currently in the process of establishing the operational level of CBD implementation. On the basis of the PEBLDS action themes and the Convention on Biological Diversity, 18 working groups have been established. These working groups cover different ecosystem, species and gene issues that are also recognised as priority areas for conservation and sustainable use of biodiversity in Slovenia. (Table 8 and Fig. 5)

The co-ordinators were proposed on the basis of a preliminary survey carried out in summer 1997. All information gathered has currently been updated. Each group consists of at least two co-ordinators who are responsible for co-ordinating work within and between groups and who are the key persons for preparation of the NBS&AP. The first meeting of the group co-ordinators was held in October 1997. With some minor changes the proposed structural framework for the implementation of the convention was endorsed. Since then several group meetings have been convened and, consequently, a provisional action plan for the year 1998 has been drafted (Table 9).

It is anticipated that all the relevant Ministries will actively participate in the implementation of the CBD in Slovenia.

Table 8: Working Groups

No	Working Group	Co-ordinators
1	Habitat mapping and establishment of ecological Network (AT 1)	Jure Dobravec* / Andrej Seliskar
2	Conservation of plant species (AT 11)	Peter Skoberne*/ Dr. Tone Wraber
3	Conservation of animal species (AT 11) (including ex-situ conservation in zoos)	Jana Vidic*,Robert Boljesic */ Dr. Matija Gogala, Dr. Boris Krystufek, Irena Furlan
4	Education and communication (AT 3)	Stane Peterlin* / Dr. Bostjan Anko
5	Biotechnology and biosafety	Dr. Biserka Strel* / Dr. Radovan Komel, (Branka Javornik)
6	Forest ecosystems (AT 9)	Baldomir Svetlicic* / Aleksander Golob
7	Mountain ecosystems (AT 10)	Metod Rogelj* / Igor Maher
8	Coastal and Marine ecosystems (AT 5)	Robert Turk* / Dr. Lovrenc Lipej
9	Inland waters and wetlands (AT 6 in AT 7)	Dr. Gordana Beltram* / Dr. Anton Brancelj, Andrej Sovinc
10	Grasslands (AT 8)	Mirjam Gorkic* / Dr. Mitja Kaligaric
11	Subterranean - *Hypogean* - ecosystems (AT 6)	Andrej Hudoklin* / Andrej Mihevc, Dr. Boris Sket
12	Landscapes (AT 4)	Jelka Habjan* / Marko Prem, Blanka Bartol
13	Micro-organisms and microbiological gene banks	Stane Peterlin* / Dr. Nina Cimerman-Gunde
14 15	*Gene banks in agriculture:* Diversity of agricultural plants and gene banks Gene banks - livestock	Darja Jeglic* / Dr. Vladimir Meglic Dragomir Kompan
16	Gene banks - forestry	Stanko Silan * / Dr. Hojka Kraigher
17	Gene banks - native plant species	Ivana Leskovar* / Dr. Joze Bavcon
18	Protected areas - *in-situ* conservation	Alma Vicar* / Breda Ogorelec

* Co-ordinators working at MOP or regional Institutes for Conservation.

Fig. 5: Main working groups involved in issues at different levels of biodiversity conservation and sustainable use of biological and landscape resources.

