

Bavarian State Ministry for
Environment, Public Health and Consumer Protection



Nature.Diversity.Bavaria.

Natur. Vielfalt. Bayern.



Dr. Otmar Bernhard
State Minister



Dr. Marcel Huber
State Secretary

Ladies and Gentlemen, Dear Nature-Lovers!

An attitude towards life and homeland is inseparably connected with nature and landscape, with the quality of recreation and value of leisure time. We in Bavaria know and appreciate this in a special way. Business and tourism are also dependent upon an intact natural environment and landscape. Plants, animals, fungi and microorganisms purify the water and air. They provide us with fertile soil and healthy food. The concept of biodiversity embraces all of this. This biological diversity is at risk if we do not stop the global loss of species.

Germany will be the host of the 9th UN Conference on the Environment from May 19 to 30, 2008. The common goal of the international community is the global preservation of biodiversity, which means: protection of the variety of species and biocoenosis, as well as genetic diversity. The 190 participating states committed themselves to this goal in 1992.

For decades, Bavaria has undertaken great efforts for the protection of nature. Since the year 2000 alone, the State of Bavaria has invested about 1.5 billion euros in the statewide network of biotopes, environmentally compatible land use and water-pollution control. 13% of the state's area has been secured for nature conservation.

Despite all of these efforts, Bavaria is also concerned about a loss of species. About 50% of the animal and plant species are now considered endangered. The climate change is likely to accelerate this development even more. We must increase and concentrate our efforts on all levels of society in order to preserve biological diversity.

This is why the Council of Ministers adopted at the beginning of April 2008 a "Strategy for Preservation of Biological Diversity in Bavaria," which it intends to implement together with the social groups involved. For example, Bavaria will more closely connect the statewide biotope network, strengthen environmental education and further dedicate itself to the topic of land use.

This brochure is intended to convey to you the "fascination of nature" and the significance that the diversity of life has for us human beings. We must treat the treasure of nature that has been entrusted to us in a careful and caring way.

A handwritten signature in black ink, appearing to read "O. Bernhard".

Dr. Otmar Bernhard
State Minister

A handwritten signature in black ink, appearing to read "M. Huber".

Dr. Marcel Huber
State Secretary

We Bavarians love the diversity of our regions, our beautiful landscapes and natural environment.

What we value about our quality of life in Bavaria also applies to the natural environment: The more varied the greening, blossoming and ripening of the meadows and fields, the more creatures large and small in the mountains and forests, rivers and lakes that crawl and run or swim, the more beautiful we think the state is. Whenever we can, we drive out “into the green” – for recuperation. Preserving the habitats of human beings, of flora and fauna throughout the world in its diversity, is the joint goal that has been set by 190 states of the international community in the Biodiversity Convention.

The diversity of species in nature also concerns us. Though we think our Bavarian homeland with its abundance of contrasts is beautiful and loveable, we know: it is also no longer an intact world.



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**We human beings do not even notice when a moth is missing.
But the bat does because it needs the moth as food.**

Bavaria is Germany's largest state in terms of territory – rich in variations of fascinating natural spaces from the Alps to the sun-pampered Main Valley and from the fertile farmland to the thickly wooded low mountain ranges. The recorded biotopes outside of the Alps now cover just 4 percent of the state's surface. They are a species reservoir, our "gene pool," and include 70 different types of habitats.

Although we human beings are not sad to see a single mosquito go, the swallows live from them. And we do not know today which losses will someday endanger us. Life needs diversity. This network includes species, but also habitats, life forms and symbioses. The exchange and adaptation to the changed environmental conditions is constantly occurring. Only this ecological interplay in nature makes life possible on earth.

In our 'Bayerischer Wald' and Berchtesgaden national parks, we allow nature to take its course and permit extensive wilderness. It is considered to be something mysterious that people were afraid of in earlier times. Now that we have almost no wilderness left, the yearning for wilderness is increasing once again.

