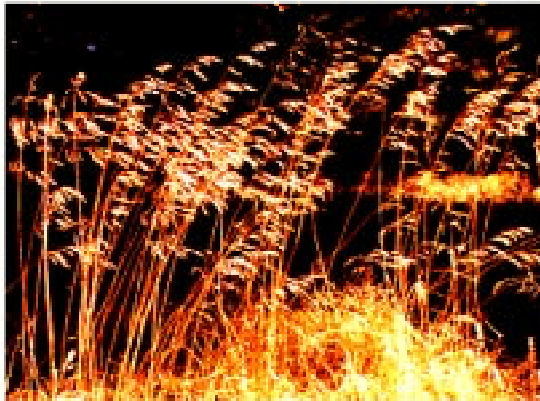


National Report of Switzerland for the Convention on Biological Diversity



BUWAL Bundesamt für Umwelt, Wald und Landschaft
OFEFP Office fédéral de l'environnement, des forêts et du paysage
UFAPP Ufficio federale dell'ambiente, delle foreste e del paesaggio
SAEFL Swiss Agency for the Environment, Forests and Landscape

National Report of Switzerland for the Convention on Biological Diversity
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*Hunting, pollution and watercourse
corrections led to the disappearance
of the otter (Lutra lutra)
from Switzerland in the 1980s.
Today, proper management of
watercourses on the Swiss Plateau
could allow it to be reintroduced.*

Foreword

News about the state of biological diversity is universally alarming. The destruction of the equatorial forests or the massacre of the last tigers are often mentioned, but this country is also concerned. We should remember that the otter disappeared from Switzerland at the beginning of the 1980s, and that ninety percent of Swiss wetlands have been destroyed over the last century? Our influence as an industrialised country and consumer of natural resources also extends far beyond our national boundaries. The extinction of species and the disappearance of ecosystems have taken place throughout the history of our planet. However, they have never before occurred on such a large scale, or been caused to such an extent by human activities.

The conclusion of the Framework Convention on Biological Diversity at Rio de Janeiro in 1992 constituted a major step forward for the conservation of the world's biological heritage. Each country, according to its means and its particular constraints recognised the importance of conservation and sustainable use, and committed itself to working in favour of biological diversity.

Five years after the Rio Conference, this report draws up a balance sheet of the actions and measures already applied or planned by Switzerland in the area of conservation and the sustainable use of biological and landscape diversity.

On reading it, you will notice the considerable number of steps already undertaken in the areas of agriculture, forestry, land-use planning and foreign policy, particularly through technical cooperation and other international processes. These efforts have already borne fruit, as many species and diverse natural environments are strictly protected while a large part of the population is aware of these issues. Nevertheless, we are far from achieving all of our objectives; numerous problems remain to be solved, and the necessity of the tasks to be undertaken is not yet universally acknowledged. The measures described in this report do not therefore represent an end in themselves, described to make us feel virtuous, but they are part of a continuous process aimed at achieving the desired objectives.

Philippe Roch

Director, Swiss Agency for the Environment, Forests and Landscape





The central chain of the Alps, with peaks over 4,000 m high and glaciers, separates the Mediterranean basin from Central Europe, and prevents the maritime influence of the Atlantic from affecting the climate of Eastern Europe.

Summary

Purpose of this report

The national report for the Convention on Biological Diversity takes stock of the implementation of the provisions of the Convention by Switzerland. It gives an initial account of the measures taken or planned in response to Switzerland's commitments to the Convention.

Switzerland commits itself to putting the Convention into practice

Switzerland has joined the international community in an effort to develop a binding instrument for the conservation and sustainable use of biological diversity, and to ensure that the benefits of biological diversity are shared. Switzerland ratified the Convention on 21 November 1994 and actively contributes to implementing it at various levels: nationally, regionally and internationally, particularly within the framework of the Pan-European Biological and Landscape Diversity Strategy and of the Bern Convention. The Convention on Biological Diversity anticipates financial commitment on the part of the industrialised countries, to allow developing countries to fulfil their obligations. Switzerland has been able to become substantially involved thanks to a credit line of Sfr. 300 million granted by the Swiss Federal Assembly in 1991. This grant has principally served the function of financing bilateral and multilateral programmes in developing countries, especially in the area of biological diversity. Other grants allow Switzerland to support several projects to conserve biological diversity in the countries of Central and Eastern Europe.

Situation of biological diversity in Switzerland

Switzerland occupies a central position in Europe. This particular geographical situation, the varied climatic conditions, the lay of the land, and the activities of man in the past have produced a multitude of different landscapes. From the low-lying flood plains to the snowy summits of the Alps, different ecosystems are arranged depending on the particular conditions of each region. The biological richness of the country is made up of 2,696 species of higher plants and ferns, 1,030 species of moss and about 2,000 species of lichen. In the animal kingdom (vertebrates and invertebrates), more than 20,000 have been described out of an estimated total of 40,000 species.

Between 33 and 95% of plant and animal species in Switzerland are considered to be rare or endangered (the percentage varies between taxonomic groups), and some have already disappeared. For cultivated plants, the use of a restricted number of high-yielding varieties has led to the progressive abandonment of traditional and rustic varieties. In spite of all efforts, the biological and landscape heritage of Switzerland is becoming still poorer because of the many kinds of pressure exerted by man on a restricted area which is densely populated and intensively exploited. Coordinated implementation of the measures described in this report is therefore essential, and must be continued and reinforced.

Conservation policy and the sustainable use of biological diversity in Switzerland

The Confederation provides sufficient legal foundation for satisfying national obligations in conservation and the sustainable use of biological diversity. Among Switzerland's many legal provisions, the most important are the Federal Law on the Protection of Nature and the Landscape of 1966 and the Law relating to Protection of the Environment of 1983, both of which have been periodically revised. Other important laws complete the legal framework, concerning in particular agriculture, forests, hunting and the protection of mammals and birds, fishing, lakes and watercourses and land-use planning. The federal system implies concerted action by the Confederation, the cantons and the municipalities in matters relating to the conservation of biological diversity.

Non-governmental organisations are increasingly involved in the conservation of biological diversity through programmes involving almost all sectors of economic life. They are seen as partners with a recognised role in the public interest, and they participate in the appropriate application of laws, making use where necessary of their right of appeal.

Principal instruments

The creation of nature reserves was the principal initial measure for the conservation of biological diversity. Later, the natural landscapes and biotopes of national interest were inventoried and protected by specific measures. At the same time, the Confederation integrated the requirement of conserving biological and landscape diversity into the way its work is to be carried out (construction, concessions, subsidies, etc.). Finally, the concepts of restoring endangered ecosystems and revitalising damaged areas were integrated into the legislation. Efforts were also directed to delimiting reserves for fauna, studying the distribution of plants and animals, and establishing red lists. The most recent measures taken concern monitoring biological diversity and evaluating the efficacy of protection measures.

At the same time, activities in various sectors, such as land-use planning, agriculture, silviculture and tourism, have been progressively integrated into resolving problems of protection and conservation. The concept of ecological compensation has also been applied within agricultural policy since 1993. An Environmental Impact Assessment is obligatory for any project which has an effect on land or the environment. It is intended that all sectors of activity of the Confederation which have an effect on land will coordinate their actions within the scope of the Swiss Landscape Concept, the national strategy coordinating the conservation and sustainable use of biological and landscape diversity.



The undulating countryside of the Swiss Plateau is transected by rivers which arise in the Alps, and it has the highest concentration of land suitable for farming, most of the urban areas, and a large proportion of Swiss economic activity.

The heart of the Alps is made up of many magnificent landscapes.



The Plateau, with intensive agriculture and silviculture.



The Jura chain with its vast meadows, which have greatly increased over the centuries at the expense of the forests.



1. Introduction

The present report evaluates the implementation of the stipulations of the Convention in Switzerland. It draws up a first balance-sheet of measures taken or planned in response to the commitments of Switzerland towards the Convention.

The conservation and sustainable use of biological diversity are of great importance for Switzerland and have for a number of years been taken into account, at the national level, and in international activities. Switzerland is situated geographically at the crossroads of Europe for biological exchanges, and has a long tradition in the conservation of biological and landscape diversity (such as the creation of the first national park in Europe in 1914). As an industrialised country consuming natural resources from all over the world, Switzerland has particularly developed economic activities based on the use of biological resources, such as the food-processing and pharmaceutical industries. For these reasons Switzerland is committed to showing solidarity with the international community.

1.1 Biological and landscape diversity in Switzerland

The Swiss Alps dominate Europe hydrographically and can be seen as a sort of water-tower. They act as a barrier and as networks for biological exchanges, and they create marked climatic distinction, separating the Mediterranean basin from Central Europe, and preventing an influence of the Atlantic on the climate of Eastern Europe. Furthermore, the Alps have served as a refuge for numerous species of arctic flora which survived climatic warming following the last ice age. Switzerland is divided into three large natural regions: the alpine chain with partly glaciated summits; the Plateau, a vast undulating plain with a mosaic of cultivated land and wooded strips; and in the west, the Jura chain with a series of hilltops which are mostly wooded. Each of these three natural regions has a multitude of different landscapes. Their diversity can be explained by the range of climatic factors influenced by the relief. In addition to these natural factors human beings have played a part over the ages, and progressively modelled the landscape according to their wishes and modes of land-use. Two regions are distinguished by their particular biological diversity: the Rhone valley, at the heart of the Alps, with its hot and arid climate, where being landlocked has created an environment rich in species, and the Ticino, on the southern side of the Alps, which has many species typical of region, influenced by a submediterranean (insubrian) climate.

In the absence of human influence, Switzerland below the alpine level would be made up almost entirely of forests and wetlands, with the exception of xeric areas in the alpine valleys and at the foot of the Jura. In the course of the centuries a varied landscape has appeared, rich in microstructures. Agro-pastoral activity, based on the extensive exploitation of natural resources, has created

many biotopes, such as straw meadows and dry grasslands, which support a diversity of animal and plant species with a range of ecological needs. Switzerland has 2.700 species of vascular plants, of which two are endemic: *Draba ladina* and *Artemisia nivalis*. The Swiss bryophyte flora is particularly rich: of the 1,600 species of moss and liverwort in Europe, about two thirds are found in Switzerland. 412 species of lichen have been inventoried in Switzerland and it is estimated there are about 10.000 animal species, of which only 1% are vertebrates.

1.2 Biological diversity in danger

The progressive disappearance of the varied rural landscape began towards the end of the last century. The construction of infrastructures (roads, dams, etc.), the extension of residential and industrial zones, and intensive farming, have all affected a great number of natural habitats, leading to a decline in flora and fauna. Agricultural development has destroyed many biotopes and deprived the landscape of its variety by channelling rivers, draining marshland, and removing hedges and copses. The biological diversity of fresh-water ecosystems was considerably affected by eutrophication before wastewater treatment plants were constructed. Uniform forests often replaced natural woodlands containing a variety of ages and species. Agriculture, which has fashioned the landscape over the course of time, has experienced changes in methods of production, leading to the use of a restricted number of cultivated varieties and strains of stock animals. Many species which were once very common and had substantial populations, have now disappeared from the forests and the intensively exploited agricultural landscape, unable to survive except on the margins. These margins are fragmented, further and further separated from each other, and subject to increasing pressure.

