Summary

In relation to the majority of European countries Croatia distinguishes itself by a great diversity of ecological systems and habitats reflected also in a considerable wealth and diversity of its flora, mycoflora and fauna. Such a wealth is the result of Croatia’s being situated at the intersection of several geographic regions, its indented relief, geological, pedological, hydrological and climatic conditions, and partly of human activities. The reasons stated, combined with various local traditions in the use of space and influenced by economic and historic circumstances, have contributed also to the extraordinary richness of biological and landscape diversity.

In comparison with the state of ecological systems in the majority of other countries of Central and Western Europe, Croatia stands out by the preserved condition of its nature. In addition to comparatively small areas of natural habitats or communities (water sources, cliffs, moors, some forests, areas of high mountains) this region is to a high degree characterized by seminatural habitats (some forests, extensive grasslands) influenced by man, but comprising chiefly indigenous living communities typical to such habitats. Anthropogenic habitats, developed under human activities and showing the structure and composition of species considerably different from the natural ones, are not as dominating as in a large part of Europe.

**LANDSCAPES**

Throughout Europe there are few natural and subnatural areas left. Instead, it is dominated by an ever-increasing number of semi-natural and artificial areas, or rather areas partly of fully modified by man. Therefore the Pan-European Biological and Landscape Diversity Strategy placed great emphasis on landscapes in which the values and interrelationships between the biological and geological diversity and national cultural heritage are reflected.

A comparatively small surface area of Croatia is a mosaic of the most diverse natural features, including a number of forms of human activities too. The diversities of the relief, soil, waters, plant coverage, climate, as well as economic and historical circumstances, resulted in diverse local traditions in the space use. All the reasons mentioned contributed to an exceptional wealth of Croatia’s landscape diversity in European proportions. However, in the course of the last decades many landscape values were degraded. The planned elaboration of Basic Landscape Elements for the entire country will provide spatial and planning foundations for identification of basic landscape values and incorporation of the obligation to protect landscapes into the legislation.

The presented overview of Croatia’s landscape units is based on the division adopted within the Physical Planning Strategy of the Republic of Croatia.

**ECOLOGICAL SYSTEMS**

In the course of NSAP elaboration, individual working groups have addressed the problem area of threats and protection of various ecological systems. Due to the specific character of the issues addressed, one working group focused separately on the coast and islands, although they do not represent a uniform ecological system. Regarding the existing state of individual ecological systems the following has been established:

**Forests**

In European proportions the state of forests in Croatia may be considered good. It is much better than in the majority of countries of the Central and Western Europe, primarily owing to the forest management method that prefers the natural composition of forests. As much as 95 percent of forest components show a natural composition and in the last hundred years the wooded areas have not decreased.

**Karst**

Viewing its natural features (landscape, hydrogeological, geomorphological, vegetation, floral and faunal) the karst region is incorporating the highest number of Croatia’s peculiarities. Regarding its overall uniqueness, wealth in endemic taxa and living communities, including the high degree of preservation, this region represents an exceptional value both in European and in global proportions.

**Wetlands and water**

In the region of Croatia vast natural wetland areas are preserved in river valleys which represents one of the highest values of biological and landscape diversity, especially at the level of the Western and Central Europe. However, these are at the same time the most threatened ecological systems in Croatia. For that reason they must be given priority in nature protection and require a national programme for their preservation and management.

**Sea**

The biological diversity of the Adriatic is more and more exposed to threat posed both by pollution of the sea by municipal and industrial wastewater and by the uneconomical use of biological resources and non-observance of legal provisions.

**Grassland and arable land**

Although originating from human activities, the grasslands of Croatia are semi-natural habitats that enrich the biological and landscape diversity to a high degree. Since used mostly in the extensive way – without fertilizers and chemicals – they are remarkable for their great biological diversity. At the European level, special importance is given to vast flood meadows and pastures in Croatian lowlands.

Arable land presents artificially generated ecological systems, intended exclusively for agricultural production and cultivated in the manner that insufficiently respects the need for the protection of biological diversity. The same is here particularly impoverished.
Croatian coast is one of the most indented coasts of the Mediterranean. The coastal mountains and offshore islands are remarkable for their plant and animal endemics. At the same time islands are highly vulnerable ecological units. For the time being they are comparatively well preserved, but threatened by planned activities. In order to preserve their natural values it is of vital importance to incorporate and follow the measures for the protection of biological and landscape diversity during planning and implementation of all development programmes.

**SPECIES AND SUBSPECIES**

A great diversity of ecological systems and habitats in Croatia results in a great diversity of plant, fungi and animal species and subspecies. The value of this diversity in European proportions is clearly evident if we, among others, compare the relation between the number of known species within well-investigated groups and the surface area of Croatia with the corresponding data for other countries. According to such a comparison, Croatia belongs among the richest European countries as regards the wealth of biological diversity. The wealth of Croatia’s endemic taxa, as well as of numerous rare and threatened relics (remnants) from the Tertiary or the Ice Age, is also highly noticeable in the karst underground, coastal mountains and offshore islands.

**Diversity of species**

<table>
<thead>
<tr>
<th>Group</th>
<th>Known</th>
<th>Assumed</th>
<th>Known</th>
<th>Assumed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plants</td>
<td>7,523</td>
<td>8,708</td>
<td>270,000</td>
<td>500,000</td>
</tr>
<tr>
<td>Fungi</td>
<td>1,744</td>
<td>25,000</td>
<td>75,000-80,000</td>
<td>2,700,000</td>
</tr>
<tr>
<td>Lichens</td>
<td>925</td>
<td>1,069</td>
<td>18,000</td>
<td>20,000</td>
</tr>
<tr>
<td>Animals</td>
<td>24,087</td>
<td>56,000</td>
<td>1,770,000</td>
<td>103,255,000</td>
</tr>
<tr>
<td>Others (viruses, bacteria)</td>
<td>?</td>
<td>?</td>
<td>8,000</td>
<td>4,000,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>-34,000</td>
<td>-91,000</td>
<td>-2,150,000</td>
<td>-111,000,000</td>
</tr>
</tbody>
</table>

**Endemics**

Croatia is extremely rich in endemic flora. With its 5.8% of endemic species, it is regarded as the centre of endemism of this part of Europe.