■ FACTS

Incidence of species in Bavaria

- 3,083 macro-fungi
- 965 mosses
- 1,574 lichen
- 2,727 ferns and flowering plants
- 16,000 animals (estimated at 30,000 to 35,000)
- 0.6% of the state area is wilderness regions (national parks)

We human beings are hardly aware of how much biological diversity is already endangered – and what we would be missing without it.

The natural spaces of Bavaria are still populated by many different species. We find the greatest species density where the landscapes are not fragmented or where there is extensive cross-linking between them and where humans shape and use them in an environmentally compatible manner. This also includes the production of food. For many thousands of years, humans have cultivated plants as food. The most important useful plants throughout the world are now wheat, rice and maize. Preserving the wild species with their genetic information is important for the growing of more resilient cultivated plants. This may be very significant during the climate change for the future of the world's food. Just because we do not know the benefits of an herb certainly doesn't mean it is a useless weed. The creation contains many things that humans do not understand or do not yet understand, but nothing is meaningless. All of the living beings within it are dependent upon each other: Where the water has no fly larvae, no trout will swim. Where the frogs have been dried up, no storks will nest. And where no mouse runs, there will no longer be a buzzard circling. All species are dependent upon each other.

■ FACTS

- 90% of the world's food is produced by 20 plant species.
- Wheat, rice and maize cover 60% of the food needs, but 75,000 plant species are edible.
- Tens of thousands of rice species are known throughout the world, but we only use a handful of them.
- Germany has recorded 3,250 types of apples.
- The gene bank for fruit (pomaceous, soft and wild fruit) in Germany contains about 3,000 specimens.



Biodiversity – Variety of Life



Nature as a Teacher



Nature is a master at organising processes, making use of materials and saving energy.

We human beings are dependent upon the interplay of the species – more than we believe. Bionics (biology and technology) practically steals ideas from “Engineer Nature.” For example, the fur of the polar bear serves as the model for insulating materials, the beak of the hoopoe for the tweezers and the spider web for the roof of Munich’s Olympic tent. The dream of flying would never have come true without studying the birds.

Biological diversity embraces the entire abundance of the habitats according to the climate, soil and altitudes and the genetic diversity of varieties and races. This includes varieties of potatoes as well as taste variations among the species of apples or races of domestic animals, which are adapted to the differences of climate, soil or food. This makes them more resistant against heat, cold, moisture or dryness.

The significance of the soil for us human beings is often underestimated. It is the basis of the earth’s food chain for us humans and most other living beings. But it is vulnerable and not endlessly available. When we erode it, overfertilize it, burden it with harmful substances, seal it off or take away its nutrients, we lose our soil foundation.

FACTS

- Germany imports 45,000 tons of medicinal plants every year.
- 55% of the domestic-animal races are endangered.
- Researchers estimate that new medications could be developed from 125,000 flowering plants in the tropics.
- A handful of soil contains 6.8 billion individual beings (bacteria, fungi, algae, macro- and microfauna), about as many as there are humans living on the earth.

Humans are part of nature and personally responsible for their environment as rational living beings.

Only the cross-linking of habitats enables the exchange of the species among each other. Conservation areas are the “hubs” required for this purpose. The diversity of habitats gives every landscape an unmistakable face and an identity that means our homeland for us humans. Unfamiliar landscapes make us curious and are attractive holiday areas. Tourism is one of the international sectors that exhibit the strongest growth. Most tourists want to recuperate in a beautiful, intact natural area and landscape. When this quality of a holiday region is no longer in tune, they react quickly and avoid the “scorched earth.”

Bavaria is the No. 1 tourism state in Germany. The capital of a recreation area is its biodiversity and varied landscapes. This must be preserved, and not the concrete leisure industry on asphalt meadows. Environmental catastrophes and the destruction of nature can quickly have a negative effect on the image of a state. For many human beings in Bavaria, recreation in the evening or on the weekend is unthinkable without “fresh air” in open nature and a beautiful landscape. Business enterprises have confirmed this: Leisure and recreation possibilities in a natural landscape close to their locations are an important location factor. The economy knows exactly what ecology is worth.



