



*The Austrian contribution to UNESCO´s MAB-Programme
Elaborated at the Institute for Urban- and Regional Sciences
(ISR) of the Austrian Academy of Sciences
Project leader: Prof. Dr. Axel Borsdorf*

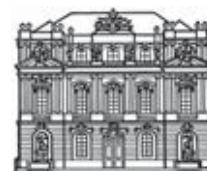
Inspired by diversity

*UNESCO´s biosphere reserve as model
regions for a sustainable interaction
between human and nature*

Sigrun Lange



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Preface

Prof. Dr. Georg Grabherr, Chair of the MAB Committee

It must have been 1985, when someone from the provincial government of the Tyrol rang me and asked if it was true that there was a biosphere reserve in this province. I was able to confirm that, as indeed the Gurgler Kamm, along with the Lobau (Lower Austria), Neusiedler See (Burgenland) and the other Tyroli-an site Gossenköllesee had been proposed in 1977 by Austria as biosphere reserve and been accepted by UNESCO. However, hardly anyone had noticed the designation of the Gurgler Kamm, not even the administration under whose responsibility it fell. Spare a little understanding for the authorities, though: unlike the national parks, biosphere reserves at that time did not have any legal basis, their content and management were not really defined. It is therefore hardly surprising that the biosphere reserve Gurgler Kamm continued to exist at best as a “sleeping beauty”, some even thought of it as dead. In the day-to-day work of conservation and land-use planning, biosphere reserves were seen as a brand without substance. This only changed when UNESCO developed a clear concept of the content and character of biosphere reserves in its Seville Strategy, which was officially declared in 1995. The Seville Strategy was de facto the “prince” who kissed the biosphere reserves awake with a new, liberal concept for conservation and utilisation. It brought with it the pressure to think again about what to do with the “old” parks. According to the Seville Strategy, the conservation of the natural resources of a region and its traditional forms of utilisation should be linked in an exemplary way with sustainable economic development. Biosphere reserves must therefore orientate themselves not just towards conservation but also towards the needs of the affected population. In the early years after their introduction in 1974, via

the UNESCO research programme “Man and the Biosphere” (MAB), biosphere reserves had mainly served as focal points for MAB relevant research and for “conservation of natural areas and the genetic material they contain”. With the newly formulated tasks of the Seville Strategy however, another chapter was opened. In its wake, early parks based on this concept evolved in Germany, for instance on the Rhön, followed by the Swiss biosphere reserve Entlebuch. Research took a back seat, the main focus in these areas, all of which were underdeveloped, being on regional economic support. Biosphere reserves with their subdivision into core area, buffer zone and transition area, were considered lucrative propositions and so, with the close involvement of the local population, the only Austrian biosphere reserve to adopt the Seville Strategy to date, the Großes Walsertal (Vorarlberg), was created. Planning for a biosphere reserve Vienna Woods (Lower Austria/Vienna) has progressed well. By now a veritable boom can be noted: there are initiatives along the rivers March and Thaya (Lower Austria), in the Pongau and the Lungau (Salzburg), in the Wachau (Lower Austria), for the Koralm (Carinthia) and in the region around the Dürrenstein (Lower Austria). At the same time, UNESCO, in its MAB research, which in Austria is carried out and co-ordinated by the Austrian Academy of Sciences, is pursuing a strategy of focusing research on the biosphere reserves.

To make efficient use of the relatively small research funds, the national committee decided to start by gathering all useful information on biosphere reserves in general and for Austria in particular. Apart from developing a research concept, the Austrian Academy of Sciences also set out to assess the status quo



Since 2003, Prof. Georg Grabherr is chair of the Austrian MAB Committee. He is leading the Department of Ecology and Conservation Biology at the University of Vienna.



Researcher at Gossenköllesee: among other things biosphere reserves serve as laboratories for scientific questions.

Photo: Roland Psenner

of current and planned biosphere reserves in Austria and of the research efforts from the MAB-era and to present the situation in a whitebook aimed at a broader public. With this whitebook, the Austrian Academy of Sciences, which is dedicated to basic research, has entered new ground and is responding to the demands for widely available and comprehensible information on its research, voiced with increasing intensity by society at large. Likewise, future MAB research should and will orientate itself on concrete research requirements of the local population and the management in biosphere reserves. This is not to curtail basic research: the opportunity for using biosphere reserves as “open air laboratories” for research in the natural sciences as well as the humanities should be taken advantage of.

The biosphere reserve scene is clearly moving. This means that a more thorough debate on what should be done about first generation parks like the Gurgler Hauptkamm has become unavoidable. Particularly from a scientific point of view this would be very welcome, as there has been research going on there for more than thirty years since the start of the UNESCO MAB programme and it would allow interesting comparisons in ecological but also in social and economic terms. So there was another telephone conversation with the provincial government of the Tyrol, this time initiated by me: “Re-definition of the biosphere reserve Gurgler Kamm?” – “Please, don’t!” This reaction, too, is in part understandable. The officials were just wiping their brows with relief after the completion of the large EU conservation project NATURA 2000. Strenuous debates, heated conflict and prolonged negotiations lay behind them and now they were confronted with something new again. No, they could not and would not confront the population – and themselves – with this new conservation concept.

It takes considerable effort to redefine or re-establish a biosphere reserve. Biosphere reserves are not a classic conservation concept. Their designation is mainly intended to trigger an ongoing process. It takes a strong and committed management and a matching infrastructure to control and co-ordinate this process, i.e. to secure conservation and at the same time to support economic stability in the region. It will always need support from the public purse. Biosphere reserves are much more demanding than national parks, they are more expensive and they represent a never-ending project. They are areas of excellence and can have an enormously positive impact on the future of a country, and as a global network, on the entire world. Society should afford itself this impact. The MAB National Committee at the Austrian Academy of Sciences is determined to make its contribution. This is to thank all those involved: the members of the committee, the Austrian commission for UNESCO and the many people we talked to, who contributed to making this whitebook work. I want to express particular thanks to Dr. Gerlinde Schrammel, for many years the life and soul of the MAB programme. Schrammel, responsible for all international programmes at the Austrian Academy of Sciences, looked after the MAB programme with expertise, charm and decisiveness, thus giving excellent support to a demanding field of research. May she now enjoy her retirement, which in the opinion of the undersigned came much too early, in the “Austrian Puszta” to which she relocated. I wish her successor, Dr. Günther Köck, best of luck for the new MAB era. Last but not least, I would like to thank the project workers who surpassed expectations with this carefully researched work.

Königstetten, 5. September 2004
o.Univ.-Prof. Dr. Georg Grabherr

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1) The implementation of UNESCO's MAB programme in Austria

As a member state of UNESCO, Austria was involved in developing the programme “Man and the Biosphere”. As early as January 1973, a national MAB-Committee was formed. The Austrian Academy of Sciences (ÖAW) brought representatives from science and politics together in one committee responsible for the implementation of the UNESCO research programme in Austria. The academic core of the committee was formed by members of the Austrian Academy of Sciences. The political decision makers came from the relevant ministries. The umbrella organisation CIPRA is the only NGO represented in the committee.

In 1976 the world-wide network of biosphere reserves was founded. Only one year later Austria nominated four biosphere reserves:



At the moment there are six biosphere reserves in Austria, of which Vienna Woods is the newest one.

Gurgler Kamm, Gossenköllesee (both Tyrol), Neusiedler See (Burgenland) and Lower Lobau (Lower Austria). At that point, the initiative for the selection of the areas came from scientists. Therefore, for many years it was mainly basic research that went on in the new protected areas. With the Seville conference in 1995, the MAB programme underwent a significant change: The former research programme was transformed into a modern instrument for the conservation and sustainable development of regions. Research was still important but only one aspect of the holistic concept. With the establishment of the two national parks Neusiedler See (1993) and Donau-Auen (1996) in Austria, applied conservation issues started to receive more attention in the two eastern biosphere reserves. But in general, the four “first generation” reserves can not be described as “model regions for sustainable development”. Still, the emphasis clearly is on research (Gurgler Kamm/Gossenköllesee) and on the preservation of natural spaces (Neusiedler See/Lobau). The first “modern” Austrian biosphere reserve was created in the Großes Walsertal in 2000. In a holistic concept, humans and their economic activities are integrated in the conservation of biodiversity. In 2005, the Vienna Woods were nominated as a further model region.

Austria and UNESCO

Austria has been a member of UNESCO since 1948. The Ministry for Foreign Affairs represents the Republic of Austria vis-à-vis UNESCO. The Austrian UNESCO Commission (ÖUK) was founded in 1949 as national co-ordinator for UNESCO matters and is based in Vienna. It has the task of advising the federal government, the provincial governments and other relevant bodies on UNESCO matters, contributing to the implementation of UNESCO programmes in Austria, informing the public on the activities of the organisation, and bringing institutions, relevant organisations and experts in contact with UNESCO.

The national commissions as constitutive partners are the national organs of UNESCO in the individual member state, and they represent that member state vis-à-vis UNESCO. National commissions are unique in the entire UN system and proof of a visionary inclusion of civil society into cross-border co-operation. The ÖUK also works with the 45 Austrian UNESCO schools, integrating UNESCO concerns into the curriculum.

Austrian UNESCO Commission

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MAB – Man and the Biosphere in Austria

The members of the MAB National Committee in Austria

The Austrian MAB-National Committee is formed by 17 representatives from the scientific community as well as from governmental and non-governmental organisations. This body meets twice a year and is located in the Austrian Academy of Sciences (ÖAW).

Chairperson of the MAB Committee: Prof. Dr. Georg Grabherr (since 2003)

Since 1986, Prof. Grabherr has headed the Department of Conservation Biology, Vegetation and Landscape Ecology at the Institute of Ecology and Conservation Biology at the University of Vienna. His research focuses on alpine vegetation, functional aspects of biodiversity in Austria, the degree of naturalness in forest ecosystems (hemeroby) and the impact of climate change on alpine habitats. Prof. Grabherr is a member of numerous international bodies and advises the European Union on the implementation of its 5th Framework Programme and on the Directive on Conservation of Natural Habitats and of Wild Fauna and Flora (Habitats Directive). His recent publications include a comprehensive ecology textbook, which he co-edited with colleagues from Germany and Switzerland in 2004.



Prof. Dr. Grabherr - chairperson of the Austrian MAB Committee. In the back, Prof. Dr. Fischer-Kowalski, a member of the MAB Committee.