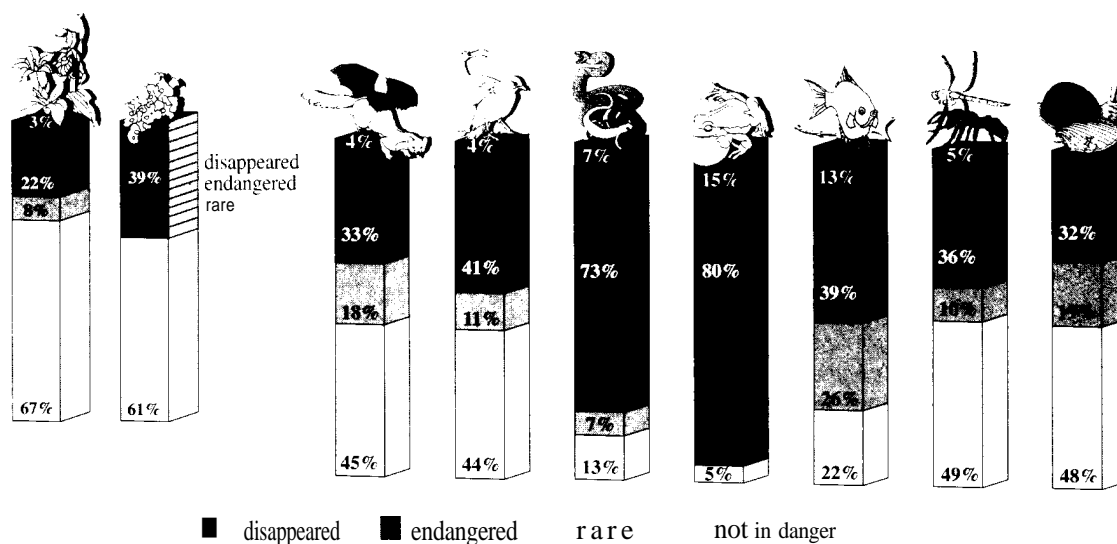
According to the most recent statistics, one square metre of agricultural or natural land disappears every second in Switzerland, to be replaced by urban development. Since the middle of the last century, almost 90 per cent of habitats with a great value and richness of species have disappeared. This phenomenon continues today: the development of urban zones and infrastructures always requires more space, while the intensifying exploitation of natural habitats leads to an impoverishment of biological diversity. Between 33 and 95 % of plant and

Situation of the principal Swiss ecosystems

- Since 1800, about 90% of Swiss wetlands have disappeared.
- Similarly, it is estimated that the area of flood plains has been reduced by 90%. Only 20% of the flood plains which are left can still be considered active.
- The decrease in area of dry and semi-dry grasslands since 1945 is estimated at more than 90%.
- More than three quarters of all standard orchards have disappeared within the last 40 years.
- In the Canton of Bern, more than half of the small streams have been channelled into underground pipes during of the last 100 years.
- The percentage of non-exploited forests on the Plateau has been about 7% for 50 years. 81% of the Plateau's forests are tall trees; spruces form 39% of woodlands on the Plateau and have often replaced broad-leaved trees.

animal species (depending on the taxonomic group) are considered rare or endangered, or have already become extinct in Switzerland. Recent changes are worrying, with the number of endangered species rising: in 1977 42% of nesting birds were endangered, and this rose to 46% in 1982 and to 58% in 1991. We should note that it is not only that the diversity of species has declined dramatically, but also the size and the distribution of the populations have been adversely affected.

Species of animal and plant endangered in Switzerland



Source: SAEFL 1994

Examples of changes to the Swiss landscape (total area of Switzerland is 42,000 km²)

Components of the landscape	annual change (rounded up), for the periods	
	1972-1983	1984-1995X
Urban areas	+ 1.356 ha	+ 1,827 ha
Buildings outside urban areas	+ 1600	--
Regional communications networks	+ 510 km	--
Local communications networks	+ 1,140 km	--
Watercourses in the open air	- 70 km	- 30 km
Orchards	- 480 ha	--
Forest	+ 1.128 ha	--

Source: SAEFL 1994 /*SAEFL 1997 partial provisional data for 1984-1995.

For cultivated plants, the use of a restricted number of high-yielding varieties has led to the progressive abandonment of ancient traditional varieties and the disappearance of some. This situation applies particularly to domestic animals. While a certain number of varieties are preserved in gene banks or in collections, the conditions of their maintenance and use *in situ* must be further strengthened. Otherwise, the deliberate or accidental introduction of exotic species, animal or plant, will endanger the genetic basis of wild indigenous species.

Estimation of fruit varieties present in Switzerland and their degree of security

Species	Total number	Vars of local origin	Local vars secure*
Apple	1,200	700	15%
Pear	600	3.50	12%
Cherry	900	650	9%
Plum	220	80	1.5%
Walnut	250	200	3%
Chestnut	130	80	5%

* secure = present in at least 5 different locations

Source: R. Corbaz, Fructus 1997

People must be made aware of what is at stake in the conservation of biological diversity. Society still considers natural resources to be available for use at will. Short-term profit is often favoured, to the detriment of the general interest in the long term. Because of immediate economic difficulties, priorities are changed, delaying the integration of the Convention's principles into political action, while budgetary restrictions hinder the implementation of planned programmes. Legal provisions are sufficient but their application could be improved. Finally, it is not enough to have a well-established policy on conservation of biological and landscape diversity if this is confined to its traditional limits. On the contrary, its integration into diverse political sectors should be reinforced: several of these have a considerable influence on biological diversity.

Examples of factors transforming the landscape, and having different origins and negative effects on biological diversity

- intensification of agriculture
- loss of agriculture, abandonment
- urbanisation
- standardisation of building codes (uniform architecture and materials)
- development of infrastructure, increase in traffic
- degradation of the environment (erosion, pollution of air, water, etc.)
- development of tourism and leisure
- use of raw materials, mining
- watercourse corrections, dams

1.3 Implementing the Convention: the existing legal framework

Efforts to regulate the use of natural resources led to a Federal Law on Forests which came into force in 1902, aimed at preventing deforestation, which had become excessive. The Swiss National Park was created in the Grisons in 1914, thus becoming the first national park in Europe. In the 1960s, Switzerland produced a Federal Law on the Protection of Nature and the Landscape.

The strategy to protect biological and landscape diversity first centred around the conservation and maintenance of nature reserves, biotopes and valuable landscapes. The results now show that protection targeted only to specific places is not enough. Humans exert many kinds of pressure on the natural environment, and effective conservation of biological diversity requires new strategies.

Switzerland has a policy for the conservation of biological and landscape diversity which is well established on a legislative level. The country is committed to integrating and coordinating legislative principles and the numerous instruments which exist in sector-based policies. The Confederation focuses its work on the implementation of a coordinating plan, the Swiss Landscape Concept. Its goal is to integrate the principles of conservation and the sustainable use of biological and landscape diversity into different sectors of activity. The Swiss Landscape Concept is a precise response to article 6b of the Convention, and to the objectives of the Pan-European Biological and Landscape Diversity Strategy.

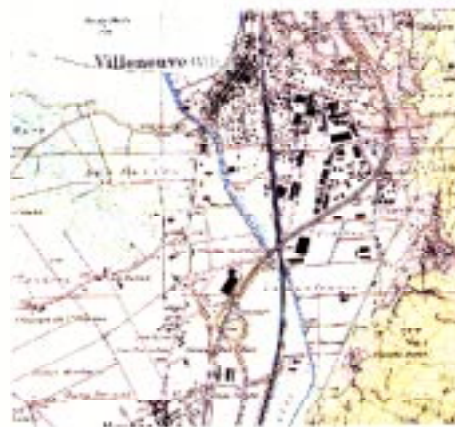
Article 6 of the Convention on Biological Diversity

Each Contracting Party shall, in accordance with its particular conditions and capabilities:

- a) Develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity or adapt for this purpose existing strategies, plans or programmes which shall reflect, inter alia, the measures set out in this Convention relevant to the Contracting Party concerned;
- b) Integrate, as far as possible and as appropriate, the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes and policies.



Map scale 1:25,000 / 1999



Map scale 1:25,000 / 1982

Topographical maps can show changes in the landscape over time. The construction of motorways, the extension of industrial areas, the enlargement of areas of habitation and the draining of the marshland all testify to the pressures of urbanisation and human activity on nature and the landscape.

The diversity of flora and fauna of the meadows is diminished in intensively cultivated landscapes.



This butterfly (Parnassius apollus) has been hunted by collectors. In general, the decrease in the butterfly population of Switzerland is due principally to the disappearance of habitats necessary for their survival.



2. Swiss policy on the conservation and sustainable use of biological diversity

A number of legislative provisions respond to the main aspects of the Convention. Developed within the framework of the Swiss federal system, they have allowed a series of application instruments to be established which are not simply a matter of satisfying legal obligations but also provide incentives, coordination and planning.

2.1 legal framework

Ratified by Switzerland in November 1994, the Convention on Biological Diversity came into force in February 1995.

In legislation, particularly that based on article 24 sexies of the Federal **Constitution**, Switzerland has already made numerous provisions for the conservation and sustainable use of biological diversity.

- **The Federal Law on the Protection of Nature and the Landscape** (1966) aims to preserve indigenous animal and plant species, biotopes and landscapes. It also defines in legal terms the establishment of measures for ecological compensation in regions which have been intensively exploited. It guarantees the right of appeal to non-governmental organisations concerned with the protection of nature. Various ordinances augment the Law: an administrative ordinance on protected species, on the protection of biotopes, on the protection of landscapes, etc.

- **The Federal Law relating to the Protection of the Environment** (1983) aims to protect humans, animals and plants, their biocenoses and their biotopes. These elements encompass biological diversity in the broad sense. This law imposes the requirement for an Environmental Impact Assessment for construction, land use management, and transformations which may affect the environment, including nature and landscape. It also regulates the import, commercialisation and use of genetically modified material.

- **The Federal Law on Forests** (1991) aims to conserve the forests in terms of their area, as natural habitats. It assigns them protective, social and economic functions. It encourages methods of exploitation which respect the composition and natural structure of the forest, and anticipates the creation of forest reserves in order to maintain the diversity of flora, fauna and landscape.

- **The Federal Law on Agriculture.** According to the Constitution, agriculture must be carried out according to the principles of sustainable development and must, among other things, maintain the life support system and the landscape. The Federal Law on Agriculture contributes to conserving the diversity of ecosystems and the quality of the environment. The law allows financial support to be granted for conservation and to create areas of ecological compensation. It supports integrated production and organic culture. In general, the law on



In the mountains, rivers and flood plains have only been straightened and channelled to a small extent. However, some of the water is used to generate hydro-electric power.

agriculture aims to maintain agricultural biological diversity by supporting research, training and advisory services, and by making regulations relating to production.

Switzerland is currently working out a new law on agriculture ("Agricultural Policy 2002"), which continues the reform of agriculture already in progress. It will give a new orientation to agricultural policy, adapted to the liberalisation of the markets and to the requirements of ecology and sustainable production, particularly separating policy on prices from that on income, and confirming direct payment to farmers for ecological performance.

• **The Federal Law on Hunting and on the Protection of Mammals and Wild Birds** (1986) and the **Federal Law on Fishing** (1991) both aim to conserve species and their habitats. In particular, the law on hunting establishes vast reserves for animals and their habitats.

• **The Federal Law on Water Pollution Control** (1991) aims to preserve the waters from damage, to ensure an adequate flow, and to re-establish the rivers and streams as natural habitats for flora and fauna and as components of the landscape. The **Federal Law on the Management of Watercourses** (1991) completes the provisions for revitalising waterways, in particular by establishing the principle of natural management.

• **The Federal Law on Land-Use Planning** (1979) gives the cantons the responsibility for coordinating land use. Land-use plans must take into account the protection of nature and the landscape. This law anticipates the definition of protected zones, in particular watercourses, lakes, landscapes of special beauty, great ecological or cultural importance, natural and historic monuments, and the biotopes of plants and animals which it is worth protecting.

2.2 Principles of federalism in the implementation of legislation

In Switzerland there are activities promoting the conservation of biological and landscape diversity at all levels of the federal state:

- **The Confederation** sets the framework of principles by means of Federal laws and ordinances.
- **The Cantons** (federal states) organise the implementation of protection and enact legislation applicable to their territory.
- **The municipalities** implement cantonal provisions on the ground, for example by promulgating regulations on protection or by creating nature reserves.

Illustration of the federalist principle in distributing the responsibilities for nature protection

Protection of Swiss fens

1. The **Confederation** draws up an inventory which identifies fens of national importance. It supports the cantons financially in carrying out this protection. In this way it respects the legislative provisions adopted by the population concerning the protection of biotopes.
2. The **cantons** put the protection of fens of national importance into practice, and take account of them when making plans for land use. They draw up plans for their protection and maintenance. The cantons are responsible for protecting fens of regional and local importance.
3. The **municipalities** and private persons implement the actual protection of the fens. The proprietors of fens commit themselves by private legal contracts to exploit the fens in accordance with the established objectives of protection. In exchange they receive subsidies from the Confederation and the cantons.

2.3 Principal instruments for the conservation and sustainable use of biological and landscape diversity

Switzerland has a wide range of instruments for the conservation and sustainable use of biological diversity.

2.3.1 Protection of biotopes, landscape and species

• **Inventories and ordinances of protection**

In accordance with the Federal Law on the Protection of Nature and Landscape, the Confederation can designate biotopes and landscapes of national importance and make provisions for their protection. To do this, inventories of the principal objects of national importance for conservation have been drawn up (e.g. an inventory of the peat bogs). Federal ordinances ensure the legal validity of the inventories. The cantons are responsible for the protection of objects of regional and local importance.

• **Swiss fund for landscape**

This fund, endowed with Sfr. 50 million, was created in 1991 at the initiative of the Swiss Federal Assembly to commemorate the 700th anniversary of the Confederation. Its objective is to contribute to the conservation of traditional rural landscapes, and to safeguard ancient methods of exploitation, cultural heritage and natural landscapes.