Natural Variety – Fascination of Nature – Recreation and Leisure

Loss of Species Also Means Loss of Culture



Unfortunately, we human beings feel the loss of a species only when it is already too late.

What does biodiversity mean for us human beings? In order to comprehend this, we must ask the opposite question: What consequences would a loss of biological diversity have? People say so casually: We cannot take any consideration of this ugly toad or that greenery in the use of the land. But do we know what consequences the loss of a species has? The species on the Red List are examined on a regular basis: How has their incidence developed? It has been possible to stabilise some endangered species in their existence through aid programmes. As a result, the incidence of some of the species has increased: for example, the white stork, peregrine falcon, bat, golden eagle, owl and Montagu's harrier. However, the overall tendency of endangerment is increasing. More and more habitats are being fragmented and isolated: This is a major reason for the decline in species because many plants and animals can no longer bridge these areas. As a consequence, the nutrient cycles change, the exchange of genes is reduced and ecosystems no longer function. This limits the ability of species to adapt to the changed environmental conditions and can lead to the extinction of entire populations.

Many species are also a part of our culture – from literature to music. The cuckoo and the skylark announce the spring, the most beautiful time of the year. Shouldn't it make us sit up and take notice that species such as these that existed quite commonly in earlier times are now dramatically declining? The loss of species also means a loss of culture as a result.

FACTS

In Bavaria:

- Areas of open space totalling 9.7 hectares are sealed every day (2006)
- Currently endangered:
 - 50% of the animals
 - 43% of the ferns and flowering plants
 - 50% of the mosses
 - 40% of the macro-fungi
- Presumed additional species loss due to climate 20 – 30%

Bavaria's diverse habitats form a significant portion of the European natural heritage.

Only the word biodiversity is new outside of the circle of experts, but not the goals that it pursues. Nature conservation in Bavaria has always focused on maintaining and protecting the diversity of species. In recent decades, we have done a great deal and created a good basis for the further work in the preservation of biodiversity. However, we need an even stronger social recognition for this goal and an even more intensive collaboration with all of the social forces. Biological diversity must also be secured on a European scale because habitats do not know any state boundaries. The European biotope network Natura 2000 intends to achieve this goal. Bavaria contributes to this in addition with its state-wide biotope network BayernNetz Natur. The intention is to connect habitats so that the animals and plants in them can make contact and an exchange can take place over a large area. The central and hub points of a biotope network are the conservation areas, especially the nature conservation areas. In the implementation of the projects, communities, administrations, associations and private individuals are working together on the regional level. Financing is provided through funding programmes of the state, the federal government, the EU and through sponsors or foundations like the Bavarian Nature Conservation Fund.



Network of Life – Natura 2000 and BayernNetz Natur

Successful Species and Biotope Protection



Our “original inhabitants” would like to remain Bavarians.

Some species of plants carry their Bavarian origins in their names. Many of these original inhabitants of Bavaria are on the Red Lists and threatened by extinction. But who knows the Eichstätter whitebeam, the Bavarian wolfsbane or the Augsburg large tiger moth? And who will mourn for them when they disappear? Some plants only grow in Bavaria and nowhere else in the world: Bavarian scurvy grass, Weltenburg hawkweed, Augsburg Steppengreiskraut, Lusen aconite. In order to preserve these species with their habitat, Bavaria has initiated state-wide aid programmes for the species with good results. The intention is to not only preserve spectacular species like the white stork, golden eagle, otter, apollo butterfly or peregrine falcon. Even the inconspicuous ones are threatened: the Kelheimer glass snail, the Alz-Brunnen snail and the Rhöne spring snail. Behind all of them flatters the large tiger moth.

Moors, meadows and riverside forests are habitats with a great diversity of species and important water reservoirs at the same time. As a result, they protect the settlement areas during floods as natural retention areas. In addition, they store CO₂ to a large degree. The moor-development concept and the meadows programme help maintain these valuable biotopes.