The major endemic junctions for flora are the mountains of Velebit and Biokovo. The most famous and one of the most threatened Croatia’s plant endemics (both the genus and the species are endemic) is Degenia velebitica, a relict species that remained from the period of Tertiary. Generally, a large number of endemics and Tertiary relics remained in these areas owing to the fact that in the tertiary period they have not undergone the Ice Age freezing. The endemics of Croatian fauna are predominantly connected with the underground karst habitats, Adriatic watercourses and Adriatic islands, particularly islands of the open sea. The fauna of the karst underground has been very poorly explored, so that in the forthcoming years a number of discoveries of new species and subspecies may be expected. The scientifically unknown underground leech discovered recently in the Luke’s pit on the Velebit mountain is one of Croatia’s peculiarities on a global scale, in which this karst region is very likely abounding.

**Degree of knowledge of Croatia’s biological diversity**

The above table shows that the number of species known in Croatia is more than two times smaller than the number of assumed species. This testifies of the low degree of exploration of Croatian flora, mycoflora and fauna.

The most extensive knowledge exists of the higher plants (pteridophytes, gymnosperms and angiosperms) with 4,288 species, and vertebrates with 1,085 species. Only few new species are expected to be discovered within these groups in future.

The knowledge of fungi in Croatia is by far the poorest as compared to the other groups. So far, 1,744 species of fungi have been recorded in Croatia. It is assumed that up to a total of 25,000 species of fungi inhabit Croatia, which means that fungi outnumber the plant kingdom.

It is established that the invertebrate groups explored in Croatia to date number a total of 23,022 species. Regarding the fact that this investigation has not included certain groups for which neither data nor competent researchers are available, we may assume that the actual total number of species is much higher and exceeds 55,000.

Unfortunately, Croatia has a problem of yet undeveloped systematic study and monitoring of biological diversity. There is no national programme of inventorying Croatia’s biological diversity available. This results in the fact that Croatia belongs to few European countries without a described flora, mycoflora and fauna of its territory and is still lacking the essential popular science handbooks (the field guides) for identification of species, even the translations of similar handbooks that apply to the entire Europe. Such handbooks would enable a larger circle of nature lovers to join the inventorying projects.

**Genetic diversity**

The protection of biological diversity implies keeping records and preservation of indigenous sorts of cultivated plants and breeds of domesticated animals. These sorts and breeds have adapted to the local climate, they are more resistant to diseases and often very well incorporated into the surrounding nature and landscape. Their diversity represents a genetic container that may always be used to improve the properties of the species grown. Besides, they represent significant national cultural heritage, because a lot of effort and knowledge of numerous generations have been put into their growing, combined with the living and climate conditions.

In this country this problem area is still not legally regulated in an integrated manner. So far no comprehensive inventories of indigenous sorts of cultivated plants and breeds of domestic animals have been made. The situation is slightly better as regards indigenous breeds in cattle breeding. Original Croatian breeds raised in Croatia have slightly better as regards indigenous breeds in cattle breeds have adapted to the local climate, they are more resistant to diseases and often very well incorporated into the surrounding nature and landscape. Their diversity represents a genetic container that may always be used to improve the properties of the species grown. Besides, they represent significant national cultural heritage, because a lot of effort and knowledge of numerous generations have been put into their growing, combined with the living and climate conditions.

In this country this problem area is still not legally regulated in an integrated manner. So far no comprehensive inventories of indigenous sorts of cultivated plants and breeds of domestic animals have been made. The situation is slightly better as regards indigenous breeds in cattle breeding. Original Croatian breeds raised in Croatia have been recorded. Some of them do not exist anywhere else in the world, and some have spread from Croatia to other countries. Dog breeds are also investigated, with some of them being officially registered, whereas registration procedures for certain breeds, e.g. the Tornjak shepherd dog, yet have to be carried out.

**BIOLOGICAL RESOURCE MANAGEMENT**

Natural resources of Croatia have been systematically exploited for centuries. The biological resources are managed mainly within the context of forestry, water management, agriculture, hunting and fishing. All these activities are
regulated by the law, with the existing regulations taking into consideration the need for sustainable management of natural resources. In practice, however, the economic component of exploitation is much more emphasized in relation to implementation of protection measures. A relative preservation of the country’s biological resources in European proportions is primarily a result of the general economic situation and other causes from the past. We still can not speak about a systematic concern about the entire biological diversity within certain activities using natural resources. One of the priorities is therefore a review of all relevant legal provisions with the view to incorporate measures of protection and sustainable use of biological diversity.

A specific problem, that is expected to gain increasingly prominence in the forthcoming years, is the impact of biotechnology and of the production of genetically modified organisms on biological diversity. These issues yet need to be legally regulated in Croatia.

**Protection of areas**

The protection of individual areas is the basic method of the conservation of biological and landscape diversity. Protected areas represent the core of the overall protection and key junctions of the ecological network, which can be considered sanctuaries and storages of biological diversity. This protection is today covering 9.9% of Croatia’s mainland territory, which is planned to be substantially extended. The Nature Protection Act is specifying eight categories of the spatial protection (national park, nature park, strict reserve, special reserve, nature monument, protected landscape, park-forest, park architecture monument). The greatest part of the protected area refers to nature parks and national parks (8.7% of the mainland). These are vast areas of national or even international importance the protection of which lies within the responsibility of the state. The majority of the proposed protected areas refer also to nature parks.

The management of other protected area categories is in the competence of the counties.