- **Red lists**

The Confederation has drawn up Red lists of animal and plant species which are endangered. Certain species are directly protected by the administrative ordinance of the Law on the Protection of Nature and the Landscape, others indirectly as biotopes or species on the Red lists must be protected in accordance with the law.

- **Specific programmes of conservation and of reintroduction of species**

Diverse programmes are in progress for ensuring the conservation of rare or endangered species, particularly by means of the implementation of the Bern Convention, in collaboration with NGOs. In accordance with the laws on the protection of nature and the landscape, and on hunting, the Confederation has placed under protection large areas for the conservation of game and waterfowl and migratory birds.

2.3.2 Coordination and planning

- **Land management**

In accordance with the law on land management, the Cantons draw up land-use plans which allow land use to be managed rationally, taking account of the requirements of protection and sustainable development.

- **Forestry planning**

Forestry planning allows the functions assigned to each area of forest to be defined. The conservation of the biological diversity of the forest is an objective to be taken into account when drawing up plans, in parallel with sustainable production and the forest's protective functions. The new law on forests allows the designation of complete forest reserves and the reparation of authorised damage such as clearing, through both quantitative measures (compensatory afforestation) and qualitative measures (restoration of biotopes).

- **National plan of action for the conservation and sustainable use of phylogenetic resources for food and agriculture**

This plan of action, approved by the Federal Council, defines a range of measures which should allow the conservation of existing phylogenetic resources, to ensure a national heritage, to contribute to the security of the world food supply and to respond to ever-increasing consumer demands.

- **Platform on ecological compensation**

The national platform on ecological compensation is composed of scientific experts and representatives of circles concerned with the protection of nature and of agriculture, who are put in charge of exchanging information and coordinating Swiss work on ecological compensation.

- **Swiss Landscape Concept (SLC): coordinated strategy for the conservation and sustainable use of biological and landscape diversity**

At the end of 1989, the Confederation gave SAEFL responsibility for devising a plan for the Swiss landscape. A plan, in the sense of the Federal Law on Land-Use Planning, is an instrument which enables the Confederation to coordinate activities with effects on the countryside. The SLC aims to coordinate all the sector-based policies which have a bearing on the conservation and sustainable use of biological and landscape diversity, for example the management of waterways, agriculture, traffic, etc.. Based on the principle of partnership, this process relies on collaboration between all interested parties: users, protectors,



authorities, and the general population. The SLC has been the subject of broad consultation with the offices and agencies of the Confederation, the cantons, various associations and non-governmental organisations, and groups within the economy and political parties.

Building and developments which affect landscapes or sensitive natural habitats are subject to an Environmental Impact Assessment.

2.3.3 Quality control and guidelines for projects

• Environmental impact assessment

Carrying out an impact assessment is obligatory for all projects which have an effect on land and the environment (roads, railways, ports, airports, pipelines and cables, gravel pits, quarries, construction of housing developments, etc.). The effects have to be evaluated before planning permission can be granted by the competent authority. The impact assessment involves several topics, including the protection of nature and the landscape, cultural heritage, air pollution abatement, noise abatement, the protection of soil and water, waste and toxic substances.

• The Confederation's tasks

The Confederation is committed, in accordance with the Federal Law on the Protection of Nature and the Landscape (Art. 3), to carry out its tasks (construction, granting concessions, subsidies, etc.) with due respect for biological and landscape diversity. All projects with federal involvement must satisfy these conditions. The costs inherent in providing protective measures are an integral part of the projects. SAEFL is responsible for monitoring the proper implementation of these provisions. Projects from other services of the Confederation are subject to an internal consultation procedure.

• Guidelines and recommendations made by the Confederation

The Confederation and the cantons draw up recommendations and guidelines on the way to carry out land-use planning and management, taking account of the need to ensure the protection and sustainable management of natural and landscape resources.

Examples of federal guidelines and recommendations for nature and landscape protection

- **Roads:** “Mesures de protection des sites et des paysages nécessitées par le trafic routier. Instructions.” (OFC / OFR / OFEFP 1995). (Protective measures for sites and landscape necessitated by road traffic. Instructions)
- **Forestry:** “Protection de la nature et du paysage dans les projets forestiers. Directives et recommandations” (OFEFP 1987) (Nature and landscape protection in forestry projects. Guidelines and recommendations)
- **Agriculture:** “Protection de la nature et du paysage lors d'améliorations foncières. Guide et recommandations” (OFEFP/OFAG 1983) (Nature and landscape protection during land improvements. Guide and recommendations)
- **Energy:** “Transport de l'énergie électrique et protection du paysage. Directives” (DFI 1980) (Distribution of electricity and landscape protection. Guidelines)
- **Tourism, leisure:** “Modification du paysage en faveur de la pratique du ski. Directives pour la protection de la nature et du paysage” (DFI 1991) (Modification of the landscape for skiing. Guidelines for the protection of nature and the landscape)

2.3.4 Incentives

• Direct payments to farmers for ecological compensation

Since 1993, an incentive policy combined with a financial instrument have been applied in agriculture, allowing contracts for farming which is in favour of the protection of nature and the landscape to be established, particularly through “ecological compensation” programmes. Farmers can voluntarily designate areas of land to be managed in particular ways (extensive meadows, conservation of standard fruit trees, etc.), and for which they receive an annual amount of money determined according to a scale.

2.3.5 Monitoring and evaluation, databases, research

• Monitoring of biological diversity

The Swiss Agency for the Environment, Forests and Landscape (SAEFL) is currently developing a programme to follow biological diversity as a function of time. In particular, it will allow appropriate changes to policy on the conservation and the sustainable use of biological diversity to be made in a timely, soundly-based manner. This process is in line with the international programmes and pursues the same objectives.

• Follow-up to the federal inventories of biotopes and landscapes

Once the objects of national importance have been designated and their levels protection have been defined, it is necessary to ensure that these measures are effective, especially in view of the resources involved. To do this, Switzerland has a follow-up programme which establishes whether protection is effective, and if necessary enables developments which are judged unfavourable to be put right. The follow-up enables one to check for example, whether the area of marshland noted in the inventory and its ecological value are being maintained and whether the measures taken have had the desired results.



- **National databases of flora and fauna**

Several centres of coordination are responsible for managing data on biological diversity. These centres are usually semi-private institutions supported by the Confederation, the cantons and NGOs. Some of these centres concentrate on fauna (invertebrates, mammals, amphibians, Chiroptera) and others on wild or cultivated flora. They stimulate applied research, participate in the development of instruments of protection (Red lists), and supply data for monitoring biological diversity.

The planting and maintenance of hedgerows is an important ecological compensation measure in agricultural areas.

- **Evaluation of ecological compensation in agriculture**

Measures concerning ecological compensation in agriculture are the subject of an evaluation by the Federal Office of Agriculture. This is on three levels: analysis of the degree of participation; analyses at particular points (change in local flora or fauna with time); sector-based analyses (changes in national flora or fauna with time).

- **Research**

The Confederation has implemented a **Priority Programme for Environmental Technology and Research**, containing a module of **research on biological diversity** with several universities and research institutes collaborating. Many projects related to biological diversity are also being conducted in universities with support from the Swiss National Science Foundation.



A bilateral cooperative effort has been established to protect the river Doubs in the Jura, on the Franco-Swiss border.

2.3.6 Activities of non-governmental organisations

Non-governmental organisations have for a long time played an important part in the area of nature and the environment. In addition to numerous past actions, such as the creation of the National Park in 1914, they continue to contribute significantly to the conservation of biological diversity. They manage hundreds of nature reserves and monitor the proper implementation of legislation, making use if necessary of their right of appeal. With their membership of about half a million, they have implemented many programmes for biodiversity conservation in Switzerland and abroad: protection of species, protection of ecosystems, and action in favour of sustainable development. They also work to increase public awareness of these issues.

2.4 International commitment

The Swiss policy on the conservation and sustainable use of biological diversity can also be seen through the many ways in which Switzerland is committed at the international level.

Switzerland has contributed to the process of preparing the Convention from the outset and continues to contribute at the international level to achieving its different objectives. Switzerland is also committed to biological diversity through the ministerial process "Environment for Europe", which is intended to reinforce

the implementation of the Pan-European Biological and Landscape Diversity Strategy, the regional Pan-European framework of the Convention on Biological Diversity.

To support the programmes and multilateral and bilateral projects in developing countries in favour of the global environment, Switzerland agreed a credit line of Sfr. 300 million in addition to development aid. A substantial part of this credit is to finance bilateral and multilateral projects on biological diversity. In the same way, Switzerland contributes significantly to the Global Environment Facility (GEF), the financial mechanism of the Convention. Further, in addition to supplementary credits granted by the Swiss Federal Council to Central and Eastern European countries, since 1990 Switzerland has supported several programmes and projects in favour of the environment and of conservation and the sustainable use of biological diversity in these countries.

Chapter 4.5 describes the nature and the importance of the principal Swiss activities at an international level, through numerous processes, agreements and conventions, in technical cooperation and in transboundary coordination.

2.5 Institutional responsibilities and collaboration

The Swiss Agency for the Environment, Forests and Landscape (SAEFL) is the principal institution responsible for implementing the Convention at national and international level. SAEFL collaborates with the cantons and with NGOs.

For international questions and the follow-up to multilateral processes, SAEFL collaborates with other concerned offices, in particular with the Swiss Agency for Development and Cooperation (SDC) and the Federal Office for Foreign Economic Affairs (FOFEA). The SDC is responsible for implementing a large number of projects and programmes of cooperation concerning biological diversity in developing countries and in Central and Eastern Europe. The SAEFL is also closely associated with bilateral and multilateral projects on the conservation of biological diversity. The FOFEA is principally responsible for financial cooperation at the international level. It also finances projects for the conservation and the sustainable use of biological diversity, especially relating to tropical hard-woods.

In 1993, the Federal Council set up an interdepartmental committee to follow up on the agreements of the Rio Conference. This committee makes proposals on how to integrate the commitment made by Switzerland at the Rio Summit to implement the principles of sustainable development. The key themes, such as biological diversity are considered by *ad hoc* groups in which the Federal administration and representatives of civil society organisations (NGOs, industry, academia) participate. The interdisciplinary group responsible for biological diversity concentrates on evaluating the Confederation's tasks and proposing measures to implement the Convention nationally and internationally.



As a result of the range of different structures of which traditional rural landscapes are made up, they encourage biological diversity.

3. Objectives

Switzerland's objectives for conservation and the sustainable use of biological and landscape diversity have been defined according to the legislation which is already in force, the state of biological diversity, and also as a function of normal Swiss political mechanisms. The fundamental principles and objectives which have been established imply a coordinated approach to conservation and sustainable development, implemented through the overall management of biological and landscape diversity throughout Switzerland, and the integration of these concepts into all important sectors.

3.1 Guidelines and principles of action

The Federal Council clearly underlined the importance of commitments made at the Rio Summit in its Guidelines North-South of 1994: "The consumption and overexploitation of natural resources by industrialised countries bears a large part of the responsibility for damage to the environment. This cannot provide a model for developing countries, for this reason Switzerland must also make a contribution to sustainable development at home".

Three **guidelines** influence the actions Switzerland is taking to manage biological and landscape diversity: **preservation**, **enhancement**, and **sustainable use**.

Preservation. This implies the protection and maintenance of rare habitats of great value, including traditional and cultural landscapes. A functional ecological network is essential to maintain biological and landscape diversity.

Enhancement. This principle is especially important on the Swiss Plateau and in built-up areas where landscapes have been exploited intensively, have lost their variety, and have become impoverished from the biological point of view. Regions which are ecologically poor must be enhanced, using existing components of the landscape and nature, or by creating them.

Sustainable use. The ability of biological diversity resources to generate must be maintained and encouraged, preserving the normal function of ecosystems and adapting the way they are used to specific local conditions. This principle particularly applies to water resources, forestry and agriculture. Nonrenewable resources should be used sparingly and renewable replacements should be sought.

The implementation of these guidelines is based on the following **principles of action**:

- **Cooperation between partners.** Sustainable development requires the collaboration of everyone for its incorporation into all sectors concerned .
- **New alliances.** The changes in society, the economy and the markets must be turned to good use to set up collaborations to benefit biological diversity, whether it be through agriculture, industry or services.
- **Principle of subsidiarity.** The tasks must be accomplished at the appropriate level. In Switzerland the cantonal and municipal authorities are responsible for implementing the conservation of biological diversity, on their own initiative or through delegation.
- **Principle of prevention.** This principle is one of the foundations of environmental law. It aims to integrate the interests of biological and landscape diversity into all projects.
- **Principle of causality.** Those responsible for an accident must take responsibility for the consequences. The internalisation of costs shows real prices so that an accurate evaluation can be made. Whenever an alteration is inevitable, corresponding compensatory measures should be taken.
- **Information / training / education.** Realisation of the significance of biological diversity by society as a whole is a key condition for sustainable development.
- **International cooperation.** Only international coordination can allow us to appreciate and serve global interests in the conservation of biological diversity.