Secretary, responsible for the international research programmes of the ÖAW:

Dr. Günter Köck

Austrian Academy of Sciences (ÖAW)

National and International Science Programmes

Dr.-Ignaz-Seipel-Platz 2, A-1010 Vienna

Members:

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Prof. Dr. Friedrich Ehrendorfer, Botanical Institute, University of Vienna

Mag. Gabriele Eschig, Austrian UNESCO Commission

Prof. Dr. Marina Fischer-Kowalski, Institute for Social Ecology, University of Klagenfurt

MR DI Elfriede Fuhrmann, Federal Ministry of Agriculture & Forestry, Environment & Water Management

MR Dr. Frieda Gollner, Federal Ministry of Foreign Affairs

Prof. Dr. Alois Herzig, Biological Station Illmitz, Provincial Government of Burgenland

Prof. Dr. Heinz Löffler (ret.), Department of Limnology, University of Vienna

DI Wolfgang Mattes, Federal Ministry of Environment

Prof. Dr. Hans Peter Nachtnebel, Institute of Water Management, Hydrology & Hydraulic Engineering, University of Natural Resources & Applied Life Sciences, Vienna

Prof. Dr. Jörg Ott, Department of Marine Biology, Faculty of Life Sciences, University of Vienna

Prof. Dr. Gernot Patzelt, University of Innsbruck

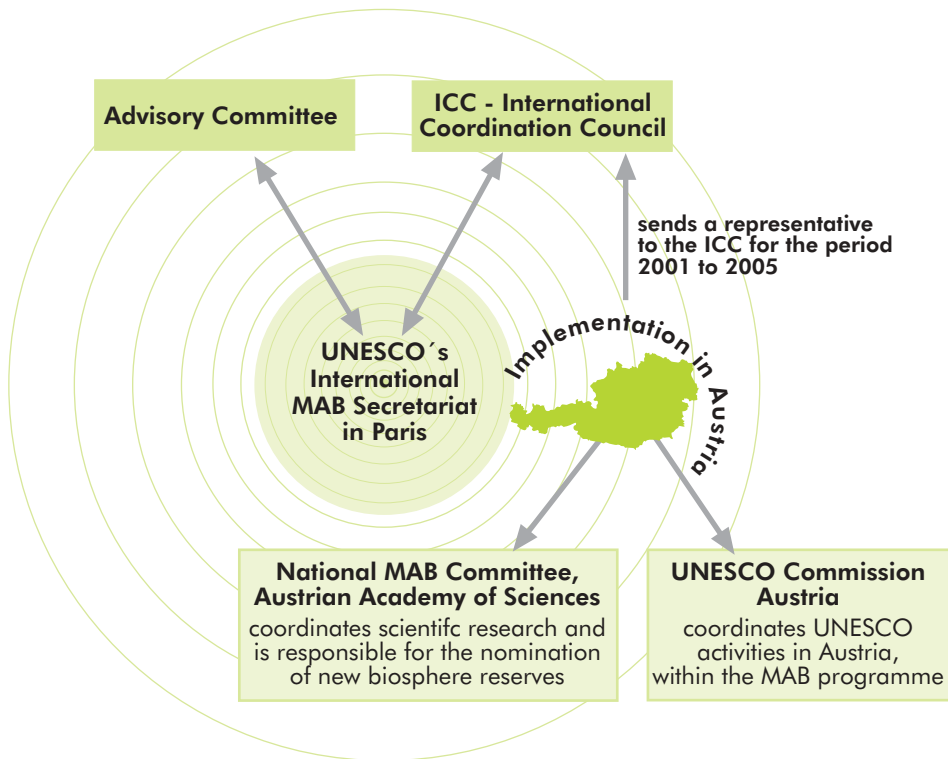
Prof. Dr. Marianne Popp, Department of Chemical Ecology and Ecosystem Research, Faculty of Life Sciences, University of Vienna

Mag. Birgit Karre, CIPRA Austria

MR Dr. Christian Smoliner, Federal Ministry for Education, Science and Culture

Prof. Dr. Wolfgang Wieser (ret.), Institute for Zoological Physiology, University of Innsbruck

Doz. Dr. Hans Winkler, Konrad Lorenz Institute for Ethology, ÖAW



The MAB structure in Austria: the MAB National Committee defines the key research topics within the MAB programme and nominates new biosphere reserves; in contrast, the UNESCO Commission communicates the MAB concept within Austria.

Graphic: Sigrun Lange

National responsibilities

In Austria, the “Man and the Biosphere” programme is coordinated by the MAB National Committee and the Austrian UNESCO Commission (ÖUK).

The National Committee designates the key research themes and is responsible for the nomination of new biosphere reserves. In contrast, the work of the ÖUK centres on communicating the MAB concept. Currently, the ÖUK is organising a meeting of the regional EuroMAB network which will take place in Vienna in October 2005. Additionally, it supports a comprehensive schools project in Lower Austria and Vienna to encourage in-depth treatment of the topic of biosphere reserves. The MAB programme, however, is only one of many areas that the UNESCO commission deals with. This means that there is no central institution to support the biosphere reserve management with the implementation of the complex concept. As a consequence there is only little capacity to develop

the “old generation“ biosphere reserves according to the international guidelines, to encourage the exchange of information between biosphere reserves and to lobby for the conservation category within Austria. In Germany for example, the MAB secretariat is based at the German Federal Agency for Nature Conservation. In 1990, a permanent working group on biosphere reserves in Germany (AGBR) was created. In 1995, at the time of the Seville conference, it developed national directives for conservation, maintenance and development, and thus supplied the decision-makers with criteria to bear in mind when designating new biosphere reserves or developing existing ones. In Austria, national directives are missing to this day; therefore, the German ones were often used for reference. A new project was started in 2005 to develop national criteria adapted to the specific situation in Austria.

Structural problems

None of the Austrian biosphere reserves designated before Seville has its own management. The areas are administered by appointed officials of the relevant provincial government, who also report regularly to UNESCO. In the Großes Walsertal, however, there is a biosphere reserve management. But here, too, the financial and personnel resources are insufficient to fulfil the many and varied functions. In the Walsertal (19.200 ha) only one person is officially responsible for implementing the Seville Strategy, while in the slightly larger Kalkalpen National Park (20.825 ha) 30 staff of the national park administration and 15 colleagues from the Austrian Federal Forestry Administration (ÖBf) are available for management, research, educational projects and PR. For the planning of the biosphere reserve Vienna Woods only two posts were created. Their holders are confronted with an immense task: the area covers more than a thousand square kilometres, with roughly a quarter of a million residents.

Open legal questions and funding gaps

National parks and biosphere reserves differ nowhere more clearly than in their respective financial support. National parks have a legal basis in the conservation legislation of the respective federal province and are common projects funded half by the federal administration and half by the respective federal province. The management is usually organised as a charity with limited liability. Biosphere reserves, however, stand on legally shaky ground. They are administered by UNESCO, but the international community does not provide any funding, instead it confines itself to advisory and co-ordinating tasks. So far only the province of Vorarlberg has added this UNESCO category to its conservation legislation. From 2005, the management of the biosphere reserve Großes Wal-

Biosphere reserve Großes Walsertal

One person responsible
for the management



National Park Kalkalpen

30 staff of the national
park administration service
and 15 staff from the
Austrian Federal Forestry
Administration



The national parks in Austria are much better equipped in financial and personnel terms than the biosphere reserves. While in the Großes Walsertal there is only one manager responsible for implementing the Seville Strategy, the slightly bigger Kalkalpen National Park boasts 30 members of staff in the park administration plus 15 colleagues from the Austrian Federal Forestry Administration (Österreichische Bundesforste, ÖBf).

Graphic: Sigrun Lange

sertal will receive an annual basic grant of 100,000 euros from the province. In addition, the local communities are paying ten euros per inhabitant to the biosphere reserve. At the time of writing, the provinces of Vienna and Lower Austria are preparing a regulation to include the conservation category in the respective provincial legislation. The planning and setting up of the biosphere reserve Vienna Woods is being funded in equal parts by both provinces. For the other UNESCO areas there is no financial support, hence no management structures have been installed. Considering how many and varied tasks the biosphere reserves fulfil, it quickly transpires that this category is not just a conservation instrument. The aim is rather to support sustainable regional development, to fulfil a nationwide research and education task and to implement international agreements such as the Convention of Biological Diversity (CBD). The concept therefore deserves the broadest possible public and political support. With regard to funding the biosphere reserves in Austria, a close co-operation between the conservation sector, economy, education and culture would be desirable.

National MAB research

Since 1973, the Austrian Academy of Sciences has been co-ordinating national research projects within the framework of the MAB programme. The UNESCO programme is aimed at supporting mainly interdisciplinary and internationally networked research, modelling and studies on the sustainable use of natural resources. The results should not only deepen our understanding of ecosystems, but the programme wants to encourage academics to find out how we can make use of our environment without destroying it. Within the framework of the “International Biological Programme”, a predecessor of the MAB programme, work concentrated on limnological studies of the Neusiedler See (Burgenland) and various Alpine bodies of water and the vegetation on Mt. Nebelkogel and on Mt. Patscherkofel (both Tyrol). The MAB programme marks the transition from pure basic research to academic work that provides answers to urgent topical questions.

Between 1973 and 1979, Austria took part in the so-called MAB6 project. This EU wide survey sought to find out more about the impact of humans on the ecosystems of mountain areas with a special focus on tourism.

Three Alpine regions in Austria were chosen for this project: Obergurgl (see page 78) in the Ötztaler Alps (Tyrol), the Großglockner (Salzburg/Carinthia), the Gasteiner Tal valley in the Hohe Tauern mountain range (Salzburg), and the Sameralm in the Salzburger Alps. With hindsight it is clear that these ambitious research projects were well ahead of their time, but they did not always meet with approval from the local population. Consequently the MAB research projects, although keeping the focus on practical application, concentrated less on concrete issues of human interaction with nature and on modelling development scenarios. Co-operation between natural and social sciences, which had been practised successfully within the MAB6 project, dwindled. From 1991, an MAB funded project studied the Austrian forests for five years in terms of their naturalness. A team of vegetation ecologists and forest experts assessed nearly 5000 forest sites. As a measure of the intensity of human use and the concomitant change in the natural woodland the so-called “hemeroby concept” was developed. The results have since been available to decision-makers in forest and conservation policy.

The Austrian Academy of Sciences (ÖAW)

The Austrian Academy of Sciences (ÖAW) was founded in 1847 and is modelled on the British “Royal Society”. Over time it progressed from being a society of scholars to being the home of modern research facilities. Its main task remains the promotion of science, particularly in the area of basic research. With the establishment of numerous specialised research units in nearly all federal provinces from the mid-1960’s onwards, the ÖAW became what it is today: the leading organisation promoting non-university research institutions in Austria. It is subdivided into two sections, one for mathematics and the natural sciences and one for the humanities and social sciences. Currently the ÖAW as society of scholars has around 600 members and contains 26 institutes with a staff of roughly 700. It is headed by a Presiding Committee made up of four members. Research activities are financed by the Federal Ministry for Education, Science and Culture. Further funds are being brought in by contract research.

At the same time studies were made of ecological transition zones (ecotones) in the riverine woodlands near Hainburg (Lower Austria), where the river March flows into the Danube. The study aimed at laying a scientific basis for riverine hydraulic engineering measures along the Danube. Within the last five years the Austrian contribution to the MAB programme has concentrated on assessing meadows and alpine pastures in mountainous regions of the country. The study was triggered by the fact that grasslands have been altered considerably over the last decades through reforestation measures and intensive agricultural use. For the affected mountain farmers the loss of species that goes with it also has an economic impact.

New key research themes

In July 2004, an international workshop in Illmitz on Neusiedler See (Burgenland)

brought scientists, monitoring experts and managers of biosphere reserves together at last with the goal of giving the Austrian MAB research a new direction and to concentrate it on concrete issues and areas of concern. The participants agreed three principles:

- 1) From now on, natural and social scientists should work more closely together (interdisciplinarity) and take into account practical issues brought up by the local managers (transdisciplinarity).
- 2) National studies should be embedded as much as possible in an international context.
- 3) The work should focus explicitly on the impact of climate change on ecosystems, on choosing suitable indicators for long-term environmental monitoring, on more effective integration of the various interest groups into the management of biosphere reserves and lastly on developing the areas further along the lines of the Seville Strategy.