**Protection of species**

In addition to protected parts of the nature, individual threatened or rare plant, fungi and animal species are also protected by the Nature Protection Act. This Act further provides protection for all wild animals in national parks, strict and special reserves, and for the entire cave fauna. The economic use of unprotected species is regulated by special permits for gathering from the nature that are to be issued by the Ministry of Environmental Protection and Physical Planning responsible for the protection of nature and the environment.

**THREATS TO BIOLOGICAL AND LANDSCAPE DIVERSITY**

The review of the current state, global and national threats and problems of the protection of biological and landscape diversity in Croatia demonstrated the following:

- a very high level of value and conservation of biological and landscape diversity on the European scale, particularly with respect to the Western and Central Europe
- a tendency of losing biological and landscape diversity in Croatia caused by recognizable factors
- a necessity to implement immediate protection measures for individual parts of the biological and landscape diversity
- a heterogeneity of the quantity and quality of existing biological diversity data that in many cases are not sufficient for implementation of adequate protection measures.

The analysis of the data collected indicated the following protection priorities:

- karst ecological systems represent a uniqueness and wealth of global value
- due to anthropogenic impacts the wetland and aquatic ecological systems are the most threatened
- the most threatened habitats are spatially limited areas threatened by anthropogenic factors (sand and gravel beaches, pools on islands, small marshes and others) or very rare habitats beyond the usual area of distribution (moors, sand vegetation)
- priority species and subspecies are those threatened on the global, European and national scale, endemic taxa and those of economical and/or instructive importance.

**STRATEGY AND ACTION PLAN FOR THE PROTECTION OF BIOLOGICAL AND LANDSCAPE DIVERSITY OF CROATIA**

The basic principles underlying the National Strategy and Action Plan for the Protection of Biological and Landscape Diversity are the following:

- the Republic of Croatia is aware of the overall biological and landscape diversity being its fundamental value and the major resource for a further development
- the objective of the Republic of Croatia is to preserve and improve the existing biological and landscape
diversity and to make every endeavour to restore a part of the taxa and habitats lost, wherever possible and justified

- the Republic of Croatia will develop all appropriate measures for identification, conservation and improvement of the existing biological and landscape diversity
- the national legislation will ensure the incorporation of measures for conservation and improvement of the overall biological diversity into all economic activities using biological resources
- the Republic of Croatia will systematically extend its endeavours in the protection of biological and landscape diversity from the national to the regional and local level
- the Republic of Croatia will continuously harmonise its efforts in the protection of biological and landscape diversity with relevant international activities, taking into consideration the fact that national biological and landscape diversity represents a unique and irretrievable part of the overall global diversity.

In addition to principles the NSAP contains general and specific national strategic objectives for the protection of biological and landscape diversity. For each strategic objective there are strategic guidelines elaborated and a plan for individual protection actions with the indication of urgency and possible sources of funding.

The Ministry of Environmental Protection and Physical Planning co-ordinates all further activities and executes all administrative and organizational jobs with the purpose of implementing the NSAP under the supervision of the Croatian Government Commission for NSAP Implementation Monitoring set up by the Government of the Republic of Croatia.

Beside the Ministry of Environmental Protection and Physical Planning there are numerous other sectors of the society involved in the NSAP implementation: from sectoral government bodies and local government and self-government units, through scientific institutions and business sector to non-governmental organizations and local community in the broader sense.

On the basis of the NSAP implementation a revision will be carried out after each five years in order to determine what has been realized from the plan defined, whether any new moments have appeared and whether the priorities have changed, and to make a new list of action plans.
Explanation of Terms and Abbreviations

*abiotic factor* – a factor of a physical, chemical or another type belonging to the inanimate part of nature (e.g. temperature, light, oxygen, etc.)

*ACCORAMS* – Agreement on the Conservation of Cetaceans of the Black sea, Mediterranean Sea and contiguous Atlantic Area, within the framework of the Bonn Convention

*African and Eurasian Migratory Waterbirds* within the framework of the Bonn Convention

*agrophytocenosis* – a plant community (see phytocenosis) developed within the agricultural system (area)

*allochthonous species* – a foreign, nonindigenous species that has not naturally inhabited a certain area, but reached the same by the intentional or unintentional introduction

*anaoxia* – lack of oxygen

*association* – a basic unit of vegetation, a plant community characterized by a specific floristic composition and certain living conditions, remarkable for especially characteristic group of species

*autochthonous species* – an indigenous species inhabiting naturally a certain area

*Barcelona Convention* – Convention for the Protection of the Mediterranean Sea against Pollution, adopted in Barcelona in 1976

*bathyde* – a bathyal step, corresponds to marine/ocean settlements covering the continental slope and a section of the bottom with a milder inclination situated immediately at the footsteps of this slope

*benthos* – living communities at the bottom of a sea or a lake

*Bern Convention* – Convention on the Conservation of European Wildlife and Natural Habitats, adopted in Bern in 1979

*biocenosis* – a living community of all organisms occupying a specific habitat, including the flora, fauna and microorganisms

*BioData&GIS* – a scientific project of the Ministry of Science and Technology called “Biological Database and GIS” (119116)

*biotic factor* – a factor whose existence is determined by the living part of the nature (e.g. competition, parasitism, commensalism, etc.)