A new alliance: the *Fondation* for Nature and the Economy

The Foundation for Nature and the Economy was launched on the occasion of European Conservation Year in 1995. Its aim is to reinforce partnership with economic circles, to favour conservation and the enhancement of biological diversity on industrial sites. It results from a collaboration between the major economic organisations, particularly the Swiss Association for Sand and Gravel and the Association of the Swiss Gas Industry, with SAEFL. Considering the great ecological potential of industrial sites and the large number of endangered species which find refuge there, private enterprises are encouraged to make their sites more natural. A label is given to enterprises which satisfy the required criteria, in particular that a minimum of 30% of the area they manage should approach a natural state, there should be infiltration of rain water, plant species indigenous at the time of plantation should be retained, etc.

3.2 Objectives at the national level

The Confederation's activities that affect the land are guided by a set of general objectives relating to conservation and the sustainable use of biological diversity. They have been defined in the Swiss Landscape Concept and can be divided into the objectives concerning the quality of nature and landscape and the objectives relating to sustainable development.

Objectives concerning the quality of nature and landscape

- *To safeguard the diversity, the beauty and the unique features of landscapes and components of natural landscapes.*

- *To set areas aside for the dynamics of natural phenomena.*
- *To guarantee the existence of biotopes to maintain the whole diversity of indigenous flora and fauna. To enhance and reconstitute networks of natural and semi-natural habitats rich in biodiversity.*
- *To safeguard particularly beautiful or rare traditional rural landscapes; to conserve sites, monuments and built-up areas of historic or cultural importance in appropriate surroundings.*

Objectives relating to sustainable development

- *To preserve renewable resources; to encourage their regeneration and their use adapted to local conditions.*
- *To conserve nonrenewable resources and components of the landscape.*
- *To safeguard and promote diversified forms of land use.*
- *To enhance intensively used urban and agricultural landscapes to increase their ecological potential and the quality of life.*

The Law on the Protection of Nature aims to integrate the interests of **biological** diversity into the sector-based policies of the Confederation. Further details are given in Chapter 4.

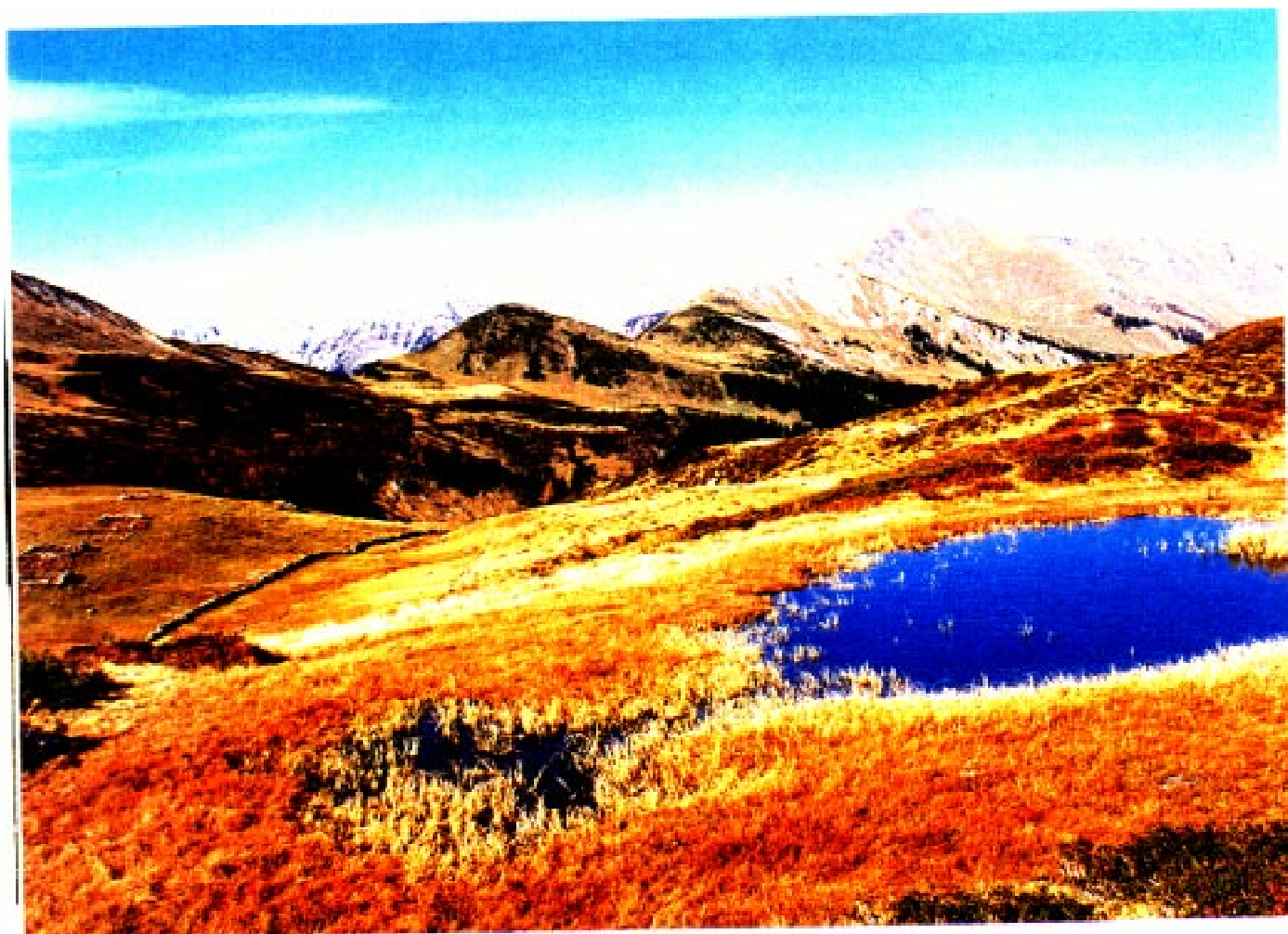
Sector-based policies under federal control which affect the conservation and sustainable use of biological diversity

- | | |
|---|---------------------------|
| • Federal building | • Defence |
| • Energy and use of hydraulic energy | • Management of waterways |
| • Leisure and tourism | • Regional development |
| • Agriculture | • Forests |
| • Protection of nature, landscape and cultural heritage | • Land-use planning |
| • Transport and civil aviation | |

3.3 Objectives of international policy and cooperation

The conservation and sustainable use of biological diversity will affect areas such as agriculture, silviculture and economic policy. Within the framework of the Convention and other international fora, Switzerland wishes to promote partnership, reinforcing synergy between the many instruments and institutions concerned with the conservation and sustainable use of biological diversity in the different sectors of economic activity. At a regional level Switzerland is particularly committed that the Pan-European Biological and Landscape Diversity Strategy should set as a priority the integration of the interests of biological diversity into the sector-based policies.

Under the aegis of the Swiss Agency for Development and Cooperation (SDC) and the Federal Office for Foreign Economic Affairs (FOFEA). Switzerland has drawn up a strategy and an environmental programme to integrate environmental concerns into all levels of cooperation in development. The primary goal is to support developing countries and those of Central and Eastern Europe, taking care to ensure the sustainable management of the natural environment and helping to prevent or solve global environmental problems. Whilst benefiting the local population, the projects should have a positive effect on policy concerning the natural environment, and should be incorporated into national or international plans.



The Pirene, the height of which may exceed 2,000 m, have largely been cleared of trees for the creation of pastures. Today, extensive (ie. non-intensive) land use allows the conservation of biological diversity.

4. Strategies, measures and activities

This chapter presents the principal sector-based policies of the Confederation in terms of objectives and measures in favour of conservation and the sustainable use of biological diversity. It also covers the activities of the Cantons and other areas such as education, information, research and international activities.

4.1 Implementation of the Convention in the principal areas of sector-based policy

4.1.1 Protection of nature and the landscape

The Swiss Agency for the Environment, Forests and Landscape (SAEFL), in collaboration with the cantons, is responsible for the application of this policy. The current situation presents some contrasts, since the instruments of protection have helped to preserve biotopes and landscapes of national importance, while in other respects, particularly in the agricultural zone and in urban regions, the situation has deteriorated to a certain extent. The work in progress consists of linking natural habitats together, evaluating the results of protecting biotopes and nationally important landscapes, and instituting global monitoring of biological diversity.

Objectives concerning the protection of nature, landscape and heritage

- *To reduce the red lists by 1% each year; no additional species should be added; and the populations of scattered species must not decrease.*
- *To complete and connect the mosaic of nationally important biotopes over a period of 10 years. To preserve the unity of landscapes which have a network of intact biotopes.*
- *To create wilderness areas.*
- *To institute and perfect systems that encourage the sustainable management of natural resources and landscapes.*
- *To establish a system to evaluate the efficacy of measures to protect and improve biological and landscape diversity.*

To achieve these objectives, the Confederation has defined a programme of measures and activities, some of which are already operational or are being implemented. The main points are presented below.

• Inventories of biotopes and landscapes

The biotopes and landscapes in the inventories of the Confederation are protected by law. The principal types of habitat are, or are in the process of being, protected by Federal ordinances.

Inventories and red lists existing or in preparation

• Federal Inventories in force (where legislation already exists)

- Federal Inventory of Peat Bogs and Transitional Marshes
- Federal Inventory of Fenlands of National Importance
- Federal Inventory of Flood Plains of National Importance
- Federal Inventory of Mire Landscapes of Particular Beauty and National Importance
- Inventory of Waterfowl and Migratory Birds of International and National Importance
- Federal Inventory of Game Reserves
- Swiss wetlands, in the sense of the Ramsar Convention
- Swiss biogenetic reserves of the Council of Europe
- Federal Inventory of Landscapes and Natural Monuments of National Importance

• Federal Inventories in preparation (where legislation already exists)

- Inventory of sites of reproduction of amphibians of national importance
- Inventory of lean pastures and dry grasslands of national importance
- Inventory of proglacial margins and alpine flood plains of national importance

• Red Lists (recognised at federal level in accordance with Art. 14 Para. 3 OPN)

- Red List of endangered animal species in Switzerland
- National and regional Red List of endangered vascular plants in Switzerland
- Red List of rare or endangered Swiss bryophytes
- Red List of indigenous species of fish and crayfish
- Provisional Red List of endangered higher fungi in Switzerland (in preparation)
- Red List of corticolous or terricolous lichens in Switzerland (in preparation)

• Programmes for species protection

As signatory of the Bern Convention on the conservation of wild species and their habitats, Switzerland is engaged in a number of programmes for the protection or reintroduction of rare or endangered species. The projects carried out or in progress particularly concern the large ungulates, the large predators (bear, lynx, wolf), bats, aquatic mammals (beaver and otter), as well as birds (bearded vulture, white swan, corncrake, capercaillie), amphibians and reptiles. In the plant kingdom, certain lichens and mosses which are rare throughout Europe, as well as higher plants, are closely monitored.

• Red lists

Several red lists have already been drawn up (see above). Among the species of animal and plant which figure in these lists, some are directly protected by the administrative ordinance of the Federal Law on the Protection of Nature and Landscape. Others are indirectly protected, in that the law makes provision for the protection of their habitats. These lists will be the subject of revision according to the IUCN criteria, to allow comparisons and their evolution over time to be followed. An improvement of the legal status of the red lists is being studied.



• **Definition of areas with priority for ecological compensation**

A study is in progress to define nationally the areas with priority for ecological compensation and to develop quantitative and qualitative objectives which will become national guidelines. The study concerns the Plateau and the low-lying plains of the alpine valleys and the Prealps, where the uses of the land are more intensive and more numerous. The application of the results should take place after 1999, with the establishment of a national ecological network. This network should be expanded eventually to include prealpine and alpine regions, with their great natural wealth.

• **Nature in an urban setting**

One of the paradoxes of the regions that are intensively exploited is the greater biological diversity in built-up areas than in the neighbouring countryside. A lower level of biocides and structurally rich areas are often enough to draw in a throng of organisms looking for a suitable habitat. SAEFL promotes biological diversity in built-up areas by supplying technical information and launching campaigns of action and public awareness in areas such as the greening of roofs, the development of industrial sites or residential zones, and infiltration of water.