Evaluating the research carried out in Austrian biosphere reserves

By DI Daniel Zollner and Mag. Michael Jungmeier, E.C.O. Institute for Ecology

The project “Biosphere reserves in Austria – basic survey and current state of research” (commissioned by the Austrian MAB National Committee) seeks to map the implementation status of the biosphere reserves concept, taking into account the research framework. Backdrop for the project is the development of biosphere reserves along the lines of the Seville Strategy and the definition of future key research areas. The following contribution presents selected results of the project, taking two very different biosphere reserves – Großes Walsertal and Gossenköllesee – as examples

to point out the implementation scale of the biosphere reserve concept.

Ready for the 21st century?

In 1995, a conference of experts called up by UNESCO worked out the Seville Strategy (named after Seville in Spain where the conference was held) that recommends concrete steps to develop biosphere reserves further in the 21st century. It contains a set of indicators which has since been used to assess the implementation of the biosphere reserves idea. Moreover the label “biosphere reserve”



Daniel Zollner joined E.C.O. in 2001. He is specializing in agriculture, forest management and conservation.

was assessed against some basic criteria for its intrinsic suitability for the individual region. The survey also sought to gain an overview of completed and ongoing research activities in the Austrian biosphere reserves. The standardised structure and the specific set of criteria made it possible to sketch the research situation in the respective biosphere reserves.

Research is an essential part of the MAB programme

In 1970 and 1971, the “Man and the Biosphere” programme with its strong scientific bias designated fourteen project areas, which to this day make up the framework for MAB research, albeit in a more focused form with five or six central themes. The biosphere reserves concept is an integral part of “Project 8 – conservation of natural areas and the genetic material they contain” and current thinking sees them as model regions for sustainable use and as crystallisation points for MAB related research. In its fully fledged phase, the “World Network of Biosphere Reserves” should capture all representative ecosystems across the globe and allow research into strategies for sustainable use. All project areas share a strong emphasis on the manifold interactions between ecosystems and utilisation by man. The research is therefore particularly concerned with answering the question how sustainable use can take place under the given ecological conditions.

Großes Walsertal and Gossenköllesee – two very different biosphere reserves

The timing of their establishment had a decisive impact on the subsequent development of the two biosphere reserves. Whilst the biosphere reserve Großes Walsertal (Vorarlberg) was set up recently (2000) with its main objectives related to the regional economy, the establishment of the biosphere reserve

Gossenköllesee (Tyrol) goes back to an initiative by researchers in 1977, who tried to secure the continued existence of an internationally relevant research site. Hence research plays a much bigger and more influential role in the biosphere reserve Gossenköllesee than in the Großes Walsertal. Research in the Walsertal is “uncoordinated and free”, while research efforts at the Gossenköllesee take place under the umbrella of the University of Innsbruck and along clear key research objectives. In both cases the official administrative structures (biosphere reserve management Großes Walsertal and the conservation agency of the province of Tyrol respectively) do not take on any research tasks.

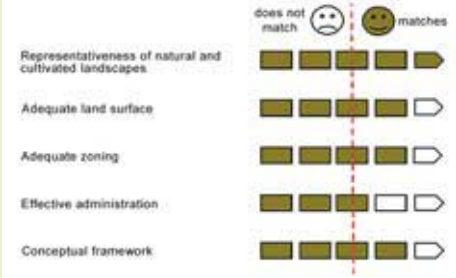
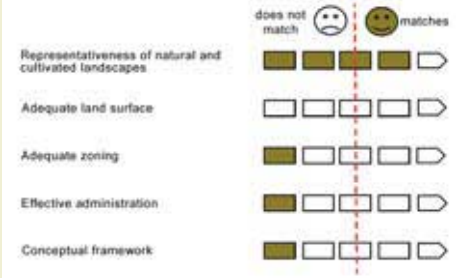
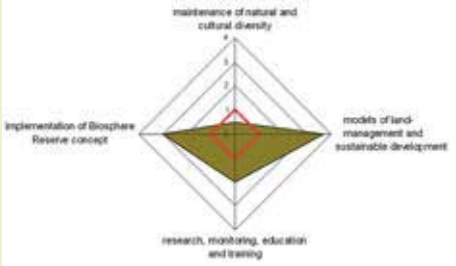
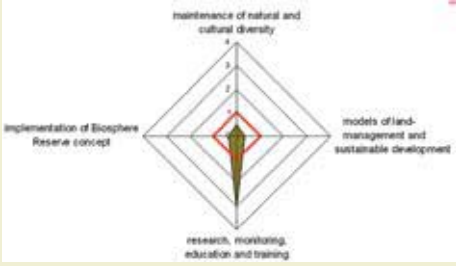
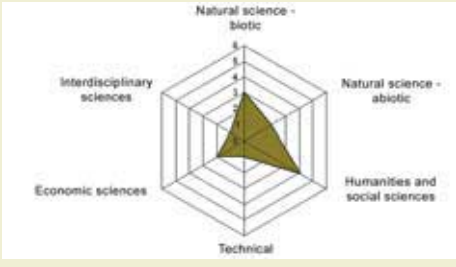
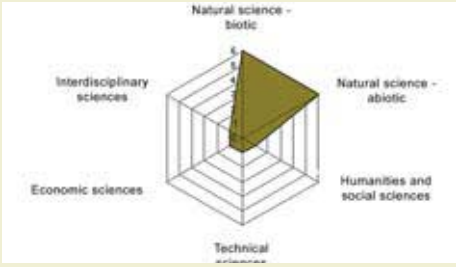
“Classic MAB research” is currently neither carried out in the Großes Walsertal nor at the Gossenköllesee. Only in very rare cases does research in Austria make use of a biosphere reserve as “open air laboratory”. There is however a thematic link with key MAB research areas, particularly at the Gossenköllesee (Wetlands, Global Change), but also for the Großes Walsertal (Quality Economics).

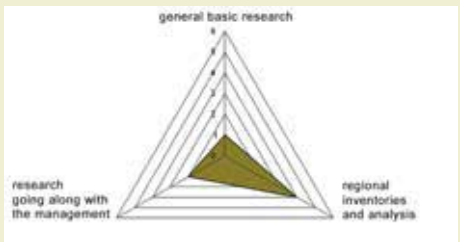
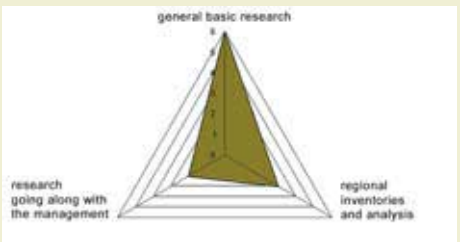
The table below shows selected aspects of the two biosphere reserves, which were set up and are managed in vastly differing circumstances. They point up the different and varied possibilities for the shape a biosphere reserve can take.



A comparison of the biosphere reserves Gossenköllesee (above) and Großes Walsertal (below) shows in what different ways the UNESCO MAB concept is being implemented in Austria.

Photos: Roland Psenner (top) and BR Management Großes Walsertal (bottom)

	Biosphere reserve Großes Walsertal (Vorarlberg)	Biosphere reserve Gossenköllesee (Tyrol)
Basic criteria	 <p>The Großes Walsertal is a positive example for the implementation of the biosphere reserve concept. The first Austrian BR to have been created after the Seville Strategy had been drawn up, all its basic criteria surpass the red line threshold. The Großes Walsertal is very well suited to fulfilling the three exemplary functions of a BR. It consists of a closed, homogenous valley and represents a typical alpine valley ecosystem complex. It is of sufficient size (19,200 ha), has graded zoning, its own biosphere reserve management plus numerous concepts and planning materials (vision, tourism concept, research guidelines in preparation, etc.).</p>	 <p>The BR Gossenköllesee was created on the initiative of scientists who wanted to maintain this area as a research site of international standing. Its focus has always been on research, the implementation of international biosphere reserve standards is of lesser importance. Hence the profile of this BR contrasts with that of the Großes Walsertal. Four of the five basic criteria are not met, mainly because of the small dimension of the site. At just 85 ha, the Gossenköllesee is the smallest biosphere reserve in the world and achieving the three main functions is only possible up to a point.</p>
Seville Strategy	 <p>The BR presents an encouraging picture, not just in terms of the basic criteria but also in terms of attainment of the main Seville Strategy objectives. All thresholds of the red frame are being at least almost met, some of them considerably surpassed.</p>	 <p>Only when it comes to objective 3 (research, monitoring, education and training), the BR Gossenköllesee exceeds the threshold and this mainly because of intensive research efforts of the University of Innsbruck.</p>
Research disciplines	 <p>The research activities in the BR relate closely to ethnological and cultural aspects (humanities and social sciences). Other key research can be noted in the natural sciences (e.g. landscape inventory, geological reports) or in economics (e.g. studies in marketing strategies, product development for the BR).</p>	 <p>In the BR Gossenköllesee one can clearly perceive a natural science bias (studies on the systemic functions of extreme alpine sites in biotic and abiotic terms). This area of research offers nodes for links with numerous international programmes (e.g. MOLAR, GLOCHAMORE, GLORIA, EMERGE, etc.). Other disciplines hardly come into it.</p>

Type of research	 <p>The main type of research concerns inventories and analyses of regional phenomena (on nature, ethnology, household situation). With the establishment of a biosphere reserve management attendant research on management is on the increase. General basic research exists in rudimentary form only.</p>	 <p>Basic research is the main research in the BR Gossenköllesee. The key theme is Global Change. Alpine lakes are very well suited as indicators for global ecological change as they do not experience any immediate influences. Currently there is no attendant research for the management, inventories and analyses are being carried out within the framework of the basic research.</p>
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Remark: A description of the methodology can be found in the report „Biosphere Reserves in Austria -Grundlagenerhebung und Stand der Forschung“ by Zollner & Jungmeier 2004.

The path emerges during walking ...

So the biosphere reserves in Austria differ greatly from each other. Just like the landscapes of this country, one could say. The biosphere reserve Großes Walsertal takes its cue to a large degree from the Seville Strategy and shows one possible path into the future. In such a “young” biosphere reserve there are of course many areas yet to be developed. A case in point might be the management structure (higher levels of personnel and financial resources) or research. At the moment efforts are being made in this biosphere reserve to build up relevant research competence. The planning and establishment of the biosphere reserve Vienna Woods also adheres to the Seville Strategy in all important aspects. The special and great challenges for this new biosphere reserve are the size of the area, the large number of inhabitants and participants in the project and last but not least the great diversity of its individual parts (forest, outskirts, towns).

Gossenköllesee (Tyrol) stands for a totally different development. Designation of the area

as biosphere reserve gave it a decisive research impetus and resulted in adding important building blocks to key MAB research globally. However, this area is unsuited to serving as a model region along the lines of the Seville Strategy. So, how to continue? Basically, the area can either be developed or abandoned. Development would necessitate high investment as the area would have to be extended and visitor facilities installed. Abandoning the area, however, can hardly be considered because of its international importance as a research site. Here we are confronted with a difficult decision that emerges in similar form in other biosphere reserves. A solution must be worked out in co-operation with various parties involved, the MAB Committee, scientists and the local population.

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Biosphere Reserve Integrated Monitoring (BRIM) – a key research task in biosphere reserves

By Prof. Marina Fischer-Kowalski and Ass.Prof. Karl Reiter

Introduction

Biosphere reserves are model areas approved by UNESCO for exploring and demonstrating how sustainable development and conservation can be harmonised at regional level. According to the Seville Strategy, which was passed in 1995, academic research in biosphere reserves is meant to support the attainment of its objectives. This means not just monitoring natural criteria to be maintained in biosphere reserves, but also exploring the societal processes that influence them. If the people living, working or spending their leisure time in biosphere reserves do not support the conservation aims – maybe because they can perceive a benefit for themselves – those aims cannot be attained. Academic research must inform the management of biosphere reserves about disruptions in the ecosystem, but also about the degree of support from relevant social groups and about possible utilisation conflicts and assist the management during interventions. At the same time it disseminates the successes and learning effects into the regional, national and international public and thus supports the model function intended by UNESCO for biosphere reserves. These functions of academic research were put together in the concept of “integrated monitoring” (BRIM = Biosphere Reserves Integrated Monitoring).