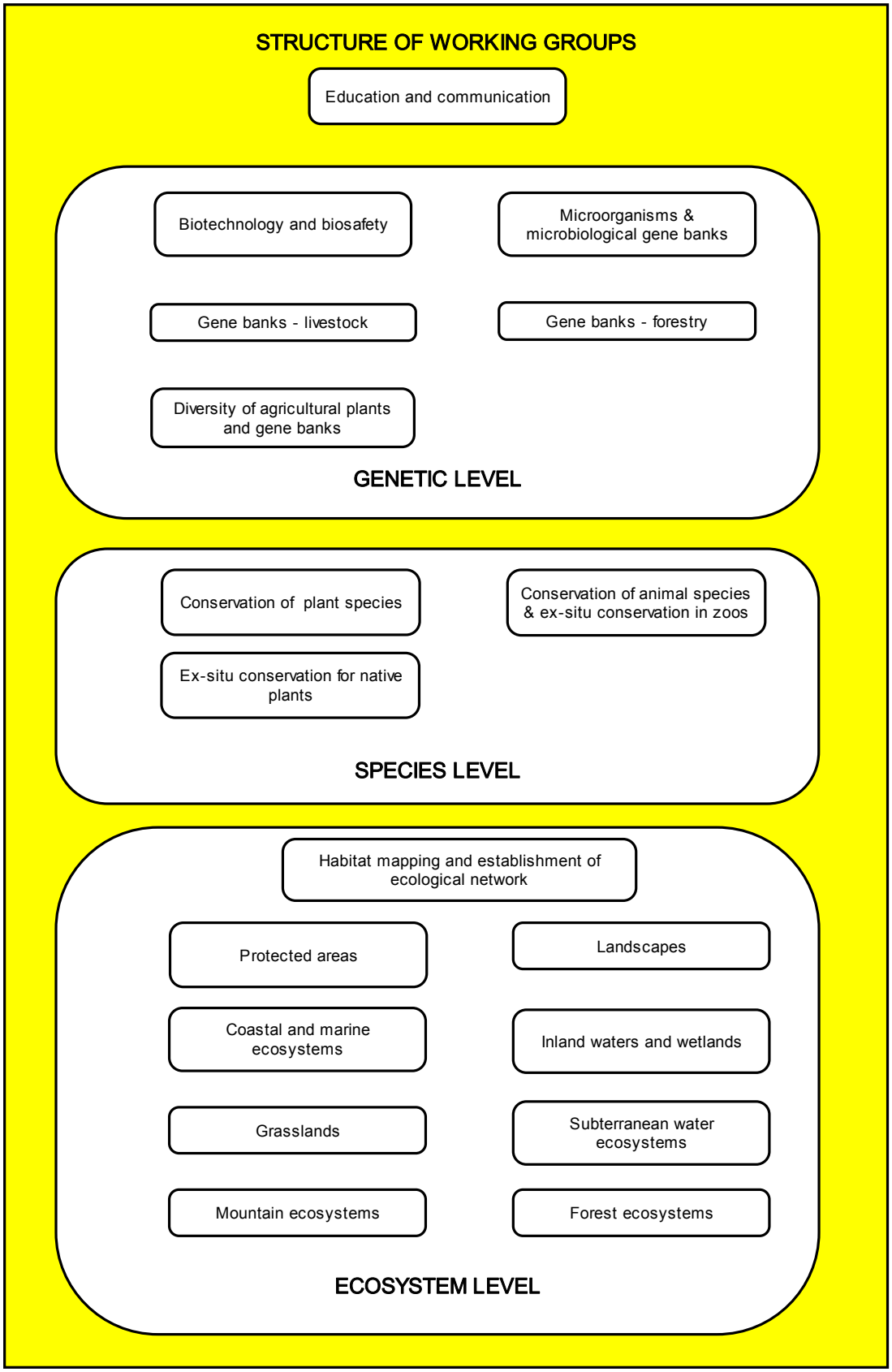


Table 9: Provisional action plan for 1998.

	Priority actions	*Timetable*
1.-	Drafting of the Biodiversity Strategy and Action Plan	July 1998
2.-	Working Groups formation Priority action plans for WG	February 1998 April 1998
3.-	Proposal for establishment of the Biodiversity Council	May 1998
4.-	Preparation for the Fourth Meeting of the Parties - COP4 Published Report on the Implementation of the Convention	 April 1998
5.-	Plan for integration of CBD principals and goals into sectors - -Information on CBD principals and goals, responsibilities -Within the MOP co-operation with the water management -Between Ministries: forestry and agriculture; -Public awareness; -Sustainable development in Protected Areas	March 1998
6.-	Establishment of CHM, and making it operational at the National Level: -Establishment and homepage -Data update -Service -Make it operational by the end of 1998	March 1998
7.-	Report	December 1998

5. Collaboration and Partnership

The main sectors requiring priority integration and co-operation are agriculture, forestry and tourism. Water management is changing but implementation legislation is lagging. Additionally, the transport, traffic and private sectors are becoming critical for conservation, particularly because their main goal has been economic development regardless of the impact on biodiversity.