• **Buffer zones**

Buffer zones are established to ensure the protection of sensitive biotopes, such as marshes, from possible negative influences (provision of nutritive substances, disturbances). The creation of buffer zones is in general carried out on a contractual basis, granting financial contributions to farmers.

Domestic gardens can be rich in biological diversity. SAEFL publishes guides to ecological exploitation and maintenance respecting the living world.

4.1.2 Land-use planning

The high demand for areas of urbanisation and the intensive exploitation of the land in a limited space make land-use planning an essential coordinating policy in terms of the conservation and sustainable use of biological and landscape diversity. The cantons are responsible for the administration of land-use planning, in accordance with the needs of protection and sustainable land use. To do this they draw up land use plans which define the zones to be protected and zones where building can take place.

Objectives in land-use planning

- To conserve objects of natural and cultural heritage, and landscapes worthy of protection.
- To conserve agricultural areas and to encourage their sustainable use.

Land-use plans incorporate these objectives as a whole. Some measures are however specifically aimed at the conservation and sustainable use of biological and landscape diversity.

Documentation of landscape modifications

The Federal Office of Spatial Planning, in collaboration with SAEFL, has implemented the programme "Observation of the Swiss countryside". with the aim of checking whether the changes in land use are in accordance with the objectives set in the law on land use. Together with other programmes such as "Swiss land area statistics". it supplies information on changes in the countryside and consequently allows the strategies of land management to be appropriately oriented.

Swiss Landscape Concept

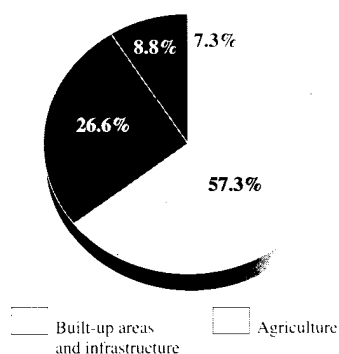
Recently approved by the Federal Council, this instrument for the coordination of sector-based policies reinforces the efforts of the Confederation to promote biological diversity, since it has at its disposal a group of objectives at the federal level.

Programme Swiss land area statistics: Cantonal land use

This programme, based on the interpretation of aerial photographs, provides statistically reliable and geographically differentiated information on the changes which influence land use in Switzerland. An example of results from the Canton of Fribourg.

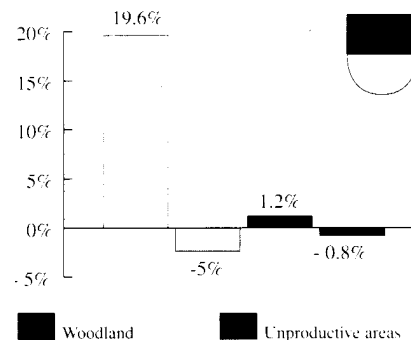
Principal types of land use

1990/1993 Total area: 167,081 ha



Canton Fribourg

Change 1979/81 to 1990/93



Source: Swiss Federal Statistical Office 1996.

4.1.3 Agriculture

In 1992, the Federal Council set new objectives in agricultural policy, orienting agriculture towards more ecological methods of production that encourage biological diversity. In addition to financial incentives, the agricultural strategy is based on training, advice and research, and regulations for agricultural practice. Agricultural policy thus also contributes to the preservation of farming in less favourable regions, such as mountain zones. The new constitutional article, accepted by the electorate in 1996, establishes among other things the preservation of the life support system and maintenance of the rural landscape. In addition, it requires all direct payments to be linked to ecological methods.

Objectives in agriculture

- *To exploit the total useful agricultural area with the help of methods that respect the environment.*
- *To exploit 65,000 ha on the plain, designated as areas of ecological compensation, with the aim of helping to conserve the diversity of indigenous species.*
- *To establish priority areas of ecological compensation in zones of major ecological interest.*
- *To sustain forms of traditional exploitation, particularly those which have contributed to the formation of landscapes, and to increase the diversity of ecosystems.*
- *To conserve and improve the diversity of species and biotopes by incorporating measures of ecological compensation and of replacement into projects of land improvement.*
- *To ensure the conservation of genetic resources in agriculture and food.*

These objectives are specifically applied in the following measures and activities.

• Ecological compensation

Ecological compensation is the principal instrument of the conservation of biological diversity in relation to land in agricultural use. Since 1993, direct incentive payments have been given to farmers to safeguard biotopes, for areas of ecological compensation, organic or integrated culture. Complementary payments are moreover made by the cantonal and federal services of protection of nature and landscape, with the aim of encouraging measures that make agricultural practices more extensive (i.e. less intensive). A strategy for evaluating the programmes encouraging ecological compensation has been drawn up by the Swiss Federal Office of Agriculture (SFOA) with the aim of verifying that the substantial financial means put at its disposal are bear fruit in terms of conservation of biological diversity. Furthermore, a National Forum on ecological compensation unites the principal actors here in order to optimise its functioning.

• Training, advisory services

The biological value of agricultural land depends particularly on the ecological knowledge of farmers, as well as on the methods used. The Agricultural Advisory Services, the *Landwirtschaftliche Beratungsstelle Lindau* (LBL) and the *Service romand de vulgarisation agricole* (SRVA), in collaboration with research institutes and the federal services, draw up the instruments necessary for the advisory service, particularly for ecological compensation. They ensure the training of the agricultural advisory officers and give advice directly to farmers.

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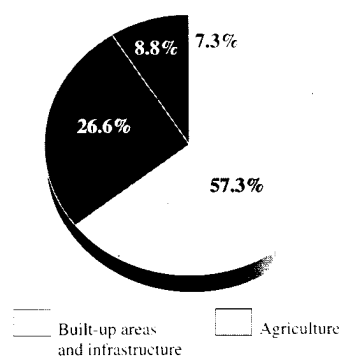
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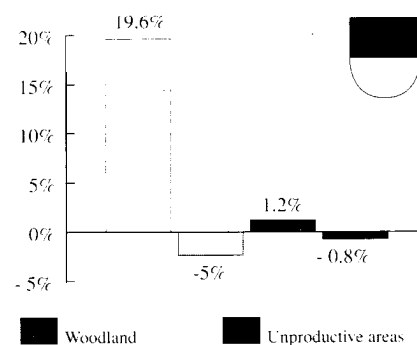
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Elements which can be used by farmers for ecological compensation

- ◯ ◆ moderately intensive meadows (2 to 3 mowings)
- ◯ ◆ extensive meadows (1 to 2 mowings), straw meadows (1 mowing in autumn)
- ◯ ◆ reconverted or recreated meadows (2 to 4 mowings)
- ◆ low nutrient pastures rich in species
- ◯ ◆ fields with rugged flora, hardy perennials, fallow shady strips
- ◯ ◆ hedges, avenues, wooded banks, copses, groups of trees
- ◯ ◆ standard orchards and isolated fruit trees
- aquatic surfaces and waterside vegetation
- ◆ untreated or unmanured farmed strips, tiered edges
- ◯ floral fallow land, strips of fields sown with self-propagating flora
- dry stone walls, heaps of stone, natural paths, isolated trees
- valuable habitat, counted in the 5 to 7% of area of compensation for the application of the rules on integrated production or organic culture
- ◯ habitat close to a natural state which benefits from contributions according to the ordinance on ecological contributions
- ◆ habitat close to a natural state which in certain cantons benefits from complementary contributions paid by the service of protection of nature and the landscape

Source: Guidelines concerning ecological compensation in agricultural exploitation, SRVA (ed.) 1996

• Land improvements

According to the new guidelines projects of land-use improvement must be vigilant about the safeguarding, appropriate use and development of rural areas, starting from natural values and landscapes. Thus, land improvements allow biotopes to be conserved and designate areas necessary for the creation of biological networks.

• Conservation of genetic resources in agriculture and food

The safeguarding of domestic species (animal and plant) and of wild stock is necessary for several reasons: to conserve the genetic heritage, to preserve the adaptive potential of cultivated plants and farm animals, and to respond to the needs of future consumers. To this end, the SFOA has drawn up a National Plan for the conservation and sustainable use of phylogenetic resources for food and agriculture (PRFA), following on the World Plan of Action of the FAO devoted to the PRFA. The Swiss commission for the conservation of cultivated plants unites the public and private organisations which work in this area. The first task of this commission has been to draw up an inventory of all the institutions concerned and of the material which they safeguard. Around 19,000 varieties, populations and lines of cultivated plants are conserved by 24 organisations. Several institutions are working to conserve the genetic resources of farm animals.



Additional activities to develop within the scope of the national Plan of Action include completing the inventories, ensuring the regeneration of the existing conservation *ex situ*, and sustaining conservation *in situ* and on farms, an agronomic evaluation of genetic resources, and making the public aware of the need for such conservation.

This photograph shows modern short fruit trees. There is a tendency to use them to replace ancient varieties of standard fruit trees, the collection and conservation of which has therefore become a necessity.

Priority activities in progress for the conservation and the sustainable use of phylogenetic resources for food and agriculture (PRFA)

- Census and inventory of PRFA
- Supporting management and improvement of PRFA on farms
- Promote conservation *in situ* of wild species similar to cultivated or wild plants destined for food and forage production
- Upkeep and regeneration of existing collections *ex situ*, regeneration of endangered entries *ex situ*
- To reinforce the characterisation, evaluation and the number of reference collections
- To increase activities directed at genetic improvement and broadening the genetic basis
- To promote sustainable agriculture, thanks to diversification of production and to a greater diversity in plants cultivated
- To research new markets for local varieties and products of high diversity
- To promote the creation of networks and integrated systems of information on PRFA
- To set up systems of monitoring and rapid alert concerning the loss of PRFA
- To make the public aware of the usefulness of conservation and use of PRFA

4.1.4 Forests

The quantitative aspect of forest conservation became important in the last century. with the implementation of a strict policy covering clearing and sustainable exploitation (prohibition of clear-cutting, a regime of progressive cutting with mainly natural regrowth). With new forestry legislation, Switzerland has also reinforced the conservation of forestry, particularly in relation to biological diversity.

Objectives of silviculture

- *To practise silviculture which respects natural conditions.*
- *To conserve and enhance forest vegetation associations and rare or endangered forms of forest, including forest margins.*
- *To create forest reserves and quiet zones with the aim of conserving or creating ecosystems large enough to guarantee the integrity of the flora, and provide refuges for fauna and spaces of particular landscape value.*

These objectives are applied through the following measures and activities.

• **Creation of forest reserves**

The new law encourages the creation of forest reserves, intended to conserve biotopes of great ecological value, populations of rare species and forest types of particular interest. The Confederation has undertaken to prepare guidelines for the creation of forest reserves and an inventory of existing forest reserves.

• **National Forest Inventory**

The National Forest Inventory (NFI) is a programme of observation which began in 1981 and which provides information on the state, characteristics and production of Swiss forests. The NFI includes indicators of biological diversity which are incorporated in the national programme of monitoring of biological diversity (see chap. 5).

• **Conservation of phylogenetic resources and diversity**

The new forestry law gives financial encouragement to proprietors who implement measures to conserve the biological diversity of the forest. The Strategy for the conservation and improvement of biological diversity, in the process of being elaborated, includes various measures: a census of seed populations, the creation of genetic reserves and the development of seed orchards, the creation of forest reserves, and encouragement to conserve rare species.

• **Silviculture which respects nature**

The national goal is to have semi-natural forest throughout the country by use of silvicultural practices which respect natural conditions. This means specifically that the forests must be composed of species which are adapted to their location, and have populations of varying age, with pockets of old trees and tiered margins. The Confederation is currently drawing up information on appropriate silvicultural practice and a strategy of providing information on this matter.

• **Conservation of species**

Other plant and animal species also benefit from silvicultural measures, following the creation of biological corridors and quiet zones that encourage fauna (e.g. capercaillie).

Strategies, measures and activities



To limit the impact of fire, the cut wood is removed, barely accessible forests by cable skidders.



Forest margins are very favourable habitats for many organisms. The objective is to promote at the national level silvicultural practices which are appropriate for the conservation of biological diversity.

4.1.5 Management of watercourses

Natural and semi-natural watercourses, riverbanks, lakes and still waters provide varied habitats for many species of plant and animal. The achievement of objectives relating to the conservation of biological diversity is ensured by the new Federal Law on the Management of Watercourses and the provisions in the Laws on the Protection of Waters and on Fishery. Efforts have been undertaken for several years to revitalise watercourses which have been diverted into pipes or dyked up.

Objectives in watercourse management

- *To conserve and reconstitute the natural diversity of the banks and beds of watercourses by encouraging their revitalisation.*
- *To enhance natural dynamics by reserving enough space for watercourses, in particular in potential flood zones, and to re-establish the rate of flow so that a natural regulation of rises in river levels is ensured.*
- *To ensure the free passage of fish and to enhance the banks as corridors for the movement of terrestrial fauna.*

These objectives are applied specifically in the following measures and activities.