The history of BRIM

BRIM was set up in 1991 on the initiative of EuroMAB. Quite quickly the initial idea of an “Inter-Biosphere Reserve Communication” became the “Interdisciplinary Monitoring of Biosphere Reserves.” At the general assembly of UNESCO in November 1995 in Seville, the following statement was written into the

final protocol: “Biosphere reserves constitute ideal sites for research, long-term monitoring, training (...) while enabling local communities to become fully involved in the conservation and sustainable use of resources.” The term “long-term monitoring” points out the necessity to observe certain features continuously and over a long period of time, not just to carry out one-off research activities. Over the last ten years, BRIM has been expanded into a monitoring system not just for natural science phenomena but one that collects and observes socio-economic facts and phenomena as well.

The “Information Centre for the Environment” (ICE), in co-operation with US MAB and UNESCO’s MAB programme, created a standardised database of species inventories of flora and fauna in the biosphere reserves. This database is called “MABFauna and MABFlora Online Database” and represents one of the few global database systems for biosphere reserves that have so far been implemented. Integrated into BRIM are also spatial information systems, because GIS (geographic information system) is especially well suited to linking integrated environmental monitoring and socio-economic use of a particular region and to providing advice to support political decision-making processes.

From BRIM (Biosphere Reserve Integrated Monitoring) to BRIA (Biosphere Reserve Integrated Assessment), an integrated sustainability assessment

Monitoring natural phenomena, i.e. the environment, is based essentially on the methods developed by ecosystems research and their



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results. Environmental monitoring seeks to explore how the relationships between the constituent parts of the monitored natural system develop. Such monitoring makes it possible to notice negative trends in time, negative trends being degradation vis-à-vis the status quo or vis-à-vis environmental quality objectives defined in a guideline. There is no need to reinvent the wheel when it comes to environmental monitoring systems. A number of proven methods exist already and only need to be co-ordinated for a particular region and jointly applied. International efforts are being made to define a core record that can accommodate information from quite diverse sources that adhere to certain methods standards. Techniques for capturing socio-economic states and activities however are far less developed and hardly standardised. Here too, international efforts are being made to fill the gaps. The form of assessment that is envisaged in the BRIM concept of UNESCO/MAB should integrate the various monitoring dimensions. We are talking of integrated monitoring, if the data captured in the various areas can be linked with each other. The link must be made through data analyses that use comparatively simple correlation techniques but can still use complex models. Once the results of such analyses are correlated to the core objective of the relevant biosphere reserve, an integrated assessment – possibly involving various interested parties and affected groups – can be arrived at as an orientation for management decisions. The broader the basis of interests the more likely it becomes that the decisions are implemented and sufficiently funded.

Are there any first steps being taken towards integrated monitoring (BRIM) in Austrian biosphere reserves?

Attempts at integrated monitoring of ecosystems in Austria started with the big research

programmes of the 1960's. At that time, ecological research began to organise on an international level. The starting point is marked by the International Biological Programme (IBP), which sought to capture the production and turnover of biomass in the most important ecosystems world-wide. Austrian research teams were involved, too: the University of Vienna for instance worked on the Neusiedler See and the University of Innsbruck in the Tyrolian Alps. While the IBP concentrated almost exclusively on natural ecosystems, its successor programme "Man and the Biosphere" (MAB) sought to capture and document the interaction between humans and ecological processes. Austria took an active part in this programme, for example with the research in the Tauern mountain range, which focused on analysing the ecological impact of winter tourism, studies on the damming of the Danube in Altenwörth, capturing the degree of naturalness in Austrian forests as a model for conservation research, or the "Obergurgl model" that anticipated today's biosphere reserve concept 40 years ago (see page 78). In co-operation and with the help of computer modelling, hotel owners and farmers in Obergurgl plus scientists from the University of Innsbruck and from IIASA in Laxenburg (Vienna) tried to develop a sustainable model for the future of the popular ski resort. The project influenced many decisions in Obergurgl for years after. Although forty years ago already impressive attempts were made at integrating environmental monitoring and research, even in the area of the more recent biosphere reserves have there not been any specific activities to establish integrated monitoring in Austria's biosphere reserves.

What should and can be included in a future system of integrated monitoring, i.e. to build up a BRIM Austria? This is the theme of a project of the Austrian Academy of Sciences.

In this project, staff from the IFF (Faculty of Interdisciplinary Research and Education at the University of Klagenfurt) and the IECB (Institute of Ecology and Conservation Biology at the University of Vienna) have mapped the current state of available data for a national BRIM. They found that the state of the data in the Austrian biosphere reserves is miles away from being comparable. A core record for natural science and socio-economic data has yet to be developed, which would serve as a binding standard for all Austrian biosphere reserves. In future, some of the research funds available to the MAB Committee of the Austrian Academy of Sciences will be earmarked for this task.

Integrated monitoring and sustainability assessment as a global task

The whole network of biosphere reserves would be excellently suited to mapping

changes in the environmental situation on earth in a regionally specific way, for small areas and in great detail, if all biosphere reserves captured data for the parameters of a globally defined core record with standardised techniques. BRIM could work alongside the global terrestrial monitoring system GTOS as part of a global monitoring network and take into account the US initiative “Long Term Ecology Research” (LTER). Such a global aspect will definitely be taken into account when establishing BRIM in Austria. Beyond monitoring and analysis, biosphere reserves could demonstrate – as envisaged in the UNESCO Seville Strategy – how the systematic linking of scientific monitoring and management decision-making based on a broad base of information and interests can encourage sustainable development in a practical way.



Landscape inventories – like realised in the Großes Walsertal by the Institute of Ecology and Conservation Biology at the University of Vienna – are examples for linking scientific monitoring with management decision-making.

Photo: BR Management Großes Walsertal

The international conservation category “biosphere reserve” in Austria

Designation of protected areas, protection of species and ecologically sustainable use of natural resources are the three pillars of the Austrian conservation policy. However, the sheer number of national and international conservation categories has created confusion. Some categories such as nature conservation areas and landscape conservation areas exist in the whole of Austria, nature parks and tranquillity zones only in some provinces. Biogenetic reserves and areas designated under Natura 2000 are European conservation categories whereas areas designated under the Ramsar-Convention and biosphere reserves exist all over the world. Regardless of the various conservation categories, which overlap in some regions, in total some 22 per cent of Austrian territory are under protection. Depending on the category, vastly different conservation regulations and restrictions apply (see appendix, page 86).

Biosphere reserves therefore represent only ONE of many conservation categories. In this context it is important to mention the fact that the international guidelines of UNESCO for biosphere reserves are NOT legally binding in the respective member states. However, Austria has voluntarily committed itself to adhering to the Seville criteria when creating such model regions. So far only the province of Vorarlberg has set up a specific conservation category for biosphere reserves within its provincial conservation legislation. The provinces of Vienna and Lower Austria each are currently planning legislation to cover the biosphere reserve Vienna Woods. UNESCO recommends offering core zones in biosphere reserves the legal protection of a strict national conservation category such as nature conservation area (Naturschutzgebiet), national park or tranquillity zone in order to guarantee their long-term survival.

Protected areas in Austria (see also appendix from page 86)

Conservation category	Number	Surface in km ²	Proportion of the Austrian land surface	Status quo
Biosphere reserves	6	1518	1,8 %	2005
World Heritage Sites	8	no information	no information	2003
Ramsar areas	16	1371	1,6 %	January 2004
Natura 2000 sites	211	13.870	16,3 %	2004
Biogenetic reservations	56	1730	2,1 %	2002
Wilderness areas	1	5	too small	2004
National parks	7	2547	3 %	2003
Nature conservation area	377	3280	3,8 %	Dec. 2000
Landscape conservation area	253	9120	11 %	Dec. 2000
Forest reservations	180	80	0,1 %	2003
Nature parks	37	3050	3,6 %	2004

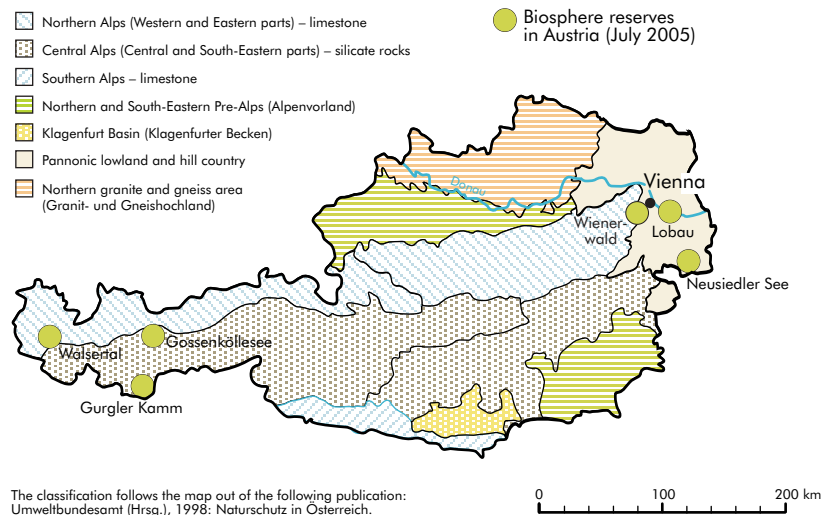
A multitude of conservation categories in Austria: nature reserves and protected landscapes, national parks and Natura 2000 designated areas play a bigger role for the conservation of Austria's natural diversity than biosphere reserves. (Source: Web site of the Federal Environment Agency)

Six biosphere reserves in Austria

The six Austrian biosphere reserves Neusiedler See (Burgenland), Lower Lobau (Vienna), Gossenköllesee (Tyrol), Gurgler Kamm (Tyrol), Großes Walsertal (Vorarlberg) and Vienna Woods (Vienna, Lower Austria) between them cover an area totalling 1518 square kilometres or roughly 1.8 per cent of the Austrian territory (July 2005). This means that in terms of acreage there are comparatively few such UNESCO model regions in Austria, particularly when viewed against other European countries. In Germany to date, 14 biosphere reserves have been designated, taking up 4.4 per cent of the state territory; Spain has nominated 22 areas with a total size of 20,361 square kilometres or four per cent of the state territory. Nature reserves and protected landscapes, Natura 2000 designated areas and national parks therefore play a much bigger role for the protection of biodiversity in Austria than biosphere reserves. This is mirrored in their degree of popularity. In September 2002, a telephone survey in the communities of the Vienna Woods found that 98 per cent of the 400 people interviewed knew the term “national park”, whereas only a fifth of them were familiar with the category “biosphere reserve”.