In forestry, there has traditionally been good co-operation between nature conservation and foresters, except for some management practices. There have always been discrepancies, as for example, in hunting issues, exploitation practices, management of forests for timber production. However, in Slovenia the first protected areas were "old growth" forests; many laws

prepared in co-operation of the Ministry of the Environment and Physical Planning and the Ministry of Agriculture, Forestry and Food were related to forest issues.

Plate 25:
Karst areas are sensitive to development pressures and close co-operation between different sectors is critical for conservation of biological and landscape diversity (GB).

Nevertheless, forestry has developed quite sustainably, and currently Slovenian forest management sets a good example for managing European forests (Helsinki Operational Level Guidelines for Sustainable Forestry, 1997).

Table 10: Some active NGOs in Slovenia, their main interest and examples of relevant activities.

NGO	Main interest	Target group	Recent activities
PDS	- education - raising awareness - promotion - nature conservation	- school children - interested individuals - naturalists	- projects for schools on recognising the biodiversity of their surroundings (started in 1997) - World Biodiversity Day - projects on animal and plant species and biotopes
SSN	- purchasing sites - financing projects - raising funds - nature conservation	- NGOs - decision makers - interested individuals	- Skocjanski zatok - Ljubljansko barje - projects carried out by other NGOs
DOPPS	- bird related issues - lobbying, promotion - international co-operation	- general public - media - decision makers	-IBA sites in Slovenia -project for conservation of threatened birds and sites in Slovenia
Ixobrychus	- research at local level and co-operation in the Mediterranean basin - lobbying - promotion, awareness - nature conservation	- local population - local decision makers - interested groups at the regional level	- lists of birds of the Slovenian coastal region - research and promotion of Skocjanski zatok, an endangered wetland area - monitoring
Dragonfly Society	- research - promotion, awareness	- experts in the field - naturalists - general public	- Atlas of dragonflies in Slovenia (Odonata Survey), 1997
Entomological	- research	- experts in the field	-Atlas of threatened

Society	- promotion, awareness	- naturalists - general public	butterflies of Slovenia, 1996
Societas herpetologica slovenica	- research - training and awareness	- experts in the field - naturalists - general public	- preparation of the Atlas of amphibians of Slovenia - participation in the project *"The Central European Salamander Year"*
REC-NFP	-service to and fund raising for national NGOs	-NGO members -decision makers	- meetings inviting NGOs - co-operation - promotion

The nature research institutes in Slovenia, and also independent scientists, are currently carrying out several projects on basic research, financially supported by the Slovenian Ministry of Science and Technology. The results of these projects can contribute to an increase in knowledge on biological diversity and can be applicable for nature conservation purposes.

NGOs form an important agent in implementation of the CBD. Out of a number of NGOs active in different aspects of biodiversity some actions have been outlined in Table 10. Their main advantage is direct implementation at the local level, thus assistance in raising public awareness. Co-operation with and integration of relevant NGOs into the process have started only recently and need to be strengthened.

The most prominent NGO is the Natural History Society of Slovenia (Prirodoslovno drustvo Slovenije - PDS), with the longest tradition of activities in the field of nature conservation. The Slovenian Fund for Nature (Slovenski sklad za naravo - SSN), the first non-profit, non-governmental and non-political foundation, was established in December 1992 in order to assist nature conservation endeavours by financing projects or action plans and providing resources for land acquisition. The Slovenian Ornithological Society (Drustvo za opazovanje in proucevanje pticev Slovenije - DOPPS) and the Union of Societies for Environmental Protection (Zveza drustev za varstvo okolja) should also be mentioned. Ixobrychus is the local ornithological society focusing on coastal nature conservation issues, and particularly active at the Mediterranean level. The importance of the Slovenian office of the Regional Environment Centre (REC) is growing. In addition to its regular activities, REC acts as a point in Slovenia where numerous and different NGO's come together. New NGOs are emerging, and some are developing into powerful organisations which influence public opinion and act as a control mechanism in decision making. Stronger collaboration needs to be established between these and other NGOs, GOs and the private sector.

Plate 26:
NGOs can provide considerable help in implementation of biodiversity principles at the local level.