• Programmes to revitalise watercourses

The revitalisation of watercourses is an important strategy for the conservation of biological and landscape diversity, particularly in areas of intensive agricultural exploitation. Agricultural policy plays a key role here, because it can encourage the creation of areas of ecological compensation along watercourses. The cantons are responsible for implementing this measure with guidelines or programmes of revitalisation. Pilot projects of revitalisation will also be undertaken on land owned by the Confederation.

• Promoting the upkeep of watercourses by natural methods, information campaigns and training

Gentle measures of watercourse upkeep offer effective protection against rising water levels and favour the revitalisation of watercourses. The Confederation is drawing up guidelines and working instruments on this topic, on the basis of experience acquired by particular cantons. Programmes of training have also been implemented to promote the content of the new laws relating to watercourse management and to improve the quality of the projects presented to the Confederation.

Management of watercourses and **management of biological diversity: the example of the Rhine**



The river bed has been widened in places, the banks have been remodelled to facilitate exchange between the fluvial and terrestrial ecosystems, banks for flooding have also been created.



4.1.6 Energy and water power

Water power is Switzerland's main indigenous source of energy. The Confederation, the only competent authority in energy policy, wishes to make a 5% increase in the mean production of hydro-electric power by the year 2000. This will be achieved by improving existing installations and by the creation of new ones. In this particular case, the objectives of conservation of biological diversity will be coordinated with those specific to the use of water power and to the distribution of the electricity it produces. The protection of nature and the landscape is simultaneously affected by the infrastructure of supply (overhead power lines) and the installations of energy production (mountain dams, collection and storage of water). These installations are in fact subject to environmental impact assessment.

Objectives in energy and water power

- *Overhead power lines and underground pipelines should not cross biotopes which are protected or worthy of protection, and measures will be taken to protect aerial fauna against the dangers of overhead power lines.*
- *Hydro-electric power stations will preferably be constructed in sites which are already equipped rather than in semi-natural areas, to avoid causing harm to landscapes and biotopes worthy of protection; compensatory measures will also be taken.*



Alpine dams have a severe impact on the landscape. The flow in mountain rivers and streams is often drastically changed.

Among the means for achieving these goals, information plays a substantial role in that the designers of transport and energy infrastructures currently lack information on the criteria for appreciating nature and the landscape. This lack must be made up by the publication of practical guides and directives. Also, to optimise the planning process, general information concerning the protection of nature and the landscape is also diffused as widely as possible among the authors of projects involving amenities. SAEFL has been called on to collaborate in drawing up measures for the protection of aerial fauna (overhead power lines), natural planning in the area around installations, and the periodic flooding of alluvial plains.

4.1.7 Leisure and tourism

In peripheral or mountainous regions, tourism often represents the principal economic resource. It also contributes to the maintenance of farming, which is so important from the point of view of landscape protection. In Switzerland, tourism ranks third in exports and one person in eleven works directly or indirectly in tourism. The negative effects of tourism and leisure activities on nature and the landscape are becoming more intensive, particularly because of the increase in these activities and the wide variety of activities on offer. Tourist transport serves many areas which are sensitive from an ecological and landscape point of view, particularly in the Alps. However, people are becoming more aware of the need to preserve the landscape and natural habitats as a resource which is essential for tourism.

The Confederation publishes guides and directives to manage any conflict between tourism or leisure, and safeguarding biological and landscape diversity. These documents are the result of participatory processes which integrate the principal parties concerned.



Objectives in leisure and tourism

- *To avoid damage resulting from tourism and leisure or repair it according to the principle of causality*
- *To adapt local and regional tourism development to the ecological and landscape context.*
- *To avoid transport access to landscapes of great value.*

The Confederation, which is in charge of granting concessions for tourist amenities, practises a very restrictive policy. Transport access to new areas for skiing is in principle no longer permitted. All new projects for installations are subject to an environmental impact assessment. The Confederation also issues guidelines for managing potential conflict between tourism or leisure, and safeguarding biological and landscape diversity.

4.1.8 Transport

Infrastructures (motorways, railway transit across the Alps) consume large amounts of land, cutting through networks of biological exchange. However, their planning is carried out so that harm to biological and landscape diversity is compensated for. Also the installations and transport infrastructures are subject to environmental impact assessment.

Objectives in transport and civil aviation

- *To minimise biological damage caused by transport infrastructures.*
- *To dedicate neighbouring spaces, for example around airports, shunting yards and motorways, to the creation of areas of ecological compensation.*



For several years, pathways for animals have been built over motorways, to maintain biological exchanges.

At the level of **measures**, the activities can be divided into three principal categories.

- **Natural maintenance of existing infrastructure**

Information and training of maintenance and development personnel in line with the natural management of spaces (natural embankments, meadows with butterflies).

- **Improvement of existing infrastructure from an ecological point of view**

In particular, by constructing passages for fauna above or below roads and railways, and replacing walls with earth embankments or sculpturing the terrain (creation of low nutrient pasture on the embankments).

- **Planning and construction of new infrastructure**

Integration of the principal migratory corridors used by fauna (making use of maps), analysis of various possibilities for minimal impact on nature and the landscape, ecological compensation and replacement measures.

4.1.9 Defence

The Federal Department of Defence, Civil Protection and Sports (DDPS) has vast areas of land at its disposal, such as firing ranges and exercise grounds, as well as areas for manoeuvres. These terrains often have a high ecological value, either because they are situated in isolated regions which are extensively exploited and shielded from other potential users of the landscape (tourism, construction, etc.), or because military activities create dynamics favourable for biological diversity (pioneer species).

The DDPS can thus contribute to achieving the objectives of the conservation of biological diversity, in particular by management of the terrain under its control.



Increasingly the conservation of biological diversity is being incorporated into the management of land belonging to the Swiss army, as illustrated by this hedge planted on an anti-tank defence.

Objectives in Defence

- *To conserve and maintain natural values created by the military exploitation (or non-exploitation) of the countryside; to protect existing natural areas and to favour networks of biotopes.*
- *To encourage traditional sustainable management of land under military control.*

The measures are particularly concerned with the areas of training and planning.

• Training and awareness

The DDPS already has a service specialising in questions of environmental protection and nature, and it is planned to implement a specific training structure between now and the year 2000 to make military and administrative personnel more aware of these issues.

• Ecological measures on military land

In 1997 the DDPS launched a pilot study of optimal terrain management from the point of view of conservation of landscape and biological diversity. The natural and landscape qualities of the land which the DDPS owns or rents will be inventoried. Conservation of biological and landscape diversity will have priority in the use of land managed by the DDPS. The Confederation has published directives for the protection of marshland on military land.



Studies are attempting to model the response of natural ecosystems to the increase in atmospheric carbon dioxide. Here, a peat bog in the Jura.

4.2 Research and higher education

Research institutions (universities, research institutes) and the organs which encourage them, such as the **Swiss National Science Foundation (SNSF)**, are important partners in the conservation of landscape and biological diversity. The themes of the SNSF which relate to natural resources (Programme Man and Biosphere, water, forest, protection of the air, soil, climatic change and natural catastrophes), as well as the **Priority Programme for Environmental Technology and Research** which was created in 1992, provide essential data which can be applied in the field. Research in the public sector provides the federal administration with the basic data necessary for its mandates of protection and conservation, which it can publish and integrate into its basic or advanced training courses.

In higher education, general ecology should soon be incorporated into all scientific training programmes. Several types of comprehensive training are offered by the universities and other establishments of higher education to produce specialists capable of managing problems connected to the protection and conservation of biological diversity (disciplines of biological and environmental sciences).

Integrated biodiversity, a Swiss research project

Among the research efforts which the Confederation supports, the project "Biodiversité Intégrée" (Integrated Biodiversity) of the Priority Programme for Environmental Technology and Research is a direct response to the Convention on Biological Diversity. Several research units have pooled their abilities to undertake multidisciplinary studies. The principal directions of study concern:

- the role of population dynamics in the maintenance of biological diversity
- the response of ecosystems to the fragmentation of habitats and the increase in carbon dioxide levels
- theoretical and practical aspects of sustainable agricultural management in the countryside.

4.3 Education, information and public awareness

Knowledge relating to biological diversity is provided at all educational levels. The Swiss Foundation for Environmental Education, created in 1994 by the Confederation, some cantons, WWF and Pro Natura, is an important instrument for promoting the incorporation of this theme into school curricula. Efforts are also undertaken to ensure the proper training of professionals: this is particularly the task of establishments of higher education and the universities. The Swiss Training Centre for the Protection of Nature and the Environment was created several years ago to provide basic training.

European Conservation Year 1995 represented an opportunity to raise public awareness. SAEFL, the Cantons, the municipalities, non-governmental organisations and economic circles pooled their financial resources. The enthusiasm and the commitment of the population, nature conservation organisations, schools and the administration were remarkable. 700 nature conservation projects and 1.000 events demonstrated that the objectives, which were to become more familiar with and to apply conservation of nature throughout Switzerland, had been achieved. Hedges were planted, watercourses were re-naturalised, and urban districts were made green. Many of these projects are now finished. Others, inspired by large number of good examples, ideas and motivation, did not start until last year. They will take several years to be completed; the impact of the European Conservation Year will extend well beyond the 1995 campaign.

Non-governmental organisations are recognised as having a public role. They play an important part in educating and raising the awareness of the population. Through innumerable activities and targeted campaigns, they see that children as well as adults adopt responsible attitudes in the face of great problems, towards conservation and the sustainable use of biological diversity. For example, more than 700 school classes participated in the 1995 Pro Natura campaign on the value of nature in the city. These organisations also manage training centres, produce educational documents and provide training for teachers.

Educational programmes will in future include knowledge about ecosystems. Practical work in the field will be organised.



4.4 Activities at the cantonal level

According to the Federal Constitution, the protection of nature and the landscape is primarily under the control of the cantons. Twenty-six cantons work to fulfil the objectives of nature conservation, within their own territory and in their own way. Many activities promoting conservation and the sustainable use of biological diversity are also organised by the cantons, individually or in concert, starting with the designation and maintenance of a number of nature reserves.

Some cantons have already implemented plans for managing biological diversity on their territory in a coordinated way, following the example of the Cantons of Aargau, Basel-Land, Schaffhausen, Ticino and Zurich.

Nature and the landscape in the blueprint of Canton Aargau

The blueprint is an instrument which allows the cantons to decide on the development of their territory. This tool must take into account the necessities of conserving landscape and biological diversity. In general, this is done by updating the existing inventories which relate to nature and landscape in the blueprint. This is not sufficient in a territory characterised by vast areas poor in natural components. In its new blueprint, the Canton of Aargau intends to enhance and enlarge natural areas and the remaining habitats. To do this, it determines its priorities, the areas to enhance and the agricultural areas which will benefit most from a financial contribution.

Priority areas:

1. Priority areas of protection (areas worthy of being protected, of at least regional importance; biotopes, areas vital to highly endangered species)
2. Complementary areas (they permit nuisances to be kept at a distance from priority areas)
3. Areas for development (areas which play an important role in the conservation of endangered species; enlargement and contact with priority areas)
4. Corridors which safeguard migratory routes and connect large biotopes.

4.5 International efforts

International efforts by Switzerland towards conservation and the sustainable use of biological diversity is apparent at several levels: in the commitment to the Convention and international processes, in technical cooperation, and in trans-boundary collaboration.

4.5.1 Activities and contributions of Switzerland to international processes

• **Switzerland and international conventions**

For several decades Switzerland has taken part in drawing up and implementing international conventions. Switzerland has ratified most of the conventions which cover aspects of the conservation of biological diversity.

Principal conventions relating to biological diversity which Switzerland has ratified

- UNESCO Convention of 2 February 1971 on Wetlands of International Importance, especially as Waterfowl Habitats (Ramsar Convention on Wetlands)
- UNESCO Convention of 23 November 1972 on the protection of global cultural and natural heritage
- UNEP Convention of 3 March 1973 on international trade in endangered species of flora and fauna (Washington Convention or CITES)
- Convention of 19 September 1979 on the Conservation of European Wildlife and Natural Habitats (Bern Convention), elaborated under the aegis of the Council of Europe
- Convention of 23 June 1979 on the Conservation of Migratory Species of Wild Animals (Bonn Convention).

For Switzerland, the environment is one of the major elements in her relationships with other countries. This viewpoint results from a belief that international cooperation in environmental matters is indissociable from the effort to enhance justice, peace and wellbeing on our planet.