Representing natural areas

One of the special tasks of the biosphere reserve network is the representation of all major natural and cultural landscapes worldwide. Diversity on our planet is to be captured as fully as possible. In its Seville Strategy, UNESCO recommends that its member states check whether their biogeographical regions are represented in the network of conservation areas in proportion to their territory. Despite its small size, Austria contains an extraordinary diversity of natural habitats. The three major natural landscapes include the Alps, the pre-Alps and basins and the



Of the three major natural landscapes in Austria, the existing biosphere reserves represent only the Alps, the pre-Alps and basins. The granite and gneiss highlands have not been included in any UNESCO designated area.

granite and gneiss highlands. The alpine landscape makes up about 63 per cent of the total territory and is the dominant element. Three of the five existing biosphere reserves are located in the alpine zone. The Northern Limestone Alps are represented by the Großes Walsertal (Vorarlberg), the Central Alps by the Tyrolean reserves Gossenköllesee and Gurgler Kamm. The two biosphere reserves in the east represent precious wetlands of the Pannonic region, i.e. the riverine forests along the Danube in the Untere Lobau (Lower Austria) and the unique steppe landscape around Neusiedler See (Burgenland). The biosphere reserve Vienna Woods is situated in the transitional zone between the easternmost spurs of the Northern Alps and the beginnings of the Pannonic hills. This landscape, cultivated of old, a mosaic of deciduous forests closely interlinked with species-rich grasslands and in great proximity to a large city like Vienna is a particularly valuable new entry for the global UNESCO network. The northern and south-eastern pre-Alps of Austria have to date not been captured and neither have the granite and gneiss highlands of the Bohemian Massif.



The biosphere reserve Neusiedler See represents the precious wetlands of the Pannonic area. Shore birds like the black-tailed godwit (*Limosa limosa*) come here to breed.

Photo: National Park Neusiedler See-Seewinkel

Possible new additions to the global network of biosphere reserves

Currently initiatives are being started in some Austrian regions by people who have recognised the opportunities of the forward-looking biosphere reserve concept and are hoping that such a designation will boost conservation and sustainable development in their rural natural and cultural landscapes. Potential new candidates include the riverine wetlands of the March-Thaya-Auen (Lower Austria), the region Lungau-Murau (Salzburg/Styria), the Nockberge (Styria) and the Koralm (Carinthia). The special natural and structural conditions of the areas around the Dürrenstein (Lower Austria), the Tennengebirge mountain range (Salzburg), and the Wachau (Lower Austria) would also be suitable nominations for biosphere reserves. The designation of those areas in which the feasibility of setting up a biosphere reserve is currently being discussed and assessed would close essential gaps in the Austrian network of biosphere reserves.



Sustainable cultivation practices characterise the sparsely populated district of Lungau.

Photo: Elisabeth Löcker

two thinly populated districts Lungau and Murau. A biosphere reserve would be perfectly suited to harmonise the economic development needs with conservation interests. What is often thought of as a drawback of this region would then be seen as its advantage. At the end of April 2004, the idea of setting up a biosphere reserve was debated at a special conference at Burg Finstergrün castle in Ramingstein. Representatives from economy, agriculture and regional politicians view it as a great opportunity for development in the region. After the conference a working group “Biosphere region Lungau” was formed to pursue the idea of a UNESCO model region further.

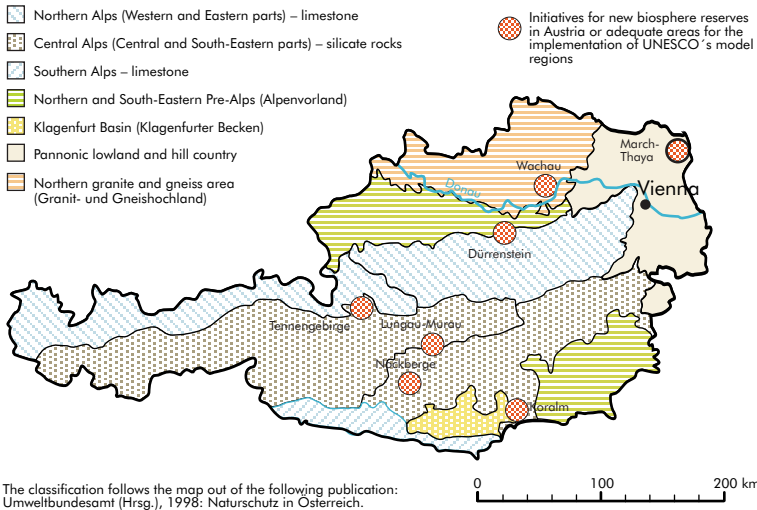
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March-Thaya-Auen (Lower Austria)

The riverine wetlands of the March-Thaya-Auen are among the major wetlands in Central Europe. If you add the cultural landscape of the north-eastern Weinviertel, this region on the border with the Czech and Slovak republics boasts a unique mosaic of diverse landscapes characterised by small units of closely interlinked and varied natural habitats – riverine wetlands, forests, meadows and fields. Whereas the neighbouring Danubian wetlands are best preserved by not being used at all, the border region of the Weinviertel with its small farms needs forms of sustainable use if the landscape is to be preserved. In 2001, a feasibility study was commissioned for a tri-lateral biosphere reserve between Austria and the Czech and the Slovak republics. The results have been available since July 2002. The study showed that the region with its ecological diversity and its traditional forms of land-use is very well suited for setting up a biosphere reserve.



Lungau-Murau (Salzburg/Styria)

The ecological richness of the region Lungau-Murau is often insufficiently realised. The fully preserved system of high valleys, essentially the headwaters of the river Mur, is surrounded by five nature and national parks. Sustainable economic activities dominate the

Zoning could take into account already existing conservation areas like Ramsar wetlands and Natura 2000 areas. A biosphere reserve as holistic organisational model could form an important cross-border communication platform and give economic impetus to a region that suffers from economic disadvantages because of its border location and the structural changes in traditional production systems. Regional actors and politicians have reacted positively to the idea of setting up a biosphere reserve. In 2003, a combined initiative of the “Distelverein”, the regional communities, and the Weinviertel management was started with the aim of nominating the biosphere reserve March-Thaya-Auen to UNESCO and had the principal support of the provincial government of Lower Austria. For the moment however, the project seems to have been shelved until the planning of the biosphere reserve Vienna Woods has been completed.

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Ötscherland/Dürrenstein (Lower Austria)

The region around the Dürrenstein is characterised by a high degree of naturalness. In the wilderness area of the Dürrenstein, in the nature reserves Lechnergraben and Leckermoos and in the Natura 2000 area Ötscher-Dürrenstein, natural diversity is protected. The three nearby communities of Gaming, Lunz, and Göstling are fairly compact and, at just 16.7 people per square kilometre, thinly populated. Despite the instalment of three nature parks in the vicinity, economic impetus is still lacking. Younger people in particular are leaving the region. Setting up a biosphere reserve could serve as an overarching structure around the existing conservation categories, since it would link ecological and economic aspects.

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Wachau (Lower Austria)

The Wachau region between Melk and Krems is among the most beautiful cultural river landscapes world-wide. Here and in the Donau-Auen national park are the only two stretches of the river Danube where it is still flowing freely. Narrow, rocky passages alternate with broad stretches, making up a diverse landscape. A colourful mosaic of regularly flooded wetlands and side arms, dry grasslands, near-natural forests, but also vineyards and orchards offers habitats for many rare plant and animal species. Parts of the Wachau have therefore been protected as a Natura 2000 area. Currently a LIFE nature project is working on conserving the most endangered habitats such as the remaining oxbow lakes and the dry and semi-dry grasslands. From the Middle Ages, the dry grasslands have been used extensively as pastures. Today the former biodiversity is endangered by shrub invasion. Woodland burning carried out by the Ökokreis Waldviertel and grazing by sheep are stemming the loss of species. Moreover, in the year 2000, the Wachau was included in the list of world cultural heritage sites. As part of this process, the “Working group for the protection of the Wachau”, in co-operation with the affected communities, created a vision to formulate the objective of preserving the uniqueness of the Wachau as an area of natural and cultural landscapes. The designation of a biosphere reserve would serve to harmonise the conservation objectives with preserving cultural specifics.

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The region around Dürrenstein is still highly natural. The surrounding communities are only sparsely populated.

Photo: *Christoph Leditznig*



Species diversity in the Wachau area is threatened by shrub invasion. Grazing by sheep shall curb this development.

Photo: *Hannes Seehofer*

Lessons and impressions from the biosphere reserve Großes Walsertal:

Interview with Josef Türtscher, REGIO chair and member of the provincial assembly of Vorarlberg

„Mr. Türtscher, you are REGIO chair and initiator of the biosphere reserve Großes Walsertal, which is seen in Austria as exemplary for implementing the Seville Strategy. Alongside your many successes you must have encountered occasional problems in the course of this process. On the basis of your experience, what recommendations would you make to those who would like to apply for this UNESCO designation for their region?“



Josef Türtscher, REGIO-chair and initiator of the biosphere reserve Großes Walsertal:

„Get going, it's worth it!“

“Informing the residents thoroughly and discussing the whole idea with them is vital to achieve the highest possible long-term acceptance and identification with the biosphere reserve label. You can never put too much time and energy into this. Often the land-owners, usually local farmers, are wary. They might have had negative experiences in the past and are afraid of restrictions on land-use. They need to be looked after especially. Here we did not do enough at first to allay their concerns. An excursion to the biosphere reserve Rhön, in which most of the local political decision-makers participated, proved helpful to drum up support in favour of a biosphere reserve decision. On the way home in the bus we were all convinced, “We can do this too”! Together we agreed a starting date for the project. This common decision was the basis for an ongoing positive co-operation with the respective conservation agencies that lasts to this day. But these are all just rational aspects. For a successful application, however, a lot more is needed. In my opinion it is important to develop a common vision, to strive for a common goal. 50 years ago, there was a terrible avalanche here in the Walsertal that injured many and cost 80 lives and huge losses of livestock and buildings. At the time

there was a real danger that this area would be abandoned altogether. But the people of the Walsertal decided to rebuild their homeland after the avalanche disaster through hard and dangerous work. Today we need to maintain for future generations what our predecessors wrested from nature and to use it in harmony with old and new requirements. It takes ambition to make something out of the not very favourable living and economic conditions in this region. Developing into a model region for economic activity in harmony with nature gives us an opportunity to add value gradually and so prevent people from leaving the Walsertal, maybe even reverse the trend. This needs good expert advice but also some regional people who burn for the idea and carry it further. As farmer, family man, regional politician and member of the provincial assembly, I was very well suited for this task, but a mayor or someone else could take on this role as well. Of course, there is still a lot to do here and some situations are hardly encouraging. I am sure, however, that we are on the right path. Setbacks slow us down but they do not deflect us from our path. I would like to encourage anyone who is working towards a UNESCO designation. To me a biosphere reserve is a suitable instrument for getting the regional development in an underdeveloped region going. It always takes a lot of effort and it may be hard going sometimes when you are on a steep path, but this feels good when you have a goal in mind and this is true just as much for your personal path as for the path of a whole region. You can only reach the lower and the higher peaks if you decide to go walking in the first place. From my experience I can only say, **“Get going, it is worth it!”**

Biosphere reserves – requirements and reality

In the 1970s, the United Nations started the MAB programme as a purely scientific programme, but from the start the emphasis was on the multifunctional character of the designated areas. Apart from research, the conservation and sustainable use of biodiversity was to be central, but ideas on how to realise such aims were vague. In the beginnings, biosphere reserves with their strictly protected unused core zones were often interpreted as instruments of “classic” conservation. Many existing large national parks applied for the international designation. New areas were integrated with the aim to turn them into long-term research sites. Only in its Seville Strategy in 1995 did UNESCO make it clear that its objectives for this conservation category were far more ambitious. Biosphere reserves were to serve as testing grounds for trying out sustainable forms of use and so to safeguard the livelihood requirements for further generations. To this day, however, claims and reality can be far apart and Austria is no exception.