■ FACTS

Successes through aid programmes for species:

- Stabilisation of endangered plant species: examples are *Armeria purpurea*, Bavarian feather grass and Augsburg Steppengreiskraut
- White stork breeding pairs 1988: 58 – 2006: 143
- Golden eagle breeding pairs 1979: 25 – 2006: 40
- Peregrine falcon breeding pairs 1993: 20 – 2006: 113
- Downgrading from the Red Lists: bats, peregrine falcons

Wolf, lynx and brown bear are the most prominent “returnees.”

It is one of the natural processes for species to disappear because they have lost their habitat or find that it has changed too much. These plants and animals do not always become extinct throughout the world. They often just keep migrating. Other species are better at adapting to the new living conditions. However, the speed at which the world we live in changes has become extremely fast. Many organisms cannot adjust to new situations in such a short amount of time. The least sensitive are living beings with a high rate of reproduction such as bacteria, viruses or insects. The more highly developed an organism is, the longer the adaptation processes take. But the final consequence in the plant and animal kingdom is this: The species becomes extinct. Some species of animals and plants return to their homeland after a long period of time. Wolves have already been sighted frequently in Bavaria. Lynxes are managing very well here. Dealing with these returnees is unaccustomed and not simple in our densely settled man-made landscape. Bavarian Wild-Animal Management will make sure that this involves fewer problems in the future. Wild animals and humans should be able to get along with as little conflict as possible in their mutual habitat.

FACTS

- Bacteria and viruses reproduce millions of times at hourly intervals.
- Insects, mice and common hares reproduce several times per year.
- Golden eagle pairs have 1 offspring per year.
- Brown bears give birth to 2 offspring every 2–3 years.



Adaptation Strategies Secure Survival

Nature Conservation Assistance Measure – Without “Moss” There’s a Loss



We human beings are the rulers in our habitat and therefore have the greatest responsibility.

The only species that can consciously intervene in nature is the human being: We can plan and sustainably use, organise and protect or recklessly exploit and destroy. For us humans as rational beings, this means assuming the responsibility for our actions.

In Bavaria, there have been programmes for the preservation of nature and landscape dating back 25 years. Farmers in particular receive a remuneration for services that benefit nature conservation, e.g. when they extensively use grassland, which means mowing the meadows later and not as frequently, planting old types of fruit in meadows scattered with fruit trees or sometimes mowing hummocky meadows in the foothills of the Alps by hand so that they won't become overgrown with bushes. The intention is to also preserve old vineyards with drystone walls crosswise to the slope so that scattered fruit trees and old grass between the vines are protected.

The Bavarian Nature Conservation Fund (established in 1982) supports clubs, associations and municipalities in projects for the protection of species and biotopes. The resources come from proceeds of the endowment funds, the Glücksspirale lottery, privatisation proceeds from the State of Bavaria and private donations. The fund promotes the purchase of plots of land, the care for specific areas and a number of projects in the BayernNetz Natur.

FACTS

In Bavaria from 2000 to 2006:

- Contractual nature conservation and care of the landscape, especially for farmers, approx. 230 million euros
- Cultivated landscape programme for farmers, 1.36 billion euros
- Silviculture programme, 37 million euros
- Bavarian Nature Conservation Fund, 30 million euros
- EU projects such as the Life-Nature Programme, 13 million euros of EU funds
- Renaturation of bodies of water, 76 million euros

Environmental education must make people sensitive and open their eyes for the whole picture and its correlations.

Children are born explorers and inventors. In order to grasp their world, they take everything in their hands, turn it over, take a close look at it and put it right into their mouths to also test the taste. The more they get out into their environment and nature, the more they see, hear and are astonished. They bombard their parents with questions. Whatever they find, they want to try it out: What can animals do? What can you do with plants? Experiences teach them: Nature experiences make a stronger impression than theories. Contacts with animals and plants are the best preconditions for environmentally conscious conduct. In order for human beings to recognise and discern their responsibility for nature, they must also know something about it. Environmental education wants to help in creating a consciousness for the value of a diverse nature, as well as for the impact on and finite nature of the Spaceship Earth. In Bavaria, there are a vast number of facilities for environmental education: national-park houses, nature-reserve houses and environmental stations. The Bayern-Tour Natur that has been initiated by the Ministry for the Environment is Germany's biggest environmental-education campaign.