• **Process Environment for Europe**

Switzerland actively participates in this process which establishes a partnership for sustainable development at the pan-European level. To this end, great importance is given to the Pan-European Biological and Landscape Diversity Strategy which is an important instrument of regional coordination for the conservation of biological diversity. Switzerland has participated in drawing up several strategies and programmes within the frame-work of congresses and ministerial conferences, such as:

- European Environmental Action Plan in Central and Eastern Europe (Ministerial Conference of Lucerne 1993)
- Pan-European Biological and Landscape Diversity Strategy (Ministerial Conference of Sofia 1995)
- The Basel Congress "Nature for East and West - from politics to practice" 1997).

The Basel Congress was set up by Switzerland to contribute to the implementation of the Pan-European Strategy, in the light of the next European Ministerial Conference on the Environment which will be held in Århus (Denmark) in 1998. Its principal topic is the incorporation of the conservation of landscape and biological diversity into sector-based policies.

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• **Ministerial Conference on the Protection of Forests in Europe**

After the resolution taken at Strasbourg in 1990 on the conservation of genetic forest resources, and that of Helsinki in 1993 on the conservation of biological diversity in the forest, preparatory work for the next meeting in Lisbon in 1998 is concerned with implementing the theme of Action 9 of the Pan-European Biological and Landscape Diversity Strategy, dedicated to forest ecosystems. Switzerland is actively engaged in this process. A national report on the criteria and indicators for the sustainable management of Swiss forests is in fact being prepared for publication.

• **Environmental policy of the European Union and Switzerland**

Switzerland closely follows the work of the European Union concerning new legislation and fundamental decisions which draw the major outlines for the future development of environmental protection in Europe. Also Switzerland is collaborating in research within the framework programmes of the European Union.

• **Council of Europe**

Switzerland has been active for many years at the heart of the Council of Europe. This body has extensive experience in the area of conservation of biological and landscape diversity. The Bern Convention was developed under its aegis, with active help from Switzerland. The Council of Europe launched the Pan-European Biological and Landscape Diversity Strategy and developed three important Pan-European networks in which Switzerland is an active party: the network of natural sites given a European Certificate, the network of biogenetic reserves, and the NATUROPA Centre with its network of national information services.

• **United Nations Environment Programme (UNEP)**

For Switzerland, UNEP has an important catalytic role to play in the implementation of Agenda 21 and of the Convention on Biological Diversity, on a global and regional level. UNEP is responsible, together with the Council of Europe, for the joint secretariat of the Pan-European Biological and Landscape Diversity Strategy, of which Switzerland has the presidency of the executive bureau.

• **Global Environment Facility (GEF)**

GEF which is the financial mechanism of the Convention, was created principally to support developing countries in implementing the commitments of the Conference de Rio in favour of the global environment. A good part of this fund is devoted to biological diversity. Switzerland has made a substantial financial contribution to it, to underline the importance attached to the rapid integration of developing countries into the process of resolving global ecological problems. As a member of the Council of GEF Switzerland is committed to improving relations between GEF and the Convention. At the time of the last Conference of the Parties in Buenos Aires in November 1996, Switzerland financed a workshop for information and dialogue which led to a better understanding of the projects of GEF, particularly by the several non-governmental organisations attending.

• **United Nations Food and Agriculture Organisation (FAO)**

Switzerland is a member of the Commission on Genetic Resources for Food and Agriculture of the FAO and has adhered to the international commitment on these resources. Switzerland has adopted the World Plan of Action for the conservation and sustainable use of phylogenetic resources for food and agriculture, and actively participates in negotiations to revise the above international commitment in the light of the Convention on Biological Diversity. Switzerland is also active within the European Cooperative Programme for networks of genetic resources.

• **International Union for the Conservation of Nature (IUCN)**

Switzerland has been a member of IUCN since its foundation in Fontainebleau (France) in 1948. A representative of Switzerland sits permanently on its Council. Particular support was given by the Confederation and the Canton of Vaud by endowing IUCN with a building as well as special fiscal arrangements. SAEFL supports the work of IUCN with a substantial annual contribution. Switzerland also participates in various scientific commissions of IUCN, such as the commission on the safeguarding and monitoring of endangered species. Furthermore, IUCN is the principal partner of SDC in the sustainable management of natural resources and biological diversity. The SDC supports many global, national and regional programmes, and an agreement of cooperation with IUCN was signed in 1997.

• **The international role of Geneva in the domain of the environment**

Switzerland also demonstrates commitment by the location in Geneva and its surroundings of several convention secretariats (Ramsar Convention on Wetlands, Washington Convention, Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and their Disposal) and many international governmental and nongovernmental organisations, such as the regional Office of UNEP, WWF international and IUCN.

4.5.2 Technical cooperation

The natural environment, conservation and the sustainable use of biological diversity benefit from being given priority in all the agreements of technical cooperation signed by Switzerland. The activities in developing countries supported by Switzerland are subject if necessary to environmental impact assessments.



Switzerland is financing a project to conserve traditional varieties of tubers and edible roots in Peru.

Within its programme of bilateral cooperation, Switzerland, and more particularly SDC, has a portfolio of 36 projects devoted specifically to biological diversity in developing countries, in Latin America as well as in Asia and Africa. These activities particularly concern the conservation of protected zones and of the genetic diversity of cultivated plants and farm animals, as well as programmes for education and public awareness about biological diversity. The projects relating to the conservation of agro-biodiversity are principally developed in collaboration with the institutions of CGIAR (Consultative Group for International Agricultural Research).

Examples of projects of cooperation devoted to biological diversity

- Andes: conservation of various local species of root and tuber crops.
- Dominican Republic: conservation of natural resources through development and implementation of management plans for protected areas.
- Guinea Bissau: implementation of a nature reserve within the framework of a global plan of land use.
- Nepal: support for Nepal's efforts to inventory and protect its natural heritage sites.
- Irian Jaya (Indonesia): conservation of the genetic diversity of sweet potatoes and indigenous knowledge about cultivation.

For its part, FOFEA has developed conservation activities in developing countries and concentrates particularly on the management of tropical forests. Among projects in progress, creation of a vast transboundary reserve between Malaysia and Indonesia (national park) and the elaboration of plans for the sustainable exploitation of forests in Brazil. Bolivia and Panama deserve mention. Furthermore, in 1998 FOFEA will participate in the Terra Capital Fund, which is a source of venture capital in Latin America to support projects which aim to preserve biological diversity.

Within the scope of agreements resheduling Bulgaria's debt to Switzerland, an agreement was signed in 1995 for the establishment of a National Eco Trust Fund containing the payments due from Bulgaria to Switzerland to the equivalent of Sfr. 20 million. The purpose of this fund is to prepare and implement projects for the protection of the environment and the conservation of biological diversity.

In the countries of Central and Eastern Europe, by means of SDC and FOFEA, Switzerland supports several projects and programmes devoted to biological diversity. In collaboration with the World Bank, Switzerland supports a series of measures to preserve the biological and cultural diversity of the region of Lake Ohrid, between Albania and Macedonia. Other projects are being carried out in Estonia, Hungary, Bulgaria (see box) and in Russia, where Switzerland supports a vast WWF project covering a considerable area and with the specific aim of preserving virgin forest in Petchora-Ilytch, and ensuring the sustainable exploitation of forests as well as the training of those responsible for the 90 reserves.

SAEFL is involved in most of the Swiss projects of cooperation concerning biological diversity. It offers advice and technical support at the time of formulation and in the evaluation of several of these projects.

Within its programme of bilateral cooperation, Switzerland, and more particularly SDC, has a portfolio of 26 projects devoted specifically to biological diversity in developing countries, in Latin America as well as in Asia and Africa. These activities particularly concern the conservation of protected zones and of the genetic diversity of cultivated plants and farm animals, as well as programmes for education and public awareness about biological diversity. The projects relating to the conservation of agro-biodiversity are principally developed in collaboration with the institutions of CGIAR (Consultative Group for International Agricultural Research).

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Programme of conservation of biological diversity in Bulgaria

Bulgaria possesses a remarkable diversity of biology and landscape, the result of its geographical situation at the gates of Asia. Recent economic and political changes threaten to destroy the fragile equilibrium of certain ecosystems. The programme being run in collaboration with the Bulgarian Ministry of the Environment, as well as Bulgarian and Swiss environmental organisations, has surveyed the richest and most fragile regions for which seven projects aiming at targeted land management have been developed. The seven projects primarily involve mountainous regions, as well as some areas on the plains and the wetlands near the Black Sea.

A cooperative project with Bulgaria aims to conserve a remarkable biological diversity in agriculture.

4.5.3 Transboundary collaboration and coordination

Among the relationships which Switzerland maintains with her neighbours within the framework of the protection of nature and the landscape, the Convention of the Alps, which aims at the global protection and sustainable use of its habitats, should be ratified in the near future.

Other types of intercantonal and transboundary cooperation have scheduled action plans which aim to preserve and promote biological diversity in natural areas, such as the protection of the Doubs at the Franco-Swiss border.

Within the framework of the active enhancement of Mont Blanc, intended to combine conservation of natural habitats and landscape with sustainable economic development respecting the environment, a collaborative project has been established by regional and local authorities with the financial support of the Ministries of the Environment of Italy, France and Switzerland.

*Specialised for steep terrain, the chamois (*Rupicapra rupicapra*) has adapted well to human pressure. The largest populations are found in animal reserves and reserves where hunting is prohibited.*



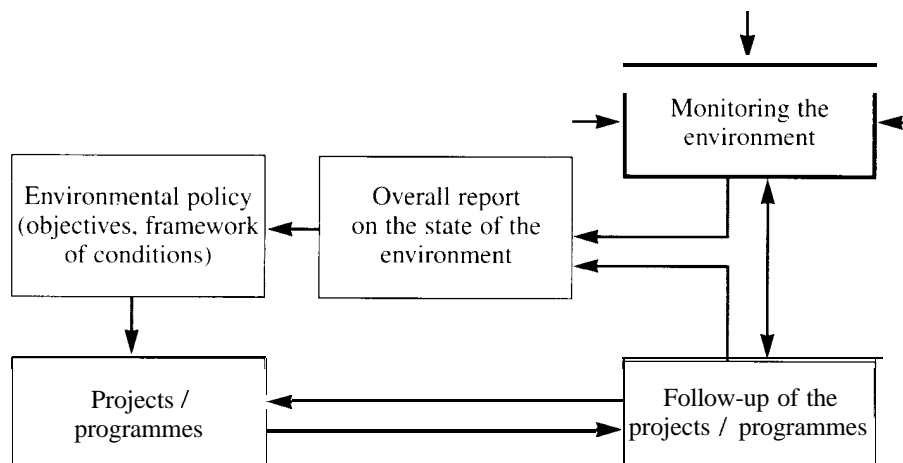
*The lakes, wintering grounds for waterfowl and migratory birds, are for the most part protected by a Federal ordinance. Here a flight of pochards and tufted ducks (*Anas ferina* and *A. platyrhynchos*).*



5. Monitoring and evaluation

Various instruments allow the application of the Convention on Biological Diversity to be monitored. These instruments are part of a global monitoring process which has the objective of achieving land development that respects the environment. The process of checking is based on feedback between environmental policy, the measures taken by the state, and observation of the environment.

Relations between environmental policy, monitoring, follow-up and reporting



Source: adapted from Maurer and Marti, 1997

The establishment and implementation of the various checking programmes is done by the Confederation, which must take account of the cantonal programmes already in progress. The results are intended for the political authorities, the federal and cantonal services and the general public.

• Monitoring biological diversity in Switzerland

The task of monitoring changes in biological diversity over time does not only depend on the Convention on Biological Diversity. The federal laws on the protection of the environment and on the protection of nature and the landscape also recommend such monitoring. The essential task is to understand how the diversity of the living world (plants, animals, habitats) in Switzerland is changing. Furthermore, the programme should contribute to evaluating the political measures which influence biological diversity and should also be part of decision-making instruments for adapting the objectives and measures of conservation of biological diversity. This project completes the monitoring networks already in existence (air, water, soil). Thirty indicators serve as a basis for this evaluation, among them the species richness in different types of habitat (forest, built-up

indicators for monitoring biological diversity in Switzerland

• **Indicators of the state of:**

Genetic diversity

number of varieties of Swiss farm animals and plants

- proportion of the different farm varieties in relation to the total production / total number

Species diversity

number of wild species living in Switzerland, identifiable by standard methods

- number of species, endangered globally, which are present in Switzerland

overall changes in the degree of endangerment

- change (trend) in the number of the chosen species
- number of widely spread species of one taxonomic unit
- changes in numbers of the widely-spread species chosen
- mean species richness in different types of countryside

Biotope diversity

- area of valuable biotopes
- quality of valuable biotopes

• **Indicators of effects:**

- area of valuable biotopes
- proportion of the different types of countryside

- area of regions left to wilderness

- length of linear landscape features
- diversity of usage on a small scale
- production per unit area of land
- nitrogen content of the soil

- wooded areas dominated by non-local species of tree

- proportion of areas of new growth which contain artificial afforestation

- wooded areas marked out by particular forms of exploitation

- length of watercourses affected by power stations

- quality of flowing or stagnant water

- density of transport access

• **Indicators of measures:**

- area of nature reserves

- area of nature reserves under adequate protection and entirely applied measures of protection

- proportion of endangered species which have mostly protected habitats

total area subject to contracts

- total area of biological land-use.