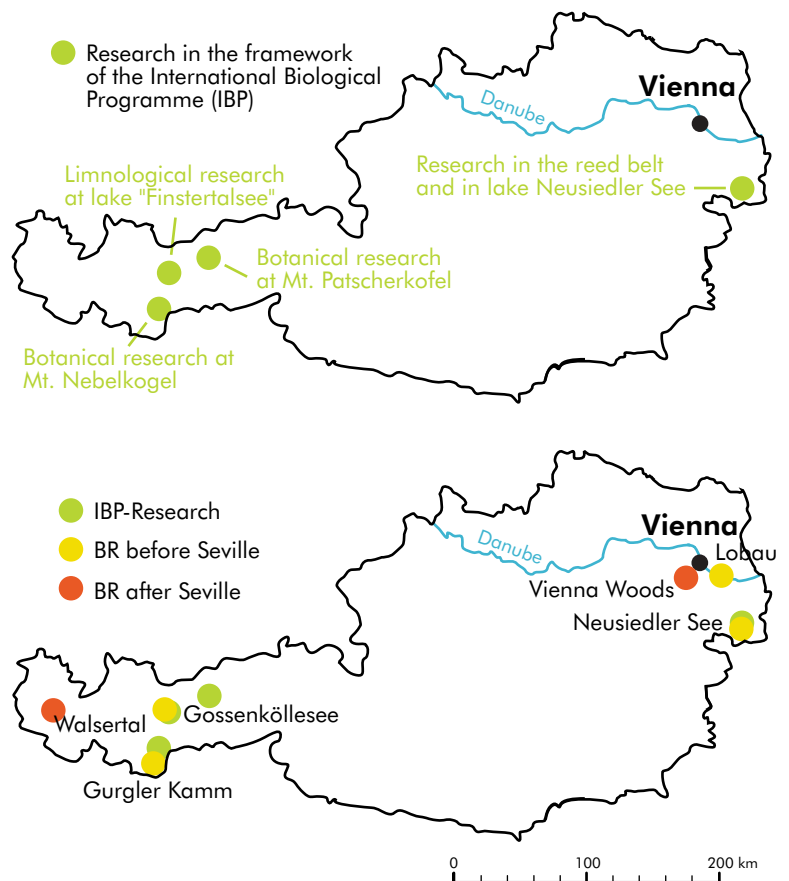
Playgrounds for researchers

Four of the Austrian biosphere reserves were designated as far back as 1977. At that time, early on in the MAB programme, classic conservation thinking still dominated. Representative ecosystems world-wide were to be protected and maintained as trial areas for internationally co-ordinated research projects. When the MAB Science Programme was initiated in the early 1970s, the “International Biological Programme (IBP)” was about to be wound down. Until 1974, in the course of the Austrian part of the IBP, projects were carried out successfully in the Neusiedler See (Burgenland) and its reed belt, and in Tyrol at Mt. Nebelkogel in the Stubai Alps, on Mt. Patscherkofel in the Tuxer Alps and on various high mountain lakes such as the Finstertaler See near Kühtai. The MAB programme in Austria was meant to continue the IBP

research in extended form. Early on Austria participated mainly in the core research themes limnology and mountain ecology of the new UNESCO programme. Therefore the initiative for setting up the four biosphere reserves came mainly from the researchers. Prof. Heinz Löffler (Neusiedler See, Lower Lobau) and Prof. Walter Moser (Gurgler Kamm, Gossenköllesee) are seen as the main initiators of the earliest nominated biosphere reserves.

Research versus regional development

The Gossenköllesee, at 85 ha the smallest biosphere reserve world-wide, is to this day exclusively reserved for research. The limno-



The MAB programme allowed the continuation of the research activities which were started within the framework of the “International Biological Programme (IBP)”. The “first generation” biosphere reserves were initiated mainly by scientists to protect their favourite research areas for long-term investigations.

logical station on its shore provides important long-term data for environmental monitoring in alpine areas. The only form of land-use is grazing by sheep. A skilift stops shortly before the edge of the biosphere reserve.

The areas Gurgler Kamm, Untere Lobau and Neusiedler See can, with hindsight, be seen as seeds for the later establishment of national conservation categories in the area of those biosphere reserves. 90 per cent of the biosphere reserve Gurgler Kamm lies in the “Ruhegebiet (tranquillity zone) Ötztaler Alps”, established in 1981. “Tranquillity zone” is a special category in the province of Tyrol. Away from noise and bustle, people should find particularly good recreation there, therefore traffic and the operation of cable-cars are not permitted in these areas. In the eastern UNESCO areas, the later established national parks “Donau-Auen” (Lower Austria, since 1996) and “Neusiedler See” (Burgenland, since 1993) are much better known than the biosphere reserves. All educational, scien-

tific and conservationist activities are co-ordinated by the management of the national parks. There is a partial overlap in the tasks of national parks and biosphere reserves, such as preserving diversity of flora and fauna in the protected core zones. In other areas, however, the different objectives are clearly in conflict with each other. Whereas nature in national parks is meant to develop freely without any utilisation, the concept of biosphere reserves expressly includes human economic activity. In the buffer and transition zones, forward-looking development solutions that take into account the requirements of nature and of man are being worked out in close co-operation with the local residents.

The „old generation“

In general the Austrian areas are too small to fulfil the many and varied tasks of a biosphere reserve. German guidelines recommend a minimum size of 30,000 ha. Only Vienna Woods, the brand-new addition to the Austrian biosphere reserves, is that big. The areas nominated in 1977 were not zoned, but at Neusiedler See the core zone of the national park was designated core zone of the biosphere reserve retrospectively. With the exception of Großes Walsertal and Vienna Woods, Austrian UNESCO regions are not inhabited which means that there are no transition zones. The local residents of the nearby communities usually are not aware of the existence of a biosphere reserve in their region. Hence the “old” areas do not yet fulfil the requirements of the international guidelines of the Seville Strategy. Extending and zoning these areas retrospectively is possible and desirable in all cases.

A turnaround after Seville

In the Großes Walsertal the situation is completely different. This was the first biosphere reserve in Austria to be designated after Seville

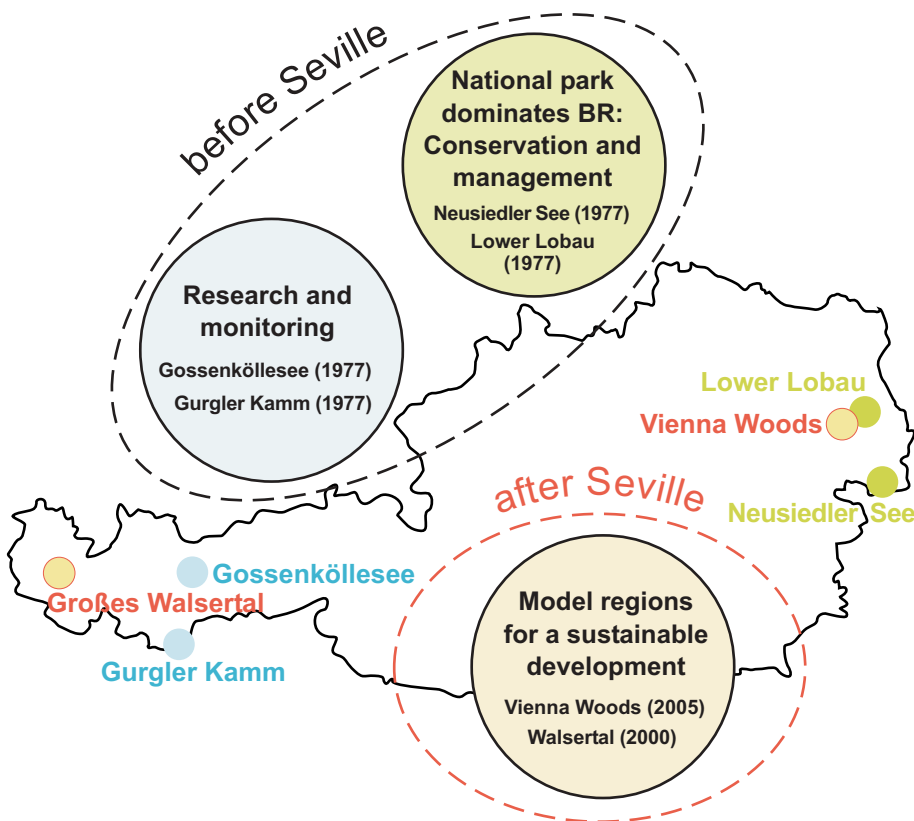
In 1996, the German MAB National Committee decided to draw up their own national “criteria for the recognition and auditing of biosphere reserves”. These are based on the UNESCO action plan of 1984 and the Seville Strategy of 1995. They define international settings and more specifically help with planning new and developing existing biosphere reserves in Germany. According to these criteria, UNESCO areas should have at least 30,000 ha but not exceed 150,000 ha. Each biosphere reserve must be subdivided into core, the buffer and transition zones. The core zone must cover at least three per cent of the total area, buffer zone at least ten per cent. Put together, core and buffer zones should take up at least a fifth of the total area. The transition zone, i.e. the area in which people live and work, should make up half the total area. The German criteria can be ordered from the German Federal Agency for Nature Conservation in Bonn (www.bfn.de/05/0506.htm) or downloaded from the following web site: <http://www.biosphaerenpark-wienerwald.org>, see Service, Downloads.

Up to now the German criteria were often used in Austria. Currently, the MAB National Committee is developing Austrian criteria for biosphere reserves adapted to the specific cultural and natural circumstances here.

and it was hoped that the international label will encourage sustainable development in the region. The inhabitants see this as their only chance of preserving the alpine valley for future generation as an area in which you can earn a livelihood. From the start the biosphere reserve concept was developed in cooperation with the residents. This led to formulating a common vision that sums up the basic aims of the six affected communities. In the two core zones, the two conservation zones “Gadental” and “Faludriga-Nova”, biodiversity conservation has priority. Only hunting and alpine grazing as traditional forms of land-use are permitted even in the core zones.

Three categories in Austria

The Austrian biosphere reserves can be divided in three categories: research and monitoring sites (Gossenköllesee and Gurgler Kamm), conservation areas in which the UNESCO designation is overlapped by national park activities (Neusiedler See and Lobau), and, lastly, model regions for sustainable development (Walsertal and Vienna Woods). The first two categories are “old generation” biosphere reserves which were designated almost 20 years before Seville. In these areas the international guidelines of UNESCO have so far been insufficiently implemented.



The biosphere reserves in Austria can be divided into three categories: research and monitoring sites, conservation sites influenced by national parks and model regions for sustainable development.

Graphic: Sigrun Lange

Biosphere reserves – opportunities in the age of globalisation

From agrarian state to service society

As recently as ca. 150 years ago, three quarters of the Austrian population were still farming people. Since then the former land of peasants has transformed itself into a highly developed industrial and service society. In 1999, in the most recent agrarian structure survey, only some 215,000 economic units were counted in agriculture and forestry. Nearly 60 per cent of them are run as a side-line. Agriculture and forestry, once the major economic factor, today contribute just two per cent to gross domestic product (GDP). In modern Austria industries such as mechanical engineering and steel, chemistry and automotive engineering provide new sources of income. The strongest motor of economic development however is the service sector. The tertiary sector contributes 65 per cent and therefore the largest share to GDP. Many fear that increasing globalisation and the opening of the markets that goes with it will increase pressure on Austrian farmers. Fear is also fuelled by the current eastwards expansion of the European Union. Meat and milk producers and cereal farmers fear disadvantages from having to compete with fertile soils and low production costs in neighbouring countries to the east. Primary production would so move further eastwards.