*biogeography* – a part of biology studying the pattern of distribution of living beings in the past and present

*biological diversity* – the entirety of all living organisms that are constituent parts of mainland, marine and other aquatic ecological systems and ecological complexes, including the diversity within species, among species and the diversity among ecological systems

*biotechnology* – each technology using biological systems, living organisms or parts thereof in the manufacture or application of products or processes for special purposes

*biotope* – see habitat

*Bonn Convention* – Convention on the Conservation of Migratory Species of Wild Animals, adopted in Bonn in 1979

*CBS* – Croatian Biological Society

*CES* – Croatian Ecological Society

*check list* – list of taxa, meaning the same as an “inventory list”


*classification* – a science (as a process) of arranging or rather ordering organisms into groups by their kinship

*CORINE* – Information System on the Co-ordination of Information on the Environment

*corollology* – a part of biology dealing with the distribution of taxa and with the study of their dependence on abiotic and biotic factors

*CSNS* – Croatian Society of Natural Sciences

*cultivated species* – species occurring in culture, formerly wild taxa that, mostly by longtime growing and selection, have been more or less modified in relation to the original taxon

*determination* – the process of identifying taxonomic affiliation of a taxa; allocating a name to a specimen of an organism by using the so-called keys; also identification of a species (or another taxonomic category)

*dolomite* – a type of rock showing a corresponding mineral composition (CaMg\(_2\)CO\(_3\)); covering large areas in the mountains of Central and Southern Europe either independently or combined with other rocks, often limestone; consisting of 54% of easily soluble calcium carbonate and 46% of hardly soluble magnesium carbonate

*domesticated species* – species whose evolution process was affected by man so as to satisfy his own needs

*ecological system* – a dynamic complex of communities of plants, animals, microorganisms and their inanimate environment interacting as a functional unit

*EEP* – European Endangered Species Programme

*endemic* – a taxon whose distribution is confined to a particular place or area; the term “endemic” is to be used together with identification of the place to which it refers, i.e. taxa may be distinguished as endemic at the continental level (e.g. European, North American and similar) or over a far smaller area (e.g. Mediterranean, Croatian, the area of Biokovo mountain and similar)

*entomofauna* – fauna of insects

*entropy* – a science (as a process) of arranging or rather ordering organisms into groups by their kinship

*excrement* – a type of rock showing a corresponding mineral composition (CaMg\(_2\)CO\(_3\)); covering large areas in the mountains of Central and Southern Europe either independently or combined with other rocks, often limestone; consisting of 54% of easily soluble calcium carbonate and 46% of hardly soluble magnesium carbonate

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*entomofauna* – fauna of insects
**EUFORGEN** – project for conservation of genetic resources of European forests

**EUROBATS** – Agreement on the Conservation of Bats in Europe, within the framework of the Bonn Convention

**eutrophication** – overgrowthing of lakes due to the increased concentration of nitrogen, phosphorus and other organic substances

**ex-situ conservation** – conservation of biological diversity components out of their natural habitats

**FAO** – United Nations Food and Agriculture Organization

**garigue** – a degradation stadium of Mediterranean evergreen vegetation, appearing mostly as a consequence of grazing; small, low compact bushes

**GEF** – Global Environment Facility

**gene** – a segment of DNA that provides the coded instructions for a characteristic, the functional unit of heredity

**genetic diversity** – diversity of genes of an individual, a population, species and higher taxonomic categories

**genetic material** – plant, animal, microbic and other material contained in functional units of heredity

**Geneva Convention** – Convention on Specially Protected Areas and Biological Diversity in the Mediterranean, adopted in Geneva in 1982

**GIS** – Geographic Information System, a technology accompanied by a specialized computer support designed for data storage, processing and analysis characterized by a spatial component and mutual spatial relations

**glacial period** – the Ice Age, the Pleistocene Epoch or Diluvium of the Quaternary Period characterized by icing and temperature by 8–12°C lower than today

**glacial relict** – a taxon that is a part of present flora or fauna, but represents the remnant of a mainly extinct flora or fauna from the preglacial (ice) age; thanks migrations glacial relics survive often in small areas and represent a highly valuable part of flora or fauna of a specific area

**GMO** – genetically modified organism

**habitat** – a unit of space characterized by a certain combination of physical and chemical factors, a space or a place as a natural environment of an organism or a population

**herbarium** – in the narrowest sense of the word a collection of dried plant specimens with adequate accompanying data and internal organization; the collection material has application in taxonomic (anatomic, morphological, phytochemical, molecular), corollological, ecological and other studies and is frequently used as a comparative material for successful identification of unknown taxa

**HRT** – Croatian Radio and Television (orig. Hrvatski radio i televizija)

**hydrophytes** – plants growing in moist and aquatic habitats, aquatic plants

**hygrophilia** – an affinity to increased moisture; relates to taxa or communities that appear under conditions of high moisture

**hypoxia** – lack of oxygen, low concentration

**identification** – see “determination”

**ichthyofauna** – fauna of fishes

**indicator species** – species capable of indicating specific changes within an ecological system and among species, mostly vulnerable to modifications of one, several or many abiotic factors

**indigenous species** – the same as autochthonous species

**in-situ conservation** – conservation of ecological systems and natural habitats, including conservation and renewal of species able to survive in their natural surroundings, and, in case of domesticated or cultivated species, in the surroundings in which they developed their specific features

**interstitial fauna** – fauna of underground pebbly and sandy alluvial deposits

**introduced species** – see allochthonous species

**introduction** – bringing in, relating most often to bringing foreign species into the autochthonous flora or fauna

**inventory list** – same as a “list of species”, check list

**inventory of species** – relates to inventories of flora and fauna species, limited taxonomically (e.g. a list of lichens or a list of decapode crabs), geographically (e.g. the inventory of flora of Istrian peninsula or the inventory of Croatia’s birds) or most often both

**ISIS** – International Species Information System

**IUCN** – International Union for the Conservation of Nature

**key** – relating to a manual (mostly a book, sometimes illustrated) of a specific internal organization that facilitates identification of taxonomic affiliation of an organism, or rather allocation of a valid name to an unknown taxon

**littoral** – a zone pertaining to the shore of a sea, of the height varying in dependence on the relief; divided into several subzones depending on the exposure to seawater and air, including the pertaining biocenoses

**MAB** – Man and Biosphere, an UNESCO programme

**macrofauna** – fauna of large organisms, the term is used mostly when speaking of marine fauna of invertebrates

**mesofauna** – fauna of medium-large organisms, the term is used mostly when speaking of marine fauna of invertebrates

**MEPPP** – Ministry of Environmental Protection and Physical Planning

**mesophytes** – plants growing in moderately moist habitats

**microfauna** – fauna of small organisms, the term is used mostly when speaking of marine fauna of invertebrates

**myrmecophilia** – an affinity to ants (butterflies of Maculinea genus)

**MTB** – fields or a grid (in German: Meßtischblätter) forming a series of squares defined by the latitude and longitude grid (according to Greenwich): 10° geographic latitude x 6° geographic longitude; each square degree is thus divided into 60 MTB fields; basic fields of the MTB grid were for the first time used for flora mapping in Germany and afterwards adopted by the majority of Central-European countries