Fascination of Nature – Experiencing Nature – Protecting Nature

Preservation of Biodiversity – A Task for All of Us



Nature.Variety.Bavaria. – Bavaria's responsibility for biodiversity

Bavaria bears national, even international responsibility, for many species of animals and plants. The extinction of plant species that only occur in Bavaria such as Bavarian scurvy grass, Weltenburg hawkweed, Augsburg Steppengreiskraut or Eichstätt whitebeam would mean an irretrievable global loss! Bavaria bears special responsibility for the protection and preservation of the Alpine landscape under cultivation and the natural landscape with its high-moor bogs, hummocky meadows and very humid wet meadows characterised by sedges and Molinia grass and the animal and plant species that live there. Bavaria is the only German state that has a part of the Alps, which are considered an international hotspot of biodiversity.

Protection of biological diversity in Bavaria also means preserving the character, variety and beauty of the Bavarian landscape as a historically developed interplay of nature and culture, of protection and environmentally compatible uses, for future generations.

With the decision for a Bavarian strategy of biodiversity, the State of Bavaria meets its special responsibility for the protection of biodiversity. The core of this strategy is to place the focus on humans in their responsibility for the creation. This involves nothing less than the preservation of species living in the wild, their populations and habitats, the diversity of the Bavarian landscape under cultivation, the species of cultivated plants and domestic animal races. As a result, the Council of Ministers in coordination with all of the departments, nature conservation associations and associations of the land users, adopted the Bavarian Strategy of Biodiversity on April 1, 2008.

FACTS

Share of the state area:

- 85% farming and forestry
- 11% transport and settlement
- 4% other

13% of the state area has been safeguarded for nature conservation.

Nature.Diversity.Bavaria. – Connecting the core areas of nature conservation and areas that are used in an environmentally compatible way with each other

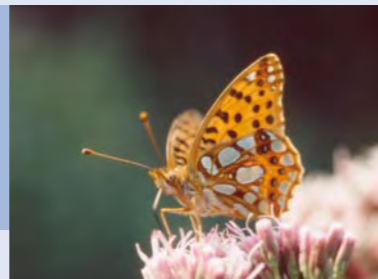
Comprehensively and sustainably preserving biological diversity in Bavaria means securing, maintaining, newly creating, developing and linking habitats with each other, in particular the core areas of nature conservation, especially nature reserves, mapped biotopes and areas secured through purchase. These areas comprise 13% of the state surface and form the basic framework of the Bavarian nature-conservation strategy as the “green infrastructure”. This basic framework must be supplemented through nature conservation and through environmentally compatible land-use concepts that combine use and protection with each other.

The Bavarian Strategy of Biodiversity is intended to more intensely combine and coordinate all of the existing nature-conservation measures and instruments. In terms of its key points, the following fields of action should be mentioned:

- Implementation with all parties concerned, especially with the land users while
- Giving priority to voluntary, cooperative nature conservation
- Concentration and reinforcement of the protection measures for endangered animals and plants living in the wild, as well as endangered domestic animal races and plants
- Expansion of the state-wide biotope network while
- Improving environmental knowledge, especially in the kindergartens, schools and universities



Environmentally Compatible Land Use



Questions and Answers on Biodiversity

Biodiversity

Biodiversity or biological variety is the diversity of the living beings (species), the variety within the species (genetic diversity) and the variety of the habitats (ecosystems). Consequently, biodiversity extends far beyond the concept of species variety.

Biodiversity Convention (CBD)

The agreement of Rio de Janeiro 1992 for the protection of biodiversity (Convention on Biological Diversity) is a UN convention that is binding under international law. Goals:

- Preservation of biological diversity (species, ecosystems, genetic diversity).
- Sustainable use of natural resources.
- Balanced and fair distribution of the profits and benefits resulting from the use of natural resources.

Up to now, the CBD has been signed by 190 states and the European Community. The 9th Conference of the Parties to the CBD will take place from May 19 to 30, 2008 in Bonn.