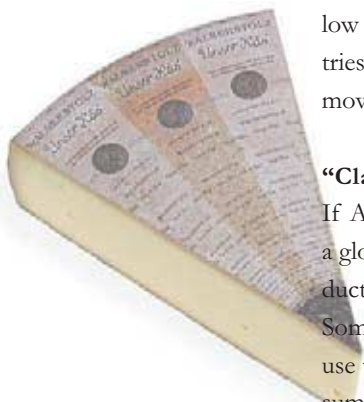
“Class not mass”

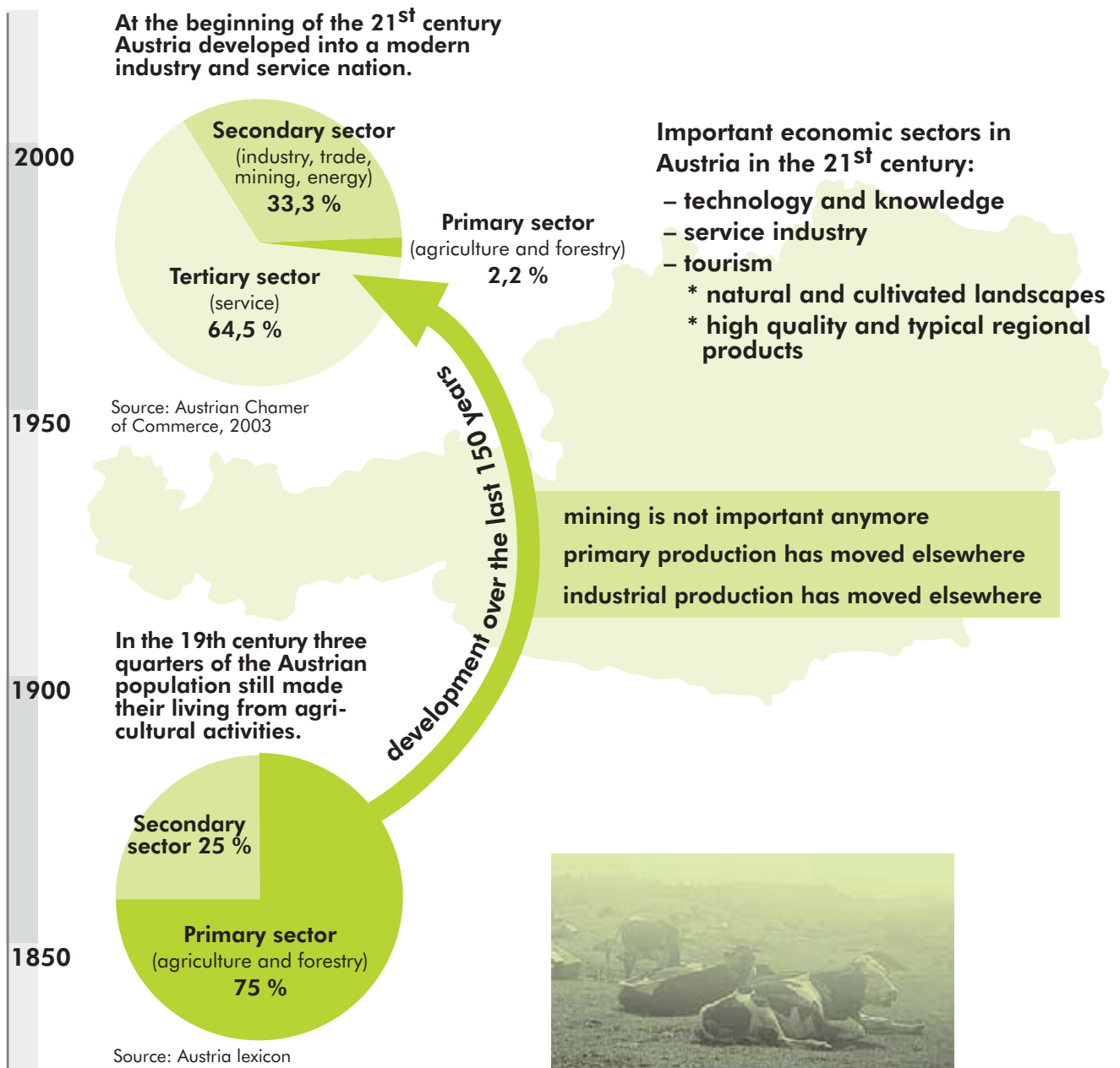
If Austrian agriculture is to hold its own in a globalised world, then regional quality products must become the focus of marketing. Some consumer groups do of course mainly use the budget food market, but many consumers are becoming more and more food conscious. Insecurity caused by food crises such as the bovine epidemic BSE or gene-manipulated foods are fuelling interest in organically produced and high-quality pro-

ducts. Strong health consciousness is also evident in current trends such as the “Slow Food Initiative: take time to enjoy” or in numerous “wellness” offers to pamper body and soul.

Impetus for regional development

Against the background of such changed economic realities it seems crucial to see biosphere reserves first and foremost as an opportunity for man and nature. The concept of an international conservation category can help to support regions, preserve their peculiarities and secure their long-term existence. The brand label “biosphere reserve” enhances the image of a region and strengthens the identity and confidence of its population. “Walserstolz” (pride of the Walsertal) is the name of a flavourful cheese made in the Großes Walsertal from unpasteurised milk. Early involvement of the population in the development of a biosphere reserve, as it happened in the planning phase of biosphere reserve Vienna Woods, triggers intense discussions. The various interest groups exchange information and add to the total knowledge and know-how. Biosphere reserves are globally linked and the regions involved benefit from this international embeddedness. The designation can also be linked to specific quality criteria in order to appeal to new customer groups and bring a competitive advantage for the local produce. This way more can be sold and at a higher price as the example of the nature park Pöllauer Tal shows: ten years ago, one litre of fruit schnapps cost the equivalent of three to five euros. Rigorous quality control and a brand label made it possible to raise the price roughly fivefold. Pöllauer Obstler schnapps is sold today at 30 to 35 euros a litre.





Austria has changed over the last 150 years from an agrarian state into a modern industrial and service sector society. Agriculture and forestry now play a much smaller role. The diverse cultural landscapes today do not primarily serve to produce food but add value for the region as recreation areas and holiday destination. Moreover they play a special role in diversity conservation.

Graphic: Sigrun Lange



Meadows with flowering fruit trees increase the attractiveness of a landscape for tourists.

Photo: Gerhard Dullnig

The regions become better known and more attractive to tourists who are interested in natural landscapes and traditional ways of food production. This opens up new opportunities for agriculture. Where farmers in rural areas used to be exclusively responsible for producing food, many earn an additional income today from a broad spectrum of activities. Measures such as direct sales channels, producing specialities that are typical for the region or organising activity shopping on the farm play an important role today. Some farmers provide raw materials for further processing in the production of attractive products, for instance growing dye plants for natural wool dyes. The special wool products complement the regional market. Special tourist packages such as farm holidays are another important economic factor. According to figures from the Ministry for Agriculture, Forestry, Water and the Environment, one in five Austrian tourist establishments is run by a farming family (figures from 1999). Nature tourism has become an essential part of the global tourist industry. According to

a guest survey in Austria from the year 2000, two thirds of the people interviewed were looking mainly for recreation in their holiday. Half are keen to walk in natural surroundings. The rural areas of Austria's mountainous regions with their unspoilt natural landscapes therefore represent an immense value for society. If this is to be retained, the farmer as food producer must increasingly take on the task of looking after nature as well. In some areas the farmers are being paid compensation for environmental services such as keeping the landscape open through mowing, maintaining trees and hedges or extensive grazing. Often this makes up a bigger share of their income than traditional food production.

The apple initiative in the biosphere reserve Rhön (Germany)

As recently as the mid-20th century the Rhön area was considered the poor house of Germany. After the Second World War the upland area was cut in two by the Iron Curtain, hampering economic recovery. Lacking economic perspectives, many people left the region. In 1991, UNESCO designated the Rhön as multi-Länder biosphere reserve with the federal states Bavaria, Hesse and Thuringia each having a share in it. The evolved cultural landscape was to be preserved and the local population was to get a stake in the future. The international label should add value to the region. A successful example of this happening is the "Rhön Apple initiative". From the 1970s onwards, dehiscent meadows, which had formerly been ubiquitous, were drastically reduced. In 1996, the association "Rhöner Apfelinitiative e.V.", which had been formed in the previous year, initiated a survey of all varieties of pomiferous fruit in the region. With eager involvement of the local population, 170 varieties of apple, 12 varieties of plum and 38 varieties of pear were identified, many of them old varieties. Since then the local fruit press has been producing organic Rhön dehiscent apple juice. From that start grew a wide product offering including apple cider, sparkling apple wine, apple sherry, cider vinegar and even a type of shandy of apple juice and beer. In Fulda, a workshop of handicapped people is producing dried apple rings that are marketed as apple crisps. Currently the demand for pesticide-free Rhön apples exceeds supply.

Why a biosphere reserve in the Vienna Woods?

by Dr. Gerfried Koch, Forestry Department of the provincial government of Lower Austria

The Vienna Woods are a precious natural and cultural landscape. Various types of forest make up one of the largest contiguous woodland areas in Europe. The interaction of forest and meadow makes the richly structured cultural landscape a hotspot for diversity of species and habitats. But the Vienna Woods are also a traditional living, working and recreational space, delicately balanced between the metropolis Vienna and the natural landscapes of Lower Austria. For decades the future of the Vienna Woods has been debated and the search was on for an effective conservation and development concept. In 2002, the Vienna Woods celebrated their millennium and a scientific investigation was commissioned to answer the key question, which conservation category is feasible, possible, sensible and effective for the Vienna Woods – national park or biosphere reserve?

For centuries, the Vienna Woods have been used for agriculture and forestry. Still, there are some near-natural areas, but they are spread over the entire Vienna Woods area. Hence the designation of large contiguous national park core zones is not an option. Particularly problematic is the spatial separation of potential core zones by the Vienna Woods motorway. The main function of a national park is the strict protection of natural habitats. This conservation category would therefore not cover the species-rich man-made meadows of the Vienna Woods. In addition to natural history type arguments, the settlement structure, the recreational pressure and the traffic infrastructure are decisive factors when weighing up the options. More than 700,000 people live in the Vienna Woods and over two million people use the region every year in search of recreation. Taking into account the IUCN criteria, the natural habitat and infrastructural conditions and the manifold usage claims on the area, it became clear that a national park for the whole of the Vienna Woods was not an option.

In contrast to a national park, a biosphere reserve gives equal weighting to the preservation of cultural and natural landscapes. This makes the biosphere reserve concept fit the Vienna Woods like a glove and it can be implemented for the area as a whole. It supports the comprehensive integration of existing conservation spaces (nature reserves, natural forest reserves, Natura 2000 area, nature parks, etc.) and takes into account the special characteristics of the Vienna Woods. A biosphere reserve also promises opportunities for economic success for its population while maintaining a high quality of living in the long term. The interaction of agriculture and forestry, recreational use and tourism as well as economic and cultural activities will open up new perspectives. The biosphere reserve Vienna Woods is an important instrument for sustainable regional development. It will link up initiatives of the regional economy better and support innovative new projects. Participation, co-operation and marketing will make the Vienna Woods a model region for a fusion of utilisation development and conservation. The economic and social opportunities for the region include: enhanced image from the label "biosphere reserve", strengthening of the regional identity, preservation of the cultural landscape as a resource for agriculture and forestry, better quality provision in tourism and other sectors, higher employment due to economic impulses, additional income for the communities and improvement of the local infrastructure. The benefits of a biosphere reserve for the Vienna Woods will be all the more strongly felt if the people of the region together fill the project with life.