6. Resource availability

Budget required

The total budget will be defined in the Action Plan of the National Biodiversity Strategy. To start the activities in the present preparatory phase, there are two main direct sources of financing:

- In-kind financing for the work of the Secretariat;
- State budget.

After ratification of the Convention a new budget line was established for implementation of the CBD. In 1997, 8,000,000.00 SIT (about 45,000 USD) was deducted for the CBD, being available when the budget was approved in December. This money is planned to cover the co-ordination of the CBD implementation, contacts with the Secretariat, and partly also to be used for directly financing or co-financing projects. It is planned that when the NSB&AP are approved, projects will be financed differently (basic sector, donors from private and business sector, international co-operation).

Manpower and skills

The research institutes and universities provide the basic information and data needed for implementation of the CBD objectives. Their staff can form the necessary human resources for present needs, however, there is an increasing need for staff with co-ordination and application skills. Organisations - whether governmental, non-governmental or profit-making - capable of taking over the management and implementation of particular projects are in this respect weak. Education and training programmes are foreseen in the long run to overcome this gap. In short term, the problem is addressed by international exchange of information and experiences on particular issues and within different sectors.

International technical and financial co-operation

Several international nature conservation projects running in Slovenia mostly focus on the development of protected areas. *For example*, Dutch and British governments and the EU provided financial and technical support for projects, exchange of knowledge and study visits.

The most relevant to CBD practical implementation is the CORINE Biotopes Programme (PHARE) which was scheduled to start in November 1997, but has been delayed. In the second half of 1997 contacts with the World Bank were established to assist Slovenia in accessing the GEF funding for the preparation of the NBS&AP. The project proposal has been prepared and submitted to the GEF Secretariat.

Plate 27-28: Development projects have to safeguard the Slovenian biodiversity (PS, KIS).

7. Monitoring and Evaluation

Monitoring and evaluation of the implementation is in preparation as part of the listed documents in Table 5.

8. Sharing national experience

National experiences have been shared throughout different activities at global, but mainly European, level. Co-operation with international organisations and other processes regarding CBD implementation include:

- Treaties
  The most relevant are the Ramsar and Bern conventions. In the framework of the Ramsar Convention, the Wetland Inventory is in preparation, and the first contacts have been made for implementation of the CORINE Biotope Programme (PHARE) and building the EMERALD network (Council of Europe), both in the preparation framework for NATURA 2000.

- Approximation Process to the European Union
  There is a strong political commitment to the approximation of Slovenian environmental legislation to that of the EU. Through these activities legal and technical capacities for implementation of the Birds and Habitats Directives are currently being examined as well as the building of the NATURA 2000 network. Additionally, all other EU legislation that can directly or indirectly influence biodiversity has to be considered. There is some co-operation with other sectors in cross-cutting issues. Sectoral co-operation needs to be strengthened and the most challenging area is agriculture.

- Environment for Europe
  The Ministerial process Environment for Europe is relevant for CBD implementation mostly in three areas:

- National Environmental Action Programme - the main goals and priority areas for biodiversity conservation are defined there; co-operation with the OECD Task Force for EAP;
- Report on biodiversity status for the Dobris Report;
- Pan-European Biodiversity and Landscape Strategy (PEBLDS) - there is a strong link between the Strategy and CBD implementation. Working groups established in Slovenia also correspond to the Action Themes of the PEBLDS. Co-ordinatiors are actively participating in the PEBLDS process (AT0, AT2, AT3, AT6,7, AT9, AT11). Working closely with the Regional Environmental Centre in Budapest and IUCN European Office, Slovenia is taking the leading role in the Sofia Biodiversity Initiative for Central and East Europe.

- Ministerial Process Protection of Forests in Europe
  Slovenia is taking an active role in the process, and the MKGP is involved in preparation of the documents.