**nonindigenous species** – see “allochthonous species”

**NGO** – Non Governmental Oranization

**nomenclature** – a part of taxonomy laying down the rules for allocating the adequate name to an organism according to the nomenclature rules

**NSAP** – National Strategy and Action Plan for the Protection of Biological and Landscape Diversity

**ornithofauna** – fauna of birds

**oviposition** – laying eggs; with insects through ovipositor

**Paris Convention** – Convention on the Protection of World Cultural and Natural Heritage, adopted in Paris in 1972

**pelagium** – the open sea (pelagos); pelagic organisms (e.g. planktons) are those living in the middle of the sea, free from any contact with the bottom

**phylogeny** – development of taxa in time and space

**phytocenosis** – a community of plant species whose occurrence, composition and number are determined by a series of ecological factors
**population** – all the individuals of one species inhabiting a given area that are capable of actual and potential mutual reproduction

**protected area** – a geographically specified area intended for or managed and controlled so as to achieve specific protection goals

**Ramsar Convention** – Convention on Wetlands of International Importance Especially as Waterbirds Habitats, adopted in Ramsar in 1971

**Ramsar area** – a protected area registered on the “List of Wetlands of International Importance” within the framework of the Ramsar Convention

**reintroduction** – introduction of a new taxon into the area that it earlier inhabited, but from which it disappeared due to diverse factors; the act of introducing again

**relict** – a taxon which is a part of the present flora or fauna, but represents a remnant of a formerly living, mostly extinct animate world

**ruderal flora** – flora of anthropogenically highly influential habitats, rich in nitrates

**ruderal communities** – communities developing in anthropogenically highly influential habitats

**scree** – a habitat often very steep, covered by movable rocks and a small quantity of nutrients; an extremely unfavourable habitat inhabited by specially adjusted taxa

**sp.** – abbreviation of “species”

**ssp.** – abbreviation of “subspecies”, also subsp.

**stenoendemic** – an endemic that, with respect to the area defined, occurs in its minor part only (e.g. the endemic of the Biokovo mountain, the endemic of the island of Jabuka), an endemic in a narrow sense, a “real” endemic

**subendemic** – an endemic that, with respect to the area defined, occurs outside its limits, an endemic in a broader sense

**subspecies** – a taxonomic category, one of the lowest (in Latin: *subspecies*, abbreviated in *sp., ssp.*), a group of populations that have to a certain degree diverged and mutually differ (from morphological, anatomic and other aspects), but still not sufficiently to form independent species (isolated in terms of reproduction); two or more subspecies form a species

**subsp.** – see *sp.*

**supralittoral** – a zone which is a part of the littoral, inhabited by organisms that stand or require permanent rising to the surface, a zone damp from spraying seawater with very seldom immersion (e.g. large tides)

**sustainable development** – development implying the satisfaction of needs of the present generation in the manner that is harmless to future generations

**sustainable use** – use of biological diversity components in the manner and to the extent that will not cause degradation of biological diversity, in the manner that preserves its potentials so as to meet the demands and aspirations of present and future generations

**systematics** – a biological science incorporating the subdisciplines such as: taxonomy, the study of evolution processes (variability sources, differentiation of populations, reproductive isolation, origin of species, hybridization, etc.) and the study of phylogeny

**taxon** – a classification unit of any class, subspecies, species, genus, family, order and similar

**taxonomy** – a biological science dealing with classification, identification and nomenclature, a subdiscipline of systematics

**Tertiary** – a geological period at the beginning of the Cenozoic, starting 65 million years ago and ending 2 million years ago; consisting of Paleocene, Eocene, Oligocene, Miocene and Pliocene

**travertine** – organogenic limestone deposits generated by complex physical, chemical and biological processes

**UNCED** – United Nations Conference on Environment and Development held in Rio de Janeiro in 1992

**var.** – abbreviation for variety (Lat. *varietas*)

**variety** – a category within a species differing from typical individuals in several features only, mostly hardly noticeably (abbreviation var.)


**WG** – working group for elaboration of the NSAP

**xerophytes** – plants growing in dry habitats

**zoocenosis** – a community of animal species whose occurrence, composition and number depend on a series of ecological factors
List of plants and animals referred to in the text