Source. SAEFLEnvironmentalBulletin, 2197

areas etc.) and the number of widely distributed species. This last indicator is particularly important because it is the widely spread species (and not the rare ones) which show the first worrying decrease in biological diversity. Other information will be valuable, such as that provided by the project evaluating agricultural ecological compensation (see chapter 2.3.5).

• **Follow-up on federal inventories of biotopes and landscapes**

A follow-up has already been carried out in relation to the inventory of landscapes, sites and natural monuments (IFP). A follow-up is being planned for the inventories of moors, fenlands and flood plains of national importance. This follow-up should establish to what extent the aims set have been achieved, whether the actual development observed is satisfactory in relation to the measures undertaken and whether the protection has been done correctly. The feedback analysis by the follow-up updates the errors made and allows the measures to be better targeted.



• **Report on the state of the environment**

The report on the state of the environment is a periodic overall account of the state of and changes in the environment in Switzerland. It provides information on the activities in progress and the measures taken. It integrates the results of follow-up and permanent monitoring and allows environmental policy to be assessed. It is intended for political decision-makers, for the public and international organisations and other specialised services abroad. This report gives an overall idea of the situation in conservation of biological and landscape diversity. It presents a coherent combination of conclusions and propositions to decision-makers.

• **Quality control by the Confederation**

SAEFL is currently implementing a programme of qualitative evaluation of the planning, application and monitoring of its activities as regards its actions of behalf of the Confederation. The objective is to optimise the work of the Agency and to make sure that the best possible attention is given to the conservation of biological diversity in the projects which are its responsibility.

Mountain farming, still done in a traditional manner, is one of the strengths necessary for the conservation of biological diversity at moderate altitudes.

6. Budgets

At the national level. the implementation of the activities and programmes described in this report are spread over domains and services under state control; it is not easy to provide complete and comparable numbers for the means available to implement the provisions planned by the Convention. The costs of measures taken to ensure the protection of species during the construction of a motorway, for example, are met by the costs of construction and not from the budget of the agency responsible for nature protection. Similarly, as agricultural policy is oriented towards ecology, diverse programmes, such as aid to marginal (mountain) regions to prevent the abandonment of farming there, contribute to maintaining biological diversity in Switzerland: the amount whose final destination is biological diversity is however difficult to estimate.

The budget which SAEFL devotes to biological diversity amounted to Sfr. 37 million in 1996, divided in the following manner: Sfr. 30 million subsidy for cantonal activities and measures, Sfr. 2 million for activities and projects of private organisations, and Sfr. 5 million for projects directly run by SAEFL, such as establishing the inventories. Currently, the budget in relation to the legal tasks assigned to SAEFL is restricted. It is estimated that proper application of the Convention by this agency would cost around Sfr. 70 million annually.

Estimate of budgets directly devoted to biological diversity at national level

Activity	Amount (in Sfr. million per year)
. SAEFL, projects and subsidies for nature and the landscape and projects for biological diversity in the forest (1996)	37
. SFOA, agricultural payments for ecological compensation (1996)	15
. SFOA, agricultural payments for ecological compensation (1996)	91
. Cantons (estimate for 1993/94)	40
. Non-governmental organisations (WWF and Pro Natura) (1996)	5.5
. Swiss Landscape Protection Fund (SO million for 10 years)	5

In general, the funding available for the conservation of biological diversity in Switzerland is relatively limited, particularly compared to spending in other domains: spending for the tasks of protecting nature come to about 0.2 per cent of the federal budget, whereas 6.7 per cent go to road construction. Similarly, a study has shown that in 1992, around Sfr. 6 billion were spent on the environment in a broad sense, of which only Sfr. 103 million went to the protection of nature and the landscape, that is 1.7%. At the cantonal level, we note significant disparities, reinforced by the system of subsidies prevalent in Switzerland: the measures taken by the cantons are subsidised by the Confederation, so the less active a canton is the lower the subsidy it receives, and the lower the amount used for conservation of biological diversity will be. Many cantons have limited human resources: certain cantonal services do not employ more than two people, although the implementation of protective measures are a cantonal responsibility.

At the international level, Switzerland has made available a credit line of Sfr. 300 million for the global environment in developing countries, agreed in 1991 for the period 1991-1997, and in addition to the regular amounts of public funding for development. During this period, Sfr. 124 million of this credit were contributed to GEF, which, over the years, has devoted 30 to 40% of its resources to biological diversity. Sfr. 6.5 million of the same credit have been used to support bilateral projects specifically intended for the conservation of biological diversity (see chapter 4.5.2).

Switzerland is also substantially committed by means of funding intended to reinforce cooperation with Central and Eastern European countries: Sfr. 38.9 million for technical cooperation and Sfr. 133 million for financial cooperation went to the protection of the environment in these countries between 1990 and 1996.

Apart from these additional contributions, the numerous programmes and projects supported by Switzerland by means of regular funding for cooperation with developing and Central and Eastern European countries include an element for promoting conservation and the sustainable use of biological diversity, particularly in forestry or agriculture. For these projects it is however difficult to estimate the amount precisely devoted to biological diversity.

Finally, many projects of conservation and the sustainable use of tropical forests are financed by means of credit lines concerning the economic and commercial policy for international cooperation in development.

Non-governmental organisations are also active in several ways. WWF-Switzerland, for example, devotes about Sfr. 6.4 million each year towards projects which aim at conservation and the sustainable use of biological diversity abroad. Charitable organisations also support a number of projects relating to the sustainable use of natural resources.

Estimate of financial commitments at the international level

Activity	amount (in Sfr. million)
• Credit line global environment (period 1991-97)	
Contribution to GEF (of which 30-40% for biological diversity according to year)	124
Bilateral and multilateral projects specifically devoted to biological diversity	65
• Element for biological diversity in the credit lines for cooperation with Central and Eastern European countries (period 1990-96)	
Technical cooperation in the environment (39 million), part estimated in favour of biological diversity	9
Of the financial cooperation for the environment (133 million), amount estimated to be used for biological diversity	10
• Element for biological diversity in the credit lines concerning measures of economic and commercial policy for international cooperation in development (period 1997-2001)	
Projects on tropical forests	25
Terra capital fund (only in 1998)	5

Annexes

1. List of the principal centres of coordination and institutions for the conservation of biological diversity (*also manage national databases)

- Centre de coordination ouest pour l'étude et la protection des chauves-souris (CCO), Genève * (Western coordination centre for the study and protection of bats)
- Centre de coordination pour la protection des amphibiens et reptiles de Suisse (KARCH), Berne/Fribourg (Coordination centre for the protection of amphibians and reptiles in Switzerland)
- Centre du Réseau Suisse de Floristique (CRSF), Chambésy (GE) * (Centre of the Swiss Floral Network)
- Centre suisse de cartographie de la faune (CSCF), Neuchâtel * (Swiss Animal Mapping Centre)
- Commission suisse pour la conservation des plantes cultivées (CPC), Nyon *
- Commission suisse pour la conservation des plantes sauvages (CPS-SKEW), Nyon *
- Institut fédéral de recherches sur la forêt, la neige et le paysage (FNP), Birmensdorf (Swiss Federal Institute for Forest, Snow and Landscape Research)
- Koordinationsstelle Ost für Fledermausschutz (KOF), Zurich (Eastern coordination centre for the protection of bats)
- Landwirtschaftliche Beratungszentrale (LBL), Lindau (Agricultural Advisory Service)
- Pro Natura - Ligue suisse pour la protection de la nature, Bâle et Yverdon (Pro Natura - Swiss League for the protection of nature)
- Pro Specie rara, Saint-Gall
- Service romand de vulgarisation agricole (SRVA), Lausanne (Agricultural Advisory Service)
- Station fédérale de recherches agronomiques de Changins (RAC), Nyon (Federal Institute for agronomic Research in Changins)
- Station ornithologique suisse, Sempach * (Swiss Ornithological Station)
- WWF Suisse, Vernier (GE) et Zurich (WWF-Switzerland)

The rarity of the midwife toad (Alytes obstetricans) is linked to the destruction of natural riverbanks (the male carries the eggs on his back).



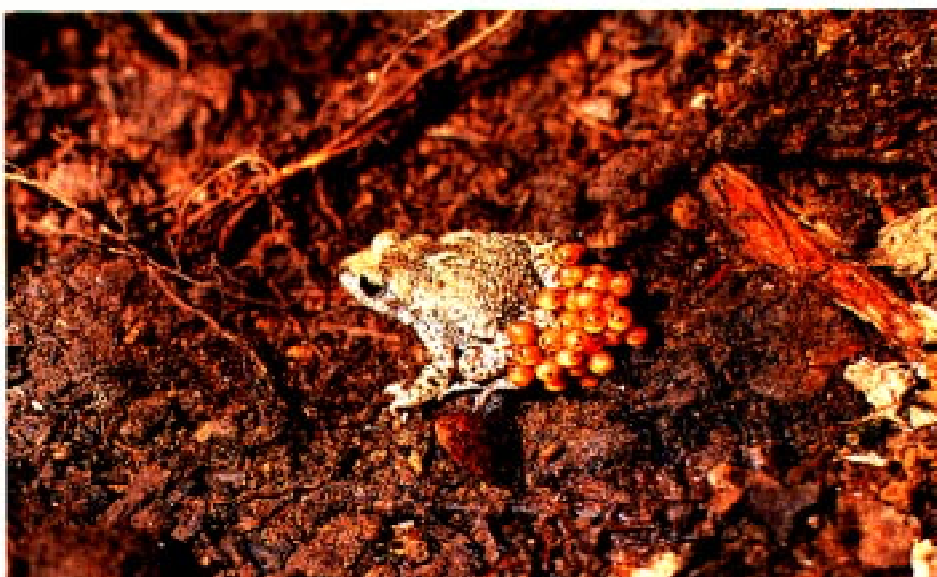
2. List of conventions and international agreements to which Switzerland adheres

- International Convention on the Regulation of Whaling
(Concluded in Washington on 2.12.1946, ratified in 1980, entered into force 29.5.1980)
- The Antarctic Treaty of 1.12.1959, with Protocol on the Protection of the Environment
(ratified 2.10.1990)
- Convention on Wetlands of International Importance, especially as Waterfowl Habitats
(Ramsar Convention, signed 2.2.1971, ratified on 19.6.1975 and entered into force for Switzerland 16.5.1976)
- UNESCO Convention on the Protection of the World's Cultural and Natural Heritage
(concluded in Paris 23.11.1972, ratified and entered into force 17.9.1975)
- UNEP Convention on International Trade in Endangered Species of Wild Flora and Fauna
(CITES, concluded in Washington 3.3.1973, ratified on 11.6.1974 and entered into force 1.7.1975)
- Convention on the Protection of Migratory Species of Wild Animals
(Bonn Convention, concluded 23.6.1979, ratified on 7.4.1995, entered into force 1.7.1995)
- Convention on the Conservation of European Wildlife and Natural Habitats, Bern
(concluded 19.9.1979, ratified 12.3.1981, entered into force 1.6.1982)
- Convention on the Protection of the Alps, Salzburg (concluded 7.11.1991)
- Convention on the Protection and Use of Transboundary Watercourses and International Lakes, Salzburg
(concluded 7.11.1991, entered into force 6.3.1995)
- Convention on the Protection of the Marine Environment of the Northeast Atlantic, Paris,
(signed 21/22.9.1992, ratified 11.5.1994)
- Convention on Biological Diversity, UNEP, Rio de Janeiro
(concluded 5.6.1992, ratified 29.12.1993, entered into force 29.12.1994)
- United Nations Framework Convention on Climate, Rio de Janeiro
(concluded 12.6.1992, ratified 10.12.1993, entered into force 21.3.1994)
- Convention on Desertification, Paris
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Formerly extinct in Switzerland, the beaver (Castor fiber) has been successfully reintroduced in several regions. Its ability to adapt makes it an unobtrusive neighbour. The population is now stable.