Dr. Gerfried Koch works for the provincial government of Lower Austria and was involved in the planning process of biosphere reserve Vienna Woods.

Biosphere reserves as early warning systems for environmental change

In 2002, at the beginning of August, heavy rain in Austria, Germany and Italy caused severe flooding which came to be known as “the flood of a century”. A year later there were record high temperatures. Weather forecasts offer superlatives from both ends of the spectrum. It is also certain that alpine glaciers are melting. Between 1850 and 1975 they lost on average roughly a third of their surface extension and half of their volume. Since then a further 20 to 30 per cent of the ice volume have melted. The climate is changing, as it has done since the beginning of the planet. Still, over the last few years “global warming” has been the stuff of intense societal debates.

In the last century, temperatures rose on global average by about 0.6 degrees Celsius, the fastest rise in the last 1000 years. What is new, apart from the speed of the temperature rise, is the link between climate change and the change in the chemical composition of the atmosphere caused by man. Activities such as burning fossil fuels, clearing large forest areas and the use of mineral feeds in agriculture contribute to the increase of various greenhouse gases in the atmosphere. The concentration of carbon dioxide has now stabilised at an average level of 360 ppm. In an attempt at taking on responsibility for its actions, the international community committed itself in the Kyoto Protocol to reduce its future emission of greenhouse gases. Austria has ratified the agreement already. It does not come into force however, until all 55 states, which together cause more than 55 per cent of the carbon dioxide emissions (relative to the year 1990), have ratified the agreement. With or without agreement, experts forecast a further rise in the average temperatures by two to five degrees Celsius over the next decades.

Such warming changes existing ecosystems. The tree line in the Alps is rising, butterflies move to more northern regions, plant growth is affected by more intense UV-light and longer growth periods. Many plant and animal species can move fast enough to cope with the expected climate change, but this is only true where large natural ecosystems exist. It is as yet unclear how the fragmentation, separation and sealing off that are typical of modern landscapes will affect adaptability. A further loss of species diversity is to be feared.

Against this background, biosphere reserves world-wide offer ideal situations for monitoring the impact of global environmental changes such as climate change, immission

1895



1999



The glaciers retreat worldwide. The photographs show Rotmoos glacier in the biosphere reserve Gurgler Kamm in the Ötztaler Alps – a comparison of the years 1895 and 1999.

**Top: Photo W. Paulcke from the journal of the DÖAV, 1895
Bottom: Photo Rüdiger Kaufmann, 1999**

of pollutants, etc. They can be found from the poles to the tropics, at sea level or at icy heights and cover a spectrum of diverse natural spaces and areas changed by man. This enables comparative studies and an analysis of regional differences. The socio-economic conditions in those UNESCO designated areas vary greatly. The global network includes remote regions as well as areas on the outskirts of cities. Biosphere reserves therefore represent a testing ground for studying the impact of climate change on agriculture and forestry, tourism and settlement. With the help of suitable indicators, the global network of biosphere reserves can serve as an early warning system and provide clues to the impact on species diversity, the distribution of species in natural

habitats and the general condition for agricultural production. Highland ecosystems with their extra wide spectrum of ecological niches have proved to yield a wealth of information. Hence the Mountain Research Initiative (MRI) together with the MAB-programme has started a monitoring programme in 26 mountain biosphere reserves world-wide (see also information below).



The impressive boulders „Torres del Paine“ in Chile belong to a biosphere reserves which was chosen as monitoring site in the MRI-MAB-initiative.

Photo: Sigrun Lange

MRI-MAB-Initiative GLOCHAMORE: environmental monitoring in mountain biosphere reserves

In the last few years the term “greenhouse effect” has become widely used. Headlines such as “Climate change threatens biodiversity”, “Island states are sinking into the sea” or “We are running low on drinking water” can be read almost daily. While the global community is struggling to reduce emission of greenhouse gasses, another initiative seeks to document the impact of global environmental changes on habitats. Monitoring stations are being set up all over the world or existing ones linked with each other to serve as early warning systems for the impact of global climate change or the changed immission of pollutants. Mountain and highland ecosystems are ideally suited for this endeavour. Meteorological, hydrological and ecological conditions change considerably within compact areas over altitudinal gradients and biodiversity is particularly high in such places. In 2001 therefore, the global monitoring network GLORIA (Global Observation Initiative in Alpine Environments) was set up and 18 mountain regions in Europe joined the pilot project. The Mountain Research Initiative, in co-operation with UNESCO, has now developed a new programme to build up MAB relevant research in biosphere reserves world-wide: GLOCHAMORE (Global Change Research in Mountain Biosphere Reserves).

The MRI is a network of interdisciplinary scientists focusing on mountain research. The researchers benefit from the infrastructure and stock of data already existing in the biosphere reserves. The subdivision of the UNESCO-model regions in core areas, buffer zones and transition areas is another advantage and allows comparison of natural ecosystems with areas in which humans have had an impact. The kick-off meeting of the science co-operation took place in November 2003 in Entlebuch, Switzerland. There 26 biosphere reserves from all climatic zones world-wide were chosen for inclusion in the project. For a start, GLORIA stations are to be set up in all these reserves or have already been set up, for instance in Glacier National Park, Montana, USA, or in Snow Mountains, Australia). Over the course of the project further areas can be integrated. Currently tropical mountain ranges like Mt. Kenya as well as the rocky massive Torres del Paine in southern Patagonia or the mountain range Sierra Nevada in the mediterranean are all part of the network. In Austria, two areas were included in the project as environmental monitoring stations: Gossenköllesee and Gurgler Kamm (both Tyrol). Both areas boast a long history of research activities in mountain habitats. Extensive data are available, for instance from the limnological research station at Gossenköllesee, which has been collecting climatic data for 30 years.

The relevance of biosphere reserves in mountain ecosystems

Interview with Dr. Thomas Schaaf from UNESCO's MAB programme



Dr. Thomas Schaaf is an assistant within the MAB programme at the UNESCO office in Paris. The geographer with a research focus on high mountain and arid ecosystems, sustainable development and conservation works for the Division of Ecological and Earth Sciences.

The „International Year of the Mountains“, proclaimed for 2002 by the General Assembly of the United Nations, increased global awareness on mountain ecosystems. You co-ordinated the respective UNESCO activities. Why was international attention directed to the mountains of the world?

Mountains occur in all world regions and on all continents. They are an important source for biological diversity, water and energy. Moreover, they are a source of such key resources as minerals, forest and agricultural products and of recreation. Mountain ecosystems are, however, also vulnerable ecosystems which are rapidly changing: they are susceptible to accelerated soil erosion, landslides and rapid loss of habitat and genetic diversity. On the human side, there is widespread poverty among mountain inhabitants, in particular in developing countries, and loss of indigenous knowledge. As a result, most global mountain areas are experiencing environmental degradation. Hence, the proper management of mountain resources and the socio-economic development of the people in mountains deserve our full attention and action. Within the science mandate of UNESCO, our interest was – and still is – to sensitize the world population to the specific problems that mountains and their inhabitants are confronted with, for example to the need to conserve mountain environments and their biological diversity from a scientific point of view and to carry out studies thereon, while at the same time to promote sustainable development in mountain regions.

How can the protection of these vulnerable ecosystems be guaranteed?

Experience has shown that the outright protection of mountain ecosystems (e.g. by creating a national park) does not always work in the

way we would like it to work, especially when a given area of land is taken away from people who have economically used the area for hundreds if not thousands of years. Inevitably, land-use conflicts with local people may then come to the fore. This is why UNESCO, under its scientific „Man and the Biosphere (MAB) Program“, has created a more conservation-cum-development oriented approach, which has become known as the „biosphere reserve concept“: some areas that have a high conservation value are legally protected in a core zone, and other areas – we call them buffer and transition or development zones – are earmarked for land-use practices that are in line with conservation objectives, such as eco-tourism, organic farming, marketing of local and handicraft products etc. This approach allows people who inhabit a biosphere reserve to live and to make a living in line with sustainable development, and the land-use pressure on the protected core areas is reduced as people benefit from alternative income opportunities. An integrated management plan of the entire site, the protected and the non-protected areas, in outright collaboration with local authorities, people and scientists will help to better safeguard areas of high conservation value.

Do biosphere reserves play an important part in the conservation of biological and cultural diversity in mountain regions?

It is very interesting to note that mountains have a high biological diversity which is mainly due to the fact that habitats change significantly with altitude and temperature, and also exposition to the sun. Due to the rugged terrain, access to and within mountains is often difficult for human beings so that plant and animal species have been preserved in remote mountain areas. At the same time, cultural diversity

is also high in mountainous regions, as access restrictions „from one valley to the other“ have often led to reduced interaction between communities in different valleys. Local customs, traditions, language and even religion may differ widely from one mountain community to the other within the same mountain range. More and more, the cultural and biological diversity of mountain biosphere reserves is being recognized as two sides of the same coin which are interlinked, in particular if you consider traditional agricultural and land-use practices that may differ from one community to the other. UNESCO tries to assist with the conservation of biological and cultural diversity by instituting holistic management schemes. One possibility in this respect is eco-tourism in mountain biosphere reserves in which visitors do not only enjoy the scenic beauty and wildlife of mountains, but also get to know and to respect specific mountain cultures. UNESCO is currently running a pilot project on „Sustainable cultural eco-tourism in mountain regions of South and Central Asia“, and we hope to apply the experience gained also in other world regions.

How many of the 482 biosphere reserves worldwide are situated in mountain areas?

About 40 per cent of all 482 biosphere reserves are located in mountains, in particular in the Andes, the Rocky Mountains, the East African highlands, the Alps, but also in the Asian and Central/Eastern European mountain ranges.

In co-operation with other institutions UNESCO’s MAB programme recently started a study on the impact of global climate change, involving biosphere reserves as monitoring sites. In Austria, the biosphere reserves Gossenkölle See and Gurgler Kamm were identified as potential

monitoring sites. Which new findings do you expect from this research co-ordination?

Mountains are very sensitive indicators for assessing the impact of global change. Differing precipitation regimes and rising temperatures will lead to glacial variation (mainly glacial retreat), and flow regimes of water in mountains will be affected. With rising temperatures, it is expected that certain plant and animal species will have to move to higher altitudes leading to enhanced competitive pressure for species at higher elevation levels. Moreover, global change will also have repercussions on the socio-economic conditions of mountain people (e.g. affecting the winter tourism industry in the industrialized countries or agricultural growing seasons in developing countries). For this reason, we wish to utilize biosphere reserves worldwide to monitor and assess the impact of global change on the biophysical environment and the livelihoods of mountain dwellers. UNESCO is very happy that biosphere reserves such as Gossenkölle See and Gurgler Kamm in Austria join this project as monitoring sites. It is essential, however, that also biosphere reserves in developing countries join the project so as to have a global coverage of the impact assessment of global change. They could benefit from the research experience of biosphere reserves and scientists in Austria so that the relatively dense global change observation and monitoring system that already exists in the northern hemisphere can be complemented data and expertise from the southern hemisphere. Only if we have a global monitoring coverage can we fully assess the impact of global climate change on our planet.



Mt. Kenya in Africa (top) and lake Gossenköllesee in Austria (below) share one characteristic: Both high mountain environments are integrated in a monitoring system to indicate the impact of global climate change on our planet at an early stage.

Photos: Sigrun Lange (top) and Roland Psenner (below)