adder (Vipera berus) also common viper
Adriatic minnow (Pisces lepidotus)
Adriatic salmon (Salmo mykiss)
Adriatic sturgeon (Acipenser naccarii)
Adriatic mackerel (Scomber scomber)
Atlantic bonito (Sarda sarda)
Atlantic bluefin tuna (Thunnus thynnus)
ash (Fraxinus excelsior)
arrowhead (Poterium sanguisorba)
beaver (Castor fiber)
bearded tit (Panurus biarmicus)
beech (Fagus sylvatica)
big white truffles (Tuber magnatum)
black alder (Alnus glutinosa)
black angler (Lophius sp.)
black arrowhead (Poterium sanguisorba)
black elder (Sambucus nigra)
black elder Bourtree (Sambucus nigra)
bog arum (Calla palustris)
bog clubmoss (Lycopodium inundatum)
Bonelli’s eagle (Hieraaetus fasciatus)
booted eagle (Hieraaetus pennatus)
broad-leaved cotton grass (Eriophorum latifolium)
British oyster (Ostrea edulis)
British oyster (Ostrea edulis)
brown bear (Ursus arctos)
brown birch (Betula pubescens)
brown hare (Lepus europaeus)
brown meagre (Sciaena undula)
British oyster (Ostrea edulis)
brown toad (Bufo bufo)
brown wrasse (Labrus merula)
bustard (Otis tarda)
butterer’s broom (Ruscus hypoglossum)
caddis-flies (Trichoptera)
Calabrian pine (Pinus brutia)
calamus (Acorns calamus)
calandra lark (Melanocorypha calandra)
Canadian pondweed (Elodea canadensis)
Canadian water weed (Elodea canadensis)
capercaillie (Tetrao urogallus)
cask shell (Tonna galea)
caspian whip snake (Coluber caspius)
cave shrimp (Troglocaris anophtalmus, Niphargus sp.)
cetina spined loach (Cobitis taenia sp. dalmatia)
chamois (Rupicapra rupicapra)
chantrelle (Cantharellus cibarius)
charr (Salvelinus alpinus)
chukar partridge (Alectoris chukar)
cigar shell (Mitra zonata) also zoned miter
cistozoa (Cystoseira spp.)
common ash (Fraxinus angustifolia)
common dolphin (Delphinus delphis)
common elder Bourtree (Sambucus nigra)
common fir (Abies alba)
common hamster (Cricetus cricetus)
common heather (Calluna vulgaris)
common hornbeam (Carpinus betulus)
common juniper (Juniperus communis)
common kingfisher (Alcedo atthis)
common oak (Quercus robur)
common otter (Lutra lutra) also otter
common paper nautilus (Argonauta argo)
common periwinkle (Vinca minor)
common redshank (Tringa totanus)
common reed (Phragmites australis)
common sandpiper (Actitis hypoleucos)
common spider crab (Maja squinado)
common spruce (Picea abies) also spruce
common spruce (Picea abies) also spruce
common toad (Bufo bufo)
common two-banded sea bream (Diplodus vulgaris)
common viper (Vipera berus) also adder
common wall lizard (Podarcis muralis sp. maculiventris)
common yew (Taxus baccata) also yew
corals (Anthozoa)
corn cockle (Agrostemma githago)
corn crake (Crex crex)
cotton grass (Eriophorum latifolium)
flake (Porzana sp.)
crashy (Astacidae)
Croatian algae (Alcyonacea)
Croatian minknow (Phoxinus croaticus)
Croatian sibirea (Sibirea aliaiensis ssp. croatica)
cuckoo wrasse (Labrus disputata)
curlow (Nunenius sp.)
Dalmatian algryoides (Algyroides nigropunctatus)
Dalmatian barbelguideon (Aulopyge hugelli)
Dalmatian black pine (Pinus nigra ssp. dalmatica)
Dalmatian garden dormouse (Eliomys quercinus ssp. dalmaticus)
Dalmatian minnow (Phoxinellus ghetaldi)
Dalmatian pelecan (Pelecanus crispus)
Dalmatian soifte (Chondrostoma siberica)
Dalmatian wall lizard (Podarcis melisellensis)
huchen (Hucho hucho)
date mussels (Lithofaga lithobagha)
decapods (Decapoda)
deep-sorted pipefish (Syngnathus typhle ssp. rotundatus)
degenia (Degenia velebitica) also Velebit degenia
diplopods (Diplopoda)
dragonflies (Odonata)
dropwort (Filipendula vulgaris)
dunlin (Calidris alpina)
durmast oak (Quercus petrae)
dusty-miller (Centauraea ragusina)
dwarf catfish (Typhla minima)
dwarf pine (Pino mugno) also mountain pine
echinodermas (Echinodermata)
eelgrass (Posidonia oceanica)
edible boletus (Boletus edulis)
edible frog (Rana esculenta)
Egyptian vulture (Neophron percnopterus)
Eleonora’s falcon (Falco eleonorae)
english holly (Ilex aquifolium)
European anchovy (Engraulis encrasicholus)
European ground squirrel (Spermophilus citellus)
European pigletch (Sardina pilchardus)
European roller (Coracias garrulus)
European sea bass (Dicentrarchus labrax)
European storm petrel (Hydrobates pelagicus)
fallow deer (Dama dama)
false rhapsor (Pseudorazbora parva)
false ringlet (Coenonympha oedipus)
ferruginous duck (Aythya nyroca)
fescue (Festuca sp.)
fir-bellied toad (Bombina bombina)
flounders (Pleuronectiformes)
frilltail (Fritillaria meleagris)
freshwater hunting (Coregonus laverus)
gadwall (Anas strepera)
German tamarisk (Myricaria germanica)
giant Mediterranean pen (Pinna nobilis) also pen shell
gill-head sea bream (Sparsus aurata)
glossy ibis (Plegadis falcinellus)
gobies (Gobiidae)
golden eagle (Aquila chrysaetos)
goldfish (Carassius auratus)
grass carp (Ctenopharyngodon idella)
grass frog (Rana temporaria) also common frog
grassy-rush (Butomus umbellatus)
gravel (Sibiraea altaiensis)
gray-hair grass (Coryneboporus canescens)
gray mullet (Mugil sp.)
gray partridge (Perdix perdix)
gray wolf (Canis lupus) also wolf
great bittmen (Botaurus stellaris)
great cormorant (Phalacrocorax carbo)
great white heron (Egretta alba)
greater bladerwort (Utricularia vulgaris)
greater nootule (Nyctalus lasiopterus)
green wrasse (Labrus viridis)
greylegg goose (Anser ater)
griffon vulture (Gyps fulvus)
grotte goby (Speloegobius trigloides)
ground beetles (Carabidae)
grouper (Epinephelus sp.)
guilt head sea-bream (Sparsus aurata)
gull-billed tern (Gelochelidon nilotica)
hake (Merluccius merluccius)
harvestman (Opiliones)
hawwhorn (Cragaeus sp.)
heat ringlet (Coenanimpha tullia)
hellebores (Helleborus spp.)
horn oak (Quercus ilex)
honey mushroom (Armillaria sp.)
horn of plenty (Craterellus cornacapoides)
horned lark (Eremophila alpestris)
horse leech (Haemopis sanguisuga)
horse-flies (Tabanidae)
Horvath’s rock lizard (Lacerta horvathii)
hover-flies (Syrphidae)
hydrozoans (Hydrozoa)
icterine warbler (Hippolais icterina)
imperial eagle (Aquila heliaca)
Italian agile frog (Rana laevis)
Italian wall lizard (Podarcis sicula)
Jabuka knawpeed (Centauraea jabakensis)
Jabuka pink (Dianthus multifloris)
Jack’s scallop (Pecten jacobaeus)
jack snipe (Lymnocryptes minimus)
kaulerpa (Caurlerpa taxifolia)
kentish plover (Charadrius alexandrinus)
knawpeed (Centauraea critidofila)
Kolombatovic grey longeared bat (Plecos autricus ssp. kolombatovici)
Kolombatović’s goby (Chromogobius zebratus ssp. zebratus)
Krka Adriatic salmon (Salmo ohridanus obtusirritis sp. brakensis)
ladybird spider (Eresus niger)
lake frog (Rana ridibunda) also marsh frog
lake trout (Salmo trutta)
lanner falcon (Falco biarmicus)
large blue butterfly (Maculinea sp.)
largemouth black bass (Micropterus salmoides)
lavander (Lavandula officinalis)
leopard snake (Elaphe situla)
lesser kestrel (Falco naumanni)
lesser Neptune grass (Cymodocea nodosa)
lesser spotted eagle (Aquila pomarina)
levant sparrowhawk (Accipiter brevipes)
Liechtenstein’s goby (Corycogobias liechtensteinii)
lime (Tilia sp.)
little bittern (Ixobrychus minutus)
little crane (Porzana parva)
little ringed plover (Charadrius dubius)
little tern (Sternia albifrons)
little white heron (Egretta garzetta)
live oak (Quercus virgiliana)
loggerhead turtle (Caretta caretta)
LIST OF PLANTS AND ANIMALS REFERRED TO IN THE TEXT