- Co-operation with international organisations
  The main contacts with international organisations are related to the implementation of international treaties (e.g. UNEP, UNESCO World Heritage Centre). The PEBLDS process has brought us close to UNEP/ROE, ECNC, Council of Europe, WWF, EUROPARC, CIPRA, International Financing Institutions and others. Some well-established contacts include the following organisations:
  - IUCN - co-operation with the Headquarters, European Regional Office, IUCN Commissions (World Commission on Protected Areas, Species Survival Commission, Commission on Education and Communication), PEBLDS process, Sofia Biodiversity Initiative;
  - REC - Environmental Action Programme for CEE, Sofia Biodiversity Initiative;
  - World Conservation Monitoring Centre (WCMC) - data for protected areas and threatened species;
  - BirdLife International - Important Bird Areas programme with national partner organisation;
  - PLANTA EUROPA - Important Plant Areas project;
  - European Environmental Agency (EEA) - Dobris Report, EIONET;
  - European Topic Centre for Nature Conservation (ETC/NC) - CORINE and NATURA 2000 network;
  - EU Commission, DG XI - the process of approximation of environmental legislation;
  - EUROPARC Federation - Experience Exchange PHARE project;
  - ICOMOS - International Council on Monuments and Sites, Slovenia has its national committee (ICOMOS/SI);
  - IPGRI - International Plant Genetic Resources Institute;
  - ECP/GR - European Co-operative Programme for Plant Genetic Resources;
  - EUFORGEN - European Forest Genetic Resources Programme;
  - SAVE - Safeguard for Agricultural Varieties in Europe;
  - DAGENE - Danubian Alliance for Gene Conservation in Animal Species;
  - UNIDO - United Nations Industrial Development Organisation;

- Bilateral agreements and activities

There is co-operation with all neighbouring countries, mostly on protected areas, water resources and local development:

- Austria: Goricko trilateral protected area; "Kamnisko-Savinjske Alpe and Karavanke" (INTERREG project);
- Hungary: Goricko trilateral protected area; the Mura River;
- Croatia: Zumberak - Gorjanci; the Kolpa River, the Drava/Mura Rivers;
- Italy: Karst area, Tarvisio area;
- ALPE-JADRAN, co-operation between Italy, Austria, Slovenia, Croatia.

Conclusion

In the short period of political changes occurring since 1991, Slovenia has been working on the establishment of sectoral policies. Agenda 21 (1992) and the PEBLDS (1995), are only two of the different initiatives which Slovenia has endorsed, thus supporting an integrated approach towards the conservation of biodiversity and sustainable use of its components. Slovenia is currently in the approximation process to the EU, and environmental issues are of critical importance. MOP includes conservation and sustainable use of biodiversity, along with waste treatment and water management, as priority areas of activity. Biodiversity is thus one of the key issues in building the environmental policies, and can provide a strong basis for sustainable development at the national level.

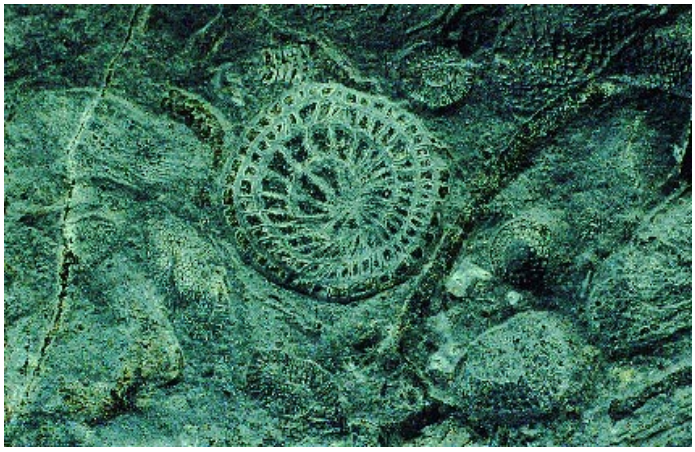


Plate 29-30:
Biotic and abiotic natural heritage are of equal importance for conservation of Slonenia's biological diversity: *Schwagerina carniolica* (26) and *Pulsatilla grandis* (27). (PS)

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Acronyms

ANC	State Authority for Nature Conservation
CBD	Convention on Biological Diversity
CHM	Clearing House Mechanism
CoE	Council of Europe
DOPPS	Bird Watching and Bird Study Association of Slovenia
ECE	Economic Commission for Europe
EIA	Environmental Impact Assessment
IBA	Important Bird Areas
IUCN	World Conservation Union
MKGP	Ministry of Agriculture, Forestry and Food
MOP	Ministry of the Environment and Physical Planning
NBS&AP	National Biodiversity Strategy and Action Plan
NEAP	National Environmental Action Programme
NFP	National Focal Points
NPVO	National Programme of Environmental Protection
PDS	Natural History Society
PEBLDS	the Pan-European Biological and Landscape Diversity Strategy
REC	Regional Environmental Centre
SPAMI	Specially Protected Areas of Mediterranean Importance
SSN	Slovenian Fund for Nature
ZGS	Slovenian Forestry Institute
WCMC	World Conservation and Monitoring Centre