Biodiversity and Climate Change

As a result of changes to the climate, the vegetation zones are shifting. A temperature increase of 1°C means a shift of the vegetation zones by about 200–300 kilometres in the direction of the pole or by 200 metres in height. This has a more intensive effect on the low mountains than the flatland. The most serious effects are looming for the Alps, which are rich in endemic species. We can assume that an additional 20-30% of the species in Germany are endangered as a result.

Number of Species in Bavaria

It is not possible to give an exact figure for how many species of living beings there are. The smaller the organisms (down to the protozoa), the less we know about the scientific status of their species, their ecology and propagation. In Bavaria as well, species that have not yet been described by science are found and proof is established that species exist in Bavaria for the first time. According to the current state of knowledge, the species spectrum throughout Bavaria includes the metazoa (multicellular animals) with 30,000 to 35,000 species, 3,083 macro-fungi, 965 mosses, 1,574 lichen and 2,727 vascular plants. The vertebrates (mammals, breeding birds, reptiles, amphibians and fish) include 380 species, which means that 99% of all animal species belong to the invertebrates, especially to the insects.

Endangered Species in Bavaria

The current Red List of endangered animals in Bavaria assesses approx. 16,000 species with respect to their endangerment situation, which means about one-half of the native fauna. Of these assessed species, only about half of them in turn are estimated to be more or less threatened. A higher-than-average portion of the endangered species are seen among reptiles (70%), ants (68%), amphibians (63%), locusts (61%) and red admiral butterflies (60%), for example. Of the 2,727 native vascular plants in Bavaria, 43% are currently threatened in their continued existence. The Red List for Mosses shows 901 species, of which about 45% are endangered. Of the 3,083 evaluated macro-fungi, 1,304 species (42%) are endangered.

Endemic Species

Endemites are species that only occur in a strictly defined area or in a specific region. Examples of Bavaria's endemic animal species – including the trans-boundary occurrences – are the Bavarian pine vole (*Microtus bavaricus*), the ground beetle (*Trechus latibuli*), the Bavarian spring snail (*Bythinella bavarica*). Endemic plants include Bavarian scurvy grass (*Cochlearia bavarica*), the Bohemian gentian (*Gentianella bohemica*) and the Lake Constance forget-me-not (*Myosotis rehsteineri*).

Causes of Species Decline

The current rate of disappearance is about 100–1000 times higher than under natural conditions. The far-reaching changes to the landscape have drastically reduced the former wealth of biological diversity. In particular, the decisive causes for this are:

- Destruction and fragmentation of habitats
- Land uses and sealing of the ground
- Disturbance of the habitats through leisure and recreation activities
- Deposit of pollutants and nutrients
- Obstruction of bodies of water
- Intensification of land use
- Abandonment of traditional forms of land use

The climate change that has been caused by humans is resulting in a new and additional dimension of the threat to biodiversity.

Neophytes and Neozoas

Neophytes and neozoas are plants or animal species that were introduced only after the discovery of the New World, which means beginning in about 1500 A.D., by humans and have established themselves since then. Examples of these are raccoons, musk, rainbow trout, signal crayfish, zebra mussel, robinia or giant hogweed. Species that have independently expanded their area are not included here. Examples of the latter are the collared dove, common rosefinch, large copper butterfly (*Lycaena dispar*) or wasp spider (*Argiope bruennichi*).

Species Distribution in Bavaria

The question of the species distribution in Bavaria cannot be clearly answered since species diversity depends upon the size of the respective area, the variety of habitats, the influence of humans and other factors. This question must frequently be answered in different ways for certain groups of animals or plants. For example, the Bavarian Alpine region is especially rich in animal and plant life because of its diversity of habitats and its high degree of naturalness. On the other hand, numerous species do not exist there because of climatic reasons. Centres of incidence for thermophile species (requiring warmth) are the Franconian shell limestone and sand areas or parts of the Franconian Jura, while the distribution of moor and wetland species is focused on the foothills of the Alps.



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