- long-fingered bat (Myotis capaccini)
- long-leaved helleborine (Cephalanthera longifolia)
- lumbricides (Lumbricidae)
- lynx (Lynx lynx)
- mallow (Anas plathyrynchos)
- maned wolf (Chrysocyon brachyurus)
- maple (Acer sp.)
- marble trout (Salmo trutta ssp. marmoratus)
- marsh frog (Rana ridibunda) also lake frog
- marsh harrier (Circus aeruginosus)
- margatong lil (Liliastrum margatong)
- Martin’s snow vole (Dinazamys bogdanovi)
- mat weed-grass (Nardus stricta)
- medicinal leech (Hirudo medicinalis)
- Mediterranean moray (Muraena helena)
- Mediterranean mussel (Mytilus galloprovincialis)
- Mediterranean shearwater (Puffinus yelkouan)
- Mediterranean toothcarp (Gambusia affinis ssp. holbrooki)
- minnow carp (Phoxinus sp.)
- minnow nase (Chondrostoma phoxinus)
- mound-building mouse (Mus spicilegus)
- mollusks (Mollusca)
- monk seal (Monarchus monachus)
- monkey goby (Neogobius fluviatilis)
- Montagn’s harrier (Circus pygargus)
- Moor frog (Rana arvalis)
- Mosor rock lizard (Lacerta mosorinensis)
- mottled black sea goby (Proterorhinus marmoratus)
- mouflon (Ovis orientalis)
- mountain anemone (Pulsatilla montana)
- mountain pine (Pinus mugo) also dwarf pine
- moustached warbler (Acrocephalus melanocephalus)
- marble trout (Salmo trutta ssp. marmoratus)
- mullet (Mugil sp.)
- narrow-leaved bindweed (Convolvulus lineatus)
- narrow-leaved helleborine (Cephalanthera longifolia)
- nehely’s horseshoe bat (Rhinolophus nehelyi)
- Neretva spined loach (Cobitis taenia ssp. narentana)
- Neretva Adriatic salmon (Salmo Adriaticus obtusirostris sp. oxyrhynchos)
- night heron (Nycticorax nycticorax)
- northern bat (Eptesicus nilsonii)
- northern bolwhite (Colinus virginianus)
- Norway lobster (Nephrops norvegicus)
- nose-horned viper (Vipsa ammodytes)
- olive-tree warbler (Hippolais olivetorum)
- olm (Proteus anguineus)
- orange-milk lactarius (Lactarius sp.)
- oriental hornbeam (Carpinus orientalis)
- oriental knight’s spur (Consolida orientalis)
- Ors’sin’s viper (Vipsa orsii)
- orthopteroid insects (Orthoptera)
- otter (Lutra lutra) also common otter
- oysercatcher (Haematopus ostralegus)
- Pacific triton (Charonia tritonis) also Triton’s trumpet
- Palagruza cabbage (Brassica poteri)
- Palagruza knapweed (Centaurea friderici)
- Palestine mole mouse (Nannospalax leucodon)
- parti-coloured bat (Vespertilio murinus)
- pea crab (Pinnotheres sp.)
- pen shell (Pinna nobilis) also giant Mediterranean pen
- peregrine falcon (Falco peregrinus)
- pheasant (Phasianus colchicus)
- pine marten (Martes martes)
- pipefish (Syngnathus sp.)
- po brook lamprey (Lethenteron zanandrei)
- po barbel (Barbus plebeius)
- pond bat (Myotis dasycneme)
- pool frog (Rana lessonae)
- poplar (Populus sp.)
- primrose (Primula vulgaris)
- pubescent oak (Quercus pubescens)
- pumpkin-seed sunfish (Lepomis gibbosus)
- purple heron (Ardea purpurea)
- purple moorgrass (Molinia coerulea)
- pygmy corncrake (Halletor pygmeus)
- pygmy owl (Glaucidium passerinum)
- quail (Coturnix coturnix)
- raccoon dog (Nyctereutes procyonoides)
- rainbow trout (Oncorhynchus mykiss)
- red coral (Corallium rubrum)
- red-crested pochard (Netta rufina)
- red deer (Cervus elaphus)
- red helleborine (Cephalanthera rubra)
- red-milk lactarius (Lactarius sp.)
- red mullet (Mullus barbatus)
- red-necked grebe (Podiceps grisegena)
- red scorpionfish (Scorpaena scrofa)
- red-footed falcon (Falco vesperinus)
- red kite (Milvus milvus)
- rock partridge (Alectoris graeca)
- roe-deer (Capreolus capreolus)
- rosemary (Rosmarinus officinalis)
- roothless duckweed (Wolfia arrhiza)
- round-leaf sundew (Drosera rotundifolia)
- rudd (Scardinius erythrophthalmus)
- sage (Salvia officinalis)
- saker falcon (Falco cherrug)
- sand goby (Pomatoschistus canestrini)
- sand martin (Riparia riparia)
- sawflies (Sympeta)
- schreibers’ bat (Miniopterus schreibersii) also bent-winged bat
- scullcap (Scutellaria galericulata)
- sea bindweed (Calystegia soldanella)
- sea buckthorn (Hipppophae rhamnoides)
- sea daffodil (Pancratium maritimum)
- sea mats (Bryozoa)
- sea parnship (Echinophora spinosa)
- sea-shore false bindweed (Calystegia soldanella)
- sea slug (Cratera pergrina)
- sea spurt (Ascidiacea)
- sea-horse (Hippocampus sp.)
- sharpnout sea bream (Diplodus puntazzo)
- sharp-snouted rock lizzard (Lacerta ocephala)
- short-eared owl (Asio flammeus)
- Siberian iris (Iris sibirica)
- silver carp (Aristichthys nobilis)
- silver carp (Hypophthalmichthys molitrix)
- slender-billed curlew (Numenius tenuirostris)
- slenderbill pipefish (Syngnathus taenionotus)
- small falcon (Falco columbarius)
- small-leafe lime (Tilia cordata)
- smooth newt (Triturus vulgaris)
- snake-eyed skink (Ablepharus kitaibeli)
- snipe (Gallinago gallinago)
- snow leopard (Panthera uncia)
- snowdrop (Galanthus nivalis)
- snowdrop anemone (Anemone sylvestris)
- Solin Adriatic salmon (Salmothymus obtusirostris ssp. salonitana)
- south Dalmatian minnow (Phoxinus phoxinus)
- souffie (Leuciscus souffia ssp. muticellus)
- sphagnum (Sphagnum sp.)
- spined loach (Cobitis taenia ssp. dalmatina)
LIST OF PLANTS AND ANIMALS REFERRED TO IN THE TEXT