Photographs were taken by Slovenian Agricultural Institute (KIS), Mihaela Cerne (MC); Peter Skoberne (PS) and Gordana Beltram (GB) at MOP-UVN; maps were provided by Geographic Institute at ZRC-SAZU.

Plate 1: Position of Slovenia in Europe.

Plate 2: Bio-geographic regions of Slovenia: the Alps (North), the Dinaric mountains (South), the Pannonian plain (East) and the Mediterranean basin (South-West). Source: Geographic Institute (ZRC-SAZU)

Plate 3: The area covered with forests exceeds 53 per cent of the surface area (Ibd.).

Plate 4: *Campanula zoysii* is one of the endemic plants of the South-East Alps (PS).

Plate 5: *Proteus anguinus,* which was discovered in Slovenia, is a subterranean species endemic to the Dinaric region (PS).

Plate 6: Up to 70 per cent of the agricultural land in Slovenia, classified as “less favoured areas”, belongs to the upland and mountain farms (PS).

Plate 7: *Trifolium inkarnatum* is a cultivar which has been produced by breeding with the autochthonous Slovenian material (KIS).

Plate 8: The tertiary hills in Eastern, Southern and Western part of Slovenia provide good growing conditions for wine production (GB).

Plate 9-11: The diversity of Slovenian landscapes from west to east: the coastal cliffs (PS), the karst poljes (GB), the Alps (PS) and the lowlands of the Panonnian plane (Plate 8).

Plate 12-14: Wetland dependent species (e.g., *Fritillaria meleagris,* different dragonfly species, amphibians - *Rana Temporaria*) are threatened due to land reclamation, drainage and constructions (PS).

Plate 15: Monoculture intensive crop production causes direct and indirect loss of biodiversity (PS).

Plate 16: Protecting caves and cave ecosystems is of critical importance due to increasing pressures to these ecosystems (PS).

Plate 17: The relatively large forest complex of Kocevje provides good habitat and shelter to large mammals like brown bear, lynx and wolf (PS).

Plate 18: Sustainable tourism development can be based on Slovenian local and natural characteristics (GB).

Plate 19: The village of Skocjan and Velika dolina in the Regional Park Skocjanske jame and an integral part of the World Heritage Site (1986) Skocjanske jame (PS).

Plate 20-21: Some information on existing and planned protected areas in Slovenia.

Plate 22: Lipicaner is an autochthonous horse bred in the stables of Lipica (PS).

Plate 23: Different accessions of lettuce developed with the native gene material (MC).

Plate 24: Some leaflets produced for information and raising public awareness.

Plate 25: Karst areas are sensitive to development pressures and close co-operation between different sectors is critical for conservation of biological and landscape diversity (GB).

Plate 26: NGOs can provide considerable help in implementation of biodiversity principles at the local level.

Plate 27-28: Development projects have to safeguard the Slovenian biodiversity (PS, KIS).

Plate 29-30: Biotic and abiotic natural heritage are of equal importance for conservation of Slonenia's biological diversity (PS): *Schwagerina carniolica* (26) and *Pulsatilla grandis* (27).

Fig. 1: Vascular plant species included in the national *Red Data List* according to the IUCN categories of threatened species (Wraber & Skoberne, 1989).

Fig. 2: Slovenian vertebrate taxa included in the national *Red Data List* according to the IUCN categories of threatened species (Vidic, 1992).

Fig. 3: A map of existing and planned protected areas in Slovenia which will cover up to 30 per cent of the territory.

Fig. 4: Main working groups involved in issues at different levels of biodiversity conservation and sustainable use of biological and landscape resources.

Fig. 5: Main working groups involved in issues at different levels of biodiversity conservation and sustainable use of biological and landscape resources.