sponges (*Spongia*)
spoonbill (*Platalea leucordia*) also white spoonbill
spotted deer (*Axis axis*)
spotted eagle (*Aquila clanga*)
spotted minnow (*Phoxinellus adspersus*)
spring-snowflake (*Leucojum vernum*)
spruce (*Picea abies*) also common spruce
squacco heron (*Ardeola raloides*)
stagshorn clubmoss (*Lycopodium clavatum*)
steppe mouse (*Apodemus uralensis*)
stock pidgeon (*Columba oenas*)
stone curlew (*Burhinus oedicnemus*)
Tengelman’s owl (*Aegolius funereus*)
three-spined stikleback (*Gasterosteus aculeatus*)
three-toed woodpecker (*Picoides tridactylus*)
Triton’s trumpet (*Charonia tritonis*) also Pacific triton
truffles (*Tuber sp.*)
turkey oak (*Quercus cerris*)
Turk’s-cap lily (*Lilium martagon*)
turnstone (*Arenaria interpres*)
upright brome (*Bromus erectus*)
upright dorycnium (*Dorycnium rectum*)
Velebit degenia (*Degenia velebitica*) also degenia
velika ozimica (*Coregonus lavaretus*)
viper’s bugloss (*Hardenia irregularis*)
Visovac trout (*Salmo trutta ssp. visovacensis*)
Visovac goby (*Knipoziitschia mrazkovicci*)
Vrgorac goby (*Knipoziitschia punctatissima ssp. croatica*)
warbler (*Locustella sp.*)
water chestnut (*Trapa natans*)
water-aloie (*Stratiotes aloides*)
water-clover (*Marsilea quadrifolia*)
water germander (*Teucrium scorodonia*)
weever (*Trachinus sp.*)
western whip snake (*Coluber viridiflavus ssp. carbonarius*)
Weymouth pine (*Pinus strobus*)
whimberl (*Numenius phaeopus*)
whiskered tern (*Chlidonias hybrida*)
white beadrush (*Rhynchospora alba*)
white poppy (*Papaver dubium ssp. lecoquii var. albifolium*)
white sea beam (*Diplodus sargus*)
white spoonbill (*Platalea leucordia*) also spoonbill
white stork (*Ciconia ciconia*)
white tailed deer (*Odocoileus virginianus*)
white-tailed eagle (*Haliaetus albicilla*)
white-winged tern (*Chlidonias leucoptera*)
wild boar (*Sus scrofa*)
willow (*Salix cf.*)
wolf (*Canis lupus*) also gray wolf
wood anemone (*Anemone sylvestris*)
woodcock (*Scopax rusticola*)
wood ant (*Formica rufa*)
woodchat shrike (*Lanius senator*)
woolly chamomile (*Anthemis tomentosa*)
yellow florned poppy (*Glaucium flavum*)
yellow gentian (*Gentiana lutea ssp. symphiandra*)
yellow sea fan (*Eunicella cavolinii*)
yellow-bellied toad (*Bombina variegata*)
yew (*Taxus baccata*) also common yew
zander (*Stizostedion lucioperca*)
zoned miter (*Mitra zonata*) also cigar shell
Zrmanja trout (*Salmo trutta ssp. zrmanjensis*)
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